INITIAL STUDY/MITIGATED NEGATIVE DECLARATION

for the

HUME SOCAL CAMPGROUND EXPANSION PROJECT

Lead Agency:

County of San Bernardino
Land Use Services Department
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Applicant:

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1.0 INTRODUCTION & PURPOSE

1.1 Purpose and Scope of the Initial Study

In accordance with the California Environmental Quality Act (CEQA) (California Public Resources Code [PRC] Section 21000 et seq.) and its Guidelines (California Code of Regulations [CCR], Title 14, Section 15000 et seq.), this Initial Study/Mitigated Negative Declaration (IS/MND) has been prepared to evaluate the potential environmental effects associated with the construction and operation of the Hume SoCal Campground Expansion Project (Project).

Per State CEQA Guidelines, Section 15070, a public agency shall prepare or have prepared a proposed negative declaration or MND for a project subject to CEQA when:

a) The initial study shows no substantial evidence, in light of the whole record before the agency, that the project may have a significant effect on the environment, or

b) The initial study identifies potentially significant effects, but:

   1) Revisions in the project plans or proposals made by, or agreed to by the applicant before the proposed mitigated negative declaration and initial study are released for public review would avoid the effects or mitigate the effects to a point where clearly no significant effects would occur, and

   2) There is no substantial evidence, in light of the whole record before the agency, that the project as revised may have a significant effect on the environment.

1.2 Summary of Findings

Section 3.0 of this document contains the Environmental Checklist that was prepared for the Project pursuant to CEQA requirements. The Environmental Checklist indicates that the Project would not result in significant impacts with the implementation of mitigation measures, as identified where applicable throughout this document.

1.3 Initial Study Public Review Process

The IS and a Notice of Intent (NOI) to adopt an MND will be distributed to responsible and trustee agencies, other affected agencies, and other parties for a 30-day public review period.

Written comments regarding this MND should be addressed to:

Elena Barragan, Senior Planner
Land Use Services Department
County of San Bernardino
385 North Arrowhead Ave
San Bernardino, CA 92415

1.4 Report Organization

This document has been organized into the following sections:

Section 1.0 – Introduction and Purpose. This section provides an introduction and overview describing the conclusions of the Initial Study.

Section 2.0 – Description of Proposed Project. This section identifies key Project characteristics and includes a list of anticipated discretionary actions.

Section 3.0 – Initial Study Checklist. The Environmental Checklist Form provides an overview of the potential impacts that may or may not result from Project implementation.

Section 4.0 – Environmental Evaluation. This section contains an analysis of environmental impacts identified in the environmental checklist.

Section 5.0 – References. The section identifies resources used to prepare the Initial Study.

2.0 DESCRIPTION OF PROPOSED PROJECT

2.1 Project Background, Location, and Setting

The Hume SoCal Campground Expansion Project is a proposal to enlarge the existing Hume SoCal Campground from the existing campground size of approximately 107 acres to approximately 252.1 acres – an addition of approximately 145 acres. The existing Hume SoCal Campground, owned by Calvary Chapel, currently accommodates approximately 300 persons, including both campers, camp staff and facility/office staff. The proposed expansion of Hume SoCal Campground and the increase in camp facilities would allow the Project to accommodate an additional approximately 2,700 persons for a maximum of approximately 3,000 campers, camp staff and facility/office staff.

The County of San Bernardino (the "County") originally approved the Hume SoCal Campground Conditional Use Permit (CUP/90-0027/M322-13) in 1991 for the campground use, and an amendment in 1993, which included permitting requirements for an on-site Natural Lined Pond. The approval of the CUP allowed the owner/ operator ("the applicant") to conduct campground activities with a maximum occupancy of approximately 300 persons. The applicant has been operating continuously since receiving the County's initial approvals.

The Project applicant would continue to use the existing campground structures during the development of the additional phases of development and buildout of the campground recreational structures within the Project site. The new campground facilities proposed for the Project would be developed in five phases. Each phase would include the development of expanded infrastructure, additional amenities, support structures, and buildings necessary to accommodate expanded camper capacity, paved parking areas, and access roadways. It is important to note that roads, camp and support structures, and parking areas have been specifically designed and clustered out of sensitive habitat areas, and to reduce impacts to stream beds or natural waterways, to preserve open space within the Project site. The unique character of the Project site and relationship with the natural open space is what guides the development and design standards (i.e., lighting standards, architecture style of the buildings, etc.), to enhance the campers' experience with nature.

To implement the Project, an amendment to rescind and replace the previously approved Planned Development Permit (PDP) with a new Preliminary Development Plan, Final Development Plan (FDP), and a Lot Line Adjustment/Lot Merger are required to be prepared and submitted to the County for review and approval. Per the County's Development Code (Chapter 85.10), PDPs are appropriate on and prepared for sites with unique site characteristics, such as difficult topography (i.e., varied terrain, steep slopes, etc.), to establish enhanced development standards that will be applied to the Project to enable more efficient land use of the Project site. Implementing these standards will ensure a consistent quality in design throughout the established community. The County has determined that an updated PDP is appropriate for the Project site.

Historical Background

At the start of the 20th century, the Green Valley Lake Christian Camp at the existing Hume SoCal Campground site was initially utilized as a logging camp called Lightning Dale. Much of the timber from the property was used to build crates for orange groves and provide wood for the Town of San Bernardino. In the 1940s, the grounds were home to Larry's Boys Camp because of its scenic hiking trails in the San

Bernardino National Forest. During this time, springs and wells still on-site were built. The Boy Scouts of America purchased the property and utilized the grounds for their Boy Scout camp from 1950-1980.

Over time, the camp was abandoned and left in disrepair until the 1980s. Then on November 7, 1983 the Board of Supervisors approved a request by the Orange County Boy Scouts of America for an amendment to the Mountain Map and the Consolidated General Plan from Rural Conservation (RCN) to Hilltop Planned Development – 1/40(HT/PD-1/40) for a Preliminary Development Plan (PDP) to establish Camp Ahwahnee (PROJ Record PUD/82-0097) for up to 335 residential units on approximately 455 acres. On December 3, 1990, the Board of Supervisors approved a Conditional Use Permit (CUP) for Calvary Chapel of Costa Mesa and Boy Scouts of America to expand the campground facilities as part of the purchase of the campground facility. Later, in 1991, the Green Valley Camp was formed. In 2002, Calvary Chapel partnered with Hume Lake Christian Camps. The Land Use designation at the time remained within the HT/PD-1/40 designation that was established within the PUD/82-0097 Project. At present, Hume Lake Christian Camps are leasing the property in harmony with Calvary Chapel of Costa Mesa under the name "Hume SoCal." A portion of the site is currently developed with improvements that support the existing Hume SoCal Campground facilities. The remaining surrounding area, which includes the total approximate 252.1-acre campground, contains forest land.

The County of San Bernardino updated the Comprehensive General Plan in 2007 and amended the land use designation from HT/PD-1/40 to – Hilltop Special Development - Residential (HT/SD-RES). In 2020, the County went to a two-map system for the General Plan and zoning map, establishing the General Plan Land Use Designation as Rural Living, and retaining the zoning HT/SD-RES.

Project Setting

Project Location

The Project site is in the Green Valley Lake Community, an unincorporated community of the County's Mountain Region; refer to **Figure 1: Regional Location Map**. The Project site consists of Assessor Parcel Numbers (APNs) 0328-071-05, -07, -10, 0328-121-40, and -42. The Project site is approximately 14 miles north of downtown San Bernardino, approximately 50 miles northeast of central Orange County, and approximately 60 miles northeast of downtown Los Angeles. Green Valley Lake Road, the main access road to the Green Valley Lake Community, runs through the northeastern portion of the Project site. The Project site is approximately 0.4-mile northwest of State Route 18 (SR-18); refer to **Figure 2: Local Vicinity Map**.

As depicted by **Figure 2**, the Project site and its surrounding land uses are contained within an area confined within the San Bernardino Mountains in the San Bernardino National Forest with several surrounding lakes nearby. These lakes include the Green Valley Lake to the northeast, Big Bear Lake to the east, and Lake Arrowhead to the west. Deep Creek is located to the south, west, and northwest of the Project site and is state-designated as Wild Trout Waters. The U.S. Forest Service considers Deep Creek eligible for National Wild and Scenic River status in recognition of its scenic, recreational, cultural, historical, ecological, and wildlife values.

The area surrounding the Project site primarily encompasses public and private land. Surrounding the entirety of the Project site is the San Bernardino National Forest. The unincorporated communities of Green Valley Lake, Arrowbear Lake, Running Springs, and Skyforest are all within approximately five miles of the Project site. There are two privately owned campgrounds, Camp Pondo and Camp Cedar Crest, both located approximately one mile to the east, while the Green Valley Lake Recreation area is approximately

two miles to the northeast. Charles Hoffman Elementary School, in Running Springs, is the closest school to the Project site, at approximately two miles south of the Project site. This school is in the Rim of the World Unified School District (RIMSD).

According to the County's Development Code and the Countywide Plan (CWP), the Project site has a land use designation and zoning of Special Development Residential (SD-RES). This land use designation and zoning "provides sites for a combination of residential, commercial, industrial, agricultural, open space, and recreation uses." The Project would be consistent with this land use designation and zoning as the existing campground and proposed campground expansion qualifies as a recreation use. The Project site's land use category within the Hilltop (HT)/SD-RES zoning and designation is Rural Living (RL) per the Development Code of the CWP. The RL land use category primarily allows for the development of residential development. Typical uses within RL areas include residential uses, public and quasi-public facilities, parks, religious facilities, and schools.

The Project site is also in the Mountain Region of the County – and is in one of the County's 35 Community Plan areas – specifically the Hilltop Community Action Guide(HCAG) area. The primary purpose of the HCAG area is to guide the future use and development of land within the HCAG area in a manner that preserves the character and independent identity of the community. By setting goals and policies for the Hilltop community that are distinct from those applied Countywide, the HCAG outlines how the County will manage and address growth while retaining the attributes that make Hilltop unique. The Project would be consistent with established land use designation in the HCAG.

Topography and Geologic Setting

On-site topographic features include steep slopes and valleys, as depicted in **Figure 3: Topographic Map**. The Project area is in southern San Bernardino County within the San Bernardino Mountain range and the greater southern California Transverse Ranges. The San Bernardino Mountains separate the southern Mojave Desert from the inland valleys of southern California. The San Bernardino Mountains of the Transverse Ranges Geomorphic Province consists of east-west trending steep mountain ranges and valleys extending approximately 311 miles from Santa Barbara County to Desert Center in Riverside County. The San Bernardino Mountains are 59 miles long, bounded by Cajon Pass to the west and Morongo Valley near Desert Hot Springs to the east. Most of the mountains are underlain by Mesozoic granitic and volcanic rocks, with a minority consisting of metamorphic rocks from the middle Proterozoic.[1] Quaternary deposits within the mountains are restricted mainly to valleys and large canyons.

The northern part of the Project site is centered on a small upland valley, while the southern area is situated on two peaks. The peaks are approximately 6,640 feet (ft) above mean sea level (amsl), the valley floor is between 6,440 ft and 6,520 ft amsl, and the terrain overall, including the valley floor, is generally sloping. Two small drainages enter the valley from the northeast with channels incised into the valley floor as they transect the Project area and drain into Deep Creek located approximately 0.6 mile to the west.

Underlying bedrock consists of the Cretaceous monzogranite of Keller Peak, a coarse-grained biotite granite rock.[2] Outcrops are common throughout the Project area. Sediment accumulation and soil

[1] Chronical Heritage (formerly PaleoWest). 2023. *Cultural Resources Investigation of the Hume SoCal Campground Project, San Bernardino County, California*, page 9.
[2] Ibid.

development within the Project site is limited to the bench and saddle areas in the southern part of the Project site. Other portions are dominated by eroding colluvial deposits moving downslope into the creek system. The low gradient of the bench and saddle has permitted the formation of soils with thick organic surface horizons and the gradual accumulation of sediments transported into the area by sheet wash and runoff.[3] Soils within portions of the site have been disturbed and compacted by onsite and surrounding development, infrastructure, and dirt and paved roads. Most of the Project site consists of campground uses, including human disturbance associated with the existing Hume SoCal Campground use. The Project site includes driveways, landscaping, buildings, structures, pavement, and concrete.

The Mill Creek Fault line passes southeast to northwest approximately eight miles south of the Project site, and the San Andreas Fault line passes southeast to northwest approximately 11 miles south of the Project site. The fault is potentially active, but very little after-shock activity is expected due to the area's bedrock composition. The site is located in the upper portion of the alluvial-filled San Bernardino Mountains on younger alluvium deposited by the Mill Creek Fault, San Andreas Fault, Deep Creek, and Green Valley Creek.

Biological Setting

The Project site resides in the Green Valley Lake Community which is a part of the Hilltop Community Action Guide(HCAG). There are numerous lakes within the HCAG area including Green Valley Lake, Arrowbear Lake, and Deep Creek Lake. Deep Creek Lake is a state-designated Wild Trout Stream and is considered eligible for National Wild and Scenic River status due to its scenic, historical/cultural, recreational, and ecological values.[4]

The HCAG area provides important habitat to many species, including rare species such as the Rubber Boa and Lemon Lily.[5] The HCAG area consists of a biodiverse community of vegetation, fish, birds, reptiles, mammals, and other natural resources such as streams and lakes.

The mountains and foothills of southern California are home to approximately nine native species of fish, 18 amphibians, 61 reptiles, 299 birds, 104 mammals, 2,900 vascular plants, and an unknown number of non-vascular plants and invertebrate species. Wildlife habitat functions are maintained or improved, including primary feeding areas, winter ranges, breeding areas, birthing areas, rearing areas, migration corridors, and landscape linkages. Fish habitat functions are maintained or improved, including spawning areas, rearing areas, and upstream and downstream migration, where possible.

Vegetation

The Project site supports land that has undergone varying degrees of anthropogenic disturbance in association with the active campground onsite. Most of the Project site is undeveloped and undisturbed, and the level of disturbance increases with closer proximity to campground facilities, and roadways and paths that connect these facilities throughout the site. ELMT Consulting, Inc., conducted a Biological Resources Assessment in September 2023, which documents the existing conditions of the Project site.

[3] Ibid.
[4] California Department of Fish and Wildlife. 2022. *Designated Wild and Heritage Trout Waters.* https://wildlife.ca.gov/Fishing/Inland/Trout-Waters. (accessed October 2025).
[5] Ibid.

The Biological Resources Assessment is provided as **Appendix A1: Biological Resources Assessment**. Two vegetation communities were observed on-site: Mixed Conifer Forest and Willow Riparian Woodland. In addition, the site supports two land cover types that would be classified as disturbed and developed. The vegetation communities and land cover types, according to the Biological Resources Assessment, are described in further detail below.

Mixed Conifer Forest

The Mixed Conifer Forest plant community is co-dominated by conifer species such as Jeffry pine (*Pinus jeffreyi*), sugar pine (*Pinus lambertiana*), and bigcone Douglas-fir (*Pseudotsuga macrocarpa*), and supports lesser dominance of oak species such as California black oak (*Quercus kelloggii*) and canyon live oak (*Quercus chrysolepis*). Understories are variable, with some areas supporting dense understories of shrubs and a dense herbaceous layer, and some areas relatively lacking understories. Other common plant species observed in this plant community include bigberry manzanita (*Arctostaphylos glauca*), Sierra lotus (*Acmispon decumbens*), California false indigo (*Amorpha californica*), coffee berry (*Frangula californica*), diffuse groundsmoke (*Gayophytum diffusum*), California aster (*Corethrogyne filaginifolia*), woollypod milkweed (*Asclepias eriocarpa*), goldenstar (*Bloomeria crocea*), giant red Indian paintbrush (*Castilleja miniate*), mountain gooseberry (*Ribes montigenum*), Grinnell's beardtongue (*Penstemon grinnellii*), Bridge's penstemon (*Penstemon rostriflorus*), snowplant (*Sarcodes sanguinea*), western wallflower (*Erysimum capitatum*), giant wollystar (*Eriastrum densifolium*), yarrow (*Achillea millefolium*), common bracken fern (*Pteridium aquilinum*), woodland strawberry (*Fragaria vesca*), California fuchsia (*Epilobium canum*), and rainbow iris (*Iris hartwegii*).

Willow Riparian Woodland

The Willow Riparian Woodland plant community is consolidated to riparian areas along much of the middle and eastern portions of Drainage 1, where underlying substrates and immediate topography allows associated species to establish. This plant community is dominated by arroyo willow (*Salix lasiolepis*), Pacific willow (*Salix lasiandra*), Scouler willow (*Salix scouleriana*), and typically supports densely vegetated understories with a varied shrub layer and a robust herbaceous layer. Other common species observed in this plant community include yarrow, woodland strawberry, western columbine (*Aquilegia Formosa*), musk monkeyflower (*Erythranthe moschata*), seep monkeyflower (*Erythranthe guttata*), cardinal monkeyflower (*Erythranthe cardinalis*), broadleaf lupine (*Lupinus latifolius*), mountain pink currant (*Ribes nevadense*), silver maple (*Acer saccharinum*), quaking aspen (*Populus tremuloides*), soft rush (*Juncus effusus*), willow dock (*Rumex salicifolius*), watercress (*Nasturtium officinale*), willow herb (*Epilobium ciliatum*), perennial pepperweed (*Lepidium latifolium*), common water weed (*Elodea canadensis*), and fragile sheathed sedge (*Carex fracta*).

Disturbed

Disturbed areas are generally areas that have been subject to a high level of human disturbances from anthropogenic activities and no longer comprise a native plant community. These areas are unpaved and are primarily or entirely devoid of vegetation or support rural/weedy plant species. Disturbed areas observed within the boundaries of the Project site generally occur along roadways and campground recreational areas. Plant species occurring within these disturbed areas include Mediterranean mustard

(*Hirschfeldia incana*), rabbit's foot grass (*Polypogon monspeliensis*), canary grass (*Phalaris canariensis*), and Jimsonweed (*Datura wrightii*).

Developed

Developed areas generally encompass all buildings/structures, parks, and paved, impervious surfaces. Within the boundaries of the Project site, developed areas include campsite facilities such as lodging, administrative offices, recreational-use structures, water towers, roadways, and flood control infrastructure. These areas are largely devoid of vegetation or support only weedy/early successional species adapted to growing in such conditions, in addition to any ornamental vegetation that may be maintained with or without artificial irrigation.

Hydrology

According to Federal Emergency Management Agency (FEMA) Flood Insurance Rate Panel 06071C8000H (effective August 28, 2008), the Project site is located within "Flood Zone D", which corresponds with areas with possible but undetermined flood hazards.[6]

Existing Land Uses

The majority of the Project site is currently developed with improvements related to the existing Hume SoCal Campground facilities. The remaining surrounding area that includes the approximately 145-acre expansion contains forest land; refer to **Table 1: Existing and Surrounding Land Use**, below.

Table 1: Existing and Surrounding Land Use

Location	Existing Use	General Plan Land Use Category	Zoning	Overlays
Project Site	Existing Hume SoCal Campground	Rural Living (RL)	Hilltop Community Action Guide - Special Development Residential (HT/SD-RES)	Fire Safety (FS-1)
North	San Bernardino National Forest	Open Space (OS)	Hilltop Community Action Guide – Resource Conservation (HT/RC)	Fire Safety (FS-1)
South	San Bernardino National Forest	Open Space (OS)	Hilltop Community Action Guide – Resource Conservation (HT/RC)	Fire Safety (FS-1)
East	San Bernardino National Forest	Open Space (OS); Rural Living (RL)	Hilltop Community Action Guide – Resource Conservation (HT/RC); Hilltop Community Action Guide - Special Development Residential (HT/SD-RES)	Fire Safety (FS-1)
West	San Bernardino National Forest	Open Space (OS)	Hilltop Community Action Guide – Resource Conservation (HT/RC)	Fire Safety (FS-1)

[6] Federal Emergency Management Agency. 2008. *Flood Insurance Rate Panel Map No. 06071C8000H*. Available at https://msc.fema.gov/portal/search. (accessed February 2024).

Source: County of San Bernardino. 2020. *Countywide Plan Policy Map LU-1(A-E) Land Use Map* [Web Map]. Available at https://www.arcgis.com/apps/webappviewer/index.html?id=f23f04b0f7ac42e987099444b2f46bc2. (accessed February 14, 2024).

Existing General Plan Designations and Zoning Districts

The County approved and adopted an updated General Plan, referred to as the Countywide Plan or CWP, in October 2020. According to the County's CWP Land Use Policy Map (last updated in October 2020) and the HCAG, the Project site and adjacent properties are in the HT/RL land use category with the land use district of HT/SD-RES as determined by the County Land Use Zoning Districts Map which utilizes the standards of the HT/SD-RES land use designation for development. According to the CWP's Land Use Element, the primary purpose of the HT/RL land-use area is to develop residential development. Typical uses within RL land use areas include public and quasi-public facilities such as parks, religious facilities, and schools. The primary purpose of the HT/SD-RES is to allow a mix of residential, commercial, and public/quasi-public uses in rural areas that maximize the utilization of natural and human-generated resources. Typical land uses are for mixed-use development in rural areas and to support specific plans and master-planned development.

As stated above, the Project proposes a Planned Development amendment to rescind and replace the previously approved Planned Development Permit, (PUD/82-0097) for the expansion of campground uses at the existing Hume SoCal Campground to a total approximately 252.1 acres to allow for an additional approximately 2,700 persons. Per the County's Development Code, SD-RES zoned areas require a CUP for campground uses. Hume SoCal is operating under an existing CUP (90-0027/M322-13) that the County approved in 1991. Adjacent land use designations consist of the San Bernardino National Forest, which is a non-County jurisdiction, to the north, west, and south, and Resource Conservation (RC) and SD-RES to the east. To the south of the Project site, in the Arrowbear Lake Community, there are zoning districts as follows: Single-family Residence (RS), General Commercial (CG), Multiple Residence (RM), and some Resource Conservation (RC). To the north of the Project site is Green Valley, which consists of RS, SD-RES, CG, and Floodway (FW) zoning. The Project would be allowed to expand as proposed following the review and approval by the County of the updated new PDP and FDP.

The CWP designates safety overlay zones such as Fire Safety (FS) Overlays and roads and highways that are considered Scenic Roads & Highways. The entirety of the Project site is included in the FS Overlay, which designates areas as being in a Very High Fire Hazard Severity Zone (VHFHSZ). These areas are designated by the California Department of Forestry and Fire Protection. The Project site is specifically designated as Fire Safety Area 1 (FS-1)[7]. Consistent with the CWP and County's Development Code, these areas are subject to additional development standards to provide enhanced public safety protection in fire-prone areas. All proposed projects applications must be submitted to the responsible fire authority in accordance with the provisions of the County's Development Code. Additionally, the Project site is subject to the Scenic Routes & Highways[8] due to SR-18, SR-330, and Green Valley Lake Road/101 Mile Drive being designated as County Scenic Routes. This designation requires an approximately 200-foot buffer along Green Valley Lake Road and the Project would be subject to the CWP development requirements specific to the being near County Scenic Routes.

[7] "HZ-5 Fire Hazard Severity Zone." ArcGIS web application. Accessed December 29, 2023. https://www.arcgis.com/apps/webappviewer/index.html?id=355f9beb4a8f446e8869459e91d58431.

[8] "NR-3 Scenic Routes & Highways." ArcGIS web application. Accessed December 29, 2023. https://www.arcgis.com/apps/webappviewer/index.html?id=01c32a4480954deba20af965275b81e7.

The Project has been prepared in conformance with the goals and policies of the CWP and HCAG in providing an expansion of an existing campground, creating new employment opportunities, and developing recreation uses while preserving the natural and scenic features of the surrounding environment. The County's Development Code implements the goals and policies of the CWP by regulating land uses and establishing development standards for each district. As such, the Project will adhere to the County's Development Code.

Utilities and Service Systems

The Project site is for the expansion of the existing Hume SoCal Campground facilities. The Project would require new utility connections, including water, wastewater, stormwater, electricity, natural gas, and telecommunications. Additionally, the utility and public service providers that would serve the Project site are detailed in **Table 2: Service Providers**. Under existing conditions, the Project area receives domestic water from the Crestline Lake Arrowhead Water Agency (CLAWA) and wastewater service from the Running Springs Water District (RSWD). Solid waste collection and disposal in the Project area is conducted by Burrtec. Solid waste generated by the Project would likely be disposed of at the Heaps Peak Transfer Station in Running Springs, approximately 8.3 miles west of the Project site before being transferred to the Mid-Valley Landfill located at 2390 Alder Avenue, Rialto, CA 92377. Electricity utility services are provided by Southern California Edison (SCE). Natural gas utility service is provided by Southern California Gas (SoCal Gas).

Table 2: Service Providers

Service	Provider
Water	Crestline Lake Arrowhead Water Agency (CLAWA)
Wastewater	Running Springs Water District (RSWD)
Stormwater Drainage	San Bernardino County Flood Control District
Electric Service	Southern California Edison (SCE)
Gas Service	Southern California Gas Company (SoCal Gas)
Solid Waste Disposal	Mountain Disposal Burrtec Waste Industries (Burrtec)
Telecommunications	Charter Communications (Spectrum Internet) and Frontier Communications
Fire Protection	County Service Area 79, Running Springs Water District, Arrowbear Park County Water District, and Community Service Area 38.
Police Protection	San Bernardino County Sheriff's Department (Twin Peaks Sheriff Service Agency)
Schools	Rim of the World Unified School District (ROWUSD)

Water Usage

Currently, the water supply to the existing Hume SoCal Campground is sourced from four private, on-site groundwater wells. Of the four wells, only one is utilized to satisfy current domestic demands while the others support non-domestic demands such as irrigation and recreational use.[9] When groundwater cannot satisfy the demand alone, the existing Hume SoCal Campground has the ability to import water from Crestline Lake Arrowhead Water Agency (CLAWA), a California State Water Project (SWP) Contractor

[9] Kimley-Horn and Associates, Inc. 2024. *1st Draft Water Supply Assessment Hume SoCal Camp Expansion*.

providing wholesale and retail treated water from Silverwood Lake. CLAWA owns and operates an intake tower at Silverwood Lake, a surface water treatment plant, nine booster stations, 20 tanks, and over 54 miles of waterlines. As of 2023, Hume SoCal Campground is one of more than 20 camps and wholesale supplemental water connections supplied by CLAWA. CLAWA operates with a maximum entitlement from SWP of 5,800 acre-feet per year (AFY), a long-term average allocation of 3,480 AFY, and a baseline supply of 2,500 AFY. Historically, Hume SoCal Campground has not needed to import water from CLAWA.

In fiscal year (FY) 2022, Hume SoCal Campground's domestic water usage was 5,946,099 gallons, or 18.4 AFY. The Hume SoCal Campground's water supply consisted of 100 percent groundwater. The Hume SoCal Campground's 2022 Annual Report to the California State Water Resource Control Board (SWRCB) detailing potable water production and sample reports is included in **Appendix B1: Water Supply Assessment**.

As discussed in **Appendix B1**, Domestic Wells No. 1, 4, and 5 are used to supply the Camp's domestic and irrigation needs. Currently, domestic Well No. 5 is the main producer of domestic water for the Camp. The domestic production is pumped to the Camp's domestic tank and irrigation tank. The combined production of the three active domestic wells is 91,980,000 gallons per year (GPY), or 282.23 AFY. Non-domestic Well No. 2 is utilized to fill and maintain the Camp's lined, recreational pond. Well No. 2 is not included in the domestic and irrigation network and is not tested for water quality.[10]

Wastewater/Sewage Disposal

As discussed in **Appendix B2: Sewer Feasibility Study**, Sewer service is provided by RSWD. The Project site is in a San Bernardino County Special District County Service Area 79 (CSA 79) Green Valley Lake that includes private camps along Green Valley Lake Road, which includes the Project site. The existing sewer system contains 4-, 6-, and 8-inch gravity sewer lines heading southwest through the Camp to an existing pump station located at the southwestern point of the existing property. This pump station has an estimated 5 foot wet well. From the pump station, the sewage is pumped through an existing force main, estimated to be 6 inches in diameter, and discharges into the existing sewer system in Green Valley Road.

Stormwater Drainage

The existing drainage pattern for the Project site is characterized by sheet flow. Under existing conditions, the Project site naturally drains from the peaks of the hills towards the southwest of the Project boundaries down to Deep Creek. The minimal stormwater infrastructure within Green Valley Lake Road consists of a natural curb and gutter providing shallow concentrated flows to the southwest toward existing discharge points. Natural topography helps disperse stormwater and allows for absorption into the natural surroundings. Flows are directed southerly through the topography to natural surroundings such as the Deep Creek and other water sources. These flows are directed further south via natural means. Flows intercepted by Green Valley Lake Road on the northern portion of the Project site are conveyed via a natural curb and gutter, where they are channelized into existing natural surroundings.

Electric Service

The site is served with electric power through aboveground electricity distribution lines. An existing aboveground/overhead 12-kilovolt (kV) distribution power line and wood poles run along the eastern

[10] Kimley-Horn and Associates, Inc. 2024. *1st Draft Water Supply Assessment Hume SoCal Camp Expansion*, page 8.

portion of the Project site from the north of Green Valley Lake Road, owned and operated by Southern California Edison (SCE).

Gas Service

The site is served gas by the Southern California Gas Company (SCGC). However, no existing transmission lines or high-pressure distribution lines come out to the region.

Solid Waste Disposal

The Project is expected to generate solid waste during the temporary, short-term construction and operational phase. Trash enclosure standards are addressed in the Planned Development Permit (PDP) as waste facilities, collection, site placement, and standards are unique to the operation of the campground and mountain conditions. The planned trash enclosure differs from the standards identified for nonresidential uses in County Development Code Chapter 84.24.[11] The enclosure is planned as part of Phase 2 Development, to be located next to the Maintenance Building with dimensions of 26 feet in length, 8.5 feet in height, and 8 feet 5 inches in width. The site would be provided solid waste disposal services by Burrtec – Mountain Disposal, which currently serves portions of the County's mountain region. The solid waste generated onsite would be brought to Heaps Peak Transfer Station in Running Springs, approximately 8.3 miles west of the Project site. The Heaps Peak Transfer Station has a maximum permitted throughput of 600 tons daily. As identified by the County, the Heaps Peak Transfer Station will have sufficient capacity for another thirty years or more due to the location being a transfer site before solid waste is taken to the Mid-Valley Landfill located at 2390 Alder Avenue, Rialto, CA 92377.

[11] San Bernardino County. ND. *Chapter 84.24: Solid Waste/Recyclable Materials Storage*. https://codelibrary.amlegal.com/codes/sanbernardino/latest/sanberncty_ca/0-0-0-172033#JD_Chapter84.24. (accessed October 2025)

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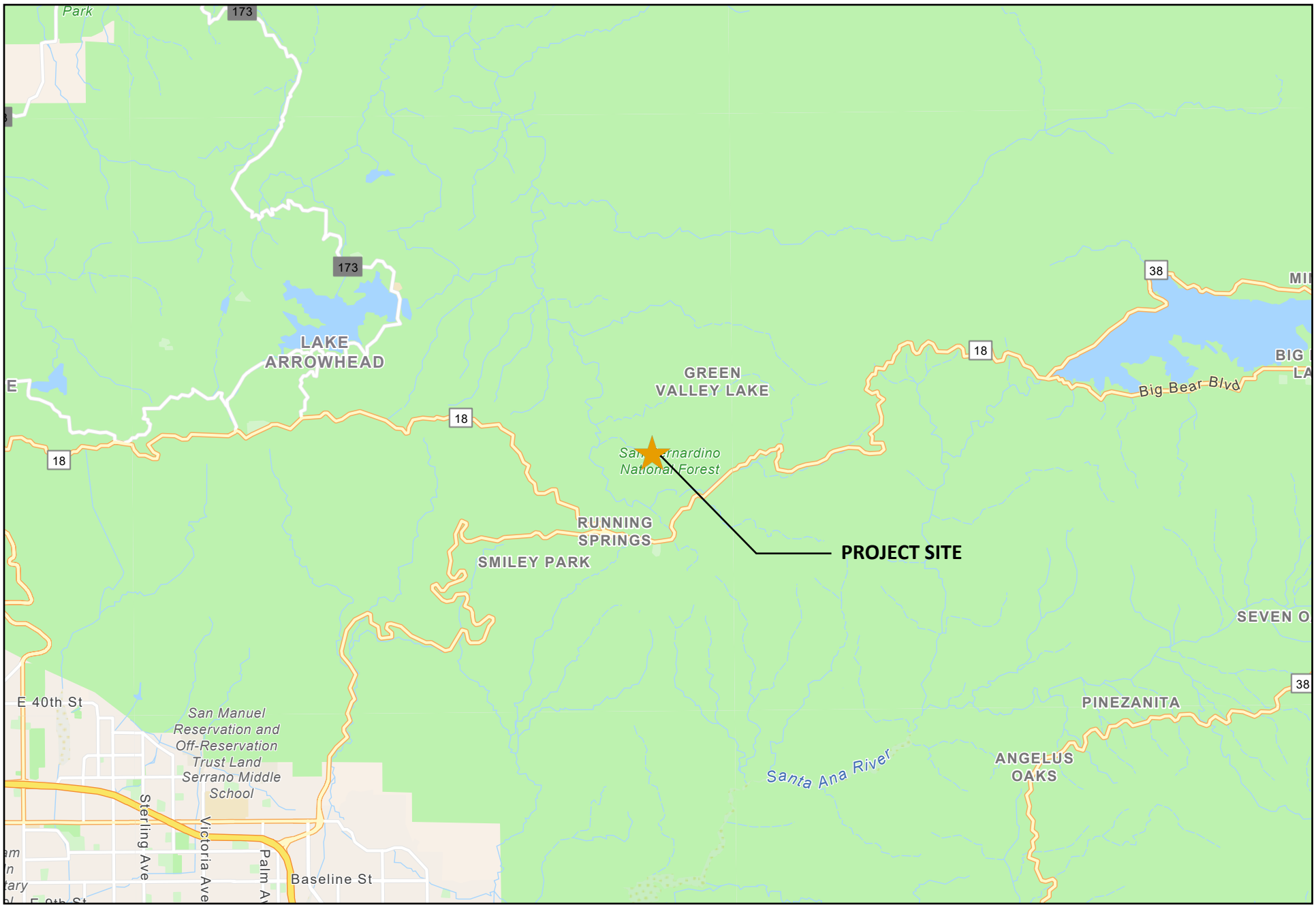
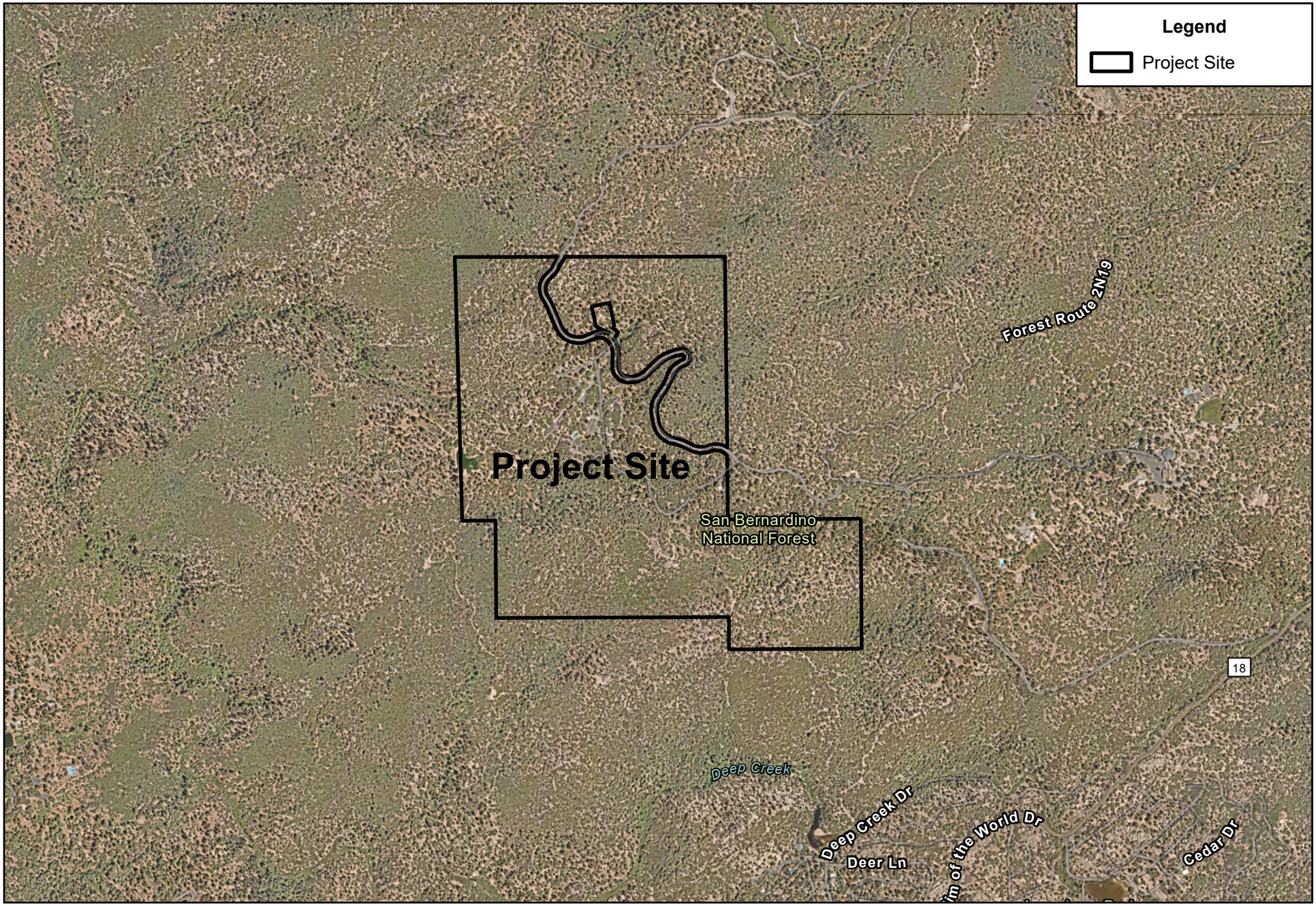


Figure 1: Regional Location Map
Hume SoCal Campground Expansion Project
San Bernardino County

Not to scale

Kimley»Horn

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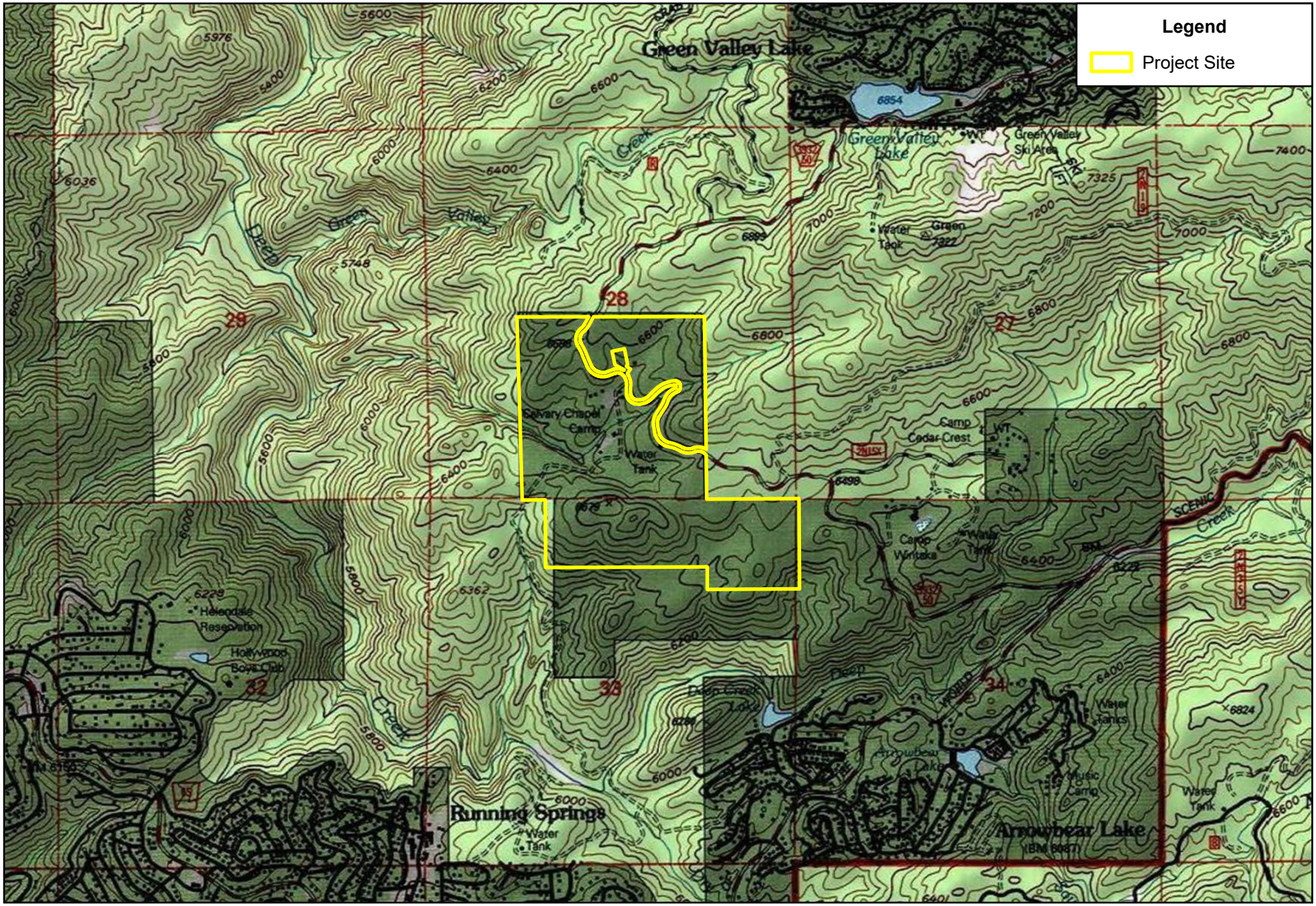
Source: Nearmap, 2023.

Figure 2: Local Vicinity Map
Hume SoCal Campground Expansion Project
San Bernardino County

Not to scale

Kimley»Horn

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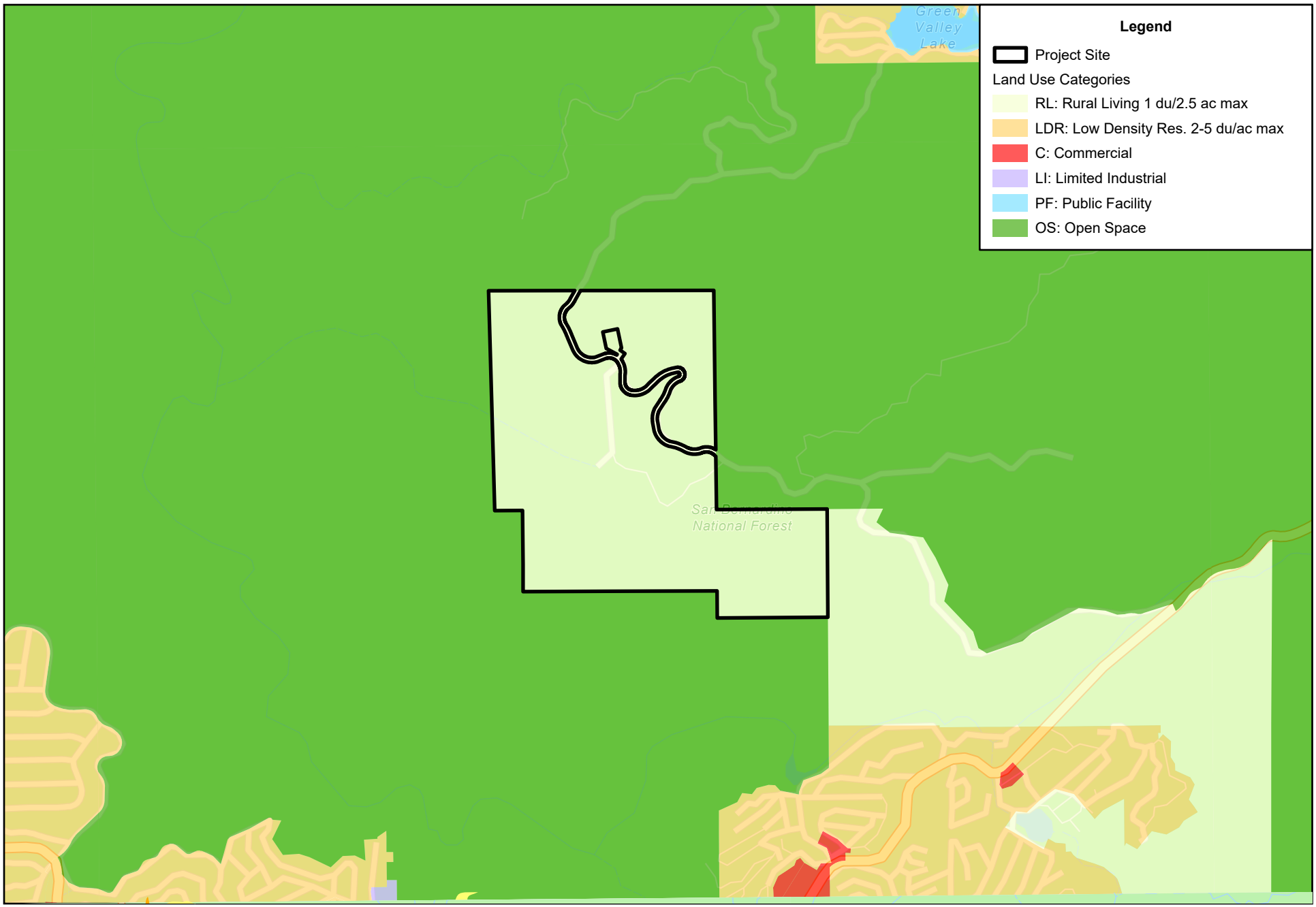
Source: ESRI, 2013.

Figure 3: Topographic Map
Hume SoCal Campground Expansion Project
San Bernardino County

Not to scale

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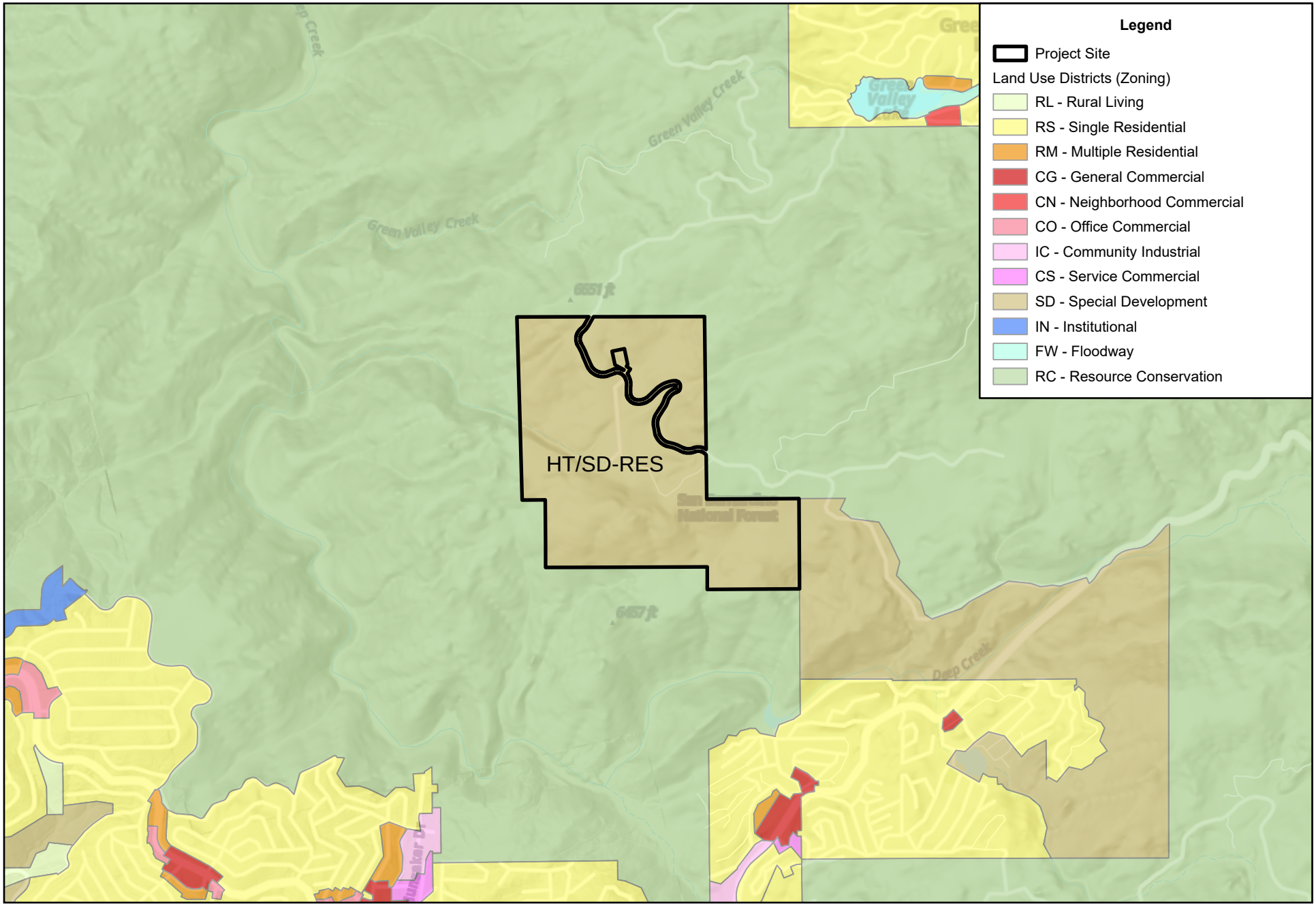
Source: County of San Bernardino, 2020 [Countywide Plan Policy Map LU-1].

Figure 4: Existing General Plan Land Use Map
Hume SoCal Campground Expansion Project
San Bernardino County

Not to scale

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Source: County of San Bernardino, 2020 [Countywide Plan Policy Map LU-1].

Figure 5: Existing Zoning Map
Hume SoCal Campground Expansion Project
San Bernardino County

Not to scale

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Proposed Project

The Project involves the expansion of the existing Hume SoCal Campground from the existing campground size of approximately 107 acres to approximately 252.1 acres – an addition of approximately 145 acres. The existing Hume SoCal Campground, owned by Calvary Chapel, currently accommodates approximately 300 persons, including both campers, camp staff and facility/office staff. The proposed expansion of Hume SoCal Campground and the increase in camp facilities would allow the Project to accommodate an additional approximately 2,700 persons for a maximum of approximately 3,000 campers, camp staff and facility/office staff. Expansion of the campground would involve the construction/installation of new camp structures including residential dorms and semi-permanent tents, staff housing, dining/meeting halls, and indoor/outdoor recreational facilities and campground infrastructure (internal roads, pedestrian trails, etc.), and the addition of recreational activities and programming. The existing campground's structures, facilities, and amenities will continue to be used. The Project would be implemented in five phases.

Project Objectives

The purpose of the Hume SoCal Campground Expansion is to implement the vision laid out in the Project objectives by expanding the campground to be able to accommodate an additional approximately 2,700 guests/users/visitors (a maximum of 3,000 persons) through the continued use of existing campground structures and the development of additional campground and recreational structures. The Project would further the goals of the County's CWP on a currently underutilized site by enhancing the County's outdoor recreation/hospitality economy and increasing local employment opportunities. This updated PDP produces an economically efficient land use and will ensure compatibility between existing and proposed land uses.

The objectives of the Hume SoCal Campground Expansion Project are as follows:

- Reinforce Hume SoCal Campground as a premier campground and regional outdoor recreation destination.
- Provide new campground expansion development that would accommodate and serve an additional approximately 2,700 guests/maximum 3,000 persons including campers and staff.
- Provide new quality amenities and facilities to support outdoor recreation.
- Establish Green Valley Lake Community as an economically sound enclave of specialized outdoor recreation and campground venues. Provide up to approximately 227 acres of open space by clustering the proposed development area for the future campground facilities within approximately 15 acres that limits impacts to sensitive habitats and identified waters of the state/ federal waters.

Construction Phasing

Construction of the Project is divided into five phases within the five parcels that comprise the overall Project site; refer to **Figure 6a: Hume SoCal Campground Expansion Overall Site Plan**. Phases 1 through 5 of the Project would involve the development of residential and recreational facilities to be utilized for campground activity, as depicted in **Figure 6b: Phase I Site Plan** through **Figure 6f: Phase 5 Site Plan**. Construction of the Hume SoCal Campground expansion is not required to be completed within a specific timeline. New construction would include grading, road and utility infrastructure, paving, building construction, architectural coating, landscaping, and the applicable off-site improvements conditioned by

the County. Each phase of the Project would include the development of expanded infrastructure, additional amenities, support structures, and buildings necessary to accommodate the expanded campground's physical area and guest capacity. New construction also includes paved parking areas and paved access roadways.

Phase 1 would include the development of Camp Middle School which would raise campsite capacity by approximately 484 occupants from 300 to 784 occupants; refer to **Figure 6b**. Implementation of Phase 1 would involve the facilities listed below and would be constructed over approximately 1-5 years with capacity slowly rising from 300 occupants to 784 occupants at the end of the last year of construction. Phase 1 would involve the following facilities:

Existing Structures (Modifications)

1. Welcome Center and Restrooms
    a. The existing Welcome Center and Restrooms would be expanded from 825 square feet (sf) to approximately 2,073 sf to accommodate a greater volume of guests. Current utilities including plumbing, electricity, and natural gas would be utilized.
2. Snack Shop
    a. The existing 3,152 sf Rec Building/ Snack Shop will be relocated. This will be repurposed as a Snack Shop would allow optimized land uses while still providing Snack Shop amenities to guests. A new Snack Shop Building would be considered. Current utilities including plumbing, electricity, and natural gas would be utilized.
3. Multipurpose Facility
    a. The existing Multipurpose facility would be expanded from its current 5,521 sf to 7,521 sf. This expansion would allow for greater capacity and increased floor space for activities and events. Current utilities including plumbing, electricity, and natural gas would be utilized.
4. Staff Housing/Medical
    a. This existing 2,556 sf. Staff Housing building will be converted to a Medical Facility which will allow for greater capacity and a larger medical facility to treat a greater capacity of individuals. Current utilities including electricity, plumbing, and natural gas would be utilized.
5. Dining/Meeting Hall
    a. The existing dining facility in the central area of the Project site would be altered from approximately 8,816 sf to 15,648 sf to allow for a greater range of space uses while expanding to accommodate 784 occupants. The Dining/Meeting Hall would provide an indoor gathering space for dining and for large meetings. An expansion of the food service kitchen will be included. Utilities included at the current facility such as plumbing, electricity, and gas would be required for the expanded Dining/Meeting Hall.
6. Garage
    a. The Garage would be expanded from approximately 450 sf to 605 sf to allow for greater equipment storage capacity. Electrical utilities would be maintained to serve the garage.

7. Maintenance Building
    a. The existing maintenance facility will be removed to allow for construction of the new Recreation center/Gym.
8. Recreation Pond
    a. A Recreation Pond exists within the western portion of the Phase 1 site. The Recreation Pond allows for aquatic activities within a natural setting. Plumbing would be required to service the recreation pond.

New Structures

1. Director Housing
    a. Director Housing would allow for camp director residency. The Director Housing would construct an approximately 2,400 sf housing unit. The Director Housing would require plumbing, electricity and natural gas services for heating to allow for occupancy.
2. Speakers Housing
    a. Speakers Housing would allow for camp speaker residency. The Speakers Housing would construct an approximately 2,400 sf housing unit. The Speakers Housing would require plumbing, electricity and natural gas services for heating to allow for occupancy.
3. Activity Quads
    a. The Activity Quads would be composed of five separate lawns throughout the Phase 1 site. The Activity Quads would provide outdoor gathering spaces for events and activities throughout the Phase 1 site. Irrigation would be required to service the Activity Quad.
4. Dorm Facilities
    a. Dormitory (Dorm) facilities for campers would be constructed within the northern and central portions of the Phase 1 site. Dorms would be constructed as two different figuration types: 40-bed dorms and 80-bed dorms, which would add lodging capacity in conjunction with the existing 54-bed dorms. Phase One includes (6) new 40-bed dorm facilities would be approximately 3,160 sf each. Phase One includes (2) new 80-bed dorms, which would be approximately 5,462 sf. each. New dorm facilities would allow for greater occupancy of the campground. Electrical, plumbing, and natural gas utilities would be required to service the dorms.
5. Staff Housing
    a. Staff Housing facilities would be constructed within the Phase 1 site to allow for staff accommodations. Staff housing facilities would include (3) Structures of approximately 6,336 sf each. Utilities including electrical, plumbing, and natural gas would be required to service staff housing.
6. Recreation Center/Gym
    a. The Recreation Center would be a 28,500-sf recreation center for camper activities. This might include Basketball, Volleyball and related summertime indoor activities such as a climbing wall, snack area, ping pong etc. Winter activities might include ice skating. New utility connections would be needed.

7. Multipurpose Chapel
    a. The Chapel would be constructed toward the center of the Project site. The new 16,900 sf Chapel facility would have a greater occupancy capacity than the old Chapel. The Chapel would be utilized primarily for worship services and activities. The Chapel would require electrical, plumbing, and natural gas services to allow for occupancy.
8. Restroom and Recreation Equipment
    a. Restrooms and Recreation Equipment storage would be provided near the Recreation Pond to allow for convenient restroom access and recreational equipment access in the western portion of the Phase 1 site. Electrical and plumbing utilities would be required to service the restroom.
9. Maintenance Building 1
    a. To allow for greater maintenance staffing and capacity, Maintenance Building 1 would be constructed at approximately 11,900 sf. Electrical, plumbing, and natural gas utilities would be required to serve the facility.
10. Maintenance Building 2
    a. To allow for greater maintenance staffing and capacity, Maintenance Building 2 would be constructed at approximately 9,475 sf. Electrical, plumbing, and natural gas utilities would be required to serve the facility.
11. Support Facilities/Trash Enclosures
    a. Trash enclosure, screening for air conditioners and utility equipment, and other minor facilities (pool enclosures, etc.) shall be permitted adjacent to structures to support standard operations associated with uses within the buildings/facilities.
    b. Trash enclosures – A 40-cubic-yard trash bin and compactor would be required to be placed on a paved surface or within a parking area adjacent to facilities/buildings that include food service such as kitchens. Alternatively, a Central Trash Collection Area can be placed in the Maintenance Building Area depending on the owner's operations and needs.

Phase 2 will be for the development of Camp High School which would raise campsite capacity by approximately 1,000 occupants from 784 to 1,784 occupants; refer to **Figure 6c: Phase 2 Site Plan**. Implementation of Phase 2 would occur over approximately 5 years with capacity slowly rising from 784 occupants to 1,784 occupants over the 5-year interval. Phase 2 would involve the following facilities:

1. Multipurpose Recreation/Gym
    a. The second Multipurpose Room would be centrally located within the Project site and provide an indoor gathering space for camper events and activities. The facility would be approximately 28,500 square feet (sf) and allow for approximately 1,000 occupants. The Multipurpose Room would require plumbing, electricity and natural gas services for heating to allow for occupancy.
2. Activity Quads
    a. The Activity Quads would be composed of five separate lawns throughout the Phase 2 site, totaling 10 activity lawns including Phase 1. The Activity Quads would provide outdoor gathering spaces for events and activities throughout the Phase 2 site. Irrigation would be required to service the Activity Quads.

3. Staff Housing
    a. Three additional staff housing facilities would be constructed across approximately three structures, each hosting approximately 32 staff members within approximately 6,336 sf. Utilities including electrical, plumbing, and natural gas would be required to service staff housing.
4. Dining Building
    a. A new Dining Building would be constructed in the northern Phase 2 site area at approximately 30,914 sf to accommodate approximately 1,000 guests. The Dining Building would provide an indoor gathering space for dining and for large meetings. Utilities including plumbing, electricity, and natural gas would be required for the Dining Building.
5. 40-Bed and 80-Bed Dorms
    a. Dormitory (Dorm) facilities for campers would be constructed within the eastern and central portions of the Phase 2 site. Approximately 22 Dorm facilities would be constructed as two different figuration types: 40-bed dorms and 80-bed dorms. 40-bed dorm facilities would be approximately 3,160 sf and 80-bed dorms would be approximately 5,462 sf. New dorm facilities would allow for greater occupancy of the campground. Electrical, plumbing, and natural gas utilities would be required to service the dorms.
6. Snack Bar
    a. The Snack Bar would be constructed in the central portion of the Phase 2 site to allow for purchase of food, beverage, and concession items. The Snack Bar would be approximately 3,131 sf and would require plumbing, electrical, and natural gas utilities to be serviced.
7. Multipurpose Chapel
    a. The Chapel would be constructed toward the eastern portion of the Phase 2 site. The Multipurpose Chapel would be constructed at approximately 22,500 sf and allow for 1,000 occupants. The Chapel would be utilized primarily for worship services and activities. The Chapel would require electrical, plumbing, and natural gas services to allow for occupancy.
8. Pool/ Pool House
    a. A Pool/ Pool House would be constructed at the eastern portion of the Phase 2 site at approximately 770 sf. The Pool/ Pool House would allow for aquatic activities within a controlled setting. Plumbing and electricity would be required to service the Pool/ Pool House.
9. Outdoor Amphitheater (Victory Circle)
    a. An additional Outdoor Amphitheater with capacity to host 1,000 guests would be constructed as part of Phase 2. The Outdoor Amphitheater would be approximately 12,000 sf and be located in the southeast portion of the Phase 2 site. Electricity services would be required to operate the Outdoor Amphitheater.
10. Restroom and Recreation Equipment Facility
    a. Restrooms would be provided within multiple site facilities including dining facilities and dormitories; however, an additional restroom would be constructed near the Phase 2

Recreation Pond to allow for convenient restroom access in the western portion of the Phase 2 site. A Recreation Equipment storage facility would also be implemented with the restroom to allow for storage of equipment. Electrical and plumbing utilities would be required to service the facility.

11. Recreation Pond
    a. A natural Recreation Pond would be constructed within the western portion of the Phase 2 site. The Recreation Pond would allow for aquatic activities within a natural setting. Plumbing would be required to service the recreation pond.
12. Support Facilities/Trash Enclosures
    a. Trash enclosure, screening for air conditioners and utility equipment, and other minor facilities (pool enclosures, etc.) shall be permitted adjacent to structures to support standard operations associated with uses within the buildings/facilities.
    b. Trash enclosures – A 40-cubic-yard trash bin and compactor would be required to be placed on a paved surface or within a parking area adjacent to facilities/buildings that include food service such as kitchens. Alternatively, a Central Trash Collection Area can be placed in the Maintenance Building Area depending on the owner's operations and needs.

Phase 3 would include the development of Camp Adult Lodge which would raise campsite capacity by approximately 100-140 occupants from 1,784 to 1,924 occupants; refer to **Figure 6d: Phase 3 Site Plan**. Implementation of Phase 3 would occur over approximately 5 years upon completion of Phase 2 with capacity slowly rising from 1,784 occupants to 1,924 occupants over the 5-year interval. Phase 3 would involve the following facility:

1. Adult Lodge
    a. The Adult Lodge would be centrally located within the Phase 3 site and is the only structure to be implemented during Phase 3. The approximately 18,000 sf facility would contain lodging, dining, and restroom facilities to allow for adult lodging.

Phase 4 would include the development of Camp Elementary which would raise campsite capacity by approximately 250-500 occupants from 1,924 to 2,424 occupants; refer to **Figure 6e: Phase 4 Site Plan**. Implementation of Phase 4 would occur over approximately 5 years upon completion of Phase 3 with capacity slowly rising from 1,924 occupants to 2,424 occupants over the 5-year interval. Phase 4 would involve the following facilities:

1. Restroom and Showers
    a. Restroom and shower facilities would be provided for guests staying within the Seasonal Housing Platform Tents. Two restroom and shower facilities would be constructed at 1,477 sf within the Phase 4 site to allow for adequate restroom and shower access. Electrical and plumbing utilities would be required to service the restroom and shower facilities.
2. Seasonal Housing Platform Tent
    a. Approximately 17 Seasonal Housing Platform Tents would be implemented at 480 sf each to allow for greater campground capacity during peak season. Seasonal Housing Platform Tents would be insulated and house beds for guests to utilize; however, these facilities would not be utilized year-round.

3. 40-Bed Dorm
    a. Dorm facilities for campers would be constructed within the central portion of the Phase 4 site. Approximately eight (8) Dorm facilities would be constructed as one figuration type: 40-bed dorms. 40-bed dorm facilities would be constructed at approximately 3,160 sf. New dorm facilities would allow for greater occupancy of the campground. Electrical, plumbing, and natural gas utilities would be required to service the dorms.
4. Restroom and Recreation Equipment
    a. Located adjacent to the Pool House site, a restroom and Recreation Equipment facility would be constructed at 1,477 sf. The restroom would provide convenient restroom access from the pool site and the Recreation Equipment facility would store recreational equipment such as pool items. Electricity and plumbing utilities would be required to serve the Restroom and Recreation Equipment facility.
5. Outdoor Amphitheater (Victory Circle)
    a. An additional Outdoor Amphitheater with capacity to host 500 guests would be constructed as part of Phase 4. The Outdoor Amphitheater would be approximately 8,000 sf and be located in the southeast portion of the Phase 4 site. Electricity services would be required to operate the Outdoor Amphitheater.
6. Craft Recreation Pavilion
    a. An approximately 579 sf Craft Recreation Pavilion would be constructed to allow for craft activities to take place and have dedicated space. Electricity and plumbing utilities would be required to serve the Craft Pavilion.
7. Dining Pavilion
    a. An additional Dining Pavilion would be constructed as part of Phase 4. The occupancy of the new Dining Pavilion would be approximately 500 individuals utilizing approximately 15,930 sf. The Dining Pavilion would provide dining services and act as a gathering space. Electrical, plumbing, and natural gas utilities would be required for the Dining Pavilion to operate.
8. Pool House and Restrooms
    a. A Pool House and Restroom facility would be constructed in the central portion of the Phase 4 site to allow for aquatic activities and restroom access across 1,750 sf. Electrical and plumbing utilities would be required.
9. Support Facilities/Trash Enclosures
    a. Trash enclosure, screening for air conditioners and utility equipment, and other minor facilities (pool enclosures, etc.) shall be permitted adjacent to structures to support standard operations associated with uses within the buildings/facilities.
    b. Trash enclosures – A 40-cubic-yard trash bin and compactor would be required to be placed on a paved surface or within a parking area adjacent to facilities/buildings that include food service such as kitchens. Alternatively, a Central Trash Collection Area can be placed in the Maintenance Building Area depending on the owner's operations and needs.

Phase 5 would include the development of Camp Wildwood which would raise campsite capacity by approximately 120 occupants from 2,424 to 2,544 occupants; refer to **Figure 6f**. Implementation of

Phase 5 would occur over approximately 5 years with capacity slowly rising from 2,424 occupants to 2,544 occupants over the 5-year interval. Phase 5 would involve the following facilities:

1. Restroom and Showers
    a. A restroom and shower facility would be provided for guests staying within the Seasonal Housing Platform Tents. One restroom and shower facility would be constructed at 1,477 sf within the Phase 5 site to allow for adequate restroom and shower access. Electrical and plumbing utilities would be required to service the restroom and shower facilities.
2. Seasonal Housing Platform Tent
    a. Approximately 8 Seasonal Housing Platform Tents would be implemented at 480 sf each to allow for greater campground capacity during peak season. Seasonal Housing Platform Tents would be insulated and house beds for guests to utilize; however, these facilities would not be utilized year-round.
3. 40-Bed Dorm
    a. Dorm facilities for campers would be constructed within the central portion of the Phase 5 site. Approximately 2 Dorm facilities would be constructed as one figuration type: 40-bed dorms. 40-bed dorm facilities would be constructed at approximately 3,160 sf. New dorm facilities would allow for greater occupancy of the campground. Electrical, plumbing, and natural gas utilities would be required to service the dorms.
4. Restroom and Recreation Equipment
    a. Located adjacent to the Pool House site, a restroom and Recreation Equipment facility would be constructed at 1,477 sf. The restroom would provide convenient restroom access from the pool site and the Recreation Equipment facility would store recreational equipment such as pool items. Electricity and plumbing utilities would be required to serve the restroom and Recreation Equipment facility.
5. Outdoor Amphitheater (Victory Circle)
    a. An additional Outdoor Amphitheater with capacity to host 160 guests would be constructed as part of Phase 5. The Outdoor Amphitheater would be approximately 3,228 sf and be located in the southern portion of the Phase 5 site. Electricity services would be required to operate the Outdoor Amphitheater.
6. Dining Pavilion
    a. An additional Dining Pavilion would be constructed as part of Phase 5. Occupancy of the new Dining Pavilion would be approximately 160 individuals utilizing approximately 3,982 sf. The Dining Pavilion would provide dining services and act as a gathering space. Electrical, plumbing, and natural gas utilities would be required for the Dining Pavilion to operate.
7. Pool House and Restrooms
    a. A Pool House and Restroom facility would be constructed in the central portion of the Phase 5 site to allow for aquatic activities and restroom access across 1,750 sf. Electrical and plumbing utilities would be required.

8. Support Facilities/Trash Enclosures
    a. Trash enclosure, screening for air conditioners and utility equipment, and other minor facilities (pool enclosures, etc.) shall be permitted adjacent to structures to support standard operations associated with uses within the buildings/facilities.
    b. Trash enclosures – A 40-cubic-yard trash bin and compactor would be required to be placed on a paved surface or within a parking area adjacent to facilities/buildings that include food service such as kitchens. Alternatively, a Central Trash Collection Area can be placed in the Maintenance Building Area depending on the owner's operations and needs.

The overall conceptual site plan, shown in **Figure 6a**, is an illustration of the potential configuration of the Project site. The final site plan presented for entitlement approval by the County may differ based on final design.

Site Access and Circulation

Off-site external circulation access to the site is provided by Green Valley Lake Road. Internal circulation is currently provided by Smokey Way and Larry's Campground Road. These roads connect to Green Valley Lake Road at the eastern edge of the existing, developed area of the Hume SoCal Campground site. These internal roads may be eliminated, modified, or enhanced to accommodate vehicle trips anticipated with the Project.

New internal roads are proposed at various locations throughout the Project site, as shown in **Figure 6a**, with the most extensive new network of internal roads proposed in Phases 1 and 2. The dimensions, e.g., width, and surfacing of all internal roads will comply with the relevant County Development Code that may be applicable, for example, for public safety access.

Internal site access would be provided largely via pedestrian access. Facilities within the Project site would be connected via pathways which would traverse the Project site connecting all facilities. A mix of paved and non-paved pathways would be implemented with paved pathways serving all essential areas such as housing, dining, and restroom facilities. Lighting would be provided on paved pathways to allow for safe site access and visibility during nighttime hours.

Project Approvals

The County is the Lead Agency under CEQA and is responsible for reviewing and certifying the adequacy of the IS/MND for the Project. Prior to development of the Project, discretionary permits and approvals must be obtained from local, state, and federal agencies, as listed below. It is expected that these agencies, at a minimum, would consider the data and analyses contained in this IS/MND when making their permit determinations.

The County originally approved the Hume SoCal Campground CUP/90-0027/M322-13 in 1991 with an amendment in 1993 that included permitting requirements for an on-site Natural Lined Pond. The approval of the existing CUP allowed the owner/operator to conduct campground activities with a maximum occupancy of 300 guests. A CUP approval was initially required to allow for the development of campground uses within the Project site. A CUP provides a process for reviewing uses and activities that may be appropriate in an applicable land zoning district, but the effects on the site and surroundings can only be determined after being proposed for a specific site. The CUP process requires the submittal of the

appropriate documentation, a public hearing, and then a review by the Planning Commission for approval of the CUP. The applicant has been operating continuously since receiving the County's initial approval for the existing CUP.

The Project entitlements include an amendment to rescind and replace the existing Planned Development Permit (PDP) with a revised Preliminary Development Plan, a Final Development Plan (FDP), and a Lot Line Adjustment (LLA) to allow for phased development. The PDP includes the uses and activities within the expanded campground, site access, new/modified internal vehicle and pedestrian circulation, and infrastructure related to drainage, water, and sewer. Also included in the updated PDP will be development standards for the different phases within the Project. Each requested approval is discussed in additional detail below.

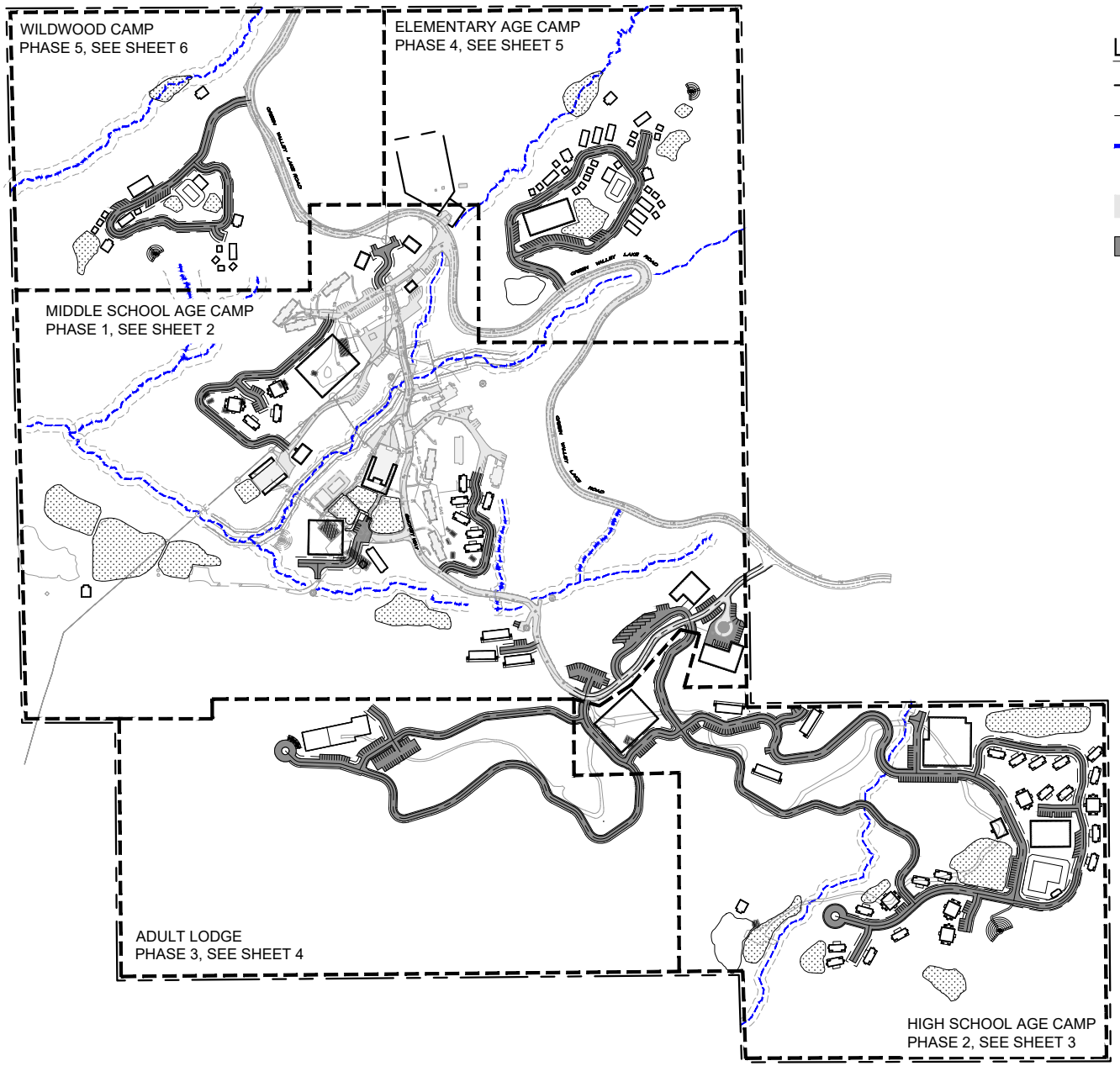
Planned Development Permit: The Project would be developed in accordance with this updated PDP. The PDP proposes a comprehensive land use plan, internal circulation plan, streetscape plan, infrastructure service plan, grading plan, maintenance plan, phasing plan, design guidelines, development regulations, and implementation measures to guide the development of the total approximately 252.1-acre Project site. Approval of the PDP by the County is required for implementation of the Project to occur on the Project site.

Final Development Plan: The Final Development Plan shall include a detailed site plan that identifies the dimensions and locations of all uses and structures for the Project and comply with the updated PDP. The Project includes a full site plan submittal for each Phase (1-5) of development for consideration by the County and would be developed in accordance with this PDP. The site plans include internal circulation plans, topography, building location, existing and proposed infrastructure and buildings, and other necessary information (parking, building size, etc.). The phasing plan, design guidelines, development regulations, and other requirements have been included in the PDP to guide each Phase of development of campground buildout for the total approximately 252.1-acre Project site. Building plans would be submitted consistent with the design and development standards as outlined in the PDP. Approval of the FDP by the County is required for construction of each Phase of development on the Project site.

Lot Line Adjustment/Lot Merger: Approval of the Project's Lot Line Amendment/Lot Merger, would create the individual legal lots for Project implementation, formalize the parcel boundaries, and provide for the public rights-of-way for access to the Project.

Other permits required for the Project may include but are not limited to the following: issuance of encroachment permits for new construction and installation of utility infrastructure in the public right-of-way; demolition permits; building construction and grading permits; tenant improvement permits; and permits for new utility connections.

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Source: Kimley-Horn, 2025.

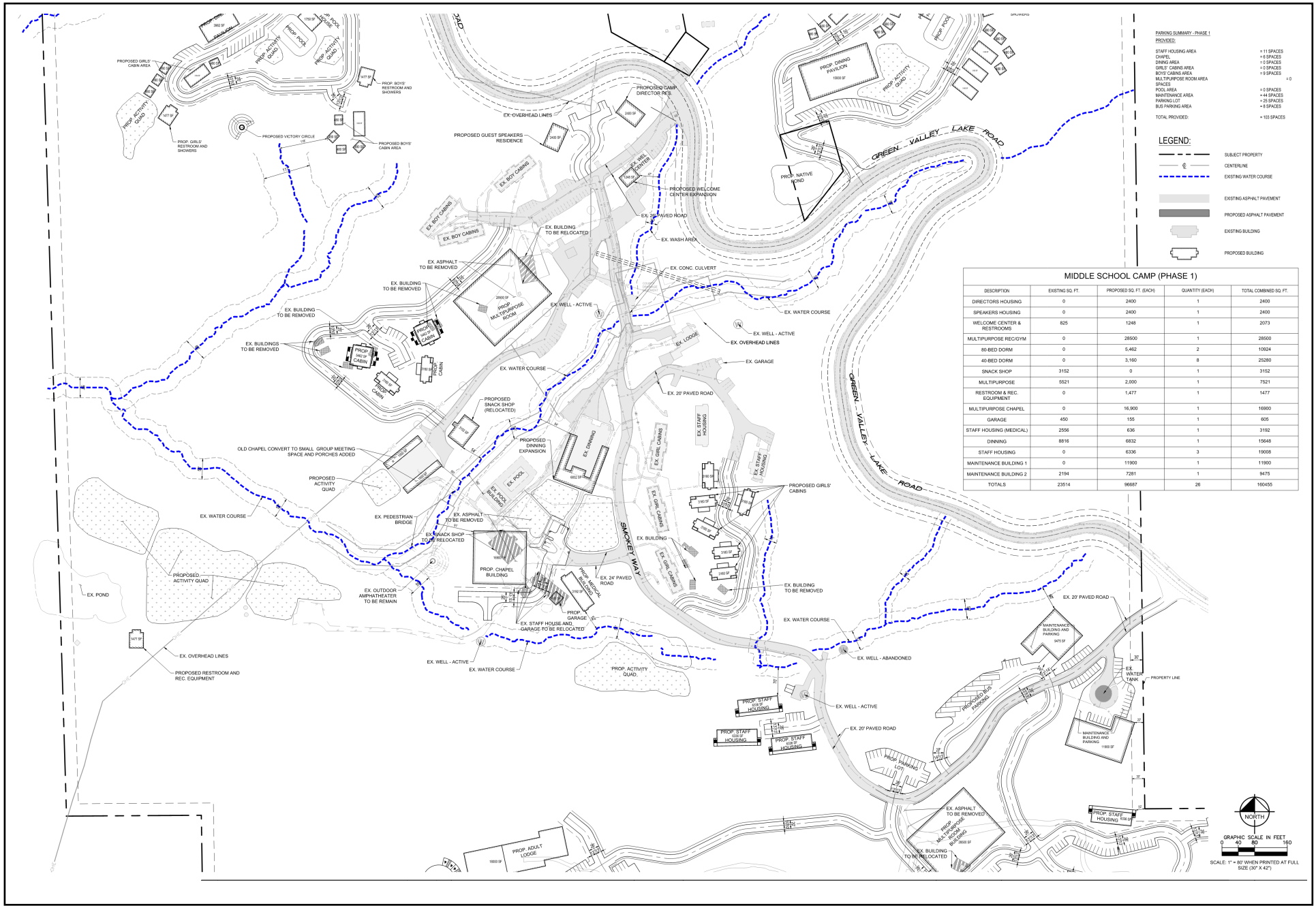
Figure 6a: Hume SoCal Campground Expansion Overall Plan Site Plan

Hume SoCal Campground Expansion Project
San Bernardino County

Not to scale

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PARKING SUMMARY - PHASE 1

PROVIDED:

STAFF HOUSING AREA	= 11 SPACES
CHAPEL	= 6 SPACES
DINING AREA	= 0 SPACES
GIRLS' CABINS AREA	= 0 SPACES
BOYS' CABINS AREA	= 9 SPACES
MULTIPURPOSE ROOM AREA	= 0 SPACES
POOL AREA	= 0 SPACES
MAINTENANCE AREA	= 44 SPACES
PARKING LOT	= 25 SPACES
BUS PARKING AREA	= 8 SPACES
TOTAL PROVIDED:	= 103 SPACES

LEGEND:

- SUBJECT PROPERTY
- CENTERLINE
- EXISTING WATER COURSE
- EXISTING ASPHALT PAVEMENT
- PROPOSED ASPHALT PAVEMENT
- EXISTING BUILDING
- PROPOSED BUILDING

MIDDLE SCHOOL CAMP (PHASE 1)

DESCRIPTION	EXISTING SQ. FT.	PROPOSED SQ. FT. (EACH)	QUANTITY (EACH)	TOTAL COMBINED SQ. FT.
DIRECTORS HOUSING	0	2400	1	2400
SPEAKERS HOUSING	0	2400	1	2400
WELCOME CENTER & RESTROOMS	825	1248	1	2073
MULTIPURPOSE REC/GYM	0	28500	1	28500
80-BED DORM	0	5,462	2	10924
40-BED DORM	0	3,160	8	25280
SNACK SHOP	3152	0	1	3152
MULTIPURPOSE	5521	2,000	1	7521
RESTROOM & REC. EQUIPMENT	0	1,477	1	1477
MULTIPURPOSE CHAPEL	0	16,900	1	16900
GARAGE	450	155	1	605
STAFF HOUSING (MEDICAL)	2556	636	1	3192
DINNING	8816	6832	1	15648
STAFF HOUSING	0	6336	3	19008
MAINTENANCE BUILDING 1	0	11900	1	11900
MAINTENANCE BUILDING 2	2194	7281	1	9475
TOTALS	23514	96687	26	160455

Source: Kimley-Horn, 2025.

Figure 6b: Phase 1 Site Plan

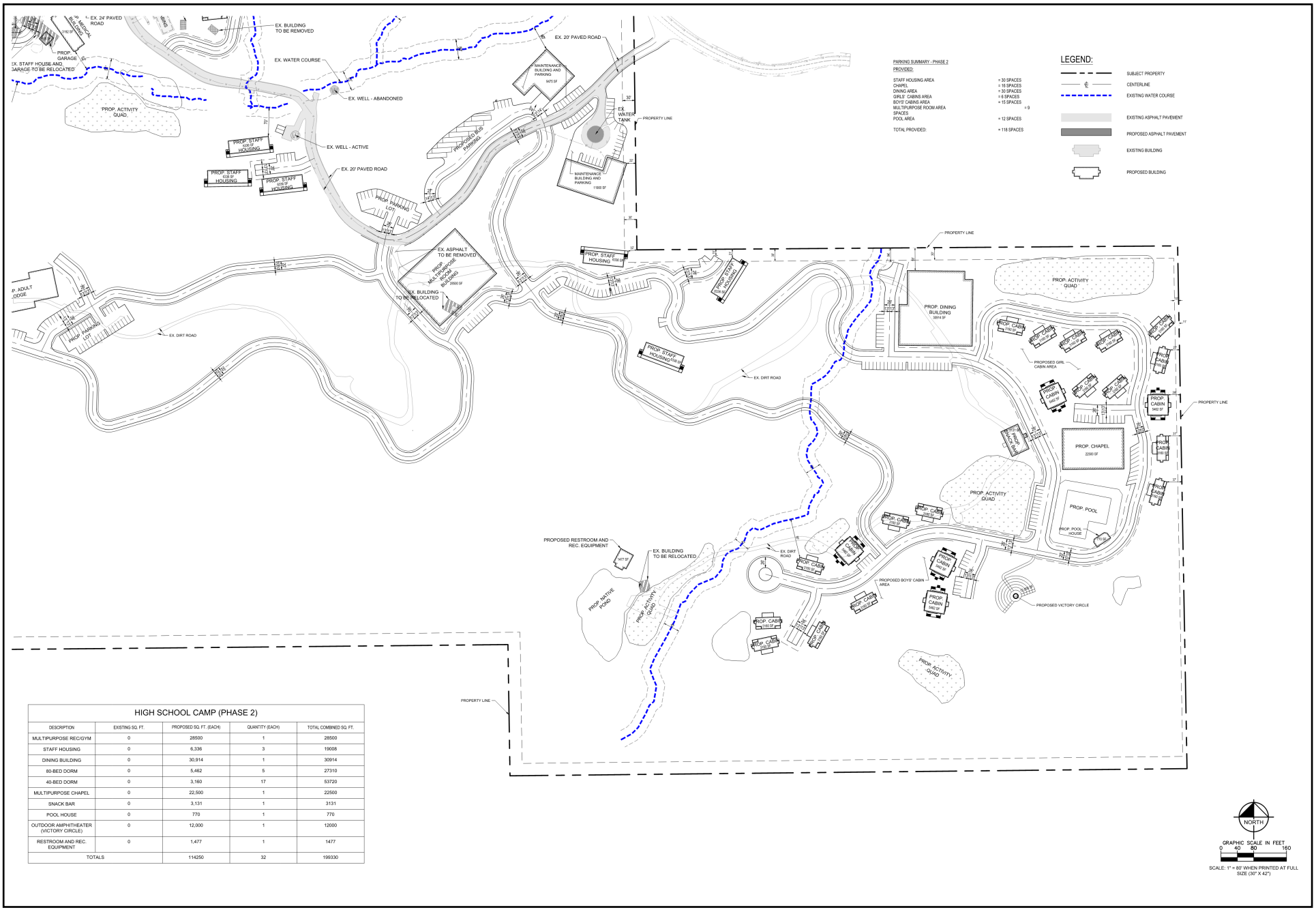
Hume SoCal Campground Expansion Project

San Bernardino County

Not to scale

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HIGH SCHOOL CAMP (PHASE 2)

DESCRIPTION	EXISTING SQ. FT.	PROPOSED SQ. FT. (EACH)	QUANTITY (EACH)	TOTAL COMBINED SQ. FT.
MULTIPURPOSE REC/GYM	0	28500	1	28500
STAFF HOUSING	0	6,336	3	19008
DINING BUILDING	0	30,914	1	30914
80-BED DORM	0	5,462	5	27310
40-BED DORM	0	3,160	17	53720
MULTIPURPOSE CHAPEL	0	22,500	1	22500
SNACK BAR	0	3,131	1	3131
POOL HOUSE	0	770	1	770
OUTDOOR AMPHITHEATER (VICTORY CIRCLE)	0	12,000	1	12000
RESTROOM AND REC. EQUIPMENT	0	1,477	1	1477
TOTALS		114250	32	199330

Source: Kimley-Horn, 2025.

Figure 6c: Phase 2 Site Plan

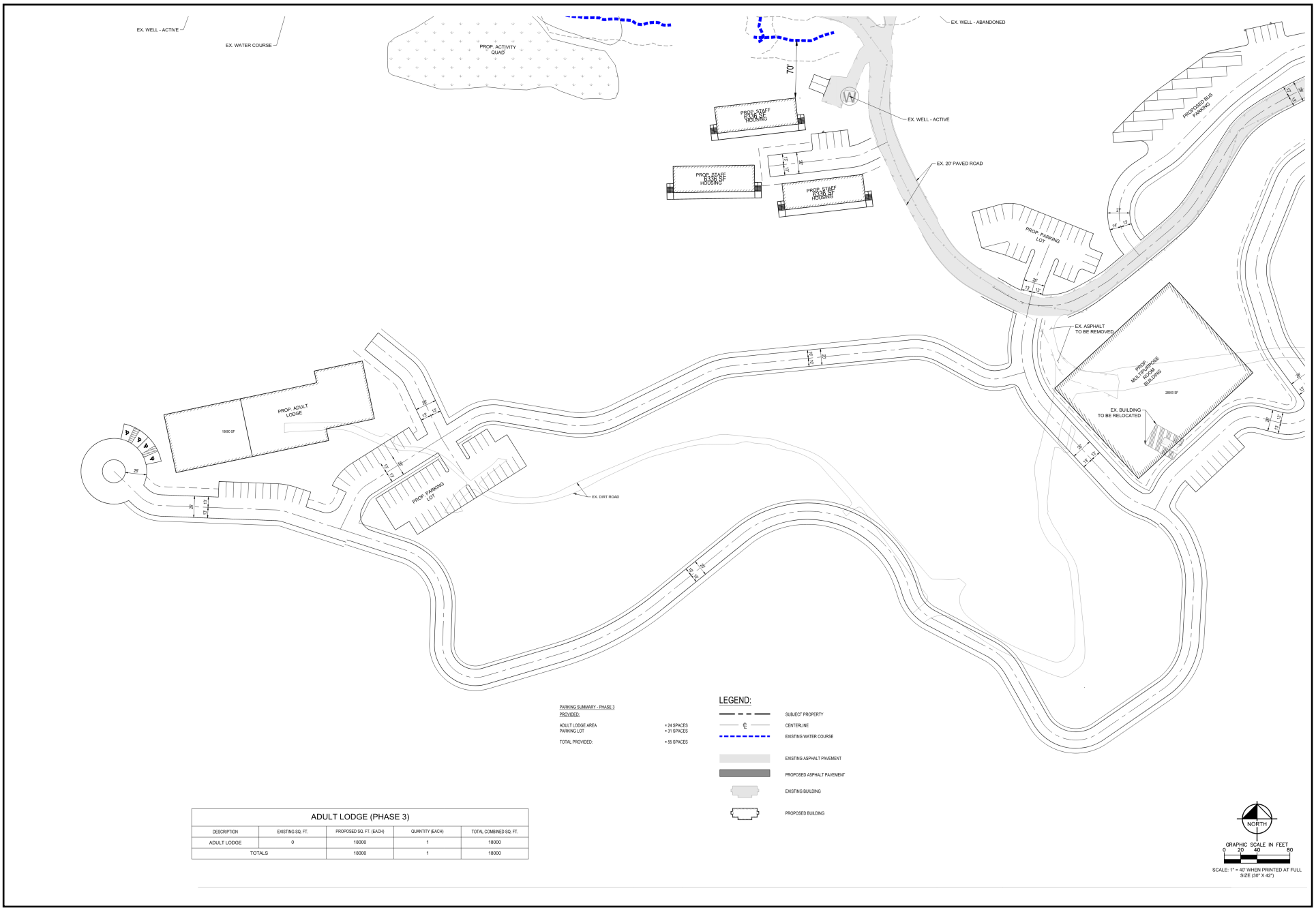
Hume SoCal Campground Expansion Project

San Bernardino County

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ADULT LODGE (PHASE 3)

DESCRIPTION	EXISTING SQ. FT.	PROPOSED SQ. FT. (EACH)	QUANTITY (EACH)	TOTAL COMBINED SQ. FT.
ADULT LODGE	0	18000	1	18000
TOTALS		18000	1	18000

Source: Kimley-Horn, 2025 X

Figure 6d: Phase 3 Site Plan

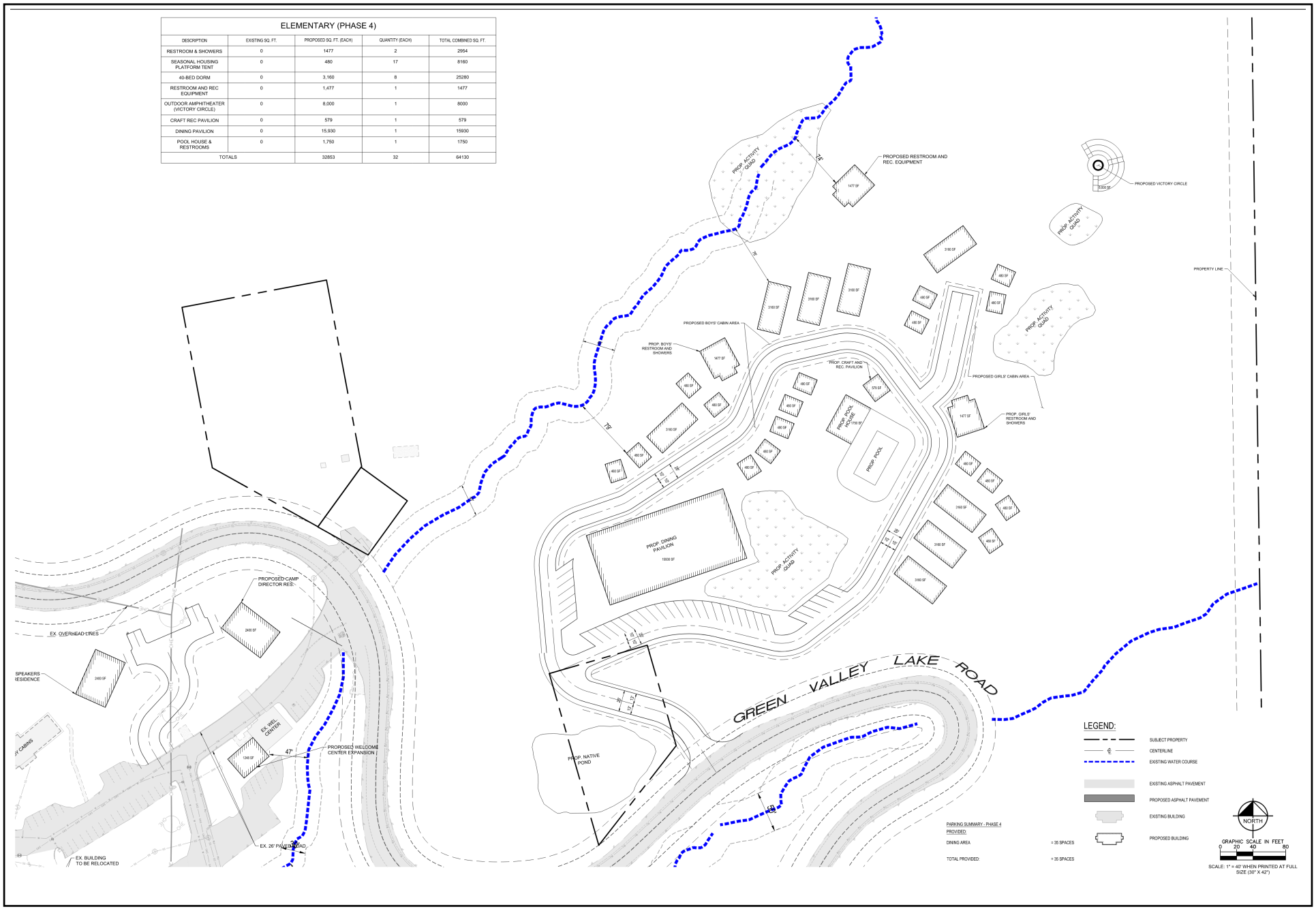
Hume SoCal Campground Expansion Project

San Bernardino County

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Source: Kimley-Horn, 2025.

Figure 6e: Phase 4 Site Plan

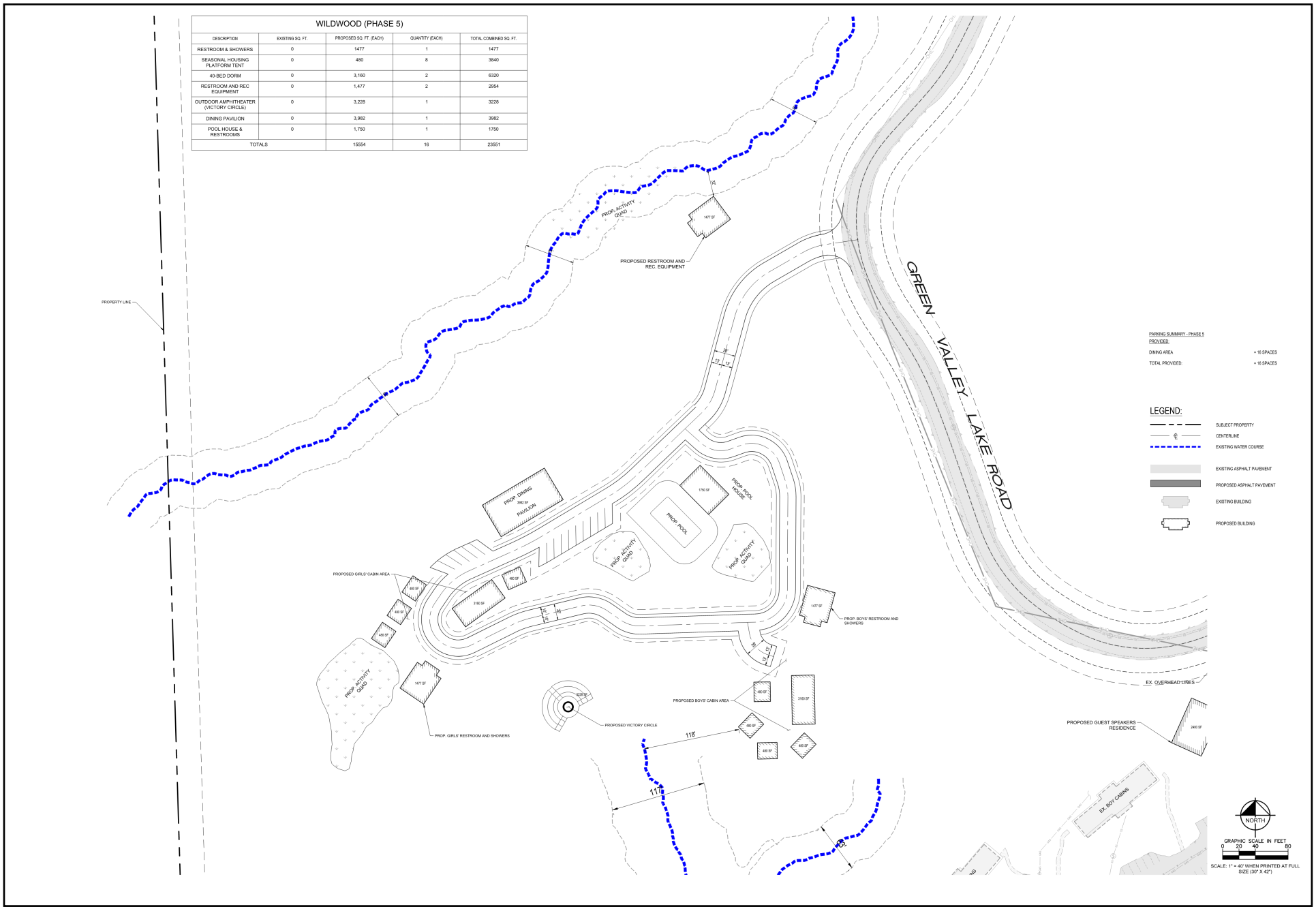
Hume SoCal Campground Expansion Project

San Bernardino County

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Source: Kimley-Horn, 2025

Figure 6f: Phase 5 Site Plan

Hume SoCal Campground Expansion Project

San Bernardino County

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3.0 INITIAL STUDY CHECKLIST

1. **Project title:**

   Hume SoCal Campground Expansion Project (Project)

2. **Lead agency name and address:**

   County of San Bernardino (County)
   385 North Arrowhead Ave,
   San Bernardino, CA 92415

3. **Contact person and phone number:**

   Elena Barragan, Senior Planner
   Land Use Services Department
   (909) 387-8311

4. **Project location:**

   Hume SoCal Campground
   32355 Green Valley Lake Road
   Green Valley Lake, CA 92341

5. **Project sponsor's name and address:**

   Rick Parkinson
   CEO/President
   Premier Interior Development
   771 Chambers Lane, Unit 300
   Simi Valley, CA 93065

6. **General plan category:**

   Rural Living (RL: 1 dwelling unit/2.5 acre max)

7. **Zoning:**

   Hilltop Special Development Residential (HT/SD-RES)

8. **Description of project: (Describe the whole action involved, including but not limited to later phases of the project, and any secondary, support, or off-site features necessary for its implementation. Attach additional sheets if necessary.)**

   The Project is the expansion of an existing 107-acre Hume SoCal Campground that currently has a guest capacity of 300 persons and is operated by Hume Lake Christian Camps. The Project will enlarge the area of the campground by approximately 144 acres and increase the number of guests that could be accommodated by up to 2,700 persons. Upon completion of the Project, the total area of the campground would be approximately 252.1 acres and would have a capacity of up to 3,000 persons. The Project would be constructed in up to five phases.

9. Surrounding land uses and setting: Briefly describe the project's surroundings:

The Project site is in a rural, forested mountain area in Green Valley Lake, an unincorporated community in the County's Mountain Region, Hilltop Community (HTC). As the Project site is in a rural area, there is limited development of any kind in the immediate vicinity. It is generally surrounded in all directions by the San Bernardino National Forest. There are several streams that pass through the Project site. The nearest large water feature to the Project site is Green Valley Lake approximately one mile to the northeast. Other unincorporated communities are present within approximately five miles from the Project site – Arrowbear Lake, Running Springs, Snow Valley, and Skyforest. The Project site is approximately 14 miles north of the downtown area of the City of San Bernardino. Road infrastructure in the vicinity is limited. Green Valley Lake Road passes through the northeastern portion of the Project site. The Project site is approximately 0.4 mile northwest of SR-18.

10. Other public agencies whose approval is required (e.g., permits, financing approval, or participation agreement.)

Additional approval may be required from the Regional Water Quality Control Board (RWQCB), California Department of Fish and Wildlife (CDFW), and United States Army Corps of Engineers (USACE) regarding impacts to streams.

11. Have California Native American tribes traditionally and culturally affiliated with the project area requested consultation pursuant to Public Resources Code section 21080.3.1? If so, is there a plan for consultation that includes, for example, the determination of significance of impacts to tribal cultural resources, procedures regarding confidentiality, etc.?

The County provided written notices to interested California Native American tribes on the list provided by the Native American Heritage Commission (NAHC). Consistent with the NAHC list, California Native American Tribes were contacted pursuant to Assembly Bill (AB) 52. The following tribes were notified: Agua Caliente Band of Cahuilla Indians, Augustine Band of Cahuilla Mission Indians, Cabazon Band of Mission Indians, Cahuilla Band of Indians, Gabrieleno Band of Mission Indians – Kizh Indian, Gabrieleno/Tongva San Gabriel Band of Mission Indians, Gabrielino /Tongva Nation, Gabrielino Tongva Indians of California Tribal Council, Gabrielino Tongva Indians of California Tribal Council, Gabrielino-Tongva Tribe, Los Coyotes Band of Cahuilla and Cupeño Indians, Morongo Band of Mission Indians, Pala Band of Mission Indians, Pechanga Band of Indians, Quechan Tribe of the Fort Yuma Reservation, Ramona Band of Cahuilla, Rincon Band of Luiseno Indians, San Manuel Band of Mission Indians, Santa Rosa Band of Cahuilla Indians, Serrano Nation of Mission Indians, Soboba Band of Luiseno Indians, and Torres-Martinez Desert Cahuilla Indians. Furthermore, PaleoWest (Cultural Resources Consultant) requested a search on September 2, 2022 of the Sacred Lands File (SFL) from the NAHC to determine if the NAHC had any knowledge of Native American cultural resources within the immediate vicinity of the Project. The NAHC suggested contacting 23 individuals representing 20 Native American tribal groups to find out if they had additional information about the Project area. On November 14, 2022, scoping letters were sent to all of the recommended tribal contact via email or mail. Follow up calls were made on December 2, 2022.A total of nine (9) responses were received and are attached to the Cultural Resources Investigation.

From the County's notice process, as of April 14, 2023, one responses was received from the following tribe: Yuhaaviatam of San Manuel Nation. Please refer to ***Tribal Cultural Resources***, for further details on Tribal Consultation.

NOTE: Conducting consultation early in the CEQA process allows tribal governments, lead agencies, and project proponents to discuss the level of environmental review, identify and address potential adverse impacts to tribal cultural resources, and reduce the potential for delay and conflict in the environmental review process. (See Public Resources Code section 21080.3.2.) Information may also be available from the California Native American Heritage Commission's Sacred Lands File per Public Resources Code section 5097.96 and the California Historical Resources Information System administered by the California Office of Historic Preservation. Please also note that Public Resources Code section 21082.3(c) contains provisions specific to confidentiality.

3.1 Environmental Factors Potentially Affected

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a "Potentially Significant Impact" as indicated by the checklist on the following pages.

- ☐ Aesthetics
- ☒ Air Quality
- ☐ Agricultural and Forestry Resources
- ☒ Biological Resources
- ☒ Cultural Resources
- ☐ Energy
- ☒ Geology/Soils
- ☐ Greenhouse Gas Emissions
- ☐ Hazards & Hazardous Materials
- ☐ Hydrology/Water Quality
- ☐ Land Use/Planning
- ☐ Mineral Resources
- ☐ Noise
- ☐ Population/Housing
- ☐ Public Services
- ☐ Recreation
- ☒ Transportation
- ☐ Tribal Cultural Resources
- ☒ Utilities/Service Systems
- ☒ Wildfire
- ☒ Mandatory Findings of Significance

DETERMINATION:

On the basis of this initial evaluation (check one):

☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

☒ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

☐ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

☐ I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

CERTIFICATION:

Signature

11/06/2025
Date

4.0 ENVIRONMENTAL ANALYSIS

AESTHETICS

ENVIRONMENTAL IMPACTS Issues		Potentially Significant Issues	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
1.	**AESTHETICS. Except as provided in Public Resources Code Section 21099, would the project:**				
a)	Have a substantial adverse effect on a scenic vista?			X	
b)	Substantially damage scenic resources, including but not limited to trees, rock outcroppings, and historic buildings within a state scenic highway?			X	
c)	In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?			X	
d)	Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?			X	

a) Have a substantial adverse effect on a scenic vista?

Less than Significant Impact. While the Countywide Plan's Policy Plan does not officially designate any scenic vistas near the Project site, the San Gabriel and San Bernardino mountains, along with the Jurupa Hills are still considered a valuable visual resource for the County, adjacent cities, and region. The Project site is located within the Mountain Region of unincorporated County, specifically within the HCAG area. Additionally, the Project would be consistent with the Hilltop/Special Development Residential (HT/SD-RES) zoning, which primarily allows for larger-scale master planned developments. HT/SD-RES zones allow for the development of campground uses, with the approval of a CUP. The Project has been prepared in conformance with the goals and policies of the CWP and HCAG in providing an expanded planned recreational development, creating new opportunities for employment and recreation, while preserving the natural and scenic features of the surrounding environment. Therefore, due to the Project's lack of diminishing effects on scenic vistas, a less-than-significant impact would occur, and no mitigation is required.

b) Substantially damage scenic resources, including but not limited to trees, rock outcroppings, and historic buildings within a state scenic highway?

Less than Significant Impact. There are no State Scenic Highways within or near to the Project site. The closest eligible State Scenic Highway is SR-18 between Big Bear Boulevard and the Crestline

Cutoff.[12] The closest point of this segment is located approximately 0.4 mile to the east of the Project site. The closest officially designated State Scenic Highway to the Project site is State Route 38 (SR-38) between South Fork Campground in Angeles Oaks and State Lane in Big Bear in the San Bernardino Mountains.[13] The closest point of this segment is approximately 15 miles to the southeast of the Project site. Therefore, construction and operation of the Project site would not damage or obstruct a scenic resource (i.e., trees, rock outcroppings, or historic buildings) within a State Scenic Highway. SR-18 and Green Valley Lake Road are each considered a County Scenic Route.[14] As the Project would maintain existing visual character through use of compatible building materials and shielding structure visibility with the heavily forested area, impacts to scenic highways would be less than significant. Additionally, no State Scenic Highways would be impacted by the buildout of the Project. As such, impacts would be less than significant.

c) *In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?*

Less than Significant Impact. The Project is not located in an urbanized area as defined by CEQA Guidelines Section 15191(m)(1). For an unincorporated area, an "urbanized" area must meet the density requirements set forth by CEQA Guidelines Section 15191(m)(1). That is, the unincorporated area must be (i) completely surrounded by one or more incorporated cities, (ii) have a population of at least 100,000 persons either by itself or in combination with the surrounding incorporated city or cities, and (iii) have a population density that at least equals the population density of the surrounding city or cities, or the County Board of Supervisors has prepared a draft document by which the Board would find that the general plan, zoning ordinance, and related policies and programs applicable to the unincorporated area are consistent with principles that: (i) encourage compact development in a manner that promotes efficient transportation systems, economic growth, affordable housing, energy efficiency, and an appropriate balance of jobs and housing, and (ii) protects the environment, open space, and agricultural areas. Based on these criteria, the Project site is not located within an urbanized area. Therefore, the following analysis will evaluate whether the Project would substantially degrade the existing visual character or quality of public views of the site and its surroundings.

The Project would involve the expansion of the existing Hume SoCal Campground to include additional campground and recreational uses in a manner consistent with the existing campground uses. The Project has been prepared in conformance with the goals and policies of the CWP and HCAG in providing an expansion of an existing campground. Additionally, the Project is near the Green Valley Lake Forest Drive County Scenic Route, according to the CWP. Also, the Project has been prepared in conformance with the County Development Code criteria for projects with an

[12] California Department of Transportation. 2021. *State Scenic Highway Map*. Available at https://caltrans.maps.arcgis.com/apps/webappviewer/index.html?id=465dfd3d807c46cc8e8057116f1aacaa (accessed August 2023).
[13] County of San Bernardino. 2019. *San Bernardino Countywide Plan Draft PEIR Section 5.1 Aesthetics.* Page 5.1-1. Available at https://countywideplan.com/wp-content/uploads/sites/68/2021/01/Ch_05-01-AE.pdf (accessed August 2023).
[14] County of San Bernardino. 2020. *San Bernardino Countywide Policy Plan Map NR-2*. https://countywideplan.com/wp-content/uploads/sites/68/2021/02/NR-3-Scenic-Routes-Highways-201027.pdf (accessed July 2025).

Open Space (OS) Overlay (County Development Code Section 82.19.040 Development Criteria within Scenic Areas).

Construction activities are not anticipated to substantially degrade the existing visual character or quality of public views. Construction activities would be temporary and equipment, vehicles, and materials are expected to be staged within a designated area in the Project site during construction activities. All construction activity and equipment staging would cease upon completion of construction. Furthermore, the surrounding land is predominately vacant, i.e., forest land and uninhabited. Therefore, short-term construction impacts to the existing visual character and quality would be less than significant.

Approximately 107 acres of the Project site is currently developed with improvements related to the existing Hume SoCal Campground facilities. The remaining surrounding area, including the approximately 144-acre expansion area, contains forest land. Due to the rural, mountainous nature of the surrounding area and the forested setting, public views would be limited to those from Green Valley Lake Road, which generally traverses the northeast part of the Project site. The Project would not substantially alter the visual character of the area, as the existing Hume SoCal Campground is located on the same site and does not significantly affect or degrade the views of the surrounding area. The change from the existing conditions to the proposed conditions is minimal as the expansion of the campground would be consistent with, and maintain, the rural, minimally developed character of the existing campground. That is, the proposed improvements to the Project site would not introduce any visually incompatible uses, architectural styles, or otherwise adverse visual elements. Therefore, the change in visual character would not significantly impact the site or the surrounding area. Therefore, the Project is not anticipated to substantially degrade the existing visual character.

Lastly, any improvements associated with the Project would be relatively minimal. Improvements within the undeveloped areas of the Project site would be rural in character typical of campground facilities and integrate with the natural landscape consistent with the CWP and County Development Code to preserve the aesthetic of the Project site. The Project site is subject to the County's Open Space (OS) Overlay, as defined by County Development Code Section 82.19.030 Special Requirements for Natural Resources. As such, development of the Project would be subject to the unique OS Overlay development criteria (Section 82.19.040 Development Criteria within Scenic Areas), which includes (but is not limited to) the following applicable requirements:

- Structure placement and style shall be compatible and not detract from the visual setting or obstruct significant views;
- Land development proposals, including but not limited to residential facilities, commercial activities, and mobile home parks/manufactured homeland-lease communities, shall be designed to blend into the natural landscape and maximize visual attributes of the natural vegetation and terrain. The design of development proposals shall also provide for maintaining a natural open space parallel to and visible from the right-of-way;

- Right-of-way access drives shall be minimized. Developments involving concentrations of commercial activities shall be designed to function as an integral unit with standard parking and right-of-way access drives;
- Removing native vegetation, especially timber, shall be minimized, and replacement vegetation and landscaping shall be compatible with the local environment and, where practicable, capable of surviving with minimum maintenance and supplemental water. Landscaping and plantings shall not obstruct significant views when installed or when they reach mature growth;
- A large-scale development should restrict the number of access points by providing common access roads. Parking and outside storage areas shall be screened from view to the maximum extent feasible, from either the Scenic Highway or the adjacent scenic or recreational resource by existing topography, by the placement of structures, or by landscaping and plantings that are compatible with the local environment and, where practicable, are capable of surviving with a minimum of maintenance and supplemental water;
- Utilities shall be constructed and routed underground except in those situations where natural features prevent the underground siting or where safety considerations necessitate above-ground construction and routing. Above-ground utilities shall be constructed and routed to minimize detrimental effects on the visual setting of the designated area. Where it is practical, above-ground utilities shall be screened from view from either the Scenic Highway or the adjacent scenic or recreational resource by existing topography or by placement of structures;
- The alteration of the site's natural topography shall be minimized and shall avoid detrimental effects on the visual setting of the designated area and the existing natural drainage system. Alterations of the natural topography shall be screened from view from either the Scenic Highway or the adjacent scenic or recreational resource by landscaping and plantings that harmonize with the natural landscape of the designated area and are capable of surviving with a minimum of maintenance and supplemental water;
- Timber harvesting within or adjacent to the right-of-way shall be limited to what is necessary to maintain and enhance the quality of the forest; and
- Wireless telecommunication facilities shall be allowed within a scenic area pursuant to County Development Code Chapter 84.27 (Wireless Telecommunication Facilities) of this Code.

With compliance to all applicable local policies and regulations (i.e., those described above), the Project would not result in a substantial change in visual character such that the site or its surrounding area would be adversely affected. Therefore, the Project would result in a less than significant impact and no mitigation is necessary.

d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?

Less than Significant Impact. Existing sources of light and glare are minimal to non-existent in the Project's immediate vicinity due to the Project site being in a rural, mountainous area. Existing light sources associated with existing Hume SoCal Campground facilities are similarly minimal due to the purpose of the facilities as a campground. Construction of the Project would be limited to the daytime hours of construction permitted (between the hours of 7:00 a.m. to 7:00 p.m. and would

not occur on Sundays or federal holidays as stated in the County Building Code Standards (Section 150.003 Construction: Hours of Construction) (unless otherwise approved by the County), and nighttime lighting would only be required seasonally. Along with the limited use of additional light sources due to daytime construction, light trespass would be negligible as the construction would not introduce substantially brighter light sources during the day. Therefore, no short-term impacts associated with light and glare would occur.

Additionally, the Project would comply with the County Light Trespass Ordinance which was adopted in December 2021. The ordinance requires light fixtures to be designed with shielding to contain lighting spillage within 0.1 footcandle for the Mountain Region.

Once operational, the buildings would use interior and exterior lighting. Consistent with Section 83.07.060 (Glare and Outdoor Lighting – Mountain and Desert Region) of the County's Development Code, all exterior lighting used on the Project site would be subject to the following requirements:

- Be fully shielded.
- Light pollution and trespass would be minimized through the use of directional lighting, fixture location, and height.
- Automated control systems such as motion sensors and timers.
- All outdoor lighting shall be extinguished by 11:00 p.m., close of business, or when people are no longer present in exterior areas, whichever is later.

Therefore, long-term impacts associated with light and glare would be less than significant.

Cumulative Impacts

The cumulative study area for aesthetic impacts is the viewshed of the Project site and surrounding areas. The geographic context for cumulative aesthetic impacts would be viewsheds visible from the Project site. Cumulative developments would be those whose effects would cumulatively impact the San Bernardino mountains. However, the Project area's existing Hume SoCal Campground facilities would minimize potential aesthetic impacts as future development would be less likely to stand out or contrast with established development patterns. Ongoing development within the Project area would have the potential to increase the amount of light and glare present. Each phase of development in the Project area would, however, be required to comply with policies and regulations set forth by the CWP and San Bernardino County Development Code. Consequently, cumulative development would not result in significant cumulative environmental impacts in conflict with aesthetics requirements for preserving visual character, public views, scenic vistas and resources, or requirements for minimizing and controlling potential light and glare. Therefore, the Project would not cause a cumulatively considerable impact on aesthetics, and no mitigation is required.

AGRICULTURE AND FORESTRY RESOURCES

ENVIRONMENTAL IMPACTS Issues	Potentially Significant Issues	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
2. AGRICULTURE AND FORESTRY RESOURCES. In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board. Would the project:				
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?				X
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?				X
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?			X	
d) Result in the loss of forest land or conversion of forest land to non-forest use?			X	
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?			X	

a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?

No Impact. Pursuant to California Government Code (CGC) Section 65570, the California Department and Conservation (DOC) Farmland Mapping and Monitoring Program compiles important farmland maps for the State. These maps combine soil survey and current land use information to provide an inventory of agricultural resources in each county, based on data from the U.S. Department of Agriculture and Natural Resources Conservation Service (NRCS). The maps

show urbanized lands and a qualitative sequence of agricultural designations. County, State, and Federal Agencies have established the following classifications of important agricultural land based on factors such as soil characteristics, climate, and water supply. Based on review of the California DOC Important Farmland maps, neither the Project site nor any adjacent land is designated as Prime Farmland, Unique Farmland, or Farmland of Statewide Importance. The Project site and adjacent land area falls outside of the NRCS soil survey and are therefore not mapped by the Farmland Mapping and Monitoring Program (FMMP).[15] As such, the Project would not convert any Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland) to a non-agricultural use, and there is no impact.

b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?

No Impact. The California Land Conservation Act of 1965 (CGC Sections 51200 et. seq.), referred to as the Williamson Act, allows local governments to contract with private landowners for the purpose of restricting specific parcels of land to agricultural or related open space use. In return, landowners receive property tax assessments which are much lower than normal because they are based upon farming and open space uses as opposed to full market value.[16] The California DOC distributes mapping data that depicts the land enrolled in Williamson Act contracts. Based on a review of California DOC's data, which depicts enrolled land as of 2022, the Project site does not contain land enrolled in a Williamson Act contract.[17]

According to the County's Land Use Map, the Project site is not currently designated or zoned for agricultural use.[18,19] The Project site is zoned Hilltop/Special Development Residential (HT/SD-RES). Additionally, the corresponding land use category of the Project site is currently Rural Living (RL). Additionally, the Project site is not currently in use for agricultural activities. Therefore, the Project would not conflict with existing zoning for agricultural use or a Williamson Act contract and there is no impact.

c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?

Less Than Significant Impact. Forestland is defined in Public Resources Code Section 12220(g) as: "Land that can support 10 percent native tree cover of any species, including hardwoods, under natural conditions, and that allows for management of one or more forest resources, including timber, aesthetics, fish and wildlife, biodiversity, water quality, recreation, and other public benefits." Timberland is defined in Public Resources Code Section 4526 as: "Land, other than land

[15] California Dept. of Conservation. 2016. *California Important Farmland Finder*. Available at https://maps.conservation.ca.gov/dlrp/ciff/ (accessed June 2023).
[16] California Department of Conservation. 2023. *Williamson Act Program*. Available at https://www.conservation.ca.gov/dlrp/wa (accessed June 2023).
[17] California Department of Conservation. 2023. *California Williamson Act Enrollment 2022* [Dataset]. Available at https://gis.conservation.ca.gov/portal/home/item.html?id=aed46e5566a244fdafc8b276fb3fa791 (accessed January 24, 2024).
[18] County of San Bernardino. 2020. *LU-1 Land Use Map*. Available at https://www.arcgis.com/apps/webappviewer/index.html?id=f23f04b0f7ac42e987099444b2f46bc2 (accessed June 2023).
[19] County of San Bernardino. 2020. *NR-5 Agricultural Resources.* Available at https://www.arcgis.com/apps/webappviewer/index.html?id=fcb9bc427d2a4c5a981f97547a0e3688 (accessed September 2021).

owned by the federal government and land designated by the board as experimental forest land, which is available for, and capable of, growing a crop of trees of any commercial species used to produce lumber and other forest products, including Christmas trees." While, the County does not have land use categories specific to these resources, County land use categories that do allow farmland and forest land include Rural Living (RL), Very Low Density Residential (VLDR), Resource/Land Management (RLM), and Open Space (OS). The Open Space (OS) land use category is present in the unincorporated portion of the County where the Project site resides. The Project site is zoned Hilltop/Special Development Residential (HT/SD-RES). Additionally, the corresponding land use category of the Project site is currently Rural Living (RL). The Project is consistent with the existing zoning and land use category of the Project site. Therefore, while the Project site contains forest land, implementation of the Project would not conflict with existing zoning for, or cause rezoning of, forest land or timberland. Therefore, impacts would be less than significant.

d) Result in the loss of forest land or conversion of forest land to non-forest use?

Less Than Significant Impact. Refer to ***Impact 2(c)***, above. The Project site contains forest land. According to the Land Cover layer in the California Department of Fish and Wildlife's BIO Viewer[20], the majority of the Project site is classified as evergreen forest. The Project site is subject to the County's Open Space (OS) Overlay, as defined in County Development Code Section 82.19.030 Special Requirements for Natural Resources. As such, development of the Project would be subject to the unique OS Overlay development criteria (Section 82.19.040 Development Criteria within Scenic Areas), which includes limitations on timber harvesting and the removal of native vegetation, especially timber. Therefore, with compliance with applicable local regulations, the Project would not result in the loss of forest land or conversion of forest land to non-forest use, and a less than significant impact would occur.

e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural use or conversion of forest land to non-forest use?

Less than Significant Impact. As discussed above under ***Impacts 2(a)*** and ***2(b)***, neither the Project site nor this portion of the unincorporated County contain areas designated for agriculture, forest land, or timberland. The County does not have land use categories specific to these resources. County land use categories that do allow farmland and forest land include Rural Living (RL), Very Low Density Residential (VLDR), Resource/Land Management (RLM), and Open Space (OS). The Open Space (OS) land use category is present in the unincorporated portion of the County where the Project site resides, which does not allow agricultural land use. The Project site does not contain existing agricultural uses. Therefore, impacts related to the conversion of farmland or forest land would be less than significant.

[20] California Department of Fish and Wildlife. 2016. *BIOS, NLCD 2016 Land Cover layer*. Available at https://apps.wildlife.ca.gov/bios/?bookmark=940 (accessed February 2024).

Cumulative Impacts

As discussed above, implementation of the Project would have a less than significant impact on agricultural or forestry resources. The Project site is zoned Hilltop (HT)/SD-RES and has a land use designation of Rural Living (RL). Although the Project site is not designated as forest land, the Project site is within forest land and contains permitted land uses within forest land. The Project site is currently developed with campground land uses and would be expanded upon, limiting impacts to forest land as approximately 227 of the 252.1-acre site would be preserved as open space/ forest land. The Project is consistent with the existing zoning and land use category of the Project site. Therefore, while the Project site contains forest land, implementation of the Project would not conflict with existing zoning for, or cause rezoning of, forest land or timberland. Agricultural land uses are not present or permitted within the Project site. As such, the Project would not contribute to an existing cumulative impact, even when combined with past, present and future projects; thus, the Project's contribution would not be cumulatively considerable.

AIR QUALITY

ENVIRONMENTAL IMPACTS Issues	Potentially Significant Issues	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
3. AIR QUALITY. Where available, the significance criteria established by the applicable air quality management district or air pollution control district may be relied upon to make the following determinations. Would the project:				
a) Conflict with or obstruct implementation of the applicable air quality plan?		X		
b) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard?		X		
c) Expose sensitive receptors to substantial pollutant concentrations?			X	
d) Result in other emissions (such as those leading to odors adversely affecting a substantial number of people?			X	

An Air Quality Assessment was conducted by Kimley-Horn (**Appendix C: Air Quality Assessment**), which evaluates the potential construction and operational emissions associated with the Project and determined the level of impact the Project would have on the environment. Additionally, the Air Quality Assessment provides mitigation measures to reduce potentially significant impacts to less than significant levels, where applicable.

1a) Conflict with or obstruct implementation of the applicable air quality plan?

Less Than Significant With Mitigation Incorporated. As part of its enforcement responsibilities, the United States Environmental Protection Agency (U.S. EPA) requires each state with nonattainment areas to prepare and submit a State Implementation Plan (SIP) that demonstrates the means to attain the National Ambient Air Quality Standards (NAAQS). The SIP must integrate federal, State, and local plan components and regulations to identify specific measures to reduce pollution in nonattainment areas, using a combination of performance standards and market-based programs. Similarly, under State law, the California Clean Air Act (CCAA) requires an air quality attainment plan to be prepared for areas designated as nonattainment regarding the California Ambient Air Quality Standards (CAAQS) and NAAQS. Air quality attainment plans outline emissions limits and control measures to achieve and maintain these standards by the earliest practical date.

The Project is located within the South Coast Air Basin (SCAB), which is under the jurisdiction of the South Coast Air Quality Management District (SCAQMD). The SCAQMD is required, pursuant to the Federal Clean Air Act (FCAA), to reduce emissions of criteria pollutants for which the SCAB

is in nonattainment. To reduce such emissions, the SCAQMD drafted the 2022 Air Quality Management Plan (AQMP) which establishes a program of rules and regulations directed at reducing air pollutant emissions and achieving CAAQS and NAAQS. The 2022 AQMP is a regional and multi-agency effort including the SCAQMD, the California Air Resources Board (CARB), the Southern California Association of Governments (SCAG), and the U.S. EPA. The plan's pollutant control strategies are based on the latest scientific and technical information and planning assumptions, including SCAG's Connect SoCal 2024-2050 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS), updated emission inventory methodologies for various source categories, and SCAG's latest growth forecasts. SCAG's latest growth forecasts were defined in consultation with local governments and with reference to local general plans. The Project is subject to the SCAQMD's AQMP.

Criteria for determining consistency with the AQMP are defined by the following indicators:

- **Consistency Criterion No. 1:** The Project will not result in an increase in the frequency or severity of existing air quality violations, or cause or contribute to new violations, or delay the timely attainment of air quality standards or the interim emissions reductions specified in the AQMP.
- **Consistency Criterion No. 2:** The Project will not exceed the assumptions in the AQMP, or increments based on the years of the Project build-out phase.

According to the SCAQMD's CEQA Air Quality Handbook, the purpose of the consistency finding is to determine if a project is inconsistent with the assumptions and objectives of the regional air quality plans, and thus if it would interfere with the region's ability to comply with CAAQS and NAAQS.

The violations to which Consistency Criterion No. 1 referred are the CAAQS and NAAQS. As shown in **Table 3**, the Project would not exceed construction emission standards with the implementation of **Mitigation Measure (MM) AQ-1**. As shown in **Table 4** and **Table 7**, the Project would not exceed operational emission standards or local significance thresholds. Therefore, the Project would not contribute to an existing air quality violation. Thus, the Project would be consistent with the first criterion.

Concerning Consistency Criterion No. 2, the AQMP contains air pollutant reduction strategies based on SCAG's latest growth forecasts, and SCAG's growth forecasts were defined in consultation with local governments and with reference to local general plans. The Project would not require a General Plan Amendment (GPA) or a Zone Change and the Project would be consistent with the land uses planned for the site. As such, the Project would not result in substantial unplanned growth or unaccounted for growth in the CWP or job growth projections used by the SCAQMD to develop the AQMP. Thus, a less than significant impact would occur, as the Project is also consistent with the second criterion.

b) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard?

Less Than Significant With Mitigation Incorporated.

Construction. Project construction activities would generate temporary emissions of criteria air pollutants. The criteria pollutants of primary concern within the Project area are O_3-precursor pollutants (i.e., reactive organic gases [ROG] and NO_X) and PM_{10} and $PM_{2.5}$. Construction-related emissions are of temporary duration, lasting only as long as construction activities occur, but would be considered a significant air quality impact if the volume of pollutants generated exceeds the SCAQMD's thresholds of significance.

Construction results in the temporary generation of emissions resulting from site grading, road paving, motor vehicle exhaust associated with construction equipment and worker trips, and the movement of construction equipment, especially on unpaved surfaces. Emissions of airborne particulate matter are largely dependent on the amount of ground disturbance associated with site preparation activities as well as weather conditions and the appropriate application of water. Fugitive dust emissions may have a substantial, temporary impact on local air quality. In addition, fugitive dust may be a nuisance to those living and working in the Project vicinity. Uncontrolled dust from construction can become a nuisance and potential health hazard to those living and working nearby.

The Project's construction emissions were calculated using the CalEEMod computer program, which is designed to model emissions for land use development projects, based on typical construction requirements. Refer to the Air Quality Modeling Data provided within **Appendix C** for more information regarding the construction assumptions used in this analysis. Predicted maximum daily construction-generated emissions for the Project are summarized in **Table 3: Construction-Related Emissions**.

Table 3: Construction-Related Emissions

Construction Year	Maximum Pounds Per Day[1]					
	ROG	NO_X	CO	SO_2	PM_{10}	$PM_{2.5}$
Unmitigated Emissions						
2025	16.2	141.0	137.0	0.40	44.6	21.0
2026	6.3	19.5	33.2	0.05	2.6	1.1
2027	6.2	18.8	32.5	0.05	2.5	1.1
SCAQMD Threshold	*75*	*100*	*550*	*150*	*150*	*55*
Exceed SCAQMD Threshold?	**No**	**Yes**	**No**	**No**	**No**	**No**
Mitigated Emissions[2]						
2025	7.3	55.9	137.0	0.40	40.7	17.5
2026	4.8	7.1	35.5	0.05	2.0	0.6
2027	4.8	7.0	34.9	0.05	2.0	0.6
SCAQMD Threshold	*75*	*100*	*550*	*150*	*150*	*55*
Exceed SCAQMD Threshold?	**No**	**No**	**No**	**No**	**No**	**No**

Construction Year	Maximum Pounds Per Day[1]					
	ROG	NO_X	CO	SO_2	PM_{10}	$PM_{2.5}$
ROG = Reactive Organic Gases; NO_X = Nitrogen Oxides; CO = Carbon Monoxide; SO_2 = Sulfur Dioxide; PM_{10} = Particulate Matter 10 microns in diameter or less; $PM_{2.5}$ = Particulate Matter 2.5 microns in diameter or less						
1. SCAQMD Rule 403 Fugitive Dust applied. The Rule 403 reduction/credits include the following: properly maintain mobile and other construction equipment; replace ground cover in disturbed areas quickly; water exposed surfaces three times daily; water all haul roads twice daily; and limit speeds on unpaved roads to 15 miles per hour. 2. MM AQ-1 requires off-road equipment 50 horsepower or greater to meet CARB Tier 4 Final standards during construction activities.						
Source: CalEEMod version 2022.1.1.20 Refer to **Appendix C** for model outputs.						

SCAQMD Rules 402 and 403 (prohibition of nuisances, watering of inactive and perimeter areas, track out requirements, etc.), are applicable to the Project and were applied in CalEEMod to minimize fugitive dust emissions. Rule 1113 provides specifications on painting practices and regulates the ROG content of paint. As required by law, all architectural coatings for the Project structures would comply with SCAQMD Rule 1113.

As shown in **Table 3**, unmitigated construction emissions would exceed the SCAQMD threshold for NO_X during the first year of construction. **MM AQ-1** requires all off-road equipment 50 horsepower or greater to meet CARB Tier 4 Final standards, reducing NO_X emissions below the SCAQMD construction standard. With the implementation of **MM AQ-1**, construction emissions would be below the SCAQMD's thresholds, and impacts would be less than significant.

Operations. Project operational emissions are those attributed to vehicle trips (mobile emissions), the use of natural gas and electricity (energy source emissions), consumer products, architectural coatings, and landscape maintenance equipment (area source emissions). CalEEMod was used to calculate emissions based on the proposed land uses for the Project and the number of trips generated.

Table 4: Operational Emissions illustrates the operational emissions from the Project. As shown in **Table 4**, Project emissions would not exceed SCAQMD thresholds for any criteria pollutants. As such, the Project would not violate any air quality standards or contribute substantially to an existing air quality violation. Therefore, Project operations would result in a less than significant long-term regional quality impact.

Table 4: Operational Emissions

Construction Year	Maximum Pounds Per Day[1]					
	ROG	NO_X	CO	SO_2	PM_{10}	$PM_{2.5}$
Unmitigated Emissions						
Area Source Emissions	6.56	0.08	9.11	<0.01	0.02	0.01
Energy Emissions	0.14	2.52	2.12	0.02	0.19	0.19
Mobile Emissions	0.55	1.03	10.00	0.03	2.58	0.67
Total Emissions	**7.25**	**3.63**	**21.23**	**0.05**	**2.79**	**0.87**
SCAQMD Threshold	*55*	*55*	*550*	*150*	*150*	*55*
Exceeds Threshold?	**No**	**No**	**No**	**No**	**No**	**No**
ROG = Reactive Organic Gases; NO_X = Nitrogen Oxides; CO = Carbon Monoxide; SO_2 = Sulfur Dioxide; PM_{10} = Particulate Matter 10 microns in diameter or less; $PM_{2.5}$ = Particulate Matter 2.5 microns in diameter or less						
Source: CalEEMod version 2022.1.1.20 Refer to **Appendix C** for model outputs.						

Cumulative Construction Impacts. The SCAB is designated nonattainment for O_3, PM_{10}, and $PM_{2.5}$ for the CAAQS and nonattainment for O_3 and $PM_{2.5}$ for the NAAQS. Appendix D of the SCAQMD White Paper on Potential Control Strategies to Address Cumulative Impacts from Air Pollution (2003) notes that projects that result in emissions that do not exceed the project specific SCAQMD regional thresholds of significance should result in a less than significant impact on a cumulative basis unless there is other pertinent information to the contrary. The mass-based regional significance thresholds published by the SCAQMD are designed to ensure compliance with both NAAQS and CAAQS and are based on an inventory of projected emissions in the SCAB. Therefore, if a project is estimated to result in emissions that do not exceed the thresholds, the project's contribution to the cumulative air quality impact in the SCAB would not be cumulatively considerable. As shown in **Table 3** above, construction-related emissions, with the incorporation of construction mitigation measure **MM AQ-1,** would not exceed the SCAQMD significance thresholds for criteria pollutants. Therefore, the Project would not generate a cumulatively considerable contribution to air pollutant emissions during construction.

The SCAQMD has developed strategies to reduce criteria pollutant emissions outlined in the AQMP pursuant to the FCAA mandates. The analysis assumed fugitive dust controls would be utilized during construction, including frequent water applications. SCAQMD rules, mandates, and compliance with adopted AQMP emissions control measures would also be imposed on construction projects throughout the SCAB, which would include related projects. Compliance with SCAQMD rules and regulations would further reduce Project construction-related emissions. Therefore, Project-related construction emissions, combined with those from other projects in the area, would not substantially deteriorate local air quality. The Project's construction-related emissions would not result in a cumulatively considerable contribution to significant cumulative air quality.

Cumulative Operational Impacts. The SCAQMD has not established separate significance thresholds for cumulative operational emissions. The nature of air emissions is largely a cumulative impact. As a result, no single project is sufficient in size to, by itself, result in nonattainment of ambient air quality standards. Instead, individual project emissions contribute to existing cumulatively significant adverse air quality impacts. The SCAQMD developed the operational thresholds of significance based on the level above which individual project emissions would result in a cumulatively considerable contribution to the SCAB's existing air quality conditions. Therefore, a project that exceeds the SCAQMD operational thresholds would also be a cumulatively considerable contribution to a significant cumulative impact.

As shown in **Table 4** above, the Project's operational emissions would not exceed SCAQMD thresholds. As a result, operational emissions associated with the Project would not result in a cumulatively considerable contribution to significant cumulative air quality impacts. A less than significant impact would occur in this regard.

Plans, Programs, and Policies

Existing requirements based on local, state, or federal regulations or laws are frequently required independently of CEQA review. Typical requirements include compliance with the provisions of the Building Code, California Green Building Standards Code (CalGreen Code), local municipal code, SCAQMD Rules, etc. Because Plans, Programs, and Policies (PPP) are neither Project specific nor a result of development of the Project, they are not considered to be project design features or mitigation measures.

PPP-1 Prior to the issuance of grading permits, the County Engineer shall confirm that the Grading Plan, Building Plans and Specifications require all construction contractors to comply with South Coast Air Quality Management District's (SCAQMD's) Rules 402 and 403 to minimize construction emissions of dust and particulates. The measures include, but are not limited to, the following:

- Portions of a construction site to remain inactive longer than a period of three months will be seeded and watered until grass cover is grown or otherwise stabilized.
- All on-site roads will be paved as soon as feasible or watered periodically or chemically stabilized.
- All material transported off-site will be either sufficiently watered or securely covered to prevent excessive amounts of dust.
- The area disturbed by clearing, grading, earthmoving, or excavation operations will be minimized at all times.
- Where vehicles leave a construction site and enter adjacent public streets, the streets will be swept daily or washed down at the end of the work day to remove soil tracked onto the paved surface.

PPP-2 Pursuant to SCAQMD Rule 1113, the Project applicant shall require by contract specifications that the interior and exterior architectural coatings (paint and primer including parking lot paint) products used would have a volatile organic compound rating of 50 grams per liter or less.

PPP-3 Require diesel powered construction equipment to turn off when not in use per Title 13 of the California Code of Regulations, Section 2449.

Mitigation Measures:

MM AQ-1 Prior to issuance of grading permits, the applicant shall prepare and submit documentation to the County of San Bernardino that demonstrate the following:

- All off-road diesel-powered construction equipment greater than 50 horsepower meets California Air Resources Board Tier 4 Final off-road emissions standards. Requirements for Tier 4 Final equipment shall be included in applicable bid documents and successful contractor(s) must demonstrate the ability to supply such equipment. A copy of each unit's Best Available Control Technology (BACT) documentation (certified tier specification or model year specification), and CARB or SCAQMD operating

permit (if applicable) shall be provided to the County at the time of mobilization of each applicable unit of equipment.

c) Expose sensitive receptors to substantial pollutant concentrations?

Less Than Significant Impact.

Localized Construction Significance Analysis. To identify impacts to sensitive receptors, the SCAQMD recommends addressing Localized Significance Thresholds (LSTs) for construction. LSTs were developed in response to SCAQMD Governing Boards' Environmental Justice Enhancement Initiative (I-4). The SCAQMD provided the *Final Localized Significance Threshold Methodology* (dated June 2003 [revised 2008]) for guidance. The LST methodology assists lead agencies in analyzing localized impacts associated with Project-specific emissions.

Since CalEEMod calculates construction emissions based on the number of equipment hours and the maximum daily soil disturbance activity possible for each piece of equipment, **Table 5: Equipment-Specific Grading Rates** is used to determine the maximum daily disturbed acreage for comparison to LSTs. The appropriate source receptor area (SRA) for the localized significance thresholds is the Central San Bernardino Mountains (SRA 37) since this area includes the Project. LSTs apply to NO_2, CO, PM_{10}, and $PM_{2.5}$. The SCAQMD produced look-up tables for projects that disturb areas less than or equal to 5 acres in size. Project construction is anticipated to disturb a maximum of 4 acres in a single day during the grading phase. As the LST guidance provides thresholds for projects disturbing 1-, 2-, and 5-acres in size and the thresholds increase with size of the site, the LSTs for a 4-acre area were interpolated and utilized for this analysis.

Table 5: Equipment-Specific Grading Rates

Construction Phase	Equipment Type	Equipment Quantity	Acres Graded per 8-Hour Day	Operating Hours per Day	Acres Graded per Day
Grading	Tractors	2	0.5	8	1
	Graders	1	0.5	8	0.5
	Dozers	1	0.5	8	0.5
	Scrapers	2	1	8	2
Maximum Acres Graded per Day					**4**
Source: CalEEMod version 2022.1.1.20. Refer to **Appendix C** for model outputs.					

The SCAQMD's methodology states that "off-site mobile emissions from the Project should not be included in the emissions compared to LSTs." Therefore, only "on-site" emissions included in the CalEEMod outputs were considered. The nearest sensitive receptor to the Project is another campground, Camp Pondo, located approximately 1,200 feet (366 meters) to the east, on the opposite side of Green Valley Lake Road. LST thresholds are provided for distances to sensitive receptors of 25, 50, 100, 200, and 500 meters. Therefore, LSTs for receptors located at 366 meters were interpolated and utilized in this analysis. **Table 6: Localized Significance of Construction Emissions**, presents the results of localized emissions during construction. **Table 6** shows that Project emissions of these pollutants on the peak day of construction would not exceed SCAQMD

thresholds at the nearest sensitive receptor. Therefore, the Project would result in a less than significant impact concerning LSTs during construction.

Table 6: Localized Significance of Construction Emissions

Construction Activity	Maximum Pounds Per Day			
	NO_X	CO	PM_{10}	$PM_{2.5}$
Unmitigated Emissions				
Demolition	4.51	18.2	0.06	0.06
Site Preparation	2.59	28.3	19.8	10.2
Grading	4.43	35.3	9.51	3.8
Building Construction	2.82	14.8	0.08	0.07
Paving	7.45	9.98	0.35	0.32
Architectural Coating	0.65	0.96	0	0
Combined Emissions from Overlapping Phases	22.45	107.54	29.8	14.45
SCAQMD Localized Screening Threshold (adjusted for 4 acres at 366 meters)	*614*	*17,995*	*166*	*78*
Exceed SCAQMD Threshold?	**No**	**No**	**No**	**No**
NO_X = Nitrogen Oxides; CO = Carbon Monoxide; PM_{10} = Particulate Matter 10 microns in diameter or less; $PM_{2.5}$ = Particulate Matter 2.5 microns in diameter or less				
Source: CalEEMod version 2022.1.1.20. Refer to **Appendix C** for model outputs.				

Localized Operational Significance Analysis. Interpolated LSTs for receptors located at 1,200 feet for SRA 37 were used in this analysis. The Project site is approximately 252.1 acres, the 5-acre threshold was conservatively used for evaluation of operational emissions. As noted above, the LSTs increase as site acreage increases. Therefore, the 5-acre LSTs are conservative for evaluation of a 252.1-acre site. The LST analysis only includes on-site sources. However, the CalEEMod model outputs do not separate on- and off-site emissions for mobile sources. For a worst-case scenario assessment, the emissions shown in **Table 7: Localized Significance of Operational Emissions** conservatively include one hundred percent of the total mobile emissions.

Table 7: Localized Significance of Operational Emissions

Activity	Maximum Pounds Per Day			
	NO_X	CO	PM_{10}	$PM_{2.5}$
Onsite Operational Emissions	3.55	21.2	2.79	0.87
SCAQMD Localized Screening Threshold (adjusted for 5-acre at 366 meters)	*648*	*18,561*	*41*	*20*
Exceed SCAQMD Threshold?	**No**	**No**	**No**	**No**
NO_X = Nitrogen Oxides; CO = Carbon Monoxide; PM_{10} = Particulate Matter 10 microns in diameter or less; $PM_{2.5}$ = Particulate Matter 2.5 microns in diameter or less				
Source: CalEEMod version 2022.1.1.20. Refer to **Appendix C** for model outputs.				

Daily on-site operational emissions are compared to the LST thresholds in **Table 7**. **Table 7** shows that the maximum daily emissions of these pollutants during Project operations would not result in significant concentrations of pollutants at nearby sensitive receptors. Therefore, the Project would result in a less than significant impact concerning LSTs during operational activities.

Criteria Pollutant Health Impacts. On December 24, 2018, the California Supreme Court issued an opinion identifying the need to provide sufficient information connecting a project's air emissions to health impacts or explain why such information could not be ascertained (Sierra Club v. County of Fresno [Friant Ranch, L.P.] [2018] Cal.5th, Case No. S219783). The SCAQMD has set its CEQA significance thresholds based on the FCAA, which defines a major stationary source (in extreme O_3 nonattainment areas such as the SCAB) as emitting 10 tons per year. The thresholds correlate with the trigger levels for the federal New Source Review (NSR) Program and SCAQMD Rule 1303 for new or modified sources. The NSR Program was created by the FCAA to ensure that stationary sources of air pollution are constructed or modified in a manner that is consistent with attainment of health-based NAAQS. The NAAQS establish the levels of air quality necessary, with an adequate margin of safety, to protect the public health. Therefore, projects that do not exceed the SCAQMD's LSTs and mass emissions thresholds would not violate any air quality standards or contribute substantially to an existing or projected air quality violation and no criteria pollutant health impacts would occur.

NO_X and ROG are precursor emissions that form O_3 in the atmosphere in the presence of sunlight where the pollutants undergo complex chemical reactions. It takes time and the influence of meteorological conditions for these reactions to occur, so O_3 may be formed at a distance downwind from the sources. Breathing ground-level O_3 can result health effects that include reduced lung function, inflammation of airways, throat irritation, pain, burning, or discomfort in the chest when taking a deep breath, chest tightness, wheezing, or shortness of breath. In addition to these effects, evidence from observational studies strongly indicates that higher daily O_3 concentrations are associated with increased asthma attacks, increased hospital admissions, increased daily mortality, and other markers of morbidity. The consistency and coherence of the evidence for effects upon asthmatics suggests that O_3 can make asthma symptoms worse and can increase sensitivity to asthma triggers.

According to the SCAQMD's 2022 AQMP, O_3, NO_X, and ROG have been decreasing in the SCAB since 1975 and are projected to continue to decrease in the future. Although vehicle miles traveled in the SCAB continue to increase, NO_X and ROG levels are decreasing because of the mandated controls on motor vehicles and the replacement of older polluting vehicles with lower-emitting vehicles. NO_X emissions from electric utilities have also decreased due to the use of cleaner fuels and renewable energy. The 2022 AQMP demonstrates how the SCAQMD's control strategy to meet the 8-hour O_3 standard in 2037. In addition, since NO_X emissions also lead to the formation of $PM_{2.5}$, the NO_X reductions needed to meet the O_3 standards will likewise lead to improvement of $PM_{2.5}$ levels and attainment of $PM_{2.5}$ standards.

The SCAQMD's air quality modeling demonstrates that NO_X reductions prove to be much more effective in reducing O_3 levels and will also lead to significant improvement in $PM_{2.5}$ concentrations.

NO_X-emitting stationary sources regulated by the SCAQMD include Regional Clean Air Incentives Market (RECLAIM) facilities (e.g., refineries, power plants, etc.), natural gas combustion equipment (e.g., boilers, heaters, engines, burners, flares) and other combustion sources that burn wood or propane. The 2016 AQMP identifies robust NO_X reductions from new regulations on RECLAIM facilities, non-refinery flares, commercial cooking, and residential and commercial appliances. Such combustion sources are already heavily regulated with the lowest NO_X emissions levels achievable but there are opportunities to require and accelerate replacement with cleaner zero-emission alternatives, such as residential and commercial furnaces, pool heaters, and backup power equipment. The AQMD plans to achieve such replacements through a combination of regulations and incentives. Technology-forcing regulations can drive development and commercialization of clean technologies, with future year requirements for new or existing equipment. Incentives can then accelerate deployment and enhance public acceptability of new technologies.

As previously discussed, localized effects of on-site Project emissions on nearby receptors for the Project would be less than significant (refer to **Table 6** and **Table 7**). The LSTs represent the maximum emissions from a project that are not expected to cause or contribute to an exceedance of the most stringent applicable state or federal ambient air quality standard. The LSTs were developed by the SCAQMD based on the ambient concentrations of that pollutant for each SRA and distance to the nearest sensitive receptor. The ambient air quality standards establish the levels of air quality necessary, with an adequate margin of safety, to protect public health, including protecting the health of sensitive populations. However, as discussed above, neither the SCAQMD nor any other air district currently have methodologies that would provide Lead Agencies and CEQA practitioners with a consistent, reliable, and meaningful analysis to correlate specific health impacts that may result from a proposed project's mass emissions. Information on health impacts related to exposure to O_3 and PM emissions published by the U.S. EPA and CARB have been summarized and discussed in the Air Quality Assessment. Health studies are used by these agencies to set the NAAQS and CAAQS.

The NAAQS and CAAQS were developed to protect the most susceptible population groups from adverse health effects and were established in terms of parts per million or micrograms per cubic meter for the applicable emissions. As stated earlier, the mass emission thresholds were established primarily in conjunction with federal permitting "major source" thresholds. If emissions were below these "de minimis" emission rates, then the Project is presumed to conform with the NAAQS. While based on the status of an air basin level of attainment of the health-based NAAQS, emissions in excess of the mass emission thresholds from one project does not mean the air basin would experience measurably higher ground level concentrations, or more frequent occurrences of ground level concentrations in exceedance of standards or delay timely attainment of a particular NAAQS.

Ozone concentrations are dependent upon a variety of complex factors, including the presence of sunlight and precursor pollutants, natural topography, nearby structures that cause building downwash, atmospheric stability, and wind patterns. Because of the complexities of predicting ground-level O_3 concentrations in relation to the NAAQS and CAAQS, none of the health-related

information can be directly correlated to the pounds/day or tons/year of emissions estimated from a single, proposed project. It should also be noted that this analysis identifies health concerns related to PM, CO, O_3, and NO_2. The Air Quality Assessment includes a list of criteria pollutants and summarizes common sources and effects. Thus, this analysis is reasonable and intended to foster informed decision making.

Diesel Particulate Matter. Exhaust from diesel engines contains a mixture of gases and solid particles. These solid particles are known as diesel particulate matter (DPM). DPM contains hundreds of different chemicals, many of which are harmful to human health. During the grading phase of construction, diesel trucks hauling soil and other material will make approximately 447 one-way trips (refer to **Appendix C** for CalEEMod outputs), to and from the site each workday. Trips from the Project site travel along Green Valley Lake Road to SR-18. Based on CalEEMod estimates, diesel trucks transporting soil and materials to the site would generate approximately 0.39 pound per day of PM_{10} exhaust which is conservatively assumed to be entirely DPM emissions. Based on CalEnviroScreen 4.0 results, the Project is located in an area that falls within the 3rd percentile for California in DPM emissions, meaning the Project is within the lowest range reported 0-10. As such, the Project's emissions would represent a low incremental contribution to the background DPM concentrations.

The amount to which the receptors are exposed (a function of concentration and duration of exposure) is the primary factor used to determine health risk (i.e., potential exposure to toxic air contaminant emission levels that exceed applicable standards). Health-related risks associated with diesel-exhaust emissions are primarily linked to long-term exposure and the associated risk of contracting cancer. The use of diesel-powered construction equipment would be episodic and would occur throughout the Project site.

Section 2485 and Section 2449 of Title 13 of the CCR limits diesel-fueled motor vehicle idling to no more than five minutes. Section 2449 limits idling for off-road diesel-fueled fleets. Section 2485 limits idling for diesel-fueled commercial motor vehicles with gross vehicle weight ratings of greater than 10,000 pounds that are or must be licensed to operate on publicly maintained highways and streets within California. Project construction is subject to and would comply with California regulations limiting the idling of heavy-duty construction equipment to no more than five minutes which would further reduce nearby sensitive receptors' exposure to temporary and variable DPM emissions.

The duration of exposure would be short, and exhaust from construction equipment dissipates rapidly. Current models and methodologies for conducting health risk assessments are associated with longer-term exposure periods of 9, 30, and 70 years, which do not correlate well with the temporary and highly variable nature of construction activities.

As noted above, construction activities would limit idling to no more than five minutes, which would further reduce nearby sensitive receptors' exposure to temporary and variable DPM emissions. Furthermore, even during the most intense period of construction, emissions of DPM would be generated from different locations on the Project site rather than in a single location

because different types of construction activities (e.g., site preparation and building construction) would not occur at the same place at the same time.

Furthermore, SCAQMD's *Multiple Air Toxics Exposure Study* (MATES V) (August 2021) shows that carcinogenic risk from air toxics in the SCAB, based on the average concentrations at the 10 monitoring sites, is approximately 40 percent lower than the monitored average in *MATES IV* (2015) and 84 percent lower than the average in MATES II (2000). The results of SCAQMD's ongoing research in air toxics shows that risk levels are decreasing despite development and vehicle traffic growth. This trend is expected to continue with the implementation of the various statewide policies focused on reducing mobile source emissions. Therefore, the temporary addition of 0.39 pound per day of DPM during the construction grading phase would result in a less than significant impact.

Carbon Monoxide (CO) Hotspots. An analysis of CO "hot spots" is needed to determine whether the change in the level of service of an intersection resulting from the Project would have the potential to result in exceedances of the CAAQS or NAAQS. It has long been recognized that CO exceedances are caused by vehicular emissions, primarily when vehicles are idling at intersections. Vehicle emissions standards have become increasingly stringent in the last 20 years. Currently, the CO standard in California is a maximum of 3.4 grams per mile for passenger cars (requirements for certain vehicles are more stringent). With the turnover of older vehicles, the introduction of cleaner fuels, and implementation of control technology on industrial facilities, CO concentrations have steadily declined. Accordingly, with the steadily decreasing CO emissions from vehicles, even very busy intersections do not result in exceedances of the CO standard.

The SCAB was re-designated as attainment in 2007 and is no longer addressed in the SCAQMD's AQMP. The 2003 AQMP is the most recent version that addresses CO concentrations. As part of the SCAQMD *CO Hotspot Analysis*, the Wilshire Boulevard and Veteran Avenue intersection, one of the most congested intersections in southern California with an average daily traffic (ADT) volume of approximately 100,000 vehicles per day, was modeled for CO concentrations. This modeling effort identified a CO concentration high of 4.6 parts per million (ppm), which is well below the 35-ppm federal standard. The Project considered herein would not produce the volume of traffic required to generate a CO hot spot in the context of SCAQMD's *CO Hotspot Analysis*. As the CO hotspots were not experienced at the Wilshire Boulevard and Veteran Avenue intersection even as it accommodates 100,000 vehicles daily, it can be reasonably inferred that CO hotspots would not be experienced at any vicinity intersections resulting from a maximum of 225 additional vehicle trips on Sundays attributable to the Project. Therefore, impacts would be less than significant.

d) Result in other emissions (such as those leading to odors adversely affecting a substantial number of people?

Less Than Significant Impact.

Construction. Odors that could be generated by construction activities are required to follow SCAQMD Rule 402 to prevent odor nuisances on sensitive land uses. SCAQMD Rule 402, Nuisance, states:

> *A person shall not discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health or safety of any such persons or the public, or which cause, or have a natural tendency to cause, injury or damage to business or property.*

Construction equipment emissions, such as diesel exhaust, and volatile organic compounds from architectural coatings and paving activities, may generate odors. However, these odors would be temporary, are not expected to affect a substantial number of people and would disperse rapidly. Therefore, Project construction activities would not result in objectionable odors that would adversely affect a substantial number of people and impacts would be less than significant.

Operations. The SCAQMD CEQA Air Quality Handbook identifies certain land uses as sources of odors. These land uses include agriculture (farming and livestock), wastewater treatment plants, food processing plants, chemical plants, composting facilities, refineries, landfills, dairies, and fiberglass molding. The Project would not include any of the land uses that have been identified by the SCAQMD as odor sources. Therefore, Project operations would not result in odors that would adversely affect people. A less than significant impact would occur.

Cumulative Impacts

The Project Phases would not conflict with an applicable air quality plan as the Project Phases would be constructed and operated within SCAQMD AQMP regulations as outlined in **MM AQ-1**. The Project Phases would also not exceed criteria air pollutant thresholds and would not make a cumulatively considerable contribution to a significant cumulative impact. Additionally, the Project Phases would not expose sensitive receptors to substantial pollutant concentrations as all relevant regulations would be followed to ensure minimize impacts. As such, cumulative impacts would be considered less than significant with the incorporation of **MM AQ-1**.

BIOLOGICAL RESOURCES

ENVIRONMENTAL IMPACTS Issues	Potentially Significant Issues	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
4. BIOLOGICAL RESOURCES. Would the project:				
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?		X		
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or US Fish and Wildlife Service?			X	
c) Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?				X
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?			X	
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?			X	
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?				X

A Biological Resources Assessment was conducted by ELMT Consulting, Inc. (**Appendix A1: Biological Resources Assessment**), which evaluates the Project site to establish baseline conditions of the environment and to assess the site for the potential for special-status plants and wildlife species to occur within the Project site that could pose an environmental constraint to implementation of the Project. Additionally, ELMT Consulting, Inc. conducted a Delineation of State and Federal Jurisdictional Waters for the Project, provided as **Appendix A2: Delineation of State and Federal Jurisdictional Waters**, which documents the regulatory authority of the U.S. Army Corps of Engineers (USACE), the Regional Water Quality Control Board (RWQCB), and the California Department of Fish and Wildlife (CDFW) pursuant to

Section 401 and 404 of the Federal Clean Water Act (CWA), the California Porter-Cologne Water Quality Control Act, and Sections 1600 *et. seq.* of the California Fish and Game Code.

a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?

Less Than Significant With Mitigation Incorporated.

The Project site is not located within federally designated Critical Habitat. The nearest Critical Habitat to the site occurs approximately 2.5 miles to the east for ash-grey paintbrush (*Castilleja cinerea*), 3.2 miles to the north for the southwestern willow flycatcher (*Empidonax traillii extimus*), and 3.3 miles to the west for the mountain yellow-legged frog (*Rana muscosa*), refer to **Appendix A1**. Therefore, no impacts to federally designated Critical Habitat would occur from implementation of the Project.

No special-status plant species were observed during the field investigation. Based on habitat requirements for the identified special-status species, known species distributions, and the quality and availability of habitats present, it was determined that the Project site has to the potential to support the following species:

- Coville's dwarf abronia (*Abronia nana* var. *covillei*; CNPS 4.2)
- Palmer's mariposa lily (*Caolochortus palmeri* var. *palmeri*; CNPS 1B.2)
- San Bernardino Mountains owl's clover (*Castilleja lasiorhyncha*; CNPS 1B.2))
- Parish's alumroot (*Heuchera parishii*; CNPS 1B.3)
- Lemon lily (*Lilium parryi*; CNPS 1B.2)
- Silky lupine (*Lupinus elatus*; CNPS 4.3)
- Parish's yampah (*Perideridia parishii* ssp. *parishii*; CNPS 2B.2)
- Laguna Mountains jewelflower (*Strepthanthus bernardinus*; CNPS 4.3)
- Southern jewelflower (*Streptanthus campestris*; CNPS 1B.3)

None of the aforementioned special-status plant species are federally or state listed as endangered or threatened. They are designated with CNPS Rare Plant Ranks 4.2, 4.3, 2B.2, 1B.2, and 1B.3. As such, if any of the aforementioned special-status plant species were observed onsite, their small, isolated populations would not contribute meaningfully to the conservation of their relative species. No focused surveys are recommended.

No special-status animal species were observed during the field investigation. Based on habitat requirements for the identified special-status species, and known distributions, it was determined that the Project site has the potential to support the following special-status wildlife species:

- Cooper's hawk (Accipiter cooperii)

- arroyo toad (Anaxyrus californicus)
- golden eagle (Aquila chrysaetos)
- long-eared owl (*Asio otus*)
- San Bernardino golden-mantled ground squirrel (*Callospermophilus lateralis bernardinus*)
- Southern rubber boa (*Charina umbratica*)
- Olive-sided flycatcher (*Contopus cooperi*)
- San Bernardino flying squirrel (Glaucomys oregonensis californicus)
- Bald eagle (Haliaeetus leucocephalus)
- White-eared pocket mouse (Perognathus alticola alticola)
- Purple martin (*Progne subis*)
- California spotted owl (Strix occidentalis occidentalis)
- Two-striped gartersnake (*Thamnophis hammondii*)

Of the aforementioned species, arroyo toad is listed as federally endangered; golden eagle is federally protected; southern rubber boa is listed as threated in California; and bald eagle is listed as endangered in California and is federally protected.

The tall, mature trees provide suitable nesting habitat for both golden eagle and bald eagle, and the open, disturbed areas scattered throughout the Project site provide hunting opportunities for both raptor species. Additionally, bald eagle has been observed nearby. Neither of these species were observed within the Project site at the time of the investigation. However, out of an abundance of caution, a preconstruction nesting bird clearance survey (**MM BIO-1** and **MM BIO-2**) would be conducted prior to ground disturbance to ensure impacts to golden eagle and bald eagle do not occur as a result of Project implementation.

Based on regional significance and listing status, the potential occurrence of California spotted owl, southern rubber boa, and San Bernardino flying squirrel are described in further detail below and in the Biological Resources Assessment (**Appendix A1**).

Other special-status animal species would be screened for prior to grading and construction activities under **MM BIO-1** to ensure proper protection for special status species.

Arroyo Toad

The arroyo toad has been designated by USFWS as a federally endangered species. Habitat suitable for the arroyo toad is present on the Project site; however, the arroyo toad was not observed on site and indications of its presence were not noted. Therefore, it is assumed to be absent from the Project site; however, **MM BIO-1** would be implemented to ensure proper screening for the arroyo toad prior to Project grading and construction activities.

California Spotted Owl

The California spotted owl has been designated by the CDFW as a species of special concern and is also considered a sensitive species in the San Bernardino National Forest by the U.S. Forest Service. The Project site supports high quality habitat and generally primarily consists of undisturbed forested areas along with areas which have undergone varying levels of disturbance in association with campground development and recreational areas. Therefore, it was determined that there is a high potential for California spotted owl to occur onsite. However, the Project would be constructed adjacent to previously disturbed areas that do not provide as high of quality habitat for spotted owl as the undeveloped areas on the periphery of the Project site. Prior to implementation of each phase of the Project, a clearance survey would be conducted to ensure spotted owl remain absent from the Project site according to **MM BIO-1**. Therefore, impacts to the California spotted owl would be less than significant.

Southern Rubber Boa

The southern rubber boa has been designated by the CDFW as a threatened species under the California Endangered Species Act and is also considered a sensitive species in the San Bernardino National Forest by the U.S. Forest Service. The periphery of the Project site supports rock outcrops suitable for hibernacula and other debris for shelter. Therefore, it was determined that the undisturbed areas on the Project site have a moderate potential to support southern rubber boa.[21] The Project would be constructed adjacent to previously disturbed areas that do not provide as high of quality habitat for southern rubber boa as the undeveloped areas on the periphery of the Project site. The Project would be constructed adjacent to previously disturbed areas, reducing impacts to non-disturbed land which provides suitable habitat for southern rubber boa. To ensure the absence of southern rubber boa from site specific locations prior to grading activities, **MM BIO-1** would be implemented. Therefore, impacts to the southern rubber boa would be less than significant.

San Bernardino Flying Squirrel

The San Bernardino flying squirrel is not a listed species by USFWS or CDFW. However, CDFW has designated San Bernardino flying squirrel a species of special concern. It is also considered a sensitive species in the San Bernardino National Forest by the U.S. Forest Service. The historic distribution of the San Bernardino flying squirrel includes both the San Bernardino and San Jacinto Mountains. The Project site consists primarily of heavily forested, undisturbed areas with a dense canopy with larger, older trees which provide suitable nesting, denning, and gliding habitat for flying squirrels. Additionally, the understory in these areas is composed of adequate woody debris which provides suitable habitat for moss and truffle for flying squirrel to forage. Due to the high quality of onsite habitat and the occurrence of San Bernardino flying squirrel in nearby areas, it was determined that the Project site has a high potential to support San Bernardino flying squirrel.[22] The Project would be constructed adjacent to previously disturbed areas that do not provide as high of quality habitat for San Bernardino flying squirrel as the undeveloped areas on

[21] ELMT Consulting, Inc. 2023. *Hume SoCal Campground Project Biological Resources Assessment*, page 9.
[22] ELMT Consulting, Inc. 2023. *Hume SoCal Campground Project Biological Resources Assessment*, page 10.

the periphery of the Project site. Prior to implementation of each phase of the Project, a clearance survey would be conducted to ensure San Bernardino flying squirrel remain absent from the Project site, in accordance with **MM BIO-1**. Therefore, impacts to the San Bernardino flying squirrel would be less than significant with the implementation of mitigation.

Additionally, in order to ensure no impact to nesting birds, including Cooper's hawk, golden eagle, long-eared owl, olive-sided flycatcher, bald eagle, purple martin, and California spotted owl do not occur, the Project would comply with **MM BIO-2.** After implementation of **MM BIO-1** and **MM BIO-2**, Project impacts would be less than significant.

Mitigation Measures

MM BIO-1 In order to protect special-status wildlife species such as the arroyo toad (*Bufo californicus*), California spotted owl (*Strix occidentalis occidentalis*), Southern rubber boa (*Charina umbratica*), and San Bernardino flying squirrel (*Glaucomys oregonesis californicus*), a pre-construction clearance survey shall be conducted prior to any ground disturbance or vegetation removal activities that may disrupt the species. The Proposed Project biologist shall ensure that impacts to any special-status wildlife observed during preconstruction clearance surveys are reduced or avoided such that impacts are less than significant (e.g., avoidance buffers, relocation from harm's way, etc.).

MM BIO-2 In order to avoid violation of the Migratory Bird Treaty Act (MBTA) and the California Fish and Game Code, site-preparation activities (removal of trees and vegetation) for all Projects shall be avoided, to the greatest extent possible, during the nesting season (generally February 1 to August 31) of potentially occurring native and migratory bird species. If Project development is proposed during the nesting/breeding season (February 1 to August 31), a pre-activity field survey shall be conducted by a qualified biologist prior to ground disturbance to determine if active nests of species protected by the MBTA or the California Fish and Game Code are present in the construction zone. If active nests are not located within the construction zone during the implementation of the Project and there is a buffer of 500 feet from an active listed species or raptor nest, 300 feet of other sensitive or protected bird nests (nonlisted), or 100 feet of sensitive or protected songbird nests, then construction activity may occur during the nesting/breeding season. However, if active nests are located during the pre-activity field survey, no grading or heavy equipment activity shall take place within at least 500 feet of an active listed species or raptor nest, 300 feet of other sensitive or protected (under MBTA or California Fish and Game Code) bird nests (nonlisted), or within 100 feet of sensitive or protect songbird nests until the nest is no longer active.

b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or US Fish and Wildlife Service?

Less Than Significant Impact. A total of seven drainage features (Drainages 1-7) were observed within the boundaries of the Project site during the field delineation; refer to **Appendix A1**. The

on-site drainage features, after flowing off-site, flow into Deep Creek before ultimately flowing into the Mojave River and support native vegetation such as the Willow Riparian Plant Community. Therefore, the onsite drainage features would qualify as waters of the United States under the jurisdiction of the USACE and would qualify as "waters of the State" under the regulatory authority of the RWQCB and CDFW. Any impacts to the on-site jurisdictional areas will require a USACE Clean Water Act Section 404 Permit, RWQCB CWA Section 401 Water Quality Certification, and a CDFW Section 1602 Lake and Streambed Alteration Agreement prior to Project implementation.[23] Acquisition of necessary permits/agreements would reduce impacts regarding jurisdictional features to a level of less than significant.

While observed on other drainage features, the Willow Riparian Woodland plant community is primarily consolidated to riparian areas along much of the middle and eastern portions of Drainage 1, where underlying substrates and immediate topography allows associated species to establish, as depicted by Exhibit 5, Vegetation of the Biological Resources Assessment. As shown on **Figures 6a** through **6f**, Project development would not encroach upon these riparian areas. Therefore, impacts related to riparian habitat would be less than significant.

c) Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological?

No Impact. To qualify as a wetland, a feature must exhibit all three wetland parameters (i.e., vegetation, soils, and hydrology). Although evidence of hydrology (i.e., scour, changes in substrate, shelving) and open water are present, no hydric soils have been mapped as occurring on-site and no anaerobic conditions were observed. While hydrophytic vegetation was observed in portions of Drainages 1, 4, 5, 6, and 7, flows within these drainage features remain sufficiently consistent to prevent the establishment of wetland conditions. Areas with open water tend to be underlain by exposed bedrock with limited, scattered pockets of silty deposits approximately two to six inches in depth, and surface flows constantly replacing existing open water, preventing the development of hydric soil (anaerobic conditions). As a result, no features on-site meet the USACE, state, or RWQCB's wetland definition to quality as jurisdictional wetlands, and no impact would occur in this regard.

d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?

Less than Significant Impact. The Project site is within the Green Valley Lake Community which is a part of the Hilltop Community Action Guide. There are numerous lakes within the area including Green Valley Lake, Arrowbear Lake, and Deep Creek Lake. Deep Creek Lake is a state-designated Wild Trout Stream and is considered eligible for National Wild and Scenic River status due to its scenic, historical/cultural, recreational, and ecological values. Deep Creek and its associated valleys have been identified as a Wildlife Corridor or Linkage.[24] Deep Creek Lake is a state-designated Wild

[23] ELMT Consulting, Inc. 2023. *Hume SoCal Campground Project Biological Resources Assessment*, page 10.
[24] ELMT Consulting, Inc. 2023. *Hume SoCal Campground Project Biological Resources Assessment*, page 13.

Trout Stream and is considered eligible for National Wild and Scenic River status due to its scenic, historical/cultural, recreational, and ecological values. While the named portion of Deep Creek occurs approximately 0.5 mile to the west of the Project site, the site supports a tributary to Deep Creek and the site boundaries overlap with the valley that straddles nearby portions of Deep Creek.

Although partially constrained by existing roadways and buildings, the natural habitats on and surrounding the Project site allow for local wildlife to move from the Project site into the undeveloped areas surrounding the Project site in search of food, shelter, or nesting habitat. However, the Project site does not function as a major wildlife movement corridor or linkage. As such, implementation of the proposed Project is not expected to have a significant impact to wildlife movement opportunities or prevent local wildlife movement through the area since there is ample habitat adjacent to the Project site to support wildlife movement opportunities.

e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

Less than Significant Impact. The Project would not conflict with County of San Bernardino Code of Ordinances pertaining to plant protection, tree conservation, and riparian plant conservation. As mentioned, the Project site is subject to the County's OS Overlay, as defined by County Development Code Section 82.19.030 Special Requirements for Natural Resources. As such, development of the Project would be subject to the unique OS Overlay development criteria (Section 82.19.040 Development Criteria within Scenic Areas), which includes considerations for the preservation of vegetation and timber harvesting. There are no additional local policies or ordinances related to the protection of biological resources, which are applicable to the Project. Therefore, the Project would not conflict with any local policies or ordinances protecting biological resources and a less than significant impact would occur.

f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?

No Impact. The Project site is not located within an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state Habitat Conservation Plan. Therefore, impacts to any local, regional, or state habitat conservation plans are not expected to occur from development of the proposed Project, and mitigation is not required.

Cumulative Impacts

As discussed above, all potential Project impacts to biological resources would be less than significant in consideration of compliance with existing laws, ordinances, regulations and standards, and implementation of proposed mitigation measures. As with the Project, all cumulative development in the area would undergo environmental and design review on a project-by-project basis pursuant to CEQA, in order to evaluate potential impacts to biological resources and avoid or reduce any impacts. There are special-status animal species with moderate or high potential to occur on the Project site. However, implementation of mitigation would avoid potential impacts to burrowing owl and nesting bird species that have any potential to occur on the Project site.

As discussed above, Project-level impacts to biological resources would be less than significant. Standard regulatory requirements and procedures are required of other present and reasonably foreseeable future projects. As a result, the proposed Project taken in sum with past, present, and reasonably foreseeable projects would not result in cumulatively considerable impacts on biological resources with **MM BIO-1** and **MM BIO-2** included.

CULTURAL RESOURCES

ENVIRONMENTAL IMPACTS Issues		Potentially Significant Issues	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
5.	**CULTURAL RESOURCES. Would the project:**				
a)	Cause a substantial adverse change in the significance of a historical resource pursuant to Section 15064.5?			X	
b)	Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5?		X		
c)	Disturb any human remains, including those interred outside of dedicated cemeteries?		X		

Historically, the term "cultural resources" encompassed archaeological, historical, paleontological, and tribal cultural resources, including both physical and intangible remains, or traces left by historic or prehistoric peoples. However, with the recent changes to the CEQA Appendix G, paleontological resources are now included in the ***Geology and Soils*** analysis. Impacts to tribal cultural resources are discussed in ***Tribal Cultural Resources***.

This analysis is based primarily on Chronical Heritage's (formerly PaleoWest) 2023 Cultural Resources Investigation of the Hume SoCal Campground Project (provided as **Appendix D: Cultural Resources Report**).

a) Cause a substantial adverse change in the significance of a historical resource pursuant to in Section 15064.5?

Less Than Significant Impact.

Construction. Construction of the Project would not cause a substantial adverse change in the significance of a historical or archaeological resource pursuant to CEQA Guidelines Section 15064.5. The Cultural Resources Investigation completed by Chronical Heritage included a South Central Coastal Information Center (SCCIC) cultural resources records search, Native American outreach, archival research, a field survey, and resource evaluations. The records search indicated there are 26 previously recorded cultural resources within a one-mile radius of the Project area.[25] Of these 26 resources, four are mapped within the Project area. The four resources within the Project area consist of one prehistoric site (P-36-002306), one prehistoric isolated artifact (P-36-012233), and two historic period built-environment resources (P-36-004887 and P-36-00749). However, none of the previously recorded resources documented within the Project vicinity meet the criteria for a listing on the California Register of Historical Resources (CRHR).

[25] Chronical Heritage (formerly PaleoWest). 2023. *Cultural Resources Investigation of the Hume SoCal Campground Project, San Bernardino County, California,* page 1.

Previously recorded resources within the Project area consisted of P-36-002306 (prehistoric habitation), P-36-004887 (historical railroad grade), P-36-07049 (historical road), and P-36-012233 (prehistoric isolated artifact). As previously stated, one new historic period archaeological resource, an abandoned 1940s pickup truck (22-0563-01H), was documented within the Project area.[26]

- **P-36-002306/CA-SBR-2306: Prehistoric Habitation.** This resource was documented in 1991 by P. Jertberg and J. Marmor as a dispersed scatter of flakes and one bone fragment on the surface outside of an enclosed campfire ring within the Calvary Chapel Youth Camp property. The 1991 site record also mentions a previously documented bedrock mortar that was observed during a previous visit; however, Jertberg and Marmor were not able to relocate the bedrock mortar. The scatter of artifacts was observed within a 50 by 50 meter area and consists of five flakes (siltstone, jasper, chert, metavolcanic, and metasedimentary), one possible biface fragment, and one bone fragment from a medium-sized mammal. Noted disturbances to the site included a dirt road on the south side of the site, a camping area, the campfire circle, and surface disturbances from campground activities.

  The resource was visited and updated in 1992 by Brian D. Dillon who noted that the prehistoric site is located at the old natural amphitheater of Camp Ahwanee, used by the Boy Scouts and others in the 1920s. Dillon noted that previous documentation of the prehistoric archaeological site stated that the site consisted of a single bedrock mortar feature as well as a small surface lithic scatter, but at the time of Dillon's documentation, neither has survived due to repeated disturbance of the area. Additionally, Dillon noted that an area of 40 by 50 meters had been bulldozed. As a result, this resource may no longer be extant.

  This resource was reported as a prehistoric habitation location with a single bedrock mortar and a small lithic scatter. The site has been extensively disturbed by modern development of a recreation center in the same location as the prehistoric site. No signs of the lithic scatter were observed; however, the bedrock mortar was found in addition to a second bedrock mortar. The first mortar is 20 cm in diameter and 11 cm deep on a granite boulder that measures 98 x 60 x 23 cm. The second bedrock mortar is 17 cm in diameter and 11cm deep on a granitic boulder that measures 1.6 x 1 x 0.7 m. The site was updated with the current location of the mortars and a statement on current conditions. The location of the bedrock mortars is the only data remaining at the site. The lithic scatter and any other associated artifacts or features were likely destroyed by the development of a baseball field in the immediate area.

  CA-SBR-2306 is a special-use area likely related to subsistence-based processing activities, such as the milling of native seeds, plant fibers, and/or small mammals. The previously documented lithic scatter was not located and no surface artifacts were identified at the site during the revisit; the area has been extensively disturbed. The absence of surface artifacts suggests that the site lacks substantial buried cultural deposits.

  Extant data indicates that the site does not meet the criteria for listing on the CRHR. CA-SBR-2306 is not associated with events that have made a significant contribution to the broad patterns of history and therefore is recommended as not eligible for listing under Criterion 1.

[26] Ibid.

It is not associated with the lives of persons significant in the past and therefore is recommended as not eligible for listing under Criterion 2. It also does not embody the distinctive characteristics of a type, period, or method of construction, and thus is recommended not eligible under Criterion 3. The site does not contain temporally diagnostic artifacts or any materials suitable for chronometric dating. The lack of chronological control and absence of artifacts mean that temporal and cultural components cannot be defined at CA-SBR-2306. Thus, while the site contains data on settlement organization and land use and subsistence practices, these data lack potential to contribute any new information important to regional prehistory or history. Furthermore, it is unlikely that additional investigations at the site will produce sufficient quantities of artifacts from controlled stratigraphic contexts to overcome these deficiencies. For these reasons, the site is recommended not eligible under CRHR Criterion 4.

- **P-36-004887/CA-SBR-4887H: Historical Railroad Grade.** This site includes two segments of Brookings Railroad grade (P-36-004887/CA-SBR-4887H) within the Project area, however these two segments do not meet the criteria for listing on the CRHR. As such, the two segments of the resources within the Project area do not appear to be eligible for listing on the CRHR under Criterion 1 and 2 and are recommended not eligible for listing. The remnants of the two railroad segments were constructed with second-hand materials by temporary laborers and lumbermen and do not embody the distinctive characteristics of a type, period, or method of construction, and thus is recommended not eligible under Criterion 3. Finally, it is unlikely that these two segments have the potential to broaden our understanding of 20th century railroad construction or lumber activities, or to the history of the San Bernardino Mountains, California, or the United States. Therefore, these segments of P-36-004887/ CA-SBR-4887H do not appear eligible for the CRHR under Criterion 4 and are recommended not eligible for listing.
- **P-36-00749/CA-SBR-7049H: Historic Road.** This site includes a small segment of the historic Rim of the World Drive (P-36-007049/CA-SBR-7049H) located within the Project area. This road segment is currently in use and runs north/south through the campground. This segment of road is paved, in use, and no associated artifacts or evidence of historic period use were observed. Furthermore, this resource extends beyond the Project area. This road segment has been evaluated and recommended eligible for listing on the CRHR under Criterion 1 and was deemed a significant road in southern California history because it opened mountain areas to increased development and recreational use. However, further on this segment was not recommended eligible for listing on either the CRHR or the NRHP due to the road being realigned, rerouted, and resurfaced.

  The segment of the road within the current Project area does not appear to retain historic integrity and is in regular use by the campground and has been subject to modern maintenance and improvements resulting in the loss of integrity. The road appears well maintained and does not exhibit any historical significance outside of the documented alignment. Additionally, the road is not directly associated with an important historical figure, it does not exhibit any architectural or engineering merits, and it does not have the data potential to yield information important to the study of the San Bernardino Mountains,

California, or the United States. As such, the segment of the resource within the current Project area does not appear to meet the criteria for listing on the CRHR.

- **P-36-012233: Prehistoric Isolated Artifact.** This resource is a prehistoric isolated, fragmented, millingstone that was recorded by Sheets and Kile in 2005. Sheets and Kile noted that the core material of the millingstone was a fine-grained, pinkish, igneous rock that appeared to be fire-affected. The millingstone fragments appeared to be incorporated into a modern, one course tall assemblage of granite stones, stacked to augment a natural alcove created by a large granite boulder.

  This resource was documented as a prehistoric isolated metate. The location of the isolated artifact was visited and thoroughly inspected; however, the metate was not located. The isolated artifact may have been destroyed or transported to an unknown location. As this resource appears to be no longer extant, it was not evaluated for listing on the CRHR; however, isolated artifacts are typically not recommended eligible for listing on the CRHR due to lack of data potential.

- **P-22-0563-01H: Historic Period Structure/Site.** The newly identified resource within the Project area consists of a 1940s Chevrolet pickup truck that was abandoned in the forest. This resource does not meet the criteria for listing on the CRHR. The truck is not associated with historic events, is not associated with the lives of persons significant in the past, does not embody the distinctive characteristics of a type, period, or method of construction, and does not have the potential to broaden the understanding of the 20th century automotive industry.

Operations. Following completion of construction of the Project and disturbances of the site, the Project would include expanded campground uses to accommodate up to 3,000 total occupants. This would be accomplished through the use of existing campground structures as well as the development of additional campground and recreational structures.

Because no historical resources eligible for listing under the CRHR were identified within in the Project site, implementation of the Project would not be expected to cause a substantial adverse change to a historic resource. Therefore, impacts to historical resources would be less than significant.

b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5?

Less Than Significant With Mitigation Incorporated.

Construction. Grading and construction activities could impact unique archaeological resources as defined in PRC Section 21083.2 or state CEQA Guideline Section 15064.5. As defined in PRC Section 21083.2, a "unique" archaeological resource is an archaeological artifact, object, or site about which it can be clearly demonstrated that without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria:

- Contains information needed to answer important scientific research questions and there is a demonstrable public interest in that information.

- Has a special and particular quality such as being the oldest of its type or the best available example of its type.
- Is directly associated with a scientifically recognized important prehistoric or historic event or person.

As described above, the results of the CRA identified two prehistoric resources and three historic period cultural resources within the Project area; however, none of the previously recorded resources documented within the Project area meet the criteria for listing on the CRHR.

Potential for buried prehistoric sites in this area is generally low. However, the layer of organic material consisting of leaf litter and pine needles would likely obscure most surface sites. Along the creeks, deposits are coarse and high-energy derived from flooding or debris flows. In the southern part of the Project is a bench with a small pond. This low gradient area may be depositional and there is potential for buried sites. Also, there is a saddle near the peaks in the southeast corner of the Project area that is also low gradient and may have the potential to gradually accumulate sediment through sheetwash and organic matter accumulation. Both areas have surfaces that are relatively stable and are only subject to limited amounts of erosion. As such, there is potential for shallowly buried prehistoric sites in these areas.

The previously recorded prehistoric archaeological resources within the Project area consisted of P-36-002306 (prehistoric habitation) and P-36-012233 (prehistoric isolated artifact).

- **P-36-002306: One Prehistoric Site.** This resource is a special-use area likely related to subsistence-based processing activities, such as the milling of native seeds, plant fibers, and/or small mammals. The previously documented lithic scatter was not located, and no surface artifacts were identified at the site during the revisit; the area has been extensively disturbed. The absence of surface artifacts suggests that the site lacks substantial buried cultural deposits. This resource is not recommended eligible for listing on the CRHR.
- **P-36-012233: One Prehistoric Isolated Artifact.** This resource was documented as a prehistoric isolated metate. The location was thoroughly inspected; however, the metate was not found. As this resource appears to be no longer extant, it was not evaluated for listing on the CRHR. Although, isolated artifacts are typically not recommended eligible for listing on the CRHR due to the lack of data potential.

The previously recorded prehistoric archaeological resources documented within the Project area do not meet the criteria for listing on the CRHR. Although the Project site has generally low sensitivity to prehistoric cultural resources, archaeological monitoring would be implemented through **MM CUL-1** to ensure impacts are less than significant.

Operations. Because the prehistoric resources are not eligible for listing under the CRHR, Project implementation would not cause a substantial adverse change to an archaeological resource, with mitigation incorporated.

Mitigation Measures

MM CUL-1 If archaeological resources are exposed during construction of the Project, all ground disturbing activities within 50 feet of the potential resource(s) shall be suspended. A qualified archaeologist, meeting the Secretary of the Interior's Professional Qualification Standards, shall evaluate the significance of the find and determine whether or not additional study is warranted. Depending upon the significance of the find, the archaeologist may simply record the find and allow work to continue. If the discovery proves significant under CEQA, additional work, such as preparation of an archaeological treatment plan, testing, or data recovery, may be warranted and shall be submitted to the Development Services Director or his/her designee. If the resource(s) are determined to be Native American in origin, the Project archaeologist shall notify the appropriate Native American Tribe(s) from a list provided by the County.

MM CUL-2 **Monitoring and Treatment Plan.** A Monitoring and Treatment Plan that is reflective of the project mitigation ("Cultural Resources" and "Tribal Cultural Resources") shall be completed by the archaeologist and submitted to the Lead Agency for dissemination to the Yuhaaviatam of San Manuel Nation Cultural Resources Management Department (YSMN, also known as San Manuel Band of Mission Indians). Once all parties review and approve the plan, it shall be adopted by the Lead Agency – the plan must be adopted prior to permitting for the project. Any and all findings will be subject to the protocol detailed within the Monitoring and Treatment Plan.

MM CUL-3 **Archaeological Monitoring.** Due to the heightened cultural sensitivity of the proposed project area, an archaeological monitor with at least 3 years of regional experience in archaeology shall be present for all ground-disturbing activities that occur within the proposed project area (which includes, but is not limited to, tree/shrub removal and planting, clearing/grubbing, grading, excavation, trenching, compaction, fence/gate removal and installation, drainage and irrigation removal and installation, hardscape installation [benches, signage, boulders, walls, seat walls, fountains, etc.], and archaeological work). A sufficient number of archaeological monitors shall be present each work day to ensure that simultaneously occurring ground disturbing activities receive thorough levels of monitoring coverage.

MM CUL-4 **Worker Environmental Awareness Program.** Prior to project initiation, a qualified archaeologist should be retained to conduct a Worker's Environmental Awareness Program (WEAP) training on archaeological sensitivity for all construction personnel prior to the commencement of any ground-disturbing activities. The training should be conducted by an archaeologist who meets or exceeds the Secretary of Interior's Professional Qualification Standards for archaeology. Tribal representatives from the Consulting Tribes, such as Yuhaaviatam of San Manuel Nation Cultural Resources Management Department (YSMN, also known as San Manuel Band of Mission Indians) will be allowed to attend and/or participate in the WEAP training should they elect to and will be given ten days' notice prior to the training. Archaeological sensitivity training should include a description of the

types of cultural material that may be encountered, cultural sensitivity issues, regulatory issues, and the proper protocol for treatment of the materials in the event of a find.

c) Disturb any human remains, including those interred outside of dedicated cemeteries?

Less Than Significant with Mitigation Incorporated.

Construction. The Project site is partially disturbed and developed with the majority of the Project site currently undisturbed and undeveloped. Expansion of the campground would involve ground disturbing activities in the developed and undeveloped portions of the Project site and could potentially lead to the uncovering of human remains. If human remains are discovered, however, those remains would be handled in accordance with applicable laws, including HSC Sections 7050.5-7055 and PRC Section 5097.98 and Section 5097.99.

Specifically, HSC Section 7050.5 prescribes the requirements for the treatment of any human remains that are accidentally discovered during excavation of a site. HSC Section 7050.5 also requires that all activities cease immediately, and a qualified archaeologist and Native American monitor be contacted immediately. As required by state law, the procedures set forth in PRC Section 5087.98 would be implemented, including evaluation by the County Coroner and notification of the NAHC. The NAHC would then designate the Most Likely Descendant of the unearthed human remains.

Furthermore, if human remains are found during excavation, excavation would be halted in the vicinity of the find and would remain undisturbed until the County Coroner has investigated, and appropriate recommendations have been made for the treatment and disposition of the remains. Following compliance with the established regulatory framework (i.e., HSC Sections 7050.5-7055 and PRC Sections 5097.98 and 5097.99) and implementation of **MM CUL-2**, the Project's impacts concerning potential to disturb human remains, would be reduced to a less than significant.

Operations. Operation of the Project would not impact human remains or cause a substantial adverse effect to undiscovered human remains. As such, no impacts would occur.

Mitigation Measures

MM CUL-2 If previously unknown cultural resources, including human remains, are identified during grading activities, a qualified archaeologist shall be retained to assess the nature and significance of the find. If human remains are encountered, State Health and Safety Code Section 7050.5 states that no further disturbance shall occur until the County Coroner has made a determination of origin and disposition pursuant to Public Resources Code Section 5097.98. The County Coroner shall be notified of the find immediately. If the remains are determined to be prehistoric, the Coroner shall notify the NAHC, which shall determine and notify a Most Likely Descendant (MLD). With the permission of the landowner or his/her authorized representative, the MLD may inspect the site of the discovery. The MLD shall

complete the inspection within 24 hours of notification by the NAHC. The MLD may recommend scientific removal and nondestructive analysis of human remains and items associated with Native American burials.

Cumulative Impacts

For purposes of cumulative cultural resources impacts analysis, cumulative impacts are considered in connection with the anticipated future development projects. Future cumulative development projects could encounter or impact cultural resources. The analysis above focuses on the Project's potential for resulting in site-specific impact that could contribute to a cumulative loss. Impacts are site-specific and not generally subject to cumulative impacts unless multiple projects impact a common resource, or an affected resource extends off-site across the locations of multiple projects, such as a historic townsite or district. With this consideration, the cumulative analysis for cultural resources considers whether the Project, in combination with the past, present, and reasonably foreseeable projects, could cumulatively affect any common cultural resources. Projects located in an archaeologically sensitive area are required to conduct archaeological monitoring during construction, which would reduce cumulative impacts to a less-than-significant level. In addition, **MM CUL-1** would apply to the Project, ensuring that its contribution to cumulative impacts would not be considerable.

As discussed above, while no archaeological resources are expected on the Project site, the potential exists for undiscovered archaeological resources to be adversely impacted during Project construction. With the implementation of **MM CUL-1**, Project construction would not cause a substantial adverse change in the significance of archaeological resources; a less than significant impact would occur. Additionally, implementation of **MM CUL-2** would ensure that unanticipated cultural resources, including human remains, would not be disturbed or substantially affected by development of the Project.

Implementation of future projects in the Project vicinity could involve actions that could damage historical and archaeological resources specific to those project sites. However, all projects would be subject to CEQA review, including studies of historical and archaeological resources that are present or could be present on-site. Where significant or potentially significant impacts are identified, implementation of all feasible mitigation would be required to reduce potentially significant impacts. As with the Project, all cumulative development in the area would undergo environmental and design review on a project-by-project basis pursuant to CEQA, in order to evaluate potential impacts to cultural resources and avoid or reduce any impacts. As discussed above, Project-level impacts to human remains would be less than significant. Standard regulatory requirements and procedures will also apply to other present and reasonably foreseeable future projects, and cumulative impacts would be less than significant.

ENERGY

ENVIRONMENTAL IMPACTS Issues	Potentially Significant Issues	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
6. ENERGY. Would the project:				
a) Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?			X	
b) Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?			X	

An Energy Assessment was conducted by Kimley-Horn (**Appendix E: Energy Assessment**), which evaluates the potential construction and operational energy consumption associated with the Project and determines the level of impact the Project would have on the environment. The below analysis derives data and findings from the Energy Assessment.

a) Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?

Less Than Significant Impact.

Construction. During construction, the Project would consume energy in two general forms: (1) the fuel energy consumed by construction vehicles and equipment; and (2) bound energy in construction materials, such as asphalt, steel, concrete, pipes, and manufactured or processed materials such as lumber and glass.

Fossil fuels used for construction vehicles and other energy-consuming equipment would be used during the demolition, site preparation, grading/infrastructure improvements, paving, and building construction phases. Fuel energy consumed during construction would be temporary in nature and would not represent a significant demand on energy resources. Some incidental energy conservation would occur during construction through compliance with State requirements that equipment not in use for more than five minutes be turned off. Project construction equipment would be required to comply with CARB Tier 4 Final standards that would require all off-road equipment 50 horsepower or greater to meet standards as well as the latest U.S. EPA and CARB standards. These emissions standards require highly efficient combustion systems that maximize fuel efficiency and reduce unnecessary fuel consumption. Due to increasing transportation costs and fuel prices, contractors and owners also have a strong financial incentive to avoid wasteful, inefficient, and unnecessary consumption of energy during construction. Total energy demand from construction is shown in **Table 8: Project Energy Consumption - Construction.**

Table 8: Project Energy Consumption - Construction

Project Source	Annual Construction Energy	San Bernardino County Annual Energy	Percentage Increase Countywide
Electricity Use		**GWh**	
Water Use[1]	0.0042	16,181	0.00003%
Diesel Use		**Gallons**	
On-Road Construction Trips[2]	47,728	280,907,070	0.0108%
Off-Road Construction Equipment[3]	30,204		0.0170%
Construction Diesel Total	77,932		0.0278%
Gasoline		**Gallons**	
On-Road Construction Trips	15,101	846,846,001	0.0018%

1. Energy consumption from water associated with water treatment and transportation during construction is based on acres disturbed per day and estimated water use per acre.
2. On-road mobile source fuel use based on vehicle miles traveled (VMT) from CalEEMod and fleet-average fuel consumption in gallons per mile from EMFAC2021 in San Bernardino County.
3. Construction fuel use was calculated based on CalEEMod emissions outputs and conversion ratios from the Climate Registry.

Source: Kimley-Horn. 2024. *Hume SoCal Camp Expansion Project – Energy Assessment*, page 11.

Substantial reductions in energy inputs for construction materials can be achieved by selecting building materials composed of recycled materials that require substantially less energy to produce than non-recycled materials. The incremental increase in the use of energy bound in construction materials such as asphalt, steel, concrete, pipes and manufactured or processed materials (e.g., lumber and gas) would not substantially increase demand for energy compared to overall local and regional demand for construction materials. It is reasonable to assume that production of building materials such as concrete, steel, etc., would employ all reasonable energy conservation practices in the interest in minimizing the cost of doing business.

As indicated in **Table 8** the annual diesel fuel consumption during construction of the Project would be 77,932 gallons and gasoline consumption would be 15,101 gallons, which would constitute a nominal percentage (0.0278 percent and 0.0018 percent, respectively) of fuel use in the County. As such, Project construction would have a minimal effect on the local and regional energy supplies. It is noted that construction fuel use is temporary and would cease upon completion of construction activities. There are no unusual Project characteristics that would necessitate the use of construction equipment that would be less energy-efficient than at comparable construction sites in the region or state. Therefore, construction fuel consumption would not be any more inefficient, wasteful, or unnecessary than other similar development projects of this nature. A less than significant impact would occur in this regard.

Operations

Transportation Energy Demand. Pursuant to the Federal Energy Policy and Conservation Act of 1975, the National Highway Traffic and Safety Administration (NTSA) is responsible for establishing additional vehicle standards and for revising existing standards. Compliance with federal fuel

economy standards is not determined for each individual vehicle model. Rather, compliance is determined based on each manufacturer's average fuel economy for the portion of their vehicles produced for sale in the United States. **Table 9: Project Energy Consumption - Operations** provides an estimate of the daily fuel consumed by vehicles traveling to and from the Project site. As indicated in **Table 9**, Project operations are estimated to consume approximately 1,460 gallons of diesel fuel and 59,983 gallons of gasoline fuel per year, which would constitute approximately 0.0005 percent and 0.0072 percent, respectively, of Countywide automotive fuel consumption. The Project would not result in any unusual characteristics that would result in excessive long-term operational fuel consumption. Fuel consumption associated with vehicle trips generated by the Project would not be considered inefficient, wasteful, or unnecessary in comparison to other similar developments in the region.

***Building Energy Demand*.** Operations of the Project would result in an increase of approximately 3.95 GWh of electricity per year and approximately 93,743 therms of natural gas per year. The Project would be required to comply with Title 24 Building Energy Efficiency Standards, which provide efficiency standards related to various building features, including appliances; water, space heating, and cooling equipment; building insulation and roofing; and lighting.

Table 9: Project Energy Consumption - Operations

Project Source	Annual Construction Energy	San Bernardino County Annual Energy[1]	Percentage Increase Countywide
Operational Electricity and Natural Gas			
Electricity			
Project Consumption	3.95 GWh/yr	16,630 GWh/yr	0.0238%
Natural Gas			
Project Consumption	93,743 therms	562,123,065 therms	0.0167%
Automotive Fuel Consumption[2]			
Diesel			
Project	1,460 gallons	281,399,849 gallons	0.0005%
Gasoline			
Project	59,983 gallons	828,612,797 gallons	0.0072%
1. The Project increases in electricity and natural gas consumption are compared with the total consumption in San Bernardino County in 2022. 2. Countywide fuel consumption is from the California Air Resources Board EMFAC2021 model.			
Source: Kimley-Horn. 2024. *Hume SoCal Camp Expansion Project – Energy Assessment*, page 11.			

As indicated in **Table 9: Project Energy Consumption - Operations**, operational energy consumption would represent approximately 0.0238 percent of electricity consumption over the current Countywide usage. The Project would adhere to all federal, state, and local requirements for energy efficiency, including the Title 24 standards. As such, the Project would not result in the inefficient, wasteful, or unnecessary consumption of building energy.

As shown in **Table 9**, the increase in electricity and automotive fuel consumption constitutes a minimal percentage (less than one percent) of existing consumption. For the reasons described

above, the Project would not place a substantial demand on regional energy supply or require significant additional capacity or significantly increase peak and base period electricity demand. Thus, the Project would not cause a wasteful, inefficient, and unnecessary consumption of energy during Project construction, operation, and/or maintenance, or preempt future energy development or future energy conservation. A less than significant impact would occur.

b) Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?

Less Than Significant Impact. Title 24 of the California Code of Regulations contains energy efficiency standards for residential and non-residential buildings based on a state mandate to reduce California's energy demand. Specifically, Title 24 addresses a number of energy efficiency measures that impact energy used for lighting, water heating, heating, and air conditioning, including the energy impact of the building envelope such as windows, doors, skylights, wall/floor/ceiling assemblies, attics, and roofs.

Part 6 of Title 24 specifically establishes energy efficiency standards for residential and nonresidential buildings constructed in the State of California in order to reduce energy demand and consumption. The Project would comply with Title 24, Part 6 per state regulations. In accordance with Title 24 Part 6, the Project would have: (a) sensor-based lighting controls— for fixtures located near windows, the lighting would be adjusted by taking advantage of available natural light; and, (b) efficient process equipment—improved technology offers significant savings through more efficient processing equipment.

Title 24, Part 11, contains voluntary and mandatory energy measures that are applicable to the Project under the California Green Building Standards Code. As discussed above, the Project would result in an increased demand for electricity, natural gas, and petroleum. In accordance with Title 24 Part 11 mandatory compliance, the Applicant would have (a) 50 percent of its construction and demolition waste diverted from landfills; (b) mandatory inspections of energy systems to ensure optimal working efficiency; (c) low pollutant emitting exterior and interior finish materials, such as paints, carpets, vinyl flooring and particle boards; and (d) a 20 percent reduction in indoor water use. Compliance with all of these mandatory measures would decrease the consumption of electricity, natural gas, and petroleum.

The San Bernardino County Greenhouse Gas Reporting Program (GHGRP) establishes a series of energy efficiency related goals intended to reduce greenhouse gas (GHG) emissions based on the Assembly Bill (AB) 32 Scoping Plan. Those applicable to the Project are Renewables Portfolio Standard for Building Energy Use, AB 1109 Energy Efficiency Standards for Lighting, Electricity Energy Efficiency, and Commercial Energy Efficiency Requirements.

Because the Project would comply with Parts 6 and 11 of Title 24 and with the San Bernardino GHGRP measures, no conflict with existing energy standards and regulations would occur. Therefore, impacts associated with renewable energy or energy efficiency plans would be considered less than significant.

Cumulative Impacts

As discussed above, it is expected that construction energy consumption associated with the Project would not be inefficient, wasteful, or unnecessary. The Project would not substantially affect existing energy or fuel supplies, or resources and new capacity would not be required. Additionally, the Project would also be required adhere to the provisions of CALGreen, which establishes planning and design standards for sustainable site development, energy efficiency (in excess of the California Energy Code requirements), water conservation, material conservation, and internal air contaminants to ensure compliance with air quality regulations. The insulation and design code requirements would minimize wasteful energy consumption. As discussed above, none of the Project energy uses would exceed one percent of Riverside County energy consumption and it is expected that energy consumption associated with the Project would not be inefficient, wasteful, or unnecessary. Therefore, the Project's cumulative contribution of energy use would be less than significant, and the Project's cumulative energy impacts would also be less than cumulatively considerable.

GEOLOGY AND SOILS

ENVIRONMENTAL IMPACTS Issues	Potentially Significant Issues	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
7. GEOLOGY AND SOILS. Would the project:				
a) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.			X	
ii) Strong seismic ground shaking?			X	
iii) Seismic-related ground failure, including liquefaction?			X	
iv) Landslides?		X		
b) Result in substantial soil erosion or the loss of topsoil?			X	
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?		X		
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?			X	
e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?		X		
f) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?			X	

A Preliminary Geotechnical Report was completed on December 13, 2023, by Leighton and Associates, Inc. to determine the potential impacts to geology and soils associated with the development of the proposed Project (**Appendix F: Preliminary Geotechnical Report**). Relating to paleontological resources, a Cultural Resources Investigation was conducted on February 2, 2024, by Chronical Heritage (formerly

PaleoWest), which included a records search for previously recorded cultural resources within the Project site and its vicinity (provided as **Appendix D**).

a) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:

i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.

ii) Strong seismic ground shaking?

Less Than Significant Impact. The Project site is within a region that is generally subject to ground motions due to earthquakes, as is all of southern California. The Mill Creek Fault line passes southeast to northwest approximately eight miles south of the Project site, and the San Andreas Fault Line passes southeast to northwest approximately eleven miles south of the Project site. Additionally, the San Jacinto Fault Zone and Johnson Valley Fault Zone are located approximately 15.5 and 36.7 miles from the Project site, respectively.[27] An earthquake along any of these or other similar more distant faults in the southern California area are capable of generating moderate to strong ground shaking at the Project site.

According to the CWP, the Project is not within or in close proximity to an Earthquake Fault Zone, including California Alquist-Priolo Earthquake Fault Zones.[28] Therefore, the rupture of a known earthquake fault is unlikely to cause substantial adverse effects to the Project. Additionally, because Southern California is an active fault zone, all structures are subject to adherence to all applicable regulations in the 2022 California Building Code (CBC). With adherence to the latest CBC, the latest California seismic design requirements will be included in the building design and inspected by the County during construction. Conformance with standard engineering practices and design criteria established in the latest CBC would reduce the effects of seismic ground shaking. Therefore, the possibility of significant fault rupture that would incite risk of loss, injury, or death on the Project site is low and potential impacts associated with the rupture of a known earthquake would be less than significant.

iii) Seismic-related ground failure, including liquefaction?

Less Than Significant Impact. Liquefaction is the loss of the strength in generally cohesionless, saturated soils when the pore-water pressure induced in the soil by a seismic event becomes equal to or exceeds the overburden pressure. The primary factors which influence the potential for liquefaction include ground water table elevation, soil type and grain size characteristics, relative density of the soil, initial confining pressure, and intensity and duration of ground shaking. The depth within which the occurrence of liquefaction may impact surface improvements is generally

[27] Leighton and Associates, Inc. 2023. *Preliminary Geotechnical Report Proposed Hume SoCal Campground Redevelopment and Expansion Project*, page 15.

[28] County of San Bernardino. 2020. *Countywide Plan Policy Map HZ-1 Earthquake Fault Zones.* Available at https://www.arcgis.com/apps/webappviewer/index.html?id=d88e2db7ee5649478d70e95c56b0d62d. (accessed February 19, 2024).

identified as the upper 50 feet below the existing ground surface. Liquefaction potential is greater in saturated, loose, poorly graded fine sands with a mean (d50) grain size in the range of 0.075 to 0.2 mm. Clayey (cohesive) soils or soils which possess clay particles (d<0.005mm) in excess of 20 percent are generally not considered to be susceptible to liquefaction, nor are those soils which are above the historic static groundwater table.

According to the CWP the Project site is not located within a mapped zone for liquefaction potential.[29,30] Additionally, the Geotechnical Report has determined that soil deposits on the Project site are not susceptible to liquefaction. Therefore, impacts associated with liquefaction would be less than significant. Additionally, the Project site is not located in a state-designated Alquist-Priolo Earthquake Fault Zone, nor is it located in a fault hazard zone depicted by the CWP. Furthermore, no ground rupture has been observed nor is it anticipated on the Project site. Therefore, the rupture of a known earthquake fault is unlikely to cause substantial seismic-related ground failure. Lastly, any structures developed as a part of the Project will be subject to seismic design criteria in accordance with the latest CBC. As such, with compliance with the latest CBC, impacts would be less than significant.

iv) Landslides?

Less Than Significant With Mitigation Incorporated. Although the Project site is not within the San Andreas Earthquake Fault Zone, the Project site is located close to several active faults where historic seismic activities have been observed in the past. The Project site's proximity to faults would increase risks attributed to ground surface rupture. Additionally, the Project site is in an area designated by the County as having low to moderate landslide susceptibility.[31] Consistent with the CWP, the Geotechnical Report concluded that the potential occurrence of landslides at the site is low. Furthermore, any geotechnical recommendations and required mitigation measures would be implemented prior to Project approval and construction initiation (refer to **MM GEO-1** below). Therefore, seismically induced landslides are not of concern for the Project site. In addition, the site is located outside of the seismically induced landslide hazard zone. Therefore, the Project would have no impact related to landslides.

b) Result in substantial soil erosion or the loss of topsoil?

Less Than Significant Impact. Erosion refers to the removal of soil from exposed bedrock surfaces by water or wind. The effects of erosion are intensified with an increase in slope (as water moves faster, it gains momentum to carry more debris), the narrowing of runoff channels (which increases the velocity of water), and by the removal of groundcover (which leaves the soil exposed to erosive forces). Surface improvements, such as paved roads and buildings, decrease the potential for erosion on-site but can increase the rate and volume of runoff, potentially causing off-site erosion.

[29] County of San Bernardino. 2020. *Countywide Plan Policy Map HZ-2 Liquefaction and Landslides.* Available at https://www.arcgis.com/apps/webappviewer/index.html?id=5864a434814c4e53adc74101b34b1905. (accessed February 2, 2024).
[30] Leighton and Associates, Inc. 2023. *Preliminary Geotechnical Report Proposed Hume SoCal Campground Redevelopment and Expansion Project*.
[31] County of San Bernardino. 2020. *Countywide Plan Policy Map HZ-2 Liquefaction and Landslides.* Available at https://www.arcgis.com/apps/webappviewer/index.html?id=5864a434814c4e53adc74101b34b1905. (accessed February 2, 2024).

The proposed Project would not result in substantial erosion or loss of topsoil with implementation of the County's drainage and water quality standards, as well as best management practice (BMPs), which would be implemented as part of the Project. Erosion Control Plans would be required as a part of the Project-specific drainage plan and would be reviewed and approved by the County. In addition, the SCAQMD and Lahontan RWQCB regulate erosion and loss of topsoil. SCAQMD Rule 403 for control of fugitive dust would reduce or eliminate the potential for soil erosion due to wind. The RWQCB State's General Construction Permit and County Public Works Department would require compliance with storm water runoff for the proposed Project, therefore reducing impacts associated with water erosion and loss of topsoil. Since the Project site is not located within the MS Phase I boundary, there are no proposed BMPs on site since storm water runoff is not required to be treated. There will be off-site drainage conveyed through the site through the various existing streams located within the site limits. The off-site runoff remains unchanged from the existing to the proposed and is not anticipated to cause any negative impacts downstream or to proposed infrastructure. Using the retention volume achieved from routing impervious areas to pervious areas, the proposed development is expected to generate negligible additional run-off downstream for storms up to the 100-year condition when compared to the existing condition as provided in the Drainage Study. With these required measures in place, the Project would have a less than significant impact involving substantial soil erosion or loss of topsoil.

c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?

Less Than Significant With Mitigation Incorporated. As mentioned, the Project site is not identified as being located on a geologic unit or soil that has been identified as being unstable or having the potential to result in on-site or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse. According to the CWP, the Project site and the immediate area are not within a zone of generalized landslide susceptibility or liquefaction.[32] Further, the Geotechnical Report (**Appendix F**) for the Project site found site conditions not conducive to landslide or liquefaction.[33] The Geotechnical Report further assessed the potential for geologic units on-site to become unstable. These include the potential for seismically-induced soil settlement, seismically-induced lateral displacements, seismically-induced landsliding, rockfall, and debris flow.

Seismically-Induced Soil Settlement. Seismically-induced soil settlement consists of dynamic settlement of unsaturated soil (above groundwater) and liquefaction-induced settlement (below groundwater). These settlements occur primarily within low density sandy soil due to reduction in volume during and shortly after an earthquake event. Given the relatively thin presence of soil deposits on the Project site and intended use of pile foundation and/or grading solutions, the potential for seismically-induced settlement is expected to be negligible.[34]

[32] County of San Bernardino. 2020. *Countywide Plan Policy Map HZ-2 Liquefaction and Landslides*. Available at https://www.arcgis.com/apps/webappviewer/index.html?id=5864a434814c4e53adc74101b34b1905 (accessed February 2, 2024).
[33] Leighton and Associates, Inc. 2023. *Preliminary Geotechnical Report Proposed Hume SoCal Campground Redevelopment and Expansion Project*.
[34] Ibid, page 10.

Seismically-Induced Lateral Displacements. On sites where a liquifiable soil mass exists, the lateral movement of a non-liquefied soil mass can occur, termed lateral spreading. The direction of mass movement is typically towards a nearby gap in local topography, such as a basin, channel, or valley. As earth deposits on the subject site are not prone to the occurrence of liquefaction, which is instrumental for the occurrence of lateral spreading, the potential for lateral spreading is in turn considered remote.[35]

Seismically-Induced Landsliding. Based on the Countywide Plan's geologic hazard maps, and preponderance of underlying massive igneous bedrock, the potential occurrence of landslides at the site is considered low. According to **MM GEO-1**, proposed slopes, if any, should be engineered and constructed at a gradient of 2:1 (horizontal:vertical) or flatter to facilitate overall stability.

Debris Flows. Debris flows are typically defined as the down-gradient movement of a viscous saturated silt and sand laden slurry like mixture soils laden with cobbles, boulders, vegetation, and other debris. These events are surface phenomenon typically confined to areas with vertical gradients, including slopes, side-hill swales, and valley bottoms where volumes of sediment have accumulated. The impacts of potential debris flow often depend on the type and volume of soil present, water content, and degree of vegetation. Debris flows are common in recent wildfire burn areas where vegetation and root structure have been removed. The loss of soil support leads to the accumulation of moisture in the soil from rain events and a higher potential for structural failure. Debris flows are not exclusive to a post-fire area and can occur as a result of repeated heavy rain storms where soil become increasingly saturated by waters. Debris flows can travel a significant distance from its source area under the right conditions.

The site reconnaissance conducted by Leighton and Associates, Inc. revealed no direct evidence of recent surface scarring or accumulations of relatively thick soils at the toe of slopes relating to possible debris flows. Despite the above, the Geotechnical Report notes that the potential for debris flows is considered a potential hazard at the site as areas surrounding planned improvements will remain undisturbed or subject to little modification.[36] A consideration of this hazard should be evaluated a part of site development, especially where buildings are cited in canyon bottom areas or side-slopes. That is, the mitigation of debris flow hazards can include installation of drainage diversion devices such as sandbags, K-Rails, Hydro Barriers, etc., placed along known flow paths to divert runoff, according to **MM GEO-1**.

Conclusion. The Geotechnical Report (**Appendix F**) includes recommendations to ensure that soils are made appropriate for development of the Project on the Project site. The recommendations are included as a part of **MM GEO-1**, below. Implementation of these geotechnical recommendations, consistent with the requirements of the 2022 CBC, would reduce impacts associated with consolidation and collapse to less than significant.

[35] Ibid, page 10.
[36] Ibid, page 12.

d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?

Less Than Significant Impact. Expansive soils are common throughout California and can cause damage to foundations and slabs, separation of masonry, or failure of paved surfaces unless properly treated during construction. Expansive soil conditions could cause damage to facility components if they are not designed with proper engineering and grading practices. According to the Geotechnical Report, the hazard for expansive behavior is considered a low risk due to the non-cohesive course-grained nature of on-site soils. Therefore, impacts related to expansive soils are anticipated to be less than significant.

e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?

No Impact. The proposed Project expansion would connect to the existing sewer system. The existing sewer system contains four-, six-, and eight-inch gravity sewer lines heading southwest through the Hume SoCal Campground to an existing pump station located at the southwestern point of the existing property. This pump station has an estimated five foot wet well. From the pump station, the sewage is pumped through an existing force main, estimated to be six inches in diameter, and discharges into the existing sewer system in Green Valley Lake Road. The capacity of the existing sewer system to serve the Project is further discussed in ***Utilities and Service Systems***. Thus, no septic tanks or alternative wastewater disposal systems would be required. Therefore, the Project would have no impact.

f) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

Less Than Significant Impact. The Project site is underlain by units or relatively thin surficial deposits including artificial fill and colluvium/alluvium.[37] Granitic bedrock occurs extensively in surface outcrops and at shallow depths below the surface soils. Due to the relatively thin and variable thickness of the surficial units, they are not mappable at the scale of available geologic maps (provided as attachments to **Appendix F**). Because paleontological sensitivity is assigned based on fossil data collected from the entire geologic unit, the paleontological sensitivity of the Project site cannot be determined. While grading activities associated with the Project have the potential to penetrate and disturb these surficial units, the relatively thin thickness of these units makes the accidental discovery of paleontological resources unlikely.

Furthermore, a literature review and records search were conducted at the SCCIC of the California Historical Resources Information System. The records search indicated there are 26 previously recorded cultural resources within a one-mile radius of the Project area, as discussed further in ***Cultural Resources***.[38] Of these 26 resources, no paleontological resources were identified. Furthermore, the Project would comply with CWP policies relating to paleontological resource

[37] Leighton and Associates, Inc. 2023. *Preliminary Geotechnical Report Proposed Hume SoCal Campground Redevelopment and Expansion Project*, page 4.

[38] Chronical Heritage (formerly PaleoWest). 2024. *Cultural Resources Investigation of the Hume SoCal Campground Project, San Bernardino County, California*, page 1.

preservation, should unanticipated paleontological resources be found onsite during construction. Therefore, there would be a less than significant impact relating to paleontological resources.

Mitigation Measures

MM GEO-1 Prior to the issuance of grading permits and/or building permits (where ground disturbing activities greater than 12 inches in depth would occur), the County shall review all Project plans for grading, foundation, structural, infrastructure, and all other relevant construction permits to ensure compliance with the applicable recommendations from the Geotechnical Report and other applicable code requirements. As specified in the Preliminary Geotechnical Report for the Proposed Hume SoCal Campground Redevelopment and Expansion Project by Leighton and Associates, Inc. (Leighton), adverse geologic structure could be exposed during construction, despite a lack of observable signs of adverse geologic structure. Therefore, a qualified Geologist should be present at the time of any temporary or permanent cuts to observe and map exposed geologic structure, as needed. Geotechnical observation and testing should be provided during the following activities:

- Upon completion of site clearing, where applicable;
- During site earthwork;
- Compaction of all fill materials;
- During installation of temporary shoring, wherever needed;
- After foundation excavations and prior to placement of concrete;
- Foundation pile and retaining wall construction;
- Utility trench backfilling and compaction; and
- When any unusual conditions are encountered.

Additionally, during their geologic investigation of the Project site, Leighton observed localized areas of exposed bedrock that pose the potential for rockfall. During the development phase of the Project, a qualified Geologist should examine areas upslope of planned improvements in more detail, and designate boulders posing a potential rockfall hazard. The boulders should be eliminated as part of the construction process, by either removal or breaking the rock in-place.

As noted in the Geotechnical Report, the potential for debris flows is considered a potential hazard at the site as areas surrounding planned improvements will remain undisturbed or subject to little modification. A consideration of this hazard should be evaluated as a part of site development, especially where buildings are cited in canyon bottom areas or side-slopes. The mitigation of debris flow hazards can include installation of drainage diversion devices such as sandbags, K-Rails, Hydro Barriers, etc., placed along known flow paths to divert runoff.

Final Project grading and foundation plans should be reviewed by Leighton as part of the design development process to ensure that Geotechnical Report recommendations are incorporated in Project plans.

Cumulative Impacts

Geology and soils impacts are site-specific and generally do not combine to result in cumulative impacts. Like the Project, future development projects would be required to comply with applicable state and local building regulations, including the most recent 2022 CBC. Site-specific geologic hazards would be addressed in each project's geotechnical report. Further, future developments would be required to comply with environmental analysis and review. Therefore, no significant cumulative impact would occur.

Additionally, other projects in the area would involve ground disturbance and could damage paleontological resources that could be buried in those project sites. As with the Project, other projects would require site-specific paleontological analysis that could lead to mitigation requiring monitoring and recovery, identification, and curation of any resources discovered. Cumulative impacts to paleontological resources would be less than significant, and Project contribution would not be cumulatively considerable with implementation of **MM GEO-1** and recommendations from the Geotechnical Report.

GREENHOUSE GAS EMISSIONS

ENVIRONMENTAL IMPACTS Issues		Potentially Significant Issues	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
8.	**GREENHOUSE GAS EMISSIONS. Would the project:**				
a)	Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?			X	
b)	Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?			X	

A Greenhouse Gas Emissions Assessment was conducted by Kimley-Horn in February 2024 (**Appendix H: Greenhouse Gas Emissions Assessment**), which evaluates the potential construction and operational emissions associated with the Project and determines the level of impact the Project would have on the environment.

a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

Less Than Significant Impact. Project construction activities would generate direct CO_2, N_2O, and CH_4 emissions from construction equipment, transport of materials, and construction workers commuting to and from the Project site. Total GHG emissions generated during all construction phases were combined and are presented in **Table 10: Construction-Related Greenhouse Gas Emissions.**

Table 10: Construction-Related Greenhouse Gas Emissions

Category	$MTCO_2e$
2025 Construction	1,523
2026 Construction	791
2027 Construction	389
Total Construction	*2,703*
30-Year Amortized Construction	*90.1*
Source: CalEEMod version 2022.1.1.20. Refer to **Appendix H** for model outputs.	

As indicated in **Table 10**, the Project would result in the generation of approximately 2,703 $MTCO_2e$ over the course of construction. Construction GHG emissions are typically summed and amortized over a 30-year period, then added to the operational emissions.[39] The amortized Project

[39] Note: The amortization period is 30 years per the South Coast Air Quality Management District (South Coast Air Quality Management District, Minutes for the GHG CEQA Significance Threshold Stakeholder Working Group #13, August 26, 2009).

construction emissions would be 90.1 $MTCO_2e$ per year. Once construction is complete, construction-related GHG emissions would cease.

Operational Greenhouse Gas Emissions. Operational emissions would occur over the Project's lifetime. GHG emissions would result from direct emissions such as Project generated vehicular traffic, on-site combustion of natural gas, and operation of any landscaping equipment. Operational GHG emissions would also result from indirect sources, such as off-site generation of electrical power, the energy required to convey water to, and wastewater from the Project, the emissions associated with solid waste generated from the Project, and any fugitive refrigerants from air conditioning or refrigerators.

The Project's operational GHG emissions are provided in **Table 11: Project Greenhouse Gas Emissions**. As shown in **Table 11**, the Project would generate approximately 1,939.1 $MTCO_2e$ annually from both construction and operations.

Table 11: Project Greenhouse Gas Emissions

Emissions Source	$MTCO_2e$ per Year
Construction Amortized Over 30 Years	90.1
Area Source	4.26
Energy	1,123
Mobile	464
Waste	172
Water and Wastewater	41.5
Refrigerants	44.6
Total	**1,939.1**
County of San Bernardino Screening Threshold	*3,000*
Exceeds Threshold?	**No**
Source: CalEEMod version 2022.1.1.20. Refer to **Appendix H** for model outputs.	

The San Bernardino County Greenhouse Gas Reduction Plan employs a GHG Development Review Process that specifies a two-step approach in quantifying GHG emissions. First, a screening threshold of 3,000 $MTCO_2e$ per year is used to determine if additional analysis is required. Projects that exceed the 3,000 $MTCO_2e$ per year screening threshold will be required to achieve a minimum 100 points per the Screening Tables or a 31 percent reduction over 2007 emissions levels. Consistent with CEQA guidelines, such projects would be determined to have a less than significant individual and cumulative impact for GHG emissions.

As shown in **Table 11**, the Project would result in approximately 1,939.1 $MTCO_2e$ per year; which would not exceed the screening threshold of 3,000 $MTCO_2e$/yr. As a result, the Project's GHG emissions would be considered less than significant and additional GHG emissions analysis would not be required.

b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

Less Than Significant Impact.

County of San Bernardino Greenhouse Gas Reduction Plan. As discussed above, the County's GHG Reduction Plan includes a review standard of 3,000 $MTCO_2e$ per year to identify projects that require the use of Screening Tables or a project-specific technical analysis to quantify and mitigate project emissions. The purpose of the Screening Tables is to provide guidance in measuring the reduction of GHG emissions attributable to certain design and construction measures incorporated into development projects. As noted above, for projects that exceed 3,000 $MTCO_2e$/year of GHG emissions, the applicant may choose to either utilize the Screening Tables or achieve a 31 percent reduction over 2007 emissions levels. **Table 11** shows that the Project would not exceed the 3,000 $MTCO_2e$ per year threshold, therefore the Project would be consistent with the County's GHG emissions reduction plan.

CEQA Guidelines require lead agencies to describe, calculate, or estimate the amount of GHG emissions that would result from a project. CEQA Guidelines (Section 15183.5) also allow individual projects to tier off of a qualified GHG reduction plan. Thus, individual projects do not need to each conduct a GHG analysis to comply with CEQA if they can demonstrate consistency with a qualified plan. Projects in jurisdictions with a qualified plan can be considered less than significant under CEQA if they show consistency with their qualified plan. As such, the additional discussion provided for RTP and CARB Scoping Plan is provided optionally and further demonstrates the project consistency with applicable plan, policy, or regulation of an agency adopted for the purpose of reducing GHG emissions.

Regional Transportation Plan/Sustainable Communities Strategy Consistency. The 2020 RTP/SCS is a long-range visioning plan that balances future mobility and housing needs with economic, environmental, and public health goals. The RTP/SCS embodies a collective vision for the region's future and is developed with input from local governments, county transportation commissions, tribal governments, nonprofit organizations, businesses, and local stakeholders in the counties of Imperial, Los Angeles, Orange, Riverside, San Bernardino, and Ventura. SCAG's RTP/SCS establishes GHG emissions goals for automobiles and light-duty trucks for 2020 and 2035 as well as an overall GHG target for the Project region consistent with both the target date of AB 32 and the post-2020 GHG reduction goals of Executive Orders 5-03-05 and B-30-15.

The RTP/SCS contains over 4,000 transportation projects, ranging from highway improvements, railroad grade separations, bicycle lanes, new transit hubs, and replacement bridges. These future investments were included in county plans developed by the six county transportation commissions and seek to reduce traffic bottlenecks, improve the efficiency of the region's network, and expand mobility choices for everyone. The RTP/SCS is an important planning document for the region, allowing project sponsors to qualify for federal funding.

The plan accounts for operations and maintenance costs to ensure reliability, longevity, and cost effectiveness. The RTP/SCS is also supported by a combination of transportation and land use strategies that help the region achieve state GHG emissions reduction goals and FCAA

requirements, preserve open space areas, improve public health and roadway safety, support our vital goods movement industry, and utilize resources more efficiently. GHG emissions resulting from development-related mobile sources are the most potent source of emissions, and therefore Project comparison to the RTP/SCS is an appropriate indicator of whether the Project would inhibit the post-2020 GHG reduction goals promulgated by the state. The Project's consistency with the RTP/SCS goals is analyzed in detail in **Table 12: Regional Transportation Plan/Sustainable Communities Strategy Consistency.**

Table 12: Regional Transportation Plan/Sustainable Communities Strategy Consistency

SCAG Goals		Compliance	
Mobility: Build and maintain an integrated multimodal transportation network.			
GOAL 1:	Support investments that are well-maintained and operated, coordinated, resilient and result in improved safety, improved air quality and minimized greenhouse gas emissions.	Consistent:	This measure is to be taken at the regional level. Project implementation would not conflict with the goal. The project would be constructed in accordance with the Title 24 of the California Building Standards Code, Title 20 of the California Code of Regulations, and CALGreen Code standards.
GOAL 2:	Ensure that reliable, accessible, affordable, and appealing travel options are readily available, while striving to enhance equity in the offerings in high-need communities.	Consistent:	This measure is to be taken at the regional level. Project implementation would not conflict with the goal. The Project will use buses to transport approximately 50 student passengers per trip, minimizing the number of vehicles accessing the site and reducing GHG emissions.
GOAL 3:	Support planning for people of all ages, abilities, and backgrounds.	N/A:	This is not a project-specific policy and is therefore not applicable.
Communities: Develop, connect, and sustain communities that are livable and thriving.			
GOAL 4:	Create human-centered communities in urban, suburban, and rural settings to increase mobility options and reduce travel distances.	Consistent:	The Project involves the development of a campground in the San Bernardino Mountains, in a rural area near SR-18. The project will use buses to transport students to the camp, reducing VMT.
GOAL 5:	Produce and preserve diverse housing types in an effort to improve affordability, accessibility, and opportunities for all households.	Consistent:	The Project involves development of a campground but does not include permanent housing. Therefore, this goal is not applicable.
Environment: Create a healthy region for the people of today and tomorrow.			
GOAL 6:	Develop communities that are resilient and can mitigate, adapt to, and respond to chronic and acute stresses and disruptions, such as climate change.	Consistent:	The project would be developed in a rural area near SR-18 however the Project will use buses to transport students to the camp, reducing VMT. The project would be constructed in accordance with Title 24 of the California Building Standards Code, Title 20 of the California Code of Regulations, and CALGreen Code standards. In addition, the project would comply with all applicable efficiency requirements. The project thus promotes GHG-reduction strategies by educating students about the benefits of environmental preservation and is well suited to maintaining resiliency against the effects of climate change.

SCAG Goals		Compliance	
GOAL 7:	Integrate the region's development pattern and transportation network to improve air quality, reduce greenhouse gas emissions and enable more sustainable use of energy and water.	Consistent:	Although the project does not include transportation improvements, the Project would use buses to transport students to camp, reducing the number of vehicle trips which would reduce GHG and air quality emissions. The reduction of energy use, improvement of air quality, and promotion of more environmentally sustainable development are encouraged through green design techniques for buildings, and other energy-reducing techniques, such as, compliance with the provisions of the California Building Energy Efficiency Standards and the CALGreen Code.
GOAL 8:	Conserve the region's resources.	Consistent:	This Project is a campground located in the mountain area of San Bernardino County. The Project will promote the conservation of natural lands by educating students about the benefits of environmental preservation.
Economy: Support a sustainable, efficient, and productive regional economic environment that provides opportunities for all people in the region.			
GOAL 9:	Improve access to jobs and educational resources.	Consistent:	The expansion of the campground and development of the site would contribute to regional economic prosperity. Therefore, the project location would improve access to job opportunities and would educate students about conservation.
GOAL 10:	Advance a resilient and efficient goods movement system that supports the economic vitality of the region, attainment of clean air and quality of life for our communities.	Consistent:	This measure is to be taken at the regional level. Project implementation would not conflict with the goal. As stated above, the project would result in less than significant air quality and health risk impacts.
Source: Southern California Association of Governments. 2024. *Connect SoCal (2024 - 2050 Regional Transportation Plan/Sustainable Communities Strategy*.			

The goals stated in the RTP/SCS were used to determine consistency with the planning efforts previously stated. As shown in **Table 12**, the Project would be consistent with the stated goals of the RTP/SCS. Therefore, the Project would not result in any significant impacts or interfere with SCAG's ability to achieve the region's post-2020 mobile source GHG reduction targets.

California Air Resource Board Scoping Plan Consistency. Adopted December 15, 2022, CARB's 2022 Scoping Plan for Achieving Carbon Neutrality (2022 Scoping Plan) sets a path to achieve targets for carbon neutrality and reduce anthropogenic GHG emissions by 85 percent below 1990 levels by 2045 in accordance with AB 1279. To achieve the targets of AB 1279, the 2022 Scoping Plan relies on existing and emerging fossil fuel alternatives and clean technologies, as well as carbon capture and storage. Specifically, the 2022 Scoping Plan focuses on zero-emission transportation; phasing out use of fossil gas use for heating homes and buildings; reducing chemical and refrigerants with high global warming potential; providing communities with sustainable options for walking, biking, and public transit; displacement of fossil-fuel fired electrical generation through use of renewable energy alternatives (e.g., solar arrays and wind turbines); and scaling up new options such as green hydrogen. The 2022 Scoping Plan sets one of the most

aggressive approaches to reach carbon neutrality in the world. Unlike the 2017 Scoping Plan, CARB no longer includes a numeric per capita threshold and instead advocates for compliance with a local GHG reduction strategy (i.e., Climate Action Plan) consistent with CEQA Guidelines Section 15183.5.

The key elements of the 2022 CARB Scoping Plan focus on transportation. Specifically, the 2022 Scoping Plan aims to rapidly move towards zero-emission (ZE) transportation (i.e., electrifying cars, buses, trains, and trucks), which constitutes California's single largest source of GHGs. The regulations that impact the transportation sector are adopted and enforced by CARB on vehicle manufacturers and are outside the jurisdiction and control of local governments. The 2022 Scoping Plan accelerates development of new regulations as well as amendments to strengthen regulations and programs already in place. Statewide strategies to reduce GHG emissions in the latest 2022 Scoping Plan include:

- Implementing Senate Bill (SB) 100 (achieve 100 percent clean electricity by 2045);
- Achieving 100 percent zero emission vehicle sales in 2035 through Advanced Clean Cars II; and
- Implementing the Advanced Clean Fleets regulation to deploy zero-emission vehicle (ZEV) buses and trucks; and
- Implementing vehicle miles traveled (VMT) reduction initiatives to achieve a 30 percent VMT reduction below 2019 levels by 2045.

The Scoping Plan notes that efforts to support VMT reduction include coordination across state agencies on affordable housing measures. Fostering more compact, transportation-efficient development in infill areas and increasing transportation choices with the goal of reducing VMT not only reduces demand for transportation fuel but also requires less energy for buildings and helps to conserve natural and working lands that sequester carbon. The multiple and often interwoven actions that reduce VMT both reduce emissions from the transportation sector and support reductions needed in other sectors.

Additional transportation policies include the Off-Road Zero-Emission Targeted Manufacturer rule, Clean Off-Road Fleet Recognition Program, In-use Off-Road Diesel-Fueled Fleets Regulation, Clean Off-Road Fleet Recognition Program, and Amendments to the In-use Off-Road Diesel-Fueled Fleets Regulation. The 2022 Scoping Plan would continue to implement SB 375. GHGs would be further reduced through the Cap-and-Trade Program carbon pricing and SB 905. SB 905 requires CARB to create the Carbon Capture, Removal, Utilization, and Storage Program to evaluate, demonstrate, and regulate carbon dioxide removal projects and technology.

As indicated above, GHG reductions are also achieved as a result of State of California energy and water efficiency requirements for new commercial/retail developments. These efficiency improvements correspond to reductions in secondary GHG emissions. For example, in 2021 approximately 38 percent of the total electricity net generation in California was derived from natural gas combustion. Therefore, energy saving measures, such as Title 24, reduce GHG emissions from the power generation facilities by reducing load demand.

As discussed previously, the County of San Bernardino GHG Reduction Plan has adopted a 3,000 $MTCO_2e$ significance threshold to determine if additional analysis is required. As shown in **Table 11**, the Project would not exceed the threshold and is consistent with the San Bernardino GHG Reduction Plan. As noted in *Scoping Plan Appendix D*, consistency with a qualified Climate Action Plan ensures consistency with the Scoping Plan, therefore the Project is consistent with 2022 Scoping Plan.

The Project would be required to comply with applicable regulatory requirements promulgated through the 2022 Scoping Plan and would not conflict with any applicable actions. As such, the Project would be consistent with the 2022 Scoping Plan.

Cumulative Impacts

It is generally the case that an individual project of this size and nature is of insufficient magnitude by itself to influence climate change or result in a substantial contribution to the global GHG inventory. The State CEQA Guidelines generally address GHG emissions as a cumulative impact because of the global nature of climate change. As such, GHG impacts are recognized as exclusively cumulative impacts; there are no non-cumulative GHG emission impacts from a climate change perspective. The additive effect of Project-related GHGs would not result in a reasonably foreseeable cumulatively considerable contribution to global climate change. In addition, the Project as well as other cumulative related projects would also be subject to all applicable regulatory requirements, which would further reduce GHG emissions. The Project would not exceed the SCAQMD's GHG threshold and would be consistent with the 2022 CARB Scoping Plan. The Project's cumulative contribution of GHG emissions would be less than significant and the Project's cumulative GHG impacts would also be less than cumulatively considerable.

HAZARDS AND HAZARDOUS MATERIALS

ENVIRONMENTAL IMPACTS Issues	Potentially Significant Issues	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
9. HAZARDS AND HAZARDOUS MATERIALS. Would the project:				
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?			X	
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?			X	
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?				X
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?			X	
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area?			X	
f) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?			X	
g) Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires?			X	

a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?

Less than Significant Impact.

Construction. Construction of the Project would occur over five phases. Construction of the Project would involve the transport, use, and disposal of hazardous materials on-site and off-site, which include fuels, paints, mechanical fluids, and solvents, but would not be present in such a quantity or used in such a manner that would pose a significant hazard to the public. Hazardous or toxic

materials transported in association with construction may include items such as asphalt, oils, paints, and fuels. All hazardous materials are required to be utilized and transported in accordance with their labeling pursuant to federal and State law. Routine construction practices include good housekeeping measures to prevent/contain/clean-up spills and contamination from fuels, solvents, concrete wastes, and other waste materials. With implementation of BMPs and compliance with all applicable federal, State, and local regulations including all Certified Unified Program Agency (CUPA) regulations, there would be a less than significant impact relating to the routine transport, use, or disposal of hazardous materials during construction.

Operations. At full buildout, the Project would consist of residential and recreational facilities to be utilized for campground activity. As previously mentioned, this land use is not expected to use significant quantities of hazardous materials or to generate significant quantities of hazardous materials requiring transport. Project operations could result in the use, storage, and disposal of hazardous household materials. These can include, but are not limited to paint solvents, pesticides and fertilizers, and maintenance supplies and equipment (e.g., drain cleaners, floor stripping products, paints, oils, fuels). The California Department of Toxic Substances Control (DTSC) does not identify the Project site as a hazardous site.[40] With oversight by the appropriate federal, State, and local agencies, and compliance by the new development with applicable regulations related to the handling, storage and disposal of hazardous materials, the Project to have a less than significant impact.

b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?

Less than Significant Impact. The Project site does not contain cleanup sites, identified by DTSC, that have undergone remediation or have been recommended for remediation.[41] The Project would consist of residential and recreational facilities to be utilized for campground activity. As previously stated, these land uses are not anticipated to result in the release of hazardous materials into the environment. As discussed in **Impact 9a**, above, the Project would not create a significant impact through the transport, use, or disposal of hazardous materials since the facilities are required to comply with all applicable federal, State, and regional regulations which are intended to avoid impacts to the public and the environment. Furthermore, hazardous materials/chemicals such as cleaners, paints, solvents, and fertilizers in low quantities do not pose a significant threat related to the release of hazardous materials into the environment. A less than significant impact would occur in this regard.

c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?

No Impact. Construction of the Project would involve the transport, use, and disposal of hazardous materials on-site and off-site, which include fuels, paints, mechanical fluids, and solvents, but

[40] California Department of Toxic Substances Control. ND. *EnviroStor* [Database]. Available at https://www.envirostor.dtsc.ca.gov/public/ (accessed January 30, 2024).
[41] Ibid.

would not be present in such a quantity or used in such a manner that would pose a significant hazard to nearby schools. The closest schools to the Project site are Mt. Calvary Lutheran Kids Corner Preschool & Child Care center (private) and Charles Hoffman Elementary School (public) located approximately 1.4 and 1.6 miles south of the Project site, respectively. This would fall outside of the 0.25-mile requirement of this threshold. Additionally, the routine transport, use, and disposal of hazardous materials must adhere to federal, State, and local regulations for transport, handling, storage, and disposal of hazardous substances. Compliance with the regulatory framework would ensure Project construction would not create a significant hazard to nearby schools due to the transport of any hazardous materials on local roadways. No impact would occur.

d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?

Less than Significant Impact. The Project site is not included on the hazardous sites list compiled pursuant to California Government Code Section 65962.5 (Cortese List).[42] Therefore, no significant adverse impacts relative to Cortese List sites which would occur with Project implementation.

e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area?

Less than Significant Impact. The Project site is not located within an airport land use plan or within two miles of a public airport or public use airport. The nearest airports are Redlands Municipal Airport and Big Bear Airport which are located approximately 10 miles southwest and 14 miles east-northeast of the Project site, respectively.[43] Thus, the Project site is not within any airport influence area, airport safety zone, or airport land use compatibility zone. Therefore, the Project would not result in an airport hazard impact to people residing or working in the area. There would be no impact related to proximity to an airport.

f) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?

Less than Significant Impact. The County adopted its Multi-Jurisdictional Hazard Mitigation Plan (MJHMP) in 2022.[44] The MJHMP identifies potential hazards that may occur within the County, such as risks associated with earthquakes, terrorism, and climate change. Mitigation is also provided in the MJHMP in order to minimize those identified risks. Project development would be congruent with the land use designations of the Project area and would therefore remain consistent with the analysis provided in the MJHMP. For each construction and operational phase of the five phases of the Project, new internal roads within the Project site and additional access roads connecting to Green Valley Lake Road would be constructed that would improve access to

[42] California Department of Toxic Substances Control. ND. *DTSC's Hazardous Waste and Substances Site List - Site Cleanup (Cortese List).* Available at https://dtsc.ca.gov/dtscs-cortese-list/ (accessed August 2023).
[43] Ibid.
[44] County of San Bernardino. 2022. *San Bernardino County Multi-Jurisdictional Hazard Mitigation Plan*. Available at https://www.sbcounty.gov/uploads/SBCFire/documents/EmergencyServices/Hazard-Mitigation-Plan-202212.pdf (accessed August 2023).

the site for emergency vehicles and exit points in the event of evacuation. Roadway improvements are further discussed in the ***Transportation*** section. The Project would not conflict with adopted emergency response or evacuation plans and would therefore generate a less than significant impact.

g) Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires?

Less than Significant Impact. Wildfire impacts are further discussed below in the ***Wildfire*** section. According to CAL FIRE's Fire and Resource Assessment Program, FHSZ Viewer, the Project site is located in a State Responsibility Area (SRA).[45] Additionally, the Project site is located on lands classified as Very High FHSZ.[46] However, as discussed in the ***Wildfire*** section during fire emergencies, SR-330, SR-18, Green Valley Lake Road, and Live Oak Drive are the designated evacuation routes within the HCAG area and all evacuation procedures would comply with the County's Emergency Plan. The County is responsible for the dissemination of information about a wildfire emergency to the public to inform them on what has happened and the actions of the emergency response agencies, as well as summarize the expected outcomes of the emergency actions.

Additionally, the Project would comply with CCR Title 14 SRA Fire Safe Regulations which ensures basic emergency access would be provided. The Project would also be in accordance with the Emergency Mutual Aid Agreements system that provides service in the emergency response and recovery efforts at the Southern Regional Emergency Operations Center, local Emergency Operations Centers, the Disaster Field Office, and community service centers. Furthermore, the Project would adhere to the Cal-EMA to prepare a Standardized Emergency Management System (SEMS) program (Title 19 CCR Section 2400 et seq.), which sets forth measures by which a jurisdiction should handle emergency disasters, and CCR Sections 51175 through 51189 which provides the framework for further preventative measures to decrease wildfire hazards. Therefore, through compliance with all applicable federal, State, and local policies and regulations, the Project would not expose people or structures either directly or indirectly to a significant risk of loss, injury or death involving wildland fires.

Cumulative Impacts

For purposes of hazards and hazardous materials, cumulative impacts are considered within the immediate vicinity surrounding the Project site. As discussed above, the Project would result in less than significant impacts from hazards and hazardous materials based on compliance with existing laws, ordinances, regulations and standards. The ***Transportation*** section discusses roadway impacts, and the ***Wildfire*** section discusses fire hazards associated with Project implementation.

Impacts associated with hazardous materials are often site-specific and localized. This IS/MND evaluates environmental hazards in connection with the Project site and surrounding area. Regarding off-site

[45] County of San Bernardino. 2020. *Countywide Plan Policy Map HZ-6 Fire Responsibility Areas*. Available at https://www.arcgis.com/apps/webappviewer/index.html?id=1510b4688d8741e8be076d9e25afec2d (accessed August 2023).
[46] California Department of Forestry and Fire Protection. 2023. *FHSZ Viewer*. Available at https://osfm.fire.ca.gov/divisions/community-wildfire-preparedness-and-mitigation/wildfire-preparedness/fire-hazard-severity-zones/ (accessed August 2023).

environmental hazards, various governmental databases were searched to identify properties with known or suspected releases of hazardous materials within a search radius of up to one mile from the site. These database searches serve as the basis for defining the cumulative impacts of the Project area.

Cumulative impacts related to hazards and hazardous materials would result from projects that combine to increase exposure to hazards and hazardous materials. The potential for cumulative impacts to occur is limited since the impacts from hazardous materials use on-site would be site-specific. The Project and other cumulative projects would be required to comply with laws and regulations governing hazardous materials and hazardous waste used and generated as described previously. Therefore, cumulative impacts related to hazards and hazardous materials would be less than significant after regulatory compliance.

HYDROLOGY AND WATER QUALITY

ENVIRONMENTAL IMPACTS Issues	Potentially Significant Issues	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
10. HYDROLOGY AND WATER QUALITY. Would the project:				
a) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?			X	
b) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?			X	
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:				
i) Result in substantial erosion or siltation on- or off-site?			X	
ii) Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite?			X	
iii) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?			X	
iv) Impede or redirect flood flows?			X	
d) In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?			X	
e) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?				X

A Preliminary Hydrology Report was prepared by Kimley-Horn for the Project in April 2025, provided as **Appendix G: Preliminary Hydrology Report**.

The Project's Water Supply Assessment (WSA) evaluates various aspects of water demand, supply, and management strategies, particularly in relation to its reliance on CLAWA and the Hume SoCal Campground's groundwater resources. The analysis, considering multiple scenarios of water shortages

and demand, details the Camp's current and future water demand and its impact on available water resources; refer to **Appendix B1**.

a) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?

Less Than Significant Impact.

Construction. The County of San Bernardino is within the Lahontan RWQCB. Pursuant to the Clean Water Act, in 2009, the SWRCB issued a statewide general National Pollutant Discharge Elimination System (NPDES) Permit for stormwater discharges from construction sites (NPDES No. CAS000002). Under this permit, discharges of stormwater from construction sites with a disturbed area of one or more acres must obtain individual National Pollutant Discharge Elimination System (NPDES) permits or be covered by the General Permit—i.e., by filing a Notice of Intent with the SWRCB and developing and implementing a Storm Water Pollution Prevention Plan (SWPPP).

Additionally, since the Project site is not located within the MS4 Phase I boundary, there are no proposed BMPs on site since storm water runoff is not required to be treated. There will be off-site drainage conveyed through the site through the various existing streams located within the site limits. The off-site runoff remains unchanged from the existing to the proposed and is not anticipated to cause any negative impacts downstream or to proposed infrastructure. Using the retention volume achieved from routing impervious areas to pervious areas, the proposed development is expected to generate negligible additional run-off downstream for storms up to the 100-year condition when compared to the existing condition.

With implementation of the Preliminary Hydrology Study findings and compliance with the NPDES permit requirements, Project construction would not violate any water quality standards or waste discharge requirements, or otherwise substantially degrade surface or groundwater quality. Therefore, water quality impacts associated with construction activities would be less than significant and no mitigation measures would be required.

Operations. As noted above, since the Project site is not located within the MS4 Phase I boundary, there are no proposed BMPs on site since storm water runoff is not required to be treated. There will be off-site drainage conveyed through the site through the various existing streams located within the site limits. The off-site runoff remains unchanged from the existing to the proposed and is not anticipated to cause any negative impacts downstream or to proposed infrastructure. Using the retention volume achieved from routing impervious areas to pervious areas, the proposed development is expected to generate negligible additional run-off downstream for storms up to the 100-year condition when compared to the existing condition. Therefore, impacts regarding water quality standards and water quality would be less than significant and no mitigation is required.

b) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?

Less Than Significant Impact. The proposed Project requires the continued use of local groundwater supplies via the existing groundwater wells. Water would be provided by CLAWA and internal wells. CLAWA has been determined to have sufficient water supplies for the Project regarding the water supply for the Camp's future expansions if used in conjunction with internal wells; refer to **Appendix B1**. Neither the Hume SoCal Campground nor CLAWA have prepared an Urban Water Management Plans (UWMP) to aid in future projection of domestic and non-domestic water demand. Therefore, the following analysis makes assumptions for the Camp's groundwater well sustainability and CLAWA allotted domestic water to the Camp. The WSA explores multiple scenarios to determine water supply and sustainability under varying conditions; refer to **Appendix B1**.

As outlined in ***Section 2.0: Description of Proposed Project,*** the FY 2022 domestic water usage of the existing Hume SoCal Campground was 5,946,099 gallons, or 18.4 AFY. The Campground's water supply consisted of 100 percent groundwater, sourced from four private, on-site wells. According to the WSA, the preferred water supply strategy for the Project involves a predominant reliance on CLAWA, complemented by the utilization of its groundwater wells. The approach is aimed at ensuring a consistent and sustainable water supply over the long term. To support and validate this strategy, the WSA advises conducting drawdown and water quality tests on all existing wells. These tests are essential for a technical evaluation of the groundwater wells' sustainability and operational reliability. With the completion of the WSA, the Camp aims to ensure water supply sustainability from existing on-site domestic wells and public water service connections.

Domestic Water Demand. With the proposed expansion, the Camp's capacity is projected to increase by approximately 1,000 percent. This will proportionally increase the number of staff required. The expected increase in domestic water demand, corresponding to the increase in occupants and expansion of facilities, is detailed in **Table 13: Estimated Camp Expansion Water Demand**.

Table 13: Estimated Camp Expansion Water Demand

Occupant Type	Count	Occupancy Duration (% of year)	Equivalent Days	Annual Domestic Demand[1] (Gallons)
Employee				
Full Time Employees	120	100%	365	8,760,000
Part Time Employees	200	50%	182.5	7,300,000
Winter Seasonal	350	17%	63.145	4,420,150
Summer Seasonal	680	17%	63.145	8,587,720
Camper/Guest				
High School Guests	1,000	13%	50	10,000,000

Occupant Type	Count	Occupancy Duration (% of year)	Equivalent Days	Annual Domestic Demand[1] (Gallons)
Middle School Guests	784	13%	50	7,840,000
Adult Lodge	140	13%	50	1,400,000
Elementary Age Guests	500	13%	50	5,000,000
Total Domestic Demand			**54,607,870 Gallons per Year (GPY)**	
			167.58 Acre-Feet per Year (AFY)	
			149,610 Gallons per Day (GPD)	
1. Annual domestic Demand = Equivalent Days *Count* (180 gallons per capita per day [GPCPD] (San Bernardino County, Special Districts Department, Standards for Domestic Water Systems, 2020) + 20 GPCPD (Camp irrigation sourced from domestic wells)				
Source: Kimley-Horn. 2024. *1st Draft Water Supply Assessment Hume SoCal Camp Expansion,* page 6.				

Non-Domestic Water Demand. The Camp's non-domestic water demand is supplied by Well No. 2, primarily used to fill a seasonal 1.5-million-gallon, lined, recreational pond. With the proposed expansion, the addition of three new ponds would necessitate an evaluation of Well No. 2's capacity to determine if it can meet the increased water requirements.

The dimensions and volumes of the proposed recreational ponds are not yet established, but it is assumed the cumulative volume is equivalent to the existing 1.5-million-gallon existing recreational pond, doubling the non-domestic water demand from the existing camp demand. It is recommended to perform a thorough assessment of the well's ability to sustain the additional demand. A network distribution system with adjustable controls and valves is recommended to effectively manage the water distribution to each pond.

FY 2022 flow data for Non-Domestic Well No. 2, retrieved from the Camp's well pumping logs, and proposed post-Project demand are displayed in **Table 14: Summary of Project Water Demand**. The demand accounts for filling of the ponds at the beginning of the summer season and periodic refilling, primarily driven by evaporation.

Table 14: Summary of Project Demand

Demand Type	Existing Demand	Proposed Demand
Domestic[1]	5,946,099 Gallons 18.4 AFY	54,607,870 Gallons 167.6 AFY
Non-Domestic	3,718,190 Gallons 11.4 AFY	7,436,380 Gallons 22.8 AFY
Water Loss[2]	193,286 Gallons 0.6 AFY	1,131,670 Gallons 3.5 AFY
Total Demand	**9,857,575 Gallons 30.2 AFY**	**63,175,920 Gallons 173.3 AFY**
1. Domestic water demand includes irrigation demand 2. Water losses are assumed to be 2 percent of total domestic and non-domestic water demand		
Source: Kimley-Horn. 2024. *1st Draft Water Supply Assessment Hume SoCal Camp Expansion*, page 11.		

The projected Campground water demand is assessed against CLAWA's 2,500 AFY baseline, 3,480 AFY long-term, and 5,800 AFY maximum entitlement allocations to determine the impact of the Camp's potential source scenarios on CLAWA. It is assumed that the Camp's non-domestic demand and water losses are supplied by Camp groundwater wells. The following analysis is based on the future Camp annual domestic demand of 54,607,870 gallons, or 167.6 AFY. Refer to **Table 15: Project Water Demand Compared Against CLAWA's Allocation Levels.**

Table 15: Project Water Demand Compared Against CLAWA's Allocation Levels

Allocation Type	CLAWA Allocation (AFY)	Majority Reliance Camp Demand Impact (125.7 AFY)	Balanced Reliance Camp Demand Impact (83.8 AFY)	Supplementary Reliance Camp Demand Impact (41.9 AFY)
Baseline	2,500	5.03%	3.35%	1.68%
Long-Term	3,480	3.61%	2.41%	1.20%
Maximum	5,800	2.17%	1.44%	0.72%
Source: Kimley-Horn. 2024. *1st Draft Water Supply Assessment Hume SoCal Camp Expansion*, page 13.				

As discussed in **Appendix B1**, CLAWA has implemented a Water Shortage Contingency Plan (WSCP) that would go into effect during dry years.[47] The Project would be required to implement conservation efforts during dry year scenarios to mitigate the impact on groundwater and CLAWA's imported water demand.

As mentioned above, multiple strategies were identified for the Camp's water supply, ranging from majority reliance on CLAWA to complete independence on its groundwater wells. Each strategy has been considered for its feasibility, sustainability, and impact on the overall water supply system, including during dry years and drought conditions. The integration of CLAWA as either a primary, supplementary, or emergency water source offers a range of benefits for both the Camp and CLAWA, should the connection need to be utilized. Based on communication with CLAWA, a formalized agreement between the Hume SoCal Campground and CLAWA is required. The Service Agreement outlines CLAWA's supply limitations and establishes a cap on the water provided to the Camp based on the scenarios outlined in the WSA (**Appendix B1**). Based on the analysis presented in **Appendix B1**, the preferred Project strategy leans towards maximizing its reliance on CLAWA, supplemented by its groundwater wells to establish a stable, long-term water supply.

Additionally, it is recommended that the Camp conduct well drawdown tests after the completion of Phase 2 to determine the sustainability and reliability of its groundwater wells; refer to **MM HYD-1**. The results of the tests will provide insights into the capacity of the groundwater wells and will inform the development of an effective water management strategy for the Camp. Therefore, with implementation of WSA recommendations and conditional implementation of CLAWA WSCP requirements, potential impacts associated with the depletion of or interference with groundwater would be less than significant.

[47] Crestline-Lake Arrowhead Water Agency. 2023. *Abridged Water Shortage Contingency Plan.* Available at https://www.clawa.org/_files/ugd/a07b32_7aba90a80ea14a33893bd1a27e98c496.pdf (accessed March 2024).

Mitigation Measures

MM HYD-1 The Applicant shall conduct well drawdown tests upon completion of Phase 2 which shall be submitted to Crestline Lake Arrowhead Water Agency (CLAWA) for review prior to approval of Phase 3 to determine sustainability and reliability of its groundwater wells.

c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:

i) Result in substantial erosion or siltation on- or off-site?

ii) Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite?

iii) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?

Less Than Significant Impact. As part of the proposed stormwater system, there would be off-site drainage conveyed through the site through the various existing streams located within the site limits. The off-site runoff remains unchanged from the existing to the proposed condition and is not anticipated to cause any negative impacts downstream or to proposed infrastructure. That is, the grading proposed for all Project parcels would maintain the natural flow pattern of the existing site, draining in the south-west direction, to the maximum extent possible. Proposed grading was completed to maximize the impervious areas flowing to on-site pervious areas and promote on-site infiltration. All Project parcels would continue to ultimately discharge into Deep Creek. Using the retention volume achieved from routing impervious areas to pervious areas, the Project is expected to generate negligible additional run-off downstream for storms up to the 100-year condition when compared to the existing condition. Therefore, the Project would not result in substantial erosion or loss of topsoil as a result of altering the existing drainage pattern of the Project site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces. With implementation of the required County drainage and water quality standards and BMPs proposed as a part of the Project, potential impacts that would result in substantial erosion or loss of topsoil as a result of altering the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, would be less than significant.

iv) Impede or redirect flood flows?

Less Than Significant Impact. The existing condition of the Project site is predominantly vacant, with existing special development-residential buildings encompassing only a minor portion of the Project area. Currently, there is an existing bridge crossing an unnamed tributary, which runs through the middle of the site, and there are a couple existing storm culverts under Green Valley Lake Road that are not anticipated to be impacted by the development of this Project. Under existing conditions, storm water runoff flows in a northeast-southwest direction and discharges

into several unnamed streams through the Project site, then continues west until ultimately discharging into Deep Creek. The existing drainage paths would be maintained for the proposed development.[48]

The existing surrounding adjacent areas are undeveloped and remain undeveloped in the proposed condition. In the existing condition, there are some off-site flows from the east that are conveyed through several existing streams located through the Project site. With implementation of the Project, the off-site flows would continue to be conveyed through the existing streams through the site.[49] Therefore, off-site flows entering the site are not anticipated to negatively impact the proposed development associated with the Project, nor would the Project impede or redirect flood flows.

The Project site is not located within a flood hazard area.[50] On-site stormwater and non-stormwater runoff would be treated with on-site BMPs and then discharged to the existing drainage courses within the site where they extend off-site, retaining the overall drainage pattern of the site, as discussed in ***Hydrology and Water Quality***. Therefore, the Project would not impede or redirect flood flows and there would be a less than significant impact.

d) In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?

Less Than Significant Impact. The Project site is located significantly inland from the coast of the Pacific Ocean and is therefore not at risk of tsunamis. According to FEMA Flood Insurance Rate Panel 06071C8000H (effective August 28, 2008), the Project site is located within "Flood Zone D", which corresponds with areas with possible but undetermined flood hazards.[51] No portion of the Project site is located within the special flood hazard area inundated by the 100-year flood.[52] Additionally, the Project site is not located within a flood hazard zone, according to the CWP.[53] The existing and future recreational ponds and pools on the site are considered subject to the occurrence of a seiche hazard in the event of large earthquakes. Due to the limited quantity of water present in the recreation ponds, impacts would be less than significant in the event of a seiche. Therefore, less than significant impacts associated with inundation by flood hazard, tsunami, or seiche zones would occur.

e) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?

No Impact. As the Project site is not located within the MS Phase I boundary, there are no proposed BMPs on site since storm water runoff is not required to be treated. There will be off-site drainage

[48] Kimley-Horn and Associates, Inc. 2024. *Preliminary Hydrology Report Hume SoCal*, page 7-8.
[49] Ibid, page 8.
[50] County of San Bernardino. 2020. *Countywide Plan Policy Map HZ-4 Flood Hazards.* Available at https://www.arcgis.com/apps/webappviewer/index.html?id=d276e645a4ae4e2bb95694ff06b4f0be (accessed February 2024).
[51] Federal Emergency Management Agency. 2008. *Flood Insurance Rate Panel Map No. 06071C8000H*. Available at https://msc.fema.gov/portal/search (accessed February 2024).
[52] Kimley-Horn and Associates, Inc. 2024. *Preliminary Hydrology Report,* page 7.
[53] County of San Bernardino. 2020. *Countywide Plan Policy Map HZ-4 Flood Hazards.* Available at https://www.arcgis.com/apps/webappviewer/index.html?id=d276e645a4ae4e2bb95694ff06b4f0be (accessed February 2024).

conveyed through the site through the various existing streams located within the site limits. The off-site runoff remains unchanged from the existing to the proposed and is not anticipated to cause any negative impacts downstream or to proposed infrastructure. The Project would maintain compliance with all relevant RWQCB regulations and County regulations. Therefore, no significant impacts are identified or anticipated, and no mitigation measures are required.

Cumulative Impacts

The potential impacts related to hydrology and water quality are generally site-specific. The Project would take the required steps to reduce hydrological and water quality impacts as analyzed above, which determined that the Project would not result in significant impacts with implementation of **MM HYD-1**. As such, the Project would not contribute to a cumulatively significant impact when considering all other potential projects in the general area and with the incorporation of **MM HYD-1**.

LAND USE AND PLANNING

ENVIRONMENTAL IMPACTS Issues		Potentially Significant Issues	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
11.	**LAND USE AND PLANNING. Would the project:**				
a)	Physically divide an established community?				X
b)	Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?				X

a) Physically divide an established community?

No Impact. The Project is the expansion of an existing campground with a current area of approximately 107 acres. It proposes the development of approximately 144 additional acres of forest land for a combined area of approximately 252.1 acres upon the completion of the Project. A portion of the Project site is currently developed with existing campground buildings, internal access roadways, and utility infrastructure associated with current campground operations (300-person capacity, currently).

Projects that are typically considered to have the potential to divide an established community include the construction of new freeways, highways, or roads that physically separate an existing or established neighborhood. As summarized in **Section 2.0: Description of Proposed Project**, a portion of the Project site is developed for current campground operations and is not currently zoned for residential use. Furthermore, the Project site is in a rural, forested mountain area. Greenway Valley Lake Road is the only road in the immediate vicinity of the Project site.

The development of the Project site would not include improvements which would substantially alter Green Valley Lake Road or other existing roadways and transportation corridors in the greater vicinity of the Project site in a manner that would cause the removal or separation of existing adjacent communities from important resources and neighboring units. Internal access roadway improvements associated with the Project would also increase traffic circulation efficiency within the Project site and increase access to Green Valley Lake Road. Therefore, the Project would not physically divide an established community and there would be no impact.

b) Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?

No Impact. The Project would be required to comply with any applicable State, regional, and local land use plans, policies, and regulations. Projects should be consistent with applicable policies to promote the efficient, sustainable growth projected in the long-term planning documents.

According to the CWP, the Project's land use designation is Rural Living (RL). The RL land use area primarily allows for development of residential development. The Project site is located within the Mountain Region of unincorporated San Bernardino County, specifically within the Hilltop Community area. According to the HCAG, the Project area contains a Rural Living (RL) land use designation. The Project has been prepared in conformance with the goals and policies of the CWP and HCAG, that emphasize the protection of sensitive resources, the integration of natural vegetation and open space, and development that is scaled and designed to enhance the natural surroundings, by providing an expanded existing campground that creates new opportunities for employment and recreation while preserving the natural and scenic features of the surrounding environment. Therefore, the Project would not cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation.

Cumulative Impacts

For the purposes of land use and planning impact analysis, cumulative impacts are considered for cumulative development in the event that Project development would exacerbate or otherwise significantly influence other nearby projects. Those projects represent past, present, and potential future projects that could lead to cumulative impacts when combined with the proposed Project. The geographic context for the land use and planning cumulative impact analysis includes the jurisdiction of local and regional agencies. The CWP EIR found land use and planning impacts to be less than significant under buildout conditions; therefore, there is no existing cumulatively significant land use impact. The CWP EIR found land use and planning impacts to be less than significant under buildout conditions; therefore, there is no existing cumulatively significant land use impact. Land use impacts would not be cumulatively considerable if the Project, in conjunction with other past, present, reasonably foreseeable future projects, would be designed or otherwise conditioned to maintain consistency with adopted land use plans and ordinances or be amended with the appropriate mitigation and conditions of approval. Implementation of the Project would neither physically divide an established community nor inhibit future development within the County in accordance with the CWP goals and policies. Given the Project's consistency, as well as the requirement for other future projects to be generally consistent with the land use policy framework, overall cumulative land use consistency impacts would be less than significant.

MINERAL RESOURCES

ENVIRONMENTAL IMPACTS Issues		Potentially Significant Issues	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
12.	**MINERAL RESOURCES. Would the project:**				
a)	Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?				X
b)	Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?				X

a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?

No Impact. According to the CWP, which compiles mineral resource mapping data from the California DOC, the Project site is designated MRZ-4, an area of general undetermined mineral resource significance.[54,55] The MRZ-4 designation indicates areas of no known mineral occurrences where geologic information does not rule out either the presence or absence of significant mineral resources. Therefore, the Project site is not designated as land that contains known mineral resources of significance, and any proposed mineral resource extraction would require a CUP from the County. Therefore, the Project would not result in the loss of a known mineral resource that would be of value to the region and the State. As such, there would be no impact from Project implementation.

b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?

No Impact. According to the County, the Project site is not designated as land that contains known mineral resources of significance.[56] Additionally, the Project site has previously been redeveloped for land uses that do not contain known mineral resources or require extraction of any mineral resources. The majority of the Project site is currently developed with improvements related to the existing Hume SoCal Campground facilities. Therefore, the Project would not result in the loss of availability of any locally important mineral resource recovery site. As such, there would be no impact due to Project implementation.

[54] California Department of Conservation, Division of Mines and Geology. 1995. *Mineral Land Classification of a Part of Southwestern San Bernardino County, California: A Part of the Eastern San Gabriel Mountains and the Western San Bernardino Mountains – Composite Map Showing MRZ's, and Mines, and Prospects.* Available at https://filerequest.conservation.ca.gov/?q=ofr_94-08_west.pdf (accessed September 12, 2022).

[55] County of San Bernardino. 2021. *Policy Map NR-4 Mineral Resources Zones*. Available at https://www.arcgis.com/apps/webappviewer/index.html?id=9948b9bc78f147fd9ea193c2ce758081 (accessed September 12, 2022).

[56] County of San Bernardino. 2019. *Countywide Plan. Draft Environmental Impact Report, Section 5.11, Mineral Resources, Figure 5.11-1 Mineral Resource Zones 2 & 3 in the Southwest Quadrant of County*. Available at https://countywideplan.com/wp-content/uploads/sites/68/2021/01/Ch_05-11-MIN.pdf (accessed September 12, 2022).

Cumulative Impacts

As the Project does not contain any mineral resources and would not have any impact due to the removal or loss of availability of these resources, the Project would not contribute to any cumulative impact on mineral resources, compared to the CWP EIR, which resulted in significant impact without mitigation. As such, there would be no cumulative impacts as a result of Project implementation.

NOISE

ENVIRONMENTAL IMPACTS Issues	Potentially Significant Issues	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
13. NOISE. Would the project result in:				
a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?			X	
b) Generation of excessive groundborne vibration or groundborne noise levels?			X	
c) For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?				X

An Acoustical Assessment was conducted by Kimley-Horn in February 2024 (**Appendix I: Acoustical Assessment**), which evaluates the potential construction and operational noise and vibration levels associated with the Project and determines the level of impact the Project would have on the environment.

a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

Less Than Significant Impact.

Construction. Construction noise typically occurs intermittently and varies depending on the construction activity's nature or phase (e.g., land clearing, grading, excavation, paving). Noise generated by construction equipment, including earth movers, material handlers, and portable generators, can reach high levels. During construction, exterior noise levels could affect noise-sensitive receptors near the construction site. However, the nearest sensitive receptor to the Project site construction area is the existing campground, Camp Pondo, with the nearest building located approximately 1,200 feet east of the Project. However, it is noted that construction activities would occur throughout the Project site and would not be concentrated at a single point near noise-sensitive receptors.

Construction activities would include demolition, site preparation, grading, building construction, paving, and architectural coating. Typical noise levels associated with individual construction equipment are listed in **Table 16: Typical Construction Equipment Noise Levels.**

Table 16: Typical Construction Equipment Noise Levels

Equipment	Typical Noise Level (dBA) at 50 feet from Source	Typical Noise Level (dBA) at 1,200 feet from Source[1]
Air Compressor	80	52
Backhoe	80	52
Compactor	82	54
Concrete Mixer	85	57
Concrete Pump	82	54
Concrete Vibrator	76	48
Crane, Mobile	83	55
Dozer	85	57
Generator	82	54
Grader	85	57
Impact Wrench	85	57
Jack Hammer	88	60
Loader	80	52
Paver	85	57
Pneumatic Tool	85	57
Pump	77	49
Roller	85	57
Saw	76	48
Scraper	85	57
Shovel	82	54
Truck	84	56
1. Calculated using the inverse square law formula for sound attenuation: $dBA_2 = dBA_1+20Log(d_1/d_2)$ Where: dBA_2 = estimated noise level at receptor; dBA_1 = reference noise level; d_1 = reference distance; d_2 = receptor location distance		
Source: Kimley-Horn. 2024. *Acoustical Assessment Hume SoCal Camp Expansion Project County of San Bernardino, California,* page 21-22.		

Typical operating cycles for these types of construction equipment may involve one or two minutes of full power operation followed by three to four minutes at lower power settings. Other primary sources of acoustical disturbance would be random incidents, which would last less than one minute (such as dropping large pieces of equipment or the hydraulic movement of machinery lifts).

Although the construction equipment noise levels in **Table 16** are from the Federal Transit Administration's (FTA's) 2018 *Transit Noise and Vibration Impact Assessment Manual*, the noise levels are based on measured data from a U.S. EPA report which uses data from the 1970s, the Federal Highway Administration Roadway Construction Noise Model which uses data from the early 1990s, and other measured data. Since that time, construction equipment has been required to meet more stringent emissions standards and the additional necessary exhaust systems also reduce noise from what is shown in the table.

Section 83.01.080(G) (Exempt Noise) of the San Bernardino County Development Code exempts noise sources associated with construction activities from the County's established noise standards

as long as the activities only take place between the hours of 7:00 a.m. to 7:00 p.m. on weekdays and Saturdays, excluding federal holidays. While the County establishes limits to the hours during which construction activity may take place, it does not identify specific noise level limits for construction noise levels. However, this analysis conservatively uses the FTA's threshold of 80 dBA and 85 dBA (8-hour L_{eq}) to evaluate construction noise impacts for residential and commercial uses, respectively.

***Project Construction Noise Levels*.** The noise levels calculated in **Table 17: Construction Noise Levels** show estimated exterior construction noise. Construction noise levels drop off at a rate of about 6 dBA per doubling of distance between the noise source and receptor. Construction equipment would operate throughout the Project site and the associated noise levels would not occur at a fixed location for extended periods of time. The nearest sensitive receptors are located at Camp Pondo, approximately 1,200 feet to the east. There are also single-family residential uses located approximately 1,540 feet to the south; however these residential uses are located on the opposite side of a hill and would be shielded from Project noise. It is noted that construction equipment would move around on-site and not all equipment would operate at the closest point to sensitive receptors to the center of the construction activity area. Therefore, the analysis assumed simultaneous operation of the two loudest pieces of equipment closest to sensitive receptors (1,200 feet) and the remaining equipment at an average distance (1,840 feet). The construction area would encompass a large area and would not concentrate all equipment at the construction area boundary. The nature of construction is such that all equipment is not (1) used simultaneously and (2) not used at the exact same location (because equipment serves different purpose) and equipment is spread across the construction area. This analysis assumes that the noisiest equipment would operate concurrently at the construction boundary closest to the nearest sensitive receptor reflects a conservative analysis. Construction noise levels shown in **Table 17** focus on the closest receptors. Noise levels at receptors further away would be lower.

Table 17 shows that construction noise levels would not exceed the 85-dBA threshold. Additionally, compliance with Section 83.01.080(G) (Exempt Noise) of the County of San Bernardino Development Code would minimize impacts from construction noise, as construction would be limited to daytime hours. Therefore, construction activities would result in a less than significant noise impact.

Table 17: Construction Noise Levels

Construction Activities	Modeled Exterior Construction Noise Level at Nearest Receptor (dBA L_{eq})	Noise Threshold (dBA L_{eq})	Exceed Threshold?	Ambient Noise Level (dBA L_{eq})	Construction + Ambient Combined Noise Level (dBA L_{eq})	Exceed Threshold?
Demolition	57.5	85	No	57.8	60.7	No[1]
Site Preparation	58.0		No		60.9	No[1]
Grading	58.1		No		61.7	No[1]
Construction	58.5		No		61.2	No[1]

Construction Activities	Modeled Exterior Construction Noise Level at Nearest Receptor (dBA L_{eq})	Noise Threshold (dBA L_{eq})	Exceed Threshold?	Ambient Noise Level (dBA L_{eq})	Construction + Ambient Combined Noise Level (dBA L_{eq})	Exceed Threshold?
Paving	51.7		No		58.8	No[1]
Architectural Coating	46.1		No		58.1	No[1]
Combined Activities[2]	64.7		No		65.5	No[1]

1. Combined construction noise and ambient noise levels remain below the 85 dBA construction noise threshold for commercial/non-residential uses.
2. Although the Project construction schedule states that all construction activities will overlap during the early stages of construction, these activities could not all occur in the same geographic location. However, to model a worst-case scenario, this analysis assumes all construction activities would occur simultaneously nearest to the closest receptor.

Source: Kimley-Horn. 2024. *Acoustical Assessment Hume SoCal Camp Expansion Project County of San Bernardino, California,* page 23.

***Construction Traffic Noise*.** Construction noise may be generated by large trucks moving materials to and from the Project site. Grading would require approximately 157,415 cubic yards of export which would result in approximately 224 roundtrip truck hauling trips per day during the grading phase. Construction would result in approximately 171 worker trips per day. Noise generated from construction traffic would increase short-term noise; however, these noise levels are temporary and would cease once construction is complete. The trucks associated with construction would occur during the allowable hours for construction specified in the Development Code (7:00 a.m. to 7:00 p.m. on weekdays and Saturdays, excluding federal holidays). Trucks (including trucks hauling excavated material) would also occur during the allowable daytime hours only. Delivery trucks, haul trucks, and worker vehicles associated with the construction of the Project would vary from day to day, with the highest volumes generally occurring during construction initiation.

Green Valley Lake Road, the access road to the Project is identified in the CWP as a Mountain Secondary Highway. Although traffic for Green Valley Lake Road is not addressed in the Transportation Impact Analysis prepared for the CWP Programmatic Environmental Impact Report (PEIR), other Mountain Secondary Highways range between 656 and 11,534 average daily traffic trips (ADT), with an average ADT of 3,575. In general, a 3-dBA increase in traffic noise is barely perceptible to people, while a 5-dBA increase is readily noticeable. Traffic volumes on Project area roadways would have to approximately double for the resulting traffic noise levels to generate a 3-dBA increase. Assuming Green Valley Lake Road traffic is comparable to the lower end of other Mountain Secondary Highways, construction traffic could result in a barely perceptible 3-dBA increase in traffic noise. This 3-dBA increase when combined with the ambient noise levels recorded on November 1 at a location nearest to a sensitive receptor (refer to *Table 6* of **Appendix I**) would increase noise to 60.8 dBA.

As noted previously, the exterior noise standards for mobile sources near commercial land uses (Camp Pondo) are 60 dBA CNEL. Based on the above calculation, construction traffic noise would attenuate to 51.8 dBA. Therefore, although construction traffic may result in a barely perceptible

increase to traffic noise, noise levels would not exceed the County's standard for mobile sources. As a result, construction traffic noise would be less than significant.

Operations. The Project would expand the existing Hume SoCal Campground to accommodate up to 3,000 persons within a 252.1-acre site. Recreational activities at the Project site would include varied outdoor activities (e.g., zip line, climbing, hiking, craft projects, recreational games, etc.) that would produce nominal noise at the nearest sensitive receptors (Camp Pondo campers located approximately 1,200 feet to the east of the Project boundary and single-family residents located approximately 1,540 feet to the south). Although the nearest single-family residential property is located 1,540 feet as a crow flies, it is located on the opposite side of the hill and would be shielded from Project noises. The primary noise sources associated with the campground would be an outdoor public address (PA) system, live music, campground noise, and off-site traffic noise.

***Public Address System*.** Operations at the campground would include occasional announcements from the PA system, presented through a distributed loudspeaker system located throughout the park. A typical PA system can produce noise levels of approximately 87.5 dBA at 20 feet from the source. The nearest sensitive receptors would be located approximately 1,200 feet from the boundary of the Project site. At this distance, the noise levels generated by the PA system would result in a noise level of approximately 51.9 dBA at the nearest sensitive receptor. As a result, the proposed PA system for announcements, music, etc., would not exceed the County's 60 dBA threshold (daytime and nighttime) for commercial uses (Camp Pondo) from stationary noise sources. Furthermore, additional noise attenuation would be provided by surrounding intervening terrain between the Project site and sensitive receptors. A less than significant impact would occur in this regard.

***Live Music*.** The campground would provide occasional live music events on the Project site. Live music typically generates noise levels of 88 dBA at 20 feet from the source. The nearest sensitive receptors are located approximately 1,200 feet from the boundary of the Project site. At this distance, the noise levels generated by live music would result in a noise level of approximately 52.4 dBA based on distance attenuation alone. As a result, live music at the Project site would not exceed the County's 60 dBA threshold for commercial uses from stationary noise sources. A less than significant impact would occur in this regard.

***Campground Activities*.** Noise associated with the campground would include crowd noise from various outdoor activities. Noise associated with activities at the campground would include conversations, children playing, music, people walking along trails, and periodic maintenance, etc. These activities would generally produce low to moderate levels of noise. The campground noise is approximately 85 dBA at a distance of 20 feet. As the nearest sensitive receptors are approximately 1,200 feet from the campground, noise levels would be approximately 49.4 dBA. As such, campground noise would be below the San Bernardino County's 60 dBA standard for commercial uses from stationary noise sources. A less than significant impact would occur in this regard.

***Off-Site Traffic Noise*.** Project implementation would generate increased traffic volumes along Green Valley Lake Road and Project area roadways. According to the Scope for the Traffic Study and Vehicle Miles Traveled (VMT) Screening Assessment prepared by Kimley Horn and Associates (Kimley-Horn; June 2023) and the Traffic Analyses prepared by Kimley-Horn in June 2025 (Trip Generation Analysis), the Project would result in 700 average daily vehicle trips per week, with 225 trips occurring on Sundays, and 7-day average of 100 trips per day. The Project's increase in traffic would result in noise increases on Project area roadways.

As discussed previously under **Construction Traffic Noise** above, Green Valley Lake Road, the access road to the Project is identified in the CWP as a Mountain Secondary Highway. Although traffic for Green Valley Lake Road is not addressed in the Transportation Impact Analysis prepared for the CWP EIR, other Mountain Secondary Highways range between 656 and 11,534 ADT. In general, a 3-dBA increase in traffic noise is barely perceptible to people, while a 5-dBA increase is readily noticeable. Traffic volumes on Project area roadways would have to approximately double for the resulting traffic noise levels to generate a 3-dBA increase. Assuming Green Valley Lake Road traffic is comparable to the lower end of other Mountain Secondary Highways, the maximum traffic generated by the Project, 225 ADT on Sundays, would not be sufficient to result in a permanent 3-dBA increase in ambient noise levels. Therefore, noise impacts associated with traffic would be less than significant.

b) Generation of excessive groundborne vibration or groundborne noise levels?

Less Than Significant Impact.

Construction Vibration. Construction can generate varying degrees of ground vibration, depending on the construction procedures and equipment. Operation of construction equipment generates vibrations that spread through the ground and diminish with distance from the source. Construction on the Project site would have the potential to result in varying degrees of temporary groundborne vibration, depending on the specific construction equipment used and the operations involved.

The FTA has published standard vibration velocities for construction equipment operations. The County Development Code Section 83.01.090(A), Vibration Standard, sets a ground vibration standard of 0.2 in/sec peak particle velocity (PPV). No ground vibration shall be allowed that can be felt without the aid of instruments at or beyond the lot line, nor shall any vibration be allowed which produces a particle velocity greater than or equal to 0.2 in/sec PPV measured at or beyond the lot line.

Table 18: Typical Construction Equipment Vibration Levels, lists vibration levels at 25 feet for typical construction equipment. Based on preliminary site plans, construction nearest to the Project boundary would occur in the southeast portion of the Project Site, approximately 25 feet from the Project boundary. As indicated in **Table 18**, based on FTA data, vibration velocities from typical heavy construction equipment operations that would be used during Project construction range from 0.003 to 0.089 in/sec PPV at 25 feet from the source of activity.

Table 18: Typical Construction Equipment Vibration Levels

Equipment	Peak Particle Velocity at 25 Feet (in/sec)
Large Bulldozer	0.089
Caisson Drilling	0.089
Loaded Trucks	0.076
Jackhammer	0.035
Small Bulldozer/Tractors	0.003
Source: Kimley-Horn. 2024. *Acoustical Assessment Hume SoCal Camp Expansion Project County of San Bernardino, California*, page 26.	

Table 18 shows that at the lot line, 25 feet from construction activity, the vibration velocities from construction equipment would not exceed 0.089 in/sec PPV, which is below the County's 0.2 in/sec PPV threshold. It is also acknowledged that construction activities would occur throughout the Project site and would not only be located at the boundary closest to other properties. Therefore, vibration impacts associated with Project construction would be less than significant.

Operational Vibration. Once operational, the Project would not be a significant source of groundborne vibration. Groundborne vibration surrounding the Project currently results from heavy-duty vehicular travel (e.g., refuse trucks, heavy duty trucks, delivery trucks, and transit buses) on the nearby local roadways. Operations of the Project would include activities associated with campgrounds that typically would not cause excessive ground-borne vibrations. Due to the rapid drop-off rate of groundborne vibration and the short duration of the associated events, vehicular traffic-induced groundborne vibration is rarely perceptible beyond the roadway right-of-way, and rarely results in vibration levels that cause damage to buildings in the vicinity. According to the FTA *Noise and Vibration Manual*, trucks rarely create vibration levels that exceed 0.012 in/sec PPV when they are on roadways. Therefore, automobiles accessing the Project site or traveling along surrounding roadways would not exceed the County's vibration threshold. Impacts would be less than significant in this regard.

c) For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?

No Impact. The nearest airports to the Project site are the Redlands Municipal Airport and Big Bear Airport located approximately 10 miles southwest and 14 miles to the east-northeast of the Project site, respectively. The Project is not within 2.0 miles of a public airport or within an airport land use plan. Additionally, there are no private airstrips located within the Project vicinity. Therefore, the Project would not expose people residing or working in the Project area to excessive airport- or airstrip-related noise levels and no mitigation is required.

Cumulative Impacts

Cumulative Construction Noise

The Project's construction activities would not result in a substantial temporary increase in ambient noise levels. Construction noise would be periodic and temporary noise impacts that would cease upon completion of construction activities. Construction activities would be required to comply with applicable County rules related to noise and would take place during daytime hours on the days permitted by the applicable Municipal Code, and projects requiring discretionary County approvals would be required to evaluate construction noise impacts, comply with the County's standard conditions of approval, and implement mitigation, if necessary, to minimize noise impacts. Construction noise impacts are by nature localized. Based on the fact that noise dissipates as it travels away from its source, noise impacts would be limited to the Project site and vicinity. Therefore, Project construction would not result in a cumulatively considerable contribution to significant cumulative impacts, assuming such a cumulative impact existed, and impacts in this regard are not cumulatively considerable.

Cumulative Mobile Noise

The Project would not generate mobile noise as no additional trips beyond existing conditions are proposed. Therefore, the Project would not contribute to the cumulative mobile noise environment. Thus, cumulative mobile noise impacts from related projects, in conjunction with Project specific noise impacts, would not be cumulatively significant.

Cumulative Stationary Noise

Stationary noise sources of the Project would result in an incremental increase in non-transportation noise sources in the Project vicinity. However, as discussed above, operational noise caused by the Project would be less than significant. Similar to the Project, other planned and approved projects would be required to mitigate for stationary noise impacts at nearby sensitive receptors, if necessary. As stationary noise sources are generally localized, there is a limited potential for other projects to contribute to cumulative noise impacts.

No known past, present, or reasonably foreseeable projects would combine with the operational noise levels generated by the Project to increase noise levels above acceptable standards because each project must comply with applicable County regulations that limit operational noise. Therefore, the Project, together with other projects, would not create a significant cumulative impact, and even if there was such a significant cumulative impact, the Project would not make a cumulatively considerable contribution to significant cumulative operational noises.

Given that noise dissipates as it travels away from its source, operational noise impacts from on-site activities and other stationary sources would be limited to the Project site and vicinity. Thus, cumulative operational noise impacts from related projects, in conjunction with Project specific noise impacts, would not be cumulatively significant.

POPULATION AND HOUSING

ENVIRONMENTAL IMPACTS Issues		Potentially Significant Issues	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
14.	**POPULATION AND HOUSING. Would the project:**				
a)	Induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?			X	
b)	Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?				X

a) Induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?

Less Than Significant Impact. The Project would not introduce new population or housing to the Project site aside from minimal temporary/seasonal housing for staff. Development would involve the expansion of campground uses for the existing Hume SoCal Campground to accommodate up to an additional 2,700 persons (an increase from 300 to 3,000 persons). New campground structures proposed for the Project would be developed in five phases. The Project is proposed to be developed on land that has been previously disturbed and developed with existing campground facilities or within areas of the existing campground property that are currently undisturbed forest.

Construction. Construction of the Project would generate temporary employment opportunities, including short-term design, engineering, and construction jobs. Construction related jobs would not result in a significant population increase because those jobs are temporary in nature and are expected to be filled by persons within the local area. This expectation is based, among other things, on the County's 7.2 percent unemployment rate.[57] Furthermore, the small percentage of skilled and managerial construction-related positions could either be filled by the local workforce or by persons from the larger region. Therefore, Project construction would not directly or indirectly induce substantial, unplanned population growth in the County resulting in a less than significant impact.

Operations. Future operation of the Project would include employment of new workers. This would directly impact the area by creating new job opportunities. A majority of the Project would involve the development of residential and recreational facilities to be used for campground activity that is temporary/seasonal. Therefore, it is unlikely the Project would directly or indirectly

[57] United States Census Bureau. 2022. *2022 American Community Survey 5-Year Estimates Data Profiles. Selected Employment Characteristics*. Available at https://data.census.gov/table/ACSDP5Y2022.DP03?t=Employment&g=050XX00US06071 (accessed March 2024).

induce substantial, unplanned population growth in the County. Thus, the impact is less than significant, and no mitigation is required.

b) Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?

No Impact. The Project would be developed on a site that has been previously disturbed and developed with existing Hume SoCal Campground facilities or within areas of the existing campground property that are currently undisturbed forest. Additional development on the Project site would not displace people or housing or necessitate the development of new housing elsewhere. While the Project would generate short-term changes in employment during construction activities and long-term operational jobs, these changes would not displace substantial numbers of existing people or housing because the Project site does not include residences aside from minimal seasonal/temporary housing for campground staff or support a residential population. As a result, there would be no impacts related to the displacement of substantial numbers of people or housing and no mitigation is required.

Cumulative Impacts

Project implementation would have a less than significant impact on the County's population and housing resources. Development of the Project would not contribute to a substantial cumulative countywide increase in population and/or housing, as the Project would further improve the jobs-housing balance in the region and would not necessitate a substantial increase in population or housing demand. Therefore, implementation of the Project would not contribute to an existing cumulative impact, resulting in a less than significant cumulative impact.

PUBLIC SERVICES

ENVIRONMENTAL IMPACTS Issues	Potentially Significant Issues	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
15. PUBLIC SERVICES. Would the project:				
a) Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:				
i) Fire protection?			X	
ii) Police protection?			X	
iii) Schools?			X	
iv) Parks?				X
v) Other public facilities?			X	

a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:

A significant impact would result if development of the Project site would result in a significant increase in demand for fire protection services, police protection, schools, parks, or other facilities such that new or physically altered stations, schools, parks, or other facilities or location from which services are provided would be needed. If the construction or operation of such facilities would cause substantial environmental effects due to the expansion or construction of facilities on new sites needed to maintain acceptable service ratios, response times, or other performance objectives, a potentially significant impact could result.

i) Fire protection?

Less Than Significant Impact. Potential impacts related to fire protection services are reviewed by the San Bernardino County Fire Protection District (SBC Fire) on a project-by-project basis. The Project's land uses, fire-protection related needs, and the Project site recommended response distance, are taken into consideration when evaluating the Project's impact to fire protection services. The Project would include the construction of expanded campground facilities. However,

SBC Fire already provides services for the Project site and has significant resources in place for the Project site. Because of the well-known risk of fires in Southern California, the County has ensured that there is more than adequate fire protection in neighborhoods under its jurisdiction. Since no new housing aside from minimal seasonal/temporary housing for campground staff would be constructed as a result of this Project, and therefore no new permanent residents added to the HCAG area, the Project would not represent a potential need for expanded fire protection in the area or affect service and response times. Additionally, the Project would comply with the County Fire District Standards, California Fire Code (CFC) and CBC, including Project features that aid in fire safety and support fire suppression activities, such as fire sprinklers, paved access, and required aisle widths.

The Running Springs Fire Department (RSFD) covers a 52 square mile area from Lake View Point overlooking the Big Bear Valley, to the Heaps Peak Dump towards Lake Arrowhead, and down to the Lower Passing Lanes of SR-330. The RSFD frequently will respond with surrounding cooperators under a mutual aid agreement. These include SBC Fire, United States Forest Service, CAL FIRE, and Arrowbear Fire. Due to this mutual aid agreement, the Project site would be served by RSFD Stations 50 and 51. The RSFD Station 50, located at 32151 Hunsaker Way in Running Springs, is approximately 1.4 miles south of the Project site, and RSFD Station 51, located at 31250 Hilltop Boulevard in Running Springs, is approximately 1.7 miles southwest of the Project site. The RSFD has a response time of 8:00 minutes to 15:00 minutes depending on weather conditions.[58] Based on the Project site's proximity to two existing fire stations, the Project would be adequately served by fire protection services, and no new or expanded unplanned facilities would be required. Prior to commencement of any construction activities, and pursuant to the San Bernardino County Code of Ordinance Section 85.01, the Project design plans would be reviewed by all applicable local agencies, including the SBC Fire and RSFD, prior to approval of building permits to ensure compliance with the County's Development Codes and Ordinances, the HCAG area, and all applicable emergency response and fire safety requirements of the SBC Fire, RSFD, and the CFC. Overall, the Project would receive adequate fire protection services and would not result in adverse physical impacts associated with the provision of or need for new or physically altered fire protection facilities, and would not adversely affect service ratios, response times, or other performance objectives. Compliance with applicable local and state regulations would ensure that the Project implementation would result in a less than significant impact to fire protection services.

ii) Police protection?

Less Than Significant Impact. The San Bernardino County Sheriff's Department (SBCSD) provides police services for the HCAG area, which includes the Project site. The County does not have a service standard for number of sheriff personnel per population and service is provided through watch stations patrol area radius. The HCAG area is covered by the SBCSD's Twin Peaks Station. The Twin Peaks Station is located at 26010 CA-189 in Twin Peaks and is approximately 8 miles west of the Project site. The Twin Peaks Station covers over 135 square miles of territory, the majority

[58] County of San Bernardino. 2019. *Hilltop Community Action Guide*, page 4. Available at (accessed October 2025).

of it within the San Bernardino National Forest.[59] The patrol area stretches from Lake Silverwood to Lake View Point and includes the towns of Crestline, Lake Arrowhead, Running Springs and numerous smaller communities and neighborhoods. As well as being home to nearly 36,000 regular residents, the popular resort and recreation destination can sometimes have a daily population that swells to over 85,000 persons on weekends and holidays.

According to the SBCSD, in 2022, the Twin Peaks Station had 17 patrol deputies serving the surrounding population of 33,496.[60] This averages to one patrol deputy per 1,970 residents. The station currently has 17 sworn deputies, two detectives, five sergeants, one lieutenant, and one captain, in addition to seven administrative employees.[61] The Twin Peaks Station's service area had a total call volume of 22,288 calls in 2022, a decrease of one percent compared to 2021, and four deputy reports filed, an increase of four percent compared to 2021.[62]

The SBCSD operates under a mutual agreement with police agencies in the surrounding cities and counties via the California Office of Emergency Services.[63] This allows use of up to 50 percent of adjustment agency resources upon request and for automatic responses within zones of mutual aid. The unincorporated areas in the County are served by the SBCSD, which operates from an office at 655 E. Third Street in the City of San Bernardino. The SBCSD and the San Bernardino City Police Department provide mutual backup services upon request within both San Bernardino and unincorporated areas.

The California Highway Patrol (CHP) provides traffic patrols on state highways, which include SR-18, SR 189, SR-173 and SR-330, in the Project vicinity. The CHP also provides emergency response support to the San Bernardino City Police Department and the SBCSD upon request. The closest CHP office to the Project site is located at 31230 CA-18 in Running Springs, approximately 1.6 miles southeast of the site.

The Twin Peaks Station already provides police services to the Project site and, although there is the possibility of increased park usage as a result of the implementation of the proposed improvements, the nature of those services would not change as a result of the proposed physical expansion and increase in guest capacity of the existing campground, and it is unlikely that additional deputies would be needed in the Project area. The need for increased police service within the HCAG area is determined by increases in service calls, demands on existing personnel, crime levels, and population. The gradual increase in population and development associated with the Project would require continued assessment of the adequacy of law enforcement staffing within the HCAG area, by the SBCSD.

[59] San Bernardino County Sheriff's Department. 2022. *Twin Peaks Patrol Station*. Available at https://wp.sbcounty.gov/sheriff/patrol-stations/twin-peaks/ (accessed February 2023).
[60] San Bernardino County Sherriff's Department. 2022. 2022 Workload Summary. Available at https://wp.sbcounty.gov/sheriff/wp-content/uploads/sites/17/2022-Sheriffs-Workload-Summary-082123.pdf?x20231 (accessed March 2024).
[61] County of San Bernardino. 2020. *Hilltop Communities Action Guide*. Available at https://countywideplan.com/wp-content/uploads/sites/68/2020/08/08_Hilltop_CAG_2020-1.pdf (accessed February 2023).
[62] Ibid.
[63] San Bernardino County Sherriff's Department. 2023. *Emergency Operations*. Available at https://wp.sbcounty.gov/sheriff/divisions/emergency-operations/ (accessed February 2023).

Project development would be subject to the SBCSD review, which would ensure that development conforms to the SBCSD emergency access and site/facility security requirements and recommendations, and thereby reduce Project demands on law enforcement services.[64] The Project would not result in adverse physical impacts associated with the provision of or need for new or physically altered police protection facilities. The Project would not substantially affect service ratios, response times, or other performance objectives such that new facilities are required; therefore, impacts would be less than significant.

iii) Schools?

Less Than Significant Impact. The Project site is in ROWUSD. The nearest schools to the Project site are Mt. Calvary Lutheran Kids Corner Preschool & Child Care Center, located at 32054 Hunsaker Way in Running Springs approximately 1.4 miles south of the site, and Charles Hoffman Elementary School, located at 2851 Running Springs School Road in Running Springs approximately 1.6 miles south of the site.

Because the Project is an expansion of campground facilities with no permanent residents, no school-aged individuals (new students) are anticipated to be directly generated by the construction and operation of the Project. It is anticipated that most workers (construction and campground staff) would come from surrounding areas or from currently planned residential developments unrelated to the Project and otherwise located elsewhere. Because no new housing, aside from temporary/seasonal housing for campground staff, would be constructed as a result of this Project, and therefore no new residents added, the Project would have no effect on schools in the area. Project implementation would not result in substantial adverse physical impacts associated with the provision of new or physically altered school facilities, need for new or physically altered school facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable student/teacher service ratios or other performance objectives. Therefore, a less than significant impact would occur.

iv) Parks?

No Impact. Multiple parks are located within the HCAG area in the vicinity of the Project site. The park nearest the Project site is the Green Valley Lake Community Center/Jim Reid Park at 33659 Green Valley Lake Road in Green Valley Lake, approximately 2.0 miles northeast of the site. As the Project is for the physical expansion and increase in guest capacity of the existing campground, and because of the nature and purpose of the campground, no park facilities/amenities would be utilized. Further details are given on recreational amenities in ***Recreation.***

v) Other public facilities?

Less Than Significant Impact. Other Public Facilities generally refers to libraries and government buildings that serve the population within the jurisdiction. The library nearest the Project site is

[64] San Bernardino County Sherriff's Department. 2022. *2022 Workload Summary.* Available at https://wp.sbcounty.gov/sheriff/wp-content/uploads/sites/17/2022-Sheriffs-Workload-Summary-082123.pdf?x20231 (accessed March 2024).

the Running Springs Branch Library, located at 2677 Whispering Pines Drive in Running Springs, approximately 1.4 miles south of the site.

The Project is an expansion of an existing campground with no permanent residents directly generated by the construction and operation of the Project. Because no new housing, aside from temporary/seasonal housing for campground staff, would be constructed as a result of this Project and, therefore, no new permanent residents would be added, the Project would have no effect on libraries or other public facilities in the area. Project implementation would not result in substantial adverse physical impacts associated with a) the provision of new or physically altered public facilities, b) the need for new or physically altered public facilities, and/or c) the construction of which could cause significant environmental impacts in order to maintain acceptable service ratios or other performance objectives. Therefore, a less than significant impact would occur.

Cumulative Impacts

The Project is not anticipated to substantially increase the need for public services in the HCAG area. The Project would not result in an overall net increase in the Hilltop community population. Further, no new housing or residents will be added to the area as a result of the implementation of this Project, which would increase the demand for fire or police services or increase the use of schools and libraries. Fire and police protection services as well as schools and libraries within the Hilltop community are currently considered adequate and the Project, in conjunction with other foreseeable development, would not increase the demand such that there would be a need for new or expanded fire or police protection services or stations, or schools or libraries. Therefore, cumulative impacts on fire and police protection services as well as schools and libraries would be considered less than significant.

RECREATION

ENVIRONMENTAL IMPACTS Issues		Potentially Significant Issues	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
16.	**RECREATION.**				
a)	Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?				X
b)	Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?			X	

a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?

No Impact. The Project site is within the Mountain Region of the County. Parks in this region serve unincorporated portions of the County along with Mountain cities. The closest Regional Park to the Project site is Lake Gregory Regional Park, located approximately 10 miles west of the Project site. Lake Gregory Regional Park is a 150-acre park in the unincorporated mountain community of Crestline. This park features a zero-depth water play park, sandy beaches, picnic facilities, and hiking trails. The lake has 84 surface acres for fishing, swimming, boating, an inflatable summer-only water park, kayaking, and other water activities. The park nearest the Project site is the Green Valley Lake Community Center/ Jim Reid Park, a local, unincorporated park located approximately two miles northeast of the Project site.[65] Recreational amenities include fishing and swimming, camping, gardening, hiking trails, and a walkable meadow. The Project involves the expansion of the existing Hume SoCal campground to accommodate up to an additional 2,700 persons (an increase from 300 for a total of 3,000 of persons). This would be accomplished through the enlargement of the campground's physical area and the construction/installation of new camp structures and campground infrastructure, and the addition of recreational activities and programming. The existing campground's structures, facilities, and amenities would continue to be used.

Due to the nature of the Project, which would provide expanded recreational amenities to an increased user group of 3,000 persons, the Project would not increase the use of nearby local, neighborhood, or regional parks such that substantial physical deterioration of the park facilities would occur. Guests of the improved campground would generally be limited to the recreational amenities provided on-site. As the Project is providing for expanded recreational

[65] County of San Bernardino. 2020. *Countywide Plan Policy Map NR-2 Parks and Open Space Resources*. Available at https://www.arcgis.com/apps/webappviewer/index.html?id=5595acba44fd4509830282e4417f7c9e (accessed February 14, 2024).

facilities/amenities on-site to accommodate an increase in guest capacity of the existing campground, and because of the nature and purpose of the campground, no external park facilities/amenities would be utilized. Therefore, no impact would occur.

b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?

Less Than Significant Impact. See ***Impact 16a***, above. The Project involves the expansion of the existing Hume SoCal Campground facility dormitories, with the addition of various recreational facilities. The recreational amenities provided would cater to those visiting or residing on the campground. Although the Project would include recreational facilities and it would require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment, the recreational activities are limited on-site due to the defined campsite and the overall size of the existing Hume SoCal Campground facility. As the Project does not include the construction or expansion of recreational facilities that would permit individuals other than campers using the site, and thus, not meet the demands of other existing residential development. The construction of the proposed recreational facilities as well as all other Project features are being considered and evaluated in this IS/MND. Thus, potential impacts from recreational facilities are not anticipated. Therefore, a less than significant impact would occur from the implementation of recreational facilities.

Cumulative Impacts

The Project is not anticipated to substantially increase the need for recreation in the HCAG area. The Project would not result in an overall net increase in the Green Valley Lake Community population. However, as outlined above the Project will increase recreational opportunities which would not result in an increased use of other recreational facilities. Similar to the Project, other cumulative projects would be required to demonstrate their level of impact on recreation; therefore, the past, present, and future projects would not result in a cumulative impact related to the provision of recreation.

TRANSPORTATION

ENVIRONMENTAL IMPACTS Issues	Potentially Significant Issues	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
17. TRANSPORTATION. Would the project:				
a) Conflict with a program plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?			X	
b) Would the project conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b)?			X	
c) Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?			X	
d) Result in inadequate emergency access?			X	

A Traffic Analyses for the Project was completed by Kimley-Horn in June 2025; refer to **Appendix J: Traffic Analysis**. The Traffic Analysis prepared for the Project has been conducted in accordance with the San Bernardino County Transportation Impact Study Guidelines (July 2019), and in accordance with the San Bernardino Association of Governments (SANBAG) Congestion Management Program (CMP) requirements. The Traffic Analysis includes a description of existing traffic conditions in the surrounding area, estimated Project trip generation and distribution, future traffic growth, VMT screening, and an assessment of Project-related effects on the roadway system. Where necessary, circulation system improvements have been identified to mitigate significant Project effects at the study locations.

a) Conflict with a program plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?

Less Than Significant Impact. The Project is not located on a bus route. The closest bus route to the Project site is Mountain Transit's Bus Route 5 on SR-18, and the closest bus stop to the Project site is at the intersection of SR-18 and Arrowbear Drive; approximately one mile southeast of the Project site.[66] Additionally, the Project is not located on a truck route, and is not located on the trail system according to the CWP Transportation and Mobility Element.[67] According to the CWP, the portion of Green Valley Lake Road that runs through the Project site is designated as a Class III Bicycle Route.[68,69] However, the Project does not conflict with the implementation of the CWP and, subsequently the San Bernardino County Transportation Authority Bicycle Plan, as Green Valley

[66] County of San Bernardino. 2020. *Countywide Plan Policy Map TM-2 Transit Network.* Available at https://www.arcgis.com/apps/webappviewer/index.html?id=879c3c9e1a5e48c99df2a26e76b9b690 (accessed May 28, 2024).
[67] County of San Bernardino. 2020. *Countywide Plan Policy Map TM-5 Goods Movement Network – Draft.* Available at https://www.arcgis.com/apps/webappviewer/index.html?id=7b6f66759d3844efbfa15d16f738519a (accessed May 28, 2024).
[68] County of San Bernardino. 2020. *Countywide Plan Policy Map TM-4 Bicycle & Pedestrian Planning*. Available at https://www.arcgis.com/apps/webappviewer/index.html?id=ee080eba63564bdab37de1d8576d46c4 (accessed May 28, 2024).
[69] Class III Bicycle Routes: A generic term for any road, street, path, or way that in some manner is specifically designated for bicycle travel regardless of whether such facilities are designated for the exclusive use of bicycles or are to be shared with other transportation modes.

Lake Road would not be physically altered by Project development. The Project would maintain direct vehicular access via two full-movement unsignalized driveways on Green Valley Lake Road.

Because Project development would be confined to the Project site, the Project would not alter any existing bicycle, public transit, or pedestrian facilities, and would not substantially increase use of such infrastructure. Therefore, there would be a less than significant impact relating to conflicts with a program plan, ordinance, or policy addressing the circulation system including transit, roadway, bicycle, and pedestrian facilities. Any impacts would be less than significant, and no mitigation is required.

b) Would the project conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b)?

Less Than Significant Impact. CEQA Guidelines Section 15064.3(b) provides criteria for potentially significant transportation impacts. For land use projects, vehicle miles traveled (VMT) exceeding an applicable threshold of significance may indicate a significant impact. According to CEQA Guidelines Section 15064.3(b), a lead agency has discretion to choose the most appropriate methodology to evaluate a project's VMT. Accordingly, the Traffic Analysis prepared for the Project has been conducted in accordance with the San Bernardino County *Transportation Impact Study Guidelines* (July 2019), and in accordance with the SANBAG CMP requirements. The San Bernardino County *Transportation Impact Study Guidelines* (July 2019) provide details on appropriate screening thresholds that can be used to identify when a proposed land use project is anticipated to result in a less-than-significant impact without conducting a more detailed level of analysis: Project Type Screening, Transit Priority Area Screening, and Low VMT Area Screening. Land development projects that meet one or more of these three screening thresholds may be presumed to create a less than significant impact on transportation and circulation. The Project would involve the construction of a summer camp that generates less than 110 average daily trips. Therefore, the Project meets at least one of the screening criteria and would be screened out based on project type.

Based on San Bernardino County VMT Screening thresholds, the Project would screen out of further VMT analysis as the Project would involve the construction of a summer camp that generates less than 110 average daily trips. Approximately 100 average daily vehicle trips would occur, inclusive of bus trips, resulting in minimal traffic impacts as less than 110 average daily trips would occur. The Traffic Analyses has determined that Sundays during peak season may generate up to 225 vehicle trips; however, impacts would remain less than significant as average daily vehicle trips would remain at approximately 100 and a Traffic Signal Warrant Analysis was conducted and determined the Project would not result in traffic generation requiring additional traffic signals in the area. Therefore, the Project would have a less than significant VMT impact and no further VMT analysis is required. No mitigation is required.

c) Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?

Less Than Significant Impact. The Project proposes to expand the existing use that would include the construction of new residential structures, outdoor recreation facilities, and expanded infrastructure; refer to Section 2.1: Project Background, Location, and Setting. The Project expansion would include new, paved-asphalt internal roads; refer to **Figures 6a** through **6f**. Because the Project proposes the expansion of an existing use, the Project is compatible with existing campground uses. Additionally, it has been designed so as not to cause any incompatible use or any hazards to the surrounding area or general public. Additionally, there are no sight distances issues as there are no steep grades or obstructive landscaping that are proposed. The Project would maintain direct vehicular access via two full-movement unsignalized driveways on Green Valley Lake Road, and one new full-movement driveway on Green Valley Lake Road (within the Phase 5 area); refer to **Figure 6f**. As proposed, the Project would not increase slopes onto Green Valley Lake Road compared to existing conditions, nor would Project implementation introduce new hazards that exacerbate the existing slope of Green Valley Lake Road. Therefore, the Project would have no impact on increasing hazards through design or incompatible uses either directly, indirectly, or cumulatively.

d) Result in inadequate emergency access?

Less Than Significant Impact. SR-38 interchange will provide regional access to the Project site, providing primary access from SR-38, which will be at the Green Valley Lake Road interchange. Surface street access to the Project will occur primarily from Green Valley Lake Road, with three Project driveways. Emergency services can currently access the site via two driveways on Green Valley Lake Road. The Project would involve the expansion of the existing Hume SoCal Campground to include additional campground and recreational uses in a manner consistent with the existing campground uses. Upon Project development, access to the Project would be from Green Valley Lake Road via three access points; refer to **Figures 6a** through **6f**. The Project would maintain direct vehicular access via two full-movement unsignalized driveways on Green Valley Lake Road as well as provide for the addition of one new full-movement driveway on Green Valley Lake Road (within the Phase 5 area); refer to **Figure 6f**. Furthermore, the design of driveways, circulation areas, and parking stalls for the proposed Project are based on the County Development Code's standards for such designs (Chapter 83.05 and 83.11). Therefore, the Project would incur no impacts related to inadequate emergency access. Any impacts would be less than significant, and no mitigation is required.

Cumulative Impacts

Cumulative impacts are determined on a project-specific basis. As concluded above, all Project impacts concerning transportation would be less than significant in consideration of compliance with existing laws, regulations, and standards. Consistent with the Project, all cumulative projects would be subject to the County's discretionary review process and would comply with existing laws, regulations, and standards, and/or implement mitigation to fully mitigate their contributions concerning transportation. Therefore, there are no significant cumulative impacts anticipated associated with transportation, and the Project's

contribution toward potential future transportation impacts in the County is not cumulatively considerable.

TRIBAL CULTURAL RESOURCES

ENVIRONMENTAL IMPACTS Issues	Potentially Significant Issues	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
18. TRIBAL CULTURAL RESOURCES. Would the project:				
a) Cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is: i) Listed or eligible for listing in the California				
i) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k)?			X	
ii) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe?		X		

On September 16, 2025 in compliance with PRC Section 21080.3.1(b), formal notification was provided to California Native American tribal representatives which may have interest in projects within the geographic area traditionally and culturally affiliated with the tribe. Native American groups may have knowledge about cultural resources in the area and may have concerns about adverse effects from development on tribal cultural resources as defined in PRC Section 21074.

A Sacred Lands File (SLF) search request was sent to the NAHC for the Project on September 2, 2022, by PaleoWest. The objective of the search was to determine if the NAHC had any knowledge of Native American cultural resources (e.g., traditional use or gathering area and place of religious or sacred activity) within the immediate vicinity of the Project. A response from the NAHC was received on November 1, 2022, indicating that there are no known Native American cultural resource(s) within the immediate vicinity of the Project area. The NAHC suggested contacting 23 individuals representing 20 Native American tribal groups to find out if they have additional information about the Project area. Scoping letters were sent to all of the recommended tribal contacts via email or mail on November 14, 2022. Follow up calls were made on December 2, 2022. As part of Chronical Heritage (formerly PaleoWest) outreach, nine (9) responses were received.

The SLF results letter, list of recommended contacts, a sample scoping letter, a contact/response matrix, and copies of correspondence are included in **Appendix D: Cultural Resources Report**.

As part of the County's outreach efforts, as of October 24,2025, one response has been received:

TCR-1 Tribal Monitoring Due to the heightened cultural sensitivity of the proposed project area, at the discretion of the consulting tribe(s), Tribal monitor(s) authorized to represent YSMN shall be present for all grounddisturbing activities that occur within the proposed project area (which includes, but is not limited to, tree/shrub removal and planting, clearing/grubbing, grading, excavation, trenching, compaction, fence/gate removal and installation, drainage and irrigation removal and installation, hardscape installation [benches, signage, boulders, walls, seat walls, fountains, etc.], and archaeological work). At the discretion of the consulting tribes, a sufficient number of Tribal monitors shall be present each work day to ensure that simultaneously occurring ground disturbing activities receive thorough levels of monitoring coverage. A Monitoring and Treatment Plan that is reflective of the project mitigation ("Cultural Resources" and "Tribal Cultural Resources") shall be completed by the archaeologist, as detailed within CUL-1, and submitted to the Lead Agency for dissemination to the Yuhaaviatam of San Manuel Nation Cultural Resources Management Department (YSMN). Once all parties review and agree to the plan, it shall be adopted by the Lead Agency – the plan must be adopted prior to permitting for the project. Any and all findings will be subject to the protocol detailed within the Monitoring and Treatment Plan.

TCR-2 Treatment of Cultural Resources During Project Implementation If a pre-contact cultural resource is discovered during project implementation, ground-disturbing activities shall be suspended 60 feet around the resource(s), and an Environmentally Sensitive Area (ESA) physical demarcation/barrier constructed. The Project Archaeologist shall develop a research design that shall include a plan to evaluate the resource for significance under CEQA criteria. Representatives from YSMN, the Archaeologist, and the Lead Agency shall confer regarding the research design, as well as any testing efforts needed to delineate the resource boundary. Following the completion of evaluation efforts, all parties shall confer regarding the resource's archaeological significance, its potential as a Tribal Cultural Resource (TCR), and avoidance (or other appropriate treatment) of the discovered resource. Removal of any cultural resource(s) shall be conducted with the presence of a Tribal monitor representing the Tribe, unless otherwise decided by YSMN. All plans for analysis shall be reviewed and approved by the applicant and YSMN prior to implementation, and all removed material shall be temporarily curated on-site.

It is the preference of YSMN that removed cultural material be reburied as close to the original find location as possible. However, should reburial within/near the original find location during project implementation not be feasible, then a reburial location for future reburial shall be decided upon by YSMN, the landowner, and the Lead Agency, and all finds shall be reburied within this

location. Additionally, in this case, reburial shall not occur until all ground-disturbing activities associated with the project have been completed, all monitoring has ceased, all cataloguing and basic recordation of cultural resources have been completed, and a final monitoring report has been issued to Lead Agency, CHRIS, and YSMN. All reburials are subject to a reburial agreement that shall be developed between the landowner and YSMN outlining the determined reburial process/location, and shall include measures and provisions to protect the reburial area from any future impacts.

Should it occur that avoidance, preservation in place, and on-site reburial are not an option for treatment, the landowner shall relinquish all ownership and rights to this material and confer with YSMN to identify an American Association of Museums (AAM)-accredited facility within the County that can accession the materials into their permanent collections and provide for the proper care of these objects in accordance with the 1993 CA Curation Guidelines. A curation agreement with an appropriate qualified repository shall be developed between the landowner and museum that legally and physically transfers the collections and associated records to the facility. This agreement shall stipulate the payment of fees necessary for permanent curation of the collections and associated records and the obligation of the Project developer/applicant to pay for those fees.

All draft records/reports containing the significance and treatment findings and data recovery results shall be prepared by the archaeologist and submitted to the Lead Agency and YSMN for their review and comment. After approval from all parties, the final reports and site/isolate records are to be submitted to the local CHRIS Information Center, the Lead Agency, and YSMN.

TCR-3 Inadvertent Discoveries of Human Remains If human remains or funerary objects are encountered during any activities associated with the project, work in the immediate vicinity (within a 100-foot buffer of the find) shall cease and the County Coroner shall be contacted pursuant to State Health and Safety Code §7050.5 and that code enforced for the duration of the project.

A a) Cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is: i) Listed or eligible for listing in the California:

i) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k)?

Less Than Significant Impact. As of July 2015, California AB 52 was enacted and expands CEQA by defining a new resource category, "Tribal Cultural Resources." AB 52 requires Lead Agencies to evaluate a project's potential to impact tribal cultural resources. Such resources include "[s]ites, features, cultural landscapes, sacred places, and objects with cultural value to a California Native American Tribe and is 1) listed or eligible for listing in the CRHR or included in a local register of

historical resources. AB 52 also gives Lead Agencies the discretion to determine, supported by substantial evidence, whether a resource qualifies as a "tribal cultural resource."

As discussed in ***Cultural Resources***, as part of the Cultural Resources Report prepared by Chronical Heritage (formerly PaleoWest) in 2023, two prehistoric resources, and three historic period cultural resources were identified within the Project site. Additionally, a cultural resources review was conducted to determine the eligibility of potential historical resources on the Project site (refer to **Appendix D**). However, all potential resources were determined to be ineligible for listing in the CRHR. Therefore, there would be no anticipated impacts to listed or eligible for listing historical resources, and no mitigation is necessary.

ii) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe?

Less Than Significant With Mitigation Incorporated. A Cultural Resources Records Search conducted at the SCCIC indicated that there are 26 previously recorded cultural resources within a one-mile radius of the Project area.[70] Additionally, the records search identified one prehistoric resource, one prehistoric isolated resource, and two historic period resources in the Project site.[71] Tasks completed within the scope of the records search included additional research, intensive-level pedestrian cultural resources survey, SLF Search with the Native American Heritage Commission, and a paleontological resources overview, performed in partial fulfillment of CEQA requirements. Additionally, Chronical Heritage (formerly PaleoWest) conducted a pedestrian survey of the Project site on November 7, 2022 and November 19, 2022, and identified one newly recorded historic period resource.[72] The SLF search returned negative results for the Project area; however, during outreach to local Native American tribes, both the Cahuilla Band of Mission Indians and the Gabrieleno/Tongva San Gabriel Band of Mission Indians indicated the area may be sensitive for cultural resources and requested a Native American monitor and an archaeological monitor be present during Project implementation (**MM CUL-1**).

None of the previously recorded resources documented within the Project area meet the criteria for listing on the CRHR. One of the resources, P- 36-012233 (an isolated metate), was not located during the survey effort and is believed to have been destroyed or moved to an unknown location. No additional cultural resource management is recommended for these resources.[73]

Nonetheless, the presence of remains or unanticipated cultural resources under the ground surface is possible. Implementation of **MM CUL-1** and **MM CUL-2** would ensure that impacts due

[70] Chronical Heritage (formerly PaleoWest). 2023. *Cultural Resources Investigation of the Hume SoCal Campground Project, San Bernardino County, California*, page 36.
[71] Ibid.
[72] Ibid, page 1.
[73] Ibid, page 36.

to discovery of unanticipated cultural resources during excavation would be less than significant with mitigation incorporated.

Cumulative Impacts

The Project would not result in tribal cultural resources impacts beyond what was contemplated for the Project site. To ensure proper handling of unanticipated cultural resources, **MM CUL-1, MM CUL-2,** and **MM TRC 1-3-2** would be implemented. Therefore, less than significant cumulative impacts related to tribal cultural resources would result from Project implementation with mitigation included.

UTILITIES AND SERVICE SYSTEMS

ENVIRONMENTAL IMPACTS Issues		Potentially Significant Issues	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
19.	**UTILITIES AND SERVICE SYSTEMS. Would the project:**				
a)	Require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?		X		
b)	Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?			X	
c)	Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?			X	
d)	Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?			X	
e)	Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?				X

a) Require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?

Less Than Significant With Mitigation Incorporated. The Project site is currently occupied by the Hume SoCal Campground. Upon Project implementation, the Project site would receive water service from CLAWA, wastewater service from RSWD, solid waste disposal from Burrtec, natural gas service from SoCal Gas, and electricity from SCE.

A Water and Sewer Master Plan was prepared for the Project to analyze the capacity of the campground water and sewer infrastructure for the proposed expansion from a capacity of 300 persons to a capacity of approximately 3,000 persons. The Water and Sewer Master Plan is provided as **Appendix B3: Water and Sewer Master Plan**. This would be accomplished through the continued use of existing campground infrastructure as well as the development of additional

campground and recreational water and sewer infrastructure within an approximately 252.1-acre area of the Green Valley Lake community. Development of the Project would require new utility connections, including water, wastewater, stormwater, electricity, and natural gas facilities to serve the Project. All utilities shall be undergrounded where feasible or to the extent possible.

***Sanitary Sewer*.** The public sewer service provider for the Project is the Running Springs Water District. The Project generally proposes new sewer connections to existing lines within Green Valley Lake Road. The existing sewer system contains four-, six-, and eight-inch gravity sewer lines heading southwest through the Camp to an existing pump station located at the southwestern point of the existing property. This pump station has an estimated five-foot diameter wet well. From the pump station, the sewage is pumped through an existing force main, estimated to be six inches in diameter, and discharges into the existing sewer system in Green Valley Lake Road. To accommodate the Camp's expansion, which includes additional accommodations and facilities, significant updates to the existing sewer system are required. Specifically, due to the hilly natural terrain of the camp, a traditional gravity sewer system would not be feasible.

The planning for the expanded sewer system is segmented into three parts, each aimed at servicing the proposed buildings and integrating the proposed sewer system into the existing infrastructure. Detailed layouts for the proposed sewer improvements are provided in **Appendix B3**, with a summary of each phase improvement below:

1. Phases 1, 2, and 3: Improvements in these phases include conveying the sewer generation into the Camp's existing sewer system. A lift station is proposed at the southern edge of Phase 2 to manage the elevation differential across Phases 2 and 3. The sewage would travel by gravity to this lift station, labeled Lift Station 1 in *Appendix B* of **Appendix B3**, where it would be pumped by force main into the existing sewer system near the existing water tank and gravity flow to the existing lift station located in Phase 1. The existing lift station would pump the additional sewage by six-inch force main off-site and discharge into the Running Springs Water District's system in Green Valley Lake Road.
2. Phase 4: Located across Green Valley Lake Road, sewer generation from Phase 4 would connect directly into Running Springs Water District's sewer lift station located along Green Valley Lake Road. Connecting directly into the public lift station eliminates the need for an easement through the Green Valley Lake Road right-of-way. An additional off-site lift station analysis is underway to determine the lift station's capacity and potential point of connection.
3. Phase 5: Sewer from this phase would connect to Running Springs Water District's eight-inch gravity sewer in Green Valley Lake Road by proposed lift station, labeled Lift Station 2 in *Appendix B* of **Appendix B3**, and force main. Lift Station 2 shall be located at the southern end of Phase 5, at the lowest elevation. The force main would connect to a proposed discharge manhole within the Camp property and be conveyed by eight-inch gravity sewer into Running Springs Water District's public system. To connect to the public system, a manhole shall be constructed in Green Valley Lake Road within Running Springs Water District's right-of-way.

Incorporating a segmented sewer system approach overcomes the Camp's topography challenges while meeting sewer design criteria. This approach ensures the sewer infrastructure is adequately planned to support the Camp's future development needs, maintaining operational efficiency and compliance with regulatory standards, which includes the County's design criteria for sanitary sewer. Additionally, **MM UTL-1** would be implemented to ensure proper facility expansion occurs prior to construction of additional phases. Therefore, the Project would require the construction of new wastewater infrastructure the construction of which could cause significant environmental effects. The proposed on-site wastewater facilities are contained within the Project site and therefore associated impacts are addressed within this IS/MND. All Project wastewater facilities would be constructed and operated in accordance with the applicable guidelines and regulations of CLAWA, RSWD, the County, and would also follow applicable IS/MND mitigation measures in each topical area addressed in the IS/MND.

Domestic Water*.** The Project would receive domestic water service from CLAWA. The projected Project water demand, discussed in ***Hydrology and Water Quality and below, would be fulfilled by a combination of CLAWA and groundwater water sources. According to the Water and Sewer Master Plan, the existing 212,000-gallon potable water tank on-site does not satisfy the County's minimum storage requirements under a peak daily demand with fire flow, necessitating an additional 297,300 gallons to reach the minimum required 509,300-gallon storage requirement. To accommodate the Project expansion demand, construction of a 300,000-gallon welded steel tank, including necessary seismic supports and interconnections, is recommended. The proposed supplementary tank is intended not only to increase storage capacity to satisfy the Camp's storage requirements but also to serve as an auxiliary reservoir during maintenance or an emergency. Construction of this new tank has the potential to result in significant environmental effects. All impacts to the environment, including impacts to habitat for fish and wildlife species, fish and wildlife populations, plant and animal communities, rare and endangered plants and animals, and historical and pre-historical resources are evaluated as part of this IS/MND in their respective sections. Where impacts were determined to be potentially significant, mitigation measures have been imposed to reduce those impacts to less than significant levels.

Stormwater*.** The existing drainage pattern for the Project site is characterized by sheet flow. Under existing conditions, the Project site naturally drains from the peaks of the hills towards the southwest of the Project boundaries down to Deep Creek. The minimal stormwater infrastructure within Green Valley Lake Road consists of a natural curb and gutter providing shallow concentrated flows to the southwest toward existing discharge points. Natural topography helps disperse stormwater and allows for absorption into the natural surroundings. Flows are directed southerly through the topography to natural surroundings such as the Deep Creek and other water sources. These flows are directed further south via natural means. Flows intercepted by Green Valley Lake Road on the northern portion of the Project site are conveyed via a natural curb and gutter, where they are channelized into existing natural surroundings. As discussed in ***Hydrology and Water Quality, the Project site would be managed in accordance with the Preliminary Hydrology Report.

Electric Power. Electric power for the Project would continue to be provided by SCE. The Project site is currently served with electric power through above-ground electricity distribution lines. An existing aboveground/overhead 12-kilovolt (kV) distribution power line and wood poles run along the eastern portion of the Project site from the north of Green Valley Lake Road, owned and operated by SCE. The Project would require connections to the existing electrical system. All required improvements and extensions to existing electrical facilities would occur within the existing roadway rights-of-way adjacent to the Project site. Furthermore, this new infrastructure would be completely undergrounded, pursuant to County Development Code criteria (County Development Code Section 82.19.040 Development Criteria within Scenic Areas) and would be installed within the proposed development areas. An analysis of Project energy use is provided in ***Energy***. Additionally, the Project would be constructed in accordance with all applicable CBC regulations, Title 24, and would not require the construction or relocation of electric power facilities.

Natural Gas. The Project site is served gas by the SoCalGas. SoCalGas provides gas services to most of Southern California, including the County. It is anticipated that the Project site would require some amount of natural gas to support future operations. Similar to electricity demands discussed in ***Energy***, it is anticipated that the Project's estimated natural gas demand of approximately 93,743 million therms would not generate a significant increase in the countywide annual demand (0.0167 percent increase, countywide); see **Table 9**. Additionally, it is not anticipated that new or expanded gas supply facilities would be required to serve the site. Thus, no natural gas facilities would have to be constructed or relocated, and a less than significant impact would occur.

Telecommunications Facilities. Cable services, including internet, phone, and television, are provided by Charter Communications (Spectrum Internet), AT&T, and Frontier Communications. The proposed Project would not interfere with the operation of existing or future facilities, and a less than significant impact would occur.

Additionally, the Developer shall pay all Development Impact Fees (DIFs) as required by the County to offset any impacts to public facilities/utility infrastructure, including repayment of infrastructure bonds, public improvements, and public facilities (County drainage Improvements, street improvements, etc.). Environmental impacts associated with the construction of site-specific utility infrastructure and facilities are discussed and disclosed throughout this IS/MND. Construction of the proposed utility system would also follow applicable mitigation measures provided in each topical area that contains potentially significant environmental effects, as addressed in this IS/MND. In consideration of existing requirements and mitigation measures, no significant impacts are anticipated with respect to Project construction. Therefore, in consideration of existing requirements, potential impacts associated with the relocation or construction of utility systems would be less than significant with mitigation incorporated.

Mitigation Measures

MM UTL-1 It is recommended that the Project initiate preliminary design for pump upgrades and storage expansion at both lift stations, and coordinate with Running Springs

Water District (RSWD) to evaluate near-term and long-term strategies for increasing Wastewater Treatment Facility (WWTP) seasonal capacity. Concurrently, the downstream gravity sewer system should be evaluated for potential bottlenecks under future lift station conditions. These efforts should be aligned with a phased development plan that matches Camp occupancy growth with the completion of required infrastructure improvements.

b) Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?

Less Than Significant Impact. The Project would receive domestic water service from CLAWA, which would require an adequate Service Agreement, which acknowledges that the Project's future water demand cannot be met solely by CLAWA. Therefore, a combination of CLAWA's supply and the Camp's groundwater resources would be used. Kimley-Horn conducted a WSA in February 2024 to determine the sufficiency of the Camp's water supplies. Neither the Hume SoCal Campground nor CLAWA have prepared an Urban Water Management Plans (UWMP) to aid in future projection of domestic and non-domestic water demand. Therefore, the following analysis makes assumptions for the Camp's groundwater well sustainability and CLAWA allotted domestic water to the Camp. The WSA explores multiple scenarios to determine water supply and sustainability under varying conditions; refer to **Appendix B1**. The preferred Project scenario would see the Project dependent on CLAWA for 75 percent of its domestic water needs, supplemented by the Camp's groundwater wells for the remaining 25 percent. Previous correspondence with CLAWA indicated a lack of system capacity to fully provide the Camp with adequate water supply, therefore, this scenario is assumed to be the maximum reliance on CLAWA's supply. This scenario ensures a significant portion of the water supply is sourced from CLAWA, mitigating the reliance on groundwater wells, which is particularly beneficial during dry years when groundwater levels might be lower. This approach aligns with the Camp's preference for a majority reliance on CLAWA to alleviate the stress on their groundwater supply and meet long-term water demands.

It is assumed that the Camp's non-domestic demand and water losses are supplied by Camp groundwater wells. According to the WSA, the Camp's domestic water demand is based on San Bernardino County's standard of 180 GPCPD.[74] The expected increase in domestic water demand, corresponding to the increase in occupants and expansion of facilities, is estimated to be 54,607,870 gallons per year (GPY), or 167.58 acre-feet per year (AFY). With the proposed expansion, the Camp's capacity is projected to increase by approximately 1,000 percent. A summary of existing and proposed water demand is provided in **Table 14**. The projected Project water demand, discussed in ***Hydrology and Water Quality***, from CLAWA is assessed against their 2,500 AFY baseline, 3,480 AFY long-term, and 5,800 AFY maximum entitlement allocations to determine the impact of the Camp's potential source scenarios on CLAWA. **Table 19: Analysis of Project Water Demand Against CLAWA's Allocation Levels** compares these baselines to the three water supply scenarios analysis in the WSA.

[74] Kimley-Horn. 2024. *Water Supply Assessment Hume SoCal Camp Expansion*, page 10.

Table 19: Analysis of Project Water Demand Against CLAWA's Allocation Levels

Allocation Type	CLAWA Allocation (AFY)	Preferred Project Scenario: Majority Reliance Camp Demand Impact (125.7 AFY)	Balanced Reliance Camp Demand Impact (83.8 AFY)	Supplementary Reliance Camp Demand Impact (41.9 AFY)
Baseline	2,500	5.03%	3.35%	1.68%
Long-Term	3,480	3.61%	2.41%	1.20%
Maximum	5,800	2.17%	1.44%	0.72%
Source: Kimley-Horn. 2024. *1st Draft Water Supply Assessment Hume SoCal Camp Expansion,* page 13.				

As shown by **Table 19**, Project water demand would comprise, at most, 5.03 percent of CLAWA's 2,500 AFY baseline. Additionally, CLAWA has implemented a WSCP that would go into effect during dry years. The Project would be required to implement similar conservation efforts during dry year scenarios to mitigate the impact on groundwater and CLAWA's imported water demand. As such, Project implementation would not exceed CLAWA water supply sources in combination with groundwater sources. Therefore, a less than significant impact would occur related to insufficient water supplies.

c) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?

Less Than Significant Impact. The Project would continue to be served by RSWD. As determined in **Appendix B2**, RSWD utilizes the RSWD Wastewater Treatment Facility (WWTP), which, as of 2015, had a capacity of 1.0 MGD and an average daily flow of 0.5 MGD.[75] According to the Water and Sewer Master Plan included as **Appendix B2**, the Project would generate approximately 59,844 gpd, or 0.06 MGD. This represents six percent of the current 1.0 MGD treatment capacity. In accordance with the County standards, a peaking factor of 3.4 was applied to average daily demand to determine peak flow for the Camp. The average daily sewer generation and corresponding peak flows for individual occupant types are shown in **Appendix B3**. The Project would generate approximately 203,470 gpd, or 0.20 MGD, total peak sewage flows. This represents 20 percent of the current 1.0 MGD treatment capacity. Flows in excess of the 1.0 MGD may cause the system to overload. However, RSWD is able to defer treatment for up to 9.7 hours until the peak instantaneous flows have subsided to a more manageable rate.[76] Upon completion of Phase 2, pump upgrades and storage expansion at the Deer Lick Lift Station and the Ahwahnee Lift Station would be required, as outlined in **MM UTL-1** which requires implementation of additional wastewater facilities and coordination with RSWD. Therefore, the Project would take adequate measures to ensure the wastewater treatment provider that it has adequate capacity to serve the Project's project demand in addition to the provider's existing commitments. A less than significant impact would occur.

[75] Running Springs Water District. 2019. *Sewer System Management Plan (SSMP),* page 38. Available at https://static1.squarespace.com/static/622be195eea5cc4b83a8fc56/t/642f2a08d80c255efe922709/1680812552898/RSWD+SSMP+%282023%29+-+Web.pdf (accessed March 2024).
[76] Ibid.

d) Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?

Less Than Significant Impact. The Project is anticipated to generate solid waste during the temporary, short-term construction phase, as well as the operational phase, but it is not anticipated to result in inadequate landfill capacity. The Project site would be provided solid waste disposal services by Burrtec – Mountain Disposal, which currently serves portions of the County's Mountain Region. The solid waste generation on-site would be brought to Heaps Peak Transfer Station in Running Springs, approximately 8.3 miles west of the Project site. The Heap's Peak Transfer Station has a maximum permitted throughput of 600 tons daily.[77] From the Heap's Peak Transfer Station, the solid waste produced by the Project would be disposed of at one of the two landfills that serve the Mountain Region: the Barstow Sanitary Landfill, Barstow, CA and the Victorville Sanitary Landfill, Victorville, CA.[78] Barstow Sanitary Landfill, located approximately 43 miles north of the Project site, has a daily throughput of 1,500 tons per day.[79] This landfill has a maximum permitted capacity of approximately 80.4 million cubic yards, and the landfill has a remaining capacity of approximately 71.5 million cubic yards.[80] Victorville Sanitary Landfill, located approximately 28 miles north of the Project site, has a daily throughput of 3,000 tons per day.[81] This landfill has a maximum permitted capacity of approximately 93.4 million cubic yards, and the landfill has a remaining capacity of approximately 79.4 million cubic yards.[82]

The Project would generate approximately 7,347 pounds per day, or approximately 3.7 tons per day; refer to **Table 20: Estimated Solid Waste Generation**.[83] That is approximately 0.62 percent of the Heaps Peak Transfer Station's maximum daily throughput, 0.25 percent of the Barstow Sanitary Landfill's maximum daily throughput, and 0.12 percent of the Victorville Sanitary Landfill's maximum daily throughput.

Table 20: Estimated Solid Waste Generation

Occupant Type	Count	Occupancy Duration (% of year)	Equivalent Days	Waste Generation Factor[1]	Waste Generation (lbs/day)	Annual Waste Generation (lbs/day)
Employee						
Full Time Employees	120	100%	365	3.55 lb/emp/day	426	155,490
Part Time Employees	200	50%	182.5	3.55 lb/emp/day	710	129,575

[77] CalRecycle. 2024. *SWIS Facility/Site Summary Heaps Peak Transfer Station (36-AA-0152).* Available at https://www2.calrecycle.ca.gov/SolidWaste/Site/Summary/2690 (accessed March 2024).
[78] San Bernardino County. 2019. *Countywide Plan. Draft Environmental Impact Report, Section 5.18, Utilities and Service Systems*, page 5.18-54. Available at https://countywideplan.com/wp-content/uploads/sites/68/2021/01/Ch_05-18-USS.pdf?x23421 (accessed March 2024).
[79] CalRecycle. 2019. *SWIS Facility/Site Activity Details Barstow Sanitary Landfill (36-AA-0046).* Available at https://www2.calrecycle.ca.gov/SolidWaste/Site/Summary/2653 (accessed March 2024).
[80] Ibid.
[81] CalRecycle. 2019. *SWIS Facility/Site Activity Details Victorville Sanitary Landfill (36-AA-0045).* Available at https://www2.calrecycle.ca.gov/SolidWaste/SiteActivity/Details/1870?siteID=2652 (accessed March 2024).
[82] Ibid.
[83] CalRecycle. 2019. *Estimated Solid Waste Generation Rates*. Available at https://www2.calrecycle.ca.gov/wastecharacterization/general/rates (accessed March 2024).

Occupant Type	Count	Occupancy Duration (% of year)	Equivalent Days	Waste Generation Factor[1]	Waste Generation (lbs/day)	Annual Waste Generation (lbs/day)
Winter Seasonal	350	17%	63.145	3.55 lb/emp/day	1,243	78,458
Summer Seasonal	680	17%	63.145	3.55 lb/emp/day	2,414	152,432
Camper/Guest						
High School Guests	1000	13%	50	1 lb/student/day	1,000	50,000
Middle School Guests	784	13%	50	1 lb/student/day	784	39,200
Adult Lodge	140	13%	50	1 lb/student/day	140	7,000
Elementary Age Guests	500	13%	50	1 lb/student/day	500	25,000
Wildwood Camp	130	13%	50	1 lb/student/day	130	6,500
				Total	***7,347 (3.7 tons/day)***	***643,655 (322 tons/year)***

1. Utilizes CalRecycle waste generation rates for education (3.55 lb/emp/day) and schools (1 lb/student/day).

Source: CalRecycle. 2019. *Estimated Solid Waste Generation Rates*. Available at https://www2.calrecycle.ca.gov/wastecharacterization/general/rates. (accessed March 2024).

The Project would be served by a landfill with sufficient remaining permitted capacity to accommodate the Project's solid waste disposal needs. Therefore, the Project's solid waste disposal needs could be accommodated at one or a combination of the disposal facilities discussed above.

Additionally, the Project, as with all other development in the County, would be required to adhere to County ordinances with respect to waste reduction and recycling. Additionally, Project operational activities would be subject to compliance with all applicable federal and state regulations for solid waste, including those identified under CALGreen and AB 939, which requires that each jurisdiction divert at least 50 percent of its waste stream away from landfill either through waste reduction, recycling, or other means. For these reasons, the Project's solid waste disposal needs could be met by the existing waste management facilities and the impact would be less than significant.

e) Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?

No Impact. The Project would comply with all applicable federal, state, and local requirements related to solid waste. The proposed Project would be subject to the building permit process, which requires a construction waste management plan for demolition of existing structures, and compliance with the County's Development Code Chapter 84.19: Recycling Facilities and Chapter 84.24: Solid Waste/Recyclable Materials Storage. The Project's operations would be subject to service and requirements of the County of San Bernardino Solid Waste Management

Division and the County's Development Code. Therefore, there would be no potential impacts associated with noncompliance of federal, state, and local management and reduction statutes and regulations related to solid waste.

Cumulative Impacts

Cumulative impacts are determined on a project-specific basis. As concluded above, all Project impacts concerning utilities and service systems would be less than significant in consideration of compliance with existing laws, regulations, and standards. Consistent with the Project, all cumulative projects would be subject to the County's discretionary review process and would comply with existing laws, regulations, and standards, and/or implement mitigation to fully mitigate their contributions concerning utilities and services systems. Therefore, there are no significant cumulative impacts anticipated associated with public utilities and service systems, and the Project's contribution toward potential future utility and service system impacts in the County is not cumulatively considerable.

WILDFIRE

ENVIRONMENTAL IMPACTS Issues		Potentially Significant Issues	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
20.	**WILDFIRE. If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project:**				
a)	Substantially impair an adopted emergency response plan or emergency evacuation plan?		X		
b)	Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?		X		
c)	Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?			X	
d)	Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?			X	

An Emergency Plan and Procedures document including an Evacuation Plan and Working Guide has been developed by Hume SoCal in April 2024 and is included as **Appendix K**.

a) Substantially impair an adopted emergency response plan or emergency evacuation plan?

Less Than Significant With Mitigation Incorporated. As previously mentioned, the Project is located in an SRA on lands classified as a Very High FHSZ.[84] SR-330, SR-18, Green Valley Lake Road, and Live Oak Drive are the designated as Mountain Secondary Highway and Major Highways and would serve as the evacuation routes within the area. During fire emergencies, specific evacuation routes would be designated, and all evacuation procedures would comply with the County's Emergency Operation Plan and Multi-Jurisdictional Hazard Mitigation Plan (MJHMP) Management Plan.[85] Additionally, the existing Hume SoCal Camp Emergency Plan and Procedures, last updated April 26, 2024, contains a four-phase plan (HSC Phase Plan) when responding to an evacuation notification by governmental authority (i.e., the County; refer to **Appendix K**).[86] Each phase outlines key steps and emergency response personnel. The phases are as follows:

[84] California Department of Forestry and Fire Protection. 2022. *FHSZ Viewer*. Available at https://egis.fire.ca.gov/FHSZ/ (accessed January 2023).
[85] County of San Bernardino. 2019. *San Bernardino County Emergency Operations Plan (EOP)*Available at SAN BERNARDINO Prepared By:San Bernardino County Fire Department Office of Emergency ServicesRevised: November 16, 2017 (accessed October 29, 2025).
[86] *Hume SoCal Camp Emergency Plan & Procedures.* April 26, 2024.

- Phase I – Evacuation Warning – Activate Evacuation Plan
- Phase II – Evacuation Order – Alarm Sounds
- Phase III – Evacuation
- Phase IV – Evacuation Location (To be designated by SBCSD)

The County is responsible for the dissemination of information about a wildfire emergency to the public to inform them on what has happened and the actions of the emergency response agencies, as well as summarize the expected outcomes of the emergency actions. The County has various systems in place for disseminating warnings and emergency information to the public including an Emergency Alert System (EAS) which enables the federal, state, and local governments to communicate with the general public through commercial broadcast stations, as well as a Telephone Emergency Notification System (TENS) which includes evacuation notices, shelter in place orders, and/or special instructions for an imminent threat.[87]

Other agencies providing fire protection services and/or fire related information for the Hilltop community include CAL FIRE, the U.S. Forest Service, and the Mountain Area Safety Taskforce (MAST).[88] MAST has successfully implemented and completed numerous programs leading to safer communities. MAST has developed evacuation plans and distributed emergency planning information to the public. MAST also created Emergency Information Visitors brochures and Emergency Response Evacuation maps for the mountain communities. The County of San Bernardino also implemented the "Ready SB" smart phone application for disaster preparedness that includes information related to evacuation areas, where to go, what routes are open, and what resources are available during the current emergency.[89]

Additionally, the Project would comply with CCR Title 14 SRA Fire Safe Regulations which ensures basic emergency access would be provided. The Project would also be operated in accordance with the Emergency Mutual Aid Agreements system which provides service in the emergency response and recovery efforts at the Southern Regional Emergency Operations Center, local Emergency Operations Centers, the Disaster Field Office, and community service centers. Furthermore, the Project would adhere to the Cal-EMA to prepare a SEMS program (Title 19 CCR Section 2400 et seq.), which sets forth measures by which a jurisdiction should handle emergency disasters, and CCR Sections 51175 through 51189 which provides the framework for further preventative measures to decrease wildfire hazards.

The Project would also comply with the Hilltop Community Safety Element and the San Bernardino CWP Hazards Element to ensure adequate emergency services and fire protection would be provided to the Project area. The CWP Hazards Element requires that new development be located outside of environmental hazard areas, such as High or Very High FHSZs, wherever possible

[87] County of San Bernardino. 2018. *Emergency Operations* Plan. Available at https://www.sbcounty.gov/uploads/SBCFire/documents/OES/2018_EOP_Update.pdf (accessed January 2023).
[88] County of San Bernardino. 2007. *Hilltop Community Plan.* Available at https://www.sbcounty.gov/Uploads/lus/CommunityPlans/HilltopCP.pdf (accessed August 22, 2022).
[89] County of San Bernardino. 2018. Emergency Operations Plan. Available at https://www.sbcounty.gov/uploads/SBCFire/documents/OES/2018_EOP_Update.pdf (accessed January 2023).

(Countywide Plan Policy HZ-1.2). For any lot or parcel that does not have sufficient buildable area outside of such hazard areas, such is the case for the Project site, the County requires adequate mitigation, including designs that allow occupants to shelter in place and to have sufficient time to evacuate during times of extreme weather and natural disasters. The adequacy of evacuation routes and emergency access are further discussed in ***Transportation***.

The Project lies within the County's Fire Safety Overlay (FS-1) and is therefore subject to the requirements of County Development Code Section 23.0304 Mountain Area Fire Hazard Abatement. When neighboring persons or properties are especially vulnerable to the effects of fire, including, but not limited to schools, hospitals, mobile home parks, and residential occupancies, it is the responsibility of the property owner to adhere to the provisions of this section when flammable vegetation stands within 100 feet, measured on the ground, of all neighboring structures. Additional clearance may be required at the discretion of the County Fire Chief/Fire Warden or their designee on buildings that may be used as evacuation centers, medical facilities and/or places of public gatherings and/or critical infrastructure (County Development Code Section 23.0304). Additionally, the County requires that all new development in County-designated Fire Safety Overlay (FS-1) and/or CAL FIRE-designated Very High FHSZs meet the requirements of the California Fire Code and the California Building Code as amended by the County Fire Protection District, including Title 14 of the California Code of Regulations fire safety requirements for any new development within an SRA, as well as provide and maintain a Fire Protection Plan or Defensible Space/Fuel Modification Plan and other pre-planning measures in accordance with the County Code of Ordinances (Countywide Plan Policy HZ-1.13). Countywide Plan Policy HZ-1.14 additionally requires proactive vegetation management/hazard abatement to reduce fire hazards on existing private properties, along roadsides of evacuation routes out of wildfire prone areas, and other private/public land where applicable, and requires new development to enter into a long-term maintenance agreement for vegetation management in defensible space, fuel modification, and roadside fuel reduction in the Fire Safety Overlay (FS-1) and/or Very High FHSZs. To this end, a Preliminary Fire Fuel Modification Plan has been prepared for the Project; refer to **Figure 7: Preliminary Fire Fuel Modification Plan**. The Fuel Modification Plan designates Zones A, B, and C, which represent buffer zones around each structure extending to the property line. Zone A extends from the outer edge of the structure or appendage to 20 feet. Zone B extends 80 feet from the edge of Zone A, and Zone C extends up to 200 feet from the edge of Zone B. Each buffer zone includes landscaping, fuel load, and irrigation design considerations that would reduce the severity and progress of wildfire within the Project site.

Additionally, the Evacuation Plan and Working Guide developed by Hume SoCal and based on CAL FIRE's "Ready, Set, Go!" model would be implemented to ensure proper preparedness and response to a wildfire. To ensure the Evacuation Plan and Working Guide are able to adequately address emergency situations, **MM WF-1** would be implemented to ensure the Evacuation Plan is updated upon completion of each Phase of the Project.

Therefore, with compliance to all applicable federal, state, and local policies and regulations, and with the implementation of the Preliminary Fire Fuel Modification Plan and Evacuation Plan

(**MM WF-1**), the Project would not substantially impair an adopted emergency response plan or emergency evacuation plan.

MM WF-1 **Evacuation Plan.** An Evacuation Plan and Working Guide strongly implemented by the Southern California Hume Lake Christian Camp ("Hume SoCal") based on CAL FIRE's "Ready, Set, Go!" model has been developed. The Evacuation Plan and Working Guide would be updated and submitted to Land Use Services for review and approval, upon completion of construction activities for each Phase to ensure adequate preparation for higher campground occupancy.

Hume SoCal will also work with local fire agencies and hold annual fire safety and evacuation preparedness informational meetings that will help Hume SoCal Campground guests and employees familiarize themselves with their own "Ready, Set, Go!" evacuation plan.

b) Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?

Less Than Significant With Mitigation Incorporated. As previously mentioned, steep terrain results in faster fire spread upslope and flat terrain tends to have little effect on fire spread, resulting in fires that are driven by vegetation and/or wind. The Project site is at an elevation of between approximately from 6,400 feet to 6,600 feet and has a relatively steep slope that could potentially result in faster fire spread and exposing occupants to pollutant concentrations from a wildfire or the uncontrollable spread of a wildfire. Although, the majority of the sites' steeper slopes ascend away from on-site development, the Project site is located on higher ground than lands surrounding the site to the east, south, and north.

Santa Ana winds could potentially increase wildfire risk on the Project site as well. On October 22, 2007, the Slide Fire burned 12,759 acres within the Green Valley Lake Community. This fire was heavily influenced from Santa Ana winds.[90,91] Hot, dry Santa Ana winds typically occur in the fall and are usually from the northeast and can reach speeds of 50 miles per hour (mph) or higher. Santa Ana winds come from the north and flow through the Cajon Pass and then follow the Santa Ana River to the south. High speed winds during Santa Ana conditions could put Project occupants at a higher risk to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire; however, the County has a Multi-Jurisdictional Hazard Mitigation Plan (MJHMP), which was approved in July 2017, that includes various hazard mitigation, such as the San Bernardino County Fire Hazard Abatement (FHA) Program that reduces the risk of fires within communities through the reduction/removal of flammable materials on properties. The FHA conducts surveys to identify fire hazards throughout the year and mails notices to abate the hazards to the property owners.

[90] California Department of Forestry and Fire Protection. 2007. *Slide Fire.* Available at https://www.fire.ca.gov/incidents/2007/10/22/slide-fire/ (accessed January 2024).
[91] *History of Green Valley Lake*. 2013. Available at https://www.green-valley-lake.com/history/# (accessed January 2023).

The property owners are given 30 days to abate the violations before receiving citations, penalties, and/or fees for abatement by the County.[92]

The Project site within a Wildland Urban Interface (WUI) area.[93] The WUI is the zone of transition between unoccupied land and human development. It is the line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels. Within the Project site, these interface areas are covered in chaparral vegetation.[94] Although high intensity fires are common within these vegetation types, **MM WF-3** would mitigate these risks. The Project would comply with the fire hazard requirements outlined in San Bernardino County Code Section 23.0301-23.0319 conforming with the FHA Program.[95] **MM WF-2** would require a qualified SBC Fire third-party fuel modification zone inspector to permit fuel modification and create adequate firebreaks in areas consisting of flammable vegetation. Additionally, existing flammable vegetation would be reduced by 50 percent on vacant lots prior to construction activities to reduce fuel for fire. Furthermore, **MM WF-3** would ensure landscaping on-site consists of drought-tolerant, fire-resistive plants and be properly maintained and watered.

The Project would also comply with the Fire Fuel Modification Plan (FMP) prepared for the Project. The plan would ensure adequate proactive protection measures are taken to reduce fire risk. The FMP would require low-growing and irrigated vegetation within a 20-foot buffer of all structures to reduce fire risk. The FMP would also require an additional 80-foot buffer zone where vegetation must be thinned, and appropriate plantings must be utilized to reduce fire risk. Additionally, the FMP would require a 100-foot buffer zone from structures requiring thinned vegetation. Multiple new fire hydrants must be installed throughout the Project site to reduce risk of spread. With implementation of the FMP requirements, impacts related to exacerbated wildfire risk would be less than significant.

Additionally, the Project would comply with FS Overlay general development standards (82.13.050) and fire hazard requirements outlined in San Bernardino County Code Section 23.0301-23.0319 conforming with the San Bernardino County Fire Hazard Abatement (FHA) Program. The primary function of this Program is to reduce fire risk by proactively establishing defensible space and reduction/removal of flammable materials on properties. The Program must conduct surveys to identify fire hazards throughout the year and mail the hazards identified to the property owner. The property owner will then have 30 days to abate the violations. Failure to do so will result in penalties, citations, and/or fees for abatement by the County. With implementation of **MMs WF-2** and **WF-3** and compliance with the regulatory framework, impacts related to exacerbated wildfire risk would be less than significant.

[92] County of San Bernardino. 2017. *Multi-Jurisdictional Hazard Mitigation Plan.* Available at https://www.sbcounty.gov/uploads/SBCFire/documents/EmergencyServices/Hazard-Mitigation-Plan.pdf (accessed March 2023).
[93] California Department of Forestry and Fire Protection. 2019. *CalFIRE FRAP, WUI, and Wildfire Hazard Potential* [Web Map]. Available at https://www.arcgis.com/apps/mapviewer/index.html?webmap=64c885ae674744348ad0ebcc16fe02f0f (accessed March 2024).
[94] United States Department of Agriculture. 2011. *San Bernardino National Forest Land Management Plan Monitoring, Evaluation, and Five Year Trend Report*. Available at https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5337913.pdf (accessed January 2023)
[95] County of San Bernardino. ND. *San Bernardino County Fire Hazard Abatement Program*. Available at https://lus.sbcounty.gov/fire-hazard-abatement-home/ (accessed January 2023).

Mitigation Measures

MM WF-2 A qualified SBC Fire third-party fuel modification zone inspector hired by the project applicant shall review the plans and construction materials list prior to bringing combustible materials on site. Additionally, adequate firebreaks at least 50 feet wide shall be created around all grading, site work, and additional construction activities in areas consisting of flammable vegetation. Existing flammable vegetation shall be reduced by 50 percent on vacant lots prior to construction.

- All new power lines shall be undergrounded for additional fire safety, and temporary construction power lines may be allowed in areas cleared of combustible vegetation.
- Caution must be used to avoid causing erosion or ground (including slope) instability or water runoff due to vegetation removal, management, or maintenance.

MM WF-3 On-site landscaping must consist of drought-tolerant, fire-resistive plants and be routinely maintained and watered by an automatic irrigation system that will maintain healthy vegetation with high moisture contents that would minimize ignition of embers from a wildfire.

c) Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?

Less Than Significant Impact. As previously stated, the Project is located in an SRA and lands classified as a Very High FHSZ. The Project contains various infrastructure improvements that, under the guidance of the Project, would be installed in five phases, as described in **Section 2.0: Description of Proposed Project**. All proposed improvements would be constructed to meet the requirements of the San Bernardino Flood Control District (SBFCD) and would comply with the requirements of the County Development Code and the CWP goals and polices. Thus, the proposed campground structures and recreation facilities within the Project would include fire systems, and fire riser rooms would be located within the building envelope, unless fully integrated into the building architecture. All fire risers and fire-related plumbing would be installed in a fire riser cabinet or meter cabinet.

Furthermore, the Project is subject to the County FS Overlay that includes areas designated as extremely high fire hazard severity zones by CAL FIRE. Due to this, the Project would be subject to additional development standards (such as setback requirements, fuel modification zones, vehicular access, building separation, erosion and sediment control, and other design requirements) to provide greater public safety in these fire-prone areas. Each project located in the FS Overlay that goes through the entitlement process must submit a fuel modification plan that addresses fuel loading, ungraded slopes, maintenance, on-site water availability, and landscaping.

In addition, each proposed development must comply with FS Overlay general development standards (County Development Code Section 82.13.050), including but not limited to[96]:

- Residential density criteria that limit the number of dwelling units per gross acre based on slope percentage;
- Site and emergency access that requires a minimum of two points of ingress and egress, and minimum width of 26 feet of all-weather surface for roads;
- Private driveways or access roadways for residential units that have a 150-foot maximum length;
- Fencing requirements, including a minimum five-foot separation for wood or vinyl fencing and the wall of the nearest structure;
- Cul-de-sac length limits of 350 feet in length;
- Vehicular access to water sources, including ponds, lakes, swimming pools, reservoirs, and water storage tanks; and
- Permanent fuel modification areas around a development projects or portions adjacent or exposed to hazardous fire areas.

All applications must also comply with fire authority standards, including CBC Chapter 7A and California Residential Code Chapter 327. After a project is approved, the code enforcement division is responsible for ensuring compliance with the conditions agreed upon in the approved permit, as well as annually inspecting fuel modification and defensible space. Additionally, as determined by the FMP, infrastructure to support emergency response in the event of a fire would be expanded with the campground expansion as additional fire breaks and fire hydrants would be installed. Therefore, in consideration of the above requirements, the installation and maintenance of associated infrastructure would result in less than significant impacts regarding temporary or ongoing impacts to the environment and no mitigation measures are required.

d) Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?

Less Than Significant. As described in ***Section 2.0: Description of Proposed Project,*** the physical expansion of Hume SoCal Campground, the new construction of campground-related structures, features, and infrastructure, and the intensification of its associated uses would allow the existing Hume SoCal Campground to increase the campground's current 300-person capacity to accommodate up to an additional 2,700 persons for a total capacity of 3,000 persons. Thus, the Project has the potential to expose additional people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes. As previously mentioned, the Project is located in an SRA on lands classified as a Very High FHSZ. Additionally, the Project area ranges in elevations from 6,400 feet to 6,600 feet and has a relatively steep slope that could potentially result in faster fire spread and exposing

[96] Office of Planning and Research. 2022. *Fire Safety Overlay Zone: San Bernardino County*. Available at https://opr.ca.gov/docs/20220817-San_Bernadino_County_Case_Study.pdf (accessed February 2024).

occupants to downslope or downstream flooding, or landslides as a result of runoff, post-fire slope instability, or drainage changes.

Potential impacts regarding flooding, landslides, and drainage are further discussed in **Geology and Soils** and **Hydrology and Water Quality**. With compliance with applicable mitigation measures, the 2022 CBC, and the geotechnical recommendations (**Appendix F**), the Project would result in a less than significant impact to geology and soils and hydrology and water quality. Therefore, while the Project site is subject to regional seismicity and ground disturbing activities which would result in runoff and drainage changes, the Project would not expose people or structures to significant risks, including downslope or downstream flooding or landslides. Therefore, compliance with applicable state and local policies and regulations would ensure that impacts are less than significant, and no mitigation measures are required.

Cumulative Impacts

Projects have the potential to be cumulatively considerable, when evaluated in the context of other past, present, or reasonably foreseeable projects that make a cumulative contribution to impacts. Similar to the Project, cumulative development within the vicinity of the Project site would be located in a Very High FHSZ. Nevertheless, all cumulative projects would be subject to the California Building Standard Codes, including the California Building Code and California Fire Code. Additionally, all cumulative projects would be required to comply with all local regulations and meet the minimum fire safety standards required by the County. Implementation of these plans and policies, in conjunction with compliance with the Fire Code and County standards, would ensure cumulative impacts with respect to wildfire hazards are less than significant. As concluded above, the Project's impact related to wildfire hazards would not be cumulatively considerable.

MANDATORY FINDINGS OF SIGNIFICANCE

ENVIRONMENTAL IMPACTS Issues		Potentially Significant Issues	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
21.	**MANDATORY FINDINGS OF SIGNIFICANCE. Does the project:**				
a)	Have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?		X		
b)	Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?			X	
c)	Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?			X	

a) Have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?

Less Than Significant With Mitigation Incorporated. The proposed Project would involve the expansion of the existing Hume SoCal Campground to include additional campground and recreational uses in a manner consistent with the existing campground uses. As described in the above sections, the Project could result in several potentially significant project-level impacts including air quality, biological resources, cultural resources, geology and soils, and wildfire. The Project would have the potential to substantially degrade the quality of the environment should Project emissions exceed CAAQS and NAAQS emissions standards, as discussed in ***Air Quality***. The Project would implement **MM AQ-1** that would require all off-road equipment 50 horsepower or greater to meet CARB Tier 4 Final standards as well as the latest Environmental Protection Agency and CARB standards. With implementation of applicable air quality mitigation measures and compliance with federal, state, and local requirements, the Project would not substantially

degrade air quality. Additionally, the Project site does not contain any known historical resources and would implement mitigation to support habitat for any special-status animals or plant communities. However, construction of the Project could result in the short-term disturbance of nesting birds from ground disturbing activities. Implementation of **MM BIO-1** and **MM BIO-2** would reduce impact to biological resources to less than significant. Development of the Project would require ground disturbance which would have the potential to uncover unanticipated cultural resources including tribal cultural resources and archaeological resources; thus, with implementation of **MMs CUL-1** and **CUL-2**, the Project would have a less than significant impact on cultural resources. Additionally, the Project would implement the recommendation included within the Geotechnical Report (**Appendix F**) to ensure that soils are made appropriate for development of the Project on the Project site. The recommendations are included as a part of **MM GEO-1**. Implementation of these geotechnical recommendations, consistent with the requirements of the 2022 CBC, would reduce geological impacts associated with consolidation and collapse to less than significant. Impacts related to wildfire, including the potential for wildfire to exacerbate pollutant concentrations or the uncontrolled spread of a wildfire, are deemed to be less than significant with incorporation of **MMs WF-2** and **WF-3**. Accordingly, with incorporation of the mitigation measures recommended throughout this IS/MND, the Project would not substantially degrade the quality of the environment and impacts would be less than significant.

b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?

Less Than Significant Impact. CEQA Guidelines Section 15064(i) states that a Lead Agency shall consider whether the cumulative impact of a project is significant and whether the effects of the project are cumulatively considerable. The Project would not contribute to cumulative development impacts within the region. Potentially significant impacts of the Project relate to air quality, biological resources, cultural resources, geology and soils, and wildfire. Development of the Project would follow applicable mitigation measures in each topical area addressed in this IS/MND. In consideration of existing requirements and mitigation measures, no significant impacts are anticipated with respect to Project construction. Therefore, in consideration of existing requirements, potential impacts associated with the development of the Project would be less than significant with mitigation incorporated. Potential impacts have been thoroughly evaluated and have been deemed to be neither individually significant nor cumulatively considerable in terms of any adverse effects upon the region, the local community, or its inhabitants.

c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?

Less Than Significant Impact. All potential impacts have been thoroughly evaluated and have been deemed to be neither individually significant nor cumulatively considerable in terms of any adverse effects upon the region, the local community, or its inhabitants. At a minimum, the Project would be required to meet the conditions of approval for the project to be implemented. It is anticipated that all such conditions of approval would further ensure that no potential for adverse impacts

would be introduced by construction activities, initial or future land uses authorized by the project approval. With required implementation of mitigation measures identified in this IS/MND, construction and operation of the Project would not involve any activities that would result in environmental effects which would cause substantial adverse effects on human beings, either directly or indirectly.

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Appendix A1

Biological Resources Assessment

HUME SOCAL CAMPGROUND PROJECT

SAN BERNARDINO COUNTY, CALIFORNIA
KELLER PEAK USGS 7.5-MINUTE TOPOGRAPHIC QUADRANGLE
SECTIONS 28 AND 33, TOWNSHIP 2 NORTH, RANGE 2 WEST
APN: 0328-071-05, -07, AND -10, AND 0328-121-40 AND -42

Biological Resources Assessment

Prepared For:

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September 2023

HUME SOCAL CAMPGROUND PROJECT

SAN BERNARDINO COUNTY, CALIFORNIA

Biological Resources Assessment

The undersigned certify that the statements furnished in this report and exhibits present data and information required for this biological evaluation, and the facts, statements, and information presented is a complete and accurate account of the findings and conclusions to the best of our knowledge and beliefs.



Travis J. McGill
Director/Biologist



Thomas J. McGill, Ph.D.
Managing Director

September 2023

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Section 1 Introduction

This report contains the findings of ELMT Consulting's (ELMT) biological resources assessment prepared for the Hume SoCal Campground Project (project site, site) located within the Green Valley Lake Community in the mountain region of San Bernardino County, California. ELMT biologists Jacob H. Lloyd Davies, Rachael A. Lyons, and Megan E. Peukert conducted a field survey and evaluated the condition of the habitat within the project site on July 31, 2023, and August 2, 2023.

The purpose of the biological resources assessment is to characterize existing site conditions on the entire project site and to assess the probability of occurrence of special-status[1] plant and wildlife species that could pose a constraint to project implementation. Special attention was given to the suitability of the project site to support southern rubber boa (*Charina umbratica*), San Bernardino flying squirrel (*Glaucomys sabrinus californicus*), California spotted owl (*Strix occidentalis*), and other special-status plant and wildlife species identified by the California Department of Fish and Wildlife's (CDFW) California Natural Diversity Database (CNDDB) and other electronic databases as potentially occurring in the general vicinity of the project site.

The site was also evaluated for its potential to support natural drainage features, ponded areas, and/or water bodies that have the potential to fall under the regulatory authority of the of the United States Army Corps of Engineers (Corps), Regional Water Quality Control Board (Regional Board), or California Department of Fish and Wildlife (CDFW) pursuant to Sections 401 and 404 of the Federal Clean Water Act (CWA), the California Porter-Cologne Water Quality Control Act, and Section 1600 *et seq.* of the Fish and Game Code.

1.1 PROJECT LOCATION

The project site is generally located north, west, and south of State Route 18, and southeast of Lake Arrowhead within the San Bernardino Mountains in the unincorporated Community of Green Valley Lake, San Bernardino County, California (Exhibit 1, *Regional Vicinity*). The site is depicted on the *Keller Peak* quadrangle of the United States Geological Survey's (USGS) 7.5-minute topographic map series within Sections 28 and 33 of Township 2 North, Range 2 West (Exhibit 2, *Site Vicinity*). Specifically, the approximately 251-acre project site is transected by Green Valley Lake Road and roughly centered around the existing Hume SoCal campground facility within Assessor's Parcel Numbers (APN) 0328-071-05, -07, and -10, and 0328-121-40 and -42 (Exhibit 3, *Project Site*).

[1] As used in this report, "special-status" refers to plant and wildlife species that are federally or State listed, proposed, or candidates; plant species that have been designated a California Native Plant Society (CNPS) Rare Plant Rank; wildlife species that are designated by the California Department of Fish and Wildlife (CDFW) as fully protected, species of special concern, or watch list species; California Department of Forestry and Fire Protection sensitive species; and International Union for Conservation of Nature Red List species.

1.2 PROJECT DESCRIPTION

The Project involves the expansion of campground uses for the existing Hume SoCal campground to accommodate up to 2,854 total occupants. This would be accomplished through the continued use of existing campground structures as well as the development of additional campground and recreational structures and uses within a 251-acre area of the Green Valley Lake community. Development of the Project site would be completed in five phases.

Each phase of the Project would include the development of expanded infrastructure, additional amenities, support structures, and buildings necessary to accommodate expanded camper capacity as well as paved parking areas and paved access roadways. Refer to Appendix A, *Site Plans*.

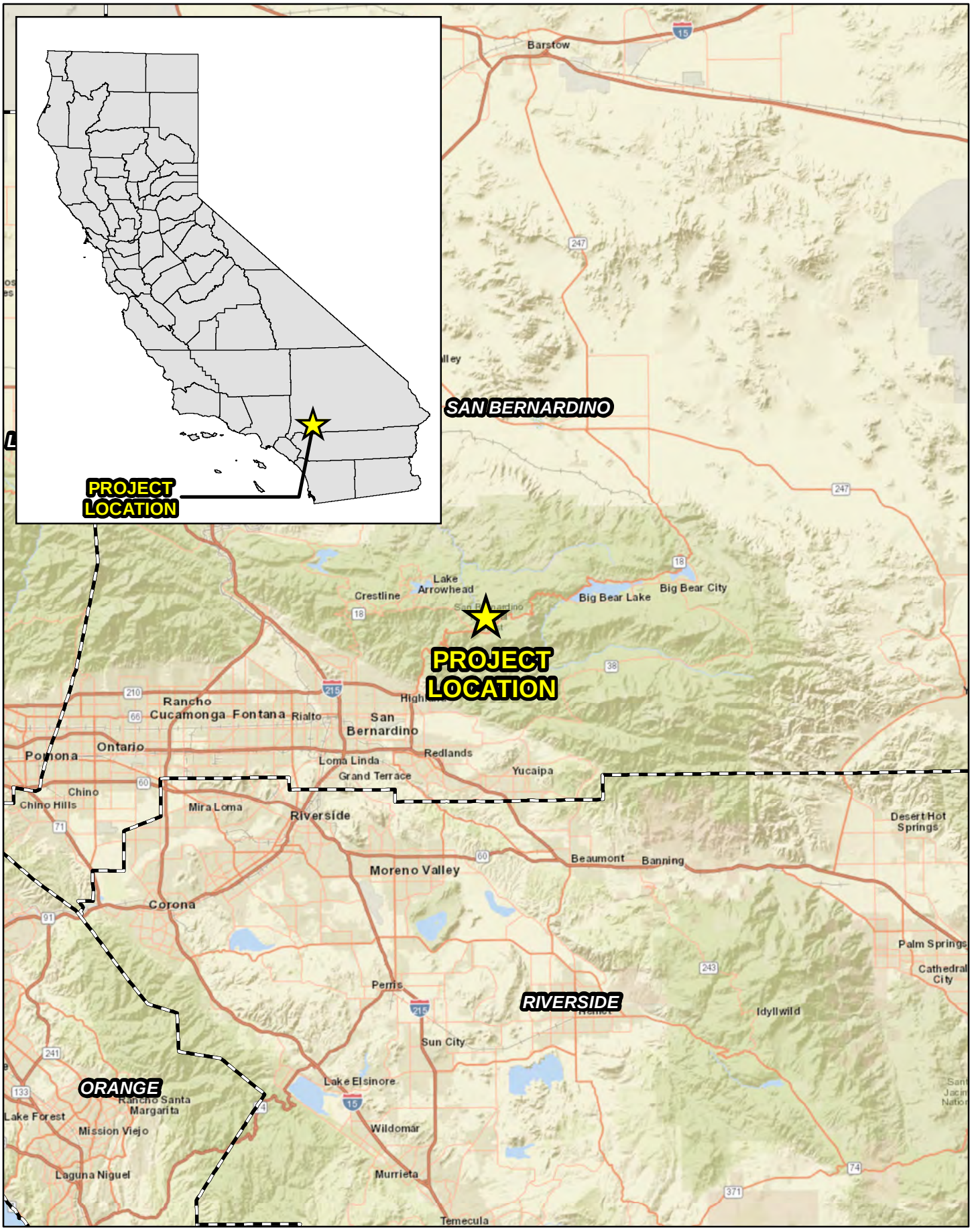
Phase 1 of the Project would involve the development of facilities to be used as a Junior High Camp. Proposed residential structures within the Phase 1 area include an expanded welcome center, private administration and guest speaker residencies, staff housing, and student dormitories. Phase 1 also includes the development of a gymnasium, bus parking, a snack shop, a chapel, converting an existing chapel to a small meeting space, an expansion to the existing dining hall, a maintenance building, an amphitheater, and restrooms. Outdoor recreation facilities include grass quads. Existing and proposed facilities within Phase 1 would accommodate up to 988 guest occupants.

Phase 2 of the Project would involve the development of facilities to be used as a High School Camp. Proposed residential structures within the Phase 2 area include staff housing buildings, and student dormitories. Phase 2 also includes the development of a large dining hall, gymnasium, a chapel, amphitheater, and restrooms. Outdoor recreation facilities include grass quads, a swimming pool, and a recreation pond. Existing and proposed facilities within Phase 2 would accommodate up to 1,096 occupants.

Phase 3 of the Project proposes the development of an Adult Lodge. Phase 3 would include the development of one adult lodge with included access road. Existing and proposed facilities within Phase 3 would accommodate up to 140 occupants.

Phase 4 of the Project would include the development of an Elementary Age Camp and associated facilities. Proposed residential structures within Phase 4 include semi-permanent insulated tent structures for students. Phase 4 also includes the development of restroom facilities with showers and an amphitheater. Outdoor recreation facilities include grass quads, a dining canopy, a swimming pool, and a recreation pond. Existing and proposed facilities within Phase 4 would accommodate up to 500 occupants.

Phase 5 of the Project proposes the creation of a tent-based youth camp, Wildwood Camp. Residential structures proposed for this phase consist of semi-permanent insulated tent structures. Phase 5 also includes the development of restroom facilities with showers and an amphitheater. Outdoor recreation facilities include grass quads, a dining canopy, a swimming pool, and a recreation pond. Existing and proposed facilities within Phase 5 would accommodate up to 130 occupants.

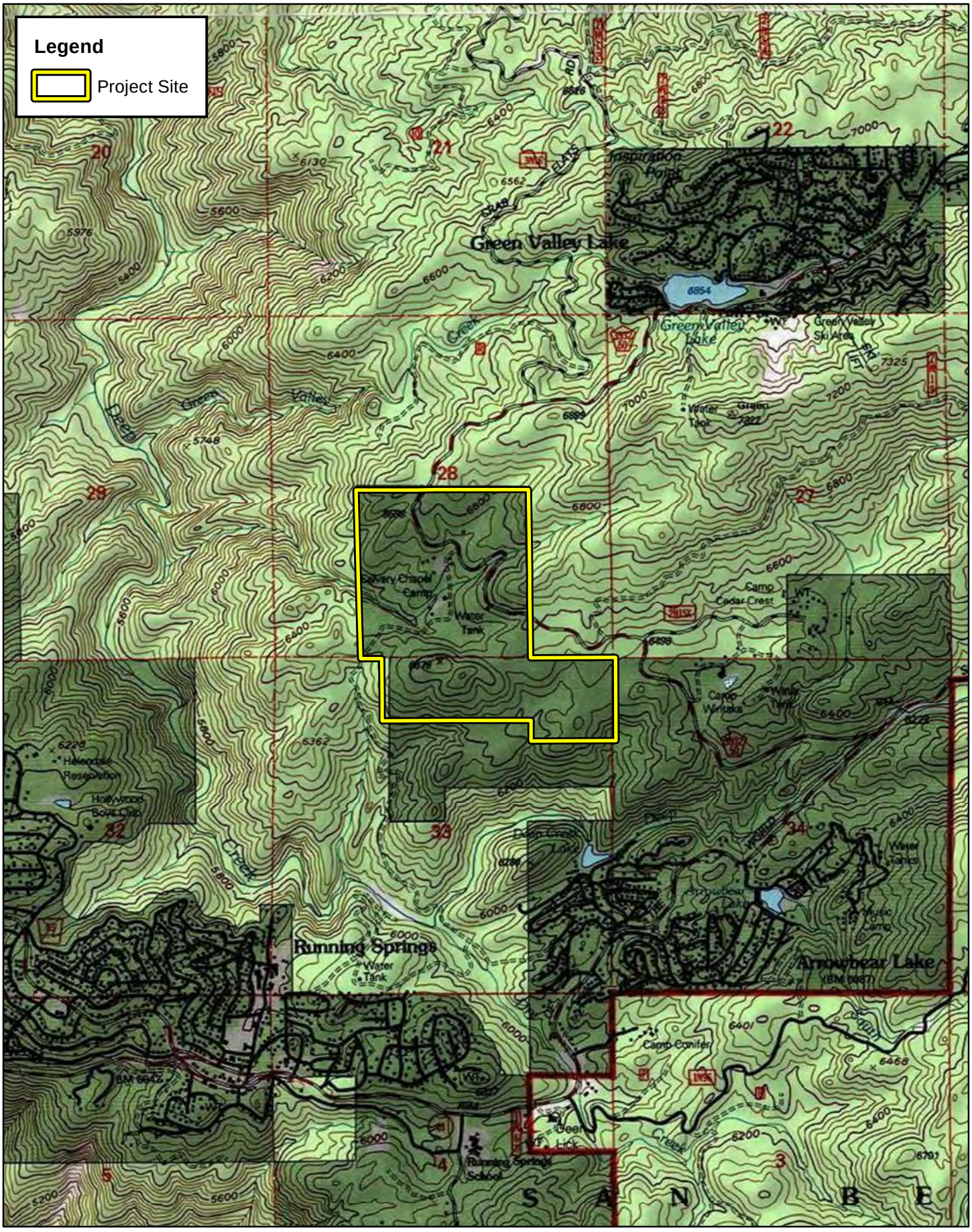


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HUME SO CAL CAMPGROUND PROJECT

Regional Vicinity

Exhibit 1



ELMT CONSULTING

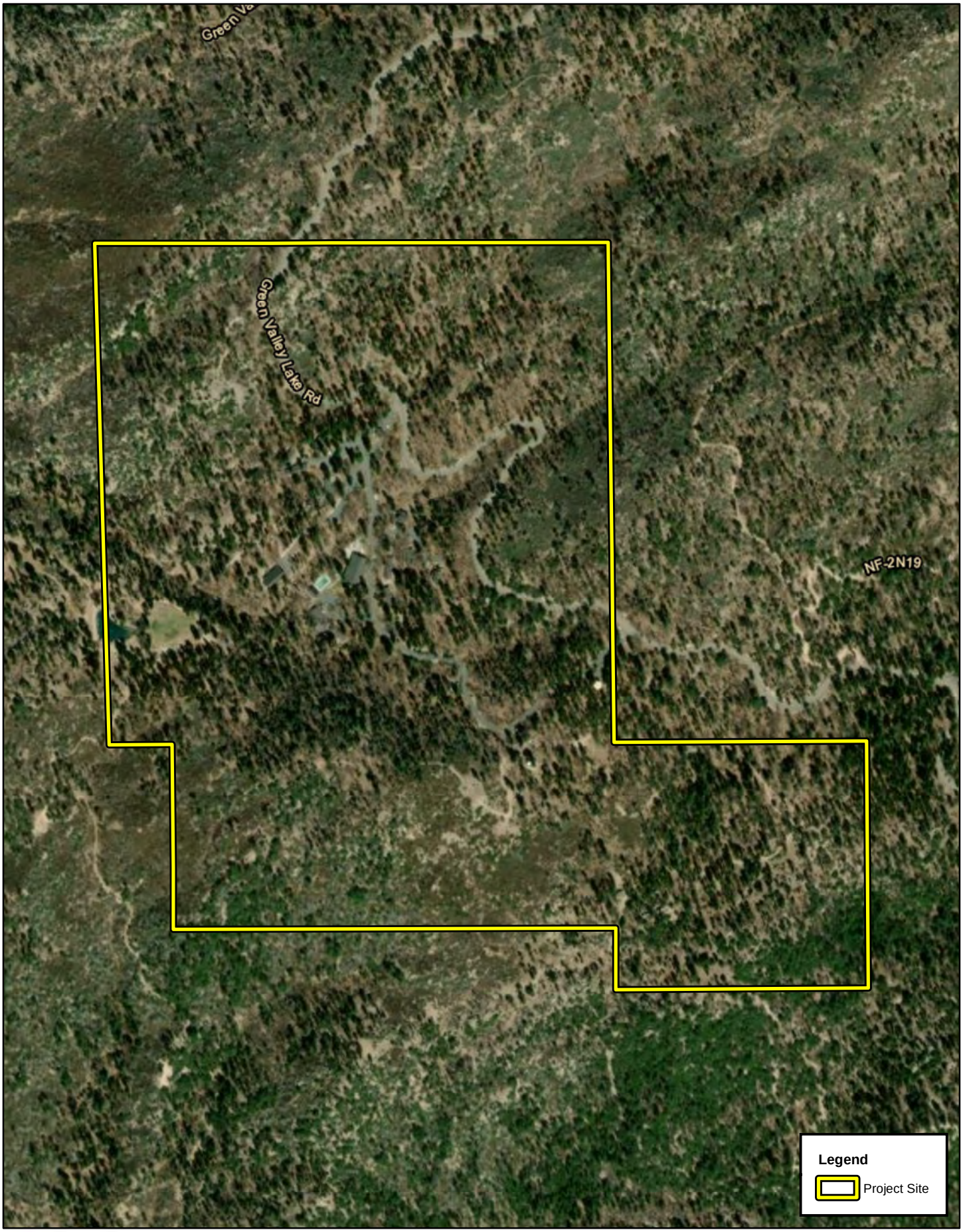
0 1,000 2,000 4,000 Feet

Source: USA Topographic Map, San Bernardino County

HUME SO CAL CAMPGROUND PROJECT

Site Vicinity

Exhibit 2



ELMT CONSULTING

0 500 1,000 2,000 Feet

HUME SO CAL CAMPGROUND PROJECT

Project Site

Source: ESRI Aerial Imagery, San Bernardino County

Exhibit 3

Section 2 Methodology

A literature review and records search were conducted to determine which special-status biological resources have the potential to occur on or within the general vicinity of the project site. In addition to the literature review, a general habitat assessment or field investigation of the project site was conducted. The field investigation was conducted to document existing conditions within the project site and assess the potential for special-status biological resources to occur.

2.1 LITERATURE REVIEW

Prior to conducting the field study, species and habitat information was gathered from the reports related to the specific project and relevant databases for the *Butler Peak, Harrison Mtn., Keller Peak,* and *Lake Arrowhead* USGS 7.5-minute quadrangles to identify species and habitats known to occur locally. These quadrangles were queried due to the proximity of the project site to quadrangle boundaries and regional topography. The literature review sources included:

- U.S. Fish and Wildlife (USFWS) threatened and endangered species occurrence GIS overlay;
- USFWS Designated Critical Habitat Maps;
- California Natural Diversity Database (CNDDB) *Rarefind 5*;
- International Union for Conservation of Naturae (IUCN);
- CNDDB Biogeographic Information and Observation System (BIOS);
- California Native Plant Society Electronic Inventory (CNPSEI) database;
- Calflora Database;
- United States Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS), Soil Survey;
- USFWS National Wetland Inventory;
- Environmental Protection Agency (EPA) Water Program "My Waters" data layers;
- Google Earth Pro historic aerial imagery (1985-2023);
- San Bernardino County General Plan;
- USFWS Critical Habitat designations for Threatened and Endangered Species;
- USFWS National Wetlands Inventory (NWI); and

The literature review provided a baseline from which to inventory the biological resources potentially occurring on the subject property. The CNDDB database was used, in conjunction with ArcGIS software, to locate the nearest recorded occurrences of special-status species and determine the distance from the project site.

2.2 FIELD INVESTIGATION

ELMT biologists Jacob H. Lloyd Davies, Rachael A. Lyons, and Megan E. Peukert evaluated the conditions of the plant communities found within the boundaries of the project site on March 22, April 18, and June 30, 2023. Plant communities identified on aerial photographs during the literature review were verified in the field. The plant communities were evaluated for their potential to support special-status plant and

wildlife species. In addition, field staff identified any natural corridors and linkages that may support the movement of wildlife through the area.

The plant communities were evaluated for their potential to support special-status plant and wildlife species. Plant communities were mapped using 7.5-minute USGS topographic base maps and aerial photography. The plant communities were classified in accordance with Sawyer, Keeler-Wolf and Evens (2009) and delineated on an aerial photograph, and then digitized into ArcGIS. The ArcGIS application was used to compute the area of each plant community in acres.

Common plant species observed during the field survey were identified by visual characteristics and morphology in the field and recorded in a field notebook. Unusual and less familiar plants were photographed in the field and identified in the laboratory using taxonomic guides. Taxonomic nomenclature used in this study follows the 2012 Jepson Manual (Hickman 2012). In this report, scientific names are provided immediately following common names of plant species (first reference only).

Wildlife species detected during field surveys by sight, calls, tracks, scat, or other sign were recorded during surveys in a field notebook. Field guides were used to assist with identification of wildlife species during the survey included The Sibley Field Guide to the Birds of Western North America (Sibley 2003), A Field Guide to Western Reptiles and Amphibians (Stebbins 2003), and A Field Guide to Mammals of North America (Reid 2006). Although common names of wildlife species are fairly well standardized, scientific names are provided immediately following common names in this report (first reference only). In addition, field staff identified any natural corridors and linkages that may support the movement of wildlife through the area.

2.3 SOIL SERIES ASSESSMENT

On-site and adjoining soils were researched prior to the field survey using the USDA NRCS Soil Survey for San Bernardino County Hilltop Community. In addition, a review of the local geological conditions and historical aerial photographs was conducted to assess the ecological changes that the project site has undergone.

2.4 JURISDICTIONAL DRAINAGES AND WETLANDS

Aerial photography was reviewed prior to conducting a field investigation in order to locate and inspect any potential natural drainage features, ponded areas, or water bodies that may fall under the jurisdiction of the Corps, Regional Board, and/or CDFW. In general, surface drainage features indicated as blue-line streams on USGS maps that are observed or expected to exhibit evidence of flow are considered potential riparian/riverine habitat and are also subject to state and federal regulatory jurisdiction. In addition, ELMT reviewed jurisdictional waters information through examining historical aerial photographs to gain an understanding of the impact of land-use on natural drainage patterns in the area. The USFWS NWI and Environmental Protection Agency (EPA) Water Program “My Waters” data layers were also reviewed to determine whether any hydrologic features and wetland areas have been documented on or within the vicinity of the Project site.

Section 3 Existing Conditions

3.1 LOCAL CLIMATE

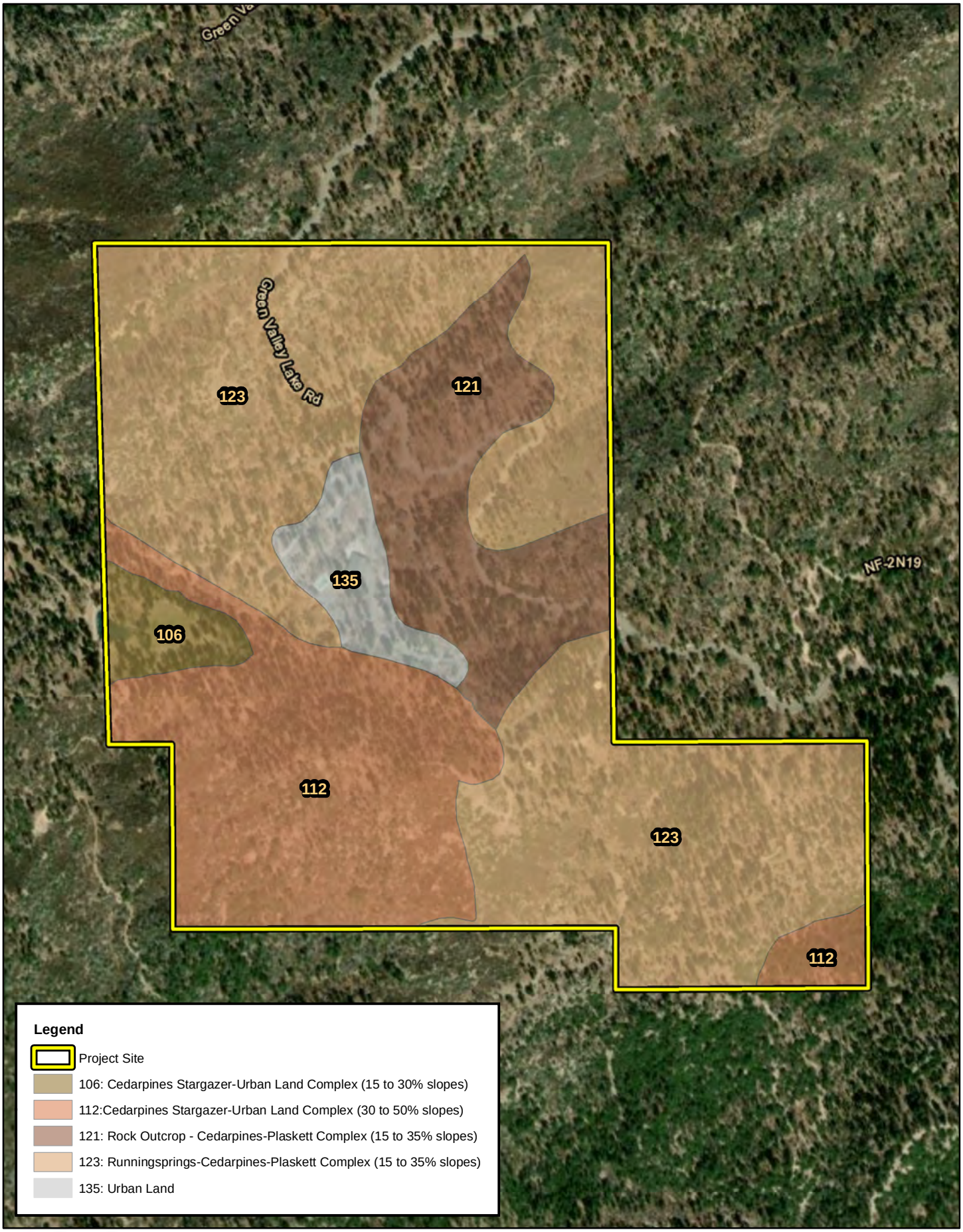
The Hilltop Community in San Bernardino County features a somewhat cooler version of a Mediterranean climate, or semi-arid climate, with warm, sunny, dry summers and cool, rainy, mild winters. Relative to other areas in Southern California, the upper elevations of the San Bernardino Mountains are influenced by a steppe climate, with colder, snowy winters and cold morning temperatures common. Climatological data obtained for the nearby City of Big Bear Lake indicates the annual precipitation averages 12.56 inches per year. The majority of precipitation in the form of rain occurs in the months between December and March, with hardly any occurring between the months of May and June. The wettest months are January and February, with monthly average total precipitation of 1.93 and 2.24 inches, respectively, and the driest months are May and June, with monthly average total precipitation of 0.47 and 0.20 inches, respectively. The average maximum and minimum temperatures are 61.1- and 41.1-degrees Fahrenheit (° F), respectively, with July (monthly average high 77.7° F) being the hottest month and February (monthly average lows 29.5° F) being the coldest. The temperature during the visits were in the mid-50s to 70s ° F with clear skies and calm winds.

3.2 TOPOGRAPHY AND SOILS

On-site surface elevation ranges from approximately 6,280 to 6,760 feet above mean sea level. The topography in the region supporting the project site is highly variable, consisting of steep slopes and valleys, and generally slopes from north to south. According to the NRCS Custom Soil Resource Report, the project site is underlain by Cedarpines-Plaskett-Stargazer complex (30 to 50 percent slopes), Cedarpines-Stargazer-Urban land complex (15 to 30 percent slopes), Rock outcrop-Cedarpines-Plaskett complex (15 to 35 percent slopes), Runningsprings-Cedarpines-Plaskett complex (15 to 35 percent slopes), and Urban land. Refer to Exhibit 4, *Soils*. Soils within portions of the site have been disturbed and compacted by on-site and surrounding development, infrastructure, and dirt and paved roads.

3.3 SURROUNDING LAND USES AND SITE CONDITIONS

The project site occurs on the southwest outskirts of the mountain Community of Green Valley Lake in a primarily undeveloped area in the San Bernardino Mountains. The majority of the area surrounding the site is comprised of natural mountain forest habitats with scattered campgrounds, residential developments, and similar camp-like settings occurring primarily to the west and east, the more consolidated portions of the Community of Green Valley Lake occurring to the northeast, and the community of Running Springs occurring to the south. The project site is generally surrounded by undeveloped land with scattered structures associated with unaffiliated camps throughout. Green Valley Lake traverses the site and continues to the northeast and southeast. The site itself primarily supports undeveloped land with various campground facilities, infrastructure, and access roads and paths throughout.



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HUME SO CAL CAMPGROUND PROJECT

Soils

Source: ESRI Aerial Imagery, Soil Survey Geographic Database, San Bernardino County

Exhibit 4

Section 4 Discussion

4.1 VEGETATION AND LAND COVER

The project site supports land that has undergone varying degrees of anthropogenic disturbance in association with the active campground onsite. Most of the project site is undeveloped and undisturbed, and the level of disturbance increases with closer proximity to campground facilities, and roadways and paths that connect these facilities throughout the site. Two (2) vegetation communities were observed on-site: Mixed Conifer Forest and Willow Riparian Woodland. In addition, the site supports two (2) land cover types that would be classified as disturbed and developed. The vegetation communities and land cover types are described in further detail below (refer to Exhibit 5, *Vegetation*).

4.1.1 Mixed Conifer Forest

The Mixed Conifer Forest plant community is co-dominated by conifer species such as Jeffrey pine (*Pinus jeffreyi*), sugar pine (*Pinus lambertiana*), and bigcone Douglas-fir (*Pseudotsuga macrocarpa*), and supports lesser dominance of oak species such as California black oak (*Quercus kelloggii*) and canyon live oak (*Quercus chrysolepis*). Understories are variable, with some areas supporting dense understories of shrubs and a dense herbaceous later, and some areas relatively lacking understories. Other common plant species observed in this plant community include bigberry manzanita (*Arctostaphylos glauca*), Sierra lotus (*Acmispon decumbens*), California false indigo (*Amorpha californica*), coffee berry (*Frangula californica*), diffuse groundsmoke (*Gayophytum diffusum*), California aster (*Corethrogyne filaginifolia*), woollypod milkweed (*Asclepias eriocarpa*), goldenstar (*Bloomeria crocea*), giant red Indian paintbrush (*Castilleja miniate*), mountain gooseberry (*Ribes montigenum*), Grinnell's beardtongue (*Penstemon grinnellii*), Bridge's penstemon (*Penstemon rostriflorus*), snowplant (*Sarcodes sanguinea*), western wallflower (*Erysimum capitatum*), giant woollystar (*Eriastrum densifolium*), yarrow (*Achillea millefolium*), common bracken fern (*Pteridium aquilinum*), woodland strawberry (*Fragaria vesca*), California fuchsia (*Epilobium canum*), and rainbow iris (*Iris hartwegii*).

4.1.2 Willow Riparian Woodland

The Willow Riparian Woodland plant community is consolidated to riparian areas along much of the middle and eastern portions of Drainage 1, where underlying substrates and immediate topography allows associated species to establish. This plant community is dominated by arroyo willow (*Salix lasiolepis*), Pacific willow (*Salix lasiandra*), Scouler willow (*Salix scouleriana*), and typically supports densely vegetated understories with a varied shrub layer and robust herbaceous layer. Other common species observed in this plant community include yarrow, woodland strawberry, western columbine (*Aquilegia formosa*), musk monkeyflower (*Erythranthe moschata*), seep monkeyflower (*Erythranthe guttata*), cardinal monkeyflower (*Erythranthe cardinalis*), broadleaf lupine (*Lupinus latifolius*), mountain pink currant (*Ribes nevadense*), silver maple (*Acer saccharinum*), quaking aspen (*Populus tremuloides*), soft rush (*Juncus effusus*), willow dock (*Rumex salicifolius*), watercress (*Nasturtium officinale*), willow herb (*Epilobium ciliatum*), perennial pepperweed (*Lepidium latifolium*), common water weed (*Elodea canadensis*), and fragile sheathed sedge (*Carex fracta*).

4.1.3 Disturbed

Disturbed areas are generally areas that have been subject to a high level of human disturbances from anthropogenic activities and no longer comprise a native plant community. These areas are unpaved and are primarily or entirely devoid of vegetation, or support ruderal/weedy plant species. Disturbed areas observed within the boundaries of the project site generally occur along roadways and campground recreational areas. Plant species occurring within these disturbed areas include Mediterranean mustard (*Hirschfeldia incana*), rabbit's foot grass (*Polypogon monspeliensis*), Canary grass (*Phalaris canariensis*), and Jimsonweed (*Datura wrightii*).

4.1.4 Developed

Developed areas generally encompass all buildings/structures, parks, and paved, impervious surfaces. Within the boundaries of the project site, developed areas include campsite facilities such as lodging, administrative offices, recreational-use structures, water towers, roadways, and flood control infrastructure. These areas are largely devoid of vegetation or support only weedy/early successional species adapted to growing in such conditions, in addition to any ornamental vegetation that may be maintained with or without artificial irrigation.

4.2 WILDLIFE

Plant communities provide foraging habitat, nesting and denning sites, and shelter from adverse weather or predation. This section provides a discussion of those wildlife species that were observed during the field survey or that are expected to occur within the project site. The discussion is to be used as a general reference and is limited by the season, time of day, and weather condition in which the field survey was conducted. Wildlife detections were based on calls, songs, scat, tracks, burrows, and direct observation.

4.2.1 Fish

No fish species were observed within the boundaries of the project site. The creeks observed flowing within site boundaries did not have large enough basins to support any fish species known to occur in the area. A man-made pond occurs in the western region of the project site. This pond is regularly used for recreational activities associated with the active campground and appears to be devoid of any fish species. Therefore, it was determined that all fish species are assumed to be absent from the project site.

4.2.2 Amphibians

The riparian plant community within the project site, has the potential to provide suitable habitat for amphibian species known to occur within the San Bernardino Mountains. Common amphibian species that could potentially occur onsite include arroyo toad (*Bufo californicus*), western toad (*Bufo boreas*), California treefrog (*Pseudacris cadaverina*), Baja California tree frog (*Pseudacris hypochondriaca*), ensatina (*Ensatina eschscholtzii*), and bullfrog (*Rana catesbeiana*).

4.2.3 Reptiles

Reptilian species observed during the field investigation include southern sagebrush lizard (*Scleporus vandenburgianus*) and western fence lizard (*Scleoporus occidentalis*). Common reptilian species that could potentially occur onsite include southern Pacific rattlesnake (*Crotalus oreganus helleri*), mountain gartersnake (*Thamnophis elegans elegans*), gopher snake (*Pituophis catenifer*), two-striped gartersnake (*Thamnophis hammondii*), and western sideblotched lizard (*Uta stansburiana elegans*).

4.2.4 Birds

The plant communities found within the boundaries of the project site provide suitable foraging and nesting habitat for a variety of resident and migrant bird species adapted to conditions within the San Bernardino Mountains. Avian species detected during the survey include Stellar's jay (*Cyanocitta stelleri*), common raven (*Corvus corax*), mountain quail (*Oreortyx pictus*), mountain bluebird (*Sialia currucoides*), black-headed grosbeak (*Pheucticus melanocephalus*), hairy woodpecker (*Leuconotopicus villosus*), white-breasted nuthatch (*Sitta carolinensis*), red-breasted nuthatch (*Sitta canadensis*), mountain chickadee (*Poecile gambeli*), northern flicker (*Colaptes auratus*), American robin (*Turdus migratorius*), western wood-pewee (*Contopus sordidulus*), spotted towhee (*Pipilo maculatus*), acorn woodpecker (*Melanerpes formicivorus*), song sparrow (*Melospiza melodia*), dark-eyed junco (*Junco hyemalis*), red-winged blackbird (*Agelaius phoeniceus*), house wren (*Troglodytes aedon*), and band-tailed pigeon (*Patagioenas fasciata*).

4.2.5 Mammals

The plant communities found within the boundaries of the project site provide suitable foraging and denning habitat for a variety of mammalian species. Most mammal species are nocturnal and are difficult to observe during a diurnal field visit. Mammalian species observed during the field investigation were chipmunk (*Neotomias* sp.), grey squirrel (*Sciurus griseus*), and ground squirrel (*Otospermophilus beecheyi*). Additional mammalian species that have the potential to occur onsite include coyote (*Canis latrans*), opossum (*Didelphis albiventris*), raccoon (*Procyon lotor*), big brown bat (*Eptesicus fuscus*), American black bear (*Ursus americanus*), mule deer (*Odocoileus hemionus*), mountain lion (*Puma concolor*), and bobcat (*Lynx rufus*).

4.4 NESTING BIRDS

No active nests were observed during the field investigation, which was conducted during the nesting season; however, several species were observed exhibiting nesting behaviors. The onsite plant communities provide suitable foraging and nesting habitat for year-round and seasonal avian residents, as well as migrating songbirds that have adapted to the mountains.

Nesting birds are protected pursuant to the Migratory Bird Treaty Act (MBTA) and California Fish and Game Code (Sections 3503, 3503.5, 3511, and 3513 prohibit the take, possession, or destruction of birds, their nests or eggs). If construction occurs between February 1st and August 31st, a pre-construction clearance survey for nesting birds should be conducted within three (3) days of the start of any vegetation removal or ground disturbing activities to ensure that no nesting birds will be disturbed during construction.

4.5 WILDLIFE CORRIDORS AND LINKAGES

Habitat linkages provide links between larger undeveloped habitat areas that are separated by development. Wildlife corridors are similar to linkages but provide specific opportunities for animals to disperse or migrate between areas. A corridor can be defined as a linear landscape feature of sufficient width to allow animal movement between two comparatively undisturbed habitat fragments. Adequate cover is essential for a corridor to function as a wildlife movement area. It is possible for a habitat corridor to be adequate for one species yet inadequate for others. Wildlife corridors are significant features for dispersal, seasonal migration, breeding, and foraging. Additionally, open space can provide a buffer against both human disturbance and natural fluctuations in resources.

According to the San Bernardino County General Plan, Deep Creek and its associated valleys have been identified as a Wildlife Corridor or Linkage. While the named portion of Deep Creek occurs approximately 0.54 miles to the west of the project site, the site supports a tributary to Deep Creek and the site boundaries overlap with the valley that straddles nearby portions of Deep Creek.

Although partially constrained by existing roadway and buildings, the natural habitats on and surrounding the project site allow for local wildlife to move from the project site into the undeveloped areas surrounding the project site in search of food, shelter, or nesting habitat. However, the project site does not function as a major wildlife movement corridor or linkage. As such, implementation of the proposed project is not expected to have a significant impact to wildlife movement opportunities or prevent local wildlife movement through the area since there is ample habitat adjacent to the project site to support wildlife movement opportunities.

4.6 STATE AND FEDERAL JURISDICTIONAL AREAS

There are three key agencies that regulate activities within inland streams, wetlands, and riparian areas in California. The Corps Regulatory Branch regulates discharge of dredge and/or fill materials into “waters of the United States” pursuant to Section 404 of the Federal Clean Water Act (CWA) and Section 10 of the Rivers and Harbors Act. Of the State agencies, the Regional Board regulates discharges into surface waters pursuant to Section 401 of the CWA and the California Porter-Cologne Water Quality Control Act and the CDFW regulates alterations to streambed and associated plant communities pursuant to Section 1602 of the California Fish and Game Code.

The USFWS NWI and the USGS National Hydrography Dataset were reviewed to determine if any blueline streams or riverine resources have been documented within or immediate surrounding the project site. Based on this review, one blue-line stream was identified as occurring within project site boundaries. This blue-line stream is classified as an intermittent seasonally flooded streambed. During the time of the field investigation this stream was inundated with water, and its banks and surrounding area supported a willow riparian plant community. Additionally, several other hydrological resources were observed throughout the project site. In total, three (3) perennial drainage features and four (4) ephemeral drainage features were observed within the boundaries of the project site.

Three (3) perennial drainage features and four (4) ephemeral drainage features were observed within the boundaries of the project site during the field delineation. ELMT carefully assessed the site for depressions,

inundation, presence of hydrophytic vegetation, staining, cracked soil, ponding, and indicators of active surface flow and corresponding physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris. Suspected jurisdictional areas were checked for the presence of definable channels, soils, and hydrology. The drainage features mapped on-site are numbered from west to east as they occur within the project site.

Drainage 1

Drainage 1 corresponds to the mapped riverine resource documented in the NWI query and is the largest and main drainage supported on the project site. This drainage is a perennial creek and traverses the entire site in an overall westerly direction. This drainage enters the northern portion of the eastern boundary and traverses to the southwest and then northwest until exiting the site near the middle of the western boundary. Flows within Drainage 1 are conveyed for approximately 2,964 linear feet before exiting the site. Surface water was present throughout most of Drainage 1. Further evidence of an OHWM was observed via scour, changes in substrate, shelving, and lack of vegetation. The OHWM of Drainage 1 ranged from approximately 2 to 35 feet. Riparian vegetation is supported along most of the middle and eastern portions of Drainage 1. The channel bottom consists of exposed bedrock, cobble, and silty substrates. After flowing off-site, Drainage 1 is a direct tributary to Deep Creek, which occurs approximately 3,560 linear feet downstream to the east.

Drainage 2

Drainage 2 is an ephemeral drainage feature that originates on a south-facing slope in the northwest portion of the project site. This drainage conveys flows south and southwest for approximately 893 linear feet until its confluence with Drainage 1. No surface water was present within Drainage 2. Evidence of an OHWM was observed via scour, changes in substrate, shelving, and lack of vegetation. The OHWM of Drainage 2 ranged from approximately 2 to 20 feet. No riparian vegetation is present within Drainage 2, which only supports upland plant species. This drainage supports a Mixed Conifer Forest and Willow Riparian Woodland plant community similar to that observed in Drainage 1.

Drainage 3

Drainage 3 is an ephemeral drainage feature that originates on a south-facing slope in the northwest portion of the project site. This drainage conveys flows to the southwest for approximately 324 linear feet until its confluence with Drainage 1. No surface water was present within Drainage 2. Evidence of an OHWM was observed via scour, changes in substrate, shelving, and lack of vegetation. The OHWM of Drainage 2 ranged from approximately 2 to 7 feet. No riparian vegetation is present within Drainage 2, which only supports upland plant species. This drainage supports a Mixed Conifer Forest and Willow Riparian Woodland plant community similar to that observed in Drainage 1.

Drainage 4

Drainage 4 is a perennial creek that originates off-site to the north. This drainage enters the eastern portion of the northern boundary of the project site and conveys flows to the southwest until converging with Drainage 1. Flows are conveyed beneath Green Valley Lake Road via a 4-foot-wide culvert into an earthen spillway, which also receives surface flows from Green Valley Lake Road. Flows within Drainage 4 are

conveyed for approximately 1,622 linear feet before entering Drainage 1. Surface water was present throughout Drainage 4. Further evidence of an OHWM was observed via scour, changes in substrate, shelving, and lack of vegetation. The OHWM of Drainage 4 ranged from approximately 2 to 20 feet. Riparian vegetation is supported along the majority of the drainage. The channel bottom consists of exposed bedrock, cobble, and silty substrates. Drainage 4 supports the same Mixed Conifer Forest and Willow Riparian Woodland plant communities observed in Drainage 1.

Drainage 5

Drainage 5 is an ephemeral drainage feature that originates on a south-facing slope in the middle portion of the project site near Green Valley Lake Road. This feature conveys surface flows south and west for approximately 1,504 linear feet until its confluence with Drainage 1. No surface water was present within Drainage 5, although riparian vegetation was present. Evidence of an OHWM was observed via scour, changes in substrate, shelving, and lack of vegetation. The OHWM of Drainage 5 ranged from approximately 2 to 6 feet. This drainage supports a Mixed Conifer Forest and Willow Riparian Woodland plant community similar to that observed in Drainage 1.

Drainage 6

Drainage 6 is an ephemeral drainage feature that originates on a south-facing slope in the middle portion of the project site near Green Valley Lake Road. This feature conveys surface flows southwest for approximately 620 linear feet until its confluence with Drainage 5. No surface water was present within Drainage 5, although riparian vegetation was present. Evidence of an OHWM was observed via scour, changes in substrate, shelving, and lack of vegetation. The OHWM of Drainage 6 ranged from approximately 2 to 4 feet. This drainage supports a Mixed Conifer Forest and Willow Riparian Woodland plant community similar to that observed in Drainage 1.

Drainage 7

Drainage 7 includes both ephemeral and perennial drainage features. The upper limits of Drainage 7 are ephemeral in nature and originate off-site near Green Valley Lake Road, just north of the southeast portion of the project site. Flows are collected from Green Valley Lake Road and are conveyed to the southwest towards a culvert beneath an access road. Just beyond this access road, perennial flows enter the drainage via a series of culverts and are conveyed further southwest until exiting site boundaries and continuing southwest along local topography. No surface water was observed upstream of the access road, but is present just downstream of the access road, where riparian vegetation and a narrow patch of wetland is present. Drainage 7 conveys flows for approximately 1,523 linear feet while within site boundaries. Further evidence of an OHWM was observed via scour, changes in substrate, shelving, changes in vegetation, and static water conditions. The OHWM of Drainage 7 ranged from approximately 2 to 16 feet. Riparian vegetation is supported along the majority of the drainage. The channel bottom consists of exposed bedrock, cobble, and silty substrates. Drainage 7 supports the same Mixed Conifer Forest and Willow Riparian Woodland plant communities observed in Drainage 1. After flowing off-site, Drainage 7 is a direct tributary to Deep Creek, which occurs approximately 1,400 linear feet downstream to the south.

4.7 SPECIAL-STATUS BIOLOGICAL RESOURCES

The CNDDB Rarefind 5, CNDDB Quickview Tool in BIOS and the CNPS Electronic Inventory of Rare and Endangered Vascular Plants of California were queried for reported locations of special-status plant and wildlife species as well as special-status natural plant communities in the *Butler Peak, Harrison Mtn., Keller Peak,* and *Lake Arrowhead* USGS 7.5-minute quadrangles. The habitat assessment evaluated the conditions of the habitat(s) within the boundaries of the project site to determine if the existing plant communities, at the time of the survey, have the potential to provide suitable habitat(s) for special-status plant and wildlife species.

The literature search identified seventy-four (74) special-status plant species, fifty-nine (59) special-status wildlife species, and five (5) special-status plant communities as having the potential to occur within the *Butler Peak, Harrison Mtn., Keller Peak,* and *Lake Arrowhead* quadrangles. Special-status plant and wildlife species were evaluated for their potential to occur within the project boundaries based on habitat requirements, availability and quality of suitable habitat, and known distributions. Species determined to have the potential to occur within the general vicinity are presented in *Table B-1: Potentially Occurring Special-Status Biological Resources*, provide in Appendix D. Refer to Table D-1 for a determination regarding the potential occurrence of special-status plant and wildlife species within the project site.

4.7.1 Special-Status Plants

According to the CNDDB and CNPS, sixty-three (74) special-status plant species have been recorded in *Butler Peak, Harrison Mtn., Keller Peak,* and *Lake Arrowhead* quadrangles (refer to Appendix D). No special-status plant species were observed on-site during the field investigation, which was conducted during the blooming period for most of the special-status plant species known to occur in the vicinity of the site. Based on habitat requirements for the identified special-status species, and known distributions, it was determined that the undeveloped/undisturbed plant communities found within the project site have a low potential to support the following special-status plant species:

- Coville's dwarf abronia (*Abronia nana* var. *covillei*; CNPS 4.2)
- Palmer's mariposa lily (*Caolochortus palmeri* var. *palmeri*; CNPS 1B.2)
- San Bernardino Mountains owl's clover (*Castilleja lasiorhyncha*; CNPS 1B.2))
- Parish's alumroot (*Heuchera parishii*; CNPS 1B.3)
- Lemon lily (*Lilium parryi*; CNPS 1B.2)
- Silky lupine (*Lupinus elatus*; CNPS 4.3)
- Parish's yampah (*Perideridia parishii* ssp. *parishii*; CNPS 2B.2)
- Laguna Mountains jewelflower (*Strepthanthus bernardinus*; CNPS 4.3)
- Southern jewelflower (*Streptanthus campestris*; CNPS 1B.3)

None of the aforementioned special-status plant species are federally or state listed as endangered or threatened but are listed as CNPS Rare Plant Rank Species.

4.7.2 Special-Status Wildlife

According to the CNDDB, fifty-nine (59) special-status wildlife species have been reported in the *Butler Peak, Harrison Mtn., Keller Peak,* and *Lake Arrowhead* quadrangles (refer to Appendix C). Based on habitat requirements for the identified special-status species, and known distributions, it was determined that the project site has the potential to support the following special-status wildlife species:

- Cooper's hawk (*Accipiter cooperii*)
- arroyo toad (*Anaxyrus californicus*)
- golden eagle (*Aquila chrysaetos*)
- long-eared owl (*Asio otus*)
- San Bernardino golden-mantled ground squirrel (*Callospermophilus lateralis bernardinus*)
- Southern rubber boa (*Charina umbratica*)
- Olive-sided flycatcher (*Contopus cooperi*)
- San Bernardino flying squirrel (*Glaucomys oregonensis californicus*)
- Bald eagle (*Haliaeetus leucocephalus*)
- White-eared pocket mouse (*Perognathus alticola alticola*)
- Purple martin (*Progne subis*)
- California spotted owl (*Strix occidentalis occidentalis*)
- Two-striped gartersnake (*Thamnophis hammondii*)

Of the afformentioned species, arroyo toad is listed as federally endangered; golden eagle is federally protected, southern rubber boa is listed as threatened in California, and bald eagle is listed as endangered in California and is federally protected.

The tall, mature trees provide suitable nesting habitat for both golden eagle and bald eagle, and the open, disturbed areas scattered throughout the project site provide hunting opportunities for both raptor species. Additionally, bald eagle has been observed nearby. Neither of these species were observed within the project site at the time of the investigation. However, out of an abundance of caution, a preconstruction nesting bird clearance survey should be conducted prior to ground disturbance to ensure impacts to golden eagle and bald eagle do not occur as a result of project implementation.

Based on regional significance and listing status, the potential occurrence of California spotted owl, southern rubber boa, and San Bernardino flying squirrel are described in further detail below.

California spotted owl

The California spotted owl has been designated by the CDFW as a species of special concern and is also considered a sensitive species in the San Bernardino National Forest by the U.S. Forest Service. The California spotted owl is distributed across the Sierra Nevada from Shasta County to Kern County, and along coastal southern California mountain ranges from Monterey County to San Diego County. In the San Bernardino Mountains, California spotted owl nests in mixed conifer habitat, oak/ Douglas-fir habitat, and hardwood/conifer habitat. In the San Bernardino Mountains, the average elevation of occupied nest habitat is at 6,000 feet. Home ranges in the San Bernardino Mountains vary from approximately 800 acres to 2,200

acres. Eighty percent of nesting trees have canopy cover greater than 70 percent, with surrounding nesting habitat having at least two canopy layers. Nest trees often contain large cavities, broken tops, and/or dwarf mistletoe brooms. In southern California conifer forest, stick nests placed on platforms built by other species are most common. In coniferous forests, such as that on-site, large snags and fallen logs are typically present in nesting habitat; this appears to be less important in lower-elevation nesting habitat. Nesting trees are on average 37 inches diameter at breast height in the San Bernardino Mountains and are typically on north-facing slopes where temperatures tend to be cooler. While California spotted owls may forage in the same habitat that they use for nesting and roosting, foraging habitat is often much more open, with canopy cover as low as 40 percent to provide large amounts of open space for flying. Although the California spotted owl will forage opportunistically on a variety of different prey species, their primary prey (79 to 97 percent) is woodrats (typically dusky-footed woodrat [*Neotoma fuscipes*]).

The project site supports high quality habitat and generally primarily consists of undisturbed forested areas along with areas which have undergone varying levels of disturbance in association with campground development and recreational areas. The canopy varies in density, but there are many areas with closed canopy which is favorable for cover for the species. Additionally, there are many trees that are both tall and mature enough to provide nesting cavities and perching opportunities for this species. Therefore, it was determined that there is a high potential for California spotted owl to occur onsite.

The proposed project will be installed adjacent to previously disturbed areas that do not provide as high of quality habitat for spotted owl as the undeveloped areas on the periphery of the project site. Prior to implementation of each phase of the project, a clearance survey should be conducted to ensure spotted owl remain absent from the project site.

Southern rubber boa

The southern rubber boa (SRB) has been designated by the CDFW as a threatened species under the California Endangered Species Act and is also considered a sensitive species in the San Bernardino National Forest by the U.S. Forest Service. SRB inhabits oak-conifer and mixed-conifer forests at elevations between 5,000 to 8,200 feet where rocks and logs or other debris provide shelter. It is semi-fossorial with either nocturnal or crepuscular tendencies, making it difficult to find in a general diurnal field survey. It is restricted to the San Bernardino and San Jacinto Mountains. They emerge from hibernation in April and general disappear during the summer months though they can appear after rains or periods of high humidity (Stewart et. al. 2005). Hoyer and Stewart (2000) found that almost all collections of SRB were on or around small to large rock outcrops which are important for hibernacula.

The periphery of the project stie supports rock outcrops suitable for hibernacula and other debris for shelter. Therefore, it was determined that the undisturbed areas on the project site has a moderate potential to support southern rubber boa. The proposed project will be installed adjacent to previously disturbed areas that do not provide as high of quality habitat for southern rubber boa as the undeveloped areas on the periphery of the project site. The proposed project will be installed adjacent to previously disturbed areas that do not provide suitable habitat for southern rubber boa.

San Bernardino flying squirrel

The San Bernardino flying squirrel is not a listed species by USFWS or CDFW. However, CDFW has designated San Bernardino flying squirrel a species of special concern. It is also considered a sensitive species in the San Bernardino National Forest by the U.S. Forest Service. The historic distribution of the San Bernardino flying squirrel includes both the San Bernardino and San Jacinto Mountains. Recent data analysis suggests that this subspecies may now only be extant in the San Bernardino Mountains. The San Bernardino flying squirrel is nocturnal and is rarely observed. It occurs in a range of coniferous and deciduous forests, including riparian forests and mixed conifer forests. They are usually found in mature old-growth forests, although forests with second-growth stands may also suffice. Occupied habitat tends to have an open understory with a heavy duff (organic debris) layer and a somewhat closed canopy. For locomotion/gliding purposes, they require somewhat dense tree cover (less than 120 feet between tall trees and preferably around 65 feet). Trees with snags and cavities suitable for nesting and denning are required, and trees that are greater than 100 feet tall and greater than 30 inches diameter at breast height are preferred. The San Bernardino flying squirrel depends strongly on truffles and arboreal moss for food, as well as to a much lesser degree seeds, nuts, insects, fruit, bird eggs, and even tree sap. Larger, older trees with associated woody debris and decaying logs tend to indicate a higher potential for healthy truffle growth in the underlying soil.

The project site consists primarily of heavily forested, undisturbed areas with a dense canopy with larger, older trees which provide suitable nesting, denning, and gliding habitat for flying squirrel. Additionally, the understory in these areas in composed of adequate woody debris which provides suitable habitat for moss and truffle for flying squirrel to forage. Due to the high quality of onsite habitat and the occurrence of San Bernardino flying squirrel in nearby areas, it was determined that the project site has a high potential to support San Bernardino flying squirrel.

The proposed project will be installed adjacent to previously disturbed areas that do not provide as high of quality habitat for San Bernardino flying squirrel as the undeveloped areas on the periphery of the project site. Prior to implementation of each phase of the project, a clearance survey should be conducted to ensure San Bernardino flying squirrel remain absent from the project site.

4.7.3 Special-Status Plant Communities

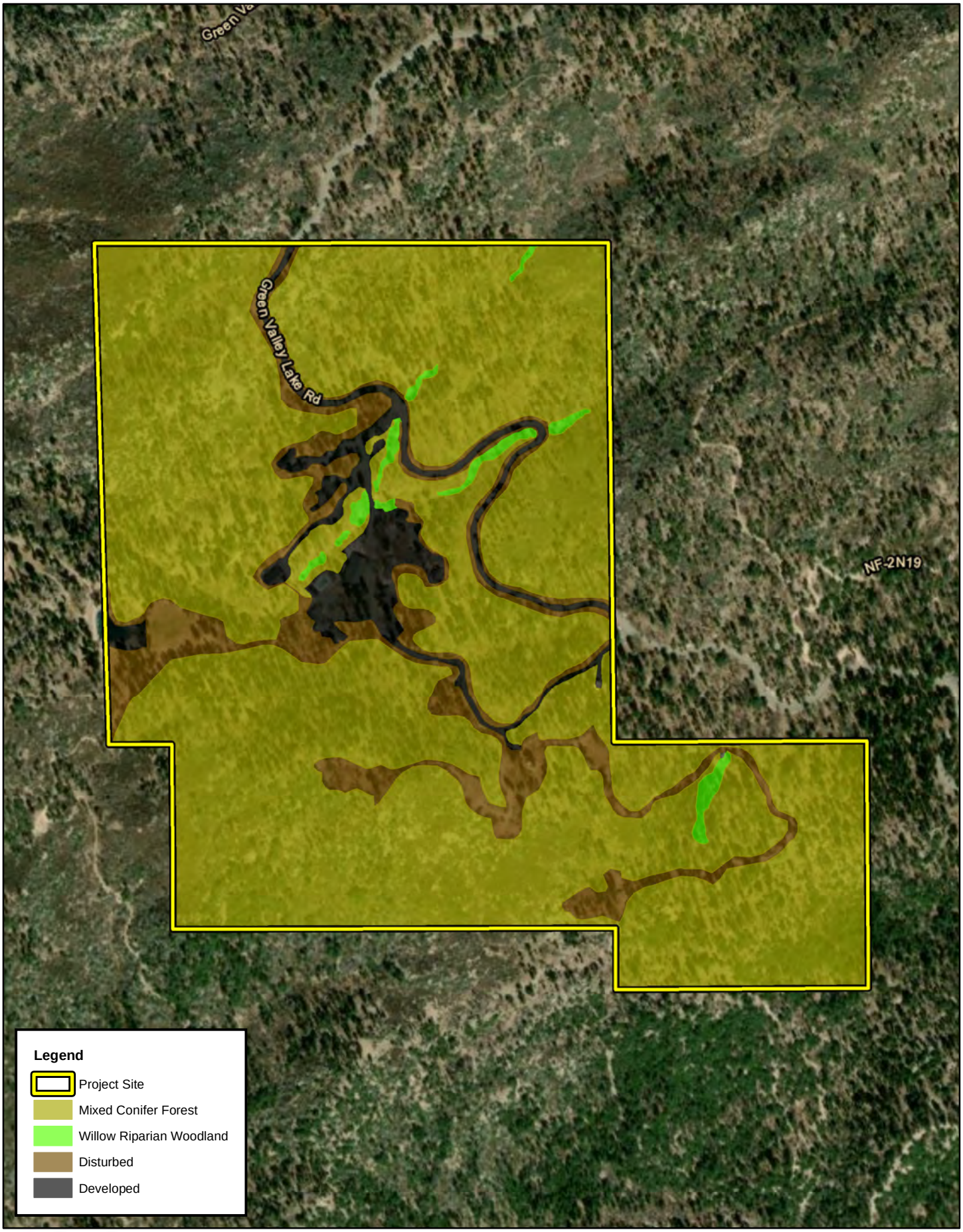
According to the CNDDB, five (5) special-status plant community has been reported in the *Butler Peak, Harrison Mtn., Keller Peak,* and *Lake Arrowhead* quadrangles: Mixed Montane Chaparral, Riversidian Alluvial Fan Sage Scrub, Southern Mixed Riparian Forest, Southern Sycamore Alder Riparian Woodland, and Westside Ponderosa Pine Forest. No special-status plant communities were observed on-site.

4.8 CRITICAL HABITAT

Under the federal Endangered Species Act, "Critical Habitat" is designated at the time of listing of a species or within one year of listing. Critical Habitat refers to specific areas within the geographical range of a species at the time it is listed that include the physical or biological features that are essential to the survival and eventual recovery of that species. Maintenance of these physical and biological features requires special management considerations or protection, regardless of whether individuals or the species are present or

not. All federal agencies are required to consult with the United States Fish and Wildlife Service (USFWS) regarding activities they authorize, fund, or permit which may affect a federally listed species or its designated Critical Habitat. The purpose of the consultation is to ensure that projects will not jeopardize the continued existence of the listed species or adversely modify or destroy its designated Critical Habitat. The designation of Critical Habitat does not affect private landowners, unless a project they are proposing is on federal lands, uses federal funds, or requires federal authorization or permits (e.g., funding from the Federal Highways Administration or a CWA Permit from the Corps). If a there is a federal nexus, then the federal agency that is responsible for providing the funding or permit would consult with the USFWS.

The project site is not located within federally designated Critical Habitat. The nearest Critical Habitat to the site occurs approximately 2.5 miles to the east for ash-grey paintbrush (*Castilleja cinerea*), 3.2 miles to the north for southwestern willow flycatcher (*Empidonax traillii extimus*), and 3.3 miles to the west for mountain yellow-legged frog (*Rana muscosa*) (Exhibit 6, *Critical Habitat*). Therefore, no impacts to federally designated Critical Habitat will occur from implementation of the proposed project.



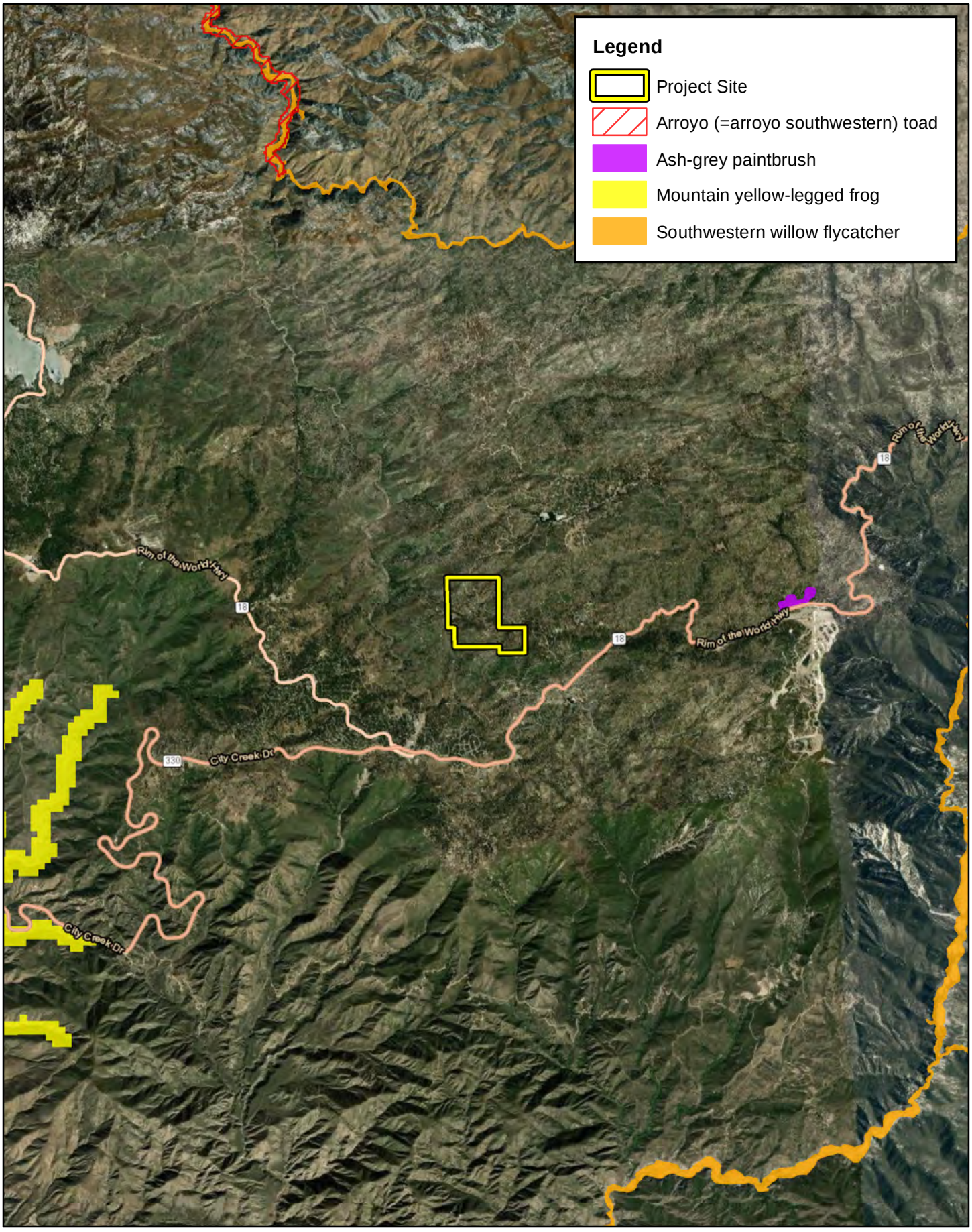
ELMT CONSULTING

HUME SO CAL CAMPGROUND PROJECT

Vegetation

Source: ESRI Aerial Imagery, San Bernardino County

Exhibit 5



ELMT CONSULTING

0 0.5 1 2 Miles

Source: ESRI Aerial Imagery, USFWS Critical Habitat, San Bernardino County

HUME SO CAL CAMPGROUND PROJECT

Critical Habitat

Exhibit 6

Section 5 Conclusion and Recommendations

The discussion below provides a summary of survey results; avoidance and minimization efforts; direct, indirect, and cumulative project impacts; and compensatory mitigation measures for each biological resource area required to be analyzed:

Special-Status Plant Species

No special-status plant species were observed during the field investigation. Based on habitat requirements for the identified special-status species, known species distributions, and the quality and availability of habitats present, it was determined that the project site has the potential to support the following species:

- Coville's dwarf abronia (CNPS 4.2)
- Palmer's mariposa lily (CNPS 1B.2)
- San Bernardino Mountains owl's clover (CNPS 1B.2))
- Parish's alumroot (CNPS 1B.3)
- Lemon lily (CNPS 1B.2)
- Silky lupine (CNPS 4.3)
- Parish's yampah (CNPS 2B.2)
- Laguna Mountains jewelflower (CNPS 4.3)
- Southern jewelflower (CNPS 1B.3)

None of the aforementioned special-status plant species are federally or state listed as endangered or threatened. They are designated with CNPS Rare Plant Ranks 4.2, 4.3, 2B.2, 1B.2, and 1B.3. As such, if any of the aforementioned special-status plant species were observed onsite, their small isolated populations would not contribute meaningfully to the conservation of their relative species. No focused surveys are recommended.

Special-Status Wildlife Species

Based on habitat requirements for the identified special-status species, and known distributions, it was determined that the project site has the potential to support the following special-status wildlife species:

- Cooper's hawk
- arroyo toad
- golden eagle
- long-eared owl
- San Bernardino golden-mantled ground squirrel
- Southern rubber boa
- Olive-sided flycatcher
- San Bernardino flying squirrel
- Bald eagle
- White-eared pocket mouse
- Purple martin

- California spotted owl
- Two-striped gartersnake

Of the afformentioned species, arroyo toad is listed as federally endangered; golden eagle is federally protected, southern rubber boa is listed as threatened in California, and bald eagle is listed as endangered in California and is federally protected.

In order to ensure no impacts to nesting birds, including Cooper's hawk, golden eagle, long-eared owl, olive-sided flycatcher, bald eagle, purple martin, and California spotted owl do not occur, the following avoidance and minimization measure will need to be implemented prior to project implementation.

Migratory Bird Treaty Act and Fish and Game Code

In order to avoid violation of the Migratory Bird Treaty Act (MBTA) and the California Fish and Game Code, site-preparation activities (removal of trees and vegetation) for all projects shall be avoided, to the greatest extent possible, during the nesting season (generally February 1 to August 31) of potentially occurring native and migratory bird species. If project development are proposed during the nesting/breeding season (February 1 to August 31), a pre-activity field survey shall be conducted by a qualified biologist prior to ground disturbance to determine if active nests of species protected by the MBTA or the California Fish and Game Code are present in the construction zone. If active nests are not located within the implementing project site and an appropriate buffer of 500 feet of an active listed species or raptor nest, 300 feet of other sensitive or protected bird nests (nonlisted), or 100 feet of sensitive or protected songbird nests, construction may be conducted during the nesting/breeding season. However, if active nests are located during the pre-activity field survey, no grading or heavy equipment activity shall take place within at least 500 feet of an active listed species or raptor nest, 300 feet of other sensitive or protected (under MBTA or California Fish and Game Code) bird nests (nonlisted), or within 100 feet of sensitive or protected songbird nests until the nest is no longer active.

Riparian Habitat and Special-Status Natural Communities

A total of seven (7) drainage features (Drainages 1-7) were observed within the boundaries of the project site during the field delineation. The on-site drainage features, after flowing off-site, flow into Deep Creek before ultimately flowing into the Mojave River. Therefore, the onsite drainage features would qualify as waters of the United States under the jurisdiction of the Corps, and would qualify as "waters of the State" under the regulatory authority of the Regional Board and CDFW. Based on the proposed project footprint, all of the onsite jurisdictional areas will be avoided, and no impacts will occur.

Wildlife Corridors

According to the San Bernardino County General Plan, Deep Creek and its associated valleys have been identified as a Wildlife Corridor or Linkage. While the named portion of Deep Creek occurs approximately 0.54 miles to the west of the project site, the site supports a tributary to Deep Creek and the site boundaries overlap with the valley that straddles nearby portions of Deep Creek.

Proposed project development would be confined to project site boundaries and areas adjacent to current onsite development. Therefore, project activities are not expected to significantly impact the capacity of Deep Creek to support wildlife movement.

Local, Regional, and State Plans

The project site is not located within an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state Habitat Conservation Plan. Therefore, impacts to any local, regional, or state habitat conservation plans are not expected to occur from development of the proposed project, and mitigation is not required.

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Appendix A Site Plans

ROBERT C. STEVENS
Planning — Graphic Design — Development Consulting
21 Beaverbrook Road — West Simsbury, Connecticut 06092





LEGEND
- PROPERTY LINE
- EXISTING CONTOUR
- EXISTING WATER COURSE
- EXISTING WELL - ACTIVE
- EXISTING WELL ABANDONED
- EXISTING ASPHALT PAVEMENT
- PROPOSED ASPHALT PAVEMENT
- EXISTING BUILDING
- PROPOSED BUILDING



SCALE: 1"=200'

JAN. 9, 2023

Hume Lake CHRISTIAN CAMPS

HUME SoCal
GREEN VALLEY LAKE, CALIFORNIA

PRELIMINARY PLAN

HUME

Appendix B Site Photographs



Photograph 1: From Green Valley Lake Road, looking northeast through a drainage present in the northeastern portion of the project site.



Photograph 2: From the northwest area of the project site, looking west at Green Valley Lake Road and additional areas of the project site beyond.



Photograph 3: From Green Valley Lake Road looking east through a heavily wooded area within the northeast portion of the project site.



Photograph 4: From an area along the northern boundary, looking south through a forested area of the project site.



Photograph 5: Depicting a water tower and surrounding forested area off Smokey Way, along the eastern boundary of the project site.



Photograph 6: From Smokey Way in the middle of the eastern boundary, looking south through a forested area adjacent to Green Valley Lake Road.



Photograph 7: From within a drainage in the southeast portion of the project site, looking north through the site.



Photograph 8: From an unnamed road in the middle of the southern portion of the project site, looking northwest through a disturbed area.



Photograph 9: From an unnamed road in the middle of the southern portion of the project site, looking south through a forested area of the project site, and beyond the southern boundary.



Photograph 10: An installed pond and outdoor recreational-use structures and surrounding facilities near the western boundary of the project site.



Photograph 11: A maintained sports field and surrounding disturbed areas near the western boundary of the project site.



Photograph 12: From the western boundary of the project site, looking north through a canyon with a significant decline in elevation.



Photograph 13: From a drainage central to the project site, looking south through riparian vegetation.



Photograph 13: From the western bank of Drainage 1, looking south though surrounding riparian vegetation.



Photograph 13: From within Drainage 1, looking north.



Photograph 14: From the entrance to the campgrounds off of Green Valley Road, looking northeast through a culvert that feeds into Drainage 1.



Photograph 14: From the upper southwest corner of the project site, looking northeast through an unnamed access road that runs through the site.

Appendix C Potentially Occurring Special-Status Biological Resources

Table C-1: Potentially Occurring Special-Status Biological Resources

Scientific Name Common Name	**Status**	**Habitat**	**Observed Onsite**	**Potential to Occur**
SPECIAL-STATUS WILDLIFE SPECIES				
Accipiter cooperii Cooper's hawk	Fed: None CA: WL	Generally, found in forested areas up to 3,000 feet in elevation, especially near edges and rivers. Prefers hardwood stands and mature forests, but can be found in urban and suburban areas where there are tall trees for nesting. Common in open areas during nesting season.	No	**Low** The project site occurs outside of the typical elevation range for this species. However, Cooper's hawk have been observed nearby.
Aimophila ruficeps canescens southern California rufous-crowned sparrow	Fed: None CA: WL	Typically found between 3,000 and 6,000 feet in elevation. Breed in sparsely vegetated shrublands on hillsides and canyons. Prefers coastal sage scrub dominated by California sagebrush (*Artemisia californica*), but can also be found breeding in coastal bluff scrub, low-growing serpentine chaparral, and along the edges of tall chaparral habitats.	No	**Presumed Absent:** No suitable habitat is present within the project site.
Anaxyrus californicus arroyo toad	Fed: **END** CA: SSC	Occurs in semi-arid regions near washes or intermittent streams, including valley-foothill grasslands, desert riparian, desert washes, and oak woodlands. Breeding habitat consists of shallow streams with a mixture of sandy and gravelly substrate and sandy terraces. Generally requires mulefat (*Baccharis salicifolia*) and willow (Salix sp.) in the streambed for vegetative canopy for breeding areas and forages for insects primarily under oak (*Quercus* sp.), cottonwood (*Populus fremontii*), and sycamore (*Platanus racemosa*) trees. Occurs at elevations from near sea level to about 4,600 feet above msl.	No	**Low** The project site occurs outside of the typical elevation range for this species. However, the project site does provide suitable habitat, and arroyo toad have been observed nearby.
Anniella stebbinsi southern California legless lizard	Fed: None CA: SSC	Locally abundant specimens are found in coastal sand dunes and a variety of interior habitats, including sandy washes and alluvial fans. A large, protected population persists in the remnant of the once extensive El Segundo Dunes at Los Angeles International Airport.	No	**Presumed Absent:** No suitable habitat is present within the project site.
Aquila chrysaetos golden eagle	Fed: None CA: FP; WL	Occupies nearly all terrestrial habitats of the western states except densely forested areas. Favors secluded cliffs with overhanging ledges and large trees for nesting and cover. Hilly or mountainous country where takeoff and soaring are supported by updrafts is generally preferred to flat habitats. Deeply cut canyons rising to open mountain slopes and crags are ideal habitat.	No	**Moderate** The project site and surrounding area provide suitable foraging and nesting habitat for the species.
Ardea herodias great blue heron	Fed: None CA: None	Fairly common all year throughout most of California, in shallow estuaries and fresh and saline emergent wetlands. Less common along riverine and rocky marine shores, in croplands, pastures, and in mountains about foothills.	No	**Presumed Absent** There is no suitable habitat present within or adjacent to the project site.
Arizona elegans occidentalis California glossy snake	Fed: None CA: SSC	Inhabits arid scrub, rocky washes, grasslands, and chaparral habitats.	No	**Presumed Absent:** No suitable habitat is present within the project site.
Artemisiospiza belli belli Bell's sage sparrow	Fed: None CA: WL	Occurs in chaparral dominated by fairly dense stands of chamise. Also found in coastal sage scrub in south of range.	No	**Presumed Absent:** No suitable habitat is present within the project site.

Scientific Name Common Name	**Status**	**Habitat**	**Observed Onsite**	**Potential to Occur**
Asio otus long-eared owl	Fed: None CA: SSC	Nests in conifer, oak, riparian, pinyon-juniper, and desert woodlands that are either open or are adjacent to grasslands, meadows, or shrublands. Key habitat components are some dense cover for nesting and roosting, suitable nest platforms, and open foraging areas.	No	**Low:** The project site provides suitable nesting and cover habitat for this species; however, it lacks the open foraging areas.
Aspidoscelis tigris stejnegeri coastal whiptail	Fed: None CA: SSC	Found in a variety of ecosystems, primarily hot and dry open areas with sparse foliage - chaparral, woodland, and riparian areas.	No	**Presumed Absent:** No suitable habitat is present within the project site.
Athene cunicularia burrowing owl	Fed: None CA: SSC	Primarily a grassland species, but it persists and even thrives in some landscapes highly altered by human activity. Occurs in open, annual or perennial grasslands, deserts, and scrublands characterized by low-growing vegetation. The overriding characteristics of suitable habitat appear to be burrows for roosting and nesting and relatively short vegetation with only sparse shrubs and taller vegetation.	No	**Presumed Absent:** No suitable habitat is present within the project site.
Bombus crotchii Crotch bumble bee	Fed: None CA: None	Exclusive to coastal California east towards the Sierra-Cascade Crest; less common in western Nevada. Inhabit grasslands and scrub areas. Require hot, dry environment. Nests underground, often in abandoned rodent dens.	No	**Presumed Absent:** No suitable habitat is present within the project site.
Bombus morrisoni Morrison bumble bee	Fed: None CA: None	Occurs throughout the west from California, east of the Sierra-Cascade Ranges, to southern British Columbia; east to New Mexico, Texas, and north to western South Dakota. Dependent on habitats with rich floral resources throughout the nesting season.	No	**Presumed Absent:** No suitable habitat is present within the project site.
Callospermophilus lateralis bernardinus San Bernardino golden-mantled ground squirrel	Fed: None CA: None	Inhabits mountain slopes and foothills, chaparral, open areas in pine, spruce, and fir forests, rocky outcroppings and slides, margins of mountain meadows, and rocky sagebrush country; campgrounds. Often in areas with abundant stumps, rocks, or fallen logs.	No	**Low** Limited habitat is present within the project site.
Calypte costae Costa's hummingbird	Fed: None CA: None	Desert and semi-desert, arid brushy foothills and chaparral. A desert hummingbird that breeds in the Sonoran and Mojave Deserts. Departs desert heat moving into chaparral, scrub, and woodland habitats.	No	**Presumed Absent:** No suitable habitat is present within the project site.
Catostomus santaanae Santa Ana sucker	Fed: **THR** CA: None	Occur in the watersheds draining the San Gabriel and San Bernardino Mountains of southern California. Steams that Santa Ana Sucker inhabit are generally perennial streams with water ranging in depth from a few inches to several feet and with currents ranging from slight to swift.	No	**Presumed Absent:** No suitable habitat is present within the project site.
Chaetodipus fallax fallax northwestern San Diego pocket mouse	Fed: None CA: SSC	Occurs in desert and coastal habitats in southern California, Mexico, and northern Baja California, from sea level to at least 4,596 feet above msl. Found in a variety of temperate habitats ranging from chaparral and grasslands to scrub forests and deserts. Requires low growing vegetation or rocky outcroppings, as well as sandy soils for burrowing.	No	**Presumed Absent:** No suitable habitat is present within the project site and the project site is out of the elevation range for this species.
Chaetodipus fallax pallidus pallid San Diego pocket mouse	Fed: None CA: SSC	Common resident of sandy herbaceous areas, usually in association with rocks or course gravel in southwestern California. Occurs mainly in arid coastal and desert border areas. Habitats include coastal scrub, chamise-redshank chaparral, mixed chaparral, sagebrush, desert wash, desert scrub, desert succulent shrub, pinyon-juniper, and annual grassland.	No	**Presumed Absent:** No suitable habitat is present within the project site.

Scientific Name Common Name	**Status**	**Habitat**	**Observed Onsite**	**Potential to Occur**
Charina umbratica southern rubber boa	Fed: None CA: **THR**	Found in a variety of montane forest habitats, particularly in the vicinity of streams or wet meadows. Requires loose, moist soil for burrowing and seeks cover in rotting logs. Restricted to the San Bernardino and San Jacinto Mountains.	No	**Moderate** Suitable habitat is present within the undisturbed northeast and western portions of the project site in association with rock outcrops, rotten logs, leaf litter, and the mesic habitat on the forested slopes and drainage.
Coccyzus americanus occidentalis western yellow-billed cuckoo	Fed: **THR** CA: **END**	In California, the breeding distribution is now thought to be restricted to isolated sites in Sacramento, Amargosa, Kern, Santa Ana, and Colorado River valleys. Obligate riparian species with a primary habitat association of willow-cottonwood riparian forest.	No	**Presumed Absent:** No suitable habitat is present within the project site.
Contopus cooperi olive-sided flycatcher	Fed: None CA: SSC	Uncommon to common, summer resident in a wide variety of forest and woodland habitats below 9,000 feet throughout California exclusive of the deserts, the Central Valley, and other lowland valleys and basins. Preferred nesting habitats include mixed conifer, montane hardwood-conifer, Douglas-fir, redwood, red fir, and lodgepole pine.	No	**High:** The project site provides suitable nesting habitat for this species.
Diadophis punctatus modestus San Bernardino ringneck snake	Fed: None CA: None	Common in open, relatively rocky areas within valley-foothill, mixed chaparral, and annual grass habitats.	No	**Presumed Absent** There is no suitable habitat present within or adjacent to the project site.
Dipodomys merriami parvus San Bernardino kangaroo rat	Fed: **END** CA: CE; SSC	Primarily found in Riversidian alluvial fan sage scrub and sandy loam soils, alluvial fans and flood plains, and along washes with nearby sage scrub. May occur at lower densities in Riversidian upland sage scrub, chaparral and grassland in uplands and tributaries in proximity to Riversidian alluvial fan sage scrub habitats. Tend to avoid rocky substrates and prefer sandy loam substrates for digging of shallow burrows.	No	**Presumed Absent:** No suitable habitat is present within the project site.
Dipodomys simulans Dulzura kangaroo rat	Fed: None CA: None	Relatively common in chaparral, coastal sage scrub, Riversidean alluvial fan sage scrub, and peninsular juniper woodland habitats.	No	**Presumed Absent** There is no suitable habitat present within or adjacent to the project site. On-site soils are rocky and have been mixed and heavily compacted by historic land uses.
Empidonax traillii willow flycatcher	Fed: None CA: **END**	A rare to locally uncommon, summer resident in wet meadow and montane riparian habitats (2,000 to 8,000 feet) in the Sierra Nevada and Cascade Range. Most often occurs in broad, open river valleys or large mountain meadows with lush growth of shrubby willows.	No	**Presumed Absent:** No suitable habitat is present within the project site.
Empidonax traillii extimus southwestern willow flycatcher	Fed: **END** CA: **END**	Occurs in riparian woodlands in southern California. Typically requires large areas of willow thickets in broad valleys, canyon bottoms, or around ponds and lakes. These areas typically have standing or running water, or are at least moist.	No	**Presumed Absent:** No suitable habitat is present within the project site.

Scientific Name Common Name	**Status**	**Habitat**	**Observed Onsite**	**Potential to Occur**
Euchloe hyantis andrewsi Andrew's marble butterfly	Fed: None CA: None	Inhabits yellow pine forests near Lake Arrowhead and Big Bear Lake at elevations between 5,000 and 6,000 feet. Uses Laguna Mountains jewelflower (*Streptanthus bernardinus*) and pine rockcress (*Arabis holboelli var. pinetorum*) as host plants; larvae feed on mountain tansy mustard (*Descurainia incana*).	No	**Presumed Absent** No suitable habitat is present within or adjacent to the project site.
Eumops perotis californicus western mastiff bat	Fed: None CA: SSC	Primarily a cliff-dwelling species, roost generally under exfoliating rock slabs. Roosts are generally high above the ground, usually allowing a clear vertical drop of at least three meters below the entrance for flight. In California, it is most frequently encountered in broad open areas. Its foraging habitat includes dry desert washes, flood plains, chaparral, oak woodland, open ponderosa pine forest, grassland, and agricultural areas.	No	**Presumed Absent:** No suitable habitat is present within the project site.
Euphilotes baueri Bauers dotted-blue	Fed: None CA: None	Its habitat is dry slopes and desert flats with scattered short brush where the larval host plants, various wild buckwheats, grow. Adults drink nectar, particularly from buckwheat. Eggs are laid singly on host plant flowers. Caterpillars eat flowers and seeds of host plants and are tended by ants. Chrysalids hibernate in sand or leaf litter	No	**Presumed Absent:** No suitable habitat is present within the project site.
Gila orcuttii arroyo chub	Fed: None CA: SSC	Warm streams of the Los Angeles Plain, which are typically muddy torrents during the winter, and clear quiet brooks in the summer, possibly drying up in places. They are found both in slow-moving and fast-moving sections, but generally deeper than 40 cm.	No	**Presumed Absent:** No suitable habitat is present within the project site.
Glaucomys oregonensis californicus San Bernadino flying squirrel	Fed: None CA: SSC	Occurs in white fir (*Abies concolor*) and Jeffrey pine (*Pinus jeffreyi*) mixed conifer forests with black oak (*Quercus kelloggii*) components at higher elevations. Use cavities in large trees, snags, and logs for cover. Habitats are typically mature, dense conifer forest in close proximity to riparian areas.	No	**High:** Suitable habitat can be found throughout the project site. This species was observed nearby.
Gopherus agassizii Mojave desert tortoise	Fed: **THR** CA: **THR**	Occurs in desert scrub, desert wash, and Joshua tree habitats with friable, sandy, well-drained soils for nest and burrow construction. Highest densities occur in creosote bush scrub with extensive annual wildflower blooms and succulents with little to no non-native plant species.	No	**Presumed Absent:** No suitable habitat is present within the project site.
Gymnogyps californianus California condor	Fed: **END** CA: **END**; FP	Permanent resident of the semi-arid, rugged mountain ranges surrounding the southern San Joaquin Valley, including the Coast Ranges from Santa Clara Co. south to Los Angeles Co., the Transverse Ranges, Tehachapi Mts., and southern Sierra Nevada. Forages over wide areas of open rangelands, roots on cliffs and in large trees and snags.	No	**Presumed Absent:** No suitable habitat is present within the project site.
Haliaeetus leucocephalus bald eagle	Fed: Delisted CA: **END**; FP	Found along the ocean shore, lake margins, and on rivers, where it both nests and winters, typically within one mile of water. Nests in large, old-growth, or dominant live trees with open branches, favoring ponderosa pines. Roosts communally in winter.	No	**High:** Suitable nesting habitat can be found throughout the project site. Additionally, this species has been observed nesting and foraging within the vicinity of Lake Arrowhead.
Lanius ludovicianus loggerhead shrike	Fed: None CA: SSC	Often found in broken woodlands, shrublands, and other habitats. Prefers open country with scattered perches for hunting and fairly dense brush for nesting.	No	**Presumed Absent:** No suitable habitat is present within the project site.

Scientific Name Common Name	**Status**	**Habitat**	**Observed Onsite**	**Potential to Occur**
Lasiurus xanthinus western yellow bat	Fed: None CA: SSC	Roosts in palm trees in foothill riparian, desert wash, and palm oasis habitats with access to water for foraging.	No	**Presumed Absent:** No suitable habitat is present within the project site.
Myotis yumanensis Yuma myotis	Fed: None CA: None	Found in forests and woodlands near water. Roosts in caves, buildings, mines, and crevices.	No	**Presumed Absent:** No suitable habitat is present within the project site.
Neotamias speciosus speciosus lodgepole chipmunk	Fed: None CA: None	Occurs in open-canopy forests of mixed conifer and pine, and occasionally in chaparral.	Yes	**Present** Species was observed onsite during the investigation.
Neotoma lepida intermedia San Diego desert woodrat	Fed: None CA: SSC	Occurs in coastal scrub communities between San Luis Obispo and San Diego Counties. Prefers moderate to dense canopies, and especially rocky outcrops.	No	**Presumed Absent:** No suitable habitat is present within the project site.
Nyctinomops femorosaccus pocketed free-tailed bat	Fed: None CA: SSC	Often found in pinyon-juniper woodlands, desert scrub, desert succulent shrub, desert riparian, desert wash, alkali desert scrub, Joshua tree, and palm oasis.	No	**Presumed Absent:** No suitable habitat is present within the project site.
***Oncorhynchus mykiss irideus* pop. 10** steelhead – southern california DPS	Fed: **END** CA: CE	Found in permanent coastal streams from San Diego to the Smith River.	No	**Presumed Absent** There is no suitable habitat present within or adjacent to the project site.
Perognathus alticola alticola white-eared pocket mouse	Fed: None CA: SSC	Endemic to the San Bernadino and Tehachapi Mountains. Found in isolated montane areas among ponderosa and Jeffrey pine habitats, but sometimes found in mixed chaparral and sagebrush habtitats as well as in fallow fields dominated by Russian thistle. Forages in open ground and beneath shrubs.	No	**Low:** The project site provides suitable habitat for this species; however, it has not been documented in the vicinity of the project site since 1938. Additionally, this species was not found during previous trapping surveys (2001 and 2003)
Perognathus longimembris brevinasus Los Angeles pocket mouse	Fed: None CA: SSC	Occurs in lower elevation grasslands and coastal sage scrub communities in and around the Los Angeles Basin. Prefers open ground with fine sandy soils. May not dig extensive burrows, but instead will seek refuge under weeds and dead leaves instead.	No	**Presumed Absent:** No suitable habitat is present within the project site.
Phrynosoma blainvillii coast horned lizard	Fed: None CA: SSC	Occurs in a wide variety of vegetation types including coastal sage scrub, annual grassland, chaparral, oak woodland, riparian woodland and coniferous forest. In inland areas, this species is restricted to areas with pockets of open microhabitat, created by disturbance (i.e. fire, floods, roads, grazing, fire breaks). The key elements of such habitats are loose, fine soils with a high sand fraction; an abundance of native ants or other insects; and open areas with limited overstory for basking and low, but relatively dense shrubs for refuge.	No	**Presumed Absent:** No suitable habitat is present within the project site.
Piranga rubra summer tanager	Fed: None CA: SSC	Breeds primarily in mature riparian woodland with an extensive canopy of Fremont cottonwood (*Populus fremontii*).	No	**Presumed Absent:** No suitable habitat is present within the project site.

Scientific Name Common Name	**Status**	**Habitat**	**Observed Onsite**	**Potential to Occur**
Polioptila californica californica coastal California gnatcatcher	Fed: **THR** CA: SSC	Obligate resident of sage scrub habitats that are dominated by California sagebrush. This species generally occurs below 750 feet elevation in coastal regions and below 1,500 feet inland. It prefers habitat with more low-growing vegetation.	No	**Presumed Absent:** No suitable habitat is present within the project site and the project site is out of the elevation range for this species.
Progne subis purple martin	Fed: None CA: SSC	Summer resident in a variety of wooded, low-elevation habitats throughout the state. Uses valley foothill and montane hardwood, valley foothill and montane hardwood-conifer, and riparian habitats. Also occurs in coniferous habitats, including closed-cone pine-cypress, ponderosa pine, Douglas-fir, and redwood. Requires areas with a concentration of nesting cavities.	No	**Moderate:** The project site provides suitable nesting habitat for this species.
Rana draytonii California red-legged frog	Fed: **THR** CA: SSC	Found mainly near ponds in humid forests, woodlands, grasslands, coastal scrub, and streamsides with plant cover. Most common in lowlands or foothills. Frequently found in woods adjacent to streams. Occurs along the coast ranges from Mendocino County south and in portions of the Sierra Nevada and Cascades ranges.	No	**Presumed Absent:** No suitable habitat is present within the project site.
Rana muscosa southern mountain yellow-legged frog	Fed: **END** CA: **END**; WL	Occurs in lower elevation habitats characterized by rocky streambeds and wet meadows, while higher elevation habitats include lakes, ponds, and streams. Occupy well lit, streams in narrow, rock-walled canyons. Often found along rock walls or vegetated banks and always within a few feet of the water.	No	**Presumed Absent:** No suitable habitat is present within the project site due to the closed forest canopy and lack of rocky stream courses with open margins within the project site. Additionally, this species was not observed during previous field surveys (2001 and 2003).
***Rhinichthys osculus* ssp. 8** Santa Ana speckled dace	Fed: None CA: SSC	Requires permanent flowing streams within summer water temperatures of 17 – 20 degrees Celsius. Inhabits shallow cobble and gravel riffles and small streams that flow through steep, rocky canyons with chaparral covered walls.	No	**Presumed Absent:** No suitable habitat is present within the project site.
Setophaga petechia yellow warbler	Fed: None CA: SSC	Nests over all of California except the Central Valley, the Mojave Desert region, and high altitudes and the eastern side of the Sierra Nevada. Winters along the Colorado River and in parts of Imperial and Riverside Counties. Nests in riparian areas dominated by willows, cottonwoods, sycamores, or alders or in mature chaparral. May also use oaks, conifers, and urban areas near stream courses.	No	**Presumed Absent:** No suitable habitat is present within the project site.
Siphateles bicolor mohavensis Mohave tui chub	Fed: **END** CA: **END**; FP	Endemic to the Mojave River Basin and adapted to alkaline, mineralized waters. Requires deep pools, ponds, or slough-like areas and needs vegetation for spawning	No	**Presumed Absent:** No suitable habitat is present within the project site.
Spea hammondii western spadefoot	Fed: None CA: SSC	Prefers open areas with sandy or gravelly soils, in a variety of habitats including mixed woodlands, grasslands, coastal sage scrub, chaparral, sandy washed, lowlands, river floodplains, alluvial fans, playas, alkali flats, foothills, and mountains. Rainpools which do not contain bullfrogs, fish, or crayfish are necessary for breeding.	No	**Presumed Absent:** No suitable habitat is present within the project site.

Scientific Name Common Name	**Status**	**Habitat**	**Observed Onsite**	**Potential to Occur**
Spinus lawrencei Lawrence's Goldfinch	Fed: None CA: None	Open woodlands, chaparral, and weedy fields. Closely associated with oaks. Nests in open oak or other arid woodland and chaparral near water.	No	**Presumed Absent** No suitable habitat is present within or adjacent to the project site.
Strix occidentalis occidentalis California spotted owl	Fed: None CA: SSC	Primarily associated with oak and oak-conifer habitats and uses dense, multi-layered canopy cover for roost seclusion. Requires mature forest with permanent water and suitable nesting trees and snags.	No	**High:** Suitable habitat can be found throughout the project site. Additionally, this species was observed foraging on-site during surveys in 2007. However, there are no known historic roost or nest sites within the project site.
Taricha torosa Coast Range newt	Fed: None CA: SSC	Found in wet forests, oak forests, chaparral, and rolling grasslands. In southern California, drier chaparral, oak woodland, and grasslands are used.	No	**Presumed Absent:** No suitable habitat is present within the project site.
Taxidea taxus American badger	Fed: None CA: SSC	Primarily occupy grasslands, parklands, farms, tallgrass and shortgrass prairies, meadows, shrub-steppe communities and other treeless areas with sandy loam soils where it can dig more easily for its prey. Occasionally found in open chaparral (with less than 50% plant cover) and riparian zones.	No	**Presumed Absent:** No suitable habitat is present within the project site.
Thamnophis hammondii two-striped gartersnake	Fed: None CA: SSC	Utilizes a variety of habitats including forests, mixed woodlands, grassland, chaparral, and farmlands. Often found near ponds, marshes, or streams.	No	**High** Suitable habitat can be found adjacent to streams running through the project site. Species has been observed nearby.
Vireo bellii pusillus least Bell's vireo	Fed: **END** CA: **END**	Primarily occupy Riverine riparian habitat that typically feature dense cover within 1 -2 meters of the ground and a dense, stratified canopy. Typically it is associated with southern willow scrub, cottonwood-willow forest, mule fat scrub, sycamore alluvial woodlands, coast live oak riparian forest, arroyo willow riparian forest, or mesquite in desert localities. It uses habitat which is limited to the immediate vicinity of water courses, 2,000 feet elevation in the interior.	No	**Presumed Absent:** No suitable habitat is present within the project site. The site does not contain the large sections of riparian forest that this species prefers.
SPECIAL-STATUS PLANT SPECIES				
Abronia nana* var. *covillei Covilles dwarf abronia	Fed: None CA: None CNPS: 4.2	Grows in carbonate, sandy areas within Great Basin scrub, Joshua tree "woodland", pinyon and juniper woodland, subalpine coniferous forest, and upper montane coniferous forest habitats. Found at elevations ranging from 5,000 to 10,710 feet. Blooming period is from May to August.	No	**Low** The habitat within the project site consists of vegetative cover that is likely too dense to support this species. However, this species has been observed nearby.
Acanthoscyphus parishii* var. *goodmaniana Cushenbury oxytheca	Fed: **END** CA: None CNPS: 1B.1	Grows within carbonate and sandy soils within pinyon and juniper woodlands (carbonate, talus). Found at elevations ranging from 4,000 to 7,800 feet. Blooming period is from May to October.	No	**Presumed Absent** Potential habitat supported by the subareas occurs outside of the known elevation range for this species.

Scientific Name Common Name	**Status**	**Habitat**	**Observed Onsite**	**Potential to Occur**
Acanthoscyphus parishii* var. *parishii Parish's oxytheca	Fed: None CA: None CNPS: 4.2	Habitats include sandy or shale chaparral. Found at elevations ranging from 3,750 to 6,748 feet above mean sea level (msl). Blooming period is from June to August.	No	**Presumed Absent:** No suitable habitat is present within the project site.
Allium howellii* var. *clokeyi Mt. Pinos onion	Fed: None CA: None CNPS: 1B.3	Grows in Great Basin scrub, meadows and seeps (edges), and pinyon and juniper woodland habitats. Found at elevations ranging from 4,265 to 6,070 feet above msl. Blooming period is from April to June.	No	**Presumed Absent:** No suitable habitat is present within the project site.
Allium parishii Parish's onion	Fed: None CA: None CNPS: 4.3	Found in rocky soils within Joshua tree woodland, Mojavean desert scrub, and pinyon and juniper woodland habitats. Found at elevations ranging from 2,953 to 5,692 feet above msl. Blooming period is from April to May.	No	**Presumed Absent:** No suitable habitat is present within the project site.
Androsace elongata* ssp. *acuta California androsace	Fed: None CA: None CNPS: 4.2	Habitats include chaparral, cismontane woodland, coastal scrub, meadows and seeps, pinyon and juniper woodland, and valley and foothill grassland. Found at elevations ranging from 492 to 4,281 feet above msl. Blooming period is from March to June.	No	**Presumed Absent:** No suitable habitat is present within the project site and the project site is out of the elevation range for this species.
Astragalus bicristatus crested milk-vetch	Fed: None CA: None CNPS: 4.3	Grows in sandy or rocky, mostly carbonate soils within lower montane coniferous forest and upper montane coniferous forest habitats. Found at elevations ranging from 5,577 to 9,006 feet. Blooming period is from May to August.	No	**Presumed Absent.** No suitable habitat is present within or adjacent to the Alternative Subareas. The Alternative Subareas occurs outside the known elevation range for this species.
Astragalus lentiginosus* var. *sierrae Big Bear Valley milk-vetch	Fed: None CA: None CNPS: 1B.2	Grows in gravelly (sometimes) and rocky (sometimes) soils within Mojavean desert scrub, meadows and seeps, pinyon and juniper woodland, and upper montane coniferous forest habitats. Found at elevations ranging from 5,905 to 8,530 feet. Blooming period is from April to August.	No	**Presumed Absent** There is no suitable habitat present within or immediately adjacent to the proposed limits of disturbance.
Astragalus leucolobus Big Bear Valley woollypod	Fed: None CA: None CNPS: 1B.2	Grows in rocky soils within lower montane coniferous forest, pebble (pavement) plain, pinyon and juniper woodland, and upper montane coniferous forest habitats. Found at elevations ranging from 3,609 to 9,465 feet. Blooming period is from May to July.	No	**Presumed Absent.** No suitable habitat is present within or adjacent to the Alternative Subareas. The Alternative Subareas occurs outside the known elevation range for this species.
Berberis nevinii Nevin's barberry	Fed: **END** CA: **END** CNPS: 1B.1	Occurs on steep, north-facing slopes or in low-grade sandy washes in chaparral, cismontane woodland, coastal scrub, and riparian scrub. Found at elevations ranging from 951 to 5,167 feet above msl. Blooming period is from March to June.	No	**Presumed Absent:** No suitable habitat is present within the project site and the project site is out of the elevation range for this species.
Boechera dispar pinyon rockcress	Fed: None CA: None CNPS: 2B.3	Grows in granitic, gravelly areas within Joshua tree "woodland", Mojavean desert scrub, and pinyon and juniper woodland habitats. Found at elevations ranging from 3,935 to 8,335 feet. Blooming period is from March to June.	No	**Presumed Absent:** No suitable habitat is present within the project site.

Scientific Name Common Name	**Status**	**Habitat**	**Observed Onsite**	**Potential to Occur**
Boechera parishii Parish's rockcress	Fed: None CA: None CNPS: 1B.2	Grows in quartzite on clay soils, carbonate (sometimes), and rocky soils within pebble plain, pinyon and juniper woodland, upper montane coniferous woodland habitats. Found at elevations ranging from 5,805 to 9,810 feet. Blooming period is from April to May.	No	**Presumed Absent** There is no suitable habitat present within or immediately adjacent to the proposed limits of disturbance.
Boechera shockleyi Shockleys rockcress	Fed: None CA: None CNPS: 2B.2	Grows within pinyon and juniper woodland habitats. Found at elevations ranging from 2,870 to 7,580 feet. Blooming period is from May to June.	No	**Presumed Absent:** No suitable habitat is present within the project site.
Calochortus palmeri* var. *palmeri Palmer's mariposa-lily	Fed: None CA: None CNPS: 1B.2	Grows in mesic soils within chaparral, lower montane coniferous forest, and meadows and seeps. Found at elevations ranging from 2,329 to 7,841 feet above msl. Blooming period is from April to July.	No	**Low:** Some suitable habitat is present within the project site.
Calochortus plummerae Plummer's mariposa-lily	Fed: None CA: None CNPS: 4.2	Prefers openings in chaparral, foothill woodland, coastal sage scrub, valley foothill grasslands, cismontane woodland, lower montane coniferous forest and yellow pine forest. Often found on dry, rocky slopes and soils and brushy areas. Can be very common after a fire. Found at elevations ranging from 459 to 6,299 feet above msl. Blooming period is from May to July.	No	**Presumed Absent:** No suitable habitat is present within the project site.
Canbya candida white pygmy-poppy	Fed: None CA: None CNPS: 4.2	Grows in gravelly, sandy, and granitic soils within Joshua tree woodland, Mojavean desert scrub, and pinyon and juniper woodland habitats. Grows in elevation ranging from 1,969 to 4,790 feet above msl. Blooming period is from March to June.	No	**Presumed Absent:** No suitable habitat is present within the project site and the project site is out of the elevation range for this species.
Castilleja cinerea ash-grey paintbrush	Fed: **THR** CA: None CNPS: 1B.2	Grows within Mojavean desert scrub, meadows and seeps, pebble (pavement) plain, pinyon and juniper woodland, and upper montane coniferous forest (clay, openings) habitats. Found at elevations ranging from 5,905 to 9,710 feet. Blooming period is from June to August.	No	**Presumed Absent** There is no suitable habitat present within or adjacent to the BSA. The BSA occurs outside of the known elevation range for this species.
Castilleja lasiorhyncha San Bernardino Mountains owl's-clover	Fed: None CA: None CNPS: 1B.2	Occurs in mesic or drying sites along the edges of streams, meadows, and vernal pools. Found in meadows and seeps, pebble plains, upper montane coniferous forest, chaparral, and riparian woodland. Found at elevations ranging from 4,265 to 7,841 feet above msl. Blooming period is from May to August.	No	**Low:** Some suitable habitat is present within the project site.
Castilleja montigena Heckard's paintbrush	Fed: None CA: None CNPS: 4.3	Grows within lower montane coniferous forest, pinyon and juniper woodland, and upper montane coniferous forest habitats. Found at elevations ranging from 6,400 to 9,185 feet. Blooming period is from May to August.	No	**Presumed Absent** There is no suitable habitat present within or adjacent to the BSA. The BSA occurs outside of the known elevation range for this species.
Castilleja plagiotoma Mojave paintbrush	Fed: None CA: None CNPS: 4.3	Found in Great Basin scrub (alluvial), Joshua tree woodland, lower montane coniferous forest, and pinyon and juniper woodland habitats. Found at elevations ranging from 984 to 8,202 feet above msl. Blooming period is from April to June.	No	**Presumed Absent:** No suitable habitat is present within the project site.

Scientific Name Common Name	**Status**	**Habitat**	**Observed Onsite**	**Potential to Occur**
Centromadia pungens* ssp. *laevis smooth tarplant	Fed: None CA: None CNPS: 1B.1	Occurs in alkaline soils within chenopod scrub, meadows and seeps, playas, riparian woodland, and valley and foothill grassland habitats. Grows in elevation ranging from 0 to 2,100 feet above msl. Blooming period ranges from April to September.	No	**Presumed Absent:** No suitable habitat is present within the project site and the project site is out of the elevation range for this species.
Chorizanthe parryi* var. *parryi Parry's spineflower	Fed: None CA: None CNPS: 1B.1	Occurs on sandy and/or rocky soils in chaparral, coastal sage scrub, and sandy openings within alluvial washes and margins. Found at elevations ranging from 951 to 3,773 feet above msl. Blooming period is from April to June.	No	**Presumed Absent:** No suitable habitat is present within the project site and the project site is out of the elevation range for this species.
Chorizanthe xanti* var. *leucotheca white-bracted spineflower	Fed: None CA: None CNPS: 1B.2	Grows on sandy or gravelly soils within coastal scrub (alluvial fans), Mojavean desert scrub, pinyon and juniper woodland habitats. Found at elevations ranging from 984 to 3,937 feet. Blooming period is from April to June.	No	**Presumed Absent** There is no suitable habitat present within or adjacent to the Project site.
Dudleya abramsii* ssp. *affinis San Bernardino Mountains dudleya	Fed: None CA: None CNPS: 1B.2	Found in pebble plain, upper montane coniferous forest, and pinyon-juniper woodland in granite or quartzite outcrops. It is rarely found on limestone. Found at elevations ranging from 4,101 to 8,530 feet above msl. Blooming period is from April to July.	No	**Presumed Absent:** No suitable habitat is present within the project site.
Eremogone ursina Big Bear Valley sandwort	Fed: **THR** CA: None CNPS: 1B.2	Grows in mesic and rocky soils within meadows and seeps, pebble plain, and pinyon and juniper woodland habitats. Found at elevations ranging from 5,905 to 9,515 feet. Blooming period is from May to August.	No	**Presumed Absent** There is no suitable habitat present within or immediately adjacent to the proposed limits of disturbance.
Eremothera boothii* ssp. *boothii Booth's evening-primrose	Fed: None CA: None CNPS: 2B.3	Found in Joshua tree woodland and pinyon-juniper woodland habitats. Found at elevations ranging from 2,953 feet to 7,874 feet above msl. Blooming period is from April to September.	No	**Presumed Absent:** No suitable habitat is present within the project site.
Eriastrum densifolium* ssp. *sanctorum Santa Ana River woollystar	Fed: **END** CA: **END** CNPS: 1B.1	Grows in coastal scrub and chaparral habitats within sandy soils on river floodplains or terraces fluvial deposits. Found at elevations ranging from 295 to 2,001 feet above msl. Blooming period is from April to September.	No	**Presumed Absent:** No suitable habitat is present within the project site and the project site is out of the elevation range for this species.
Erigeron parishii Parish's daisy	Fed: **THR** CA: None CNPS: 1B.1	Grows in carbonate and granitic soils in Mojavean desert scrub and pinyon/juniper woodland habitats. Found at elevations ranging from 2,624 to 6,561 feet. Blooming period is from May to August.	No	**Presumed Absent:** No suitable habitat is present within the project site.
Eriogonum ovalifolium var. vineum Cushenbury buckwheat	Fed: **END** CA: None CNPS: 1B.1	Grows in carbonate soils in Joshua tree woodland, Mojavean desert scrub, and pinyon/juniper woodland habitats. Found at elevations ranging from 4,593 to 8,005 feet. Blooming period is from May to August.	No	**Presumed Absent:** No suitable habitat is present within the project site.
Eriophyllum lanatum* var. *obovatum southern Sierra woolly sunflower	Fed: None CA: None CNPS: 4.3	Prefers sandy loam soils within lower montane coniferous forest and upper montane coniferous forest habitats. Found at elevations ranging from 3,655 to 8,202 feet above msl. Blooming period is from June to July.	No	**Presumed Absent:** No suitable habitat is present within the project site.

Scientific Name Common Name	**Status**	**Habitat**	**Observed Onsite**	**Potential to Occur**
Erythranthe exigua San Bernardino Mountains monkeyflower	Fed: None CA: None CNPS: 1B.2	Grows in clay and mesic soils within meadows and seeps, pebble (pavement) plain, and upper montane coniferous forest habitats. Found at elevations ranging from 5,905 to 7,595 feet. Blooming period is from May to July	No	**Presumed Absent** There is no suitable habitat present within or adjacent to the BSA. The BSA occurs outside of the known elevation range for this species.
Erythranthe purpurea little purple monkeyflower	Fed: None CA: None CNPS: 1B.2	Grows within meadows and seeps, pebble plain, and upper montane coniferous forest habitats. Found at elevations ranging from 6,235 to 7,545 feet. Blooming period is from May to June.	No	**Presumed Absent** There is no suitable habitat present within or immediately adjacent to the proposed limits of disturbance.
Frasera neglecta pine green-gentian	Fed: None CA: None CNPS: 4.3	Occurs in lower montane coniferous forest, pinyon and juniper woodland and upper montane coniferous forest habitats. Found at elevations ranging from 4,593 to 8,202 feet above msl. Blooming period is from May to July.	No	**Presumed Absent:** No suitable habitat is present within the project site.
Fritillaria pinetorum pine fritillary	Fed: None CA: None CNPS: 4.3	Associated with granitic and metamorphic soils within chaparral, lower montane coniferous forest, upper montane coniferous forest, subalpine coniferous forest, pinyon and juniper woodland. Found at elevations ranging from 5,692 to 10,826 feet above msl. Blooming period is from May to September.	No	**Presumed Absent:** No suitable habitat is present within the project site.
Galium johnstonii Johnston's bedstraw	Fed: None CA: None CNPS: 4.3	Preferred habitats include chaparral, riparian woodland, lower montane coniferous forest, pinyon and juniper woodland. Found at elevations ranging from 4,003 to 7,546 feet above msl. Blooming period is from June to July.	No	**Presumed Absent:** No suitable habitat is present within the project site.
Heuchera abramsii urn-flowered alumroot	Fed: None CA: None CNPS: 4.3	Grows within upper montane coniferous forest habitats. Found at elevations ranging from 9,185 to 11,485. Blooming period is from July to august		**Presumed Absent:** No suitable habitat is present within the project site.
Heuchera caespitosa urn-flowered alumroot	Fed: None CA: None CNPS: 4.3	Grows in rocky soils within cismontane woodland, lower montane coniferous forest, riparian forest, and upper montane coniferous forest. Found at elevations ranging from 3,789 to 8,694 feet above msl. Blooming period is from May to August.	No	**Presumed Absent:** No suitable habitat is present within the project site.
Heuchera parishii Parish's alumroot	Fed: None CA: None CNPS: 1B.3	Found in lower montane coniferous forest, subalpine coniferous forest, upper montane coniferous forest, and alpine boulder and rock fields in rocky places. It sometimes occurs on carbonate. Found at elevations ranging from 4,921 to 12,467 feet above msl. Blooming period is from June to August.	No	**Low:** Some suitable habitat is present within the project site.
Hulsea vestita* ssp. *parryi Parry's hulsea	Fed: None CA: None CNPS: 4.3	Grows in granitic or carbonate, rocky openings within lower montane coniferous forest, pinyon and juniper woodland and upper montane coniferous forest habitats. Found at elevations ranging from 4,495 to 9,498 feet above msl. Blooming period is from April to August.	No	**Presumed Absent:** No suitable habitat is present within the project site.
Imperata brevifolia California satintail	Fed: None CA: None CNPS: 2B.1	Occurs in mesic sites, alkali seeps, and riparian areas within coastal scrub, chaparral, riparian scrub, Mojavean scrub, and alkali meadows and seeps. Found at elevations ranging from 0 to 1,640 feet above msl. Blooming period is from September to May.	No	**Presumed Absent:** No suitable habitat is present within the project site and the project site is out of the elevation range for this species.

Scientific Name Common Name	**Status**	**Habitat**	**Observed Onsite**	**Potential to Occur**
Ivesia argyrocoma* var. *argyrocoma silver-haired ivesia	Fed: None CA: None CNPS: 1B.2	Found in meadows, pebble plains, and upper montane coniferous forest, often with other rare plants. Found at elevations ranging from 4,790 to 9,711 feet above msl. Blooming period is from June to August.	No	**Presumed Absent:** No suitable habitat is present within the project site.
Lilium humboldtii* ssp. *ocellatum ocellated humboldt lily	Fed: None CA: None CNPS: 4.2	Found in openings within chaparral, cismontane woodland, coastal scrub, lower montane coniferous forest, and riparian woodland habitats. Found at elevations ranging from 98 to 5,906 feet above msl. Blooming period is from March to August.	No	**Presumed Absent:** No suitable habitat is present within the project site.
Lilium parryi lemon lily	Fed: None CA: None CNPS: 1B.2	Occurs in lower montane coniferous forest, meadows and seeps, riparian forest, and upper montane coniferous forest habitats. Generally occurs in wet, mountainous terrain; forested areas; on the shady edges of streams; or in open, boggy meadows and seeps. Found at elevations ranging from 4,003 to 9,006 feet above msl. Blooming period is from July to August.	No	**Low:** Some suitable habitat is present within the project site.
Lupinus elatus silky lupine	Fed: None CA: None CNPS: 4.3	Grows within lower montane coniferous forest and upper montane coniferous forest habitats. Found at elevations ranging from 4,920 to 9,845 feet. Blooming period is from June to August.	No	**Low:** Some suitable habitat is present within the project site.
Malacothamnus parishii Parish's bush-mallow	Fed: None CA: None CNPS: 1A	Occurs within chaparral and coastal scrub habitats. Found at elevations ranging from 1,001 to 1,493 feet above msl. Blooming period is from June to July.	No	**Presumed Absent:** No suitable habitat is present within the project site and the project site is out of the elevation range for this species.
Monardella macrantha* ssp. *hallii Hall's monardella	Fed: None CA: None CNPS: 1B.3	Occurs in broadleaved upland forest, chaparral, lower montane coniferous forest, cismontane woodland, and valley and foothill grassland along dry slopes and ridges. Found at elevations ranging from 2,395 to 7,201 feet above msl. Blooming period is from June to October.	No	**Presumed Absent:** No suitable habitat is present within the project site.
Muhlenbergia californica California muhly	Fed: None CA: None CNPS: 4.3	Found in chaparral, coastal scrub, lower montane coniferous forest, meadows and seeps. Only known to occur in the San Bernardino Mountains. Found at elevations ranging from 328 to 6,562 feet above msl. Blooming period is from June to September.	No	**Presumed Absent:** No suitable habitat is present within the project site.
Navarretia peninsularis Baja navarretia	Fed: None CA: None CNPS: 1B.2	Grows in mesic areas within chaparral, lower montane coniferous forest, meadows and seeps, and pinyon and juniper woodland habitats. Found at elevations ranging from 4,920 to 7,545 feet. Blooming period is from (May) June to August.	No	**Presumed Absent** There is no suitable habitat present within or immediately adjacent to the proposed limits of disturbance.
Nemacladus gracilis graceful nemacladus	Fed: None CA: None CNPS: 4.3	Grows in gravelly (sometimes), sandy (sometimes) areas within cismontane woodland and valley and foothill grassland habitats. Found at elevations ranging from 395 to 6,235 feet. Blooming period is from March to May.	No	**Presumed Absent:** No suitable habitat is present within the project site.
Opuntia basilaris* var. *brachyclada short-joint beavertail	Fed: None CA: None CNPS: 1B.2	Habitats include chaparral, Joshua tree woodland, Mojavean desert scrub, pinyon and juniper woodlands. Found at elevations ranging from 1,394 to 5,906 feet above msl. Blooming period is from April to August.	No	**Presumed Absent:** No suitable habitat is present within the project site.

Scientific Name Common Name	**Status**	**Habitat**	**Observed Onsite**	**Potential to Occur**
Packera bernardina San Bernardino ragwort	Fed: None CA: None CNPS: 1B.2	Grows within meadows and seeps, pebble plain, and upper montane coniferous forest habitats. Fount at elevations ranging from 5,905 to 7,545 feet. Blooming period is from May to July.	No	**Presumed Absent** There is no suitable habitat present within or immediately adjacent to the proposed limits of disturbance.
Packera ionophylla Tehachapi ragwort	Fed: None CA: None CNPS: 4.3	Grows in lower montane coniferous forest and upper montane coniferous forest habitats. Found at elevations ranging from 4,921 to 8,858 feet above msl. Blooming period is from June to July.	No	**Presumed Absent:** No suitable habitat is present within the project site.
Pediomelum castoreum Beaver Dam breadroot	Fed: None CA: None CNPS: 1B.2	Occurs in Joshua tree woodland and Mojavean desert scrub in sandy soils and in washes and roadcuts. Found at elevations ranging from 2,001 to 2,707 feet above msl. Blooming period is from April to May.	No	**Presumed Absent:** No suitable habitat is present within the project site and the project site is out of the elevation range for this species.
Pelazoneuron puberulum* var. *sonorensis Sonoran maiden fern	Fed: None CA: None CNPS: 2B.2	Grows within meadows and seeps (seeps, streams) habitats. Found at elevations ranging from 165 to 2,000 feet. Blooming period is from January to September.	No	**Presumed Absent** There is no suitable habitat present within or adjacent to the project site.
Perideridia parishii* ssp. *parishii Parish's yampah	Fed: None CA: None CNPS: 2B.2	Found in lower montane coniferous forest, meadows, and upper montane coniferous forest in damp meadows or along streambeds. It often grows in areas with an open pine canopy. Found at elevations ranging from 4,806 to 9,843 feet above msl. Blooming period is from June to August.	No	**Low:** Marginal habitat is present within the project site.
Phacelia exilis Transverse Range phacelia	Fed: None CA: None CNPS: 4.3	Grows in sandy or gravelly soils within lower montane coniferous forest, meadows and seeps, pebble (pavement) plain, and upper montane coniferous forest habitats. Found at elevations ranging from 3,609 to 8,858 feet above msl. Blooming period is from May to August.	No	**Presumed Absent:** No suitable habitat is present within the project site.
Phacelia mohavensis Mojave phacelia	Fed: None CA: None CNPS: 4.3	Occurs in sandy or gravelly soils within cismontane woodland, lower montane coniferous forest, meadows and seeps, pinyon and juniper woodland. Found at elevations ranging from 4,593 to 8,202 feet above msl. Blooming period is from April to August.	No	**Presumed Absent:** No suitable habitat is present within the project site.
Phlox dolichantha Big Bear Valley phlox	Fed: None CA: None CNPS: 1B.2	Grows within pebble plain and upper montane coniferous forest habitats. Fout at elevations ranging from 6,005 to 9,745 feet. Blooming period is from May to July.	No	**Presumed Absent** There is no suitable habitat present within or immediately adjacent to the proposed limits of disturbance.
Piperia leptopetala narrow-petaled rein orchid	Fed: None CA: None CNPS: 4.3	Found in cismontane woodland, lower montane coniferous forest, and upper montane coniferous forest habitats. Found at elevations ranging from 1,247 and 7,300 feet above msl. Blooming period is from May to July.	No	**Presumed Absent:** No suitable habitat is present within the project site.
Rupertia rigida Parish's rupertia	Fed: None CA: None CNPS: 4.3	Grows within chaparral, cismontane woodland, lower montane coniferous forest, meadows and seeps, pebble plain, and valley and foothill grassland habitats. Found at elevations ranging from 2,295 to 8,205 feet. Blooming period is from June to August.	No	**Presumed Absent** There is no suitable habitat present within or immediately adjacent to the proposed limits of disturbance.

Scientific Name Common Name	**Status**	**Habitat**	**Observed Onsite**	**Potential to Occur**
Saltugilia latimeri Latimer's woodland-gilia	Fed: None CA: None CNPS: 1B.2	Habitats include chaparral, Mojavean desert scrub, pinyon and juniper woodland. Prefers rocky or sandy, often granitic soils. Found at elevations ranging from 1,312 to 6,234 feet. Blooming period is from March to June.	No	**Presumed Absent** There is no suitable habitat present within or immediately adjacent to the proposed limits of disturbance.
Selaginella asprella bluish spike-moss	Fed: None CA: None CNPS: 4.3	Occurs in granitic and rocky soils within cismontane woodland, lower and upper montane coniferous forests, pinyon and juniper woodland, and subalpine coniferous forests. Found at elevations ranging from 5,249 to 8,858 feet. Blooming period is July.	No	**Presumed Absent.** The Alternative Subareas occurs outside the known elevation range for this species.
Sidalcea hickmanii* ssp. *parishii Parish's checkerbloom	Fed: None CA: Rare CNPS: 1B.2	Grows within chaparral, cismontane woodland, and lower montane coniferous forest habitats. Found at elevations ranging from 3,280 to 8,200 feet. Blooming period is from (May) June to August.	No	**Presumed Absent** There is no suitable habitat present within or immediately adjacent to the proposed limits of disturbance.
Sidalcea malviflora* ssp. *dolosa Bear Valley checkerbloom	Fed: None CA: None CNPS: 1B.2	Found in meadows and seeps, riparian woodland, lower montane coniferous forest, and upper montane coniferous forest in wet areas. It is highly affected by hydrological changes in its environment. Found at elevations ranging from 4,905 to 8,809 feet above msl. Blooming period is from May to August.	No	**Presumed Absent:** No suitable habitat is present within the project site.
Sidalcea neomexicana Salt Spring checkerbloom	Fed: None CA: None CNPS: 2B.2	Habitat includes chaparral, coastal scrub, lower montane coniferous forest, plays, and mojavean desert scrub. Found at elevations ranging from 49 to 5,020 feet above msl. Blooming period is from March to June.	No	**Presumed Absent:** No suitable habitat is present within the project site and the project site is out of the elevation range for this species.
Sidalcea pedata bird-foot checkerbloom	Fed: **END** CA: **END** CNPS: 1B.1	Grows within meadows and seeps and pebble plain habitats. Found at elevations ranging from 5,250 to 8,205 feet. Blooming period is from May to August.		**Presumed Absent** There is no suitable habitat present within or immediately adjacent to the proposed limits of disturbance.
Sidotheca caryophylloides chickweed oxytheca	Fed: None CA: None CNPS: 4.3	Grows in sandy soils within lower montane coniferous forest. Found at elevations ranging from 3,655 to 8,530 feet above msl. Blooming period is from July to September.	No	**Presumed Absent:** No suitable habitat is present within the project site.
Streptanthus bernardinus Laguna Mountains jewelflower	Fed: None CA: None CNPS: 4.3	Grows in chaparral and lower montane coniferous forest on clay or decomposed granite soils. It is sometimes found in disturbed areas such as streamsides or roadcuts. Found at elevations ranging from 4,724 to 8,202 feet above msl. Blooming period is from May to August.	No	**Low:** Some suitable habitat is present within the project site.
Streptanthus campestris southern jewelflower	Fed: None CA: None CNPS: 1B.3	Occurs in open, rocky areas in chaparral, lower montane coniferous forest, and pinyon-juniper woodland. Found at elevations ranging from 1,969 to 9,154 feet above msl. Blooming period is from May to July.	No	**Low:** Marginal habitat is present within the project site.

Scientific Name Common Name	**Status**	**Habitat**	**Observed Onsite**	**Potential to Occur**
Symphyotrichum defoliatum San Bernardino aster	Fed: None CA: None CNPS: 1B.2	Grows in cismontane woodland, coastal scrub, lower montane coniferous forest, meadows and seeps, marshes and swamps, valley and foothill grassland (vernally mesic). Can be found growing near ditches, streams, and springs within these habitats. Found at elevations ranging from 7 to 6,693 feet above msl. Blooming period is from July to November.	No	**Presumed Absent:** No suitable habitat is present within the project site.
Syntrichopappus lemmonii Lemmon's syntrichopappus	Fed: None CA: None CNPS: 4.3	Occurs in sandy or gravelly soils within chaparral, Joshua tree woodland, and Pinyon and juniper woodland habitats. Found at elevations ranging from 1,640 to 6,004 feet above msl. Blooming period is from April to May (June).	No	**Presumed Absent:** No suitable habitat is present within the project site.
Thelypteris puberula* var. *sonorensis Sonoran maiden fern	Fed: None CA: None CNPS: 2B.2	Found in meadows and seeps along streams and other seepage areas. Found at elevations ranging from 164 to 2,001 feet above msl. Blooming period is from January to September.	No	**Presumed Absent:** No suitable habitat is present within the project site and the project site is out of the elevation range for this species.
Trichostema micranthum small-flowered bluecurls	Fed: None CA: None CNPS: 4.3	Occurs in mesic soils within lower montane coniferous forest and meadows and seeps. Found at elevations ranging from 5,003 to 7,546 feet above msl. Blooming period is from June to September.	No	**Presumed Absent:** No suitable habitat is present within the project site.
Yucca brevifolia western Joshua tree	Fed: None CA: **CE** CNPS: N/A	Occurs in a variety of arid habitats within the Mojave Desert. Found at elevations ranging from 1,600 to 6,600 feet. Blooming period is from March to June.	No	**Presumed Absent** There is no suitable habitat within or adjacent to the project site.
SPECIAL-STATUS PLANT COMMUNITIES				
Mixed Montane Chaparral	CDFW Sensitive Habitat	Associated with mountainous terrain from mid to high elevation at 3000 to 10,000 feet above msl. In southern California, it occurs above 7000 feet above msl. Mixed montane chaparral is characterized by a mixture of evergreen species; however, deciduous or partially deciduous species may also be present. When mature, it is often impenetrable to large mammals. Species composition of mixed montane chaparral varies throughout California and is dependent on changes with elevation, geographical range, and soil type. Examples of species occurring within this plant community include mountain whitehorn (*Ceanothus cordulatus*), various species of manzanita (*Arctostaphylos* sp.) mountain mahogany (*Cercocarpus betuloides*), and toyon (*Heteromeles arbutifolia*).	No	**Absent**
Riversidian Alluvial Fan Sage Scrub	CDFW Sensitive Habitat	Occur within broad washes of sandy alluvial drainages that carry rainfall runoff sporadically in winter and spring, but remain relatively dry through the remainder of the year. Is restricted to drainages and floodplains with very sandy substrates that have a dearth of decomposed plant material. These areas do not develop into riparian woodland or scrub due to the limited water resources and scouring by occasional floods.	No	**Absent**
Southern Mixed Riparian Forest	CDFW Sensitive Habitat	Typically a younger successional stage of riparian forest, due to disturbance or more frequent flooding. Plant species include willow (*Salix* sp.) species, elderberry (*Sambucus* sp.), oak species, sycamore (*Platanus racemosa*), cottonwood (*Populus* sp.), and smaller shrubs.	No	**Absent**

Scientific Name Common Name	**Status**	**Habitat**	**Observed Onsite**	**Potential to Occur**
Southern Sycamore Alder Riparian Woodland	CDFW Sensitive Habitat	Occurs below 2,000 meters in elevation, sycamore and alder often occur along seasonally-flooded banks; cottonwoods and willows are also often present. Poison oak, mugwort, elderberry and wild raspberry may be present in understory.	No	**Absent**
Westside Ponderosa Pine Forest	CDFW Sensitive Habitat	The Westside Ponderosa Pine Forest is found on suitable mountain and foothill sites throughout California except in the immediate area of San Francisco Bay, in the north coast area, south of Kern County in the Sierra Nevada and east of the Sierra Nevada Crest. It consists of pure stands of ponderosa pine as well as stands of mixed species in which at least 50% of the canopy area is ponderosa pine. Associated species varies depending on location in the state and site conditions.	No	**Absent**

U.S. Fish and Wildlife Service (USFWS) - Federal
END - Federal Endangered
THR - Federal Threatened

California Department of Fish and Wildlife (CDFW) - California
END- California Endangered
THR - California Threatened
SSC - California Species of Concern
WL - Watch List
FP - California Fully Protected

California Native Plant Society (CNPS)
California Rare Plant Rank
1A Plants Presumed Extirpated in California and Either Rare or Extinct Elsewhere
1B Plants Rare, Threatened, or Endangered in California and Elsewhere
2B Plants Rare, Threatened, or Endangered in California, but More Common Elsewhere
4 Plants of Limited Distribution – A Watch List

Threat Ranks
0.1 - Seriously threatened in California
0.2 - Moderately threatened in California
0.3 - Not very threatened in California

Appendix D Regulations

Special status species are native species that have been afforded special legal or management protection because of concern for their continued existence. There are several categories of protection at both federal and state levels, depending on the magnitude of threat to continued existence and existing knowledge of population levels.

Federal Regulations

Endangered Species Act of 1973

Federally listed threatened and endangered species and their habitats are protected under provisions of the Federal Endangered Species Act (ESA). Section 9 of the ESA prohibits "take" of threatened or endangered species. "Take" under the ESA is defined as to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any of the specifically enumerated conduct." The presence of any federally threatened or endangered species that are in a project area generally imposes severe constraints on development, particularly if development would result in "take" of the species or its habitat. Under the regulations of the ESA, the United States Fish and Wildlife Service (USFWS) may authorize "take" when it is incidental to, but not the purpose of, an otherwise lawful act.

Critical Habitat is designated for the survival and recovery of species listed as threatened or endangered under the ESA. Critical Habitat includes those areas occupied by the species, in which are found physical and biological features that are essential to the conservation of an ESA listed species and which may require special management considerations or protection. Critical Habitat may also include unoccupied habitat if it is determined that the unoccupied habitat is essential for the conservation of the species.

Whenever federal agencies authorize, fund, or carry out actions that may adversely modify or destroy Critical Habitat, they must consult with USFWS under Section 7 of the ESA. The designation of Critical Habitat does not affect private landowners, unless a project they are proposing uses federal funds, or requires federal authorization or permits (e.g., funding from the Federal Highway Administration or a permit from the U.S. Army Corps of Engineers (Corps)).

If USFWS determines that Critical Habitat will be adversely modified or destroyed from a proposed action, the USFWS will develop reasonable and prudent alternatives in cooperation with the federal institution to ensure the purpose of the proposed action can be achieved without loss of Critical Habitat. If the action is not likely to adversely modify or destroy Critical Habitat, USFWS will include a statement in its biological opinion concerning any incidental take that may be authorized and specify terms and conditions to ensure the agency is in compliance with the opinion.

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) (16 U.S. Government Code [USC] 703) makes it unlawful to pursue, capture, kill, possess, or attempt to do the same to any migratory bird or part, nest, or egg of any such bird listed in wildlife protection treaties between the United States, Great Britain, Mexico, Japan, and the countries of the former Soviet Union, and authorizes the U.S. Secretary of the Interior to protect and regulate the taking of migratory birds. It establishes seasons and bag limits for hunted species and protects migratory birds, their occupied nests, and their eggs (16 USC 703; 50 CFR 10, 21).

The MBTA covers the taking of any nests or eggs of migratory birds, except as allowed by permit pursuant to 50 CFR, Part 21. Disturbances causing nest abandonment and/or loss of reproductive effort (i.e., killing or abandonment of eggs or young) may also be considered "take." This regulation seeks to protect migratory birds and active nests.

In 1972, the MBTA was amended to include protection for migratory birds of prey (e.g., raptors). Six families of raptors occurring in North America were included in the amendment: Accipitridae (kites, hawks, and eagles); Cathartidae (New World vultures); Falconidae (falcons and caracaras); Pandionidae (ospreys); Strigidae (typical owls); and Tytonidae (barn owls). The provisions of the 1972 amendment to the MBTA protects all species and subspecies of the families listed above. The MBTA protects over 800 species including geese, ducks, shorebirds, raptors, songbirds and many relatively common species.

State Regulations

California Environmental Quality Act (CEQA)

The California Environmental Quality Act (CEQA) provides for the protection of the environment within the State of California by establishing State policy to prevent significant, avoidable damage to the environment through the use of alternatives or mitigation measures for projects. It applies to actions directly undertaken, financed, or permitted by State lead agencies. If a project is determined to be subject to CEQA, the lead agency will be required to conduct an Initial Study (IS); if the IS determines that the project may have significant impacts on the environment, the lead agency will subsequently be required to write an Environmental Impact Report (EIR). A finding of non-significant effects will require either a Negative Declaration or a Mitigated Negative Declaration instead of an EIR. Section 15380 of the CEQA Guidelines independently defines "endangered" and "rare" species separately from the definitions of the California Endangered Species Act (CESA). Under CEQA, "endangered" species of plants or animals are defined as those whose survival and reproduction in the wild are in immediate jeopardy, while "rare" species are defined as those who are in such low numbers that they could become endangered if their environment worsens.

California Endangered Species Act (CESA)

In addition to federal laws, the state of California implements the CESA which is enforced by CDFW. The CESA program maintains a separate listing of species beyond the FESA, although the provisions of each act are similar.

State-listed threatened and endangered species are protected under provisions of the CESA. Activities that may result in "take" of individuals (defined in CESA as; "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill") are regulated by CDFW. Habitat degradation or modification is not included in the definition of "take" under CESA. Nonetheless, CDFW has interpreted "take" to include the destruction of nesting, denning, or foraging habitat necessary to maintain a viable breeding population of protected species.

The State of California considers an endangered species as one whose prospects of survival and reproduction are in immediate jeopardy. A threatened species is considered as one present in such small numbers throughout its range that it is likely to become an endangered species in the near future in the

absence of special protection or management. A rare species is one that is considered present in such small numbers throughout its range that it may become endangered if its present environment worsens. State threatened and endangered species are fully protected against take, as defined above.

The CDFW has also produced a species of special concern list to serve as a species watch list. Species on this list are either of limited distribution or their habitats have been reduced substantially, such that a threat to their populations may be imminent. Species of special concern may receive special attention during environmental review, but they do not have formal statutory protection. At the federal level, USFWS also uses the label species of concern, as an informal term that refers to species which might be in need of concentrated conservation actions. As the Species of Concern designated by USFWS do not receive formal legal protection, the use of the term does not necessarily ensure that the species will be proposed for listing as a threatened or endangered species.

Fish and Game Code

Fish and Game Code Sections 3503, 3503.5, 3511, and 3513 are applicable to natural resource management. For example, Section 3503 of the Code makes it unlawful to destroy any birds' nest or any birds' eggs that are protected under the MBTA. Further, any birds in the orders Falconiformes or Strigiformes (Birds of Prey, such as hawks, eagles, and owls) are protected under Section 3503.5 of the Fish and Game Code which makes it unlawful to take, possess, or destroy their nest or eggs. A consultation with CDFW may be required prior to the removal of any bird of prey nest that may occur on a project site. Section 3511 of the Fish and Game Code lists fully protected bird species, where the CDFW is unable to authorize the issuance of permits or licenses to take these species. Pertinent species that are State fully protected by the State include golden eagle (*Aquila chrysaetos*) and white-tailed kite (*Elanus leucurus*). Section 3513 of the Fish and Game Code makes it unlawful to take or possess any migratory nongame bird as designated in the MBTA or any part of such migratory nongame bird except as provided by rules and regulations adopted by the Secretary of the Interior under provisions of the MBTA.

Native Plant Protection Act

Sections 1900–1913 of the Fish and Game Code were developed to preserve, protect, and enhance Rare and Endangered plants in the state of California. The act requires all state agencies to use their authority to carry out programs to conserve Endangered and Rare native plants. Provisions of the Native Plant Protection Act prohibit the taking of listed plants from the wild and require notification of the CDFW at least ten days in advance of any change in land use which would adversely impact listed plants. This allows the CDFW to salvage listed plant species that would otherwise be destroyed.

California Native Plant Society Rare and Endangered Plant Species

Vascular plants listed as rare or endangered by the CNPS, but which have no designated status under FESA or CESA are defined as follows:

California Rare Plant Rank

1A- Plants Presumed Extirpated in California and either Rare or Extinct Elsewhere

1B- Plants Rare, Threatened, or Endangered in California and Elsewhere

2A- Plants Presumed Extirpated in California, But More Common Elsewhere

2B- Plants Rare, Threatened, or Endangered in California, But More Common Elsewhere

3- Plants about Which More Information is Needed - A Review List

4- Plants of Limited Distribution - A Watch List

Threat Ranks

.1- Seriously threatened in California (over 80% of occurrences threatened / high degree and immediacy of threat)

.2- Moderately threatened in California (20-80% occurrences threatened / moderate degree and immediacy of threat)

.3- Not very threatened in California (<20% of occurrences threatened / low degree and immediacy of threat or no current threats known).

There are three key agencies that regulate activities within inland streams, wetlands, and riparian areas in California. The Corps Regulatory Branch regulates activities pursuant to Section 404 of the Federal Clean Water Act (CWA) and Section 10 of the Rivers and Harbors Act. Of the State agencies, the CDFG regulates activities under the Fish and Game Code Section 1600-1616, and the Regional Board regulates activities pursuant to Section 401 of the CWA and the California Porter-Cologne Water Quality Control Act.

Federal Regulations

Section 404 of the Clean Water Act

In accordance with the Revised Definition of "Waters of the United States"; Conforming (September 8, 2023), "waters of the United Sates" are defined as follows:

(a) *Waters of the United States* means:

(1) Waters which are:
(i) Currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;
(ii) The territorial seas; or
(iii) Interstate waters;

(2) Impoundments of waters otherwise defined as waters of the United States under this definition, other than impoundments of waters identified under paragraph (a)(5) of this section;

(3) Tributaries of waters identified in paragraph (a)(1) or (2) of this section that are relatively permanent, standing or continuously flowing bodies of water;

(4) Wetlands adjacent to the following waters:
(i) Waters identified in paragraph (a)(1) of this section; or
(ii) Relatively permanent, standing or continuously flowing bodies of water identified in paragraph (a)(2) or (a)(3) of this section and with a continuous surface connection to those waters;

(5) Intrastate lakes and ponds not identified in paragraphs (a)(1) through (4) of this section that are relatively permanent, standing or continuously flowing bodies of water with a continuous surface connection to the waters identified in paragraph (a)(1) or (a)(3) of this section

(b) The following are not "waters of the United States" even where they otherwise meet the terms of paragraphs (a)(2) through (5) of this section:

(1) Waste treatment systems, including treatment ponds or lagoons, designed to meet the requirements of the Clean Water Act;

(2) Prior converted cropland designated by the Secretary of Agriculture. The exclusion would cease upon a change of use, which means that the area is no longer available for the production of agricultural commodities. Notwithstanding the determination of an area's status as prior converted

cropland by any other Federal agency, for the purposes of the Clean Water Act, the final authority regarding Clean Water Act jurisdiction remains with EPA;

(3) Ditches (including roadside ditches) excavated wholly in and draining only dry land and that do not carry a relatively permanent flow of water;

(4) Artificially irrigated areas that would revert to dry land if the irrigation ceased;
(5) Artificial lakes or ponds created by excavating or diking dry land to collect and retain water and which are used exclusively for such purposes as stock watering, irrigation, settling basins, or rice growing;
(6) Artificial reflecting or swimming pools or other small ornamental bodies of water created by excavating or diking dry land to retain water for primarily aesthetic reasons;

(7) Waterfilled depressions created in dry land incidental to construction activity and pits excavated in dry land for the purpose of obtaining fill, sand, or gravel unless and until the construction or excavation operation is abandoned and the resulting body of water meets the definition of waters of the United States; and

(8) Swales and erosional features (*e.g.*, gullies, small washes) characterized by low volume, infrequent, or short duration flow.

(c) In this section, the following definitions apply:

(1) *Wetlands* means those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

(2) *Adjacent* means having a continuous surface connection

(3) *High tide line* means the line of intersection of the land with the water's surface at the maximum height reached by a rising tide. The high tide line may be determined, in the absence of actual data, by a line of oil or scum along shore objects, a more or less continuous deposit of fine shell or debris on the foreshore or berm, other physical markings or characteristics, vegetation lines, tidal gages, or other suitable means that delineate the general height reached by a rising tide. The line encompasses spring high tides and other high tides that occur with periodic frequency but does not include storm surges in which there is a departure from the normal or predicted reach of the tide due to the piling up of water against a coast by strong winds such as those accompanying a hurricane or other intense storm.

(4) *Ordinary high water mark* means that line on the shore established by the fluctuations of water and indicated by physical characteristics such as clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas.

(5) *Tidal waters* means those waters that rise and fall in a predictable and measurable rhythm or cycle due to the gravitational pulls of the moon and sun. Tidal waters end where the rise and fall of the water surface can no longer be practically measured in a predictable rhythm due to masking by hydrologic, wind, or other effects.

Section 401 of the Clean Water Act

Pursuant to Section 401 of the CWA, any applicant for a federal license or permit to conduct any activity which may result in any discharge to waters of the United States must provide certification from the State or Indian tribe in which the discharge originates. This certification provides for the protection of the physical, chemical, and biological integrity of waters, addresses impacts to water quality that may result from issuance of federal permits, and helps insure that federal actions will not violate water quality standards of the State or Indian tribe. In California, there are nine Regional Water Quality Control Boards (Regional Board) that issue or deny certification for discharges to waters of the United States and waters of the State, including wetlands, within their geographical jurisdiction. The State Water Resources Control Board assumed this responsibility when a project has the potential to result in the discharge to waters within multiple Regional Boards.

State Regulations

Fish and Game Code

Fish and Game Code Sections 1600 et. seq. establishes a fee-based process to ensure that projects conducted in and around lakes, rivers, or streams do not adversely impact fish and wildlife resources, or, when adverse impacts cannot be avoided, ensures that adequate mitigation and/or compensation is provided.

Fish and Game Code Section 1602 requires any person, state, or local governmental agency or public utility to notify the CDFW before beginning any activity that will do one or more of the following:

(1) substantially obstruct or divert the natural flow of a river, stream, or lake;
(2) substantially change or use any material from the bed, channel, or bank of a river, stream, or lake; or
(3) deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it can pass into a river, stream, or lake.

Fish and Game Code Section 1602 applies to all perennial, intermittent, and ephemeral rivers, streams, and lakes in the State. CDFW's regulatory authority extends to include riparian habitat (including wetlands) supported by a river, stream, or lake regardless of the presence or absence of hydric soils and saturated soil conditions. Generally, the CDFW takes jurisdiction to the top of bank of the stream or to the outer limit of the adjacent riparian vegetation (outer drip line), whichever is greater. Notification is generally required for any project that will take place in or in the vicinity of a river, stream, lake, or their tributaries. This includes rivers or streams that flow at least periodically or permanently through a bed or channel with banks that support fish or other aquatic life and watercourses having a surface or subsurface flow that support or have supported riparian vegetation. A Section 1602 Streambed Alteration Agreement would be required if impacts to identified CDFW jurisdictional areas occur.

Porter Cologne Act

The California *Porter-Cologne Water Quality Control Act* gives the State very broad authority to regulate waters of the State, which are defined as any surface water or groundwater, including saline waters. The Porter-Cologne Act has become an important tool in the post SWANCC and Rapanos regulatory environment, with respect to the state's authority over isolated and insignificant waters. Generally, any person proposing to discharge waste into a water body that could affect its water quality must file a Report of Waste Discharge in the event that there is no Section 404/401 nexus. Although "waste" is partially defined as any waste substance associated with human habitation, the Regional Board also interprets this to include fill discharged into water bodies.

Appendix A2

Delineation of State and Federal Jurisdictional Waters

HUME SOCAL CAMPGROUND PROJECT

SAN BERNARDINO COUNTY, CALIFORNIA

KELLER PEAK USGS 7.5-MINUTE TOPOGRAPHIC QUADRANGLE
SECTIONS 28 AND 33, TOWNSHIP 2 NORTH, RANGE 2 WEST
APN: 0328-071-05, -07, AND -10, AND 0328-121-40 AND -42

Delineation of State and Federal Jurisdictional Waters

Prepared For:

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September 2023

HUME SOCAL CAMPGROUND PROJECT

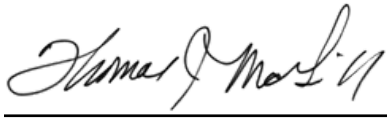
SAN BERNARDINO COUNTY, CALIFORNIA

Delineation of State and Federal Jurisdictional Waters

The undersigned certify that the statements furnished in this report and exhibits present data and information required for this biological evaluation, and the facts, statements, and information presented is a complete and accurate account of the findings and conclusions to the best of our knowledge and beliefs.



Travis J. McGill
Biologist/Director



Thomas J. McGill, Ph.D.
Managing Director

September 2023

Executive Summary

ELMT Consulting (ELMT) has prepared this Delineation of State and Federal Jurisdictional Waters Report for the proposed Hume SoCal Campground Project located within Assessor Parcel Numbers (APNs) 0328-071-05, -07, -10, 121-40, and 121-42 (project site or site) located in the City of Green Valley Lake, San Bernardino County, California. The jurisdictional delineation documents the regulatory authority of the U.S. Army Corps of Engineers (Corps), the Regional Water Quality Control Board (Regional Board), and the California Department of Fish and Wildlife (CDFW) pursuant to Section 401 and 404 of the Federal Clean Water Act (CWA), the California Porter-Cologne Water Quality Control Act, and Sections 1600 *et. seq.* of the California Fish and Game Code.[1]

A total of seven (7) drainage features (Drainages 1-7) were observed within the boundaries of the project site during the field delineation. The on-site drainage features, after flowing off-site, flow into Deep Creek before ultimately flowing into the Mojave River. Therefore, the onsite drainage features would qualify as waters of the United States under the jurisdiction of the Corps, and would qualify as "waters of the State" under the regulatory authority of the Regional Board and CDFW. Refer to Table ES-1 for a summary of on-site jurisdictional areas.

Table ES-1: Jurisdictional Areas

Jurisdictional Feature	Stream Flow	Cowardin Class	Class of Aquatic Resource	Corps/Regional Board Waters of the State		CDFW Streambed		
				On-Site Jurisdiction		On-Site Jurisdictional Streambed		Associated Habitat
				Acreage	Linear Feet	Acreage	Linear Feet	Acreage
Drainage 1	Perennial	Riverine	Non-Section 10 Non-Wetland	0.95	3,382	0.95	3,382	1.48
Drainage 2	Ephemeral	Riverine	Non-Section 10 Non-Wetland	0.18	875	0.18	875	0
Drainage 3	Ephemeral	Riverine	Non-Section 10 Non-Wetland	0.03	303	0.03	303	0
Drainage 4	Perennial	Riverine	Non-Section 10 Non-Wetland	0.28	1,613	0.28	1,613	0.73
Drainage 5	Ephemeral	Riverine	Non-Section 10 Non-Wetland	0.094	1,504	0.094	1,504	0
Drainage 6	Ephemeral	Riverine	Non-Section 10 Non-Wetland	0.055	620	0.055	620	0
Drainage 7	Perennial	Riverine	Non-Section 10 Non-Wetland	0.25	1,523	0.25	1,523	0.75
			TOTALS	**1.839**	**9,820**	**1.839**	**9,820**	**2.96**

[1] The field surveys for this jurisdictional delineation were conducted on November 17, 2021 pursuant to the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region, Version 2.0* (Corps 2008); and *Minimum Standards for Acceptance of Aquatic Resources Delineation Reports* (Corps 2017); *The MESA Field Guide: Mapping Episodic Stream Activity* (CDFW 2014); and a *Review of Stream Processes and Forms in Dryland Watersheds* (CDFW 2010).

Approximately 1.839 acres (9,820 linear feet) of waters of the United States occur on-site. Likewise, the on-site drainage features exhibit characteristics consistent with CDFW's methodology and would be considered CDFW streambed totaling 4.8 acres (9,820 linear feet).

Any impacts to the on-site jurisdictional areas will require a Corps Clean Water Act Section 404 Permit, Regional Board CWA Section 401 Water Quality Certification, and a CDFW Section 1602 Lake and Streambed Alteration Agreement prior to Project implementation. However, based on the proposed project footprint, all of the onsite jurisdictional areas will be avoided and no impacts will occur. Refer to Sections 1-7 for a detailed analysis of site conditions and regulatory requirements.

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Section 1 Introduction

This delineation has been prepared for the Hume SoCal Campground Project (project site, site) located near Green Valley Lake within Assessor Parcel Numbers 0328-071-05, -07, and -10, and 0328-121-40 and -42 in the unincorporated community of Green Valley Lake, San Bernardino County, California (Project) in order to document the potential jurisdictional authority of the U.S. Army Corps of Engineers (Corps), the Regional Water Quality Control Board (Regional Board), and the California Department of Fish and Wildlife (CDFW) pursuant to Section 401 and 404 of the Federal Clean Water Act (CWA), the California Porter-Cologne Water Quality Control Act and Sections 1600 *et seq.* of the California Fish and Game Code. The analysis presented in this report is supported by field surveys and verification of site conditions conducted on July 31, 2023 and August 2, 2023.

This jurisdictional delineation explains the methodology undertaken by ELMT Consulting (ELMT) to define the regulatory authority of the aforementioned regulatory agencies and documents the findings made by ELMT. This report documents the jurisdictional boundaries using the most up-to-date regulations, written policy, and guidance from the regulatory agencies.

1.1 PROJECT LOCATION

The project site is generally located north, west, and south of State Route 18, and southeast of Lake Arrowhead within the San Bernardino Mountains in the unincorporated Community of Green Valley Lake, San Bernardino County, California (Exhibit 1, *Regional Vicinity*). The site is depicted on the *Keller Peak* quadrangle of the United States Geological Survey's (USGS) 7.5-minute topographic map series within Sections 28 and 33 of Township 2 North, Range 2 West (Exhibit 2, *Site Vicinity*). Specifically, the approximately 251-acre project site is transected by Green Valley Lake Road and roughly centered around the existing Hume SoCal campground facility within Assessor's Parcel Numbers (APN) 0328-071-05, -07, and -10, and 0328-121-40 and -42 (Exhibit 3, *Project Site*).

1.2 PROJECT DESCRIPTION

The Project involves the expansion of campground uses for the existing Hume SoCal campground to accommodate up to 2,854 total occupants. This would be accomplished through the continued use of existing campground structures as well as the development of additional campground and recreational structures and uses within a 251-acre area of the Green Valley Lake community. Development of the Project site would be completed in five phases.

Each phase of the Project would include the development of expanded infrastructure, additional amenities, support structures, and buildings necessary to accommodate expanded camper capacity as well as paved parking areas and paved access roadways. Refer to Appendix A, *Site Plans*.

Phase 1 of the Project would involve the development of facilities to be used as a Junior High Camp. Proposed residential structures within the Phase 1 area include an expanded welcome center, private administration and guest speaker residencies, staff housing, and student dormitories. Phase 1 also includes the development of a gymnasium, bus parking, a snack shop, a chapel, converting an existing chapel to a

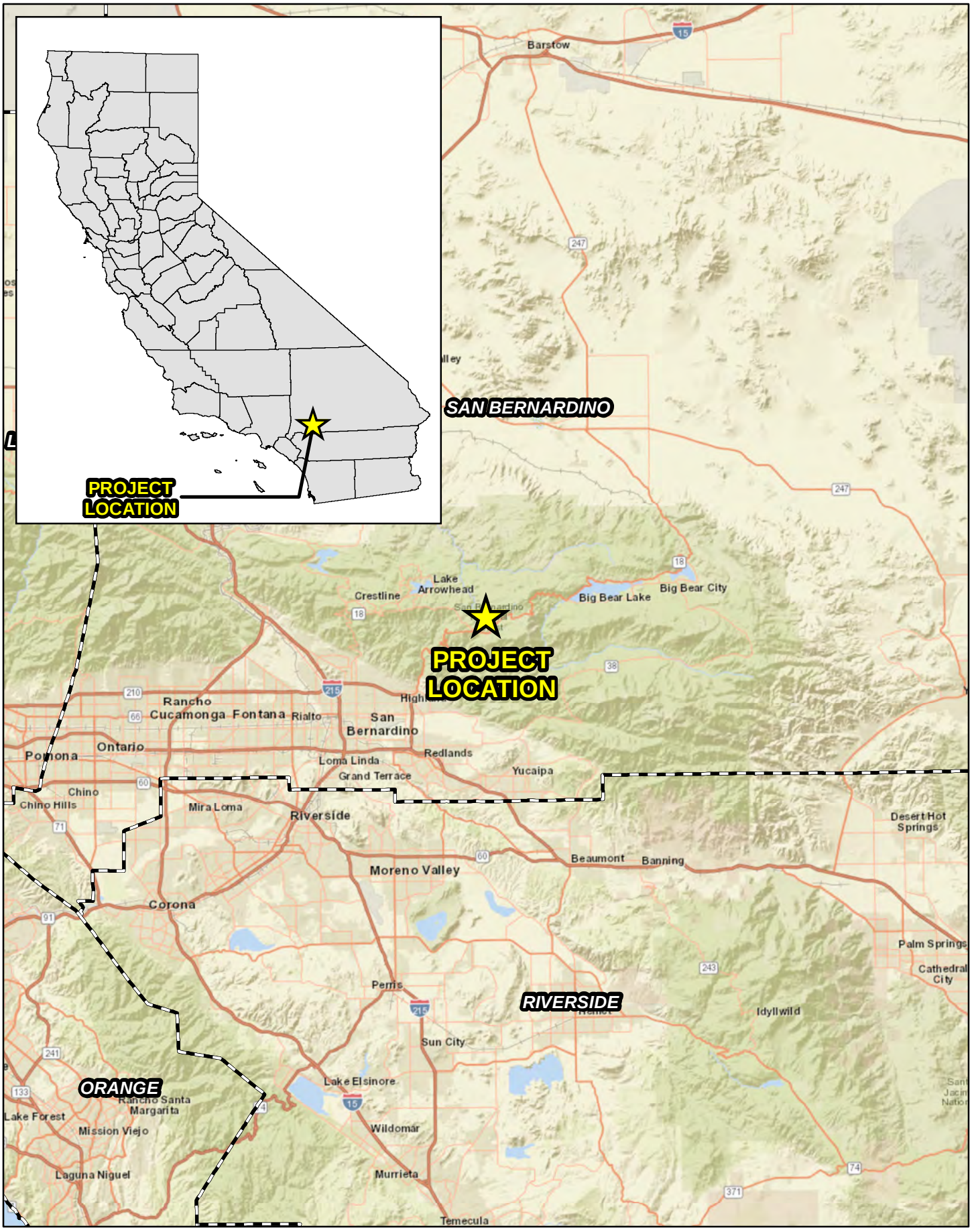
small meeting space, an expansion to the existing dining hall, a maintenance building, an amphitheater, and restrooms. Outdoor recreation facilities include grass quads. Existing and proposed facilities within Phase 1 would accommodate up to 988 guest occupants.

Phase 2 of the Project would involve the development of facilities to be used as a High School Camp. Proposed residential structures within the Phase 2 area include staff housing buildings, and student dormitories. Phase 2 also includes the development of a large dining hall, gymnasium, a chapel, amphitheater, and restrooms. Outdoor recreation facilities include grass quads, a swimming pool, and a recreation pond. Existing and proposed facilities within Phase 2 would accommodate up to 1,096 occupants.

Phase 3 of the Project proposes the development of an Adult Lodge. Phase 3 would include the development of one adult lodge with included access road. Existing and proposed facilities within Phase 3 would accommodate up to 140 occupants.

Phase 4 of the Project would include the development of an Elementary Age Camp and associated facilities. Proposed residential structures within Phase 4 include semi-permanent insulated tent structures for students. Phase 4 also includes the development of restroom facilities with showers and an amphitheater. Outdoor recreation facilities include grass quads, a dining canopy, a swimming pool, and a recreation pond. Existing and proposed facilities within Phase 4 would accommodate up to 500 occupants.

Phase 5 of the Project proposes the creation of a tent-based youth camp, Wildwood Camp. Residential structures proposed for this phase consist of semi-permanent insulated tent structures. Phase 5 also includes the development of restroom facilities with showers and an amphitheater. Outdoor recreation facilities include grass quads, a dining canopy, a swimming pool, and a recreation pond. Existing and proposed facilities within Phase 5 would accommodate up to 130 occupants.

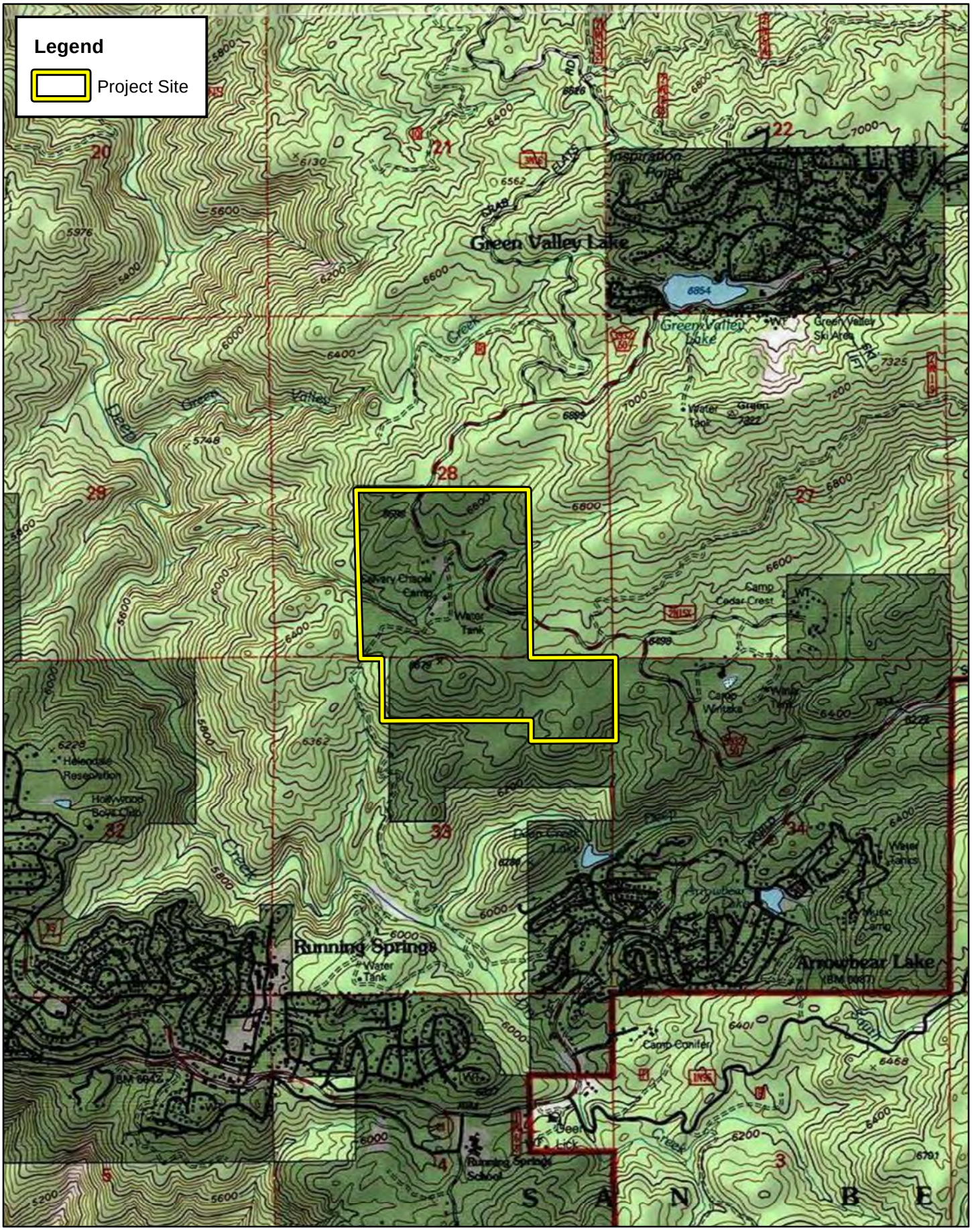


ELMT CONSULTING

HUME SO CAL CAMPGROUND PROJECT

Regional Vicinity

Exhibit 1



ELMT CONSULTING

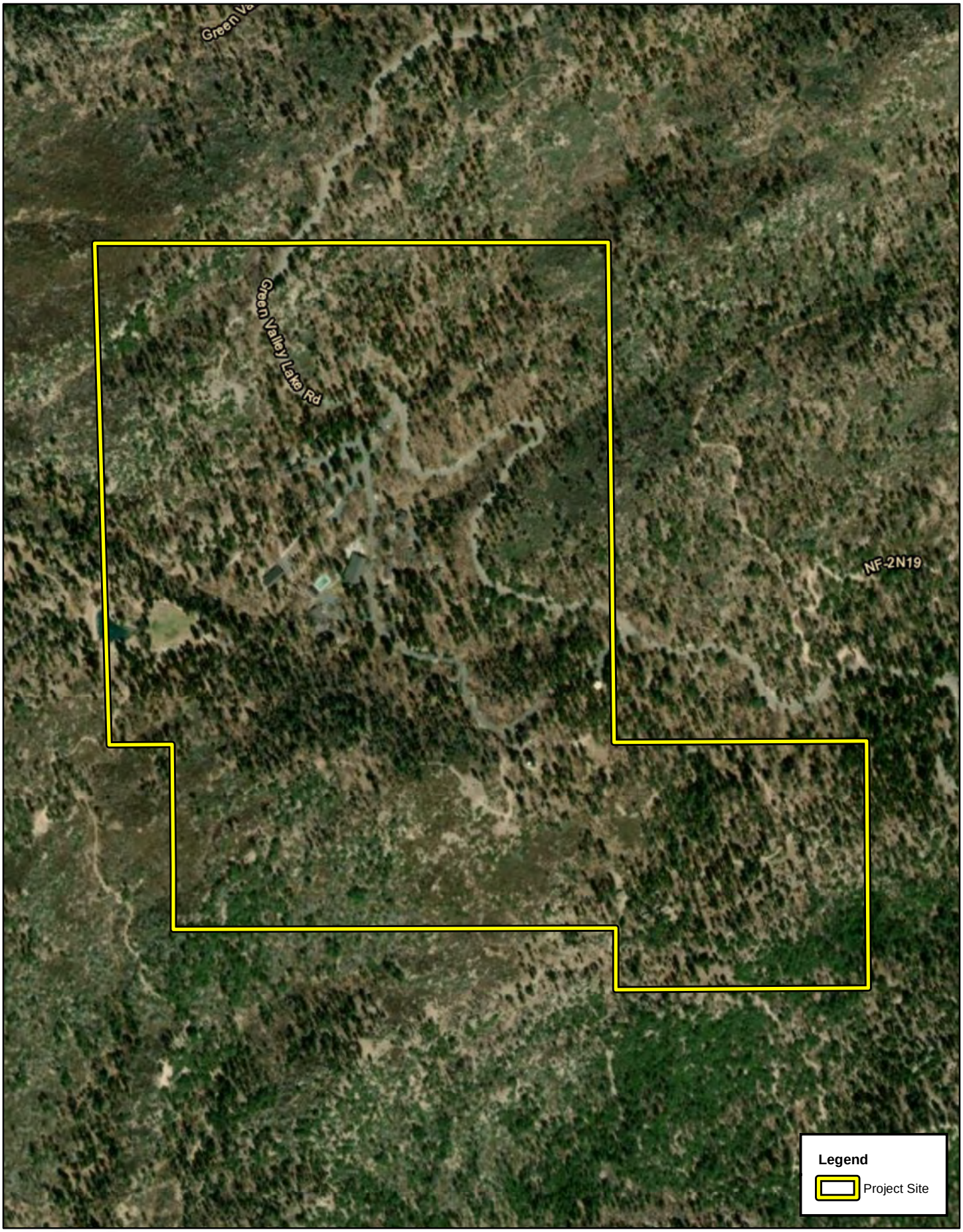
0 1,000 2,000 4,000 Feet

Source: USA Topographic Map, San Bernardino County

HUME SO CAL CAMPGROUND PROJECT

Site Vicinity

Exhibit 2



ELMT CONSULTING

0 500 1,000 2,000 Feet

HUME SO CAL CAMPGROUND PROJECT

Project Site

Source: ESRI Aerial Imagery, San Bernardino County

Exhibit 3

Section 2 Regulations

There are three key agencies that regulate activities within inland streams, wetlands, and riparian areas in California. The Corps Regulatory Division regulates activities pursuant to Section 404 of the CWA, Section 10 of the Rivers and Harbors Act, and Section 103 of the Marine Protection, Research, and Sanctuaries Act. The Regional Board regulates activities pursuant to Section 401 of the CWA and the California Porter-Cologne Water Quality Control Act and the CDFW regulates activities under Sections 1600 *et seq*. of the California Fish and Game Code.

2.1 U.S. ARMY CORPS OF ENGINEERS

Since 1972, the Corps and U.S. Environmental Protection Agency (EPA) have jointly regulated the discharge of dredged or fill material into waters of the United States, including wetlands, pursuant to Section 404 of the CWA. The Corps and EPA define "fill material" to include any "material placed in waters of the United States where the material has the effect of: (i) replacing any portion of a water of the United States with dry land; or (ii) changing the bottom elevation of any portion of the waters of the United States." Examples include, but are not limited to, sand, rock, clay, construction debris, wood chips, and "materials used to create any structure or infrastructure in the waters of the United States."

2.2 REGIONAL WATER QUALITY CONTROL BOARD

Pursuant to Section 401 of the CWA, any applicant for a federal license or permit to conduct any activity which may result in any discharge to waters of the United States must provide certification from the State or Indian tribe in which the discharge originates. This certification provides for the protection of the physical, chemical, and biological integrity of waters, addresses impacts to water quality that may result from issuance of federal permits and helps insure that federal actions will not violate water quality standards of the State or Indian tribe. In California, there are nine Regional Boards that issue or deny certification for discharges to waters of the United States and waters of the State, including wetlands, within their geographical jurisdiction. The State Water Resources Control Board (SWRCB) assumes this responsibility when a project has the potential to result in the discharge to waters within multiple Regional Boards.

Additionally, the California Porter-Cologne Water Quality Control Act gives the State very broad authority to regulate waters of the State, which are defined as any surface water or groundwater, including saline waters. The Porter-Cologne Water Quality Control Act has become an important tool post *Solid Waste Agency of Northern Cook County vs. United States Corps of Engineers*[2] (SWANCC) and *Rapanos v. United States*[3] (Rapanos) court cases with respect to the State's regulatory authority over isolated and insignificant waters. Generally, any applicant proposing to discharge waste into a water body must file a Report of Waste Discharge in the event that there is no Section 404/401 nexus. Although "waste" is partially defined as any waste substance associated with human habitation, the Regional Board also interprets this to include discharge of dredged and fill material into water bodies.

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2 Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers, 531 U.S. 159 (2001)
3 Rapanos v. United States, 547 U.S. 715 (2006)

Under the State Water Resources Control Board Sate Wetland Definition, an area is a wetland if, under normal circumstances, (1) the area has continuous or recurrent saturation of the upper substrate caused by groundwater, or shallow surface water, or both; (2) the duration of such saturation is sufficient to cause anaerobic conditions in the upper substrate; and (3) the area's vegetation is dominated by hydrophytes or the area lacks vegetation.

2.3 CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE

Sections 1600 *et seq.* of the California Fish and Game Code establishes a fee-based process to ensure that projects conducted in and around lakes, rivers, or streams do not substantially adversely impact fish and wildlife resources, or, when adverse impacts cannot be avoided, ensures that adequate mitigation and/or compensation is provided. Pursuant to Section 1602 of the California Fish and Game Code, a notification must be submitted to the CDFW for any activity that will divert or obstruct the natural flow or alter the bed, channel, or bank (which may include associated biological resources) of a river or stream or use material from a streambed. One CDFW guidance document, although not a formally adopted rule or policy, requires notification for activities taking place within rivers or streams that flow perennially or episodically and that are defined by the area in which surface water currently flows, or has flowed, over a given course during the historic hydrologic regime, and where the width of its course can reasonably be identified by physical and biological indicators. If the project will not "substantially adversely affect an existing fish or wildlife resource," following notification to CDFW, the project may commence without an agreement with CDFW. (Fish & G. Code, § 1602(a)(4)(A)(i).)

Section 3 Methodology

The analysis presented in this report is supported by field surveys and verification of site conditions conducted on July 31, 2023 and August 2, 2023. ELMT conducted a field delineation to determine the jurisdictional limits of "waters of the State" and jurisdictional streambed (including potential wetlands), located within the boundaries of the project site. While in the field, jurisdictional features were recorded on an aerial base map at a scale of 1" = 50' using topographic contours and visible landmarks as guidelines. Data points were obtained with a Garmin Map62 Global Positioning System to record and identify specific widths for ordinary high water mark (OHWM) indicators and the locations of photographs, soil pits, and other pertinent jurisdictional features, if present. This data was then transferred as a .shp file and added to the Project's jurisdictional exhibits. The jurisdictional exhibits were prepared using ESRI ArcInfo Version 10 software.

3.1 WATERS OF THE UNITED STATES

In the absence of adjacent wetlands, the limits of the Corps jurisdiction in non-tidal waters extend to the OHWM, which is defined as "*. . . that line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas.*"[4] Indicators of an OHWM are defined in *A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States* (Corps 2008). An OHWM can be determined by the observation of a natural line impressed on the bank; shelving; changes in the character of the soil; destruction of terrestrial vegetation; presence of litter and debris; wracking; vegetation matted down, bent, or absent; sediment sorting; leaf litter disturbed or washed away; scour; deposition; multiple observed flow events; bed and banks; water staining; and/or change in plant community. The Regional Board shares the Corps' jurisdictional methodology, unless SWANCC or Rapanos conditions are present. In the latter case, the Regional Board considers such drainage features to be jurisdictional waters of the State.

In accordance with the Revised Definition of "Waters of the United States"; Conforming (September 8, 2023), "waters of the United Sates" are defined as follows:

(a) ***Waters of the United States*** means:

(1) Waters which are:
(i) Currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;
(ii) The territorial seas; or
(iii) Interstate waters;

[4] CWA regulations 33 CFR §328.3(e).

(2) Impoundments of waters otherwise defined as waters of the United States under this definition, other than impoundments of waters identified under paragraph (a)(5) of this section;

(3) Tributaries of waters identified in paragraph (a)(1) or (2) of this section that are relatively permanent, standing or continuously flowing bodies of water;

(4) Wetlands adjacent to the following waters:
(i) Waters identified in paragraph (a)(1) of this section; or
(ii) Relatively permanent, standing or continuously flowing bodies of water identified in paragraph (a)(2) or (a)(3) of this section and with a continuous surface connection to those waters;

(5) Intrastate lakes and ponds not identified in paragraphs (a)(1) through (4) of this section that are relatively permanent, standing or continuously flowing bodies of water with a continuous surface connection to the waters identified in paragraph (a)(1) or (a)(3) of this section

(b) The following are not "waters of the United States" even where they otherwise meet the terms of paragraphs (a)(2) through (5) of this section:

(1) Waste treatment systems, including treatment ponds or lagoons, designed to meet the requirements of the Clean Water Act;

(2) Prior converted cropland designated by the Secretary of Agriculture. The exclusion would cease upon a change of use, which means that the area is no longer available for the production of agricultural commodities. Notwithstanding the determination of an area's status as prior converted cropland by any other Federal agency, for the purposes of the Clean Water Act, the final authority regarding Clean Water Act jurisdiction remains with EPA;

(3) Ditches (including roadside ditches) excavated wholly in and draining only dry land and that do not carry a relatively permanent flow of water;

(4) Artificially irrigated areas that would revert to dry land if the irrigation ceased;
(5) Artificial lakes or ponds created by excavating or diking dry land to collect and retain water and which are used exclusively for such purposes as stock watering, irrigation, settling basins, or rice growing;
(6) Artificial reflecting or swimming pools or other small ornamental bodies of water created by excavating or diking dry land to retain water for primarily aesthetic reasons;

(7) Waterfilled depressions created in dry land incidental to construction activity and pits excavated in dry land for the purpose of obtaining fill, sand, or gravel unless and until the construction or excavation operation is abandoned and the resulting body of water meets the definition of waters of the United States; and

(8) Swales and erosional features (*e.g.,* gullies, small washes) characterized by low volume, infrequent, or short duration flow.

(c) In this section, the following definitions apply:

(1) ***Wetlands*** means those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

(2) ***Adjacent*** means having a continuous surface connection

(3) ***High tide line*** means the line of intersection of the land with the water's surface at the maximum height reached by a rising tide. The high tide line may be determined, in the absence of actual data, by a line of oil or scum along shore objects, a more or less continuous deposit of fine shell or debris on the foreshore or berm, other physical markings or characteristics, vegetation lines, tidal gages, or other suitable means that delineate the general height reached by a rising tide. The line encompasses spring high tides and other high tides that occur with periodic frequency but does not include storm surges in which there is a departure from the normal or predicted reach of the tide due to the piling up of water against a coast by strong winds such as those accompanying a hurricane or other intense storm.

(4) ***Ordinary high water mark*** means that line on the shore established by the fluctuations of water and indicated by physical characteristics such as clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas.

(5) ***Tidal waters*** means those waters that rise and fall in a predictable and measurable rhythm or cycle due to the gravitational pulls of the moon and sun. Tidal waters end where the rise and fall of the water surface can no longer be practically measured in a predictable rhythm due to masking by hydrologic, wind, or other effects.

Pursuant to the Corps Wetland Delineation Manual (Corps 1987), the identification of wetlands is based on a three-parameter approach involving indicators of hydrophytic vegetation, hydric soils, and wetland hydrology. In order to qualify as a wetland, a feature must exhibit at least minimal characteristics within each of these three parameters. It should also be noted that both the Regional Board and CDFW follow the methods utilized by the Corps to identify wetlands. For this project location, Corps jurisdictional wetlands are delineated using the methods outlined in the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region, Version 2.0* (Corps 2008).

3.2 WATERS OF THE STATE

3.2.1 REGIONAL WATER QUALITY CONTROL BOARD

The California *Porter-Cologne Water Quality Control Act* gives the Regional Board very broad authority to regulate waters of the State, which are defined as any surface water or groundwater, including saline waters. The Regional Board shares the Corps' methodology for delineating the limits of jurisdiction based on the identification of OHWM indicators and utilizing the three parameter approach for wetlands.

3.2.2 CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE

Sections 1600 *et seq*. of the California Fish and Game Code applies to all perennial, intermittent, and ephemeral rivers, streams, and lakes in the State. CDFW Regulations define "stream" as "a body of water that flows at least periodically or intermittently through a bed or channel having banks and that supports fish or other aquatic life. This includes watercourses having a surface or subsurface flow that supports or has supported riparian vegetation." (14 Cal. Code Regs., § 1.72.) For this project location, CDFW jurisdictional limits were delineated using this definition of "stream."

Section 4 Literature Review

ELMT conducted a thorough review of relevant literature and materials to preliminarily identify areas that may fall under the jurisdiction of the regulatory agencies. A summary of materials utilized during ELMT's literature review is provided below and in Appendix A, *Documentation*. In addition, refer to Section 8 for a complete list of references used throughout the course of this delineation.

4.1 WATERSHED REVIEW

The project site is located near the southern limits of the Mojave Watershed (HUC 18090208). The Mojave Watershed is a large, closed basin in the western Mojave Desert that occurs within central and western San Bernardino County and drains approximately 4,500 square miles. The primary geographic and hydrologic feature of the Mojave Watershed is the Mojave River, which occurs approximately 11.2 miles to the northwest of the site. The headwaters of the Mojave River are in the San Bernardino Mountains, which annually receives greater than forty inches of precipitation at its highest elevations. Much of the winter precipitation in the San Bernardino Mountains falls in the form of snow, which provides spring recharge to the Mojave River system. This results in an annual recharge to the Mojave River of approximately 75,000 acre-feet. The Mojave River transects the watershed north and east to its terminus at Silver Lake, just north of the Community of Baker. Elevations within the watershed range from 8,500 feet above mean sea level at Butler Peak in the San Bernardino Mountains to 1,400 feet above mean sea level at Afton Canyon near the terminus of the Mojave River. There are multiple intermittent or ephemeral waterways in the eastern portion of the watershed which convey surface water runoff to Silver Lake during extreme rain events. Silver Lake remains dry most of the year. Aside from extreme rain events, the Mojave River channel is typically dry downstream of the Mojave Forks Dam, except in certain locations where groundwater is forced to the surface by geologic influences.

South of Mojave Forks Dam, the Mojave River is fed by the West Fork Mojave River to the west, which also forms the Mojave River Forks Reservoir, and Deep Creek to the east. The headwater tributaries of Deep Creek occur within the surrounding 2 to 3 miles surrounding the site, and the nearest portions of Deep Creek to the site occur approximately 0.22 miles to the south and 0.46 miles to the west, circling around the site along local topography before flowing northward.

4.2 LOCAL CLIMATE

Southwestern San Bernardino County features a somewhat cooler version of a Mediterranean climate, or semi-arid climate, with warm, sunny, dry summers and cool, rainy, mild winters. Relative to other areas in Southern California, the upper elevations of the San Bernardino Mountains are influenced by a steppe climate, with colder, snowy winters and cold morning temperatures common. Climatological data obtained for the nearby City of Big Bear Lake indicates the annual precipitation averages 12.56 inches per year. The majority of precipitation in the form of rain occurs in the months between December and March, with hardly any occurring between the months of May and June. The wettest months are January and February, with monthly average total precipitation of 1.93 and 2.24 inches, respectively, and the driest months are May and June, with monthly average total precipitation of 0.47 and 0.20 inches, respectively. The average maximum and minimum temperatures are 61.1- and 41.1-degrees Fahrenheit (° F), respectively, with July

(monthly average high 77.7° F) being the hottest month and February (monthly average lows 29.5° F) being the coldest. The temperature during both site visits was in the mid-70s ° F with clear skies and calm winds.

4.3 USGS TOPOGRAPHIC QUADRANGLE

The USGS 7.5 Minute Series Topographic Quadrangle maps show geological formations and their characteristics, describing the physical setting of an area through contour lines and major surface features including lakes, rivers, streams, buildings, landmarks, and other factors that may fall under an agency's jurisdiction. Additionally, the maps depict topography through color and contour lines, which are helpful in determining elevations and latitude and longitude within the project site.

The project site is depicted on the Keller Peak quadrangle of the United States Geological Survey's (USGS) 7.5-minute topographic map series within Sections 28 and 33 of Township 2 North, Range 2 West. According to the topographic map, the project site consists almost entirely of vacant/undeveloped land that supports natural plant communities with campground facilities and other infrastructure scattered throughout.

Elevation on project site ranges from to 6,280 to 6,760 feet above mean sea level and is highly variable, consisting of steep slopes and valleys generally sloping from north to south.

4.4 AERIAL PHOTOGRAPHS

Prior to conducting the field delineation, ELMT reviewed current and historical aerial photographs (1985-2022) of the project as available from Google Earth Pro Imaging. Aerial photographs can be useful during the delineation process, as they often indicate the presence of drainage features and riverine habitat within the boundaries of the project site, if any.

According to the 1995 through 2022 aerial photographs, the project site has supported the majority of existing campground facilities, roads, and infrastructure since 1995. The only major observable changes occurring on-site since 1995 are occasional paving/resurfacing of access roads and parking areas, and the installation of a paved parking are and adjoining facilities structures along the southern limits of the existing campground between 2015 and 2016.

Despite the presence of structures, access roads, and existing land uses associated with campground activities, undeveloped portions of the project site generally support natural plant communities consistent with nearby open spaces. Undeveloped portions of the site support sprawling forests and riparian woodlands are present along perennial waterways. In addition, the site supports two (2) land cover types that would be classified as disturbed and developed. Refer to Appendix B, *Site Photographs*.

4.5 SOILS

Soils within and adjacent to the Project site were researched prior to the field delineation using the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Custom Soil Resource Report for San Bernardino National Forest Area, California. Soil surveys furnish soil maps and

interpretations originally needed in providing technical assistance to farmers and ranchers; in guiding other decisions about soil selection, use, and management; and in planning, research, and disseminating the results of the research. In addition, soil surveys are now heavily utilized in order to obtain soil information with respect to potential wetland environments and jurisdictional areas (i.e., soil characteristics, drainage, and color).

Based on the NRCS USDA Web Soil Survey, the project site is underlain by Cedarpines-Plaskett-Stargazer complex (30 to 50 percent slopes), Cedarpines-Stargazer-Urban land complex (15 to 30 percent slopes), Rock outcrop-Cedarpines-Plaskett complex (15 to 35 percent slopes), Runningsprings-Cedarpines-Plaskett complex (15 to 35 percent slopes), and Urban land. Soils underlying the camp portions of the site have been disturbed and compacted by on-site and surrounding development, infrastructure, and dirt and paved roads.

4.6 HYDRIC SOILS LIST OF CALIFORNIA

ELMT reviewed the USDA NRCS Hydric Soils List of California in an effort to verify whether on-site soils are considered to be hydric[5]. It should be noted that lists of hydric soils along with soil survey maps provide off-site ancillary tools to assist in wetland determinations, but they are not a substitute for field investigations. The presence of hydric soils is initially investigated by comparing the mapped soil series for the site to the County list of hydric soils. According to the hydric soils list, none of the soil types mapped as underlying the project site have been listed as hydric in San Bernardino National Forest, California.

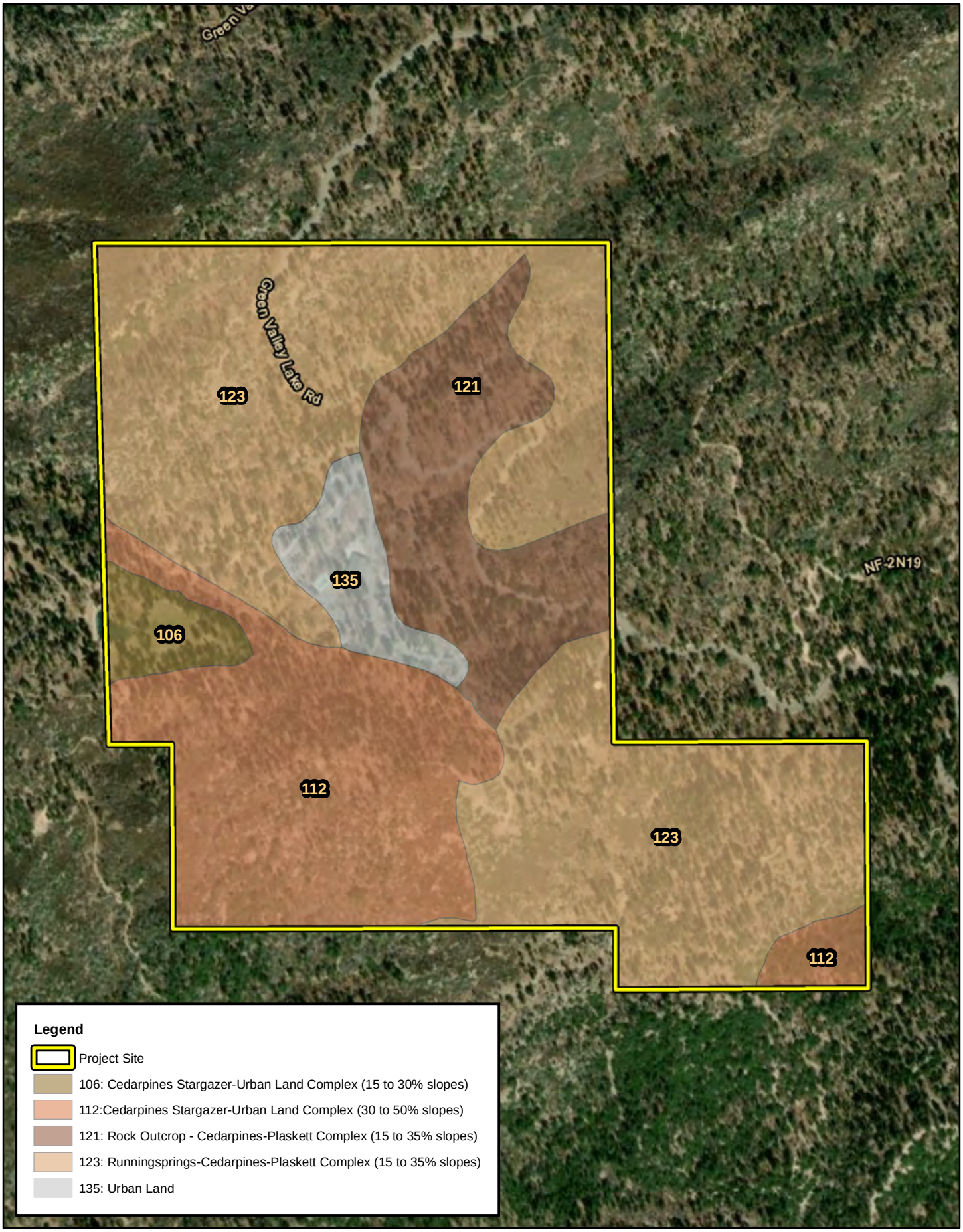
4.7 NATIONAL WETLANDS INVENTORY

ELMT reviewed the U.S. Fish and Wildlife Service's (USFWS) National Wetland Inventory maps. Based on this review, no wetland features have been mapped within the boundaries of the project site. One (1) riverine resource was mapped on-site, entering the northern portion of the eastern boundary and traversing southwest towards the western portion of the site, then veering northwest to exit the northern portion of the western boundary. This feature is mapped in association with a tributary of Deep Creek, the named portion of which flows westward out of the valleys to the east and south of the site before veering north to the west of the site. Refer to Appendix A, *Documentation*.

4.8 FLOOD ZONE

The Federal Emergency Management Act (FEMA) website was searched for flood data for the project site. Based on Flood Insurance Rate Map No. 06071C8000H, the project site is located within Zone D – areas with flood risk due to levees. Refer to Appendix A, *Documentation.*

[5] A hydric soil is a soil that formed under conditions of saturation, flooding or ponding long enough during the growing season to develop anaerobic conditions in the upper part.



ELMT CONSULTING

HUME SO CAL CAMPGROUND PROJECT

Soils

Source: ESRI Aerial Imagery, Soil Survey Geographic Database, San Bernardino County

Exhibit 4

Section 5 Site Conditions

ELMT biologists Jacob H. Lloyd Davies, Rachael A. Lyons, and Megan E. Peukert conducted a field delineation on July 31, 2023, and August 2, 2023 to verify existing site conditions and document the extent of potential jurisdictional areas within the boundaries of the project site. ELMT field staff encountered no limitations during the field delineation.

5.1 ON-SITE FEATURES

5.1.1 DRAINAGE FEATURES

Three (3) perennial drainage features and four (4) ephemeral drainage features were observed within the boundaries of the project site during the field delineation (refer to Exhibit 5, *Jurisdictional Areas*). ELMT carefully assessed the site for depressions, inundation, presence of hydrophytic vegetation, staining, cracked soil, ponding, and indicators of active surface flow and corresponding physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris. Suspected jurisdictional areas were checked for the presence of definable channels, soils, and hydrology. The drainage features mapped on-site are numbered from west to east as they occur within the project site.

Drainage 1

Drainage 1 corresponds to the mapped riverine resource documented in the NWI query and is the largest and main drainage supported on the project site. This drainage is a perennial creek and traverses the entire site in an overall westerly direction. This drainage enters the northern portion of the eastern boundary and traverses to the southwest and then northwest until exiting the site near the middle of the western boundary. Flows within Drainage 1 are conveyed for approximately 2,964 linear feet before exiting the site. Surface water was present throughout most of Drainage 1. Further evidence of an OHWM was observed via scour, changes in substrate, shelving, and lack of vegetation. The OHWM of Drainage 1 ranged from approximately 2 to 35 feet. Riparian vegetation is supported along most of the middle and eastern portions of Drainage 1. The channel bottom consists of exposed bedrock, cobble, and silty substrates. After flowing off-site, Drainage 1 is a direct tributary to Deep Creek, which occurs approximately 3,560 linear feet downstream to the east.

Two (2) plant communities occur along Drainage 1: Mixed Conifer Forest and Willow Riparian Woodland. The Mixed Conifer Forest plant community is co-dominated by conifer species such as Jeffrey pine (*Pinus jeffreyi*), sugar pine (*Pinus lambertiana*), and bigcone Douglas-fir (*Pseudotsuga macrocarpa*), and supports lesser dominance of oak species such as California black oak (*Quercus kelloggii*) and canyon live oak (*Quercus chrysolepis*). Understories are variable, with some areas supporting dense understories of shrubs and a dense herbaceous later, and some areas relatively lacking understories. Other common plant species observed in this plant community include bigberry manzanita (*Arctostaphylos glauca*), Sierra lotus (*Acmispon decumbens*), California false indigo (*Amorpha californica*, FAC), coffee berry (*Frangula californica*), diffuse groundsmoke (*Gayophytum diffusum*), California aster (*Corethrogyne filaginifolia*), woollypod milkweed (*Asclepias eriocarpa*), goldenstar (*Bloomeria crocea*), giant red Indian paintbrush

(*Castilleja miniate*, FAC), mountain gooseberry (*Ribes montigenum*), Grinnell's beardtongue (*Penstemon grinnellii*), Bridge's penstemon (*Penstemon rostriflorus*), snowplant (*Sarcodes sanguinea*), western wallflower (*Erysimum capitatum*), giant woollystar (*Eriastrum densifolium*), yarrow (*Achillea millefolium* FACU), common bracken fern (*Pteridium aquilinum*, FACU), woodland strawberry (*Fragaria vesca*, UPL), California fuchsia (*Epilobium canum*), and rainbow iris (*Iris hartwegii*, FACU).

The Willow Riparian Woodland plant community is consolidated to riparian areas along much of the middle and eastern portions of Drainage 1, where underlying substrates and immediate topography allows associated species to establish. This plant community is dominated by arroyo willow (*Salix lasiolepis*, FACW), Pacific willow (*Salix lasiandra*, FACW), Scouler willow (*Salix scouleriana*, FAC), and typically supports densely vegetated understories with a varied shrub layer and robust herbaceous layer. Other common species observed in this plant community include yarrow, woodland strawberry, western columbine (*Aquilegia formosa*, FAC), musk monkeyflower (*Erythranthe moschata*, FACW), seep monkeyflower (*Erythranthe guttata*, FAC), cardinal monkeyflower (*Erythranthe cardinalis*, FACW), broadleaf lupine (*Lupinus latifolius*, FACW), mountain pink currant (*Ribes nevadense*, FAC), silver maple (*Acer saccharinum*, FAC), quaking aspen (*Populus tremuloides*, FACU), soft rush (*Juncus effusus*, FACW), willow dock (*Rumex salicifolius*, FACW), watercress (*Nasturtium officinale*, OBL), willow herb (*Epilobium ciliatum*, FACW), perennial pepperweed (*Lepidium latifolium*, FAC), common water weed (*Elodea canadensis*, OBL), and fragile sheathed sedge (*Carex fracta*, FAC).

Drainage 2

Drainage 2 is an ephemeral drainage feature that originates on a south-facing slope in the northwest portion of the project site. This drainage conveys flows south and southwest for approximately 893 linear feet until its confluence with Drainage 1. No surface water was present within Drainage 2. Evidence of an OHWM was observed via scour, changes in substrate, shelving, and lack of vegetation. The OHWM of Drainage 2 ranged from approximately 2 to 20 feet. No riparian vegetation is present within Drainage 2, which only supports upland plant species. This drainage supports a Mixed Conifer Forest and Willow Riparian Woodland plant community similar to that observed in Drainage 1.

Drainage 3

Drainage 3 is an ephemeral drainage feature that originates on a south-facing slope in the northwest portion of the project site. This drainage conveys flows to the southwest for approximately 324 linear feet until its confluence with Drainage 1. No surface water was present within Drainage 2. Evidence of an OHWM was observed via scour, changes in substrate, shelving, and lack of vegetation. The OHWM of Drainage 2 ranged from approximately 2 to 7 feet. No riparian vegetation is present within Drainage 2, which only supports upland plant species. This drainage supports a Mixed Conifer Forest and Willow Riparian Woodland plant community similar to that observed in Drainage 1.

Drainage 4

Drainage 4 is a perennial creek that originates off-site to the north. This drainage enters the eastern portion of the northern boundary of the project site and conveys flows to the southwest until converging with Drainage 1. Flows are conveyed beneath Green Valley Lake Road via a 4-foot-wide culvert into an earthen spillway, which also receives surface flows from Green Valley Lake Road. Flows within Drainage 4 are conveyed for approximately 1,622 linear feet before entering Drainage 1. Surface water was present

throughout Drainage 4. Further evidence of an OHWM was observed via scour, changes in substrate, shelving, and lack of vegetation. The OHWM of Drainage 4 ranged from approximately 2 to 20 feet. Riparian vegetation is supported along the majority of the drainage. The channel bottom consists of exposed bedrock, cobble, and silty substrates. Drainage 4 supports the same Mixed Conifer Forest and Willow Riparian Woodland plant communities observed in Drainage 1.

Drainage 5

Drainage 5 is an ephemeral drainage feature that originates on a south-facing slope in the middle portion of the project site near Green Valley Lake Road. This feature conveys surface flows south and west for approximately 1,504 linear feet until its confluence with Drainage 1. No surface water was present within Drainage 5, although riparian vegetation was present. Evidence of an OHWM was observed via scour, changes in substrate, shelving, and lack of vegetation. The OHWM of Drainage 5 ranged from approximately 2 to 6 feet. This drainage supports a Mixed Conifer Forest and Willow Riparian Woodland plant community similar to that observed in Drainage 1.

Drainage 6

Drainage 6 is an ephemeral drainage feature that originates on a south-facing slope in the middle portion of the project site near Green Valley Lake Road. This feature conveys surface flows southwest for approximately 620 linear feet until its confluence with Drainage 5. No surface water was present within Drainage 5, although riparian vegetation was present. Evidence of an OHWM was observed via scour, changes in substrate, shelving, and lack of vegetation. The OHWM of Drainage 6 ranged from approximately 2 to 4 feet. This drainage supports a Mixed Conifer Forest and Willow Riparian Woodland plant community similar to that observed in Drainage 1.

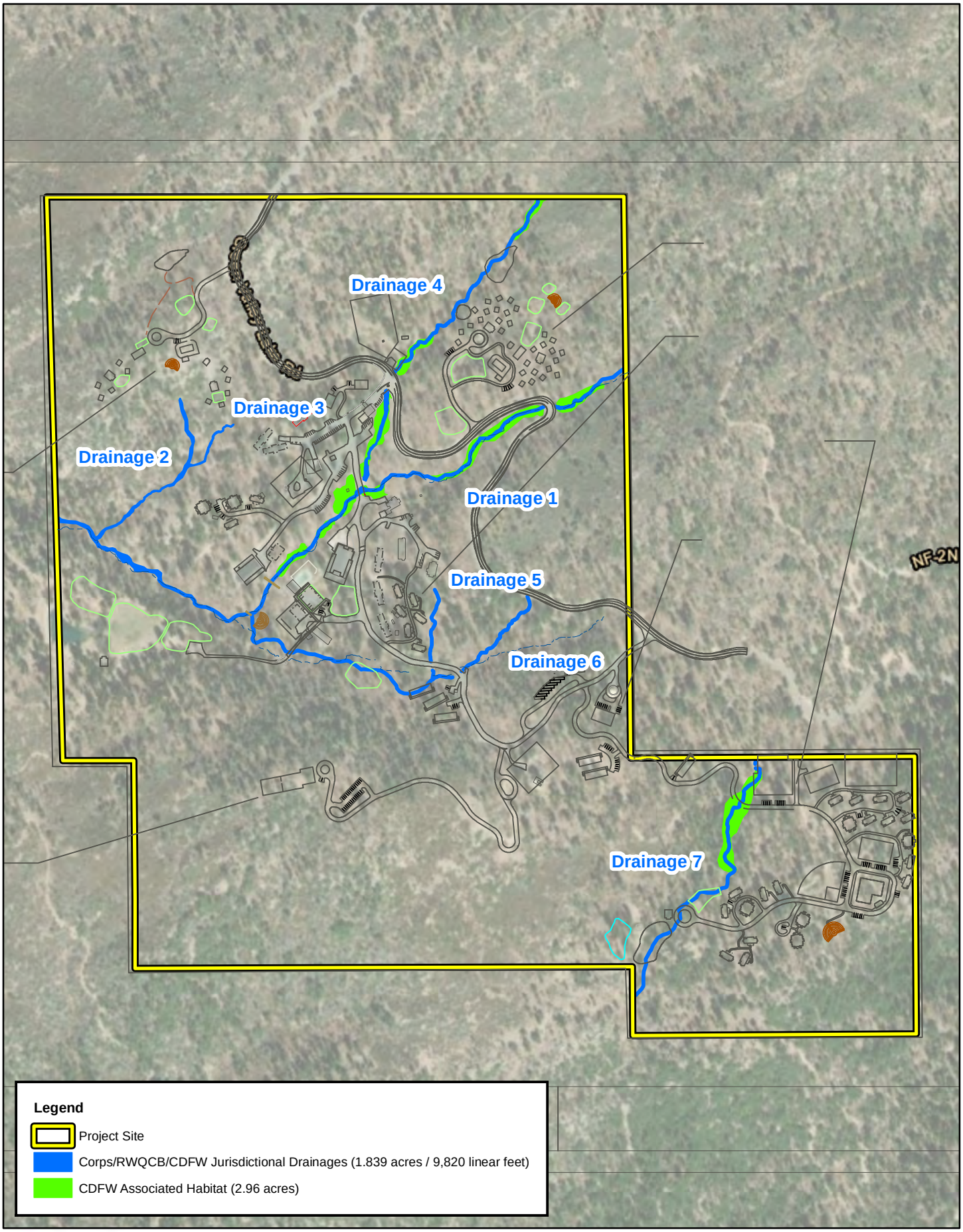
Drainage 7

Drainage 7 includes both ephemeral and perennial drainage features. The upper limits of Drainage 7 are ephemeral in nature and originate off-site near Green Valley Lake Road, just north of the southeast portion of the project site. Flows are collected from Green Valley Lake Road and are conveyed to the southwest towards a culvert beneath an access road. Just beyond this access road, perennial flows enter the drainage via a series of culverts and are conveyed further southwest until exiting site boundaries and continuing southwest along local topography. No surface water was observed upstream of the access road, but is present just downstream of the access road, where riparian vegetation and a narrow patch of wetland is present. Drainage 7 conveys flows for approximately 1,523 linear feet while within site boundaries. Further evidence of an OHWM was observed via scour, changes in substrate, shelving, changes in vegetation, and static water conditions. The OHWM of Drainage 7 ranged from approximately 2 to 16 feet. Riparian vegetation is supported along the majority of the drainage. The channel bottom consists of exposed bedrock, cobble, and silty substrates. Drainage 7 supports the same Mixed Conifer Forest and Willow Riparian Woodland plant communities observed in Drainage 1. After flowing off-site, Drainage 7 is a direct tributary to Deep Creek, which occurs approximately 1,400 linear feet downstream to the south.

5.1.2 WETLAND FEATURES

In order to qualify as a wetland, a feature must exhibit all three wetland parameters (i.e., vegetation, soils, and hydrology) described in the Corps Arid West Regional Supplement. Although evidence of hydrology

(i.e., scour, changes in substrate, shelving) and open water are present, no hydric soils have been mapped as occurring on-site and no anaerobic conditions were observed. While hydrophytic vegetation was observed in portions of Drainages 1, 4, 5, 6, and 7, flows within these drainage features remain sufficiently consistent to prevent the establishment of wetland conditions. Areas with open water tend to be underlain by exposed bedrock with limited, scattered pockets of silty deposits approximately 2 to 6 inches in depth, and surface flows constantly replace existing open water, preventing the development of hydric soil (anaerobic) conditions. As a result, no features on-site meet the Corps' or Regional Board's wetland definition to qualify as jurisdictional wetlands.



ELMT CONSULTING

Source: ESRI Aerial Imagery, San Bernardino County

HUME SO CAL CAMPGROUND PROJECT

Jurisdictional Areas

Exhibit 5

Section 6 Findings

This report presents ELMT's best effort at determining the extent of jurisdictional features using the most up-to-date regulations, written policy, and guidance from the regulatory agencies.

6.1 U.S. ARMY CORPS OF ENGINEERS DETERMINATION

6.1.1 WATERS OF THE UNITED STATES DETERMINATION

Prior to leaving the site, surface flows from Drainages 2 through 6 are conveyed to Drainage 1, which exits the western boundary of the site and conveys flows westward to Deep Creek. Drainage 7 also bears a direct connection to Deep Creek, conveying flows off-site to the south. Deep Creek conveys flows along local topography to the northwest until its confluence with Mojave Fork West at Mojave Forks Dam, which consolidates flows from these features and directs them northward within the Mojave River.

All of the onsite drainage features have a surface hydrologic connection to downstream waters of the United States. Approximately 1.839 acres (9,820 linear feet) of waters of the United States occur on-site.

6.1.2 FEDERAL WETLAND DETERMINATION

An area must exhibit all three wetland parameters described in the Corps Arid West Regional Supplement to be considered a jurisdictional wetland. Based on the results of the field delineation, it was determined that no areas within the project site met all three wetland parameters. Therefore, no jurisdictional wetland features exist within the project site.

6.2 REGIONAL WATER QUALITY CONTROL BOARD

6.2.1 WATERS OF THE STATE DETERMINATION

The on-site drainage feature exhibits characteristics consistent with the Regional Board's methodology and would likely be considered jurisdictional waters of the State. Approximately 1.839 acres (9,820 linear feet) of non-wetland waters of the State occur on-site.

6.2.2 STATE WETLAND DETERMINATION

Under the State Water Resources Control Board Sate Wetland Definition, an area is a wetland if, under normal circumstances, (1) the area has continuous or recurrent saturation of the upper substrate caused by groundwater, or shallow surface water, or both; (2) the duration of such saturation is sufficient to cause anaerobic conditions in the upper substrate; and (3) the area's vegetation is dominated by hydrophytes or the area lacks vegetation.

Based on the results of the field delineation, it was determined that no areas within the project site meet the State Wetland Definition. Therefore, no state wetland features exist within the project site.

6.3 CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE

The on-site drainage features exhibit characteristics consistent with CDFW's methodology and would be considered CDFW streambed. Approximately 4.8 acres (9,820 linear feet) of CDFW jurisdiction was mapped within boundaries of the Project site.

Section 7 Regulatory Approval Process

The following is a summary of the various permits, certifications, and agreements that may be necessary prior to construction and/or alteration within jurisdictional areas. Ultimately the regulatory agencies make the final determination of jurisdictional boundaries and permitting requirements.

7.1 UNITED STATES ARMY CORPS OF ENGINEERS

The Corps regulates discharges of dredged or fill materials into waters of the United States, including wetlands, pursuant to Section 404 of the CWA. If any impacts occur to the onsite drainage features, it will be necessary for the Applicant to acquire a CWA Section 404 permit prior to impacts occurring within Corps jurisdictional areas. If impacts from the proposed Project will result in the loss of less than 1/2-acre of Corps jurisdiction (non-wetland waters), the proposed Project can be authorized via a Nationwide Permit (NWP). However, if impacts will be greater than 1/2-acre, the proposed Project will need to be processed under a Standard Individual Permit.

Based on the proposed design plan, no impacts to Corps jurisdictional areas are expected to occur from project implementation.

7.2 REGIONAL WATER QUALITY CONTROL BOARD

The Regional Board regulates discharges to surface waters pursuant to Section 401 of the CWA and the California Porter-Cologne Water Quality Control Act. The Regional Board's jurisdiction extends to all waters of the State and U.S., including wetlands. A Section 401 Water Quality Certification from the Regional Board will be required for impacts to the onsite drainage features. The Regional Board also requires a Section 401 Certification Application Fee, which is dependent on the amount and type of impacts (i.e., acreage, linear feet, and project type). It should also be noted that the Regional Board requires that California Environmental Quality Act (CEQA) compliance be obtained prior to issuance of the water quality certification.

Based on the proposed design plan, no impacts to Regional Board jurisdictional areas are expected to occur from project implementation.

7.3 CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE

Pursuant to Section 1602 of the California Fish and Game Code, the CDFW regulates any activity that will divert or obstruct the natural flow or alter the bed, channel, or bank (which may include associated biological resources) of a river or stream. Therefore, any impacts to the on-site jurisdictional areas will require a Section 1602 Streambed Alteration Agreement from the CDFW prior to project implementation, if the project will have a substantial adverse impact on an existing fish or wildlife resource. The notification fee is based on the term and cost of a project. The Section 1602 Streambed Alteration Agreement will not be issued until all fees are paid to the CDFW.

Based on the proposed design plan, no impacts to CDFW jurisdictional areas are expected to occur from project implementation.

7.4 RECOMMENDATIONS

It is recommended that this delineation be forwarded to the regulatory agencies for their review and concurrence. The concurrence/receipt would solidify findings noted within this report.

Section 8 References

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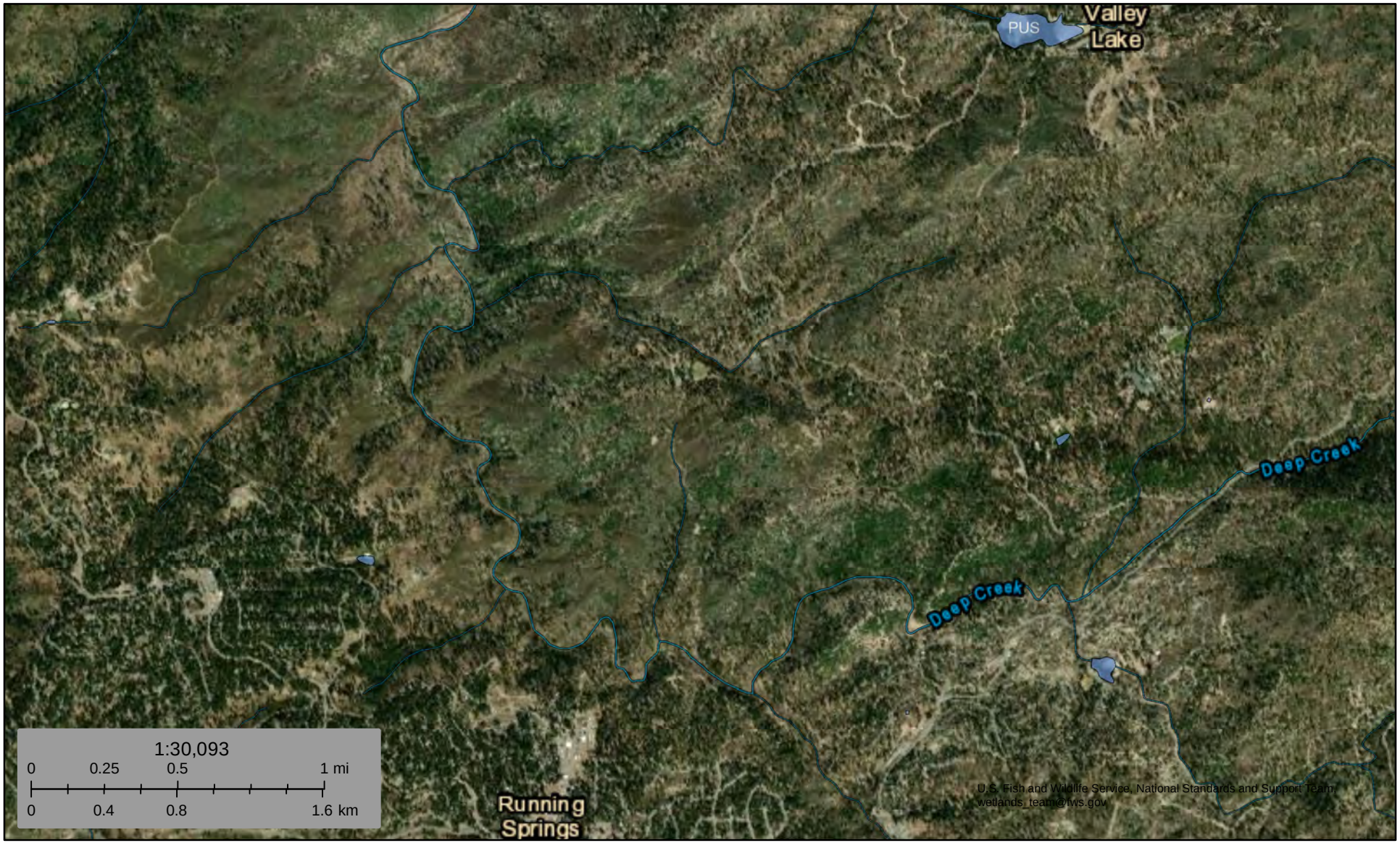
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Appendix A Documentation

U.S. Fish and Wildlife Service
National Wetlands Inventory

Hume SoCal Campground



October 11, 2023

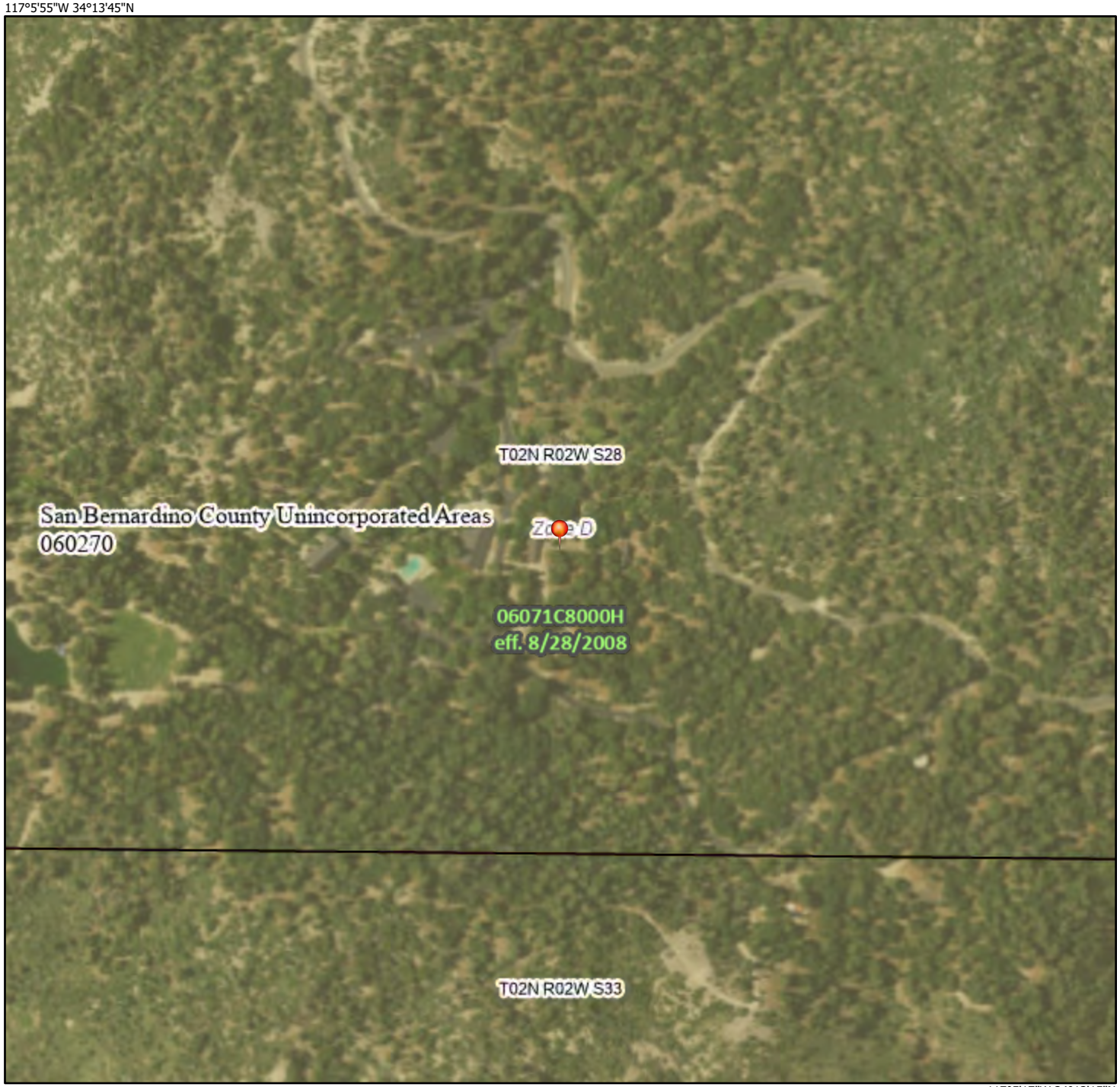
Wetlands

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

National Flood Hazard Layer FIRMette

FEMA



Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 10/31/2022 at 6:45 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

Appendix B Site Photographs



Photograph 1: From Green Valley Lake Road looking upstream (northeast) along Drainage 1.



Photograph 2: From Green Valley Lake Road looking south along Drainage 1.



Photograph 3: Looking upstream (north) along Drainage 2. Ephemeral drainages supported on-site are bounded by a Mixed Conifer Forest plant community.



Photograph 4: Looking upstream (northeast) along Drainage 3.



Photograph 5: Looking north along Drainage 4 near the entrance to the Hume SoCal Campground at Green Valley Lake Road. Upper portions of Drainage 4 are visible beyond Green Valley Lake Road.



Photograph 6: The confluence of Drainages 1 and 4 support a robust Willow Riparian Woodland plant community.



Photograph 7: Looking upstream (north) along the upper limits of Drainage 5.



Photograph 8: Looking upstream (north) along the upper limits of Drainage 6.



Photograph 9: Drainages 5 and 6 support narrow swathes of Willow Riparian Woodland immediately south of Smokey Way.



Photograph 10: Lower portions of Drainage 1, downstream of existing campground facilities, bear little to no surface water and are bounded by a Mixed Conifer Woodland plant community.



Photograph 11: Looking downstream (southwest) along the upper limits of Drainage 7, north of the access road.



Photograph 12: Looking downstream (southwest) along the middle portion of Drainage 7, where surface water is no longer present and supported vegetation shifts from a Willow Riparian plant community to Mixed Conifer Forest.

Appendix C Methodology

WATERS OF THE UNITED STATES

In accordance with the Revised Definition of "Waters of the United States"; Conforming (September 8, 2023), "waters of the United Sates" are defined as follows:

(a) ***Waters of the United States*** means:

(1) Waters which are:
(i) Currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;
(ii) The territorial seas; or
(iii) Interstate waters;

(2) Impoundments of waters otherwise defined as waters of the United States under this definition, other than impoundments of waters identified under paragraph (a)(5) of this section;

(3) Tributaries of waters identified in paragraph (a)(1) or (2) of this section that are relatively permanent, standing or continuously flowing bodies of water;

(4) Wetlands adjacent to the following waters:
(i) Waters identified in paragraph (a)(1) of this section; or
(ii) Relatively permanent, standing or continuously flowing bodies of water identified in paragraph (a)(2) or (a)(3) of this section and with a continuous surface connection to those waters;

(5) Intrastate lakes and ponds not identified in paragraphs (a)(1) through (4) of this section that are relatively permanent, standing or continuously flowing bodies of water with a continuous surface connection to the waters identified in paragraph (a)(1) or (a)(3) of this section

(b) The following are not "waters of the United States" even where they otherwise meet the terms of paragraphs (a)(2) through (5) of this section:

(1) Waste treatment systems, including treatment ponds or lagoons, designed to meet the requirements of the Clean Water Act;

(2) Prior converted cropland designated by the Secretary of Agriculture. The exclusion would cease upon a change of use, which means that the area is no longer available for the production of agricultural commodities. Notwithstanding the determination of an area's status as prior converted cropland by any other Federal agency, for the purposes of the Clean Water Act, the final authority regarding Clean Water Act jurisdiction remains with EPA;

(3) Ditches (including roadside ditches) excavated wholly in and draining only dry land and that do not carry a relatively permanent flow of water;

(4) Artificially irrigated areas that would revert to dry land if the irrigation ceased;

(5) Artificial lakes or ponds created by excavating or diking dry land to collect and retain water and which are used exclusively for such purposes as stock watering, irrigation, settling basins, or rice growing;
(6) Artificial reflecting or swimming pools or other small ornamental bodies of water created by excavating or diking dry land to retain water for primarily aesthetic reasons;

(7) Waterfilled depressions created in dry land incidental to construction activity and pits excavated in dry land for the purpose of obtaining fill, sand, or gravel unless and until the construction or excavation operation is abandoned and the resulting body of water meets the definition of waters of the United States; and

(8) Swales and erosional features (*e.g.*, gullies, small washes) characterized by low volume, infrequent, or short duration flow.

(c) In this section, the following definitions apply:

(1) ***Wetlands*** means those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

(2) ***Adjacent*** means having a continuous surface connection

(3) ***High tide line*** means the line of intersection of the land with the water's surface at the maximum height reached by a rising tide. The high tide line may be determined, in the absence of actual data, by a line of oil or scum along shore objects, a more or less continuous deposit of fine shell or debris on the foreshore or berm, other physical markings or characteristics, vegetation lines, tidal gages, or other suitable means that delineate the general height reached by a rising tide. The line encompasses spring high tides and other high tides that occur with periodic frequency but does not include storm surges in which there is a departure from the normal or predicted reach of the tide due to the piling up of water against a coast by strong winds such as those accompanying a hurricane or other intense storm.

(4) ***Ordinary high water mark*** means that line on the shore established by the fluctuations of water and indicated by physical characteristics such as clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas.

(5) ***Tidal waters*** means those waters that rise and fall in a predictable and measurable rhythm or cycle due to the gravitational pulls of the moon and sun. Tidal waters end where the rise and fall of the water surface can no longer be practically measured in a predictable rhythm due to masking by hydrologic, wind, or other effects.

WETLANDS

For this project location, Corps jurisdictional wetlands are delineated using the methods outlined in the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region, Version 2.0* (Corps 2008). This document is one of a series of Regional Supplements to the Corps Wetland Delineation Manual (Corps 1987). The identification of wetlands is based on a three-parameter approach involving indicators of hydrophytic vegetation, hydric soil, and wetland hydrology. In order to be considered a wetland, an area must exhibit at least minimal characteristics within these three (3) parameters. The Regional Supplement presents wetland indicators, delineation guidance, and other information that is specific to the Arid West Region. In the field, vegetation, soils, and evidence of hydrology are examined using the methodology listed below and documented on Corps wetland data sheets, when applicable. It should be noted that both the Regional Board and the CDFW jurisdictional wetlands encompass those of the Corps.

Vegetation

Nearly 5,000 plant types in the United States may occur in wetlands. These plants, often referred to as hydrophytic vegetation, are listed in regional publications by the U.S. Fish and Wildlife Service (USFWS). In general, hydrophytic vegetation is present when the plant community is dominated by species that can tolerate prolonged inundation or soil saturation during growing season. Hydrophytic vegetation decisions are based on the assemblage of plant species growing on a site, rather than the presence or absence of particular indicator species. Vegetation strata are sampled separately when evaluating indicators of hydrophytic vegetation. A stratum for sampling purposes is defined as having 5 percent or more total plant cover. The following vegetation strata are recommended for use across the Arid West:

- *Tree Stratum:* Consists of woody plants 3 inches or more in diameter at breast height (DBH), regardless of height;
- *Sapling/shrub stratum:* Consists of woody plants less than 3 inches DBH, regardless of height;
- *Herb stratum:* Consists of all herbaceous (non-woody) plants, including herbaceous vines, regardless of size; and,
- *Woody vines:* Consists of all woody vines, regardless of size.

The following indicator is applied per the test method below.[1] Hydrophytic vegetation is present if any of the indicators are satisfied.

[1] Although the Dominance Test is utilized in the majority of wetland delineations, other indicator tests may be employed. If one indicator of hydric soil and one primary or two secondary indicators of wetland hydrology are present, then the Prevalence Test (Indicator 2) may be performed. If the plant community satisfies the Prevalence Test, then the vegetation is hydric. If the Prevalence Test fails, then the Morphological Adaptation Test may be performed, where the delineator analyzes the vegetation for potential morphological features.

Indicator 1 – Dominance Test

Cover of vegetation is estimated and is ranked according to their dominance. Species that contribute to a cumulative total of 50% of the total dominant coverage, plus any species that comprise at least 20% (also known as the "50/20 rule") of the total dominant coverage, are recorded on a wetland data sheet. Wetland indicator status in California (Region 0) is assigned to each species using the *National Wetland Plant List, version 2.4.0* (Corps 2012). If greater than 50% of the dominant species from all strata were Obligate, Facultative-wetland, or Facultative species, the criteria for wetland vegetation is considered to be met. Plant indicator status categories are described below:

- *Obligate Wetland (OBL):* Plants that almost always occur in wetlands;
- *Facultative Wetland (FACW):* Plants that usually occur in wetlands, but may occur in non-wetlands;
- *Facultative (FAC):* Plants that occur in wetlands and non-wetlands;
- *Facultative Upland (FACU):* Plants that usually occur in non-wetlands, but may occur in wetlands; and,
- *Obligate Upland (UPL):* Plants that almost never occur in wetlands.

Hydrology

Wetland hydrology indicators are presented in four (4) groups, which include:

Group A – Observation of Surface Water or Saturated Soils

Group A is based on the direct observation of surface water or groundwater during the site visit.

Group B – Evidence of Recent Inundation

Group B consists of evidence that the site is subject to flooding or ponding, although it may not be inundated currently. These indicators include water marks, drift deposits, sediment deposits, and similar features.

Group C – Evidence of Recent Soil Saturation

Group C consists of indirect evidence that the soil was saturated recently. Some of these indicators, such as oxidized rhizospheres surrounding living roots and the presence of reduced iron or sulfur in the soil profile, indicate that the soil has been saturated for an extended period.

Group D – Evidence from Other Site Conditions or Data

Group D consists of vegetation and soil features that indicate contemporary rather than historical wet conditions, and include shallow aquitard and the FAC-neutral test.

If wetland vegetation criteria is met, the presence of wetland hydrology is evaluated at each transect by recording the extent of observed surface flows, depth of inundation, depth to saturated soils, and depth to free water in the soil test pits. The lateral extent of the hydrology indicators are used as a guide for locating soil pits for evaluation of hydric soils and jurisdictional areas. In portions of the stream where the flow is divided by multiple channels with intermediate sand bars, the entire area between the channels is considered within the OHWM and the wetland hydrology indicator is considered met for the entire area.

Soils

A hydric soil is a soil that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper 16-20 inches.[2] The concept of hydric soils includes soils developed under sufficiently wet conditions to support the growth and regeneration of hydrophytic vegetation. Soils that are sufficiently wet because of artificial measures are included in the concept of hydric soils. It should also be noted that the limits of wetland hydrology indicators are used as a guide for locating soil pits. If any hydric soil features are located, progressive pits are dug moving laterally away from the active channel until hydric features are no longer present within the top 20 inches of the soil profile.

Once in the field, soil characteristics are verified by digging soil pits along each transect to an excavation depth of 20 inches; in areas of high sediment deposition, soil pit depth may be increased. Soil pit locations are usually placed within the drainage invert or within adjoining vegetation. At each soil pit, the soil texture and color are recorded by comparison with standard plates within a *Munsell Soil Chart* (2009). Munsell Soil Charts aid in designating color labels to soils, based by degrees of three simple variables – hue, value, and chroma. Any indicators of hydric soils, such as organic accumulation, iron reduction, translocation, and accumulation, and sulfate reduction, are also recorded.

Hydric soil indicators are present in three groups, which include:

<u>All Soils</u>

"All soils" refers to soils with any United States Department of Agriculture (USDA) soil texture. Hydric soil indicators within this group include histosol, histic epipedon, black histic, hydrogen sulfide, stratified layers, 1 cm muck, depleted below dark surface, and thick dark surface.

<u>Sandy Soils</u>

"Sandy soils" refers to soil materials with a USDA soil texture of loamy fine sand and coarser. Hydric soil indicators within this group include sandy mucky mineral, sandy gleyed matrix, sandy redox, and stripped matrix.

[2] According to the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region, Version 2.0 (Corps 2008), growing season dates are determined through on-site observations of the following indicators of biological activity in a given year: (1) above-ground growth and development of vascular plants, and/or (2) soil temperature.

Loamy and Clayey Soils

"Loamy and clayey soils" refers to soil materials with a USDA soil texture of loamy very fine sand and finer. Hydric soil indicators within this group include loamy mucky mineral, loamy gleyed matrix, depleted matrix, redox dark surface, depleted dark surface, redox depressions, and vernal pools.

SWANCC WATERS

The term "isolated waters" is generally applied to waters/wetlands that are not connected by surface water to a river, lake, ocean, or other body of water. In the presence of isolated conditions, the Regional Board and CDFW take jurisdiction through the application of the OHWM/streambed and/or the 3 parameter wetland methodology utilized by the Corps.

Appendix B1

Water Supply Assessment

1st Draft

Water Supply Assessment

Hume SoCal Camp Expansion

Prepared for:
Hume SoCal Camp

Prepared by:

Kimley»Horn

February 2024

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Executive Summary

The Water Supply Assessment (WSA) for Hume SoCal Camp ("the Camp") provides a comprehensive analysis of the Camp expansion's water demand, supply, and management strategies during dry years. The assessment particularly focuses on the Camp's reliance on Crestline-Lake Arrowhead Water Agency (CLAWA) and its own groundwater supply to meet future water demands. The analysis explores various scenarios of water demand and shortages, highlighting the impact of the Camp's expansion on available water resources. It outlines multiple water supply strategies, ranging from a primary reliance on CLAWA to complete self-sufficiency using the Camp's existing groundwater wells. Each strategy has been examined for its feasibility, sustainability, and overall impact on the water supply system.

A key component of this WSA is examining the potential for integrating water from CLAWA with the Camp's existing groundwater resources. This integration, serving as either the primary, supplementary, or backup water supplier to the Camp, requires an agreement between the Camp and CLAWA that delineates CLAWA's supply constraints and establishes specific limits to the supply that can be provided to the Camp.

The Camp's preferred water supply strategy involves a predominant reliance on CLAWA, complemented by the utilization of its groundwater wells. The approach is aimed at ensuring a consistent and sustainable water supply over the long term. To support and validate this strategy, the WSA advises conducting drawdown and water quality tests on all existing wells. These tests are essential for a technical evaluation of the groundwater wells' sustainability and operational reliability.

Introduction

This WSA analyzes the sufficiency of the Camp's water supplies for the proposed expansion from a capacity of 300 occupants to a capacity of approximately 3,000 occupants (Project). This would be accomplished through the continued use of existing campground structures as well as the development of additional campground and recreational structures and uses within a 251-acre area of the Green Valley Lake community. The Project is located directly east of Green Valley Lake Road and approximately 0.4 miles northwest of State Route 18 *(Figure 1)*. The Project would be developed on five parcels totaling approximately 251 acres.

Regulatory Background

Senate Bill (SB) 610, also known as the California Water Code, establishes the primary legal standards for assessing the sufficiency of water supplies for new development projects. In accordance with the SB Section 10190, the Project meets the criteria as a proposed residential development of more than 500 dwelling units, thus is subject to the California Environmental Quality Act (CEQA). As part of the environmental review process pursuant to the CEQA, these statutes require the applicant to prepare a WSA of the reliability of water supplies for the project, considering normal, single dry, and multiple dry years over a 20-year horizon. The basic requirement is that a WSA must "include a discussion with regard to whether the public water system's total projected water supplies available during normal, single dry, and multiple dry water years during a 20-year projection will meet the projected water demand associated with the proposed project, in addition to the water system's existing and planned future uses, including agricultural and manufacturing uses."

All data used in the following analysis was gathered and shared by Bob Mull, Hume Volunteer Fire Chief. The following information was provided to KH to complete the following assessment:

- Historical domestic water usage
- Existing water infrastructure exhibit

Project Location

The 251-acre Project site (APN 0328-071-05, 0328-071-07, 0328-071-10, 0328-121-40, 0328-121-42) is located immediately east of Green Valley Lake Road and approximately 0.4 miles northwest of State Route 18 in Green Valley Lake, CA *(Figure 2)*. The Project is in unincorporated San Bernardino County (the County) and bounded by National Forest to the north, south, west, and east.

Figure 1 Regional Location Map



NORTH

Kimley»Horn

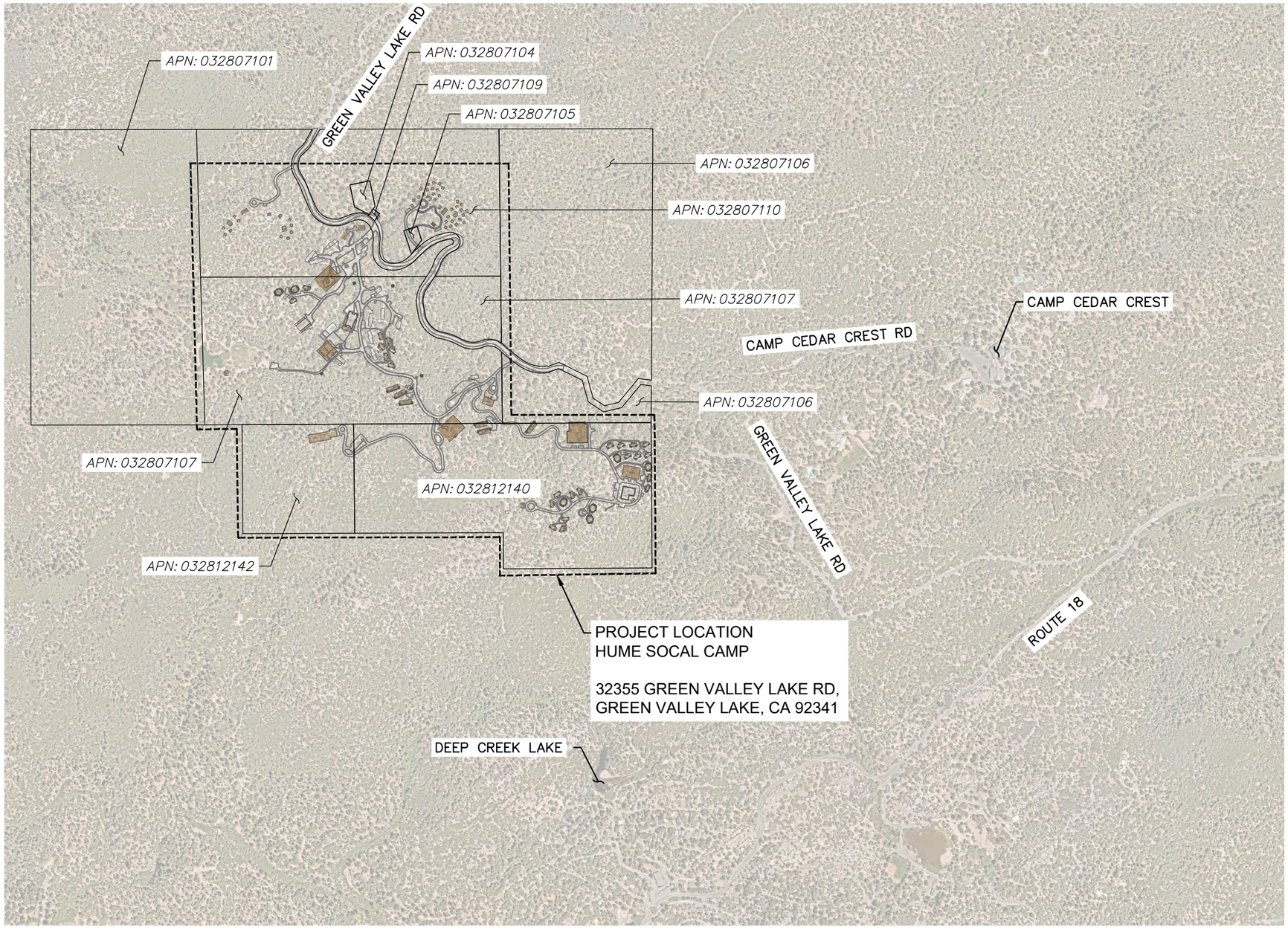
FIGURE 1 - REGIONAL LOCATION MAP

SAN BERNARDINO COUNTY

HUME SOCAL CAMP

JANUARY 2024

Figure 2 Regional Parcel Map



Kimley»Horn

FIGURE 2 - REGIONAL PARCEL MAP

SAN BERNARDINO COUNTY

HUME SOCAL CAMP

JANUARY 2024

Existing Conditions

The Project site is currently undeveloped recreational land zoned for Hilltop/Special Development-Residential per the County's General Plan. Currently, the water supply to the Camp is sourced from four private, on-site groundwater wells. Of the four well, only one is utilized to satisfy current domestic demands while the others support non-domestic demands such as irrigation and recreational use.

Proposed Project

Development of the Project site would be completed in five phases (*Figure 3*). Each phase of the Project would include the development of expanded infrastructure, additional amenities, support structures, and buildings necessary to accommodate expanded camper capacity as well as paved parking areas and paved access roadways.

- Phase 1 of the Project would involve the development of facilities to be used as a Junior High Camp where existing and proposed facilities would accommodate up to 784 occupants.
- Phase 2 of the Project would involve the development of facilities to be used as a High School Camp where existing and proposed facilities would accommodate up to 1,000 occupants.
- Phase 3 of the Project proposes the development of an Adult Lodge where existing and proposed facilities accommodate up to 140 occupants.
- Phase 4 of the Project would include the development of an Elementary Age Camp and associated facilities where existing and proposed facilities would accommodate up to 500 occupants.
- Phase 5 of the Project proposes the creation of a tent-based youth camp, Wildwood Camp where existing and proposed facilities would accommodate up to 130 occupants.

At full buildout, the Project will accommodate approximately 3,000 total occupants, including campers and staff.

With the completion of this WSA, the Camp aims to ensure water supply sustainability from existing on-site domestic wells and public water service connections.

Estimated Water Demand for the Project

The Project water demand was calculated using San Bernardino County's domestic water use planning standard of 180 gallons per capita per day (GPCPD). To this, 20 GPCPD were added to account for Camp irrigation demand, which also utilizes water from the domestic wells. The combined demand for both domestic and irrigation use, referred to as domestic hereon, is 200 GPCPD. This assessment considers the projected number of occupants at each expansion phase and determines a corresponding water demand based on occupancy duration. This calculation is used to determine the annual domestic water demand for different phases and categories of occupants, including campers, staff, and visitors.

Currently, Hume has a capacity of 300 occupants, including campers and staff. The staff is comprised of 12 full-time residents, 20 part-time employees, 35 winter seasonal employees, and 68 summer seasonal employees.

The summer and winter seasonal periods, which are each 9-weeks long, consist of alternating sessions of high school campers, middle school campers, and combined age campers. The sessions during the seasonal periods range from two to six night stays. It is assumed that all age groups of campers have full occupancy approximately 50 days and nights, or ~ 13%, out of each year. Future number of staff

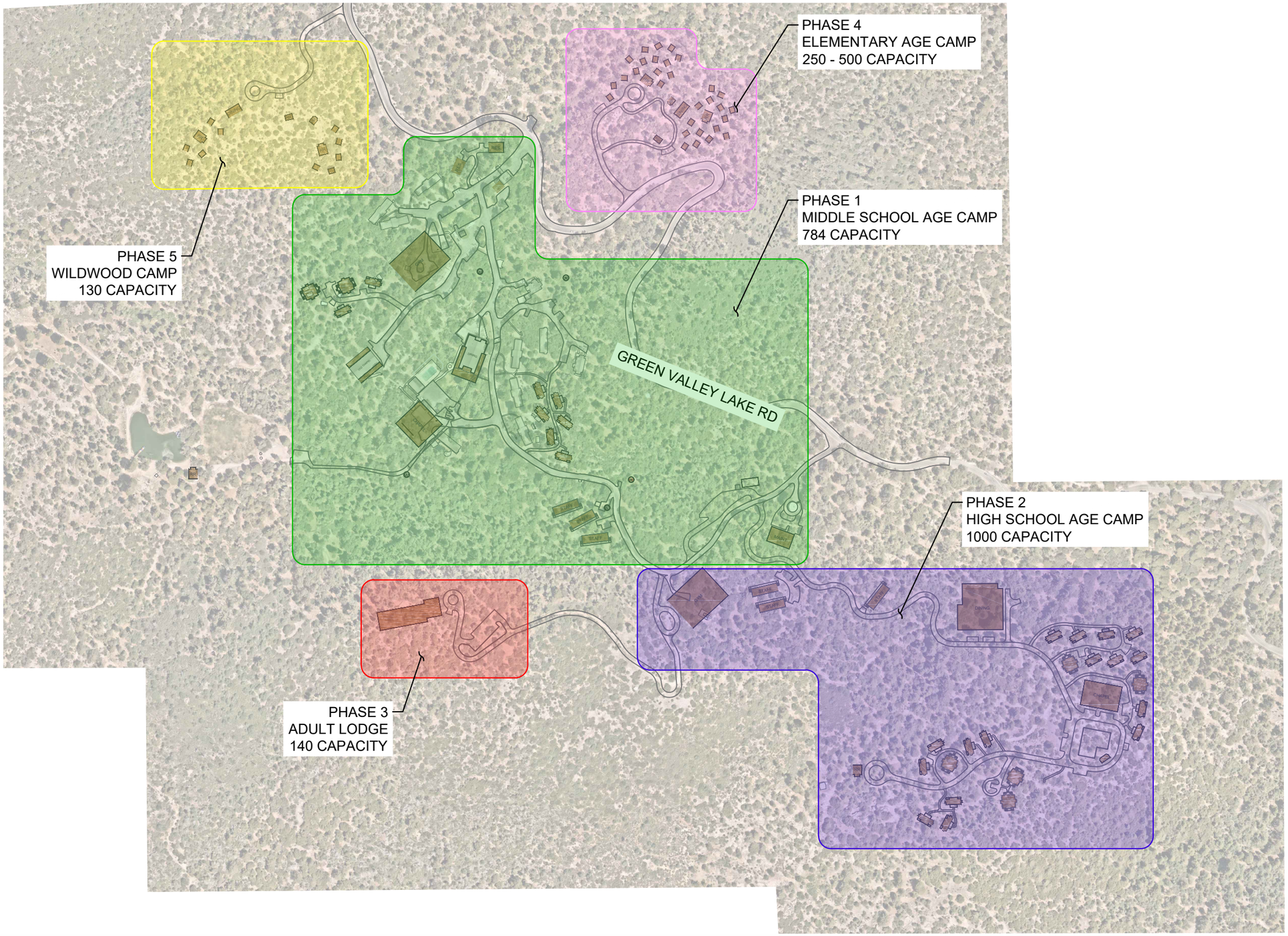
members were assumed to be proportional to the increase in camp capacity, an increase of approximately 1,000%. *Table 1* displays the breakdown of occupants, including campers and staff, and their corresponding occupancy duration and domestic water demand.

Table 1 Estimated Camp Expansion Water Demand

	Occupant Type	Count	Occupancy Duration (% of year)	Equivalent Days	Annual Domestic Demand[1] (Gallons)
Employee	Full Time Employees	120	100%	365	8,760,000
	Part Time Employees	200	50%	182.5	7,300,000
	Winter Seasonal	350	17%	63.145	4,420,150
	Summer Seasonal	680	17%	63.145	8,587,720
Camper/Guest	High School Guests	1000	13%	50	10,000,000
	Middle School Guests	784	13%	50	7,840,000
	Adult Lodge	140	13%	50	1,400,000
	Elementary Age Guests	500	13%	50	5,000,000
	Wildwood Camp	130	13%	50	1,300,000
			Total Domestic Demand	54,607,870 Gallons per Year (GPY)	
				167.58 Acre-Feet per Year (AFY)	
				149,610 Gallons per Day (GPD)	

[1] *Annual domestic Demand = Equivalent Days *Count* (180 GPCPD (San Bernardino County, Special Districts Department, Standards for Domestic Water Systems, 2020) + 20 GPCPD (Camp irrigation sourced from domestic wells)*

Figure 3 Conceptual Site Plan



Kimley»Horn

FIGURE 3 - CONCEPTUAL SITE PLAN

SAN BERNARDINO COUNTY

HUME SOCAL CAMP

JANUARY 2024

Water Supply

Hume sources its water from on-site groundwater wells with the potential to import water via a single connection to Crestline-Lake Arrowhead Water Agency. Hume's main source of water supply is groundwater from their on-site wells, which currently satisfy all domestic and non-domestic water demands for the camp. When groundwater cannot satisfy the demand alone, Hume has the ability to import water from Crestline-Lake Arrowhead Water Agency (CLAWA or "The Agency"), a California State Water Project (SWP) Contractor providing wholesale and retail treated water from Silverwood Lake. CLAWA operates with a maximum entitlement from SWP of 5,800 acre-feet per year (AFY), a long-term average allocation of 3,480 AFY, and a baseline supply of 2,500 AFY. Historically, Hume has never needed to import water from CLAWA.

In FY 2022, Hume's domestic water usage was 5,946,099 gallons, or 18.4 AFY. The Camp's water supply consisted of 100% groundwater. The Camp's 2022 Annual Report to the California State Water Resource Control Board detailing potable water production and sample reports is included in *Appendix A*.

Neither the Camp nor CLAWA have prepared Urban Water Management Plans (UWMP) to aid in future projection of domestic and non-domestic water demand. Therefore, the following analysis makes assumptions for the Camp's groundwater well sustainability and CLAWA allotted domestic water to the Camp. Multiple scenarios are explored to determine water supply and sustainability under varying conditions.

The following sections aim to project Hume's water supply, future water demand, and ensure long term water sustainability of both the Camp and CLAWA and detail the assumptions made throughout the analysis.

Groundwater

The Camp has historically relied solely on the use of groundwater to satisfy all of their domestic and non-domestic water needs. *Table 2* below displays the existing on-site wells and their production. Well pump logs, detailing historical usage for each operational well, are included in *Appendix B.*

Table 2 Existing on-site groundwater wells

Well No.	Well Use	Well Production (gpm)
1	Domestic	44
2	Non-Domestic, Recreational	Unknown
3	Domestic, Non-Operational, Abandoned	-
4	Domestic	46
5	Domestic	85

Domestic Wells No. 1, 4, and 5 are used to supply the Camp's domestic and irrigation needs. Currently, domestic Well No. 5 is the main producer of domestic water for the Camp. The domestic production is pumped to the Camp's domestic tank and irrigation tank. The combined production of the three active domestic wells is 91,980,000 Gallons per Year (GPY), or 282.23 AFY. Non-domestic Well No. 2 is utilized to fill and maintain the Camp's lined, recreational pond. Well No. 2 is not included in the domestic and irrigation network and is not tested for water quality.

These wells, ranging in depth from 270 feet to 425 feet, draw water from the surrounding groundwater, which has not been characterized as a defined aquifer. This poses challenges in predicting the sustainability of the groundwater supply for long-term usage.

The Camp anticipates continued usage of the wells for the foreseeable future, including after full buildout, either as a predominant or supplemental source of domestic water. To ensure the existing groundwater wells can continue to provide the Camp with sufficient supply, Kimley-Horn advises conducting drawdown tests on each well to understand their capacity and the health of the underlying aquifer. The test well should be installed to a depth consistent with the existing wells to accurately monitor the aquifer's response to sustained pumping. The drawdown test will involve pumping the well at a constant rate and measuring the decline in water level in the well over time. This data will help determine the well's specific capacity, the groundwater recharge rate, and identify any potential long-term depletion or other issues that could affect the Camp's groundwater supply. Additionally, to use Domestic Wells No. 1 and 4 for drinking water, water quality is required to verify the domestic water meets drinking water standards. These wells, which have been used mainly for irrigation, are permitted as drinking water wells but must be retested prior to repurposing as reliable sources of domestic drinking water for the Camp.

Imported Water

The Camp has the option to import from CLAWA as a source of domestic water, however, the connection has never been utilized. Imported water is delivered to the Camp by single CLAWA connection. The Agency provides both wholesale and retail treated water from Silverwood Lake across the mountain to Green Valley lake. The Agency owns and operates an intake tower at Silverwood Lake, a Surface Water Treatment Plant, nine booster stations, 20 tanks, and over 54 miles of waterlines. As of 2023, Hume is one of more than 20 camps and wholesale supplemental water connections supplied by CLAWA. Additionally, the Agency serves approximately 1,225 retail customers. The State Water Project (SWP) has allotted CLAWA with a maximum entitlement of 5,800 AFY and long-term average allocation of 3,480 AFY.

Silverwood Lake, the Agency's source of wholesale and treated water, is supplied adequate water by the East Branch Aqueduct of the State Water Project's (SWP) Southern Field Division. The SWP is a state-level water management project overseen by the state's Department of Water Resources (DWR) consisting of pump stations, reservoirs, aqueducts, tunnels, and power plants. The SWP conveys water from the Feather River to the Central Valley, South Bay Area, and Southern California via the 444-mile-long California Aqueduct. Approximately 30% of SWP is used for irrigation and 70% is used for residential, commercial, and industrial needs in Southern California and the Bay Area.

Kimley-Horn was unable to obtain record drawings of CLAWA's domestic water system during this analysis to determine the location of the Camp's connection. A fire flow test is advised at the nearest location to the site to determine the available pressure at the connection. The system pressure at the connection, in conjunction with a water use agreement between the Camp and CLAWA, will dictate the flow of water that can be provided to the Camp.

Recycled Water

The Camp currently has no recycled water supply in place, nor is there a demand for recycled water. This is due to the lack of nearby recycled water treatment facilities to supply recycled water and future need for recycled water, as the existing groundwater wells adequately meet the Camp's water requirements.

Water Storage and Distribution System

The water storage and distribution system at Hume is comprised of two main storage tanks fed by three domestic wells (No. 1, No. 4, and No. 5). A 212,000-gallon tank is utilized for domestic water storage, while a separate 50,000-gallon tank is designated for irrigation water storage. Distribution from these storage tanks is managed through a gravity-fed system, conveying domestic water through 10-inch and 4-inch distribution mains which branches into a network of 3-inch to 1-inch PVC distribution pipes servicing the camp.

The Camp also operates a system for recreational water use. Water from a non-domestic well (Well No. 2) is used to fill a 1.5 million-gallon recreational pond annually. The pond is lined to prevent seepage and is replenished in the spring and emptied in the fall to serve recreational activities throughout the summer camp season.

Water Demand

This section outlines the projected water demands for the Camp, considering the production from domestic wells for both domestic and irrigation purposes, and the use of non-domestic water from an untested recreational well for filling the recreational pond. These projections are based on current usage patterns, San Bernardino County planning guidelines, expected growth in camp occupancy, and expansions of camp facilities. The estimates are based on a comprehensive analysis rather than periodic intervals, ensuring they are aligned with the Camp's development phases.

The following demands were calculated under the assumption that there are no new expansions planned after Phases 1 – 5 for the foreseeable future. Therefore, the future demand analyzed is for full Camp occupancy after the construction and completion of all phases. The FY 2022 water use (Pre-Project Demand) and projected water use after the construction and completion of all phases (Post-Project Demand) are detailed in the following sections.

Domestic Water Demand

The Camp's domestic water demand is based on San Bernardino County's standard of 180 GPCPD. To account for irrigation demand also sourced from the domestic wells, the Camp's domestic water demand was increased to 200 GPCPD. This figure is used to calculate the annual water demand by considering the number of camp occupants, including campers, staff, and visitors, and their respective length of stay.

With the proposed expansion, the Camp's capacity is projected to increase by approximately 1,000%. This will proportionally increase the number of staff required. The expected increase in domestic water demand, corresponding to the increase in occupants and expansion of facilities, is detailed in *Table 1* and summarized in *Table 3*.

Non-Domestic Water Demand

The Camp's non-domestic water demand is supplied by Well No. 2, primarily used to fill a seasonal 1.5 million-gallon, lined, recreational pond. With the proposed expansion, the addition of three new ponds will necessitate an evaluation of Well No. 2's capacity to determine if it can meet the increased water requirements.

The dimensions and volumes of the proposed recreational ponds are not yet established, but it is assumed the cumulative volume is equivalent to the existing 1.5 million-gallon existing recreational pond, doubling the non-domestic water demand from the existing camp demand. It is recommended to perform a thorough assessment of the well's ability to sustain the additional demand. A network distribution system with adjustable controls and valves is recommended to effectively manage the water distribution to each pond.

FY 2022 flow data for Non-Domestic Well No. 2, retrieved from the Camp's well pumping logs, and proposed post-project demand are displayed in *Table 3*. The demand accounts for filling of the ponds at the beginning of the summer season and periodic refilling, primarily driven by evaporation.

Water Loss

The Camp does not monitor water losses caused by real losses (e.g., leaks in mains and service lines), apparent losses (e.g., unauthorized consumption, metering inaccuracies, and data handling errors), and unlogged water (e.g., hydrant flushing, firefighting, and blow-off water from well start-up).

Water losses are assumed to be 2% of total domestic and non-domestic water use. *Table 3* displays the Camp's anticipated water loss during for existing and proposed demands. Proposed demand is following

Table 3 Summary of Camp Water Demand

Demand Type	Existing Demand	Proposed Demand
Domestic[1]	5,946,099 Gallons 18.4 AFY	54,607,870 Gallons 167.6 AFY
Non-Domestic	3,718,190 Gallons 11.4 AFY	7,436,380 Gallons 22.8 AFY
Water Loss[2]	193,286 Gallons 0.6 AFY	1,131,670 Gallons 3.5 AFY
Total Demand	9,857,575 Gallons 30.2 AFY	63,175,920 Gallons 173.3 AFY

[1] Domestic water demand includes irrigation demand
[2]Water losses are assumed to be 2 percent of total domestic and non-domestic water demand

Water Supply Strategy

In assessing the future water demand for the Camp and its reliance on CLAWA for domestic water, the utilization of CLAWA as either a primary or supplemental water source is a key consideration for determining the most suitable water supply strategy to satisfy the Camp's future demand.

Utilizing CLAWA as a domestic water provider offers benefits to the Agency. The introduction of additional water from CLAWA would assist of maintaining satisfactory water quality throughout the public system by decreasing residence time of the water in the pipes. Additionally, it would offer a cost-effective and reliable solution for procuring domestic water, particularly during dry periods. This financial consideration of importing domestic water from CLAWA would need to be assessed against the cost and feasibility of relying exclusively on the Camp's groundwater wells or constructing new wells.

The scenarios analyzed for incorporating CLAWA's imported water into the Camp's water supply include:

1. Majority Reliance on CLAWA (75% CLAWA / 25% Camp Groundwater Wells): This scenario would see the Camp dependent on CLAWA for 75% of its domestic water needs, supplemented by the Camp's groundwater wells for the remaining 25%. Previous correspondence with CLAWA indicated a lack of system capacity to fully provide the Camp with adequate water supply, therefore, this scenario is assumed to be the maximum reliance on CLAWA's supply. This scenario ensures a significant portion of the water supply is sourced from CLAWA, mitigating the reliance on groundwater wells, particularly beneficial during dry years when groundwater levels might be lower. This approach aligns with the Camp's preference for a majority reliance on CLAWA to alleviate the stress on their groundwater supply and meet long-term water demands.

2. Balanced Reliance (50% CLAWA / 50% Camp Groundwater Wells): This scenario proposes an equal reliance on both CLAWA and the Camp's groundwater wells. Additionally, it provides a long term balance approach to diversify the water supply and mitigate risks. The balanced resilience approach ensures a stable water supply if one source faces temporary challenges, such as infrastructure issues or environmental factors affecting water level or quality.

3. Supplementary Reliance (25% CLAWA / 75% Camp Groundwater Wells): This approach involved the Camp as the main supplier of their domestic water demand with supplemental use of CLAWA's supply during times of peak demand. This scenario is ideal for maintaining a high level of self-sufficiency for the Camp while still acknowledging the advantages of integrating CLAWA's resources and diversifying domestic water sources.

4. No Reliance on CLAWA (100% Groundwater Wells): Assuming a dependable supply of groundwater, the Camp's groundwater wells can provide sufficient supply for the projected future water demand. This scenario implies confidence in the groundwater wells' capacity and quality of groundwater and will involve proactive measures by the Camp for groundwater management and conservation to maintain a sustainable long term supply. Test well drawdown results will provide insight into the groundwater supply sustainability and feasibility of this scenario.

The projected Camp demand, discussed in *Water Demand* section, from CLAWA is assessed against their 2,500 AFY baseline, 3,480 AFY long-term, and 5,800 AFY maximum entitlement allocations to determine

the impact of the Camp's potential source scenarios on CLAWA. It is assumed that the Camp's non-domestic demand and water losses are supplied by Camp groundwater wells. The following analysis is based on the future Camp annual domestic demand of 54,607,870 gallons, or 167.6 AFY.

Table 4 Analysis of the Camp's Projected Water Demand Against CLAWA's Allocation Levels

Allocation Type	CLAWA Allocation (AFY)	Majority Reliance Camp Demand Impact (125.7 AFY)	Balanced Reliance Camp Demand Impact (83.8 AFY)	Supplementary Reliance Camp Demand Impact (41.9 AFY)
Baseline	2,500	5.03%	3.35%	1.68%
Long-Term	3,480	3.61%	2.41%	1.20%
Maximum	5,800	2.17%	1.44%	0.72%

Meeting Dry Year Demands

This section, as required by Senate Bill 52, expands on the available options that may need to be implemented by CLAWA in order to reconcile any short falls in supply that may occur during any of the dry year scenarios. Depending on the Camp's water allowance from CLAWA, water shortage contingency plans that go into effect may affect the availability of imported water. The Camp is expected to implement similar conservation efforts during dry year scenarios to mitigate the impact on groundwater and CLAWA's imported water demand. The Camp's reliance scenarios were compared to CLAWA water shortage supply to determine the impact to the Agency's allotted supply.

Water Shortage Contingency Plan

It is critical that during dry years, especially extreme drought conditions, CLAWA implements continued preventive actions and demand-reducing measures to its customers. While water efficiency measures and voluntary conservation should be maintained at all times, CLAWA has the right to implement strict demand-reducing measures with potential penalties during extreme dry conditions to ensure water security for essential needs within its service area. This section summarizes CLAWA's 2023 Abridged Water Shortage Contingency Plan (WSCP) prepared by Webb Associates. For more detailed information on the CLAWA's approach to mitigating supply deficits and water shortages, please refer to CLAWA's WSCP.

Water shortages may occur due to several reasons such as population growth, climate change, drought, and natural disasters. The WSCP addresses the necessary steps for the Agency to take in the event of a water shortage, which have effects on the supply of available water for import to the Camp. The WSCP outlines six measures that CLAWA will take for water shortage percentages ranging from 10%-50%. The six shortage levels are summarized in *Table 5.*

Table 5 CLAWA Water Shortage Stages, Triggers, and Actions for Retail Customers

Shortage Level	Percent Shortage Range	Water Supply (AFY)	Shortage Response Actions
1	Up to 10%	2,250 - 2,500	Voluntary conservation.
2	11% to 20%	2,000 - 2,249	Mandatory conservation and BMPs for supply management.
3	21% to 30%	1,750 - 1,999	Mandatory conservation and BMPs for supply management. Update messaging.
4	31% to 40%	1,500 - 1,749	Mandatory conservation and BMPs for supply management. Update messaging and reduce flushing.
5	41% to 50%	1,250 - 1,499	Mandatory conservation and BMPs for supply management. Update messaging and reduce flushing. No new connections or turnouts. Allocation plan may be declared.
6	> 50% Reduction	< 1,250	Mandatory conservation and BMPs for supply management. Update messaging and reduce flushing. No new connections or turnouts. Allocation plan may be declared.

The following analysis in *Table 6* addresses how the Camp's future domestic demand impacts CLAWA's supply when the WSCP is enacted. Both Majority and Balanced Resilience scenarios are analyzed to depict the range in impact of the Camp's water use on CLAWA's system. The Majority, Balanced, and Supplementary Reliance demands used in *Table 6* are 125.7 AFY, 83.8 AFY, and 41.9 AFY, respectively.

Table 6 Implications of Camp's Demand on CLAWA Shortage Supply

Shortage Level	Majority Reliance Demand (125.7 AFY) - Camp Demand % of Shortage Water Supply	Balanced Reliance Demand (83.8 AFY) - Camp Demand % of Shortage Water Supply	Supplementary Reliance Demand (41.9 AFY) - Camp Demand % of Shortage Water Supply
1	5.0% - 5.6%	3.4% - 3.7%	1.7% - 1.9%
2	5.6% - 6.3%	3.7% - 4.2%	1.9% - 2.1%
3	6.3% - 7.2%	4.2% - 4.8%	2.1% - 2.4%
4	7.2% - 8.4%	4.8% - 5.6%	2.4% - 2.8%
5	8.4% - 10.1%	5.6% - 6.7%	2.8% - 3.4%
6	> 10.1%	> 6.7%	> 3.4%

Conclusion

In summary, this WSA for the Camp has evaluated various aspects of water demand, supply, and management strategies, particularly in relation to its reliance on CLAWA and the Camp's groundwater resources. The analysis, considering multiple scenarios of water shortages and demand, details the Camp's current and future water demand and its impact on available water resources.

Multiple strategies were identified for the Camp's water supply, ranging from majority reliance on CLAWA to complete independence on its groundwater wells. Each strategy has been considered for its feasibility, sustainability, and impact on the overall water supply system, including during dry years and drought conditions. The integration of CLAWA as either a primary, supplementary, or emergency water source offers a range of benefits for both the Camp and CLAWA, should the connection need to be utilized. Based on communication with CLAWA, a formalized agreement between the Camp and CLAWA is required. The attached agreement outlines CLAWA's supply limitations and establishes a cap on the water provided to the Camp based on the scenarios outlined in the *Water Supply Strategies* section. The Camp's preference leans towards maximizing its reliance on CLAWA, supplemented by its groundwater wells to establish a stable, long-term water supply.

Additionally, it is recommended that the Camp conduct well drawdown tests to determine the sustainability and reliability of its groundwater wells. The results of the tests will provide insights into the capacity of the groundwater wells and will inform the development of an effective water management strategy for the Camp.

Appendix A Hume SoCal Camp Annual Report (2022)

CA3600595 CALVARY CHAPEL CHRISTIAN CAMP

To view last year's report, click here (../TakeSurvey/PreviousSummary?surveysTakenId=455853).

California State Water Resource Control Board
2022 electronic Annual Report (eAR) to the Division of Drinking Water
for the year ending December 31, 2022

[Section 116530 Health & Safety Code]

A. WATER SYSTEM INFORMATION

Water System Number:	CA3600595
Water System Name:	CALVARY CHAPEL CHRISTIAN CAMP
Water System Classification: ⓘ	Nonpublic
Related Regulating Agency: ⓘ	LPA66 - SAN BERNARDINO COUNTY
Water System Ownership ⓘ	Privately owned business (non-community)

If the address recorded is a PO Box or similar, please update to a physical address that would most accurately describe the location of the water system.

Physical location ⓘ Address 1	32355 GREEN VALLEY LAKE RD	
Address 2		
City Zip Code	GREEN VALLEY LAKE	92314
General Office Phone: ⓘ *(with area code)*		
Web site address:		

Answer fields shaded yellow are **Mandatory Questions** and must be answered to complete this report. Based on previous answers, some answer fields are shaded salmon indicating **Conditionally Mandatory Questions.** Any missed responses to Mandatory and Conditionally Mandatory questions will be shown in the Finalize Section.

REPORT STARTED BY ⓘ

Name:

Title:

Work phone:

Cell phone:

Email address:

Bmull@hume.org

Please be aware that all comment boxes throughout this electronic annual report will be made publicly available WITH THE EXCEPTION of the comment box below. Only Waterboard staff and other people with your water system's login credentials will have access to this comment box. You are encouraged to provide any comments that you believe may help improve this annual report process.

CA3600595 CALVARY CHAPEL CHRISTIAN CAMP

To view last year's report, click here (../TakeSurvey/PreviousSummary?surveysTakenId=455853).

2. Public Water System Contacts

IMPORTANT: Each water system **must have one and only one Administrative Contact AND one and only one Financial Contact.** The same person may be both the Administrative and Financial Contacts.

The Division of Drinking Water will be send important information to the Administrative Contact email address. The Administrative Contact's address, business phone number, and email will be publicly accessible at: https://sdwis.waterboards.ca.gov/PDWW/ (https://sdwis.waterboards.ca.gov/PDWW/)

EXISTING CONTACTS: To edit a contact, select the "Edit Contact" checkbox, this will allow for editing all fields except the contact name. To indicate an individual should no longer be associated with the water system, select the "Remove Contact" checkbox.

NEW CONTACTS: To add a new contact for the water system scroll down to subsection B, "ADD NEW CONTACT HERE" header and enter the contact information for the new contact. All contacts must have a form of communication provided and at least one role type selected.

A. EXISTING CONTACTS	Contact Record	Phone Type	Phone Number & Extension	Contact Type (Modify with checkbox)	
Contact 1 First Name, Middle Initial	ROBERT	Business	(559) 500-9100	☐Remove Contact 1	☐Edit Contact 1
Last Name	MULL	Home		☑Administrative	☐Operator
Title	SITE DIRECTOR	Facsimile		☑Financial	☑Emergency
Address 1	PO BOX 8560	Mobile		☐Designated Operator In Charge	☐Sampler / Water Quality
Address 2					
City	GREEN VALLEY LAKE	Emergency		☐Contract Operator	☐Legal
State	CA				
Zip Code	92341				
Email 1	bmull@hume.org			☐Owner	☐Funding
Email 2				☐Carbon Copy	
Contact 2 First Name, Middle Initial		Business		☐Remove Contact 2	☐Edit Contact 2
Last Name		Home		☐Administrative	☐Operator
Title		Facsimile		☐Financial	☐Emergency

CA3600595 CALVARY CHAPEL CHRISTIAN CAMP

To view last year's report, click here (../TakeSurvey/PreviousSummary?surveysTakenId=455853).

3. Population Served

Total Population in DDW Records: ⓘ 110 7/19/2023

Population Type ⓘ	Population Count	Annual Operating Period ⓘ Begin Date MM	Begin Date DD	End Date MM	End Date DD
Residential	12	1	1	12	31
Transient	110	3	24	3	26
Non-Transient	10	1	1	12	31

Method Used to Determine Population: ⓘ Other

If population is based on "Other" , identify the methods or sources of how it was estimated:

Residential - Four Families are serviced daily by the system
Transient - On the 60th business day of 2023, 110 guests were untilizing the system (3/24 - 3-26)
Non-transient - Full time/ Part time workers working on the facility on a routine bases

List the names of communities served by the system identifying both incorporated and unincorporated areas:

COMMENTS (Note: Comments will be made publicly available): ⓘ

Prefill this section
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CA3600595 CALVARY CHAPEL CHRISTIAN CAMP

To view last year's report, click here (../TakeSurvey/PreviousSummary?surveysTakenId=455853).

4. Number of Service Connections

A. Active Service Connections:

Total Active Potable Water Connections currently in Division of Drinking Water database:	18

The total number of Service Connections as of December 31, 2022 must be reported as either Unmetered or Metered for each Service Connection Type as appropriate.

TYPE	Potable Water Unmetered	Metered	2022 Total*	2021 Total*
Single-family Residential: single family detached dwellings	0	0	0	0
Multi-family Residential: Apartments, condominiums, town houses, duplexes and trailer parks	17	0	17	17
Commercial/Institutional: Retail establishments, office buildings, laundries, schools, prisons, hospitals, dormitories, nursing homes, hotels, churches, campgrounds	0	0	0	0
Industrial: All manufacturing	0	0	0	0
Landscape Irrigation: Parks, play fields, cemeteries, median strips, golf courses	1	0	1	1
Agricultural Irrigation: Irrigation of commercially-grown crops	0	0	0	0

Do NOT report fire sprinkler connections and fire hydrants. These connections are not counted toward "service connections" for compliance purposes.

Total Active Connections*	18	0	18	18

* Calculated field

B. Number of Inactive Connections (all types)

Include only service connections that have been physically disconnected (e.g, meter removed) from the water system. All other service connections should be considered as "Active."	0

CA3600595 CALVARY CHAPEL CHRISTIAN CAMP

To view last year's report, click here (../TakeSurvey/PreviousSummary?surveysTakenId=455853).

5. Source Inventory

Section A

(A) Small Water System Source Type

As a Small Water System, sources are listed in Section A tables by either groundwater or surface water. The existing inventory is prefilled for groundwater sources in table A1, and for surface water sources in table A3. You may view these sources at Public Drinking Water Watch (https://sdwis.waterboards.ca.gov/PDWW/). You may suggest inventory updates for groundwater sources in table A2, and for surface water in table A4. For any source(s) not listed, please select "Email for Help on this page" at the bottom of this page to be connected with your Regulating Agency.

A1. Groundwater Source Inventory - Existing

Source ID	Source Name	Source Activity	Source Type, Availability
001	WELL #1	A	Well Permanent
004	WELL #4	A	Well Permanent
005	WELL #5	A	Well Permanent

A2. Groundwater Source Inventory - Updated

Add the Source listed from above and describe any changes. An example might be a change to activity or availability. Must include comment describing change listed.
Note: Please include Source ID and Source Name as displayed in table A1.

To add a new row, select the green plus sign in the upper right corner of the table. To remove a row, select the trash can at the end of a row. Save changes by selecting the green check mark at the end of the row.

Source ID	Name	Activity	Comments
Not found			

A3. Surface Water Source Inventory-Existing ⓘ

Source ID	Source Name	Source Activity	Source Type, Availability
		Not found	

A4. Surface Water Source Inventory - Updated

Add the Source listed from above and describe any changes. An example might be a change to activity or availability. Must include comment describing change listed.
Note: Please include Source ID and Source Name as displayed in table A3.

To add a new row, select the green plus sign in the upper right corner of the table. To remove a row, select the trash can at the end of a row. Save changes by selecting the green check mark at the end of the row.

Source ID	Name	Activity	Comments
		Not found	

A5. Source Inventory Comment

Section B. Source Metering and Well Monitoring

1. Are your water sources metered?	Yes
2. Do you have equipment on hand to monitor groundwater levels at all your wells?	No

☐ Check this box if you have funding available to achieve this.

3. Do you routinely monitor the *static* water levels in your wells?	No
4. Do you routinely monitor the *pumping* water levels in your wells?	No
5. Are these levels recovering, declining or steady?:	Don't Know

Section C. Standby Source Use

If a standby source was used in 2022, provide the following information.
To add a new row, select the green plus sign in the upper right corner of the table. To remove a row, select the trash can at the end of a row. Save changes by selecting the green check mark at the end of the row.

Name of the Standby Source used in 2022:	No. of days the Standby Source was in operation:	Were customers notified? (Y/N)	Was the Division of Drinking Water notified? (Y/N)	Describe the reason the Standby Source was used:
Not found				

COMMENTS (Note: Comments will be made publicly available):

Prefill this section
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CA3600595 CALVARY CHAPEL CHRISTIAN CAMP

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6. Water Supply and Delivery

A. WATER PRODUCED, PURCHASED, AND SOLD

Units of Measure for tables in Section 6A: Gallons

Volumes are based on: METERED VOLUMES

6.A1 - Water Produced, Purchased, and Sold

If only total annual production is available, report your monthly estimated volumes by dividing the total by 12 for monthly reporting. If you have no annual production, please use the checkboxes to prefill zero values and advance to subsection 6.A2 for water purchasing details.

A	B	C	D	E	F	G	H	I
	Potable Water					Non-potable Water		
Month	Water Produced from Groundwater (Wells)	Water Produced from Surface Water	Finished Water Purchased or Received from another PWS	Total Amount of Potable Water*	Water Sold to Another PWS	Total Amount of Non-potable Water	Water Sold to Another PWS	Recycled
Check here if no production for every month	☐	☑	☑		☑	☑	☑	☑
January	495508.333	0	0	495508.333	0	0	0	0
February	495508.333	0	0	495508.333	0	0	0	0
March	495508.333	0	0	495508.333	0	0	0	0
April	495508.333	0	0	495508.333	0	0	0	0
May	495508.333	0	0	495508.333	0	0	0	0
June	495508.333	0	0	495508.333	0	0	0	0
July	495508.333	0	0	495508.333	0	0	0	0
August	495508.333	0	0	495508.333	0	0	0	0
September	495508.333	0	0	495508.333	0	0	0	0
October	495508.333	0	0	495508.333	0	0	0	0
November	495508.333	0	0	495508.333	0	0	0	0
December	495508.333	0	0	495508.333	0	0	0	0
Annual Total*	5946099.99599	0	0	5946099.9959	0	0	0	0
Percent Treated								

PWS = Public Water System

*Calculated field

The **Maximum Day** is the day during 2022 with the highest total water usage. Provide the date for Maximum volume supplied to the Distribution System, and report individual volumes recorded that day for each supply type.

Maximum Daily Demand (Date)	
Maximum Day - Groundwater (Volume)	
Maximum Day - Surface Water (Volume)	
Maximum Day - Purchased or Received (Volume)	
Maximum Day - Total Potable Water (Calculated)	0
Maximum Day - Sold (Volume)	

6.A2 - Water Purchased or Sold or Transferred

The sources with buyer and seller relationships in Division of Drinking Water's SDWIS databased are listed below, and available publicly at https://sdwis.waterboards.ca.gov/PDWW/. Use the dropdown to the right of each row to indicate if your source was used during the 2022 calendar year.

To edit a row, select the pencil sign at the end of the row. Save changes by selecting the green check mark at the end of the row. To remove a row, select the trash can at the end of a row. If you do not see a source listed, please select "Email for Help" at the bottom of the page to be connected with your Regulating Agency.

WSID	WSFID - Name	Sells to and/or Buys from	OtherWSID	OtherWSName	OtherWSFID-WSName	Was this source used during 2022?

Not found

6.A3 - Recycled Water Supplied

If recycled water was *supplied* to *your customers*, complete the table below:

The table below is prefilled with recycled water systems reported in last year's eAR. To edit a row, select the pencil image to the right of the row. To add a new row, select the green plus sign in the upper right corner of the table. To remove a row, select the trash can at the end of a row. Save changes by selecting the green check mark at the end of the row.

Specify the level of treatment (e.g., tertiary, disinfected secondary)	Name of Recycled Water supplier

Not found

CA3600595 CALVARY CHAPEL CHRISTIAN CAMP

To view last year's report, click here (../TakeSurvey/PreviousSummary?surveysTakenId=455853).

10. Backflow–Cross Connection Control

A. Backflow Assemblies and Air Gaps

	Total Number Reported in 2021	Total Number in System in 2022	Number Installed in 2022	Number Tested in 2022	Number Failed in 2022	Number Repaired/ Replaced
Backflow Assemblies on the Service Connections or Meter (Reduced Pressure Principle and Double Check Valve assemblies)	5	5	00	5	0	0
Backflow Assemblies On-site but not on the Service Connections or Meter (Reduced Pressure Principle and Double Check Valve assemblies)	0	0	0	0	0	0
Air-gap Separation	1	1	0			

No. of *Inactive* Backflow Prevention Assemblies in water system in 2022: 0

B. Cross Connection Control Program

Are cross-connection control surveys regularly conducted on the system? Yes

Date of last cross-connection control survey done on the system: 07/05/2022

Cross Connection Control Program Coordinator

Name:

Business Phone: Email Address:

Certification or training received:

Certification Number (if applicable):

Describe any cross-connection incidents that occurred during 2022:

CALVARY CHAPEL CHRISTIAN CAMP - WELL #1 (3600595-001)

LAST AND NEXT SAMPLE REPORT

PS Codes	Group Name	Analyte Number	Analyte Name	Detected Level	Less Than	RL	Unit	MCL	DLR	Last Sampled	Frequency	Next Due	Notes
CA3600595_001_001	NITRATE/ NITRITE	1040	NITRATE		<	0.400	MG/ L	10	.4	03-22-2023	12	2024/03	
CA3600595_001_001	NITRATE/ NITRITE	1041	NITRITE		<	0.400	MG/ L	1	.4	12-17-2020	36	2023/12	DUE NOW

CALVARY CHAPEL CHRISTIAN CAMP - WELL #4 (3600595-004)

LAST AND NEXT SAMPLE REPORT

PS Codes	Group Name	Analyte Number	Analyte Name	Detected Level	Less Than	RL	Unit	MCL	DLR	Last Sampled	Frequency	Next Due	Notes
CA3600595_004_004	NITRATE/ NITRITE	1040	NITRATE		<	0.400	MG/ L	10	.4	01-24-2023	12	2024/01	DUE NOW
CA3600595_004_004	NITRATE/ NITRITE	1041	NITRITE		<	0.400	MG/ L	1	.4	12-17-2020	36	2023/12	DUE NOW

CALVARY CHAPEL CHRISTIAN CAMP - WELL 5 (3600595-005)

LAST AND NEXT SAMPLE REPORT

PS Codes	Group Name	Analyte Number	Analyte Name	Detected Level	Less Than	RL	Unit	MCL	DLR	Last Sampled	Frequency	Next Due	Notes
CA3600595_005_005	NITRATE/ NITRITE	1040	NITRATE		<	0.400	MG/ L	10	.4	03-22-2023	12	2024/03	
CA3600595_005_005	NITRATE/ NITRITE	1041	NITRITE		<	0.400	MG/ L	1	.4	12-17-2020	36	2023/12	DUE NOW

Appendix B Hume SoCal Camp Pump Logs

Well 1 - Main Road

Irrigation and Domestic. Mainly used for irrigation.

Date	Meter Reading	Volume Pumped (Gallons)	Days in Period	Average Daily Flow (GPD)
10/2/2023	27639600	736300	31	23751.6
9/1/2023	26903300	712600	29	24572.4
8/3/2023	26190700	561600	31	18116.1
7/3/2023	25629100	776200	32	24256.3
6/1/2023	24852900	747100	31	24100.0
5/1/2023	24105800	0	30	0.0
4/1/2023	24105800	0	31	0.0
3/1/2023	24105800	0	28	0.0
2/1/2023	24105800	200	29	6.9
1/3/2023	24105600	0	32	0.0
12/2/2022	24105600	0	29	0.0
11/3/2022	24105600	0	31	0.0
10/3/2022	24105600	318000	32	9937.5
9/1/2022	23787600	682600	30	22753.3
8/2/2022	23105000	744500	32	23265.6
7/1/2022	22360500	707100	30	23570.0
6/1/2022	21653400	115800	30	3860.0
5/2/2022	21537600	0	30	0.0
4/2/2022	21537600	0	31	0.0
3/2/2022	21537600	0	29	0.0
2/1/2022	21537600	0	26	0.0
1/6/2022	21537600	0	36	0.0
12/1/2021	21537600	0	30	0.0
11/1/2021	21537600	655700	61	10749.2
9/1/2021	20881900	660700	30	22023.3
8/2/2021	20221200	565300	32	17665.6
7/1/2021	19655900	540400	29	18634.5
6/2/2021	19115500	2500	41	61.0
4/22/2021	19113000	0	31	0.0
3/22/2021	19113000	0	28	0.0
2/22/2021	19113000	0	31	0.0
1/22/2021	19113000	0	30	0.0
12/23/2020	19113000	115200	47	2451.1
11/6/2020	18997800	164700	21	7842.9
10/16/2020	18833100	93600	7	13371.4
10/9/2020	18739500	228700	7	32671.4
10/2/2020	18510800	357400	15	23826.7
9/17/2020	18153400	353000	14	25214.3
9/3/2020	17800400	120100	6	20016.7
8/28/2020	17680300	190000	7	27142.9
8/21/2020	17490300	145500	21	6928.6
7/31/2020	17344800	78300	7	11185.7
7/24/2020	17266500	137100	7	19585.7

7/17/2020	17129400	149700	7	21385.7
7/10/2020	16979700	218200	7	31171.4
7/3/2020	16761500	311900	14	22278.6
6/19/2020	16449600	314700	17	18511.8
6/2/2020	16134900	347800	14	24842.9
5/19/2020	15787100	199600	8	24950.0
5/11/2020	15587500	19400	17	1141.2
4/24/2020	15568100			
9/18/2019	15565800	327600	14	23400.0
9/4/2019	15238200	424000	18	23555.6
8/17/2019	14814200	164800	7	23542.9
8/10/2019	14649400	457000	21	21761.9
7/20/2019	14192400	241600	8	30200.0
7/12/2019	13950800	242500	10	24250.0
7/2/2019	13708300	266400	11	24218.2
6/21/2019	13441900	170200	7	24314.3
6/14/2019	13271700	219000	9	24333.3
6/5/2019	13052700			
10/27/2018	12812600	155900	7	22271.4
10/20/2018	12656700	157900	7	22557.1
10/13/2018	12498800	472200	21	22485.7
9/22/2018	12026600	316000	14	22571.4
9/8/2018	11710600	138400	6	23066.7
9/2/2018	11572200	175600	8	21950.0
8/25/2018	11396600	94500	4	23625.0
8/21/2018	11302100	409600	18	22755.6
8/3/2018	10892500	136300	6	22716.7
7/28/2018	10756200	182100	8	22762.5
7/20/2018	10574100	160700	7	22957.1
7/13/2018	10413400	137700	6	22950.0
7/7/2018	10275700	157900	7	22557.1
6/30/2018	10117800	540300	65	8312.3
4/26/2018	9577500			
			Max, gpd	32671.4

Well 2 - Activity Road

Non-Domestic, feeds lake

Date	Meter Reading	Volume Pumped (Gallons)	Days in Period	Average Daily Flow (GPD)
10/2/2023	4727210	172950	31	5579.0
9/1/2023	4554260	371010	29	12793.4
8/3/2023	4183250	443860	31	14318.1
7/3/2023	3739390	328860	32	10276.9
6/1/2023	3410530	357290	29	12320.3
5/3/2023	3053240	0	30	0.0
4/3/2023	3053240	0	31	0.0
3/3/2023	3053240	0	28	0.0
2/3/2023	3053240	0	31	0.0
1/3/2023	3053240	0	32	0.0
12/2/2022	3053240	0	29	0.0
11/3/2022	3053240	0	31	0.0
10/3/2022	3053240	428970	32	13405.3
9/1/2022	2624270	405090	30	13503.0
8/2/2022	2219180	448670	32	14020.9
7/1/2022	1770510	369840	30	12328.0
6/1/2022	1400670	377910	30	12597.0
5/2/2022	1022760	13740	27	508.9
4/5/2022	1009020	0	35	0.0
3/1/2022	1009020	0	28	0.0
2/1/2022	1009020	0	26	0.0
1/6/2022	1009020	0	36	0.0
12/1/2021	1009020	0	30	0.0
11/1/2021	1009020			
9/1/2021	10476940	419300	30	13976.7
8/2/2021	10057640	436270	32	13633.4
7/1/2021	9621370	367510	28	13125.4
6/3/2021	9253860	561960	42	13380.0
4/22/2021	8691900	92600	31	2987.1
3/22/2021	8599300	0	28	0.0
2/22/2021	8599300	0	31	0.0
1/22/2021	8599300			
11/22/2020	8599300	0	9	0.0
11/13/2020	8599300	630	7	90.0
11/6/2020	8598670	100020	7	14288.6
10/30/2020	8498650	100610	7	14372.9
10/23/2020	8398040	100470	7	14352.9
10/16/2020	8297570	113810	8	14226.3
10/8/2020	8183760	84080	6	14013.3
10/2/2020	8099680	223160	15	14877.3
9/17/2020	7876520	47160	6	7860.0

9/11/2020	7829360	150080	8	18760.0
9/3/2020	7679280	73730	6	12288.3
8/28/2020	7605550	116810	6	19468.3
8/22/2020	7488740	88560	8	11070.0
8/14/2020	7400180	59950	7	8564.3
8/7/2020	7340230	149070	7	21295.7
7/31/2020	7191160	60200	7	8600.0
7/24/2020	7130960	82720	7	11817.1
7/17/2020	7048240	94940	7	13562.9
7/10/2020	6953300	138010	7	19715.7
7/3/2020	6815290	186410	14	13315.0
6/19/2020	6628880	171460	7	24494.3
6/12/2020	6457420	152820	10	15282.0
6/2/2020	6304600	218840	14	15631.4
5/19/2020	6085760	280020	18	15556.7
5/1/2020	5805740			
10/26/2019	5805740	149250	11	13568.2
10/15/2019	5656490	161230	11	14657.3
10/4/2019	5495260	237520	16	14845.0
9/18/2019	5257740	72520	5	14504.0
9/13/2019	5185220	133450	9	14827.8
9/4/2019	5051770	277740	18	15430.0
8/17/2019	4774030	90840	7	12977.1
8/10/2019	4683190	291350	19	15334.2
7/22/2019	4391840	156410	10	15641.0
7/12/2019	4235430	157190	10	15719.0
7/2/2019	4078240	174270	11	15842.7
6/21/2019	3903970	159570	10	15957.0
6/11/2019	3744400			
8/3/2018	3178810	31530	6	5255.0
7/28/2018	3147280	77150	8	9643.8
7/20/2018	3070130	63600	7	9085.7
7/13/2018	3006530	62380	6	10396.7
7/7/2018	2944150	72550	7	10364.3
6/30/2018	2871600	675670	65	10394.9
4/26/2018	2195930			
			Max, gpd	24494.3

Well 4 - Building "B"

Not used in long time. Primariliy used for irrigation and domestic. Split between two.

Date	Meter Reading	Volume Pumped (Gallons)	Days in Period	Average Daily Flow (GPD)
10/2/2023	33307400	0	31	0.0
9/1/2023	33307400	0	29	0.0
8/3/2023	33307400	0	31	0.0
7/3/2023	33307400	0	32	0.0
6/1/2023	33307400	1200	31	38.7
5/1/2023	33306200	0	30	0.0
4/1/2023	33306200	0	31	0.0
3/1/2023	33306200	0	28	0.0
2/1/2023	33306200	2900	29	100.0
1/3/2023	33303300	0	31	0.0
12/3/2022	33303300	0	30	0.0
11/3/2022	33303300	258800	31	8348.4
10/3/2022	33044500	543900	32	16996.9
9/1/2022	32500600	463300	30	15443.3
8/2/2022	32037300	527900	32	16496.9
7/1/2022	31509400	337200	29	11627.6
6/2/2022	31172200	63900	32	1996.9
5/1/2022	31108300	100	26	3.8
4/5/2022	31108200	0	34	0.0
3/2/2022	31108200	0	29	0.0
2/1/2022	31108200	0	26	0.0
1/6/2022	31108200	500	36	13.9
12/1/2021	31107700	0	30	0.0
11/1/2021	31107700	569000	61	9327.9
9/1/2021	30538700	525900	30	17530.0
8/2/2021	30012800	547900	32	17121.9
7/1/2021	29464900	597800	28	21350.0
6/3/2021	28867100	1053100	42	25073.8
4/22/2021	27814000	273600	31	8825.8
3/22/2021	27540400	0	28	0.0
2/22/2021	27540400	0	32	0.0
1/21/2021	27540400	0	30	0.0
12/22/2020	27540400	4400	53	83.0
10/30/2020	27536000	143100	7	20442.9
10/23/2020	27392900	143700	7	20528.6
10/16/2020	27249200	83000	7	11857.1
10/9/2020	27166200	207600	7	29657.1
10/2/2020	26958600	336000	15	22400.0
9/17/2020	26622600	68600	6	11433.3
9/11/2020	26554000	271600	8	33950.0
9/3/2020	26282400	120600	6	20100.0
8/28/2020	26161800	193000	7	27571.4
8/21/2020	25968800	148700	7	21242.9

8/14/2020	25820100	104700	7	14957.1
8/7/2020	25715400	258700	7	36957.1
7/31/2020	25456700	104100	7	14871.4
7/24/2020	25352600	151700	7	21671.4
7/17/2020	25200900	166200	7	23742.9
7/10/2020	25034700	252300	7	36042.9
7/3/2020	24782400	360500	14	25750.0
6/19/2020	24421900	251700	7	35957.1
6/12/2020	24170200	63600	32	1987.5
5/11/2020	24106600	438300	17	25782.4
4/24/2020	23668300			
11/13/2019	23630100	389100	28	13896.4
10/16/2019	23241000	484700	12	40391.7
10/4/2019	22756300	374400	16	23400.0
9/18/2019	22381900	339700	14	24264.3
9/4/2019	22042200	456300	18	25350.0
8/17/2019	21585900	185000	7	26428.6
8/10/2019	21400900	528900	21	25185.7
7/20/2019	20872000	280400	8	35050.0
7/12/2019	20591600	279100	10	27910.0
7/2/2019	20312500	310300	11	28209.1
6/21/2019	20002200	200900	7	28700.0
6/14/2019	19801300	266600	9	29622.2
6/5/2019	19534700			
11/8/2018	19332700	70300	5	14060.0
11/3/2018	19262400	98400	7	14057.1
10/27/2018	19164000	99300	7	14185.7
10/20/2018	19064700	101400	7	14485.7
10/13/2018	18963300	311900	21	14852.4
9/22/2018	18651400	119900	8	14987.5
9/14/2018	18531500	89800	6	14966.7
9/8/2018	18441700	95400	6	15900.0
9/2/2018	18346300	123400	8	15425.0
8/25/2018	18222900	66200	4	16550.0
8/21/2018	18156700	295700	18	16427.8
8/3/2018	17861000	100600	6	16766.7
7/28/2018	17760400	138200	8	17275.0
7/20/2018	17622200	124200	7	17742.9
7/13/2018	17498000	109400	6	18233.3
7/7/2018	17388600	128000	7	18285.7
6/30/2018	17260600			
			Max, gpd	40391.7

Well 5 - Tank Road (Domestic, Main Domestic Source)

Main domestic source. Newest well.

Date	Meter Reading	Volume Pumped (Gallons)	Days in Period	Average Daily Flow (GPD)
12/1/2023	36807200	147400	30	4913.3
11/1/2023	36659800	255100	30	8503.3
10/2/2023	36404700	657400	31	21206.5
9/1/2023	35747300	1138500	29	39258.6
8/3/2023	34608800	1620500	31	52274.2
7/3/2023	32988300	1497100	32	46784.4
6/1/2023	31491200	1540900	31	49706.5
5/1/2023	29950300	182800	30	6093.3
4/1/2023	29767500	210500	31	6790.3
3/1/2023	29557000	223500	28	7982.1
2/1/2023	29333500	225000	29	7758.6
1/3/2023	29108500	137700	33	4172.7
12/1/2022	28970800	200950	29	6929.3
11/2/2022	28769850	200950	30	6698.3
10/3/2022	28568900	540100	32	16878.1
9/1/2022	28028800	518500	30	17283.3
8/2/2022	27510300	1188000	32	37125.0
7/1/2022	26322300	496500	30	16550.0
6/1/2022	25825800	1222900	30	40763.3
5/2/2022	24602900	498500	27	18463.0
4/5/2022	24104400	188100	34	5532.4
3/2/2022	23916300	276800	29	9544.8
2/1/2022	23639500	252100	26	9696.2
1/6/2022	23387400	189300	36	5258.3
12/1/2021	23198100	191100	30	6370.0
11/1/2021	23007000	223000	30	7433.3
10/2/2021	22784000	222000	30	7400.0
9/2/2021	22562000	326800	31	10541.9
8/2/2021	22235200	553000	32	17281.3
7/1/2021	21682200	549500	28	19625.0
6/3/2021	21132700	884900	42	21069.0
4/22/2021	20247800	804200	31	25941.9
3/22/2021	19443600	37800	28	1350.0
2/22/2021	19405800	108100	31	3487.1
1/22/2021	19297700	28900	31	932.3
12/22/2020	19268800	175000	60	2916.7
10/23/2020	19093800	0	7	0.0
10/16/2020	19093800	23500	7	3357.1
10/9/2020	19070300	51700	7	7385.7
10/2/2020	19018600	70300	15	4686.7
9/17/2020	18948300	33800	6	5633.3
9/11/2020	18914500	38200	8	4775.0
9/3/2020	18876300	49200	6	8200.0

8/28/2020	18827100	32900	7	4700.0
8/21/2020	18794200	28100	7	4014.3
8/14/2020	18766100	26600	7	3800.0
8/7/2020	18739500	54500	7	7785.7
7/31/2020	18685000	21000	7	3000.0
7/24/2020	18664000	214000	7	30571.4
7/17/2020	18450000	40000	7	5714.3
7/10/2020	18410000	94400	7	13485.7
7/3/2020	18315600	812600	14	58042.9
6/19/2020	17503000	152700	7	21814.3
6/12/2020	17350300	189600	10	18960.0
6/2/2020	17160700	90000	14	6428.6
5/19/2020	17070700	1155700	18	64205.6
5/1/2020	15915000	56100	11	5100.0
4/20/2020	15858900	43700	7	6242.9
4/13/2020	15815200	37400	7	5342.9
4/6/2020	15777800	53700	33	1627.3
3/4/2020	15724100	34000	4	8500.0
2/29/2020	15690100	64300	8	8037.5
2/21/2020	15625800	67400	8	8425.0
2/13/2020	15558400	87400	7	12485.7
2/6/2020	15471000	38600	8	4825.0
1/29/2020	15432400	183400	27	6792.6
1/2/2020	15249000			
			Max, gpd	64205.6

Appendix B2

Sewer Feasability Study

1st Draft

Sewer Feasibility Study

Hume SoCal

Prepared for:
Hume SoCal

Prepared by:

Kimley»Horn



Sam McWhorter, P.E.

July 2025

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Executive Summary

This Sewer Feasibility Study evaluates whether the existing wastewater infrastructure managed by Running Springs Water District (RSWD) can accommodate the phased expansion of the Hume SoCal Campground (Hume or "the Camp") in Green Valley Lake, California. The Camp is proposing an increase in occupancy from approximately 300 to 2,652 occupants across five phases. Sewer generation from the Camp flows through the Ahwahnee Lift Station, Deer Lick Lift Station, and ultimately the Running Springs Water District's Wastewater Treatment Plant. This study models the projected sewer flows from the expansion and assesses each infrastructure component's capacity to manage and convey those flows.

Flow projections were developed using the 2022 California Plumbing Code's generation of 50 gallons per capita per day, with peaking factors applied per San Bernardino County's standards. These flow projections were further supported by sewer generations for campers with central toilet and bath facilities outlined in *Wastewater Engineering: Treatment and Resource Recovery* (Metcalf & Eddy, Fifth Edition).

The Ahwahnee Lift station has a firm pumping capacity of 560 gallons per minute (GPM) and a total emergency storage volume of 40,950 gallons. The existing peak flow into the station is approximately 362 GPM from the Green Valley Lake service area. Projected flows from the Camp exceed firm capacity beginning in Phase 2, reaching 657 GPM at full build out. Under Phase 5 and existing pump conditions, emergency storage provides approximately 6.9 hours of peak inflow storage.

The Deer Lick Lift Station has a firm capacity of 520 GPM and 63,130 gallons of equalization storage. The existing peak inflow is approximately 547 GPM. The Camp's added flow exceeds the lift station's capacity beginning in Phase 1, with total peak inflow rising to 842 GPM by Phase 5. At full build out, the equalization basin provides approximately 3.2 hours of peak flow detention.

The Running Springs Water District Wastewater Treatment Plant is permitted for 1.0 million gallons per day (MGD), but is seasonally reduced to 0.5 MGD during summer months due to maintenance activities. Based on the current flow data and projected contributions from the Camp, the plant already exceeds its 0.5 MGD summer threshold in May and June. With Phase 3, the exceedance extends into July. By Phase 5, the combined flows exceed the summer capacity for May, June, July, and August.

Alternative treatment via on-site septic was investigated but deemed infeasible. The Camp lies within a septic prohibited zone governed by the Lahontan Basin Plan. While the Water Board suggested activated sludge as a potential treatment technology, they indicated that approval would be uncertain and cost-prohibitive compared to improvements to the existing sewer system.

Introduction

This sewer feasibility study analyzes the capacity of the existing downstream infrastructure of the Hume SoCal campground for the proposed expansion from a capacity of 300 occupants to 2,652 occupants (the Project). The sewer in Green Valley Lake is managed by Running Springs Water District (RSWD), which collects, treats, and disposes of the Camp's wastewater.

Project Location

The 251-acre Project site (APN 0328-071-05, 0328-071-07, 0328-071-10, 0328-121-40, 0328-121-42) is located immediately east of Green Valley Lake Road and approximately 0.4 miles northwest of State Route (SR) 18 in Green Valley Lake, CA. Green Valley Lake is in unincorporated San Bernardino County (the County). The Project is bounded by National Forest to the north, south, west, and east.

Existing System

Wastewater from the Project pumps into the existing Ahwahnee Lift Station and travels through the Green Valley Lake Road 8-inch force main for 2994 linear feet (LF). It transitions to an 8 to 10-inch gravity main that follows Green Valley Lake Road for 5058 LF. Near the intersection of Green Valley Lake Road and SR-18, a double 8-inch inverted siphon and 8-inch sewer gravity main connect to an 8-10" gravity sewer main on SR-18, which leads to the existing Deer Lick Lift Station.

The Deer Lick Lift Station pumps the wastewater into an 8-inch force main in SR-18. After 4217 LF, the force main transitions to a 10-inch to 15-inch gravity sewer main, which also includes 2179 LF of a double 8-inch inverted siphon between Hunsaker Way and Old City Creek Road. The 10-inch to 15-inch gravity sewer main conveys the wastewater to the RSWD Wastewater Treatment Plant (WWTP).

Table 1 displays the lengths of the existing sewer pipes between the Ahwahnee Lift Station and RSWD WWTP. The existing system is illustrated in Exhibit 1. Information and lengths of the system was found from as-builts in Appendix A.

Table 1: Length of Existing Pipe from Ahwahnee Lift Station to RSWD WWTP

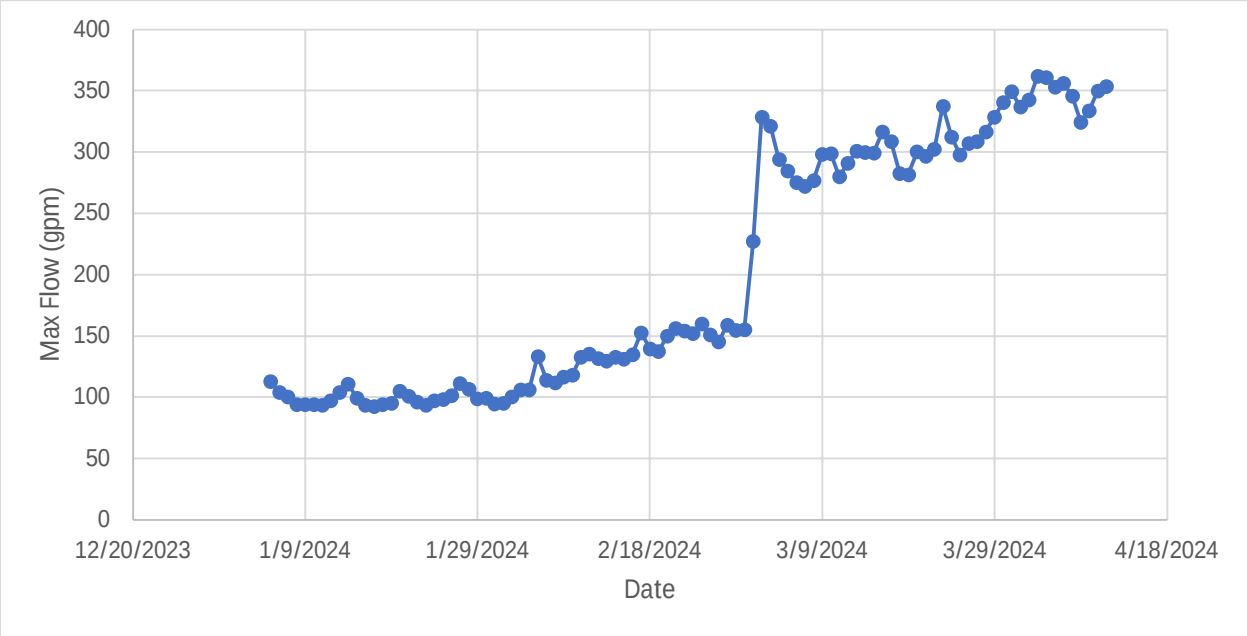
Pipe	Length (ft)
Ahwahnee Lift Station to Deer Lick Lift Station	
8" Force Main	2994
8"-10" Gravity	13764
Double 8" Inverted Siphon	1146
Deer Lick Lift Station to RSWD WWTP	
8" Force Main	4217
8"-10" Gravity	8320
Double 8" Inverted Siphon	2179

Ahwahnee Lift Station

The Ahwahnee Lift Station was constructed in 1974 and expanded in 2014. The lift station is located along Green Valley Lake Road, east of the Project. The lift station serves the Green Valley Lake service area and the Camp. The lift station has two 560 gallons per minute (GPM) pumps with a total dynamic head of 130 ft. This results in a firm pump capacity of 560 GPM and a total pumping capacity of 1,120 GPM. The original wet well has a volume of 950 gallons, and the lift station has two 20,000-gallon tanks for emergency storage. The lift station has a total peak flow storage of 40,950 gallons.

Sewer flow monitoring provided flow data for Manhole #7, upstream of the Ahwahnee Lift Station, from January 2024 to April 2024. This data was assumed to represent all flow into the lift station, except for the Camp flow. The peak flow seen by the lift station was 361.90 GPM. See Figure 1 for the maximum flow of the Ahwahnee Lift Station throughout the monitoring period of January 2024 to April 2024.

Figure 1: Existing Ahwahnee Lift Station Max Flow (GPM) from 01/2024 to 04/2024



Deer Lick Lift Station

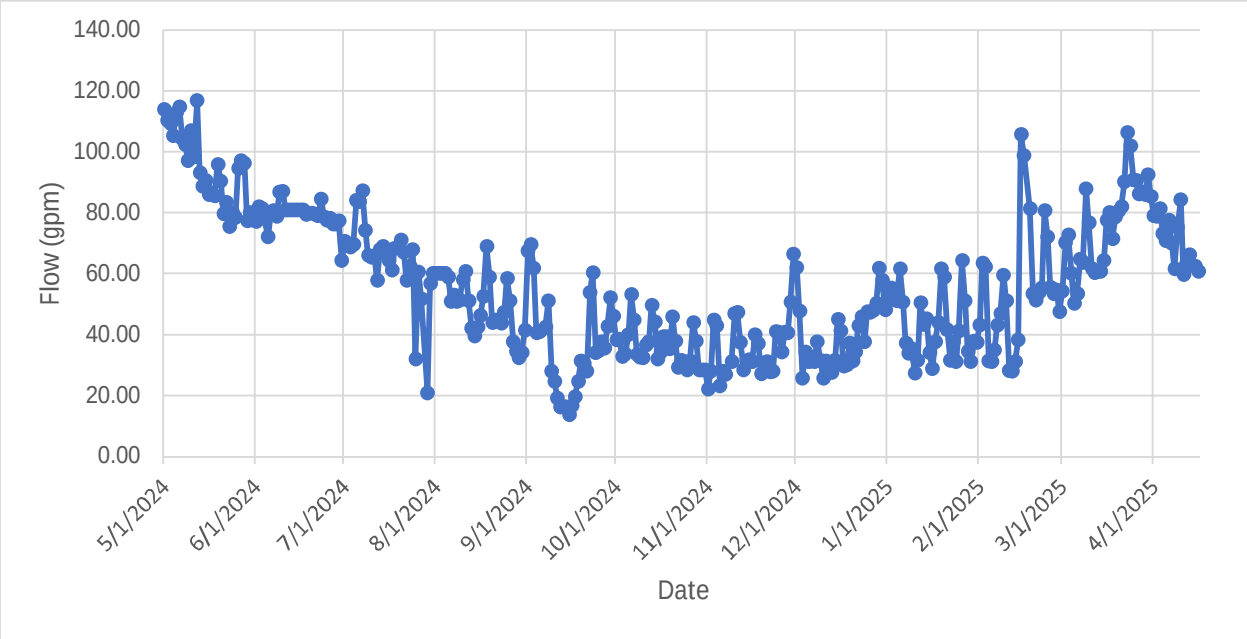
The Deer Lick Lift Station was constructed in 1976 and is located along SR-18. The lift station serves Green Valley Lake, Snow Valley, Hume Lake Camp, Camp Cedar Crest, and Pondo Camp. The lift station has two 520 GPM pumps with a total dynamic head of 145 ft. This results in a firm pump capacity of 520 GPM and a total pumping capacity of 1,040 GPM. The wet well has a volume of 630 gallons, and the lift station has a 62,500-gallon equalization basin for peak flow storage. The lift station has a total peak flow storage of 63,130 gallons.

RSWD provided flow data for the Deer Lick Lift Station from January 2024 to April 2025. However, to accurately compare the Ahwahnee and Deer Lick Lift Stations, analysis for the Deer Lick Lift Station was done using flow from January 2024 to April 2024, which is the same monitoring period as the data provided for the Ahwahnee Lift Station.

The peak flow seen by the lift station was 546.88 GPM. In accordance with Appendix B, the *2012 County of San Bernardino Standards for Sanitary Sewer (SB County Standards),* a peaking factor of 3.0 was applied to the lift station's maximum average value (182.29 GPM) to obtain the peak flow. See Figure 2 for the average daily flow of the Deer Lick Lift Station throughout the monitoring period of January 2024 to April 2025.

If all the RSWD-provided data (January 2024 to April 2025) were analyzed, a lower peak flow would have been found. Instead, by analyzing January 2024 to April 2024, the resulting peak flow used for further analysis is a conservative value.

Figure 2: Existing Deer Lick Lift Station Average Flow (GPM) from 01/2024 to 04/2025



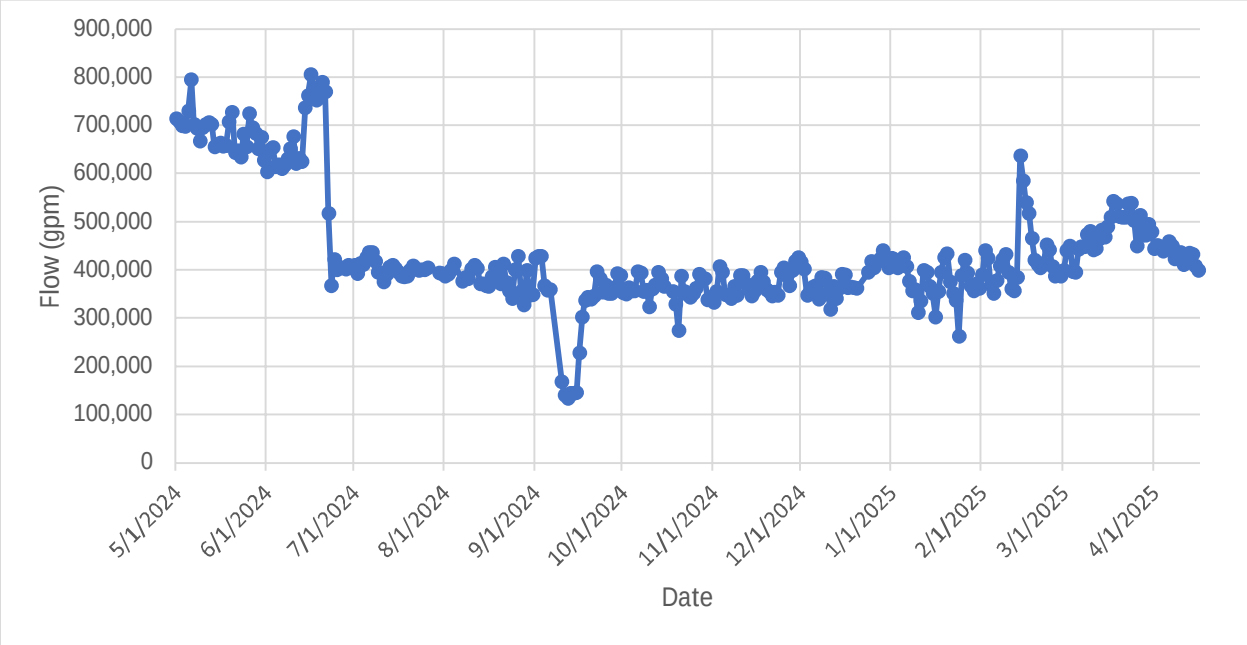
RSWD Wastewater Treatment Plant

The RSWD Wastewater Treatment Plant, constructed in 1978, is located off Fredalba Road at 3400 Sewer Plant Road. The plant is ruled under permit WDR1000036054. The treatment plant has a total capacity of 1 million gallons per day (MGD). During the summer months, its capacity will lower to 0.5 MGD due to maintenance of the plant.

RSWD provided flow data for the treatment plant from May 2024 to April 2025. See Figure 3 for the average RSWD WWTP flow throughout the monitoring period.

The flow data provided exhibits several anomalies, including spikes and drops in reported flows that do not align with expected seasonal patterns. These anomalies likely reflect isolated operational events, data collection errors, or temporary maintenance conditions rather than typical base conditions. Before proposed improvements can be fully identified, it is recommended that these anomalies be reviewed and resolved with RSWD to establish accurate baseline flow.

Figure 3: Existing RSWD WWTP Average Flow (GPM) from 05/2024 to 04/2025



Projected Flows

Development of the Project will be completed in five phases. For analysis of the impact of each phase and the total impact of the Project on the system, projected sewer generation rates and flows were first determined.

The number of guests per phase was provided by the Camp. The difference between the total guests and the estimated total occupants during Phase 5 (provided by the Camp) was calculated to find the total estimated number of employees. This value was scaled proportionally and added to the increase of guests per phase.

Shown in Appendix C, the *2022 California Plumbing Code (Appendix H, Table H 201.1(4))* standard for summer and seasonal camps provided a sewer generation value of 50 gallons per capita per day (GPCPD). Although this value is meant for septic systems, it was assumed to provide an accurate reflection of sewage flow rates for the Camp. This value was multiplied by each phase's total occupants to find the average sewer generation per phase.

To further support the use of the 50 GPCPD sewer generation rate, reference was made to *Wastewater Engineering: Treatment and Resource Recovery* (Metcalf & Eddy, Fifth Edition). Table 3-5, "Typical Wastewater Flowrates from Recreational Facilities in the United States," provides daily average sewage flow values for recreational facilities similar to those at the Camp. For campers using central toilet and bath facilities, the listed value is 33.8 GPCPD. Additionally, dining hall wastewater is estimated at 5.3 gallons per meal served. Assuming three meals per day per camper, this results in an additional 15.9 GPCPD, yielding a total of 49.7 GPCPD per camper.

This value closely aligns with the 50 GPCPD provided in the *2022 California Plumbing Code* for summer and seasonal camps. Accordingly, the 50 GPCPD figure was used for estimating average daily sewer generation across all phases of the Project.

The proposed average daily sewer generation for each occupant type per phase (including employees) is shown in Table 2.

Table 2: Proposed Average Sewer Generation per Phase

Occupant Type	Phase	Guests	Average Sewer Generation per Phase (GPD)[1]
Middle School Guests	1	784	40,700
High School Guests	2	1000	51,919
Adult Lodge	3	140	7,269
Elementary Age Guests	4	500	25,959
Wildwood Camp	5	130	6,749

1 = Average Sewer Generation per Phase including estimated employees.

In accordance with the *SB County Standards*, a peaking factor of 3.2 was applied to the average daily demand to determine peak flow for the Camp. The total projected flows for each phase are shown in Table 3 and Table 4.

Table 3: Camp Projected Flows (GPD)

Phase	Average Flow (GPD)	Cumulative Average Flow (GPD)	Peak Flow (GPD)	Cumulative Peak Flow (GPD)
Phase 1	40,700	40,700	130,240	130,240
Phase 2	51,919	92,619	166,139	296,379
Phase 3	7,269	99,887	23,260	319,639
Phase 4	25,959	125,846	83,070	402,709
Phase 5	6,749	132,596	21,598	424,307

Table 4: Camp Projected Flows (GPM)

Phase	Average Flow (GPM)	Cumulative Average Flow (GPM)	Peak Flow (GPM)	Cumulative Peak Flow (GPM)
Phase 1	28.26	28.26	90.44	90.44
Phase 2	36.05	64.32	115.37	205.82
Phase 3	5.05	69.37	16.15	221.97
Phase 4	18.03	87.39	57.69	279.66
Phase 5	4.69	92.08	15.00	294.66

Seasonal Variation

The camp occupancy per month in Phase 5 was provided by the Camp. Because of the difference in camp occupancy between seasons, the proposed camp seasonal flow variations were calculated to provide an accurate assessment of the impact of the Camp's expansion on the system.

The total number of guests was divided by the total Phase 5 guests to obtain a percentage that was used to scale the camp occupancy for Phases 1-4. Average flow and peak flows were calculated using the same methodology from Table 3, utilizing the *2022 California Plumbing Code* standard of 50 gallons per capita per day (GPCPD) and the *SB County Standards* peaking factor of 3.2.

Table 5 through Table 9 display the proposed seasonal flow variations from Phase 1 through 5.

Table 5: Phase 1 – Proposed Camp Seasonal Flow Variations

Month	Camp Occupancy	Average Flow (GPD)	Peak Flow (GPD)
January	91	4,528	14,489
February	96	4,789	15,324
March	79	3,929	12,573
April	93	4,651	14,882
May	91	4,528	14,489
June	621	31,035	99,311
July	814	40,704	130,253
August	462	23,115	73,967
September	103	5,142	16,454
October	91	4,528	14,489
November	103	5,142	16,454
December	100	5,004	16,012

Table 6: Phase 2 – Proposed Camp Seasonal Flow Variations

Month	Camp Occupancy	Average Flow (GPD)	Peak Flow (GPD)
January	206	10,303	32,970
February	218	10,897	34,870
March	179	8,941	28,611
April	212	10,582	33,864
May	206	10,303	32,970
June	1412	70,620	225,983
July	1852	92,623	296,393
August	1052	52,598	168,313
September	234	11,700	37,440
October	206	10,303	32,970
November	234	11,700	37,440
December	228	11,386	36,434

Table 7: Phase 3 – Proposed Camp Seasonal Flow Variations

Month	Camp Occupancy	Average Flow (GPD)	Peak Flow (GPD)
January	222	11,112	35,557
February	235	11,752	37,606
March	193	9,643	30,856
April	228	11,413	36,521
May	222	11,112	35,557
June	1523	76,161	243,717
July	1998	99,891	319,652
August	1135	56,726	181,522
September	252	12,618	40,378
October	222	11,112	35,557
November	252	12,618	40,378
December	246	12,279	39,294

Table 8: Phase 4 – Proposed Camp Seasonal Flow Variations

Month	Camp Occupancy	Average Flow (GPD)	Peak Flow (GPD)
January	280	13,999	44,797
February	296	14,806	47,379
March	243	12,148	38,875
April	288	14,379	46,012
May	280	13,999	44,797
June	1919	95,954	307,053
July	2517	125,851	402,722
August	1429	71,467	228,695
September	318	15,897	50,872
October	280	13,999	44,797
November	318	15,897	50,872
December	309	15,470	49,505

Table 9: Phase 5 – Proposed Camp Seasonal Flow Variations

Month	Camp Occupancy	Average Flow (GPD)	Peak Flow (GPD)
January	295	14,750	47,200
February	312	15,600	49,920
March	256	12,800	40,960
April	303	15,150	48,480
May	295	14,750	47,200
June	2,022	101,100	323,520
July	2,652	132,600	424,320
August	1,506	75,300	240,960
September	335	16,750	53,600
October	295	14,750	47,200
November	335	16,750	53,600
December	326	16,300	52,160

Proposed Analysis

Ahwahnee Lift Station

The flow from the Camp will initially be pumped into the Ahwahnee Lift Station, which has a firm pump capacity of 560 GPM. The proposed cumulative flow through the lift station was calculated by combining the proposed flows from each phase of the Camp from Table 4 with the existing lift station peak flow of 361.90 GPM.

Table 10 shows the proposed Ahwahnee Lift Station flows after each phase of the Camp expansion. The flows from Phase 2 to 5 exceed the firm capacity of the lift station of 560 GPM. Due to the increased flow, the pumps within the Ahwahnee Lift Station will also have increased run times.

The Ahwahnee Lift Station has two 20,000-gallon storage tanks that were analyzed to determine the amount of storage at full pump capacity. Table 11 displays the storage capacity of the Ahwahnee Lift emergency storage tanks for each phase. At Phase 5, the emergency storage tanks can store peak flow for around 7 hours.

Table 10: Proposed Ahwahnee Lift Station Flows

Phase	Camp Peak Flow (GPM)	Cumulative Peak Flow (GPM)	Existing Ahwahnee Lift Station Peak Flow (GPM)	Proposed Cumulative Flow (GPM)
Phase 1	90.44	90.44	361.90	452.34
Phase 2	115.37	205.82	361.90	567.72
Phase 3	16.15	221.97	361.90	583.87
Phase 4	57.69	279.66	361.90	641.56
Phase 5	15.00	294.66	361.90	656.56

Table 11: Proposed Ahwahnee Lift Station Storage Capacity

Phase	Storage Capacity[2]	Units
Phase 1	-371.56[3]	min
	-6.19[3]	hr
Phase 2	5,182.00	min
	86.37	hr
Phase 3	1,675.64	min
	27.93	hr
Phase 4	490.44	min
	8.17	hr
Phase 5	414.26	min
	6.90	hr

2 = At peak flow conditions, assuming continuous pump use.
3 = Pump capacity is greater than proposed cumulative flow in; continuous pump use will handle peak flow.

Conveyance from Ahwahnee Lift Station to Deer Lick Lift Station

Because the pumps are the limiting factor in the system, the existing force and gravity mains from the Ahwahnee Lift Station to the Deer Lick Lift Station were assumed to remain at their existing capacity. The capacity of the existing gravity mains was calculated using an n of 0.013 for PVC pipes and a maximum d/D of 0.50, from the *SB County Standards*.

The existing 8-inch force main can handle flows up to 1,253 GPM and the double 8-inch inverted siphon can handle up to 2,506 GPM, with a maximum velocity of 8 ft/s. Ahwahnee Lift Station's maximum pumping capacity of 560 GPM is the highest flow rate experienced within the system and restricts the system to this lower value.

Table 12 displays the capacity of the sewer mains from the Ahwahnee Lift Station to the Deer Lick Lift Station.

Table 12: Existing Ahwahnee Lift Station Conveyance Capacity

Pipe Size (in)	Slope (%)	Flowrate (GPM)
8" Gravity	1	271.17
	3	469.68
	5	606.36
10" Gravity	1	491.67
	3	851.59
	5	1,099.40
8" FM Capacity		1,253.28
Double 8" Inverted Siphon		2,506.57

Deer Lick Lift Station

The flow from the Ahwahnee Lift Station will be pumped to the Deer Lick Lift Station, which has a firm pump capacity of 520 GPM. The proposed cumulative flow through the lift station was calculated by combining the proposed flows from each phase of the Camp from Table 4 with the existing lift station peak flow of 546.88 GPM. The existing flow from Ahwahnee was included in the existing Deer Lick peak flow. Therefore, the proposed flows from the Camp at each phase were added to peak flow at the Deer Lick Lift Station for this analysis.

Table 13 shows the proposed Deer Lick Lift Station flows after each phase of the Camp expansion.

The Deer Lick Lift Station has one 65,000-gallon equalization basin that was analyzed to determine the amount of storage at full pump capacity. Table 14 displays the storage capacity of the Deer Lick Lift equalization basin for each phase. At Phase 5, the equalization basin can store peak flow 3.24 hours.

Table 13: Proposed Deer Lick Lift Station Flows

Phase	Camp Peak Flow (GPM)	Existing Deer Lick Lift Station Peak Flow (GPM)	Proposed Cumulative Flow (GPM)
Phase 1	90.44	546.88	637.32
Phase 2	205.82	546.88	752.69
Phase 3	221.97	546.88	768.85
Phase 4	279.66	546.88	826.53
Phase 5	294.66	546.88	841.53

Table 14: Proposed Deer Lick Lift Station Storage Capacity

Phase	Storage Capacity[4]	Units
Phase 1	532.73	min
	8.88	hr
Phase 2	268.59	min
	4.48	hr
Phase 3	248.85	min
	4.19	hr
Phase 4	203.89	min
	3.40	hr
Phase 5	194.38	min
	3.24	hr

4 = At peak flow conditions, assuming continuous pump use.

Conveyance from Deer Lick Lift Station to RSWD WWTP

Because the pumps are the limiting factor in the system, the existing force and gravity mains from the Deer Lick Lift Station to the RSWD WWTP were assumed to remain at their existing capacity. The capacity of the existing gravity mains was calculated using an n of 0.013 for PVC pipes and a maximum d/D of 0.67, from the *SB County Standards*.

The existing 8-inch force main can handle flows up to 1,253 GPM and the double 8-inch inverted siphon can handle up to 2,506 GPM, with a maximum velocity of 8 ft/s. Deer Lick Lift Station's maximum pumping capacity of 1,040 GPM is the highest flow rate experienced within the system and restricts the system to this lower value.

Table 15 displays the capacity of the sewer mains from the Deer Lick Lift Station to the RSWD WWTP.

Table 15: Existing Deer Lick Lift Station Conveyance Capacity

Pipe Size (in)	Slope (%)	Flowrate (GPM)
8" Gravity	1	271.17
	3	469.68
	5	606.36
10" Gravity	1	491.67
	3	851.59
	5	1,099.40
12" Gravity	1	799.51
	3	1,384.78
	5	1,787.75
15" Gravity	1	1,449.60
	3	2,510.78
	5	3,241.40
8" FM Capacity		1,253.28
Double 8" Inverted Siphon		2,506.57

RSWD Wastewater Treatment Plant

The RSWD Wastewater Treatment Plant has a total capacity of 1.0 MGD, but during the summer months, its capacity will decrease to 0.5 MGD for maintenance of the treatment plant. The proposed combined flow from the existing system and the proposed Camp expansion was calculated to determine the phases and months that the combined flow would exceed capacity. The average Hume Camp flow was obtained from the proposed seasonal variation tables Table 5 through Table 9. Existing plant flow was provided by SCADA (Supervisory Control and Data Acquisition) data.

Table 16 through Table 20 represent proposed combined RSWD WWTP flows for Phase 1-5. Based on the SCADA data, existing plant flow exceeds the WWTP capacity of 0.5 MGD in May and June. With the proposed RSWD WWTP flows after the Camp expansion, Phase 3 causes May, June, and July to exceed capacity. Phase 5 causes May, June, July, and August combined flows to exceed capacity.

Table 16: Phase 1 – Proposed RSWD WWTP Flows

Month	Average Hume Camp Flow (GPD)	Existing Plant Flow (GPD)	Combined Average Flow (GPD)
January	4,528	375,935	380,463
February	4,789	427,929	432,718
March	3,929	475,645	479,574
April	4,651	432,875	437,526
May	4,528	685,968	690,496
June	31,035	603,133	634,168
July	40,704	402,893	443,597
August	23,115	382,207	405,322
September	5,142	314,593	319,735
October	4,528	359,483	364,011
November	5,142	372,033	377,175
December	5,004	380,821	385,825

Table 17: Phase 2 – Proposed RSWD WWTP Flows

Month	Average Hume Camp Flow (GPD)	Existing Plant Flow (GPD)	Combined Average Flow (GPD)
January	10,303	375,935	386,238
February	10,897	427,929	438,826
March	8,941	475,645	484,586
April	10,582	432,875	443,457
May	10,303	685,968	696,271
June	70,620	603,133	673,753
July	92,623	402,893	495,516
August	52,598	382,207	434,805
September	11,700	314,593	326,293
October	10,303	359,483	369,786
November	11,700	372,033	383,733
December	11,386	380,821	392,207

Table 18: Phase 3 – Proposed RSWD WWTP Flows

Month	Average Hume Camp Flow (GPD)	Existing Plant Flow (GPD)	Combined Average Flow (GPD)
January	11,112	375,935	387,047
February	11,752	427,929	439,681
March	9,643	475,645	485,288
April	11,413	432,875	444,288
May	11,112	685,968	697,080
June	76,161	603,133	679,294
July	99,891	402,893	502,784
August	56,726	382,207	438,933
September	12,618	314,593	327,211
October	11,112	359,483	370,595
November	12,618	372,033	384,651
December	12,279	380,821	393,100

Table 19: Phase 4 – Proposed RSWD WWTP Flows

Month	Average Hume Camp Flow (GPD)	Existing Plant Flow (GPD)	Combined Average Flow (GPD)
January	13,999	375,935	389,934
February	14,806	427,929	442,735
March	12,148	475,645	487,793
April	14,379	432,875	447,254
May	13,999	685,968	699,967
June	95,954	603,133	699,087
July	125,851	402,893	528,744
August	71,467	382,207	453,674
September	15,897	314,593	330,490
October	13,999	359,483	373,482
November	15,897	372,033	387,930
December	15,470	380,821	396,291

Table 20: Phase 5 – Proposed RSWD WWTP Flows

Month	Average Hume Camp Flow (GPD)	Existing Plant Flow (GPD)	Combined Average Flow (GPD)
January	23,600	375,935	399,535
February	24,960	427,929	452,889
March	20,480	475,645	496,125
April	24,240	432,875	457,115
May	23,600	685,968	709,568
June	161,760	603,133	764,893
July	212,160	402,893	615,053
August	120,480	382,207	502,687
September	26,800	314,593	341,393
October	23,600	359,483	383,083
November	26,800	372,033	398,833
December	26,080	380,821	406,901

Septic System Analysis

An on-site wastewater treatment system (OWTS) was evaluated for wastewater treatment and disposal for this site. Geotechnical data, estimated flows, and other site parameters were analyzed for their compliance with the San Bernardino County Local Agency Management Plan (LAMP), the Lahontan Basin Plan, and the Water Quality Control Board's (Water Board) OWTS Policy. The LAMP states that flows exceeding 10,000 GPD fall under the Water Board's jurisdiction.

This site lies within the Mojave Hydrological Unit adjacent to Deep Creek at approximately 6400 ft of elevation. The Lahontan Basin plan prohibits the discharge of waste to land or water in the Mojave Hydrologic Unit if in the Deep Creek watershed above elevation 3,200 feet to protect the surface and ground waters of the area. Exceptions can be made if it is proven that the waste discharge will not decrease the water quality relative to the objectives in the area.

Using GeoTracker to investigate existing facilities nearby, a camp within the same hydrological area was discovered with multiple septic systems permitted on-site to treat wastewater flows. This led to discussion with the Lahontan Water Board to inquire about septic feasibility for this facility.

Per discussion with the Lahontan Water Board, a conventional septic system is not a feasible treatment method for this site due to the Basin Plan's septic prohibition zone that the facility resides in. Facilities nearby with septic systems were permitted or designed prior to the 1975 prohibition.

If on-site wastewater treatment and disposal was the only option for this site, an alternative treatment system (ATS) would be required according to conditions set by the Water Board. Based on preliminary information, the Lahontan Water Board suggested activated sludge treatment as an option for this application. However, the Lahontan Water Board cannot confirm approval of any on-site wastewater treatment system before an official review.

Design of an ATS, such as an activated sludge treatment system, can be costly to design, build, and operate. With connection to an existing sewer system, it is likely of greater benefit to the developer and the Water Board to make improvements to the existing sewer system compared to designing and operating a small wastewater treatment plant on-site.

Conclusion

This sewer feasibility study evaluates the capacity of the existing wastewater infrastructure managed by RSWD to accommodate the proposed expansion of the Hume SoCal campground. This includes the Ahwahnee Lift Station, the Deer Lick Lift Station, and the RSWD WWTP. Additionally, the study evaluates the impact of the proposed phased expansion of the Camp on the existing infrastructure.

The study finds that the proposed expansion of the Camp will strain the existing wastewater infrastructure. For the Ahwahnee Lift Station, Phases 2 to 5 of the expansion will exceed the pumping capacity of 560 GPM. Additionally, in Phase 5, based on the proposed peak flow of 95.56 GPM, the emergency storage at the lift station has a peak flow storage capacity of 6.90 hours.

For the Deer Lick Lift Station, all phases (Phases 1 to 5) of the expansion will exceed the pumping capacity of 520 GPM. However, peak flow calculations indicate the pumping capacity is already surpassed under existing conditions. In Phase 5, based on the proposed peak flow of 841.53 GPM, the equalization basin at the lift station has a peak flow storage capacity of 3.24 hours.

For both the conveyance system between the Ahwahnee Lift Station, Deer Lick Lift Station, and RSWD WWTP, the pumps are the limiting factor of flowrate in the wastewater system. The force mains, inverted siphons, and gravity mains at most slopes have higher capacity than the pump capacity.

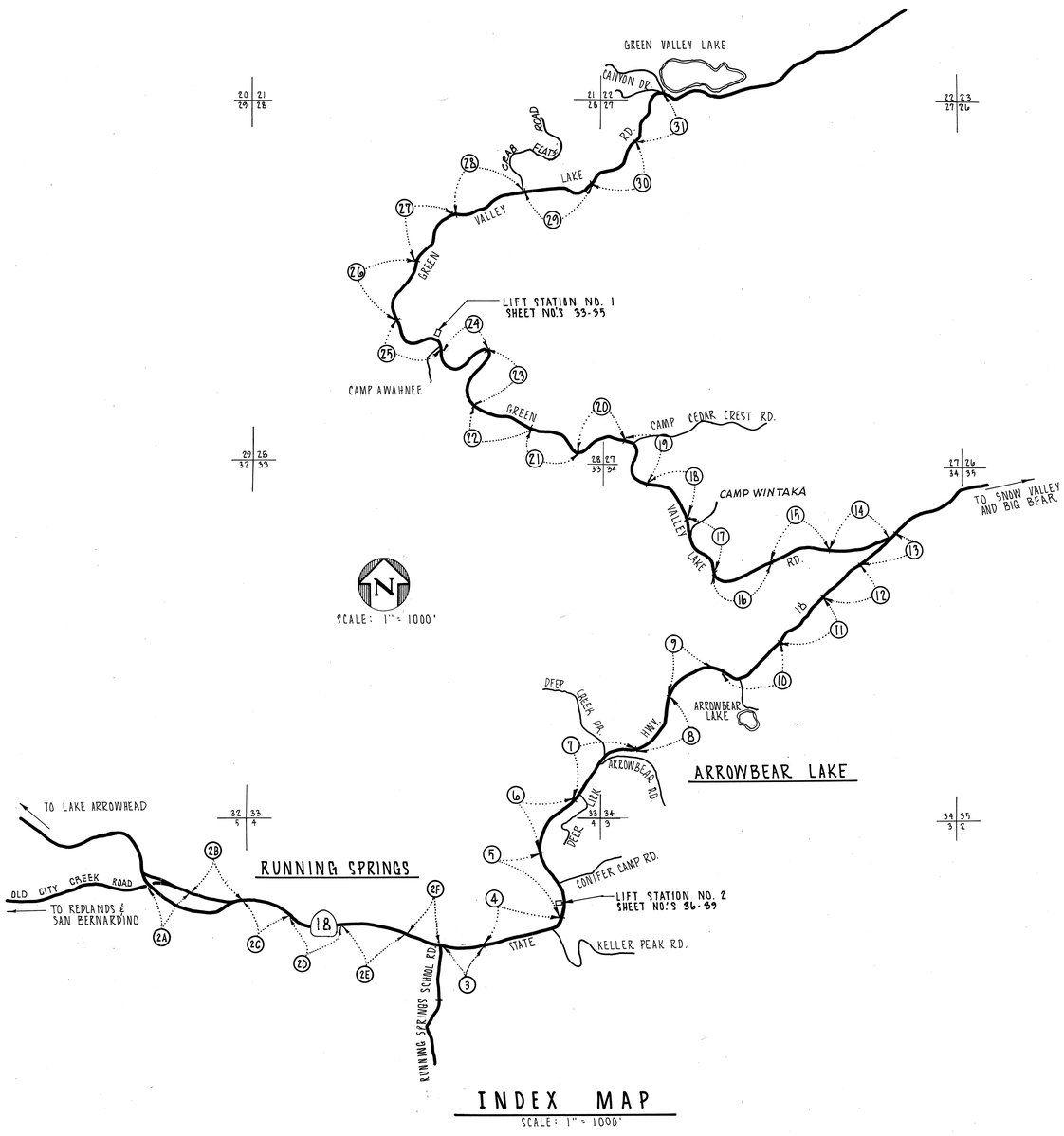
The RSWD WWTP has a capacity of 1.0 MGD in the winter and 0.5 MGD in the summer months. Existing flows for the RSWD WWTP show that the plant exceeds capacity in May and June. Phase 3 of the expansion of the Camp will cause flows to exceed in May, June, and July. Phase 5 will cause flows to exceed in May, June, July, and August.

Based on these findings, it is recommended that the Camp initiate preliminary design for pump upgrades and storage expansion at both lift stations, and coordinate with RSWD to evaluate near-term and long-term strategies for increasing WWTP seasonal capacity. Concurrently, the downstream gravity sewer system should be evaluated for potential bottlenecks under future lift station conditions. These efforts should be aligned with a phased development plan that matches Camp occupancy growth with the completion of required infrastructure improvements. This study is intended to serve as the technical foundation for those discussions and design coordination between Hume SoCal, RSWD, and Kimley-Horn.

APPENDIX A

Conveyance As-Builts (Green Valley Lake Interceptor, 1974 & 1969 Interceptor Sewers)

GREEN VALLEY LAKE



GENERAL NOTES

1. ALL STATIONING ON THE DRAWINGS ARE ALONG THE TRANSIT LINE UNLESS OTHERWISE SHOWN. THE ACTUAL PIPE LENGTHS BETWEEN STATIONS ARE NOT NECESSARILY THE NUMERIC DIFFERENCE BETWEEN THESE STATIONS. THE CONTRACTOR IS RESPONSIBLE FOR CALCULATING THE ACTUAL LENGTH OF PIPE FOR BID PURPOSES.
2. THE CENTERLINE OF STATE HIGHWAY 18 AND GREEN VALLEY LAKE ROAD AS SHOWN ON THE PLANS IS THAT OF THE EXISTING PAVEMENT STRIPING. THE ENGINEER MAY ALLOW VARIATIONS IN THE ALIGNMENT OF THE SEWER AS SHOWN ON THE PLANS DUE TO OBSTRUCTIONS ENCOUNTERED IN EXCAVATION. THE VARIATIONS WILL BE CONSISTANT WITH GOOD DESIGN PRACTICES AND TRAFFIC REQUIREMENTS.
3. IN THE INSTALLATION OF THE SEWER PIPE AT THE VARIOUS VERTICAL AND HORIZONTAL CURVES, THE JOINT DEFLECTIONS SHALL NOT EXCEED THE MAXIMUM AS RECOMMENDED BY THE PIPE MANUFACTURER. SHORT LENGTHS OF PIPE MAY BE REQUIRED IN SOME CASES.
4. ALL PIPE SHALL BE EXTRA STRENGTH V.C.P., PVC - MAX. SDR35, ABS COMPOSITE, OR DUCTILE IRON UNLESS OTHERWISE NOTED. THE CLASS OF DUCTILE IRON PIPE SHALL BE ACCORDING TO THE SPECIFICATIONS FOR THE DEPTHS LISTED.
5. ALL ELEVATIONS ON THESE PLANS ARE BASED ON U.S.G.S. DATUM.
6. THE PIPE BEDDING SHALL CONFORM TO STD. DWG. E-2 FOR NORMAL BEDDING EXCEPT WHERE THE DEPTH OF THE TRENCH EXCEEDS THE MAX. ALLOWABLE DEPTH AS LISTED BELOW. IN SUCH CASES, SPECIAL BEDDING SHALL BE USED.

* MAXIMUM ALLOWABLE TRENCH DEPTH FOR NORMAL BEDDING

	PIPE SIZE	MAX. TRENCH WIDTH = 2'-9"	MAX. TRENCH WIDTH = 3'-0"
V.C.P.	8"	14'	14'
	10"	16'	12'
PVC	8"-10"	12'	10'

* TRENCH DEPTH IS THE VERTICAL DISTANCE FROM THE GROUND SURFACE TO THE BOTTOM OF THE TRENCH. ABS COMPOSITE OR DUCTILE IRON - NO MAXIMUM DEPTH RESTRICTION.

7. WHERE PVC OR ABS COMPOSITE PIPE IS USED, MANHOLE COUPLINGS SHALL BE USED FOR ALL CONNECTIONS TO MANHOLES.
8. NOTE DELETED
9. △ NOTE DELETED
10. ALL MANHOLE COVERS WITHIN STATE HWY SHALL BE SET 1" BELOW EXISTING PAVEMENT GRADE AND THE TOP SHALL BE PAVED WITH ASPHALT CONCRETE.
11. CONCRETE ENCASEMENT PER SPECIAL DISTRICTS STANDARD DWG. E-2 SHALL BE CONSTRUCTED AROUND SEWER PIPE WHERE THE COVER OVER THE TOP OF THE PIPE IS 2'-0" OR LESS FOR V.C.P. AND 3'-0" OR LESS FOR PVC OR ABS COMPOSITE PIPE
12. CORRUGATED METAL OR REINFORCED CONCRETE PIPE CROSSING OVER THE SEWER TRENCH SHALL BE SUPPORTED IN ACCORDANCE WITH THE SUPPORT DETAIL SHOWN ON SHEET 32. "SEWER UNDERCROSSING"
13. CORRUGATED METAL OR REINFORCED CONCRETE PIPE CROSSING WITHIN 18" UNDER THE SEWER SHALL BE BLANKETED IN ACCORDANCE WITH THE DETAIL SHOWN ON SHEET 32. "SEWER UNDERCROSSING"
14. THE EXISTANCE AND LOCATION OF ANY UNDERGROUND UTILITY PIPES OR STRUCTURES SHOWN ON THESE PLANS WERE OBTAINED BY A SEARCH OF THE AVAILABLE RECORDS. NEITHER THE ENGINEER NOR THE COUNTY SERVICE AREA GUARANTEE THE ACCURACY OR COMPLETENESS OF THE LOCATION OR THE EXISTENCE OR NON-EXISTENCE OF ANY UNDERGROUND UTILITY PIPE OR STRUCTURE WITHIN THE LIMITS OF WORK OF THIS PROJECT. THE CONTRACTOR SHALL LOCATE ALL UTILITY PIPES OR STRUCTURES PRIOR TO COMMENCING WORK IN ANY GIVEN AREA AND SHALL TAKE ALL PRECAUTIONARY MEASURES TO PROTECT ALL OF THE UTILITY PIPES OR STRUCTURES WHETHER OR NOT THEY ARE SHOWN ON THE PLANS.
15. THE CONTRACTOR IS REQUIRED TO NOTIFY THE EXISTING UTILITY COMPANIES IN THE AREA 72 HOURS PRIOR TO STARTING ANY WORK. THE KNOWN UTILITY COMPANIES IN THE AREA ARE:

WATER: ARROWBEAR PARK COUNTY WATER DISTRICT
32869 HILLTOP BLVD.
ARROWBEAR, CALIFORNIA
PHONE: 867-2704

RUNNING SPRINGS COUNTY WATER DISTRICT
31242 HILLTOP BLVD.
RUNNING SPRINGS, CALIFORNIA
PHONE: 867-2766

GREEN VALLEY MUTUAL WATER COMPANY
33646 HOLCOMB CREEK DR.
GREEN VALLEY LAKE, CALIFORNIA
PHONE: 867-2912

CRESTLINE - LAKE ARROWHEAD WATER AGENCY
24116 CREST FOREST DR.
CRESTLINE CALIFORNIA
PHONE: 338-1779

GAS: SOUTHERN CALIFORNIA GAS COMPANY
P.O. BOX 6226 (570 WEST 4TH STREET)
SAN BERNARDINO, CALIFORNIA
PHONE: 884-9411

ELECTRICITY: SOUTHERN CALIFORNIA EDISON COMPANY
26364 PINE AVE.
RIM FOREST CALIFORNIA
PHONE: 337-2561

TELEPHONE: CONTINENTAL TELEPHONE COMPANY
27790 W. MAIN ST.
BARSTOW CALIFORNIA
PHONE: 256-3511

16. ALL MANHOLES WITHIN COUNTY ROADS SHALL BE RAISED TO ½" BELOW FINISHED GRADE PER STD. DWG. E-4

LIST OF STANDARD DRAWINGS

SPECIAL DISTRICTS DEPARTMENT COUNTY OF SAN BERNARDINO STANDARDS FOR SANITARY SEWERS

DWG. NO.	
E-1	PROTECTION OF UTILITY WATER LINES FROM GRAVITY SEWERS
E-2	PIPE BEDDING
E-3	CONCRETE BLANKET
E-4	PRECAST MANHOLE
E-7	MANHOLE FRAME AND COVER

LEGEND

TOE	EDGE OF PAVEMENT
	TOE OF SLOPE
TOP	TOP OF SLOPE
—G— G—	GAS MAIN
—W— W—	WATER MAIN
—S— S—	SEWER MAIN (EXIST.)
—E— E—	UNDERGROUND ELECTRICAL
—T— T—	UNDERGROUND TELEPHONE
P.P.	POWER POLE
P.P.	POWER POLE WITH GUY WIRE
CMP	CORRUGATED METAL PIPE
RCP	REINFORCED CONCRETE PIPE
RCB	REINFORCED CONCRETE BOX
VALVE	WATER VALVE
F.H.	FIRE HYDRANT
A.C.	ASPHALT CONCRETE

INDEX OF SHEETS

SHEET NUMBERS	DESCRIPTION
1	TITLE SHEET
2	INDEX AND NOTES
2A-13	PLAN AND PROFILE STATE HIGHWAY 18
14-31	PLAN AND PROFILE GREEN VALLEY LAKE ROAD
32	DETAIL SHEET
33-37	LIFT STATION NO. 1 (GREEN VALLEY LAKE ROAD) / LIFT STATION NO. 2 (STATE HIGHWAY 18)
38	DELETED
39,40	LIFT STATION NO. 2 (STATE HIGHWAY 18)
41	DELETED
42,43	LIFT STATIONS NO. 1 & 2 ELECTRICAL
44	DELETED
45	LIFT STATIONS NO. 1 & 2 ARCHITECTURAL
46	DELETED
47-48	LIFT STATIONS NO. 1 & 2 ARCHITECTURAL

REV	DATE	BY	DESCRIPTION
△	7/19	H.N.	GENERAL NOTE 9.
△	9/24/74		GENERAL REVISIONS TO GENERAL NOTES

SCALE: AS SHOWN

DESIGNED A.W. ATKINS
DRAWN M.R. GORES
CHECKED D.R. ALLISON

VTN ENGINEERS ARCHITECTS PLANNERS 353 WEST SIXTH STREET, SAN BERNARDINO, CALIFORNIA 92401 PHONE (714) 889-4431

SUBMITTED Donald R. Allison — PROJECT ENGINEER — R.E. NO. 10466 — DATE 4-1-74

RECOMMENDED Richard S. Titera — PROJECT MANAGER — R.E. NO. 8605 — DATE 4-1-74

APPROVED Cally M. Powell — DATE 5-21-74

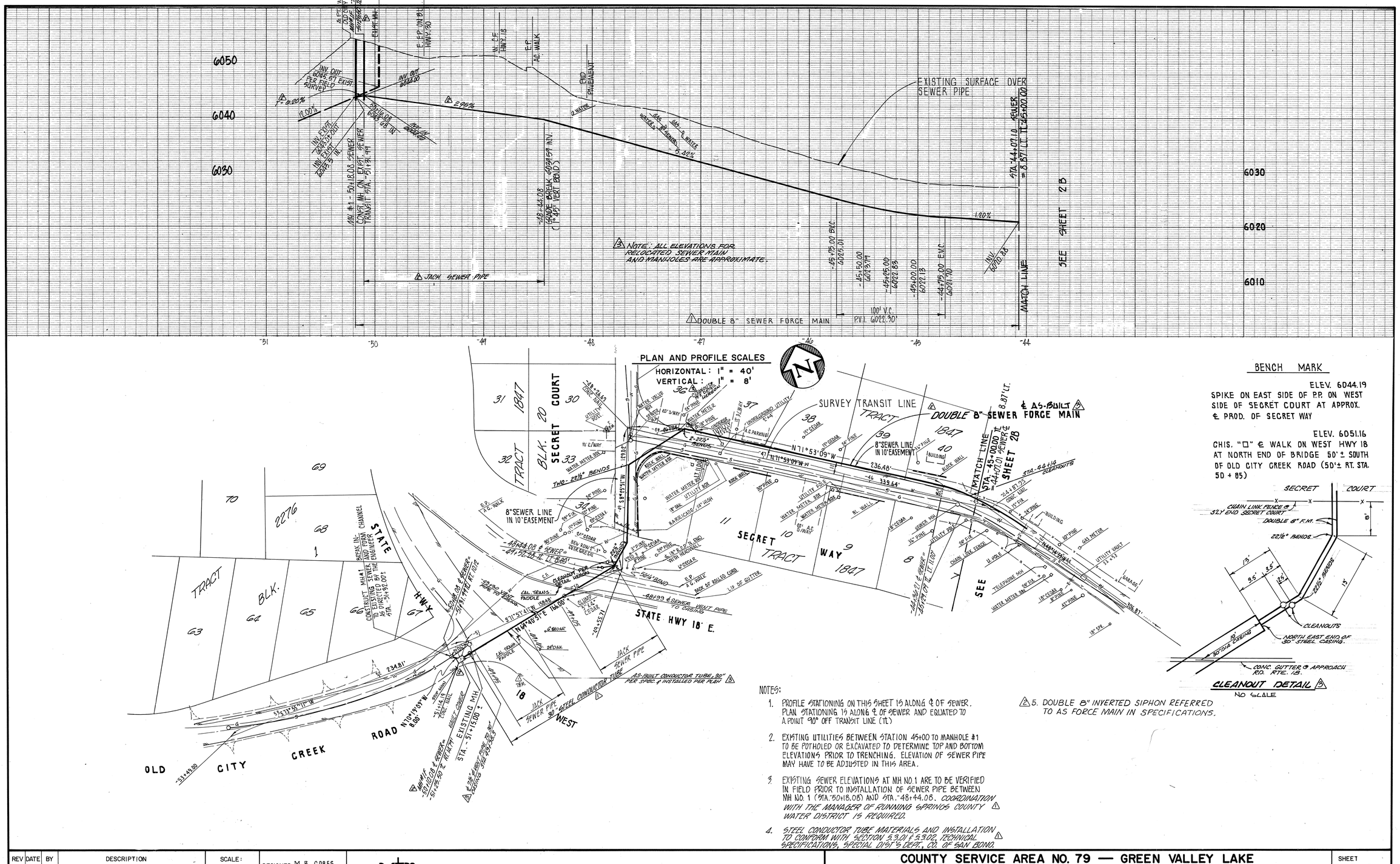
APPROVED Albert R. Reid — DATE 5-21-74

COUNTY SERVICE AREA NO. 79 — GREEN VALLEY LAKE

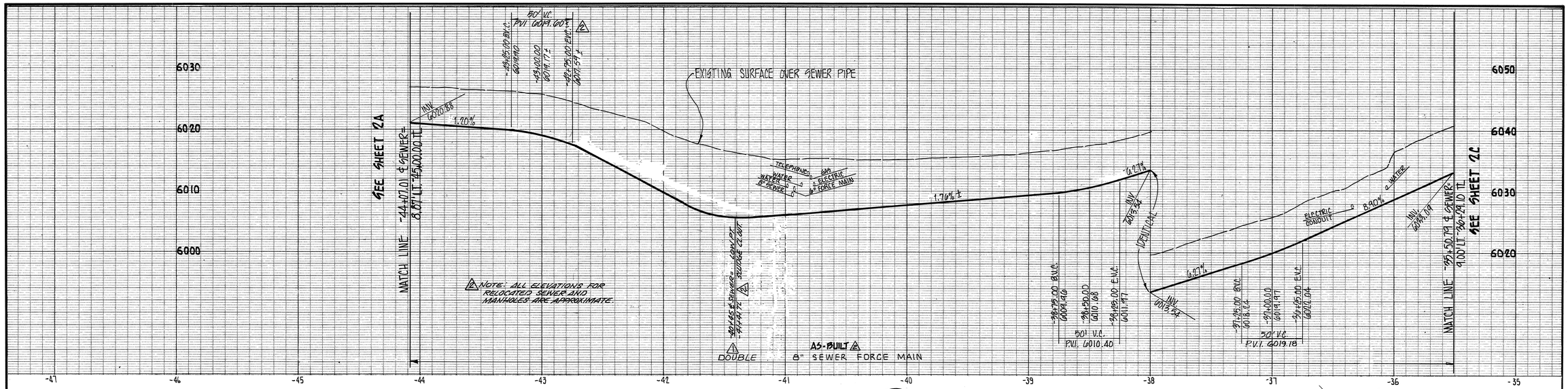
INTERCEPTOR

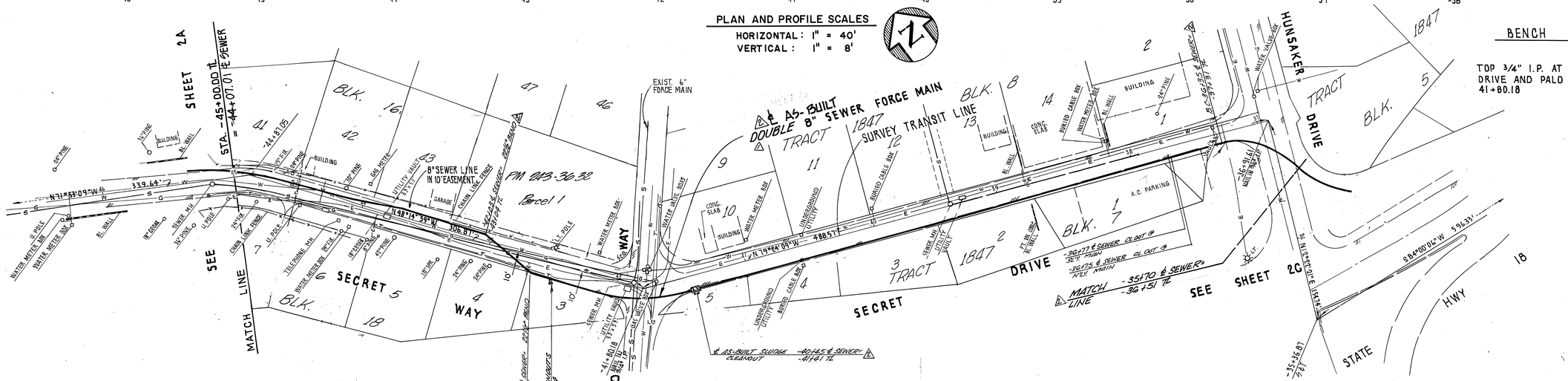
INDEX AND NOTE SHEET

SHEET 2 OF 48



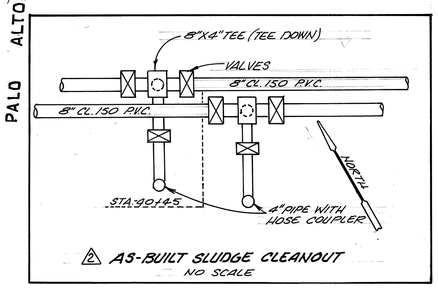
PLAN AND PROFILE SCALES
HORIZONTAL : 1" = 40'
VERTICAL : 1" = 8'
SURVEY TRANSIT LINE
DOUBLE 8" SEWER FORCE MAIN
℄ AS-BUILT
SECRET COURT
BLK. 20
TRACT 1847
SECRET WAY
TRACT 1847
BLK. 33
TRACT 30
BLK. 34
TRACT 39
BLK. 11
TRACT 10
BLK. 9
TRACT 8
BLK. 40
TRACT 1847
8" SEWER LINE IN 10' EASEMENT
8" SEWER LINE IN 10' EASEMENT
N 71°53'09" W
236.48'
339.64'
MATCH LINE STA. -45+00.00 TL = 44+07.10 SEWER ℄ SHEET 2B
STA. 44+14 CLEANOUTS
SEE SHEET 2B
STATE HWY 18 E.
STATE HWY 18 W.
CHANNEL
CONSTRUCT MH #41 EXISTING SEWER AND TURN OVER AS DIRECTED BY THE ENGINEER STA. -51+92.00
-48+99 ℄ SEWER TO CASING
VENT PIPE
-48+92 ℄ SEWER TO CASING
-49+08.08 ℄ SEWER = -51+91.99 LT. 8.00'
-48+44.08 ℄ SEWER = -51+92.15 LT. 8.00'
-48+44.08 ℄ SEWER = 23.59' LT. 11.00'
STA. -51+15.00 ± EXISTING MH
-51+25.00 ± ANCHOR BOLT CIRCLE
-51+19.13 TOWE WALL
-51+14.13 TOWE WALL
JACK SEWER PIPE
30" STEEL CONDUCTOR TUBE
AS-BUILT CONDUCTOR TUBE 30" PER SPECS. & INSTALLED PER PLAN
JACK SEWER PIPE TO BE ENCASED IN 42" CASING
-33+49.00
OLD CITY CREEK ROAD N 70° 19' 07" W 8.00'
S 55° 13' 55" W
23.81'
WEST
EAST
CAL TRANS PADDLE
CLEANOUT PER DETAIL HEREON
CLEANOUT
CAL TRANS PADDLE
E.P. A.C. WALK
BACK OF ROLLED CURB
L/P OF GUTTER
E.P. A.C. WALK
CHAIN LINK FENCE
CHAIN LINK FENCE
CHAIN LINK FENCE





PLAN AND PROFILE SCALES
HORIZONTAL: 1" = 40'
VERTICAL: 1" = 8'

BENCH MARK
ELEV. 6014.87
TOP 3/4" I.P. AT ℄ INT. SECRET DRIVE AND PALO ALTO STA. 41+80.18



△2 AS-BUILT SLUDGE CLEANOUT
NO SCALE

NOTE:

1. PROFILE STATIONING ON THIS SHEET IS ALONG ℄ OF SEWER. PLAN STATIONING IS ALONG ℄ OF SEWER AND EQUATED TO A POINT 90° OFF TRANSIT LINE.
2. EXIST. UTILITIES IN PALO ALTO ARE TO BE POT HOLED OR EXCAVATED TO DETERMINE TOP AND BOTTOM ELEVATIONS PRIOR TO ANY TRENCHING BETWEEN STATIONS (-) 45+00 TO (-) 38+50. ELEVATION OF SEWER PIPE MAY HAVE TO BE ADJUSTED IN THIS AREA
3. △1 DOUBLE 8" INVERTED SIPHON REFERRED TO AS FORCE MAIN IN SPECIFICATIONS.
4. △2 ALL STATION EQUATIONS FOR AS BUILT SEWER ARE APPROXIMATE.

REV	DATE	BY	DESCRIPTION
△1	8/16	H.N.	REMOVED SLUDGE CLEANOUT DETAIL. ADDED CLEANOUT ADDED NOTE 3 ADDED (ONE POINT ELEV. DOUBLE 8" W.O. 8" FORCEMAIN
△2	2/18	D.H.	PLOT AS-BUILT ALIGNMENT PLAN &
			PROFILE FROM -45+00 TO -36+51

SCALE: AS SHOWN

DESIGNED M.R. GORES
DRAWN M.R. GORES
CHECKED G.W. ATKINS

vtn ENGINEERS ARCHITECTS PLANNERS AVE., SAN BERNARDINO, CALIFORNIA 92401 PHONE (714) 889-4431

SUBMITTED Donald R. Allison PROJECT ENGINEER — R.E. NO. 19466 — DATE 4-1-75

RECOMMENDED Kirkland S. Jones PROJECT MANAGER — R.E. NO. 8625 — DATE 4-10-75

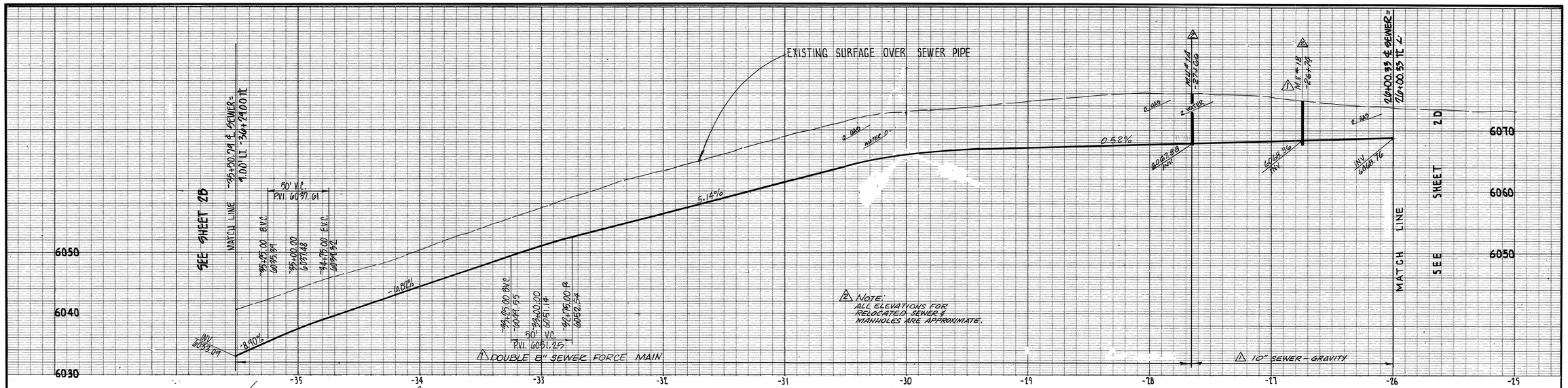
COUNTY SERVICE AREA NO. 79 — GREEN VALLEY LAKE

APPROVED Tuddy McDonnell — DATE 4-10-75

APPROVED Albert E. Reed — DATE 4-10-75

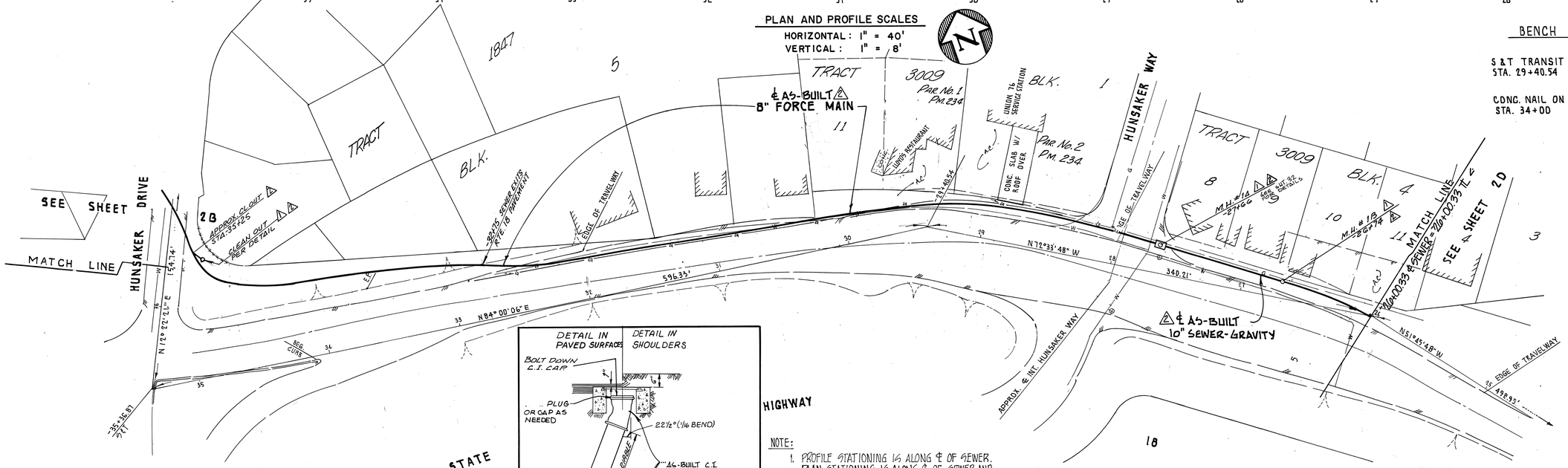
INTERCEPTOR
PLAN AND PROFILE
SECRET WAY
300' W/O PALO ALTO WAY to HUNSAKER DRIVE

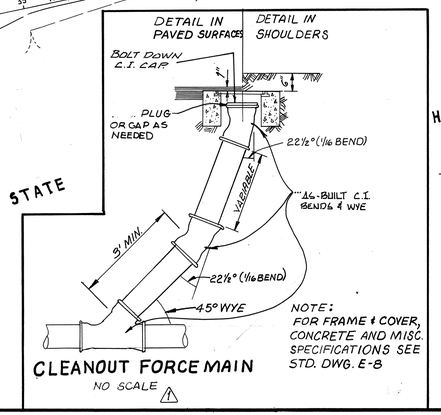
SHEET 2B OF 48



PLAN AND PROFILE SCALES
HORIZONTAL : 1" = 40'
VERTICAL : 1" = 8'

BENCH MARK
ELEV. 6074.28
S&T TRANSIT LINE ANGLE POINT
STA. 29+40.54
ELEV. 6050.25
CONC. NAIL ON TRANSIT LINE
STA. 34+00





NOTE: FOR FRAME & COVER, CONCRETE AND MISC. SPECIFICATIONS SEE STD. DWG. E-8

CLEANOUT FORCE MAIN
NO SCALE

NOTE:
1. PROFILE STATIONING IS ALONG ℄ OF SEWER. PLAN STATIONING IS ALONG ℄ OF SEWER AND EQUATED TO A POINT 90° OFF TRANSIT LINE (TL).
2. DOUBLE 8" INVERTED SIPHON REFERRED TO AS FORCE MAIN IN SPECIFICATIONS.

NOTE: AS-BUILT DIMENSIONS TO ℄ SEWER ARE FROM PAINTED CENTERLINE RTE. 18 - PLOTTED ON DECEMBER, 1977.

REV	DATE	BY	DESCRIPTION
1	8/76	HN	ADDED MH #1A & 1B ADDED CLEANOUT & DETAIL. ADDED NOTE 1. REVISED PROFILE TO "SEWER WAS 8" FORCE MAIN" DOUBLE 8" WAS 8"
2	2/78	D.H.	PLOT AS-BUILT ALIGNMENT IN PLAN & PROFILE FROM HUNSAKER DR. TO -26+00

SCALE: AS SHOWN
DESIGNED M. R. GORES
DRAWN M. R. GORES
CHECKED G.W. ATKINS

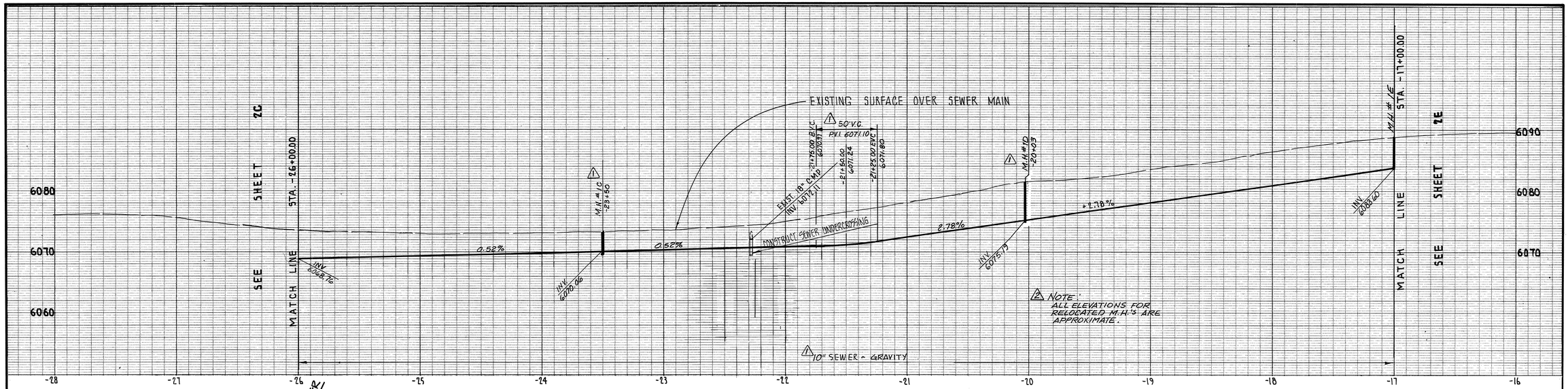
VTN ENGINEERS ARCHITECTS PLANNERS , SAN BERNARDINO, CALIFORNIA 92401 PHONE (714) 889-4431

SUBMITTED Donald R. Allison — PROJECT ENGINEER — R.E. NO. 19466 — DATE 4-1-75
RECOMMENDED Richard S. Ittner — PROJECT MANAGER — R.E. NO. 8005 — DATE 4-10-75

COUNTY SERVICE AREA NO. 79 — GREEN VALLEY LAKE
APPROVED Cathy McConnell — DATE 4-10-75
APPROVED Albert R. Pond — DATE 4-10-75

INTERCEPTOR
PLAN AND PROFILE
STATE HIGHWAY 18
HUNSAKER DRIVE to STA. (-) 26+00

SHEET 2C OF 48

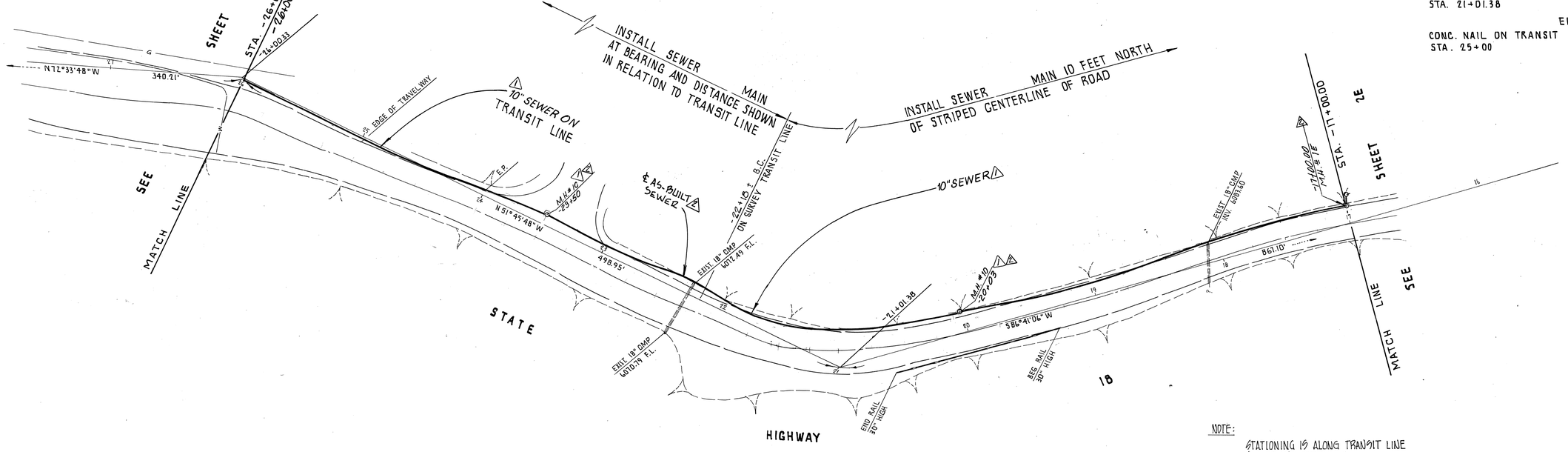


PLAN AND PROFILE SCALES
HORIZONTAL : 1" = 40'
VERTICAL : 1" = 8'

BENCH MARK

ELEV. 6079.51
S & T TRANSIT LINE ANGLE POINT
STA. 21+01.38

ELEV. 6072.66
CONC. NAIL ON TRANSIT LINE
STA. 25+00



NOTE:
STATIONING IS ALONG TRANSIT LINE
SEE GENERAL NOTES 1 & 2

REV	DATE	BY	DESCRIPTION
1	8/76	H.N.	REVISED PROFILE; ADDED M.H.#16 & 10" SEWER WAS 8" FORCE MAIN
2	1/78	D.H.	PLOT AS-BUILT SEWER ALIGNMENT & ADJUST M.H. ELEVATIONS FROM -26+00 TO -17+00 PLANE PROFILE

SCALE: AS SHOWN

DESIGNED M. R. GORES
DRAWN M. R. GORES
CHECKED G.W. ATKINS

VTN ENGINEERS ARCHITECTS PLANNERS , CALIFORNIA 92401 PHONE (714) 889-4431

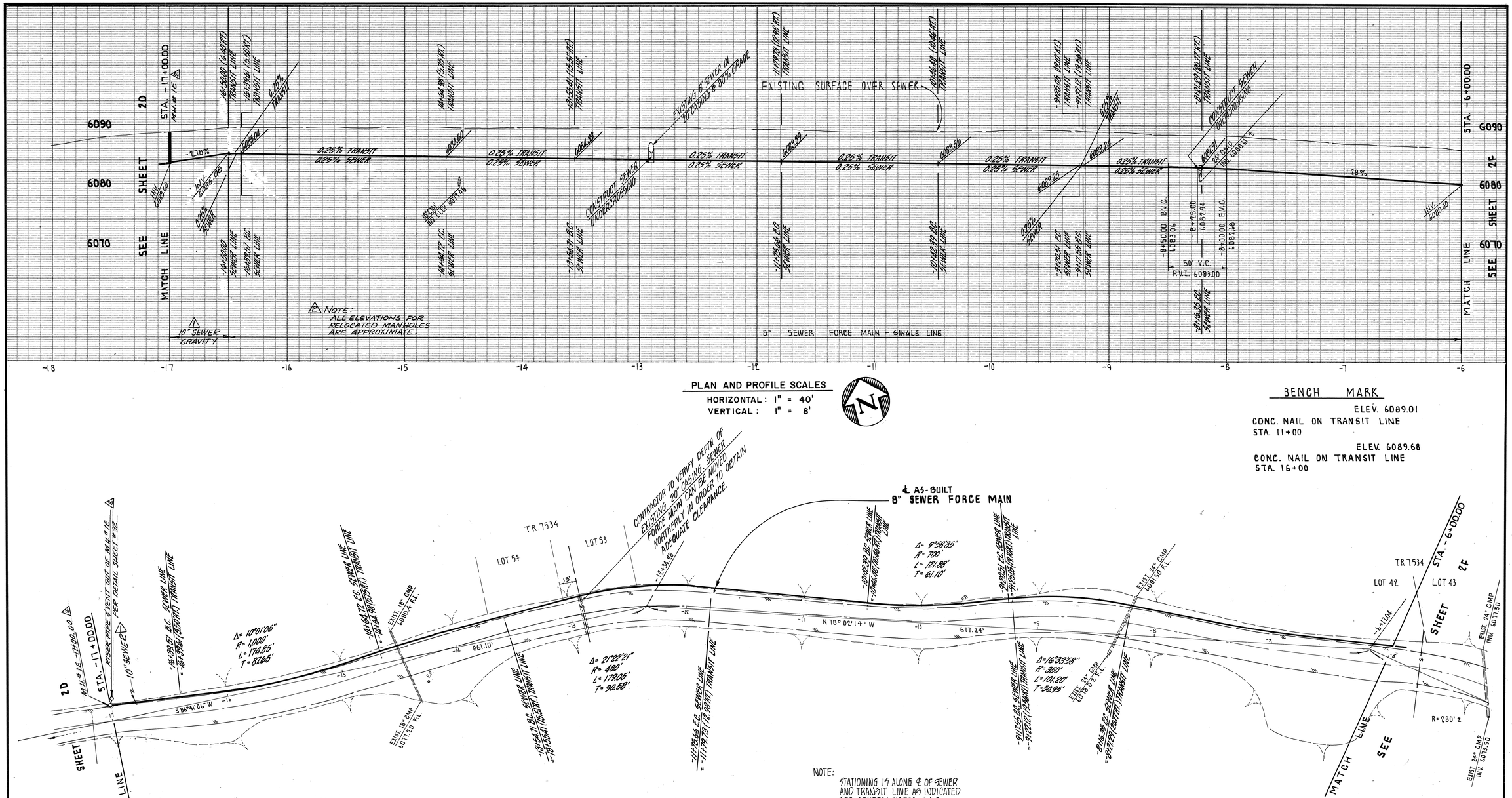
SUBMITTED Donald R. Allison — 19166 R.E. NO. — 4-1-75 DATE — PROJECT ENGINEER
RECOMMENDED Richard S. Ibsen — 8605 R.E. NO. — 4-10-75 DATE — PROJECT MANAGER

COUNTY SERVICE AREA NO. 79 — GREEN VALLEY LAKE

APPROVED Cathy McDonald — DATE 4-10-75
APPROVED Albert E. Reed — DATE 4-10-75

INTERCEPTOR
PLAN AND PROFILE
STATE HIGHWAY 18
STA. (-) 26+00 to STA. (-) 17+00

SHEET 2D OF 48



NOTE:
ALL ELEVATIONS FOR RELOCATED MANHOLES ARE APPROXIMATE.

PLAN AND PROFILE SCALES
HORIZONTAL: 1" = 40'
VERTICAL: 1" = 8'

BENCH MARK

ELEV. 6089.01
CONC. NAIL ON TRANSIT LINE
STA. 11+00

ELEV. 6089.68
CONC. NAIL ON TRANSIT LINE
STA. 16+00

CONTRACTOR TO VERIFY DEPTH OF EXISTING 20" CASING. SEWER FORCE MAIN CAN BE MOVED NORTHERLY IN ORDER TO OBTAIN ADEQUATE CLEARANCE.

℄ AS-BUILT
8" SEWER FORCE MAIN

NOTE:
STATIONING IS ALONG ℄ OF SEWER AND TRANSIT LINE AS INDICATED
SEE GENERAL NOTES 1 & 2

REV	DATE	BY	DESCRIPTION
1	8/76	H.N.	Added 10" Sewer from sta -17+00 to sta -16+50.
2	1/78	D.H.	Plot As-Built Alignment in Plan & Profile from -17+00 to -6+00

SCALE: AS SHOWN

DESIGNED M. R. GORES
DRAWN M. R. GORES
CHECKED G. W. ATKINS

vtn ENGINEERS ARCHITECTS PLANNERS — SAN BERNARDINO, CALIFORNIA 92401 PHONE (714) 889-4431

SUBMITTED Donald R. Allison — PROJECT ENGINEER — R.E. NO. 19160 — DATE 4-1-75

RECOMMENDED Richard S. Iten — PROJECT MANAGER — R.E. NO. 8605 — DATE 4-10-75

APPROVED Ashley McDonald — DATE 4-10-75

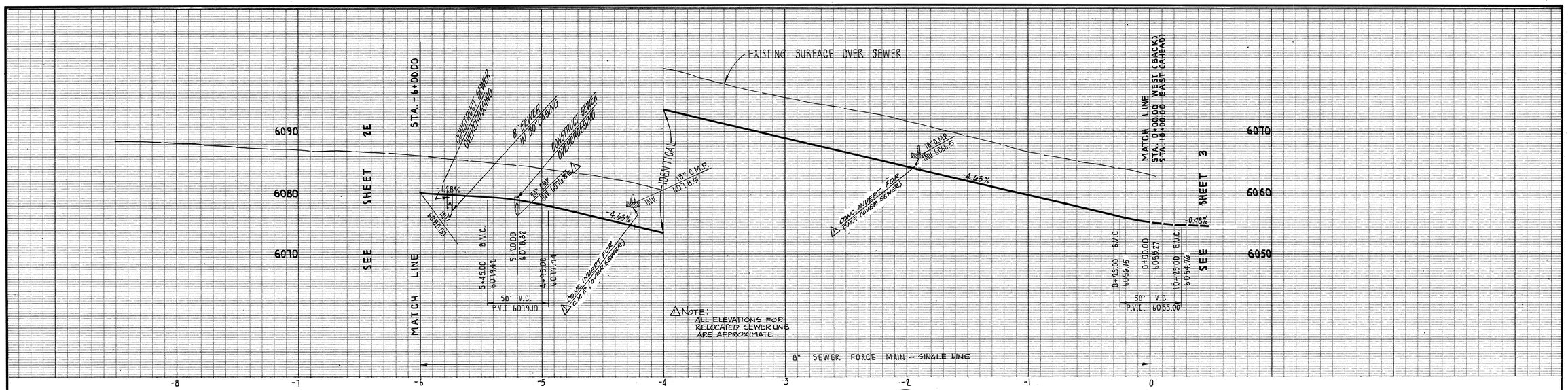
APPROVED Elbert R. Reed — DATE 4-10-75

COUNTY SERVICE AREA NO. 79 — GREEN VALLEY LAKE

INTERCEPTOR

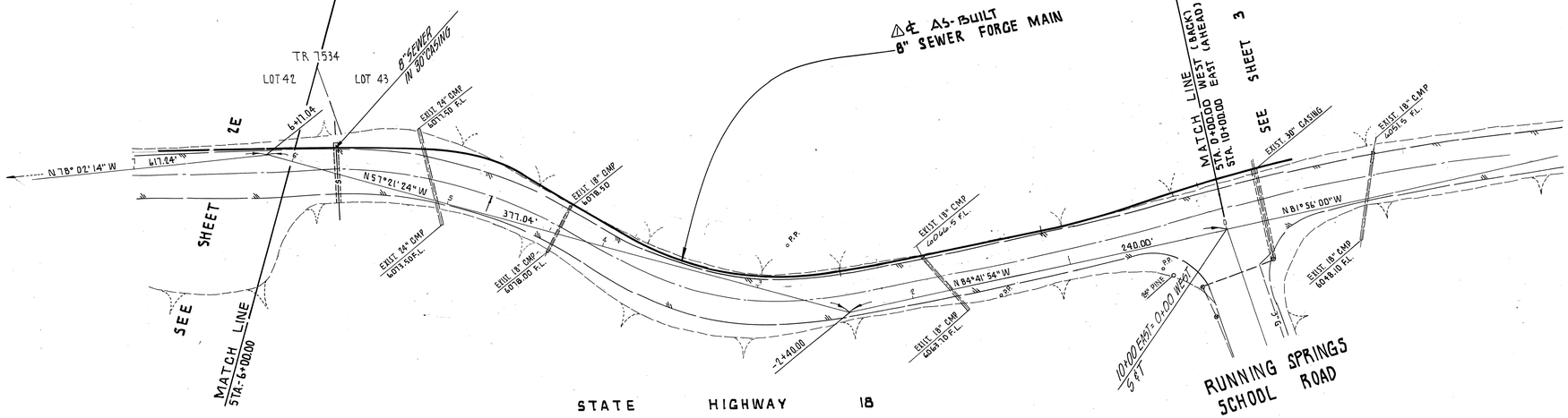
PLAN AND PROFILE
STATE HIGHWAY 18
STA. (-)17+00 to STA. (-) 6+00

SHEET 2E OF 48



PLAN AND PROFILE SCALES
HORIZONTAL: 1" = 40'
VERTICAL: 1" = 8'

BENCH MARK
ELEV. 6063.16
S & T AT TRANSIT LINE ANGLE POINT
STA. 10+00 EAST = 0+00 WEST



NOTE:
STATIONING IS ALONG TRANSIT LINE
SEE GENERAL NOTES NO. 1 & 2

REV	DATE	BY	DESCRIPTION
△	1-76	DH.	PLOT AS-BUILT ALIGNMENT IN PLAN & PROFILE FROM -6+00 TO 0+00.

SCALE: AS SHOWN

DESIGNED M. R. GORES
DRAWN M. R. GORES
CHECKED G.W. ATKINS

vtn ENGINEERS ARCHITECTS PLANNERS , SAN BERNARDINO, CALIFORNIA 92401 PHONE (714) 889-4431

SUBMITTED Donald R. Allison — PROJECT ENGINEER — R.E. NO. 19466 — DATE 4-1-75

RECOMMENDED Richard S. Stern — PROJECT MANAGER — R.E. NO. 8605 — DATE 4-10-75

APPROVED Ashley McDowell — DATE 4-10-75

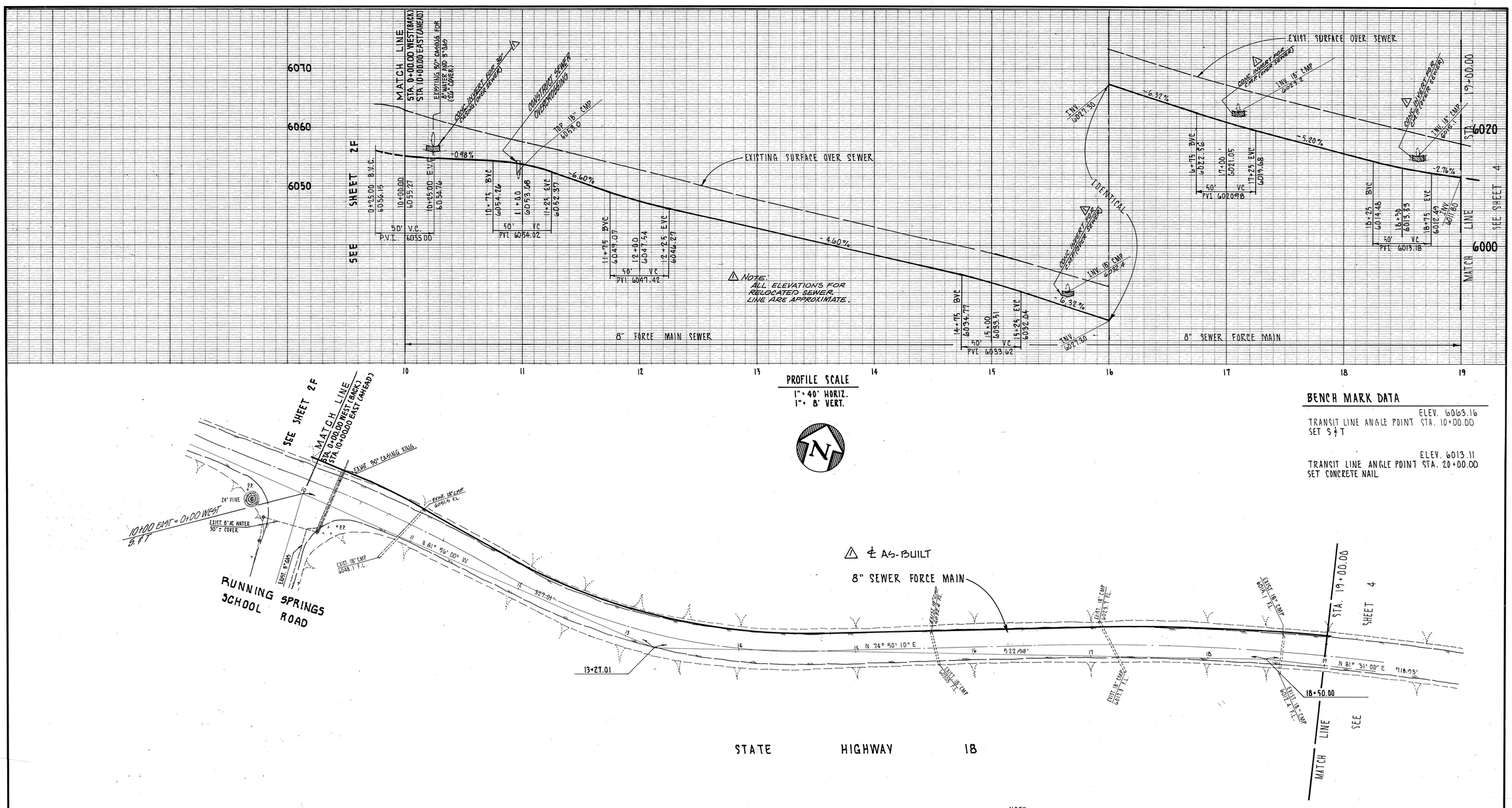
APPROVED Albert R. Reed — DATE 4-10-75

COUNTY SERVICE AREA NO. 79 — GREEN VALLEY LAKE

INTERCEPTOR

PLAN AND PROFILE
STATE HIGHWAY 18
STA. (—) 6+00 to RUNNING SPRINGS SCHOOL ROAD

SHEET 2F OF 48



PROFILE SCALE
1" = 40' HORIZ.
1" = 8' VERT.

PLAN SCALE
1" = 40'

BENCH MARK DATA

ELEV. 6063.16
TRANSIT LINE ANGLE POINT STA. 10+00.00
SET ⅝ T

ELEV. 6013.11
TRANSIT LINE ANGLE POINT STA. 20+00.00
SET CONCRETE NAIL

NOTE: STATIONING IS ALONG TRANSIT LINE.
SEE GENERAL NOTES 1 & 2

REV	DATE	BY	DESCRIPTION
△	7-30-74	D.H.	PLOT AS-BUILT SEWER ALIGNMENT PLAN & PROFILE FROM 10+00 TO 19+00

SCALE: AS SHOWN

DESIGNED G.W. ATKINS
DRAWN M.R. GORES
CHECKED D.R. ALLISON

VTN ENGINEERS ARCHITECTS PLANNERS , SAN BERNARDINO, CALIFORNIA 92401 PHONE (714) 889-4431

SUBMITTED Donald R. Allison — PROJECT ENGINEER — 19466 R.E. NO. — 4-1-74 DATE

RECOMMENDED Richard S. Titus — PROJECT MANAGER — 8603 R.E. NO. — 4-1-74 DATE

APPROVED Ashby McDonald — DATE 5-21-74

APPROVED Albert K. Reed — DATE 5-21-74

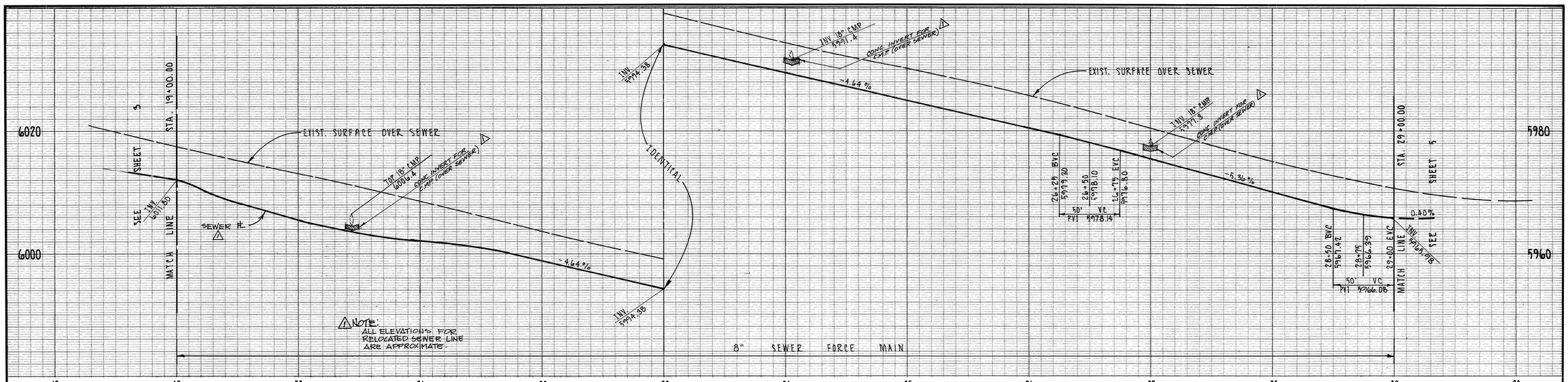
COUNTY SERVICE AREA NO. 79 — GREEN VALLEY LAKE

INTERCEPTOR

PLAN AND PROFILE
STATE HIGHWAY 18
RUNNING SPRINGS SCHOOL ROAD to STA. 19+00

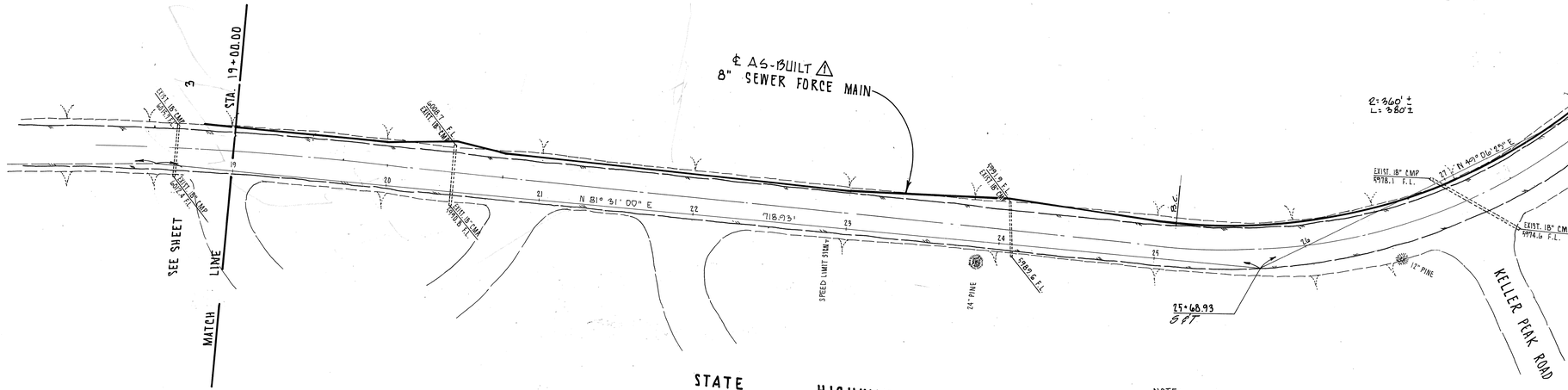
SHEET 3 OF 48

711-07



PROFILE SCALE
1" = 40' HORIZ.
1" = 8' VERT.





NOTE:
STATIONING IS ALONG TRANSIT LINE
SEE GENERAL NOTES 1 & 2

PLAN SCALE
1" = 40'

BENCH MARK DATA

ELEV. 6013.11
TRANSIT LINE ..... STATION
20+00.00 SET CONC. NAIL

ELEV. 5987.45
TRANSIT LINE ANGLE POINT STA. 25+68.93
SET S & T

REV	DATE	BY	DESCRIPTION
⚠1	1/78	D.H.	PLOT AS-BUILT ALIGNMENT 19+00 TO 29+00 IN PLAN & PROFILE

SCALE: AS SHOWN

DESIGNED G.W. ATKINS
DRAWN M.R. GORES
CHECKED D.R. ALLISON

VTN ENGINEERS ARCHITECTS PLANNERS , SAN BERNARDINO, CALIFORNIA 92401 PHONE (714) 889-4431

SUBMITTED Donald R. Allison — PROJECT ENGINEER — R.E. NO. 19466 — DATE 4-1-74
RECOMMENDED Richard S. Ittner — PROJECT MANAGER — R.E. NO. 8605 — DATE 4-1-74

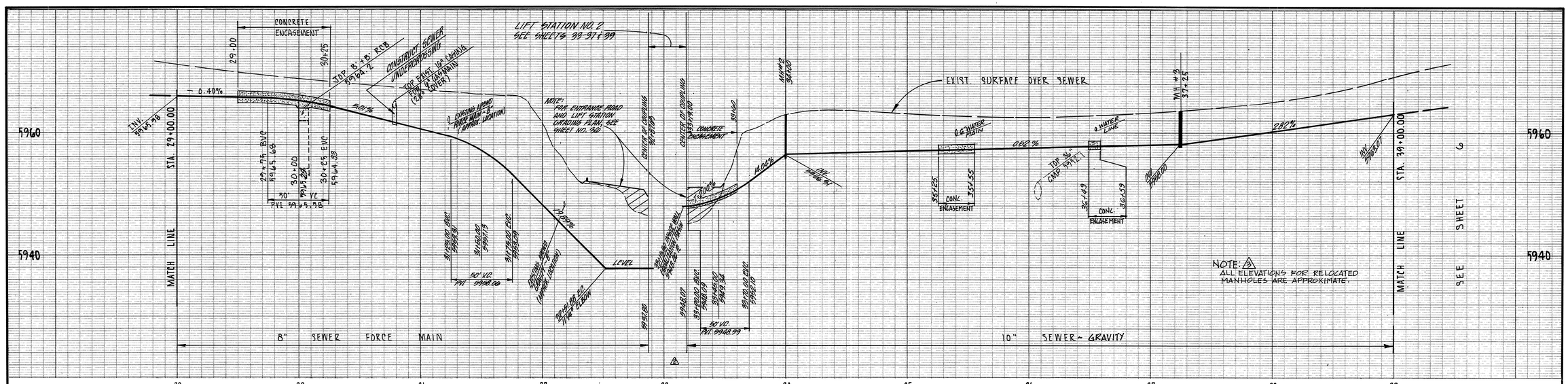
APPROVED Addy M. Bonelli — DATE 5-21-74
APPROVED Albert A. Reid — DATE 5-21-74

COUNTY SERVICE AREA NO. 79 — GREEN VALLEY LAKE

INTERCEPTOR

PLAN AND PROFILE
STATE HIGHWAY 18
STA. 19+00 to STA. 29+00

SHEET 4 OF 48

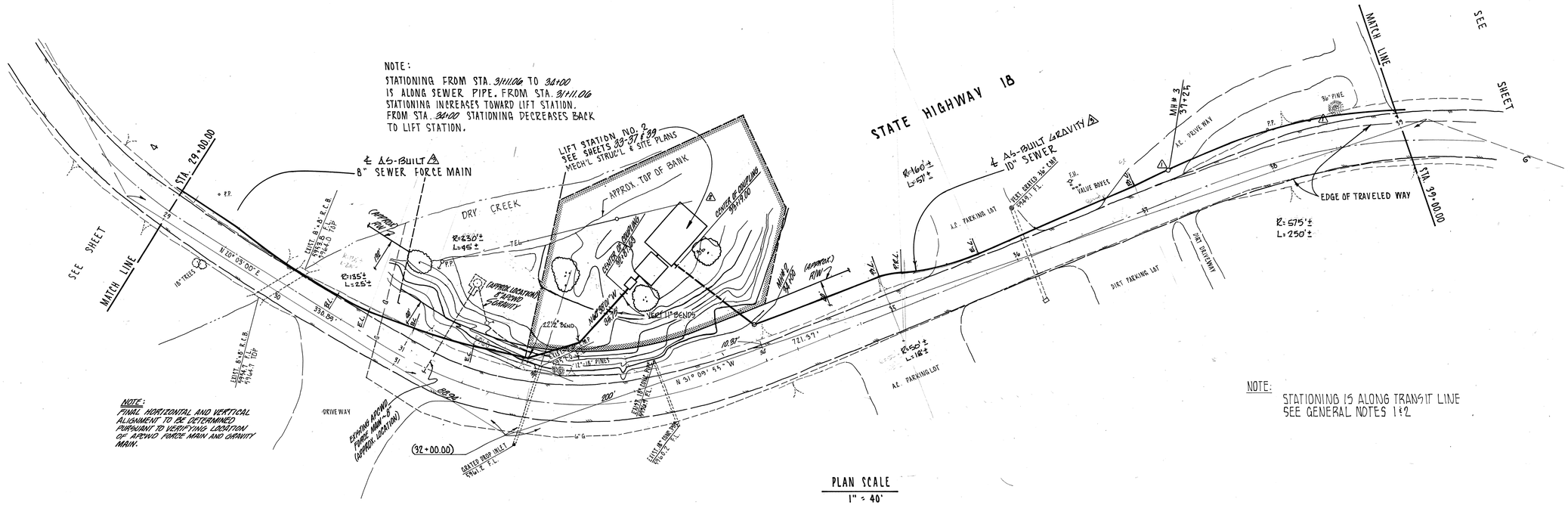


PROFILE SCALE
1" = 40' HORIZ.
1" = 8' VERT.

BENCH MARK DATA

ELEV. 5969.61
TRANSIT LINE ANGLE POINT STA. 39+21.37
SET S & T

ELEV. 5964.63
SPIKE IN P.P. 1178336E 50 FEET LEFT STA. 37+00



PLAN SCALE
1" = 40'

REV	DATE	BY	DESCRIPTION
△	8/70	H.N.	Revise profile between Lift Sta 2 & Sta 39+00. Delete 8" stubs @ MH's 2 & 3. Delete MH 9A.
△	9/70	H.N.	Lift Sta site plan, profile & appurtenances
△	1/18	D.H.	PLOT AS-BUILT ALIGNMENT 29+00 TO 39+00

SCALE: AS SHOWN

DESIGNED G.W. ATKINS
DRAWN M.R. GORES
CHECKED D.R. ALLISON

VTN ENGINEERS ARCHITECTS PLANNERS , SAN BERNARDINO, CALIFORNIA 92401 PHONE (714) 889-4431

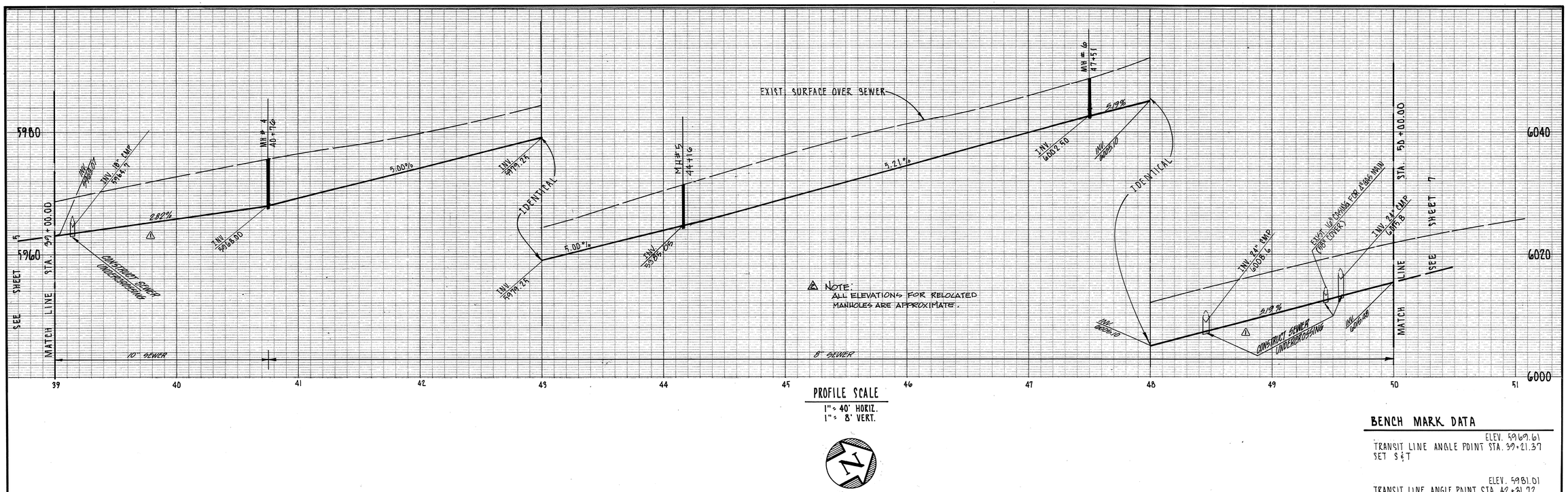
SUBMITTED Donald R. Allison — PROJECT ENGINEER — R.E. NO. 19466 — DATE 4-1-74
RECOMMENDED Richard S. Titera — PROJECT MANAGER — R.E. NO. 8605 — DATE 4-1-74

COUNTY SERVICE AREA NO. 79 — GREEN VALLEY LAKE

APPROVED Addy M. Powell — DATE 5-21-74
APPROVED Albert R. Reid — DATE 5-21-74

INTERCEPTOR
PLAN AND PROFILE
STATE HIGHWAY 18
STA. 29+00 to STA. 39+00

SHEET 5 OF 48



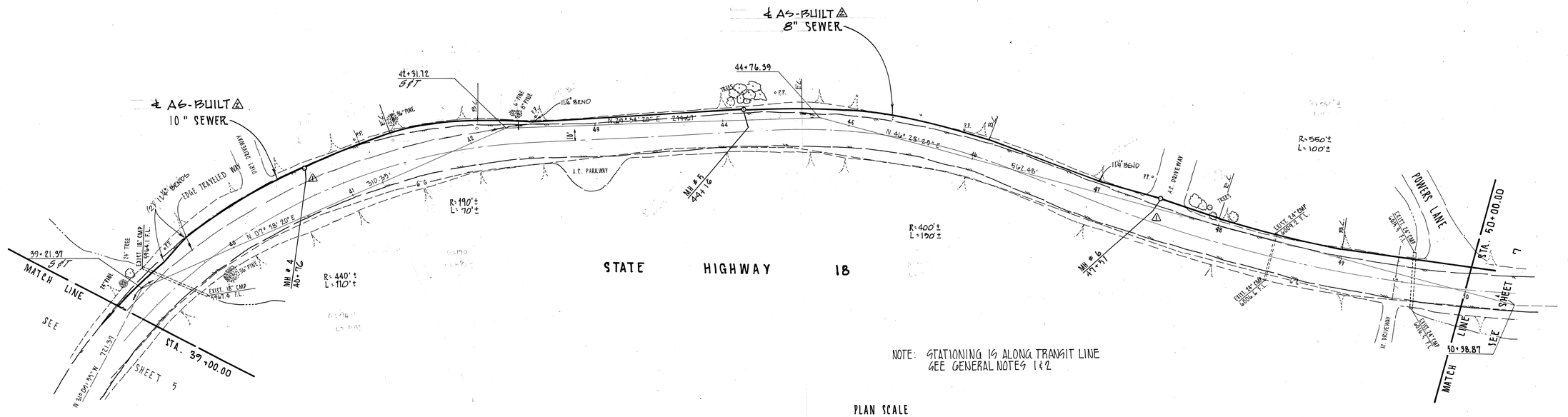
NOTE:
ALL ELEVATIONS FOR RELOCATED MANHOLES ARE APPROXIMATE.

PROFILE SCALE
1" = 40' HORIZ.
1" = 8' VERT.

BENCH MARK DATA

ELEV. 5969.61
TRANSIT LINE ANGLE POINT STA. 39+21.37
SET S&T

ELEV. 5981.01
TRANSIT LINE ANGLE POINT STA. 42+31.72
SET S&T



NOTE: STATIONING IS ALONG TRANSIT LINE
SEE GENERAL NOTES 1 & 2

PLAN SCALE
1" = 40'

REV	DATE	BY	DESCRIPTION
1	8/76	H.N.	Revise profile between sta 39+00 & MH # also MH.
			& sta. 50+00. Delete Exhibit MH's 4, 5 & 6.
2	1/78	C.W.	Plot As-Built alignment 39+00 to 50+00

SCALE: AS SHOWN

DESIGNED G. W. ATKINS
DRAWN M.R. GORES
CHECKED D.R. ALLISON

vtn ENGINEERS ARCHITECTS PLANNERS , SAN BERNARDINO, CALIFORNIA 92401 . PHONE (714) 889-4431

SUBMITTED Donald R. Allison PROJECT ENGINEER — 19466 R.E. NO. — 4-1-74 DATE

RECOMMENDED Roland S. Ittner PROJECT MANAGER — 8605 R.E. NO. — 4-1-74 DATE

COUNTY SERVICE AREA NO. 79 — GREEN VALLEY LAKE

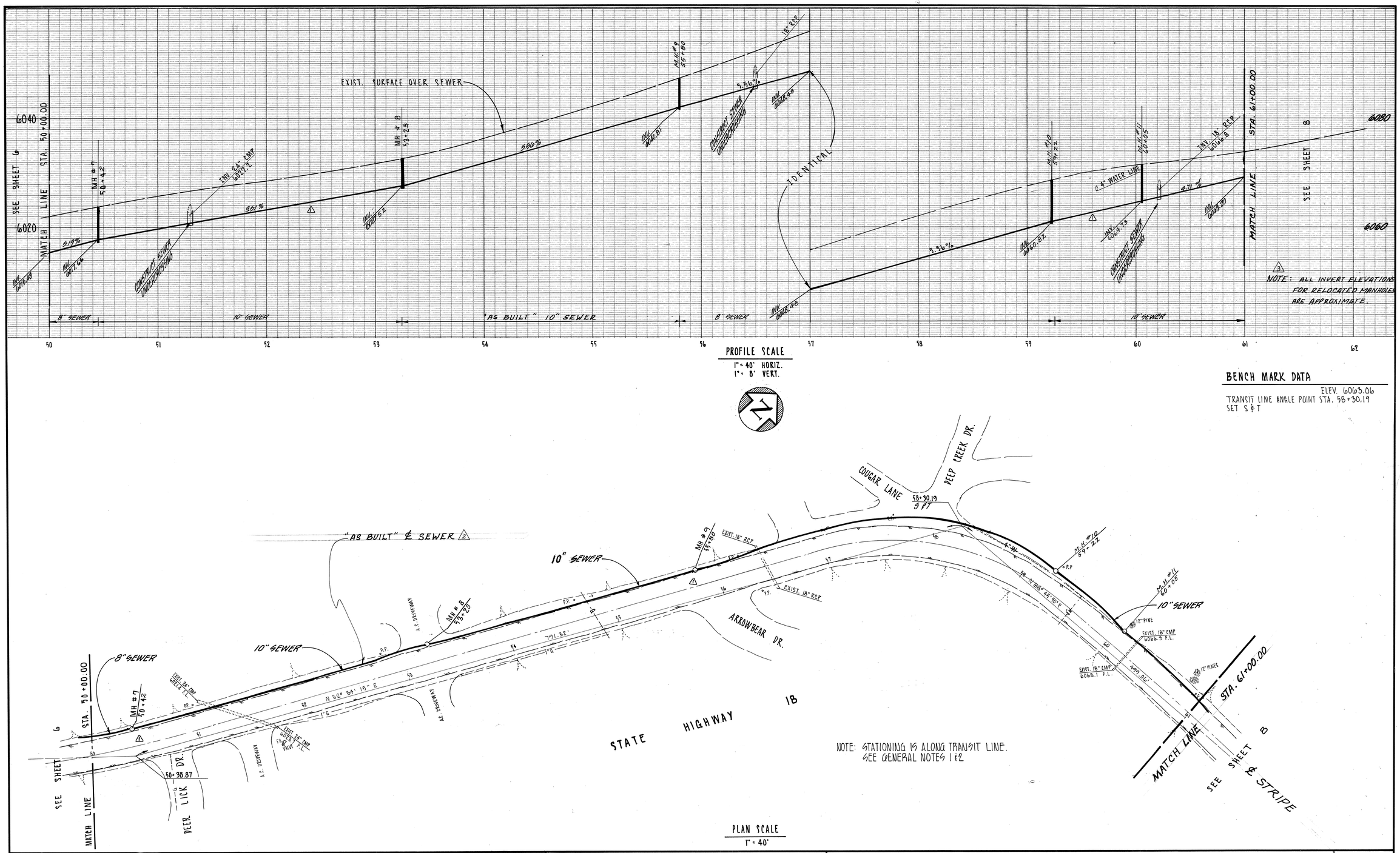
APPROVED Sally McDonnell — DATE 5-21-74

APPROVED Albert A. Reid — DATE 5-21-74

INTERCEPTOR

PLAN AND PROFILE
STATE HIGHWAY 18
STA. 39+00 to STA. 50+00

SHEET 6 OF 48



PROFILE SCALE
1" = 40' HORIZ.
1" = 8' VERT.

BENCH MARK DATA

ELEV. 6060.06
TRANSIT LINE ANGLE POINT STA. 58+30.19
SET S & T

PLAN SCALE
1" = 40'

REV	DATE	BY	DESCRIPTION
1	8/76	H.H.	Revise profile between sta 50+00 & MH.9 also MH.10 & MH.11. Delete 8" stubs @ MH.9 & 7.
2	1/78	HH	PLAN - "AS BUILT" ALIGNMENT PLOTTED FOR SR 330 TO STA. 61+00
3	1/78	HH	PROFILE - "AS BUILT" LOCATION OF M.H. 7, 8, 9, 10 & 11 & ADDED NOTE

SCALE: AS SHOWN

DESIGNED G.W. ATKINS
DRAWN M.R. GORES
CHECKED DR. ALLISON

vtn ENGINEERS ARCHITECTS PLANNERS , SAN BERNARDINO, CALIFORNIA 92401 PHONE (714) 889-4431

SUBMITTED Donald R. Allison — PROJECT ENGINEER — 19466 R.E. NO. — 4-1-74 DATE

RECOMMENDED Richard S. Titus — PROJECT MANAGER — 8605 R.E. NO. — 4-1-74 DATE

APPROVED Addy M. Powell — DATE 5-21-74

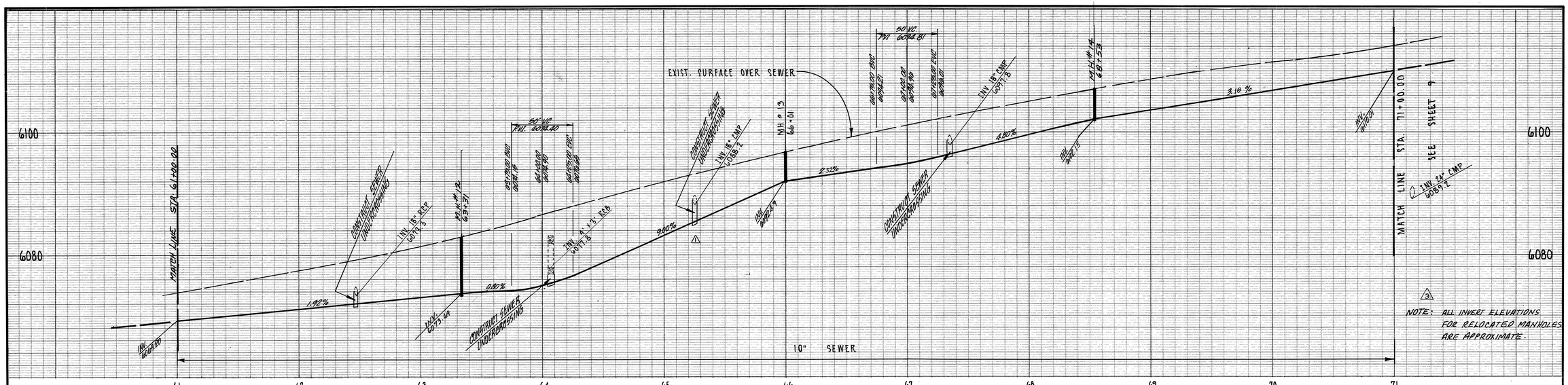
APPROVED Albert R. Reid — DATE 5-21-74

COUNTY SERVICE AREA NO. 79 — GREEN VALLEY LAKE

INTERCEPTOR

PLAN AND PROFILE
STATE HIGHWAY 18
STA. 50+00 to STA. 61+00

SHEET 7 OF 48



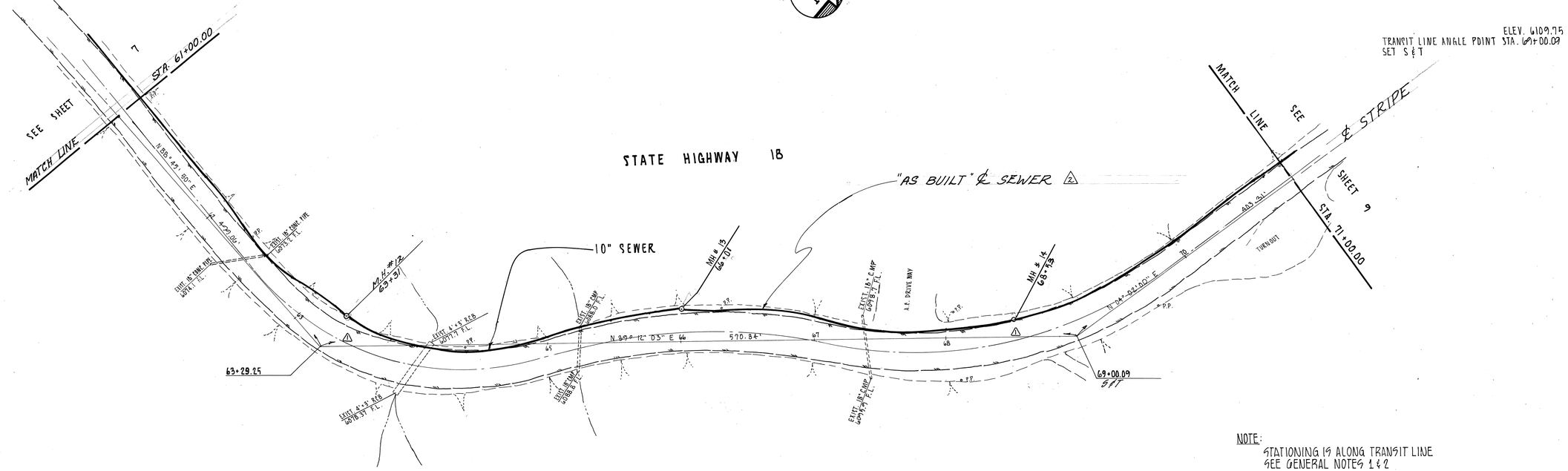
PROFILE SCALE
1"= 40' HORIZ.
1"= 8' VERT.

NOTE: ALL INVERT ELEVATIONS FOR RELOCATED MANHOLES ARE APPROXIMATE.

BENCH MARK DATA

USC & GS BM NO. 296-1935 ELEV. 6087.36
STA. 64+10 47 FEET RIGHT, IN THE SW SIDE OF THE BASE OF A LARGE ROCK OUTCROP. STANDARD DISK STAMPED " R 296-1935 "

ELEV. 6109.75
TRANSIT LINE ANGLE POINT STA. 69+00.09
SET S & T



NOTE:
STATIONING IS ALONG TRANSIT LINE
SEE GENERAL NOTES 1 & 2

PLAN SCALE
1"= 40'

REV	DATE	BY	DESCRIPTION
1	8/78	H.N.	Revise profile between MH 11 & 66 71+00. Delete 8" stubs @ MH 13, 12 & 14.
2	11-78	HH	PLAN - "AS BUILT" ALIGNMENT PLOTTED STA & NOTE TO STA. 71+00.
3	11-78	HH	PROFILE - "AS BUILT" LOCATION OF M.H. 11, 12, 13 & 14 & ADDED NOTE.

SCALE: AS SHOWN

DESIGNED G.W. ATKINS
DRAWN M.R. GORES
CHECKED D.R. ALLISON

vtn ENGINEERS ARCHITECTS PLANNERS , SAN BERNARDINO, CALIFORNIA 92401 PHONE (714) 889-4431

SUBMITTED Donald R. Allison PROJECT ENGINEER — 10466 R.E. NO. — 4-1-74 DATE

RECOMMENDED Richard S. Stites PROJECT MANAGER — 8605 R.E. NO. — 4-1-74 DATE

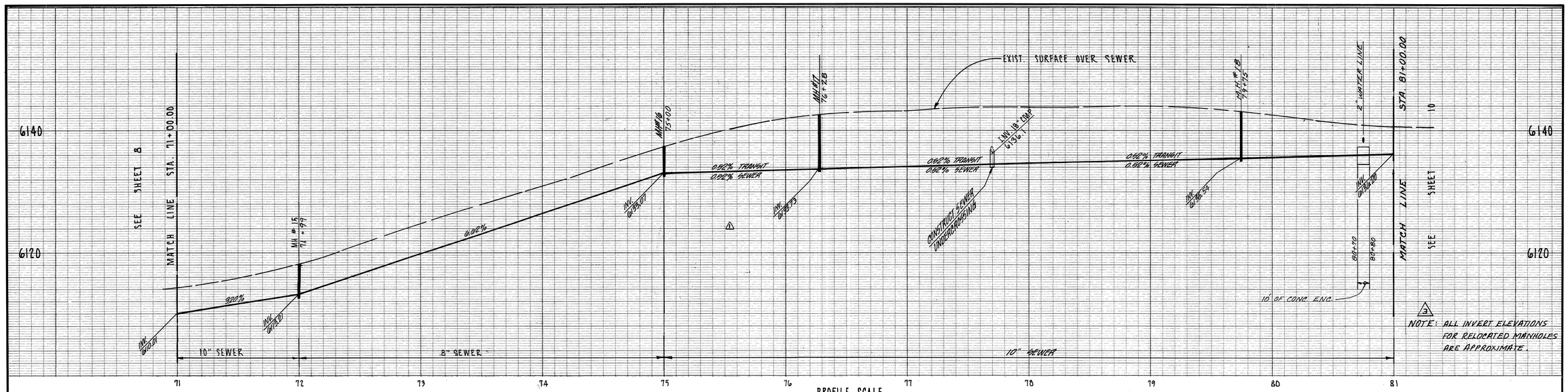
COUNTY SERVICE AREA NO. 79 — GREEN VALLEY LAKE

APPROVED Addy McPowell — DATE 5-21-74

APPROVED A R Neal — DATE 5-21-74

INTERCEPTOR
PLAN AND PROFILE
STATE HIGHWAY 18
STA. 61+00 to STA. 71+00

SHEET 8 OF 48



INV. 24" CMP 6089.2

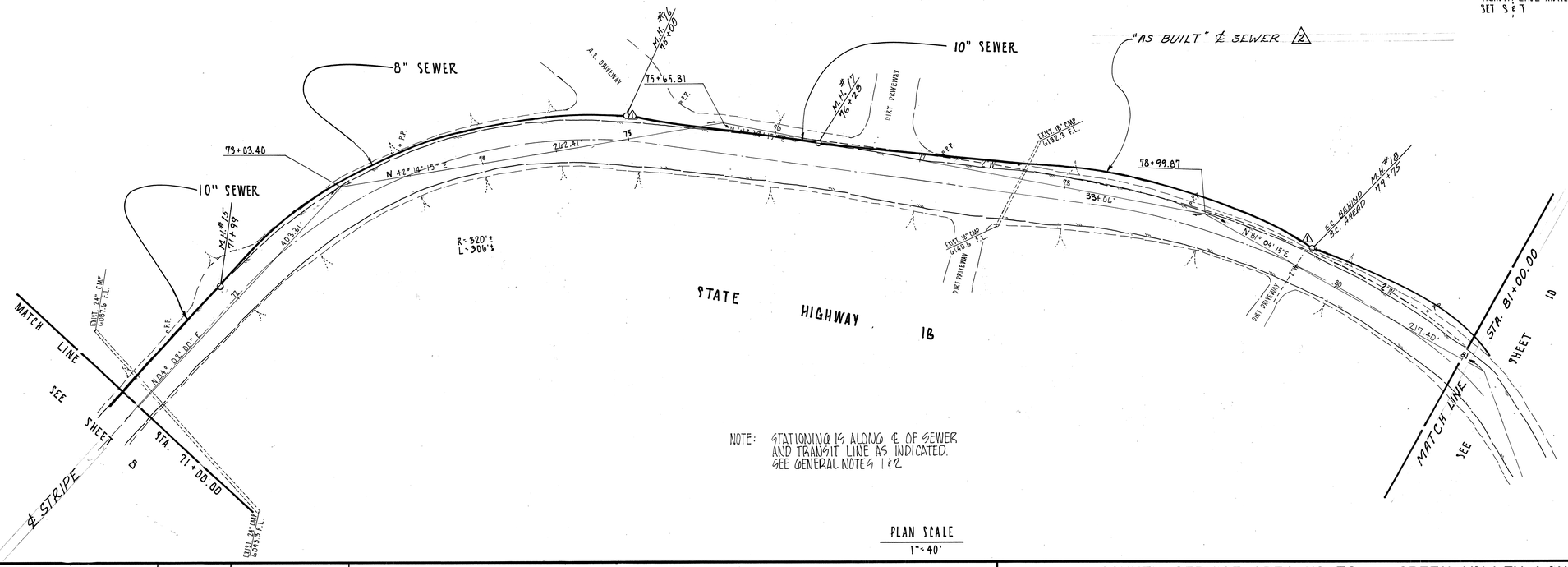
PROFILE SCALE
1"=40' HORIZ.
1"=8' VERT.

NOTE: ALL INVERT ELEVATIONS FOR RELOCATED MANHOLES ARE APPROXIMATE.

BENCH MARK DATA

ELEV. 6109.75
TRANSIT LINE ANGLE POINT STA. 69+00.00
SET S & T

ELEV. 6140.85
TRANSIT LINE ANGLE POINT STA. 81+19.27
SET S & T



NOTE: STATIONING IS ALONG ℄ OF SEWER AND TRANSIT LINE AS INDICATED. SEE GENERAL NOTES 1 & 2

PLAN SCALE
1"=40'

REV	DATE	BY	DESCRIPTION
1	8/76	HN	Revise profile between sta 71+00 & sta. 81+00. Delete 8" stubs @ MH's 17 & 18.
2	1/78	HH	REINS. "AS BUILT" ALIGNMENT PLOTTED STA. 71+00 TO STA. 81+00.
3	1/78	HH	REVISE "AS BUILT" LOCATION MH. #15, 17, 18 & BEGIN. & END.

SCALE: AS SHOWN

DESIGNED G.W. ATKINS
DRAWN M.R. GORES
CHECKED D.R. ALLISON

vtn ENGINEERS ARCHITECTS PLANNERS , SAN BERNARDINO, CALIFORNIA 92401 PHONE (714) 889-4431

SUBMITTED Donald R. Allison PROJECT ENGINEER — 19466 R.E. NO. — 4-1-74 DATE

RECOMMENDED Richard S. Titus PROJECT MANAGER — 8605 R.E. NO. — 4-1-74 DATE

APPROVED Addy M. Powell — DATE 5-21-74

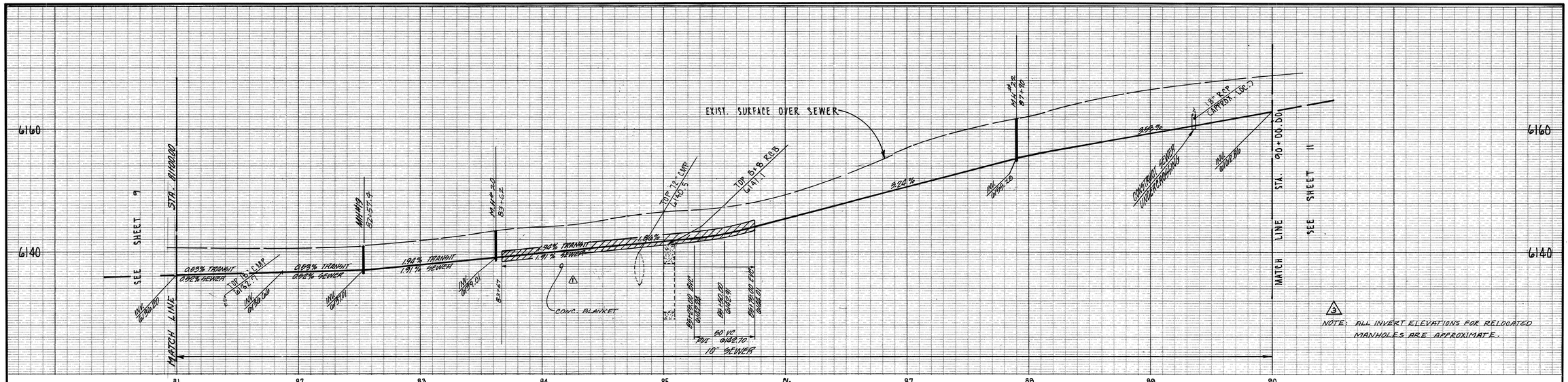
APPROVED R. R. Reed — DATE 5-21-74

COUNTY SERVICE AREA NO. 79 — GREEN VALLEY LAKE

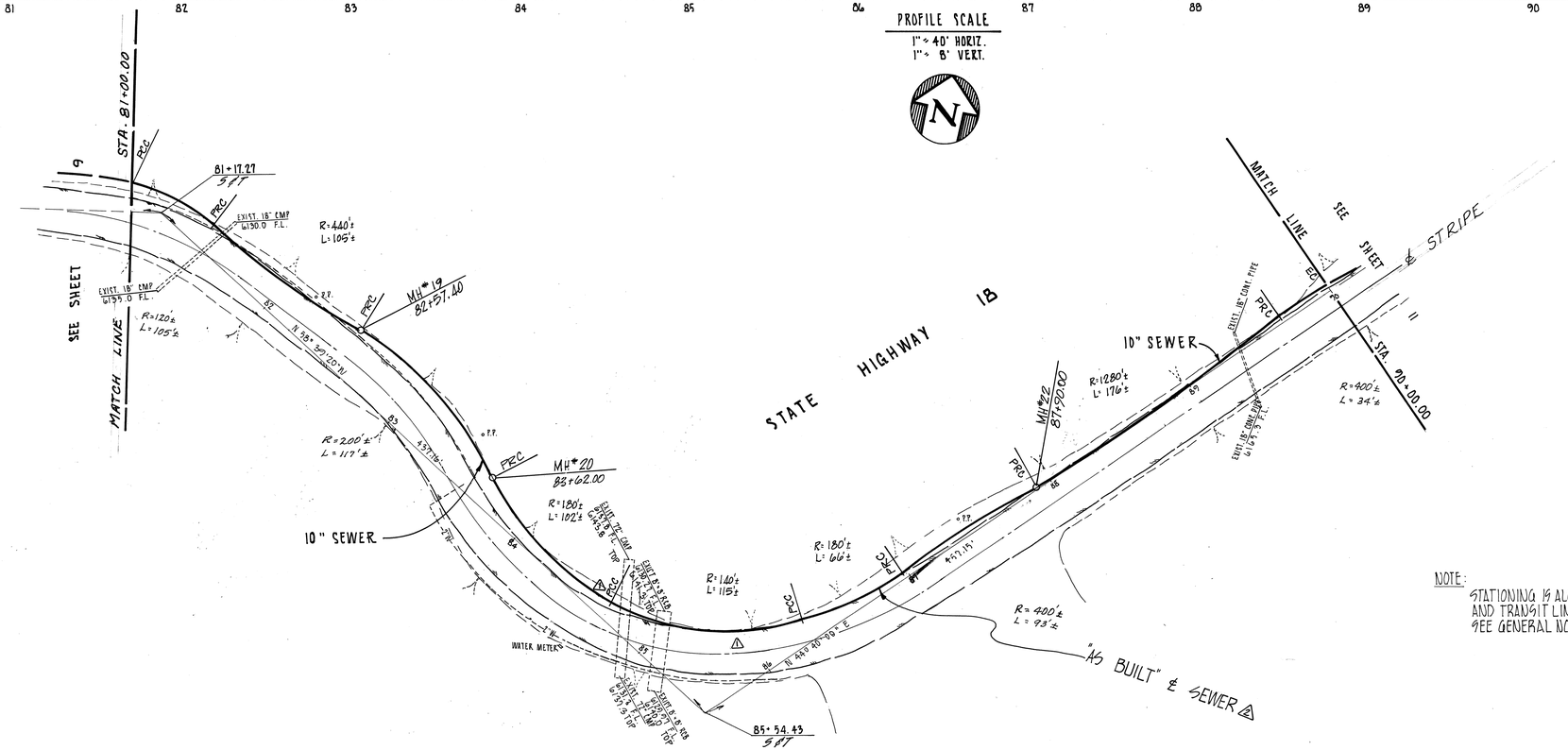
INTERCEPTOR

PLAN AND PROFILE
STATE HIGHWAY 18
STA. 71+00 to STA. 81+00

SHEET 9 OF 48



PROFILE SCALE
1" = 40' HORIZ.
1" = 8' VERT.



NOTE:
STATIONING IS ALONG ℄ OF SEWER AND TRANSIT LINE AS INDICATED
SEE GENERAL NOTES 1 & 2

PLAN SCALE
1" = 40'

BENCH MARK DATA

ELEV. 6140.85
TRANSIT LINE ANGLE POINT STA. 81+17.27
SET S & T

ELEV. 6148.93
TRANSIT LINE ANGLE POINT STA. 85+54.43
SET S & T

REV	DATE	BY	DESCRIPTION
1	8/78	H.N.	Revise profile between sta. 81+00 & sta. 90+00. Align. MH 20 to sta. 83+00. Delete 8" stub @ MH 20 & delete MH 21 & 8" stub @ MH 21.
2	1/78	J.	TRANSITION AS BUILT ALIGNMENT PLOTTED STA. 84+00.00
3	1/78	J.	PROFILE - AS BUILT LOCATION OF MH# 19, 20, 22 & CONC. BLANKET & NOTE.

SCALE: AS SHOWN

DESIGNED G.W. ATKINS
DRAWN M.R. GORES
CHECKED D.R. ALLISON

VTN ENGINEERS ARCHITECTS PLANNERS , SAN BERNARDINO, CALIFORNIA 92401 PHONE (714) 889-4431

SUBMITTED Donald R. Allison — PROJECT ENGINEER — 19466 R.E. NO. — 4-1-74 DATE
RECOMMENDED Richard B. Stites — PROJECT MANAGER — B6051 R.E. NO. — 4-1-74 DATE

COUNTY SERVICE AREA NO. 79 — GREEN VALLEY LAKE

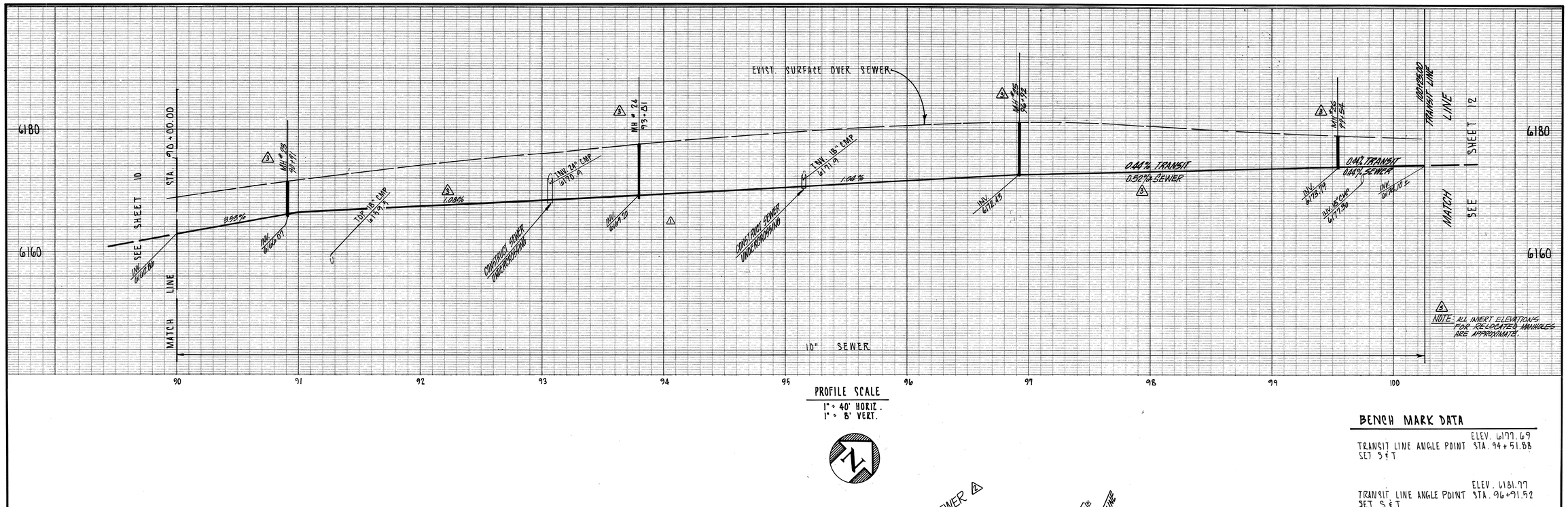
APPROVED Cathy M. Powell — DATE 5-21-74

APPROVED O.R. Reid — DATE 5-21-74

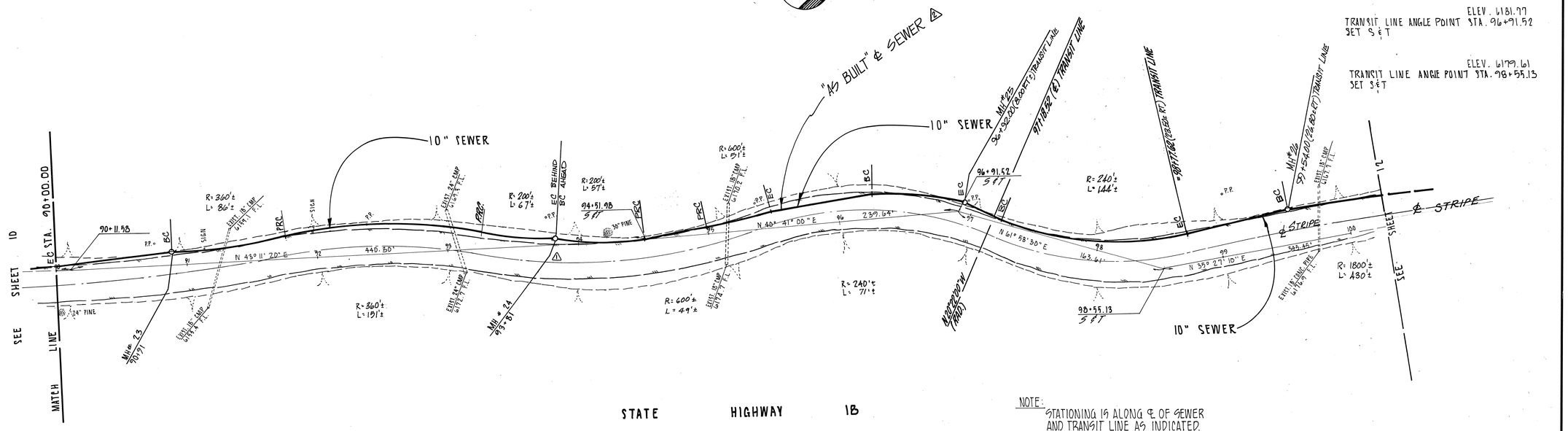
INTERCEPTOR

PLAN AND PROFILE
STATE HIGHWAY 18
STA. 81+00 to STA. 90+00

SHEET 10 OF 48



PROFILE SCALE
1" = 40' HORIZ.
1" = 8' VERT.



STATE HIGHWAY 18

PLAN SCALE
1" = 40'

NOTE:
STATIONING IS ALONG ℄ OF SEWER AND TRANSIT LINE AS INDICATED. SEE GENERAL NOTES 1 & 2.

BENCH MARK DATA

ELEV. 6177.69
TRANSIT LINE ANGLE POINT STA. 94+51.88
SET S & T

ELEV. 6181.77
TRANSIT LINE ANGLE POINT STA. 96+91.52
SET S & T

ELEV. 6179.61
TRANSIT LINE ANGLE POINT STA. 98+55.13
SET S & T

REV	DATE	BY	DESCRIPTION
1	8/76	H.N.	Revise profile between Sta 90+00 & MH 28. Delete 5' stub @ MH 28.
2	12/77	J	PLAN - "As Built" alignment plotted Sta. 90+00.00 to Sta. 98+55.13.
3	12/77	J	PROFILE - Grades & added note.

SCALE: AS SHOWN

DESIGNED G.W. ATKINS
DRAWN M.R. GORES
CHECKED D.R. ALLISON

vtn ENGINEERS ARCHITECTS PLANNERS , SAN BERNARDINO, CALIFORNIA 92401 PHONE (714) 889-4431

SUBMITTED Donald R. Allison — PROJECT ENGINEER — 19466 R.E. NO. — 4-1-74 DATE

RECOMMENDED Richard S. Jitsuta — PROJECT MANAGER — 8605 R.E. NO. — 4-1-74 DATE

COUNTY SERVICE AREA NO. 79 — GREEN VALLEY LAKE

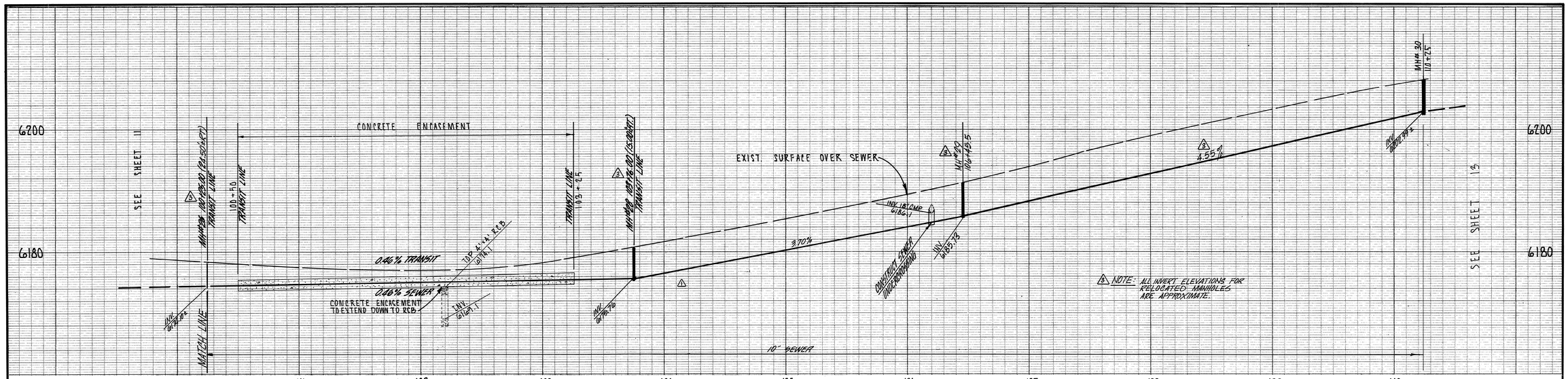
APPROVED Addy M. Powell — DATE 5-21-74

APPROVED A R Reid — DATE 5-21-74

INTERCEPTOR

PLAN AND PROFILE
STATE HIGHWAY 18
STA. 90+00 to STA. 100+00

SHEET 11 OF 48

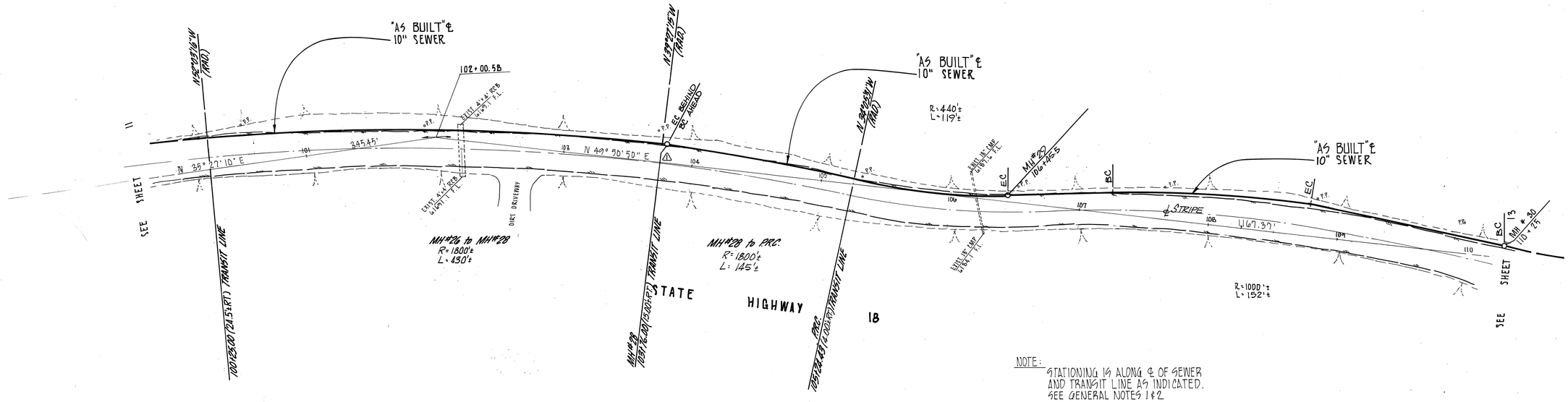


PROFILE SCALE
1" = 40' HORIZ.
1" = 8' VERT.

BENCH MARK DATA

SET CONC. NAIL AT STA. 109+00 ELEV. 6184.01

SET CONC. NAIL AT STA. 108+00 ELEV. 6198.51



NOTE:
STATIONING IS ALONG ℄ OF SEWER AND TRANSIT LINE AS INDICATED. SEE GENERAL NOTES 1 & 2.

PLAN SCALE
1" = 40'

REV	DATE	BY	DESCRIPTION
1	8/76	H.N.	Revise profile between MH #1 & MH 30. Delete 8" stub @ MH #28.
2	12/77	JD	PLAN - TIE STA. 102+25.00
3	12/77	JD	PROFILE - "AS BUILT" LOCATION OF MH #26, 28, 29 & ADDED NOTE.

SCALE: AS SHOWN

DESIGNED G.W. ATKINS
DRAWN M.R. GOKES
CHECKED D.R. ALLISON

VTN ENGINEERS ARCHITECTS PLANNERS , SAN BERNARDINO, CALIFORNIA 92401 PHONE (714) 889-4431

SUBMITTED Donald K. Allison — PROJECT ENGINEER — R.E. NO. 19466 — DATE 4-1-74

RECOMMENDED Richard S. Titus — PROJECT MANAGER — R.E. NO. 8605 — DATE 4-1-74

COUNTY SERVICE AREA NO. 79 — GREEN VALLEY LAKE

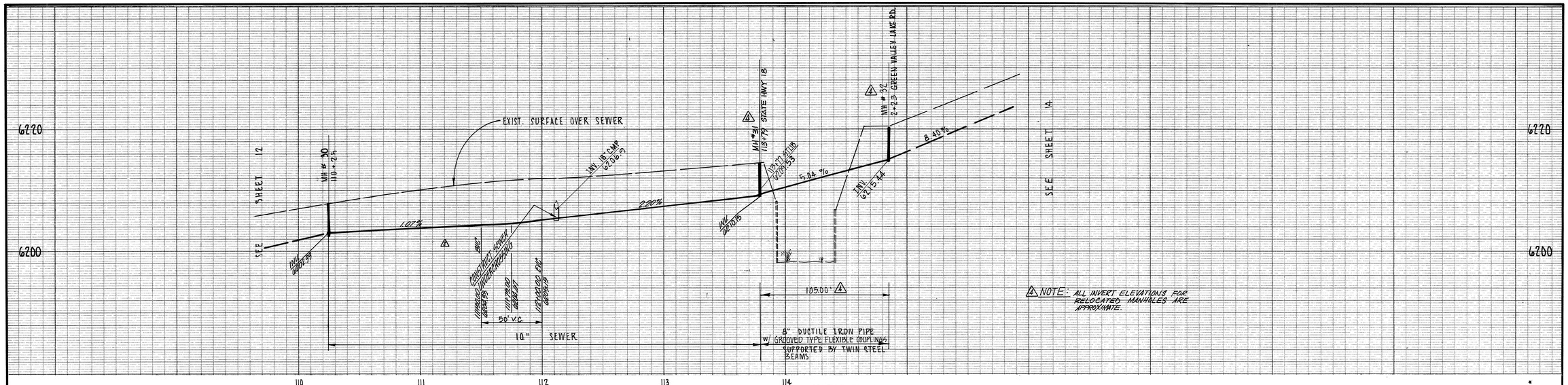
APPROVED Cathy M. Powell — DATE 5-21-74

APPROVED O R Reed — DATE 5-21-74

INTERCEPTOR

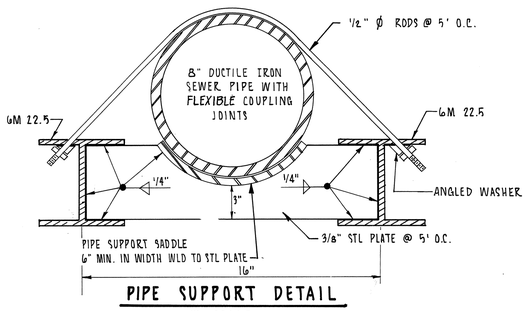
PLAN AND PROFILE
STATE HIGHWAY 18
STA. 100+00 to STA. 110+00

SHEET 12 OF 48

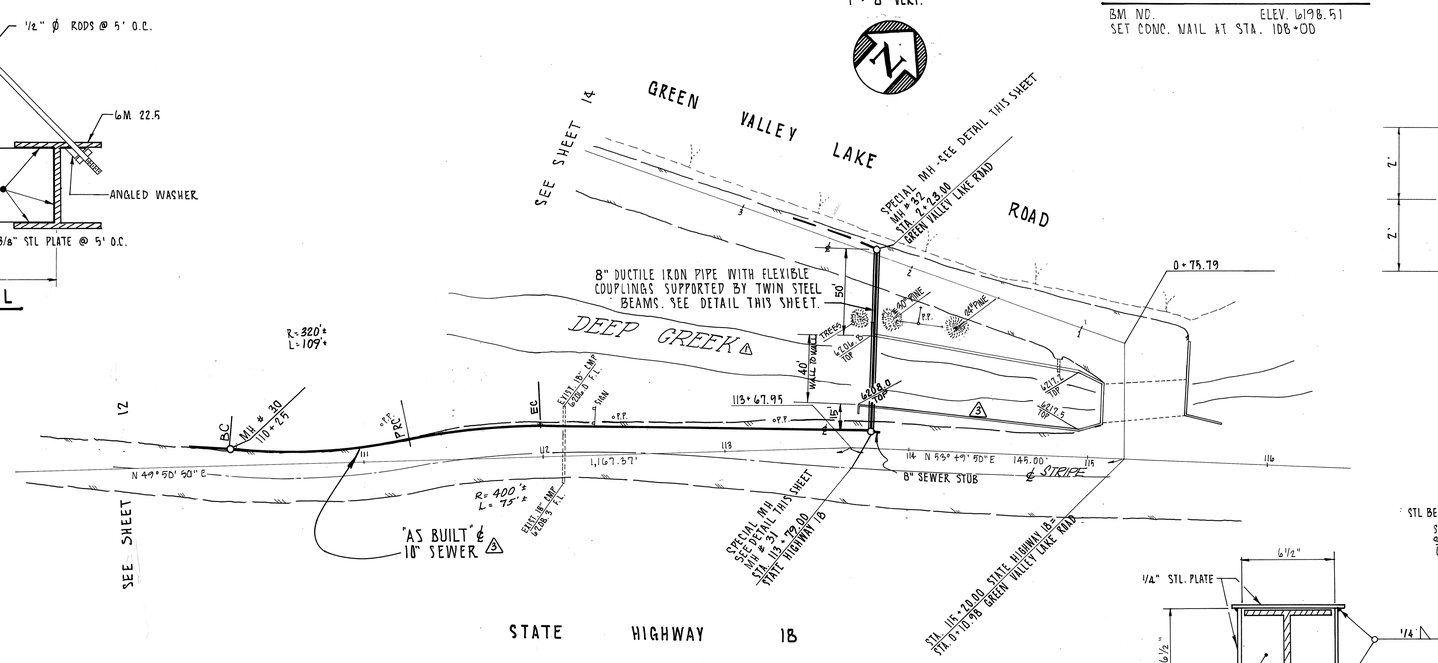


NOTE: ALL INVERT ELEVATIONS FOR RELOCATED MANHOLES ARE APPROXIMATE.

PROFILE SCALE
1" = 40' HORIZ.
1" = 8' VERT.



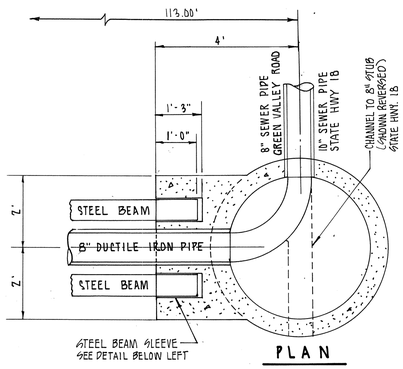
PIPE SUPPORT DETAIL
NO SCALE



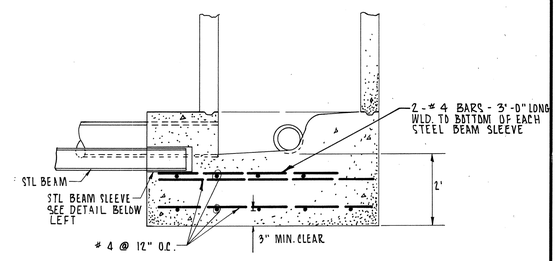
NOTE:
STATIONING IS ALONG TRANSIT LINE.
SEE GENERAL NOTES 1 & 2

PLAN SCALE
1" = 40'

BENCH MARK DATA
BM NO. ELEV. 6198.51
SET CONC. NAIL AT STA. 108+00



PLAN



SECTION

SPECIAL MANHOLE DETAIL
NO SCALE

STEEL BEAM SLEEVE DETAIL
NO SCALE

REV	DATE	BY	DESCRIPTION
1	7/76	H.N.	ADD "DEEP CREEK".
2	8/76	H.N.	Revise profile between MH 30 & MH 31.
3	12/77	J.P.	PLAN - STA. 2+23.80 & CORRECTED PLANS X-ING.
4	12/77	J.P.	PROFILE - AS BUILT STATION OF MH # 31.32 & NOTE.

SCALE: AS SHOWN

DESIGNED G.W. ATKINS
DRAWN M.R. GORES
CHECKED DR. ALLISON

VTN ENGINEERS ARCHITECTS PLANNERS , SAN BERNARDINO, CALIFORNIA 92401 PHONE (714) 889-4431

SUBMITTED Donald R. Allison — PROJECT ENGINEER — 19466 R.E. NO. — 4-1-74 DATE

RECOMMENDED Richard S. Titus — PROJECT MANAGER — 8605 R.E. NO. — 4-1-74 DATE

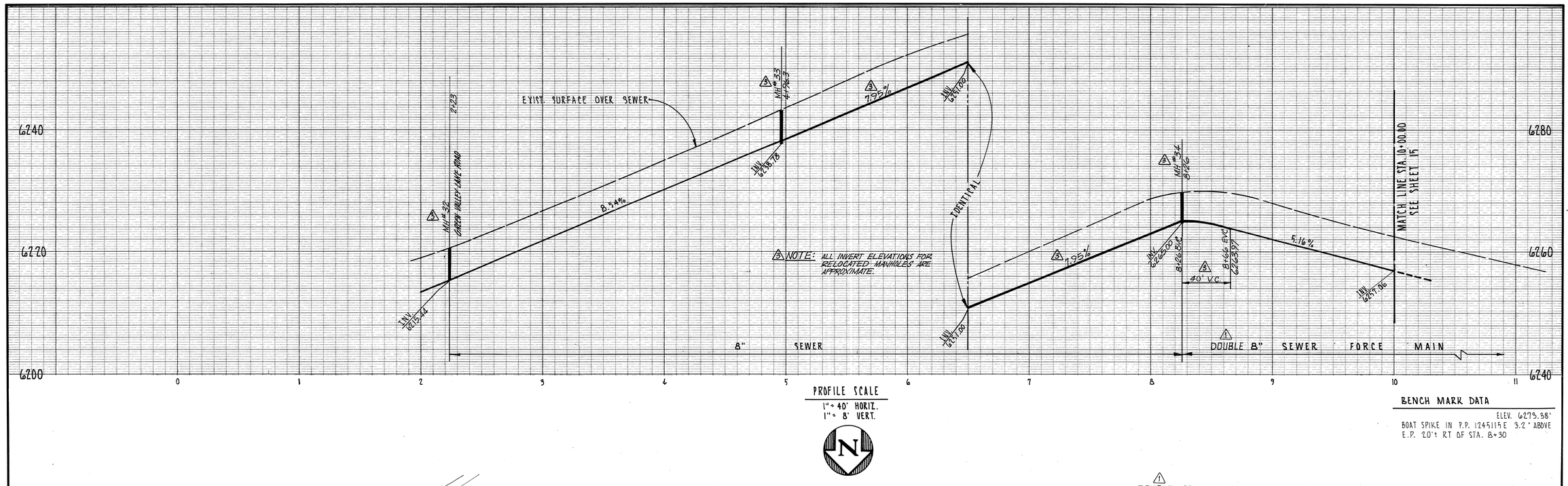
COUNTY SERVICE AREA NO. 79 — GREEN VALLEY LAKE

APPROVED Ashby McDonnell — DATE 5-21-74

APPROVED C. R. Reid — DATE 5-21-74

INTERCEPTOR
PLAN AND PROFILE
STATE HIGHWAY 18
STA. 110+00 to GREEN VALLEY LAKE ROAD

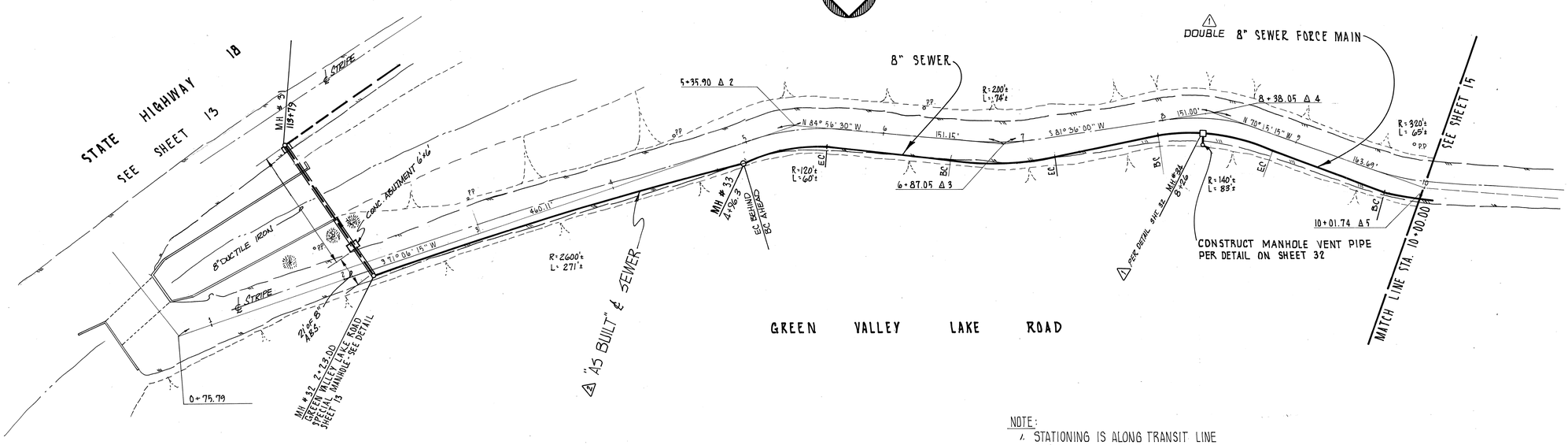
SHEET 13 OF 48



PROFILE SCALE
1" = 40' HORIZ.
1" = 8' VERT.

BENCH MARK DATA

ELEV. 6273.38'
BOAT SPIKE IN P.P. 12451154E 3.2' ABOVE
E.P. 20'± RT OF STA. 8+30



NOTE:
1. STATIONING IS ALONG TRANSIT LINE SEE GENERAL NOTES 1 & 2.
3 2. DOUBLE 8" INVERTED SIPHON REFERRED TO AS FORCE MAIN IN SPECIFICATIONS.

PLAN SCALE
1" = 40'

REV	DATE	BY	DESCRIPTION
1	8/76	H.N.	Added "Double" 8 Force Main Rev. M.H.# 34 Added Note 2
2	12/77	J.D.	PLAN - "AS BUILT" ALIGNMENT PLOTTED STA. 2+23.00 TO STA. 10+00.00
3	12/77	J.D.	PROFILE - "AS BUILT" LOCATION OF MH # 32, 33, 34 & ADDED NOTE 2 VERT. CURVE

SCALE: AS SHOWN

DESIGNED G.W. ATKINS
DRAWN M.R. GORES
CHECKED D.R. ALLISON

VTN ENGINEERS ARCHITECTS PLANNERS , SAN BERNARDINO, CALIFORNIA 92401 PHONE (714) 889-4431

SUBMITTED Donald R. Allison PROJECT ENGINEER — R.E. NO. 19406 — DATE 4-1-74

RECOMMENDED Richard S. Stites PROJECT MANAGER — R.E. NO. 8605 — DATE 4-1-74

APPROVED Ashley M. Powell — DATE 5-21-74

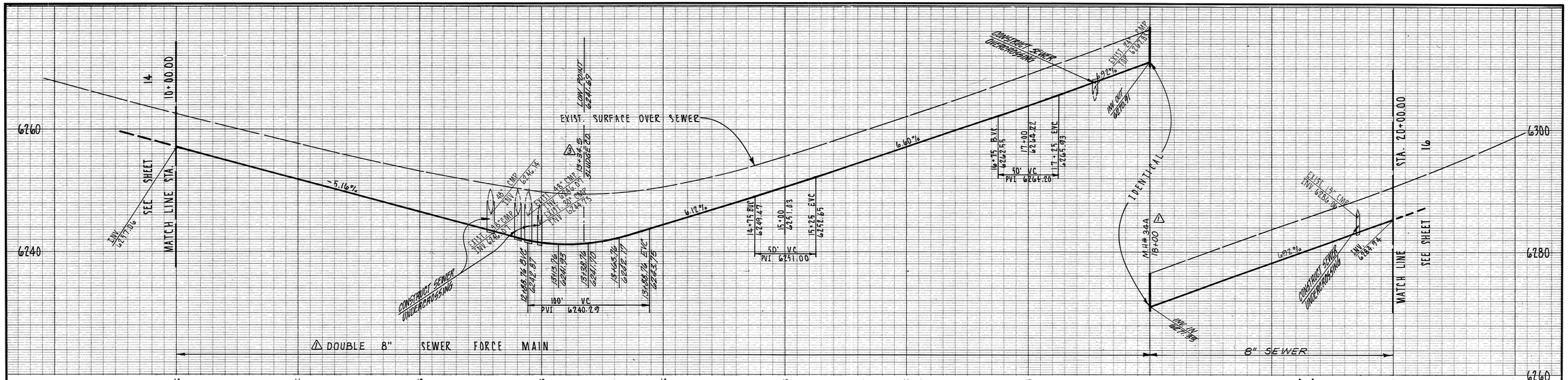
APPROVED Q. R. Reed — DATE 5-21-74

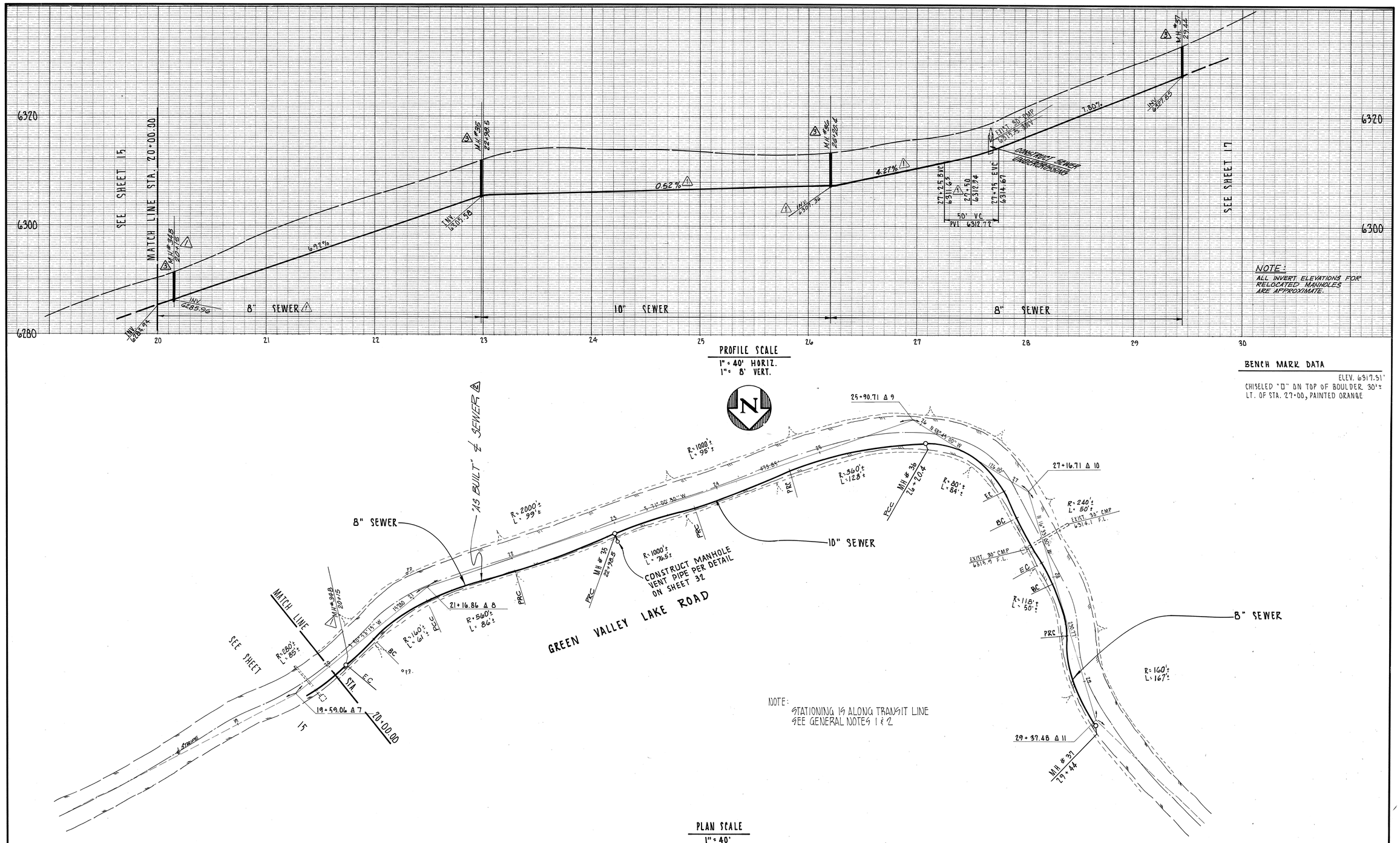
COUNTY SERVICE AREA NO. 79 — GREEN VALLEY LAKE

INTERCEPTOR

PLAN AND PROFILE
GREEN VALLEY LAKE ROAD
STATE HIGHWAY 18 to STA. 10+00

SHEET 14 OF 48


6260
6240
MATCH LINE STA. 10+00.00
SEE SHEET 14
EXIST. SURFACE OVER SEWER
CONSTRUCT SEWER UNDERGROUND
-5.16%
6.12%
6.60%
6.92%
LOW POINT 6221.69
180' VC PVI 6240.29
50' VC PVI 6249.00
50' VC PVI 6264.20
EVC 6252.85
EVC 6245.93
EXIST 48" CMP INV 6244.45
EXIST 48" CMP INV 6243.45
EXIST 48" CMP INV 6242.45
EXIST 30" CMP INV 6241.45
EXIST 24" CMP INV 6239.45
EXIST 24" CMP INV 6239.75
INV 6227.88
INV 6227.99
INV 6234.74
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REV	DATE	BY	DESCRIPTION
1	8/76	H.N.	Added M.H.# 348 at sta 20+20 Rem. force Main sta 19+59
2	10/77	JP	PLAN "AS BUILT" ALIGNMENT PLOTTED STA. 20+00.00 TO STA. 29+44.00
3	10/77	JP	PROFILE "AS BUILT" LOCATION OF M.H.# 348, 35, 36, 37 & ADDED NOTE.

SCALE: AS SHOWN

DESIGNED G.W. ATKINS
DRAWN M.R. GORES
CHECKED D.R. ALLISON

vtn ENGINEERS ARCHITECTS PLANNERS , SAN BERNARDINO, CALIFORNIA 92401 PHONE (714) 889-4431

SUBMITTED — PROJECT ENGINEER — R.E. NO. 19466 — DATE 4-1-74

RECOMMENDED — PROJECT MANAGER — R.E. NO. 8605 — DATE 4-1-74

APPROVED — DATE 5-21-74

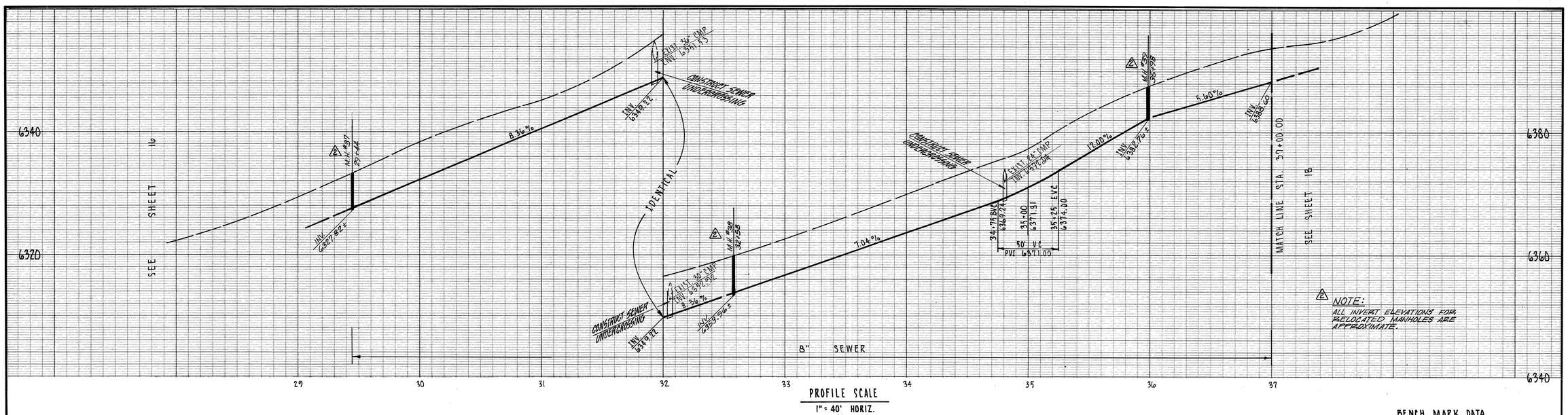
APPROVED — DATE 5-21-74

COUNTY SERVICE AREA NO. 79 — GREEN VALLEY LAKE

INTERCEPTOR

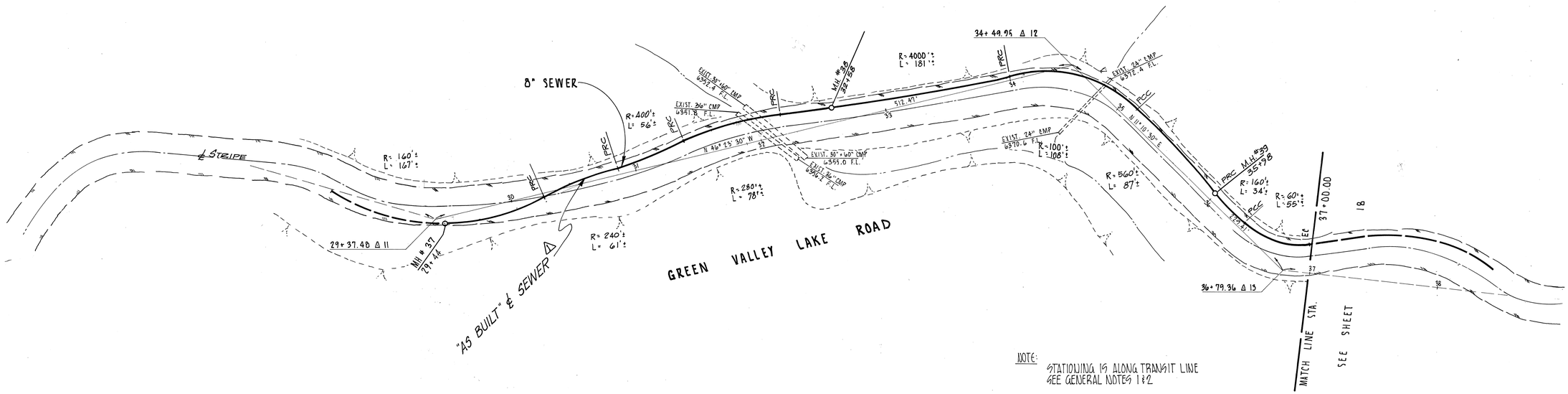
PLAN AND PROFILE
GREEN VALLEY LAKE ROAD
STA. 20+00 to STA. 29+50

SHEET 16 OF 48



PROFILE SCALE
1" = 40' HORIZ.
1" = 8' VERT.

BENCH MARK DATA
ELEV. 6377.73'
CHISELED "□" IN SOUTH END OF EXIST. 24" CMP HEADWALL 12' LT. OF STA. 34+78



NOTE:
STATIONING IS ALONG TRANSIT LINE
SEE GENERAL NOTES 1 & 2

PLAN SCALE
1" = 40'

REV	DATE	BY	DESCRIPTION
1	10/77	JD	PLAN - AS BUILT ALIGNMENT FROM STA. 29+48 TO STA. 37+00.
2	6/79	JD	PROFILE - AS BUILT LOCATION OF M.H.'S 37, 38, 39 & ADDED NOTE.

SCALE: AS SHOWN

DESIGNED G.W. ATKINS
DRAWN M.R. GORES
CHECKED D.R. ALLISON

vtn ENGINEERS ARCHITECTS PLANNERS , SAN BERNARDINO, CALIFORNIA 92401 PHONE (714) 889-4431

SUBMITTED Donald M. Allison PROJECT ENGINEER — 19466 R.E. NO. — 4-1-74 DATE

RECOMMENDED Roland L. Tatum PROJECT MANAGER — 8605 R.E. NO. — 4-1-74 DATE

APPROVED Ashley M. Powell — DATE 5-21-74

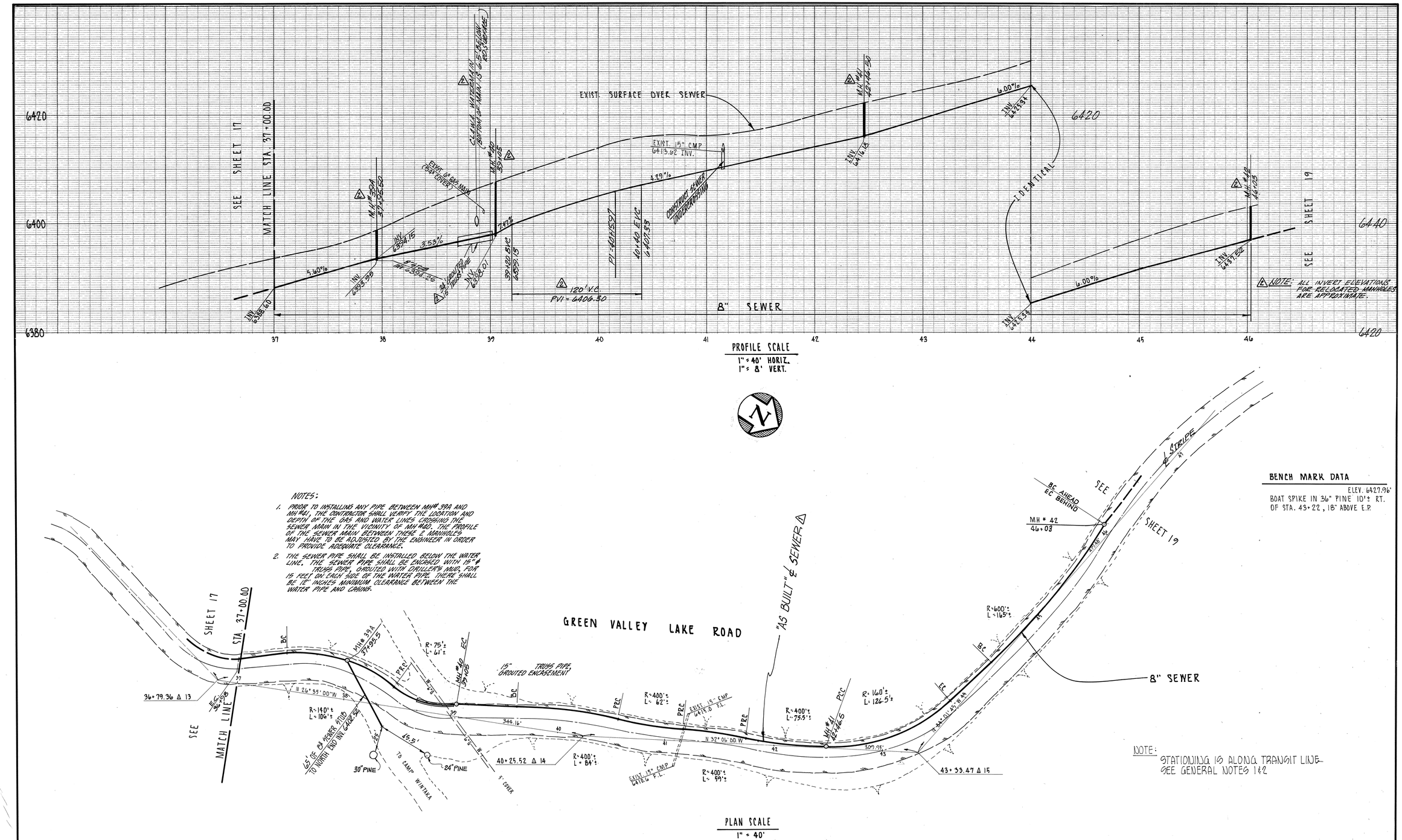
APPROVED O. R. Reed — DATE 5-21-74

COUNTY SERVICE AREA NO. 79 — GREEN VALLEY LAKE

INTERCEPTOR

PLAN AND PROFILE
GREEN VALLEY LAKE ROAD
STA. 29+50 to STA. 37+00

SHEET 17 OF 48



REV	DATE	BY	DESCRIPTION
1	10/77	JD	PLAN-"AS BUILT" ALIGNMENT PLOTTED STA. 37+00.00 TO STA. 46+03.00
2	11/77	JD	PROFILE-"AS BUILT" & SEWER MAIN & LOCATION OF M.H.'S #39A, #41, #42 & ADDED NOTE.

SCALE: AS SHOWN

DESIGNED G.W. ATKINS
DRAWN M.R. GORES
CHECKED D.R. ALLISON

VTN ENGINEERS ARCHITECTS PLANNERS , SAN BERNARDINO, CALIFORNIA 92401 PHONE (714) 889-4431

SUBMITTED Donald R. Allison PROJECT ENGINEER — 19466 R.E. NO. — 4-1-74 DATE

RECOMMENDED Richard S. Titus PROJECT MANAGER — B605 R.E. NO. — 4-1-74 DATE

APPROVED Ashby McDowell — DATE 5-21-74

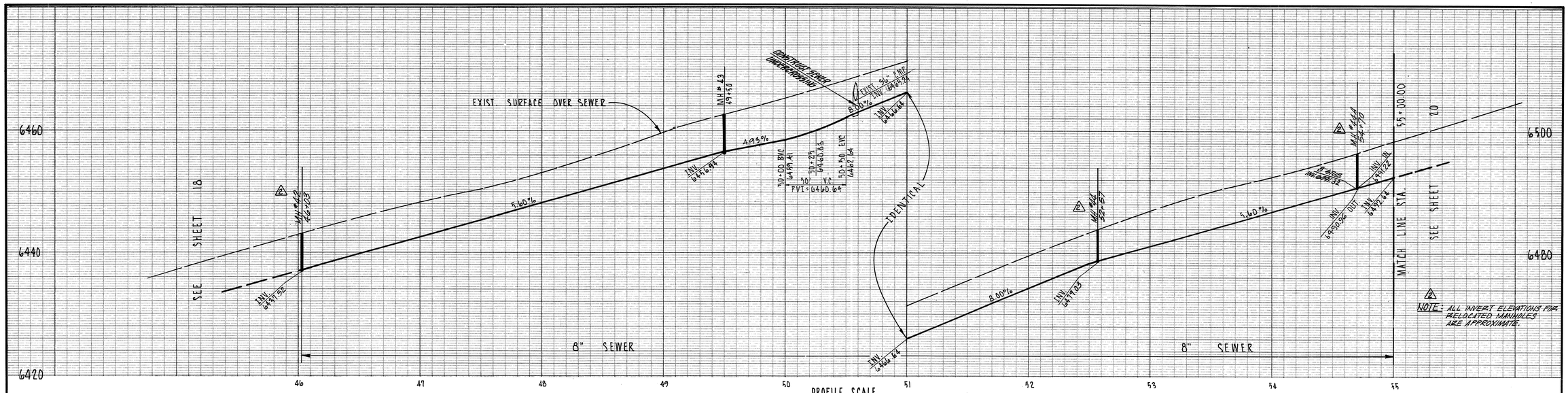
APPROVED A P Reed — DATE 5-21-74

COUNTY SERVICE AREA NO. 79 — GREEN VALLEY LAKE

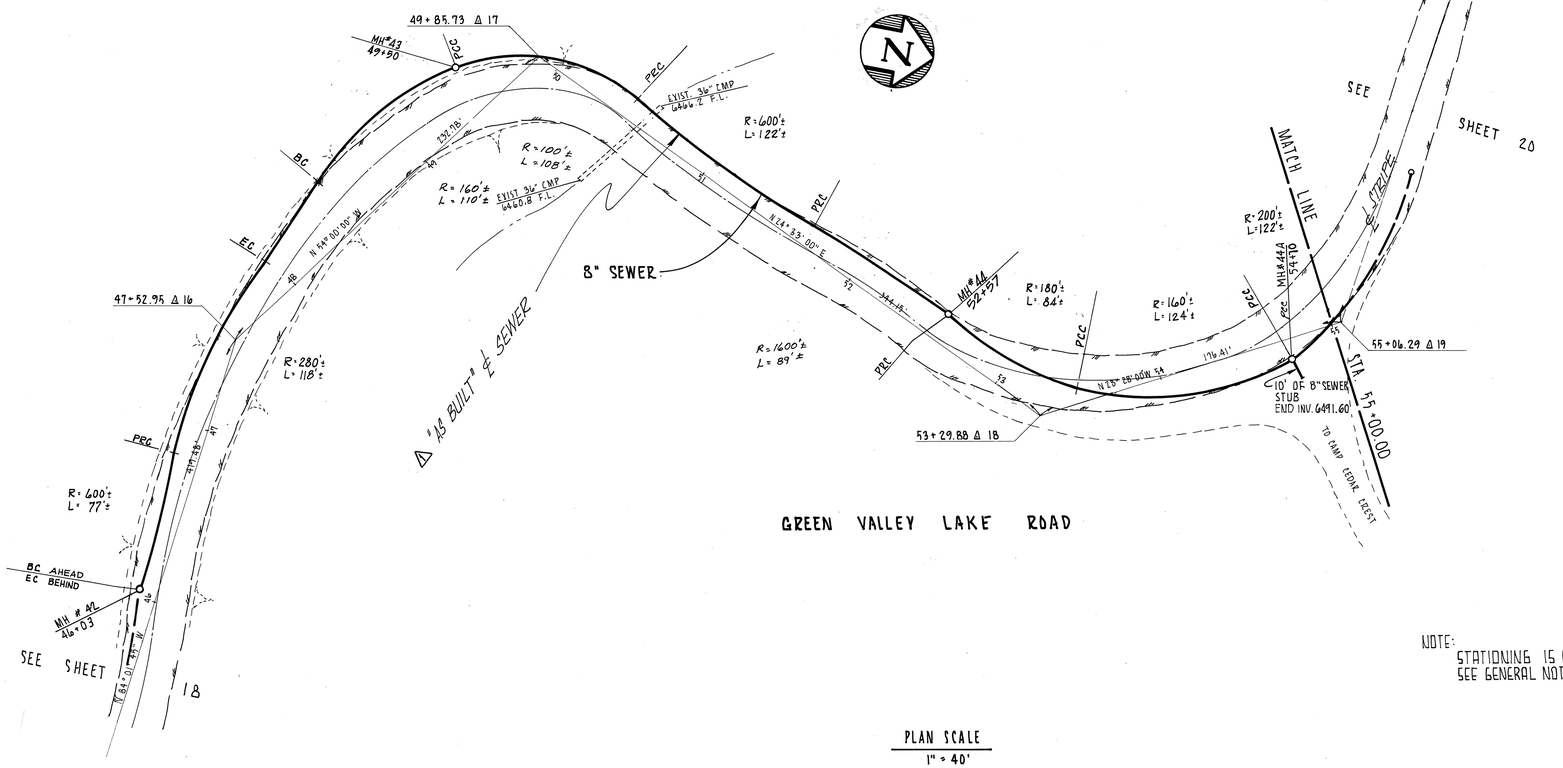
INTERCEPTOR

PLAN AND PROFILE
GREEN VALLEY LAKE ROAD
STA. 37+00 to STA. 46+00

SHEET 18 OF 48



PROFILE SCALE
1" = 40' HORIZ.
1" = 8' VERT.



PLAN SCALE
1" = 40'

BENCH MARK DATA

ELEV. 6491.07'
BOAT SPIKE IN 36" PINE 40' LEFT OF STA. 53+10

NOTE:
STATIONING IS ALONG TRANSIT LINE
SEE GENERAL NOTES 1 & 2

REV	DATE	BY	DESCRIPTION
1	11-77	JD	PLAN: "AS BUILT" ALIGNMENT PLOTTED STA. 46+03 TO STA. 47+52.95 ADDED
2	11-77	JD	PROFILE: REVISED LOCATION OF MH # 42, 43, 44A & ADDED NOTE.

SCALE: AS SHOWN

DESIGNED G.W. ATKINS
DRAWN M.R. GORES
CHECKED D.R. ALLISON

VTN ENGINEERS ARCHITECTS PLANNERS , SAN BERNARDINO, CALIFORNIA 92401 PHONE (714) 889-4431

SUBMITTED Donald R. Allison PROJECT ENGINEER — 19466 R.E. NO. — 4-1-74 DATE

RECOMMENDED Richard S. Jitera PROJECT MANAGER — 8605 R.E. NO. — 4-1-74 DATE

COUNTY SERVICE AREA NO. 79 — GREEN VALLEY LAKE

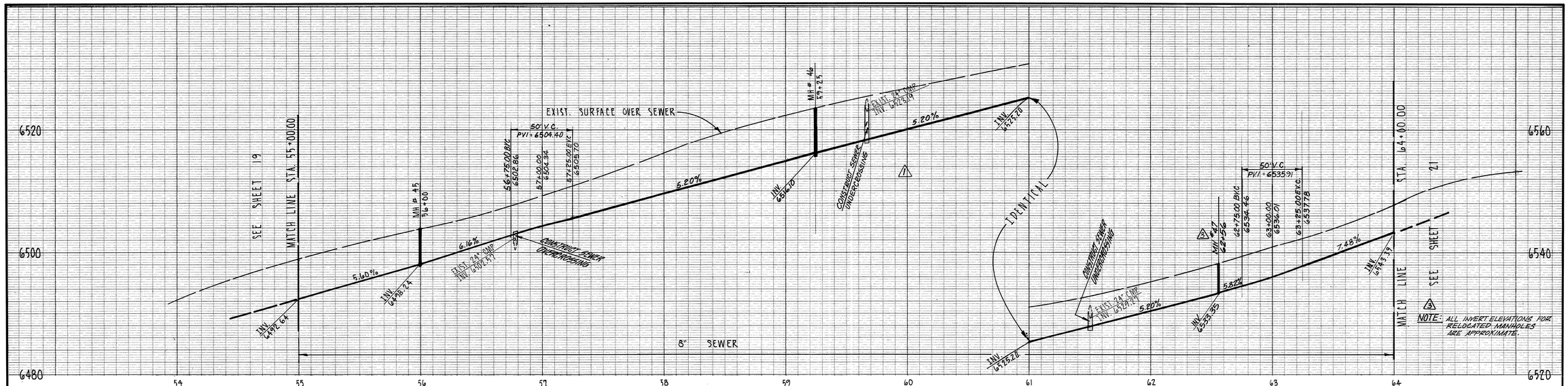
APPROVED Addy McDonald — DATE 5-21-74

APPROVED O.R. Reid — DATE 5-21-74

INTERCEPTOR

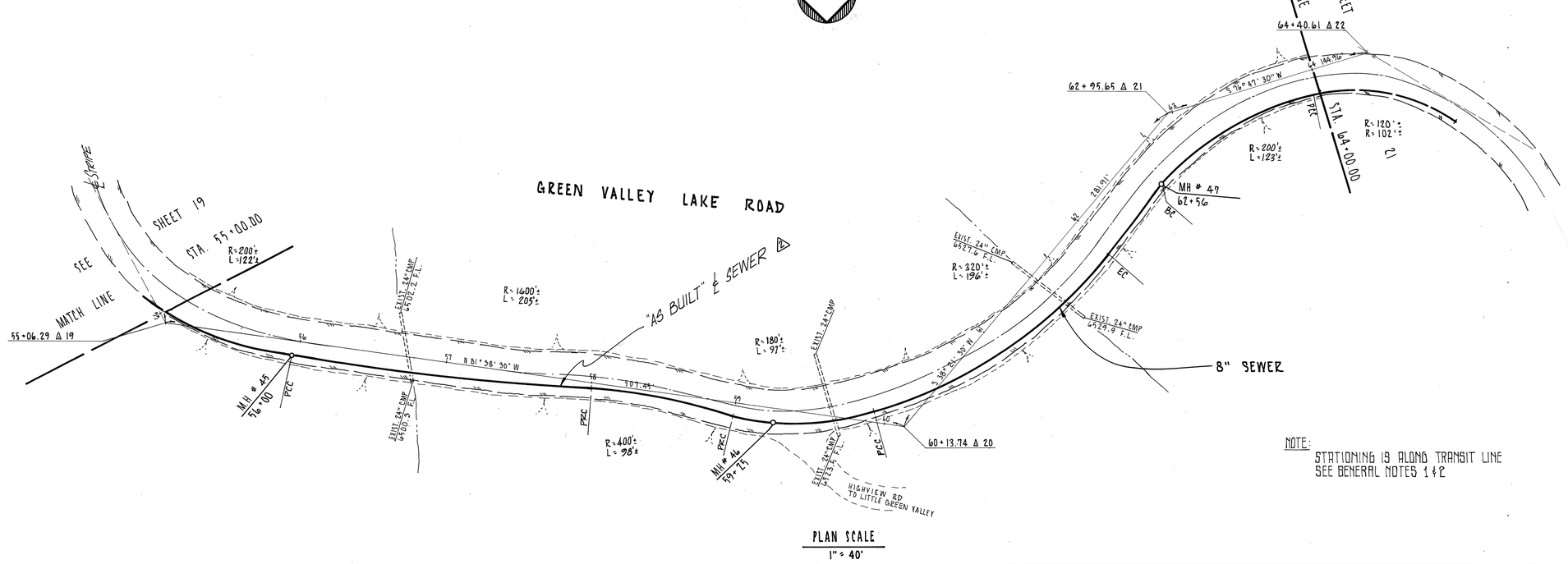
PLAN AND PROFILE
GREEN VALLEY LAKE ROAD
STA. 46+00 to STA. 55+00

SHEET 19 OF 48



PROFILE SCALE
1" = 40' HORIZ.
1" = 8' VERT.

BENCH MARK DATA
ELEV. 6546.33'
CONC. NAIL IN TOP OF BOULDER
13' LT. OF STA. 63+10, PAINTED ORANGE



NOTE:
STATIONING IS ALONG TRANSIT LINE
SEE GENERAL NOTES 1 & 2

PLAN SCALE
1" = 40'

REV	DATE	BY	DESCRIPTION
1	8/76	H.N.	Revised Profile from sta. 56 to sta. 64
2	11/77	JL	PLAN - "AS BUILT" ALIGNMENT PLOTTED STA. 55+00.00 TO STA. 64+00.00
3	11/77	JL	PROFILE - "AS BUILT" LOCATION OF MH # 47 & ADDED NOTE

SCALE: AS SHOWN

DESIGNED G.W. ATKINS
DRAWN M.R. GORES
CHECKED D.R. ALLISON

VTN ENGINEERS ARCHITECTS PLANNERS , SAN BERNARDINO, CALIFORNIA 92401 PHONE (714) 889-4431

SUBMITTED Donald R. Allison — PROJECT ENGINEER — 19406 R.E. NO. — 4-1-74 DATE

RECOMMENDED Richard S. Titus — PROJECT MANAGER — 8605 R.E. NO. — 4-1-74 DATE

APPROVED Ashley McDowell — DATE 5-21-74

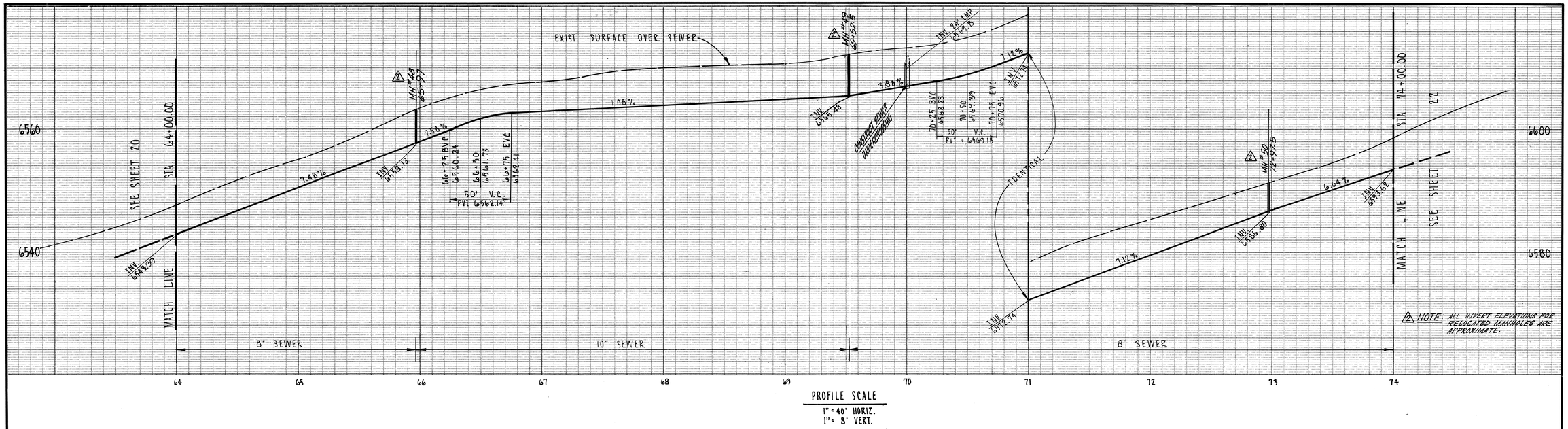
APPROVED A R Reid — DATE 5-21-74

COUNTY SERVICE AREA NO. 79 — GREEN VALLEY LAKE

INTERCEPTOR

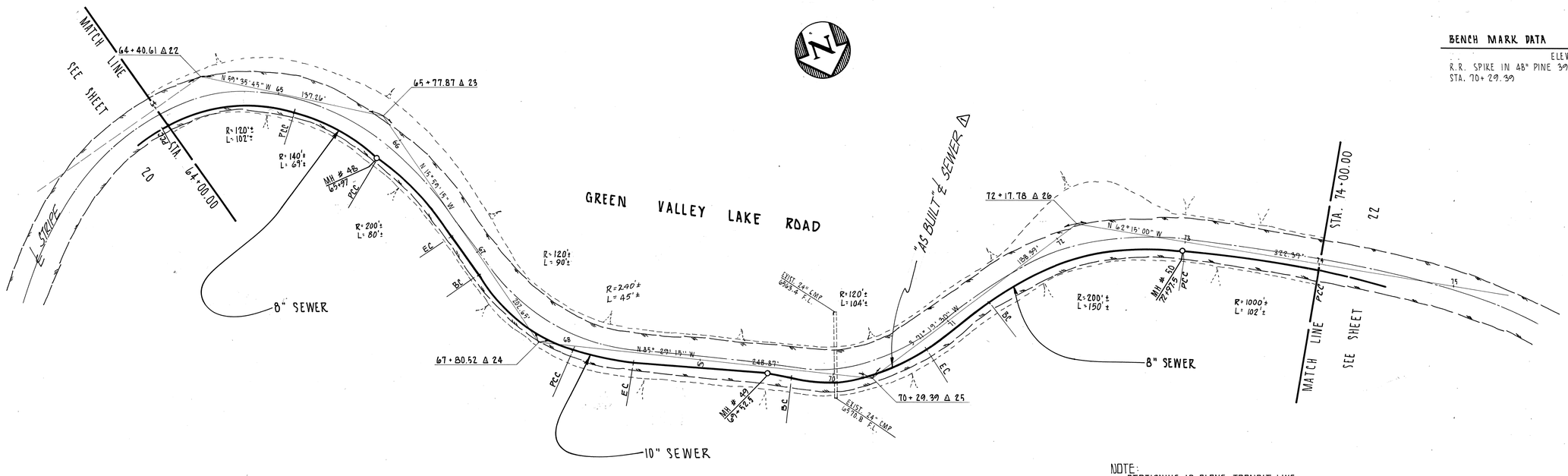
PLAN AND PROFILE
GREEN VALLEY LAKE ROAD
STA. 55+00 to STA. 64+00

SHEET 20 OF 48



⚠2 NOTE: ALL INVERT ELEVATIONS FOR RELOCATED MANHOLES ARE APPROXIMATE.

PROFILE SCALE
1" = 40' HORIZ.
1" = 8' VERT.



N

BENCH MARK DATA

ELEV. 6573.99'
R.R. SPIKE IN 48" PINE 39'± RT.
STA. 70+29.39

NOTE:
STATIONING IS ALONG TRANSIT LINE
SEE GENERAL NOTES 1 & 2

PLAN SCALE
1" = 40'

REV	DATE	BY	DESCRIPTION
⚠1	8/77	JJ	PLAN - "AS BUILT" ALIGNMENT PLOTTED STA 64+00.00 TO STA. 74+00.00
⚠2	9/77	JJ	PROFILE - "AS BUILT" LOCATION OF MH #48,49,50 & HARD NOTE.

SCALE: AS SHOWN

DESIGNED G.W. ATKINS
DRAWN M.R. GORES
CHECKED D.R. ALLISON

VTN ENGINEERS ARCHITECTS PLANNERS , SAN BERNARDINO, CALIFORNIA 92401 PHONE (714) 889-4431

SUBMITTED Donald R. Allison PROJECT ENGINEER — 19466 R.E. NO. — 4-1-74 DATE

RECOMMENDED Richard S. Stites PROJECT MANAGER — 8605 R.E. NO. — 4-1-74 DATE

APPROVED Cathy M. Powell — DATE 5-21-74

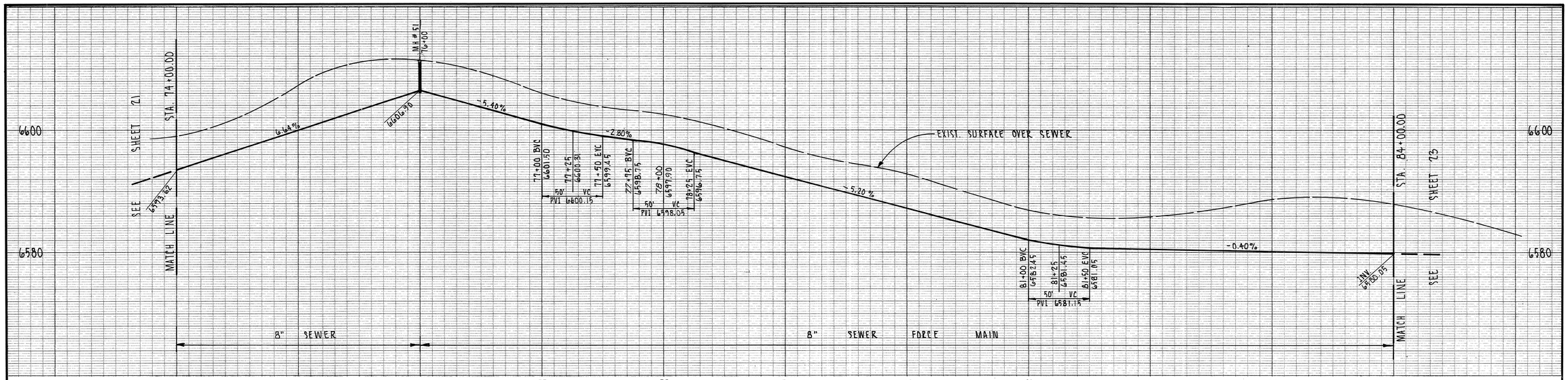
APPROVED R R Reed — DATE 5-21-74

COUNTY SERVICE AREA NO. 79 — GREEN VALLEY LAKE

INTERCEPTOR

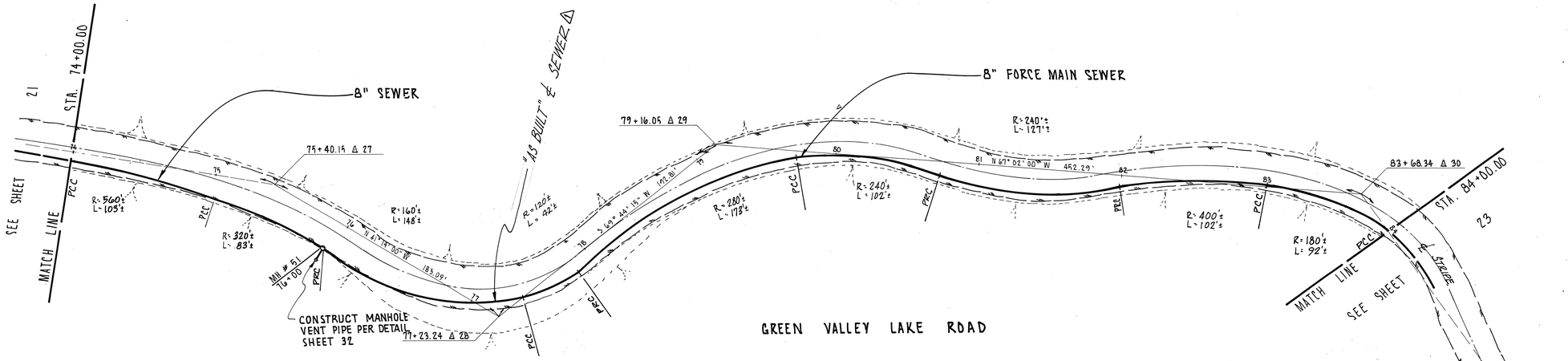
PLAN AND PROFILE
GREEN VALLEY-LAKE ROAD
STA. 64+00 to STA. 74+00

SHEET 21 OF 48



PROFILE SCALE
1" = 40' HORIZ.
1" = 8' VERT.

BENCH MARK DATA
ELEV. 6597.57'
BOAT SPIKE IN 24" PINE 32' LEFT OF STA. 80+00.00



NOTE:
STATIONING IS ALONG TRANSIT LINE
SEE GENERAL NOTES 1 & 2

PLAN SCALE
1" = 40'

REV	DATE	BY	DESCRIPTION
1	11/74	JP	PLAN - "AS BUILT" ALIGNMENT PLOTTED STA. 74+00.00 TO STA. 84+00.00

SCALE: AS SHOWN

DESIGNED G.W. ATKINS
DRAWN M.R. GORES
CHECKED P.R. ALLISON

VTN ENGINEERS ARCHITECTS PLANNERS , SAN BERNARDINO, CALIFORNIA 92401 PHONE (714) 889-4431

SUBMITTED Donald K. Allison PROJECT ENGINEER — R.E. NO. 19466 — DATE 4-1-74

RECOMMENDED Richard S. Titus PROJECT MANAGER — R.E. NO. 8605 — DATE 4-1-74

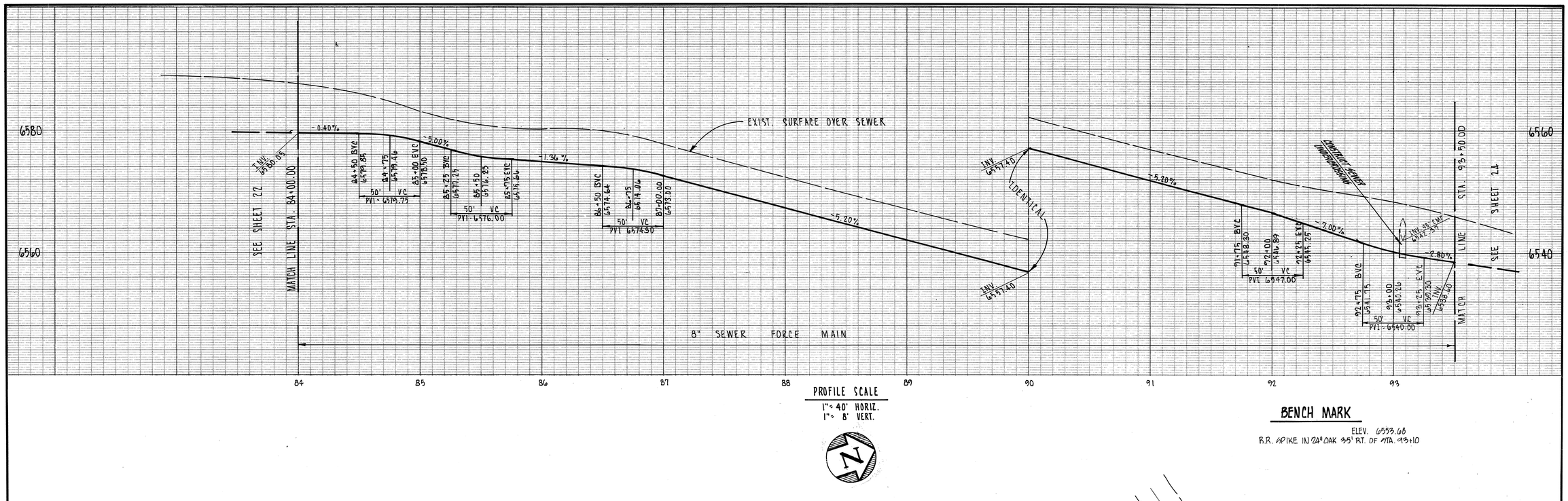
COUNTY SERVICE AREA NO. 79 — GREEN VALLEY LAKE

APPROVED Ashley M. Powell — DATE 5-21-74

APPROVED O R Reid — DATE 5-21-74

INTERCEPTOR
PLAN AND PROFILE
GREEN VALLEY LAKE ROAD
STA. 74+00 to STA. 84+00

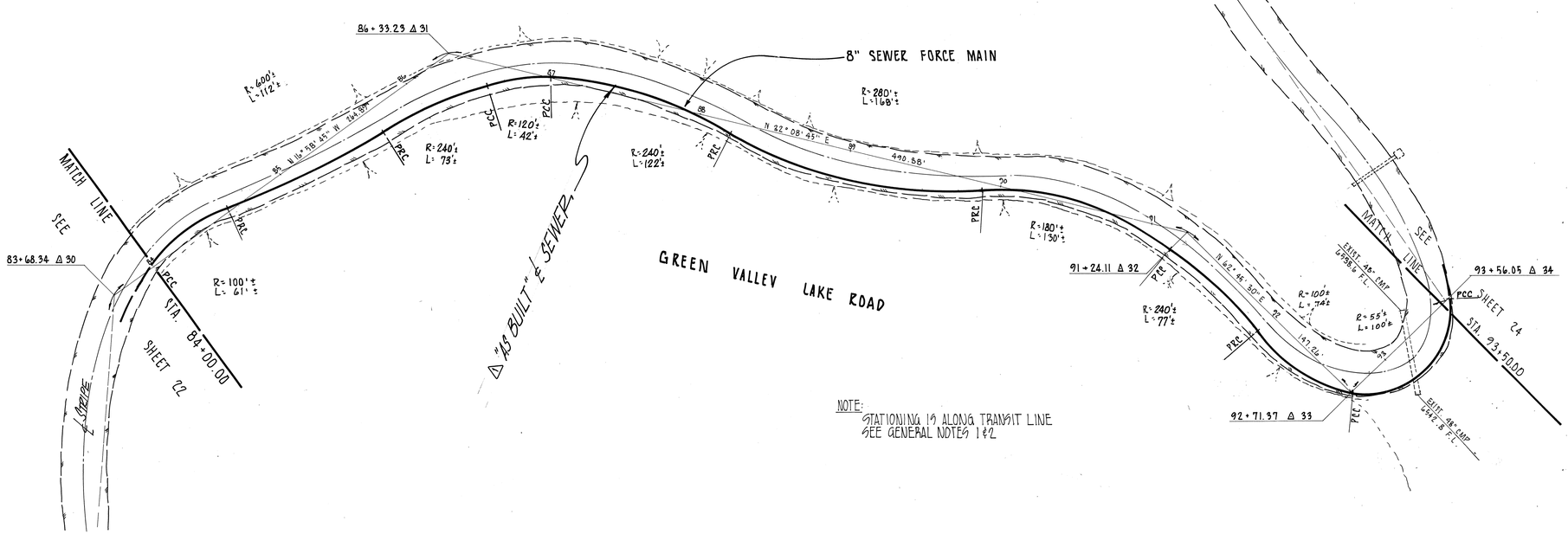
SHEET 22 OF 48



PROFILE SCALE
1"= 40' HORIZ.
1"= 8' VERT.

BENCH MARK

ELEV. 6553.68
B.R. APIKE IN 24" OAK 35' RT. OF STA. 93+10



NOTE:
STATIONING IS ALONG TRANSIT LINE
SEE GENERAL NOTES 1 & 2

PLAN SCALE
1"= 40'

REV	DATE	BY	DESCRIPTION
1	11/74	JH	PLAN - "AS BUILT" ALIGNMENT PLOTTED STA. 84+00.00 TO STA. 93+50.00

SCALE: AS SHOWN

DESIGNED G.W. ATKINS
DRAWN M.R. GORES
CHECKED D.R. ALLISON

vtn ENGINEERS ARCHITECTS PLANNERS , SAN BERNARDINO, CALIFORNIA 92401 PHONE (714) 889-4431

SUBMITTED Donald R. Allison PROJECT ENGINEER — 19466 R.E. NO. — 4-1-74 DATE

RECOMMENDED Richard S. Titus PROJECT MANAGER — 8605 R.E. NO. — 4-1-74 DATE

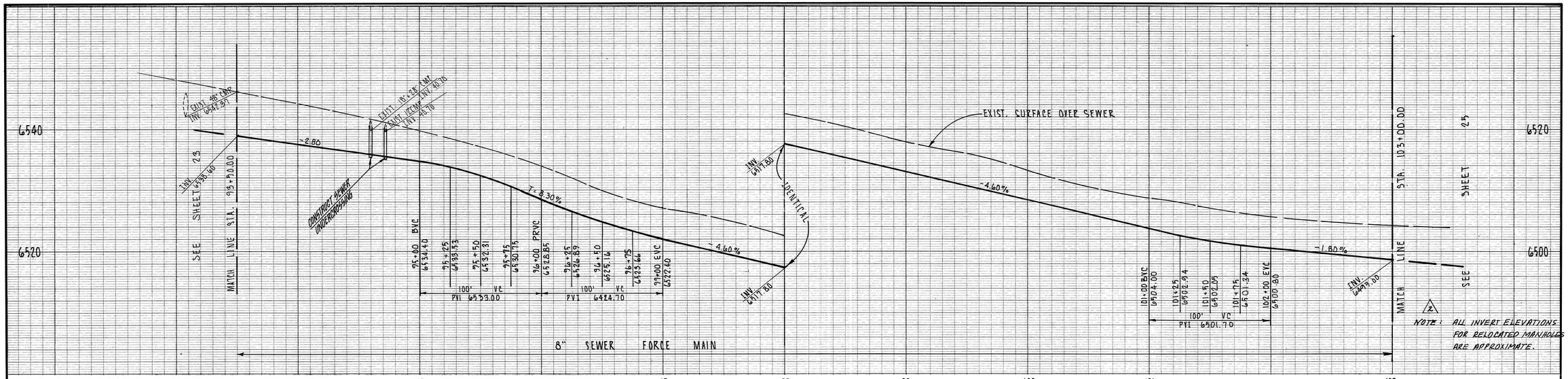
COUNTY SERVICE AREA NO. 79 — GREEN VALLEY LAKE

APPROVED Cathy McDonell — DATE 5-21-74

APPROVED G R Reed — DATE 5-21-74

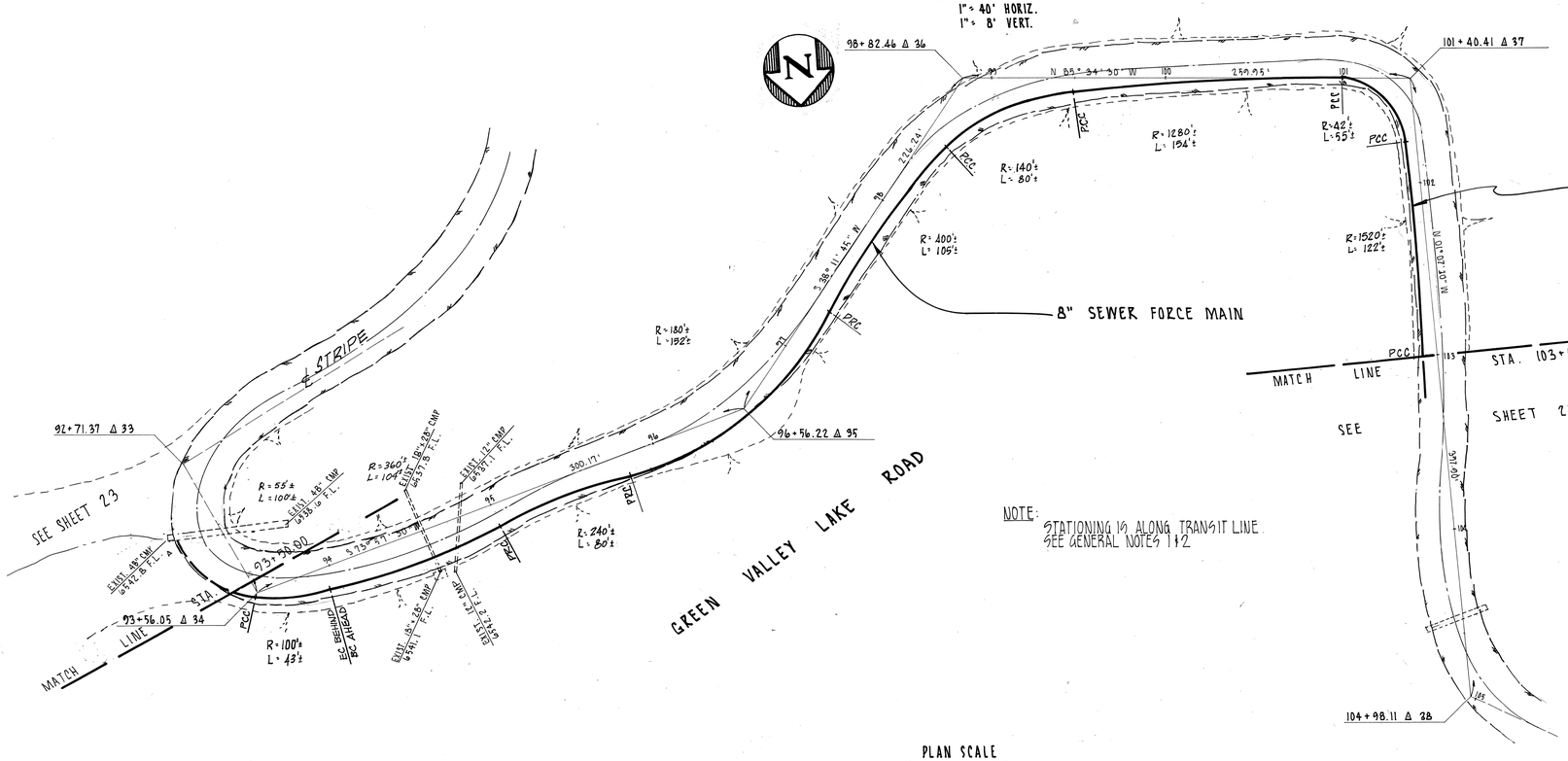
INTERCEPTOR
PLAN AND PROFILE
GREEN VALLEY LAKE ROAD
STA. 84+00 to STA. 93+00

SHEET 23 OF 48



NOTE: ALL INVERT ELEVATIONS FOR RELOCATED MANHOLES ARE APPROXIMATE.

PROFILE SCALE
1" = 40' HORIZ.
1" = 8' VERT.



NOTE: STATIONING IS ALONG TRANSIT LINE SEE GENERAL NOTES 1 & 2

PLAN SCALE
1" = 40'

BENCH MARK DATA

ELEV. 6553.68'
R.R. SPIKE IN 24" OAK 35' RT. OF STA. 93+10

ELEV. 6515.94'
BOAT SPIKE IN LEANING 18" OAK 40' LT. OF STA. 99+60, PAINTED ORANGE

REV	DATE	BY	DESCRIPTION
⚠1	11-77	JP	PLAN - "AS BUILT" ALIGNMENT PLOTTED STA. 93+50.00 TO STA. 103+00.00

SCALE: AS SHOWN

DESIGNED G.W. ATKINS
DRAWN M.R. GORES
CHECKED D.R. ALLISON

VTN ENGINEERS ARCHITECTS PLANNERS , SAN BERNARDINO, CALIFORNIA 92401 PHONE (714) 889-4431

SUBMITTED Donald R. Allison — PROJECT ENGINEER — 19466 R.E. NO. — 4-1-74 DATE

RECOMMENDED Richard S. Jitters — PROJECT MANAGER — B6057 R.E. NO. — 4-1-74 DATE

COUNTY SERVICE AREA NO. 79 — GREEN VALLEY LAKE

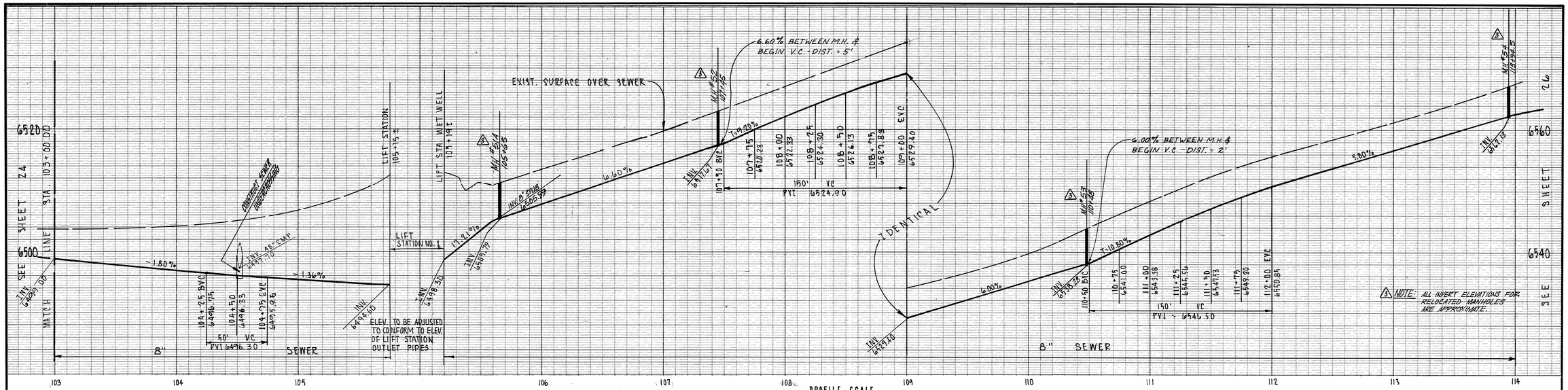
APPROVED Ashley W. Powell — DATE 5-21-74

APPROVED R R Reed — DATE 5-21-74

INTERCEPTOR

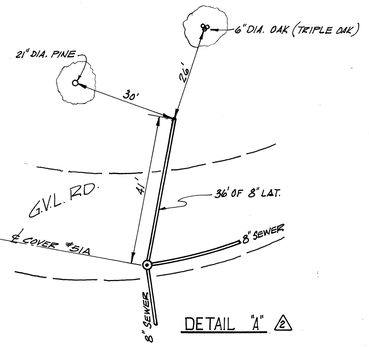
PLAN AND PROFILE
GREEN VALLEY LAKE ROAD
STA. 93+00 to STA. 103+00

SHEET 24 OF 48



PROFILE SCALE
1" = 40' HORIZ.
1" = 8' VERT.

BENCH MARK
ELEV. 6576.95'
BOLT & PIKE IN P.P. # (NO NUMBER?) 25' LT. OF STA. 114+75



NOTE:
STATIONING BETWEEN STA. 105+42 AND 105+65 IS ALONG SEWER PIPE. FROM STA. 105+42 STATIONING INCREASES TOWARD LIFT STATION. FROM STA. 105+65 STATIONING DECREASES BACK TO LIFT STATION.

REV	DATE	BY	DESCRIPTION
1	8/76	H.N.	Added Lateral & Bldg.
2	12/77	J.D.	Plan - "As Built" Alignment plotted, Sta. 103+00.00 to Sta. 108+75.00 & Detail "A" Added
3	12/77	J.D.	Profile - As Built location of M.H.'s 51A, 52, 53, 54 & added note.

SCALE: AS SHOWN

DESIGNED G.W. ATKINS
DRAWN M.R. GORES
CHECKED D.R. ALLISON

SUBMITTED Donald L. Allison, PROJECT ENGINEER — 10466 R.E. NO. — 4-1-74 DATE

RECOMMENDED Richard S. Titus, PROJECT MANAGER — B605 R.E. NO. — 4-1-74 DATE

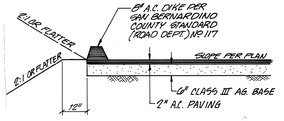
COUNTY SERVICE AREA NO. 79 — GREEN VALLEY LAKE

APPROVED Addy M. Powell — DATE 5-21-74

APPROVED R R Reid — DATE 5-21-74

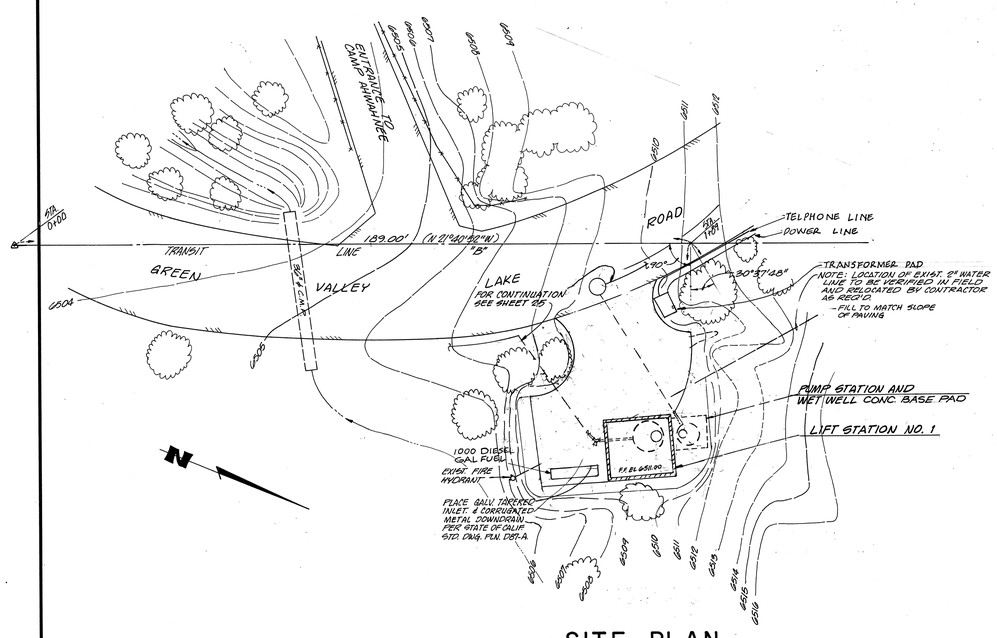
INTERCEPTOR
PLAN AND PROFILE
GREEN VALLEY LAKE ROAD
STA. 103+00 to STA. 114+00

SHEET 25 OF 48



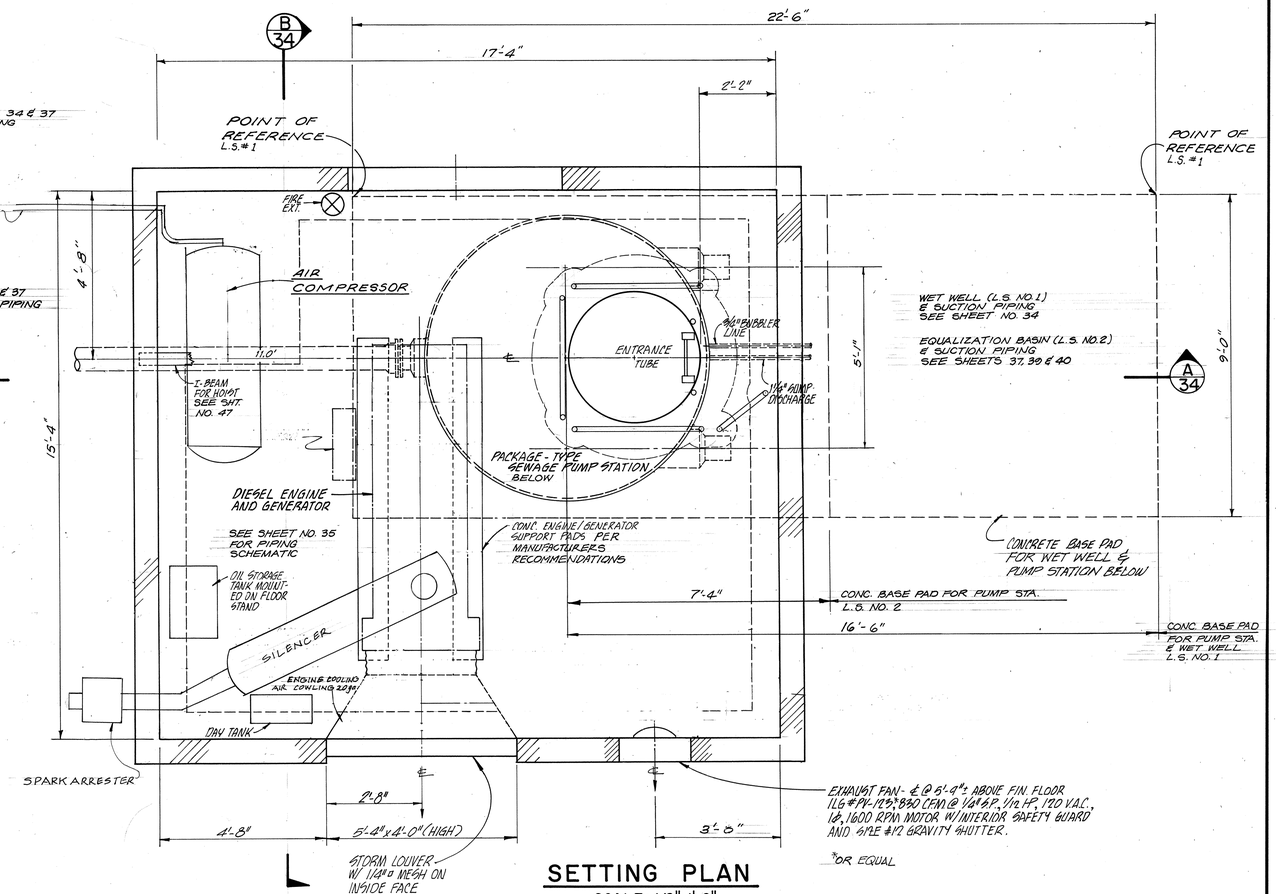
PAVING DETAIL

N.T.S.



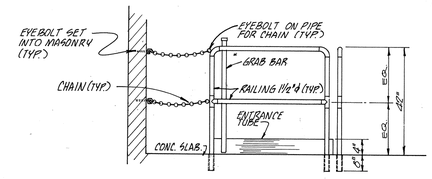
SITE PLAN

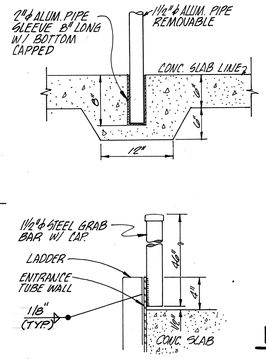
SCALE 1"=20'

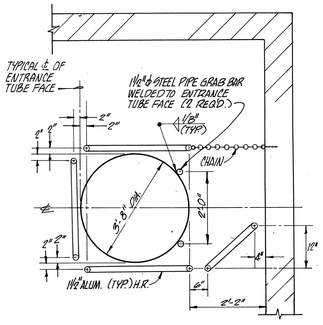


SETTING PLAN

SCALE: 1/2"=1'-0"







HANDRAIL DETAILS

N.T.S.

AS-BUILT DRAWING
CHANGES OR BY: S. DANANDEH
APPROVED
ENGINEER OF WORK

REV	DATE	BY	DESCRIPTION
1	9/3/76	G.C.C.	REVISED SETTING PLAN TO ACCOMODATE L.S. 1&2

SCALE: AS NOTED

DESIGNED R.C.G.
DRAWN C.L.
CHECKED R.C.G.

VTN ENGINEERS ARCHITECTS PLANNERS , SAN BERNARDINO, CALIFORNIA 92401 PHONE (714) 889-4431

SUBMITTED Robert C. Zimmerman PROJECT ENGINEER — C-20805 R.E. NO. — 4-1-74 DATE

RECOMMENDED Richard S. Stites PROJECT MANAGER — C-8605 R.E. NO. — 4-1-74 DATE

COUNTY SERVICE AREA NO. 79 — GREEN VALLEY LAKE

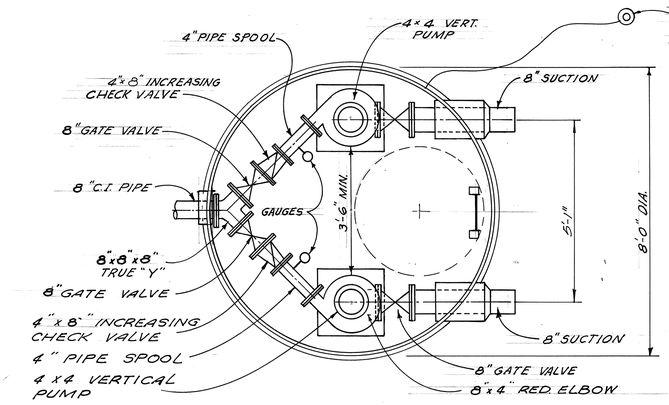
APPROVED Addy McDonell — DATE 5-21-74

APPROVED R. Reed — DATE 5-21-74

INTERCEPTOR

LIFT STATION NO. 1 SITE PLAN
LIFT STATION NO. 1&2 SETTING PLAN

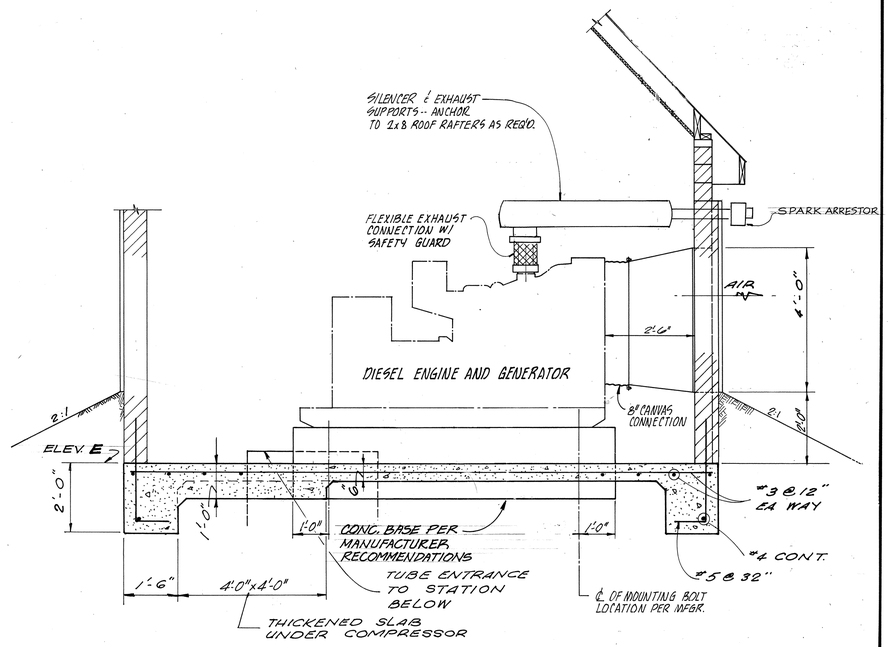
SHEET 33 OF 48



STATION PLAN

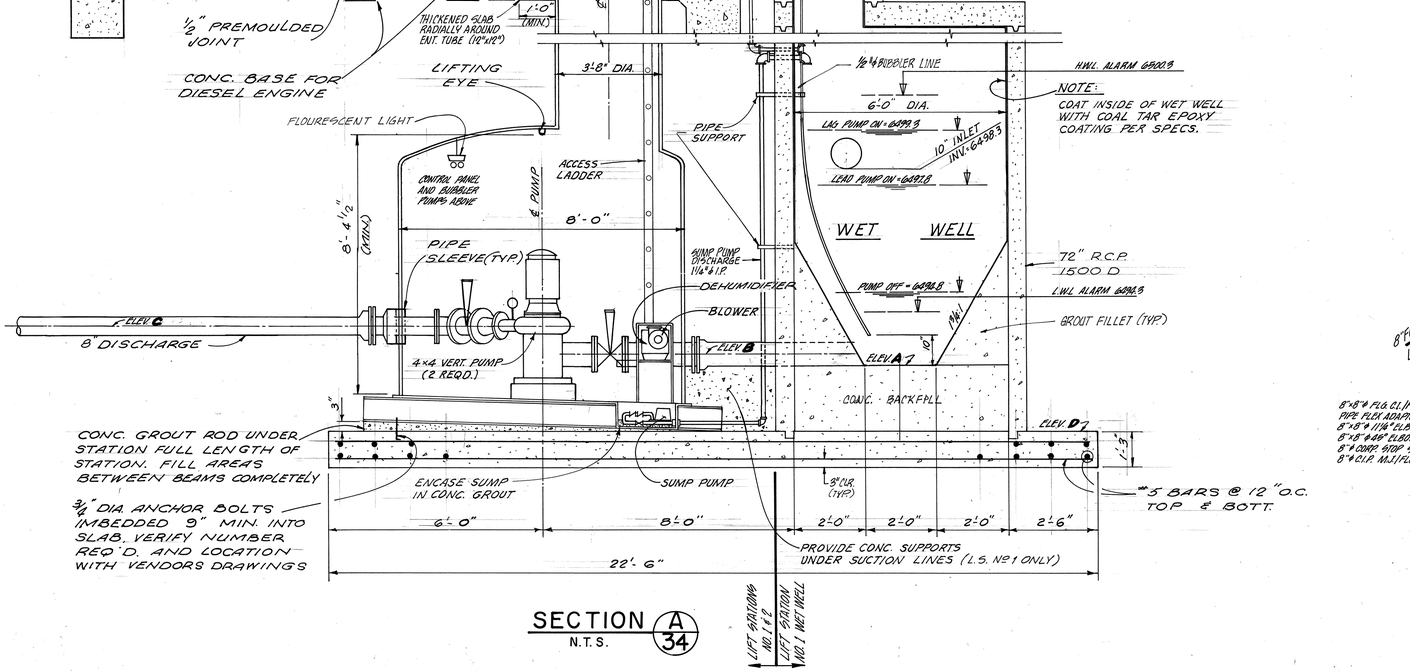
N.T.S.

LIFT STATION SCHEDULE			
ITEM	DESCRIPTION	L.S. NO. 1	L.S. NO. 2
	PUMPS - DISCHARGE Q	2 @ 960 GPM EA.	2 @ 200 GPM EA.
	TOTAL DYNAMIC HEAD	130 FT.	155 FT.
	MOTORS	2 @ 50 H.P. EA.	2 @ 10 H.P. EA.
A	ELEV. @ SUCTION INVERT	6492.80	5930.93
B	ELEV. @ ℄ SUCTION	6499.13	5930.06
C	ELEV. @ ℄ DISCHARGE	6498.6±	5998.13
D	ELEV. @ TOP OF PAD	6491.33	5934.58
E	ELEV. @ FINISH FLOOR	6511.0	5991.0



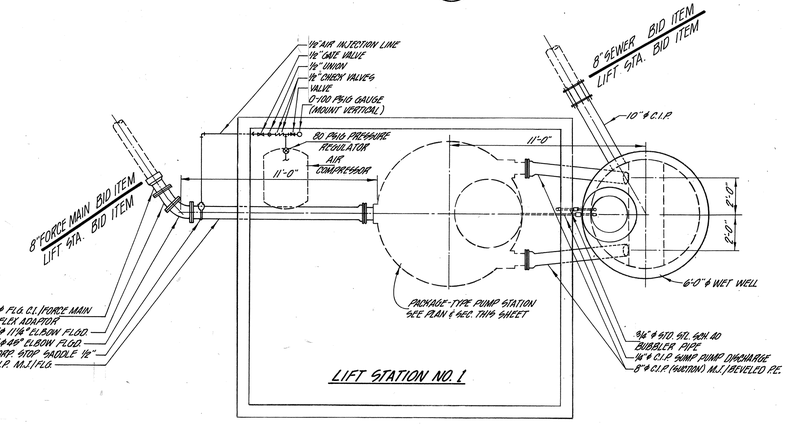
SECTION (B/34)

1/2" = 1'-0"



SECTION (A/34)

N.T.S.



PIPING PLAN

SCALE: 1/4"=1'-0"

AS-BUILT DRAWING
CHANGES DR BY: S. DANANDEH
APPROVED :
ENGINEER OF WORKS

REV	DATE	BY	DESCRIPTION
1	9/76	G.D.C.	INCREASED WET WELL SIZE, REVISED SHEET TO ACCOMODATE LIFT STATIONS NO. 1 & 2

SCALE: AS NOTED

DESIGNED R.C.G.
DRAWN C.L.
CHECKED R.C.G.

VTN ENGINEERS ARCHITECTS PLANNERS , SAN BERNARDINO, CALIFORNIA 92401 PHONE (714) 889-4431

SUBMITTED Robert C. Summerman PROJECT ENGINEER C-20805 R.E. NO. 4-1-74 DATE

RECOMMENDED Roland S. Titus PROJECT MANAGER C-8605 R.E. NO. 4-1-74 DATE

COUNTY SERVICE AREA NO. 79 — GREEN VALLEY LAKE

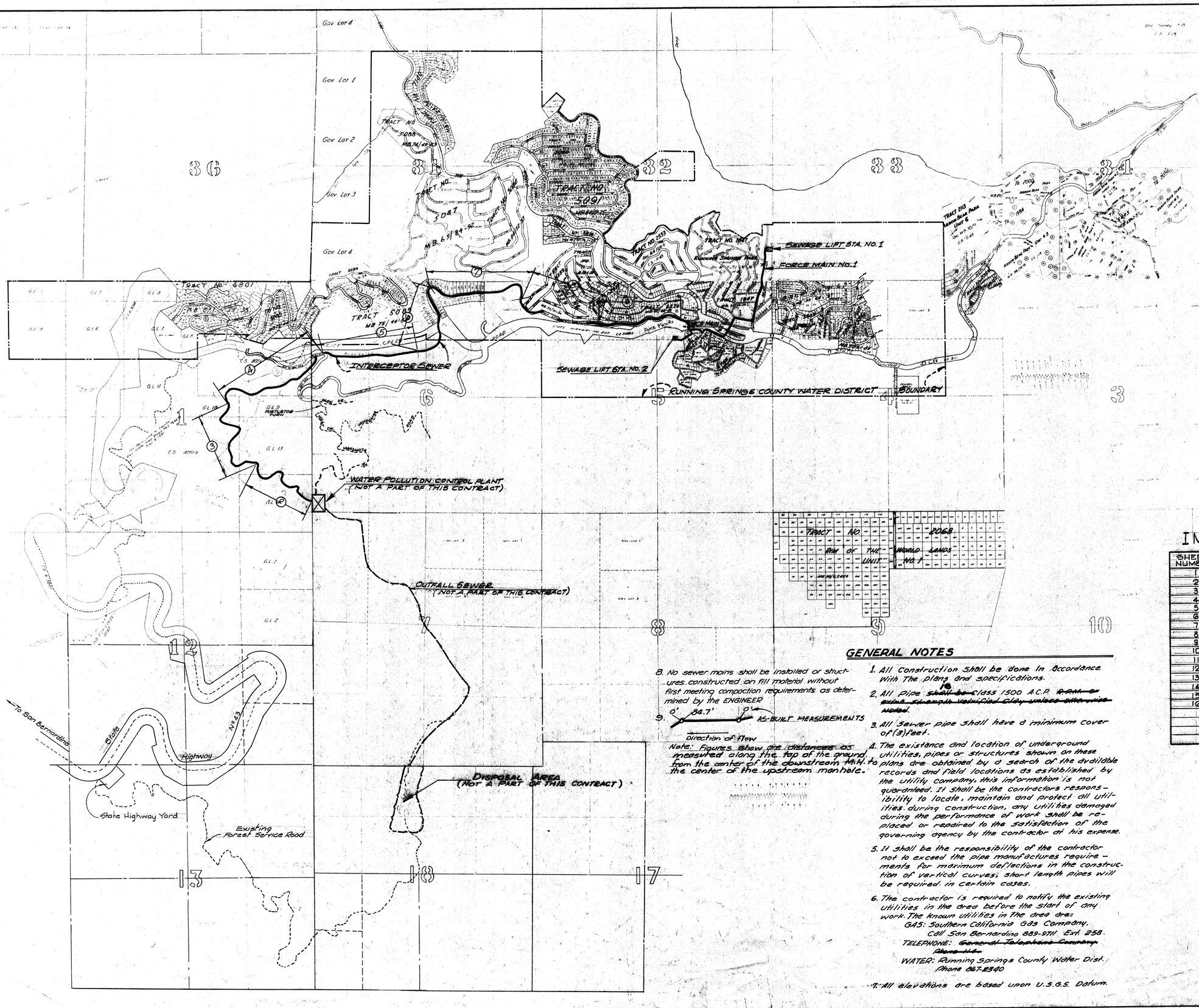
APPROVED Bobby M. Powell DATE 5-21-74

APPROVED C. R. Reid DATE 5-21-74

INTERCEPTOR

LIFT STATION NO. 1 & 2 STATION PLAN AND ELEVATIONS
LIFT STATION NO. 1 WET WELL AND PIPING PLAN

SHEET 34 OF 48



GENERAL NOTES

1. All Construction shall be done in accordance With The plans and specifications.
2. All pipe shall be Class 1500 A.C.P. ~~R.C.P. or pipe strength Vitrified Clay unless otherwise noted.~~
3. All sewer pipe shall have a minimum cover of (3) feet.
4. The existance and location of underground utilities, pipes or structures shown on these plans are obtained by a search of the available records and field locations as established by the utility company. this information is not guaranteed. It shall be the contractors responsibility to locate, maintain and protect all utilities during construction, any utilities damaged during the performance of work shall be replaced or repaired to the satisfaction of the governing agency by the contractor at his expense.
5. It shall be the responsibility of the contractor not to exceed the pipe manufactures requirements for maximum deflections in the construction of vertical curves; short length pipes will be required in certain cases.
6. The contractor is required to notify the existing utilities in the area before the start of any work. The known utilities in the area are:
   GAS: Southern California Gas Company. Call San Bernardino 889-9711 Ext. 258.
   TELEPHONE: ~~General Telephone Company Phone No.~~
   WATER: Running Springs County Water Dist. Phone 867-2340
7. All elevations are based upon U.S.G.S. Datum.
8. No sewer mains shall be installed or structures constructed on fill material without first meeting compaction requirements as determined by the ENGINEER
9. 0' 84.7' 0' AS-BUILT MEASUREMENTS
   Direction of flow
   Note: Figures show the distances as measured along the top of the ground from the center of the downstream MH. to the center of the upstream manhole.

INDEX TO DRAWINGS

SHEET NUMBER	DESCRIPTION
1	INDEX AND VICINITY MAP
2	PLAN AND PROFILE STA. 14+70.83 TO 37+66.08
3	PLAN AND PROFILE STA. 37+66.08 TO 59+98.13
4	PLAN AND PROFILE STA. 59+98.13 TO 84+79.92
5	PLAN AND PROFILE STA. 84+79.92 TO 110+15.65
6	PLAN AND PROFILE STA. 110+15.65 TO 132+38.41
7	PLAN AND PROFILE STA. 132+38.41 TO 158+59.27
8	PLAN AND PROFILE STA. 158+59.27 TO 184+14.60
9	PLAN AND PROFILE STA. 184+14.60 TO 203+05.94
10	STANDARD CONSTRUCTION DETAILS
11	BRIDGE DETAILS
12	MISCELLANEOUS DETAILS
13	SEWAGE LIFT STATION Nº 1
14	SEWAGE LIFT STATION Nº 1 FORCE MAIN
15	SEWAGE LIFT STATION Nº 2
16	SEWAGE LIFT STATION Nº 2 FORCE MAIN

NESTE, BRUDIN & STONE .... CIVIL ENGINEERS

AS CONSTRUCTED

By Calen L. Brisbin Date 1-11-72

REVISION	DATE	BY

RUNNING SPRINGS COUNTY WATER DISTRICT

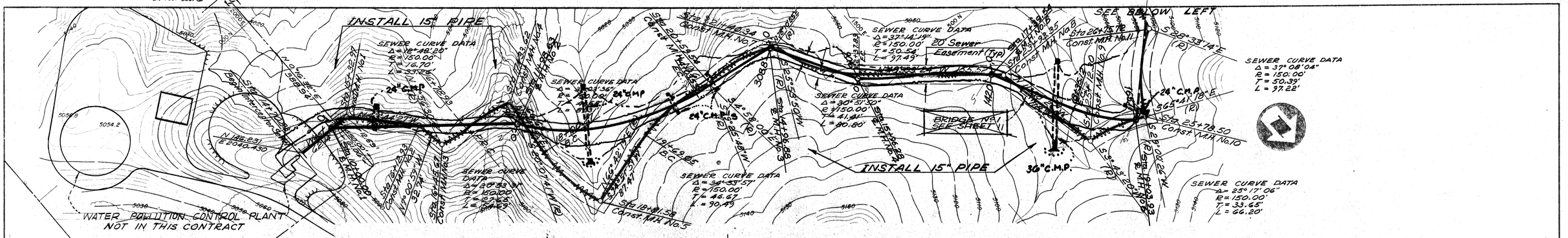
1969 INTERCEPTOR SEWERS

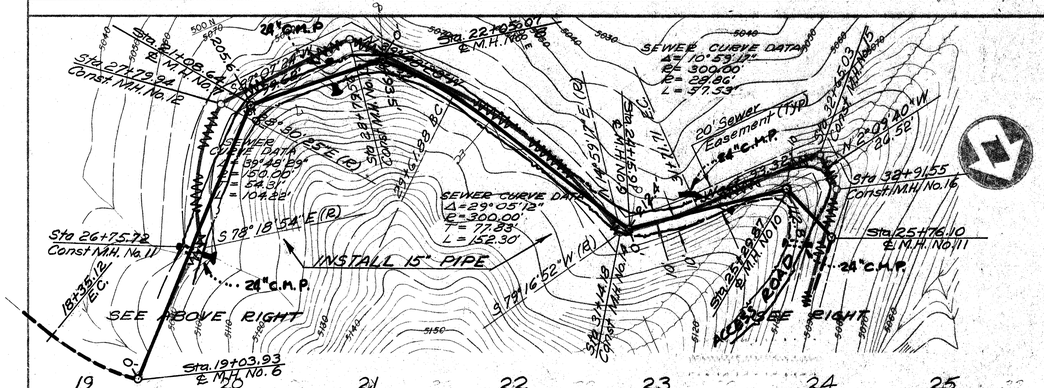
INDEX & VICINITY MAP

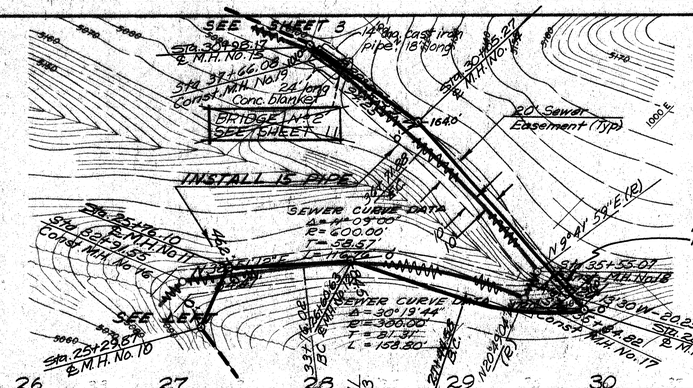
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DRAWN	AC
CHECKED	RLP
JOB No.	
SCALE:	

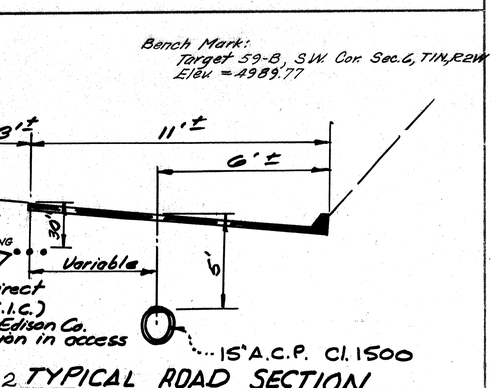
NESTE, BRUDIN & STONE
CIVIL ENGINEERS
330 W. Fifth St. San Bernardino, Calif.
Date 2-28-69 Calif. Reg. No. 8618

SHEET 1-16
SHEETS
DRG. No. SC-4-18









TYPICAL ROAD SECTION

NESTE, BRUDIN & STONE ..... CIVIL ENGINEERS

AS CONSTRUCTED

By Calen L. Neste Date 4-4-70

Revision	Date	By
Add Bench Mark	7-9-69	G.E.C.

RUNNING SPRINGS COUNTY WATER DISTRICT

1969 INTERCEPTOR SEWERS

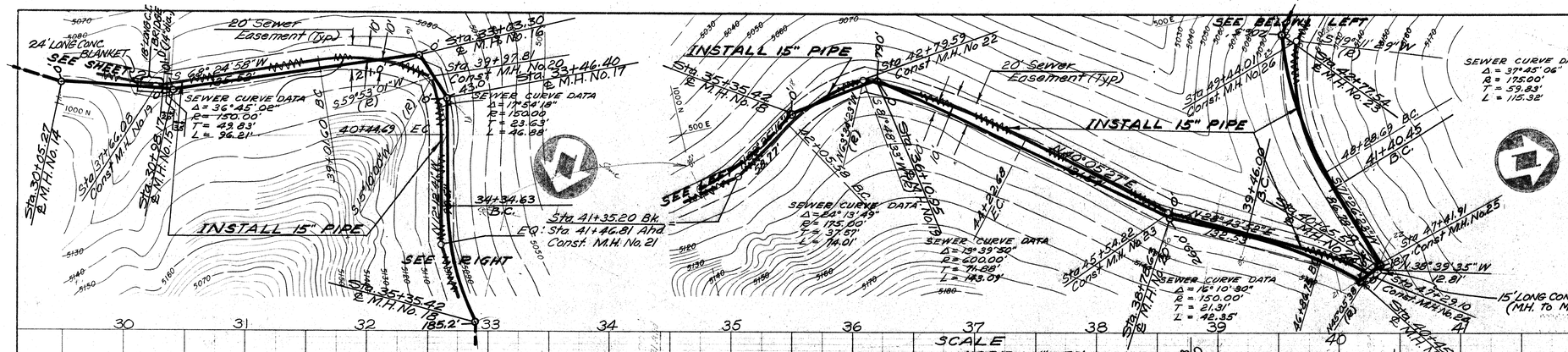
STA. 10+00 To STA. 30+98.17

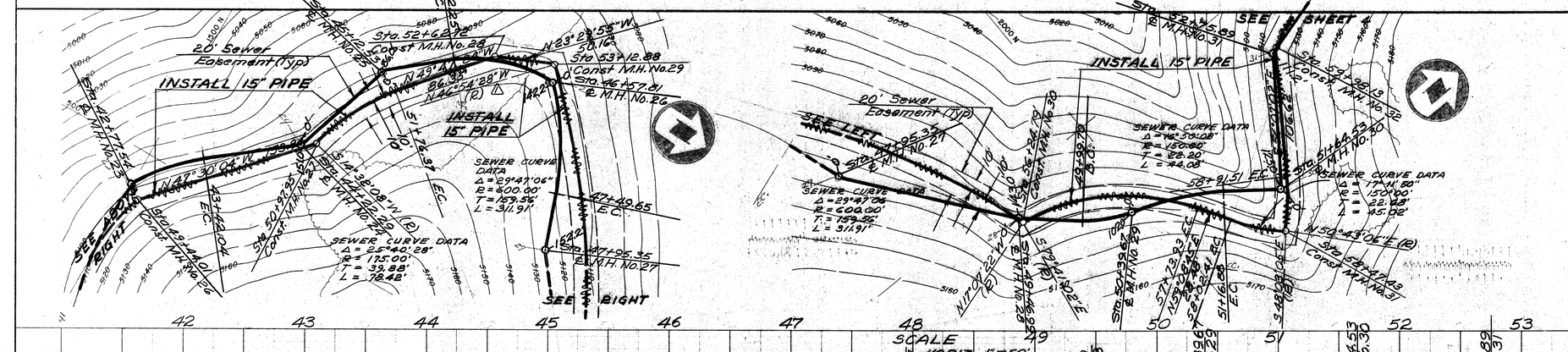
Designed	RLN	
Drawn	CARREYER	
Checked	R.R.R.	
Job No	59-5006	
Scale	As Shown	

NESTE, BRUDIN & STONE
CIVIL ENGINEERS
350 West Fifth Street San Bernardino, Calif.
Date 2-28-69 Calif. Reg. No. RCE 8613

Sheet 2 of 16 Sheets
DRG. NO. SC-4-187

Bench Mark:
Target 59-C, Elev. = 5014.64





Bench Mark:
Target 59-D, Elev. = 5097.05

NESTE, BRUDIN & STONE .... CIVIL ENGINEERS

AS CONSTRUCTED

By Arden L. Nielsen Date 1-11-72

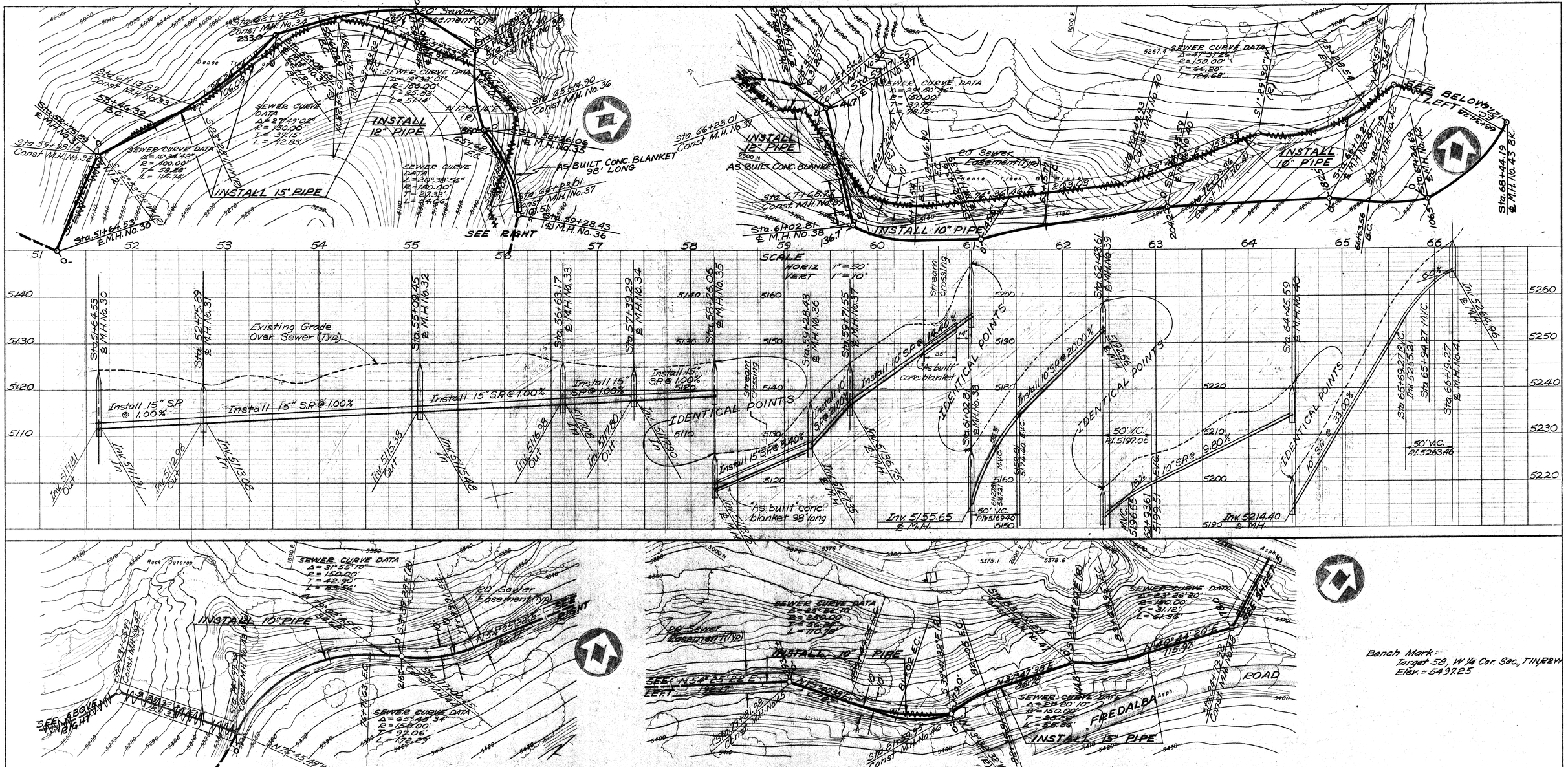
Revision	Date	By
Add Bench Mark	7-9-69	G.E.C.
Changed Rod Bearing M.H. 29	6-28-69	A.L.N.

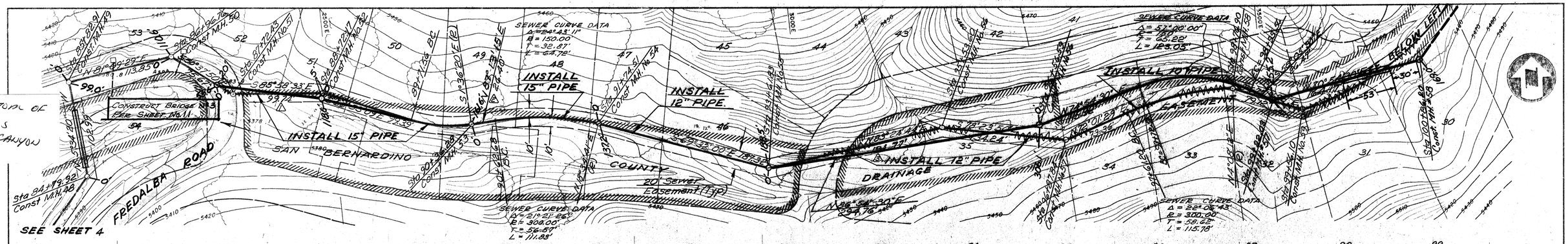
RUNNING SPRINGS COUNTY WATER DISTRICT

1969 INTERCEPTOR SEWERS

STA. 30+98.17 To STA. 52+75.89

Designed ALN	NESTE, BRUDIN & STONE CIVIL ENGINEERS		Sheet 3 of 16 Sheets
Drawn CAREYER			
Checked R.R.R.	350 West Fifth Street	San Bernardino, Calif.	
Job No 59-50.06			DRG. NO. SC-4-181
Scale As Shown	Date 2-27-69	Calif. Reg. No RCE 8613	


Sta 51+64.53 ℄ M.H. No. 30
Sta 52+75.89 ℄ M.H. No. 31
Sta 53+92.78 ℄ M.H. No. 32
Sta 55+09.45 ℄ M.H. No. 33
Sta 56+58.17 ℄ M.H. No. 34
Sta 57+39.29 ℄ M.H. No. 35
Sta 58+26.06 ℄ M.H. No. 36
Sta 59+28.43 ℄ M.H. No. 37
Sta 59+71.55 ℄ M.H. No. 38
Sta 61+02.81 ℄ M.H. No. 39
Sta 62+43.61 ℄ M.H. No. 40
Sta 63+45.59 ℄ M.H. No. 41
Sta 64+19.27 ℄ M.H. No. 42
Sta 66+24.69 ℄ M.H. No. 43
Sta 68+44.19 ℄ M.H. No. 43 Bk.
Sta 66+23.01 Const. M.H. No. 39
Sta 66+03.01 Const. M.H. No. 37
Sta 67+68.74 Const. M.H. No. 38
Sta 61+24.21 Const. M.H. No. 40
Sta 63+49.39 Const. M.H. No. 41
Sta 64+45.97 Const. M.H. No. 42
Sta 65+24.69 Const. M.H. No. 43
Sta 66+79.34 Const. M.H. No. 44
Sta 67+39.99 Const. M.H. No. 45
Sta 68+43.96 Const. M.H. No. 46
Sta 69+31.16 Const. M.H. No. 47
Sta 70+79.34 Const. M.H. No. 48
Sta 71+70.25 Const. M.H. No. 49
Sta 72+31.63 Const. M.H. No. 50
Sta 73+39.34 Const. M.H. No. 51
Sta 74+79.34 Const. M.H. No. 52
Sta 75+70.25 Const. M.H. No. 53
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Sta 765+39.34 Const. M.H. No. 743
Sta 766+79.34 Const. M.H. No. 744
Sta 767+70.25



NESTE, BRUDIN & STONE .... CIVIL ENGINEERS

AS CONSTRUCTED

By Arlen L. Neste Date 6-11-72

Revision	Date	By
Add Bench Mark	7-9-69	G.E.C.
Changed Distance M.H. 55 to 56	6-28-69	A.L.N.
Changed Bearing M.H. 53 to B.C.	6-28-69	A.L.N.
Changed Bearing M.H. 51-52	6-28-69	A.L.N.

RUNNING SPRINGS COUNTY WATER DISTRICT

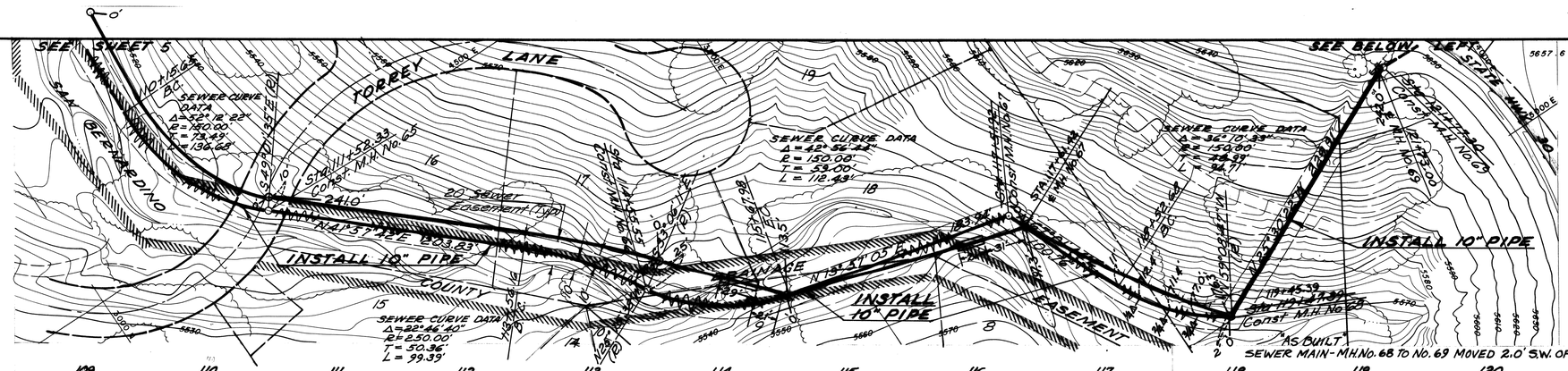
1969 INTERCEPTOR SEWERS

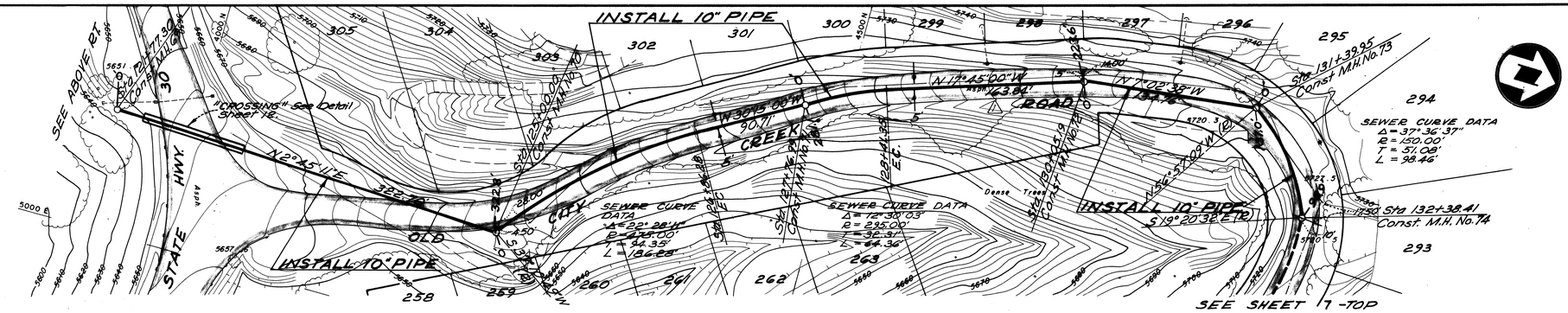
STA. 84+79.92 To STA. 108+09.28 B.K. 109+00.05 Ahd.

Designed	ALN
Drawn	CARRYER
Checked	R.R.R.
Job No	59-50.06
Scale	As Shown

NESTE, BRUDIN & STONE
CIVIL ENGINEERS
350 West Fifth Street San Bernardino, Calif
Date 2-28-67 Calif. Reg. No. RCE 8613

Sheet 5 of 16 Sheets
DRG. No. SC-4-131





NESTE, BRUDIN & STONE .... CIVIL ENGINEERS

AS CONSTRUCTED

By Calvin L. Tidlow Date 1-11-72

Revision	Date	By
Add Bench Mark	7-9-69	
Changed Distance M.H. 71-72	6-28-69	A.L.N.

RUNNING SPRINGS COUNTY WATER DISTRICT

1969 INTERCEPTOR SEWERS OLD CITY CREEK ROAD

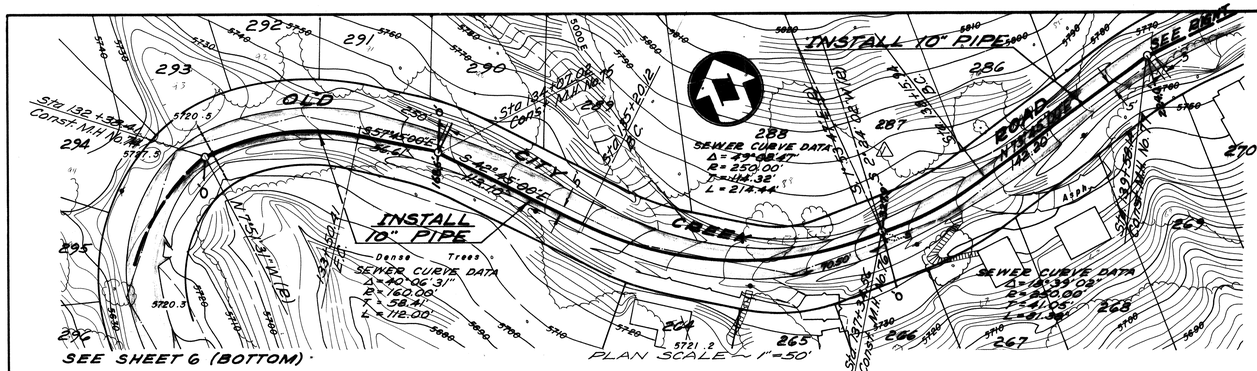
STA. 110+15.65 TO STA. 132+38.41

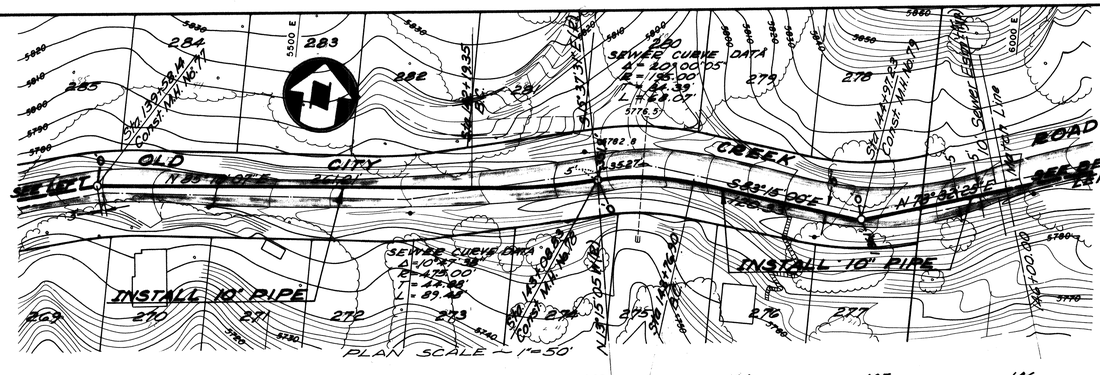
Designed	ALN
Drawn	CAREYEE
Checked	REP
Job No.	59-50.06
Scale	As Shown

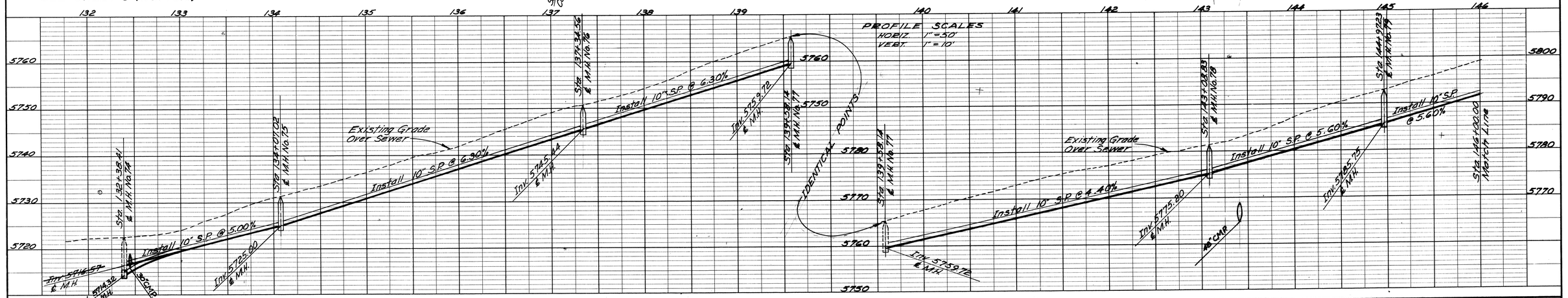
NESTE, BRUDIN & STONE
CIVIL ENGINEERS
350 West Fifth Street San Bernardino, Calif.
Date 2-28-69 Calif. Reg. No. R.C.E. 26613

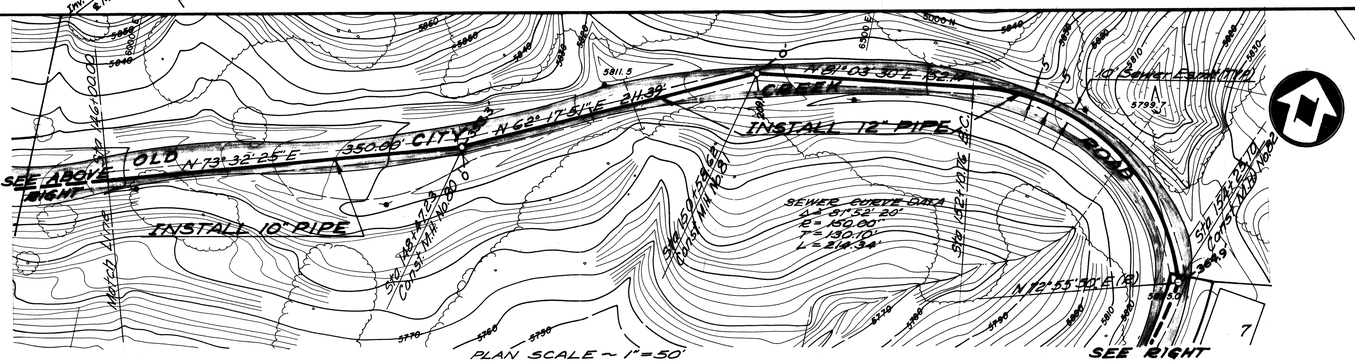
Sheet 6 of 16 Sheets

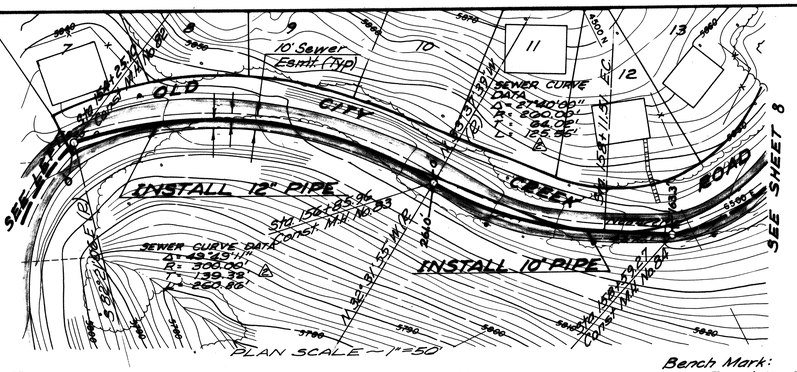
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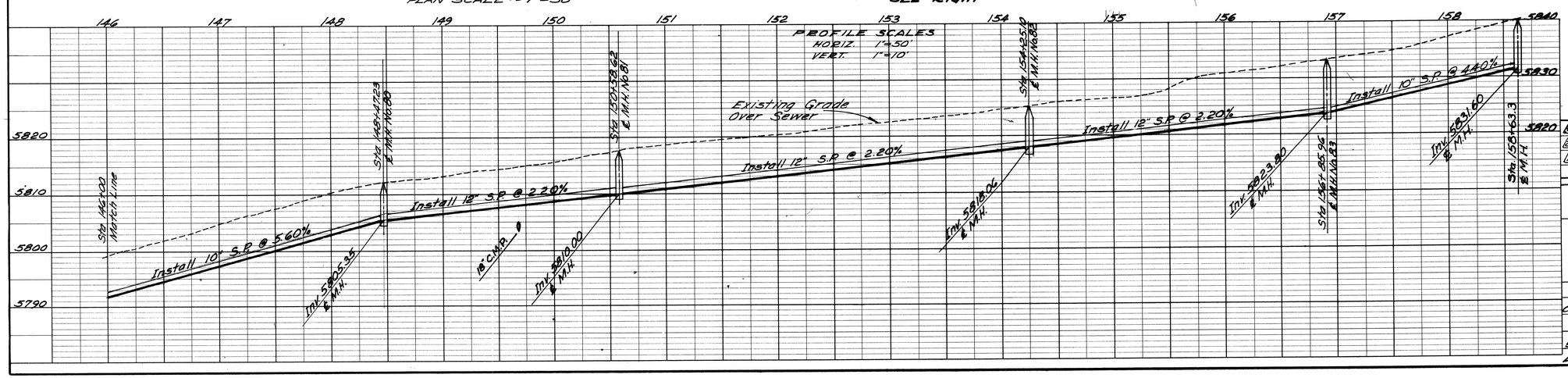












Bench Mark:
Target 17, Elev. = 5667.7
Target 19, Elev. = 5790.8
Target 20 Elev. = 5843.01

NESTE, BRUDIN & STONE . . . . CIVIL ENGINEERS

AS CONSTRUCTED

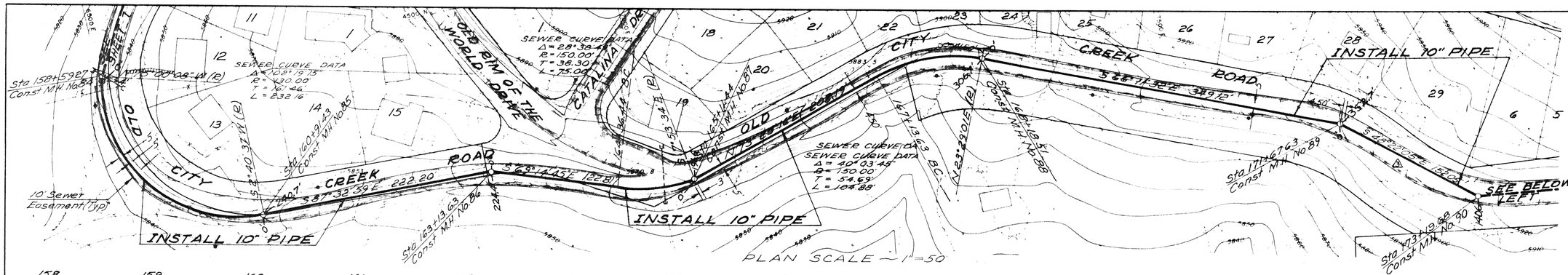
By Calvin L. Nielsen Date 1-11-72

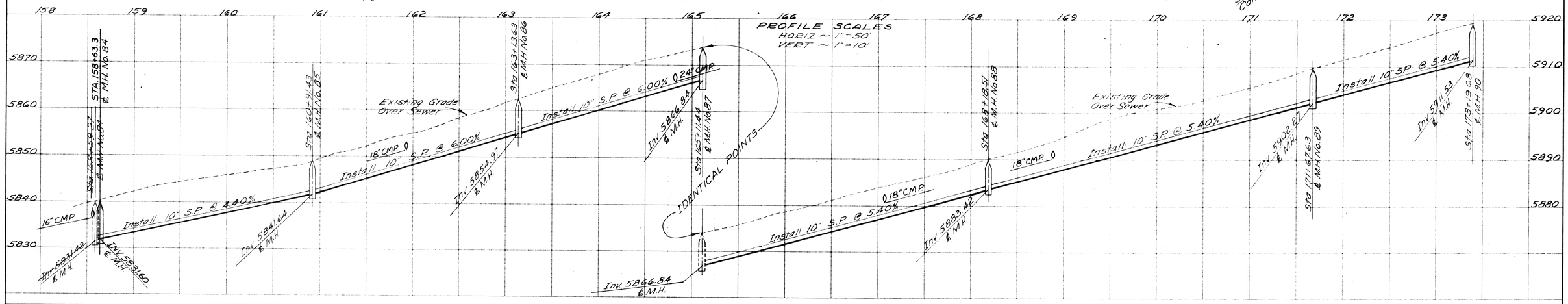
Revision	Date	By
4 Add Bench Mark	7-9-69	G.E.C.
3 Added curve data	6-28-69	A.L.N.
2 Corrected Rad. Bearing M.H. 76	6-28-69	A.L.N.
1		

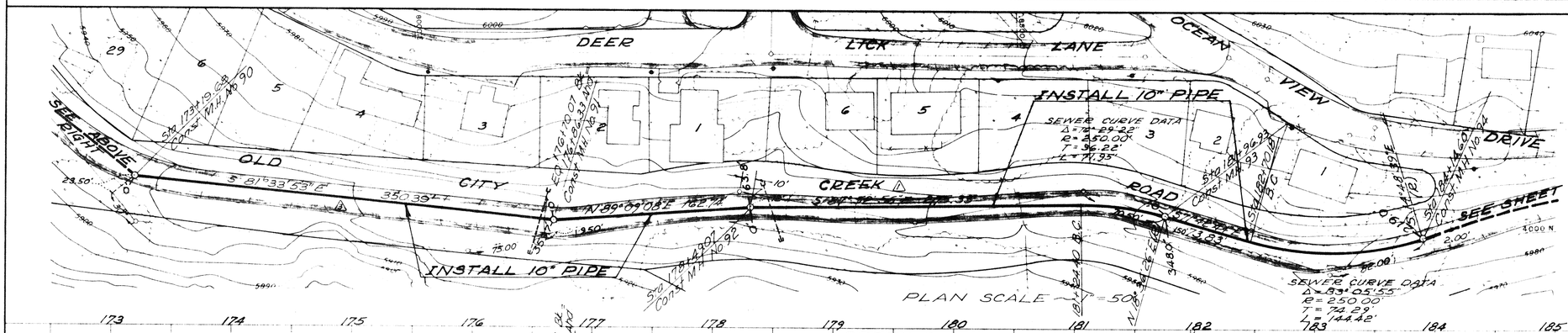
RUNNING SPRINGS COUNTY WATER DISTRICT

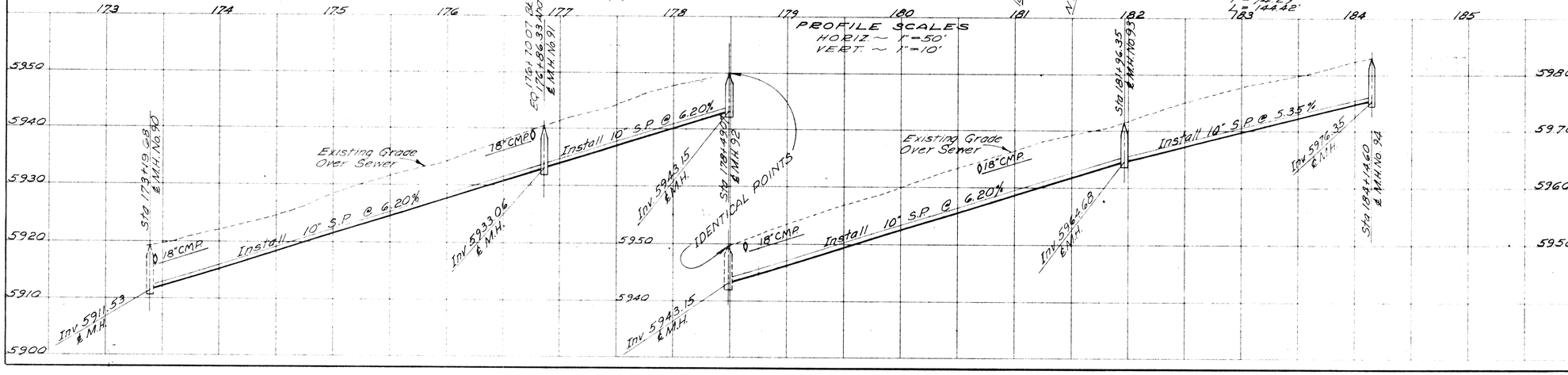
1969 INTERCEPTOR SEWERS
OLD CITY CREEK ROAD
STA. 132+38.41 To STA. 158+63.3

Designed A.L.N.	NESTE, BRUDIN & STONE
Drawn CABEYEE	CIVIL ENGINEERS
Checked K.W.P.	350 West Fifth Street, San Bernardino, Calif.
Job No. 69-50.06	Date 2-28-69 Calif. Reg. No. RCE 8619
Scale AS Shown	Sheet 7 of 16 Sheets DRG. NO. SC-4-181









Bench Mark
Target 21, Elev. 5874.7
Target 22, Elev. 5977.20

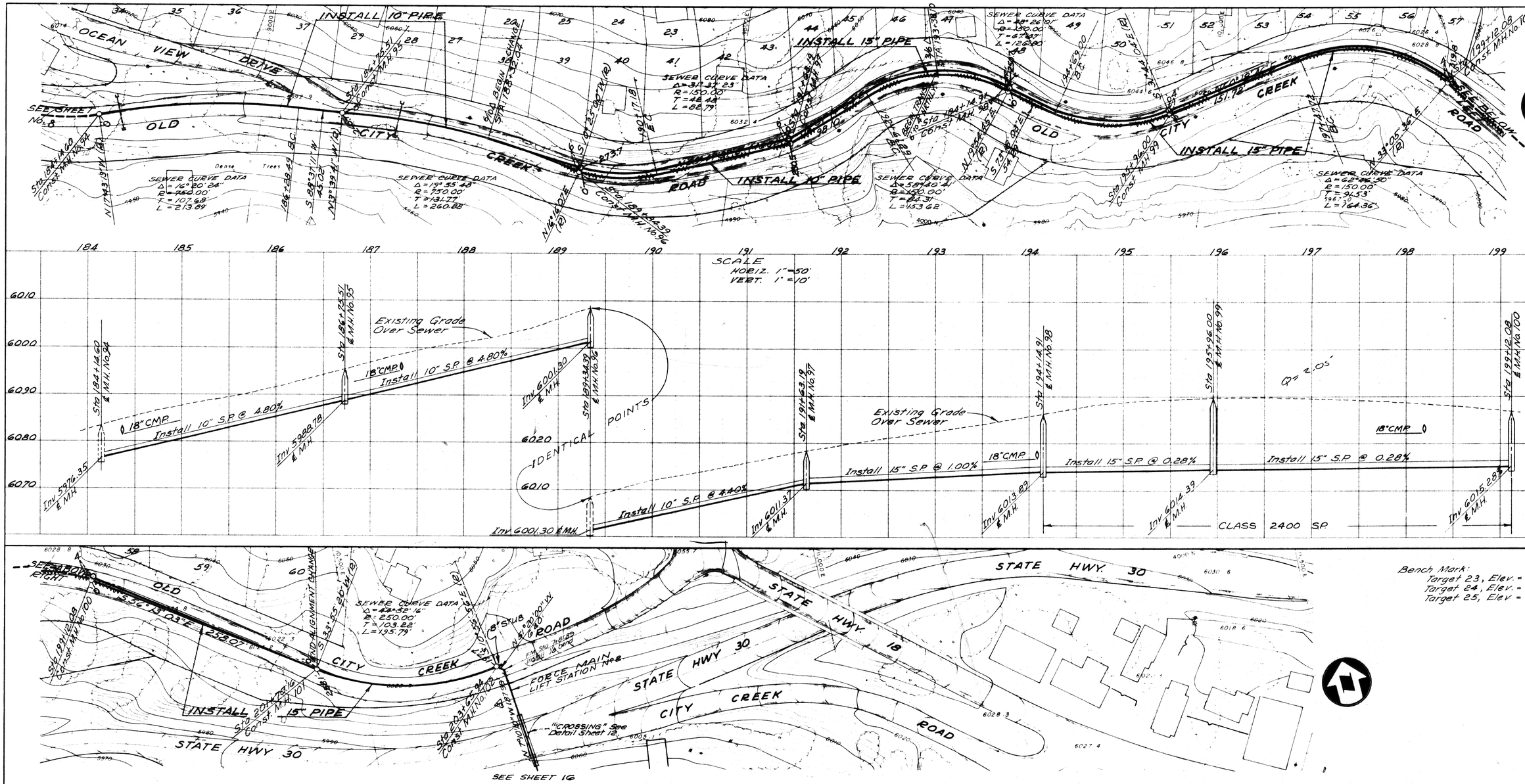
Calvin L. Nielsen 1-11-72

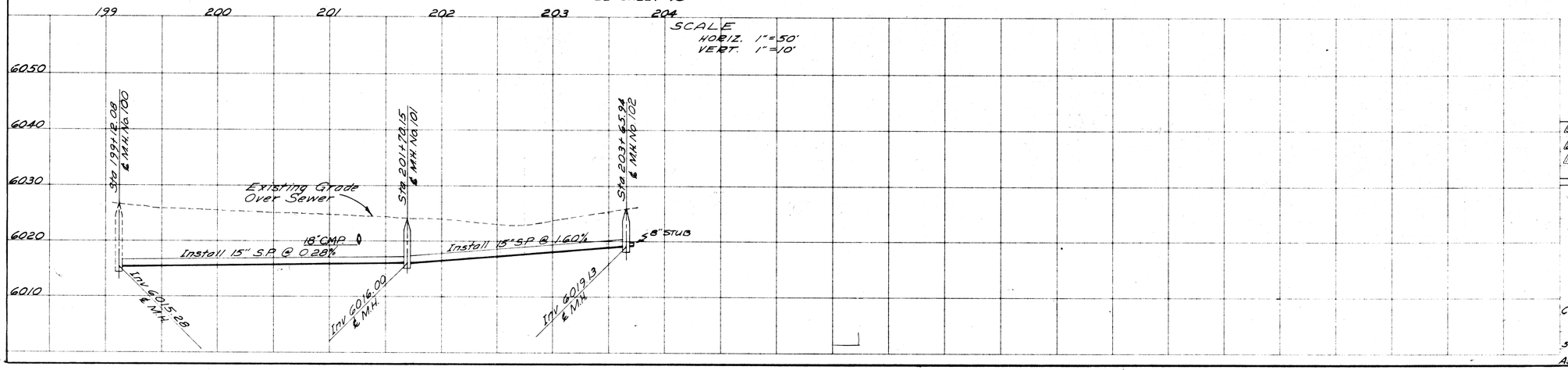
Δ Corrected Alignment	7-23-69	A.L.N.
Δ Add Bench Mark	7-9-69	G.E.C.
Δ Corrected Bearing	6-28-69	A.L.N.
Revision	Date	By

RUNNING SPRINGS COUNTY WATER DISTRICT

1969 INTERCEPTOR SEWERS
OLD CITY CREEK ROAD
STA 158+59.27 TO STA. 184+14.60

Drawn A.L.N.	NESTE, BRUDIN & STONE	Sheet 8 of 16
Traced CARREYER	CIVIL ENGINEERS	Sheets
Checked K.E.K.	1st Avenue at Front Street San Bernardino, Calif.	Dwg. No.
Job No. 59-3006	Donna C. Neste Calif. Reg. No. RCE 8613	SC-4-181
Scale As Shown	Date 2-27-69	





Carlon L. Neste 1-11-72

3	Corrected Distance	7-23-69	ALN
2	Add Bench Mark	7-9-69	GEC
1	Corrected Bearing M.H. 95	6-28-69	ALN
	Revision	Date	By

RUNNING SPRINGS COUNTY WATER DISTRICT

1969 INTERCEPTOR SEWERS
OLD CITY CREEK ROAD
STA. 184+14.60 TO STA. 203+65.94

Designed ALN	NESTE, BRUDIN & STONE	Sheet 9 of 16 Sheets
Drawn CARREYER	CIVIL ENGINEERS	
Checked A.L.N.	301 West 6th Street San Bernardino, Calif.	
Job 59-50.06	Calif. Reg. No. RCE 8613	DRG. NO. SC-4-181
Date AS SHOWN	Date 2-8-69	

APPENDIX B

County of San Bernadino Standards for Sanitary Sewer (2012) Division C

COUNTY OF SAN BERNARDINO
SPECIAL DISTRICTS DEPARTMENT

STANDARDS FOR SANITARY SEWER

DIVISION "C"
DESIGN CRITERIA AND PLAN PREPARATION

DIVISION "D"
GENERAL CONDITIONS
TECHNICAL SPECIFICATIONS

DIVISION "E"
STANDARD DRAWINGS

November 13, 2012

COUNTY OF SAN BERNARDINO
SPECIAL DISTRICTS DEPARTMENT

STANDARDS FOR SANITARY SEWERS

BOARD OF SUPERVISORS

Gary Ovitt, Chairman
Brad Mitzelfelt
Josie Gonzales
Neil Derry
Paul Biane

_____
Board of Supervisors

SPECIAL DISTRICTS DEPARTMENT

Review by Special Districts Department of the Environmental Improvement Agency, County of San Bernardino

_____
Special Districts Department

Approved as to form this _____ day of _____, 2009

County Counsel _____
Deputy County Counsel

August 13, 2012

COUNTY OF SAN BERNARDINO
SPECIAL DISTRICTS DEPARTMENT

TABLE OF CONTENTS
DIVISION "C"
DESIGN CRITERIA AND
PLAN PREPARATION SEWERS

Section		Page
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1.2	Sewers and Appurtenances -	C-1
1.3	Over Sizing Required by District -	C-3
1.4	Manholes and Cleanouts - -	C-3
1.5	Sewage Lift Stations - -	C-4
1.6	Plan Preparation - - -	C-5
1.7	Technical Specifications - -	C-5
1.8	Standard Drawings - -	C-5

COUNTY OF SAN BERNARDINO
SPECIAL DISTRICTS DEPARTMENT

DESIGN CRITERIA AND PLAN PREPARATION
SEWERS

The following requirements pertain to the design and preparation of plans for construction of the various components to the sewerage system.

1.1 GENERAL

1.1.01 Scope. - All sewers, sewage lift stations, treatment facilities and appurtenances to be owned, maintained and/or operated by the District shall be designed according to the criteria set forth in this section. **The same criteria shall hold for systems served but not owned, maintained and/or operated by the District insofar as said criteria may affect the efficiency of the District's system**. All additions to the District's system shall be plan checked and inspected by the District.

1.1.02 Design Competence. - All District facilities shall be designed by professional engineers according to accepted practice in the sewerage field. The design engineer shall arrange for a pre-design meeting with the District Engineer to review the proposed project.

1.1.03 Sewage Lift Stations and Inverted Siphons. - Every effort should be made, within economic reason, to avoid sewage lift stations, inverted siphons and exposed piping, Their use will be allowed only upon approval by the District.

1.1.04 Legal Access. - Each lot to be served by sewer shall abut a public street or sewer, shall abut a public street or recorded easement containing a sewer, or be provided with permanent legal access to such a sewer. The easement shall be clear of permanent structures, such as building eaves, roof lines, and large trees. Temporary construction easements of adequate size shall also be provided. The location of the street, easement, or legal access shall permit gravity flow from the lot to the sewer main. Deviations from any of the criteria adopted herein may be permitted upon written request to and approval by the District.

1.2 SEWERS AND APPURTENANCES.

1.2.01 Flows. - The flow used for the design capacity for sewers and sewage lift stations shall be the "computed peak flow," which shall be determined on the basis of projected land use and average daily flow per capita for the various geographical areas as follows:

Mountain Areas	80 gpcd
Valley and Desert Areas	100 gpcd

Sewer flows shall be computed from projected land use and population density over the area tributary to the sewer reach under consideration. The following peaking factors shall be applied to the sewer flows as determined above:

Average Flow (mgd)	Peak Factor
0.0 - 0.01	4.0
0.05	3.4
0.10	3.2
0.20	3.0
0.30	2.8
0.50	2.7
0.8	2.6
1.0	2.5
1.5	2.4
2.5	2.3
4.0	2.2
6.0	2.1
10	2.0
15	1.9
30	1.8

Design flows from commercial, industrial, hotels, motels, campgrounds, etc., shall be determined in consultation with the District.

1.2.02 Formula. - Capacity of all sewers shall be determined by the use of the "Mannings" formula:

$$Q = A \frac{1{,}486}{n} r^{2/3} s^{1/2}$$

where: Q = flow capacity - cfs
n = coefficient of roughness 0.013
r = hydraulic radius
s = slope
A = cross sectional area

1.2.03 Roughness Coefficient. - The Roughness coefficient used in design shall be n = .013 for all sewers. If any manufacturer claims that the "n" factor of his pipe should be less, he must submit documented evidence to substantiate his claims. The reliability of such evidence shall be determined by the District.

1.2.04 Pipe Size. - All gravity feed sewer pipe up to and including eight (8) inch diameter shall be sized to carry the peak flow when fifty percent (50%) full. This requirement shall apply regardless of the cross section shape of the sewer. All larger sewer pipe, except those designed as laterals, shall be sized to carry the peak flow when seventy-five (75%) full. This requirement shall apply regardless of the cross-section of the sewer. No sewer main with an internal diameter less than eight (8) inches shall be installed without prior written approval of the District.

1.2.05 Sewer Slopes and Velocities. - The minimum allowable slope is that which will give a velocity of not less than two (2) feet per second when the sewer is flowing fifty percent (50%) full. The purpose of this requirement is to prevent sewage sedimentation and subsequent generation of corrosive gases. The velocity shall be determined by means of the "Mannings Formula."

$$V = \frac{1{,}486}{n} \; r^{2/3} \; s^{1/2}$$

In sewers of uniform size passing through manholes without a major change in direction or slope, there shall be no arbitrary drop between inlet and outlet. In sewers which change slope but do not change direction or size, the slopes of the incoming sewers shall be carried through to the outlet of the manhole. Where diameters change, and in junctions involving major direction or slope changes, the various elevations shall be chosen to match water surfaces under average flow conditions at ultimate development of the tributary area (not under maximum flow conditions).

1.2.06 Minimum Slopes. - The minimum slopes to be used with various pipe sizes are listed herein and shall be used when necessary to prevent long reaches of deep sewer mains. The design engineer shall strive for minimum slopes of 0.008 to 0.01 feet per foot in order to maintain a cleaning velocity.

Diameter inches	Minimum Slope Ft./Ft.
6	0.0060
8	0.0040
10	0.0029
12	0.0022
15	0.0016
18	0.0012
21	0.0010
24	0.0008

1.2 .07 Exceptions to Minimum Slopes. - Where topography limits or prevents the use of minimum slopes as described herein, the District may require an engineer's report. This report shall describe the alternatives and their economies. The report shall also include an evaluation of prospective maintenance and sewer gas problems. Greater minimum slope than those specified in Section 1.2.06 hereof may be required where the presence of hydrogen sulfide may be detrimental to and affect the life of the sewer pipe being used.

1.2.08 Slopes in Force Mains. - In force mains a continuous uphill slope shall be provided from the sources to the outlet. Combination air and vacuum valves shall be provided where high points cannot be avoided.

1.2.09 Location. - All sewer mains shall be located in public streets or recorded easements such that each lot within a development can be served by gravity flow, and the services shall be extended according the Standard Drawings No. E-9 and E-10.

1.2.10 Curved Sewers, - Curvilinear vertical and horizontal alignment on sewer mains for new developments shall be avoided unless approved by the District review. If curvilinear sewers are permitted the following conditions must be met:

(a) No more than one (1) horizontal circular curve and one (1) vertical curve shall be permitted between any two (2) manholes. The curve may be a combination horizontal and vertical, but in no instance may there be more than one (1) vertical and one (1) horizontal curve between two (2) manholes.

(b) At least one (1) end of the curve shall terminate in a manhole.

(c) No sewer on a curvilinear alignment shall be less than eight (8) inch diameter.

(d) The radius of curvature is not less than one hundred and twenty-five (125) feet. A shorter radius of curvature may be used upon approval of the District, where shorter than normal depth pipe is used.

(e) The deflection of joints shall not exceed that recommended by the pipe manufacturer.

1.2.11 Sewer Under Structures. - No main sewer shall be located beneath a structure except as approved in writing by the District

1.2.12 Structural Integrity. - Provisions shall be made in all cases to preserve the structural integrity of the pipes, conduits, or structures affected.

1.2.13 Depth of Sewer. - Permission from the District must be obtained if the following minimum depths may not be met. In general, the load on the pipe must be considered and adequate precautions taken to protect it either by means of encasement, supports, or added strength.

Minimum cover of pipe for various locations:

In public streets in pavement: 5 feet (service to properties permitting)
In public street parkways: 5 feet where possible
Lateral sewer (at curb or edge of pavement): 4 feet

In recorded easements, not subject to vehicular traffic...3 feet

Stream crossing: Standard drawings: No. E-13.

1.2.14 Sewer laterals. - A sewer lateral serving a single Family dwelling or equivalent shall be at least four inches in diameter, if the length of the lateral is one hundred feet or longer, a minimum of six inch diameter will be required. Sewer laterals shall conform to Section 3.15 of the Technical Specifications and Standard Drawings: E-9 Thu. E- 13 and Section 3.15 of the Technical Specifications. Sewer laterals in waterways, easements, and deep cuts should have the house service brought to a minimum depth of five (5) feet.

1.2.15 Special Sewer Design Conditions. _ When it is necessary to construct sewers and appurtenances in areas where a potential erosion hazard exists, individual design considerations shall be given to provide additional protection to the sewer facilities to prevent their damage. Special design considerations can be applicable to stream and canyon crossings, parallel construction to stream beds, construction on steep slopes requiring special anchorage, and shallow sewer construction in roadways. Concrete encasements, cutoff walls (Standard Drawing No. E-20), special backfill materials (soil cement), and special erosion - control facilities may be required.

1.2.16 Clearance From Other Utilities. - Special care shall be exercised in locating sewer lines near other utilities, especially water lines. Sewer lines shall, wherever possible, be located three (3) feet below water lines and where parallel installations occur, a ten (10) foot horizontal separation shall be maintained. Separations and special construction shall conform to Standard Drawing No. E-1.

1.2.17 Use of Asbestos- Cement Sewer Pipes. Due to the carcinogenic properties of asbestos fibers. Asbestos Cement pipe shall not be used in sanitary sewer systems.

1.3 OVERSIZING REQUIRED BY DISTRICT.

The District may find that the capacity of certain new sewers and pump stations within an area under development should be increased to accommodate existing or future additional development. In such a case, the quantity of additional flow shall be determined by the District's Engineer. The flow resulting from the addition of the developer's and the District Engineer's "Computer peak flow" shall be used as the basis of design. The District shall pay for any resulting increase in size or depth according to Section 1.9.07 of the District's Ordinance.

1.4 MANHOLES AND CLEANOUTS.

1.4.0 Manhole Location and Spacing. - Manholes shall be located at all junctions, all changes in direction (except curved sewers), and all changes in pipe size. Where the distance between manholes required for the foregoing reasons exceeds three hundred (300) feet. Good judgment should be used in placing intermediate man hole at points of probable sewer intersections, at beginning or end of curves, or lacking other reasons, at approximately equal intervals. In general, the space between Manholes is a maximum of three hundred (300) feet... In areas where slopes equal or exceed twenty five percent (25%) manhole spacing shall not exceed one hundred (100) feet. Good judgment should be used in the location of manholes along water courses. Manholes should not be placed directly in the water courses. Manholes can be either coated concrete or polymer based structures and shall conform to Standard Drawing No. E-2 thru E-6.

1.4.02 Shallow Manholes. - Manholes three (3) feet or less in depth above the shelf shall be of special design.

1.4.03 Cleanouts. - Dead-end sewers not over one hundred and seventy-five (175) feet in length shall terminate in standard manholes or cleanouts. Cleanouts shall be brought to ground surface in a long radius or two (2) forty-five degree (45) angles with a full sewer diameter opening. Cast iron frame and cover shall be provided. Dead ends over one hundred and seventy-five (175) feet shall terminate in standard manholes unless future extension of said dead end will include a manhole within three hundred and fifty (350) feet, in which case a temporary cleanout is permitted. Cleanouts shall conform to Standard Drawing No. E-14 and E-15 and Section 4.0 of the
Technical Specifications.

1.4.03.1 Abandoning Existing Sewer Stub– Existing sewer stubs to be abandoned shall be approved by District Engineer.

1.4.03.2 Grease Interceptor- A Grease interceptor shall be required for any business having the potential of producing grease. Size of the interceptor will be approved by the District Engineer.

1.4.03.3 Oil/Sand Interceptor- An oil/sand interceptor shall be installed for any business having the potential of producing oil and sand waste. Size of interceptor shall be approved by the District Engineer.

1.4.04 **Drop Manholes.** - Whenever possible, sewers shall be brought into manholes without a drop. Where the invert of an incoming sewer is above the top of an outlet sewer, a drop manhole will be required and shall conform to Standard Drawing No. E-4 and Section 4.0 of the Technical Specifications.

1.4.05 **Manhole Trap**. - A special type manhole trap may be required to provide a means to prevent debris from clogging the sewer. The manhole trap shall conform to Section 4.0 of the Technical Specifications.

1.4.06 **Frame and Covers.** - All manholes and cleanouts, except the manhole trap in 1.4.05, shall have cast iron frames and covers. All frame and covers shall be provided with stainless steel fasteners recessed into the cover for locking the cover in place. The tap shall be drilled through the frame for easy cleaning. In no case shall the diameter of a manhole be less than twenty four (24) inches, inside diameter.

1.5 SEWAGE LIFT STATIONS.

1.5.01 **General.** - Sewage lift stations shall only be utilized where it is impossible to provide gravity flow to interceptor sewers, or other portions of the collection system. The use of sewage lift stations to provide service to ten (10) or fewer lots or parcels of land will not be permitted. The use of underground, factory built units is desired; below ground use of reinforced concrete construction is discouraged; and masonry block structures are not permitted. Sewage lift stations shall be located in areas accessible to both men and equipment and upon land to which legal access is provided and for which a permanent easement or title is recorded. Where structures above ground are required, the structure shall be compatible with the surroundings, an alternate flow path shall be provided for wet well maintenance.

1.5.02 **Capacity.** - Capacity of the pumps shall be sufficient to handle ultimate peak flows from the tributary area with the largest pump out of service. If areas outside the proposed development may best be sewered to a sewage lift station, the District reserves the right to order oversizing of such facilities and provide reimbursement to the developer for the cost increment of the additional construction. The wet well storage shall be sized to be compatible with pump capacity and to eliminate frequent pump cycling.

1.5.03 **Standby Power.** - A standby generator shall be provided where, in the opinion of the District, potential hazard to the health and safety of the people in the immediate area, due to overflow, is imminent or the normal energy source is subject to outages. Capacity of the generator shall be sufficient to handle peak flows.

1.5.04 **Pumps and Motors.** - At least two (2) pumps or sewage ejectors shall be provided at each lift station. Pump or discharge shall be no less than four (4) inches in diameter; the pump shall be so placed that under normal operating conditions it will operate under a positive head at the suction inlet. The speed of pumps and motors shall be no greater than seventeen hundred and sixty (1,760) rpm, and the pump shaft shall not be supported by the motor shaft.

A separate sump pump shall be provided in the lift station structure to remove leakage or drainage, with the discharge into the wet well above the high water level.

The sewage ejector station shall have two (2) sewage pots, two (2) receiver type compressors and one (1) air storage tank.

1.5.05 **Structure.** - The wet well or manhole shall be completely separated from the main sewage lift station structure. The sewage lift station structure shall be designed by qualified engineers. Provisions within this structure shall be made to facilitate removing of pumps, motors and other equipment. Suitable stairways or ladders shall be provided for convenient access and all requirements of the State Division of Industrial Safety shall be complied with in the manufacturing of the unit, provisions for access, and for the protection of persons and property from mechanical or electrical equipment.

1.5.06 **Electrical Equipment.**

(a) All electrical starters, switches, lights, motors, fixtures, controllers and instruments shall be enclosed and constructed in accordance with the National Board of Fire Underwriter's Specifications to meet the hazardous conditions anticipated. The Health and Safety Code of the State of California shall also be met.

(b) All starters shall be of the magnetic type and shall be provided with hand, off or, automatic (HOA) selector switches.

(c) The motor starters shall be operated automatically from a wet well liquid level control. Controls of the sonic level type are required.

(d) Standby equipment shall be started automatically upon power failure.

1.5.07 Miscellaneous Requirements.

(a) Adequate ventilation shall be provided for all pump stations. Where the pump pit is below the ground surface, mechanical ventilation is required to effectively ventilate the dry well and also the wet well if screens or mechanical equipment requiring maintenance or inspection are located in the wet well. The ventilation equipment should have a minimum capacity of six (6) turnovers per hour under continuous operation. With intermittent operation, a two (2) minute turnover should be provided. Equipment shall start automatically with door opening.

(b) Gate valves shall be placed on suction and discharge lines of each pump. A lever and weight operated swing check valve shall be placed on each discharge line between the gate valve and the pump.

(c) An air compressor, to inject air into the force main, may be required by the District, depending upon an analysis of possible sulfide conditions.

(d) Steel fabricated, factory units shall be provided with some means of cathodic protection.

(e) A high water alarm circuit shall be provided to permit transmission of high water level indication over leased telephone lines. The circuits shall be complete to and including terminal point for leased lines at station. A local alarm light and or horn may be required by the District.

(f) An electric dehumidifier shall be provided, which is to operate on a refrigeration cycle and is automatically controlled by and adjustable humidistat, and has a thermostatically controlled heater to complement the dehumidifier.

1.6 PLAN PREPARATION.

Plans prepared for additions to the District's sewerage system and submitted to the District for approval shall be in substantial form and contain the information as herein set forth.

1.6.01 - Drawings shall be ink on mylar, sheet size shall be 36-inch by 24-inch with standard District title block. FINAL drawings shall be placed in AutoCAD electronic format, copied and given to the District for archiving.

1.6.02 - The General Notes shall appear once on the first plan and profile sheet. All required certifications and approvals also appear on the first sheet.

1.6.03 - Each sheet shall have a title block in the lower right hand corner.

1.6.04 - Each sheet shall have a "North" arrow, where applicable.

1.6.05 - A key map having a scale of 1 inch = 500 feet or larger shall be shown on the first sheet of each set of drawings. Said key map shall show all sewers, their sizes, manholes and appurtenances in their scaled relation to one another. All roads shall be shown.

1.6.06 - Plan and profile sheets shall have a scale of 1 inch = 40 feet horizontal and 1 inch = 4 feet vertical. Or 1 inch = 50 feet horizontal and 1 inch = 5 feet vertical. Double plan and profile sheets may be used.

1.6 07 - At least one (1) bench mark shall be shown and/or described on each sheet.

1.6.08 - The profile shall show the size of pipe; the type of pipe; the pipe strength; manhole center location by station; invert; elevation of sewer pipe at manhole center; the existing ground elevation and proposed finished ground elevation; the grade of pipes in percent; the depth, size, nature and location of all other utilities which cross over or under the sewer; location and nature of special construction such as the encasement of bored casings; and any other information pertinent and necessary to the proper construction and recordation of the sewers.

1.6.09 - The plans shall show the tract and lot numbers of all property adjacent to the sewer to be constructed.

1.6.10 - The plans shall show all right of way lines, the distance form the centerline of all roads, rights of way and easements to the center of the sewer.

1.6.11 - The plans shall show exact location of proposed house connections.

1.6.12 - The plans shall show exact location of all structures within twenty (20) feet of the sewer centerline and shall show all water wells within fifty (50) feet of the sewer centerline.

1.7 TECHNICAL SPECIFICATIONS.

The District's Technical Specifications shall be utilized in the design of sewer facilities. Technical Specifications are in Division "D" of the District's adopted policies.

1.8 STANDARD DRAWINGS.

The District's Standard Drawings shall be utilized in the design of sewer facilities. Standard Drawings are shown in Division "E" of the District's adopted policies.

APPENDIX C

2022 California Plumbing Code Appendix H

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APPENDIX H

PRIVATE SEWAGE DISPOSAL SYSTEMS

The provisions contained in this appendix are not mandatory unless specifically adopted by a state agency, or referenced in the adopting ordinance.

H 101.0 General.

H 101.1 Applicability. This appendix provides general guidelines for the materials, design, and installation of private sewage disposal systems.

H 101.2 General Requirements. Where permitted by Section 713.0, the building sewer shall be permitted to be connected to a private sewage disposal system in accordance with the provisions of this appendix. The type of system shall be determined on the basis of location, soil porosity, and groundwater level, and shall be designed to receive all sewage from the property. The system, except as otherwise approved, shall consist of a septic tank with effluent discharging into a subsurface disposal field, into one or more seepage pits, or into a combination of subsurface disposal field and seepage pits. The Authority Having Jurisdiction shall be permitted to grant exceptions to the provisions of this appendix for permitted structures that have been destroyed due to fire or natural disaster, and that cannot be reconstructed in compliance with these provisions provided that such exceptions are the minimum necessary.

H 101.3 Quantity and Quality. Where the quantity or quality of the sewage is such that the above system cannot be expected to function satisfactorily for commercial, agricultural, and industrial plumbing systems; for installations where appreciable amounts of industrial or indigestible wastes are produced; for occupancies producing abnormal quantities of sewage or liquid waste; or where grease interceptors are required by other parts of this code, the method of sewage treatment and disposal shall be first approved by the Authority Having Jurisdiction. Special sewage disposal systems for minor, limited, or temporary uses shall be first approved by the Authority Having Jurisdiction.

H 101.4 Septic Tank and Disposal Field Systems. Disposal systems shall be designed to utilize the most porous or absorptive portions of the soil formation. Where the groundwater level extends to within 12 feet (3658 mm) or less of the ground surface or where the upper soil is porous, and the underlying stratum is rock or impervious soil, a septic tank and disposal field system shall be installed.

H 101.5 Flood Hazard Areas. Disposal systems shall be located outside of flood hazard areas.

Exception: Where suitable sites outside of flood hazard areas are not available, disposal systems shall be permitted to be located in flood hazard areas on sites where the effects of inundation under conditions of the design flood are minimized.

H 101.6 Design. Private sewage disposal systems shall be so designed that additional seepage pits or subsurface drain fields, equivalent to not less than 100 percent of the required original system, shall be permitted to be installed where the original system cannot absorb all the sewage. No division of the lot or erection of structures on the lot shall be made where such division or structure impairs the usefulness of the 100 percent expansion area.

H 101.7 Capacity. No property shall be improved more than its capacity to absorb sewage effluent properly by the means provided in this code.

Exception: The Authority Having Jurisdiction shall be permitted to, at its discretion, approve an alternate system.

H 101.8 Location. No private sewage disposal system, or part thereof, shall be located in any lot other than the lot that is the site of the building or structure served by such private sewage disposal system, nor shall any private sewage disposal system or part thereof be located at any point having less than the minimum distances indicated in Table H 101.8.

Nothing contained in this code shall be construed to prohibit the use of all or part of an abutting lot to provide additional space for a private sewage disposal system or part thereof where proper cause, transfer of ownership, or change of boundary not in violation of other requirements has been first established to the satisfaction of the Authority Having Jurisdiction. The instrument recording such action shall constitute an agreement with the Authority Having Jurisdiction, which shall clearly state and show that the areas so joined or used shall be maintained as a unit during the time they are so used. Such agreement shall be recorded in the office of the County Recorder as part of the conditions of ownership of said properties and shall be binding on heirs, successors, and assigns to such properties. A copy of the instrument recording such proceedings shall be filed with the Authority Having Jurisdiction.

H 101.9 Building Permit. Where there is insufficient lot area or improper soil conditions for sewage disposal for the building or land use proposed, and the Authority Having Jurisdiction so finds, no building permit shall be issued, and no private sewage disposal shall be permitted. Where space or soil conditions are critical, no building permit shall be issued until engineering data, and test reports satisfactory to the Authority Having Jurisdiction have been submitted and approved.

H 101.10 Additional Requirements. Nothing contained in this appendix shall be construed to prevent the Authority Having Jurisdiction from requiring compliance with additional requirements than those contained herein, where such additional requirements are essential to maintaining a safe and sanitary condition.

H 101.11 Alternate Systems. Alternate systems shall be permitted to be used by special permission of the Authority Having Jurisdiction after being satisfied with their adequacy. This authorization is based on extensive field and test data from conditions similar to those at the proposed site or requires such additional data as necessary to assure that the alternate system will produce continuous and long-range results at the proposed site, not less than equivalent to systems which are specifically authorized.

Where demonstration systems are to be considered for installation, conditions for installation, maintenance, and monitoring at each such site shall first be established by the Authority Having Jurisdiction.

Approved aerobic systems shall be permitted to be substituted for conventional septic tanks provided the Authority Having Jurisdiction is satisfied that such systems will produce results not less than equivalent to septic tanks, whether their aeration systems are operating or not.

TABLE H 101.8
LOCATION OF SEWAGE DISPOSAL SYSTEM

MINIMUM HORIZONTAL DISTANCE	BUILDING SEWER	SEPTIC TANK	DISPOSAL FIELD	SEEPAGE PIT OR CESSPOOL
Building or structures[1]	2 feet	5 feet	8 feet	8 feet
Property line adjoining private property	Clear[2]	5 feet	5 feet	8 feet
Water supply wells	50 feet[3]	50 feet	100 feet	150 feet
Streams and other bodies of water	50 feet	50 feet	100 feet[7]	150 feet[7]
Trees	–	10 feet	–	10 feet
Seepage pits or cesspools[8]	–	5 feet	5 feet	12 feet
Disposal field[8]	–	5 feet	4 feet[4]	5 feet
On-site domestic water service line	1 foot[5]	5 feet	5 feet	5 feet
Distribution box	–	–	5 feet	5 feet
Pressure public water main	10 feet[6]	10 feet	10 feet	10 feet

For SI units: 1 foot = 304.8 mm

Notes:

1. Including porches and steps, whether covered or uncovered, breezeways, roofed porte cocheres, roofed patios, carports, covered walks, covered driveways, and similar structures or appurtenances.
2. See Section 312.3.
3. Drainage piping shall clear domestic water supply wells by not less than 50 feet (15 240 mm). This distance shall be permitted to be reduced to not less than 25 feet (7620 mm) where the drainage piping is constructed of materials approved for use within a building.
4. Plus 2 feet (610 mm) for each additional 1 foot (305 mm) of depth more than 1 foot (305 mm) below the bottom of the drain line. (See Section H 601.0)
5. See Section 720.0.
6. For parallel construction – For crossings, approval by the Health Department shall be required.
7. These minimum clear horizontal distances shall also apply to disposal fields, seepage pits, and the mean high-tide line.
8. Where disposal fields, seepage pits, or both are installed in sloping ground, the minimum horizontal distance between any part of the leaching system and ground surface shall be 15 feet (4572 mm).

H 201.0 Capacity of Septic Tanks.

H 201.1 General. The liquid capacity of septic tanks shall comply with Table H 201.1(1) and Table H 201.1(4) as determined by the number of bedrooms or apartment units in dwelling occupancies and the estimated waste/sewage design flow rate or the number of plumbing fixture units as determined from Table 702.1 of this code, whichever is greater in other building occupancies. The capacity of any one septic tank and its drainage system shall be limited to the soil structure classification in Table H 201.1(2), and as specified in Table H 201.1(3).

TABLE H 201.1(1)
CAPACITY OF SEPTIC TANKS[1, 2, 3, 4]

SINGLE-FAMILY DWELLINGS - NUMBER OF BEDROOMS	MULTIPLE DWELLING UNITS OR APARTMENTS - ONE BEDROOM EACH	OTHER USES: MAXIMUM FIXTURE UNITS SERVED PER TABLE 702.1	MINIMUM SEPTIC TANK CAPACITY (gallons)
1 or 2	–	15	750
3	–	20	1000
4	2 units	25	1200
5 or 6	3	33	1500
–	4	45	2000
–	5	55	2250
–	6	60	2500
–	7	70	2750
–	8	80	3000
–	9	90	3250
–	10	100	3500

For SI units: 1 gallon = 3.785 L

Notes:

1. Extra bedroom, 150 gallons (568 L) each.
2. Extra dwelling units over 10: 250 gallons (946 L) each.
3. Extra fixture units over 100: 25 gallons (94.6 L) per fixture unit.
4. Septic tank sizes in this table include sludge storage capacity and the connection of domestic food waste disposers without further volume increase.

TABLE H 201.1(2)
DESIGN CRITERIA OF FIVE TYPICAL SOILS

TYPE OF SOIL	REQUIRED SQUARE FEET OF LEACHING AREA PER 100 GALLONS	MAXIMUM ABSORPTION CAPACITY IN GALLONS PER SQUARE FEET OF LEACHING AREA FOR A 24 HOUR PERIOD
Coarse sand or gravel	20	5.0
Fine sand	25	4.0
Sandy loam or sandy clay	40	2.5
Clay with considerable sand or gravel	90	1.1
Clay with small amount of sand or gravel	120	0.8

For SI units: 1 square foot = 0.0929 m^2, 1 gallon = 3.785 L, 1 gallon per square foot = 40.7 L/m^2

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TABLE H 201.1(3)
LEACHING AREA SIZE BASED ON SEPTIC TANK CAPACITY

REQUIRED SQUARE FEET OF LEACHING AREA PER 100 GALLONS SEPTIC TANK CAPACITY (square feet per 100 gallons)	MAXIMUM SEPTIC TANK SIZE ALLOWABLE (gallons)
20–25	7500
40	5000
90	3500
120	3000

For SI units: 1 square foot per 100 gallons = 0.000245 m²/L, 1 gallon = 3.785 L

TABLE H 201.1(4)
ESTIMATED WASTE/SEWAGE FLOW RATES[1, 2, 3]

TYPE OF OCCUPANCY	GALLONS PER DAY
Airports (per employee)	15
Airports (per passenger)	5
Auto washers – check with equipment manufacturer	–
Bowling alleys – with snack bar only (per lane)	75
Campground – with central comfort station (per person)	35
Campground – with flush toilets - no showers (per person)	25
Camps (day) – no meals served (per person)	15
Camps (summer and seasonal camps) – (per person)	50
Churches – sanctuary (per seat)	5
Churches – with kitchen waste (per seat)	7
Dance halls – (per person)	5
Factories – no showers (per employee)	25
Factories – with showers (per employee)	35
Factories – with cafeteria (per employee)	5
Hospitals – (per bed)	250
Hospitals – kitchen waste only (per bed)	25
Hospitals – laundry waste only (per bed)	40
Hotels – no kitchen waste (per bed)	60
Institutions – resident (per person)	75
Nursing home – (per person)	125
Rest home – (per person)	125
Laundries – self-service with minimum 10 hours per day (per wash cycle)	50
Laundries – commercial check with manufacturer's specification	–
Motel (per bed space)	50
Motel – with kitchen (per bed space)	60
Offices – (per employee)	20
Parks – mobile homes (per space)	250
Parks (picnic) – with toilets only (per parking space)	20
Parks (recreational vehicles) – without water hook-up (per space)	75
Parks (recreational vehicles) – with water and sewer hook-up (per space)	100
Restaurants – cafeteria (per employee)	20
Restaurants – with toilet waste (per customer)	7
Restaurants – with kitchen waste (per meal)	6
Restaurants – with kitchen waste disposable service (per meal)	2
Restaurants – with garbage disposal (per meal)	1
Restaurants – with cocktail lounge (per customer)	2
Schools staff and office (per person)	20
Schools – elementary (per student)	15
Schools – intermediate and high (per student)	20
Schools – with gym and showers (per student)	5

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TABLE H 201.1(4) (continued)
ESTIMATED WASTE/SEWAGE FLOW RATES[1, 2, 3]

TYPE OF OCCUPANCY	GALLONS PER DAY
Schools – with cafeteria (per student)	3
Schools (boarding) – total waste (per person)	100
Service station – with toilets for 1st bay	1000
Service station – with toilets for each additional bay	500
Stores – (per employee)	20
Stores – with public restrooms (per 10 square feet of floor space)	1
Swimming pools – public (per person)	10
Theaters – auditoriums (per seat)	5
Theaters – with drive-in (per space)	10

For SI units: 1 square foot = 0.0929 m², 1 gallon per day = 3.785 L/day

Notes:

1 Sewage disposal systems sized using the estimated waste/sewage flow rates shall be calculated as follows:
- (a) Waste/sewage flow, up to 1500 gallons per day (5678 L/day)
  Flow x 1.5 = septic tank size
- (b) Waste/sewage flow, over 1500 gallons per day (5678 L/day)
  Flow x 0.75 + 1125 = septic tank size
- (c) Secondary system shall be sized for total flow per 24 hours.

2 See Section H 201.1.

3 Because of the many variables encountered, it is not possible to set absolute values for waste/sewage flow rates for all situations. The designer should evaluate each situation and, where figures in this table need modification; they should be made with the concurrence of the Authority Having Jurisdiction.

H 301.0 Area of Disposal Fields and Seepage Pits.

H 301.1 General. The minimum effective absorption area in disposal fields in square feet (m^2), and in seepage pits in square feet (m^2) of sidewall, shall be predicated on the required septic tank capacity of gallons (liters), estimated waste/sewage flow rate, or whichever is greater, and shall be in accordance with Table H 201.1(2) as determined by the type of soil found in the excavation, and shall be as follows:

(1) Where disposal fields are installed, not less than 150 square feet (13.9 m^2) of trench bottom shall be provided for each system exclusive of any hard pan, rock, clay, or other impervious formations. Sidewall area more than the required 12 inches (305 mm) and not exceeding 36 inches (914 mm) below the leach line shall be permitted to be added to the trench bottom area where computing absorption areas.

(2) Where leaching beds are permitted instead of trenches, the area of each such bed shall be not less than 50 percent greater than the tabular requirements for trenches. Perimeter sidewall area more than the required 12 inches (305 mm) and not exceeding 36 inches (914 mm) below the leach line shall be permitted to be added to the trench bottom area where computing absorption areas.

(3) No excavation for a leach line or leach bed shall be located within 5 feet (1524 mm) of the water table nor to a depth where sewage is capable of contaminating the underground water stratum that is usable for domestic purposes.

Exception: In areas where the records or data indicate that the groundwaters are grossly degraded, the 5 foot (1524 mm) separation requirement shall be permitted to be reduced by the Authority Having Jurisdiction. The applicant shall supply evidence of groundwater depth to the satisfaction of the Authority Having Jurisdiction.

(4) The minimum effective absorption area in any seepage pit shall be calculated as the excavated sidewall area below the inlet exclusive of any hardpan, rock, clay, or other impervious formations. The minimum required area of porous formation shall be provided in one or more seepage pits. No excavation shall extend within 10 feet (3048 mm) of the water table nor to a depth where sewage is capable of contaminating underground water stratum that is usable for domestic purposes.

Exception: In areas where the records or data indicate that the groundwaters are grossly degraded, the 10 foot (3048 mm) separation requirement shall be permitted to be reduced by the Authority Having Jurisdiction.

The applicant shall supply evidence of groundwater depth to the satisfaction of the Authority Having Jurisdiction.

(5) Leaching chambers that comply with IAPMO PS 63 and bundled expanded polystyrene synthetic aggregate units that comply with IAPMO IGC 276 shall be sized using the required area calculated using Table H 201.1(2) with a 0.70 multiplier.

H 401.0 Percolation Test.

H 401.1 Pit Sizes. Where practicable, disposal field and seepage pit sizes shall be computed from Table H 201.1(2). Seepage pit sizes shall be computed by percolation tests unless use of Table H 201.1(2) is approved by the Authority Having Jurisdiction.

H 401.2 Absorption Qualities. The absorption qualities of seepage pits and questionable soils other than those listed in Table H 201.1(2), the proposed site, shall be subjected to percolation tests acceptable to the Authority Having Jurisdiction.

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H 401.3 Absorption Rates. Where a percolation test is required, no private disposal system shall be permitted to serve a building where that test shows the absorption capacity of the soil is less than 0.83 gallons per square foot (gal/ft^2) (33.8 L/m^2) or more than 5.12 gal/ft^2 (208.6 L/m^2) of leaching area per 24 hours. Where the percolation test shows an absorption rate greater than 5.12 gal/ft^2 (208.6 L/m^2) per 24 hours, a private disposal system shall be permitted where the site does not overlie groundwaters protected for drinking water supplies, a minimum thickness of 2 feet (610 mm) of the native soil below the entire proposed system is replaced by loamy sand, and the system design is based on percolation tests made in the loamy sand.

H 501.0 Septic Tank Construction.

H 501.1 Plans. Plans for septic tanks shall be submitted to the Authority Having Jurisdiction for approval. Such plans shall show dimensions, reinforcing, structural calculations, and such other pertinent data as required.

H 501.2 Design. Septic tank design shall be such as to produce a clarified effluent consistent with accepted standards and shall provide adequate space for sludge and scum accumulations.

H 501.3 Construction. Septic tanks shall be constructed of solid, durable materials not subject to excessive corrosion or decay and shall be watertight.

H 501.4 Compartments. Septic tanks shall have not less than two compartments unless otherwise approved by the Authority Having Jurisdiction. The inlet compartment of any septic tank shall be not less than two-thirds of the total capacity of the tank, nor less than 500 gallons (1892 L) liquid capacity, and shall be not less than 3 feet (914 mm) in width and 5 feet (1524 mm) in length. Liquid depth shall be not less than 2½ feet (762 mm) nor more than 6 feet (1829 mm). The secondary compartment of a septic tank shall have a capacity of not less than 250 gallons (946 L) and a capacity not exceeding one-third of the total capacity of such tank. In septic tanks having a 1500 gallon (5678 L) capacity, the secondary compartment shall be not less than 5 feet (1524 mm) in length.

H 501.5 Access. Access to each septic tank shall be provided by not less than two manholes 20 inches (508 mm) in minimum dimension or by an equivalent removable cover slab. One access manhole shall be located over the inlet, and one access manhole shall be located over the outlet. Where a first compartment exceeds 12 feet (3658 mm) in length, an additional manhole shall be provided over the baffle wall.

H 501.6 Pipe Opening Sizes. The inlet and outlet pipe openings shall not be larger in size than the connecting sewer pipe. The vertical leg of round inlet and outlet fittings shall not be less in size than the connecting sewer pipe nor less than 4 inches (100 mm) in diameter. A baffle-type fitting shall have the equivalent cross-sectional area of the connecting sewer pipe and not less than a 4 inch (102 mm) horizontal dimension where measured at the inlet and outlet pipe inverts.

H 501.7 Pipe Extension. The inlet and outlet pipe or baffle shall extend 4 inches (102 mm) above and not less than 12 inches (305 mm) below the water surface. The invert of the inlet pipe shall be at a level not less than 2 inches (51 mm) above the invert of the outlet pipe.

H 501.8 Free Vent Area. Inlet and outlet pipe fittings or baffles and compartment partitions shall have a free vent area equal to the required cross-sectional area of the house sewer or private sewer discharging therein to provide free ventilation above the water surface from the disposal field or seepage pit through the septic tank, house sewer, and stack to the outer air.

H 501.9 Sidewalls. The sidewalls shall extend not less than 9 inches (229 mm) above the liquid depth. The cover of the septic tank shall be not less than 2 inches (51 mm) above the back vent openings.

H 501.10 Partitions and Baffles. Partitions or baffles between compartments shall be of solid, durable material and shall extend not less than 4 inches (102 mm) above the liquid level. The transfer port between compartments shall be a minimum size equivalent to the tank inlet, but in no case less than 4 inches (102 mm) in size, shall be installed in the inlet compartment side of the baffle so that the entry into the port is placed 65 percent to 75 percent in the depth of the liquid. Wooden baffles are prohibited.

H 501.11 Structural Design. The structural design of septic tanks shall comply with the following requirements:

(1) Each such tank shall be structurally designed to withstand all anticipated earth or other loads. Septic tank covers shall be capable of supporting an earth load of not less than 500 pounds per square foot (lb/ft^2) (2441 kg/m^2) where the maximum coverage does not exceed 3 feet (914 mm).

(2) In flood hazard areas, tanks shall be anchored to counter buoyant forces during conditions of the design flood. The vent termination and service manhole of the tank shall be not less than 2 feet (610 mm) above the design flood elevation or fitted with covers designed to prevent the inflow of floodwater or the outflow of the contents of the tanks during conditions of the design flood.

H 501.12 Manholes. Septic tanks installed under concrete or blacktop paving shall have the required manholes accessible by extending the manhole openings to grade in a manner acceptable to the Authority Having Jurisdiction.

H 501.13 Materials. The materials used for constructing a septic tank shall be in accordance with the following:

(1) Materials used in constructing a concrete septic tank shall be in accordance with applicable standards in Chapter 17.

(2) The minimum wall thickness of a steel septic tank shall be number 12 U.S. gauge (0.109 of an inch) (2.77 mm), and each such tank shall be protected from corrosion both externally and internally by an approved bituminous coating or by other acceptable means.

(3) Septic tanks constructed of alternate materials shall be permitted to be approved by the Authority Having Jurisdiction where in accordance with approved applicable standards. Wooden septic tanks shall be prohibited.

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H 501.14 Prefabricated Septic Tanks. Prefabricated septic tanks shall comply with the following requirements:

(1) Manufactured or prefabricated septic tanks shall comply with approved applicable standards and be approved by the Authority Having Jurisdiction. Prefabricated bituminous coated septic tanks shall comply with UL 70.

(2) Independent laboratory tests and engineering calculations certifying the tank capacity and structural stability shall be provided as required by the Authority Having Jurisdiction.

H 601.0 Disposal Fields.

H 601.1 Distribution Lines. Distribution lines shall be constructed of clay tile laid with open joints, perforated clay pipe, perforated bituminous fiber pipe, perforated high-density polyethylene pipe, perforated ABS pipe, perforated PVC pipe, or other approved materials, provided that approved openings are available for distribution of the effluent into the trench area.

H 601.2 Filter Material. Before placing filter material or drain lines in a prepared excavation, smeared or compacted surfaces shall be removed from trenches by raking to a depth of 1 inch (25.4 mm) and the loose material removed. Clean stone, gravel, slag, or similar filter material acceptable to the Authority Having Jurisdiction, varying in size from ¾ of an inch to 2½ inches (19.1 mm to 64 mm), shall be placed in the trench to the depth and grade required by this section. Drain pipe shall be placed on filter material in an approved manner. The drain lines shall then be covered with filter material to the minimum depth required by this section, and this material covered with untreated building paper, straw, or similar porous material to prevent the closure of voids with earth backfill. No earth backfill shall be placed over the filter material cover until after inspection and acceptance.

Exception: Listed or approved plastic leaching chambers and bundled expanded polystyrene synthetic aggregate units shall be permitted to be used in lieu of pipe and filter material. Chamber and bundled expanded polystyrene synthetic aggregate unit installations shall follow the rules for disposal fields, where applicable, and shall be in accordance with the manufacturer's instructions.

H 601.3 Grade Board. A grade board staked in the trench to the depth of filter material shall be utilized where the distribution line is constructed with drain tile or a flexible pipe material that will not maintain alignment without continuous support.

H 601.4 Seepage Pits. Where seepage pits are used in combination with disposal fields, the filter material in the trenches shall terminate not less than 5 feet (1524 mm) from the pit excavation, and the line extending from such points to the seepage pit shall be approved pipe with watertight joints.

H 601.5 Distribution Boxes. Where two or more drain lines are installed, an approved distribution box of sufficient size to receive lateral lines shall be installed at the head of each disposal field. The invert of outlets shall be level, and the invert of the inlet shall be not less than 1 inch (25.4 mm) above the outlets. Distribution boxes shall be designed to ensure equal flow and shall be installed on a level concrete slab in natural or compacted soil.

H 601.6 Laterals. Laterals from a distribution box to the disposal field shall be approved pipe with watertight joints. Multiple disposal field laterals, where practicable, shall be of uniform length.

H 601.7 Connections. Connections between a septic tank and a distribution box shall be laid with approved pipe with watertight joints on natural ground or compacted fill.

H 601.8 Dosing Tanks. Where the quantity of sewage exceeds the amount that is permitted to be disposed of in 500 lineal feet (152.4 m) of leach line, a dosing tank shall be used. Dosing tanks shall be equipped with an automatic siphon or pump that discharges the tank once every 3 or 4 hours. The tank shall have a capacity equal to 60 to 75 percent of the interior capacity of the pipe to be dosed at one time. Where the total length of pipe exceeds 1000 lineal feet (305 m), the dosing tank shall be provided with two siphons or pumps dosing alternately and each serving one-half of the leach field.

H 601.9 Construction. Disposal fields shall be constructed in accordance with Table H 601.9.

Minimum spacing between trenches or leaching beds shall be not less than 4 feet (1219 mm) plus 2 feet (610 mm) for each additional foot (305 mm) of depth more than 1 foot (305 mm) below the bottom of the drain line. Distribution drain lines in leaching beds shall be not more than 6 feet (1829 mm) apart on centers, and no part of the perimeter of the leaching bed shall exceed 3 feet (914 mm) from a distribution drain line. Disposal fields, trenches, and leaching beds shall not be paved over or covered by concrete or a material that is capable of reducing or inhibiting a possible evaporation of sewer effluent.

H 601.10 Joints. Where necessary on sloping ground to prevent excessive line slope, leach lines or leach beds shall be stepped. The lines between each horizontal section shall be made with watertight joints and shall be designed, so each horizontal leaching trench or bed shall be utilized to the maximum capacity before the effluent shall pass to the next lower leach line or bed. The lines between each horizontal leaching section shall be made with approved watertight joints and installed on the natural or unfilled ground.

TABLE H 601.9
GENERAL DISPOSAL FIELD REQUIREMENTS

ELEMENT	MINIMUM	MAXIMUM
Number of drain lines per field	1	-
Length of each line	-	100 feet
Bottom width of trench	18 inches	36 inches
Spacing of lines, center-to-center	6 feet	-
Depth of earth cover of lines (preferred 18 inches)	12 inches	-
Grade of lines	level	3 inches per 100 feet
Filter material under drain lines	12 inches	-
Filter material over drain lines	2 inches	-

For SI units: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 inch per foot = 83.3 mm/m

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H 701.0 Seepage Pits.

H 701.1 Capacity. The capacity of seepage pits shall be based on the quantity of liquid waste discharging thereinto and on the character and porosity of the surrounding soil, and shall be in accordance with Section H 301.0 of this appendix.

H 701.2 Multiple Installations. Multiple seepage pit installations shall be served through an approved distribution box or be connected in series using a watertight connection laid on undistributed or compacted soil. The outlet from the pit shall have an approved vented leg fitting extending not less than 12 inches (305 mm) below the inlet fitting.

H 701.3 Construction. A seepage pit shall be circular in shape and shall have an excavated diameter of not less than 4 feet (1219 mm). Each such pit shall be lined with approved-type whole new hard-burned clay brick, concrete brick, concrete circular-type cesspool blocks, or other approved materials. Approval shall be obtained before construction for any pit having an excavated diameter greater than 6 feet (1829 mm).

H 701.4 Lining. The lining in a seepage pit shall be laid on a firm foundation. Lining materials shall be placed tight together and laid with joints staggered. Except in the case of approved-type precast concrete circular sections, no brick or block shall be greater in height than its width and shall be laid flat to form not less than a 4 inch (102 mm) wall. Brick or block greater than 12 inches (305 mm) in length shall have chamfered matching ends and be scored to provide for seepage. Excavation voids behind the brick, block, or concrete liner shall have not less than 6 inches (152 mm) of clean ¾ of an inch (19.1 mm) gravel or rock.

H 701.5 Brick and Block. Brick or block used in seepage pit construction shall have a compressive strength of not less than 2500 pounds per square inch (lb/in^2) (1 757 674 kg/m^2).

H 701.6 Sidewall. A seepage pit shall have a minimum sidewall (not including the arch) of 10 feet (3048 mm) below the inlet.

H 701.7 Arch and Dome. The arch or dome of a seepage pit shall be permitted to be constructed in one of three ways:

(1) Approved-type hard-burned clay brick or solid concrete brick or block laid in cement mortar.

(2) Approved brick or block laid dry. In both of the above methods, an approved cement mortar covering of not less than 2 inches (51 mm) in thickness shall be applied, said covering to extend not less than 6 inches (152 mm) beyond the sidewalls of the pit.

(3) Approved-type one or two-piece reinforced concrete slabs of not less than 2500 lb/in^2 (1 757 674 kg/m^2) minimum compressive strength, not less than 5 inches (127 mm) thick, and designed to support an earth load of not less than 400 pounds per square foot (lb/ft^2) (1953 kg/m^2). Each such cover shall be provided with a 9 inch (229 mm) minimum inspection hole with plug or cover and shall be coated on the underside with an approved bituminous or other nonpermeable protective compound.

H 701.8 Location. The top of the arch or cover shall be not less than 18 inches (457 mm) but not exceed 4 feet (1219 mm) below the surface of the ground.

H 701.9 Inlet Fitting. An approved vented inlet fitting shall be provided in the seepage pit so arranged as to prevent the inflow from damaging the sidewall.

Exception: Where using a one- or two-piece concrete slab cover inlet, fitting shall be permitted to be a one-fourth bend fitting discharging through an opening in the top of the slab cover. On multiple seepage pit installations, the outlet fittings shall comply with Section H 701.2 of this appendix.

H 801.0 Cesspools.

H 801.1 Limitations. A cesspool shall be considered as a temporary expedient pending the construction of a public sewer; as an overflow facility where installed in conjunction with an existing cesspool; or as a means of sewage disposal for limited, minor, or temporary uses, where first approved by the Authority Having Jurisdiction.

H 801.2 Septic Tanks. Where it is established that a public sewer system will be available in less than 2 years, and soil and groundwater conditions are favorable to cesspool disposal, cesspools without septic tanks shall be permitted to be installed for single-family dwellings or for other limited uses where first approved by the Authority Having Jurisdiction.

H 801.3 Construction. Each cesspool, where permitted, shall be in accordance with the construction requirements set forth in Section H 701.0 of this appendix for seepage pits and shall have a sidewall (not including arch) of not less than 20 feet (6096 mm) below the inlet, provided, however, that where a strata of gravel or equally pervious material of 4 feet (1219 mm) in thickness is found, the depth of such sidewall shall not exceed 10 feet (3048 mm) below the inlet.

H 801.4 Existing Installations. Where overflow cesspools or seepage pits are added to existing installations, the effluent shall leave the existing pit through an approved vented leg extending not less than 12 inches (305 mm) downward into such existing pit and having its outlet flow line not less than 6 inches (152 mm) below the inlet. The pipe between pits shall be laid with approved watertight joints.

H 901.0 Commercial or Industrial Special Liquid-Waste Disposal.

H 901.1 Interceptor. Where liquid wastes contain excessive amounts of grease, garbage, flammable wastes, sand, or other ingredients that affect the operation of a private sewage disposal system, an interceptor for such wastes shall be installed.

H 901.2 Installation. Installation of such interceptors shall comply with Section 1009.0 of this code, and their location shall comply with Table H 101.8 of this appendix.

H 901.3 Sampling Box. A sampling box shall be installed where required by the Authority Having Jurisdiction.

H 901.4 Design and Structural Requirement. Interceptors shall be of approved design and be not less than two compartments. Structural requirements shall comply with Section H 501.0 of this appendix.

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H 901.5 Location. Interceptors shall be located as close to the source as possible and be accessible for servicing. Necessary manholes for servicing shall be at grade level and be gastight.

H 901.6 Waste Discharge. Waste discharge from interceptors shall be permitted to be connected to a septic tank or other primary system or be disposed into a separate disposal system.

H 901.7 Design Criteria. A formula shall be permitted to be adapted to other types of occupancies with similar wastes. (See Chart H 901.7)

H 1001.0 Inspection and Testing.

H 1001.1 Inspection. Inspection requirements shall comply with the following:

(1) Applicable provisions of Section 105.0 of this code and this appendix shall be required. Plans shall be required in accordance with Section 103.3 of this code.

(2) System components shall be properly identified as to manufacturer. Septic tanks or other primary systems shall have the rated capacity permanently marked on the unit.

(3) Septic tanks or other primary systems shall be installed on dry, level, well-compacted soil.

(4) Where design is predicated on soil tests, the system shall be installed at the same location and depth as the tested area.

H 1001.2 Testing. Testing requirements shall comply with the following:

(1) Septic tanks or other primary components shall be filled with water to flow line before requesting an inspection. Seams or joints shall be left exposed (except the bottom), and the tank shall remain watertight.

(2) A flow test shall be performed through the system to the point of effluent disposal. All lines and components shall be watertight. Capacities required air space, and fittings shall comply with the provisions outlined in this appendix.

H 1101.0 Abandoned Sewers and Sewage Disposal Facilities.

H 1101.1 Plugged and Capped. An abandoned building (house) sewer, or part thereof, shall be plugged or capped in an approved manner within 5 feet (1524 mm) of the property line.

H 1101.2 Fill Material. A cesspool, a septic tank, or a seepage pit that has been abandoned or has been discontinued otherwise from further use, or to which no waste or soil pipe from a plumbing fixture is connected, shall have the sewage removed therefrom and be completely filled with the earth, sand, gravel, concrete, or other approved material.

H 1101.3 Filling Requirements. The top cover or arch over the cesspool, septic tank, or seepage pit shall be removed before filling, and the filling shall not extend above the top of the vertical portions of the sidewalls or above the level of any outlet pipe until inspection has been called and the cesspool, septic tank, or seepage pit has been inspected. After such inspection, the cesspool, septic tank, or seepage pit shall be filled to the level of the top of the ground.

H 1101.4 Owner. No person owning or controlling a cesspool, septic tank, or seepage pit on the premises of such person or in that portion of any public street, alley, or other

CHART H 901.7
RECOMMENDED DESIGN CRITERIA

GREASE AND GARBAGE, COMMERCIAL KITCHENS										
Number of meals per peak hour	x	Waste flow rate[1]	x	Retention time[2]	x	Storage factor[3]	=	Interceptor size (liquid capacity)		
SAND-SILT OIL, AUTO WASHERS										
Number of vehicles per hour	x	Waste flow rate[1]	x	Retention time[2]	x	Storage factor[3]	=	Interceptor size (liquid capacity)		
SILT-LINT GREASE, LAUNDRIES, LAUNDROMATS										
Number of machines	x	2 cycles per hour	x	Waste flow rate[1]	x	Retention time[2]	=	Storage factor[3]	=	Intereeptor size (liquid capacity)

Notes:

1 For waste flow rate see Table H 201.1(4).

2 Retention Times:
- (a) Kitchen (commercial) – with dishwasher, garbage disposal, or both = 2.5 hours
- (b) Kitchen (single service) – with garbage disposal = 1.5 hours
- (c) Auto Washers (sand-silt oil) = 2.0 hours
- (d) Laundries/Laundromats = 2.0 hours

3 Storage Factors:
- (a) Kitchen (commercial) – with 8 hours operation = 1
- (b) Kitchen (commercial) – with 16 hours operation = 2
- (c) Kitchen (commercial) – with 24 hours operation = 3
- (d) Kitchen (single service) = 1.5
- (e) Auto Washers (sand-silt oil) – with self service = 1.5
- (e) Auto Washers (sand-silt oil) – with employee operated = 2
- (d) Laundries/Laundromats – with rock filter = 1.5 hours

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public property abutting such premises shall fail, refuse, or neglect to be in accordance with the provisions of this section or upon receipt of notice so to be in accordance with the Authority Having Jurisdiction.

H 1101.5 Permittee. Where disposal facilities are abandoned consequent to connecting any premises with the public sewer, the permittee making the connection shall fill all abandoned facilities in accordance with the Authority Having Jurisdiction within 30 days from the time of connecting to the public sewer.

H 1201.0 Drawings and Specifications.

H 1201.1 General. The Authority Having Jurisdiction, Health Officer, or other department having jurisdiction shall be permitted to require the following information before a permit is issued for a private sewage disposal system or at a time during the construction thereof:

(1) Plot plan drawn to scale, completely dimensioned, showing direction and approximate slope of surface, location of present or proposed retaining walls, drainage channels, water supply lines or wells, paved areas and structures on the plot, number of bedrooms or plumbing fixtures in each structure, and location of the private sewage disposal system with relation to lot lines and structures.

(2) Details of construction necessary to ensure compliance with the requirements of this appendix together with a full description of the complete installation including quality, kind, and grade of materials, equipment, construction, workmanship, and methods of assembly and installation.

(3) A log of soil formations and groundwater levels as determined by test holes dug in close proximity to a proposed seepage pit or disposal field, together with a statement of water absorption characteristics of the soil at the proposed site, as determined by approved percolation tests.

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Appendix B3

Water and Sewer Master Plan

1st Draft

Water and Sewer Master Plan

Hume SoCal

Prepared for:
Hume SoCal

Prepared by:

Kimley»Horn

February 2024

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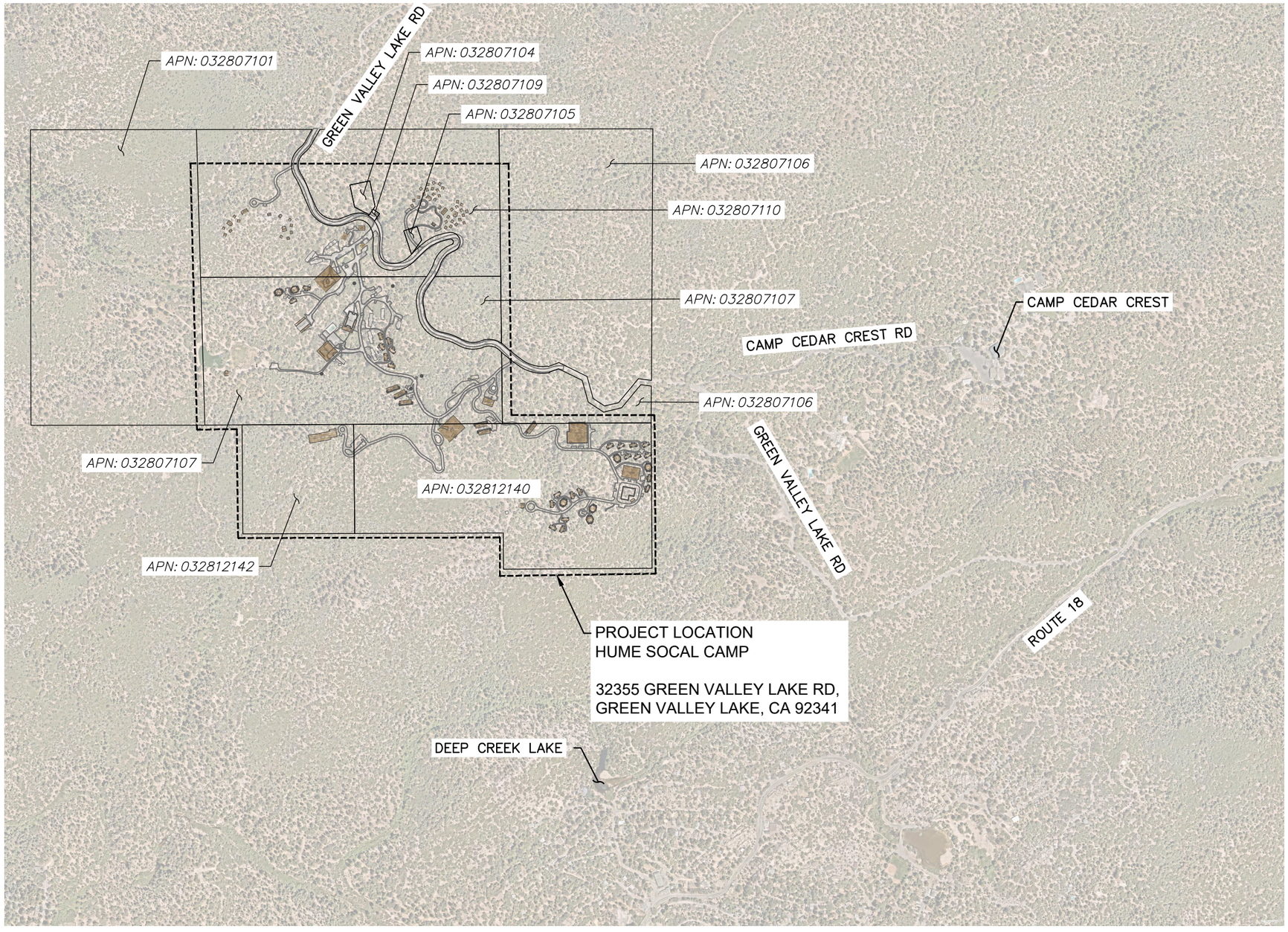
Introduction

This Water and Sewer Master Plan analyzes the capacity of the Hume SoCal (Hume or "the Camp") campground water and sewer infrastructure for the proposed expansion from a capacity of 300-occupants to a capacity of approximately 3,000-occupants (Project) and outlines necessary improvements that will be needed to accommodate the future expansion. This would be accomplished through the continued use of existing campground infrastructure as well as the development of additional campground and recreational water and sewer infrastructure within a 251-acre area of the Green Valley Lake community. The Project is located directly east of Green Valley Lake Road and approximately 0.4 miles northwest of State Route 18. The Project would be developed on five parcels totaling approximately 251 acres.

Project Location

The 251-acre Project site (APN 0328-071-05, 0328-071-07, 0328-071-10, 0328-121-40, 0328-121-42) is located immediately east of Green Valley Lake Road and approximately 0.4 miles northwest of State Route 18 in Green Valley Lake, CA (Figure 1). The City is in unincorporated San Bernardino County (the County). The Project is bounded by National Forest to the north, south, west, and east.

Figure 1 Regional Location Map



Kimley»Horn

FIGURE 1 - REGIONAL LOCATION MAP

CITY OF GREEN VALLEY LAKE

HUME LAKE CHRISTIAN CAMPS

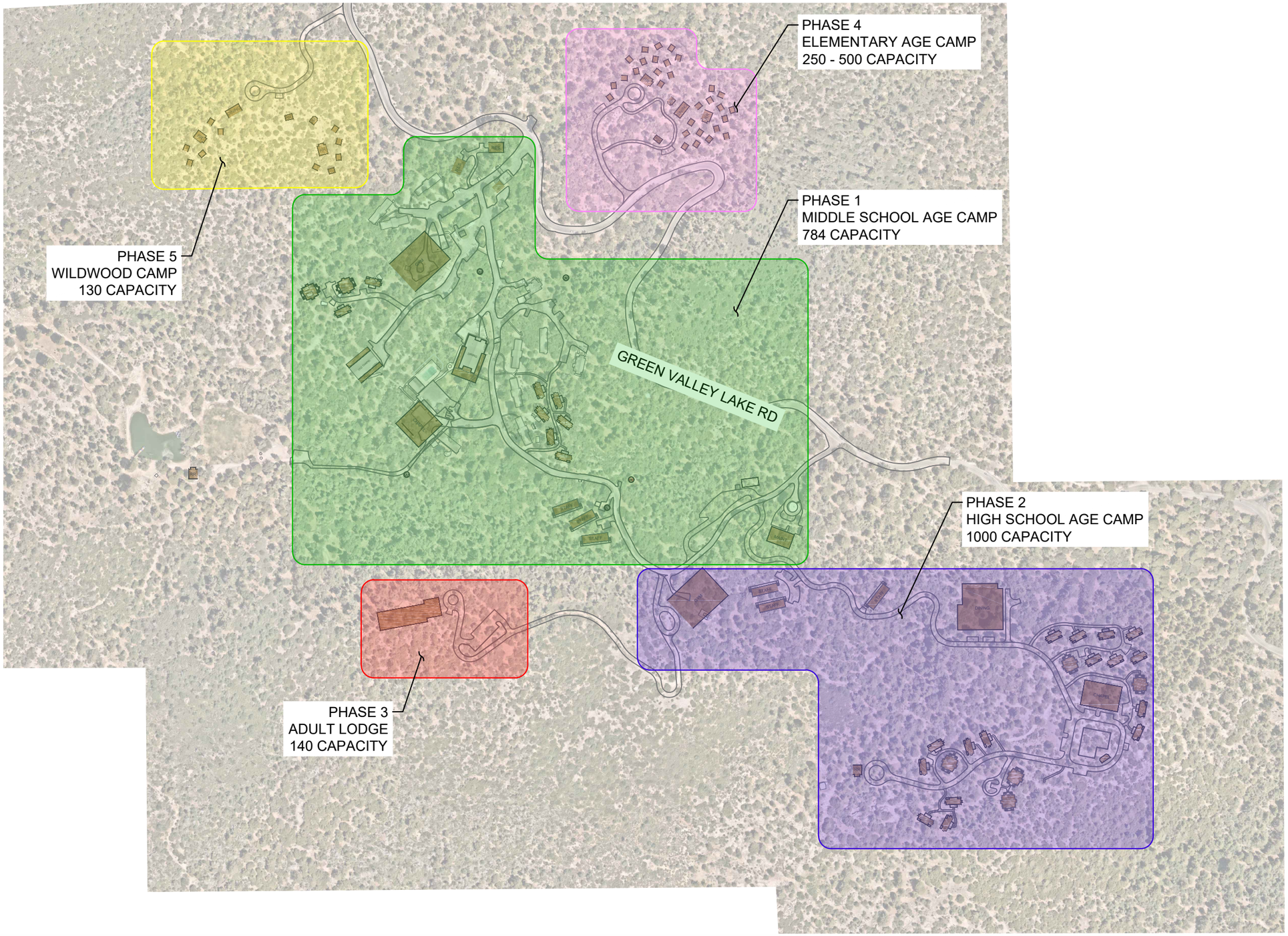
JANUARY 2024

Proposed Expansion

Development of the Project site would be completed in five phases (Figure 2). Each phase of the Project would include the development of expanded infrastructure, additional amenities, support structures, and buildings necessary to accommodate expanded camper capacity as well as paved parking areas and paved access roadways.

- Phase 1 of the Project would involve the development of facilities to be used as a Junior High Camp where existing and proposed facilities would accommodate up to 784 occupants.
- Phase 2 of the Project would involve the development of facilities to be used as a High School Camp where existing and proposed facilities would accommodate up to 1,000 occupants.
- Phase 3 of the Project proposes the development of an Adult Lodge where existing and proposed facilities accommodate up to 140 occupants.
- Phase 4 of the Project would include the development of an Elementary Age Camp and associated facilities where existing and proposed facilities would accommodate up to 500 occupants.
- Phase 5 of the Project proposes the creation of a tent-based youth camp, Wildwood Camp where existing and proposed facilities would accommodate up to 130 occupants.

Figure 2 Conceptual Site Plan



NORTH

GRAPHIC SCALE IN FEET
0 200 400 800

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FIGURE 2 - CONCEPTUAL SITE PLAN
CITY OF GREEN VALLEY LAKE
HUME LAKE CHRISTIAN CAMPS
JANUARY 2024

Land Use and Population

Existing Land Use Data

The Project site is designated as undeveloped recreational land, falling under the Hilltop/Special Development-Residential zoning category per the County's General Plan. The site covers a hilly terrain containing slopes between 15-35% per the United States Department of Agriculture (USDA) Natural Resource Conservation Service's Web Soil Survey located in Appendix A. The hydraulic soil groups of the existing soils are B and D which have moderate and slow infiltration rates. The proposed site is undeveloped land that is forested with some rocky areas.

Population and Projections

Currently, Hume has a capacity of 300 – occupants, including campers and staff. The staff is comprised of 12 full-time residents, 20 part-time employees, 35 winter seasonal employees, and 68 summer seasonal employees.

The summer and winter seasonal periods, which are each 9-weeks long, consist of alternating sessions of high school campers, middle school campers, and combined age campers. The sessions during the seasonal periods range from two to six-night stays. It is assumed that all age groups of campers have full occupancy approximately 50 days and nights, or approximately 13%, out of each year. Future number of staff members were assumed to be proportional to the increase in camp capacity, an increase of approximately 1,000%. Table 3 displays the breakdown of occupants, including campers and staff, and their corresponding occupancy duration.

Water System

Water System Design Criteria

The Camp's existing and proposed water system analysis was based on the San Bernardino County (County) Special Districts Water Design Standards. The Project water demand was calculated using the County's domestic water use average daily domestic demand of 180 gallons per capita per day (GPCPD). Additionally, peak daily flows were estimated at two times the average daily demand and peak hourly flows were estimated at four times the average daily demand. Table 1 further details the County's water system design criteria utilized for the following analysis.

Table 1 Water System Design Criteria

Water System Criteria	Design Criteria
Storage Volume	Peak Daily Demand and Fire Flow Storage
Water Pipe Velocity	Maximum 8 Feet per Second (FPS)
Water Pipe Size	Minimum 8-inch Diameter
Pressure Range (Without Fire Flow)	40 psi - 125 psi (Pressure Reducing Valves Required Past 90 psi)
Pressure Range (With Fire Flow)	20 psi - 125 psi (Pressure Reducing Valves Required Past 90 psi)

Existing Supply Sources

The Camp has historically relied on its five groundwater wells to meet both its potable and non-potable water demands. *Table 2* displays the on-site wells and their production.

Table 2 Existing on-site groundwater wells

Well No.	Well Use	Well Production (gpm)
1	Domestic	44
2	Non-Domestic, Recreational	Unknown
3	Domestic, Non-Operational, Abandoned	-
4	Domestic	46
5	Domestic	85

Well No. 5 has the highest production rate and has served as the Camp's main source of drinking water. Additionally, Well No. 5 is the most recently constructed well at the Camp. Wells No. 1 and No. 4 are primarily used for irrigation with a valve to reroute flow to for potable water use, pending water quality approval. Well No. 3 is currently out of service with no plan for well reactivation. Well No. 2 is primarily used to fill a seasonal 1.5 million-gallon, lined, recreational pond. The potable water pumped from Wells No. 1, No. 2, and No. 3 are directed to the existing 212,000-gallon water tank which then feeds the Camp's potable water supply by gravity.

Existing Potable Water Distribution System

The Camp currently has an existing 212,000-gallon welded steel potable water tank bolted to a concrete ring foundation. The water tank is 24 feet high with a 38-foot diameter. Additionally, there is an existing 50,000-gallon irrigation tank which sits on dirt and has a concrete ring filled with gravel. The tanks display visible signs of deterioration, with multiple patches that indicate previous damage which has been effectively repaired. Currently, the tank inlet and outlet connections do not have any seismic coupling to accommodate potential ground movement.

Water distribution within the Camp operates on a gravity-fed system, utilizing 8-inch and 10-inch diameter mains to distribute domestic water. These mains then branch off in a series of 1-inch to 3-inch PVC distribution pipes that service the Camp buildings. The existing water distribution system is depicted in Appendix B.

Proposed Water Demands

The Project water demand was calculated using San Bernardino County's domestic water use planning value of 180 gallons per capita per day (GPCPD) and the proposed populations calculated in the Water Supply Assessment prepared by Kimley-Horn & Associates (KH). This assessment considers the projected number of occupants at each expansion phase and determines a corresponding water demand based on occupancy duration. This calculation is used to determine the annual domestic water demand for different phases and categories of occupants, including campers, staff, and guests. Table 3 displays the proposed water demand per occupant type.

Table 3 Estimated Camp Expansion Water Demand

	Occupant Type	Count	Occupancy Duration (% of year)	Equivalent Days	Annual Domestic Demand[1] (Gallons)
Employee	Full Time Employees	120	100%	365	7,884,000
	Part Time Employees	200	50%	182.5	6,570,000
	Winter Seasonal	350	17%	63.145	3,978,135
	Summer Seasonal	680	17%	63.145	7,728,948
Camper/Guest	High School Guests	1000	13%	50	9,000,000
	Middle School Guests	784	13%	50	7,056,000
	Adult Lodge	140	13%	50	1,260,000
	Elementary Age Guests	500	13%	50	4,500,000
	Wildwood Camp	130	13%	50	1,170,000
			Total Demand		54,607,870 Gallons per Year (GPY)
					150.82 Acre-Feet per Year (AFY)
					134,650 Gallons per Day (GPD)

In addition to the total potable water demand, the total demand for a fire event was calculated assuming that 2,000 gallons per minute would be needed for a 2-hour fire event. Table 4 outlines the County's fire flow requirements.

Table 4 Estimated Fire Flow Demand

Fire Flow (GPM)	Duration (Hours)	Total Demand (Gallons)
2000	2	240,000

The ratio of campers for each phase was also used to estimate a total water demand for each phase. Table 5 summarizes the resulting demands for each phase of the Project.

Table 5 Estimated Water Demand by Phase

	Occupant Type	Phase	% of Camp	Equivalent Daily Domestic Demand (GPD)	Daily Peak Demand (GPD)	Peak Hourly Demand (GPD)
Camper/Guest	High School Guests	2	39%	52,721	105,442	210,885
	Middle School Guests	1	31%	41,333	82,667	165,334
	Adult Lodge	3	5%	7,381	14,762	29,524
	Elementary Age Guests	4	20%	26,361	52,721	105,442
	Wildwood Camp	5	5%	6,854	13,708	27,415
				134,650	269,300	538,600

Proposed Water System

Three proposed water distribution system options were analyzed due to the Project's elevation challenges. Particularly, the domestic water tank elevation is lower than the planned expansions in Phases 3 and 4, resulting in low pressure within a gravity-fed system. The three options analyzed were:

1. Option 1 – Two New Tanks with Well Pipe Reconstruction: This option proposed rebuilding the water storage tanks at the system's highest elevation within Phase 3, ensuring adequate pressure throughout. This would involve construction two new tanks and rerouting the groundwater well pipes to the new tanks.
2. Option 2 – Two New Tanks with Existing Intermediate Tank: This option proposed adding two new tanks within Phase 3 and utilizing the existing 212,000-gallon tank as an intermediate tank. A booster pump station near the existing tank will then pump the water up to the two new tanks, thus maintaining a gravity-fed system.
3. Option 3 – One New Tank with Booster Pumps: This option involves constructing three booster pump stations for low pressures Phases 3, 4, and 5, in addition to construction a new 300,000-gallon tank near the existing 212,000-gallong tank. The existing tank will remain in use.

Schematic alignments of the proposed water system and the proposed improvements for the scenarios are depicted in the Appendix B. A construction cost analysis for each option is attached in Appendix C.

Hydraulic Model

To accurately assess system pressures, water pipe diameters, and fire flow capacities, a hydraulic model was prepared using Bentley System's WaterCAD. The model simulated conditions by assigning demands are various nodes throughout the Camp's expansion phases for the scenarios outlined above. The model tests the County's required fire flow of 2,000 gallons per minute at various fire hydrants throughout the Camp expansion phases to evaluate the system pressure under maximum demand. Tested fire hydrant locations are shown in Appendix B. The WaterCAD results for the various system options analyzed are detailed their following corresponding section.

Water Storage

The existing 212,000-gallon potable water tank does not satisfy the County's tank minimum storage requirements under a peak daily demand with fire flow, necessitating an additional 297,300 gallons to reach the minimum required 509,300-gallon storage requirement. To accommodate the Camp expansion demand, KH recommends constructing a 300,000-gallon welded steel tank, including necessary seismic supports and interconnections. The proposed supplementary tank is intended not only to increase storage capacity to satisfy the Camp's storage requirements but also to serve as an auxiliary reservoir during maintenance or emergency.

Option 1 – Two New Tanks with Well Pipe Replacement

This option involves constructing two new potable water storage tanks at the Camp's highest accessible point within Phase 3 as depicted in Appendix B. Set at an elevation of 6,680 feet, the highest within the proposed development area, this option ensures adequate gravity-fed pressures throughout the system. The proposed tanks include a 300,000-gallon tank, measuring 34 feet in diameter and 50 feet in height, alongside a secondary 210,000-gallon tank, with a 28-foot diameter and equal height. This option requires replacing the existing pipelines from the groundwater wells to the proposed, elevated tanks, potentially incorporating booster pumps to overcome the increase in head required to reach the tanks. Necessary adjustments such as grading for access roads and tank foundation will be required. To manage pressures exceeding 90 psi in certain phases, pressure reducing valves in various high pressure locations throughout the system. Option 1 system pressures are displayed below in Table 6 and detailed in Appendix C. The highlighted Junctions in Table 6 indicate pressures above the acceptable range for Peak Hourly demand, thus will require pressure reducing valves.

Table 6 Option 1 - Peak Hourly Flow Junction Pressures

Junction	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-15	6,445.00	146	6,701.30	111
J-16	6,630.00	21	6,722.36	40
J-17	6,549.56	146	6,711.16	70
J-18	6,578.96	146	6,708.66	56
J-19	6,503.46	146	6,701.86	86
J-20	6,470.57	146	6,701.49	100
J-21	6,466.45	146	6,701.40	102
J-22	6,497.60	146	6,701.59	88
J-23	6,508.88	115	6,705.00	85
J-24	6,518.74	19	6,705.00	81
J-25	6,544.94	19	6,704.99	69
J-26	6,470.05	115	6,704.89	102
J-27	6,479.63	115	6,706.91	98
J-28	6,489.00	115	6,707.43	95
J-29	6,530.00	115	6,707.37	77
J-31	6,502.29	115	6,705.14	88
J-34	6,560.00	73	6,705.05	63
J-35	6,602.00	73	6,705.04	45
J-37	6596.02	21	6,722.36	55

The primary advantage of this approach is its reliance on gravity to distribute water, which minimizes energy consumption and mechanical failure risk. However, this option entails significant construction and infrastructure costs, including two tanks, the expense of rerouting the groundwater well pipelines, and potential need for a booster pump to pump groundwater up to the new tank site.

Option 2 – Two New tanks with Existing Intermediate Tank

Similar to Option 1, this option involves the addition of two new potable water storage tanks at the Camp's highest accessible elevation in Phase 3. This option, however, utilizes the existing 212,000-gallon tank as an intermediate tank and proposes a booster pump station at the existing tank site to pump the water to the two new tanks. By incorporating a booster pump at the existing tank site, the existing tank is able to be used as an intermediate tank before being pump up to the higher elevation, proposed tanks. This option minimizes disruption to the existing groundwater wells and allows the existing well discharge piping to remain in place. This maintains the gravity-fed water system and leverages the existing tank, preserving and enhancing the existing system. The disadvantage to Option 2 includes the costs of construction two new tanks, a booster pump station, and the necessary pipelines to convey water from the existing tank to the proposed tanks. Due Option 2 utilizing the same gravity-fed system from the two proposed tanks as in Option 1, the system pressures will be the same as shown in Table 6.

Option 3 – One New Tank with Booster Pumps

Option 3 involves constructing booster pump stations for low pressures Phases 3, 4, and 5, in addition to construction a new 300,000-gallon tank near the existing 212,000-gallong tank. The existing tank will remain in use. This option addresses the low-pressure areas within the proposed water system by installing booster pumps. Booster pump stations will be positioned new the low-pressure phases to standardize pressure throughout the Camp.

The water system was modeled with the proposed tank without the use of booster pumps to determine the low pressure zones within the system, which necessitate the addition of booster pumps. The pressures from utilizing the existing tank with booster pump system can be seen in Table 7. The highlighted Junctions in Table 6 indicate pressures below the acceptable range for Peak Hourly demand, thus will require booster pumps to provide adequate pressure in those zones. Based on the results, pumps will be needed in Phases 3, 4, and 5 to address low-pressure zones. The proposed booster pump locations are shown in Appendix B.

Table 7 Option 2 - Peak Hourly Flow Junction Pressures

Junction	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-15	6,445.00	146	6,601.02	68
J-16	6,630.00	21	6,604.97	-11
J-17	6,549.56	146	6,604.97	24
J-18	6,578.96	146	6,608.39	13
J-19	6,503.46	146	6,601.58	42
J-20	6,470.57	146	6,601.22	57
J-21	6,466.45	146	6,601.13	58
J-22	6,497.60	146	6,601.31	45
J-23	6,508.88	115	6,598.82	39
J-24	6,518.74	19	6,598.81	35
J-25	6,544.94	19	6,598.81	23
J-26	6,470.05	115	6,598.71	56
J-27	6,479.63	115	6,600.73	52
J-28	6,489.00	115	6,601.25	49
J-29	6,530.00	115	6,601.18	31
J-31	6,502.29	115	6,598.96	42
J-34	6,560.00	73	6,598.87	17
J-35	6,602.00	73	6,598.86	-1

Conclusion

The evaluation of the three distribution system options for the Camp expansion presents a comprehensive overview of potential strategies to enhance the Camp's infrastructure in alignment with anticipated growth and demand. Each option presents a set of financial and operational considerations, ranging from initial construction costs to long-term maintenance. The findings in the Water Master Plan have provided a comparison of the advantages and disadvantages of each option, offering potential pathways to meet future Camp expansion water demands.

Sewer System

Sewer System Design Criteria

The Camp's proposed sewer system planning adheres to the County's Standards for Sanitary Sewer. A peaking factor of 3.4 was applied to the average annual sewer generation to determine peak sewer generation at the Camp. Table 8 outlines the County's design criteria which was used in the following sewer analysis. Additionally, sewer lift stations were designed to handle peak flows from the corresponding tributary area with the use of a single pump.

Table 8 Sewer System Design Criteria

Sewer System Criteria	Design Criteria
Projected Flow (Mountain Areas)	80 Gallons per Capita per Day (GPCPD)
Maximum Velocity	8 FPS
Roughness Coefficient	n = 0.013
Minimum Velocity	2 FPS
Maximum Pipe Capacity	50% Full
Minimum Pipe Slope	0.008 – 0.01 Feet per Foot
Manhole Spacing	Every 300 Feet

Existing Private Sewer System

The Camp's existing sewer system is primarily composed of 4-inch and 6-inch gravity sewer which feed into duplex, submersible lift station. The sewage is pumped the lift station by 6-inch force towards the entrance to the Camp, eventually connecting into the Running Springs Water District public sewer system in Green Valley Road. The existing sewer system is depicted in Appendix B. Existing manhole invert elevations are provided in Appendix B derived from Camp utility record drawings, which can be seen in Appendix E.

Existing Public Sewer System

Sewer in Green Valley Lake is managed by Running Springs Water District which collects, treats, and disposes of the Camp's wastewater. The existing sewer system in Green Valley Lake Road contains a 6-foot diameter lift station across the road from where Hume connects to their system in Green Valley Lake Road. An existing 8-inch gravity sewer line runs south down Green Valley Lake Road until flowing into the lift station at the entrance to the Hume camp which pumps to an 8-inch force main which runs down Green Valley Lake Road until reaching Highway-18. Hume's wastewater flows through their private system into a discharge manhole at the entrance to the camp which gravity flows into the existing lift station. This existing infrastructure is depicted Appendix E.

Proposed Sewer Generation

In accordance with the County standards, a peaking factor of 3.4 was applied to average daily demand to determine peak flow for the Camp. The average daily sewer generation and corresponding peak flows for individual occupant types are shown in Table 9.

Table 9 Estimated Camp Expansion Sewage Generation

	Occupant Type	Count	Occupancy Duration (% of year)	Equivalent Days	Annual Sewage Generation[1] (Gallons)	Peak Sewage Flows (Gallons)
Employee	Full Time Employees	120	100%	365	3,504,000	11,913,600
	Part Time Employees	200	50%	182.5	2,920,000	9,928,000
	Winter Seasonal	350	17%	63.145	1,768,060	6,011,404
	Summer Seasonal	680	17%	63.145	3,435,088	11,679,299
Camper/Guest	High School Guests	1000	13%	50	4,000,000	13,600,000
	Middle School Guests	784	13%	50	3,136,000	10,662,400
	Adult Lodge	140	13%	50	560,000	1,904,000
	Elementary Age Guests	500	13%	50	2,000,000	6,800,000
	Wildwood Camp	130	13%	50	520,000	1,768,000
			Total Demand	21,843,148 Gallons per Year (GPY)		74,266,703 Gallons per Year (GPY)
				59,844 Gallons per Day (GPD)		203, 470 Gallons per Day (GPD)

[1] *Annual domestic Demand = Equivalent Days * Count * 180 GPCPD (San Bernardino County, Special Districts Department, Standards for Sewer Systems, 2012)*

This method for calculating peak sewer flow for each development involved determining the proportion of campers per phase and multiplying this percentage to the overall projected peak flow for the entire proposed development, as shown in Table 10.

Table 10 Sewer Generation per Phase

	Occupant Type	Phase	Percentage of Camp	Peak Sewage Generation per Phase (GPD)
Camper/Guest	High School Guests	2	39%	79,667.19
	Middle School Guests	1	31%	62,459.08
	Adult Lodge	3	5%	11,153.41
	Elementary Age Guests	4	20%	39,833.59
	Wildwood Camp	5	5%	10,356.73
			100%	203,470

Proposed Sewer System

To accommodate the Camp's expansion, which includes additional dwelling units and facilities, significant updates to the existing sewer system are required. Specifically, due to the hilly natural terrain of the camp, a traditional gravity sewer system will not be feasible. The planning for the expanded sewer system is segmented into three parts, each aimed at servicing the proposed buildings and integrating the proposed sewer system into the existing infrastructure. Detailed layouts for the proposed sewer improvements are provided in Appendix B, with a summary of each phase improvement below:

1. Phases 1, 2, and 3: Improvements in these phases include conveying the sewer generation into the Camp's existing sewer system. A list station is proposed at the southern edge of Phase 2 to manage the elevation differential across Phases 2 and 3. The sewage will travel by gravity to this lift station, labeled Lift Station 1 in Appendix B, where it will be pumped by force main into the existing sewer system near the existing water tank and gravity flow to the existing lift station located in Phase 1. The existing lift station will pump the additional sewage by 6-inch force main off-site and discharge into the Running Springs Water District's system in Green Valley Lake Road.

2. Phase 4: Located across Green Valley Lake Road, sewer generation from Phase 4 will connect directly into Running Springs Water District's sewer lift station located along Green Valley Lake Road. Connecting directly into the public lift station eliminates the need for an easement through the Green Valley Lake Road Right-of-Way. Additional off-site lift station analysis is recommended to determine the lift station's capacity and potential point of connection.

3. Phase 5: Sewer from this phase will connect to Running Springs Water District's 8-inch gravity sewer in Green Valley Lake Road by proposed lift station, labeled Lift Station 2 in Appendix B, and force main. Lift Station 2 shall be located at the southern end of Phase 5, at the lowest elevation. The force main will connect to a proposed discharge manhole within the Camp property and be conveyed by 8-inch gravity sewer into Running Springs Water District's public system. To connect to the public system, a manhole shall be constructed in Green Valley Lake Road within Running Springs Water District's Right-of-Way.

The proposed sewer system is depicted in Appendix B with corresponding construction costs for the improvements detailed in Appendix C.

Proposed Sewer Pipe Capacities

To support the Camp expansion, an analysis was performed to determine the minimum pipe slopes and diameters required to effectively handle the cumulative flow anticipated. While each phase primarily handles its distinct flow, Phase 1 is an exception, as it will also accommodate additional flows from Phases 2 and 3. Bentley System's Flowmaster software was utilized to perform the sewer capacity calculations. The detailed Flowmaster results are displayed in Appendix F and summarized in Table 11.

Table 11 Proposed Sewer System Pipe Capacities

	Pipe Diameter (in)	Total Flow (GPD)	Channel Slope	Normal Depth (in)	Percent Full	Velocity (FPS)
Phase 1	6	153,279	0.5%	3.5	57.6%	2.03
	8	153,279	0.5%	2.9	36.1%	2.09
	10	153,279	0.5%	2.6	26.4%	2.06
Phase 2	6	79,667	0.7%	2.1	35.0%	2.01
	8	79,667	0.8%	1.8	22.8%	2.05
Phase 3	6	11,153	3.5%	0.5	8.9%	2.01
Phase 4	6	39,834	1.2%	1.3	21.4%	2.00
Phase 5	6	10,356	3.7%	0.5	8.4%	2.01

Sewer Pipe Improvements

Due to the additional sewer generation anticipated from the Camp expansion, particularly impacting Phase 1 from increased generation in Phases 2 and 3, increasing pipe diameters is recommended to satisfy pipe capacity requirements. In Phase 1, the current 4-inch and 6-inch gravity sewer pipes shall be replaced with 8-inch and 10-inch diameter pipes, respectively. Sewer pipe diameters for each phase are displayed in Table 11.

Proposed Lift Stations

The Camp has an existing lift station with an estimated 5-foot diameter wet well at the southwestern end of the existing site. To accommodate the Camp's expansion, two additional lift stations (Proposed Lift Stations 1 and 2) are proposed at low elevation locations in Phases 2 and 5. The existing lift station is assumed to receive peak flows from Phase 1, 2, and 3. Proposed Lift Station 1 will receive flows from Phase 2 and the proposed Lift Station 2 will receive flows from Phase 5. The locations, elevations, and discharge inverts of proposed Lift Stations 1 and 2 are depicted in Appendix B.

Conclusion

The Sewer Master Plan developed for the Camp's expansion accommodates the future sewer generation and adheres to the sewer design guidelines established by San Bernardino County. By incorporating a segmented sewer system approach overcomes the Camp's topography challenges while meeting sewer design criteria. This approach ensures the sewer infrastructure is adequately planned to support the Camp's future development needs, maintaining operational efficiency and compliance with regulatory standards.

Permitting Requirements

Running Spring Water District

The public sewer service provider for the Camp is the Running Springs Water District. For customers requiring new connections to the existing system with new construction will have to apply and follow the steps provided on the Running Springs Water District webpage. The proposed water system is private, but there are proposed sewer connection to existing lines within Green Valley Lake Road.

To obtain a permit for a sewer connection, the applicant will have to complete a Service Availability Application and return it to the office located at: 31242 Hilltop Boulevard, Running Springs, CA 92382. The applicant shall then complete the following steps to apply for a permit:

1. An owner desiring water, sewer, and fire protection services shall make application at the District office. A plan check fee of $220 is due at the time of application along with the submittal of the required plans prior to plan check processing and issuance of service availability letters.

2. Current Plan Check Fees:
    a. $50 Water and Sewer
    b. $170 Fire Letter
    c. $197 Fire Sprinkler Plan

3. Plot Plans: At the time of application, plans shall be submitted on 11” x 17” or larger sheets at a minimum scale of 1” = 10’, printed and stapled together to form a complete set. Two complete sets will be required with each application (one electronic copy is also preferred) along with the following items within the plan sets:
    a. Legal owner’s name and phone number
    b. Lot, Block, and Tract
    c. Address
    d. Assessor’s Parcel Number
    e. Lot Dimensions
    f. Names of surrounding streets
    g. Distances to structures on adjacent lots, if structures are less than 30 feet from construction (including, but not limited to, existing or proposed neighboring properties including homes, barns, garages, sheds, wells, outhouses, etc.)
    h. Topographical Survey including points of access
    i. Square Footage
    j. New Construction - all livable and non-livable/residential storage
    k. Addition - existing and proposed
    l. Additions - floor plans for the existing structure

4. Letters take three (3) weeks for processing and only the owner may pick up the set of Letters. An agent must provide the District with a notarized Letter of Authorization from owner to pick up plans.

Crestline Lake Arrowhead Water Agency (CLAWA)

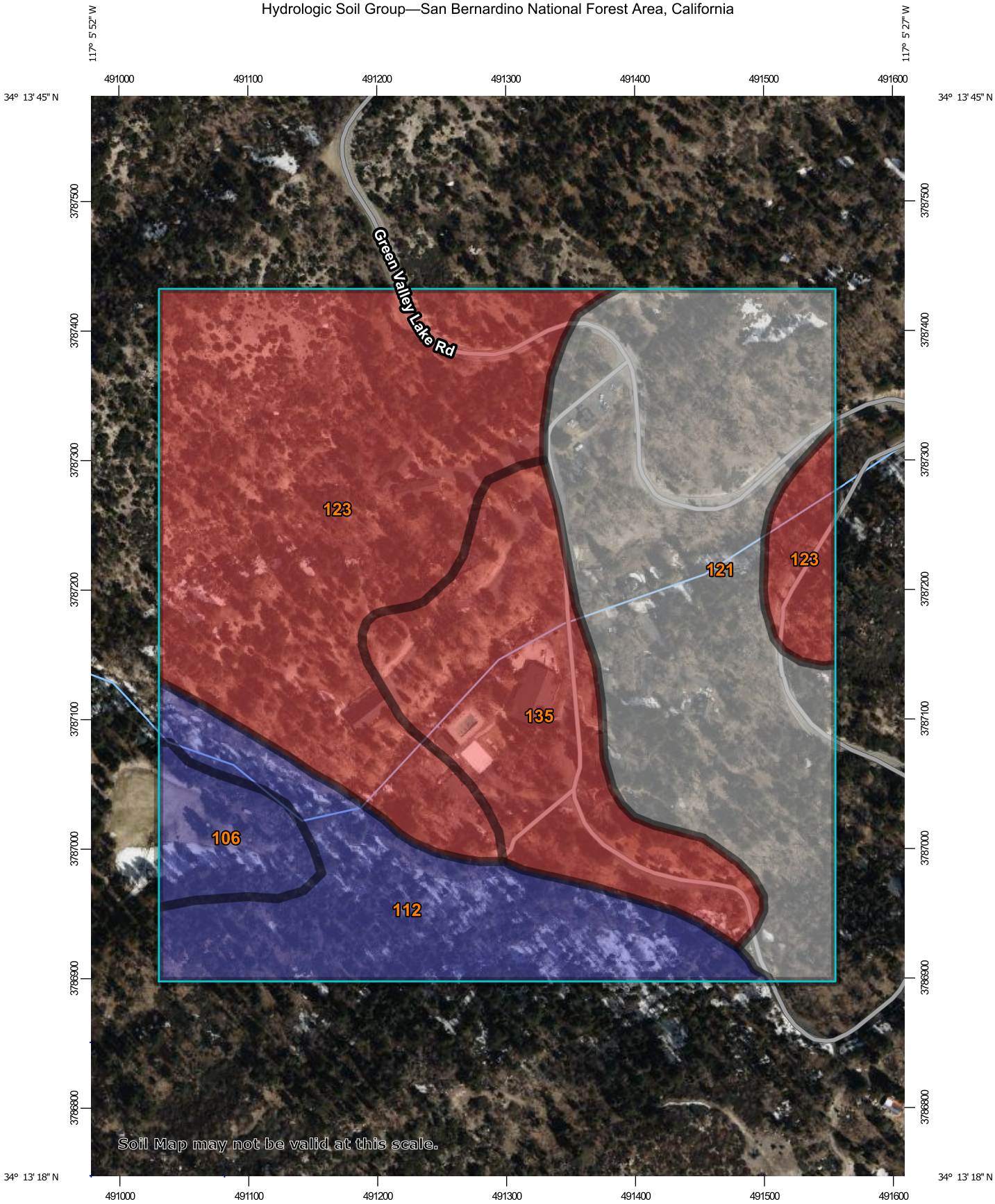
The Camp has a public water connection to the Crestline Lake Arrowhead Water Agency's (CLAWA) potable water system. CLAWA is a State Water Project purveyor and has the capacity to serve the Camp in the future following the proposed Project. The *Water Supply Assessment* prepared by KH outlines the future demand and various scenarios for satisfying the demand. The Camp prefers to integrate CLAWA's water into the Camp's supply to ensure water supply sustainability and reliability. The objective of the *Water Supply Assessment* is to establish a maximum allotted supply from CLAWA to the Camp.

San Bernardino County

To connect to the existing sewer in Green Valley Lake Road, the applicant will require an Encroachment Permit from the County of San Bernardino to trench within the right of way and connect to the existing sewer system along with crossing the Right-of-Way to supply water to Phase 4. The requirements and applications for an Encroachment Permit can be found on the San Bernardino County permitting website.

If this construction requires road closures, then a Road Closure permit will also be required from the County of San Bernardino.

Appendix A – Web Soil Survey



Map Scale: 1:4,070 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 150 300 600 900

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Lines

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Points

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: San Bernardino National Forest Area, California
Survey Area Data: Version 15, Aug 30, 2023

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 17, 2022—Jun 12, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
106	Cedarpines-Stargazer-Urban land complex, 15 to 30 percent slopes	B	2.7	3.9%
112	Cedarpines-Plaskett-Stargazer complex, 30 to 50 percent slopes	B	10.5	15.0%
121	Rock outcrop-Cedarpines-Plaskett complex, 15 to 35 percent slopes		20.8	29.8%
123	Runningsprings-Cedarpines-Plaskett complex, 15 to 35 percent slopes	D	25.0	35.9%
135	Urban land	D	10.7	15.4%
Totals for Area of Interest			**69.6**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Appendix B – Water and Sewer Exhibits

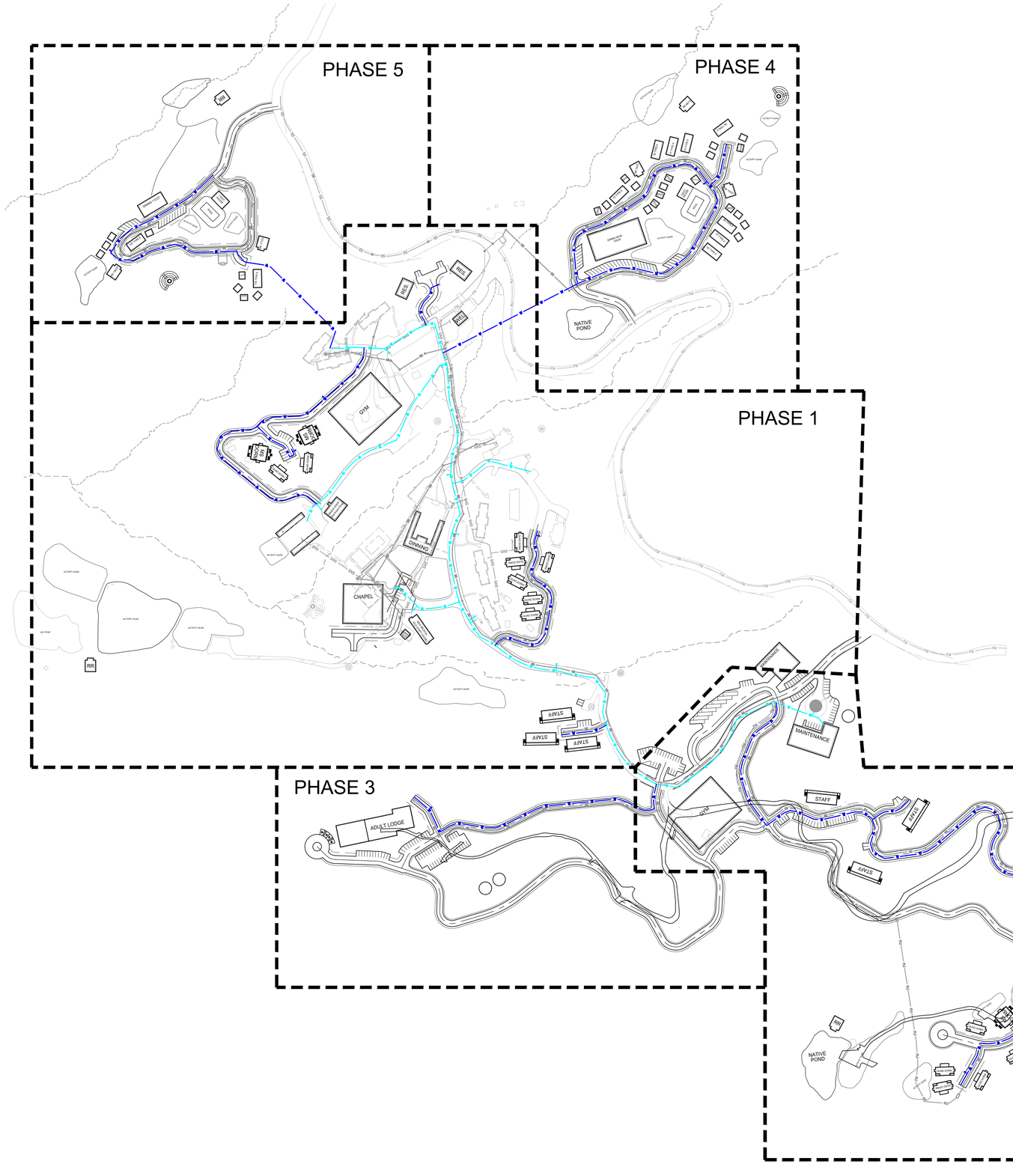
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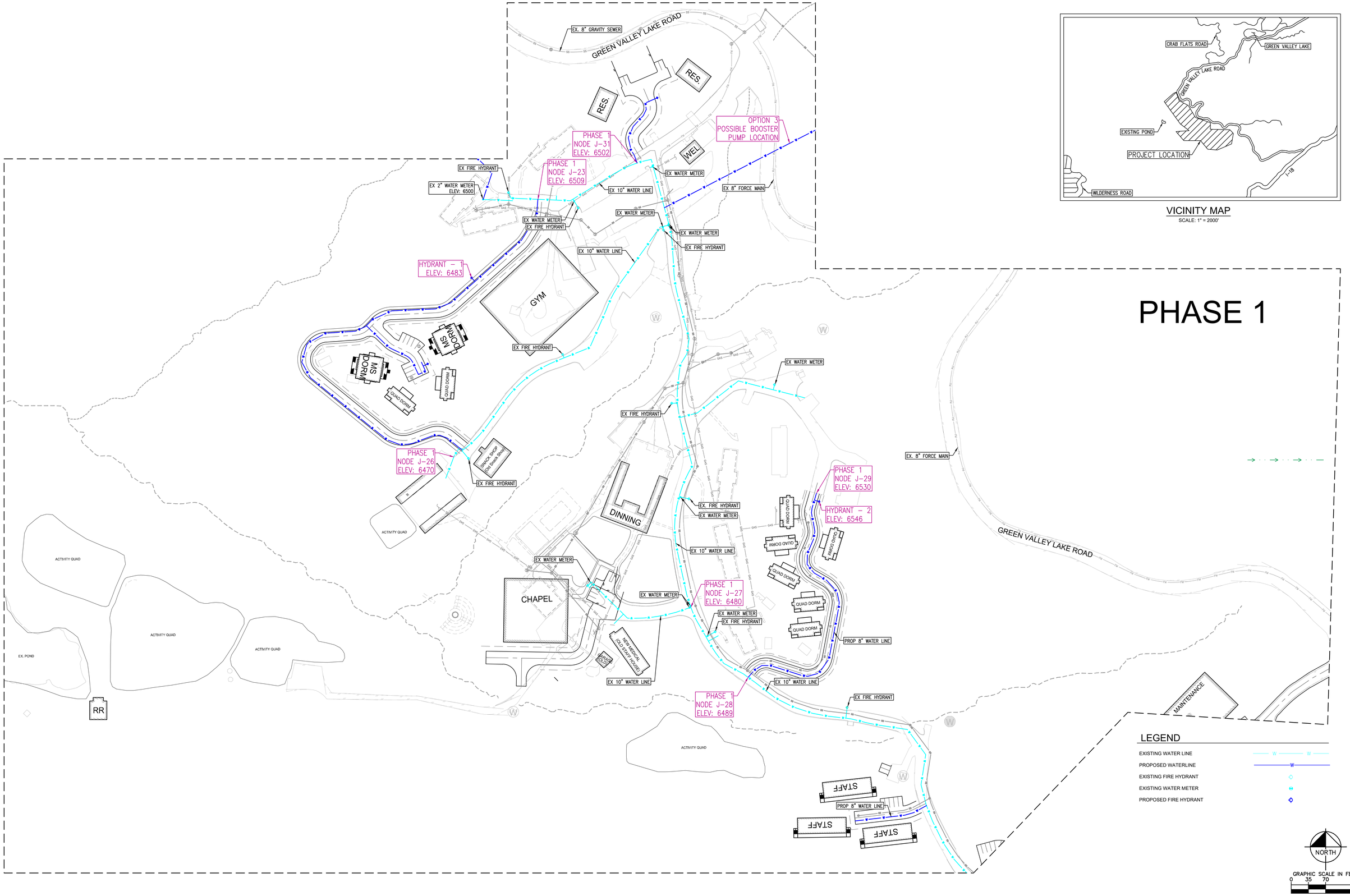
PHASE 4

PHASE 1

PHASE 3

PHASE 2


GATE
RES
RES
RES



VICINITY MAP
SCALE: 1" = 2000'

PHASE 1

LEGEND

- EXISTING WATER LINE
- PROPOSED WATERLINE
- EXISTING FIRE HYDRANT
- EXISTING WATER METER
- PROPOSED FIRE HYDRANT

NORTH

GRAPHIC SCALE IN FEET
0 35 70 140

No.	REVISIONS	DATE	BY

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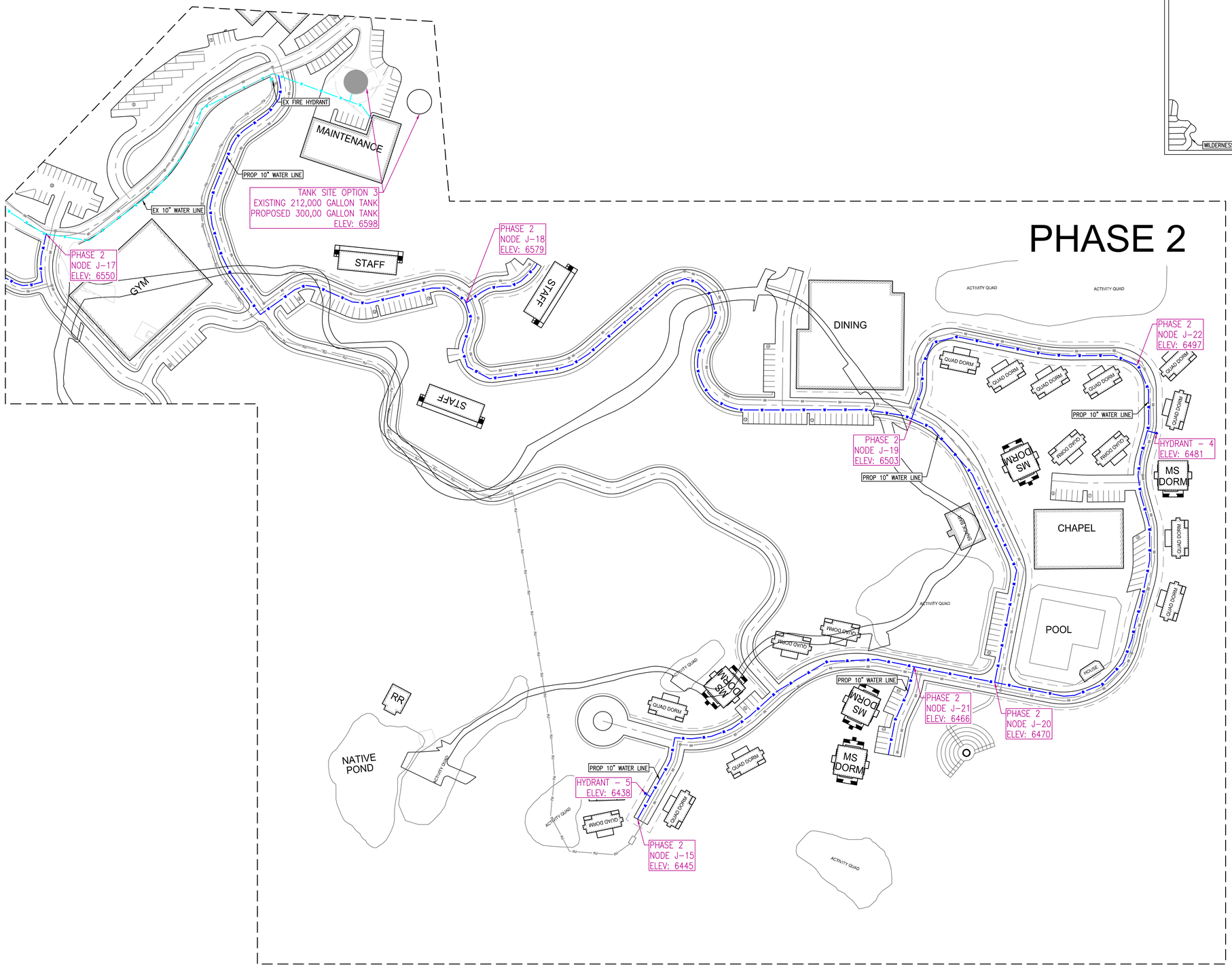
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SCALE	AS SHOWN
DESIGNED BY	JDA
DRAWN BY	JDA
	___

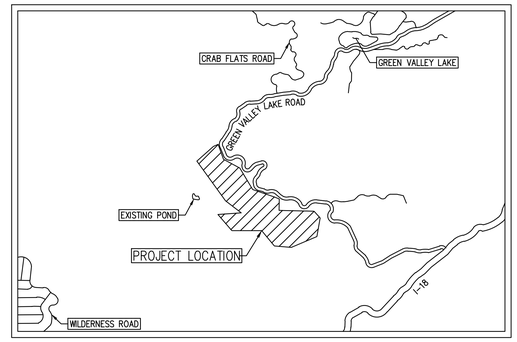
HUME SOCAL - GREEN VALLEY LAKE, CA
PREPARED FOR
HUME LAKE
MUNICIPALITY CA

WATER EXHIBIT - PHASE 1

SHEET NUMBER
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VICINITY MAP
SCALE: 1" = 2000'

LEGEND

EXISTING WATER LINE	W W
PROPOSED WATERLINE	W
EXISTING FIRE HYDRANT	
EXISTING WATER METER	
PROPOSED FIRE HYDRANT	

NORTH

GRAPHIC SCALE IN FEET
0 35 70 140

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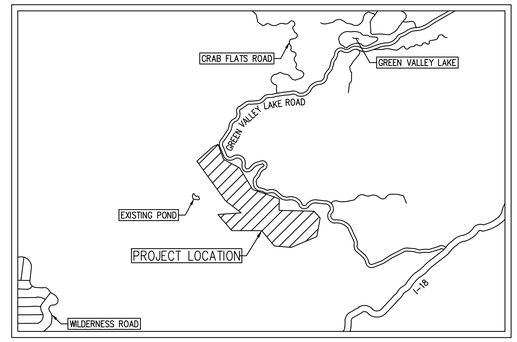
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DATE	1/31/2024
SCALE	AS SHOWN
DESIGNED BY	JDA
DRAWN BY	JDA
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WATER EXHIBIT - PHASE 2

SHEET NUMBER
3

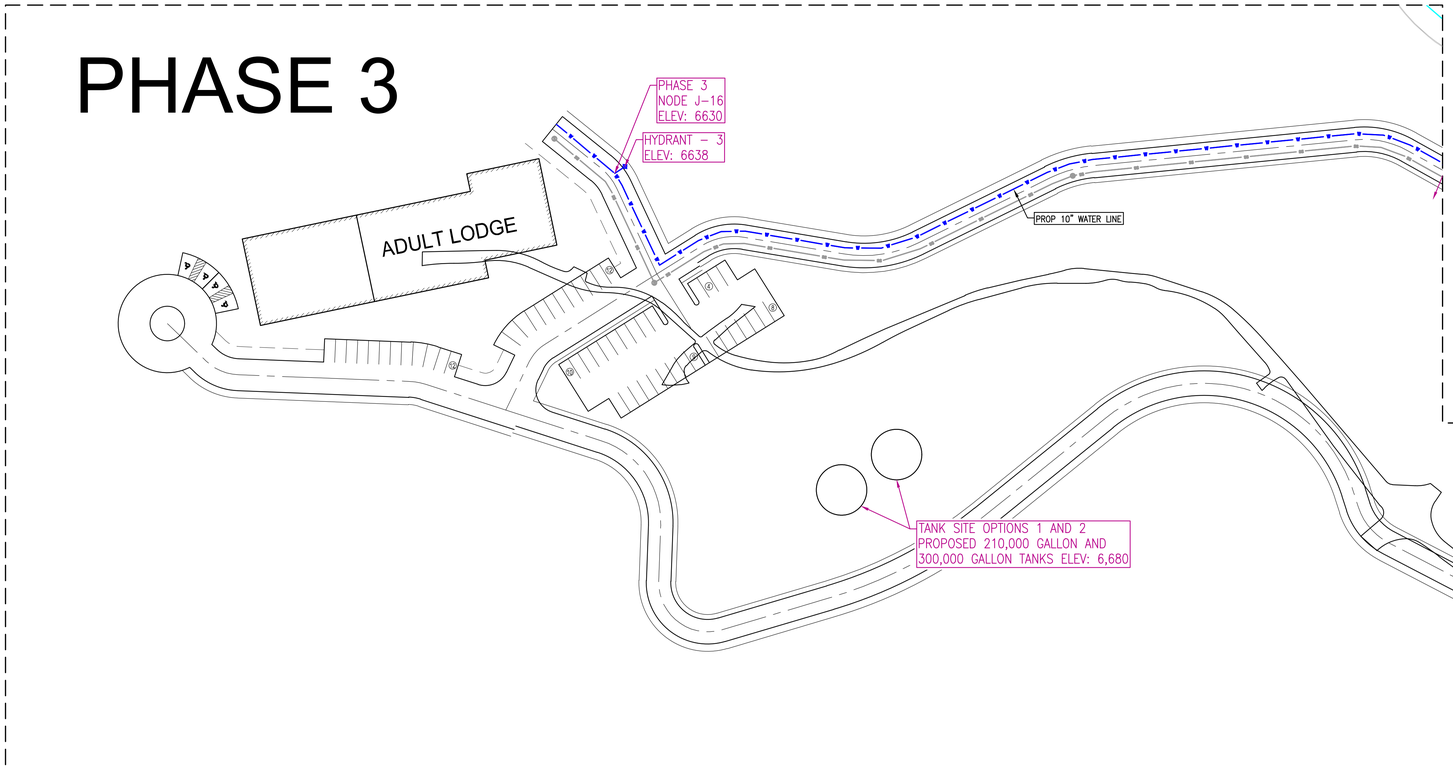
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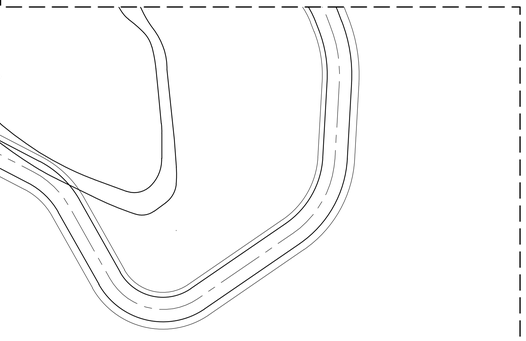


VICINITY MAP

SCALE: 1" = 2000'

PHASE 3





LEGEND

EXISTING WATER LINE	W W
PROPOSED WATERLINE	W
EXISTING FIRE HYDRANT	
EXISTING WATER METER	
PROPOSED FIRE HYDRANT	

NORTH

GRAPHIC SCALE IN FEET
0 25 50 100

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KHA PROJECT	
DATE	1/31/2024
SCALE	AS SHOWN
DESIGNED BY	JDA
DRAWN BY	JDA
	___

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MUNICIPALITY CA

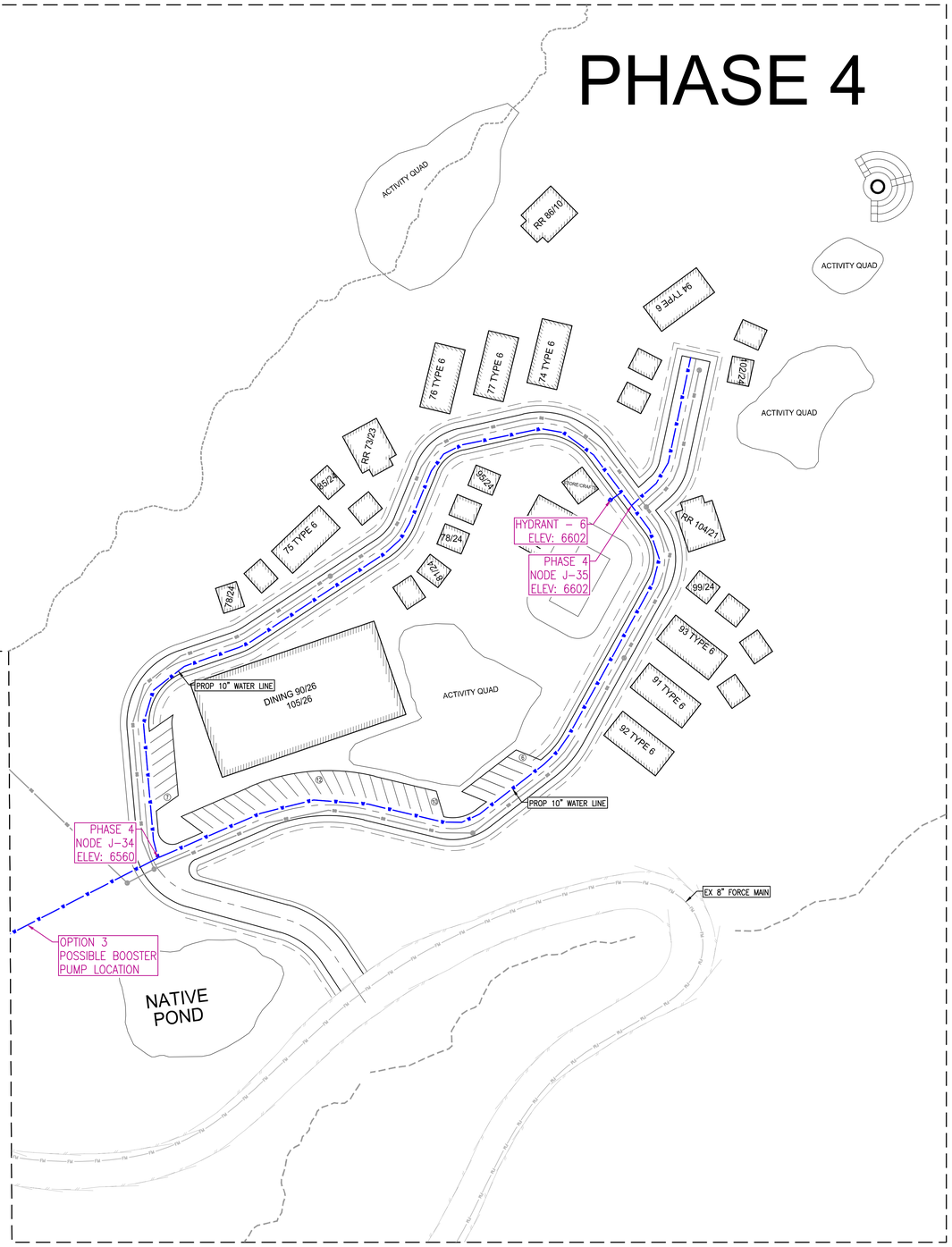
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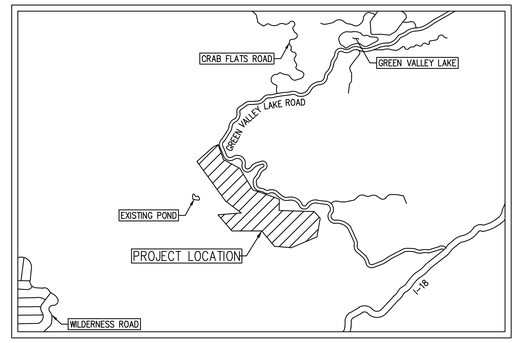
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PHASE 4





VICINITY MAP
SCALE: 1" = 2000'

LEGEND

EXISTING WATER LINE	W W
PROPOSED WATERLINE	W
EXISTING FIRE HYDRANT	
EXISTING WATER METER	
PROPOSED FIRE HYDRANT	

NORTH

GRAPHIC SCALE IN FEET
0 25 50 100

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KHA PROJECT	
DATE	1/31/2024
SCALE	AS SHOWN
DESIGNED BY	JDA
DRAWN BY	JDA
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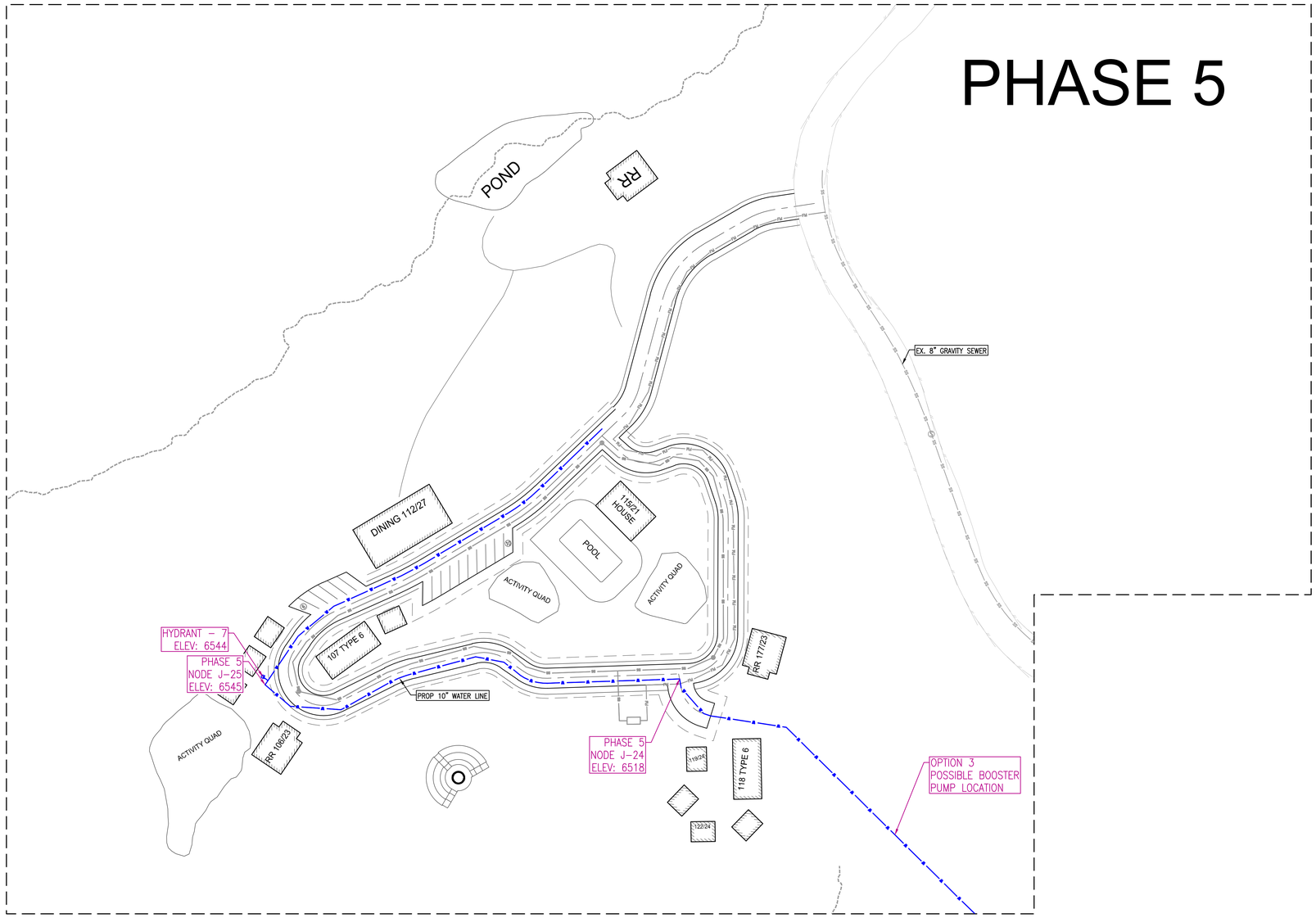
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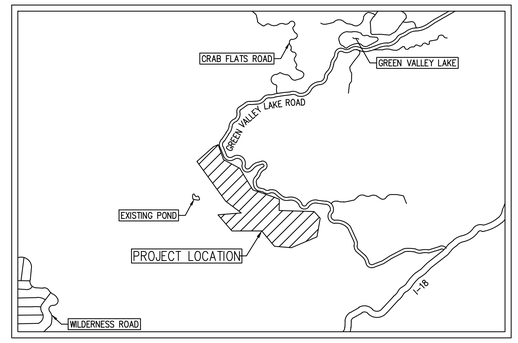
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SHEET NUMBER
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PHASE 5





VICINITY MAP
SCALE: 1" = 2000'

LEGEND

EXISTING WATER LINE	W W
PROPOSED WATERLINE	W
EXISTING FIRE HYDRANT	
EXISTING WATER METER	
PROPOSED FIRE HYDRANT	

NORTH

GRAPHIC SCALE IN FEET
0 25 50 100

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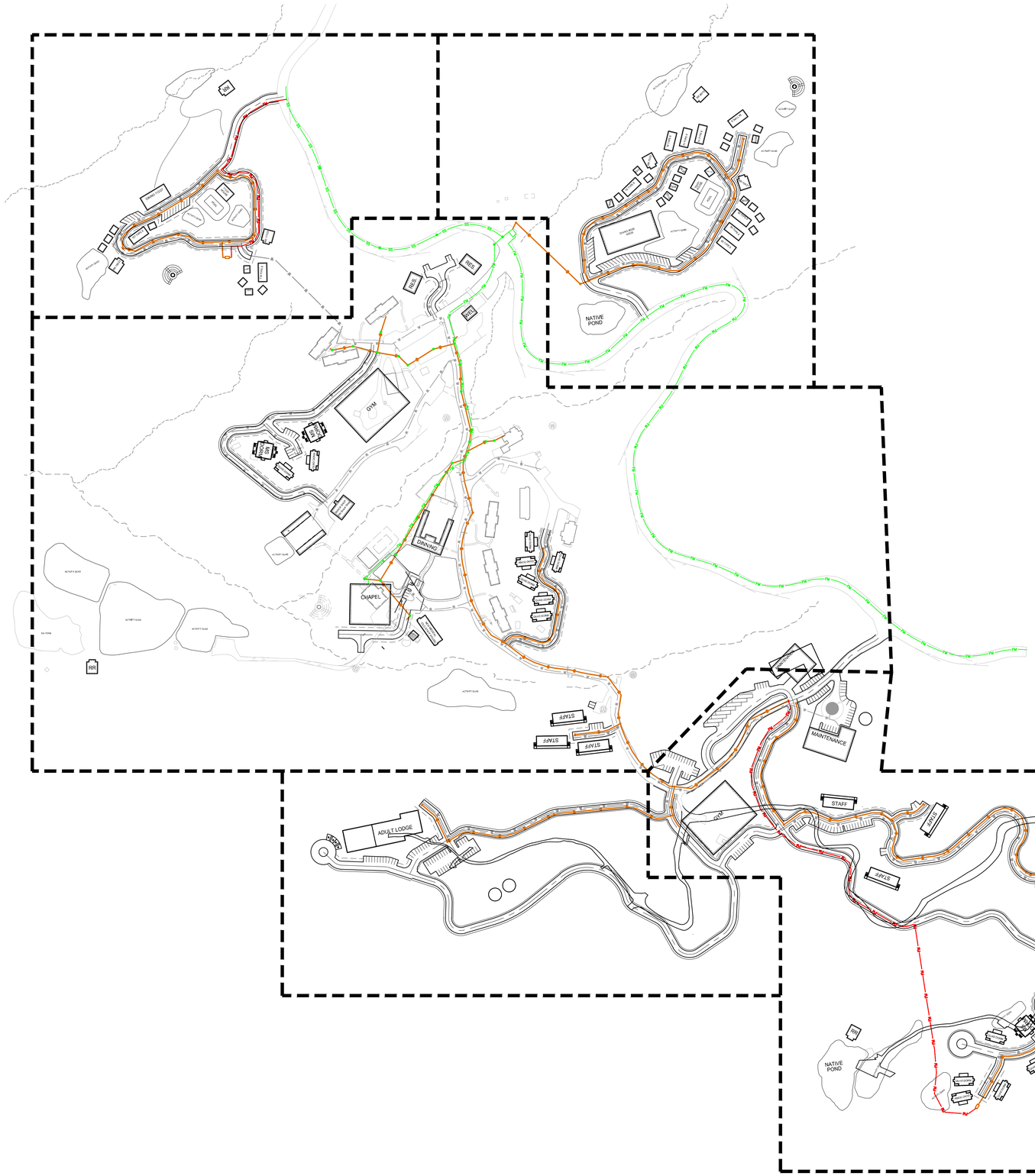
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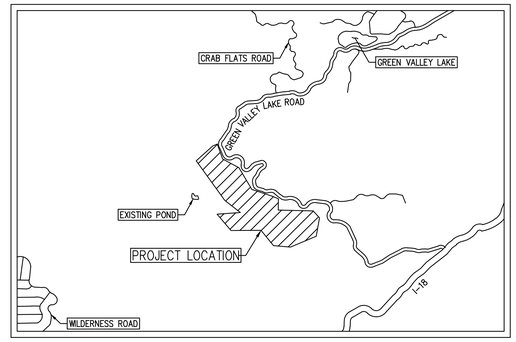
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PH-4 ELEMENTARY AGE CAMP

SHEET NUMBER
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VICINITY MAP

SCALE: 1" = 2000'

LEGEND

EXISTING SEWER LINE	S
EXISTING FORCE MAIN	FM FM
PROPOSED SEWER LINE	S
PROPOSED FORCE MAIN	FM FM
FLOW LINE	
EXISTING STREAM	
EXISTING SEWER MANHOLE	S
PROPOSED SEWER MANHOLE	S

NORTH

GRAPHIC SCALE IN FEET
0 75 150 300

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DATE	1/30/2024
SCALE	AS SHOWN
DESIGNED BY	JDA
DRAWN BY	JDA
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SEWER EXHIBIT - OVERVIEW

SHEET NUMBER
1

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KEY MAP

VICINITY MAP
SCALE: 1" = 2000'

LEGEND

- EXISTING SEWER LINE
- EXISTING FORCE MAIN
- PROPOSED SEWER LINE
- PROPOSED FORCE MAIN
- FLOW LINE
- EXISTING STREAM
- EXISTING SEWER MANHOLE
- PROPOSED SEWER MANHOLE

NORTH

GRAPHIC SCALE IN FEET
0 35 70 140

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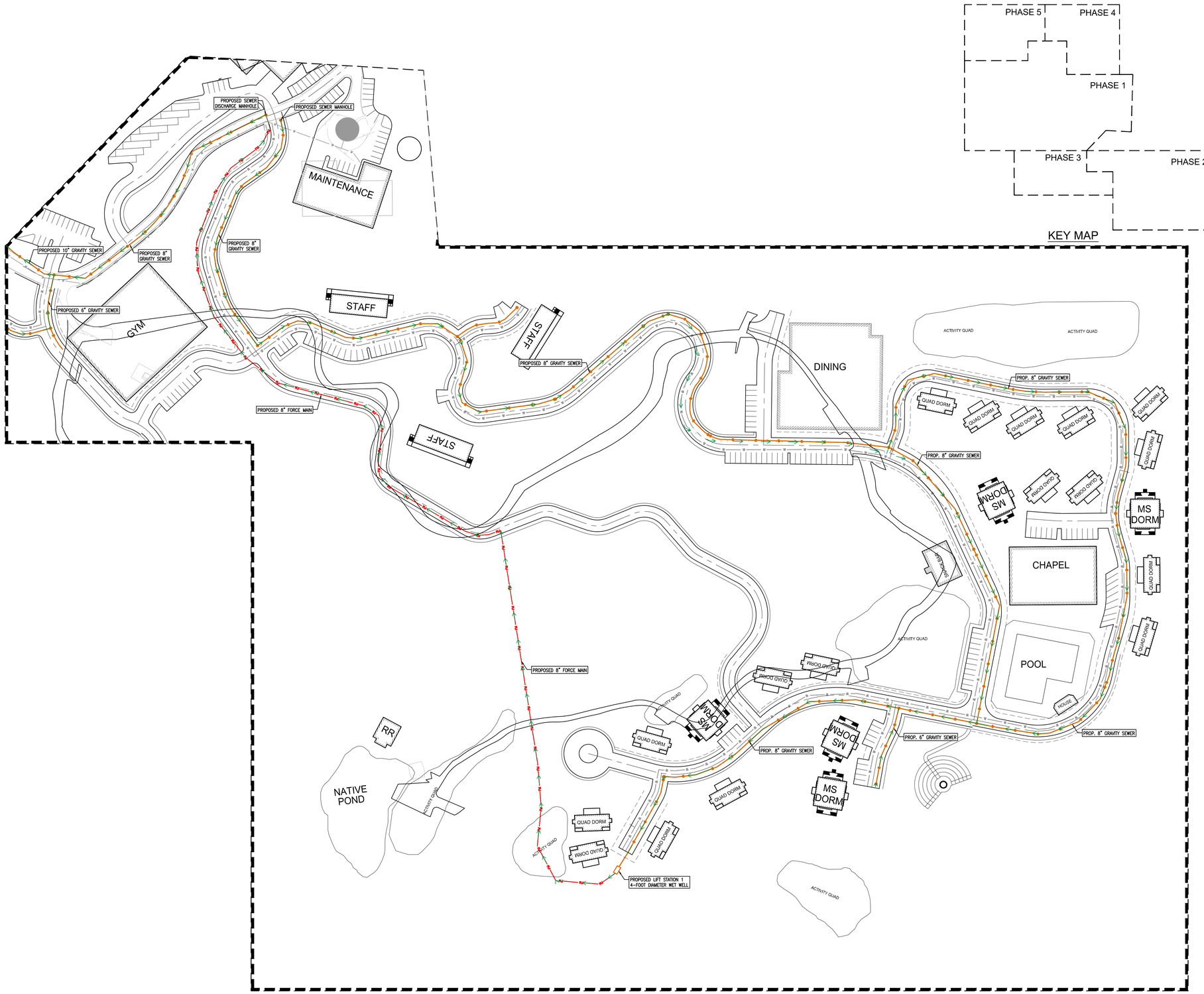
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DRAWN BY	JDA
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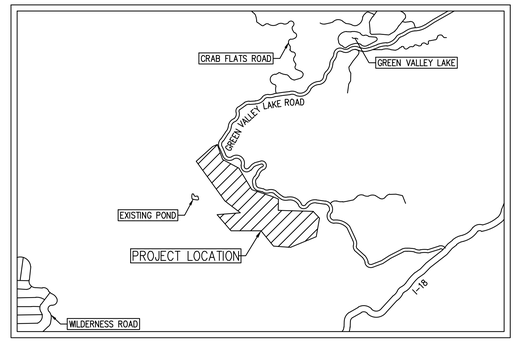
SEWER EXHIBIT - PHASE 1

SHEET NUMBER
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KEY MAP



VICINITY MAP
SCALE: 1" = 2000'

LEGEND

EXISTING SEWER LINE	S
EXISTING FORCE MAIN	FM FM
PROPOSED SEWER LINE	S
PROPOSED FORCE MAIN	FM FM
FLOW LINE	
EXISTING STREAM	
EXISTING SEWER MANHOLE	
PROPOSED SEWER MANHOLE	

NORTH

GRAPHIC SCALE IN FEET
0 35 70 140

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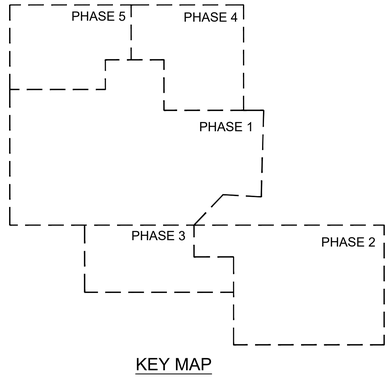
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SCALE	AS SHOWN
DESIGNED BY	JDA
DRAWN BY	JDA
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PREPARED FOR
HUME LAKE
MUNICIPALITY CA

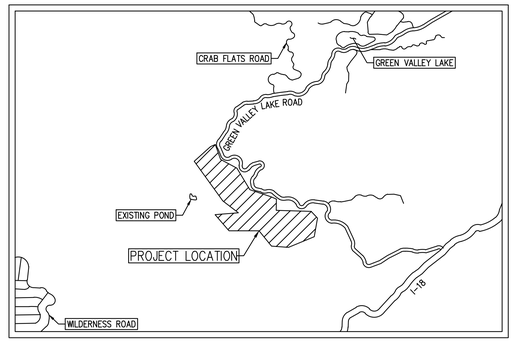
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SHEET NUMBER
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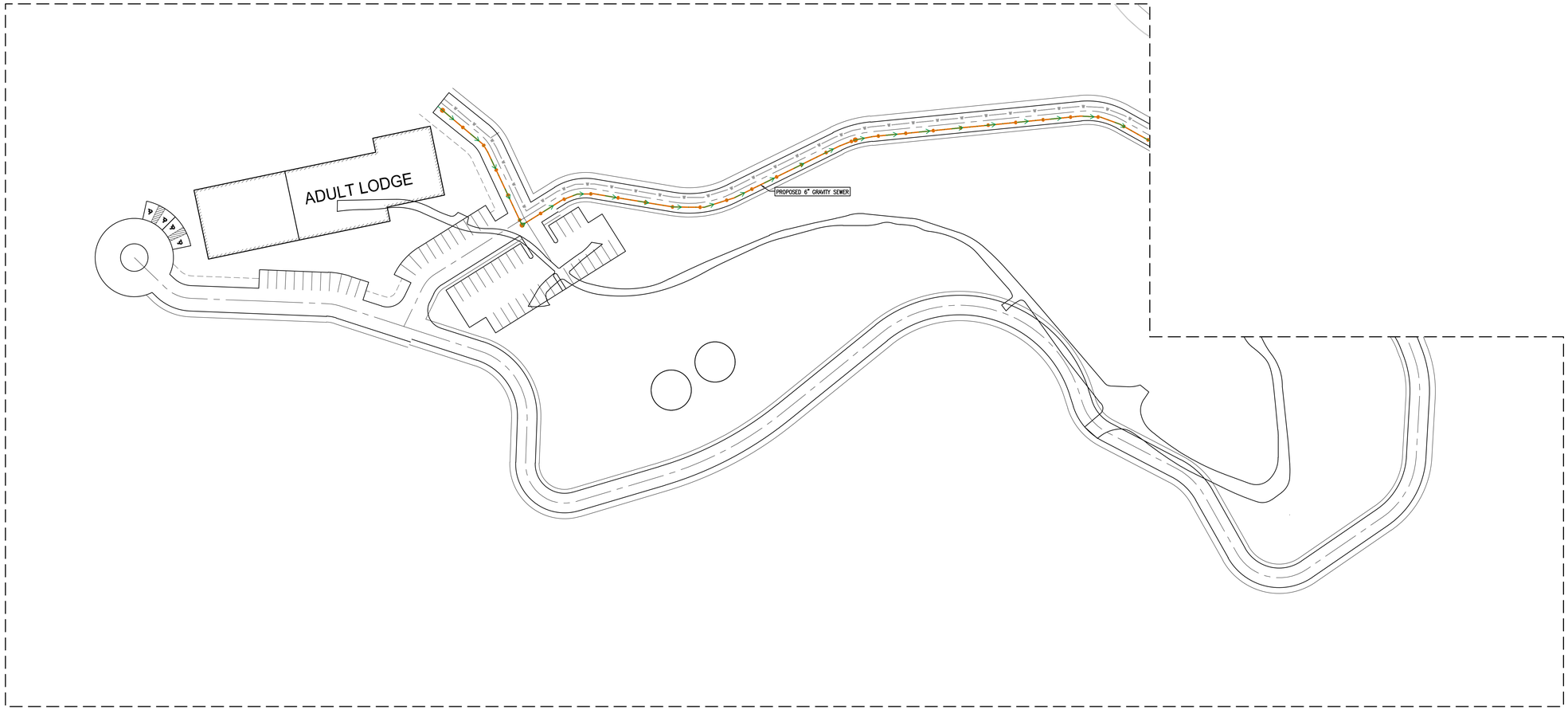


KEY MAP



VICINITY MAP

SCALE: 1" = 2000'



LEGEND

- EXISTING SEWER LINE — S —
- EXISTING FORCE MAIN — FM — FM —
- PROPOSED SEWER LINE — S —
- PROPOSED FORCE MAIN — FM — FM —
- FLOW LINE
- EXISTING STREAM
- EXISTING SEWER MANHOLE
- PROPOSED SEWER MANHOLE

NORTH

GRAPHIC SCALE IN FEET
0 25 50 100

No.	REVISIONS	DATE	BY

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KHA PROJECT	
DATE	1/30/2024
SCALE	AS SHOWN
DESIGNED BY	JDA
DRAWN BY	JDA
	___

HUME SOCAL - GREEN VALLEY LAKE, CA

PREPARED FOR

HUME LAKE

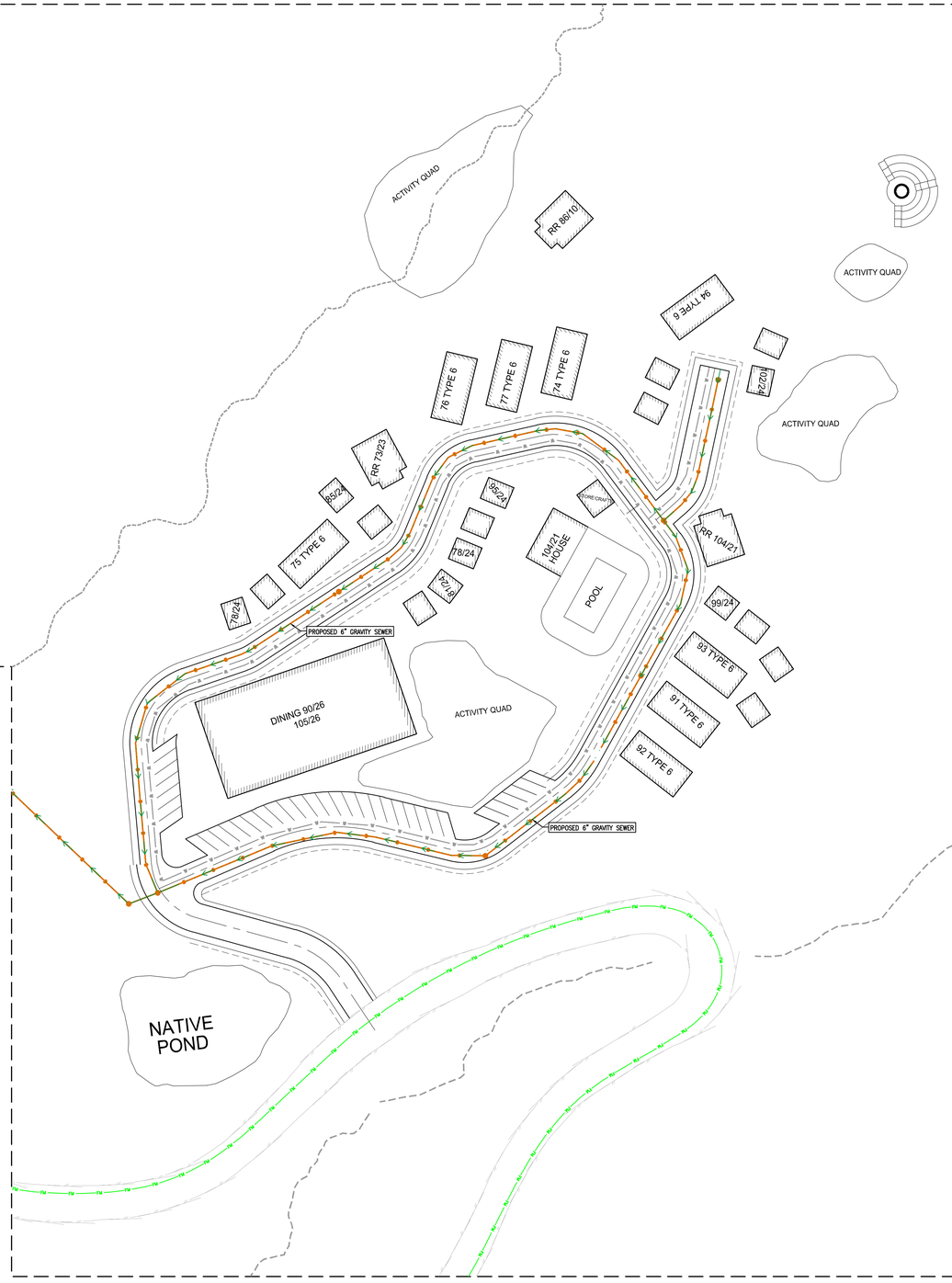
MUNICIPALITY CA

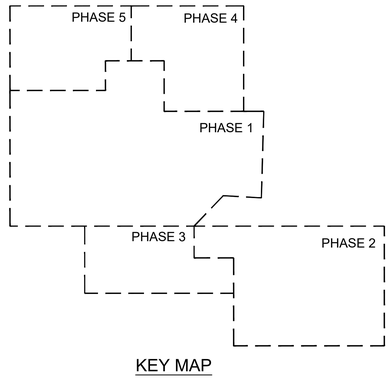
SEWER EXHIBIT - PHASE 3

SHEET NUMBER

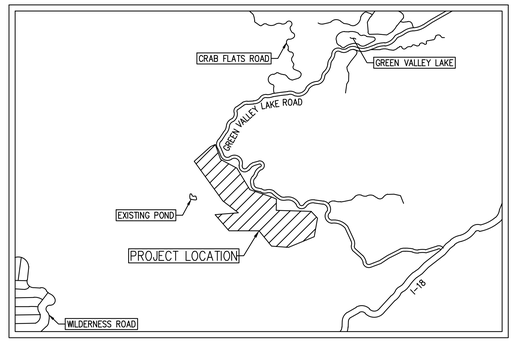
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KEY MAP



VICINITY MAP
SCALE: 1" = 2000'

LEGEND

EXISTING SEWER LINE	S
EXISTING FORCE MAIN	FM — FM
PROPOSED SEWER LINE	S
PROPOSED FORCE MAIN	FM — FM
FLOW LINE	
EXISTING STREAM	
EXISTING SEWER MANHOLE	S
PROPOSED SEWER MANHOLE	S

NORTH

GRAPHIC SCALE IN FEET
0 25 50 100

No.	REVISIONS	DATE	BY

Kimley»Horn

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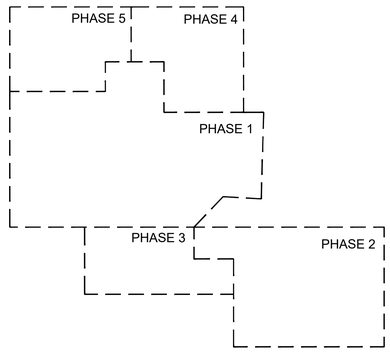
KHA PROJECT	
DATE	1/30/2024
SCALE	AS SHOWN
DESIGNED BY	JDA
DRAWN BY	JDA
	___

HUME SOCAL - GREEN VALLEY LAKE, CA
PREPARED FOR
HUME LAKE
MUNICIPALITY CA

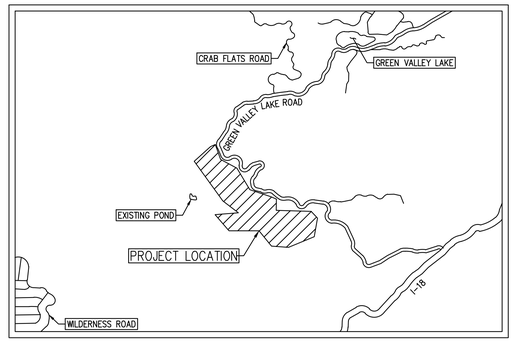
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SHEET NUMBER
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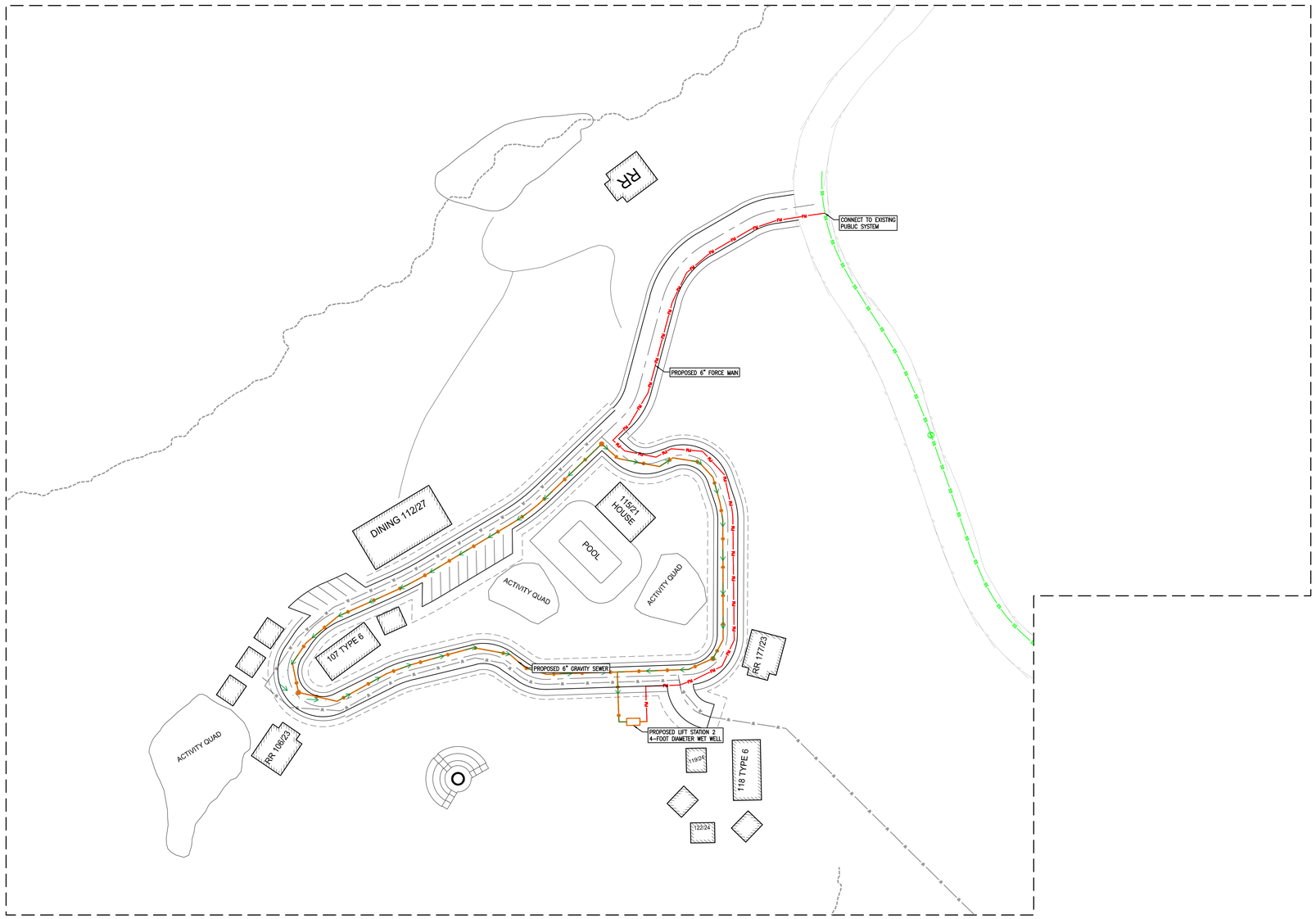


KEY MAP



VICINITY MAP

SCALE: 1" = 2000'



LEGEND

- EXISTING SEWER LINE
- EXISTING FORCE MAIN
- PROPOSED SEWER LINE
- PROPOSED FORCE MAIN
- FLOW LINE
- EXISTING STREAM
- EXISTING SEWER MANHOLE
- PROPOSED SEWER MANHOLE

NORTH

GRAPHIC SCALE IN FEET
0 25 50 100

No.	REVISIONS	DATE	BY

Kimley»Horn

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KHA PROJECT	
DATE	1/30/2024
SCALE	AS SHOWN
DESIGNED BY	JDA
DRAWN BY	JDA
	___

HUME SOCAL - GREEN VALLEY LAKE, CA
PREPARED FOR
HUME LAKE
MUNICIPALITY CA

SEWER EXHIBIT - PHASE 5

SHEET NUMBER
6

Plotted By:Wagaman, Samantha Sheet Set:Kha Layout:5 PH-4 ELEMENTARY AGE CAMP January 30, 2024 02:59:12pm I:\Shelly\01\ca_and1\REV_LDEV\195436002 - Hume SoCal Project\CAD\Exhibits\Sewer Study Exhibit\SewerExhibit.dwg
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Appendix C – Opinion of Probable Construction Costs

Client:	Hume Socal Camp	Date:	2/2/2024
Project:		Prepared By:	SW
KHA No.:	195436002	Checked By:	SW

Title: HUME Socal Option 1

No.	Item	Spec. #	Quantity	Unit	Unit Price	Cost
1	Mobilization (5%)		1	LS	$369,275.00	$369,275
2	6-Inch PVC Gravity Sewer Pipe		4,150	LF	$140.00	$581,000
3	8-Inch PVC Gravity Sewer Pipe		5,200	LF	$160.00	$832,000
4	10-Inch PVC Gravity Sewer Pipe		2,450	LF	$200.00	$490,000
5	4-Foot Diameter Sewer Manhole		30	EA	$8,000.00	$240,000
6	6-Inch PVC Sewer Force Main Piping		800	LF	$200.00	$160,000
7	8-Inch PVC Sewer Force Main Piping		1,900	LF	$250.00	$475,000
8	8-Inch PVC Water Pipe		5,200	LF	$225.00	$1,170,000
9	10-Inch PVC Water Pipe		5,400	LF	$250.00	$1,350,000
10	Fire Hydrant		6	EA	$5,000.00	$30,000
11	300,000-Gallon Water Tank - Equipment		300,000	GAL	$1.25	$375,000
12	300,000-Gallon Water Tank - Installation		1	LS	$100,000.00	$100,000
13	210,000 -Gallon Water Tank - Equipment		210,000	GAL	$1.25	$262,500
14	210,000-Gallon Water Tank - Installation		1	LS	$100,000.00	$100,000
15	Well Upgrades and Piping to New Tanks		1	LS	$500,000.00	$500,000
16	4-Foot Diameter Pre-Packaged Lift Station and Valve Vault - Equipment		1	LS	$50,000.00	$50,000
17	4-Foot Diameter Pre-Packaged Lift Station and Valve Vault - Installation		1	LS	$150,000.00	$150,000
18	6-Foot Diameter Pre-Packaged Lift Station and Valve Vault - Equipment		1	LS	$70,000.00	$70,000
19	6-Foot Diameter Pre-Packaged Lift Station and Valve Vault - Installation		1	LS	$150,000.00	$150,000
20	Flygt Submersible Pumps		4	EA	$25,000.00	$100,000
21	Misc. Pipe Spools, Fittings and Supports		1	LS	$50,000.00	$50,000
22	Electrical Equipment		1	LS	$150,000.00	$150,000
			Subtotal:			$7,754,775
			Conting. (%,+/-)		30	$2,326,433
			Engineering/Admin/Permitting. (%,+/-)		20	$1,550,955
			Total			$11,640,000

The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

Client:	Hume Socal Camp	Date:	2/2/2024
Project:		Prepared By:	SW
KHA No.:	195436002	Checked By:	SW

Title: HUME Socal Option 2

No.	Item	Spec. #	Quantity	Unit	Unit Price	Cost
1	Mobilization (5%)		1	LS	$361,775.00	$361,775
2	6-Inch PVC Gravity Sewer Pipe		4,150	LF	$140.00	$581,000
3	8-Inch PVC Gravity Sewer Pipe		5,200	LF	$160.00	$832,000
4	10-Inch PVC Gravity Sewer Pipe		2,450	LF	$200.00	$490,000
5	4-Foot Diameter Sewer Manhole		30	EA	$8,000.00	$240,000
6	6-Inch PVC Sewer Force Main Piping		800	LF	$200.00	$160,000
7	8-Inch PVC Sewer Force Main Piping		1,900	LF	$250.00	$475,000
8	8-Inch PVC Water Pipe		5,200	LF	$225.00	$1,170,000
9	10-Inch PVC Water Pipe		5,400	LF	$250.00	$1,350,000
10	Fire Hydrant		6	EA	$5,000.00	$30,000
11	300,000-Gallon Water Tank - Equipment		300,000	GAL	$1.25	$375,000
12	300,000-Gallon Water Tank - Installation		1	LS	$100,000.00	$100,000
13	210,000 -Gallon Water Tank - Equipment		210,000	GAL	$1.25	$262,500
14	210,000-Gallon Water Tank - Installation		1	LS	$100,000.00	$100,000
13	Booster Pump Station - Equipment		1	EA	$250,000.00	$250,000
14	Booster Pumps Station - Installation		1	EA	$100,000.00	$100,000
15	4-Foot Diameter Pre-Packaged Lift Station and Valve Vault - Equipment		1	LS	$50,000.00	$50,000
16	4-Foot Diameter Pre-Packaged Lift Station and Valve Vault - Installation		1	LS	$150,000.00	$150,000
17	6-Foot Diameter Pre-Packaged Lift Station and Valve Vault - Equipment		1	LS	$70,000.00	$70,000
18	6-Foot Diameter Pre-Packaged Lift Station and Valve Vault - Installation		1	LS	$150,000.00	$150,000
19	Flygt Submersible Pumps		4	EA	$25,000.00	$100,000
20	Misc. Pipe Spools, Fititngs and Supports		1	LS	$50,000.00	$50,000
21	Electrical Equipment		1	LS	$150,000.00	$150,000
				Subtotal:		$7,597,275
				Conting. (%,+/-)	30	$2,279,183
				Engineering/Admin/Permitting. (%,+/-)	20	$1,519,455
				Total		$11,400,000

The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

Client:	Hume Socal Camp	Date:	2/2/2024
Project:		Prepared By:	SW
KHA No.:	195436002	Checked By:	SW

Title: HUME Socal Option 3

No.	Item	Spec. #	Quantity	Unit	Unit Price	Cost
1	Mobilization (5%)		1	LS	$378,650.00	$378,650
2	6-Inch PVC Gravity Sewer Pipe		4,150	LF	$140.00	$581,000
3	8-Inch PVC Gravity Sewer Pipe		5,200	LF	$160.00	$832,000
4	10-Inch PVC Gravity Sewer Pipe		2,450	LF	$200.00	$490,000
5	4-Foot Diameter Sewer Manhole		30	EA	$8,000.00	$240,000
6	6-Inch PVC Sewer Force Main Piping		800	LF	$200.00	$160,000
7	8-Inch PVC Sewer Force Main Piping		1,900	LF	$250.00	$475,000
8	8-Inch PVC Water Pipe		5,200	LF	$225.00	$1,170,000
9	10-Inch PVC Water Pipe		5,400	LF	$250.00	$1,350,000
10	Fire Hydrant		6	EA	$5,000.00	$30,000
11	300,000-Gallon Water Tank - Equipment		300,000	GAL	$1.25	$375,000
12	300,000-Gallon Water Tank - Installation		1	LS	$100,000.00	$100,000
13	Booster Pump Station - Equipment		3	EA	$250,000.00	$750,000
14	Booster Pumps Station - Installation		3	EA	$100,000.00	$300,000
15	4-Foot Diameter Pre-Packaged Lift Station and Valve Vault - Equipment		1	LS	$50,000.00	$50,000
16	4-Foot Diameter Pre-Packaged Lift Station and Valve Vault - Installation		1	LS	$150,000.00	$150,000
17	6-Foot Diameter Pre-Packaged Lift Station and Valve Vault - Equipment		1	LS	$70,000.00	$70,000
18	6-Foot Diameter Pre-Packaged Lift Station and Valve Vault - Installation		1	LS	$150,000.00	$150,000
19	Flygt Submersible Pumps		4	EA	$25,000.00	$100,000
20	Misc. Pipe Spools, Fititngs and Supports		1	LS	$50,000.00	$50,000
21	Electrical Equipment		1	LS	$150,000.00	$150,000
			Subtotal:			$7,951,650
			Conting. (%,+/-)		30	$2,385,495
			Engineering/Admin/Permitting. (%,+/-)		20	$1,590,330
			Total			$11,930,000

The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

Appendix D – WaterCAD Results

OPTION 1 AND OPTION 2

Junction Table - Time: 0.00 hours

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-15	6,445.00	146	6,701.30	111
J-16	6,630.00	21	6,722.36	40
J-17	6,549.56	146	6,711.16	70
J-18	6,578.96	146	6,708.66	56
J-19	6,503.46	146	6,701.86	86
J-20	6,470.57	146	6,701.49	100
J-21	6,466.45	146	6,701.40	102
J-22	6,497.60	146	6,701.59	88
J-23	6,508.88	115	6,705.00	85
J-24	6,518.74	19	6,705.00	81
J-25	6,544.94	19	6,704.99	69
J-26	6,470.05	115	6,704.89	102
J-27	6,479.63	115	6,706.91	98
J-28	6,489.00	115	6,707.43	95
J-29	6,530.00	115	6,707.37	77
J-31	6,502.29	115	6,705.14	88
J-34	6,560.00	73	6,705.05	63
J-35	6,602.00	73	6,705.04	45
J-37	6,596.02	21	6,722.36	55

OPTION 3

Junction Table - Time: 0.00 hours

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-15	6,445.00	146	6,601.02	68
J-16	6,630.00	21	6,604.97	-11
J-17	6,549.56	146	6,604.97	24
J-18	6,578.96	146	6,608.39	13
J-19	6,503.46	146	6,601.58	42
J-20	6,470.57	146	6,601.22	57
J-21	6,466.45	146	6,601.13	58
J-22	6,497.60	146	6,601.31	45
J-23	6,508.88	115	6,598.82	39
J-24	6,518.74	19	6,598.81	35
J-25	6,544.94	19	6,598.81	23
J-26	6,470.05	115	6,598.71	56
J-27	6,479.63	115	6,600.73	52
J-28	6,489.00	115	6,601.25	49
J-29	6,530.00	115	6,601.18	31
J-31	6,502.29	115	6,598.96	42
J-34	6,560.00	73	6,598.87	17
J-35	6,602.00	73	6,598.86	-1

Appendix E – Record Drawings

BLDG I
CHAPEL

FUTURE SEWER

(STUB & PLUG)

PUMP PLANT (20) SEE SHEET 4

BLDG Q
REC. BLDG

BLDG P

EXISTING POOL

FORCE MAIN

GRAVITY

BLDG K
STAFF ONLY-DUPLEX

6" FLANGED GATE VALVE 12"x10"x4" TEE WITH SIDE FLANGES

PINK NEW SEWER

DELETED

BLDG J
DINING HALL & KITCHEN

GREASE TRAP

EXIST SLAB

BLDG N
GIRLS DORM

BLDG O
GIRLS DORM

BLDG M
GIRLS DORM

CLEAN OUT

MATCH LINE SEE SHEET 1

R=150' MIN.

FORCE MAIN

GRAVITY SEWER 40" DEEP (GREEN)

4" FIRE SPRINKLER (FD) 40" DEEP

BUILDING TO BE REMOVED

FORCE MAIN GOES OVER 6" SEWER

BOTH SEWER LINES GO UNDER WATER WITH 12" CLEARANCE. NO JOINTS IN SEWER LINES AND WATER LINES WITHIN 5' OF CROSSINGS.

CONCRETE ENCASE WHERE LESS THAN 3' COVER

45° BENDS

6" LATERAL GOES UNDER FORCE MAIN

BLDG H
GARAGE

NOTE: EXISTING BLDGS TO BE REMOVED

BLDG D
BOYS DORM

BLDG E
BOYS DORM

1-2½" 2-2" 1-1¼" 24" DEEP

SEWER LATERAL TO CROSS UNDER WATER=12" CLEARANCE

BLDG C
BOYS DORM

1½" PVC WATER SERVICE (NEW)

2-2" 1-1¼" 24" DEEP

LATERAL GOES UNDER FORCE MAIN

INV. 6485.00 GAS

SINGLE FAMILY

BLDG A

SEWER LATERAL TO GO UNDER WATER WITH 12" CLEARANCE (NO JOINTS IN SEWER LINES AND WATER LINES WITHIN 5' OF CROSSING)

6" FLANGED GATE VALVE 12"x10"x4" TEE WITH SIDE FLANGES

BLDG B
STUB & PLUG

SINGLE FAMILY RES.

CONSTRUCTION OF FORCE MAIN FOR LOCATION & ELEV.

GREEN VALLEY LAKE ROAD

NOTE:

1. ELEVATIONS SHOWN ABOVE ... WITH ... MINIMUM ... TO HOLD ... LINE TO ... NO DEPTH LESS THAN ... IF POSS...
2. STOP ALL FOUR IN...

Preliminary
NOT for Construction

California Council of Civil Engineers & Land Surveyors

40' 0' 40' 80' 120'
GRAPHIC SCALE: 1"=40'

Hall & Foreman, Inc
3170 REDHILL AVENUE · COSTA MESA, CA 92626-3425 · (714) 641-
CIVIL ENGINEERING · LAND PLANNING · LAND SURV...

Designed by ... Drawn by ... Checked by ...

REVISIONS ... Appr'd

BENCH MARK

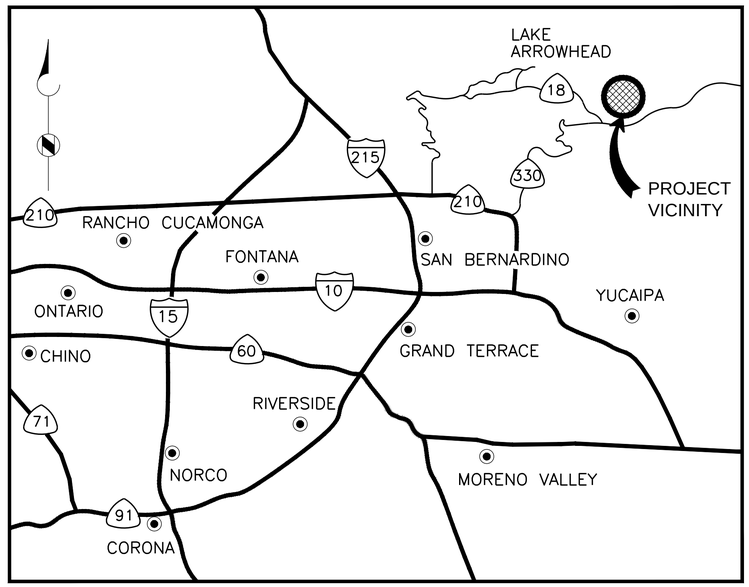
CALVARY CHAPEL YOUTH CAMP

COUNTY OF SAN BERNARDINO
COUNTY SERVICE AREA 79

CONTRACT DOCUMENTS FOR CONSTRUCTION OF

AHWAHNEE LIFT STATION (GREEN VALLEY LAKE)
WET WELL EXPANSION

JUNE 2014



VICINITY MAP
NO SCALE

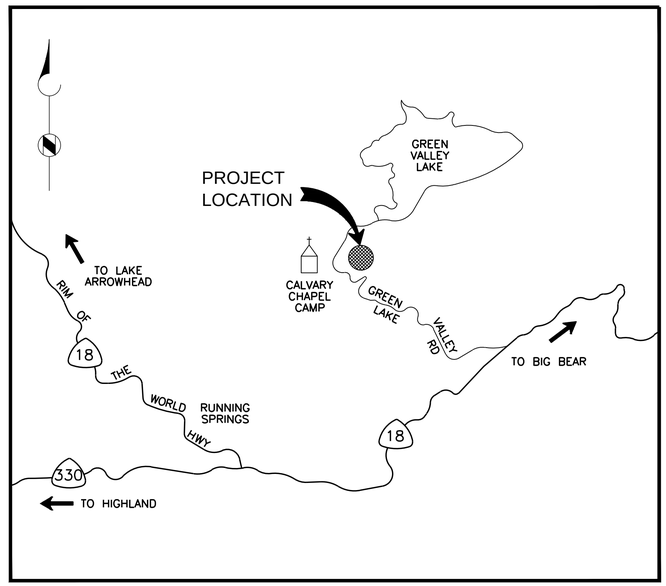
BOARD OF SUPERVISORS

ROBERT A. LOVINGOOD..... First District
JANICE RUTHERFORD..... (Chair) Second District
JAMES RAMOS..... Third District
GARY OVITT..... (Vice - Chair) Fourth District
JOSIE GONZALES..... Fifth District

INDEX OF DRAWINGS

1	G-1	VICINITY, LOCATION MAP AND INDEX OF DRAWINGS
2	G-2	GENERAL NOTES, SYMBOLS AND ABBREVIATIONS
3	C-1	SITE PLAN
4	C-2	OVERFLOW AND DRAIN LINE PLAN AND PROFILE
5	C-3	CROSS-SECTION AND DETAILS
6	AB-1	1974 RECORD DRAWING (SHEET 33) *
7	AB-2	1974 RECORD DRAWING (SHEET 34) *

* FOR REFERENCE ONLY



LOCATION MAP
NO SCALE

REGISTERED PROFESSIONAL ENGINEER
ERIK T. HOWARD
No. C53318
Exp. 6/30/15
CIVIL
STATE OF CALIFORNIA

ATKINS
650 E. HOSPITALITY LN. SUITE 460, SAN BERNARDINO, CA 92408
Tel: (909) 890-5951, Fax: (909) 890-3610
www.atkinsglobal.com/northamerica

REV.	DATE	DESCRIPTION	APP.

SUBMITTED BY: ERIK T. HOWARD R.C.E. NO. C53318 DATE: 06/12/14

MV / JH DESIGNED
MV / JH DRAWN
E. HOWARD CHECKED

CONTACT PERSON: JAMES ORAVETS, DEPUTY DIRECTOR DATE

APPROVED BY: COUNTY OF SAN BERNARDINO DATE

COUNTY OF SAN BERNARDINO
SPECIAL DISTRICTS DEPARTMENT
157 W. FIFTH STREET 2ND FLOOR
SAN BERNARDINO, CA 92415-0450

AHWAHNEE LIFT STATION
WET WELL EXPANSION

VICINITY, LOCATION MAP,
AND INDEX OF DRAWINGS

DRAWING NUMBER G-1
SHEET 1 OF 7
SCALE: AS SHOWN
DATE: MAY 2014

DWG: Z:\10003695-SBCSDD-Dn Coll 2016\H_WD 5_Ahwahnee LS_Green Valley\Design\01-TITLSHT-G01-AW.dwg USER: herr8226
DATE: Jun 12, 2014 5:33pm XREFS: Z_BDR_AW

GENERAL NOTES

1. ALL IMPROVEMENTS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE COUNTY OF SAN BERNARDINO SPECIAL DISTRICTS DEPARTMENT STANDARDS, (LATEST), STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION AND THE AMERICAN WATER WORKS ASSOCIATION STANDARDS AND DRAWINGS. THE CONTRACTOR SHALL HAVE A CURRENT COPY OF THE SEWER STANDARD DRAWINGS AND SPECIFICATIONS AT THE JOB SITE AT ALL TIMES.

2. THE CONTRACTOR SHALL NOTIFY THE COUNTY OF SAN BERNARDINO, SPECIAL DISTRICTS DEPARTMENT ENGINEERING AND CONSTRUCTION DIVISION – PHONE (909) 387–5940 SEVEN (7) DAYS PRIOR TO ANY CONSTRUCTION. THE CONTRACTOR SHALL OBTAIN AN ENCROACHMENT PERMIT AND BUSINESS LICENSE FROM THE COUNTY OF SAN BERNARDINO PRIOR TO CONSTRUCTION.

3. THE CONTRACTOR SHALL NOTIFY THE LOCAL BUSINESSES AND RESIDENTS IN WRITING A MINIMUM OF SEVEN (7) DAYS PRIOR TO COMMENCEMENT OF CONSTRUCTION. THIS NOTIFICATION SHALL INFORM THE LOCAL BUSINESSES AND RESIDENTS OF ALL POSSIBLE INCONVENIENCES INCURRED BY THE CONSTRUCTION. THIS NOTIFICATION SHALL ALSO INCLUDE THE NAME OF THE CONSTRUCTION COMPANY, TELEPHONE NUMBER, AND PERSON TO CONTACT.

4. THE CONTRACTOR SHALL CONTACT UNDERGROUND SERVICE ALERT (811) AT LEAST 48 HOURS PRIOR TO ANY CONSTRUCTION.

5. THE CONTRACTOR AND SUBCONTRACTOR(S) PERFORMING WORK SHOWN ON OR RELATED TO THESE PLANS SHALL CONDUCT THEIR OPERATIONS SO THAT ALL EMPLOYEES ARE PROVIDED A SAFE PLACE TO WORK AND THAT THE PUBLIC IS PROTECTED. THE CONTRACTOR AND SUBCONTRACTOR(S) SHALL COMPLY WITH THE OCCUPATIONAL SAFETY AND HEALTH REGULATIONS OF THE U.S. DEPARTMENT OF LABOR AND THE STATE OF CALIFORNIA DEPARTMENT OF INDUSTRIAL RELATIONS "CONSTRUCTION SAFETY ORDERS". THE ENGINEER AND THE OWNER SHALL NOT BE RESPONSIBLE, IN ANY WAY, FOR THE COMPLIANCE WITH THESE LABOR AND SAFETY RULES BY THE CONTRACTOR OR SUBCONTRACTOR(S).

6. OPERATORS OF EQUIPMENT WHICH COULD COME IN CONTACT WITH OVERHEAD HIGH VOLTAGE POWER LINES SHALL BE AWARE OF THE PROXIMITY OF THE EQUIPMENT TO OVERHEAD LINES. THE CONTRACTOR SHALL COMPLY WITH THE REQUIREMENTS AND CLEARANCES OF TITLE 8 – INDUSTRIAL RELATIONS, DIVISION I, CHAPTER 4 – DIVISION OF INDUSTRIAL SAFETY, SUBCHAPTER 5 – ELECTRICAL SAFETY ORDERS, GROUP 2 – HIGH VOLTAGE ELECTRICAL SAFETY ORDERS, ARTICLE 37, SECTION 2946, PROVISIONS FOR PREVENTING ACCIDENTS DUE TO PROXIMITY TO OVERHEAD LINES. IF THESE CLEARANCES CANNOT BE MAINTAINED, THE CONTRACTOR SHALL CONTACT SOUTHERN CALIFORNIA EDISON TO MAKE ARRANGEMENTS INCLUDING THE PAYMENT OF FEES, TO REARRANGE AND/OR DE–ENERGIZE THE CIRCUIT. FEES FOR THIS SERVICE SHALL BE BORNE BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE COUNTY. AND/OR DISTRICT.

7. ACTUAL FIELD CONDITIONS MAY VARY FROM THOSE SHOWN ON THE CONSTRUCTION DRAWINGS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING ACTUAL ABOVE GROUND CONDITIONS PRIOR TO SUBMITTAL OF HIS/HER BID.

8. THE CONTRACTOR SHALL POTHOLE ALL THE UTILITY CROSSINGS PRIOR TO THE BEGINNING OF CONSTRUCTION. THE CONTRACTOR SHALL ALSO FIELD VERIFY THE EXACT LOCATION, SIZE, DEPTH, AND TYPE OF ALL EXISTING UTILITIES AND INTERFERENCES SITUATED ALONG THE ROUTE OF THE PROPOSED CONSTRUCTION PRIOR TO COMMENCEMENT OF EXCAVATION, FABRICATION, AND INSTALLATION. THE CONTRACTOR SHALL, AT HIS EXPENSE AND COST, CONSTRUCT ALL IMPROVEMENTS IN SUCH A MANNER AS WILL PROTECT ALL EXISTING UNDERGROUND UTILITIES AND, IN THE EVENT OF ANY CONFLICTS, SHALL NOTIFY THE ENGINEER.

9. UPDATED "AS BUILT – RECORD DRAWINGS" SHALL BE KEPT CURRENT. PROGRESS PAYMENTS WILL NOT BE RELEASED UNTIL "AS – BUILT" INFORMATION, ON THE CONTRACTOR'S PLANS, HAS BEEN VERIFIED AS BEING CURRENT BY THE INSPECTOR.

10. ALL STATIONING SHOWN ARE PIPELINE CENTERLINE STATIONS, UNLESS OTHERWISE NOTED.

11. THE CONTRACTOR SHALL PROTECT ALL EXISTING UTILITIES (I.E. ELECTRICAL, TELEPHONE DUCTS AND CABLES, WATER, SEWER, STORM DRAIN, GAS, OIL, FIBER OPTIC DUCTS AND CABLE, IRRIGATION LINES, LATERALS, AND MANHOLES) AT HIS OWN EXPENSE AND COST.

12. THE CONTRACTOR SHALL HAVE APPROVED SHOP DRAWINGS PRIOR TO CONSTRUCTION AND SHALL HAVE COPIES OF APPROVED SHOP DRAWINGS AT THE JOB SITE AT ALL TIMES.

13. ALL TRAFFIC CONTROL SHALL BE IN ACCORDANCE WITH THE LATEST PUBLICATION ENTITLED "STATE OF CALIFORNIA MANUAL OF TRAFFIC CONTROL FOR CONSTRUCTION AND MAINTENANCE WORK ZONES" (SAF–T–MANUAL).

14. THE CONTRACTOR SHALL HAVE ADEQUATE MATERIALS AT THE JOB SITE TO AVOID DISRUPTION OF CONSTRUCTION ACTIVITY AND TO MINIMIZE THE TIME TRENCHES REMAIN OPEN.

15. TRENCH RESURFACING SHALL BE IN ACCORDANCE WITH THE SAN BERNARDINO DEPARTMENT OF PUBLIC WORKS STD. DWG. 132, UNLESS OTHERWISE INDICATED ON THE PLANS OR IN THE SPECIFICATIONS. SAW CUTTING EXISTING PAVEMENT SHALL EXTEND A MINIMUM OF ONE (1) FOOT OUTSIDE OF THE PIPE LINE TRENCH EXCAVATION LINE AND/OR SHALL BE AT LOCATIONS INDICATED IN THE DRAWINGS. CURB, CROSS GUTTERS, SIDEWALK, AND DRIVE APPROACHES SHALL BE REMOVED AND REPLACED TO THE NEAREST CONSTRUCTION JOINT ON EITHER SIDE OF THE PIPE LINE TRENCH, OR AS DETERMINED BY THE COUNTY'S ENGINEERING DIVISION.

16. PRIOR TO CONSTRUCTION, ALL SURVEY POINTS THAT MAY BE DISTURBED SHALL BE TIED OUT AND A CORNER RECORD OF EACH POINT FILED WITH THE COUNTY SURVEYOR. A COPY OF EACH CORNER RECORD SHALL BE SUBMITTED TO THE COUNTY'S ENGINEERING DIVISION. FOLLOWING CONSTRUCTION, ALL SURVEY POINTS THAT WERE DISTURBED SHALL BE RESET IN THEIR ORIGINAL POSITIONS AND A CORNER RECORD OF EACH POINT FILED WITH THE COUNTY SURVEYOR.

17. EXCEPT WHERE OTHERWISE NOTED, ALL PIPES SHALL HAVE A MINIMUM OF 48 INCHES OF COVER OVER THE TOP OF THE PIPE. FOR WATER, AND 60 INCHES (MIN) COVER FOR SEWER.

18. THE EXISTENCE AND LOCATION OF ANY UNDERGROUND UTILITIES, PIPES AND/OR STRUCTURES SHOWN ON THESE PLANS WERE OBTAINED BY A SEARCH OF AVAILABLE RECORDS. THE CONTRACTOR SHALL ASCERTAIN THE TRUE LOCATION OF ANY UNDERGROUND UTILITIES, PIPELINES, AND THE LIKE, AND SHALL BE RESPONSIBLE FOR DAMAGE TO ANY PUBLIC OR PRIVATE UTILITIES OR FACILITIES, SHOWN OR NOT SHOWN HEREON.

19. THE CONTRACTOR SHALL RESTORE OR REPLACE IN KIND ALL EXISTING IMPROVEMENTS DISTURBED DURING CONSTRUCTION.

20. THE CONTRACTOR SHALL MAINTAIN THE WORK IN A NEAT, SAFE, CLEAN, AND SANITARY CONDITION AT ALL TIMES AND TO THE SATISFACTION OF THE AGENCY HAVING JURISDICTION OVER THE AREA. STREETS SHALL BE KEPT CLEAN OF DEBRIS, WITH DUST AND NUISANCE BEING CONTROLLED AT ALL TIMES. THE CONTRACTOR SHALL ALSO BE RESPONSIBLE FOR ANY CLEAN–UP ON ADJACENT STREETS AFFECTED BY HIS CONSTRUCTION.

21. AT THE END OF EACH WORKING DAY AND AT THE TIMES WHEN CONSTRUCTION OPERATIONS ARE SUSPENDED FOR ANY REASONS, THE CONTRACTOR SHALL REMOVE ALL EQUIPMENT, VEHICLES, MATERIAL, TRAFFIC CONTROL DEVICES, STOCKPILE OR ANY OTHER FORM OF OBSTRUCTION FROM THE STREET RIGHT–OF–WAY.

22. AT THE END OF EACH WORK DAY, THE CONTRACTOR SHALL EITHER BACKFILL AND PLACE BASE PAVEMENT OR STEEL PLATE OVER EXCAVATIONS WITHIN STREET RIGHT–OF–WAY SO TRAVEL WAY CAN BE OPENED.

BASIS OF BEARINGS

THE EASTERLY LINE OF THAT PARCEL SHOWN AS 1.049 ACRES ON RECORD OF SURVEY RECORDED IN BOOK 7, AT PAGE 38, AND ON CORNER RECORD 83–047, BOTH RECORDS OF SAN BERNARDINO COUNTY. SAID LINE BEARS NORTH 10°21'25" WEST.

BENCHMARK

THE BENCH MARK FOR THIS SURVEY IS THE FINISH FLOOR OF THE EXISTING COUNTY SERVICE AREA 79 LIFT STATION No. 1 (THE AHWAHNEE LIFT STATION). SAID ELEVATION IS 6511.00 PER IMPROVEMENT PLANS.

SYMBOL LEGEND

- EXISTING UTILITY (AS IDENTIFIED)
- EXISTING REDUCER
- EXISTING MANHOLE
- EXISTING VALVE
- EXISTING NORMALLY CLOSED VALVE
- EXISTING WATER METER
- EXISTING BLOWOFF ASSEMBLY
- EXISTING FIRE HYDRANT
- EXISTING CURB & GUTTER
- EXISTING RIGHT OF WAY LINE
- EXISTING SEWER (S)
- EXISTING GAS (G)
- EXISTING WATER (W)
- EASEMENT LINE
- CENTER LINE
- PROPOSED PIPE
- PROPOSED GATE VALVE
- PROPOSED AIR RELEASE VACUUM VALVE ASSEMBLY
- PROPOSED BLOW–OFF ASSEMBLY
- CUT & PLUG OR CUT & CAP EXIST. PIPE
- REDUCER

ABBREVIATIONS

ABAND.	ABANDONED
AC	ASPHALT CONCRETE
BC	BEGINNING OF CURVE
℄	CENTERLINE
CLR.	CLEAR
CMP	CORRUGATED METAL PIPE
DEFL.	DEFLECTION
D.I.P.	DUCTILE IRON PIPE
E	EAST/ELECTRICAL
EC	END OF CURVE
EG	EXISTING GROUND
ELEV.	ELEVATION
EXIST.	EXISTING
FLG	FLANGED
G	GAS
GB	GRADE BREAK
GV	GATE VALVE
HORIZ.	HORIZONTAL
INV.	INVERT
L	LENGTH
L.F.	LINEAR FOOT/FEET
MAX.	MAXIMUM
MH	MANHOLE
MIN.	MINIMUM
MJ	MECHANICAL JOINT
N	NORTH
No.	NUMBER
PO	PUSH–ON
PVC	POLYVINYL CHLORIDE
PVMT	PAVEMENT
R	RADIUS
REQ'D	REQUIRED
S	SOUTH/SLOPE/SEWER
SBCSDD	SAN BERNARDINO COUNTY SPECIAL DISTRICTS DEPARTMENT
SD	STORM DRAIN
SFM	SEWER FORCEMAIN
SS	STAINLESS STEEL
STA	STATION
STL	STEEL
VERT.	VERTICAL
W	WEST/WATER

REGISTERED PROFESSIONAL ENGINEER
ERIK T. HOWARD
No. C53318
Exp. 6/30/15
CIVIL
STATE OF CALIFORNIA

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Tel: (909) 890-5951, Fax: (909) 890-3610
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REV.	DATE	DESCRIPTION	APP.

SUBMITTED BY: ERIK T. HOWARD R.C.E. NO. C53318 — DATE: 06/12/14

MV / JH DESIGNED
MV / JH DRAWN
E. HOWARD CHECKED

CONTACT PERSON: JAMES ORAVETS, DEPUTY DIRECTOR — DATE
APPROVED BY: COUNTY OF SAN BERNARDINO — DATE

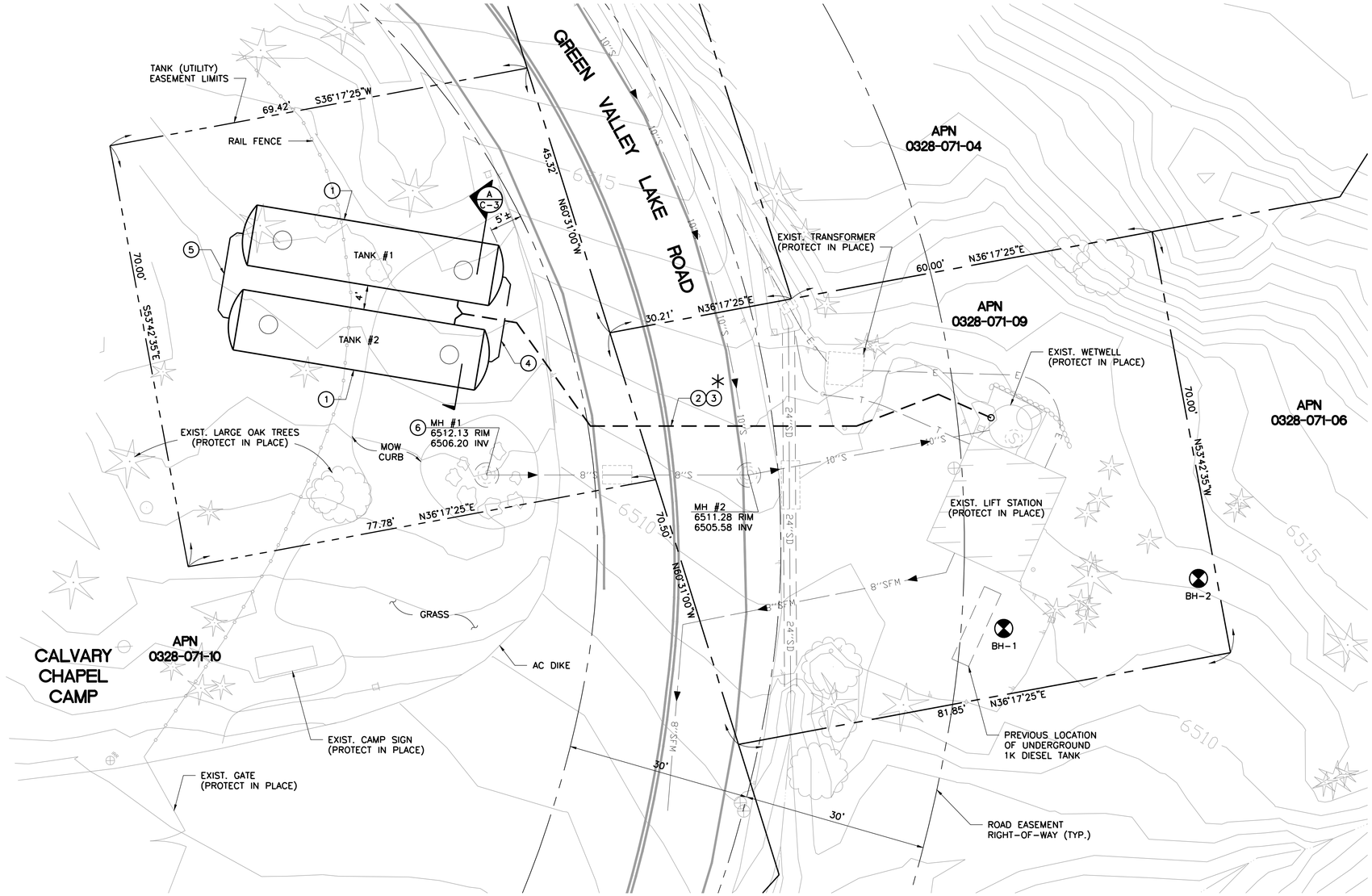
COUNTY OF SAN BERNARDINO
SPECIAL DISTRICTS DEPARTMENT
157 W. FIFTH STREET 2ND FLOOR
SAN BERNARDINO, CA 92415–0450

AHWAHNEE LIFT STATION
WET WELL EXPANSION

GENERAL NOTES, SYMBOLS AND ABBREVIATIONS

DRAWING NUMBER G-2
SHEET 2 OF 7
SCALE: AS SHOWN
DATE: MAY 2014

DWG: Z:\100036695-SBCSDD-On Call 2016\H_WD 5_Ahwahnee LS_Green Valley\Design\02-GENDTE-AW.dwg USER: herr8226
DATE: Jun 12, 2014 12:56pm XREFS: Z_BDR_AW



APPROXIMATE BORING LOCATION PER 1-4-11 CONVERSE REPORT

DRAINLINE AND OVERFLOW PIPING SHOWN SINGLE LINE FOR CLARITY. SEE SHEET C-2 FOR MORE INFORMATION.

CONSTRUCTION NOTES

1. 10' DIA. x 40' LONG (NOMINAL) FIBERGLASS STORAGE TANK; 20,000 GAL.
2. 8-INCH PVC TANK DRAINLINE (BELOW). SEE SHEET C-2 FOR PLAN AND PROFILE.
3. 12-INCH PVC WETWELL OVERFLOW (ABOVE). SEE SHEET C-2 FOR PLAN AND PROFILE.
4. 8-INCH AND 12-INCH TANK CONNECTIONS; SEE DETAILS SHEET C-3.
5. 8-INCH PVC TANK INTERCONNECT.
6. ADJUST (LOWER) EXIST. PRIVATE (CAMP) FORCE MAIN DISCHARGE MANHOLE TO WITHIN 2-INCHES OF FINISH GRADE.

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0 10 20 30
SCALE: 1" = 10'

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APPROVED BY: COUNTY OF SAN BERNARDINO DATE

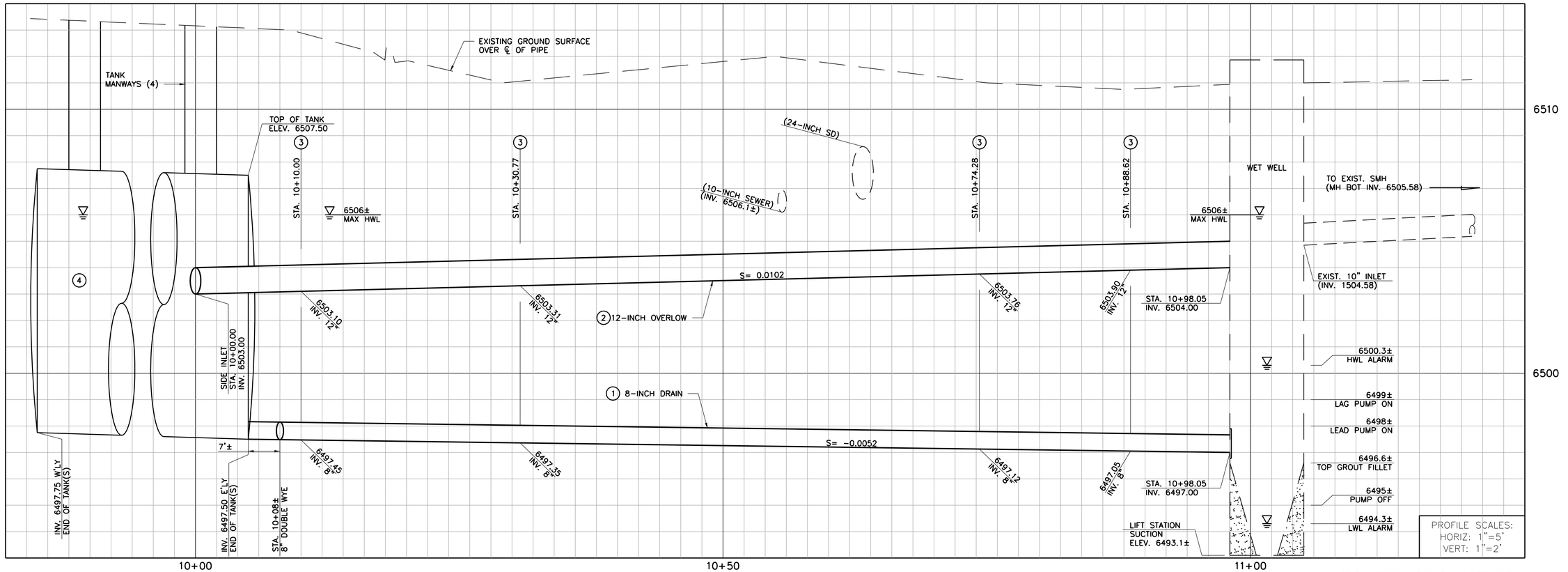
COUNTY OF SAN BERNARDINO
SPECIAL DISTRICTS DEPARTMENT
157 W. FIFTH STREET 2ND FLOOR
SAN BERNARDINO, CA 92415-0450

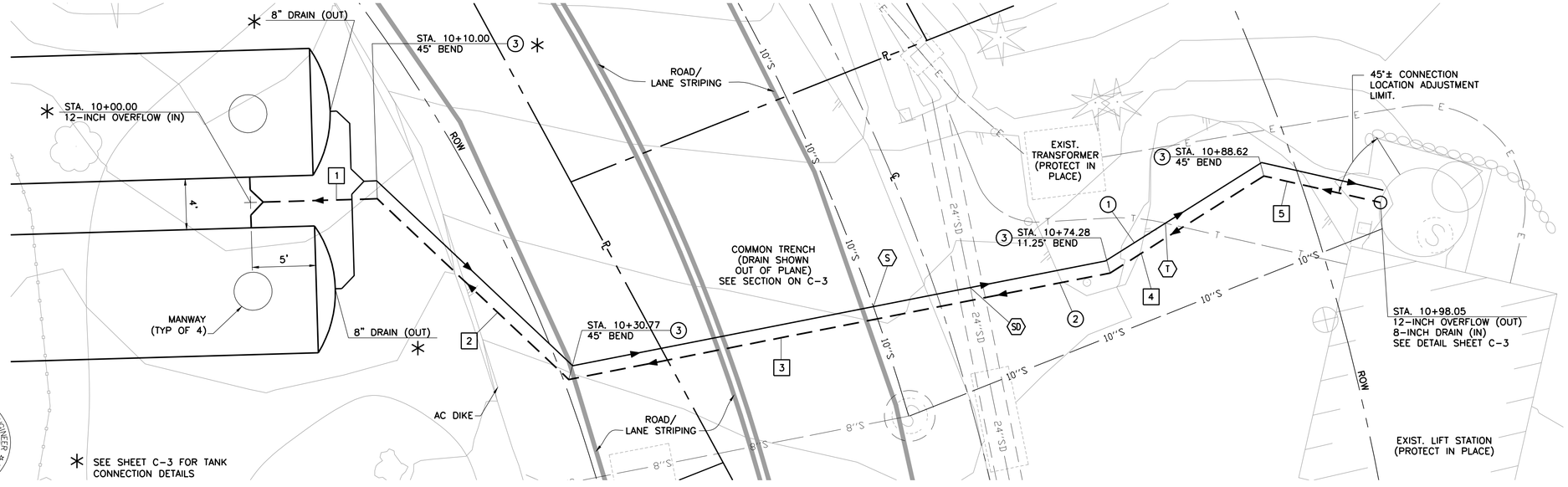
AHWAHNEE LIFT STATION
WET WELL EXPANSION

SITE PLAN

DRAWING NUMBER C-1
SHEET 3 OF 7
SCALE: AS SHOWN
DATE: MAY 2014

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DATE: Jun 12, 2014 12:57pm XREFS: Z_TOPO_AW Z_XUTIL_AW Z_CLRW_AW Z_BBR_AW
USER: hern8226





CONSTRUCTION NOTES

1. 8-INCH SDR 26 PVC (GREEN) SEWER PIPE.
2. 12-INCH SDR 26 PVC (GREEN) SEWER PIPE.
3. SDR 26 PVC GASKET JOINT FITTINGS; DEGREE AS SHOWN.
4. FIBERGLASS SEWAGE STORAGE TANK(S).

LINE TABLE		
LINE	BEARING	LENGTH
1	N 56°17'25" E	10.0'±
2	N 78°42'35" W	20.77'
3	N 46°50'07" E	43.51'
4	N 25°43'22" E	14.34'
5	N 70°43'22" E	9.9'±

0 5 10 15
SCALE: 1" = 5'

REGISTERED PROFESSIONAL ENGINEER ERIK T. HOWARD No. C53318 Exp. 6/30/15 CIVIL STATE OF CALIFORNIA

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REV.	DATE	DESCRIPTION	APP.

DATE:

SUBMITTED BY: ERIK T. HOWARD R.C.E. NO. C53318 06/12/14 DATE:

MV / JH DESIGNED
MV / JH DRAWN
E. HOWARD CHECKED

CONTACT PERSON: JAMES ORAVETS, DEPUTY DIRECTOR DATE

APPROVED BY: COUNTY OF SAN BERNARDINO DATE

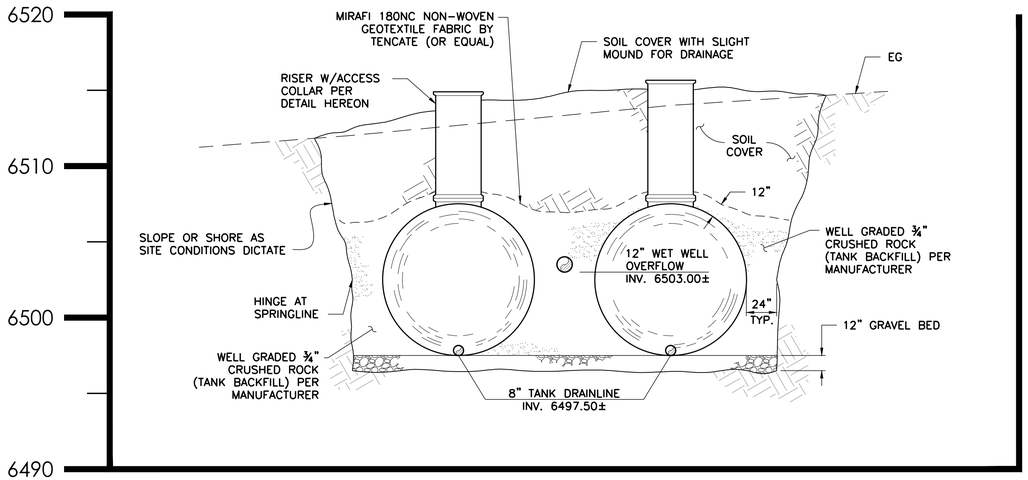
COUNTY OF SAN BERNARDINO
SPECIAL DISTRICTS DEPARTMENT
157 W. FIFTH STREET 2ND FLOOR
SAN BERNARDINO, CA 92415-0450

AHWAHNEE LIFT STATION
WET WELL EXPANSION

OVERFLOW AND DRAIN LINE
PLAN AND PROFILE

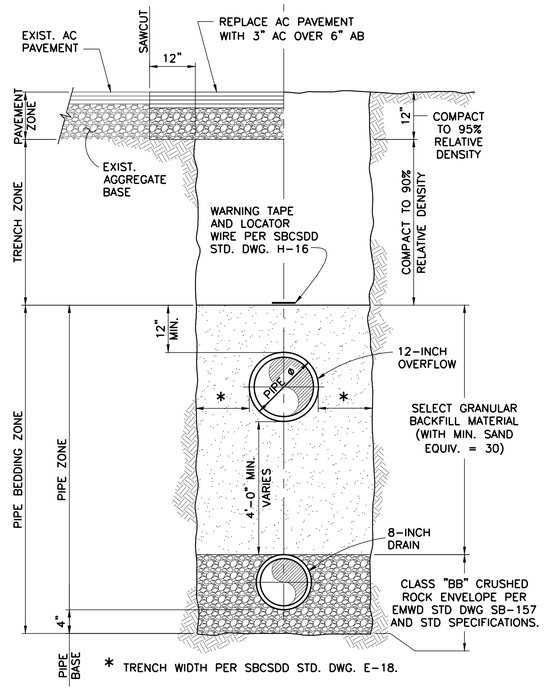
DRAWING NUMBER C-2
SHEET 4 OF 7
SCALE: AS SHOWN
DATE: MAY 2014

USER: hern8226
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DATE: Jun 12, 2014 12:57pm
XREFS: Z_TOPO_AW Z_XUTIL_AW Z_CLRW_AW Z_PROP_AW Z-VALN-SS



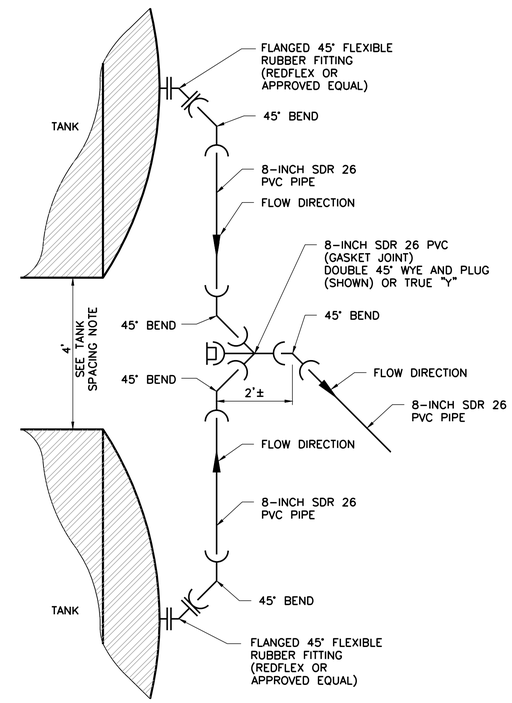
CROSS SECTION A / C-1

SCALE: 1" = 5'



COMMON TRENCH SECTION

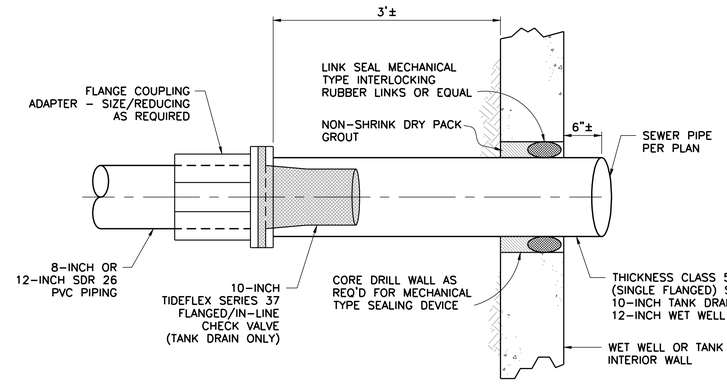
NOT TO SCALE



8-INCH PVC TANK OUTLET CONNECTION

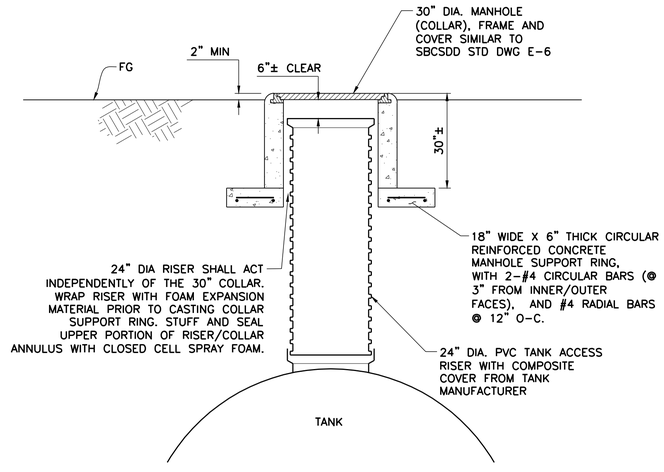
NOT TO SCALE

TANK SPACING NOTE:
FITTING/PIPING CONFIGURATION IS APPROXIMATE; FINAL CONNECTIONS TO TANKS SHALL BE MADE WITH A FLEXIBLE RUBBER FITTING. DUE TO THE WIDE VARIETY OF FITTINGS AND ADAPTER AVAILABILITY, SPACING BETWEEN TANKS MAY NEED TO BE INCREASED TO ACCOMMODATE FINAL CONNECTIONS. FITTINGS SHALL BE SDR 26 PVC WITH GASKET JOINTS UNLESS OTHERWISE NOTED.



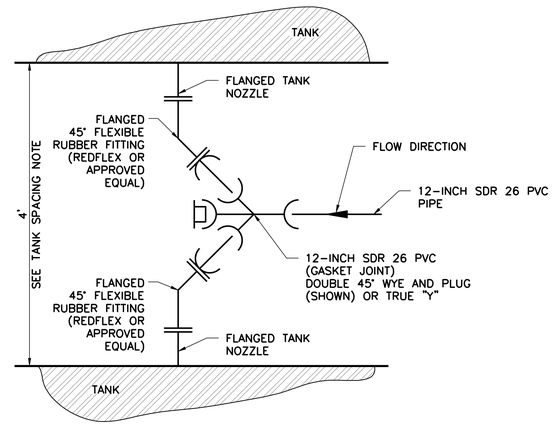
TYP. WET WELL PENETRATION DETAIL 1 / TYP

NOT TO SCALE



TYPICAL TANK ACCESS RISER

SCALE: 1" = 2'



12-INCH PVC TANK INLET CONNECTION

NOT TO SCALE

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MV / JH DESIGNED
MV / JH DRAWN
E. HOWARD CHECKED

CONTACT PERSON: JAMES ORAVETS, DEPUTY DIRECTOR DATE

APPROVED BY: COUNTY OF SAN BERNARDINO DATE

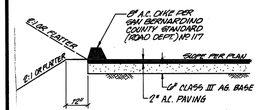
COUNTY OF SAN BERNARDINO
SPECIAL DISTRICTS DEPARTMENT
157 W. FIFTH STREET 2ND FLOOR
SAN BERNARDINO, CA 92415-0450

AHWAHNEE LIFT STATION
WET WELL EXPANSION

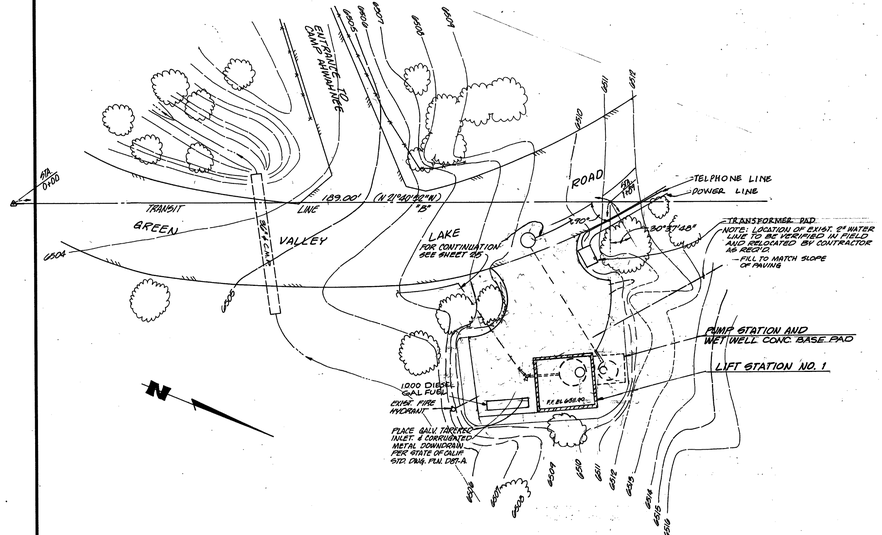
CROSS SECTION AND DETIALS

DRAWING NUMBER C-3
SHEET 5 OF 7
SCALE: AS SHOWN
DATE: MAY 2014

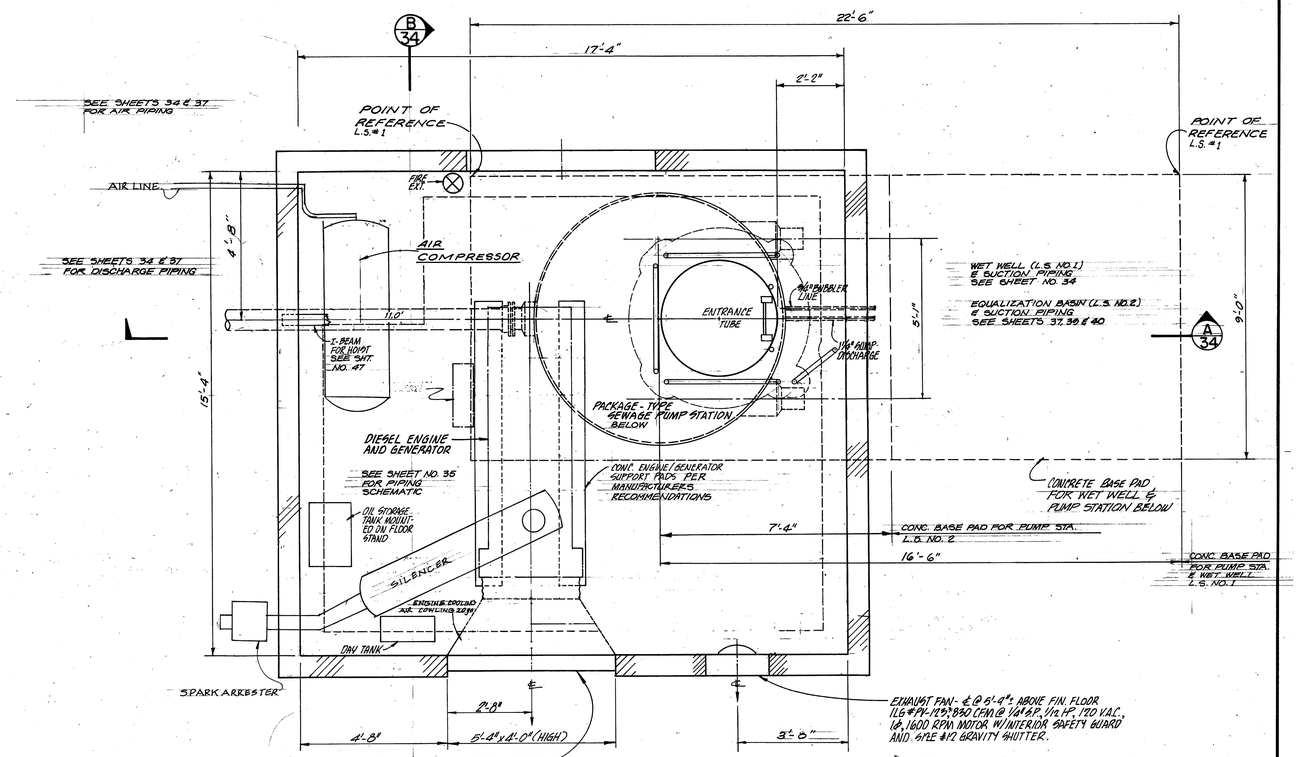
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DATE: Jun 12, 2014 5:18pm XREFS: Z_BDR_AW Z-HYD-VALN-SS Z_PREP_AW



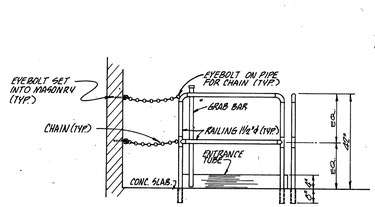
PAVING DETAIL
N.T.S.

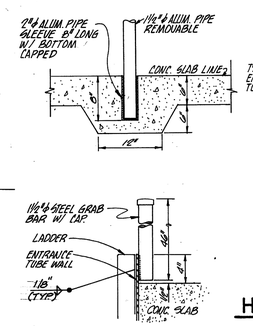


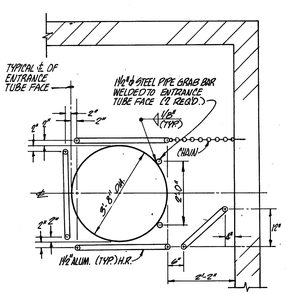
SITE PLAN
SCALE 1"=20'



SETTING PLAN
SCALE: 1/2"=1'-0"







HANDRAIL DETAILS
N.T.S.

AS-BUILT DRAWING
CHANGES OR BY: S. DAVANDEH
APPROVED
ENGINEER OF WORK

REV	DATE	BY	DESCRIPTION
△	2/27/62	C.C.	REVISED SETTING PLAN TO ACCOMODATE L.S. 1&2

SCALE: AS NOTED

DESIGNED R.C.G.
DRAWN C.L.
CHECKED R.C.G.

VTN ENGINEERS ARCHITECTS PLANNERS , SAN BERNARDINO, CALIFORNIA 92401 PHONE (714) 889-4431

SUBMITTED Robert C. Zimmerman PROJECT ENGINEER — C-20805 R.E. NO. — 4-1-74 DATE

RECOMMENDED Richard E. Jitter PROJECT MANAGER — C-8605 R.E. NO. — 4-1-74 DATE

COUNTY-SERVICE AREA NO. 79 — GREEN VALLEY LAKE

APPROVED Bobby McDonell — DATE 5-21-74

APPROVED A.R. Reed — DATE 5-21-74

INTERCEPTOR

LIFT STATION NO. 1 SITE PLAN
LIFT STATION NO. 1&2 SETTING PLAN

SHEET 33 OF 48

REGISTERED PROFESSIONAL ENGINEER — ERIK T. HOWARD — No. C53318 — Exp. 6/30/15 — CIVIL — STATE OF CALIFORNIA

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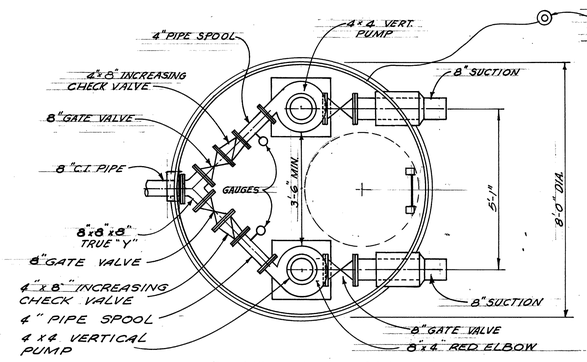
COUNTY OF SAN BERNARDINO
SPECIAL DISTRICTS DEPARTMENT
157 W. FIFTH STREET 2ND FLOOR
SAN BERNARDINO, CA 92415-0450

AHWAHNEE LIFT STATION
WET WELL EXPANSION

1974 RECORD DRAWING (SHEET 33)

DRAWING NUMBER AB-1
SHEET 6 OF 7
SCALE: AS SHOWN
DATE: MAY 2014

DWG: Z:\10036695-SBCSDD-Dn Call 2016\HWD 5_Ahwahnee LS_Green Valley\Design\06-EX-LSPLN-01-AW.dwg USER: hern8226
DATE: Jun 12, 2014 12:58pm XREFS: Z_BBR_AW



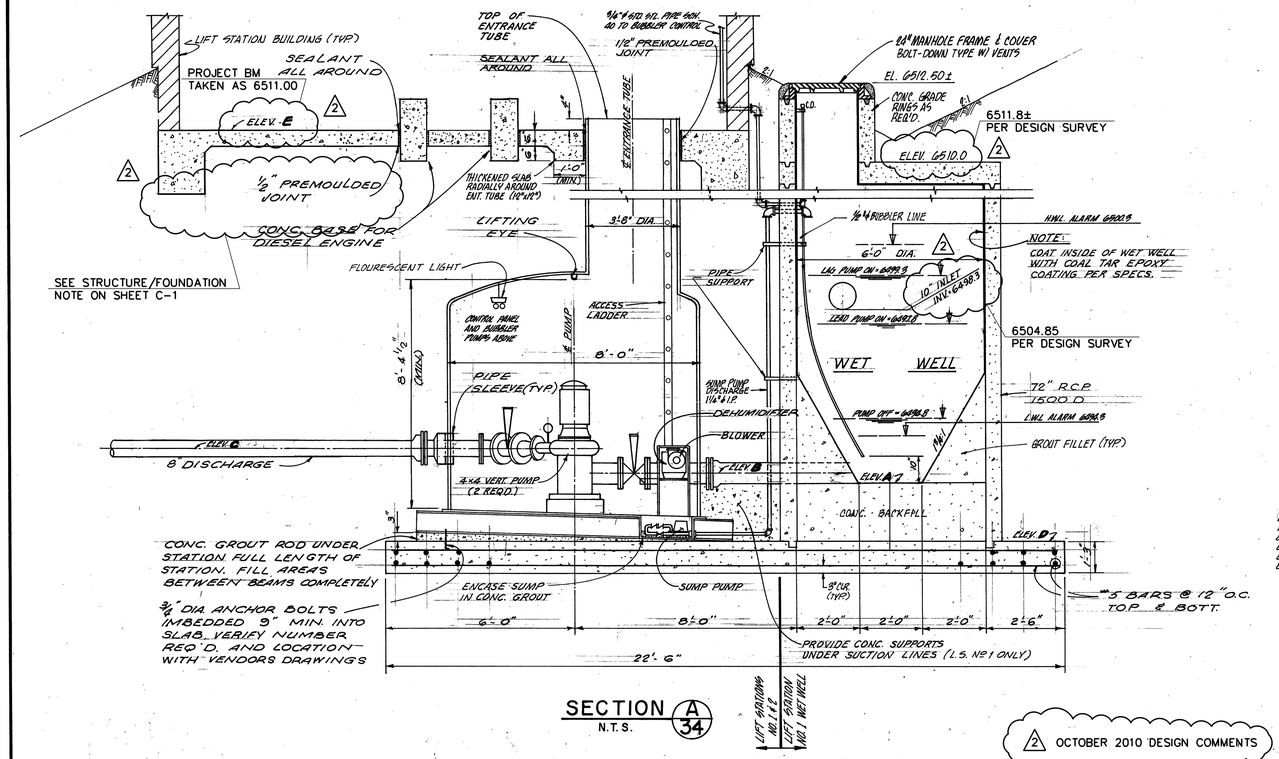
STATION PLAN

N.T.S.

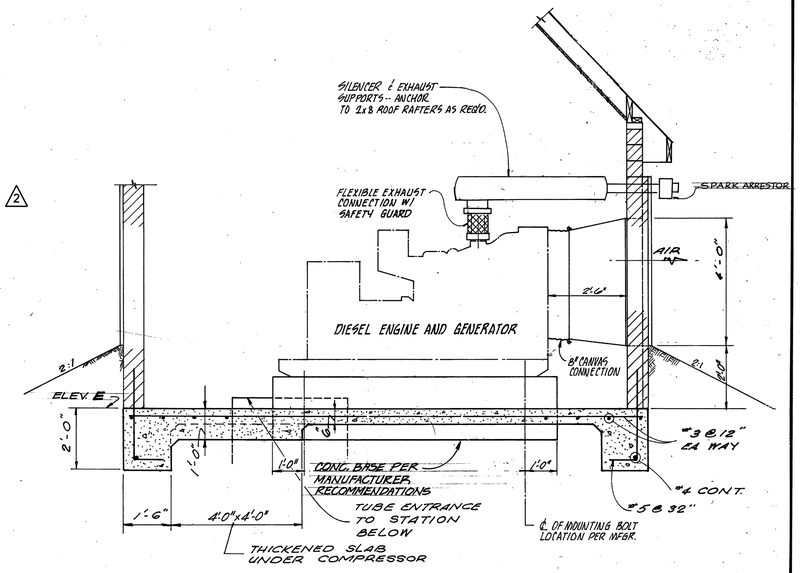
LIFT STATION SCHEDULE

ITEM	DESCRIPTION	L.S. NO. 1	L.S. NO. 2
	PUMPS - DISCHARGE Q	2@ 960 GPM EA.	2@ 400 GPM EA.
	TOTAL DYNAMIC HEAD	130 FT.	78.5 FT.
	MOTORS	2@ 30 H.P. EA.	2@ 20 H.P. EA.
A	ELEV. @ SUCTION INVERT	6492.80	6492.83
B	ELEV. @ ℄ SUCTION	6495.13	6493.00
C	ELEV. @ ℄ DISCHARGE	6498.67	6498.13
D	ELEV. @ TOP OF PAD	6501.33	6501.33
E	ELEV. @ FINISH FLOOR	6511.0	6511.0

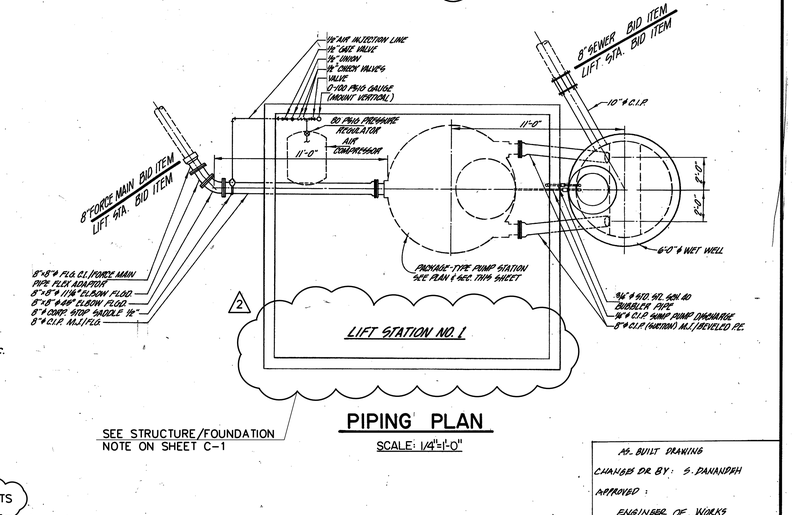
2



SECTION A
34
N.T.S.



SECTION B
34
1/2" = 1'-0"



PIPING PLAN

SCALE: 1/4"=1'-0"

2 OCTOBER 2010 DESIGN COMMENTS

AS-BUILT DRAWING
CHANGES DR BY: S. DANANDEH
APPROVED:
ENGINEER OF WORKS

REV	DATE	BY	DESCRIPTION
1	9/10	S.D.	PROVIDED WET WELL SIZE, PROVIDED SHEET TO ACCOMODATE LIFT STATIONS NO. 1 & 2

SCALE: AS NOTED

DESIGNED R.C.G.
DRAWN C.L.
CHECKED R.C.G.

VTN ENGINEERS ARCHITECTS PLANNERS , SAN BERNARDINO, CALIFORNIA 92401 PHONE (714) 889-4431

SUBMITTED: Robert C. Summerhays — PROJECT ENGINEER — C-20805 R.E. NO. — 4-1-74 DATE
RECOMMENDED: Richard S. Titus — PROJECT MANAGER — C-8605 R.E. NO. — 4-1-74 DATE

COUNTY SERVICE AREA NO. 79 — GREEN VALLEY LAKE

APPROVED Cathy M. Powell — DATE 5-21-74
APPROVED A R Reid — DATE 5-21-74

INTERCEPTOR

LIFT STATION NO. 1 & 2 STATION PLAN AND ELEVATIONS
LIFT STATION NO. 1 WET WELL AND PIPING PLAN

SHEET 34 OF 48

REGISTERED PROFESSIONAL ENGINEER — ERIK T. HOWARD — No. C53318 Exp. 6/30/15 — CIVIL — STATE OF CALIFORNIA

ATKINS
650 E. HOSPITALITY LN. SUITE 460, SAN BERNARDINO, CA 92408
Tel: (909) 890-5951, Fax: (909) 890-3610
www.atkinsglobal.com/northamerica

REV.	DATE	DESCRIPTION	APP.

SUBMITTED BY: ERIK T. HOWARD — R.C.E. NO. C53318 — DATE: 06/12/14

MV / JH DESIGNED
MV / JH DRAWN
E. HOWARD CHECKED

CONTACT PERSON: JAMES ORAVETS, DEPUTY DIRECTOR — DATE
APPROVED BY: COUNTY OF SAN BERNARDINO — DATE

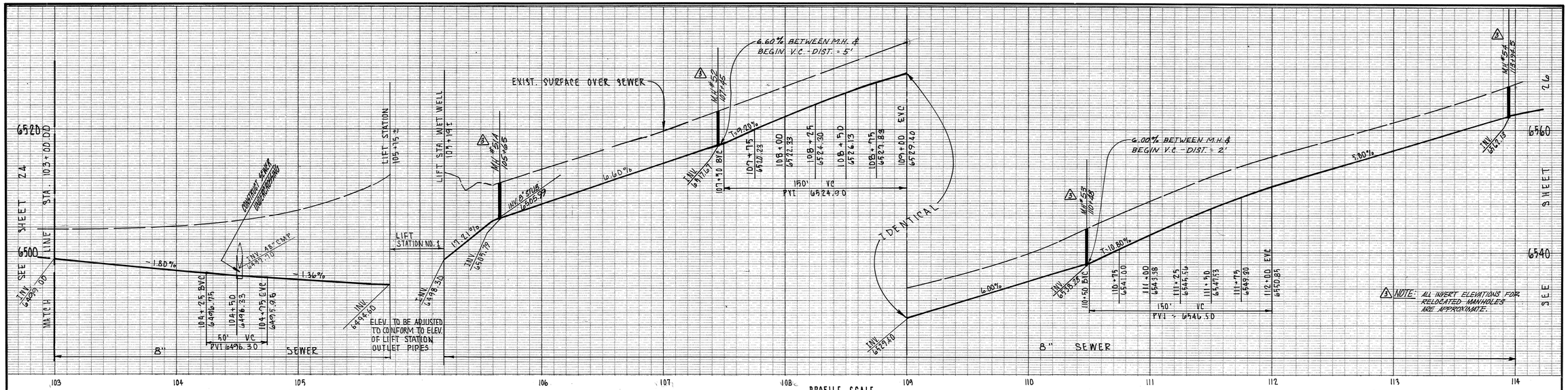
COUNTY OF SAN BERNARDINO
SPECIAL DISTRICTS DEPARTMENT
157 W. FIFTH STREET 2ND FLOOR
SAN BERNARDINO, CA 92415-0450

AHWAHNEE LIFT STATION
WET WELL EXPANSION

1974 RECORD DRAWING (SHEET 34)

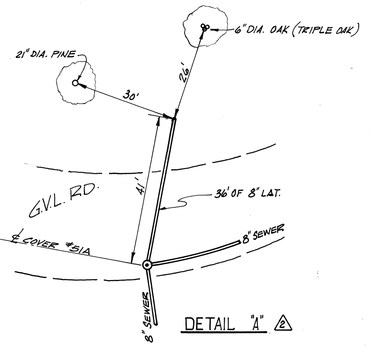
DRAWING NUMBER AB-2
SHEET 7 OF 7
SCALE: AS SHOWN
DATE: MAY 2014

DWG: Z:\10003695-SBCSDD-Dn Coll 2016\H_WD 5_Ahwahnee LS_Green Valley\Design\07-EX-LSPLN-02-AW.dwg
DATE: Jun 12, 2014 1:00pm
XREFS: Z_BDR_AW
USER: herr8226



PROFILE SCALE
1" = 40' HORIZ.
1" = 8' VERT.

BENCH MARK
ELEV. 6576.95'
BOLT & PIKE IN P.P. # (NO NUMBER?) 25' LT. OF STA. 114+75



NOTE:
STATIONING BETWEEN STA. 105+42 AND 105+65 IS ALONG SEWER PIPE. FROM STA. 105+42 STATIONING INCREASES TOWARD LIFT STATION. FROM STA. 105+65 STATIONING DECREASES BACK TO LIFT STATION.

REV	DATE	BY	DESCRIPTION
1	8/76	H.N.	Added Lateral & Bldg.
2	12/77	J.D.	Plan - "As Built" Alignment plotted, Sta. 103+00.00 to Sta. 108+75.00 & Detail "A" Added
3	12/77	J.D.	Profile - As Built location of M.H.'s 51A, 52, 53, 54 & added note.

SCALE: AS SHOWN

DESIGNED G.W. ATKINS
DRAWN M.R. GORES
CHECKED D.R. ALLISON

SUBMITTED Donald L. Allison, PROJECT ENGINEER — 10466 R.E. NO. — 4-1-74 DATE

RECOMMENDED Richard S. Titus, PROJECT MANAGER — B605 R.E. NO. — 4-1-74 DATE

COUNTY SERVICE AREA NO. 79 — GREEN VALLEY LAKE

APPROVED Addy M. Powell — DATE 5-21-74

APPROVED R R Reid — DATE 5-21-74

INTERCEPTOR
PLAN AND PROFILE
GREEN VALLEY LAKE ROAD
STA. 103+00 to STA. 114+00

SHEET 25 OF 48

Appendix F – Flowmaster Results

Phase 1 10" Sewer Pipe

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data		
Roughness Coefficient	0.013	
Channel Slope	0.500	%
Diameter	10.0	in
Discharge	153,279.00	gpd

Results		
Normal Depth	2.6	in
Flow Area	0.1	ft²
Wetted Perimeter	0.9	ft
Hydraulic Radius	1.5	in
Top Width	0.74	ft
Critical Depth	2.5	in
Percent Full	26.4	%
Critical Slope	0.599	%
Velocity	2.06	ft/s
Velocity Head	0.07	ft
Specific Energy	0.29	ft
Froude Number	0.914	
Maximum Discharge	1,077,066.16	gpd
Discharge Full	1,001,264.56	gpd
Slope Full	0.012	%
Flow Type	Subcritical	

GVF Input Data		
Downstream Depth	0.0	in
Length	0.0	ft
Number Of Steps	0	

GVF Output Data		
Upstream Depth	0.0	in
Profile Description	N/A	
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.0	%
Normal Depth Over Rise	25.3	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	2.6	in
Critical Depth	2.5	in
Channel Slope	0.500	%
Critical Slope	0.599	%

Phase 1 8" Sewer Pipe

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data		
Roughness Coefficient	0.013	
Channel Slope	0.500	%
Diameter	8.0	in
Discharge	153,279.00	gpd

Results		
Normal Depth	2.9	in
Flow Area	0.1	ft²
Wetted Perimeter	0.9	ft
Hydraulic Radius	1.6	in
Top Width	0.64	ft
Critical Depth	2.7	in
Percent Full	36.1	%
Critical Slope	0.646	%
Velocity	2.09	ft/s
Velocity Head	0.07	ft
Specific Energy	0.31	ft
Froude Number	0.877	
Maximum Discharge	594,039.99	gpd
Discharge Full	552,232.73	gpd
Slope Full	0.039	%
Flow Type	Subcritical	

GVF Input Data		
Downstream Depth	0.0	in
Length	0.0	ft
Number Of Steps	0	

GVF Output Data		
Upstream Depth	0.0	in
Profile Description	N/A	
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.0	%
Normal Depth Over Rise	23.5	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	2.9	in
Critical Depth	2.7	in
Channel Slope	0.500	%
Critical Slope	0.646	%

Phase 1 6" Sewer Pipe

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data		
Roughness Coefficient	0.013	
Channel Slope	0.450	%
Diameter	6.0	in
Discharge	153,279.00	gpd

Results		
Normal Depth	3.5	in
Flow Area	0.1	ft²
Wetted Perimeter	0.9	ft
Hydraulic Radius	1.6	in
Top Width	0.49	ft
Critical Depth	2.9	in
Percent Full	57.6	%
Critical Slope	0.767	%
Velocity	2.03	ft/s
Velocity Head	0.06	ft
Specific Energy	0.35	ft
Froude Number	0.734	
Maximum Discharge	261,677.85	gpd
Discharge Full	243,261.53	gpd
Slope Full	0.179	%
Flow Type	Subcritical	

GVF Input Data		
Downstream Depth	0.0	in
Length	0.0	ft
Number Of Steps	0	

GVF Output Data		
Upstream Depth	0.0	in
Profile Description	N/A	
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.0	%
Normal Depth Over Rise	48.4	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	3.5	in
Critical Depth	2.9	in
Channel Slope	0.450	%
Critical Slope	0.767	%

Phase 3 6" Sewer Pipe

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	3.500 %
Diameter	6.0 in
Discharge	11,153.00 gpd

Results	
Normal Depth	0.5 in
Flow Area	0.0 ft²
Wetted Perimeter	0.3 ft
Hydraulic Radius	0.3 in
Top Width	0.29 ft
Critical Depth	0.8 in
Percent Full	8.9 %
Critical Slope	0.811 %
Velocity	2.00 ft/s
Velocity Head	0.06 ft
Specific Energy	0.11 ft
Froude Number	2.022
Maximum Discharge	729,784.67 gpd
Discharge Full	678,423.99 gpd
Slope Full	0.001 %
Flow Type	Supercritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	8.9 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.5 in
Critical Depth	0.8 in
Channel Slope	3.500 %
Critical Slope	0.811 %

Phase 2 6" Sewer Pipe

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data		
Roughness Coefficient	0.013	
Channel Slope	0.700	%
Diameter	6.0	in
Discharge	79,667.00	gpd

Results		
Normal Depth	2.1	in
Flow Area	0.1	ft²
Wetted Perimeter	0.6	ft
Hydraulic Radius	1.2	in
Top Width	0.48	ft
Critical Depth	2.1	in
Percent Full	35.0	%
Critical Slope	0.715	%
Velocity	2.01	ft/s
Velocity Head	0.06	ft
Specific Energy	0.24	ft
Froude Number	0.989	
Maximum Discharge	326,369.63	gpd
Discharge Full	303,400.43	gpd
Slope Full	0.048	%
Flow Type	Subcritical	

GVF Input Data		
Downstream Depth	0.0	in
Length	0.0	ft
Number Of Steps	0	

GVF Output Data		
Upstream Depth	0.0	in
Profile Description	N/A	
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.0	%
Normal Depth Over Rise	33.7	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	2.1	in
Critical Depth	2.1	in
Channel Slope	0.700	%
Critical Slope	0.715	%

Phase 2 8" Sewer Pipe

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data		
Roughness Coefficient	0.013	
Channel Slope	0.800	%
Diameter	8.0	in
Discharge	79,667.00	gpd

Results		
Normal Depth	1.8	in
Flow Area	0.1	ft²
Wetted Perimeter	0.7	ft
Hydraulic Radius	1.1	in
Top Width	0.56	ft
Critical Depth	1.9	in
Percent Full	22.8	%
Critical Slope	0.648	%
Velocity	2.05	ft/s
Velocity Head	0.07	ft
Specific Energy	0.22	ft
Froude Number	1.106	
Maximum Discharge	751,407.75	gpd
Discharge Full	698,525.29	gpd
Slope Full	0.010	%
Flow Type	Supercritical	

GVF Input Data		
Downstream Depth	0.0	in
Length	0.0	ft
Number Of Steps	0	

GVF Output Data		
Upstream Depth	0.0	in
Profile Description	N/A	
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.0	%
Normal Depth Over Rise	22.8	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	1.8	in
Critical Depth	1.9	in
Channel Slope	0.800	%
Critical Slope	0.648	%

Phase 4 6" Sewer Pipe

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data		
Roughness Coefficient	0.013	
Channel Slope	1.200	%
Diameter	6.0	in
Discharge	39,834.00	gpd

Results		
Normal Depth	1.3	in
Flow Area	0.0	ft²
Wetted Perimeter	0.5	ft
Hydraulic Radius	0.8	in
Top Width	0.41	ft
Critical Depth	1.5	in
Percent Full	21.4	%
Critical Slope	0.716	%
Velocity	2.00	ft/s
Velocity Head	0.06	ft
Specific Energy	0.17	ft
Froude Number	1.290	
Maximum Discharge	427,318.15	gpd
Discharge Full	397,244.41	gpd
Slope Full	0.012	%
Flow Type	Supercritical	

GVF Input Data		
Downstream Depth	0.0	in
Length	0.0	ft
Number Of Steps	0	

GVF Output Data		
Upstream Depth	0.0	in
Profile Description	N/A	
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.0	%
Normal Depth Over Rise	21.4	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	1.3	in
Critical Depth	1.5	in
Channel Slope	1.200	%
Critical Slope	0.716	%

Phase 5 6" Sewer Pipe

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data		
Roughness Coefficient	0.013	
Channel Slope	3.800	%
Diameter	6.0	in
Discharge	10,356.00	gpd

Results		
Normal Depth	0.5	in
Flow Area	0.0	ft²
Wetted Perimeter	0.3	ft
Hydraulic Radius	0.3	in
Top Width	0.28	ft
Critical Depth	0.7	in
Percent Full	8.4	%
Critical Slope	0.783	%
Velocity	2.01	ft/s
Velocity Head	0.06	ft
Specific Energy	0.11	ft
Froude Number	2.098	
Maximum Discharge	760,418.22	gpd
Discharge Full	706,901.62	gpd
Slope Full	0.001	%
Flow Type	Supercritical	

GVF Input Data		
Downstream Depth	0.0	in
Length	0.0	ft
Number Of Steps	0	

GVF Output Data		
Upstream Depth	0.0	in
Profile Description	N/A	
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.0	%
Normal Depth Over Rise	8.4	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.5	in
Critical Depth	0.7	in
Channel Slope	3.800	%
Critical Slope	0.783	%

Phase 1 4" Sewer Pipe

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data		
Roughness Coefficient	0.013	
Channel Slope	0.700	%
Diameter	4.0	in
Discharge	100,000.00	gpd

Results		
Normal Depth	3.2	in
Flow Area	0.1	ft²
Wetted Perimeter	0.7	ft
Hydraulic Radius	1.2	in
Top Width	0.27	ft
Critical Depth	2.7	in
Percent Full	79.5	%
Critical Slope	1.083	%
Velocity	2.08	ft/s
Velocity Head	0.07	ft
Specific Energy	0.33	ft
Froude Number	0.697	
Maximum Discharge	110,696.28	gpd
Discharge Full	102,905.72	gpd
Slope Full	0.661	%
Flow Type	Subcritical	

GVF Input Data		
Downstream Depth	0.0	in
Length	0.0	ft
Number Of Steps	0	

GVF Output Data		
Upstream Depth	0.0	in
Profile Description	N/A	
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.0	%
Normal Depth Over Rise	48.4	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	3.2	in
Critical Depth	2.7	in
Channel Slope	0.700	%
Critical Slope	1.083	%

Appendix G – Excerpts from San Bernardino County Design Manuals

1.2 Water Demand

1.2.01 Domestic Use -- Domestic flows shall be based on consumption records of surrounding water systems. In the absence of such records, domestic flows shall be based on the following: an average daily use of 180 gallons per capita per day; a peak daily flow of two times the average daily flow; and a peak hourly flow of four times the average annual daily flow.

1.2.02 Fire Flow -- Fire flow demand on the system shall be per the standards entitled “Guide for Determination of Required Fire Flow” published by Insurance Services Office. All fire protection water systems shall require the approval of the fire authority having jurisdiction in that given area prior to final approval of the water system design.

All fire flow requirements are over and above the average daily consumption of water, and shall be achieved at not less than twenty-(20) psi minimum residual pressure at the point of fire flow.

1.3 Design For Future Growth

Transmission and distribution mains shall be designed for ultimate demand. Storage, supply, and booster station facilities shall be reviewed by the District on a per case basis.

1.4 Supply

1.4.01 General -- The supply system shall be designed as a multi-source system capable of handling peak daily demand with the largest source of supply not in operation.

1.4.02 Wells -- Wells shall be housed in a structure compatible with the surroundings. Provisions within this structure shall be made to facilitate removing of pumps, motors and other equipment. Wells shall be located upon land to which legal access is provided and for which a permanent easement or title is recorded. Vertical turbine pumps shall meet the standards set forth in AWWA Standard E-101. All wells shall be furnished with sounding tube, air line, water meter, electric kilowatt hour meter, running time meter, air valve, gravel shoot casing vent, check valve or pump control valve, and shutoff valve on the discharge piping.

1.5 Storage

Storage capacity shall consist of operational storage plus fire flow storage as related to each pressure zone. Operational storage shall be the maximum day demand. The inclusion of emergency storage should be considered depending upon the reliability of supply.

1.6 Booster Stations

1.6.01 Pumps in Hydropneumatic Systems -- In systems where pumps shall be instantaneous peak demands, without supplementary flows from storage, the pump capacity shall be based on peak hour demand together with coincidental fire flow demand for the highest fire flow anticipated for the proposed land use with one pump out of service.

1.6.02 Pumps in Gravity Systems -- In systems with adequate available flows from storage to supplement pumping, pumping capacity should be based on peak day demand together with coincidental fire flow demand for the highest fire flow anticipated for the proposed land use with one pump out of service.

1.6.03 Structure -- Booster pumps shall be housed in a weather-tight structure compatible with the surroundings. Provisions within this structure shall be made to facilitate removing of pumps, motors and other equipment.

1.7 Transmission and Distribution Mains

1.7.01 Pipe Size -- Mains shall be sized to accommodate the greater of the following while maintaining a minimum pressure as specified in subsection 1.7.02 herein at street service connections. The minimum pipe diameter is 8".

1) peak hour demand

2) peak day demand plus fire flow

3) nighttime storage replenishment flow

The capacity of water mains shall be determined by using the Williams and Hazen Formula with an appropriate "C" value. The velocity of the water in the pipe shall be limited to 8-feet per second maximum, except in hydrant branch lines.

The maximum loss of head during either peak hour or nighttime replenishment flow conditions shall be 3-feet per 1,000 lineal feet of pipeline.

1.7.02 Operating Pressures -- Maximum pressure in mains shall not exceed 125 psi. Pressure reducers will be required on service connections where static pressure exceeds 90 psi.

Minimum pressure in mains shall be 40 psi during peak hour operation without fire flows and shall not be less than 20 psi during peak hour operation with fire flows.

1.7.03 Depth of Cover -- A minimum four – foot depth of cover from top of pipe to finish grade or top of pavement shall be maintained on all pipelines below grade. Additional cover may be required where deemed necessary by the District.

1.7.04 Location and Alignment -- Wherever possible, water mains shall be located in public streets parallel to street centerlines.

1.7.05 Clearance from Sewer Lines -- Where possible, a minimum horizontal clear distance of 10-feet shall be provided between water and sewer line laid parallel. Where such lines cross a minimum vertical clearance of 3-feet shall be provided with the sewer under the water line.

If the above conditions cannot be met, special construction will be required according to the requirements set forth on Standard Drawing No. H-1 herein.

1.7.06 Mains under Structures -- No water mains shall be located beneath a structure (including fences and block walls) except as approved in writing by the District.

1.7.07 Looped Lines and Flushouts -- Looped lines shall be provided where practical. Where dead ends are necessary, provisions for flushing shall be included. No flushing device shall be connected directly to a sewer. Flushout assembly and size shall conform to Standard Drawing No. H-8A. Blowoff assemblies shall be utilized on pipelines greater than or equal to 24 inches in diameter.

Fire hydrants may be used for flushout, where applicable, and upon approval by the District.

1.7.08 Valves -- Provide sufficient valves to permit isolation and repair of leaks and breaks, and in accordance with good water works practice. Except for transmission lines, in no case should a length of pipe greater than 1,320 feet be left without valve control. A valve box and cover shall be provided for all valves below grade and shall conform to Standard Drawing No. H-11 herein, unless part of an assembly covered by another standard drawing.

1.7.09 Fire Hydrants -- Fire hydrants shall be spaced along distribution mains as follows:

Single Family Residential (R-1)	660 feet maximum
Multiple Residential, Commercial & Industrial	330 feet maximum

Spacing of fire hydrants shall not exceed the above maximum distances but fire hydrants may be spaced at closer intervals in conformance with requirements of local fire control authorities.

Hydrants shall be located at street corners or intersection whenever practical. Hydrants shall be 5 1/4-inch Type “B” according to land use as follows:

Medium to High density residential, Commercial, and Industrial	Type “B”

Hydrant installation assembly shall conform to Standard Drawing No. H-2A and H-2B herein.

1.7.10 Service Connections -- Service connection assemblies shall conform to Standard Drawings No. H-4A and H-4B herein.

1.7.11 Air and Vacuum Valves -- Air release valves, air-vacuum valves, and air-vacuum combination valves shall be used in supply, transmission and distribution lines according to accepted practice in the water field. Air-vacuum combination valves shall be provided at high points in distribution system mains.

Valve assemblies shall conform to Standard Drawing No. H-6 herein.

1.7.12 Blowoffs -- Blowoff assemblies will be required at low points in distribution system mains 4 inches or greater in diameter.

Blowoff assemblies shall conform to Standard Drawings No. H-7A herein.

1.7.13 Thrust Blocks -- Concrete thrust blocks shall be installed as required according to Standard Drawing H-3A and H-4B herein. Where circumstances prevent the use of standard thrust blocks, special thrust restraint design shall require District approval.

1.7.14 Casing Spacers-- Installation of pipeline into a casing will require the use of restrained casing spacers, the number of spacers will vary by size, type and length of pipe. Quantities and brand to be approved by engineer/inspector.

1.8 Electrical Equipment

Electrical starters, switches, lights, motors, fixtures, controllers and instruments shall be enclosed and constructed in accordance with the National Board of Fire Underwriter’s Specifications to meet hazardous conditions anticipated. The Health and Safety Code of the State of California and National Electrical Code shall also be met.

Starters shall be of the magnetic type and shall be provided with hand-off automatic selector switches. The design of electrical equipment shall require District approval.

COUNTY OF SAN BERNARDINO
SPECIAL DISTRICTS DEPARTMENT

DESIGN CRITERIA AND PLAN PREPARATION
SEWERS

The following requirements pertain to the design and preparation of plans for construction of the various components to the sewerage system.

1.1 GENERAL

1.1.01 Scope. - All sewers, sewage lift stations, treatment facilities and appurtenances to be owned, maintained and/or operated by the District shall be designed according to the criteria set forth in this section. **The same criteria shall hold for systems served but not owned, maintained and/or operated by the District insofar as said criteria may affect the efficiency of the District's system**. All additions to the District's system shall be plan checked and inspected by the District.

1.1.02 Design Competence. - All District facilities shall be designed by professional engineers according to accepted practice in the sewerage field. The design engineer shall arrange for a pre-design meeting with the District Engineer to review the proposed project.

1.1.03 Sewage Lift Stations and Inverted Siphons. - Every effort should be made, within economic reason, to avoid sewage lift stations, inverted siphons and exposed piping, Their use will be allowed only upon approval by the District.

1.1.04 Legal Access. - Each lot to be served by sewer shall abut a public street or sewer, shall abut a public street or recorded easement containing a sewer, or be provided with permanent legal access to such a sewer. The easement shall be clear of permanent structures, such as building eaves, roof lines, and large trees. Temporary construction easements of adequate size shall also be provided. The location of the street, easement, or legal access shall permit gravity flow from the lot to the sewer main. Deviations from any of the criteria adopted herein may be permitted upon written request to and approval by the District.

1.2 SEWERS AND APPURTENANCES.

1.2.01 Flows. - The flow used for the design capacity for sewers and sewage lift stations shall be the "computed peak flow," which shall be determined on the basis of projected land use and average daily flow per capita for the various geographical areas as follows:

Mountain Areas	80 gpcd
Valley and Desert Areas	100 gpcd

Sewer flows shall be computed from projected land use and population density over the area tributary to the sewer reach under consideration. The following peaking factors shall be applied to the sewer flows as determined above:

Average Flow (mgd)	Peak Factor
0.0 - 0.01	4.0
0.05	3.4
0.10	3.2
0.20	3.0
0.30	2.8
0.50	2.7
0.8	2.6
1.0	2.5
1.5	2.4
2.5	2.3
4.0	2.2
6.0	2.1
10	2.0
15	1.9
30	1.8

Design flows from commercial, industrial, hotels, motels, campgrounds, etc., shall be determined in consultation with the District.

1.2.02 Formula. - Capacity of all sewers shall be determined by the use of the "Mannings" formula:

$$Q = A \frac{1.486}{n} r^{2/3} s^{1/2}$$

where: Q = flow capacity - cfs
n = coefficient of roughness 0.013
r = hydraulic radius
s = slope
A = cross sectional area

1.2.03 Roughness Coefficient. - The Roughness coefficient used in design shall be n = .013 for all sewers. If any manufacturer claims that the "n" factor of his pipe should be less, he must submit documented evidence to substantiate his claims. The reliability of such evidence shall be determined by the District.

1.2.04 Pipe Size. - All gravity feed sewer pipe up to and including eight (8) inch diameter shall be sized to carry the peak flow when fifty percent (50%) full. This requirement shall apply regardless of the cross section shape of the sewer. All larger sewer pipe, except those designed as laterals, shall be sized to carry the peak flow when seventy-five (75%) full. This requirement shall apply regardless of the cross-section of the sewer. No sewer main with an internal diameter less than eight (8) inches shall be installed without prior written approval of the District.

1.2.05 Sewer Slopes and Velocities. - The minimum allowable slope is that which will give a velocity of not less than two (2) feet per second when the sewer is flowing fifty percent (50%) full. The purpose of this requirement is to prevent sewage sedimentation and subsequent generation of corrosive gases. The velocity shall be determined by means of the "Mannings Formula."

$$V = \frac{1,486}{n} \; r^{2/3} \; s^{1/2}$$

In sewers of uniform size passing through manholes without a major change in direction or slope, there shall be no arbitrary drop between inlet and outlet. In sewers which change slope but do not change direction or size, the slopes of the incoming sewers shall be carried through to the outlet of the manhole. Where diameters change, and in junctions involving major direction or slope changes, the various elevations shall be chosen to match water surfaces under average flow conditions at ultimate development of the tributary area (not under maximum flow conditions).

1.2.06 Minimum Slopes. - The minimum slopes to be used with various pipe sizes are listed herein and shall be used when necessary to prevent long reaches of deep sewer mains. The design engineer shall strive for minimum slopes of 0.008 to 0.01 feet per foot in order to maintain a cleaning velocity.

Diameter inches	Minimum Slope Ft./Ft.
6	0.0060
8	0.0040
10	0.0029
12	0.0022
15	0.0016
18	0.0012
21	0.0010
24	0.0008

1.2 .07 Exceptions to Minimum Slopes. - Where topography limits or prevents the use of minimum slopes as described herein, the District may require an engineer's report. This report shall describe the alternatives and their economies. The report shall also include an evaluation of prospective maintenance and sewer gas problems. Greater minimum slope than those specified in Section 1.2.06 hereof may be required where the presence of hydrogen sulfide may be detrimental to and affect the life of the sewer pipe being used.

1.2.08 Slopes in Force Mains. - In force mains a continuous uphill slope shall be provided from the sources to the outlet. Combination air and vacuum valves shall be provided where high points cannot be avoided.

1.2.09 Location. - All sewer mains shall be located in public streets or recorded easements such that each lot within a development can be served by gravity flow, and the services shall be extended according the Standard Drawings No. E-9 and E-10.

1.2.10 Curved Sewers, - Curvilinear vertical and horizontal alignment on sewer mains for new developments shall be avoided unless approved by the District review. If curvilinear sewers are permitted the following conditions must be met:

(a) No more than one (1) horizontal circular curve and one (1) vertical curve shall be permitted between any two (2) manholes. The curve may be a combination horizontal and vertical, but in no instance may there be more than one (1) vertical and one (1) horizontal curve between two (2) manholes.

(b) At least one (1) end of the curve shall terminate in a manhole.

(c) No sewer on a curvilinear alignment shall be less than eight (8) inch diameter.

(d) The radius of curvature is not less than one hundred and twenty-five (125) feet. A shorter radius of curvature may be used upon approval of the District, where shorter than normal depth pipe is used.

(e) The deflection of joints shall not exceed that recommended by the pipe manufacturer.

1.2.11 Sewer Under Structures. - No main sewer shall be located beneath a structure except as approved in writing by the District

1.2.12 Structural Integrity. - Provisions shall be made in all cases to preserve the structural integrity of the pipes, conduits, or structures affected.

1.2.13 Depth of Sewer. - Permission from the District must be obtained if the following minimum depths may not be met. In general, the load on the pipe must be considered and adequate precautions taken to protect it either by means of encasement, supports, or added strength.

Minimum cover of pipe for various locations:

In public streets in pavement: 5 feet (service to properties permitting)
In public street parkways: 5 feet where possible
Lateral sewer (at curb or edge of pavement): 4 feet

In recorded easements, not subject to vehicular traffic...3 feet

Stream crossing: Standard drawings: No. E-13.

1.2.14 Sewer laterals. - A sewer lateral serving a single Family dwelling or equivalent shall be at least four inches in diameter, if the length of the lateral is one hundred feet or longer, a minimum of six inch diameter will be required. Sewer laterals shall conform to Section 3.15 of the Technical Specifications and Standard Drawings: E-9 Thu. E- 13 and Section 3.15 of the Technical Specifications. Sewer laterals in waterways, easements, and deep cuts should have the house service brought to a minimum depth of five (5) feet.

1.2.15 Special Sewer Design Conditions. _ When it is necessary to construct sewers and appurtenances in areas where a potential erosion hazard exists, individual design considerations shall be given to provide additional protection to the sewer facilities to prevent their damage. Special design considerations can be applicable to stream and canyon crossings, parallel construction to stream beds, construction on steep slopes requiring special anchorage, and shallow sewer construction in roadways. Concrete encasements, cutoff walls (Standard Drawing No. E-20), special backfill materials (soil cement), and special erosion - control facilities may be required.

1.2.16 Clearance From Other Utilities. - Special care shall be exercised in locating sewer lines near other utilities, especially water lines. Sewer lines shall, wherever possible, be located three (3) feet below water lines and where parallel installations occur, a ten (10) foot horizontal separation shall be maintained. Separations and special construction shall conform to Standard Drawing No. E-1.

1.2.17 Use of Asbestos- Cement Sewer Pipes. Due to the carcinogenic properties of asbestos fibers. Asbestos Cement pipe shall not be used in sanitary sewer systems.

1.3 OVERSIZING REQUIRED BY DISTRICT.

The District may find that the capacity of certain new sewers and pump stations within an area under development should be increased to accommodate existing or future additional development. In such a case, the quantity of additional flow shall be determined by the District's Engineer. The flow resulting from the addition of the developer's and the District Engineer's "Computer peak flow" shall be used as the basis of design. The District shall pay for any resulting increase in size or depth according to Section 1.9.07 of the District's Ordinance.

1.4 MANHOLES AND CLEANOUTS.

1.4.0 Manhole Location and Spacing. - Manholes shall be located at all junctions, all changes in direction (except curved sewers), and all changes in pipe size. Where the distance between manholes required for the foregoing reasons exceeds three hundred (300) feet. Good judgment should be used in placing intermediate man hole at points of probable sewer intersections, at beginning or end of curves, or lacking other reasons, at approximately equal intervals. In general, the space between Manholes is a maximum of three hundred (300) feet... In areas where slopes equal or exceed twenty five percent (25%) manhole spacing shall not exceed one hundred (100) feet. Good judgment should be used in the location of manholes along water courses. Manholes should not be placed directly in the water courses. Manholes can be either coated concrete or polymer based structures and shall conform to Standard Drawing No. E-2 thru E-6.

1.4.02 Shallow Manholes. - Manholes three (3) feet or less in depth above the shelf shall be of special design.

1.4.03 Cleanouts. - Dead-end sewers not over one hundred and seventy-five (175) feet in length shall terminate in standard manholes or cleanouts. Cleanouts shall be brought to ground surface in a long radius or two (2) forty-five degree (45) angles with a full sewer diameter opening. Cast iron frame and cover shall be provided. Dead ends over one hundred and seventy-five (175) feet shall terminate in standard manholes unless future extension of said dead end will include a manhole within three hundred and fifty (350) feet, in which case a temporary cleanout is permitted. Cleanouts shall conform to Standard Drawing No. E-14 and E-15 and Section 4.0 of the
Technical Specifications.

1.4.03.1 Abandoning Existing Sewer Stub– Existing sewer stubs to be abandoned shall be approved by District Engineer.

1.4.03.2 Grease Interceptor- A Grease interceptor shall be required for any business having the potential of producing grease. Size of the interceptor will be approved by the District Engineer.

1.4.03.3 Oil/Sand Interceptor- An oil/sand interceptor shall be installed for any business having the potential of producing oil and sand waste. Size of interceptor shall be approved by the District Engineer.

Appendix C

Air Quality Assessment

Air Quality Assessment
Hume SoCal Camp Expansion Project
County of San Bernardino, California

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Appendix A: Air Quality Modeling Data

LIST OF ABBREVIATED TERMS

AQMP	air quality management plan
AB	Assembly Bill
ADT	average daily traffic
CAPCOA	California Air Pollution Control Officers Association
CARB	California Air Resources Board
CAAQS	California Ambient Air Quality Standards
CCAA	California Clean Air Act
CalEEMod	California Emissions Estimator Model
CEQA	California Environmental Quality Act
CO	carbon monoxide
cy	cubic yards
DPM	diesel particulate matter
FCAA	Federal Clean Air Act
H_2S	hydrogen sulfide
Pb	lead
LST	localized significance threshold
$\mu g/m^3$	micrograms per cubic meter
mg/m^3	milligrams per cubic meter
NAAQS	National Ambient Air Quality Standards
NO_2	nitrogen dioxide
NO_x	nitrogen oxide
O_3	ozone
PM_{10}	particulate matter less than 10 microns in diameter
$PM_{2.5}$	particulate matter less than 2.5 microns in diameter
ppm	parts per million
ROG	reactive organic gases
RTP/SCS	Regional Transportation Plan/Sustainable Communities Strategy
SB	Senate Bill
SRA	source receptor area
SCAB	South Coast Air Basin
SCAQMD	South Coast Air Quality Management District
SCAG	Southern California Association of Governments
sf	square foot
SO_{4-2}	sulfates
SO_2	sulfur dioxide
TAC	toxic air contaminant
U.S. EPA	U.S. Environmental Protection Agency
VOC	volatile organic compound

1 INTRODUCTION

This report documents the results of an Air Quality Assessment completed for the Hume SoCal Camp Expansion Project ("Project" or "Proposed Project"). The purpose of this Air Quality Assessment is to evaluate the potential construction and operational emissions associated with the Project and determine the level of impact the Project would have on the environment.

1.1 Project Location and Setting

The Project site is approximately 251 acres located in an unincorporated mountain region of San Bernardino County, along Green Valley Lake Road and approximately 0.4 miles northwest of State Route 18 (SR-18); refer to **Exhibit 1: Regional Location Map**. Surrounding the Project site is the Green Valley Lake Community to the north, the Running Springs to the southwest, and the City of Big Bear to the east, as shown in **Exhibit 2: Local Vicinity Map**.

A portion of the Project site is currently developed with improvements related to the existing Hume SoCal campground facilities. The remaining surrounding areas are vacant and contain forest land. The Project land use designation is Rural Living (RL) per the San Bernardino County General Plan (Countywide Plan). The RL land use area primarily allows for the development of residential development. Typical uses within RL land use areas also include public and quasi-public facilities such as parks, religious facilities and schools. The Project area is also located within the Hilltop Community Plan which allows for larger-scale master planned developments which can include a combination of residential, commercial, and/ or manufacturing activities that maximizes the utilization of natural and human-generated resources in rural areas.

1.2 Project Description

The Project involves the expansion of campground uses for the existing Southern California Hume Lake Christian Camp (Hume SoCal) campground to accommodate up to an additional 3,000 occupants. This would be accomplished through the use of existing campground structures as well as the development of additional campground and recreational facilities and uses within a 251-acre area of the Green Valley Lake community, refer to **Exhibit 3: Conceptual Site Plan**. New campground structures proposed for the Project would be developed in five phases.

Each phase of the Project would include the development of expanded infrastructure, additional amenities, support structures, and buildings necessary to accommodate expanded camper capacity as well as paved parking areas and paved access roadways.

Phase 1 of the Project would involve the development of facilities to be used as a Junior High Camp. Proposed residential structures within the Phase 1 area include an expanded welcome center, private administration and guest speaker residences, staff housing, and student dormitories. Phase 1 also includes the development of a gymnasium, bus parking, a snack shop, a chapel, converting an existing chapel to a small meeting space, an expansion to the existing dining hall, a maintenance building, an amphitheater, and restrooms. Outdoor recreation facilities include grass quads. Existing and proposed facilities within Phase 1 would accommodate up to 784 occupants.

Phase 2 of the Project would involve the development of facilities to be used as a High School Camp. Proposed residential structures within the Phase 2 area include staff housing buildings and student dormitories. Phase 2 also includes the development of a large dining hall, gymnasium, a chapel, amphitheater, and restrooms. Outdoor recreation facilities include grass quads, a swimming pool, and a recreation pond. Existing and proposed facilities within Phase 2 would accommodate up to 1,000 occupants.

Phase 3 of the Project proposes the development of an Adult Lodge. Phase 3 would include the development of one adult lodge with included access road. Existing and proposed facilities within Phase 3 would accommodate up to 140 occupants.

Phase 4 of the Project would include the development of an Elementary Age Camp and associated facilities. Proposed residential structures within Phase 4 include student yurt tents. Phase 4 also includes the development of restroom facilities with showers and an amphitheater. Outdoor recreation facilities include grass quads, a dining canopy, a swimming pool, and a recreation pond. Existing and proposed facilities within Phase 4 would accommodate up to 500 occupants.

Phase 5 of the Project proposes the creation of a tent-based youth camp, Wildwood Camp. Residential structures proposed for this phase consist of yurt tents. Phase 5 also includes the development of restroom facilities with showers and an amphitheater. Outdoor recreation facilities include grass quads, a dining canopy, a swimming pool, and a recreation pond. Existing and proposed facilities within Phase 5 would accommodate up to 130 occupants.

Project Phasing and Construction

Although the Project is anticipated to be constructed in five phases, to analyze a worst-case scenario, construction modeling assumed all five phases of the Project would be constructed simultaneously and completed within two years, beginning in June 2025 and finishing in June 2027.

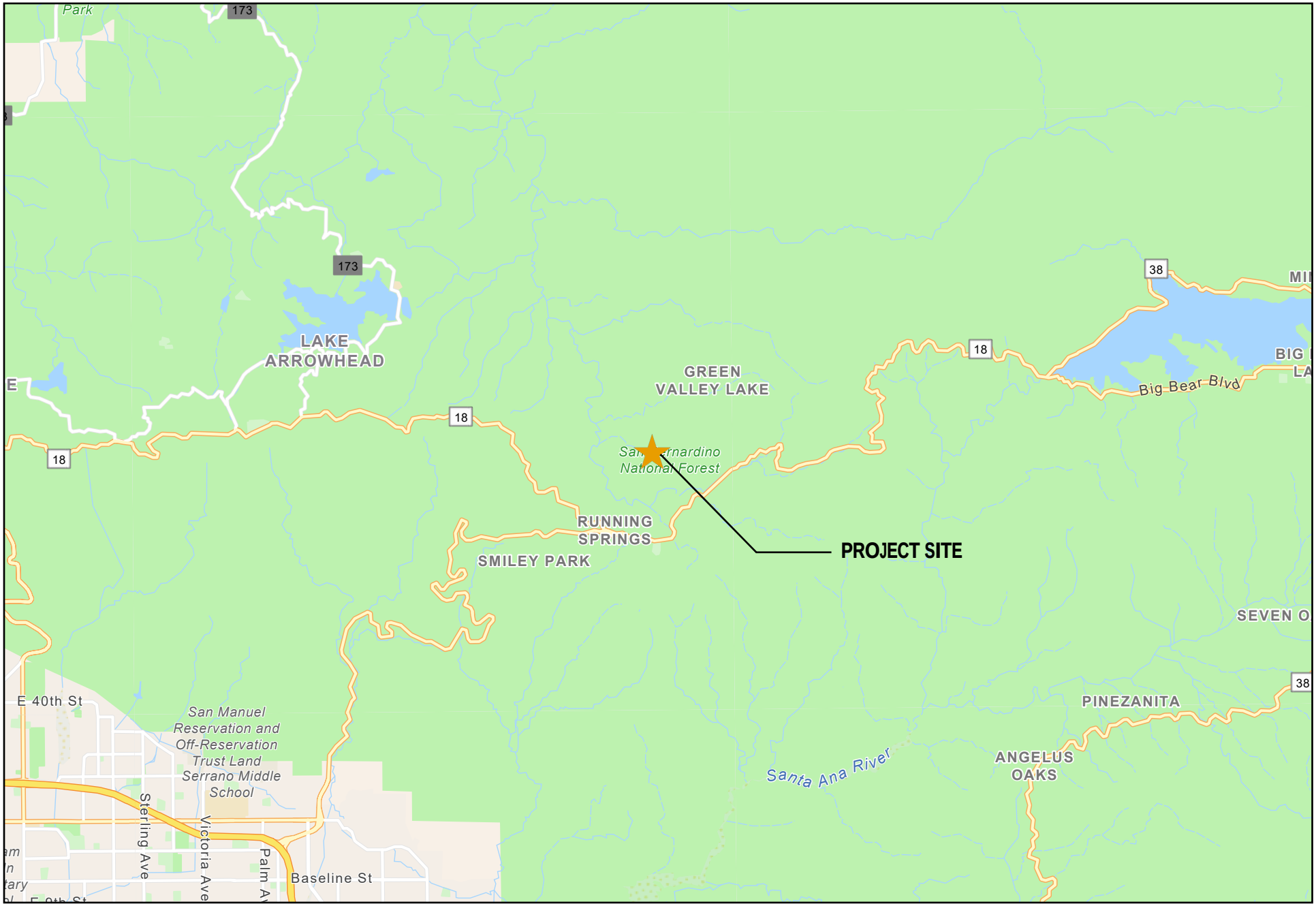


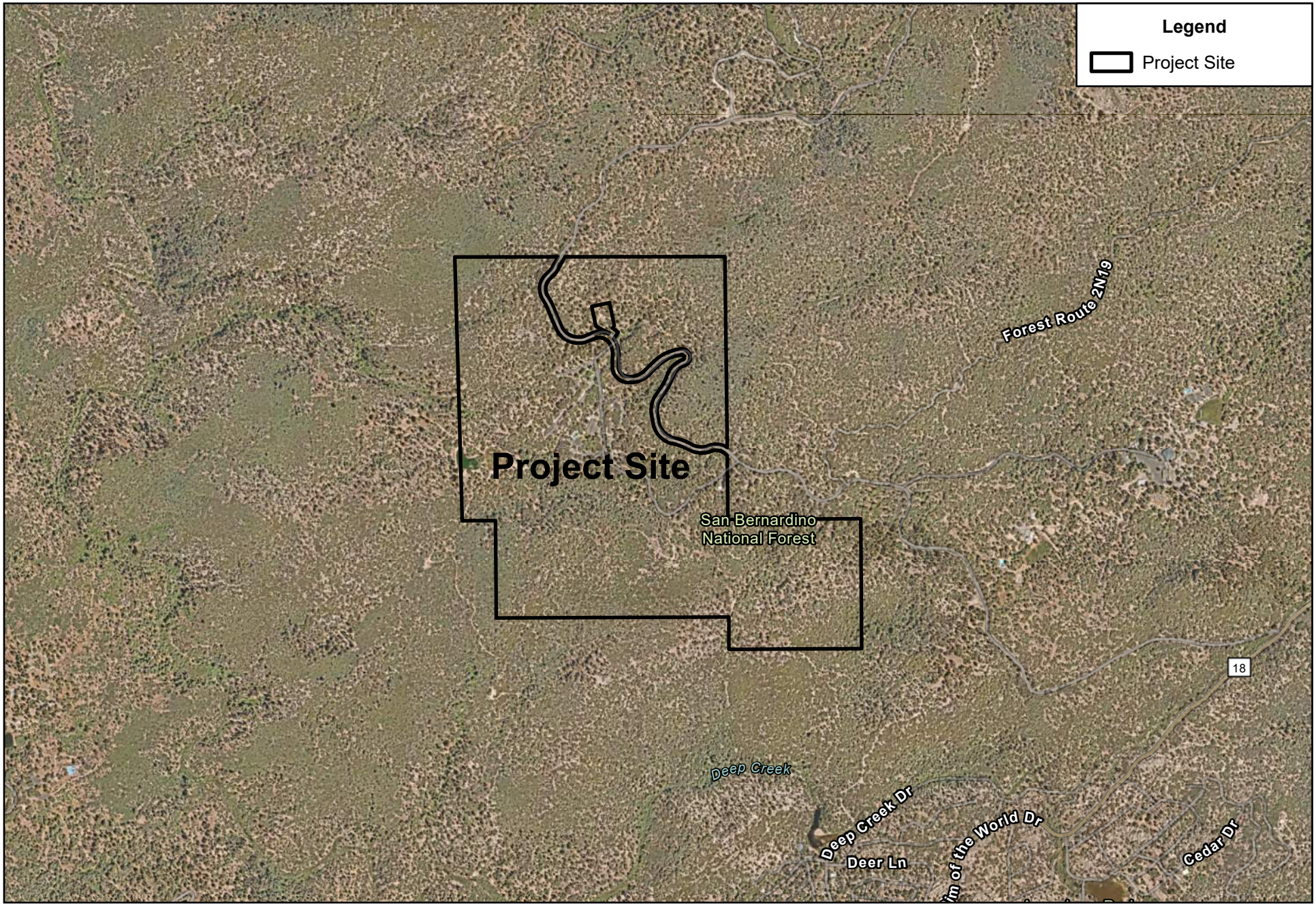
Exhibit 1: Regional Location Map

Hume SoCal Campground Expansion Project

San Bernardino County

Not to scale

Kimley»Horn



Source: Nearmap, 2023.

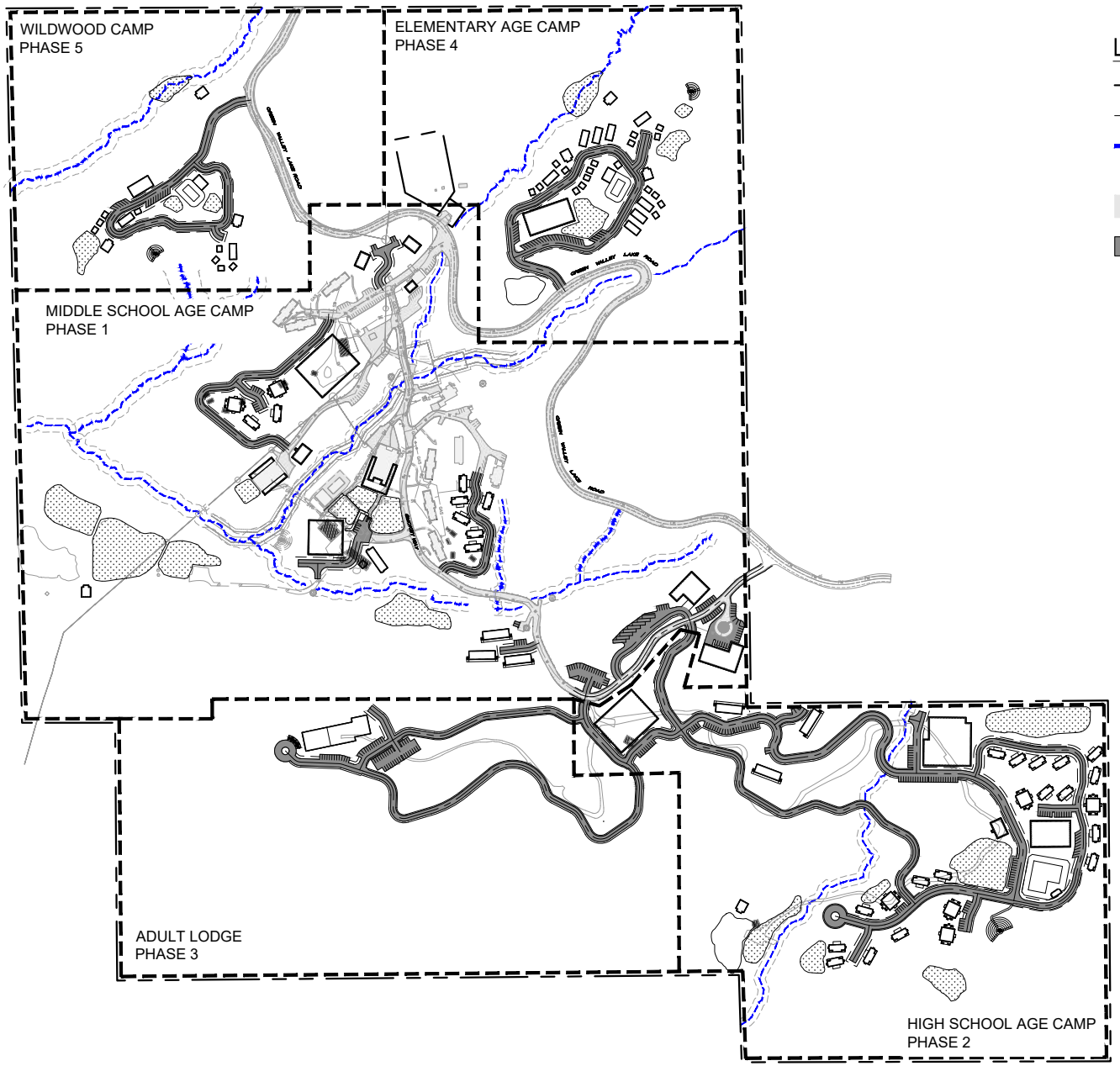
Exhibit 2: Local Vicinity Map

Hume SoCal Campground Expansion Project

San Bernardino County

Not to scale

Kimley»Horn



Source: Kimley-Horn, 2025.

Exhibit 3: Conceptual Site Plan

Hume SoCal Campground Expansion Project
San Bernardino County

Not to scale

Kimley»Horn

2 ENVIRONMENTAL SETTING

2.1 Climate and Meteorology

The California Air Resources Board (CARB) divides the State into 15 air basins that share similar meteorological and topographical features. The Project is located within the South Coast Air Basin (SCAB), which includes the non-desert portions of Los Angeles, Riverside, and San Bernardino counties, as well as all of Orange County. The SCAB is on a coastal plain with connecting broad valleys and low hills, bounded by the Pacific Ocean on the southwest and high mountains forming the remainder of the perimeter.[1] Air quality in this area is determined by natural factors such as topography, meteorology, and climate, in addition to the presence of existing air pollution sources and ambient conditions. These factors along with applicable regulations are discussed below.

The SCAB is part of a semi-permanent high-pressure zone in the eastern Pacific Ocean. As a result, the climate is mild and tempered by cool sea breezes. This usually mild weather pattern is occasionally interrupted by periods of extreme heat, winter storms, and Santa Ana winds. The annual average temperature throughout the 6,645-square-mile SCAB ranges from low 60 to high 80 degrees Fahrenheit with little variance. With more oceanic influence, coastal areas show less variability in annual minimum and maximum temperatures than inland areas.

Contrasting the steady pattern of temperature, rainfall is seasonally and annually highly variable. Almost all annual rainfall occurs between the months of November and April. Summer rainfall is reduced to widely scattered thundershowers near the coast, with slightly heavier activity in the east and over the mountains.

Although the SCAB has a semiarid climate, the air closer to the Earth's surface is typically moist because of the presence of a shallow marine layer. Except for occasional periods when dry, continental air is brought into the SCAB by offshore winds, the "ocean effect" is dominant. Periods of heavy fog are frequent and low clouds known as high fog are characteristic climatic features, especially along the coast. Annual average humidity is 70 percent at the coast and 57 percent in the eastern portions of the SCAB.

Wind patterns across the SCAB are characterized by westerly or southwesterly on-shore winds during the day and easterly or northeasterly breezes at night. Wind speed is typically higher during the dry summer months than during the rainy winter. Between periods of wind, air stagnation may occur in both the morning and evening hours. Air stagnation is one of the critical determinants of air quality conditions on any given day. During winter and fall, surface high-pressure systems over the SCAB, combined with other meteorological conditions, result in very strong, downslope Santa Ana winds. These winds normally continue for a few days before predominant meteorological conditions are reestablished.

The mountain ranges to the east affect the diffusion of pollutants by inhibiting the eastward transport of pollutants. Air quality in the SCAB generally ranges from fair to poor and is similar to air quality in most of coastal southern California. The entire region experiences heavy concentrations of air pollutants during prolonged periods of stable atmospheric conditions.

[1] South Coast Air Quality Management District, *CEQA Air Quality Handbook*, 1993.

In addition to the characteristic wind patterns that affect the rate and orientation of horizontal pollutant transport, two distinct types of temperature inversions control the vertical depth through which air pollutants are mixed. These inversions are the marine inversion and the radiation inversion. The height of the base of the inversion at any given time is called the "mixing height." The combination of winds and inversions is a critical determinant leading to highly degraded air quality for the SCAB in the summer and generally good air quality in the winter.

2.2 Air Pollutants of Concern

The air pollutants emitted into the ambient air by stationary and mobile sources are regulated by State and federal laws. These regulated air pollutants are known as "criteria air pollutants" and are categorized into primary and secondary pollutants.

Primary air pollutants are emitted directly from sources. Carbon monoxide (CO), reactive organic gases (ROG), nitrogen oxide (NO_X), sulfur dioxide (SO_2), coarse particulate matter (PM_{10}), fine particulate matter ($PM_{2.5}$), and lead are primary air pollutants. Of these, CO, NO_X, SO_2, PM_{10}, and $PM_{2.5}$ are primary criteria pollutants. ROG and NO_X are criteria pollutant precursors and form secondary criteria pollutants through chemical and photochemical reactions in the atmosphere. For example, the criteria pollutant ozone (O_3) is formed by a chemical reaction between ROG and NO_X in the presence of sunlight. O_3 and nitrogen dioxide (NO_2) are the principal secondary pollutants. Sources and health effects commonly associated with criteria pollutants are summarized in **Table 1: Air Contaminants and Associated Public Health Concerns**.

Table 1: Air Contaminants and Associated Public Health Concerns

Pollutant	Major Man-Made Sources	Human Health and Environmental Effects
Particulate Matter (PM_{10} and $PM_{2.5}$)	Power plants, steel mills, chemical plants, unpaved roads and parking lots, wood-burning stoves and fireplaces, automobiles, and others.	Increased respiratory symptoms, such as irritation of the airways, coughing, or difficulty breathing; asthma; chronic bronchitis; irregular heartbeat; nonfatal heart attacks; and premature death in people with heart or lung disease. Impairs visibility.
Ozone (O_3)	Formed by a chemical reaction between reactive organic gases/volatile organic compounds (ROG or VOC)[1] and nitrogen oxides (NO_X) in the presence of sunlight. Motor vehicle exhaust industrial emissions, gasoline storage and transport, solvents, paints and landfills.	Irritates and causes inflammation of the mucous membranes and lung airways; causes wheezing, coughing, and pain when inhaling deeply; decreases lung capacity; aggravates lung and heart problems. Damages plants; reduces crop yield.
Sulfur Dioxide (SO_2)	A colorless gas formed when fuel containing sulfur is burned and when gasoline is extracted from oil. Examples are petroleum refineries, cement manufacturing, metal processing facilities, locomotives, and ships.	Respiratory irritant. Aggravates lung and heart problems. In the presence of moisture and oxygen, sulfur dioxide converts to sulfuric acid which can damage marble, iron and steel. Damages crops and natural vegetation. Impairs visibility. Precursor to acid rain.
Carbon Monoxide (CO)	An odorless, colorless gas formed when carbon in fuel is not burned completely; a component of motor vehicle exhaust.	Reduces the ability of blood to deliver oxygen to vital tissues, affecting the cardiovascular and nervous system. Impairs vision, causes dizziness, and can lead to unconsciousness or death.
Nitrogen Dioxide (NO_2)	A reddish-brown gas formed during fuel combustion for motor vehicles and industrial sources. Sources include motor	Respiratory irritant; aggravates lung and heart problems. Precursor to O_3. Contributes to global warming and nutrient overloading

Table 1: Air Contaminants and Associated Public Health Concerns

Pollutant	Major Man-Made Sources	Human Health and Environmental Effects
	vehicles, electric utilities, and other sources that burn fuel.	which deteriorates water quality. Causes brown discoloration of the atmosphere.
Lead (Pb)	Lead is a metal found naturally in the environment as well as in manufactured products. The major sources of lead emissions have historically been motor vehicles (such as cars and trucks) and industrial sources. Due to the phase out of leaded gasoline, metals processing is the major source of lead emissions to the air today. The highest levels of lead in air are generally found near lead smelters. Other stationary sources are waste incinerators, utilities, and lead-acid battery manufacturers.	Exposure to lead occurs mainly through inhalation of air and ingestion of lead in food, water, soil, or dust. It accumulates in the blood, bones, and soft tissues and can adversely affect the kidneys, liver, nervous system, and other organs. Excessive exposure to lead may cause neurological impairments such as seizures, mental retardation, and behavioral disorders. Even at low doses, lead exposure is associated with damage to the nervous systems of fetuses and young children, resulting in learning deficits and lowered IQ.

[1] Volatile Organic Compounds (VOCs or Reactive Organic Gases [ROG]) are hydrocarbons/organic gases that are formed solely of hydrogen and carbon. There are several subsets of organic gases including ROGs and VOCs. Both ROGs and VOCs are emitted from the incomplete combustion of hydrocarbons or other carbon-based fuels. The major sources of hydrocarbons are combustion engine exhaust, oil refineries, and oil-fueled power plants; other common sources are petroleum fuels, solvents, dry cleaning solutions, and paint (via evaporation).

Source: California Air Resources Board (CARB), Common Air Pollutants, https://ww2.arb.ca.gov/resources/common-air-pollutants, Accessed November 30, 2023.

Toxic Air Contaminants

Toxic air contaminants (TACs) are airborne substances that can cause short-term (acute) or long-term (i.e., chronic, carcinogenic or cancer causing) adverse human health effects (i.e., injury or illness). TACs include both organic and inorganic chemical substances. They may be emitted from a variety of common sources including gasoline stations, automobiles, dry cleaners, industrial operations, and painting operations. The current California list of TACs includes more than 200 compounds, including particulate emissions from diesel-fueled engines.

CARB identified diesel particulate matter (DPM) as a TAC. DPM differs from other TACs in that it is not a single substance but rather a complex mixture of hundreds of substances. Diesel exhaust is a complex mixture of particles and gases produced when an engine burns diesel fuel. DPM is a concern because it causes lung cancer; many compounds found in diesel exhaust are carcinogenic. DPM includes the particle-phase constituents in diesel exhaust. The chemical composition and particle sizes of DPM vary between different engine types (heavy-duty, light-duty), engine operating conditions (idle, accelerate, decelerate), fuel formulations (high/low sulfur fuel), and the year of the engine. Some short-term (acute) effects of diesel exhaust include eye, nose, throat, and lung irritation, and diesel exhaust can cause coughs, headaches, light-headedness, and nausea. DPM poses the greatest health risk among the TACs. Almost all diesel exhaust particle mass is 10 microns or less in diameter. Due to their extremely small size, these particles can be inhaled and eventually trapped in the bronchial and alveolar regions of the lung.

Ambient Air Quality

CARB monitors ambient air quality at approximately 250 air monitoring stations across the State. These stations usually measure pollutant concentrations ten feet above ground level; therefore, air quality is often referred to in terms of ground-level concentrations. Existing ambient air quality levels, historical

trends, and projections near the Project are documented by measurements made by the South Coast Air Quality Management District (SCAQMD), the air pollution regulatory agency in the SCAB that maintains air quality monitoring stations which process ambient air quality measurements.

Pollutants of concern in the SCAB include O_3, PM_{10}, and $PM_{2.5}$. The closest air monitoring station to the Project that monitors ambient concentrations of these pollutants is the Crestline Monitoring Station (located approximately 10 miles to the west).[2] Local air quality data from 2020 to 2022 are provided in **Table 2: Ambient Air Quality Data**, which lists the monitored maximum concentrations and number of exceedances of state or federal air quality standards for each year.

Table 2: Ambient Air Quality Data

Criteria Pollutant	2020	2021	2022
Ozone (O_3) [1]			
1-hour Maximum Concentration (ppm)	0.129	0.148	0.143
8-hour Maximum Concentration (ppm)	0.139	0.120	0.122
Number of Days Standard Exceeded			
CAAQS 1-hour (>0.070 ppm)	69	65	61
NAAQS 8-hour (>0.070 ppm)	118	110	100
Carbon Monoxide (CO) [1]			
1-hour Maximum Concentration (ppm)	1.907	1.966	1.749
Number of Days Standard Exceeded			
NAAQS 1-hour (>35 ppm)	0	0	0
CAAQS 1-hour (>20 ppm)	0	0	0
Nitrogen Dioxide (NO_2) [2]			
1-hour Maximum Concentration (ppm)	0.054	0.056	0.053
Number of Days Standard Exceeded			
NAAQS 1-hour (>0.100 ppm)	0	0	0
CAAQS 1-hour (>0.18 ppm)	0	0	0
Particulate Matter Less Than 10 Microns (PM_{10}) [1]			
National 24-hour Maximum Concentration	51.8	33.4	49.1
State 24-hour Maximum Concentration	43.8	28.2	41.5
State Annual Average Concentration (CAAQS=20 µg/m³)	19.2	16.4	14.7
Number of Days Standard Exceeded			
NAAQS 24-hour (>150 µg/m³)	0	0	0
CAAQS 24-hour (>50 µg/m³)	0	0	0
Particulate Matter Less Than 2.5 Microns ($PM_{2.5}$) [2]			
National 24-hour Maximum Concentration	56.6	57.9	40.1
State 24-hour Maximum Concentration	56.6	57.9	40.1
Number of Days Standard Exceeded			
NAAQS 24-hour (>35 µg/m³)	6	3	6

Notes:
NAAQS = National Ambient Air Quality Standards; CAAQS = California Ambient Air Quality Standards; ppm = parts per million; µg/m³ = micrograms per cubic meter; – = not measured;* = insufficient data
[1] Measurements taken at the Crestline Monitoring Station at 24171 Lake Dr, Crestline, CA 92325 (CARB# 36181)
[2] Measurements taken at the San Bernardino Monitoring Station at 24302 E. 4th St, San Bernardino, CA 92410 (CARB# 36203)

Source: All pollutant measurements are from the CARB Aerometric Data Analysis and Management system database (https://www.arb.ca.gov/adam) except for CO, which were retrieved from the CARB Air Quality and Meteorological Information System (https://www.arb.ca.gov/aqmis2/aqdselect.php).

[2] California Air Resources Board, Air Monitoring Sites – Interactive Map. 2022, https://ww2.arb.ca.gov/applications/air-monitoring-sites-interactive-map, Accessed November 2023.

2.3 Sensitive Receptors

Sensitive populations are more susceptible to the effects of air pollution than is the general population. Sensitive receptors that are in proximity to localized sources of toxics are of particular concern. Land uses considered sensitive receptors include residences, schools, playgrounds, childcare centers, long-term health care facilities, rehabilitation centers, convalescent centers, and retirement homes. The nearest sensitive receptor to the Project is another campground, Camp Pondo, located approximately 1,200 feet to the east, on the opposite side of Green Valley Lake Road.

3 REGULATORY SETTING

3.1 Federal

Federal Clean Air Act

Air quality is federally protected by the Federal Clean Air Act (FCAA) and its amendments. Under the FCAA, the United States Environmental Protection Agency (U.S. EPA) developed the primary and secondary National Ambient Air Quality Standards (NAAQS) for the criteria air pollutants including O_3, NO_2, CO, SO_2, PM_{10}, $PM_{2.5}$, and lead. Proposed projects in or near nonattainment areas could be subject to more stringent air-permitting requirements. The FCAA requires each state to prepare a State Implementation Plan (SIP) to demonstrate how it would attain the NAAQS within the federally imposed deadlines.

The U.S. EPA can withhold certain transportation funds from states that fail to comply with the planning requirements of the FCAA. If a state fails to correct these planning deficiencies within two years of Federal notification, the U.S. EPA is required to develop a Federal implementation plan for the identified nonattainment area or areas. The provisions of 40 Code of Federal Regulations Parts 51 and 93 apply in all nonattainment and maintenance areas for transportation-related criteria pollutants for which the area is designated nonattainment or has a maintenance plan. Applicable NAAQS are summarized in **Table 3: State and Federal Ambient Air Quality Standards**.

3.2 State of California

California Air Resources Board

CARB administers the air quality policy in California. The California Ambient Air Quality Standards (CAAQS) were established in 1969 pursuant to the Mulford-Carrell Act. These standards, included with the NAAQS in **Table 3**, are generally more stringent and apply to more pollutants than the NAAQS. In addition to the criteria pollutants, CAAQS have been established for visibility reducing particulates, hydrogen sulfide, and sulfates.

The California Clean Air Act (CCAA) requires that each local air district prepare and maintain an Air Quality Management Plan (AQMP) to achieve compliance with CAAQS. These AQMPs also serve as the basis for the preparation of the SIP for meeting federal clean air standards for the State of California. Like the U.S. EPA, CARB also designates areas within California as either attainment or nonattainment for each criteria pollutant based on whether the CAAQS have been achieved. Under the CCAA, areas are designated as nonattainment for a pollutant if air quality data shows that a State standard for the pollutant was violated at least once during the previous three calendar years. Exceedances that are affected by highly irregular or infrequent events such as wildfires, volcanoes, etc. are not considered violations of a State standard, and are not used as a basis for designating areas as nonattainment. The applicable State standards are summarized in **Table 3**.

Table 3: State and Federal Ambient Air Quality Standards

Pollutant	Averaging Time	State Standards[1]	National Standards[2]
Ozone (O_3) [2, 5, 7]	1 Hour	0.09 ppm (180 µg/m³)	NA
	8 Hour	0.070 ppm (137 µg/m³)	0.070 ppm (137 µg/m³)
Carbon Monoxide (CO)	1 Hour	20 ppm (23 mg/m³)	35 ppm (40 mg/m³)
	8 Hour	9.0 ppm (10 mg/m³)	9 ppm (10 mg/m³)
Nitrogen Dioxide (NO_2)	1 Hour	0.18 ppm (339 µg/m³)	0.100 ppm (188 µg/m³)
	Annual Arithmetic Mean	0.030 ppm (57 µg/m³)	0.053 ppm (100 µg/m³)
Sulfur Dioxide (SO_2) [8]	1 Hour	0.25 ppm (655 µg/m³)	0.075 ppm (196 µg/m³)
	24 Hour	0.04 ppm (105 µg/m³)	0.14 ppm (365 µg/m³)
	Annual Arithmetic Mean	NA	0.03 ppm (80 µg/m³)
Particulate Matter (PM_{10}) [1, 3, 6]	24-Hour	50 µg/m³	150 µg/m³
	Annual Arithmetic Mean	20 µg/m³	NA
Fine Particulate Matter ($PM_{2.5}$) [3, 4, 6, 9]	24-Hour	NA	35 µg/m³
	Annual Arithmetic Mean	12 µg/m³	9 µg/m³
Sulfates (SO_{4-2})	24 Hour	25 µg/m³	NA
Lead (Pb) [10, 11]	30-Day Average	1.5 µg/m³	NA
	Calendar Quarter	NA	1.5 µg/m³
	Rolling 3-Month Average	NA	0.15 µg/m³
Hydrogen Sulfide (H_2S)	1 Hour	0.03 ppm (42 µg/m³)	NA
Vinyl Chloride (C_2H_3Cl) [10]	24 Hour	0.01 ppm (26 µg/m³)	NA

Notes:
ppm = parts per million; µg/m³ = micrograms per cubic meter; mg/m³ = milligrams per cubic meter; – = no information available.

1 California standards for O_3, carbon monoxide (except Lake Tahoe), sulfur dioxide (1-hour and 24-hour), nitrogen dioxide, suspended particulate matter - PM_{10}, and visibility reducing particles are values that are not to be exceeded. The standards for sulfates, Lake Tahoe carbon monoxide, lead, hydrogen sulfide, and vinyl chloride are not to be equaled or exceeded. If the standard is for a 1-hour, 8-hour or 24-hour average (i.e. all standards except for lead and the PM_{10} annual standard), then some measurements may be excluded. Measurements are excluded that CARB determines would occur less than once per year on the average. The Lake Tahoe carbon monoxide standard is 6.0 ppm, a level one-half the national standard and two-thirds the State standard.

2 National standards shown are the "primary standards" designed to protect public health. National standards other than for O_3, particulates and those based on annual averages are not to be exceeded more than once a year. The 1-hour O_3 standard is attained if, during the most recent three-year period, the average number of days per year with maximum hourly concentrations above the standard is equal to or less than one. The 8-hour O_3 standard is attained when the 3-year average of the 4th highest daily concentrations is 0.070 ppm or less. The 24-hour PM_{10} standard is attained when the 3-year average of the 99th percentile of monitored concentrations is less than 150 µg/m$_3$. The 24-hour $PM_{2.5}$ standard is attained when the 3-year average of 98th percentiles is less than 35 µg/m³.

3 Except for the national particulate standards, annual standards are met if the annual average falls below the standard at every site. The national annual particulate standard for PM_{10} is met if the 3-year average falls below the standard at every site. The annual $PM_{2.5}$ standard is met if the 3-year average of annual averages spatially-averaged across officially designed clusters of sites falls below the standard.
NAAQS are set by the U.S. EPA at levels determined to be protective of public health with an adequate margin of safety.

4 On October 1, 2015, the national 8-hour O_3 primary and secondary standards were lowered from 0.075 to 0.070 ppm. An area will meet the standard if the fourth-highest maximum daily 8-hour O_3 concentration per year, averaged over three years, is equal to or less than 0.070 ppm. U.S. EPA will make recommendations on attainment designations by October 1, 2016, and issue final designations October 1, 2017. Nonattainment areas will have until 2020 to late 2037 to meet the health standard, with attainment dates varying based on the O_3 level in the area.

5 The national 1-hour O_3 standard was revoked by the U.S. EPA on June 15, 2005.

6 In June 2002, CARB established new annual standards for $PM_{2.5}$ and PM_{10}.

7 The 8-hour California O_3 standard was approved by the CARB on April 28, 2005, and became effective on May 17, 2006.

8 On June 2, 2010, the U.S. EPA established a new 1-hour SO_2 standard, effective August 23, 2010, which is based on the 3-year average of the annual 99th percentile of 1-hour daily maximum concentrations. The existing 0.030 ppm annual and 0.14 ppm 24-hour SO_2 NAAQS however must continue to be used until one year following U.S. EPA initial designations of the new 1-hour SO_2 NAAQS.

9 In December 2012, U.S. EPA strengthened the annual $PM_{2.5}$ NAAQS from 15.0 to 12.0 µg/m³. In December 2014, the U.S. EPA issued final area designations for the 2012 primary annual $PM_{2.5}$ NAAQS. Areas designated “unclassifiable/attainment” must continue to take steps to prevent their air quality from deteriorating to unhealthy levels. The effective date of this standard is April 15, 2015.

10 CARB has identified lead and vinyl chloride as ‘toxic air contaminants’ with no threshold level of exposure below which there are no adverse health effects determined.

11 National lead standards, rolling 3-month average: final rule signed October 15, 2008. Final designations effective December 31, 2011.

Source: South Coast Air Quality Management District, *Air Quality Management Plan*, 2022; California Air Resources Board, *Ambient Air Quality Standards*, December 2022.

3.3 Regional

South Coast Air Quality Management District

The SCAQMD is the air pollution control agency for Orange County and the urban portions of Los Angeles, Riverside, and San Bernardino Counties. The agency's primary responsibility is ensuring that the CAAQS and NAAQS are attained and maintained in the SCAB. The SCAQMD is also responsible for adopting and enforcing rules and regulations concerning air pollutant sources, issuing permits for stationary sources of air pollutants, inspecting stationary sources of air pollutants, responding to citizen complaints, monitoring ambient air quality and meteorological conditions, awarding grants to reduce motor vehicle emissions, conducting public education campaigns, and many other activities. All projects are subject to SCAQMD rules and regulations in effect at the time of construction.

The SCAQMD is also the lead agency in charge of developing the AQMP, with input from the Southern California Association of Governments (SCAG) and CARB. The AQMP is a comprehensive plan that includes control strategies for stationary and area sources, as well as for on-road and off-road mobile sources. SCAG has the primary responsibility for providing future growth projections and the development and implementation of transportation control measures. CARB, in coordination with federal agencies, provides the control element for mobile sources.

The 2022 AQMP was adopted by the SCAQMD Governing Board on December 2, 2022. The purpose of the AQMP is to set forth a comprehensive and integrated program that would lead the SCAB into compliance with the federal 24-hour $PM_{2.5}$ air quality standard, and to provide an update to the SCAQMD's commitments towards meeting the federal 8-hour O_3 NAAQS. The AQMP incorporates the latest scientific and technological information and planning assumptions, including the *Regional Transportation Plan/Sustainable Communities Strategy* (RTP/SCS) and updated emission inventory methodologies for various source categories.

The SCAQMD has published the *CEQA Air Quality Handbook* (approved by the SCAQMD Governing Board in 1993 and augmented with guidance for Localized Significance Thresholds [LST] in 2008). The SCAQMD guidance helps local government agencies and consultants to develop environmental documents required by California Environmental Quality Act (CEQA) and provides identification of suggested thresholds of significance for criteria pollutants for both construction and operation (see discussion of thresholds below). With the help of the *CEQA Air Quality Handbook* and associated guidance, local land use planners and consultants are able to analyze and document how proposed and existing projects affect air quality in order to meet the requirements of the CEQA review process. The SCAQMD periodically provides supplemental guidance and updates to the handbook on their website.

SCAG is the regional planning agency for Los Angeles, Orange, Ventura, Riverside, San Bernardino, and Imperial Counties and serves as a forum for regional issues relating to transportation, the economy, community development, and the environment. Under federal law, SCAG is designated as a Metropolitan Planning Organization and under State law as a Regional Transportation Planning Agency and a Council of Governments.

The State and federal attainment status designations for the SCAB are summarized in **Table 4: South Coast Air Basin Attainment Status**. The SCAB is currently designated as a nonattainment area for O_3, PM_{10}, and $PM_{2.5}$ CAAQS, as well as O_3 and $PM_{2.5}$ NAAQS. The SCAB is designated as attainment or unclassified for the remaining CAAQS and NAAQS.

Table 4: South Coast Air Basin Attainment Status

Pollutant	State	Federal
Ozone (O_3) (1 Hour Standard)	Non-Attainment	Non-Attainment (Extreme)
Ozone (O_3) (8 Hour Standard)	Non-Attainment	Non-Attainment (Extreme)
Particulate Matter ($PM_{2.5}$) (24 Hour Standard)	–	Non-Attainment (Serious)
Particulate Matter ($PM_{2.5}$) (Annual Standard)	Non-Attainment	Non-Attainment (Serious)
Particulate Matter (PM_{10}) (24 Hour Standard)	Non-Attainment	Attainment (Maintenance)
Particulate Matter (PM_{10}) (Annual Standard)	Non-Attainment	–
Carbon Monoxide (CO) (1 Hour Standard)	Attainment	Attainment (Maintenance)
Carbon Monoxide (CO) (8 Hour Standard)	Attainment	Attainment (Maintenance)
Nitrogen Dioxide (NO_2) (1 Hour Standard)	Attainment	Unclassifiable/Attainment
Nitrogen Dioxide (NO_2) (Annual Standard)	Attainment	Attainment (Maintenance)
Sulfur Dioxide (SO_2) (1 Hour Standard)	Attainment	Unclassifiable/Attainment
Sulfur Dioxide (SO_2) (24 Hour Standard)	Attainment	–
Lead (Pb) (30 Day Standard)	Attainment	Unclassifiable/Attainment
Lead (Pb) (3 Month Standard)	Attainment	–
Sulfates (SO_{4-2}) (24 Hour Standard)	Attainment	–
Hydrogen Sulfide (H_2S) (1 Hour Standard)	Unclassified	–

Source: South Coast Air Quality Management District, *Air Quality Management Plan*, 2022; United States Environmental Protection Agency, *Nonattainment Areas for Criteria Pollutants (Green Book)*, 2022.

The following is a list of SCAQMD rules that are required of construction activities associated with the Project:

- **Rule 402 (Nuisance)** – This rule prohibits the discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health, or safety of any such persons or the public, or which cause, or have a natural tendency to cause, injury or damage to business or property. This rule does not apply to odors emanating from agricultural operations necessary for the growing of crops or the raising of fowl or animals.

- **Rule 403 (Fugitive Dust)** – The purpose of this rule is to minimize the amount of particulate matter in the ambient air as a result of anthropogenic fugitive dust sources. This rule requires fugitive dust sources to implement best available control measures for all sources, and all forms of visible particulate matter are prohibited from crossing any property line. This rule is intended

to reduce PM_{10} emissions from any transportation, handling, construction, or storage activity that has the potential to generate fugitive dust. PM_{10} suppression techniques are summarized below.

a) Portions of a construction site to remain inactive longer than a period of three months will be seeded and watered until grass cover is grown or otherwise stabilized.

b) All on-site roads will be paved as soon as feasible or watered periodically or chemically stabilized.

c) All material transported off-site will be either sufficiently watered or securely covered to prevent excessive amounts of dust.

d) The area disturbed by clearing, grading, earthmoving, or excavation operations will be minimized at all times.

e) Where vehicles leave a construction site and enter adjacent public streets, the streets will be swept daily or washed down at the end of the work day to remove soil tracked onto the paved surface.

- **Rule 1113 (Architectural Coatings)** – This rule requires manufacturers, distributors, and end users of architectural and industrial maintenance coatings to reduce ROG emissions from the use of these coatings, primarily by placing limits on the ROG content of various coating categories.

3.4 Local

San Bernardino Countywide Plan (General Plan)

The County of San Bernardino addresses air quality in the Natural Resources Element of its General Plan. The Natural Resources Element contains goals and policies that work to promote health and wellness of residents in San Bernardino County through improvements in locally generated emissions. The following policies are applicable to the Proposed Project:

Policy NR-1.1 **Land Use.** We promote compact and transit-oriented development countywide and regulate the types and locations of development in unincorporated areas to minimize vehicle miles traveled and greenhouse gas emissions.

Policy NR-1.2 **Indoor air quality**. We promote the improvement of indoor air quality through the California Building and Energy Codes and through the provision of public health programs and services.

Policy NR-1.3 **Coordination on air pollution**. We collaborate with air quality management districts and other local agencies to monitor and reduce major pollutants affecting the county at the emission source.

Policy NR-1.6 **Fugitive dust emissions**. We coordinate with air quality management on requirement for dust control plans, revegetation, and soil compaction to prevent fugitive dust emissions.

Policy NR-1.8 **Construction and operations**. We invest in county facilities and fleet vehicles to improve energy efficiency and reduce emissions. We encourage county contractors and other builders and developers to use low-emission construction vehicles and equipment to improve air quality and reduce emissions.

County of San Bernardino Development Code

The San Bernardino County Development Code implements the goals and policies of the General Plan by regulating land uses within the unincorporated areas of the County. The development Code contains the following standards for air quality that would apply to the Project:

§ 83.01.040 Air Quality.

(c) Diesel Exhaust Emissions Control Measures. The following emissions control measures shall apply to all discretionary land use projects approved by the County on or after January 15, 2009:

(1) On-Road Diesel Vehicles. On-road diesel vehicles are regulated by the State of California Air Resources Board.

(2) Off-Road Diesel Vehicle/Equipment Operations. All business establishments and contractors that use off-road diesel vehicle/equipment as part of their normal business operations shall adhere to the following measures during their operations in order to reduce diesel particulate matter emissions from diesel-fueled engines:

(A) Off-road vehicles/equipment shall not be left idling on site for periods in excess of five minutes. The idling limit does not apply to:
(I) Idling when queuing;
(II) Idling to verify that the vehicle is in safe operating condition;
(III) Idling for testing, servicing, repairing or diagnostic purposes;
(IV) Idling necessary to accomplish work for which the vehicle was designed (such as operating a crane);
(V) Idling required to bring the machine system to operating temperature; and
(VI) Idling necessary to ensure safe operation of the vehicle.

(B) Use reformulated ultra low-sulfur diesel fuel in equipment and use equipment certified by the U.S. Environmental Protection Agency (U.S. EPA) or that pre-dates U.S. EPA regulations.

(C) Maintain engines in good working order to reduce emissions.

(D) Signs shall be posted requiring vehicle drivers to turn off engines when parked.

(E) Any requirements or standards subsequently adopted by the South Coast Air Quality Management District, the Mojave Desert Air Quality Management District or the California Air Resources Board.

(F) Provide temporary traffic control during all phases of construction.

(G) On-site electrical power connections shall be provided for electric construction tools to eliminate the need for diesel-powered electric generators, where feasible.

(H) Maintain construction equipment engines in good working order to reduce emissions. The developer shall have each contractor certify that all construction equipment is properly serviced and maintained in good operating condition.

(I) Contractors shall use ultra low sulfur diesel fuel for stationary construction equipment as required by Air Quality Management District (AQMD) Rules 431.1 and 431.2 to reduce the release of undesirable emissions.

(J) Substitute electric and gasoline-powered equipment for diesel-powered equipment, where feasible.

4 SIGNIFICANCE CRITERIA AND METHODOLOGY

4.1 Air Quality Thresholds

Based upon the criteria derived from State CEQA Guidelines Appendix G, a Project normally would have a significant effect on the environment and would require mitigation if it would meet any of the following criteria:

- Conflict with or obstruct implementation of the applicable air quality plan.
- Result in a cumulatively considerable net increase of any criteria pollutant for which the Project region is in nonattainment under an applicable State or federal ambient air quality standard.
- Expose sensitive receptors to substantial pollutant concentrations.
- Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people.

SCAQMD Thresholds

The significance criteria established by SCAQMD may be relied upon to make the above determinations. According to the SCAQMD, an air quality impact is considered significant if a project would violate any ambient air quality standard, contribute substantially to an existing or projected air quality violation, or expose sensitive receptors to substantial pollutant concentrations. The SCAQMD has established thresholds of significance for air quality during construction and operational activities of land use development projects, as shown in **Table 5: South Coast Air Quality Management District Emissions Thresholds**.

Table 5: South Coast Air Quality Management District Emissions Thresholds

Criteria Air Pollutants and Precursors	Maximum Pounds Per Day	
	Construction-Related	Operational-Related
Reactive Organic Gases (ROG)	75	55
Carbon Monoxide (CO)	550	550
Nitrogen Oxides (NO_X)	100	55
Sulfur Oxides (SO_X)	150	150
Coarse Particulates (PM_{10})	150	150
Fine Particulates ($PM_{2.5}$)	55	55

Source: South Coast Air Quality Management District, *South Coast AQMD Air Quality Significance Thresholds*.

Localized Carbon Monoxide

In addition to the daily thresholds listed above, the Project would also be subject to the CAAQS and NAAQS. These are addressed through an analysis of localized CO impacts. The significance of localized impacts depends on whether ambient CO levels near the Project site are above the CAAQS and NAAQS for CO standards (the more stringent CAAQS are 20 ppm for 1-hour and 9 ppm for 8-hour). The SCAB has been designated as attainment under the 1-hour and 8-hour CAAQS and NAAQS.

Localized Significance Thresholds

In addition to the CO hotspot analysis, the SCAQMD developed LSTs for emissions of NO_2, CO, PM_{10}, and $PM_{2.5}$ generated at new development sites (off-site mobile source emissions are not included in the LST analysis). LSTs represent the maximum emissions that can be generated at a project without expecting to cause or substantially contribute to an exceedance of the most stringent CAAQS or NAAQS. LSTs are based on the ambient concentrations of that pollutant within the Project source receptor area (SRA), as demarcated by the SCAQMD, and the distance to the nearest sensitive receptor. LST analysis for construction is applicable for all projects that disturb 5 acres or less on a single day. The Project is located within SCAQMD SRA 37. **Table 6: Localized Significance Thresholds for Construction/Operations**, shows the LSTs for a 1-acre, 2-acre, and 5-acre project in SRA 37 with sensitive receptors located at approximately 25 meters. **Table 6** shows that the LSTs increase as acreage increases. The nearest sensitive receptors are located approximately 1,200 feet (366 meters) east of the Project site.

Table 6: Localized Significance Thresholds for Construction/Operations

Project Size	Maximum Pounds Per Day			
	NO_X	CO	PM_{10}	$PM_{2.5}$
1 Acre	118/118	667/667	4/1	3/1
2 Acres	170/170	972/972	7/2	4/1
5 Acres	270/270	1,746/1,746	14/4	8/2

NO_X = Nitrogen Oxides; CO = Carbon Monoxide; PM_{10} = Particulate Matter 10 microns in diameter or less; $PM_{2.5}$ = Particulate Matter 2.5 microns in diameter or less

Note: Based on a sensitive receptor distance of 25 meters in SRA 37.

Source: South Coast Air Quality Management District, *Localized Significance Threshold Methodology,* July 2008.

It should be noted that LSTs are screening thresholds and are therefore conservative. The construction LST acreage is determined based the expected daily acreage disturbed. The operational LST acreage is based on the total area of the project site. Although the Project site is greater than five acres, the 5-acre operational LSTs are conservatively used to evaluate the Project.

4.2 Methodology

This air quality impact analysis considers the Project's construction and operational impacts. Where criteria air pollutant quantification was required, emissions were modeled using the California Emissions Estimator Model (CalEEMod) version 2022.1.1.20. CalEEMod is a Statewide land use emissions computer model designed to quantify potential criteria pollutant emissions associated with both construction and operations from a variety of land use projects. Air quality impacts were assessed according to methodologies recommended by CARB and the SCAQMD.

Construction

Project-related construction equipment, trucks, worker vehicles, and ground-disturbing activities would generate emissions of criteria air pollutants and precursors. Daily regional construction emissions are estimated by assuming construction occurs at the earliest feasible date (i.e., a conservative estimate of construction activities) and applying off-road, fugitive dust, and on-road emissions factors in CalEEMod.

Construction was modeled according to the following timeline:

- Demolition (tearing down of buildings/structures): June 2025 to August 2025
- Site Preparation (clearing vegetation and other natural materials): June 2025 to August 2025
- Grading (cut/fill of land): June 2025 to June 2027
- Paving (laying of concrete or asphalt): June 2025 to June 2027
- Building Construction (construction of buildings/structures): June 2025 to June 2027
- Architectural Coating (interior and exterior painting): June 2025 to June 2027

Operations

Project operations would result in emissions of area sources (consumer products, architectural coating, and landscape equipment), energy sources (natural gas usage), mobile sources (motor vehicles from Project generated vehicle trips), and off-road equipment. Project-generated increases in operational emissions would be predominantly associated with motor vehicle use. Emissions from each of these categories are discussed below.

- **Area Sources.** Area source emissions would be generated due to consumer products, on-site equipment, architectural coating, and landscaping. Consumer products are various solvents used in non-industrial applications, which emit VOCs during product use. These typically include cleaning supplies, kitchen aerosols, cosmetics, and toiletries.

- **Energy Sources.** Energy source emissions would be generated due to electricity and natural gas usage associated with the Project. Primary uses of electricity and natural gas by the Project would be for miscellaneous commercial/retail equipment, space heating and cooling, water heating, ventilation, lighting, appliances, and electronics. Energy source emissions were calculated in CalEEMod. No changes were made to the default energy usage consumption rates or emissions factors.

- **Mobile Sources.** Mobile sources are emissions from motor vehicles, including tailpipe and evaporative emissions. Depending upon the pollutant being discussed, the potential air quality impact may be of either regional or local concern. For example, ROG, NO_X, PM_{10}, and $PM_{2.5}$ are all pollutants of regional concern. NO_X and ROG react with sunlight to form O_3, known as photochemical smog. Additionally, wind currents readily transport PM_{10} and $PM_{2.5}$. However, CO tends to be a localized pollutant, dispersing rapidly at the source.

  Project-generated vehicle emissions are based on the trip generation within the *Scope for the Traffic Study* and *Vehicle Miles Traveled (VMT) Screening Assessment* prepared by Kimley Horn and Associates (June 2023) and incorporated into CalEEMod as recommended by the SCAQMD.

As discussed above, the SCAQMD provides significance thresholds for emissions associated with Proposed Project construction and operations. The Proposed Project's construction and operational emissions are compared to the daily criteria pollutant emissions significance thresholds in order to determine the significance of a Project's impact on regional air quality.

The localized effects from the Project's on-site emissions were evaluated in accordance with the SCAQMD's LST methodology, which uses on-site mass emissions rate look-up tables and Project-specific

modeling. LSTs represent the maximum emissions from a project that are not expected to cause or contribute to an exceedance of the most stringent applicable NAAQS or CAAQS and are developed based on the ambient concentrations of that pollutant for each SRA and distance to the nearest sensitive receptor.

5 POTENTIAL IMPACTS AND MITIGATION

5.1 Air Quality Analysis

Threshold 5.1 Would the Project conflict with or obstruct implementation of the applicable air quality plan?

As part of its enforcement responsibilities, the U.S. EPA requires each state with nonattainment areas to prepare and submit a SIP that demonstrates the means to attain the NAAQS. The SIP must integrate federal, State, and local plan components and regulations to identify specific measures to reduce pollution in nonattainment areas, using a combination of performance standards and market-based programs. Similarly, under State law, the CCAA requires an air quality attainment plan to be prepared for areas designated as nonattainment regarding the CAAQS and NAAQS. Air quality attainment plans outline emissions limits and control measures to achieve and maintain these standards by the earliest practical date.

The Project is located within the SCAB, which is under the jurisdiction of the SCAQMD. The SCAQMD is required, pursuant to the FCAA, to reduce emissions of criteria pollutants for which the SCAB is in nonattainment. To reduce such emissions, the SCAQMD drafted the 2022 AQMP which establishes a program of rules and regulations directed at reducing air pollutant emissions and achieving CAAQS and NAAQS. The 2022 AQMP is a regional and multi-agency effort including the SCAQMD, the CARB, the SCAG, and the U.S. EPA. The plan's pollutant control strategies are based on the latest scientific and technical information and planning assumptions, including SCAG's Connect SoCal 2024-2050 RTP/SCS, updated emission inventory methodologies for various source categories, and SCAG's latest growth forecasts. SCAG's latest growth forecasts were defined in consultation with local governments and with reference to local general plans. The Project is subject to the SCAQMD's AQMP.

Criteria for determining consistency with the AQMP are defined by the following indicators:

- **Consistency Criterion No. 1**: The Project will not result in an increase in the frequency or severity of existing air quality violations, or cause or contribute to new violations, or delay the timely attainment of air quality standards or the interim emissions reductions specified in the AQMP.
- **Consistency Criterion No. 2**: The Project will not exceed the assumptions in the AQMP, or increments based on the years of the Project build-out phase.

According to the SCAQMD's *CEQA Air Quality Handbook*, the purpose of the consistency finding is to determine if a project is inconsistent with the assumptions and objectives of the regional air quality plans, and thus if it would interfere with the region's ability to comply with CAAQS and NAAQS.

The violations to which Consistency Criterion No. 1 refers are the CAAQS and NAAQS. As shown in **Table 7**, the Project would not exceed construction emission standards with the implementation of Mitigation Measure (**MM**) **AQ-1**. As shown in **Table 8** and **Table 11**, the Project would not exceed operational emission standards, or local significance thresholds. Therefore, the Project would not contribute to an existing air quality violation. Thus, the Project would be consistent with the first criterion.

Concerning Consistency Criterion No. 2, the AQMP contains air pollutant reduction strategies based on SCAG's latest growth forecasts, and SCAG's growth forecasts were defined in consultation with local governments and with reference to local general plans. The Project would not require a General Plan Amendment (GPA) or a Zone Change and the project would be consistent with the land uses planned for the site. As such, the Project would not result in substantial unplanned growth or unaccounted for growth in the Countywide Plan or job growth projections used by the SCAQMD to develop the AQMP. Thus, a less than significant impact would occur no impact would occur, as the Project is also consistent with the second criterion.

Mitigation Measures: Mitigation measures **MM AQ-1** (refer to Impact Threshold 5.2, below).

Level of Significance: Less than significant with mitigation incorporated.

Threshold 5.2 Would the Project result in a cumulatively considerable net increase of any criteria pollutant for which the Project region is non-attainment under an applicable state or federal ambient air quality standard?

Construction Emissions

Project construction activities would generate temporary emissions of criteria air pollutants. The criteria pollutants of primary concern within the Project area are O_3-precursor pollutants (i.e., ROG and NO_X) and PM_{10} and $PM_{2.5}$. Construction-related emissions are of temporary duration, lasting only as long as construction activities occur, but would be considered a significant air quality impact if the volume of pollutants generated exceeds the SCAQMD's thresholds of significance.

Construction results in the temporary generation of emissions resulting from site grading, road paving, motor vehicle exhaust associated with construction equipment and worker trips, and the movement of construction equipment, especially on unpaved surfaces. Emissions of airborne particulate matter are largely dependent on the amount of ground disturbance associated with site preparation activities as well as weather conditions and the appropriate application of water. Fugitive dust emissions may have a substantial, temporary impact on local air quality. In addition, fugitive dust may be a nuisance to those living and working in the Project vicinity. Uncontrolled dust from construction can become a nuisance and potential health hazard to those living and working nearby.

The Project's construction emissions were calculated using the CalEEMod computer program, which is designed to model emissions for land use development projects, based on typical construction requirements. See **Appendix A: Air Quality Modeling Data** for more information regarding the construction assumptions used in this analysis. Predicted maximum daily construction-generated emissions for the Project are summarized in in **Table 7: Construction-Related Emissions**.

Table 7: Construction-Related Emissions

Construction Year	Maximum Pounds Per Day[1]					
	ROG	NO_X	CO	SO_2	PM_{10}	$PM_{2.5}$
Unmitigated Emissions						
2025	16.2	**141.0**	137.0	0.40	44.6	21.0
2026	6.3	19.5	33.2	0.05	2.6	1.1
2027	6.2	18.8	32.5	0.05	2.5	1.1
SCAQMD Threshold	*75*	*100*	*550*	*150*	*150*	*55*
Exceed SCAQMD Threshold?	**No**	**Yes**	**No**	**No**	**No**	**No**
Mitigated Emissions[2]						
2025	7.3	*55.9*	137.0	0.40	*40.7*	*17.5*
2026	4.8	*7.1*	35.5	0.05	*2.0*	*0.6*
2027	4.8	*7.0*	34.9	0.05	*2.0*	*0.6*
SCAQMD Threshold	*75*	*100*	*550*	*150*	*150*	*55*
Exceed SCAQMD Threshold?	**No**	**No**	**No**	**No**	**No**	**No**

ROG = Reactive Organic Gases; NO_X = Nitrogen Oxides; CO = Carbon Monoxide; SO_2 = Sulfur Dioxide; PM_{10} = Particulate Matter 10 microns in diameter or less; $PM_{2.5}$ = Particulate Matter 2.5 microns in diameter or less

1. SCAQMD Rule 403 Fugitive Dust applied. The Rule 403 reduction/credits include the following: properly maintain mobile and other construction equipment; replace ground cover in disturbed areas quickly; water exposed surfaces three times daily; water all haul roads twice daily; and limit speeds on unpaved roads to 15 miles per hour.
2. **MM AQ-1** requires off-road equipment 50 horsepower or greater to meet CARB Tier 4 Final standards during construction activities.

Source: CalEEMod version 2022.1.1.20 Refer to Appendix A for model outputs.

SCAQMD Rules 402 and 403 (prohibition of nuisances, watering of inactive and perimeter areas, track out requirements, etc.), are applicable to the Project and were applied in CalEEMod to minimize fugitive dust emissions. Rule 1113 provides specifications on painting practices and regulates the ROG content of paint. As required by law, all architectural coatings for the Project structures would comply with SCAQMD Rule 1113.

As shown in **Table 7**, unmitigated construction emissions would exceed the SCAQMD threshold for NO_X during the first year of construction. **MM AQ-1** requires all off-road equipment 50 horsepower or greater to meet CARB Tier 4 Final standards, reducing NO_X emissions below the SCAQMD construction standard. With the implementation of **MM AQ-1**, construction emissions would be below the SCAQMD's thresholds, and impacts would be less than significant.

Operational Emissions

Project operational emissions are those attributed to vehicle trips (mobile emissions), the use of natural gas and electricity (energy source emissions), and consumer products, architectural coatings, and landscape maintenance equipment (area source emissions). CalEEMod was used to calculate emissions based on the proposed land uses for the plan area and the number of trips generated.

Table 8: Operational Emissions illustrates the operational emissions from the Project. As shown in **Table 8**, Project emissions would not exceed SCAQMD thresholds for any criteria pollutants. As such, the Project would not violate any air quality standards or contribute substantially to an existing air quality violation. Therefore, regional operations would result in a less than significant long-term regional quality impact.

Table 8: Operational Emissions

Source	Maximum Pounds Per Day					
	ROG	NO_X	CO	SO_2	PM_{10}	$PM_{2.5}$
Unmitigated Emissions						
Area Source Emissions	6.56	0.08	9.11	<0.01	0.02	0.01
Energy Emissions	0.14	2.52	2.12	0.02	0.19	0.19
Mobile Emissions	0.55	1.03	10.00	0.03	2.58	0.67
Total Emissions	7.25	3.63	21.23	0.05	2.79	0.87
SCAQMD Threshold	*55*	*55*	*550*	*150*	*150*	*55*
Exceeds Threshold?	No	No	No	No	No	No

ROG = Reactive Organic Gases; NO_X = Nitrogen Oxides; CO = Carbon Monoxide; SO_2 = Sulfur Dioxide; PM_{10} = Particulate Matter 10 microns in diameter or less; $PM_{2.5}$ = Particulate Matter 2.5 microns in diameter or less

Source: CalEEMod version 2022.1.1.20. Refer to Appendix A for model outputs.

Cumulative Construction Impacts

The SCAB is designated nonattainment for O_3, PM_{10}, and $PM_{2.5}$ for the CAAQS and nonattainment for O_3 and $PM_{2.5}$ for the NAAQS. Appendix D of the SCAQMD *White Paper on Potential Control Strategies to Address Cumulative Impacts from Air Pollution* (2003) notes that projects that result in emissions that do not exceed the project specific SCAQMD regional thresholds of significance should result in a less than significant impact on a cumulative basis unless there is other pertinent information to the contrary. The mass-based regional significance thresholds published by the SCAQMD are designed to ensure compliance with both NAAQS and CAAQS and are based on an inventory of projected emissions in the SCAB. Therefore, if a project is estimated to result in emissions that do not exceed the thresholds, the project's contribution to the cumulative air quality impact in the SCAB would not be cumulatively considerable. As shown in **Table 7** above, construction-related emissions with the incorporation of construction mitigation measure **MM AQ-1** would not exceed the SCAQMD significance thresholds for criteria pollutants. Therefore, the Proposed Project would not generate a cumulatively considerable contribution to air pollutant emissions during construction.

The SCAQMD has developed strategies to reduce criteria pollutant emissions outlined in the AQMP pursuant to the FCAA mandates. The analysis assumed fugitive dust controls would be utilized during construction, including frequent water applications. SCAQMD rules, mandates, and compliance with adopted AQMP emissions control measures would also be imposed on construction projects throughout the SCAB, which would include related projects. Compliance with SCAQMD rules and regulations would further reduce Project construction-related emissions. Therefore, Project-related construction emissions, combined with those from other projects in the area, would not substantially deteriorate local air quality. The Project's construction-related emissions would not result in a cumulatively considerable contribution to significant cumulative air quality.

Cumulative Operational Impacts

The SCAQMD has not established separate significance thresholds for cumulative operational emissions. The nature of air emissions is largely a cumulative impact. As a result, no single project is sufficient in size to, by itself, result in nonattainment of ambient air quality standards. Instead, individual project emissions contribute to existing cumulatively significant adverse air quality impacts. The SCAQMD developed the operational thresholds of significance based on the level above which individual project emissions would result in a cumulatively considerable contribution to the SCAB's existing air quality

conditions. Therefore, a project that exceeds the SCAQMD operational thresholds would also be a cumulatively considerable contribution to a significant cumulative impact.

As shown in **Table 8** above, the Project's operational emissions would not exceed SCAQMD thresholds. As a result, operational emissions associated with the Project would not result in a cumulatively considerable contribution to significant cumulative air quality impacts. A less than significant impact would occur in this regard.

Plans, Programs, and Policies

Existing requirements based on local, state, or federal regulations or laws are frequently required independently of CEQA review. Typical requirements include compliance with the provisions of the Building Code, CalGreen Code, local municipal code, SCAQMD Rules, etc. Because Plans, Programs, and Policies (PPP) are neither Project specific nor a result of development of the Project, they are not considered to be project design features or Mitigation Measures.

PPP-1 Prior to the issuance of grading permits, the County Engineer shall confirm that the Grading Plan, Building Plans and Specifications require all construction contractors to comply with South Coast Air Quality Management District's (SCAQMD's) Rules 402 and 403 to minimize construction emissions of dust and particulates. The measures include, but are not limited to, the following:

- Portions of a construction site to remain inactive longer than a period of three months will be seeded and watered until grass cover is grown or otherwise stabilized.
- All on-site roads will be paved as soon as feasible or watered periodically or chemically stabilized.
- All material transported off site will be either sufficiently watered or securely covered to prevent excessive amounts of dust.
- The area disturbed by clearing, grading, earthmoving, or excavation operations will be minimized at all times.
- Where vehicles leave a construction site and enter adjacent public streets, the streets will be swept daily or washed down at the end of the work day to remove soil tracked onto the paved surface.

PPP-2 Pursuant to SCAQMD Rule 1113, the Project applicant shall require by contract specifications that the interior and exterior architectural coatings (paint and primer including parking lot paint) products used would have a volatile organic compound rating of 50 grams per liter or less.

PPP-3 Require diesel powered construction equipment to turn off when not in use per Title 13 of the California Code of Regulations, Section 2449.

Mitigation Measures:

MM AQ-1 Prior to issuance of grading permits, the applicant shall prepare and submit documentation to the County of San Bernardino that demonstrate the following:

- All off-road diesel-powered construction equipment greater than 50 horsepower meets California Air Resources Board Tier 4 Final off-road emissions standards. Requirements for Tier 4 Final equipment shall be included in applicable bid documents and successful contractor(s) must demonstrate the ability to supply such equipment. A copy of each unit's Best Available Control Technology (BACT) documentation (certified tier specification or model year specification), and CARB or SCAQMD operating permit (if applicable) shall be provided to the County at the time of mobilization of each applicable unit of equipment.

Level of Significance: Less than significant impact with mitigation incorporated. Construction emissions have been reduced to less than significant with the incorporation of **MM AQ-1**.

Threshold 5.3 Would the Project expose sensitive receptors to substantial pollutant concentrations?

Localized Construction Significance Analysis

To identify impacts to sensitive receptors, the SCAQMD recommends addressing LSTs for construction. LSTs were developed in response to SCAQMD Governing Boards' Environmental Justice Enhancement Initiative (I-4). The SCAQMD provided the *Final Localized Significance Threshold Methodology* (dated June 2003 [revised 2008]) for guidance. The LST methodology assists lead agencies in analyzing localized impacts associated with Project-specific emissions.

Since CalEEMod calculates construction emissions based on the number of equipment hours and the maximum daily soil disturbance activity possible for each piece of equipment, **Table 9: Equipment-Specific Grading Rates** is used to determine the maximum daily disturbed acreage for comparison to LSTs. The appropriate SRA for the localized significance thresholds is the Central San Bernardino Mountains (SRA 37) since this area includes the Project. LSTs apply to NO_2, CO, PM_{10}, and $PM_{2.5}$. The SCAQMD produced look-up tables for projects that disturb areas less than or equal to 5 acres in size. Project construction is anticipated to disturb a maximum of 4 acres in a single day during the grading phase. As the LST guidance provides thresholds for projects disturbing 1-, 2-, and 5-acres in size and the thresholds increase with size of the site, the LSTs for a 4-acre area were interpolated and utilized for this analysis.

Table 9: Equipment-Specific Grading Rates

Construction Phase	Equipment Type	Equipment Quantity	Acres Graded per 8-Hour Day	Operating Hours per Day	Acres Graded per Day
Grading	Tractors	2	0.5	8	1
	Graders	1	0.5	8	0.5
	Dozers	1	0.5	8	0.5
	Scrapers	2	1	8	2
				Maximum Acres Graded per Day	**4**

Source: CalEEMod version 2022.1.1.20. Refer to Appendix A for model outputs.

The SCAQMD's methodology states that "off-site mobile emissions from the Project should not be included in the emissions compared to LSTs." Therefore, only "on-site" emissions included in the CalEEMod outputs were considered. The nearest sensitive receptor to the Project is another campground, Camp Pondo, located approximately 1,200 feet (366 meters) to the east, on the opposite side of Green Valley Lake Road. LST thresholds are provided for distances to sensitive receptors of 25, 50, 100, 200, and 500 meters. Therefore, LSTs for receptors located at 366 meters were interpolated and utilized in this analysis. **Table 10: Localized Significance of Construction Emissions**, presents the results of localized emissions during construction. **Table 10** shows that Project emissions of these pollutants on the peak day of construction would not exceed SCAQMD thresholds at the nearest sensitive receptor. Therefore, the Project would result in a less than significant impact concerning LSTs during construction.

Table 10: Localized Significance of Construction Emissions

Construction Activity	Maximum Pounds Per Day			
	NO_X	CO	PM_{10}	$PM_{2.5}$
Unmitigated Emissions				
Demolition	4.51	18.2	0.06	0.06
Site Preparation	2.59	28.3	19.8	10.2
Grading	4.43	35.3	9.51	3.8
Building Construction	2.82	14.8	0.08	0.07
Paving	7.45	9.98	0.35	0.32
Architectural Coating	0.65	0.96	0	0
Combined Emissions from Overlapping Phases	22.45	107.54	29.8	14.45
SCAQMD Localized Screening Threshold (adjusted for 4 acres at 366 meters)	*614*	*17,995*	*166*	*78*
Exceed SCAQMD Threshold?	No	No	No	No

NO_X = Nitrogen Oxides; CO = Carbon Monoxide; PM_{10} = Particulate Matter 10 microns in diameter or less; $PM_{2.5}$ = Particulate Matter 2.5 microns in diameter or less

Source: CalEEMod version 2022.1.1.20 Refer to Appendix A for model outputs.

Localized Operational Significance Analysis

Interpolated LSTs for receptors located at 1,200 feet (366 meters) for SRA 37 were used in this analysis. The Project site is approximately 251 acres, the 5-acre threshold was conservatively used for evaluation of operational emissions. As noted above, the LSTs increase as site acreage increases. Therefore, the 5-acre LSTs are conservative for evaluation of a 251-acre site. The LST analysis only includes on-site sources. However, the CalEEMod model outputs do not separate on- and off-site emissions for mobile sources. For a worst-case scenario assessment, the emissions shown in **Table 11: Localized Significance of Operational Emissions** conservatively includes one hundred percent of the total mobile emissions.

Table 11: Localized Significance of Operational Emissions

Activity	Maximum Pounds Per Day			
	NO_X	CO	PM_{10}	$PM_{2.5}$
Onsite Operational Emissions	3.55	21.2	2.79	0.87
SCAQMD Localized Screening Threshold (adjusted for 5-acre at 366 meters)	*648*	*18,561*	*41*	*20*
Exceed SCAQMD Threshold?	**No**	**No**	**No**	**No**

NO_X = Nitrogen Oxides; CO = Carbon Monoxide; PM_{10} = Particulate Matter 10 microns in diameter or less; $PM_{2.5}$ = Particulate Matter 2.5 microns in diameter or less

Source: CalEEMod version 2022.1.1.20. Refer to Appendix A for model outputs.

Daily on-site operational emissions are compared to the LST thresholds in **Table 11**. **Table 11** shows that the maximum daily emissions of these pollutants during Project operations would not result in significant concentrations of pollutants at nearby sensitive receptors. Therefore, the Project would result in a less than significant impact concerning LSTs during operational activities.

Criteria Pollutant Health Impacts

On December 24, 2018, the California Supreme Court issued an opinion identifying the need to provide sufficient information connecting a project's air emissions to health impacts or explain why such information could not be ascertained (*Sierra Club v. County of Fresno* [Friant Ranch, L.P.] [2018] Cal.5th, Case No. S219783). The SCAQMD has set its CEQA significance thresholds based on the FCAA, which defines a major stationary source (in extreme O_3 nonattainment areas such as the SCAB) as emitting 10 tons per year. The thresholds correlate with the trigger levels for the federal New Source Review (NSR) Program and SCAQMD Rule 1303 for new or modified sources. The NSR Program[3] was created by the FCAA to ensure that stationary sources of air pollution are constructed or modified in a manner that is consistent with attainment of health-based NAAQS. The NAAQS establish the levels of air quality necessary, with an adequate margin of safety, to protect the public health. Therefore, projects that do not exceed the SCAQMD's LSTs and mass emissions thresholds would not violate any air quality standards or contribute substantially to an existing or projected air quality violation and no criteria pollutant health impacts would occur.

NO_X and ROG are precursor emissions that form O_3 in the atmosphere in the presence of sunlight where the pollutants undergo complex chemical reactions. It takes time and the influence of meteorological conditions for these reactions to occur, so ozone may be formed at a distance downwind from the sources. Breathing ground-level O_3 can result health effects that include reduced lung function, inflammation of airways, throat irritation, pain, burning, or discomfort in the chest when taking a deep breath, chest tightness, wheezing, or shortness of breath. In addition to these effects, evidence from observational studies strongly indicates that higher daily O_3 concentrations are associated with increased asthma attacks, increased hospital admissions, increased daily mortality, and other markers of morbidity. The consistency and coherence of the evidence for effects upon asthmatics suggests that O_3 can make asthma symptoms worse and can increase sensitivity to asthma triggers.

According to the SCAQMD's 2022 AQMP, O_3, NO_X, and ROG have been decreasing in the SCAB since 1975 and are projected to continue to decrease in the future. Although vehicle miles traveled in the SCAB continue to increase, NO_X and ROG levels are decreasing because of the mandated controls on

[3] Code of Federal Regulation (CFR) [i.e., PSD (40 CFR 52.21, 40 CFR 51.166, 40 CFR 51.165 (b)), Non-attainment NSR (40 CFR 52.24, 40 CFR 51.165, 40 CFR part 51, Appendix S)

motor vehicles and the replacement of older polluting vehicles with lower-emitting vehicles. NO_X emissions from electric utilities have also decreased due to the use of cleaner fuels and renewable energy. The 2022 AQMP demonstrates how the SCAQMD's control strategy to meet the 8-hour O_3 standard in 2037. In addition, since NO_X emissions also lead to the formation of $PM_{2.5}$, the NO_X reductions needed to meet the O_3 standards will likewise lead to improvement of $PM_{2.5}$ levels and attainment of $PM_{2.5}$ standards.

The SCAQMD's air quality modeling demonstrates that NO_X reductions prove to be much more effective in reducing O_3 levels and will also lead to significant improvement in $PM_{2.5}$ concentrations. NO_X-emitting stationary sources regulated by the SCAQMD include Regional Clean Air Incentives Market (RECLAIM) facilities (e.g., refineries, power plants, etc.), natural gas combustion equipment (e.g., boilers, heaters, engines, burners, flares) and other combustion sources that burn wood or propane. The 2016 AQMP identifies robust NO_X reductions from new regulations on RECLAIM facilities, non-refinery flares, commercial cooking, and residential and commercial appliances. Such combustion sources are already heavily regulated with the lowest NO_X emissions levels achievable but there are opportunities to require and accelerate replacement with cleaner zero-emission alternatives, such as residential and commercial furnaces, pool heaters, and backup power equipment. The AQMD plans to achieve such replacements through a combination of regulations and incentives. Technology-forcing regulations can drive development and commercialization of clean technologies, with future year requirements for new or existing equipment. Incentives can then accelerate deployment and enhance public acceptability of new technologies.

As previously discussed, localized effects of on-site Project emissions on nearby receptors for the Project would be less than significant (refer to Table 10 and Table 11). The LSTs represent the maximum emissions from a project that are not expected to cause or contribute to an exceedance of the most stringent applicable state or federal ambient air quality standard. The LSTs were developed by the SCAQMD based on the ambient concentrations of that pollutant for each SRA and distance to the nearest sensitive receptor. The ambient air quality standards establish the levels of air quality necessary, with an adequate margin of safety, to protect public health, including protecting the health of sensitive populations. However, as discussed above, neither the SCAQMD nor any other air district currently have methodologies that would provide Lead Agencies and CEQA practitioners with a consistent, reliable, and meaningful analysis to correlate specific health impacts that may result from a proposed project's mass emissions. Information on health impacts related to exposure to O_3 and PM emissions published by the U.S. EPA and CARB have been summarized above and discussed in the Regulatory Setting section. Health studies are used by these agencies to set the NAAQS and CAAQS.

The NAAQS and CAAQS were developed to protect the most susceptible population groups from adverse health effects and were established in terms of parts per million or micrograms per cubic meter for the applicable emissions. As stated earlier, the mass emission thresholds were established primarily in conjunction with federal permitting "major source" thresholds. If emissions were below these "de minimis" emission rates, then the Proposed Project is presumed to conform with the NAAQS.[4] While based on the status of an air basin level of attainment of the health-based NAAQS, emissions in excess of the mass emission thresholds from one project does not mean the air basin would experience measurably higher ground level concentrations, or more frequent occurrences of ground level concentrations in exceedance of standards, or delay timely attainment of a particular NAAQS.

[4] U.S. Environmental Protection Agency, Frequent Questions about General Conformity. Available: https://www.epa.gov/general-conformity/frequent-questions-about-general-conformity. Accessed July 2019.

Ozone concentrations are dependent upon a variety of complex factors, including the presence of sunlight and precursor pollutants, natural topography, nearby structures that cause building downwash, atmospheric stability, and wind patterns. Because of the complexities of predicting ground-level O_3 concentrations in relation to the NAAQS and CAAQS, none of the health-related information can be directly correlated to the pounds/day or tons/year of emissions estimated from a single, proposed project. It should also be noted that this analysis identifies health concerns related to PM, CO, O_3, and NO_2. **Table 1** includes a list of criteria pollutants and summarizes common sources and effects. Thus, this analysis is reasonable and intended to foster informed decision making.

Diesel Particulate Matter

Exhaust from diesel engines contains a mixture of gases and solid particles. These solid particles are known as diesel particulate matter (DPM). DPM contains hundreds of different chemicals, many of which are harmful to human health. During the grading phase of construction, diesel trucks hauling soil and other material will make approximately 447 one-way trips (refer to Appendix A, CalEEMod outputs), to and from the site each workday. Trips from the Project site, travel along Green Valley Lake Road to State Route 18 (SR-18). Based on CalEEMod estimates, diesel trucks transporting soil and materials to the site would generate approximately 0.39 pounds per day of PM_{10} exhaust which is conservatively assumed to be entirely DPM emissions. Based on CalEnviroScreen 4.0 results, the Project is located in an area that falls within the 3rd percentile for California in DPM emissions, meaning the Project is within the lowest range reported 0-10. As such, the project's emissions would represent a low incremental contribution to the background DPM concentrations.

The amount to which the receptors are exposed (a function of concentration and duration of exposure) is the primary factor used to determine health risk (i.e., potential exposure to toxic air contaminant emission levels that exceed applicable standards). Health-related risks associated with diesel-exhaust emissions are primarily linked to long-term exposure and the associated risk of contracting cancer. The use of diesel-powered construction equipment would be episodic and would occur throughout the Project site.

Section 2485 and Section 2449 of Title 13 of the California Code of Regulations limits diesel-fueled motor vehicle idling to no more than five minutes. Section 2449 limits idling for off-road diesel-fueled fleets. Section 2485 limits idling for diesel-fueled commercial motor vehicles with gross vehicle weight ratings of greater than 10,000 pounds that are or must be licensed to operate on publicly maintained highways and streets within California. Project construction is subject to and would comply with California regulations limiting the idling of heavy-duty construction equipment to no more than five minutes which would further reduce nearby sensitive receptors' exposure to temporary and variable DPM emissions.

The duration of exposure would be short, and exhaust from construction equipment dissipates rapidly. Current models and methodologies for conducting health risk assessments are associated with longer-term exposure periods of 9, 30, and 70 years, which do not correlate well with the temporary and highly variable nature of construction activities.

As noted above, construction activities would limit idling to no more than five minutes, which would further reduce nearby sensitive receptors' exposure to temporary and variable DPM emissions. Furthermore, even during the most intense period of construction, emissions of DPM would be generated from different locations on the Project site rather than in a single location because different

types of construction activities (e.g., site preparation and building construction) would not occur at the same place at the same time.

Furthermore, SCAQMD's Multiple Air Toxics Exposure Study (MATES V) (August 2021) shows that carcinogenic risk from air toxics in the South Coast Air Basin, based on the average concentrations at the 10 monitoring sites, is approximately 40 percent lower than the monitored average in MATES IV (2015) and 84 percent lower than the average in MATES II (2000).[5] The results of SCAQMD's ongoing research in air toxics shows that risk levels are decreasing despite development and vehicle traffic growth. This trend is expected to continue with the implementation of the various statewide policies focused on reducing mobile source emissions. Therefore, the temporary addition of 0.39 pounds per day of DPM during the construction grading phase would result in a less than significant impact.

Carbon Monoxide Hotspots

An analysis of CO "hot spots" is needed to determine whether the change in the level of service of an intersection resulting from the Project would have the potential to result in exceedances of the CAAQS or NAAQS. It has long been recognized that CO exceedances are caused by vehicular emissions, primarily when vehicles are idling at intersections. Vehicle emissions standards have become increasingly stringent in the last 20 years. Currently, the CO standard in California is a maximum of 3.4 grams per mile for passenger cars (requirements for certain vehicles are more stringent). With the turnover of older vehicles, introduction of cleaner fuels, and implementation of control technology on industrial facilities, CO concentrations have steadily declined. Accordingly, with the steadily decreasing CO emissions from vehicles, even very busy intersections do not result in exceedances of the CO standard.

The SCAB was re-designated as attainment in 2007 and is no longer addressed in the SCAQMD's AQMP. The 2003 AQMP is the most recent version that addresses CO concentrations. As part of the SCAQMD *CO Hotspot Analysis*, the Wilshire Boulevard and Veteran Avenue intersection, one of the most congested intersections in southern California with an average daily traffic (ADT) volume of approximately 100,000 vehicles per day, was modeled for CO concentrations. This modeling effort identified a CO concentration high of 4.6 ppm, which is well below the 35-ppm Federal standard. The Project considered herein would not produce the volume of traffic required to generate a CO hot spot in the context of SCAQMD's *CO Hotspot Analysis*. As the CO hotspots were not experienced at the Wilshire Boulevard and Veteran Avenue intersection even as it accommodates 100,000 vehicles daily, it can be reasonably inferred that CO hotspots would not be experienced at any vicinity intersections resulting from a maximum of 225 additional vehicle trips on Sundays attributable to the Project. Therefore, impacts would be less than significant.

Mitigation Measures: No mitigation is required.

Level of Significance: Less than significant impact.

[5] South Coast Air Quality Management District (August 2021). *MATES V Final Report, page ES-16*. Available at http://www.aqmd.gov/docs/default-source/planning/mates-v/mates-v-final-report-9-24-21.pdf?sfvrsn=6. Accessed November 2023.

Threshold 5.4 Would the Project result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?

Construction

Odors that could be generated by construction activities are required to follow SCAQMD Rule 402 to prevent odor nuisances on sensitive land uses. SCAQMD Rule 402, Nuisance, states:

> *A person shall not discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health or safety of any such persons or the public, or which cause, or have a natural tendency to cause, injury or damage to business or property.*

Construction equipment emissions, such as diesel exhaust, and volatile organic compounds from architectural coatings and paving activities, may generate odors. However, these odors would be temporary, are not expected to affect a substantial number of people and would disperse rapidly. Therefore, Project construction activities would not result in objectionable odors that would adversely affect a substantial number of people and impacts would be less than significant.

Operations

The SCAQMD *CEQA Air Quality Handbook* identifies certain land uses as sources of odors. These land uses include agriculture (farming and livestock), wastewater treatment plants, food processing plants, chemical plants, composting facilities, refineries, landfills, dairies, and fiberglass molding. The Project would not include any of the land uses that have been identified by the SCAQMD as odor sources. Therefore, Project operations would not result in odors that would adversely affect people.

Mitigation Measures: No mitigation is required.

Level of Significance: Less than significant impact.

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Hume Campground Detailed Report

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Data Field	Value
Project Name	Hume Campground
Construction Start Date	6/2/2025
Operational Year	2027
Lead Agency	—
Land Use Scale	Project/site
Analysis Level for Defaults	County
Windspeed (m/s)	2.50
Precipitation (days)	11.2
Location	34.225431095364584, -117.09470743545103
County	San Bernardino-South Coast
City	Unincorporated
Air District	South Coast AQMD
Air Basin	South Coast
TAZ	5153
EDFZ	10
Electric Utility	Southern California Edison
Gas Utility	Southern California Gas
App Version	2022.1.1.20

1.2. Land Use Types

Land Use Subtype	Size	Unit	Lot Acreage	Building Area (sq ft)	Landscape Area (sq ft)	Special Landscape Area (sq ft)	Population	Description

Hotel	48.0	Room	3.14	136,966	0.00	0.00	159	Dorms
Health Club	9.38	1000sqft	0.22	9,375	0.00	0.00	—	Multipurpose Rec/Gym
Place of Worship	4.66	1000sqft	0.11	4,662	0.00	0.00	—	Chapels
General Office Building	21.9	1000sqft	0.50	21,940	0.00	0.00	—	Misc Buildings, restrooms
Other Non-Asphalt Surfaces	106	1000sqft	2.43	0.00	0.00	0.00	—	platforms for seasonal tents
Other Asphalt Surfaces	216	1000sqft	4.95	0.00	0.00	0.00	—	roads
High Turnover (Sit Down Restaurant)	35.3	1000sqft	0.81	35,264	0.00	0.00	—	Kitchen and Dining
Recreational Swimming Pool	0.61	1000sqft	0.01	606	0.00	0.00	—	Pools
Arena	1.15	1000sqft	0.37	1,152	0.00	0.00	—	Outdoor Amphitheater

1.3. User-Selected Emission Reduction Measures by Emissions Sector

Sector	#	Measure Title
Construction	C-5	Use Advanced Engine Tiers

2. Emissions Summary

2.1. Construction Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Un/Mit.	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	18.0	16.2	141	137	0.40	4.74	39.9	44.6	4.39	16.7	21.0	—	53,752	53,752	4.22	5.46	77.6	55,562

Mit.	6.95	7.25	55.9	143	0.40	0.80	39.9	40.7	0.80	16.7	17.5	—	53,752	53,752	4.22	5.46	77.6	55,562
% Reduced	61%	55%	60%	-4%	—	83%	—	9%	82%	—	17%	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	3.12	6.35	20.6	31.7	0.05	0.82	1.84	2.66	0.76	0.44	1.20	—	6,632	6,632	0.32	0.25	0.24	6,715
Mit.	1.20	4.81	7.21	34.0	0.05	0.12	1.84	1.96	0.12	0.44	0.56	—	6,632	6,632	0.32	0.25	0.24	6,715
% Reduced	62%	24%	65%	-7%	—	85%	—	26%	84%	—	53%	—	—	—	—	—	—	—
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	3.48	4.44	26.5	28.7	0.07	0.95	6.49	7.44	0.87	2.72	3.60	—	8,957	8,957	0.63	0.74	5.27	9,198
Mit.	1.24	3.41	9.59	29.9	0.07	0.14	6.49	6.64	0.14	2.72	2.86	—	8,957	8,957	0.63	0.74	5.27	9,198
% Reduced	64%	23%	64%	-4%	—	85%	—	11%	84%	—	20%	—	—	—	—	—	—	—
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.64	0.81	4.84	5.25	0.01	0.17	1.19	1.36	0.16	0.50	0.66	—	1,483	1,483	0.10	0.12	0.87	1,523
Mit.	0.23	0.62	1.75	5.45	0.01	0.03	1.19	1.21	0.03	0.50	0.52	—	1,483	1,483	0.10	0.12	0.87	1,523
% Reduced	64%	23%	64%	-4%	—	85%	—	11%	84%	—	20%	—	—	—	—	—	—	—
Exceeds (Daily Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Threshold	—	75.0	100	550	150	—	—	150	—	—	55.0	—	—	—	—	—	—	—
Unmit.	—	No	Yes	No	No	—	—	No	—	—	No	—	—	—	—	—	—	—
Mit.	—	No	No	No	No	—	—	No	—	—	No	—	—	—	—	—	—	—
Exceeds (Average Daily)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Threshol	—	75.0	100	550	150	—	—	150	—	—	55.0	—	—	—	—	—	—	—
Unmit.	—	No	No	No	No	—	—	No	—	—	No	—	—	—	—	—	—	—
Mit.	—	No	No	No	No	—	—	No	—	—	No	—	—	—	—	—	—	—

2.2. Construction Emissions by Year, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Year	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2025	18.0	16.2	141	137	0.40	4.74	39.9	44.6	4.39	16.7	21.0	—	53,752	53,752	4.22	5.46	77.6	55,562
2026	3.00	6.25	19.4	33.2	0.05	0.74	1.84	2.58	0.68	0.44	1.12	—	6,717	6,717	0.31	0.25	8.34	6,807
2027	2.88	6.15	18.7	32.5	0.05	0.67	1.84	2.51	0.62	0.44	1.06	—	6,665	6,665	0.26	0.24	7.48	6,751
Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2025	3.12	6.35	20.6	31.7	0.05	0.82	1.84	2.66	0.76	0.44	1.20	—	6,632	6,632	0.32	0.25	0.24	6,715
2026	2.97	6.21	19.5	31.1	0.05	0.74	1.84	2.58	0.68	0.44	1.12	—	6,582	6,582	0.26	0.25	0.22	6,664
2027	2.85	6.12	18.8	30.6	0.05	0.67	1.84	2.51	0.62	0.44	1.06	—	6,533	6,533	0.26	0.24	0.19	6,612
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2025	3.48	4.16	26.5	28.7	0.07	0.95	6.49	7.44	0.87	2.72	3.60	—	8,957	8,957	0.63	0.74	5.27	9,198
2026	2.12	4.44	14.0	22.4	0.03	0.53	1.30	1.83	0.49	0.31	0.80	—	4,716	4,716	0.19	0.18	2.57	4,777
2027	1.01	2.17	6.66	10.9	0.02	0.24	0.65	0.88	0.22	0.16	0.37	—	2,321	2,321	0.09	0.09	1.14	2,350
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2025	0.64	0.76	4.84	5.25	0.01	0.17	1.19	1.36	0.16	0.50	0.66	—	1,483	1,483	0.10	0.12	0.87	1,523
2026	0.39	0.81	2.55	4.10	0.01	0.10	0.24	0.33	0.09	0.06	0.15	—	781	781	0.03	0.03	0.43	791
2027	0.18	0.40	1.22	1.99	< 0.005	0.04	0.12	0.16	0.04	0.03	0.07	—	384	384	0.02	0.01	0.19	389

2.3. Construction Emissions by Year, Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Year	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2025	6.95	7.25	55.9	143	0.40	0.80	39.9	40.7	0.80	16.7	17.5	—	53,752	53,752	4.22	5.46	77.6	55,562
2026	1.20	4.81	6.99	35.5	0.05	0.12	1.84	1.96	0.12	0.44	0.56	—	6,717	6,717	0.31	0.25	8.34	6,807
2027	1.17	4.78	6.89	34.9	0.05	0.12	1.84	1.96	0.12	0.44	0.56	—	6,665	6,665	0.26	0.24	7.48	6,751
Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2025	1.20	4.81	7.21	34.0	0.05	0.12	1.84	1.96	0.12	0.44	0.56	—	6,632	6,632	0.32	0.25	0.24	6,715
2026	1.17	4.77	7.09	33.4	0.05	0.12	1.84	1.96	0.12	0.44	0.56	—	6,582	6,582	0.26	0.25	0.22	6,664
2027	1.14	4.75	6.99	32.9	0.05	0.12	1.84	1.96	0.12	0.44	0.56	—	6,533	6,533	0.26	0.24	0.19	6,612
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2025	1.24	2.35	9.59	29.9	0.07	0.14	6.49	6.64	0.14	2.72	2.86	—	8,957	8,957	0.63	0.74	5.27	9,198
2026	0.84	3.41	5.11	24.1	0.03	0.09	1.30	1.39	0.08	0.31	0.40	—	4,716	4,716	0.19	0.18	2.57	4,777
2027	0.40	1.68	2.49	11.8	0.02	0.04	0.65	0.69	0.04	0.16	0.20	—	2,321	2,321	0.09	0.09	1.14	2,350
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2025	0.23	0.43	1.75	5.45	0.01	0.03	1.19	1.21	0.03	0.50	0.52	—	1,483	1,483	0.10	0.12	0.87	1,523
2026	0.15	0.62	0.93	4.40	0.01	0.02	0.24	0.25	0.02	0.06	0.07	—	781	781	0.03	0.03	0.43	791
2027	0.07	0.31	0.46	2.15	< 0.005	0.01	0.12	0.13	0.01	0.03	0.04	—	384	384	0.02	0.01	0.19	389

2.4. Operations Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Un/Mit.	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	2.56	7.24	3.55	21.2	0.04	0.23	2.57	2.79	0.22	0.65	0.87	329	9,817	10,146	33.7	0.25	279	11,340
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.91	5.72	3.55	10.0	0.04	0.21	2.57	2.78	0.21	0.65	0.86	329	9,594	9,923	33.7	0.25	270	11,109
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	2.02	6.74	3.62	16.6	0.04	0.22	2.55	2.77	0.22	0.65	0.86	329	9,648	9,977	33.7	0.25	273	11,168
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.37	1.23	0.66	3.04	0.01	0.04	0.47	0.51	0.04	0.12	0.16	54.5	1,597	1,652	5.58	0.04	45.3	1,849
Exceeds (Daily Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Threshold	—	55.0	55.0	550	150	—	—	150	—	—	55.0	—	—	—	—	—	—	—
Unmit.	—	No	No	No	No	—	—	No	—	—	No	—	—	—	—	—	—	—
Exceeds (Average Daily)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Threshold	—	55.0	55.0	550	150	—	—	150	—	—	55.0	—	—	—	—	—	—	—
Unmit.	—	No	No	No	No	—	—	No	—	—	No	—	—	—	—	—	—	—

2.5. Operations Emissions by Sector, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Sector	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.66	0.55	0.96	10.0	0.03	0.02	2.57	2.58	0.02	0.65	0.67	—	2,918	2,918	0.10	0.12	9.19	2,964
Area	1.62	6.56	0.08	9.11	< 0.005	0.02	—	0.02	0.01	—	0.01	—	37.4	37.4	< 0.005	< 0.005	—	37.6
Energy	0.28	0.14	2.52	2.12	0.02	0.19	—	0.19	0.19	—	0.19	—	6,751	6,751	0.62	0.05	—	6,781
Water	—	—	—	—	—	—	—	—	—	—	—	32.7	110	143	3.36	0.08	—	251
Waste	—	—	—	—	—	—	—	—	—	—	—	296	0.00	296	29.6	0.00	—	1,037
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	269	269
Total	2.56	7.24	3.55	21.2	0.04	0.23	2.57	2.79	0.22	0.65	0.87	329	9,817	10,146	33.7	0.25	279	11,340
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.63	0.52	1.03	7.93	0.03	0.02	2.57	2.58	0.02	0.65	0.67	—	2,733	2,733	0.10	0.12	0.24	2,771
Area	—	5.06	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Energy	0.28	0.14	2.52	2.12	0.02	0.19	—	0.19	0.19	—	0.19	—	6,751	6,751	0.62	0.05	—	6,781
Water	—	—	—	—	—	—	—	—	—	—	—	32.7	110	143	3.36	0.08	—	251
Waste	—	—	—	—	—	—	—	—	—	—	—	296	0.00	296	29.6	0.00	—	1,037
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	269	269
Total	0.91	5.72	3.55	10.0	0.04	0.21	2.57	2.78	0.21	0.65	0.86	329	9,594	9,923	33.7	0.25	270	11,109
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.63	0.52	1.05	8.28	0.03	0.02	2.55	2.57	0.02	0.65	0.66	—	2,762	2,762	0.10	0.12	3.97	2,804
Area	1.11	6.09	0.05	6.24	< 0.005	0.01	—	0.01	0.01	—	0.01	—	25.6	25.6	< 0.005	< 0.005	—	25.7
Energy	0.28	0.14	2.52	2.12	0.02	0.19	—	0.19	0.19	—	0.19	—	6,751	6,751	0.62	0.05	—	6,781
Water	—	—	—	—	—	—	—	—	—	—	—	32.7	110	143	3.36	0.08	—	251
Waste	—	—	—	—	—	—	—	—	—	—	—	296	0.00	296	29.6	0.00	—	1,037
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	269	269
Total	2.02	6.74	3.62	16.6	0.04	0.22	2.55	2.77	0.22	0.65	0.86	329	9,648	9,977	33.7	0.25	273	11,168

Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.12	0.09	0.19	1.51	< 0.005	< 0.005	0.47	0.47	< 0.005	0.12	0.12	—	457	457	0.02	0.02	0.66	464
Area	0.20	1.11	0.01	1.14	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	4.25	4.25	< 0.005	< 0.005	—	4.26
Energy	0.05	0.03	0.46	0.39	< 0.005	0.03	—	0.03	0.03	—	0.03	—	1,118	1,118	0.10	0.01	—	1,123
Water	—	—	—	—	—	—	—	—	—	—	—	5.41	18.2	23.6	0.56	0.01	—	41.5
Waste	—	—	—	—	—	—	—	—	—	—	—	49.1	0.00	49.1	4.90	0.00	—	172
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	44.6	44.6
Total	0.37	1.23	0.66	3.04	0.01	0.04	0.47	0.51	0.04	0.12	0.16	54.5	1,597	1,652	5.58	0.04	45.3	1,849

2.6. Operations Emissions by Sector, Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Sector	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.66	0.55	0.96	10.0	0.03	0.02	2.57	2.58	0.02	0.65	0.67	—	2,918	2,918	0.10	0.12	9.19	2,964
Area	1.62	6.56	0.08	9.11	< 0.005	0.02	—	0.02	0.01	—	0.01	—	37.4	37.4	< 0.005	< 0.005	—	37.6
Energy	0.28	0.14	2.52	2.12	0.02	0.19	—	0.19	0.19	—	0.19	—	6,751	6,751	0.62	0.05	—	6,781
Water	—	—	—	—	—	—	—	—	—	—	—	32.7	110	143	3.36	0.08	—	251
Waste	—	—	—	—	—	—	—	—	—	—	—	296	0.00	296	29.6	0.00	—	1,037
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	269	269
Total	2.56	7.24	3.55	21.2	0.04	0.23	2.57	2.79	0.22	0.65	0.87	329	9,817	10,146	33.7	0.25	279	11,340
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.63	0.52	1.03	7.93	0.03	0.02	2.57	2.58	0.02	0.65	0.67	—	2,733	2,733	0.10	0.12	0.24	2,771
Area	—	5.06	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Energy	0.28	0.14	2.52	2.12	0.02	0.19	—	0.19	0.19	—	0.19	—	6,751	6,751	0.62	0.05	—	6,781
Water	—	—	—	—	—	—	—	—	—	—	—	32.7	110	143	3.36	0.08	—	251

Waste	—	—	—	—	—	—	—	—	—	—	—	296	0.00	296	29.6	0.00	—	1,037
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	269	269
Total	0.91	5.72	3.55	10.0	0.04	0.21	2.57	2.78	0.21	0.65	0.86	329	9,594	9,923	33.7	0.25	270	11,109
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.63	0.52	1.05	8.28	0.03	0.02	2.55	2.57	0.02	0.65	0.66	—	2,762	2,762	0.10	0.12	3.97	2,804
Area	1.11	6.09	0.05	6.24	< 0.005	0.01	—	0.01	0.01	—	0.01	—	25.6	25.6	< 0.005	< 0.005	—	25.7
Energy	0.28	0.14	2.52	2.12	0.02	0.19	—	0.19	0.19	—	0.19	—	6,751	6,751	0.62	0.05	—	6,781
Water	—	—	—	—	—	—	—	—	—	—	—	32.7	110	143	3.36	0.08	—	251
Waste	—	—	—	—	—	—	—	—	—	—	—	296	0.00	296	29.6	0.00	—	1,037
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	269	269
Total	2.02	6.74	3.62	16.6	0.04	0.22	2.55	2.77	0.22	0.65	0.86	329	9,648	9,977	33.7	0.25	273	11,168
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.12	0.09	0.19	1.51	< 0.005	< 0.005	0.47	0.47	< 0.005	0.12	0.12	—	457	457	0.02	0.02	0.66	464
Area	0.20	1.11	0.01	1.14	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	4.25	4.25	< 0.005	< 0.005	—	4.26
Energy	0.05	0.03	0.46	0.39	< 0.005	0.03	—	0.03	0.03	—	0.03	—	1,118	1,118	0.10	0.01	—	1,123
Water	—	—	—	—	—	—	—	—	—	—	—	5.41	18.2	23.6	0.56	0.01	—	41.5
Waste	—	—	—	—	—	—	—	—	—	—	—	49.1	0.00	49.1	4.90	0.00	—	172
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	44.6	44.6
Total	0.37	1.23	0.66	3.04	0.01	0.04	0.47	0.51	0.04	0.12	0.16	54.5	1,597	1,652	5.58	0.04	45.3	1,849

3. Construction Emissions Details

3.1. Demolition (2025) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	2.86	2.40	22.2	19.9	0.03	0.92	—	0.92	0.84	—	0.84	—	3,425	3,425	0.14	0.03	—	3,437
Demolition	—	—	—	—	—	—	0.00	0.00	—	0.00	0.00	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.51	0.43	3.95	3.55	0.01	0.16	—	0.16	0.15	—	0.15	—	610	610	0.02	< 0.005	—	612
Demolition	—	—	—	—	—	—	0.00	0.00	—	0.00	0.00	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.09	0.08	0.72	0.65	< 0.005	0.03	—	0.03	0.03	—	0.03	—	101	101	< 0.005	< 0.005	—	101
Demolition	—	—	—	—	—	—	0.00	0.00	—	0.00	0.00	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.08	0.07	0.07	1.17	0.00	0.00	0.20	0.20	0.00	0.05	0.05	—	211	211	0.01	0.01	0.78	215
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.17	0.00	0.00	0.03	0.03	0.00	0.01	0.01	—	35.0	35.0	< 0.005	< 0.005	0.06	35.5
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.03	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	5.79	5.79	< 0.005	< 0.005	0.01	5.88
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.2. Demolition (2025) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.36	0.36	4.51	18.2	0.03	0.06	—	0.06	0.06	—	0.06	—	3,425	3,425	0.14	0.03	—	3,437
Demolition	—	—	—	—	—	—	0.00	0.00	—	0.00	0.00	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.06	0.06	0.80	3.24	0.01	0.01	—	0.01	0.01	—	0.01	—	610	610	0.02	< 0.005	—	612
Demolition	—	—	—	—	—	—	0.00	0.00	—	0.00	0.00	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.01	0.15	0.59	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	101	101	< 0.005	< 0.005	—	101
Demolition	—	—	—	—	—	—	0.00	0.00	—	0.00	0.00	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.08	0.07	0.07	1.17	0.00	0.00	0.20	0.20	0.00	0.05	0.05	—	211	211	0.01	0.01	0.78	215
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.17	0.00	0.00	0.03	0.03	0.00	0.01	0.01	—	35.0	35.0	< 0.005	< 0.005	0.06	35.5
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.03	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	5.79	5.79	< 0.005	< 0.005	0.01	5.88

Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.3. Site Preparation (2025) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	3.94	3.31	31.6	30.2	0.05	1.37	—	1.37	1.26	—	1.26	—	5,295	5,295	0.21	0.04	—	5,314
Dust From Material Movement	—	—	—	—	—	—	19.7	19.7	—	10.1	10.1	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.70	0.59	5.63	5.37	0.01	0.24	—	0.24	0.22	—	0.22	—	943	943	0.04	0.01	—	946
Dust From Material Movement	—	—	—	—	—	—	3.50	3.50	—	1.80	1.80	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	0.13	0.11	1.03	0.98	< 0.005	0.04	—	0.04	0.04	—	0.04	—	156	156	0.01	< 0.005	—	157
Dust From Material Movement	—	—	—	—	—	—	0.64	0.64	—	0.33	0.33	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.09	0.08	0.08	1.36	0.00	0.00	0.23	0.23	0.00	0.05	0.05	—	247	247	0.01	0.01	0.91	250
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.02	0.19	0.00	0.00	0.04	0.04	0.00	0.01	0.01	—	40.8	40.8	< 0.005	< 0.005	0.07	41.4
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.04	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	6.76	6.76	< 0.005	< 0.005	0.01	6.86
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.4. Site Preparation (2025) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e

Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.50	0.50	2.59	28.3	0.05	0.10	—	0.10	0.10	—	0.10	—	5,295	5,295	0.21	0.04	—	5,314
Dust From Material Movement	—	—	—	—	—	—	19.7	19.7	—	10.1	10.1	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.09	0.09	0.46	5.04	0.01	0.02	—	0.02	0.02	—	0.02	—	943	943	0.04	0.01	—	946
Dust From Material Movement	—	—	—	—	—	—	3.50	3.50	—	1.80	1.80	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.02	0.08	0.92	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	156	156	0.01	< 0.005	—	157
Dust From Material Movement	—	—	—	—	—	—	0.64	0.64	—	0.33	0.33	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.09	0.08	0.08	1.36	0.00	0.00	0.23	0.23	0.00	0.05	0.05	—	247	247	0.01	0.01	0.91	250
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.02	0.19	0.00	0.00	0.04	0.04	0.00	0.01	0.01	—	40.8	40.8	< 0.005	< 0.005	0.07	41.4
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.04	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	6.76	6.76	< 0.005	< 0.005	0.01	6.86
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.5. Grading (2025) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	3.80	3.20	29.7	28.3	0.06	1.23	—	1.23	1.14	—	1.14	—	6,599	6,599	0.27	0.05	—	6,622

Dust From Material Movement	—	—	—	—	—	—	9.39	9.39	—	3.68	3.68	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.46	0.39	3.58	3.41	0.01	0.15	—	0.15	0.14	—	0.14	—	795	795	0.03	0.01	—	798
Dust From Material Movement	—	—	—	—	—	—	1.13	1.13	—	0.44	0.44	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.08	0.07	0.65	0.62	< 0.005	0.03	—	0.03	0.02	—	0.02	—	132	132	0.01	< 0.005	—	132
Dust From Material Movement	—	—	—	—	—	—	0.21	0.21	—	0.08	0.08	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.10	0.09	0.09	1.56	0.00	0.00	0.26	0.26	0.00	0.06	0.06	—	282	282	0.01	0.01	1.05	286
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	3.94	0.66	37.1	20.8	0.21	0.39	8.29	8.69	0.39	2.27	2.66	—	30,923	30,923	3.25	5.06	65.7	32,577

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.15	0.00	0.00	0.03	0.03	0.00	0.01	0.01	—	31.6	31.6	< 0.005	< 0.005	0.05	32.0
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.47	0.08	4.72	2.52	0.02	0.05	0.99	1.04	0.05	0.27	0.32	—	3,728	3,728	0.39	0.61	3.43	3,924
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.03	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	5.23	5.23	< 0.005	< 0.005	0.01	5.30
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.09	0.01	0.86	0.46	< 0.005	0.01	0.18	0.19	0.01	0.05	0.06	—	617	617	0.06	0.10	0.57	650

3.6. Grading (2025) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.64	0.64	4.43	35.3	0.06	0.12	—	0.12	0.12	—	0.12	—	6,599	6,599	0.27	0.05	—	6,622
Dust From Material Movement	—	—	—	—	—	—	9.39	9.39	—	3.68	3.68	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.08	0.08	0.53	4.26	0.01	0.01	—	0.01	0.01	—	0.01	—	795	795	0.03	0.01	—	798
Dust From Material Movement	—	—	—	—	—	—	1.13	1.13	—	0.44	0.44	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.01	0.10	0.78	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	132	132	0.01	< 0.005	—	132
Dust From Material Movement	—	—	—	—	—	—	0.21	0.21	—	0.08	0.08	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.10	0.09	0.09	1.56	0.00	0.00	0.26	0.26	0.00	0.06	0.06	—	282	282	0.01	0.01	1.05	286
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	3.94	0.66	37.1	20.8	0.21	0.39	8.29	8.69	0.39	2.27	2.66	—	30,923	30,923	3.25	5.06	65.7	32,577
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.15	0.00	0.00	0.03	0.03	0.00	0.01	0.01	—	31.6	31.6	< 0.005	< 0.005	0.05	32.0
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Hauling	0.47	0.08	4.72	2.52	0.02	0.05	0.99	1.04	0.05	0.27	0.32	—	3,728	3,728	0.39	0.61	3.43	3,924
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.03	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	5.23	5.23	< 0.005	< 0.005	0.01	5.30
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.09	0.01	0.86	0.46	< 0.005	0.01	0.18	0.19	0.01	0.05	0.06	—	617	617	0.06	0.10	0.57	650

3.7. Building Construction (2025) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.35	1.13	10.4	13.0	0.02	0.43	—	0.43	0.40	—	0.40	—	2,398	2,398	0.10	0.02	—	2,406
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.35	1.13	10.4	13.0	0.02	0.43	—	0.43	0.40	—	0.40	—	2,398	2,398	0.10	0.02	—	2,406
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.56	0.47	4.35	5.44	0.01	0.18	—	0.18	0.17	—	0.17	—	999	999	0.04	0.01	—	1,003
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	0.10	0.09	0.79	0.99	< 0.005	0.03	—	0.03	0.03	—	0.03	—	165	165	0.01	< 0.005	—	166
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.44	0.39	0.38	6.70	0.00	0.00	1.12	1.12	0.00	0.26	0.26	—	1,212	1,212	0.05	0.04	4.49	1,230
Vendor	0.11	0.03	1.18	0.64	0.01	0.02	0.29	0.31	0.02	0.08	0.10	—	1,062	1,062	0.08	0.16	2.99	1,115
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.41	0.37	0.42	5.05	0.00	0.00	1.12	1.12	0.00	0.26	0.26	—	1,111	1,111	0.05	0.04	0.12	1,125
Vendor	0.10	0.03	1.23	0.64	0.01	0.02	0.29	0.31	0.02	0.08	0.10	—	1,062	1,062	0.08	0.16	0.08	1,112
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.17	0.15	0.19	2.22	0.00	0.00	0.47	0.47	0.00	0.11	0.11	—	470	470	0.02	0.02	0.81	476
Vendor	0.04	0.01	0.52	0.26	< 0.005	0.01	0.12	0.13	0.01	0.03	0.04	—	443	443	0.03	0.07	0.54	464
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.03	0.03	0.03	0.41	0.00	0.00	0.08	0.08	0.00	0.02	0.02	—	77.7	77.7	< 0.005	< 0.005	0.13	78.8
Vendor	0.01	< 0.005	0.09	0.05	< 0.005	< 0.005	0.02	0.02	< 0.005	0.01	0.01	—	73.3	73.3	0.01	0.01	0.09	76.8
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.8. Building Construction (2025) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e

Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.35	0.33	2.82	14.8	0.02	0.08	—	0.08	0.07	—	0.07	—	2,398	2,398	0.10	0.02	—	2,406
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.35	0.33	2.82	14.8	0.02	0.08	—	0.08	0.07	—	0.07	—	2,398	2,398	0.10	0.02	—	2,406
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.15	0.14	1.18	6.18	0.01	0.03	—	0.03	0.03	—	0.03	—	999	999	0.04	0.01	—	1,003
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.03	0.03	0.21	1.13	< 0.005	0.01	—	0.01	0.01	—	0.01	—	165	165	0.01	< 0.005	—	166
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.44	0.39	0.38	6.70	0.00	0.00	1.12	1.12	0.00	0.26	0.26	—	1,212	1,212	0.05	0.04	4.49	1,230
Vendor	0.11	0.03	1.18	0.64	0.01	0.02	0.29	0.31	0.02	0.08	0.10	—	1,062	1,062	0.08	0.16	2.99	1,115
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.41	0.37	0.42	5.05	0.00	0.00	1.12	1.12	0.00	0.26	0.26	—	1,111	1,111	0.05	0.04	0.12	1,125
Vendor	0.10	0.03	1.23	0.64	0.01	0.02	0.29	0.31	0.02	0.08	0.10	—	1,062	1,062	0.08	0.16	0.08	1,112
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.17	0.15	0.19	2.22	0.00	0.00	0.47	0.47	0.00	0.11	0.11	—	470	470	0.02	0.02	0.81	476
Vendor	0.04	0.01	0.52	0.26	< 0.005	0.01	0.12	0.13	0.01	0.03	0.04	—	443	443	0.03	0.07	0.54	464
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.03	0.03	0.03	0.41	0.00	0.00	0.08	0.08	0.00	0.02	0.02	—	77.7	77.7	< 0.005	< 0.005	0.13	78.8
Vendor	0.01	< 0.005	0.09	0.05	< 0.005	< 0.005	0.02	0.02	< 0.005	0.01	0.01	—	73.3	73.3	0.01	0.01	0.09	76.8
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.9. Building Construction (2026) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.28	1.07	9.85	13.0	0.02	0.38	—	0.38	0.35	—	0.35	—	2,397	2,397	0.10	0.02	—	2,405
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	1.28	1.07	9.85	13.0	0.02	0.38	—	0.38	0.35	—	0.35	—	2,397	2,397	0.10	0.02	—	2,405
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.91	0.77	7.04	9.26	0.02	0.27	—	0.27	0.25	—	0.25	—	1,712	1,712	0.07	0.01	—	1,718
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.17	0.14	1.28	1.69	< 0.005	0.05	—	0.05	0.05	—	0.05	—	283	283	0.01	< 0.005	—	284
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.41	0.37	0.34	6.19	0.00	0.00	1.12	1.12	0.00	0.26	0.26	—	1,187	1,187	0.05	0.04	4.06	1,204
Vendor	0.10	0.02	1.13	0.61	0.01	0.02	0.29	0.31	0.02	0.08	0.10	—	1,044	1,044	0.07	0.16	2.76	1,096
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.39	0.35	0.38	4.68	0.00	0.00	1.12	1.12	0.00	0.26	0.26	—	1,088	1,088	0.02	0.04	0.11	1,102
Vendor	0.10	0.02	1.17	0.62	0.01	0.02	0.29	0.31	0.02	0.08	0.10	—	1,044	1,044	0.07	0.16	0.07	1,094
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.28	0.25	0.30	3.51	0.00	0.00	0.80	0.80	0.00	0.19	0.19	—	788	788	0.01	0.03	1.25	799
Vendor	0.07	0.01	0.84	0.44	0.01	0.01	0.21	0.22	0.01	0.06	0.07	—	746	746	0.05	0.11	0.85	782

Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.05	0.05	0.05	0.64	0.00	0.00	0.15	0.15	0.00	0.03	0.03	—	131	131	< 0.005	0.01	0.21	132
Vendor	0.01	< 0.005	0.15	0.08	< 0.005	< 0.005	0.04	0.04	< 0.005	0.01	0.01	—	123	123	0.01	0.02	0.14	130
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.10. Building Construction (2026) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.35	0.33	2.82	14.8	0.02	0.07	—	0.07	0.07	—	0.07	—	2,397	2,397	0.10	0.02	—	2,405
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.35	0.33	2.82	14.8	0.02	0.07	—	0.07	0.07	—	0.07	—	2,397	2,397	0.10	0.02	—	2,405
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.25	0.23	2.01	10.6	0.02	0.05	—	0.05	0.05	—	0.05	—	1,712	1,712	0.07	0.01	—	1,718
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	0.05	0.04	0.37	1.93	< 0.005	0.01	—	0.01	0.01	—	0.01	—	283	283	0.01	< 0.005	—	284
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.41	0.37	0.34	6.19	0.00	0.00	1.12	1.12	0.00	0.26	0.26	—	1,187	1,187	0.05	0.04	4.06	1,204
Vendor	0.10	0.02	1.13	0.61	0.01	0.02	0.29	0.31	0.02	0.08	0.10	—	1,044	1,044	0.07	0.16	2.76	1,096
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.39	0.35	0.38	4.68	0.00	0.00	1.12	1.12	0.00	0.26	0.26	—	1,088	1,088	0.02	0.04	0.11	1,102
Vendor	0.10	0.02	1.17	0.62	0.01	0.02	0.29	0.31	0.02	0.08	0.10	—	1,044	1,044	0.07	0.16	0.07	1,094
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.28	0.25	0.30	3.51	0.00	0.00	0.80	0.80	0.00	0.19	0.19	—	788	788	0.01	0.03	1.25	799
Vendor	0.07	0.01	0.84	0.44	0.01	0.01	0.21	0.22	0.01	0.06	0.07	—	746	746	0.05	0.11	0.85	782
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.05	0.05	0.05	0.64	0.00	0.00	0.15	0.15	0.00	0.03	0.03	—	131	131	< 0.005	0.01	0.21	132
Vendor	0.01	< 0.005	0.15	0.08	< 0.005	< 0.005	0.04	0.04	< 0.005	0.01	0.01	—	123	123	0.01	0.02	0.14	130
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.11. Building Construction (2027) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e

Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.23	1.03	9.39	12.9	0.02	0.34	—	0.34	0.31	—	0.31	—	2,397	2,397	0.10	0.02	—	2,405
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.23	1.03	9.39	12.9	0.02	0.34	—	0.34	0.31	—	0.31	—	2,397	2,397	0.10	0.02	—	2,405
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.44	0.36	3.33	4.58	0.01	0.12	—	0.12	0.11	—	0.11	—	849	849	0.03	0.01	—	852
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.08	0.07	0.61	0.84	< 0.005	0.02	—	0.02	0.02	—	0.02	—	141	141	0.01	< 0.005	—	141
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.40	0.35	0.30	5.76	0.00	0.00	1.12	1.12	0.00	0.26	0.26	—	1,163	1,163	0.01	0.04	3.66	1,179
Vendor	0.10	0.02	1.08	0.59	0.01	0.02	0.29	0.31	0.02	0.08	0.10	—	1,024	1,024	0.07	0.15	2.46	1,074
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.37	0.33	0.34	4.34	0.00	0.00	1.12	1.12	0.00	0.26	0.26	—	1,067	1,067	0.02	0.04	0.09	1,079
Vendor	0.09	0.02	1.13	0.59	0.01	0.02	0.29	0.31	0.02	0.08	0.10	—	1,025	1,025	0.07	0.15	0.06	1,072
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.13	0.12	0.13	1.61	0.00	0.00	0.40	0.40	0.00	0.09	0.09	—	383	383	0.01	0.01	0.56	388
Vendor	0.03	0.01	0.40	0.21	< 0.005	0.01	0.10	0.11	0.01	0.03	0.03	—	363	363	0.03	0.05	0.38	380
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02	0.02	0.02	0.29	0.00	0.00	0.07	0.07	0.00	0.02	0.02	—	63.4	63.4	< 0.005	< 0.005	0.09	64.3
Vendor	0.01	< 0.005	0.07	0.04	< 0.005	< 0.005	0.02	0.02	< 0.005	0.01	0.01	—	60.1	60.1	< 0.005	0.01	0.06	62.9
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.12. Building Construction (2027) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.35	0.33	2.82	14.8	0.02	0.07	—	0.07	0.07	—	0.07	—	2,397	2,397	0.10	0.02	—	2,405
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	0.35	0.33	2.82	14.8	0.02	0.07	—	0.07	0.07	—	0.07	—	2,397	2,397	0.10	0.02	—	2,405
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.12	0.12	1.00	5.25	0.01	0.03	—	0.03	0.03	—	0.03	—	849	849	0.03	0.01	—	852
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.02	0.18	0.96	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	141	141	0.01	< 0.005	—	141
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.40	0.35	0.30	5.76	0.00	0.00	1.12	1.12	0.00	0.26	0.26	—	1,163	1,163	0.01	0.04	3.66	1,179
Vendor	0.10	0.02	1.08	0.59	0.01	0.02	0.29	0.31	0.02	0.08	0.10	—	1,024	1,024	0.07	0.15	2.46	1,074
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.37	0.33	0.34	4.34	0.00	0.00	1.12	1.12	0.00	0.26	0.26	—	1,067	1,067	0.02	0.04	0.09	1,079
Vendor	0.09	0.02	1.13	0.59	0.01	0.02	0.29	0.31	0.02	0.08	0.10	—	1,025	1,025	0.07	0.15	0.06	1,072
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.13	0.12	0.13	1.61	0.00	0.00	0.40	0.40	0.00	0.09	0.09	—	383	383	0.01	0.01	0.56	388
Vendor	0.03	0.01	0.40	0.21	< 0.005	0.01	0.10	0.11	0.01	0.03	0.03	—	363	363	0.03	0.05	0.38	380

Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02	0.02	0.02	0.29	0.00	0.00	0.07	0.07	0.00	0.02	0.02	—	63.4	63.4	< 0.005	< 0.005	0.09	64.3
Vendor	0.01	< 0.005	0.07	0.04	< 0.005	< 0.005	0.02	0.02	< 0.005	0.01	0.01	—	60.1	60.1	< 0.005	0.01	0.06	62.9
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.13. Paving (2025) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.95	0.80	7.45	9.98	0.01	0.35	—	0.35	0.32	—	0.32	—	1,511	1,511	0.06	0.01	—	1,517
Paving	—	0.02	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.95	0.80	7.45	9.98	0.01	0.35	—	0.35	0.32	—	0.32	—	1,511	1,511	0.06	0.01	—	1,517
Paving	—	0.02	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.40	0.33	3.11	4.16	0.01	0.15	—	0.15	0.13	—	0.13	—	630	630	0.03	0.01	—	632
Paving	—	0.01	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.07	0.06	0.57	0.76	< 0.005	0.03	—	0.03	0.02	—	0.02	—	104	104	< 0.005	< 0.005	—	105
Paving	—	< 0.005	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.08	0.07	0.07	1.17	0.00	0.00	0.20	0.20	0.00	0.05	0.05	—	211	211	0.01	0.01	0.78	215
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07	0.06	0.07	0.88	0.00	0.00	0.20	0.20	0.00	0.05	0.05	—	194	194	0.01	0.01	0.02	196
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.03	0.03	0.03	0.39	0.00	0.00	0.08	0.08	0.00	0.02	0.02	—	81.9	81.9	< 0.005	< 0.005	0.14	83.1
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	< 0.005	0.01	0.07	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	13.6	13.6	< 0.005	< 0.005	0.02	13.8
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.14. Paving (2025) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.16	0.16	1.93	10.6	0.01	0.03	—	0.03	0.03	—	0.03	—	1,511	1,511	0.06	0.01	—	1,517
Paving	—	0.02	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.16	0.16	1.93	10.6	0.01	0.03	—	0.03	0.03	—	0.03	—	1,511	1,511	0.06	0.01	—	1,517
Paving	—	0.02	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.07	0.07	0.81	4.42	0.01	0.01	—	0.01	0.01	—	0.01	—	630	630	0.03	0.01	—	632
Paving	—	0.01	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.01	0.15	0.81	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	104	104	< 0.005	< 0.005	—	105
Paving	—	< 0.005	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.08	0.07	0.07	1.17	0.00	0.00	0.20	0.20	0.00	0.05	0.05	—	211	211	0.01	0.01	0.78	215
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07	0.06	0.07	0.88	0.00	0.00	0.20	0.20	0.00	0.05	0.05	—	194	194	0.01	0.01	0.02	196
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.03	0.03	0.03	0.39	0.00	0.00	0.08	0.08	0.00	0.02	0.02	—	81.9	81.9	< 0.005	< 0.005	0.14	83.1
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	< 0.005	0.01	0.07	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	13.6	13.6	< 0.005	< 0.005	0.02	13.8
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.15. Paving (2026) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.91	0.76	7.12	9.94	0.01	0.32	—	0.32	0.29	—	0.29	—	1,511	1,511	0.06	0.01	—	1,516
Paving	—	0.02	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.91	0.76	7.12	9.94	0.01	0.32	—	0.32	0.29	—	0.29	—	1,511	1,511	0.06	0.01	—	1,516
Paving	—	0.02	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.65	0.54	5.08	7.10	0.01	0.23	—	0.23	0.21	—	0.21	—	1,079	1,079	0.04	0.01	—	1,083
Paving	—	0.02	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.12	0.10	0.93	1.30	< 0.005	0.04	—	0.04	0.04	—	0.04	—	179	179	0.01	< 0.005	—	179
Paving	—	< 0.005	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Worker	0.07	0.06	0.06	1.08	0.00	0.00	0.20	0.20	0.00	0.05	0.05	—	207	207	0.01	0.01	0.71	210
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07	0.06	0.07	0.82	0.00	0.00	0.20	0.20	0.00	0.05	0.05	—	190	190	< 0.005	0.01	0.02	192
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.05	0.04	0.05	0.61	0.00	0.00	0.14	0.14	0.00	0.03	0.03	—	138	138	< 0.005	0.01	0.22	139
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.11	0.00	0.00	0.03	0.03	0.00	0.01	0.01	—	22.8	22.8	< 0.005	< 0.005	0.04	23.1
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.16. Paving (2026) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.16	0.16	1.93	10.6	0.01	0.03	—	0.03	0.03	—	0.03	—	1,511	1,511	0.06	0.01	—	1,516
Paving	—	0.02	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.16	0.16	1.93	10.6	0.01	0.03	—	0.03	0.03	—	0.03	—	1,511	1,511	0.06	0.01	—	1,516
Paving	—	0.02	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.11	0.11	1.38	7.57	0.01	0.02	—	0.02	0.02	—	0.02	—	1,079	1,079	0.04	0.01	—	1,083
Paving	—	0.02	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.02	0.25	1.38	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	179	179	0.01	< 0.005	—	179
Paving	—	< 0.005	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07	0.06	0.06	1.08	0.00	0.00	0.20	0.20	0.00	0.05	0.05	—	207	207	0.01	0.01	0.71	210
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Worker	0.07	0.06	0.07	0.82	0.00	0.00	0.20	0.20	0.00	0.05	0.05	—	190	190	< 0.005	0.01	0.02	192
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.05	0.04	0.05	0.61	0.00	0.00	0.14	0.14	0.00	0.03	0.03	—	138	138	< 0.005	0.01	0.22	139
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.11	0.00	0.00	0.03	0.03	0.00	0.01	0.01	—	22.8	22.8	< 0.005	< 0.005	0.04	23.1
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.17. Paving (2027) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.88	0.74	6.94	9.95	0.01	0.30	—	0.30	0.27	—	0.27	—	1,511	1,511	0.06	0.01	—	1,516
Paving	—	0.02	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.88	0.74	6.94	9.95	0.01	0.30	—	0.30	0.27	—	0.27	—	1,511	1,511	0.06	0.01	—	1,516

Paving	—	0.02	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.31	0.26	2.46	3.53	< 0.005	0.11	—	0.11	0.10	—	0.10	—	535	535	0.02	< 0.005	—	537
Paving	—	0.01	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.06	0.05	0.45	0.64	< 0.005	0.02	—	0.02	0.02	—	0.02	—	88.6	88.6	< 0.005	< 0.005	—	88.9
Paving	—	< 0.005	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07	0.06	0.05	1.01	0.00	0.00	0.20	0.20	0.00	0.05	0.05	—	203	203	< 0.005	0.01	0.64	206
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07	0.06	0.06	0.76	0.00	0.00	0.20	0.20	0.00	0.05	0.05	—	186	186	< 0.005	0.01	0.02	188
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02	0.02	0.02	0.28	0.00	0.00	0.07	0.07	0.00	0.02	0.02	—	66.8	66.8	< 0.005	< 0.005	0.10	67.7

Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.05	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	11.1	11.1	< 0.005	< 0.005	0.02	11.2
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.18. Paving (2027) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.16	0.16	1.93	10.6	0.01	0.03	—	0.03	0.03	—	0.03	—	1,511	1,511	0.06	0.01	—	1,516
Paving	—	0.02	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.16	0.16	1.93	10.6	0.01	0.03	—	0.03	0.03	—	0.03	—	1,511	1,511	0.06	0.01	—	1,516
Paving	—	0.02	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.06	0.06	0.68	3.75	< 0.005	0.01	—	0.01	0.01	—	0.01	—	535	535	0.02	< 0.005	—	537

Paving	—	0.01	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.01	0.12	0.69	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	88.6	88.6	< 0.005	< 0.005	—	88.9
Paving	—	< 0.005	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07	0.06	0.05	1.01	0.00	0.00	0.20	0.20	0.00	0.05	0.05	—	203	203	< 0.005	0.01	0.64	206
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07	0.06	0.06	0.76	0.00	0.00	0.20	0.20	0.00	0.05	0.05	—	186	186	< 0.005	0.01	0.02	188
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02	0.02	0.02	0.28	0.00	0.00	0.07	0.07	0.00	0.02	0.02	—	66.8	66.8	< 0.005	< 0.005	0.10	67.7
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.05	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	11.1	11.1	< 0.005	< 0.005	0.02	11.2
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.19. Architectural Coating (2025) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.15	0.13	0.88	1.14	< 0.005	0.03	—	0.03	0.03	—	0.03	—	134	134	0.01	< 0.005	—	134
Architectural Coatings	—	3.74	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.15	0.13	0.88	1.14	< 0.005	0.03	—	0.03	0.03	—	0.03	—	134	134	0.01	< 0.005	—	134
Architectural Coatings	—	3.74	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.06	0.05	0.37	0.48	< 0.005	0.01	—	0.01	0.01	—	0.01	—	55.7	55.7	< 0.005	< 0.005	—	55.8
Architectural Coatings	—	1.56	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.01	0.07	0.09	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	9.21	9.21	< 0.005	< 0.005	—	9.25
Architectural Coatings	—	0.28	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.09	0.08	0.08	1.34	0.00	0.00	0.22	0.22	0.00	0.05	0.05	—	242	242	0.01	0.01	0.90	246
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.08	0.07	0.08	1.01	0.00	0.00	0.22	0.22	0.00	0.05	0.05	—	222	222	0.01	0.01	0.02	225
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.03	0.03	0.04	0.44	0.00	0.00	0.09	0.09	0.00	0.02	0.02	—	93.9	93.9	< 0.005	< 0.005	0.16	95.2
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.08	0.00	0.00	0.02	0.02	0.00	< 0.005	< 0.005	—	15.5	15.5	< 0.005	< 0.005	0.03	15.8
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.20. Architectural Coating (2025) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.02	0.65	0.96	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	134	134	0.01	< 0.005	—	134
Architectural Coatings	—	3.74	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.02	0.65	0.96	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	134	134	0.01	< 0.005	—	134
Architectural Coatings	—	3.74	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.01	0.27	0.40	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	55.7	55.7	< 0.005	< 0.005	—	55.8
Architectural Coatings	—	1.56	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.05	0.07	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	9.21	9.21	< 0.005	< 0.005	—	9.25
Architectural Coatings	—	0.28	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.09	0.08	0.08	1.34	0.00	0.00	0.22	0.22	0.00	0.05	0.05	—	242	242	0.01	0.01	0.90	246
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.08	0.07	0.08	1.01	0.00	0.00	0.22	0.22	0.00	0.05	0.05	—	222	222	0.01	0.01	0.02	225
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.03	0.03	0.04	0.44	0.00	0.00	0.09	0.09	0.00	0.02	0.02	—	93.9	93.9	< 0.005	< 0.005	0.16	95.2
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.08	0.00	0.00	0.02	0.02	0.00	< 0.005	< 0.005	—	15.5	15.5	< 0.005	< 0.005	0.03	15.8
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.21. Architectural Coating (2026) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.15	0.12	0.86	1.13	< 0.005	0.02	—	0.02	0.02	—	0.02	—	134	134	0.01	< 0.005	—	134
Architectural Coatings	—	3.74	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.15	0.12	0.86	1.13	< 0.005	0.02	—	0.02	0.02	—	0.02	—	134	134	0.01	< 0.005	—	134
Architectural Coatings	—	3.74	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.10	0.09	0.61	0.81	< 0.005	0.02	—	0.02	0.02	—	0.02	—	95.4	95.4	< 0.005	< 0.005	—	95.7
Architectural Coatings	—	2.67	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.02	0.11	0.15	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	15.8	15.8	< 0.005	< 0.005	—	15.8
Architectural Coatings	—	0.49	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.08	0.07	0.07	1.24	0.00	0.00	0.22	0.22	0.00	0.05	0.05	—	237	237	0.01	0.01	0.81	241
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.08	0.07	0.08	0.94	0.00	0.00	0.22	0.22	0.00	0.05	0.05	—	218	218	< 0.005	0.01	0.02	220
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.06	0.05	0.06	0.70	0.00	0.00	0.16	0.16	0.00	0.04	0.04	—	158	158	< 0.005	0.01	0.25	160
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.13	0.00	0.00	0.03	0.03	0.00	0.01	0.01	—	26.1	26.1	< 0.005	< 0.005	0.04	26.5
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.22. Architectural Coating (2026) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.02	0.65	0.96	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	134	134	0.01	< 0.005	—	134
Architectural Coatings	—	3.74	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.02	0.65	0.96	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	134	134	0.01	< 0.005	—	134
Architectural Coatings	—	3.74	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.02	0.46	0.69	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	95.4	95.4	< 0.005	< 0.005	—	95.7
Architectural Coatings	—	2.67	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.08	0.13	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	15.8	15.8	< 0.005	< 0.005	—	15.8
Architectural Coatings	—	0.49	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.08	0.07	0.07	1.24	0.00	0.00	0.22	0.22	0.00	0.05	0.05	—	237	237	0.01	0.01	0.81	241
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.08	0.07	0.08	0.94	0.00	0.00	0.22	0.22	0.00	0.05	0.05	—	218	218	< 0.005	0.01	0.02	220
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.06	0.05	0.06	0.70	0.00	0.00	0.16	0.16	0.00	0.04	0.04	—	158	158	< 0.005	0.01	0.25	160
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.13	0.00	0.00	0.03	0.03	0.00	0.01	0.01	—	26.1	26.1	< 0.005	< 0.005	0.04	26.5
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.23. Architectural Coating (2027) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.14	0.11	0.83	1.13	< 0.005	0.02	—	0.02	0.02	—	0.02	—	134	134	0.01	< 0.005	—	134
Architectural Coatings	—	3.74	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.14	0.11	0.83	1.13	< 0.005	0.02	—	0.02	0.02	—	0.02	—	134	134	0.01	< 0.005	—	134
Architectural Coatings	—	3.74	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.05	0.04	0.29	0.40	< 0.005	0.01	—	0.01	0.01	—	0.01	—	47.3	47.3	< 0.005	< 0.005	—	47.5
Architectural Coatings	—	1.32	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.01	0.05	0.07	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	7.83	7.83	< 0.005	< 0.005	—	7.86
Architectural Coatings	—	0.24	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.08	0.07	0.06	1.15	0.00	0.00	0.22	0.22	0.00	0.05	0.05	—	233	233	< 0.005	0.01	0.73	236
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07	0.07	0.07	0.87	0.00	0.00	0.22	0.22	0.00	0.05	0.05	—	213	213	< 0.005	0.01	0.02	216
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.03	0.02	0.03	0.32	0.00	0.00	0.08	0.08	0.00	0.02	0.02	—	76.6	76.6	< 0.005	< 0.005	0.11	77.6
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.06	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	12.7	12.7	< 0.005	< 0.005	0.02	12.9
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.24. Architectural Coating (2027) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.02	0.65	0.96	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	134	134	0.01	< 0.005	—	134
Architectural Coatings	—	3.74	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.02	0.65	0.96	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	134	134	0.01	< 0.005	—	134
Architectural Coatings	—	3.74	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.01	0.23	0.34	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	47.3	47.3	< 0.005	< 0.005	—	47.5
Architectural Coatings	—	1.32	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.04	0.06	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	7.83	7.83	< 0.005	< 0.005	—	7.86
Architectural Coatings	—	0.24	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.08	0.07	0.06	1.15	0.00	0.00	0.22	0.22	0.00	0.05	0.05	—	233	233	< 0.005	0.01	0.73	236
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07	0.07	0.07	0.87	0.00	0.00	0.22	0.22	0.00	0.05	0.05	—	213	213	< 0.005	0.01	0.02	216
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.03	0.02	0.03	0.32	0.00	0.00	0.08	0.08	0.00	0.02	0.02	—	76.6	76.6	< 0.005	< 0.005	0.11	77.6
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.06	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	12.7	12.7	< 0.005	< 0.005	0.02	12.9
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

4. Operations Emissions Details

4.1. Mobile Emissions by Land Use

4.1.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	0.66	0.55	0.96	10.0	0.03	0.02	2.57	2.58	0.02	0.65	0.67	—	2,918	2,918	0.10	0.12	9.19	2,964
Health Club	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Place of Worship	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
General Office Building	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
High Turnover (Sit Down Restaurant)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Recreational Swimmin Pool	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Arena	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.66	0.55	0.96	10.0	0.03	0.02	2.57	2.58	0.02	0.65	0.67	—	2,918	2,918	0.10	0.12	9.19	2,964
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	0.63	0.52	1.03	7.93	0.03	0.02	2.57	2.58	0.02	0.65	0.67	—	2,733	2,733	0.10	0.12	0.24	2,771
Health Club	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Place of Worship	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
General Office Building	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
High Turnover (Sit Down Restaurant)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Recreational Swimming Pool	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Arena	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.63	0.52	1.03	7.93	0.03	0.02	2.57	2.58	0.02	0.65	0.67	—	2,733	2,733	0.10	0.12	0.24	2,771
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Hotel	0.12	0.09	0.19	1.51	< 0.005	< 0.005	0.47	0.47	< 0.005	0.12	0.12	—	457	457	0.02	0.02	0.66	464
Health Club	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Place of Worship	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
General Office Building	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
High Turnover (Sit Down Restaurant)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Recreational Swimming Pool	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Arena	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.12	0.09	0.19	1.51	< 0.005	< 0.005	0.47	0.47	< 0.005	0.12	0.12	—	457	457	0.02	0.02	0.66	464

4.1.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	0.66	0.55	0.96	10.0	0.03	0.02	2.57	2.58	0.02	0.65	0.67	—	2,918	2,918	0.10	0.12	9.19	2,964

Health Club	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Place of Worship	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
General Office Building	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
High Turnover (Sit Down Restaurant)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Recreational Swimming Pool	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Arena	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.66	0.55	0.96	10.0	0.03	0.02	2.57	2.58	0.02	0.65	0.67	—	2,918	2,918	0.10	0.12	9.19	2,964
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	0.63	0.52	1.03	7.93	0.03	0.02	2.57	2.58	0.02	0.65	0.67	—	2,733	2,733	0.10	0.12	0.24	2,771
Health Club	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Place of Worship	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
General Office Building	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
High Turnover (Sit Down Restaurant)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Recreational Swimming Pool	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Arena	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.63	0.52	1.03	7.93	0.03	0.02	2.57	2.58	0.02	0.65	0.67	—	2,733	2,733	0.10	0.12	0.24	2,771
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	0.12	0.09	0.19	1.51	< 0.005	< 0.005	0.47	0.47	< 0.005	0.12	0.12	—	457	457	0.02	0.02	0.66	464
Health Club	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Place of Worship	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
General Office Building	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
High Turnover (Sit Down Restaurant)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Recreati Swimming Pool	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Arena	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.12	0.09	0.19	1.51	< 0.005	< 0.005	0.47	0.47	< 0.005	0.12	0.12	—	457	457	0.02	0.02	0.66	464

4.2. Energy

4.2.1. Electricity Emissions By Land Use - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	—	—	—	—	—	—	—	—	—	—	—	—	2,073	2,073	0.20	0.02	—	2,085
Health Club	—	—	—	—	—	—	—	—	—	—	—	—	84.8	84.8	0.01	< 0.005	—	85.3
Place of Worship	—	—	—	—	—	—	—	—	—	—	—	—	42.2	42.2	< 0.005	< 0.005	—	42.4
General Office Building	—	—	—	—	—	—	—	—	—	—	—	—	363	363	0.03	< 0.005	—	365
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	—	—	1,173	1,173	0.11	0.01	—	1,180

Recreati Swimming Pool	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Arena	—	—	—	—	—	—	—	—	—	—	—	—	10.4	10.4	< 0.005	< 0.005	—	10.5
Total	—	—	—	—	—	—	—	—	—	—	—	—	3,746	3,746	0.36	0.04	—	3,768
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	—	—	—	—	—	—	—	—	—	—	—	—	2,073	2,073	0.20	0.02	—	2,085
Health Club	—	—	—	—	—	—	—	—	—	—	—	—	84.8	84.8	0.01	< 0.005	—	85.3
Place of Worship	—	—	—	—	—	—	—	—	—	—	—	—	42.2	42.2	< 0.005	< 0.005	—	42.4
General Office Building	—	—	—	—	—	—	—	—	—	—	—	—	363	363	0.03	< 0.005	—	365
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	—	—	1,173	1,173	0.11	0.01	—	1,180
Recreational Swimming Pool	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Arena	—	—	—	—	—	—	—	—	—	—	—	—	10.4	10.4	< 0.005	< 0.005	—	10.5
Total	—	—	—	—	—	—	—	—	—	—	—	—	3,746	3,746	0.36	0.04	—	3,768
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	—	—	—	—	—	—	—	—	—	—	—	—	343	343	0.03	< 0.005	—	345

Health Club	—	—	—	—	—	—	—	—	—	—	—	—	14.0	14.0	< 0.005	< 0.005	—	14.1
Place of Worship	—	—	—	—	—	—	—	—	—	—	—	—	6.98	6.98	< 0.005	< 0.005	—	7.02
General Office Building	—	—	—	—	—	—	—	—	—	—	—	—	60.1	60.1	0.01	< 0.005	—	60.5
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	—	—	194	194	0.02	< 0.005	—	195
Recreational Swimming Pool	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Arena	—	—	—	—	—	—	—	—	—	—	—	—	1.73	1.73	< 0.005	< 0.005	—	1.74
Total	—	—	—	—	—	—	—	—	—	—	—	—	620	620	0.06	0.01	—	624

4.2.2. Electricity Emissions By Land Use - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	—	—	—	—	—	—	—	—	—	—	—	—	2,073	2,073	0.20	0.02	—	2,085

Health Club	—	—	—	—	—	—	—	—	—	—	—	—	84.8	84.8	0.01	< 0.005	—	85.3
Place of Worship	—	—	—	—	—	—	—	—	—	—	—	—	42.2	42.2	< 0.005	< 0.005	—	42.4
General Office Building	—	—	—	—	—	—	—	—	—	—	—	—	363	363	0.03	< 0.005	—	365
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	—	—	1,173	1,173	0.11	0.01	—	1,180
Recreational Swimming Pool	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Arena	—	—	—	—	—	—	—	—	—	—	—	—	10.4	10.4	< 0.005	< 0.005	—	10.5
Total	—	—	—	—	—	—	—	—	—	—	—	—	3,746	3,746	0.36	0.04	—	3,768
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	—	—	—	—	—	—	—	—	—	—	—	—	2,073	2,073	0.20	0.02	—	2,085
Health Club	—	—	—	—	—	—	—	—	—	—	—	—	84.8	84.8	0.01	< 0.005	—	85.3
Place of Worship	—	—	—	—	—	—	—	—	—	—	—	—	42.2	42.2	< 0.005	< 0.005	—	42.4
General Office Building	—	—	—	—	—	—	—	—	—	—	—	—	363	363	0.03	< 0.005	—	365

Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	—	—	1,173	1,173	0.11	0.01	—	1,180
Recreational Swimming Pool	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Arena	—	—	—	—	—	—	—	—	—	—	—	—	10.4	10.4	< 0.005	< 0.005	—	10.5
Total	—	—	—	—	—	—	—	—	—	—	—	—	3,746	3,746	0.36	0.04	—	3,768
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	—	—	—	—	—	—	—	—	—	—	—	—	343	343	0.03	< 0.005	—	345
Health Club	—	—	—	—	—	—	—	—	—	—	—	—	14.0	14.0	< 0.005	< 0.005	—	14.1
Place of Worship	—	—	—	—	—	—	—	—	—	—	—	—	6.98	6.98	< 0.005	< 0.005	—	7.02
General Office Building	—	—	—	—	—	—	—	—	—	—	—	—	60.1	60.1	0.01	< 0.005	—	60.5
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	—	—	194	194	0.02	< 0.005	—	195

Recreati Swimming Pool	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Arena	—	—	—	—	—	—	—	—	—	—	—	—	1.73	1.73	< 0.005	< 0.005	—	1.74
Total	—	—	—	—	—	—	—	—	—	—	—	—	620	620	0.06	0.01	—	624

4.2.3. Natural Gas Emissions By Land Use - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	0.12	0.06	1.10	0.92	0.01	0.08	—	0.08	0.08	—	0.08	—	1,311	1,311	0.12	< 0.005	—	1,315
Health Club	0.01	0.01	0.11	0.09	< 0.005	0.01	—	0.01	0.01	—	0.01	—	129	129	0.01	< 0.005	—	129
Place of Worship	0.01	< 0.005	0.05	0.05	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	64.1	64.1	0.01	< 0.005	—	64.3
General Office Building	0.02	0.01	0.16	0.14	< 0.005	0.01	—	0.01	0.01	—	0.01	—	193	193	0.02	< 0.005	—	193
Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
High Turnover (Sit Down Restaurant)	0.12	0.06	1.08	0.91	0.01	0.08	—	0.08	0.08	—	0.08	—	1,291	1,291	0.11	< 0.005	—	1,295

Recreational Swimming	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Arena	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	15.8	15.8	< 0.005	< 0.005	—	15.9
Total	0.28	0.14	2.52	2.12	0.02	0.19	—	0.19	0.19	—	0.19	—	3,004	3,004	0.27	0.01	—	3,013
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	0.12	0.06	1.10	0.92	0.01	0.08	—	0.08	0.08	—	0.08	—	1,311	1,311	0.12	< 0.005	—	1,315
Health Club	0.01	0.01	0.11	0.09	< 0.005	0.01	—	0.01	0.01	—	0.01	—	129	129	0.01	< 0.005	—	129
Place of Worship	0.01	< 0.005	0.05	0.05	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	64.1	64.1	0.01	< 0.005	—	64.3
General Office Building	0.02	0.01	0.16	0.14	< 0.005	0.01	—	0.01	0.01	—	0.01	—	193	193	0.02	< 0.005	—	193
Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
High Turnover (Sit Down Restaurant)	0.12	0.06	1.08	0.91	0.01	0.08	—	0.08	0.08	—	0.08	—	1,291	1,291	0.11	< 0.005	—	1,295
Recreational Swimming Pool	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Arena	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	15.8	15.8	< 0.005	< 0.005	—	15.9
Total	0.28	0.14	2.52	2.12	0.02	0.19	—	0.19	0.19	—	0.19	—	3,004	3,004	0.27	0.01	—	3,013
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Hotel	0.02	0.01	0.20	0.17	< 0.005	0.02	—	0.02	0.02	—	0.02	—	217	217	0.02	< 0.005	—	218
Health Club	< 0.005	< 0.005	0.02	0.02	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	21.3	21.3	< 0.005	< 0.005	—	21.4
Place of Worship	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	10.6	10.6	< 0.005	< 0.005	—	10.6
General Office Building	< 0.005	< 0.005	0.03	0.02	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	31.9	31.9	< 0.005	< 0.005	—	32.0
Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
High Turnover (Sit Down Restaurant)	0.02	0.01	0.20	0.17	< 0.005	0.02	—	0.02	0.02	—	0.02	—	214	214	0.02	< 0.005	—	214
Recreational Swimming Pool	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Arena	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	2.62	2.62	< 0.005	< 0.005	—	2.63
Total	0.05	0.03	0.46	0.39	< 0.005	0.03	—	0.03	0.03	—	0.03	—	497	497	0.04	< 0.005	—	499

4.2.4. Natural Gas Emissions By Land Use - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	0.12	0.06	1.10	0.92	0.01	0.08	—	0.08	0.08	—	0.08	—	1,311	1,311	0.12	< 0.005	—	1,315

Health Club	0.01	0.01	0.11	0.09	< 0.005	0.01	—	0.01	0.01	—	0.01	—	129	129	0.01	< 0.005	—	129
Place of Worship	0.01	< 0.005	0.05	0.05	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	64.1	64.1	0.01	< 0.005	—	64.3
General Office Building	0.02	0.01	0.16	0.14	< 0.005	0.01	—	0.01	0.01	—	0.01	—	193	193	0.02	< 0.005	—	193
Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
High Turnover (Sit Down Restaurant)	0.12	0.06	1.08	0.91	0.01	0.08	—	0.08	0.08	—	0.08	—	1,291	1,291	0.11	< 0.005	—	1,295
Recreational Swimming Pool	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Arena	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	15.8	15.8	< 0.005	< 0.005	—	15.9
Total	0.28	0.14	2.52	2.12	0.02	0.19	—	0.19	0.19	—	0.19	—	3,004	3,004	0.27	0.01	—	3,013
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	0.12	0.06	1.10	0.92	0.01	0.08	—	0.08	0.08	—	0.08	—	1,311	1,311	0.12	< 0.005	—	1,315
Health Club	0.01	0.01	0.11	0.09	< 0.005	0.01	—	0.01	0.01	—	0.01	—	129	129	0.01	< 0.005	—	129
Place of Worship	0.01	< 0.005	0.05	0.05	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	64.1	64.1	0.01	< 0.005	—	64.3
General Office Building	0.02	0.01	0.16	0.14	< 0.005	0.01	—	0.01	0.01	—	0.01	—	193	193	0.02	< 0.005	—	193

Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
High Turnover (Sit Down Restaurant)	0.12	0.06	1.08	0.91	0.01	0.08	—	0.08	0.08	—	0.08	—	1,291	1,291	0.11	< 0.005	—	1,295
Recreational Swimming Pool	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Arena	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	15.8	15.8	< 0.005	< 0.005	—	15.9
Total	0.28	0.14	2.52	2.12	0.02	0.19	—	0.19	0.19	—	0.19	—	3,004	3,004	0.27	0.01	—	3,013
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	0.02	0.01	0.20	0.17	< 0.005	0.02	—	0.02	0.02	—	0.02	—	217	217	0.02	< 0.005	—	218
Health Club	< 0.005	< 0.005	0.02	0.02	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	21.3	21.3	< 0.005	< 0.005	—	21.4
Place of Worship	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	10.6	10.6	< 0.005	< 0.005	—	10.6
General Office Building	< 0.005	< 0.005	0.03	0.02	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	31.9	31.9	< 0.005	< 0.005	—	32.0
Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
High Turnover (Sit Down Restaurant)	0.02	0.01	0.20	0.17	< 0.005	0.02	—	0.02	0.02	—	0.02	—	214	214	0.02	< 0.005	—	214

Recreati Swimming Pool	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Arena	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	2.62	2.62	< 0.005	< 0.005	—	2.63
Total	0.05	0.03	0.46	0.39	< 0.005	0.03	—	0.03	0.03	—	0.03	—	497	497	0.04	< 0.005	—	499

4.3. Area Emissions by Source

4.3.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Source	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	—	4.51	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	—	0.56	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Landscape Equipment	1.62	1.50	0.08	9.11	< 0.005	0.02	—	0.02	0.01	—	0.01	—	37.4	37.4	< 0.005	< 0.005	—	37.6
Total	1.62	6.56	0.08	9.11	< 0.005	0.02	—	0.02	0.01	—	0.01	—	37.4	37.4	< 0.005	< 0.005	—	37.6
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	—	4.51	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	—	0.56	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Total	—	5.06	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	—	0.82	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	—	0.10	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Landscape Equipment	0.20	0.19	0.01	1.14	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	4.25	4.25	< 0.005	< 0.005	—	4.26
Total	0.20	1.11	0.01	1.14	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	4.25	4.25	< 0.005	< 0.005	—	4.26

4.3.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Source	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	—	4.51	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	—	0.56	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Landscape Equipment	1.62	1.50	0.08	9.11	< 0.005	0.02	—	0.02	0.01	—	0.01	—	37.4	37.4	< 0.005	< 0.005	—	37.6
Total	1.62	6.56	0.08	9.11	< 0.005	0.02	—	0.02	0.01	—	0.01	—	37.4	37.4	< 0.005	< 0.005	—	37.6
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Consum Products	—	4.51	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	—	0.56	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	5.06	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	—	0.82	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	—	0.10	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Landscape Equipment	0.20	0.19	0.01	1.14	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	4.25	4.25	< 0.005	< 0.005	—	4.26
Total	0.20	1.11	0.01	1.14	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	4.25	4.25	< 0.005	< 0.005	—	4.26

4.4. Water Emissions by Land Use

4.4.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	—	—	—	—	—	—	—	—	—	—	—	2.33	7.86	10.2	0.24	0.01	—	17.9
Health Club	—	—	—	—	—	—	—	—	—	—	—	1.06	3.58	4.64	0.11	< 0.005	—	8.16
Place of Worship	—	—	—	—	—	—	—	—	—	—	—	0.28	0.94	1.22	0.03	< 0.005	—	2.15

General Office Building	—	—	—	—	—	—	—	—	—	—	—	7.47	25.2	32.6	0.77	0.02	—	57.4
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	—	20.5	69.1	89.6	2.11	0.05	—	157
Recreational Swimming Pool	—	—	—	—	—	—	—	—	—	—	—	0.07	0.23	0.30	0.01	< 0.005	—	0.53
Arena	—	—	—	—	—	—	—	—	—	—	—	0.95	3.20	4.16	0.10	< 0.005	—	7.30
Total	—	—	—	—	—	—	—	—	—	—	—	32.7	110	143	3.36	0.08	—	251
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	—	—	—	—	—	—	—	—	—	—	—	2.33	7.86	10.2	0.24	0.01	—	17.9
Health Club	—	—	—	—	—	—	—	—	—	—	—	1.06	3.58	4.64	0.11	< 0.005	—	8.16
Place of Worship	—	—	—	—	—	—	—	—	—	—	—	0.28	0.94	1.22	0.03	< 0.005	—	2.15
General Office Building	—	—	—	—	—	—	—	—	—	—	—	7.47	25.2	32.6	0.77	0.02	—	57.4
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00

Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	—	20.5	69.1	89.6	2.11	0.05	—	157
Recreational Swimming Pool	—	—	—	—	—	—	—	—	—	—	—	0.07	0.23	0.30	0.01	< 0.005	—	0.53
Arena	—	—	—	—	—	—	—	—	—	—	—	0.95	3.20	4.16	0.10	< 0.005	—	7.30
Total	—	—	—	—	—	—	—	—	—	—	—	32.7	110	143	3.36	0.08	—	251
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	—	—	—	—	—	—	—	—	—	—	—	0.39	1.30	1.69	0.04	< 0.005	—	2.97
Health Club	—	—	—	—	—	—	—	—	—	—	—	0.18	0.59	0.77	0.02	< 0.005	—	1.35
Place of Worship	—	—	—	—	—	—	—	—	—	—	—	0.05	0.16	0.20	< 0.005	< 0.005	—	0.36
General Office Building	—	—	—	—	—	—	—	—	—	—	—	1.24	4.17	5.41	0.13	< 0.005	—	9.50
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	—	3.40	11.4	14.8	0.35	0.01	—	26.1

Recreational Swimming	—	—	—	—	—	—	—	—	—	—	—	0.01	0.04	0.05	< 0.005	< 0.005	—	0.09
Arena	—	—	—	—	—	—	—	—	—	—	—	0.16	0.53	0.69	0.02	< 0.005	—	1.21
Total	—	—	—	—	—	—	—	—	—	—	—	5.41	18.2	23.6	0.56	0.01	—	41.5

4.4.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	—	—	—	—	—	—	—	—	—	—	—	2.33	7.86	10.2	0.24	0.01	—	17.9
Health Club	—	—	—	—	—	—	—	—	—	—	—	1.06	3.58	4.64	0.11	< 0.005	—	8.16
Place of Worship	—	—	—	—	—	—	—	—	—	—	—	0.28	0.94	1.22	0.03	< 0.005	—	2.15
General Office Building	—	—	—	—	—	—	—	—	—	—	—	7.47	25.2	32.6	0.77	0.02	—	57.4
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	—	20.5	69.1	89.6	2.11	0.05	—	157

Recreational Swimmin Pool	—	—	—	—	—	—	—	—	—	—	—	0.07	0.23	0.30	0.01	< 0.005	—	0.53
Arena	—	—	—	—	—	—	—	—	—	—	—	0.95	3.20	4.16	0.10	< 0.005	—	7.30
Total	—	—	—	—	—	—	—	—	—	—	—	32.7	110	143	3.36	0.08	—	251
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	—	—	—	—	—	—	—	—	—	—	—	2.33	7.86	10.2	0.24	0.01	—	17.9
Health Club	—	—	—	—	—	—	—	—	—	—	—	1.06	3.58	4.64	0.11	< 0.005	—	8.16
Place of Worship	—	—	—	—	—	—	—	—	—	—	—	0.28	0.94	1.22	0.03	< 0.005	—	2.15
General Office Building	—	—	—	—	—	—	—	—	—	—	—	7.47	25.2	32.6	0.77	0.02	—	57.4
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	—	20.5	69.1	89.6	2.11	0.05	—	157
Recreational Swimming Pool	—	—	—	—	—	—	—	—	—	—	—	0.07	0.23	0.30	0.01	< 0.005	—	0.53
Arena	—	—	—	—	—	—	—	—	—	—	—	0.95	3.20	4.16	0.10	< 0.005	—	7.30
Total	—	—	—	—	—	—	—	—	—	—	—	32.7	110	143	3.36	0.08	—	251
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Hotel	—	—	—	—	—	—	—	—	—	—	—	0.39	1.30	1.69	0.04	< 0.005	—	2.97
Health Club	—	—	—	—	—	—	—	—	—	—	—	0.18	0.59	0.77	0.02	< 0.005	—	1.35
Place of Worship	—	—	—	—	—	—	—	—	—	—	—	0.05	0.16	0.20	< 0.005	< 0.005	—	0.36
General Office Building	—	—	—	—	—	—	—	—	—	—	—	1.24	4.17	5.41	0.13	< 0.005	—	9.50
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	—	3.40	11.4	14.8	0.35	0.01	—	26.1
Recreational Swimming Pool	—	—	—	—	—	—	—	—	—	—	—	0.01	0.04	0.05	< 0.005	< 0.005	—	0.09
Arena	—	—	—	—	—	—	—	—	—	—	—	0.16	0.53	0.69	0.02	< 0.005	—	1.21
Total	—	—	—	—	—	—	—	—	—	—	—	5.41	18.2	23.6	0.56	0.01	—	41.5

4.5. Waste Emissions by Land Use

4.5.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	—	—	—	—	—	—	—	—	—	—	—	14.2	0.00	14.2	1.42	0.00	—	49.6
Health Club	—	—	—	—	—	—	—	—	—	—	—	28.8	0.00	28.8	2.88	0.00	—	101
Place of Worship	—	—	—	—	—	—	—	—	—	—	—	14.3	0.00	14.3	1.43	0.00	—	50.1
General Office Building	—	—	—	—	—	—	—	—	—	—	—	11.0	0.00	11.0	1.10	0.00	—	38.5
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	—	226	0.00	226	22.6	0.00	—	791
Recreational Swimming Pool	—	—	—	—	—	—	—	—	—	—	—	1.86	0.00	1.86	0.19	0.00	—	6.51
Arena	—	—	—	—	—	—	—	—	—	—	—	0.02	0.00	0.02	< 0.005	0.00	—	0.06
Total	—	—	—	—	—	—	—	—	—	—	—	296	0.00	296	29.6	0.00	—	1,037
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	—	—	—	—	—	—	—	—	—	—	—	14.2	0.00	14.2	1.42	0.00	—	49.6
Health Club	—	—	—	—	—	—	—	—	—	—	—	28.8	0.00	28.8	2.88	0.00	—	101

Place of Worship	—	—	—	—	—	—	—	—	—	—	—	14.3	0.00	14.3	1.43	0.00	—	50.1
General Office Building	—	—	—	—	—	—	—	—	—	—	—	11.0	0.00	11.0	1.10	0.00	—	38.5
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	—	226	0.00	226	22.6	0.00	—	791
Recreational Swimming Pool	—	—	—	—	—	—	—	—	—	—	—	1.86	0.00	1.86	0.19	0.00	—	6.51
Arena	—	—	—	—	—	—	—	—	—	—	—	0.02	0.00	0.02	< 0.005	0.00	—	0.06
Total	—	—	—	—	—	—	—	—	—	—	—	296	0.00	296	29.6	0.00	—	1,037
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	—	—	—	—	—	—	—	—	—	—	—	2.34	0.00	2.34	0.23	0.00	—	8.20
Health Club	—	—	—	—	—	—	—	—	—	—	—	4.77	0.00	4.77	0.48	0.00	—	16.7
Place of Worship	—	—	—	—	—	—	—	—	—	—	—	2.37	0.00	2.37	0.24	0.00	—	8.30
General Office Building	—	—	—	—	—	—	—	—	—	—	—	1.82	0.00	1.82	0.18	0.00	—	6.37
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00

Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	—	37.4	0.00	37.4	3.74	0.00	—	131
Recreational Swimming Pool	—	—	—	—	—	—	—	—	—	—	—	0.31	0.00	0.31	0.03	0.00	—	1.08
Arena	—	—	—	—	—	—	—	—	—	—	—	< 0.005	0.00	< 0.005	< 0.005	0.00	—	0.01
Total	—	—	—	—	—	—	—	—	—	—	—	49.1	0.00	49.1	4.90	0.00	—	172

4.5.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	—	—	—	—	—	—	—	—	—	—	—	14.2	0.00	14.2	1.42	0.00	—	49.6
Health Club	—	—	—	—	—	—	—	—	—	—	—	28.8	0.00	28.8	2.88	0.00	—	101
Place of Worship	—	—	—	—	—	—	—	—	—	—	—	14.3	0.00	14.3	1.43	0.00	—	50.1
General Office Building	—	—	—	—	—	—	—	—	—	—	—	11.0	0.00	11.0	1.10	0.00	—	38.5
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00

Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	—	226	0.00	226	22.6	0.00	—	791
Recreational Swimming Pool	—	—	—	—	—	—	—	—	—	—	—	1.86	0.00	1.86	0.19	0.00	—	6.51
Arena	—	—	—	—	—	—	—	—	—	—	—	0.02	0.00	0.02	< 0.005	0.00	—	0.06
Total	—	—	—	—	—	—	—	—	—	—	—	296	0.00	296	29.6	0.00	—	1,037
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	—	—	—	—	—	—	—	—	—	—	—	14.2	0.00	14.2	1.42	0.00	—	49.6
Health Club	—	—	—	—	—	—	—	—	—	—	—	28.8	0.00	28.8	2.88	0.00	—	101
Place of Worship	—	—	—	—	—	—	—	—	—	—	—	14.3	0.00	14.3	1.43	0.00	—	50.1
General Office Building	—	—	—	—	—	—	—	—	—	—	—	11.0	0.00	11.0	1.10	0.00	—	38.5
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	—	226	0.00	226	22.6	0.00	—	791

Recreational	—	—	—	—	—	—	—	—	—	—	—	1.86	0.00	1.86	0.19	0.00	—	6.51
Arena	—	—	—	—	—	—	—	—	—	—	—	0.02	0.00	0.02	< 0.005	0.00	—	0.06
Total	—	—	—	—	—	—	—	—	—	—	—	296	0.00	296	29.6	0.00	—	1,037
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	—	—	—	—	—	—	—	—	—	—	—	2.34	0.00	2.34	0.23	0.00	—	8.20
Health Club	—	—	—	—	—	—	—	—	—	—	—	4.77	0.00	4.77	0.48	0.00	—	16.7
Place of Worship	—	—	—	—	—	—	—	—	—	—	—	2.37	0.00	2.37	0.24	0.00	—	8.30
General Office Building	—	—	—	—	—	—	—	—	—	—	—	1.82	0.00	1.82	0.18	0.00	—	6.37
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	—	37.4	0.00	37.4	3.74	0.00	—	131
Recreational Swimming Pool	—	—	—	—	—	—	—	—	—	—	—	0.31	0.00	0.31	0.03	0.00	—	1.08
Arena	—	—	—	—	—	—	—	—	—	—	—	< 0.005	0.00	< 0.005	< 0.005	0.00	—	0.01
Total	—	—	—	—	—	—	—	—	—	—	—	49.1	0.00	49.1	4.90	0.00	—	172

4.6. Refrigerant Emissions by Land Use

4.6.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	214	214
Health Club	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.05	0.05
Place of Worship	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.02	0.02
General Office Building	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.05	0.05
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	55.1	55.1
Recreational Swimming Pool	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	< 0.005	< 0.005
Arena	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.01	0.01
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	269	269
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	214	214
Health Club	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.05	0.05
Place of Worship	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.02	0.02

General Office Building	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.05	0.05
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	55.1	55.1
Recreational Swimming Pool	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	< 0.005	< 0.005
Arena	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.01	0.01
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	269	269
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	35.4	35.4
Health Club	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.01	0.01
Place of Worship	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	< 0.005	< 0.005
General Office Building	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.01	0.01
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	9.13	9.13
Recreational Swimming Pool	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	< 0.005	< 0.005
Arena	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	< 0.005	< 0.005
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	44.6	44.6

4.6.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	214	214
Health Club	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.05	0.05
Place of Worship	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.02	0.02
General Office Building	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.05	0.05
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	55.1	55.1
Recreational Swimming Pool	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	< 0.005	< 0.005
Arena	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.01	0.01
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	269	269
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	214	214
Health Club	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.05	0.05
Place of Worship	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.02	0.02

General Office Building	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.05	0.05
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	55.1	55.1
Recreational Swimming Pool	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	< 0.005	< 0.005
Arena	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.01	0.01
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	269	269
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	35.4	35.4
Health Club	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.01	0.01
Place of Worship	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	< 0.005	< 0.005
General Office Building	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.01	0.01
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	9.13	9.13
Recreational Swimming Pool	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	< 0.005	< 0.005
Arena	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	< 0.005	< 0.005
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	44.6	44.6

4.7. Offroad Emissions By Equipment Type

4.7.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.7.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.8. Stationary Emissions By Equipment Type

4.8.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.8.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.9. User Defined Emissions By Equipment Type

4.9.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.9.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10. Soil Carbon Accumulation By Vegetation Type

4.10.1. Soil Carbon Accumulation By Vegetation Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Vegetation	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.2. Above and Belowground Carbon Accumulation by Land Use Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.3. Avoided and Sequestered Emissions by Species - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Species	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.4. Soil Carbon Accumulation By Vegetation Type - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Vegetation	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.5. Above and Belowground Carbon Accumulation by Land Use Type - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.6. Avoided and Sequestered Emissions by Species - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Species	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Remove	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

5. Activity Data

5.1. Construction Schedule

Phase Name	Phase Type	Start Date	End Date	Days Per Week	Work Days per Phase	Phase Description
Demolition	Demolition	6/2/2025	8/29/2025	5.00	65.0	—
Site Preparation	Site Preparation	6/2/2025	8/29/2025	5.00	65.0	—
Grading	Grading	6/2/2025	7/31/2025	5.00	44.0	—
Building Construction	Building Construction	6/2/2025	6/30/2027	5.00	543	—
Paving	Paving	6/2/2025	6/30/2027	5.00	543	—
Architectural Coating	Architectural Coating	6/2/2025	6/30/2027	5.00	543	—

5.2. Off-Road Equipment

5.2.1. Unmitigated

Phase Name	Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor
Demolition	Rubber Tired Dozers	Diesel	Average	2.00	8.00	367	0.40
Demolition	Excavators	Diesel	Average	3.00	8.00	36.0	0.38
Demolition	Concrete/Industrial Saws	Diesel	Average	1.00	8.00	33.0	0.73
Site Preparation	Rubber Tired Dozers	Diesel	Average	3.00	8.00	367	0.40
Site Preparation	Tractors/Loaders/Backhoes	Diesel	Average	4.00	8.00	84.0	0.37
Grading	Graders	Diesel	Average	1.00	8.00	148	0.41
Grading	Excavators	Diesel	Average	2.00	8.00	36.0	0.38
Grading	Tractors/Loaders/Backhoes	Diesel	Average	2.00	8.00	84.0	0.37
Grading	Scrapers	Diesel	Average	2.00	8.00	423	0.48
Grading	Rubber Tired Dozers	Diesel	Average	1.00	8.00	367	0.40
Building Construction	Forklifts	Diesel	Average	3.00	8.00	82.0	0.20
Building Construction	Generator Sets	Diesel	Average	1.00	8.00	14.0	0.74
Building Construction	Cranes	Diesel	Average	1.00	7.00	367	0.29

Building Construction	Welders	Diesel	Average	1.00	8.00	46.0	0.45
Building Construction	Tractors/Loaders/Backhoes	Diesel	Average	3.00	7.00	84.0	0.37
Paving	Pavers	Diesel	Average	2.00	8.00	81.0	0.42
Paving	Paving Equipment	Diesel	Average	2.00	8.00	89.0	0.36
Paving	Rollers	Diesel	Average	2.00	8.00	36.0	0.38
Architectural Coating	Air Compressors	Diesel	Average	1.00	6.00	37.0	0.48

5.2.2. Mitigated

Phase Name	Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor
Demolition	Rubber Tired Dozers	Diesel	Tier 4 Final	2.00	8.00	367	0.40
Demolition	Excavators	Diesel	Tier 4 Final	3.00	8.00	36.0	0.38
Demolition	Concrete/Industrial Saws	Diesel	Tier 4 Final	1.00	8.00	33.0	0.73
Site Preparation	Rubber Tired Dozers	Diesel	Tier 4 Final	3.00	8.00	367	0.40
Site Preparation	Tractors/Loaders/Backhoes	Diesel	Tier 4 Final	4.00	8.00	84.0	0.37
Grading	Graders	Diesel	Tier 4 Final	1.00	8.00	148	0.41
Grading	Excavators	Diesel	Tier 4 Final	2.00	8.00	36.0	0.38
Grading	Tractors/Loaders/Backhoes	Diesel	Tier 4 Final	2.00	8.00	84.0	0.37
Grading	Scrapers	Diesel	Tier 4 Final	2.00	8.00	423	0.48
Grading	Rubber Tired Dozers	Diesel	Tier 4 Final	1.00	8.00	367	0.40
Building Construction	Forklifts	Diesel	Tier 4 Final	3.00	8.00	82.0	0.20
Building Construction	Generator Sets	Diesel	Average	1.00	8.00	14.0	0.74
Building Construction	Cranes	Diesel	Tier 4 Final	1.00	7.00	367	0.29
Building Construction	Welders	Diesel	Tier 4 Final	1.00	8.00	46.0	0.45
Building Construction	Tractors/Loaders/Backhoes	Diesel	Tier 4 Final	3.00	7.00	84.0	0.37

Paving	Pavers	Diesel	Tier 4 Final	2.00	8.00	81.0	0.42
Paving	Paving Equipment	Diesel	Tier 4 Final	2.00	8.00	89.0	0.36
Paving	Rollers	Diesel	Tier 4 Final	2.00	8.00	36.0	0.38
Architectural Coating	Air Compressors	Diesel	Tier 4 Final	1.00	6.00	37.0	0.48

5.3. Construction Vehicles

5.3.1. Unmitigated

Phase Name	Trip Type	One-Way Trips per Day	Miles per Trip	Vehicle Mix
Demolition	—	—	—	—
Demolition	Worker	15.0	18.5	LDA,LDT1,LDT2
Demolition	Vendor	—	10.2	HHDT,MHDT
Demolition	Hauling	0.00	20.0	HHDT
Demolition	Onsite truck	—	—	HHDT
Site Preparation	—	—	—	—
Site Preparation	Worker	17.5	18.5	LDA,LDT1,LDT2
Site Preparation	Vendor	—	10.2	HHDT,MHDT
Site Preparation	Hauling	0.00	20.0	HHDT
Site Preparation	Onsite truck	—	—	HHDT
Grading	—	—	—	—
Grading	Worker	20.0	18.5	LDA,LDT1,LDT2
Grading	Vendor	—	10.2	HHDT,MHDT
Grading	Hauling	447	20.0	HHDT
Grading	Onsite truck	—	—	HHDT
Building Construction	—	—	—	—
Building Construction	Worker	86.0	18.5	LDA,LDT1,LDT2
Building Construction	Vendor	34.4	10.2	HHDT,MHDT

Building Construction	Hauling	0.00	20.0	HHDT
Building Construction	Onsite truck	—	—	HHDT
Paving	—	—	—	—
Paving	Worker	15.0	18.5	LDA,LDT1,LDT2
Paving	Vendor	—	10.2	HHDT,MHDT
Paving	Hauling	0.00	20.0	HHDT
Paving	Onsite truck	—	—	HHDT
Architectural Coating	—	—	—	—
Architectural Coating	Worker	17.2	18.5	LDA,LDT1,LDT2
Architectural Coating	Vendor	—	10.2	HHDT,MHDT
Architectural Coating	Hauling	0.00	20.0	HHDT
Architectural Coating	Onsite truck	—	—	HHDT

5.3.2. Mitigated

Phase Name	Trip Type	One-Way Trips per Day	Miles per Trip	Vehicle Mix
Demolition	—	—	—	—
Demolition	Worker	15.0	18.5	LDA,LDT1,LDT2
Demolition	Vendor	—	10.2	HHDT,MHDT
Demolition	Hauling	0.00	20.0	HHDT
Demolition	Onsite truck	—	—	HHDT
Site Preparation	—	—	—	—
Site Preparation	Worker	17.5	18.5	LDA,LDT1,LDT2
Site Preparation	Vendor	—	10.2	HHDT,MHDT
Site Preparation	Hauling	0.00	20.0	HHDT
Site Preparation	Onsite truck	—	—	HHDT
Grading	—	—	—	—
Grading	Worker	20.0	18.5	LDA,LDT1,LDT2

Grading	Vendor	—	10.2	HHDT,MHDT
Grading	Hauling	447	20.0	HHDT
Grading	Onsite truck	—	—	HHDT
Building Construction	—	—	—	—
Building Construction	Worker	86.0	18.5	LDA,LDT1,LDT2
Building Construction	Vendor	34.4	10.2	HHDT,MHDT
Building Construction	Hauling	0.00	20.0	HHDT
Building Construction	Onsite truck	—	—	HHDT
Paving	—	—	—	—
Paving	Worker	15.0	18.5	LDA,LDT1,LDT2
Paving	Vendor	—	10.2	HHDT,MHDT
Paving	Hauling	0.00	20.0	HHDT
Paving	Onsite truck	—	—	HHDT
Architectural Coating	—	—	—	—
Architectural Coating	Worker	17.2	18.5	LDA,LDT1,LDT2
Architectural Coating	Vendor	—	10.2	HHDT,MHDT
Architectural Coating	Hauling	0.00	20.0	HHDT
Architectural Coating	Onsite truck	—	—	HHDT

5.4. Vehicles

5.4.1. Construction Vehicle Control Strategies

Non-applicable. No control strategies activated by user.

5.5. Architectural Coatings

Phase Name	Residential Interior Area Coated (sq ft)	Residential Exterior Area Coated (sq ft)	Non-Residential Interior Area Coated (sq ft)	Non-Residential Exterior Area Coated (sq ft)	Parking Area Coated (sq ft)
Architectural Coating	0.00	0.00	314,039	104,680	19,282

5.6. Dust Mitigation

5.6.1. Construction Earthmoving Activities

Phase Name	Material Imported (cy)	Material Exported (cy)	Acres Graded (acres)	Material Demolished (sq. ft.)	Acres Paved (acres)
Demolition	0.00	0.00	0.00	—	—
Site Preparation	—	—	97.5	0.00	—
Grading	—	157,414	132	0.00	—
Paving	0.00	0.00	0.00	0.00	7.38

5.6.2. Construction Earthmoving Control Strategies

Non-applicable. No control strategies activated by user.

5.7. Construction Paving

Land Use	Area Paved (acres)	% Asphalt
Hotel	0.00	0%
Health Club	0.00	0%
Place of Worship	0.00	0%
General Office Building	0.00	0%
Other Non-Asphalt Surfaces	2.43	0%
Other Asphalt Surfaces	4.95	100%
High Turnover (Sit Down Restaurant)	0.00	0%
Recreational Swimming Pool	0.00	0%
Arena	0.00	0%

5.8. Construction Electricity Consumption and Emissions Factors

kWh per Year and Emission Factor (lb/MWh)

Year	kWh per Year	CO2	CH4	N2O

2025	0.00	532	0.03	< 0.005
2026	0.00	532	0.03	< 0.005
2027	0.00	532	0.03	< 0.005

5.9. Operational Mobile Sources

5.9.1. Unmitigated

Land Use Type	Trips/Weekday	Trips/Saturday	Trips/Sunday	Trips/Year	VMT/Weekday	VMT/Saturday	VMT/Sunday	VMT/Year
Hotel	100	100	100	36,500	3,618	3,618	3,618	1,320,729
Health Club	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Place of Worship	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
General Office Building	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
High Turnover (Sit Down Restaurant)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Recreational Swimming Pool	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Arena	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

5.9.2. Mitigated

Land Use Type	Trips/Weekday	Trips/Saturday	Trips/Sunday	Trips/Year	VMT/Weekday	VMT/Saturday	VMT/Sunday	VMT/Year
Hotel	100	100	100	36,500	3,618	3,618	3,618	1,320,729
Health Club	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Place of Worship	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

General Office Building	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
High Turnover (Sit Down Restaurant)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Recreational Swimming Pool	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Arena	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

5.10. Operational Area Sources

5.10.1. Hearths

5.10.1.1. Unmitigated

5.10.1.2. Mitigated

5.10.2. Architectural Coatings

Residential Interior Area Coated (sq ft)	Residential Exterior Area Coated (sq ft)	Non-Residential Interior Area Coated (sq ft)	Non-Residential Exterior Area Coated (sq ft)	Parking Area Coated (sq ft)
0	0.00	314,039	104,680	19,282

5.10.3. Landscape Equipment

Season	Unit	Value
Snow Days	day/yr	0.00
Summer Days	day/yr	250

5.10.4. Landscape Equipment - Mitigated

Season	Unit	Value
Snow Days	day/yr	0.00
Summer Days	day/yr	250

5.11. Operational Energy Consumption

5.11.1. Unmitigated

Electricity (kWh/yr) and CO2 and CH4 and N2O and Natural Gas (kBTU/yr)

Land Use	Electricity (kWh/yr)	CO2	CH4	N2O	Natural Gas (kBTU/yr)
Hotel	2,185,629	346	0.0330	0.0040	4,091,242
Health Club	89,416	346	0.0330	0.0040	402,057
Place of Worship	44,465	346	0.0330	0.0040	199,935
General Office Building	382,894	346	0.0330	0.0040	602,034
Other Non-Asphalt Surfaces	0.00	346	0.0330	0.0040	0.00
Other Asphalt Surfaces	0.00	346	0.0330	0.0040	0.00
High Turnover (Sit Down Restaurant)	1,236,591	346	0.0330	0.0040	4,029,648
Recreational Swimming Pool	0.00	346	0.0330	0.0040	0.00
Arena	10,987	346	0.0330	0.0040	49,405

5.11.2. Mitigated

Electricity (kWh/yr) and CO2 and CH4 and N2O and Natural Gas (kBTU/yr)

Land Use	Electricity (kWh/yr)	CO2	CH4	N2O	Natural Gas (kBTU/yr)
Hotel	2,185,629	346	0.0330	0.0040	4,091,242
Health Club	89,416	346	0.0330	0.0040	402,057
Place of Worship	44,465	346	0.0330	0.0040	199,935

General Office Building	382,894	346	0.0330	0.0040	602,034
Other Non-Asphalt Surfaces	0.00	346	0.0330	0.0040	0.00
Other Asphalt Surfaces	0.00	346	0.0330	0.0040	0.00
High Turnover (Sit Down Restaurant)	1,236,591	346	0.0330	0.0040	4,029,648
Recreational Swimming Pool	0.00	346	0.0330	0.0040	0.00
Arena	10,987	346	0.0330	0.0040	49,405

5.12. Operational Water and Wastewater Consumption

5.12.1. Unmitigated

Land Use	Indoor Water (gal/year)	Outdoor Water (gal/year)
Hotel	1,217,605	0.00
Health Club	554,467	0.00
Place of Worship	145,869	0.00
General Office Building	3,899,478	0.00
Other Non-Asphalt Surfaces	0.00	0.00
Other Asphalt Surfaces	0.00	0.00
High Turnover (Sit Down Restaurant)	10,703,813	0.00
Recreational Swimming Pool	35,841	0.00
Arena	496,247	0.00

5.12.2. Mitigated

Land Use	Indoor Water (gal/year)	Outdoor Water (gal/year)
Hotel	1,217,605	0.00
Health Club	554,467	0.00
Place of Worship	145,869	0.00

General Office Building	3,899,478	0.00
Other Non-Asphalt Surfaces	0.00	0.00
Other Asphalt Surfaces	0.00	0.00
High Turnover (Sit Down Restaurant)	10,703,813	0.00
Recreational Swimming Pool	35,841	0.00
Arena	496,247	0.00

5.13. Operational Waste Generation

5.13.1. Unmitigated

Land Use	Waste (ton/year)	Cogeneration (kWh/year)
Hotel	26.3	—
Health Club	53.4	—
Place of Worship	26.6	—
General Office Building	20.4	—
Other Non-Asphalt Surfaces	0.00	—
Other Asphalt Surfaces	0.00	—
High Turnover (Sit Down Restaurant)	420	—
Recreational Swimming Pool	3.45	—
Arena	0.03	—

5.13.2. Mitigated

Land Use	Waste (ton/year)	Cogeneration (kWh/year)
Hotel	26.3	—
Health Club	53.4	—
Place of Worship	26.6	—
General Office Building	20.4	—

Other Non-Asphalt Surfaces	0.00	—
Other Asphalt Surfaces	0.00	—
High Turnover (Sit Down Restaurant)	420	—
Recreational Swimming Pool	3.45	—
Arena	0.03	—

5.14. Operational Refrigeration and Air Conditioning Equipment

5.14.1. Unmitigated

Land Use Type	Equipment Type	Refrigerant	GWP	Quantity (kg)	Operations Leak Rate	Service Leak Rate	Times Serviced
Hotel	Household refrigerators and/or freezers	R-134a	1,430	0.00	0.60	0.00	1.00
Hotel	Other commercial A/C and heat pumps	R-410A	2,088	1.80	4.00	4.00	18.0
Hotel	Walk-in refrigerators and freezers	R-404A	3,922	< 0.005	7.50	7.50	20.0
Health Club	Other commercial A/C and heat pumps	R-410A	2,088	< 0.005	4.00	4.00	18.0
Health Club	Stand-alone retail refrigerators and freezers	R-134a	1,430	0.04	1.00	0.00	1.00
Place of Worship	Household refrigerators and/or freezers	R-134a	1,430	0.02	0.60	0.00	1.00
Place of Worship	Other commercial A/C and heat pumps	R-410A	2,088	< 0.005	4.00	4.00	18.0
Place of Worship	Stand-alone retail refrigerators and freezers	R-134a	1,430	< 0.005	1.00	0.00	1.00
Place of Worship	Walk-in refrigerators and freezers	R-404A	3,922	< 0.005	7.50	7.50	20.0
General Office Building	Household refrigerators and/or freezers	R-134a	1,430	0.02	0.60	0.00	1.00

General Office Building	Other commercial A/C and heat pumps	R-410A	2,088	< 0.005	4.00	4.00	18.0
High Turnover (Sit Down Restaurant)	Household refrigerators and/or freezers	R-134a	1,430	0.00	0.60	0.00	1.00
High Turnover (Sit Down Restaurant)	Other commercial A/C and heat pumps	R-410A	2,088	1.80	4.00	4.00	18.0
High Turnover (Sit Down Restaurant)	Walk-in refrigerators and freezers	R-404A	3,922	< 0.005	7.50	7.50	20.0
Recreational Swimming Pool	Other commercial A/C and heat pumps	R-410A	2,088	< 0.005	4.00	4.00	18.0
Recreational Swimming Pool	Stand-alone retail refrigerators and freezers	R-134a	1,430	0.04	1.00	0.00	1.00
Arena	Other commercial A/C and heat pumps	R-410A	2,088	< 0.005	4.00	4.00	18.0
Arena	Stand-alone retail refrigerators and freezers	R-134a	1,430	0.04	1.00	0.00	1.00
Arena	Walk-in refrigerators and freezers	R-404A	3,922	< 0.005	7.50	7.50	20.0

5.14.2. Mitigated

Land Use Type	Equipment Type	Refrigerant	GWP	Quantity (kg)	Operations Leak Rate	Service Leak Rate	Times Serviced
Hotel	Household refrigerators and/or freezers	R-134a	1,430	0.00	0.60	0.00	1.00
Hotel	Other commercial A/C and heat pumps	R-410A	2,088	1.80	4.00	4.00	18.0
Hotel	Walk-in refrigerators and freezers	R-404A	3,922	< 0.005	7.50	7.50	20.0
Health Club	Other commercial A/C and heat pumps	R-410A	2,088	< 0.005	4.00	4.00	18.0

Health Club	Stand-alone retail refrigerators and freezers	R-134a	1,430	0.04	1.00	0.00	1.00
Place of Worship	Household refrigerators and/or freezers	R-134a	1,430	0.02	0.60	0.00	1.00
Place of Worship	Other commercial A/C and heat pumps	R-410A	2,088	< 0.005	4.00	4.00	18.0
Place of Worship	Stand-alone retail refrigerators and freezers	R-134a	1,430	< 0.005	1.00	0.00	1.00
Place of Worship	Walk-in refrigerators and freezers	R-404A	3,922	< 0.005	7.50	7.50	20.0
General Office Building	Household refrigerators and/or freezers	R-134a	1,430	0.02	0.60	0.00	1.00
General Office Building	Other commercial A/C and heat pumps	R-410A	2,088	< 0.005	4.00	4.00	18.0
High Turnover (Sit Down Restaurant)	Household refrigerators and/or freezers	R-134a	1,430	0.00	0.60	0.00	1.00
High Turnover (Sit Down Restaurant)	Other commercial A/C and heat pumps	R-410A	2,088	1.80	4.00	4.00	18.0
High Turnover (Sit Down Restaurant)	Walk-in refrigerators and freezers	R-404A	3,922	< 0.005	7.50	7.50	20.0
Recreational Swimming Pool	Other commercial A/C and heat pumps	R-410A	2,088	< 0.005	4.00	4.00	18.0
Recreational Swimming Pool	Stand-alone retail refrigerators and freezers	R-134a	1,430	0.04	1.00	0.00	1.00
Arena	Other commercial A/C and heat pumps	R-410A	2,088	< 0.005	4.00	4.00	18.0
Arena	Stand-alone retail refrigerators and freezers	R-134a	1,430	0.04	1.00	0.00	1.00
Arena	Walk-in refrigerators and freezers	R-404A	3,922	< 0.005	7.50	7.50	20.0

5.15. Operational Off-Road Equipment

5.15.1. Unmitigated

Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor

5.15.2. Mitigated

Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor

5.16. Stationary Sources

5.16.1. Emergency Generators and Fire Pumps

Equipment Type	Fuel Type	Number per Day	Hours per Day	Hours per Year	Horsepower	Load Factor

5.16.2. Process Boilers

Equipment Type	Fuel Type	Number	Boiler Rating (MMBtu/hr)	Daily Heat Input (MMBtu/day)	Annual Heat Input (MMBtu/yr)

5.17. User Defined

Equipment Type	Fuel Type

5.18. Vegetation

5.18.1. Land Use Change

5.18.1.1. Unmitigated

Vegetation Land Use Type	Vegetation Soil Type	Initial Acres	Final Acres

5.18.1.2. Mitigated

Vegetation Land Use Type	Vegetation Soil Type	Initial Acres	Final Acres

5.18.1. Biomass Cover Type

5.18.1.1. Unmitigated

Biomass Cover Type	Initial Acres	Final Acres

5.18.1.2. Mitigated

Biomass Cover Type	Initial Acres	Final Acres

5.18.2. Sequestration

5.18.2.1. Unmitigated

Tree Type	Number	Electricity Saved (kWh/year)	Natural Gas Saved (btu/year)

5.18.2.2. Mitigated

Tree Type	Number	Electricity Saved (kWh/year)	Natural Gas Saved (btu/year)

6. Climate Risk Detailed Report

6.1. Climate Risk Summary

Cal-Adapt midcentury 2040–2059 average projections for four hazards are reported below for your project location. These are under Representation Concentration Pathway (RCP) 8.5 which assumes GHG emissions will continue to rise strongly through 2050 and then plateau around 2100.

Climate Hazard	Result for Project Location	Unit
Temperature and Extreme Heat	29.8	annual days of extreme heat

Extreme Precipitation	13.3	annual days with precipitation above 20 mm
Sea Level Rise	—	meters of inundation depth
Wildfire	30.1	annual hectares burned

Temperature and Extreme Heat data are for grid cell in which your project are located. The projection is based on the 98th historical percentile of daily maximum/minimum temperatures from observed historical data (32 climate model ensemble from Cal-Adapt, 2040–2059 average under RCP 8.5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.
Extreme Precipitation data are for the grid cell in which your project are located. The threshold of 20 mm is equivalent to about ¾ an inch of rain, which would be light to moderate rainfall if received over a full day or heavy rain if received over a period of 2 to 4 hours. Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.
Sea Level Rise data are for the grid cell in which your project are located. The projections are from Radke et al. (2017), as reported in Cal-Adapt (Radke et al., 2017, CEC-500-2017-008), and consider inundation location and depth for the San Francisco Bay, the Sacramento-San Joaquin River Delta and California coast resulting different increments of sea level rise coupled with extreme storm events. Users may select from four scenarios to view the range in potential inundation depth for the grid cell. The four scenarios are: No rise, 0.5 meter, 1.0 meter, 1.41 meters
Wildfire data are for the grid cell in which your project are located. The projections are from UC Davis, as reported in Cal-Adapt (2040–2059 average under RCP 8.5), and consider historical data of climate, vegetation, population density, and large (> 400 ha) fire history. Users may select from four model simulations to view the range in potential wildfire probabilities for the grid cell. The four simulations make different assumptions about expected rainfall and temperature are: Warmer/drier (HadGEM2-ES), Cooler/wetter (CNRM-CM5), Average conditions (CanESM2), Range of different rainfall and temperature possibilities (MIROC5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.

6.2. Initial Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score	Vulnerability Score
Temperature and Extreme Heat	4	0	0	N/A
Extreme Precipitation	N/A	N/A	N/A	N/A
Sea Level Rise	1	0	0	N/A
Wildfire	1	0	0	N/A
Flooding	N/A	N/A	N/A	N/A
Drought	N/A	N/A	N/A	N/A
Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	0	0	0	N/A

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.
The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.
The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores do not include implementation of climate risk reduction measures.

6.3. Adjusted Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score	Vulnerability Score
Temperature and Extreme Heat	4	1	1	4
Extreme Precipitation	N/A	N/A	N/A	N/A
Sea Level Rise	1	1	1	2
Wildfire	1	1	1	2
Flooding	N/A	N/A	N/A	N/A
Drought	N/A	N/A	N/A	N/A
Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	1	1	1	2

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.
The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.
The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores include implementation of climate risk reduction measures.

6.4. Climate Risk Reduction Measures

7. Health and Equity Details

7.1. CalEnviroScreen 4.0 Scores

The maximum CalEnviroScreen score is 100. A high score (i.e., greater than 50) reflects a higher pollution burden compared to other census tracts in the state.

Indicator	Result for Project Census Tract
Exposure Indicators	—
AQ-Ozone	99.1
AQ-PM	15.3
AQ-DPM	2.59
Drinking Water	42.0
Lead Risk Housing	36.7
Pesticides	0.00

Toxic Releases	35.8
Traffic	3.75
Effect Indicators	—
CleanUp Sites	5.64
Groundwater	35.0
Haz Waste Facilities/Generators	0.00
Impaired Water Bodies	58.7
Solid Waste	87.2
Sensitive Population	—
Asthma	45.6
Cardio-vascular	75.6
Low Birth Weights	10.6
Socioeconomic Factor Indicators	—
Education	15.8
Housing	72.6
Linguistic	—
Poverty	53.9
Unemployment	—

7.2. Healthy Places Index Scores

The maximum Health Places Index score is 100. A high score (i.e., greater than 50) reflects healthier community conditions compared to other census tracts in the state.

Indicator	Result for Project Census Tract
Economic	—
Above Poverty	42.38419094
Employed	31.70794303
Median HI	23.4826126
Education	—

Bachelor's or higher	43.17977672
High school enrollment	100
Preschool enrollment	60.00256641
Transportation	—
Auto Access	40.33106634
Active commuting	1.039394328
Social	—
2-parent households	59.01450019
Voting	84.80687797
Neighborhood	—
Alcohol availability	79.49441807
Park access	81.35506224
Retail density	0.757089696
Supermarket access	2.399589375
Tree canopy	94.6875401
Housing	—
Homeownership	69.85756448
Housing habitability	33.99204414
Low-inc homeowner severe housing cost burden	18.91441037
Low-inc renter severe housing cost burden	42.409855
Uncrowded housing	86.21840113
Health Outcomes	—
Insured adults	85.29449506
Arthritis	0.0
Asthma ER Admissions	72.4
High Blood Pressure	0.0
Cancer (excluding skin)	0.0

Asthma	0.0
Coronary Heart Disease	0.0
Chronic Obstructive Pulmonary Disease	0.0
Diagnosed Diabetes	0.0
Life Expectancy at Birth	57.5
Cognitively Disabled	35.0
Physically Disabled	41.1
Heart Attack ER Admissions	74.1
Mental Health Not Good	0.0
Chronic Kidney Disease	0.0
Obesity	0.0
Pedestrian Injuries	77.9
Physical Health Not Good	0.0
Stroke	0.0
Health Risk Behaviors	—
Binge Drinking	0.0
Current Smoker	0.0
No Leisure Time for Physical Activity	0.0
Climate Change Exposures	—
Wildfire Risk	95.4
SLR Inundation Area	0.0
Children	3.5
Elderly	53.1
English Speaking	84.3
Foreign-born	0.6
Outdoor Workers	23.8
Climate Change Adaptive Capacity	—

Impervious Surface Cover	92.5
Traffic Density	7.9
Traffic Access	23.0
Other Indices	—
Hardship	40.2
Other Decision Support	—
2016 Voting	86.2

7.3. Overall Health & Equity Scores

Metric	Result for Project Census Tract
CalEnviroScreen 4.0 Score for Project Location (a)	34.0
Healthy Places Index Score for Project Location (b)	48.0
Project Located in a Designated Disadvantaged Community (Senate Bill 535)	No
Project Located in a Low-Income Community (Assembly Bill 1550)	Yes
Project Located in a Community Air Protection Program Community (Assembly Bill 617)	No

a: The maximum CalEnviroScreen score is 100. A high score (i.e., greater than 50) reflects a higher pollution burden compared to other census tracts in the state.
b: The maximum Health Places Index score is 100. A high score (i.e., greater than 50) reflects healthier community conditions compared to other census tracts in the state.

7.4. Health & Equity Measures

No Health & Equity Measures selected.

7.5. Evaluation Scorecard

Health & Equity Evaluation Scorecard not completed.

7.6. Health & Equity Custom Measures

No Health & Equity Custom Measures created.

8. User Changes to Default Data

Screen	Justification

Characteristics: Project Details	changed locational context from NA to Rural
Land Use	Land uses entered to match project description, hotel rooms = dorm buildings
Construction: Construction Phases	Construction phases updated to match applicant construction schedule
Operations: Vehicle Data	Updated vehicle trip data to match traffic study, 7-day average ADT: employee trips 50 per day, bus trips with 50 student campers per bus = 29, adults 21 trips per day. total ADT =100

Appendix D

Cultural Resources Report

PALEOWEST

CULTURAL RESOURCES INVESTIGATION OF THE HUME SOCAL CAMPGROUND PROJECT, SAN BERNARDINO COUNTY, CALIFORNIA

DRAFT REPORT

Roberta Thomas
Gena Severen
Michael Mirro
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4/14/2023



CULTURAL RESOURCES INVESTIGATION OF THE HUME SOCAL CAMPGROUND PROJECT, SAN BERNARDINO COUNTY, CALIFORNIA

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April 14, 2023

Keywords: Green Valley Lake Community; Hume SoCal Campground; San Bernardino County; Assessor's Parcel Numbers 0328-071-05; 0328-071-07; 0328-071-10; 0328-121-40; and 0328-121-42; P-36-002306 (prehistoric habitation); P-36-004887 (historical railroad grade); P-36-07049 (World Rim Drive); P-36-012233 (prehistoric isolated artifact); 22-0563-01H (historical abandoned pickup truck)

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MANAGEMENT SUMMARY

PaleoWest, LLC (PaleoWest) was contracted by Kimley-Horn to conduct a Phase I cultural resources investigation in support of the Hume SoCal Campground Project (Project) in the Green Valley Lake community, in San Bernardino County, California. The Project proposes the expansion of the current Hume SoCal Campground facilities to accommodate up to 2,854 total occupants. The Project requires compliance with the California Environmental Quality Act (CEQA); San Bernardino County (County) is the Lead Agency for the purposes of CEQA.

This report summarizes the methods and results of the cultural resources investigation of the Project area. This investigation included background research, communication with the Native American Heritage Commission (NAHC) and interested Native American tribal groups, development of appropriate background contexts, a survey of the Project area, resource evaluations, and preparation of this report. The purpose of the investigation was to determine the potential for the Project to cause adverse effects to cultural resources under CEQA.

A literature review and records search were conducted at the South Central Coastal Information Center of the California Historical Resources Information System. The records search indicated there are 26 previously recorded cultural resources within a one-mile radius of the Project area. Of these 26 resources, four are mapped within the Project area. The four resources within the Project area consist of one prehistoric site (P-36-002306), one prehistoric isolated artifact (P-36-012233), and two historic period built-environment resources (P-36-004887 and P-36-00749).

As part of the background research, PaleoWest requested a search of the Sacred Lands File (SLF) from the NAHC. Results of the SLF search indicate that there are no known Native American cultural resource(s) within the immediate vicinity of the Project area. The NAHC suggested contacting 23 individuals representing 20 Native American tribal groups to determine if they have additional information about Native American cultural resources in the Project area. All 23 recommended individuals were contacted as part of the outreach effort. To date, 10 responses has been received.

PaleoWest conducted a pedestrian survey of the proposed Project area on November 7 and 19, 2022. The survey found that the Project area is a modern, highly developed, campground facility surrounded by sub-alpine mountain forest environment. All four of the previously recorded cultural resources that were identified during the records search were attempted to be located during the survey. In addition, one newly recorded historic period archaeological resource, an abandoned 1940s Chevrolet pickup truck (22-0563-01H), was documented during the survey. As part of the current study, an evaluation for historical significance indicates that none of the resources identified within the Project area are recommended eligible for listing in the California Register of Historical Resources (CRHR). As such, no further cultural resource management is recommended for these resources.

Despite the overall general low sensitivity, due to the limited ground visibility and the presence of two previously recorded prehistoric cultural resources within the Project area, archaeological monitoring is recommended for initial ground-disturbing activities associated with development of the Project area. During this initial monitoring effort, the Project Archaeologist can determine if additional archaeological monitoring or cultural resource management efforts may be warranted.

In the event that potentially significant cultural resources are encountered during construction activities associated with the Project, a qualified archaeologist shall be obtained to assess the significance of the find in accordance with the criteria set forth in the CRHR. In addition, Health and Safety Code 7050.5, CEQA 15064.5(e), and Public Resources Code 5097.98 mandate the process to be followed in the unlikely event of an accidental discovery of any human remains in a location other than a dedicated cemetery.

1.0 INTRODUCTION

PaleoWest, LLC (PaleoWest) was contracted by Kimley-Horn to conduct a Phase I cultural resources investigation in support of the Hume SoCal Campground Project (Project) in the Green Valley Lake community, in San Bernardino County, California. The Project proposes the expansion of the current Hume SoCal Campground facilities to accommodate up to 2,854 total occupants. The Project requires compliance with the California Environmental Quality Act (CEQA); San Bernardino County (County) is the Lead Agency for the purposes of CEQA.

1.1 PROJECT LOCATION AND DESCRIPTION

The Project area is located within the Green Valley Lake Community in the mountain region of San Bernardino County. The Project is located immediately east of Green Valley Lake Road and approximately 0.4 miles northwest of State Route 18 (Figure 1-1). The Project would be developed on five parcels totaling approximately 251 acres including Assessor's Parcel Numbers 0328-071-05; 0328-071-07; 0328-071-10; 0328-121-40; and 0328-121-42. The Project is depicted in Sections 28 and 33, Township 2 North, Range 2 West, on the U.S. Geological Survey Keller Peak, CA 7.5' topographic quadrangle (Figure 1-2). The area is currently partially developed and includes the current Hume SoCal Campground facilities.

The Project proposes the expansion of the current Hume SoCal Campground facilities to accommodate up to 2,854 total occupants. This would be accomplished through the continued use of existing campground structures as well as the development of additional campground and recreational structures and uses within a 251-acre area of the Green Valley Lake community. Development of the Project site would be completed in five phases.

Phase 1 of the Project would involve the development of facilities to be used as a Junior High Camp. Proposed residential structures within the Phase 1 area include an expanded welcome center, private administration and guest speaker residencies, staff housing, and student dormitories. Phase 1 also includes the development of a gymnasium, bus parking, a snack shop, a chapel, converting an existing chapel to a small meeting space, an expansion to the existing dining hall, a maintenance building, an amphitheater, and restrooms. Outdoor recreation facilities include grass quads. Existing and proposed facilities within Phase 1 would accommodate up to 988 guest occupants.

Phase 2 of the Project would involve the development of facilities to be used as a High School Camp. Proposed residential structures within the Phase 2 area include staff housing buildings, and student dormitories. Phase 2 also includes the development of a large dining hall, gymnasium, a chapel, amphitheater, and restrooms. Outdoor recreation facilities include grass quads, a swimming pool, and a recreation pond. Existing and proposed facilities within Phase 2 would accommodate up to 1,096 occupants.

Phase 3 of the Project proposes the development of an Adult Lodge. Phase 3 would include the development of one adult lodge with included access road. Existing and proposed facilities within Phase 3 would accommodate up to 140 occupants.

Phase 4 of the Project would include the development of an Elementary Age Camp and associated facilities. Proposed residential structures within Phase 4 include semi-permanent insulated tent structures for students. Phase 4 also includes the development of restroom

facilities with showers and an amphitheater. Outdoor recreation facilities include grass quads, a dining canopy, a swimming pool, and a recreation pond. Existing and proposed facilities within Phase 4 would accommodate up to 500 occupants.

Phase 5 of the Project proposes the creation of a tent-based youth camp, Wildwood Camp. Residential structures proposed for this phase consist of semi-permanent insulated tent structures. Phase 5 also includes the development of restroom facilities with showers and an amphitheater. Outdoor recreation facilities include grass quads, a dining canopy, a swimming pool, and a recreation pond. Existing and proposed facilities within Phase 5 would accommodate up to 130 occupants.

1.2 REPORT ORGANIZATION

This report documents the results of a cultural resource investigation conducted for the proposed Project. Chapter 1 has introduced the project location and description. Chapter 2 states the regulatory context that should be considered for the Project. Chapter 3 synthesizes the natural and cultural setting of the Project area and surrounding region. The results of the cultural resource literature and records search conducted at the South Central Coastal Information Center (SCCIC), along with the Sacred Lands File (SLF) search and summary of the Native American communications are presented in Chapter 4. The field methods employed during this investigation and findings are outlined in Chapter 5 with management recommendation provided in Chapter 6. This is followed by bibliographic references and appendices.



Figure 1-1. Project Vicinity Map.

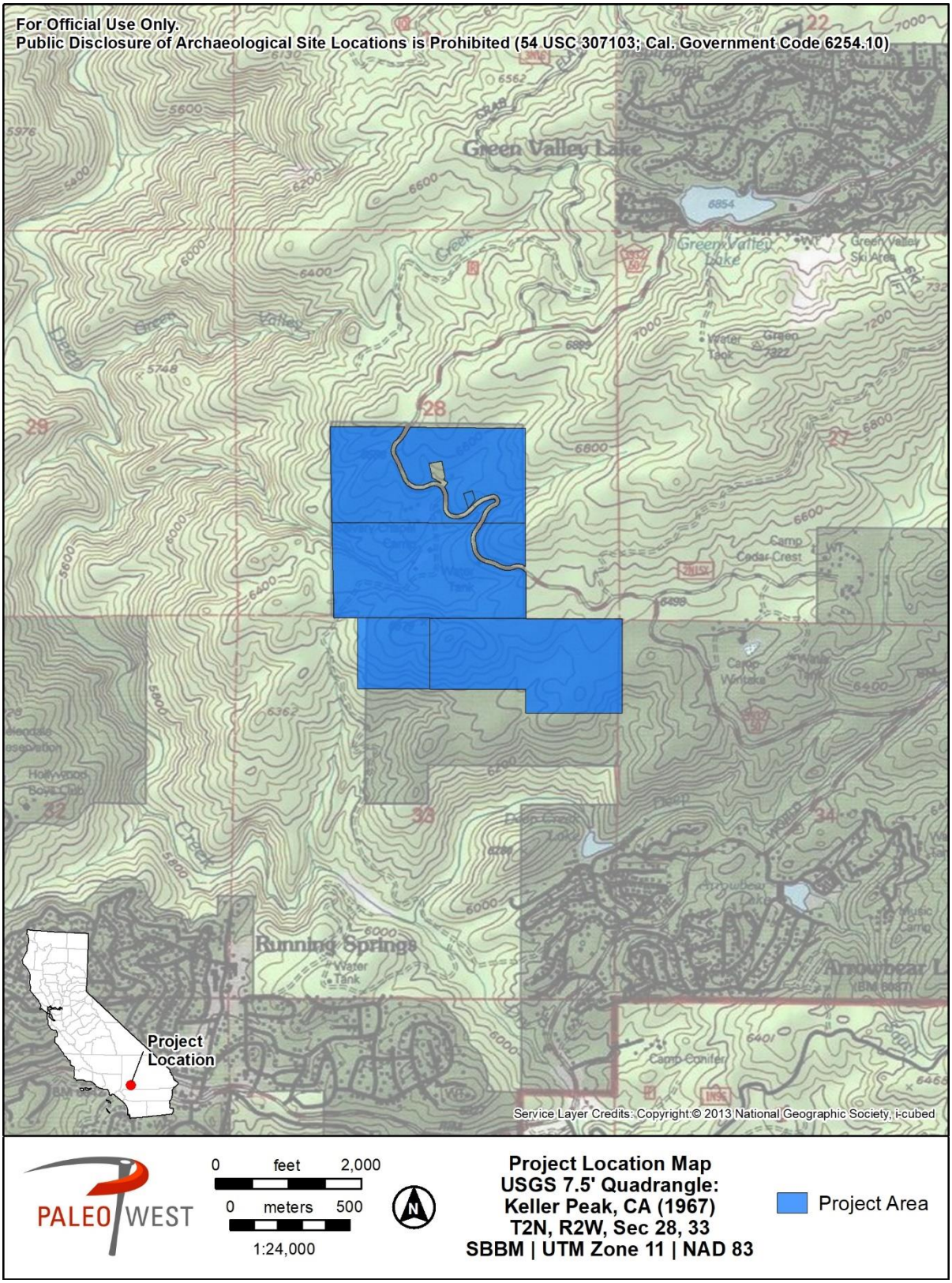


Figure 1-2. Project Location Map.

2.0 REGULATORY CONTEXT

2.1 CALIFORNIA ENVIRONMENTAL QUALITY ACT

The proposed Project is subject to compliance with CEQA, as amended. Compliance with CEQA statutes and guidelines requires both public and private projects with financing or approval from a public agency to assess a project's impact on cultural resources (Public Resources Code Section 21082, 21083.2 and 21084 and California Code of Regulations 10564.5). The first step in the process is to identify cultural resources that may be impacted by a project and then determine whether the resources are "historically significant" resources.

CEQA defines historically significant resources as "resources listed or eligible for listing in the California Register of Historical Resources (CRHR)" (Public Resources Code Section 5024.1). A cultural resource may be considered historically significant if the resource is 45 years old or older, possesses integrity of location, design, setting, materials, workmanship, feeling, and association.[1] In addition, it must meet at least one of the following criteria for listing on the CRHR:

1. Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;
2. Is associated with the lives of persons important in our past;
3. Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or,
4. Has yielded, or may be likely to yield, information important in prehistory or history (Public Resources Code Section 5024.1).

Cultural resources are buildings, sites, humanly modified landscapes, traditional cultural properties, structures, or objects that may have historical, architectural, cultural, or scientific importance. CEQA states that if a project will have a significant impact on important cultural resources, deemed "historically significant," then project alternatives and mitigation measures must be considered.

2.2 SAN BERNARDINO COUNTY GENERAL PLAN

The following information outlines the goals of the County's General Plan for cultural resources documented within the County as of October 27, 2020, when the Cultural Resources Element of the Plan was updated (County of San Bernardino 2022):

2.2.1 Goal CR-1 Tribal Cultural Resources

Tribal cultural resources that are preserved and celebrated out of respect for Native American beliefs and traditions.

1 The Office of Historic Preservation (OHP) guidelines recognize a 45-year-old criteria threshold for documenting and evaluating cultural resources (assumes a 5-year lag between resource identification and the date that planning decisions are made) (OHP 1995:2). The age threshold is an operational guideline and not specific to CEQA statutory or regulatory codes.

Policy CR-1.1 Tribal notification and coordination. We notify and coordinate with tribal representatives in accordance with state and federal laws to strengthen our working relationship with area tribes, avoid inadvertent discoveries of Native American archaeological sites and burials, assist with the treatment and disposition of inadvertent discoveries, and explore options of avoidance of cultural resources early in the planning process.

Policy CR-1.2 Tribal planning. We will collaborate with local tribes on countywide planning efforts and, as permitted or required, planning efforts initiated by local tribes.

Policy CR-1.3 Mitigation and avoidance. We consult with local tribes to establish appropriate project-specific mitigation measures and resource-specific treatment of potential cultural resources. We require project applicants to design projects to avoid known tribal cultural resources, whenever possible. If avoidance is not possible, we require appropriate mitigation to minimize project impacts on tribal cultural resources.

Policy CR-1.4 Resource monitoring. We encourage active participation by local tribes as monitors in surveys, testing, excavation, and grading phases of development projects with potential impacts on tribal resources.

2.2.2 Goal CR-2 Historic and Paleontological Resources

Historic resources (buildings, structures, or archaeological resources) and paleontological resources that are protected and preserved for their cultural importance to local communities as well as their research and educational potential.

Policy CR-2.1 National and state historic resources. We encourage the preservation of archaeological sites and structures of state or national significance in accordance with the Secretary of Interior's standards.

Policy CR-2.2 Local historic resources. We encourage property owners to maintain the historic integrity of resources on their property by (listed in order of preference): preservation, adaptive reuse, or memorialization.

Policy CR-2.3 Paleontological and archaeological resources. We strive to protect paleontological and archaeological resources from loss or destruction by requiring that new development include appropriate mitigation to preserve the quality and integrity of these resources. We require new development to avoid paleontological and archeological resources whenever possible. If avoidance is not possible, we require the salvage and preservation of paleontological and archeological resources.

Policy CR-2.4 Partnerships. We encourage partnerships to champion and financially support the preservation and restoration of historic sites, structures, and districts.

Policy CR-2.5 Public awareness and education. We increase public awareness and conduct education efforts about the unique historic, natural, tribal, and cultural resources in San Bernardino County through the County Museum and in collaboration with other entities.

3.0 SETTING

This chapter discusses the environmental setting, in addition to the prehistoric, ethnographic, and historical cultural settings of the Project area to provide context about the nature and significance of the cultural resources within the region. Topography, access to water, and natural resources are key factors in dictating human activities in the region during prehistoric, ethnographic, and historic periods. Therefore, before discussing human activities in the region, a summary of the natural environmental setting is summarized below.

3.1 ENVIRONMENTAL SETTING

The Project area is located in southern San Bernardino County within the San Bernardino Mountain range and the greater southern California Transverse Ranges. The San Bernardino Mountains separate the southern Mojave Desert from the inland valleys of southern California. The San Bernardino Mountains of the Transverse Ranges Geomorphic Province consists of a series east-west trending steep mountain ranges and valleys extending approximately 500 kilometers (km) from Santa Barbara County to Desert Center in Riverside County. The San Bernardino Mountains are 95 km long bounded by Cajon Pass west and Morongo Valley near Desert Hot Springs to the east. The majority of the mountains is underlain by Mesozoic granitic and volcanic rocks with a minority consisting of metamorphic rocks from the middle Proterozoic (Morton and Miller 2006). Quaternary deposits within the mountains are largely restricted to valleys and large canyons.

The northern part of the Project area is centered on a small upland valley while the southern area is situated on two peaks. The peaks are about 6,640 ft (feet) above mean sea level (amsl), the valley floor is between 6,440 to 6,520 ft amsl and the terrain overall, including the valley floor, is generally sloping. Two small drainages enter the valley from the northeast with channels incised into the valley floor as they transect the Project area and drain into Deep Creek about 1 km to the west.

Underlying bedrock consists of Cretaceous monzogranite of Keller Peak, which is a coarse grained biotite granite rock (Morton and Miller 2006). Outcrops are common throughout the Project area. Sediment accumulation and soil development within the Project area is limited to the bench and saddle areas in the southern part of the Project area. Other portions are dominated by eroding colluvial deposits moving downslope and into the creek system. The low gradient of the bench and saddle have permitted the formation of soils with thick organic surface horizons and gradual accumulation of sediments transported into the area by sheet wash and runoff (Soil Survey Staff 2023a,b).

The San Bernardino Mountains contain a large diversity of environmental zones, from high desert creosote scrub vegetation regime, to sub-alpine and alpine forest. The Project area is located within the sub-alpine zone on the northern watershed side of the mountains. The climate and environment of the region are typical of southern California's mountains, with temperatures in the region reaching over 85 degrees Fahrenheit in the summer and dipping to below freezing in the winter. The average annual precipitation is approximately 8-14 inches.

The dominant plant community in the vicinity of the Project area is sub-alpine forest: California Black Oak (*Quercus Kelloggi)*, California Live Oak (*Quercus agrifolia*), Coulter Pine (*Pinus*

coulteri), Sugar Pine (*Pinus lambertiana*), White Fir (*Abies concolor*), Manzanita (*Arctostaphylos manzanita*), Chamise (*Adenostoma fasciculatum*), and Willow (*Salix alba*). Geologic makeup of the project area is exclusively granite (bedrock) with quartz. Sediments observed in the Project area include a loamy silty sand in the top 6-8 inches (decomposed leaf matter) underlain by decomposed granite (bedrock or varying degrees of erosion). Topography of the Project area consists of mountains separated by drainages, with little flat terrain.

3.2 CULTURAL AND HISTORICAL SETTING

3.2.1 Prehistoric Setting

Prehistoric occupation of the inland valleys of Southern California can be divided into seven cultural periods: Paleoindian (circa [ca.] 12,000–9,500 years before present [B.P.]); Early Archaic (ca. 9,500–7,000 B.P.); Middle Archaic (ca. 7,000–4,000 B.P.); Late Archaic (ca. 4,000–1,500 B.P.); Saratoga Springs (ca. 1,500–750 B.P.); Late Prehistoric (ca. 750–410 B.P.); and Protohistoric (ca. 410–180 B.P.), which ended in the ethnographic period. Due to the nature of prehistoric archaeological sites identified within 0.5 mile of the Project area, the prehistoric cultural setting discussed below begins at the Late Archaic period.

These periods are structured based on the archaeological research conducted at Diamond Valley Lake as part of the Eastside Reservoir Project (ESRP), located approximately 30 miles southeast of the Project area (Goldberg et al. 2001; McDougall et al. 2003). For the most part, the prehistory of the inland valleys of Southern California that characterizes the Project area has been less thoroughly understood than that of the nearby desert and coastal regions. Prior to the ESRP cultural resources studies, no comprehensive synthesis had been developed specifically for the interior valley and mountain localities of cismontane Southern California that characterize the region. The following has been adapted from Horne and McDougall (2008).

Late Archaic Period (ca. 4000 to 1500 B.P.)

The Late Archaic period was a time of cultural intensification in Southern California. The beginning of the Late Archaic coincides with the Little Pluvial, a period of increased moisture in the region. Effective moisture continued to increase in the desert interior by approximately 3,600 B.P. and lasted throughout most of the Late Archaic. This ameliorated climate allowed for more extensive occupation of the region. By approximately 2,100 B.P., however, drying and warming increased, perhaps providing motivation for resource intensification. Archaeological site types that typify this time period include residential bases with large, diverse artifact assemblages, abundant faunal remains, and cultural features as well as temporary bases, temporary camps, and task-specific activity areas. In general, sites showing evidence of the most intensive use tend to be on range-front benches adjacent to permanent water sources, such as perennial springs or larger streams, while less intensively used locales occur either on upland benches or on the margins of active alluvial fans (Goldberg et al. 2001).

Data from Late Archaic component archaeological sites also suggest increased sedentism during this period, with a change to a semi-sedentary land-use and collection strategy. The profusion of features, and especially refuse deposits in Late Archaic components, suggests that seasonal encampments saw longer use and more frequent reuse than during the latter part of the preceding Middle Archaic period, with increasing moisture improving the conditions of Southern California after ca. 3,100 B.P. (Goldberg et al. 2001; Spaulding 2001). Drying and

warming after ca. 2,100 B.P. likely extracted a toll on expanding populations, influencing changes in resource procurement strategies, promoting economic diversification and resource intensification, and perhaps resulting in a permanent shift towards greater sedentism (Goldberg et al. 2001).

A technological innovation introduced during this period was the mortar and pestle. These tools were used for processing acorns and hard seeds, such as those derived from the mesquite pod. This development correlates with a warming and drying trend that began around 2,100 B.P., which appears to have resulted in resource intensification (Goldberg et al. 2001).

The subsistence base broadened during the Late Archaic period. The technological advancement of the mortar and pestle may indicate the use of acorns, an important storable subsistence resource. Hunting also presumably gained in importance. An abundance of broad, leaf-shaped blades and heavy, often stemmed or notched projectile points have been found in association with large numbers of terrestrial and aquatic mammal bones. Other characteristic features of this period include the appearance of bone and antler implements and the occasional use of asphaltum and steatite. Most chronological sequences for Southern California recognize the introduction of the bow and arrow by 1,500 B.P., marked by the appearance of small arrow points and arrow shaft straighteners.

Technologically, the artifact assemblage of this period was similar to that of the preceding Middle Archaic; new tools were added either as innovations or as "borrowed" cultural items. Diagnostic projectile points of this period are still fairly large (dart point size), but also include more refined notched (Elko), concave base (Humboldt), and small stemmed (Gypsum) forms (Warren 1984). Late in the period, Rose Spring arrow points appeared in the archaeological record in the deserts, reflecting the spread of the bow and arrow technology from the Great Basin and the Colorado River region. This projectile point type was not found at the ESRP study area, and there is no evidence suggesting that the bow and arrow had come into use at this time in the inland regions of Southern California.

Saratoga Springs Period (ca. 1500 to 750 B.P.)

In the early years of this period, cultural trends were, in large part, a continuation of the developments begun during the end of the Late Archaic Period. These include an increasing adaptation to the arid environment in the deserts and an increase in trade relations (Warren 1984). Warren (1984) indicates that there were four cultural spheres within the Mojave and Colorado deserts during the early part of this period, including a southern desert sphere influenced by Patayan (Hakatayan) cultures adjacent to the Colorado River. This southern cultural sphere includes the Colorado Desert and San Jacinto Mountains, but it is unclear whether this influence extended as far west as the Project area.

Lake Cahuilla is believed to have refilled the Coachella Valley around 1,450 B.P. and was the focus of cultural activities such as exploitation of fish, waterfowl, and wetland resources during this period. Desert people, speaking Shoshonean languages, may have moved into Southern California at this time, the so-called "Shoshonean Intrusion." Brown and Buff Ware pottery first appeared on the lower Colorado River at about 1,200 B.P. and started to diffuse across the California deserts by about 1,100 B.P. (Moratto 1984).

About 1,060 B.P., environmental conditions became notably warmer and drier. This period of intense drought, the Medieval Warm, extended throughout the Southwest (Stine 1994; Warren 1984), and led to the withdrawal of Native American populations from marginal desert areas.

Human occupation of the Lake Perris and the ESRP area declined during this time period with use focused on springs and other sources of water (Goldberg et al. 2001). In inland San Diego County, a similar period of reduced activity or abandonment during this time has been noted (Moratto 1984). Saratoga Springs-style projectile points, a large triangular form associated with use of the bow and arrow, began to appear in the ESRP area at this time. However, the sparse assemblages found from this period obscure the exact timing of the transformation from dart and atlatl to bow and arrow.

Late Prehistoric Period (ca. 750 to 400 B.P.)

The Medieval Warm extended into the Late Prehistoric Period, ending about 575 B.P. A period of lower temperatures and increased precipitation, known as the Little Ice Age, resulted in increased resource productivity in the inland region. Population increased in the region of the Project area during this wet interval. In the ESRP area, several small, but apparently semisedentary occupations, date to this time period. Cottonwood Triangular points began to appear in inland assemblages at this time, and Obsidian Butte obsidian became much more common (Goldberg et al., 2001).

By about 500 B.P., strong ethnic patterns developed among native populations in Southern California. This may reflect accelerated cultural change brought about by increased efficiency in cultural adaptation and diffusion of technology from the central coastal region of California and the southern Great Basin (Douglas 1981). During this period, Lake Cahuilla began to recede (Waters 1983) and the large Patayan populations occupying its shores began moving westward into areas such as Anza Borrego, Coyote Canyon, the Upper Coachella Valley, the Little San Bernardino Mountains, and the San Jacinto Plain (Wilke 1976). The final desiccation of Lake Cahuilla, which had occurred by approximately 400 B.P. (A.D. 1640), resulted in a population shift away from the lakebed into the Peninsular Ranges to the west, and the Colorado River regions to the east.

Protohistoric Period (ca. 410–180 B.P.)

The improved, dynamic conditions of the Little Ice Age continued throughout the Protohistoric period. Utilization of the bow and arrow promoted an increase in hunting efficiency while a renewed abundance of mortars and pestles indicates extensive exploitation of various hard nuts and berries. As a result of the increased resource utilization of the area, sedentism intensified with small, fully sedentary villages forming during the Protohistoric period. This is evidenced by sites containing deeper middens suggesting more permanent habitation. These would have been the villages, or rancherias, noted by the early nonnative explorers (True 1966). The cultural assemblage associated with the Protohistoric period included the introduction of locally manufactured ceramic vessels and ceramic smoking pipes, an abundance of imported Obsidian Butte obsidian, Cottonwood Triangular points, and Desert Side-notched points as well as the addition of European trade goods, such as glass trade beads, late in the period (Meighan 1954).

3.2.2 Ethnohistoric Setting

Archival research and published reports suggest the Project area is situated within the traditional use territory of the Serrano, specifically the Yuhaviatam clan of Serrano people, who have historically lived in the San Bernardino Mountains. The Serrano spoke language belonging to the Takic branch of the Shoshonean family, a part of the larger Uto-Aztecan language stock

(Geiger and Meighan 1976:19). In the following section, a brief synopsis of Serrano ethnography is presented. This information has been summarized from Bean and Smith (1978), Bean and Vane (2001), and McCawley (1996).

The Serrano belonged to nonpolitical, nonterritorial patrimoieties that governed marriage patterns as well as patrilineal clans and lineages. Each clan, "political-ritual-corporate units" composed of 3 to 10 lineages, owned a large territory in which each lineage owned a village site with specific resource areas. Clan lineages cooperated in defense, in large communal subsistence activities, and in performing rituals. Clans were apt to own land in the valley, foothill, and mountain areas, providing them with the resources of many different ecological niches.

In prehistoric times, Serrano shelters are believed to have been dome shaped; after contact they tended to be rectangular in shape. Serrano shelters were often made of brush, palm fronds, or arrowweed. Most of the Serrano domestic activities were performed outside the shelters within the shade of large, expansive *ramadas*.

The Serrano were, for the most part, hunting, collecting, harvesting, and protoagricultural people. As in most of California, acorns were a major staple, but the roots, leaves, seeds, and fruit of many other plants also were used. Fish, birds, insects, and large and small mammals were also available.

To gather and prepare these food resources, the Serrano had an extensive inventory of equipment including bows and arrows, traps, nets, disguises, blinds, spears, hooks and lines, poles for shaking down pine nuts and acorns, cactus pickers, seed beaters, digging sticks and weights, and pry bars. In addition, the Serrano had an extensive inventory of food processing equipment including hammers and anvils, mortars and pestles, manos and metates, winnowing shells and baskets, strainers, leaching baskets and bowls, knives (made of stone, bone, wood, and carrizo cane), bone saws, and drying racks made of wooden poles to dry fish.

Mountain tops, unusual rock formations, springs, and streams are held sacred to the Serrano, as are rock art sites and burial and cremation sites. In addition, various birds are revered as sacred beings of great power and sometimes were killed ritually and mourned in mortuary ceremonies similar to those for important individuals. As such, bird cremation sites are sacred.

3.3 HISTORICAL SETTING

3.3.1 County of San Bernardino

The earliest recorded historic-period use of the lands within the San Bernardino Valley began in the 1770s, following establishment of the Mission San Gabriel approximately 40 miles west of the Project site. The area was part of the mission lands and was primarily used for horse and cattle grazing. In 1842, the Lugo family was granted rights to approximately 37,000 acres of land in what was to become *Rancho San Bernardino*. The Project area lies at the southern boundary of the rancho.

During this time, the Yuhaaviatam Clan, who inhabited what is now known as the Project area, was first identified by Spanish explorers who used the term "Serrano" people to describe the indigenous population. "Serrano" is the Spanish term for "highlander." Due to colonization, the Tribe, which includes descendants of the Yuhaaviatam Clan, is known as the San Manuel Band

of Mission Indians as "San Manuel" came from the Yuhaaviatam's leader's Spanish name, Santos Manuel, and "Mission Indians" originated from the 21 missions that were established by the Spanish settlers in California between 1769 and 1823. Much of the Yuhaaviatam Clan was murdered or captured and placed at the San Gabriel Mission. During the 1700s and 1800s, much of the Yuhaaviatam Clan and many other indigenous people from nearby regions were used as labor for mission support and then for irrigation efforts to support the growing communities of settlers in Mentone, Redlands, and Loma Linda (San Manuel Band of Mission Indians 2023).

One of the earliest settlements established in the San Bernardino Valley was Politana, which was founded in 1842 by a group of settlers from New Mexico; the settlement lies southeast of the Project area on the east side of the Santa Ana River. Three years later, the community of Agua Mansa was established on the west side of the river. Farmsteads were laid out in both communities and an extensive irrigation system was constructed. Agua Mansa flourished until 1862, when a flood destroyed the settlement leaving only the cemetery and chapel. Although the cemetery remains, now known as the Agua Mansa Pioneer Cemetery, the chapel was abandoned in 1883 and is no longer extant.

Settlement in the San Bernardino Valley was also spurred by the establishment of a Mormon colony under the leadership of Amasa Lyman and Charles Rich. Brothers Lyman and Rich bought the San Bernardino Rancho from Jose and Maria Armenta Lugo in 1851. San Bernardino County was established on April 26, 1853 and ceded a portion of its territory to the formation of Riverside County in 1893. Two Mormon colonies were established on either side of the Santa Ana River. The Mormons who settled in the San Bernardino area raised livestock, planted crops, and established civic services such as a school and a post office. The majority of the Mormon settlers in San Bernardino returned to Salt Lake City; however, some remained. Agriculture and livestock continued to be the chief industries in San Bernardino County (Chasteen 2015).

General agriculture and livestock raising pursuits were quickly overshadowed by the citrus industry in Southern California beginning in the 1870s. The first orange trees in San Bernardino were planted by Anson Van Leuven in 1857. Citrus quickly became the largest industry in Southern California; including growing, packing, and shipping. Other industries included cattle ranching, growing sugar beets, and viticulture and enology. The burgeoning citrus industry led to a population boom and spurred the development of transcontinental railroads (Chasteen 2015).

Several companies were formed beginning in the mid- to late-1800s in an effort to develop San Bernardino County and Southern California in general. Beginning in 1887 in San Bernardino County, the Semi-Tropic Land and Water Company was formed. The company purchased 28,000 acres and the water rights to Lytle Creek, and laid out the townsites of Rosena (now known as Fontana), Rialto, Bloomington, and San Sevaine. The Semi-Tropic Land and Water Company, though ultimately unsuccessful in its attempts, initiated much of the early residential and commercial development in San Bernardino County. After the Semi-Tropic Land and Water Company failed, largely due to a nationwide economic depression, several other development companies, such as the Fontana Farms Company, were formed to purchase the Semi-Tropic Land and Water Company holdings and also to further development of towns and industries in the San Bernardino Valley. The establishment of transcontinental rail lines brought an influx of people and money to Southern California, which lead to a real estate boom (Chasteen 2015).

3.3.2 Green Valley Lake Community

The community of Green Valley Lake is unincorporated and lies north of Running Springs and and Arrow Bear. The community was developed after 1926 when the Green Valley Dam was constructed on Green Valley Creek creating the Green Valley Lake (Green Valley Lake 2013). While the dam was built on the creek, the Green Valley Lake is man-made, formed by the dam. The approximately 9-acre lake is fed solely by rain runoff, snow melt, and underground springs.

The San Bernardino Mountains and the Project area are historically known for logging and lumber activities, cattle ranching, hunting, and for providing passage for the Mormons into the San Bernadino Valley in the 1850s. As early as the 1880s, timber claims on the Green Valley area lands, near the Project, were made by the Highland Lumber Company. The lumber company went on to build the City Creek Toll Road, now Highway 330, which took lumber from the Molina Box Factory to make orange crates utilized heavily by the booming citrus industry in the San Bernardino Valley (Green Valley Lake 2013). The Project area became a part of the San Bernardino National Forest Reserve in 1893 and shortly after the Highland Lumber Company was sold to the Brookings Lumber Company. A number of the lumber haul roads and railroad grades that were used in the mid-1800s and early 1900s were eventually converted to the highways that now run through the mountain range. In the early half of the 20th century, the San Bernardino National Forest was created but much of the original homesteads in the area were kept private property. Today, the Green Valley Lake community remains as the "best kept secret on the mountain" and consists of a small population of about 300 people (Green Valley Lake 2013). The community attracts visitors looking to get away from the nearby Los Angeles, Orange, Riverside, and San Diego counties and take advantage of the outdoor activities the community provides.

4.0 CULTURAL RESOURCES INVENTORY

PaleoWest completed a literature review and records search at the SCCIC at California State University, Fullerton, on October 20, 2022. This inventory effort included the Project area and a 1-mile radius around the Project area, collectively termed the study area. The objective of this records search was to identify prehistoric or historic period cultural resources that have been previously recorded within the study area during prior cultural resource investigations.

As part of the cultural resources inventory, PaleoWest staff also examined historical maps and aerial images to characterize the developmental history of the Project area and surrounding area. A summary of the results of the record search and background research are provided below.

4.1 PREVIOUS CULTURAL RESOURCE INVESTIGATIONS

The records search results indicate that 50 previous investigations have been conducted and documented within the study area between 1976 and 2015 (Table 4-1). Of these 50 studies, only eight of these studies includes portions of the Project area. As a result of the records search, it appears that 100% of the Project area has been inventoried for cultural resources.

Table 4-1. Previous Cultural Investigations within the Project Study Area

Report No.	Year	Author(s)	Title
SB-00381	1976	Hearn, Joseph E.	Archaeological - Historical Resources Assessment of Arrowbear Area, Keller Peak Quad, NE 1/4 of NE 1/4, Sec. 4 T1N R2W
SB-00419	1976	Hearn, Joseph E. And Ruth D. Simpson	Archaeological - Historical Resources Assessment of Running Springs Domestic Water Improvement Facilities Project For 1976
SB-00516	1977	Brown, La Verna A.	Historical And Archaeological Reconnaissance: Lake Arrowhead Tracts 9972 and 9973
SB-00628	1978	Hearn, Joseph E.	Archaeological - Historical Resources Assessment of Tentative Tracts 10393 And 10394, Running Springs Area
SB-01151	1981	Smith, Gerald A.	Cultural Resources Assessment: Green Valley Lake Dredging Project
SB-01217	1981	Lerch, Michael K.	Cultural Resources Assessment for The Jack Rindal - Snow Valley, Inc., General Plan Amendment, Arrowbear Lake Area, San Bernardino County, California
SB-01814	1988	Wilke, Philip J.	Arrowbear Park County Water District
SB-02217	1990	White, Robert S.	An Archaeological Assessment of a 300 +/- Acre Parcel as Shown on TTM 14530 in Running Springs, San Bernardino County
SB-02226	1991	LSA Associates	An Archaeological Assessment of the Calvary Chapel Youth Camp
SB-02487	1991	Mckenna, Jeanette A.	A Phase II Archaeological Testing Program: Archaeological Testing of Sites CA-SBR-6782 and CA-SBR-6783, Running Springs/Rainbow Creek, Running Springs, San Bernardino County, California

Report No.	Year	Author(s)	Title
SB-02759	**1993**	**Dillon, Brian D.**	**An Archaeological Assessment of the Calvary Chapel Youth Camp, San Bernardino Mountains, San Bernardino County, California**
SB-02925	1991	Mlazovsky, Marilyn	Camp Awahanee Gas & Water Line
SB-02926	1991	Mlazovsky, Marilyn	Camp Awahanee Water Tank and Access Road
SB-02928	1993	Mlazovsky, Marilyn	I-96 Road Paving
SB-02931	1993	Mlazovsky, Marilyn	Yellow Stake Campsites Rehabilitation
SB-02936	1993	Mlazovsky, Marilyn	Picnic / Staging Area
SB-03331	2000	Duke, Curt	Cultural Resources Assessment for Pacbell Wireless Facility Cm496-01
SB-03336	1985	Reynolds, Robert E.	Dry Creek Firewood Sale
SB-04091	2000	Romani, Gwendolyn	Green Valley to Arrowbear Lake Areas Deteriorated Pole Replacement Project, SBNF, San Bernardino County, California
SB-04092	2001	Jensen, Peter M.	Proposed Sprint SB54XC483C Cell Tower Site, 31324 Green Valley Lake Road at Arrowbear Lake Within the Ponderosa Pines Christian Camp Facility, San Bernardino County, California
SB-04933	2004	Mirro, Michael	Cultural Resources Survey of 80 Acres on the Valley View/Cedar Pines Property for the Natural Resources Conservation Service
SB-04934	2006	Mirro, Michael	Cultural Resources Survey of 102.3 Acres within the AB165ULP Project Area for the Natural Resources Conservation Service
SB-04935	2006	Mirro, Michael	Cultural Resources Survey of Approximately 298 Acres within the Urban Large Parcel RS 181 Project Area for the Natural Resources Conservation Service
SB-04936	2005	Mirro, Michael	Cultural Resources Survey of 23 acres on the Herdrick, Seecombe, Simon Project Area for the Natural Resources Conservation Service
SB-04937	**2006**	**Mirro, Michael**	**Cultural Resources Survey of Approximately 90 Acres within the Calvary Chapel Extension Project Area for the Natural Resources Conservation Service**
SB-04942	**2005**	**Mirro, Michael**	**Update for the Cultural Resources Survey of Approximately 160 Acres within the Calvary Chapel Project Area for the Natural Resources Conservation Service**
SB-04945	2004	Mirro, Michael	Cultural Resources Survey of 115 Acres on the Ponderosa Pines Camp Property for the Natural Resources Conservation Service
SB-04946	2004	Mirro, Michael	Cultural Resources Survey of 126 Acres on the SBLMT and W. Sauey Property for the Natural Resources Conservation Service
SB-04947	2004	Mirro, Michael	Cultural Resources Survey of 11 Acres on the Frake Property for the Natural Resources Conservation Service
SB-04948	2004	Mirro, Michael	Cultural Resources Survey of 87 Acres on the Arrowbear Property for the Natural Resources Conservation Service

Report No.	Year	Author(s)	Title
SB-04949	2004	Mirro, Michael	Cultural Resources Survey of 71 Acres on the William Wyatt Property for the Natural Resources Conservation Service
SB-04954	2004	Mirro, Michael	Cultural Resources Survey of a 14-mile Segment of Highway 18 near Lake Arrowhead, California
SB-05530	2006	Mirro, Michael	Cultural Resources Survey of 300 Parcels Encompassing 126 Acres Within the Urban Large Parcel Rs 203 Project Area for the Natural Resources Conservation Service
SB-05907	**2007**	**Mirro, Michael**	**Cultural Resources Monitoring of State Route 18 in the San Bernardino Mountains for the National Resources Conservation Service**
SB-06470	**2009**	**Mason, Roger D. and Roger G. Hatheway**	**Cultural Resources Monitoring Report for the San Bernardino Mountains Disaster Debris Management Program, San Bernardino County, California**
SB-06482	2008	Kessler, John S.	Confidential Archaeological Letter for the Richardson Forest Fire Prevention Exemption, San Bernardino County, California
SB-06483	2009	Feller, P.L.	Confidential Archaeological Letter for the Pittman Forest Fire Prevention Exemption, San Bernardino County, California
SB-06485	2008	Kessler, John S.	Confidential Archaeological Letter for the Degraffenreid Forest Fire Prevention Exemption, San Bernardino, California
SB-06551	2008	Kessler, John S.	Confidential Archaeological Letter for the Running Springs East Fuel Modification Forest Fire Prevention Exemption, San Bernardino County, California
SB-06554	2010	Valasquez, S.	An Archaeological Survey Report for the FY 2009 Region Contract- Camp Helendade BSA Property Green Tree Thinning Unit, HFT RRU-218/ CRP 09-028, San Bernardino County, California
SB-06555	2010	Hatheway, Roger	Historical And Archaeological Survey of the Aguirre Conditional Use Permit (Cup) Property, County of San Bernardino, Vicinity of Arrowbear, California
SB-06761	**2005**	**Gardner, Jill K., Audry Williams, and Hubert Switalski**	**A Heritage Resources Inventory for the Hazard Tree Removal Project in the Mountain Top and Front Country Districts of the San Bernardino National Forest on Behalf of Southern California Edison Company**
SB-07114	2010	Hale, Sara, Chandler, Evelyn, and Mason, Roger	Cultural Resources Inventory of Two Proposed Pole Replacements in Twin Peaks and Arrowbear San Bernardino County, California
SB-07397	2011	Losekoot, Frank	A Confidential Archaeological Letter for the Headwaters Fuel Modification Projects for the County of San Bernardino, Hazardous Tree Removal Operations, San Bernardino County, California
SB-07399	2010	Feller, P.L.	Confidential Archaeological Letter for the Hoag Forest Fire Prevention Exemption, San Bernardino County, California

Report No.	Year	Author(s)	Title
SB-07668	2014	Dahdul, Miriam, Daniel Ballester, and Nina Gallardo	Phase I Archaeological Assessment: Running Spring Water District Lift Stations Replacement Project, Running Springs Area, San Bernardino County, California
SB-07753	2011	Losekoot, Frank	A Confidential Archaeological Letter for the Mountain Heli East Fuel Modification Project for the County of San Bernardino, San Bernardino County, California
SB-08015	2015	Bietz, Spencer and Natalie Brodie	Archaeological Survey Report for the Southern California Edison Company Replacement of One Deteriorated Power Pole on an Unnamed Circuit, TD 869544, San Bernardino National Forest, San Bernardino County, California
SB-08133	2015	Fulton, Phil	Cultural Resource Assessment Class I Inventory
SB-08140	2014	Bonner, Wayne H., Sarah A. Williams, Carrie D. Wills, and Kathleen A. Crawford	Cultural Resources Records Search and Site Visit Results for T-Mobile West, LLC Candidate IE24776C (SCE Calectric-Pepper & Highgrove-Calectric 115KV-121061E), Southeast Corner Macy and Walnut San Bernardino, San Bernardino County, California

Note: Cultural Resources Studies in **bold** are within the Project area.

4.2 CULTURAL RESOURCES REPORTED WITHIN ONE MILE OF PROJECT AREA

The records search indicated that twenty-six cultural resources have been previously documented within the study area (Table 4-2). Of these twenty-six resources, four lie within the Project area. The four resources within the Project area consist of one prehistoric site (P-36-002306), one prehistoric isolated artifact (P-36-012233), and two historic period structures/sites (P-36-004887 and P-36-00749).

Table 4-2. Previously Recorded Cultural Resources within the Project Study Area

Primary No.	Trinomial	Period	Type	Description
P-36-000947	CA-SBR-947	Prehistoric	Site	Running Springs Site; bedrock milling features along the stream bed
P-36-001487	CA-SBR-1487	Prehistoric	Site	Green Valley Creek Site; bedrock milling features
P-36-001488	CA-SBR-1488	Prehistoric	Site	Keller Peak Site; two milling stones
P-36-002306	**CA-SBR-2306**	**Prehistoric**	**Site**	**Camp Awahanee Site; single bedrock milling feature and small lithic scatter [No longer extant]**
P-36-004886	CA-SBR-4886	Prehistoric	Isolate	Single bedrock mortar
P-36-004887	**CA-SBR-4887H**	**Historic**	**Built**	**Brookings railroad grade**
P-36-006783	CA-SBR-6783/H	Multicomponent	Site	Single prehistoric battered stone and fire-affected rock, historic period refuse and gun shells
P-36-007049	**CA-SBR-7049H**	**Historic**	**Built**	**Rim of the World Drive**
P-36-007129	CA-SBR-7129	Prehistoric	Isolate	Single bedrock mortar

Primary No.	Trinomial	Period	Type	Description
P-36-007130	CA-SBR-7130H	Historic	Site	Narrow gauge logging railroad alignment built by Brookings Lumber Company
P-36-012233		**Prehistoric**	**Isolate**	**Single milling stone observed in two fragments**
P-36-012683		Historic	Site	Camp Cedar Crest; multiple structures
P-36-012684		Prehistoric	Site	Bedrock milling features
P-36-012685		Historic	Site	Stone fireplace and chimney
P-36-012686		Historic	Site	Square concrete platform
P-36-012783		Historic	Built	Well/cistern
P-36-012784		Historic	Built	Arrowbear "Red Light" District, presently Lumber Baron Pizza
P-36-012785	CA-SBR-15909H	Historic	Site	Remnants of single-family cabin
P-36-015013	CA-SBR-15908H	Historic	Built	Bridge 54-309, SR 18
P-36-015014		Historic	Built	Running Springs Logging Wheels Historical Monument
P-36-021123	CA-SBR-13639H	Historic	Site	Stone foundation wall and two large logs atop foundation
P-36-023996	CA-SBR-15181H	Historic	Built	Powers Lane
P-36-023997	CA-SBR-15182H	Historic	Built	Upper Boulder Road
P-36-060184		Prehistoric	Isolate	Single maul/hammer
P-36-060250		Prehistoric	Isolate	Single quartzite core
P1061-8		Prehistoric	Site	Bedrock milling feature

Note: Cultural resources in **bold** are within the Project area.

4.2.1 P-36-002306/CA-SBR-2306

This resource was documented in 1991 by P. Jertberg and J. Marmor as a dispersed scatter of flakes and one bone fragment on the surface outside of an enclosed campfire ring within the Calvary Chapel Youth Camp property. The 1991 site record also mentions a previously documented bedrock mortar that was observed during a previous visit; however, Jertberg and Marmor were not able to relocate the bedrock mortar. The scatter of artifacts was observed within a 50 by 50 meter area and consists of five flakes (siltstone, jasper, chert, metavolcanic, and metasedimentary), one possible biface fragment, and one bone fragment from a medium-sized mammal (Jertberg and Marmor 1991). Noted disturbances to the site included a dirt road on the south side of the site, a camping area, the campfire circle, and surface disturbances from campground activities.

The resource was visited and updated in 1992 by Brian D. Dillon who noted that the prehistoric site is located at the old natural amphitheater of Camp Ahwanee, used by the Boy Scouts and others in the 1920s. Dillon noted that previous documentation of the prehistoric archaeological site stated that the site consisted of a single bedrock mortar feature as well as a small surface

lithic scatter, but at the time of Dillon's documentation, neither has survived due to repeated disturbance of the area. Additionally, Dillon noted that an area of 40 by 50 meters had been bulldozed. As a result, this resource may no longer be extant.

4.2.2 P-36-004887/CA-SBR-4887H

This resource was documented in 1981 by M.K. Lerch as a historic period grade segment of narrow-gauge logging railroad built by Brookings Lumber Company to transport timber from where it was cut to their mill at Fredalba. Specifically, Lerch observed one railroad tie and many small railroad spikes that local residents have collected. At this time, Lerch noted that many portions of the railroad grade had been paved and are now modern roadways.

The resource as updated in 2004 by Hubert Switalski. Switalski documented the remains of a segment of the historic Brookings Railroad grade that is located east of Keller Peak Road and is 1.3 miles in length. It was noted that much of the segment of the railroad grade in 2004 is now known as Highway 18, Keller Peak Road, and other paved roads in the area. The segment that was recorded by Switalski had been reduced to a dirt trail.

4.2.3 P-36-007049/CA-SBR-7049H

This resource is known as Rim of the World Drive and has been documented multiple times. In 1997, David Maxwell documented a 400-foot-long segment of the road near the northwest boundary of Camp Harrold F. Whittle. Maxwell noted that this segment of the resource consisted of a dirt road with modified trees (possible markers). Maxwell also noted that since the late 1950s the road segment appeared to be used as a horse trail by the YMCA.

In 1991, Michael Lerch and Mark Swanson documented the original route of Rim of the World Drive from its dedication site (established on July 18, 1915) until it was bypassed to the south by construction of a newer high-gear road in 1930. Specifically, the resource was documented as running between US Forest Service Baylis Park Picnic Area on State Route (SR) 18 and Pinecrest Conference Center SR 189. Lerch and Swanson noted that the road segment was a graded asphalt-paved roadway and that stone entry monuments were present at the north end.

In 2001, John D. Goodman II documented a maintained Forest Service Road that spans approximately 6.5 miles and merges with two roads and follows the alignment of an early segment of the 1915-1923 Rim of the World Drive in Fawnskin Valley. Goodman noted that the segment of the Forest Service Road is part of Rim of the World Drive that was taken over by the County in 1911 and became a toll-free road.

In 2002, Daniel F. McCarthy and John D. Goodman II documented a series of earlier roads dating from the turn of the century that were designated as Rim of the World Drive in 1915. McCarthy and Goodman documented a series of roads that began at the mouth of Waterman Canyon going to the top of the crest of the San Bernardino Mountains and proceeded east through Crestline, Heaps Peak, Hunsaker Flat (Running Springs), Green Valley, north of Butler Peak to Fawnskin Valley, Big Bear Lake, Pine Lake (Big Bear Lake), Clark Grade past Clark Ranch across Bear Creek, Keller Creek down to the Santa Ana Canyon road where it exits the mouth of the Santa Ana Canyon. McCarthy and Goodman (2002) noted that the historic route of the Rim of the World Drive varied in width from between 16-20 feet and the original length was 101 miles long.

Michael W. Tuma updated a segment of Rim of the World Drive in 2005 that was within the Arrowhead Spring area. Tuma noted that there were no apparent changes to the condition of the highway within the segment that was revisited.

In 2010, ECORP archaeologists Elizabeth Denniston and Jenn Howard visited two segments of the historic-age alignments of Rim of the World Drive. The first segment overlapped the Santa Ana Road and ran through Manzanita Flats. The second segment was a small 150-foot-long segment that branched off 7 Pines Road. Denniston and Howard noted that in 2010, there were no changes to these segments of the resource and all previously recorded information appears accurate.

Joshua Trampier documented and updated segments of the Crest Route in 2011, which intersected SRs 18, 38, and 189 in the San Bernardino National Forest. Three road segments of the Crest Route, located on SR 18 at postmile 21.2, SR 38 at postmile 58.9, and again at SR 189 at postmile 1.7. The segments continued beyond the right-of-way, and only portions located within the right-of-way were documented. The first of three segments was noted as being almost completely lost due to vegetation overgrowth and consisted of an unpaved two-lane road. The second segment, called Rim of the World Drive, intersected with SR 38, and extended through a residential area and provided access to downtown Fawnskin. The third segment had been incorporated into the driveway/parking lot of the Mountain High Market and numerous asphalt patches were visible on the surface of the road.

Most recently, in 2012, Josh Smallwood visited and updated a 2,724-foot-long stretch of Rim of the World Drive (SR 18) that traverses through the town of Rimforest in the San Bernardino Mountains. Smallwood noted that the segment of the road appeared much the same way it did in the late 1940s according to historical maps and photographs of the area with little changes over the last 60 or 70 years. Smallwood also commented that the segment and Rim of the World of 1915-1916 and the 1920-1960 is significant to the development and growth of the San Bernardino Mountains region and, as such, appears eligible for CRHR under Criterion 1.

4.2.4 P-36-012233

This resource is a prehistoric isolated, fragmented, millingstone that was recorded by Sheets and Kile in 2005. Sheets and Kile noted that the core material of the millingstone was a fine-grained, pinkish, igneous rock that appeared to be fire-affected. The millingstone fragments appeared to be incorporated into a modern, one course tall assemblage of granite stones, stacked to augment a natural alcove created by a large granite boulder.

4.3 ADDITIONAL SOURCES CONSULTED

Additional sources consulted during the cultural resource literature and data review include the National Register of Historic Places (NRHP), the Office of Historic Preservation Archaeological Determinations of Eligibility, and the Office of Historic Preservation Built Environment Resources Directory (BERD). Of the four resources within the Project area, one resource (P-007049, Rim of the World Highway) is listed as eligible on the NRHP.

Historical maps and aerial images were also consulted as part of the background research. Maps that were examined as part of this effort include Redlands, California 15-minute (1899), Redlands, California 30-minute (1901), San Bernardino, California 1 by 2-degree (1953) USGS series maps (TopoView 2022). Historical aerial images were available on NETROnline dating to

1938, 1966, 1969, 1980, 1985, 1990, 2010, and 2020. Results of the archival review indicate that the Project area remained primarily undeveloped until sometime between 1938 and 1966 after the construction of structures and the development of clearings for camp complexes/resorts (NETROnline 2022; TopoView 2022). The Hume SoCal Campground, specifically, appears within the Project area on aerial photos as early as 1966. According to Hume Christian Camps (2020), at the turn of the century, Green Valley Lake Christian Camp was originally a logging camp called Lightning Dale. Much of the timber that came from the property was used to build crates for orange groves and provide wood for the town of San Bernardino. In the 1940s, the grounds were home to the Larry's Boys Camp and the springs and wells that are on-site today were built. The Boy Scouts of America then purchased the property and utilized the grounds for their camp from 1950-1980. The grounds were then purchased by the Calvary Chapel of Costa Mesa in the 1980s, and the Green Valley Lake Christian Camp broke ground in 1991. In 2020, the camp was released to the Hume Lake Christian Camps which now leases the property from Calvary Chapel of Costa Mesa.

A review of Bureau of Land Management (BLM) General Land Office (GLO) records indicated that a portion of the Project area is a part of a Sale-Cash Entry (3 Stat. 566) Patent issued to Walter E. Seely in 1889 (BLM 2022). The patent provided the sale of public lands in entire, half, quarter, and half quarter sections (less than 160 acres) after July 1, 1820. It appears that buildings and other structures constructed within the Project area that are associated with the Calvary Chapel Camp (now SoCal Hume) lie within the lands related to the patent.

4.4 BURIED SITE SENSITIVITY

Potential for buried prehistoric sites in this area is generally low. However, the layer of organic material consisting of leaf litter and pine needles would likely obscure most surface sites. Along the creeks, deposits are coarse and high-energy derived from flooding or debris flows. In the southern part of the Project is a bench with a small pond. This low gradient area may be depositional and there is potential for buried sites. As well, there is a saddle near the peaks in the southeast corner of the Project area that is also low gradient and may have the potential to gradually accumulate sediment through sheetwash and organic matter accumulation. Both areas have surfaces that are relatively stable and are only subject to limited amounts of erosion. As such, there is potential for shallowly buried prehistoric sites in these areas. Elsewhere in the Project area deposits are erosional and sites would be restricted to the surface beneath the organic leaf litter.

4.5 NATIVE AMERICAN COORDINATION

A SLF search request was sent to the NAHC for the Project on September 2, 2022. The objective of the search was to determine if the NAHC had any knowledge of Native American cultural resources (e.g., traditional use or gathering area and place of religious or sacred activity) within the immediate vicinity of the Project. A response from the NAHC was received on November 1, 2022, indicating that there are no known Native American cultural resource(s) within the immediate vicinity of the Project area. The NAHC suggested contacting 23 individuals representing 20 Native American tribal groups to find out if they have additional information about the Project area. Scoping letters were sent to all of the recommended tribal contacts via email or mail on November 14, 2022. Follow up calls were made on December 2,

2022. The SLF results letter, list of recommended contacts, a sample scoping letter, a contact/response matrix, and copies of correspondence are included in Appendix A.

To date, 10 responses has been received:

- A response from Lacy Padilla, the Agua Caliente Band of Cahuilla Indians' Tribal Historic Preservation Officer, was received via email on November 15, 2022. The response from Lacy Padilla states that the Tribal Historic preservation office's cultural registry did not reveal any Tribal Traditional Use Areas within the Project area. Therefore, the Tribe defers to other Tribes in the area.
- A response from Omar Aceves, the Tribal Operations Clerk for the Augustine Band of Cahuilla Mission Indians was received via email on November 23, 2022 with a letter from Victoria Martin, the Tribal Vice-Chairperson, attached. The letter from Victoria Martin stated that the Tribe is unaware at this time of specific cultural resources that may be affected by the Project. If resources are discovered during the development of the Project, Ms. Martin requests that the Tribal Office be contacted immediately for further evaluation.
- Response received via email on November 17, 2022 from BobbyRay Esparza, the Cultural Director for the Cahuilla Band of Indians, stating that the Project does lie within the Tribe's traditional land use area and that they believe that cultural resources may be unearthed during construction. Furthermore, the Tribe requests that a cultural monitor from the Cahuilla be present for all ground disturbing activities including grading, trenching, drilling, grubbing, and survey. Additionally, Mr. Esparza requests that a copy of the cultural report and all associated materials be provided to the Tribe.
- During a follow up phone call on December 2, 2022, Mr. Morales, the Chairman for the Gabrieleno/Tongva San Gabriel Band of Mission Indians, stated that the Project is within areas that are highly sensitive for cultural resources. He requests that a Native American Monitor and an Archaeological Monitor be present during all ground-disturbing activities. Additionally, Mr. Morales requests that he be contacted after the client has agreed to implementing Native American monitoring.
- During a follow up phone call on December 2, 2022, Mr. Paul Macarro, the Cultural Resources Coordinator for the Pechanga Band of Indians stated that the Tribe defers to more local Tribal Groups for this Project as it lies outside of their Traditional Use Area.
- A response from Jill McCormick, the Fort Yuma Quechan Tribe's Historic Preservation Officer, was received via email on November 15, 2022. The response from Jill McCormick states that the Tribe does not wish to comment on the Project and that they defer to more local Tribes and support their determinations on the matter.
- During a follow up phone call on December 2, 2022, staff from the Tribal Office for the Ramona Band of Cahuilla recommended that PaleoWest re-send the scoping letter again to Mr. Gomez's email address. A follow up email was sent to Mr. Gomez, the Environmental Coordinator for the Ramona Band of Cahuilla, on December 2, 2022.
- During a follow up phone call on December 2, 2022, Mr. Ontiveros, the Cultural Resources Department Representative for the Soboba Band of Luiseno Indians,

stated that the Tribe defers to the San Manuel Band of Mission Indians for the Project.

- An email response was received on December 9, 2022 from Deneen Pelton, the Cultural Resources Department Coordinator for the Rincon Band of Luiseno Indians, stating that the Project is not within the Band's specific Area of Historic Interest (AHI) and that they defer to more local Tribes for pertinent information regarding the Project area.
- An email response was received on December 20, 2022 from Bonnie Bryant, Cultural Resource Technician for the San Manuel Band of Mission Indians (SMBMI), stating that the Tribe is not aware of any Serrano cultural resources within the proposed Project area; however, the Project is of great interest to the Tribe. As such, the Tribe is interested in consulting with the CEQA lead agency during AB 52 consultation.

5.0 FIELD INVESTIGATION

5.1 FIELD METHODS

A cultural resources survey of the Project area was completed by PaleoWest archaeologists Evan Mills, M.A., RPA, and Jackson Case, B.A. on November 7, and 19, 2022. The survey methods followed standard archaeological methods consisting of parallel pedestrian transects spaced at 10–15-meter (m) (33–50-ft) intervals when allowed by terrain and vegetation. Field staff investigated all landforms (ridges, toes of slopes, broad low angle terrain) likely to contain archaeological materials. They also opportunistically examined any subsurface exposures, including rodent burrows and cut banks. The transects were navigated using georeferenced maps on iPad tablets and handheld global position system (GPS) units (Bad Elf GPS unit). Field iPads included all Project maps and relevant site forms. Field iPads with the ArcGIS web application were used to record and document resources.

The Project area was documented with digital photographs that included general views of the topography and vegetation density, and other images. A photograph log was maintained to include photograph number, date, orientation, photograph description, and comments. Mr. Mills and Mr. Case carefully inspected all areas likely to contain or exhibit sensitive cultural resources to ensure discovery and documentation of any visible, potentially significant cultural resources located within the Project area. Materials and features that could not be accurately dated in the field were also recorded. Historic period indicators include standing buildings, objects, structures such as sheds, or concentrations of materials at least 45 years in age, such as domestic refuse (e.g., glass bottles, ceramics, toys, buttons, and leather shoes), refuse from other pursuits such as agriculture (e.g., metal tanks, farm machinery parts, and horseshoes) or structural materials (e.g., nails, glass windowpanes, corrugated metal, wood posts or planks, metal pipes and fittings, and railroad spurs). Prehistoric site indicators include areas of darker soil with concentrations of ash, charcoal, animal bone (burned or unburned), shell, flaked stone, ground -stone, pottery, or even human bone.

All cultural materials and features of an eligible age were recorded during the surveys in accordance with OHP (1995) guidelines. When artifacts or features were found during the surveys, site boundaries were defined by surveying out in widening concentric circles until artifacts were no longer encountered. Artifacts or features that were within 30 m of each other, or that were clearly related, were combined into the same isolate or site. All resources were digitally recorded in the field directly into a FileMaker database on iPad.

All newly identified cultural resources were recorded on appropriate Department of Parks and Recreation (DPR) 5232 forms. In addition, previously recorded cultural resources were revisited during the survey. The current condition of each resource was assessed to determine if there had been any changes since the last recordation. All newly recorded sites were fully recorded and are described in this report.

5.2 FIELD RESULTS

The Project is located within the property of the existing Hume Socal Campground which extends on both east and west sides of Green Valley Lake Road. The Project area is located

within the sub-alpine zone of the San Bernardino Mountains (Figure 5-1). The area is characterized by undulating slopes that face predominately west, north, and south. The sediments within the Project area are loamy duff (decomposing leaf matter) at varying depths on the surface, underlain by decomposing granite bedrock. Alluvial sandy silts exist in the low lying flat or basin landforms. Vegetation is exclusively sub-alpine forest, White Fir, California Black Oak, California Live Oak, Coulter Pine, Sugar Pine, and willow in the wash bottoms. Understory vegetation consists of manzanita, chamise, and white thorn. Roughly 35-45% of the Project area is developed and include portions of the campground.

Approximately 85% of the Project area was intensively surveyed, the remaining 15% included steep slopes, areas of dense vegetation, and areas fully developed by the campground (building pads, paved roads, recreational facilities [pond, ice rink]). Ground visibility across the Project area was poor (0-10%). The forest environment contains an extensive amount of duff (pine needles and leaves) on top of the ground surface. Disturbances included all elements of the campground (roads, buildings, recreation areas, equipment storage yards). The forest surrounding the camp is largely undisturbed and remains undeveloped.

During the survey, an attempt was made to visit all four previously recorded resources mapped within the Project area. Additionally, one new historic period archaeological resource was identified during the survey effort. The campground features and elements are modern and do not meet the age requirement to be considered historic resources.



Figure 5-1. Project area overview, facing east

5.3 DOCUMENTED CULTURAL RESOURCE EVALUATIONS

Previously recorded resources within the Project area consisted of P-36-002306 (prehistoric habitation), P-36-004887 (historical railroad grade), P-36-07049 (historical road), and P-36-012233 (prehistoric isolated artifact) (Figure 5-2). As previously stated, one new historic period archaeological resource, an abandoned 1940s pickup truck (22-0563-01H), was documented within the Project area (Figure 5-2).

5.3.1 P-36-002306/CA-SBR-2306

This resource was reported as a prehistoric habitation location with a single bedrock mortar and a small lithic scatter. The site has been extensively disturbed by modern development of a recreation center in the same location as the prehistoric site. No signs of the lithic scatter were observed (Figure 5-3); however, the bedrock mortar was found in addition to a second bedrock mortar. The first mortar is 20 cm in diameter and 11 cm deep on a granite boulder that measures 98 x 60 x 23 cm. The second bedrock mortar is 17 cm in diameter and 11cm deep on a granitic boulder that measures 1.6 x 1 x 0.7 m. The site was updated with current location of the mortars and a statement on current conditions (See Appendix B for DPR update). The location of the bedrock mortars is the only data remaining at the site. The lithic scatter and any other associated artifacts or features were likely destroyed by the development of a baseball field in the immediate area.

CRHR Eligibility

CA-SBR-2306 is a special-use area likely related to subsistence-based processing activities, such as the milling of native seeds, plant fibers, and/or small mammals. The previously documented lithic scatter was not located and no surface artifacts were identified at the site during the revisit; the area has been extensively disturbed. The absence of surface artifacts suggest that the site lacks substantial buried cultural deposits.

Extant data indicate that the site does not meet the criteria for listing on the CRHR. CA-SBR-2306 is not associated with events that have made a significant contribution to the broad patterns of history and therefore is recommended as not eligible for listing under Criterion 1. It is not associated with the lives of persons significant in the past and therefore is recommended as not eligible for listing under Criterion 2. It also does not embody the distinctive characteristics of a type, period, or method of construction, and thus is recommended not eligible under Criterion 3. The site does not contain temporally diagnostic artifacts or any materials suitable for chronometric dating. The lack of chronological control and absence of artifacts mean that temporal and cultural components cannot be defined at CA-SBR-2306. Thus, while the site contains data on settlement organization and land use and subsistence practices, these data lack potential to contribute any new information important to regional prehistory or history. Furthermore, it is unlikely that additional investigations at the site will produce sufficient quantities of artifacts from controlled stratigraphic contexts to overcome these deficiencies. For these reasons, the site is recommended not eligible under CRHR Criterion 4.

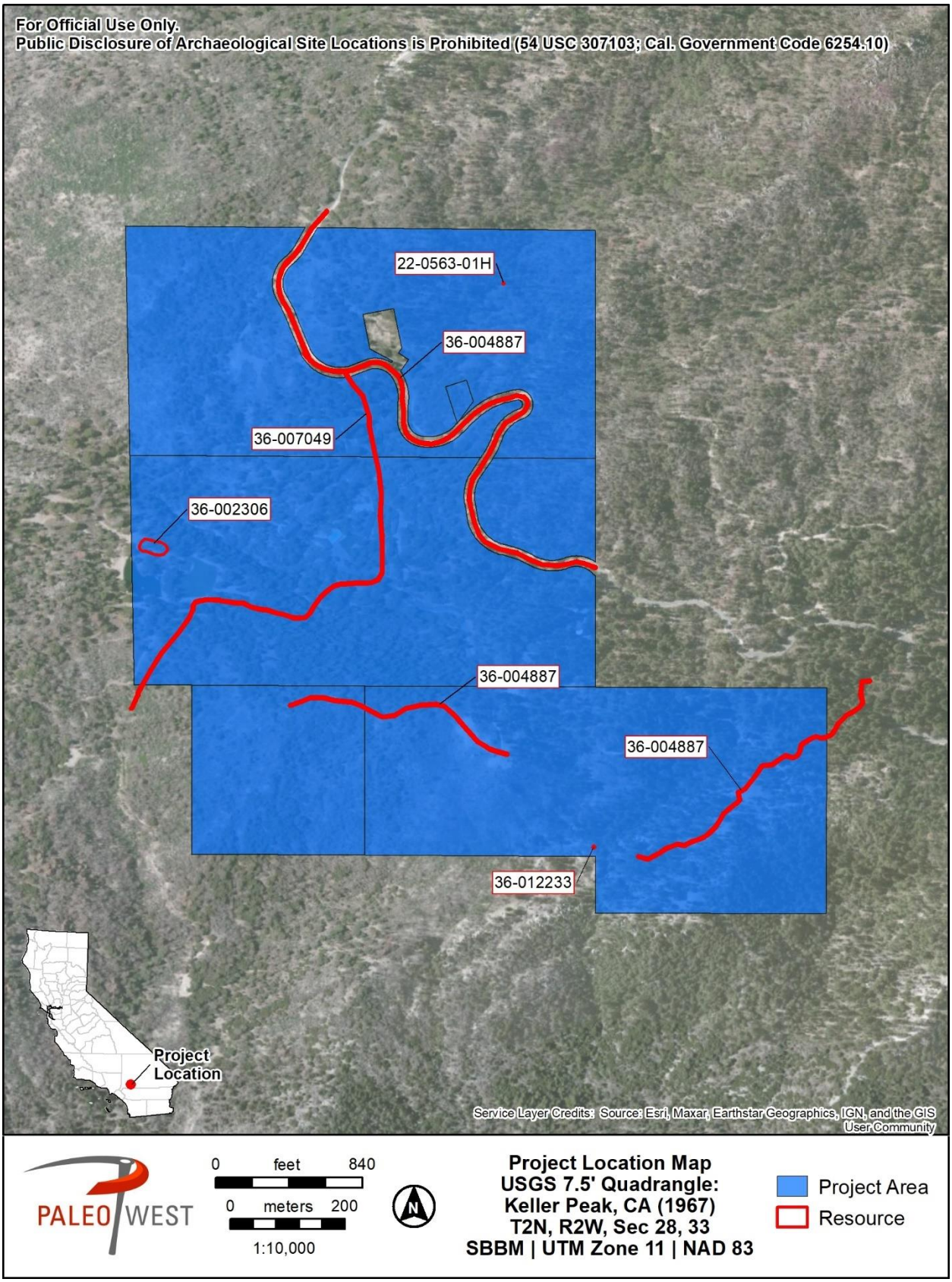


Figure 5-2. Resource Location Map



Figure 5-3. CA-SBR-2306 Feature 2 facing former site location (baseball field), facing east-southeast

5.3.2 36-004887/CA-SBR-4887H

This resource includes two segments of the Brookings Railroad grade plotted within the Project area. One of the segments (northern) is the current alignment of Green Valley Lake Road. The road is in use and the primary access route to the community of Green Valley Lake, northeast of the Project area (Figure 5-4). Approximately 70% of the mapped alignment of the second segment (southern) was located within the Project area. The previous plotted alignment was slightly askew based on the findings of the current field effort and, as such, a more accurate alignment was plotted with sub-meter accurate GPS and an update to the record was prepared (See Appendix B for DPR update). The southern segment is faint in most of the visible sections and some segments have been used by the camp (Figure 5-5). Additional segments of the railroad grade exist outside the Project area and were not investigated as part of the Project.

CRHR Eligibility

The Brookings Railroad was constructed in the early 1900s and was reportedly in use in the San Bernardino Mountains between 1908 and 1913 by the Brookings Lumber Company (Lerch 1981). During the late 1800s and early 1900s the population of the San Bernardino valley was rapidly increasing, creating a fervent need for lumber to be used to construct homes, stores, church, civic buildings, etc. In response to this need, John E. Brookings, with financial backing from his cousin, Robert S. Brookings, formed the Brookings Lumber Company and began purchasing the assets of other struggling lumber companies, crippled by the nationwide economic depression of 1892-1893, in the area (RWHS 2023). In order to transport logs from

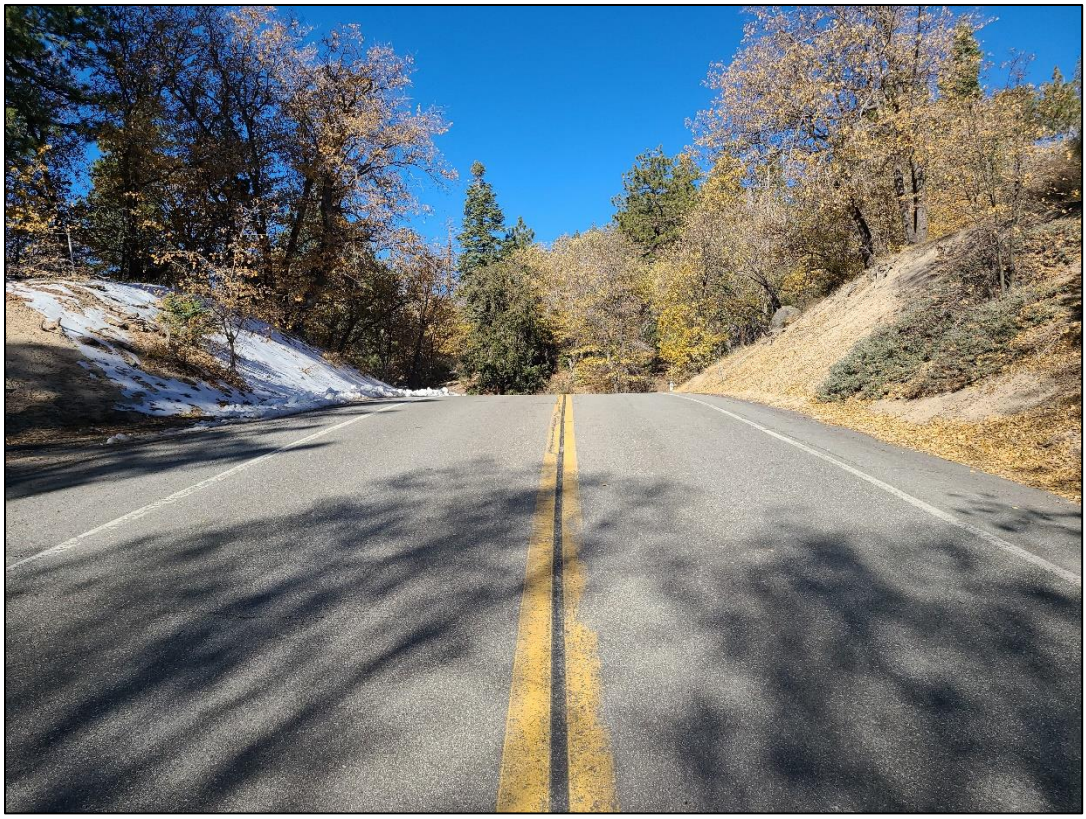


Figure 5-4. CA-SBR-4887H northern end of Project area, facing west-northwest



Figure 5-5. CA-SBR-4887H southern segment, facing west

the surrounding timberlands within the mountains to their newly renovated sawmill southwest of present-day Running Springs (formerly known as Fredalba), the Brookings Railroad was constructed. It was reportedly the first and only logging railroad in the San Bernardino Mountains and was constructed with second-hand equipment by temporary Sante Fe Railroad laborers as well as lumbermen with little or no railroad construction experience (trainboard.com 2023). Steep grades prevented the use of the railroad all the way to the base of the mountains confining the railroad operations in the timberlands. "As forests were cleared, the railroad was extended into the next suitable logging area. About six miles of track were laid throughout the Brookings timberlands" (trainboard.com 2023). By 1913 the timber stands that were leased began to run dry (RWHS 2023). At that time, the company started looking for new lumber locations along the coastline and workers began to leave to the area in search of new prospects.

A review of the available data indicates that the two segments of Brookings Railroad grade within the Project area do not meet the criteria for listing on the CRHR. While CA-SBR-4887H is associated with the expansion and construction of areas within the San Bernardino valley, it is associated with one of many lumber companies in Southern California and was not solely vital to the expansion of the area. Additionally, John F. Brookings is one of many lumbermen throughout the country and the state that moved from place to place looking for areas to continue their lumber interests. As such, the two segments of the resources within the Project area do not appear to be eligible for listing on the CRHR under Criterion 1 and 2 and are recommended not eligible for listing. The remnants of the two railroad segments were constructed with second-hand materials by temporary laborers and lumbermen and do not embody the distinctive characteristics of a type, period, or method of construction, and thus is recommended not eligible under Criterion 3. Finally, it is unlikely that these two segments have the potential to broaden our understanding of 20th century railroad construction or lumber activities, or to the history of the San Bernardino Mountains, California, or the United States. Therefore, these segments of CA-SBR-4887H do not appear eligible for the CRHR under Criterion 4 and are recommended not eligible for listing.

5.3.3 36-007049/CA-SBR-7049H

A small segment of the historic Rim of the World Drive (P-36-007049/CA-SBR-7049H) is located within the Project area. The resource extends throughout the San Bernardino Mountains. The segment located within the Project area is currently in use as one of the main roads running North/South through the campground. The plotted alignment of the resource was confirmed in the field and does not appear to have been altered from the previous recording event. This segment of road is paved, in use, and no associated artifacts or evidence of historic period use were observed (Figure 5-6) (See Appendix B for DPR update). This resource extends beyond the Project area in many locations.

CRHR Eligibility

The Rim of the World Drive, dedicated in 1915, has been evaluated and recommended eligible for listing on the CRHR under Criterion 1. The entire length of Rim of the World Drive through the San Bernardino Mountains, including this segment within the Project area, was mapped by the San Bernardino National Forest in 2001. The mapping was completed as part of the recordation and evaluation of the entire 1915–1916 route from the mouth of Waterman Canyon,



Figure 5-6. CA-SBR-7049H northern Project area, facing south-southwest

through the mountains, and down to the mouth of Santa Ana Canyon (McCarthy and Goodman 2001). McCarthy and Goodman (2001) indicated that the Rim of the World Drive was a significant road in Southern California history because it opened the mountain areas to increased recreational use and development. However, McCarthy and Goodman did not recommend the road eligible for listing on either the CRHR or the NRHP because they stated that over the last several decades, the original alignment has been realigned, rerouted, and resurfaced and does not appear to retain sufficient integrity. A later examination of the eligibility of the road, conducted by Josh Smallwood, focused on the significance the road has had on the area since the 1920s (Smallwood 2012).

Rim of the World Drive evolved over the early decades of the 20th century to accommodate the expansion and growth of development in the region and was designated State Highway 18 by the 1920s. Smallwood (2012) recommended the resource eligible for the CRHR under Criterion 1 because of the "significant role it played in the development and growth of the San Bernardino Mountain region." Additionally, Smallwood argued that despite the various road modifications and improvements in the 1920s and early 1930s, the alignment, design, materials, construction, and appearance have changed very little since that time. As such, the road retains sufficient integrity to relate its significance dating to the period of 1933–1960s. However, Smallwood did not complete survey of the entire length of Rim of the World Drive, but instead focused his evaluation on a 2,724-ft-long segment in the community of Rimforest stating that segment of road retains sufficient historical integrity to relate the period of significance, 1933-1960s, and is eligible for the CRHR under Criterion 1. Smallwood (2012) indicated the segment located within the community of Rimforest does not appear to be eligible under any of the other criteria of the CRHR, as it is not directly associated with an

important historical figure (Criterion 2), it does not exhibit any architectural or engineering merits (Criterion 3), and it does not have the data potential to yield information important to the study of our local, state, or national history (Criterion 4).

While the larger resource and, specifically, the portion evaluated by Smallwood in 2012 appears to be eligible for listing on the CRHR under Criterion 1 and retains sufficient historic integrity, the segment of the road within the current Project area does not appear to retain that same historic integrity. The segment of road within the Project area is in regular use by the campground and has been subject to modern maintenance and improvements resulting in the loss of integrity. The road appears well maintained and does not exhibit any historical significance outside of the documented alignment. Additionally, as Smallwood stated the road is not directly associated with an important historical figure, it does not exhibit any architectural or engineering merits, and it does not have the data potential to yield information important to the study of the San Bernardino Mountains, California, or the United States. As such, the segment of the resource within the current Project area does not appear meet the criteria for listing on the CRHR.

5.3.4 36-012233

This resource was documented as a prehistoric isolated metate. The location of the isolated artifact was visited and thoroughly inspected; however, the metate was not located. The isolated artifact may have been destroyed or transported to an unknown location (See Appendix B for DPR update). As this resource appears to be no longer extant, it was not evaluated for listing on the CRHR; however, isolated artifacts are typically not recommended eligible for listing on the CRHR due to lack of data potential.

5.3.5 22-0563-01H

The newly identified resource within the Project area consists of a 1940s Chevrolet pickup truck that was abandoned in the forest. The truck may have been brought to the location at any point over the past 80 years. There are no other historic constituents in the vicinity and the campground has been using the area for archery. The truck is stripped, has no visible Vehicle Identification Number or license plate; however, there is noted graffiti on it, and a faint "STONE and BRICK WORK" on the bed of the truck (See Appendix B for DPR update).

CRHR Eligibility

Very little information can be discerned about this abandoned resource; however, a review of the available data indicates that the resource does not meet the criteria for listing on the CRHR. The abandoned truck cannot be associated with events that have made a significant contribution to the broad patterns of history and therefore is recommended not eligible for listing under Criterion 1. It does not appear to be associated with the lives of persons significant in the past and therefore is recommended as not eligible for listing under Criterion 2. It also does not embody the distinctive characteristics of a type, period, or method of construction, and thus is recommended not eligible under Criterion 3. Finally, it is unlikely that this resource has the potential to broaden our understanding of the 20th century automotive industry, or to the history of the San Bernardino Mountains, California, or the United States. Therefore, the resource is recommended not eligible for the CRHR under Criterion 4.



Figure 5-7. 22-0563-01H, abandoned pickup truck, facing southeast

6.0 FINDINGS AND RECOMMENDATIONS

Kimley-Horn retained PaleoWest to complete a cultural resource assessment of the proposed Project near the community of Green Valley Lake in San Bernardino County, California. The assessment included an SCCIC cultural resources records search, Native American outreach, archival research, a field survey, and resource evaluations.

The results of the cultural resource assessment identified two prehistoric resources, and three historic period cultural resources in the Project area. The SLF search returned negative results for the Project area; however, during outreach to local Native American tribes, both the Cahuilla Band of Mission Indians and the Gabrieleno/Tongva San Gabriel Band of Mission Indians indicated the area may be sensitive for cultural resources and requested a Native American monitor and an archaeological monitor be present during Project implementation.

None of the previously recorded resources documented within the Project area meet the criteria for listing on the CRHR. One of the resources, P- 36-012233 (an isolated metate), was not located during the survey effort and is believed to have been destroyed or moved to an unknown location. No additional cultural resource management is recommended for these resources.

The potential for buried prehistoric sites in the Project area is generally low and no new prehistoric resources were identified during the survey; however, the layer of organic material covering the majority of the ground surface would likely obscure most surface sites. Additionally, there are two areas of low gradient in the Project area, including a bench with a small pond in the southern part of the Project area and a saddle near the peak in the southeast corner of the Project. Both areas have surfaces that are relatively stable and are only subject to limited amounts of erosion. As such, there is potential for shallowly buried prehistoric sites in these areas. Elsewhere in the Project deposits are erosional and sites would be restricted to the surface beneath the organic leaf litter. Despite the overall general low sensitivity, due to the limited ground visibility and the presence of two previously recorded prehistoric cultural resources within the Project area, archaeological monitoring would be recommended for initial ground-disturbing activities associated with development of the Project area. During this initial monitoring effort, the Project Archaeologist can determine if additional archaeological monitoring or cultural resource management efforts may be warranted.

In the event that potentially significant cultural materials are encountered during Project-related ground-disturbing activities, all work should be halted in the vicinity of the discovery until a qualified archaeologist can visit the site of discovery and assess the significance of the archaeological resource. In addition, Health and Safety Code 7050.5, CEQA 15064.5(e), and Public Resources Code 5097.98 mandate the process to be followed in the unlikely event of an accidental discovery of any human remains in a location other than a dedicated cemetery. Finally, should additional actions be proposed outside the currently defined Project area that have the potential for additional subsurface disturbance, further cultural resource management may be required.

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Appendix A.
Native American Coordination

NATIVE AMERICAN HERITAGE COMMISSION

CHAIRPERSON
Laura Miranda
Luiseño

VICE CHAIRPERSON
Reginald Pagaling
Chumash

SECRETARY
Sara Dutschke
Miwok

COMMISSIONER
Isaac Bojorquez
Ohlone-Costanoan

COMMISSIONER
Buffy McQuillen
Yokayo Pomo, Yuki, Nomlaki

COMMISSIONER
Wayne Nelson
Luiseño

COMMISSIONER
Stanley Rodriguez
Kumeyaay

COMMISSIONER
[Vacant]

COMMISSIONER
[**Vacant**]

EXECUTIVE SECRETARY
Raymond C. Hitchcock
Miwok/Nisenan

NAHC HEADQUARTERS
1550 Harbor Boulevard
Suite 100
West Sacramento,
California 95691
(916) 373-3710
nahc@nahc.ca.gov
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November 1, 2022

Robbie Thomas
PaleoWest Archaeology

Via Email to: rthomas@paleowest.com

Re: SoCal Hume Phase I Project, San Bernardino County

Dear Mr. Thomas:

A record search of the Native American Heritage Commission (NAHC) Sacred Lands File (SLF) was completed for the information you have submitted for the above referenced project. The results were negative. However, the absence of specific site information in the SLF does not indicate the absence of cultural resources in any project area. Other sources of cultural resources should also be contacted for information regarding known and recorded sites.

Attached is a list of Native American tribes who may also have knowledge of cultural resources in the project area. This list should provide a starting place in locating areas of potential adverse impact within the proposed project area. I suggest you contact all of those indicated; if they cannot supply information, they might recommend others with specific knowledge. By contacting all those listed, your organization will be better able to respond to claims of failure to consult with the appropriate tribe. If a response has not been received within two weeks of notification, the Commission requests that you follow-up with a telephone call or email to ensure that the project information has been received.

If you receive notification of change of addresses and phone numbers from tribes, please notify me. With your assistance, we can assure that our lists contain current information.

If you have any questions or need additional information, please contact me at my email address: Cameron.vela@nahc.ca.gov.

Sincerely,

Cameron Vela

Cameron Vela
Cultural Resources Analyst

Attachment

Native American Heritage Commission
Native American Contact List
San Bernardino County
11/1/2022

Agua Caliente Band of Cahuilla Indians
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Palm Springs, CA, 92264
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Agua Caliente Band of Cahuilla Indians
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Augustine Band of Cahuilla Mission Indians
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Cabazon Band of Mission Indians
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Cahuilla Band of Indians
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Los Coyotes Band of Cahuilla and Cupeño Indians
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This list is current only as of the date of this document. Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resource Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources assessment for the proposed SoCal Hume Phase I Project, San Bernardino County.

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This list is only applicable for contacting local Native Americans with regard to cultural resources assessment for the proposed SoCal Hume Phase I Project, San Bernardino County.

Native American Heritage Commission
Native American Contact List
San Bernardino County
11/1/2022

San Manuel Band of Mission Indians
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Torres-Martinez Desert Cahuilla Indians
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This list is current only as of the date of this document. Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resource Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources assessment for the proposed SoCal Hume Phase I Project, San Bernardino County.

PALEOWEST

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LOS ANGELES COUNTY
517 S. Ivy Avenue
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November 14, 2022

Charles Alvarez
Gabrielino-Tongva Tribe
23454 Vanowen Street
West Hills, CA, 91307
Transmitted via email to roadkingcharles@aol.com

RE: Cultural Resource Investigation for the Hume SoCal Phase I Project, San Bernardino County, California

Dear Mr. Alvarez,

On behalf of Kimley-Horn, PaleoWest, LLC (PaleoWest) is conducting a cultural resource investigation in support of the Hume SoCal Phase I Project (Project). The Project is situated on approximately 251 acres of land and includes Assessor's Parcel Numbers (APNs) 0328-071-05; -07; -10; -40; and -42 within the Green Valley Lake community in San Bernardino County (County) (see attached map). PaleoWest understands this Project is subject to compliance with the California Environmental Quality Act (CEQA) and the County will be the lead CEQA agency.

A cultural resource records search and literature review was completed for the Project at the South Central Coastal Information Center at California State University, Fullerton. The records search indicated that there are four cultural resources that have been previously documented within the Project area. These four resources include two historic period structures and two prehistoric archaeological resources. The prehistoric resources consist of a bedrock milling feature with a lithic scatter and an isolated millingstone that has been fractured into two fragments. The resource consisting of the bedrock milling feature and lithic scatter are noted to no longer be extant due to repeated disturbance to the area. The historic period resources consist of the Brookings Railroad Grade and the Rim of the World Drive. A pedestrian survey of the Project area is currently being conducted by PaleoWest archaeologists.

As part of the cultural resource investigation, PaleoWest requested a search of the Native American Heritage Commission's (NAHC's) Sacred Lands File. The NAHC responded on November 1, 2022 stating that that no Native American cultural resources were identified within the Project area. However, should your records show that cultural resources exist within or near the Project area (see enclosed map), please contact me at (918) 232-4312 or rthomas@paleowest.com.

Your comments are very important to us, and to the successful completion of this Project. I look forward to hearing from you in the near future. Thank you for taking the time to review this request.

Sincerely,

Roberta Thomas, M.A., RPA
Senior Archaeologist
PaleoWest

SAMPLE

For Official Use Only.
Public Disclosure of Archaeological Site Locations is Prohibited (54 USC 307103; Cal. Government Code 6254.10)



PALEO WEST

0 feet 2,000
0 meters 500
1:24,000

Project Location Map
USGS 7.5' Quadrangle:
Keller Peak, CA (1967)
T2N, R2W, Sec 28, 33
SBBM | UTM Zone 11 | NAD 83

Project Area

Native American Contact/Response Matrix				
Recommended Contacts (Name and Tribal Affiliation)	Contact Info	Initial Contact	Follow up Attempts	Comments/Notes
Reid Milanovich, Chairperson Agua Caliente Band of Cahuilla Indians 5401 Dinah Shore Drive Palm Springs, CA, 92264	Phone: (760) 699 - 6800 Fax: (760) 699-6919 laviles@aguacaliente.net	Sent via email 11/14/2022	NA	See below
Patricia Garcia-Plotkin, Director Agua Caliente Band of Cahuilla Indians 5401 Dinah Shore Drive Palm Springs, CA, 92264	Phone: (760) 699 - 6907 Fax: (760) 699-6924 ACBCI-THPO@aguacaliente.net	Sent via email 11/14/2022	NA	A response from Lacy Padilla, the Agua Caliente Band of Cahuilla Indians' Tribal Historic Preservation Officer, was received via email on November 15, 2022. The response from Lacy Padilla states that the Tribal Historic preservation office's cultural registry did not reveal any Tribal Traditional Use Areas within the Project area. Therefore, the Tribe defers to other Tribes in the area.
Amanda Vance, Chairperson Augustine Band of Cahuilla Mission Indians 84-001 Avenue 54 Coachella, CA, 92236	Phone: (760) 398 - 4722 Fax: (760) 369-7161 hhaines@augustinetribe.com	Sent via email 11/14/2022	NA	A response from Omar Aceves, the Tribal Operations Clerk for the Augustine Band of Cahuilla Mission Indians was received via email on 11/23/22 with a letter from Victoria Martin, the Tribal Vice-Chairperson, attached. The letter from Victoria Martin stated that the Tribe is unaware at this time of specific cultural resources that may be affected by the Project. In the event that resources are discovered during the development of the Project, Ms. Martin requests that the Tribal Office be contacted immediately for further evaluation.
Doug Welmas, Chairperson Cabazon Band of Mission Indians 84-245 Indio Springs Parkway Indio, CA, 92203	Phone: (760) 342 - 2593 Fax: (760) 347-7880 jstapp@cabazonindians-nsn.gov	Sent via email 11/14/2022	Phone call 12/2/2022	Called and left VM for Mr. Welmas
Daniel Salgado, Chairperson Cahuilla Band of Indians 52701 U.S. Highway 371 Anza, CA, 92539	Phone: (951) 763 - 5549 Fax: (951) 763-2808 Chairman@cahuilla.net	Sent via email 11/14/2022	NA	Response received via email on 11/17/22 from BobbyRay Esparza, the Cultural Director for the Cahuilla Band of Indians, stating that the Project does lie within the Tribe's traditional land use area and that they believe that cultural resources may be unearthed during construction. Furthermore, the Tribe requests that a cultural monitor from the Cahuilla be present for all ground disturbing activities including grading, trenching, drilling, grubbing, and survey. Additionally, Mr. Ezparza requests that a copy of the cultural report and all associated materials be provided to the Tribe.

Native American Contact/Response Matrix				
Recommended Contacts (Name and Tribal Affiliation)	Contact Info	Initial Contact	Follow up Attempts	Comments/Notes
Andrew Salas, Chairperson Gabrieleno Band of Mission Indians - Kizh Nation P.O. Box 393 Covina, CA, 91723	Phone: (626) 926 - 4131 admin@gabrielenoindians.org	Sent via email 11/14/2022	Phone call 12/2/2022	Called and unable to leave VM for Mr. Salas as his mailbox is full.
Anthony Morales, Chairperson Gabrieleno/Tongva San Gabriel Band of Mission Indians P.O. Box 693 San Gabriel, CA, 91778	Phone: (626) 483 - 3564 Fax: (626) 286-1262 GTTribalcouncil@aol.com	Sent via email 11/14/2022	Phone call 12/2/2022	Called and spoke with Mr. Morales. Mr. Morales stated that the Project is within areas that are highly sensitive for cultual resources. He requests that a Native American Monitor and an Archaeological Monitor be present during all ground-disturbing activities. Additionally, Mr. Morales requests that he be contacted after the client has agreed to implementing Native American monitoring.
Sandonne Goad, Chairperson Gabrielino /Tongva Nation 106 1/2 Judge John Aiso St., #231 Los Angeles, CA, 90012	Phone: (951) 807 - 0479 sgoad@gabrielino-tongva.com	Sent via email 11/14/2022	Phone call 12/2/2022	Called and left VM for Ms. Goad.
Robert Dorame, Chairperson Gabrielino Tongva Indians of California Tribal Council P.O. Box 490 Bellflower, CA, 90707	Phone: (562) 761 - 6417 Fax: (562) 761-6417 gtongva@gmail.com	Sent via email 11/14/2022	NA	See below
Christina Conley, Tribal Consultant and Administrator Gabrielino Tongva Indians of California Tribal Council P.O. Box 941078 Simi Valley, CA, 93094	Phone: (626) 407 - 8761 christina.marsden@alumni.usc.edu	Sent via email 11/14/2022	Phone call 12/2/2022	Called and left VM for Ms. Conley
Charles Alvarez Gabrielino-Tongva Tribe 23454 Vanowen Street West Hills, CA, 91307	Phone: (310) 403 - 6048 roadkingcharles@aol.com	Email returned sent via USPS 11/14/2022	Phone call 12/2/2022	Called and left VM for Mr. Alvarez

Native American Contact/Response Matrix				
Recommended Contacts (Name and Tribal Affiliation)	Contact Info	Initial Contact	Follow up Attempts	Comments/Notes
Ray Chapparosa, Chairperson Los Coyotes Band of Cahuilla and Cupeño Indians P.O. Box 189 Warner Springs, CA, 92086-0189	Phone: (760) 782 - 0711 Fax: (760) 782-0712	Sent via email 11/14/2022	Phone call 12/2/2022	Called and left message with Tribal Office staff.
Ann Brierty, THPO, Morongo Band of Mission Indians 12700 Pumarra Road Banning, CA, 92220	Phone: (951) 755 - 5259 Fax: (951) 572-6004 abrierty@morongo-nsn.gov	Sent via email 11/14/2022	Phone call 12/2/2022	Called and left VM for Ms. Brierty.
Robert Martin, Chairperson Morongo Band of Mission Indians 12700 Pumarra Road Banning, CA, 92220	Phone: (951) 755 - 5110 Fax: (951) 755-5177 abrierty@morongo-nsn.gov	Sent via email 11/14/2022	Phone call 12/2/2022	Called and left VM for Mr. Martin
Shasta Gaughen, Tribal Historic Preservation Officer Pala Band of Mission Indians PMB 50, 35008 Pala Temecula Rd. Pala, CA, 92059	Phone: (760) 891 - 3515 Fax: (760) 742-3189 sgaughen@palatribe.com	Sent via email 11/14/2022	Phone call 12/2/2022	Called and left VM for Ms. Gaughen
Paul Macarro, Cultural Resources Coordinator Pechanga Band of Indians P.O. Box 1477 Temecula, CA, 92593	Phone: (951) 770 - 6306 Fax: (951) 506-9491 pmacarro@pechanga-nsn.gov	Sent via email 11/14/2022	Phone call 12/2/2022	Called and spoke with Mr. Macarro. Mr. Macarro stated that the Tribe defers to more local Tribal Groups for this Project as it lies outside of their Traditional Use Area
Mark Macarro, Chairperson Pechanga Band of Indians P.O. Box 1477 Temecula, CA, 92593	Phone: (951) 770 - 6000 Fax: (951) 695-1778 epreston@pechanga-nsn.gov	Sent via email 11/14/2022	NA	See above
Manfred Scott, Acting Chairman Kw'ts'an Cultural Committee Quechan Tribe of the Fort Yuma Reservation P.O. Box 1899 Yuma, AZ, 85366	Phone: (928) 750 - 2516 scottmanfred@yahoo.com	Sent via email 11/14/2022	NA	See below

Native American Contact/Response Matrix				
Recommended Contacts (Name and Tribal Affiliation)	Contact Info	Initial Contact	Follow up Attempts	Comments/Notes
Jill McCormick, Historic Preservation Officer, Quechan Tribe of the Fort Yuma Reservation P.O. Box 1899 Yuma, AZ, 85366	Phone: (760) 572 - 2423 historicpreservation@quechantribe.com	Sent via email 11/14/2022	NA	Email received from Ms. McCormick on 11/15/22 stating that the Tribe does not wish to comment on the Project and that they defer to more local Tribes and support their determinations.
John Gomez, Environmental Coordinator Ramona Band of Cahuilla P. O. Box 391670 Anza, CA, 92539	Phone: (951) 763 - 4105 Fax: (951) 763-4325 jgomez@ramona-nsn.gov	Sent via email 11/14/2022	Phone call 12/2/2022	Called and spoke with Tribal Office staff who recommended that the letter be sent again to Mr. Gomez via his email. Email was sent again on 12/2/2022
Joseph Hamilton, Chairperson Ramona Band of Cahuilla P.O. Box 391670 Anza, CA, 92539	Phone: (951) 763 - 4105 Fax: (951) 763-4325 admin@ramona-nsn.gov	Sent via email 11/14/2022	NA	See above
Cheryl Madrigal, Tribal Historic Preservation Officer Rincon Band of Luiseno Indians One Government Center Lane Valley Center, CA, 92082	Phone: (760) 297 - 2635 crd@rincon-nsn.gov	Sent via email 11/14/2022	Phone call 12/2/2022	Called and left VM for Ms. Madrigal. Email response from Deneen Pelton, the Cultural Resources Department Coordinator for the Rincon Band of Luiseno Indians, was received on 12/9/22 stating that the Project is not within the Band's specific Area of Historic Interest (AHI) and that they defer to more local Tribes for pertinent information regarding the Project area.
Bo Mazzetti, Chairperson Rincon Band of Luiseno Indians One Government Center Lane Valley Center, CA, 92082	Phone: (760) 749 - 1051 Fax: (760) 749-5144 bomazzetti@aol.com	Sent via email 11/14/2022	NA	See above
Jessica Mauck, Director of Cultural Resources San Manuel Band of Mission Indians 26569 Community Center Drive Highland, CA, 92346	Phone: (909) 864 - 8933 Jessica.Mauck@sanmanuel-nsn.gov	Sent via email 11/14/2022	Phone call 12/2/2022	Email received from Mr. Bonnie Bryant, Cultural Resource Technician, on 12/20/22 stated that there are no known serrano cultural resources in the proposed Project area; however, the area is of great concern to SMBMI. As such, the Tribe is interested in consulting pursuant to AB 52.
Lovina Redner, Tribal Chair Santa Rosa Band of Cahuilla Indians P.O. Box 391820 Anza, CA, 92539	Phone: (951) 659 - 2700 Fax: (951) 659-2228 lsaul@santarosa-nsn.gov	Sent via email 11/14/2022	Phone call 12/2/2022	Called and unable to leave VM

Native American Contact/Response Matrix				
Recommended Contacts (Name and Tribal Affiliation)	Contact Info	Initial Contact	Follow up Attempts	Comments/Notes
Wayne Walker, Co-Chairperson Serrano Nation of Mission Indians P. O. Box 343 Patton, CA, 92369	Phone: (253) 370 - 0167 serranonation1@gmail.com	Sent via email 11/14/2022	Phone call 12/2/2022	Called and left VM for Mr. Walker
Mark Cochrane, Co-Chairperson Serrano Nation of Mission Indians P. O. Box 343 Patton, CA, 92369	Phone: (909) 528 - 9032 serranonation1@gmail.com	Sent via email 11/14/2022	NA	See above
Isaiah Vivanco, Chairperson Soboba Band of Luiseno Indians P. O. Box 487 San Jacinto, CA, 92581	Phone: (951) 654 - 5544 Fax: (951) 654-4198 ivivanco@soboba-nsn.gov	Sent via email 11/14/2022	NA	See below
Joseph Ontiveros, Cultural Resource Department Soboba Band of Luiseno Indians P.O. BOX 487 San Jacinto, CA, 92581	Phone: (951) 663 - 5279 Fax: (951) 654-4198 jontiveros@soboba-nsn.gov	Sent via email 11/14/2022	Phone call 12/2/2022	Called and spoke with Mr. Ontiveros who stated that the Tribe defers to the San Manuel Band of Mission Indians
Torres-Martinez Desert Cahuilla Indians Cultural Committee, P.O. Box 1160 Thermal, CA, 92274	Phone: (760) 397 - 0300 Fax: (760) 397-8146 Cultural-Committee@torresmartineznsn.gov	Sent via email 11/14/2022	Phone call 12/2/202	Called and left VM

From:	THPO Consulting
To:	Gena Severen; THPO Consulting
Cc:	Roberta Thomas
Subject:	RE: Cultural Resource Investigation for the Hume SoCal Phase I Project, San Bernardino County, California
Date:	Tuesday, November 15, 2022 10:31:52 AM
Attachments:	image002.png image003.png image004.png image005.png

Greetings,

A records check of the Tribal Historic preservation office's cultural registry revealed that this project is not located within the Tribe's Traditional Use Area. Therefore, we defer to the other tribes in the area. This letter shall conclude our consultation efforts.

Thank you,

Lacy Padilla
THPO Operations Manager
Agua Caliente Band of Cahuilla Indians
5401 Dinah Shore Drive Palm Springs, CA 92264
D: 760-699-6956 I C: 760-333-5222

From: Gena Severen <GGranger@paleowest.com>
Sent: Monday, November 14, 2022 7:54 PM
To: THPO Consulting <ACBCI-THPO@aguacaliente.net>
Cc: Roberta Thomas <rthomas@paleowest.com>
Subject: Cultural Resource Investigation for the Hume SoCal Phase I Project, San Bernardino County, California

** This Email came from an External Source **

Please see the attached letter and map for the Hume SoCal Phase I Project, San Bernardino County, California.

Warm regards,

Gena Severen (Granger), MA, RPA | Associate Archaeologist
PaleoWest
ggranger@paleowest.com
mobile: 562-310-0153
www.paleowest.com

Los Angeles, California

517 S. Ivy Avenue
Monrovia, CA 91016



This email has been scanned by Inbound Shield™.

From:	Jill McCormick
To:	Gena Severen
Cc:	Roberta Thomas
Subject:	Re: [EXTERNAL]:Cultural Resource Investigation for the Hume SoCal Phase I Project, San Bernardino County, California
Date:	Tuesday, November 15, 2022 5:19:04 AM
Attachments:	image002.png image003.png image004.png image005.png

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This email is to inform you that we do not wish to comment on this project. We defer to the more local Tribes and support their determinations on this matter.

H. Jill McCormick M. A.
Historic Preservation Officer
Ft. Yuma Quechan Tribe
350 Picacho Road
Winterhaven, CA 92283
Office: 760-572-2423
Cell: 928-261-0254

From: Gena Severen <GGranger@paleowest.com>
Sent: Monday, November 14, 2022 9:06:20 PM
To: Jill McCormick <historicpreservation@quechantribe.com>
Cc: Roberta Thomas <rthomas@paleowest.com>
Subject: [EXTERNAL]:Cultural Resource Investigation for the Hume SoCal Phase I Project, San Bernardino County, California

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Please see the attached letter and map for the Hume SoCal Phase I Project, San Bernardino County, California.

Warm regards,

Gena Severen (Granger), MA, RPA | Associate Archaeologist
PaleoWest
ggranger@paleowest.com
mobile: 562-310-0153
www.paleowest.com
Los Angeles, California
517 S. Ivy Avenue
Monrovia, CA 91016

Roberta Thomas

From: BobbyRay Esparza <Besparza@cahuilla.net>
Sent: Thursday, November 17, 2022 11:00 AM
To: Roberta Thomas
Cc: anthony madrigal
Subject: Re: Cultural Resource Investigation for the Hume SoCal Phase I Project, San Bernardino County, California

Good morning Robbie,

The Cahuilla Band of Indians received and reviewed the project notification regarding the above project located in San Bernardino County, Ca. According to the map provided the project is located within the Cahuilla's traditional land use area. Therefore, we do have an interest in this project. We believe that cultural resources may unearthed during construction. The Cahuilla Band requests that cultural monitor from Cahuilla be present for all ground disturbing activities including grading, trenching, drilling, grubbing, and survey. We also request the cultural report and all associated materials with this project. The Cahuilla Band appreciates your assistance in preserving Tribal Cultural Resources in your prpoject.

Respectfully,

BobbyRay Esparza
Cultural Director
Cahuilla Band of Indians
Cell: (760) 423-2773
Office: (951) 763-5549
Fax: (951) 763-2808

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From: BobbyRay Esparza <Bresparza@cahuilla.net>
Sent: Tuesday, November 15, 2022 9:40 AM
To: BobbyRay Esparza <Besparza@cahuilla.net>
Subject: Fw: Cultural Resource Investigation for the Hume SoCal Phase I Project, San Bernardino County, California

Respectfully,

BobbyRay Esparza
Cahuilla Band of Indians
Council Member

From: Daniel Salgado <CHAIRMAN@CAHUILLA.NET>
Sent: Tuesday, November 15, 2022 8:38 AM
To: BobbyRay Esparza <Bresparza@cahuilla.net>; Anthony Madrigal <anthonymad2002@gmail.com>; Anthony Madrigal Sr <Amadrigalsr@cahuilla.net>
Subject: FW: Cultural Resource Investigation for the Hume SoCal Phase I Project, San Bernardino County, California

Fyi…

Daniel Salgado
Tribal Council Chairman
Cahuilla Band of Indians

From: Gena Severen <GGranger@paleowest.com>
Date: Monday, November 14, 2022 at 7:57 PM
To: "chairman@cahuilla.net" <CHAIRMAN@CAHUILLA.NET>
Cc: Roberta Thomas <rthomas@paleowest.com>
Subject: Cultural Resource Investigation for the Hume SoCal Phase I Project, San Bernardino County, California

Please see the attached letter and map for the Hume SoCal Phase I Project, San Bernardino County, California.

Warm regards,

Gena Severen (Granger), MA, RPA | Associate Archaeologist
PaleoWest
ggranger@paleowest.com
mobile: 562-310-0153
www.paleowest.com

Los Angeles, California
517 S. Ivy Avenue
Monrovia, CA 91016

AUGUSTINE BAND OF CAHUILLA INDIANS
PO Box 846 84-481 Avenue 54 Coachella CA 92236
Telephone: (760) 398-4722
Fax (760) 369-7161
Tribal Chairperson: Amanda Vance
Tribal Vice-Chairperson: Victoria Martin
Tribal Secretary: Geramy Martin

Date: November 23, 2022

RE: Cultural Resource Investigation for the Hume SoCal Phase I Project, San Bernardino County, California

Dear: Gena Severen (Granger)
Associate Archaeologist

Thank you for the opportunity to offer input concerning the development of the above-identified project. We appreciate your sensitivity to the cultural resources that may be impacted by your project and the importance of these cultural resources to the Native American peoples that have occupied the land surrounding the area of your project for thousands of years. Unfortunately, increased development and lack of sensitivity to cultural resources have resulted in many significant cultural resources being destroyed or substantially altered and impacted. Your invitation to consult on this project is greatly appreciated.

At this time, we are unaware of specific cultural resources that may be affected by the proposed project, however, in the event, you should discover any cultural resources during the development of this project please contact our office immediately for further evaluation.

Very truly yours,

Victoria Martin

Victoria Martin, Tribal Vice-Chairperson
Augustine Band of Cahuilla Indians

From: Deneen Pelton
To: Gena Severen
Cc: Cheryl Madrigal
Subject: Hume SoCal Phase 1
Date: Friday, December 9, 2022 8:39:34 AM

Greetings,

This email is written on behalf of Rincon Band of Luiseño Indians, ("Rincon Band" or "Band"), a federally recognized Indian Tribe and sovereign government.

The Band has received the notification for the above referenced project. The location identified within project documents is not within the Band's specific Area of Historic Interest (AHI).

At this time, we have no additional information to provide. We recommend that you directly contact a Tribe that is closer to the project and may have pertinent information.

Thank you for submitting this project for Tribal review. If you have additional questions or concerns, please do not hesitate to contact our office at your convenience at (760) 749-1092 or via electronic mail at crd@rincon-nsn.gov.

Thank you for the opportunity to protect and preserve our cultural assets.

Deneen Pelton
Cultural Resources Department Coordinator
Cultural Resources Department
Rincon Band of Luiseño Indians
One Government Center Lane | Valley Center, CA 92082
Office:760-749-1092
Fax: 760-749-8901
Email: dpelton@rincon-nsn.gov

Rincon Band of Luiseño Indians
www.rincon-nsn.gov

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Roberta Thomas

From: Mr. Bonnie Bryant <Bonnie.Bryant@sanmanuel-nsn.gov>
Sent: Tuesday, December 20, 2022 2:22 PM
To: Roberta Thomas
Cc: Ryan Nordness
Subject: Hume Socal Phase I project Information reques

IRONSCALES couldn't recognize this email as this is the first time you received an email from this sender Bonnie.Bryant@sanmanuel-nsn.gov

Hey Ms. Thomas,
Thank you for reaching out to the San Manuel Band of Mission Indians concerning the proposed project area. SMBMI appreciates the opportunity to review the project documentation received by the Cultural Resources Management Department. The proposed project did not have any known serrano cultural resources. The area is of great concern to SMBMI, and is very interested to consult whenever this project moves into AB52/CEQA territory.
Thank you again for your correspondence, if you have any additional questions or comments, please reach out to me at your earliest convenience.
Respectfully,
Respectfully,
Mr. Bonnie Bryant
Cultural Resource technician
San Manuel Band of Mission Indians
Bonnie.Bryant@sanmanuel-nsn.gov

Mr. Bonnie Bryant
Cultural Resources Tech
Bonnie.Bryant@sanmanuel-nsn.gov
O:(909) 864-8933 x 50-2033
M:(909) 633-6615
26569 Community Center Dr Highland, California 92346

Appendix B.
DPR Forms

***Recorded by:** E. Mills, J. Case ***Date:** 11/19/22 ☐ Continuation ☒ Update

This resource was visited by PaleoWest archaeologists on 11/19/2022 as part of the Hume Socal Phase I Cultural Resource Investigation. The area has been heavily developed by the current camp owners, there is a sports field on top of where the site is plotted. No surface cultural material was observed in the entire vicinity. The only remaining elements of the prehistoric site are two bedrock mortars located west of the plotted site on a small ridge. Feature 1 is a conical bedrock mortar that measures 20cm in diameter by 11cm deep, the granite boulder it sits on measures 98cm x 60cm x 23cm tall. Feature 2 is another bedrock mortar, placed on a shelf of a granite boulder with the southern side of the mortar even to the boulder surface, while the northern side is deep into the boulder. The mortar measures 17cm in diameter by 11cm deep on the north side. The boulder measures 1.6m x 1m x 70cm tall. Feature 2 has a natural shelf and basin on the south side, the mortar placed where it is would make easier collection of ground acorns.

The rest of the site is destroyed. The camp has turned the surrounding 150-200m diameter into a recreaction area, with sports field, large pond, and general open space.

CRHR Evaluation:
CA-SBR-2306 is a special-use area likely related to subsistence-based processing activities, such as the milling of native seeds, plant fibers, and/or small mammals. The previously documented lithic scatter was not located and no surface artifacts were identified at the site during the revisit; the area has been extensively disturbed. The absence of surface artifacts suggest that the site lacks substantial buried cultural deposits.

Extant data indicate that the site does not meet the criteria for listing on the CRHR. CA-SBR-2306 is not associated with events that have made a significant contribution to the broad patterns of history and therefore is recommended as not eligible for listing under Criterion 1. It is not associated with the lives of persons significant in the past and therefore is recommended as not eligible for listing under Criterion 2. It also does not embody the distinctive characteristics of a type, period, or method of construction, and thus is recommended not eligible under Criterion 3. The site does not contain temporally diagnostic artifacts or any materials suitable for chronometric dating. The lack of chronological control and absence of artifacts mean that temporal and cultural components cannot be defined at CA-SBR-2306. Thus, while the site contains data on settlement organization and land use and subsistence practices, these data lack potential to contribute any new information important to regional prehistory or history. Furthermore, it is unlikely that additional investigations at the site will produce sufficient quantities of artifacts from controlled stratigraphic contexts to overcome these deficiencies. For these reasons, the site is recommended not eligible under CRHR Criterion 4.


Feature 1 detail shot


Feature 2 detail shot facing north.

Report Citation: 2023. Thomas, Roberta, Gena Severen, Evan Mills, and Michael Mirro. *Cultural Resources Investigation of the Hume Socal Campground Project, San Bernardino County, California*. Prepared by PaleoWest LLC, Redlands, CA.

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
SKETCH MAP

Primary #
HRI#
Trinomial

***Resource Name or #:** 36-002306

***Drawn by:** B. Spelts

***Scale:** 1:800

***Date of map:** December 2022



*Required information

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

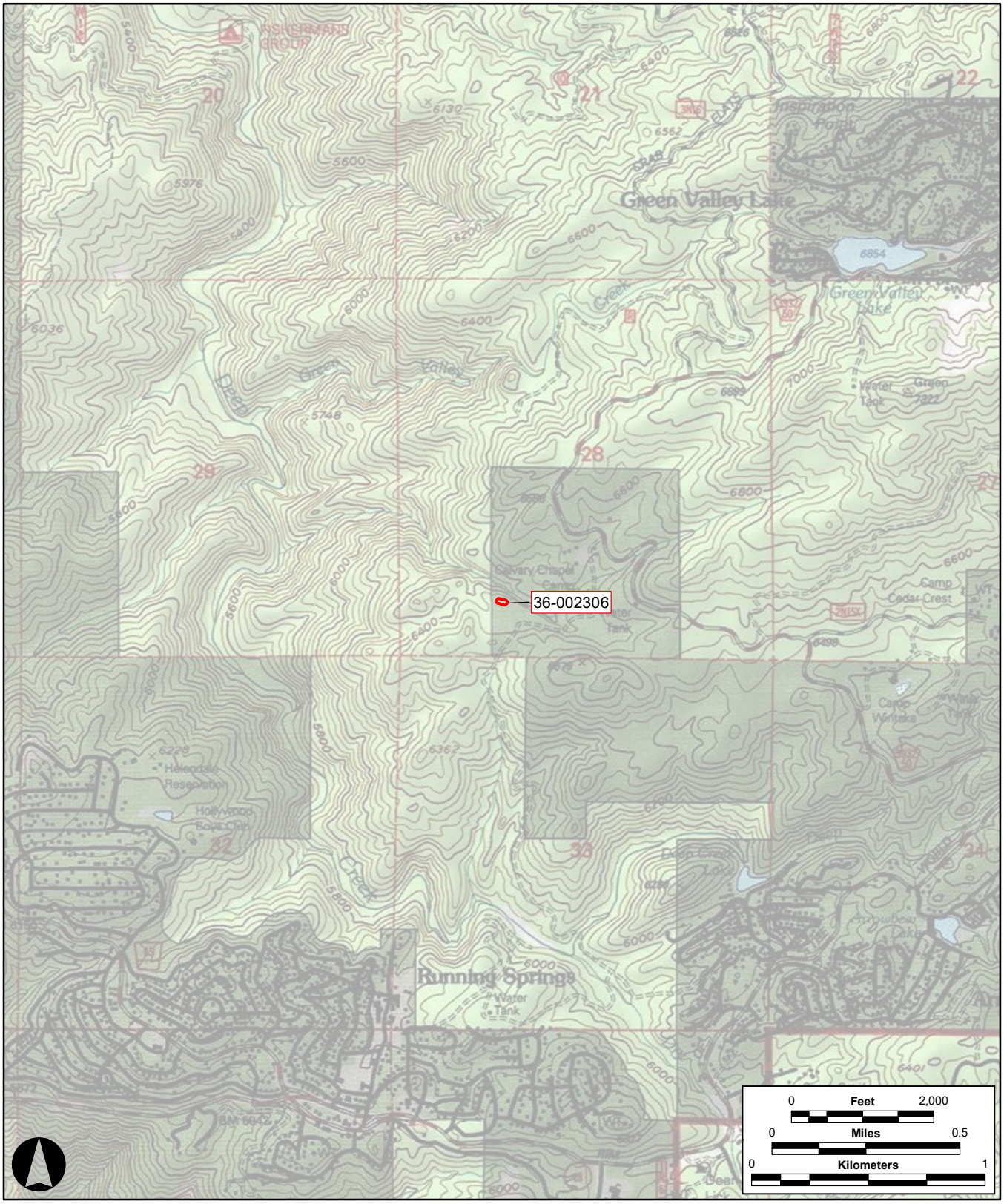
LOCATION MAP

Primary
HRI

Trinomial

Page 3 **of** 3 **Resource Name or #:** 36-002306 **Scale:** 1:24,000

Map Name: Keller Peak, Ca (1978) 7.5' USGS Quad. **Date:** 2022



P36-002306

(1061)

ARCHAEOLOGICAL SITE RECORD UPDATE

PERMANENT TRINOMIAL: CA-SBR-2306/H
OTHER DESIGNATIONS: Boy Scout Camp Site

1: *COUNTY:* San Bernardino

2: *USGS QUAD:* Keller Peak 7.5 Minute, 1967; Photorevised 1988.

3: *UTM:* Zone 11, 491120 M. Easting, 3786840 M. Northing.

4: *TOWNSHIP:* 2 North, *RANGE:* 2 West,
ne1/4 of sw1/4 of se1/4 of sw1/4 of Section 28.

5: *ELEVATION:* 6450-6500 feet above mean sea level.

6: *LOCATION:*

On a small, flat stream terrace and adjacent slope south of a perennial tributary to Deep Creek, adjacent to the dirt road leading to the Calvary Chapel Youth Camp headquarters, approximately 1.25 miles southwest of Green Valley Lake, in the San Bernardino Mountains.

7:*PREHISTORIC:* Yes *HISTORIC:* Yes *PROTOHISTORIC:* Unknown

8: *SITE DESCRIPTION:*

The prehistoric site is located at the old natural amphitheater of Camp Ahwahnee, used by the Boy Scouts and others as an improved campground as early as the 1920's. The prehistoric archaeological site is said to have consisted of both a single bedrock mortar feature as well as a small surface lithic scatter; neither has survived into the present day due to repeated disturbance of the area.

The historic site consists of a portion of the old narrow-gauge logging railroad alignment built by the Brookings Lumber Company in the 1890's and used up til 1910. The rails and ties are long gone, but a stretch of approximately 200 meters of the old, overgrown leveled grade remains in fairly good condition to the south of the present dirt road leading past the destroyed prehistoric site.

9: *SITE TYPE:* Prehistoric: Temporary Camp (?).
Historic: Railroad Logging Line.

10: *AREA:*

Prehistoric: Not applicable. Bulldozed area measures 40 x 50 meters.

Historic: Railroad alignment measures some 5 meters wide by 200 meters long, and merges with later logging skid roads and modern dirt roads.

11: *DEPTH:* None noted.

11/17/92
DELLON

12: *FEATURES:*

Prehistoric: Granite boulder with bedrock mortar holes was reported as destroyed or moved off site in 1973.

Historic: Remnants of the 80 to 100 year old railway logging line described above.

13: *ARTIFACTS:* None noted in 1992: 5 flakes and possible biface reported in 1991.

14: *NON-ARTIFACTUAL CONSTITUENTS:* None noted.

15: *HUMAN REMAINS:* None noted.

16: *DISTURBANCE:*

Prehistoric Site: Extreme. The prehistoric site has been completely destroyed as the result of repeated episodes of cumulative damage. The site was used as a log landing several times in the past and graded or bulldozed each time, most recently in 1973, when the bedrock mortar feature was removed. The site area has also been used as a campground continuously since the 1920's, both by "Larry's Boy's Camp" and the Boy Scouts of America; numerous semi-permanent 1/2 planked, 1/2 tent structures used to be in existence atop and adjacent to the archaeological site, as well as attendant facilities such as out-houses, sinks, water lines, showers, etc. The site area also hosted a small amphitheater where log benches upslope (north) of a large, rock-lined campfire circle were employed for group seating. Subsequent to P. Jertberg's January, 1991 visit (LSA, 1991), all traces of the old campground installations but for a single outhouse were demolished, the brush adjacent to the site was cleared mechanically, and a thick duff layer was scraped off the site as a fire control measure.

Historic Site: Moderate. All but a short section of the logging railroad grade has been converted to logging haul roads or to modern dirt roads; a short section (roughly 200 meters long) however, remains in good condition and is worth preserving.

17: *NEAREST WATER:*

Perennial creek tributary to Deep Creek runs along northern margin of site, some 50 meters north.

18: *VEGETATION COMMUNITY:* Mixed coniferous forest.

19: *VEGETATION ON SITE:* Oaks, Pines, Fir, Manzanita

20: *SITE SOIL:* Gray to tan sandy clay and DG.

21: *SURROUNDING SOIL:* Same as above.

22: *GEOLOGY:* Exposed granite boulders.

23: *LANDFORM:* Flat stream terrace and adjacent slope.

P36-002306

24: *SLOPE:* At site: 0-5%; nearby: 5-25%.

25: *EXPOSURE:* Westerly, northerly.

26: *LANDOWNER:* Calvary Chapel Youth Camp, Green Valley, CA, 92341

27: *REMARKS:*

Archaeological site CA-SBR-2306 was originally recorded in 1973 by R.A. Robinson, a local avocational archaeologist who lives in the Green Valley Lake community. At the time of its original recording, Robinson noted a single granite bedrock boulder with five mortar holes. Robinson revisited the site in 1982 and filed a site update, noting that the bedrock mortar boulder had either been destroyed or removed since the time of his earlier visit. I spoke with Mr. Robinson by telephone in late 1992, and he confirmed that shortly after the time of his original recording of the site, it was bulldozed and essentially destroyed.

The site was visited by Ms. P. Jertberg in January, 1991, and re-recorded. Jertberg confirmed the absence of the bedrock feature at the site, but reported "5 flakes (siltstone, jasper, chert, metavolcanic, metasedimentary) and one possible biface" and "One bone fragment (medium mammal)" on the surface near the campfire at the bottom of the old Boy Scout amphitheater. No other description of these putative artifacts is provided, and they were not collected, measured, or illustrated. Jertberg could not determine whether or not her "artifacts" were the result of primary or secondary deposition, and states that "a thick (6" -10") layer of leaves and pine needles covers the surround area severely limiting visibility".

Subsequent to Jertberg's January, 1991 visit, the site surface was scraped and all traces of the "artifacts" she failed to collect were lost. At present, no archaeological evidence remains at the prehistoric site, and it must be considered 100% destroyed. Although the report presumably written by Jertberg herself of the 1991 Calvary Chapel Youth Camp archaeological survey (LSA, 1991: 7) notes the existence of "the narrow gauge Brookings Railroad Grade" nearby, the historic component, consisting of a section of that very railroad grade at the CA-SBR-2306 site was overlooked: Jertberg, the previous archaeological surveyor of the property, declined to record the historic logging railroad alignment as an historic site, despite being notified of its presence by Dr. Rick Oliver, the Calvary Chapel Youth Camp manager.

Proposed for the site vicinity is selective timber harvesting and conversion of the old Boy Scout amphitheater into a baseball diamond. Concomitant with this latter development is to be the importation and spreading of clean fill over the lower margin of what used to be archaeological site CA-SBR-2306 so as to raise a level grade. Because the prehistoric site has been completely destroyed, such activities will not constitute an adverse impact to remaining prehistoric cultural resources. There is no reason why either the timber harvest plan or baseball diamond construction should not proceed in the area previously identified as that of prehistoric site CA-SBR-2306.

On the other hand, the remaining portion of the old railroad logging grade lies outside the proposed baseball diamond, but may be affected by the proposed timber harvest. That portion of the old railroad grade remaining should be pre-

REMARKS (Cont'd):

served intact by the following mitigative methods: any trees cut in the vicinity of the grade should be directionally felled away from the grade and taken out by lifting, not dragging, across the grade itself. The grade may be used for tree extraction by rubber-tired vehicles only, and not re-graded or otherwise "improved" for the purposes of timber extraction. Any and all log landings and additional skid roads should be located away from the old alignment.

If such mitigation steps are followed, there is no reason why the timber harvest presently proposed cannot proceed.

28: *REFERENCES:*

LSA Associates, Inc.
1991 An Archaeological Assessment of the Calvary Chapel/Boy Scouts of America Youth Camp, Green Valley Lake, California.

Dillon, Brian D.
1993 Archaeological Impact Assessment of the Calvary Chapel Youth Camp, an 107 acre parcel in the San Bernardino Mountains, San Bernardino County, California.

29: *PROJECT NAME:* Same as above (Dillon, 1993).

30: *PROJECT TYPE:* Site Survey and Inventory.

31: *SITE ACCESSION NUMBER:* None

32: *SITE PHOTOS:* Dillon, 1992.

33: *DATE RECORDED:* November 17, 1992

34: *RECORDED BY:* Brian D. Dillon, Ph.D.

35: *AFFILIATION/ADDRESS:* Consulting Archaeologist,
16007 Lemarsh St., Sepulveda,
CA, 91343

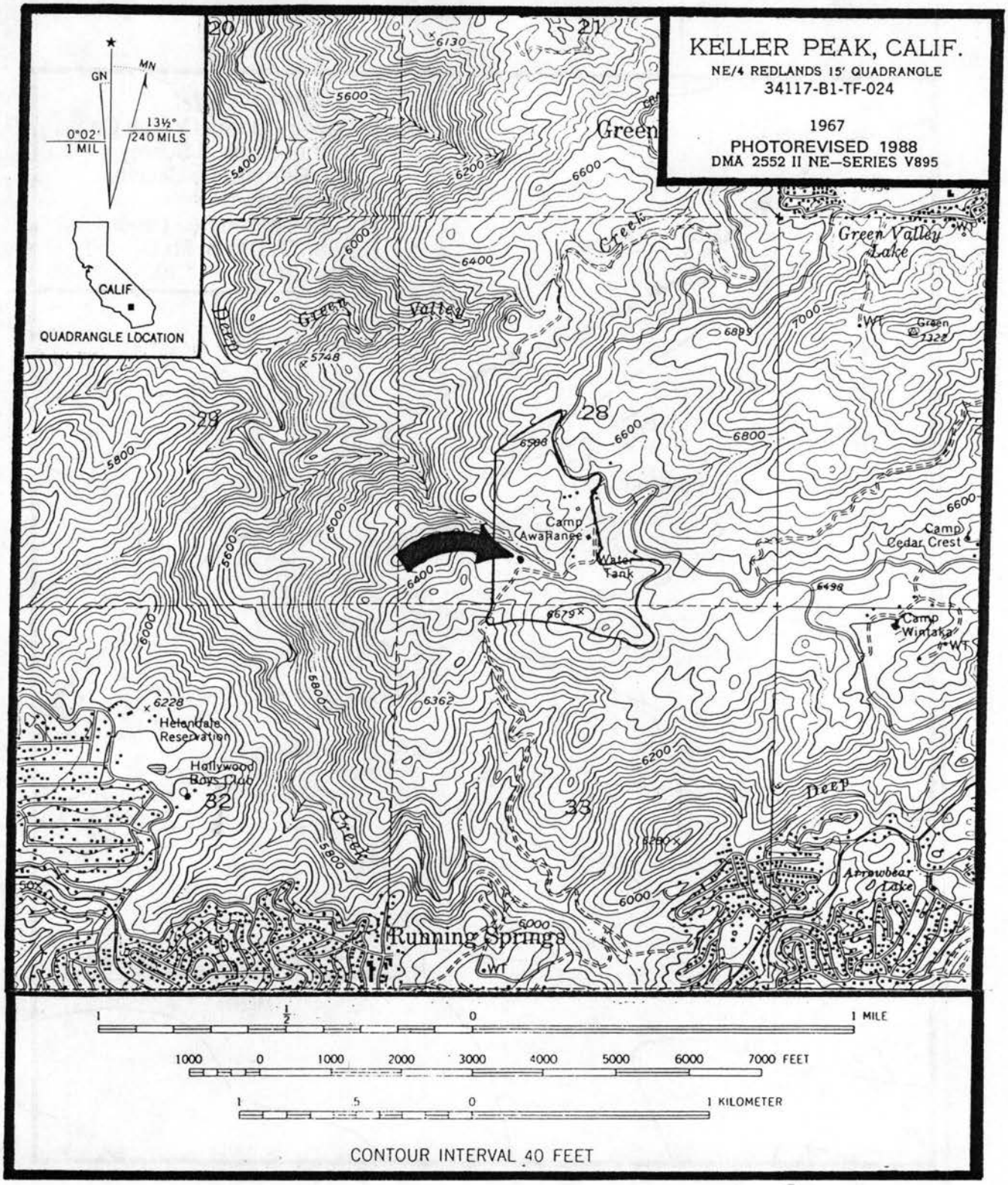


Figure 1: Location of archaeological site CA-SBR-2306/H on the Calvary Chapel Youth Camp, reproduced from the USGS Keller Peak 7.5 minute Topographic Sheet.

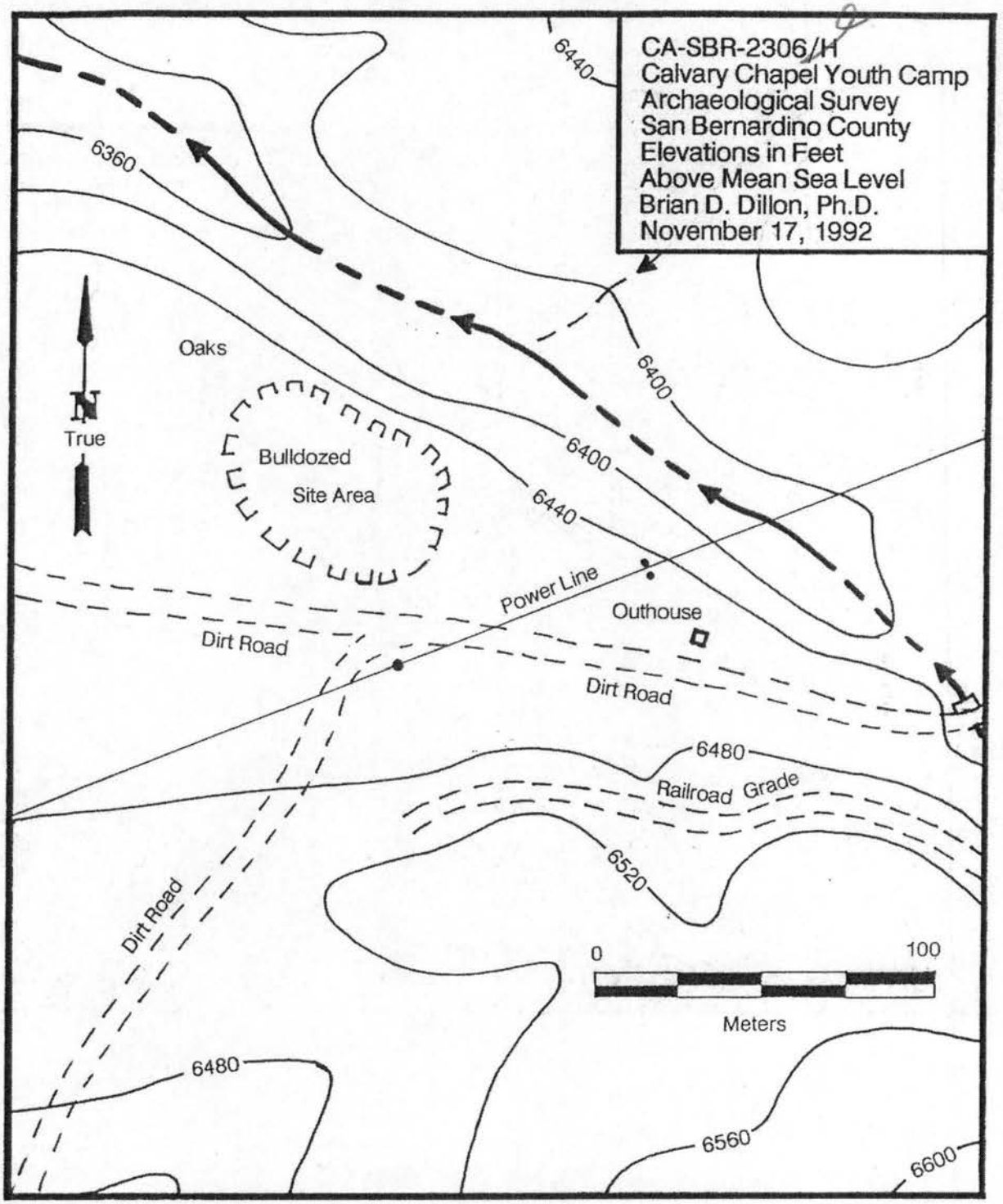


Figure 2: Archaeological site map of CA-SBR-2306/H on the Calvary Chapel Youth Camp.

P36-002306



Figure 3 (Above): View towards northwest over reported location of archaeological site CA-SBR-2306 on the Calvary Chapel Youth Camp. Scraped area contained log benches, and was covered with duff in 1991.
Figure 4 (Below): View towards west along the old Brookings Lumber Company narrow-gauge railroad grade at CA-SBR-2306/H. Scale bar points north, measures 2 meters, Dillon photos, 1992.



P36-002386

State of California - The Resources Agency Permanent Trinomial: CA-SBr-2306 Supplement X

DEPARTMENT OF PARKS AND RECREATION

ARCHAEOLOGICAL SITE RECORD

Other Designations: _____

Page 1 of 4

1. County: San Bernardino

2. USGS Quad: Keller Peak (7.5') X (15') _____ Photorevised 1988

3. UTM Coordinate: Zone |1|1| |4|9|1|1|0|0| m Easting |3|7|8|6|8|1|0| m Northing ( )

4. Township 2 north Range 2 west:NE ¼ of SW ¼ SE ¼ SW ¼ of Section 28 Base Mer. SBM ( )

5. Map Coordinates: 120 mmS 110 mmE (from NW corner of map) 6. Elevation 6440 feet ( )

7. Location: Assessor's Parcel Number 328-071-7,10/ Calvary Chapel Youth Camp/Enter camp area west from Green Valley Lake Road, continue southwest on dirt road approximately .4 of a mile, site is on north side of road/ the site area is in a cleared open area with large campfire surrounded by logs/a major drainage defines the north and east boundary/one vacant cabin is on southeast and one structure to the west/ ( )

8. Prehistoric X Historic ___ Protohistoric ___ 9. Site Description The site is a dispersed scatter of flakes on the surface outside the enclosed campfire ring/ one bone fragment was observed on surface/the site area is a clearing with some large granite boulders and trees around it/the bedrock mortar on original site record was not relocated and may have been moved or destroyed per earlier records. ( )

10. Area 50 meters m( )x 50 meters m( ) _____ m^2

Method of Determination: Pacing ( )

11. Depth: Unknown cm Method of Determination: NA ( )

12. Features: None observed ( )

13. Artifacts: 5 flakes (siltstone, jasper, chert, metavolcanic, metasedimentary) and one possible biface fragment. ( )

14. Non-Artifactual Constituents and Faunal Remains: One bone fragment (medium mammal) ( )

15. Date Recorded: Update 1/16/91 16. Recorded By: P. Jertberg/J. Marmor ( )

17. Affiliation and Address: LSA Associates, Inc., 3403 10th Street, Riverside, CA 92501 ( )

WPFORMS\ARCH.1

See Continuation Sheet (X)

P36-00230

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

Permanent Trinomial: CA-SBr-2306

1 | 91
Mo. Yr.

ARCHAEOLOGICAL SITE RECORD

Other Designations: _____

18. Human Remains: None observed ( )

19. Site Disturbances: Dirt road on south side of site area/camping, campfire circle, cabin activities have disturbed surface. ( )

20. Nearest Water (type, distance, direction) Major seasonal drainage adjacent to north and east boundary of site. ( )

21. Vegetation Community (site vicinity): Western Coniferous Forest Plant Community Plant List ( )

22. Vegetation (on site): Several species of oak, pine and fir including Jeffrey Pine, Black Oak, Ceanothus, Manzanita, Ceanothus

23. Site Soil: Loose, coarse decomposing granite with humus derived from thick cover of leaves and pine needles ( )

24. Surrounding Soil: Same ( )

25. Geology: Large granite outcrops dispersed throughout the area ( )

26. Landform: San Bernardino Mountain Range portion of Transverse Mountain Range System ( )

27. Slope: Almost flat 28. Exposure: Open/lower north facing slope of ridgeline ( )

29. Landowner(s) (and/or tenants) and Address: Calvary Chapel of Costa Mesa, 3800 S. Fairview Avenue, Santa Ana, CA 92704 and Boy Scouts of America,3590 Harbor Gateway North,Costa Mesa, CA 92704 ( )

30. Remarks: Artifactual materials visible on cleared surface only/a thick (6" - 10") layer of leaves and pine needles covers the surrounding area severly limiting visibility. A determination of primary or secondary deposit could not be made. Artifacts were left in field marked by yellow flagging. ( )

31. References: An Archaeological Assessment of Calvary Chapel Youth Camp, Green Valley Lake, San Bernardino County, California by Patricia Jertberg, LSA Associates Inc., January 1991 ( )

32. Name of Project: Calvary Chapel Youth Camp ( )

33. Type of Investigation: Archival records search and field assessment ( )

34. Site Accession Number: _____ Curated At: _____

35. Photos: 30 black and white photos developed on proof sheet/ curated at LSA, Riverside ( )

See Continuation Sheet (X)

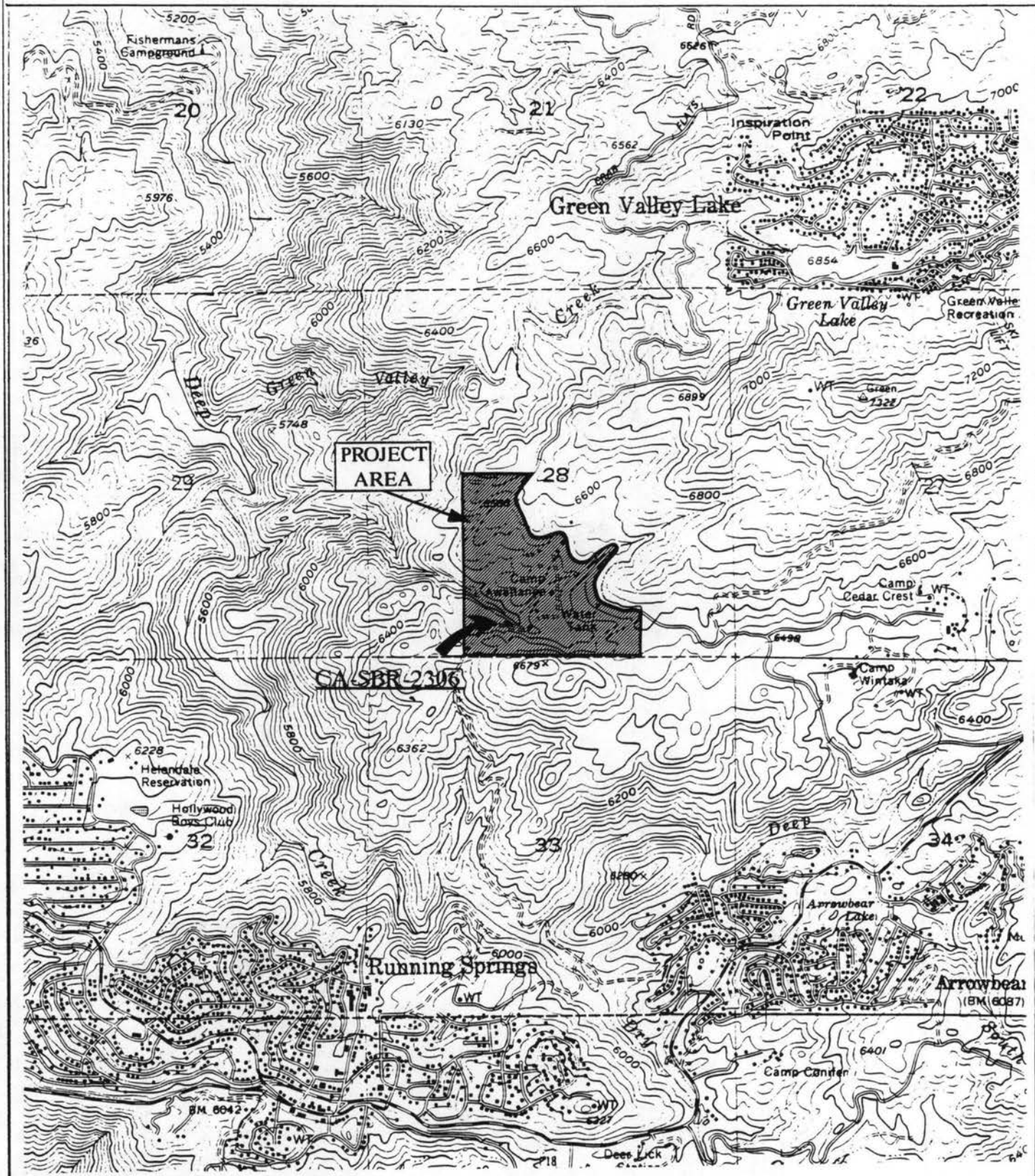
P36-002306

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

ARCHEOLOGICAL SITE LOCATION MAP

Permanent Trinomial: CA-SBr-2306 1 | 91 (Mo. Yr.)

Other Designations: _____



Source: USGS Quad 7.5' - Keeler Peak, Ca.

P36-002306

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

ARCHEOLOGICAL SITE MAP

Page 4 of 4 .

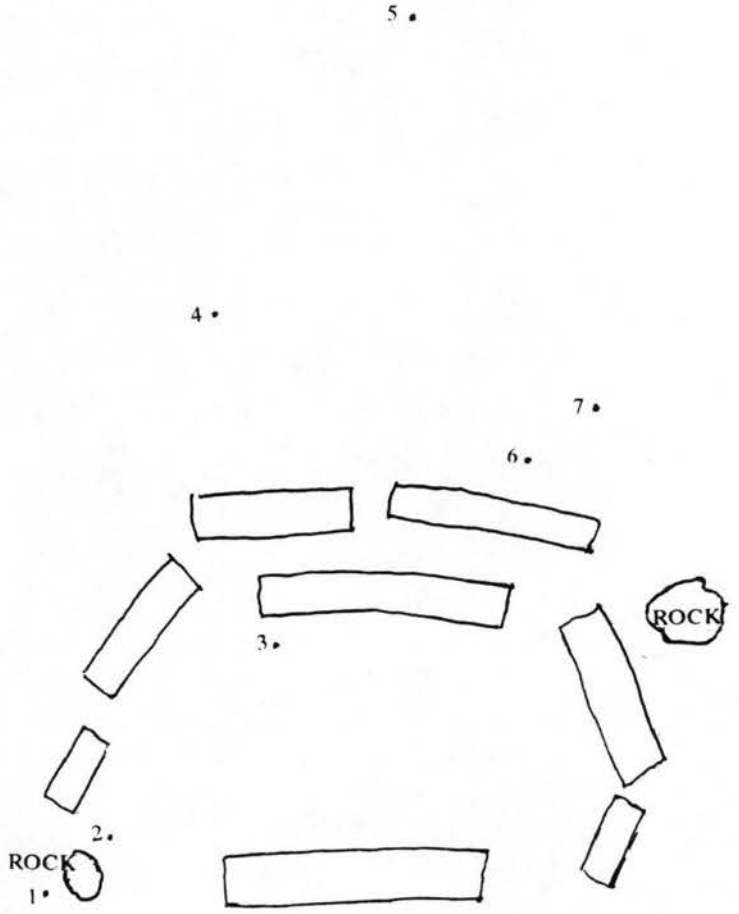
Permanent Trinomial: CA-SBr-2306

1 | 91
Mo. Yr.

Other Designations:

ARTIFACTS AND BONE

1 = SILTSTONE FLAKE
2 = RED JASPER FLAKE
3 = CHERT FLAKE
4 = METAVOLCANIC FLAKE
5 = METASEDIMENTARY FLAKE
6 = CHERT BIFACE FRAGMENT
7 = BONE FRAGMENT



NORTH

SCALE: 1 PACE = .87 METERS

⊗ DATUM

5 PACES

P36-002306
SBr 2306

1678
SBCM1678

SAN BERNARDINO COUNTY MUSEUM
SITE SURVEY FORM

Office Use Only: SITE # SBr 2306

PRIORITY

REFERRED TO

Field No. USFS # 102 Site Name CAMP AWAHANEE

County SAN BERNARDINO State CALIF

USGS quad maps: REDLANDS 15', ~~KEELER PEAK~~ KELLER PEAK 7 1/2'

____ of ____ of ____ of ____ of ____ of SE1/4 of SW1/4 of sec. 28 OK DAR 1/16/86

Twp. 2 N, Rng. 2 W, ____ Base Meridian, Elevation 6300'

Distance 1/4 MILE along bearing S.W. from CAMP HEADQUARTERS

Latitude & Longitude or UTM grid #S 11/3786820 N 491140 E X
~~3786800N-491325E~~

Site dimensions 100' x 100' (?)

Site description (features, condition, situation) 5 BEDROCK MORTARS STILL VISABLE. SITE HAS BEEN USED AS TENTING AREA BY BOY SCOUTS FOR MANY YEARS.

Details concerning possible destruction NEARLY COMPLETE DESTRUCTION

Collected artifacts stored at NONE

Sketch artifacts, site location, features, etc. on back

Recorded by R. A. ROBINSON Date 21 SEPT 73

Address BOX 185 GREEN VALLEY LAKE CA 92341

Additional remarks
MORTARS HAVE BEEN MOVED AND OVERUN BY TENT SITES. 3/31/82 RAR

See map on Back

Return to: Archaeological Data Center, San Bernardino County Museum
18860 Orange Avenue, Bloomington, Ca. 92316. (Ph. 877-2272)

*Recorded by: E. Mills, J. Case *Date: 11/19/2022 ☐ Continuation ☒Update

Two segments of the Brookings Railroad grade were visited by PaleoWest archaeologists as part of the Hume Socal Campground Phase I Cultrual Resource Investigation. The northern segment within this project area is the current Green Valley Lake Road, an active access to the community of Green Valley Lake. The southern segment was investigated and found in sections. The original plotted location was slightly inaccurate, or is no longer visible, another possibility is the railroad grade has been modified and used by past and present owners of the property. The two segments mapped during this update are faint and are believed to be the historic grade. The western segment is 1,391 feet long and the eastern segment is 1,870 feet long. Both segments are mapped with submeter accurate GPS in the correct location (see location map attached). The road width and visibility vary throughout the length of each segment.

CRHR Evaluation:
The Brookings Railroad was constructed in the early 1900s and was reportedly in use in the San Bernardino Mountains between 1908 and 1913 by the Brookings Lumber Company (Lerch 1981). During the late 1800s and early 1900s the population of the San Bernardino valley was rapidly increasing, creating a fervent need for lumber to be used to construct homes, stores, church, civic buildings, etc. In response to this need, John E. Brookings, with financial backing from his cousin, Robert S. Brookings, formed the Brookings Lumber Company and began purchasing the assets of other struggling lumber companies, crippled by the nationwide economic depression of 1892-1893, in the area (RWHS 2023). In order to transport logs from the surrounding timberlands within the mountains to their newly renovated sawmill southwest of present-day Running Springs (formerly known as Fredalba), the Brookings Railroad was constructed. It was reportedly the first and only logging railroad in the San Bernardino Mountains and was constructed with second-hand equipment by temporary Sante Fe Railroad laborers as well as lumbermen with little or no railroad construction experience (trainboard.com 2023). Steep grades prevented the use of the railroad all the way to the base of the mountains confining the railroad operations in the timberlands. “As forests were cleared, the railroad was extended into the next suitable logging area. About six miles of track were laid throughout the Brookings timberlands” (trainboard.com 2023). By 1913 the timber stands that were leased began to run dry (RWHS 2023). At that time, the company started looking for new lumber locations along the coastline and workers began to leave to the area in search of new prospects.

A review of the available data indicates that the two segments of Brookings Railroad grade within the Project area do not meet the criteria for listing on the CRHR. While CA-SBR-4887H is associated with the expansion and construction of areas within the San Bernardino valley, it is associated with one of many lumber companies in Southern California and was not solely vital to the expansion of the area. Additionally, John F. Brookings is one of many lumbermen throughout the country and the state that moved from place to place looking for areas to continue their lumber interests. As such, the two segments of the resources within the Project area do not appear to be eligible for listing on the CRHR under Criterion 1 and 2 and are recommended not eligible for listing. The remnants of the two railroad segments were constructed with second-hand materials by temporary laborers and lumbermen and do not embody the distinctive characteristics of a type, period, or method of construction, and thus is recommended not eligible under Criterion 3. Finally, it is unlikely that these two segments have the potential to broaden our understanding of 20th century railroad construction or lumber activities, or to the history of the San Bernardino Mountains, California, or the United States. Therefore, these segments of CA-SBR-4887H do not appear eligible for the CRHR under Criterion 4 and are recommended not eligible for listing.



Central portion of western segment facing east.



Western end of eastern segment facing east.

Report Citation: 2023. Thomas, Roberta, Gena Severen, Evan Mills, and Michael Mirro. *Cultural Resources Investigation of the Hume Socal Campground Project, San Bernardino County, California*. Prepared by PaleoWest LLC, Redlands, CA.

References:

Lerch, M. K.
1981 Department of Parks and Recreation Form(s) for P-36-004887. On file at the South Central Coastal Information Center, California State University, Fullerton.

Rim of the World Historical Society (RWHS)
2023 Mountain History Museum. Mileposts #1031 (07/06/2021). Accessed April 2023, https://mtnmuseum.org/mileposts-1031/.

Trainboard.com
2023 Brookings Lumber History. Logging no easy task, Mark Landis, correspondent (04/07/2002). Accessed April 2023, https://www.trainboard.com/highball/index.php?threads/brookings-lmbr-history.35266/.

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

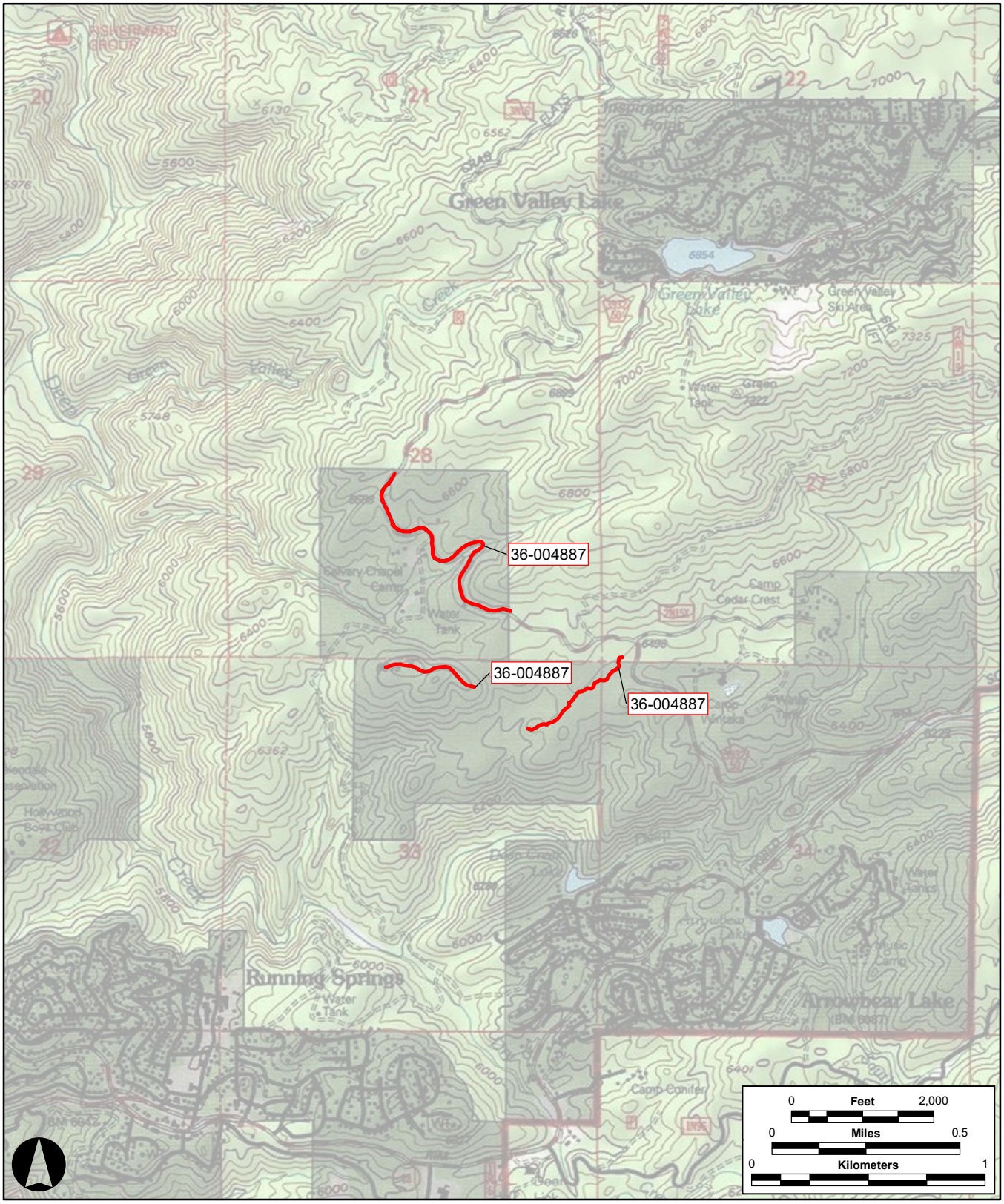
LOCATION MAP

Primary
HRI

Trinomial

Page X3 **of** 3 **Resource Name or #:** 36-004887 **Scale:** 1:24,000

Map Name: Keller Peak, Ca (1978) 7.5' USGS Quad. **Date:** 2022



Center for Archaeological Research
CALIFORNIA STATE UNIVERSITY, BAKERSFIELD

PRIMARY RECORD

Primary # P-36-004887 **UPDATE**
HRI #
Trinomial CA-SBR-4887H
NRHP Status Code

Other Listings
Review Code | Reviewer | Date

 *Resource Name or #: CA-SBR-4887H

P1. Other Identifier: Brookings Railroad Grade
*P2. Location: ■ Not for Publication ☐ Unrestricted *a. County: San Bernardino
and (P2b and P2c or P2d. Attach a Location Map as necessary.)
*b. USGS 7.5' Quad: Keller Peak, CA Date: 1996 T2N; R2W; Sections 3, 4, 27, 28, 33, 34, 35, & 36; SBBM
c. Address: City: Zip:
d. UTM: Zone: 11; 491000 -- 496000 mE/ 3785000 -- 3788000 mN (GPS NAD 27)
e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate) Site is located throughout Keller Peak 7.5' quad. The portion of the site that intersects within our survey boundaries is located in section 35, where the Edison power line crosses over the railroad grade.

*P3a. Description: (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries) The site is the remains of the historic Brookings Railroad grade that runs throughout the area, which was in operation ca. 1908-1913. The railroad was used to haul lumber. Portions of this railroad are now Highway 18, Keller Peak Road, and other paved roads in the area. The section of the old grade that was encountered during the present survey, has been reduced to a dirt trail. This portion is located east of Keller Peak Road and is 1.3 miles in length.

*P3b. Resource Attributes: (List attributes and codes) AH7. railroad grades

*P4. Resources Present: ☐Building ☐Structure ☐Object ■Site ☐District ☐Element of District ☐Other (Isolates, etc.)

No Photograph Taken

P5b. Description of Photo: (View, date, accession #) None

*P6. Date Constructed/Age and Sources: ■Historic
☐Prehistoric ☐Both

*P7. Owner and Address:
San Bernardino National Forest
1824 S. Commercenter Circle
San Bernardino, CA 92408

*P8. Recorded by: Updated by
Hubert Switalski, Amec, 403 East H St., Tehachapi, CA 93561 &
Audry Williams, CAR, 9001 Stockdale Hwy, Bakersfield, CA93311

*P9. Date Recorded: May 2004

*P10. Survey Type: (Describe)
General Reconnaissance

*P11. Report Citations: A Heritage Resources Inventory for the Hazard Tree Removal Project in the Mountain Top and Front Country Districts of the San Bernardino National Forest, on Behalf of the Southern California Edison Company, Rosemead, California and Archaeological Monitoring for the Hazard Tree Removal Project in the Mountain Top; Front Country Districts of the San Bernardino National Forest, on Behalf of the Southern California Edison Company

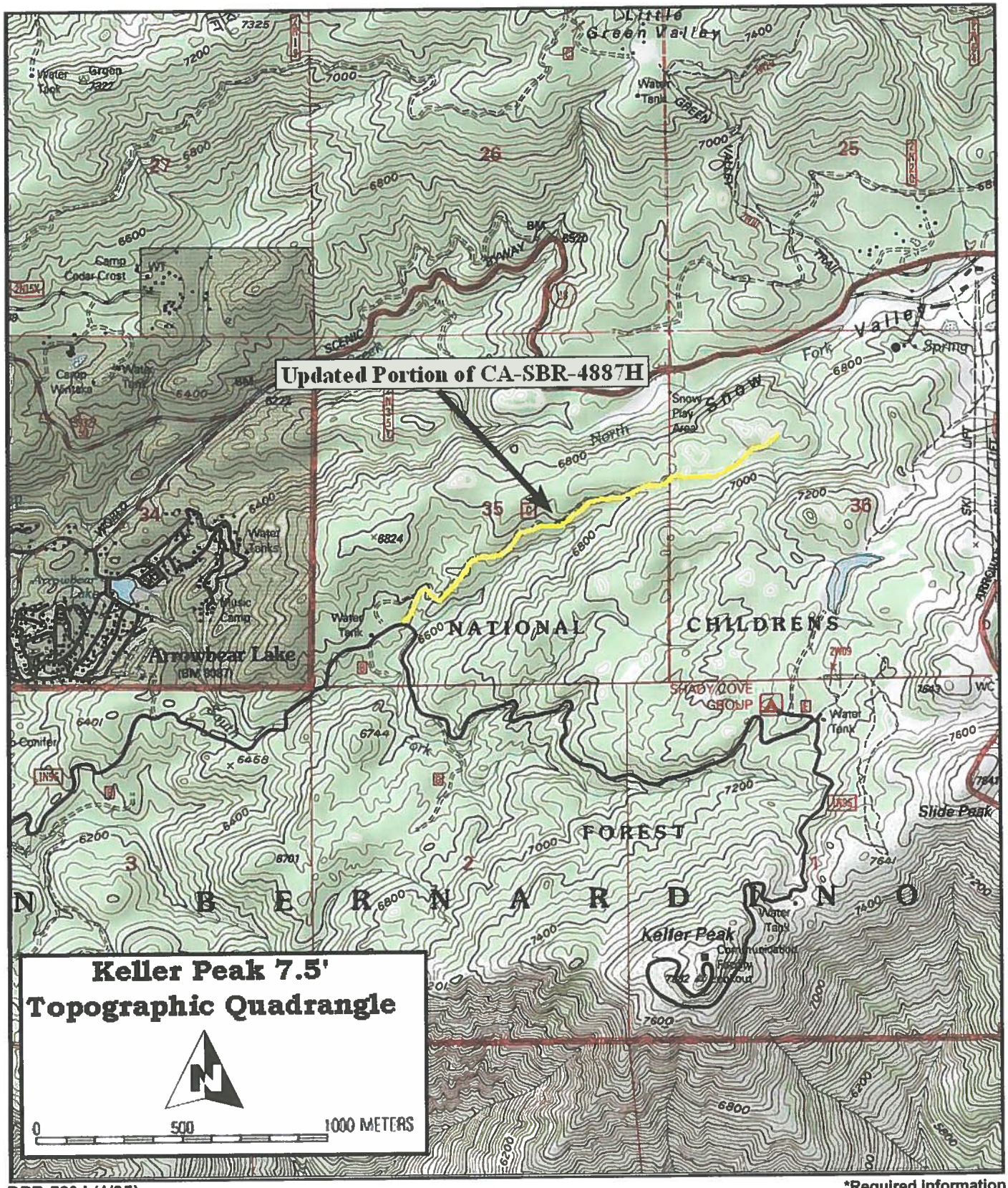
*Attachments: ☐NONE ■Location Map ☐Sketch Map ☐Continuation Sheet ☐Building, Structure, and Object Record
☐Archaeological Record ☐District Record ☐Linear Feature Record ☐Milling Station Record ☐Rock Art Record
☐Artifact Record ☐Photograph Record ☐ Other (List):

Center for Archaeological Research
CALIFORNIA STATE UNIVERSITY, BAKERSFIELD

LOCATION MAP

Primary # P36-004887 UPDATE
HRI#
Trinomial CA-SBR-4887H

*Resource Name or #: CA-SBR-4887H
*Map Name: Keller Peak, CA
*Scale: 1:24,000
*Date of Map: 1996



DPR 523J (1/95)

*Required Information

SAN BERNARDINO COUNTY MUSEUM
2024 ORANGE TREE LANE
REDLANDS, CA. 92373

HISTORIC SITE SURVEY RECORD

P36 004887

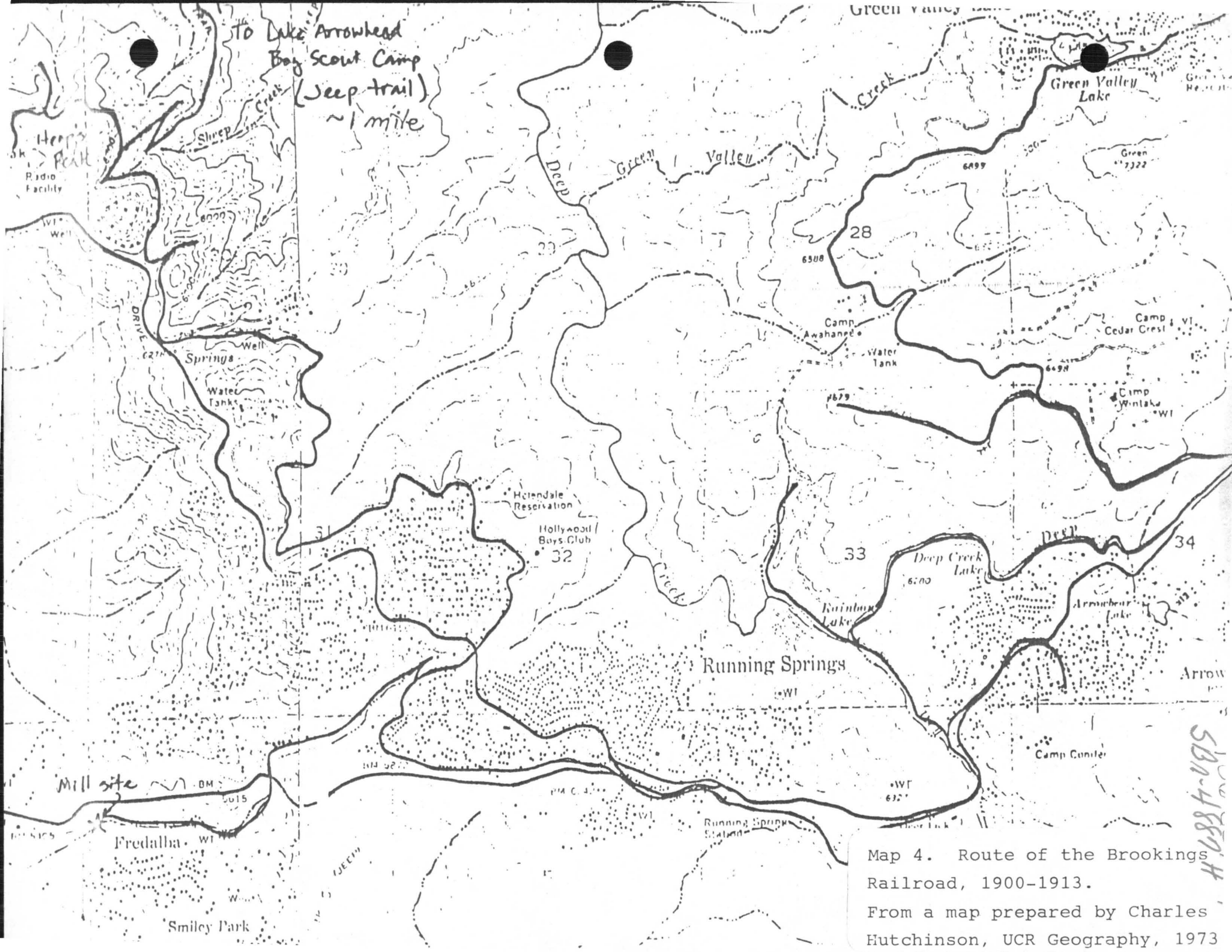
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SITE NO. SBr-4887-H

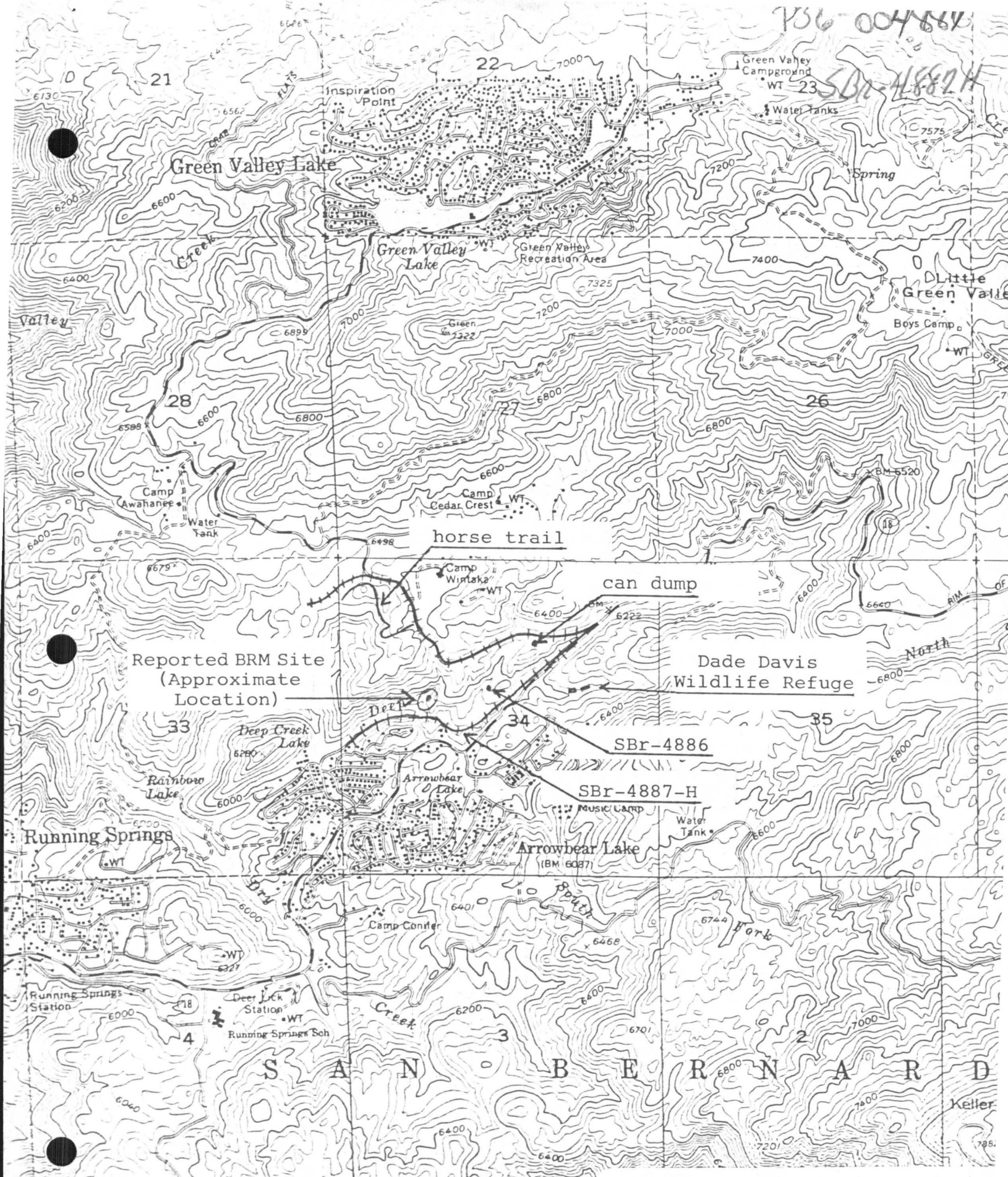
COUNTY San Bernardino

SITE NAME Brookings Railroad Grade

1. USGS QUAD. Keller Peak (7½') Redlands (15)
2. UTM GRID ZONE 11 : 492000-493000 mE 3785800 ± 30 mN
3. Twp. 2N Range 2W ; ___ ¼ of ___ ¼ of ___ ¼ of ___ ¼ of N½ ½ of Sec. 34
4. Location Along south bank of Deep Creek, north of Arrowbear, and a portion in the NW¼ of Section 34, and NE¼ of Section 33. Site also continues further west but was not checked.
5. Area 1000 m (E-W) x 10 m (N-S) 6. Contour 6000-6200
7. Owner Snow Valley, Inc. Address ___
8. Temporal Period: Circa 1908-1913 Period American Logging
9. Activity: Mining ___ Railroad XX Military ___ Homesteading ___ Exploration/ Traveling ___ Settlement ___ Ranching ___ Other XX Explain Logging railroad built by Brookings Lumber Company to get timber from where it was cut to their mill at Fredalba. RR was a narrow-gauge.
10. Site Type: Town ___ Camp ___ Homestead ___ Road ___ Trail ___ Mine ___ Railroad XX Grave Yard ___ Trash Dump ___ Military ___ Other ___
11. Previous Site Designation, Published References Brookings Railroad, see Hutchison 1973 "Lumbering in the San Bernardinos;" Johanneck 1975, A History of Lumbering in the San Bernardino Mountains; LaFuze 1971, Saga of the San Bernardinos.
12. Features: Structure ___ Dugout ___ Fire Hearth ___ Cairn ___ Rock Alignment ___ Trash Dump ___ Irrigation ___ Trail ___ Road ___ Corral ___ Burial ___ Well ___ Spring ___ R&R Grade (berm) XX Tram (road/way) ___ Tailings ___ Other XX Explain Some rock work where RR crossed Deep Creek
13. Artifacts: Wood (size/type) XX Glass (color) ___ Metal (type) XX Bone ___ Ceramic (color) ___ Adobe (condition) ___ Nails (size/type) XX Cans (size/type) ___ Ordnance ___ Other ___ Explain One RR tie observed, many small RR spikes have been collected by local residents-others may still be present but none observed.
14. Disturbance: Animal ___ Burning ___ Vandalism ___ ORV ___ Other XX Explain Many portions of the grade have been paved into roadways (modern).
15. Present Condition: Good ___ Fair XX Poor ___ Explain Portions of grade which are still present are readily observable and would make a good riding and hiking trail.
16. Sketch Map ___ 17. Photos ___
18. Recorder M. K. Lerch 19. Date 11/15/81



Map 4. Route of the Brookings Railroad, 1900-1913.
From a map prepared by Charles Hutchinson, UCR Geography, 1973



Map 3. Cultural Resources Map Adapted from USGS 7.5 minute Keller Peak Quadrangle, 1976 ed. San Bernardino County Museum Ass'

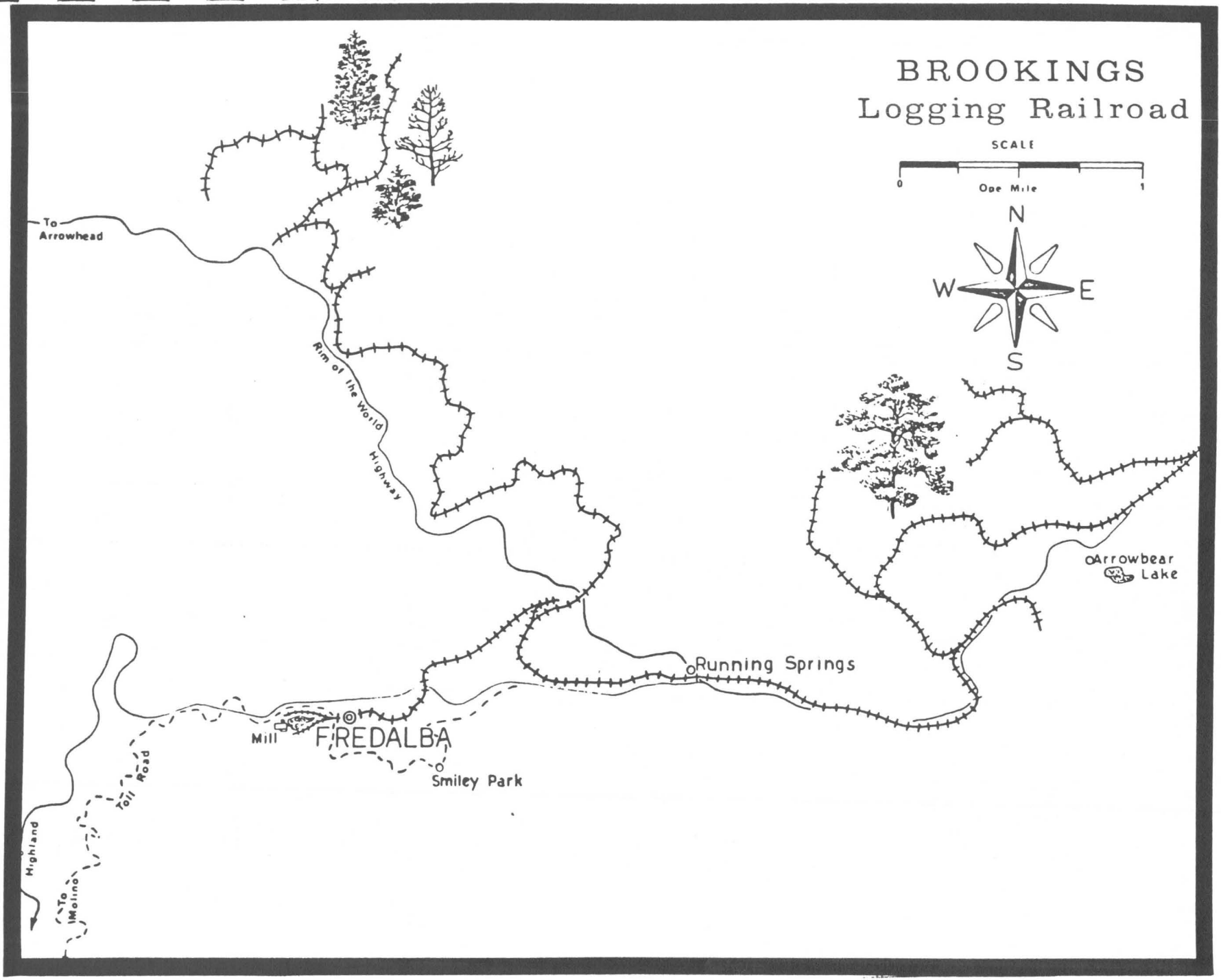


Figure 7. The Brookings Logging Railroad, San Bernardino Mountains, California (Turner 1965:28).

*Recorded by: E. Mills, J. Case *Date: 11/19/2022 ☐ Continuation ☒ Update

A segment of this resource was visited by PaleoWest archaeologists on 11/19/2022 as part of the Hume Socal Campground Cultural Resource Investigation. The segment visited corresponds to the segment noted on page 26 of the original site record. This segment of the road is now utilized as a main road within the current camp. The road grade is paved in 75% of the northern section anddirt in the southern 25%. No historic indicators of the road are evident besides the grade itself. The northern, paved segment of the road connects with modern Green Valley Lake Road (36-004887), and is the main access to the community of Green Valley Lake. The location of the road grade appears to be plotted correctly throughout this segment when compared to the original site record.

CRHR Evaluation:
The Rim of the World Drive, dedicated in 1915, has been evaluated and recommended eligible for listing on the CRHR under Criterion 1. The entire length of Rim of the World Drive through the San Bernardino Mountains, including this segment within the Project area, was mapped by the San Bernardino National Forest in 2001. The mapping was completed as part of the recordation and evaluation of the entire 1915–1916 route from the mouth of Waterman Canyon, through the mountains, and down to the mouth of Santa Ana Canyon (McCarthy and Goodman 2001). McCarthy and Goodman (2001) indicated that the Rim of the World Drive was a significant road in Southern California history because it opened the mountain areas to increased recreational use and development. However, McCarthy and Goodman did not recommend the road eligible for listing on either the CRHR or the NRHP because they stated that over the last several decades, the original alignment has been realigned, rerouted, and resurfaced and does not appear to retain sufficient integrity. A later examination of the eligibility of the road, conducted by Josh Smallwood, focused on the significance the road has had on the area since the 1920s (Smallwood 2012).

Rim of the World Drive evolved over the early decades of the 20th century to accommodate the expansion and growth of development in the region and was designated State Highway 18 by the 1920s. Smallwood (2012) recommended the resource eligible for the CRHR under Criterion 1 because of the "significant role it played in the development and growth of the San Bernardino Mountain region." Additionally, Smallwood argued that despite the various road modifications and improvements in the 1920s and early 1930s, the alignment, design, materials, construction, and appearance have changed very little since that time. As such, the road retains sufficient integrity to relate its significance dating to the period of 1933–1960s. However, Smallwood did not complete survey of the entire length of Rim of the World Drive, but instead focused his evaluation on a 2,724-ft-long segment in the community of Rimforest stating that segment of road retains sufficient historical integrity to relate the period of significance, 1933-1960s, and is eligible for the CRHR under Criterion 1. Smallwood (2012) indicated the segment located within the community of Rimforest does not appear to be eligible under any of the other criteria of the CRHR, as it is not directly associated with an important historical figure (Criterion 2), it does not exhibit any architectural or engineering merits (Criterion 3), and it does not have the data potential to yield information important to the study of our local, state, or national history (Criterion 4).

While the larger resource and, specifically, the portion evaluated by Smallwood in 2012 appears to be eligible for listing on the CRHR under Criterion 1 and retains sufficient historic integrity, the segment of the road within the current Project area does not appear to retain that same historic integrity. The segment of road within the Project area is in regular use by the campground and has been subject to modern maintenance and improvements resulting in the loss of integrity. The road appears well maintained and does not exhibit any historical significance outside of the documented alignment. Additionally, as Smallwood stated the road is not directly associated with an important historical figure, it does not exhibit any architectural or engineering merits, and it does not have the data potential to yield information important to the study of the San Bernardino Mountains, California, or the United States. As such, the segment of the resource within the current Project area does not appear meet the criteria for listing on the CRHR.

*Recorded by: E. Mills, J. Case *Date: 11/19/2022 ☐ Continuation ☒ Update



Overview of road grade still in use facing north.

Report Citation: 2023. Thomas, Roberta, Gena Severen, Evan Mills, and Michael Mirro. *Cultural Resources Investigation of the Hume Socal Campground Project, San Bernardino County, California*. Prepared by PaleoWest LLC, Redlands, CA.

References:

McCarthy, Daniel F., and John D. Goodman II
2001 Department of Parks and Recreation Form(s) for P-36-007049. On file at the South Central Coastal Information Center, California State University, Fullerton.

Smallwood, Josh
2012 Department of Parks and Recreation Form(s) for P-36-007049. On file at the South Central Coastal Information Center, California State University, Fullerton.

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

PRIMARY RECORD

Primary # 36-007049 (update)
HRI #
Trinomial CA-SBR-7049H
NRHP Status Code 3S

Other Listings
Review Code **Reviewer** **Date**

Resource Name or #: (Assigned by recorder) Æ-2410-1H; Rim of the World Drive

P1. **Other Identifier:**

P2. **Location: a. County** San Bernardino, CA ☐ **Not for Publication** ☒ **Unrestricted**
b. USGS 7.5′ Quad Harrison Mtn, CA **Date** 1973
T 2 **N**; **R** 3 **W**; portions **of Sec** 29 and 30; **S.B.B.M.**
c. Address: None **City** Rimforest **Zip** 92378
d. Zone 11 478,963 **mE/** 3,787,695 **mN** West end of segment
479,790 **mE/** 3,787,649 **mN** East end of segment

e. Other Locational Data (e.g., parcel #, legal description, directions to resource, additional UTMs, etc., when appropriate): This stretch of Rim of the World Drive (State Route 18) traverses through the town of Rimforest in the San Bernardino Mountains.

P3a. **Description** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries): This 2,724-ft (0.52-mile) -long segment of the historical Rim of the World Drive appears much the way it did in the late 1940s according to historical maps and photographs of the area. It is a short segment of State Highway 18 that has evolved as Rim of the World Drive since 1915. Only this short segment was documented during this study. Rim of the World Drive (36-007049) is a two-lane, asphalt-paved, stripe-divided highway with paved shoulders (see Figure 1). The pavement along Rim of the World Drive widens along the commercial strip in the downtown area of Rimforest to provide parking for automobiles. Photographs and postcards from the 1940s reveal that the design, appearance, and overall characteristics of this segment of Rim of the World Drive have changed very little over the last 60 or 70 years (see Figure 2). This segment of Rim of the World Drive was recorded during this study as an update to the previous record for 36-007049. The Rim of the World Drive through the San Bernardino Mountains, including the segment located in the Project area, was mapped by the San Bernardino National Forest in 2001 as part of the recordation and evaluation of the entire 1915–1916 route from the mouth of Waterman Canyon, up and across the mountains, and then down again to the mouth of Santa Ana Canyon (McCarthy and Goodman 2001:1–42).

P3b. **Resource Attributes** (List all attributes and codes): HP 37: Highway/trail

P4. **Resources Present:** ☐ Building ☒ Structure ☐ Object ☐ Site ☐ District ☐ Element of District ☐ Other:

P5. **Photograph or Drawing:** (Photograph required for buildings, structures, and objects.) See photograph on attached Continuation Sheet.

P6. **Date Constructed/Age and Source:** ☐ Prehistoric ☒ Historic ☐ Both

P7. **Owner and Address:** County of San Bernardino

P8. **Recorded by** (Name, affiliation, address): Josh Smallwood, Applied EarthWorks, Inc., 3550 E. Florida Ave., Suite H, Hemet, CA 92544.

P9. **Date Recorded:** July 11, 2012

P10. **Type of Survey:** ☒ Intensive ☐ Reconnaissance ☐ Other
Describe: Maximum 15-m pedestrian transects.

P11. **Report Citation** (Provide full citation or enter "none"): Smallwood, Josh (2012): *Cultural Resources Report for the Proposed Rimforest Storm Drain Project, San Bernardino County, California*. Prepared for County of San Bernardino, Department of Public Works, by Applied EarthWorks, Inc. (Æ).

Attachments: ☐ None ☒ Location Map ☐ Site Map ☒ Continuation Sheet ☒ Building, Structure, and Object Record ☐ Archaeological Site Record ☐ District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record ☐ Artifact Record ☐ Photograph Record Other:

B1. Historic Name: Rim of the World Drive **B2.** Common Name: Same
B3. Original Use: Automobile route through the San Bernardino Mountains
B4. Present Use: Same
B5. Architectural Style: Asphalt-paved two-lane striped highway with dirt shoulders
B6. Construction History: (Construction date, alterations, and date of alterations) The following brief history of Rim of the World Drive was provided by Roger Hatheway, author of the *Images of America* book titled, "Rim of the World Drive" (2007). Dedicated on July 17 and 18, 1915, the Rim of the World Drive was touted as a 101-mile-long scenic auto route that was immediately recognized as a true wonder of engineering and beauty, where rugged canyons and mountain peaks were conquered and natures' wonder was miraculously revealed at every turn. The "Rim" route opened the mountains to a new generation of tourists, campers, and holiday seekers. By 1917, the regular holiday pilgrimages had begun in earnest, and mountain auto stages had established regular service over what was now a State highway.

Rider's California: A Guide-Book for Travelers provided the schedule for seasonal group auto tours along the Rim of the World Drive from Los Angeles, for those who could afford the tour. One of the schedules published in 1922 reads,

> The Motor Transit, Co. during the season runs a daily special from Los Angeles at 7 a.m., from San Bernardino at 10:00 a.m., reaching Pinecrest at 12 and Arrowhead Lake at 12:45 p.m. There is daily local service between Arrowhead Lake and Big Bear Lake in 3 hrs.: also between Big Bear Lake and Redlands, via Mill Creek Canyon in 5 hrs. 20 min. (Collection of Roger Hatheway)

A promotional brochure issued by the San Bernardino Chamber of Commerce in 1929 describes the 101 miles on the "Rim of the World" through the San Bernardino Mountains:

> The San Bernardino Mountains are famed the world over for their natural attractions, as well as for the comfort which numerous lodges, camps, and taverns located in sheltered spots along the rocky ways, afford the traveler on foot, in the saddle, or journeying in the more convenient automobile way. The San Bernardino Mountains are penetrated by the most modern mountain highway system in the world. The Rim-of-the-World Drive has gained world-wide recognition because of the magnificent mountain scenery through which it takes the tourist. For a distance of fifty miles or more it winds along the crest of the mountains, alternating in outlook from the Mojave desert and never ending mirages on the north, to the green and fertile San Bernardino Valley on the south. It is a journey through wonderland, and is a revelation to every visitor, each turn in the road presenting some new charm, each winding trail disclosing some new beauty, smooth-surfaced lakes coming into view here and there. It is a trip of never-ending delight. (Collection of Josh Smallwood)

Another early promotional brochure describes the Rim of the World Drive as:

> An improved highway embracing many engineering feats and affording an interesting and worth-while scenic trip, is located in the heart of the San Bernardino Mountains. The gateway to this 101-mile mountain drive is San Bernardino. Passing, through Waterman Canyon, one climbs 13 miles, up many curves and switchbacks, to Crestline, proceeding thence along the crest of the San Bernardino Range above the Valley of the Little Bear and its beautiful, placid Lake Arrowhead. The village of Lake Arrowhead is a modern community, with shops, hotels, and every convenience for all forms of outdoor sports, both summer and winter. Continuing the journey, one passes through Running Springs Park and Fish Camp, a beautiful timbered area, and up the new road to the dam at the west end of Big Bear Lake. All the resorts and public camps on the lake are accessible from this point. From many points along this 40-mile crest drive the traveler sees spread out before him checker-board orange groves, thriving cities, misty rolling hills, and in the distance the blue waters of the Pacific stretching to the far horizon.
>
> From Big Bear Lake the return journey is made by way of Mill Creek Canyon, Mentone, and Redlands, or over the City Creek Road. The former route is very beautiful and takes one through fine forests of pine and fir, down the tortuous curves of the Mill Creek grade, and out into the orange-grove lands of the Santa Ana Valley. From this road side trips may be made to Upper Santa Ana River Canyon and Upper Mill Creek." (Collection of Roger Hatheway)

B6. **Construction History:** (Continued) By the mid-1920s, California highway planners and engineers realized that the capacity of the now famous Rim of the World Drive had exceeded all expectations. On a holiday weekend such as Memorial Day or Labor Day, it could take up to four hours to reach the crest from San Bernardino, and lines of traffic snaked up the mountain until well after midnight. As a result, a "High-Gear" road was planned that eliminated dreaded switchbacks, and ideally allowed the driver of a totally stock automobile to travel from San Bernardino to the mountain crest entirely in high gear. First planned in the mid-1920s, construction was underway by 1928, the switchbacks were eliminated by 1931, and the completed highway was officially opened on October 21, 1933. Scenic rockwork and chains were later added as part of a W.P.A. funded program to increase the safety and beauty of the drive. On February 10, 1936, the Lake Arrowhead Women's Club honored highway engineer E. Q. Sullivan for his work on the newly improved highway.

Construction of the high gear road on the Rim of the World Drive was a genuine breakthrough. By the early 1930s, mountain resorts and communities were linked to the valley by a blacktop highway, better facilitating the huge Memorial Day, Fourth of July, and Labor Day weekend traffic blowouts. Roadway improvements continued, and by the late 1960s, the present four lane route was completed "up the hill." The segment of the Rim of the World Drive/Highway 18 from the Crestline Cut-Off to Rim Forest was completed during the years 1930–1933. Today the historic Rim of the World Drive threads its way through the most urbanized mountains in America. Assembled from many component parts and continuously realigned and rebuilt from 1915 to the late-1960s, it is the very "backbone" of the San Bernardino Mountains connecting all towns, resorts, and recreation areas.

B7. **Moved?** ☒ No ☐ Yes ☐ Unknown **Date:** **Original Location:**

B8. **Related Features:** No historical roadside features such as rockwork and chain or wooden guardrails, or objects such as survey markers or monuments were encountered along this segment.

B9a. Architect: Highway engineer E. Q. Sullivan **b.** Builder: San Bernardino County

B10. **Significance:** **Theme** Early twentieth century mountain roads
Area San Bernardino Mountains **Period of Significance** 1933-1960s
Property Type Road **Applicable Criteria** CRHR Criterion A
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.) The entire length of Rim of the World Drive through the San Bernardino Mountains, including this segment, was mapped by the San Bernardino National Forest in 2001 as part of the recordation and evaluation of the entire 1915–1916 route from the mouth of Waterman Canyon, up and across the mountains, and then down again to the mouth of Santa Ana Canyon (McCarthy and Goodman 2001:1–42). McCarthy and Goodman indicate that the Rim of the World Drive designated in 1915 was a significant road in southern California history, as it opened the mountain areas to increased recreational use and development. However, as indicated in the record, due to the 1915–1916 road being realigned, rerouted, and resurfaced over the last several decades, the original alignment does not appear to retain sufficient integrity to be eligible for the NRHP or the CRHR. The recorders assigned a NRHP Status Code of "5," finding that the resource is ineligible, but still of local interest. Their evaluation focused specifically on the extant dirt portions of the 1915–1916 route, and it does not consider the significance and integrity of the Rim of the World Drive that has existed since the 1920s.

Rim of the World Drive, like other early automobile roads found in southern California evolved progressively through the decades of the early twentieth century, as necessary, to accommodate the boom in growth and development of the region during the 1920s, road projects that occurred during the Great Depression, and another boom during the post-WWII era. During that time, Rim of the World Drive, as explained in Chapter 2 of this report, was transformed from an early dirt automobile road that took several hours to traverse and was only afforded by the few people who had the proper vehicles to make the trip, into a "high-gear road" during the 1920s and 1930s, which excelled its benefits and use to a broader range of the public. Rim of the World Drive, designated as State Highway 18 by the 1920s, has existed since that time as the backbone of the San Bernardino Mountains, providing access to and facilitating the growth and development of the various mountain communities found along its route. Based on the historical background of the Rim of the World Drive developed during this and the 2002 National Forest study, it is apparent that the Rim of the World Drive of 1915–1916 and of the 1920s–1960s is significant for the role it played in the development and growth of the San Bernardino Mountains region, making it eligible for the CRHR under Criterion 1.

B10. Significance: (Continued)

The road was improved through numerous modifications in the 1920s and early 1930s, resulting in completion of the "high-gear" road in 1933, and the alignment, design, materials, construction, and appearance have changed very little since then. While the road of today may not retain sufficient integrity to relate its 1915–1916 period of significance, it certainly retains sufficient integrity to relate its significance dating to the period of 1933–1960s. Photographs of the Rimforest community from the late 1940s indicate that this segment of Rim of the World Drive appears much the same as it did at that time; during a period of early growth and development within the town. While a complete survey of the entire length of Rim of the World Drive is beyond the scope of this study, there is sufficient data to suggest that the segment located within the Project area retains sufficient historical integrity to relate the period of significance, 1933-1960s, and is eligible for the CRHR under Criterion 1. The segment located within the Project area in the community of Rimforest does not appear to be eligible under any of the other criteria of the CRHR, as it is not directly associated with an important historical figure (Criterion 2), it does not exhibit any architectural or engineering merits (Criterion 3), and it does not have the data potential to yield information important to the study of our local, state, or national history (Criterion 4).

B11. Additional Resource Attributes: (List attributes and codes)

B12. References:

B13. Remarks: **Project Impacts Assessment:** For the segment of Rim of the World Drive (36-007049) situated within the Rimforest Storm Drain Project boundaries, the existing features that contribute to the historical significance and integrity of this "historical resource" under CEQA are the location, design, and setting of the roadway, and the materials used in its construction. No historical roadside features such as rockwork and chain or wooden guardrails, or objects such as survey markers or monuments were encountered along this segment. The proposed Project within the vicinity of Rim of the World Drive involves trenching for underground pipelines, which has no potential to alter, destroy, relocate, or remove any features that contribute to the integrity or significance of Rim of the World Drive. Based on these considerations, the present study concludes that the proposed Project *will not cause a substantial adverse change* to the integrity or significance of Rim of the World Drive, 36-007049.

B14. Evaluator: Josh Smallwood
Date of Evaluation: October 2012

(Sketch Map with north arrow required.)

See attached Continuation Sheet

(This space reserved for official comments.)



Figure 1. Rim of the World Drive/SR 18 through the town of Rimforest. Photograph taken on July 11, 2012; view to the east.



Figure 2 A circa-1940s "Frasher's Fotos" postcard depicts a winter scene along Rim of the World Drive/SR 18 through the town of Rimforest (view to the west).



Figure 3 An aerial view of the segment of Rim of the World Drive recorded during this study.

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

LOCATION MAP

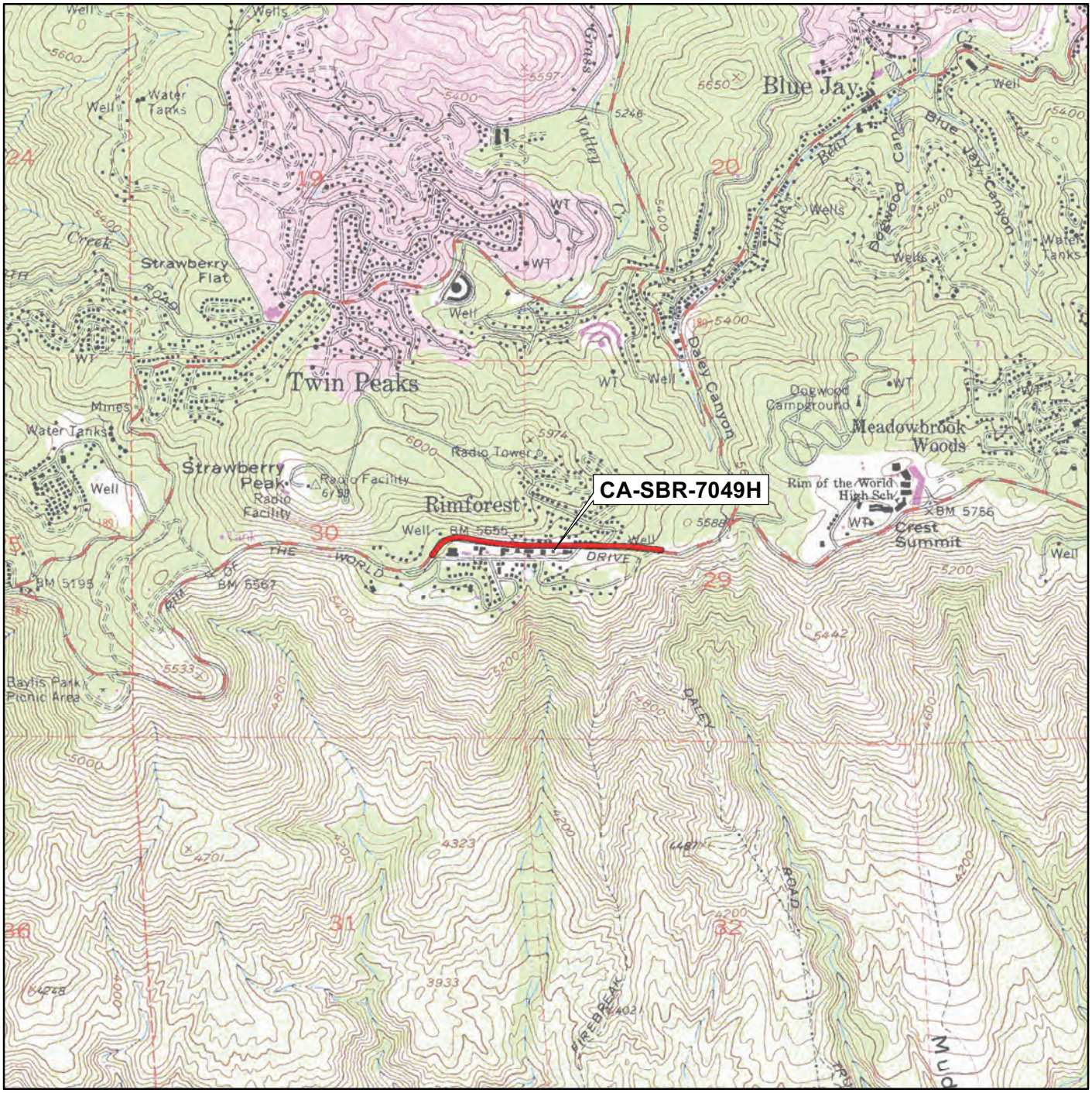
Primary # 36-007049 (Update)
HRI#
Trinomial CA-SBR-7049H

***Resource Name or #:** Æ-2410-1H

***Scale:** 1:24,000

***Map Name:** Harrison Mtn. (1967, photorevised 1980), CA, USGS 7.5' quadrangle

***Date:** 2012



SCALE 1:24,000

1 0.5 0 1 Miles

1,000 0 1,000 2,000 3,000 4,000 5,000 6,000 7,000 Feet

1 0.5 0 1 Kilometers

TRUE NORTH

Update 7/12

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary # P-36-007049
HRI #
Trinomial
NRHP Status Code
Other Listings
Review Code Reviewer Date

 *Resource Name or #: SRI-3556

P1. Other Identifier: SRI-3556
*P2. Location: ☑ Not for Publication ☐ Unrestricted *a. County: San Bernardino
*b. USGS Quad: 7.5' FAWNSKIN (2009); T 2N R 1W, NE¼ of SE¼ of Sec. 11; SBBM ← HARRISON MTN
c. Address:
d. UTM: Zone 11; 489834 mE/ 3789547 mN NAD27 GPS
e. Other Locational Data:
Feature 6386 is located on the north side of Highway 18 at postmile 21.2, southeast of Crestline. Feature 8833 is located off Highway 189 at postmile 1.7 in the town of Twin Peaks. Feature 6764 is located on Highway 38 near postmile 55.9 in Fawnskin.

*P3a. Description:
This is an update for three segments of the Crest Route (P-36-007049), which intersect Highways 18, 38 and 189 in the San Bernardino National Forest. The current project only examines the first 15 meters from the edge of pavement corresponding to the Caltrans right-of-way. The site continues beyond the right-of-way, but these portions were not recorded.

*P3b. Resource Attributes: AH7 Historical-period road, HP37 Historical-period road
*P4. Resources Present: ☐ Building ☐ Structure ☐ Object ☑ Site ☐ District ☐ Element of District ☐ Other (Isolates, etc.)



*P5b. Description of Photo:
Facing SE; 5/18/2011; Mile Pine Road

*P6. Date Constructed/Age & Sources:
☑ Historic ☐ Prehistoric ☐ Both

*P7. Owner and Address:
GARTHOFFNER, ROLF C, P O BOX 547
LAKE ARROWHEAD CA

*P8. Recorded by:
Joshua Trampier, SRI

*P9. Date Recorded: 5/19/2011
*P10. Survey Type:
Reconnaissance survey of highway right-of-way

*P11. Citation: Report forthcoming

*Attachments: ☐ None ☑ Location Map ☑ Sketch Map ☑ Continuation Sheet ☐ Building, Structure, and Object Record
☑ Archaeological Record ☐ District Record ☑ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record
☐ Artifact Record ☑ Photograph Record ☐ Other:

*A1. Dimensions: a. Length 27680 m (E/W) x b. Width 1372 m (N/S)
Method of Measurement: ☐ Paced ☐ Taped ☐ Visual estimate ☑ GPS ☐ Other:
Method of Determination: ☐ Artifacts ☑ Features ☐ Soil ☐ Vegetation ☐ Topography ☐ Cut bank ☐ Animal burrow ☐ Excavation ☐ Property boundary ☑ Other: The site boundary is determined in part by the right-of-way established ...
Reliability of determination: ☐ High ☑ Medium ☐ Low
Explain: Three segements of the road were visible where they cross Highways 18, 38 and 189. Based on ...
Limitations: ☐ Restricted access ☐ Paved/built over ☑ Site limits incompletely defined ☑ Disturbances ☑ Vegetation ☐ Other:

A2. Depth: None ☑ None ☐ Unknown Method of determination: None

*A3. Human Remains: ☐ Present ☑ Absent ☐ Possible ☐ Unknown

*A4. Features:

This site consists of three segments of the Crest Route (P-36-007049), located on Highway 18 at postmile 21.2, Highway 38 at postmile 58.9, and again at Highway 189 at postmile 1.7. The site boundary was defined using the 1915 map of the Crest Route from the Touring Information Bureau. Though the site continues beyond the right-of-way, only the portions located in the right-of-way was recorded. Based on the previous site record, three other segments should have crossed the highway within the caltrans right-of-way, but these were not found. They occurred at.

A first segment of this site was found intersecting Highway 18. This segment (Feature 6386) is unpaved and two-lane. The road is estimated to measure about 16 feet wide and runs west to east on the north side of Highway 18. The road segment is almost completely overgrown by vegetation, though the sloping approach of the road from west down to east can be seen from Highway 18. The entrance to the highway has been blocked by several large granite boulders.

The second segement of the road, called Rim of the World Drive (Feature 6764), is oriented relatively east to west at this segment and intersects Highway 38 from the west. Only the southern portion of the road, approximately half the road, is located within the right-of-way. Only this portion was recorded. This road extends passes through a residential area and provides access to downtown Fawnskin.

The third segment (Feature 8833) is a moderately maintained, asphalt-paved road/parking lot on Highway 189. Initially, as previous site records indicate, this site was a portion of the Crest Route. The Crest Route has since been incorporated into Highway 189, the parking lot for the Mountain High Market, and Mile Pine Road. Mile Pine Road is located behind the market and begins approximately 33 m south of Highway 189. The portion of the road located within the parking lot exhibits numerous asphalt patches. The road is oriented northwest to southeast and intersects Highway 189 from the southeast.

*A5. Cultural Constituents:

No artifacts were located at the site.

*A6. Were Specimens Collected? ☑ No ☐ Yes

*A7. Site Condition ☐ Good ☑ Fair ☐ Poor

Feature 6386 has almost completely been lost due to vegetation overgrowth. It can chiefly be distinguished by its planed surface visible from the highway and to some extent when standing on the road. Feature 8833 has long since been incorporated into the driveway/parking lot of the Mountain High Market. Numerous asphalt patches are visible on the surface of the road. Feature 6764 is in good condition.

*A8. Nearest Water: Lake Gregory is located approximately 2.9 km west of the Feature 8833. Big Bear Lake is located ...

*A9. Elevation: 1638 m amsl

A10. Environmental Setting:

The road winds through the San Bernardino National Forest. Vegetation consists of coniferous and deciduous trees, shrubs, grasses, and forbs. The general topography is hilly with granitic outcrops.

A11. Historical Information:

In previous site records, the site boundary was defined using a 1915 map of the Crest Route distributed by the Touring Information Bureau.

*A12. Age: ☐ Prehistoric ☐ Protohistoric ☐ 1542-1769 ☐ 1769-1848 ☐ 1848-1880 1880-1914 ☑ 1914-1945 ☑ Post-1945 ☐ Undetermined

A13. Interpretations:

None

A14. Remarks:

None

A15. References:

None

A16. Photographs: See photograph record
Original Media/Negatives Kept At: 21 W. Stuart Ave, Redlands, CA 92373

***A17. Form Prepared By:** Joshua Trampier **Date:** 5/19/2011
Affiliation and Address: Statistical Research, Inc., 21 W. Stuart Ave, Redlands, CA 92373

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

LINEAR FEATURE RECORD

Primary # P-36-007049
HRI #
Trinomial

*Resource Name or #: SRI-3556

L1. Historic and/or Common Name: Rim of the World Drive

L2a. Portion Described: ☐ Entire Resource ☑ Segment ☐ Point Observation **Designation:** Feature 6386

L2b. Location of Point or Segment:

Zone 11; 477724 mE/ 3786970 mN NAD27 GPS
Zone 11; 477733 mE/ 3786955 mN NAD27 GPS
Zone 11; 478533 mE/ 3788467 mN NAD27 GPS
Zone 11; 478540 mE/ 3788481 mN NAD27 GPS
Zone 11; 504951 mE/ 3791847 mN NAD27 GPS

L3. Description:

This site consists of three segments of the Crest Route (P-36-007049), located on Highway 18 at postmile 21.2, Highway 38 at postmile 58.9, and again at Highway 189 at postmile 1.7. The site boundary was defined using the 1915 map of the Crest Route from the Touring Information Bureau. Though the site continues beyond the right-of-way, only the portions located in the right-of-way was recorded. Based on the previous site record, three other segments should have crossed the highway within the caltrans right-of-way, but these were not found. They occurred at.

A first segment of this site was found intersecting Highway 18. This segment (Feature 6386) is unpaved and two-lane. The road is estimated to measure about 16 feet wide and runs ...

L4. Dimensions:

a. Top Width: 5.00 m
b. Bottom Width: N/A
c. Height or Depth: None
d. Length of Segment: 15.00 m

L5. Associated Resources:

None

L4e. Sketch of Cross-Section: **Facing:**

L6. Setting:

The road winds through the San Bernardino National Forest. Vegetation consists of coniferous and deciduous trees, shrubs, grasses, and forbs. The general topography is hilly with granitic outcrops.

L7. Integrity Considerations:

Feature 6386 has almost completely been lost due to vegetation overgrowth. It can chiefly be distinguished by its planed surface visible from the highway and to some extent when standing on the ...

L8b. Description of Photo, Map, or Drawing

See sketch map

L9. Remarks:

None

L10. Form Prepared By:

Joshua Trampier

L11. Date: 5/19/2011

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

LINEAR FEATURE RECORD

Primary # P-36-007049
HRI #
Trinomial

 *Resource Name or #: SRI-3556

L1. Historic and/or Common Name: none

L2a. Portion Described: ☐ Entire Resource ☑ Segment ☐ Point Observation **Designation:** Feature 8833

L2b. Location of Point or Segment:

Zone 11; 477724 mE/ 3786970 mN NAD27 GPS
Zone 11; 477733 mE/ 3786955 mN NAD27 GPS
Zone 11; 478533 mE/ 3788467 mN NAD27 GPS
Zone 11; 478540 mE/ 3788481 mN NAD27 GPS
Zone 11; 504951 mE/ 3791847 mN NAD27 GPS

L3. Description:

This site consists of three segments of the Crest Route (P-36-007049), located on Highway 18 at postmile 21.2, Highway 38 at postmile 58.9, and again at Highway 189 at postmile 1.7. The site boundary was defined using the 1915 map of the Crest Route from the Touring Information Bureau. Though the site continues beyond the right-of-way, only the portions located in the right-of-way was recorded. Based on the previous site record, three other segments should have crossed the highway within the caltrans right-of-way, but these were not found. They occurred at.

A first segment of this site was found intersecting Highway 18. This segment (Feature 6386) is unpaved and two-lane. The road is estimated to measure about 16 feet wide and runs ...

L4. Dimensions:

a. Top Width: 15.00 m
b. Bottom Width: N/A
c. Height or Depth: None
d. Length of Segment: 15.00 m

L5. Associated Resources:

None

L4e. Sketch of Cross-Section: **Facing:**

L6. Setting:

The road winds through the San Bernardino National Forest. Vegetation consists of coniferous and deciduous trees, shrubs, grasses, and forbs. The general topography is hilly with granitic outcrops.

L7. Integrity Considerations:

Feature 6386 has almost completely been lost due to vegetation overgrowth. It can chiefly be distinguished by its planed surface visible from the highway and to some extent when standing on the ...

L8b. Description of Photo, Map, or Drawing

See sketch map

L9. Remarks:

None

L10. Form Prepared By:

Joshua Trampier

L11. Date: 5/19/2011

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

LINEAR FEATURE RECORD

Primary # P-36-007049
HRI #
Trinomial

*Resource Name or #: SRI-3556

L1. Historic and/or Common Name: Rim of the World Drive

L2a. Portion Described: ☐ Entire Resource ☑ Segment ☐ Point Observation **Designation:** Feature 6764

L2b. Location of Point or Segment:

Zone 11; 477724 mE/ 3786970 mN NAD27 GPS
Zone 11; 477733 mE/ 3786955 mN NAD27 GPS
Zone 11; 478533 mE/ 3788467 mN NAD27 GPS
Zone 11; 478540 mE/ 3788481 mN NAD27 GPS
Zone 11; 504951 mE/ 3791847 mN NAD27 GPS

L3. Description:

This site consists of three segments of the Crest Route (P-36-007049), located on Highway 18 at postmile 21.2, Highway 38 at postmile 58.9, and again at Highway 189 at postmile 1.7. The site boundary was defined using the 1915 map of the Crest Route from the Touring Information Bureau. Though the site continues beyond the right-of-way, only the portions located in the right-of-way was recorded. Based on the previous site record, three other segments should have crossed the highway within the caltrans right-of-way, but these were not found. They occurred at.

A first segment of this site was found intersecting Highway 18. This segment (Feature 6386) is unpaved and two-lane. The road is estimated to measure about 16 feet wide and runs ...

L4. Dimensions:

a. Top Width: 8.00 m
b. Bottom Width: N/A
c. Height or Depth: None
d. Length of Segment: 19.00 m

L5. Associated Resources:

None

L4e. Sketch of Cross-Section: **Facing:**

L6. Setting:

The road winds through the San Bernardino National Forest. Vegetation consists of coniferous and deciduous trees, shrubs, grasses, and forbs. The general topography is hilly with granitic outcrops.

L7. Integrity Considerations:

Feature 6386 has almost completely been lost due to vegetation overgrowth. It can chiefly be distinguished by its planed surface visible from the highway and to some extent when standing on the ...

L8b. Description of Photo, Map, or Drawing

See sketch map

L9. Remarks:

None

L10. Form Prepared By:

Joshua Trampier

L11. Date: 5/19/2011

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

PHOTOGRAPH RECORD

Primary # P-36-007049
HRI #
Trinomial

***Resource Name or #:** SRI-3556

Camera Format:
Lens Size:
Film Type and Speed: Digital
Negatives Kept At: 21 W. Stuart Ave, Redlands, CA 92373

Date	Time	Exp/ Frame	Subject/Description	View Toward	Accession #
5/18/2011		1200	Mile Pine Road	SE	
5/19/2011		40	Road	W	
5/19/2011		41	Road	None	
6/16/2011		2	Rim of the World Drive	NW	

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

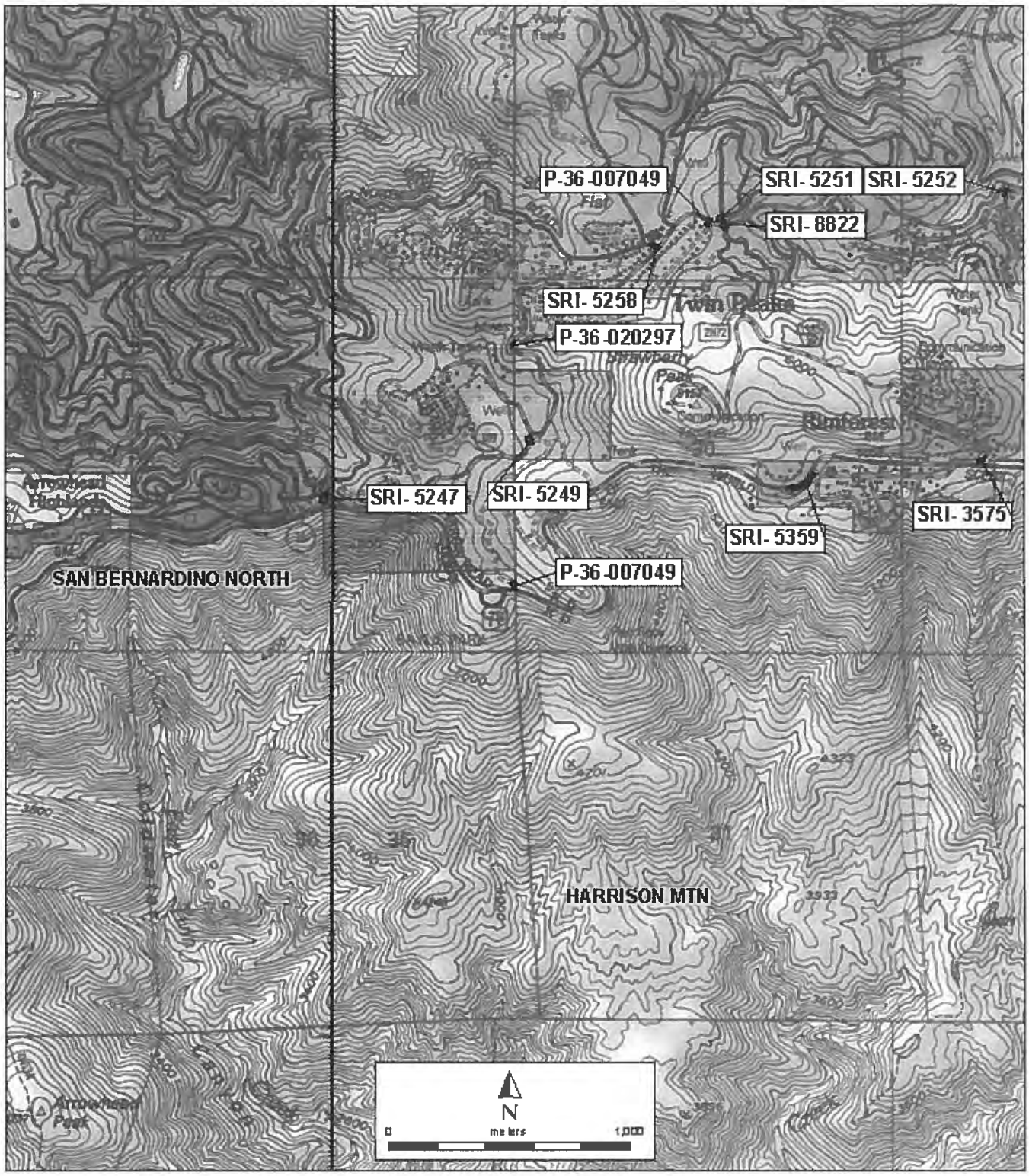
LOCATION MAP

Primary # P-36-007049
HRI #
Trinomial

*Resource Name or #: SRI-3556

*Map Name: 7.5' Harrison Mtn USGS Topographic Quad Scale: 1:24,000

*Year: 2009



*Required Information

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

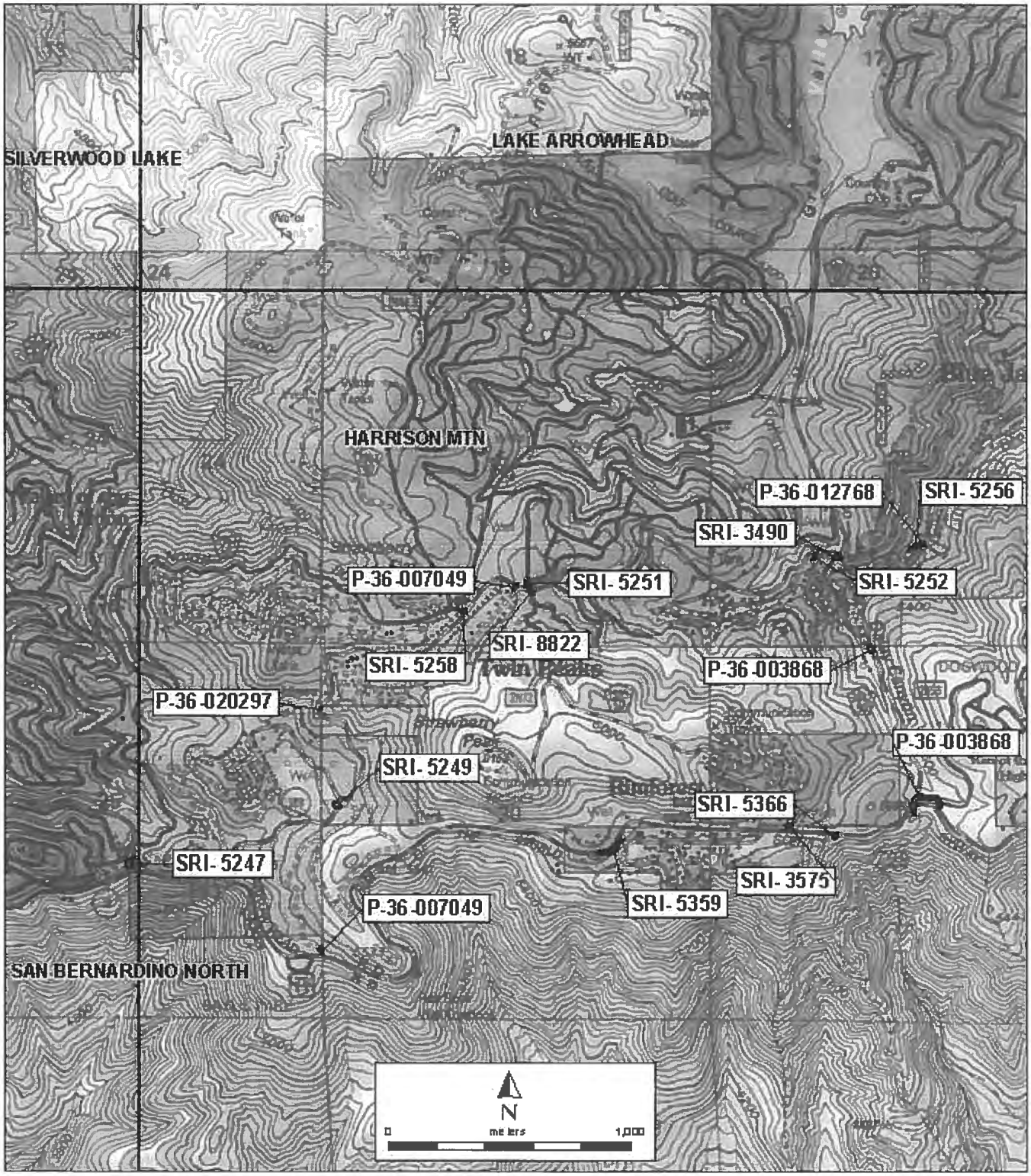
LOCATION MAP

Primary # P-36-007049
HRI #
Trinomial

*Resource Name or #: SRI-3556

*Map Name: 7.5' Harrison Mtn USGS Topographic Quad Scale: 1:24,000

*Year: 2009



*Required Information

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

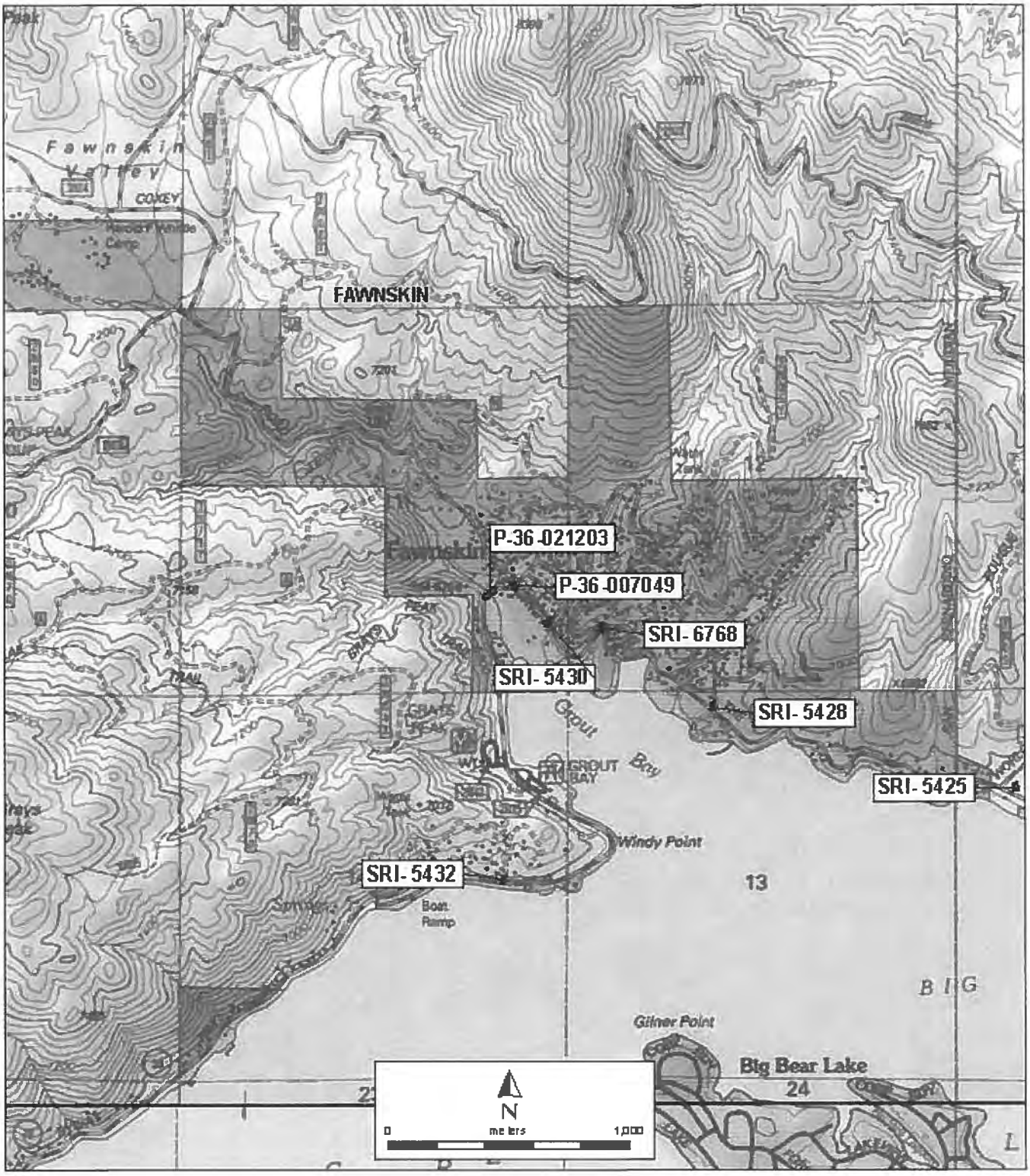
LOCATION MAP

Primary # P-36-007049
HRI #
Trinomial

*Resource Name or #: SRI-3556

*Map Name: 7.5' FAWNSKIN USGS Topographic Quad Scale: 1:24,000

*Year: 2009



*Required Information

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

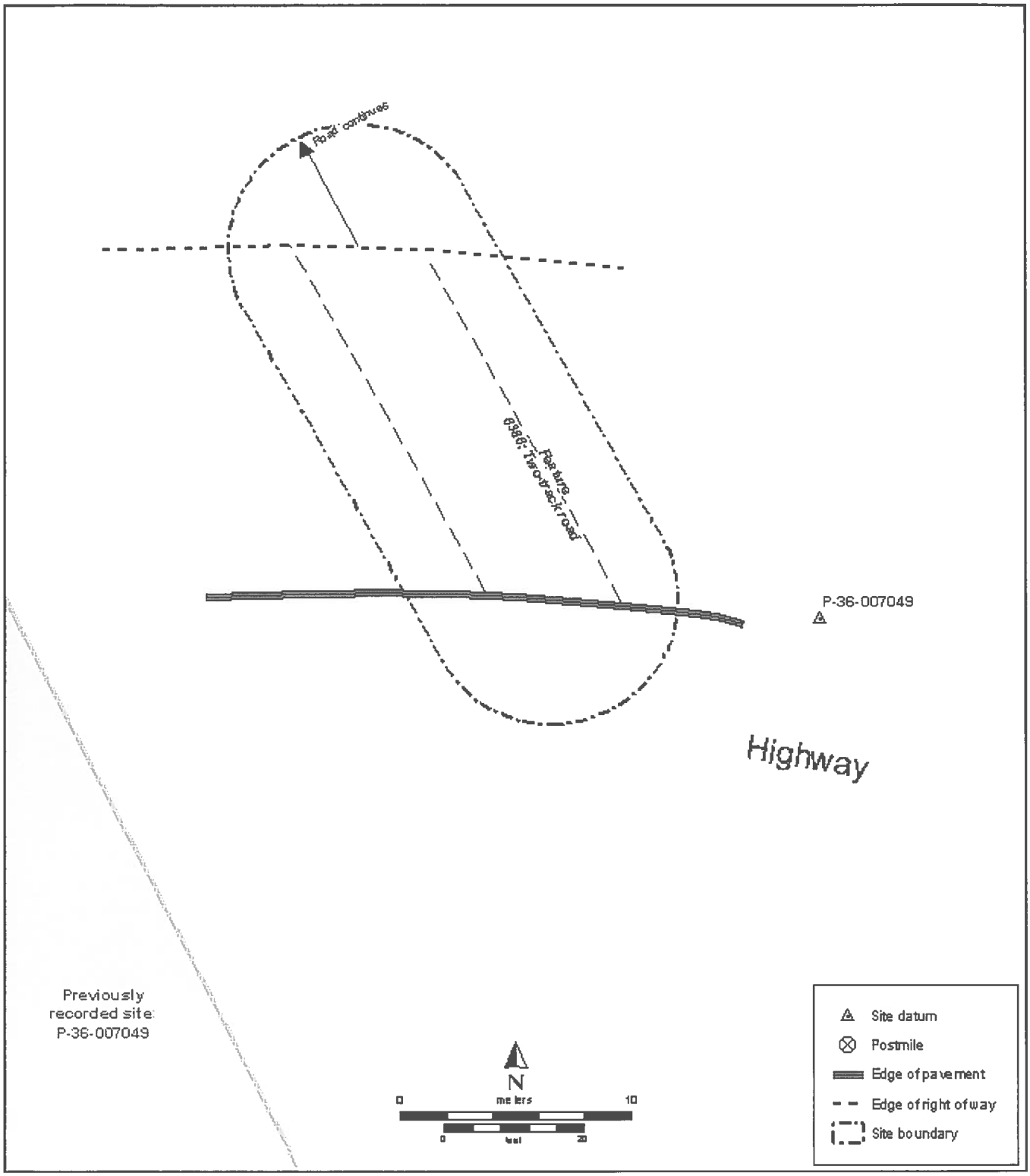
SKETCH MAP

Primary # P-36-007049
HRI #
Trinomial

*Resource Name or #: SRI-3556

*Drawn By: Joshua Trampier

*Date: 05/19/2011



*Required Information

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

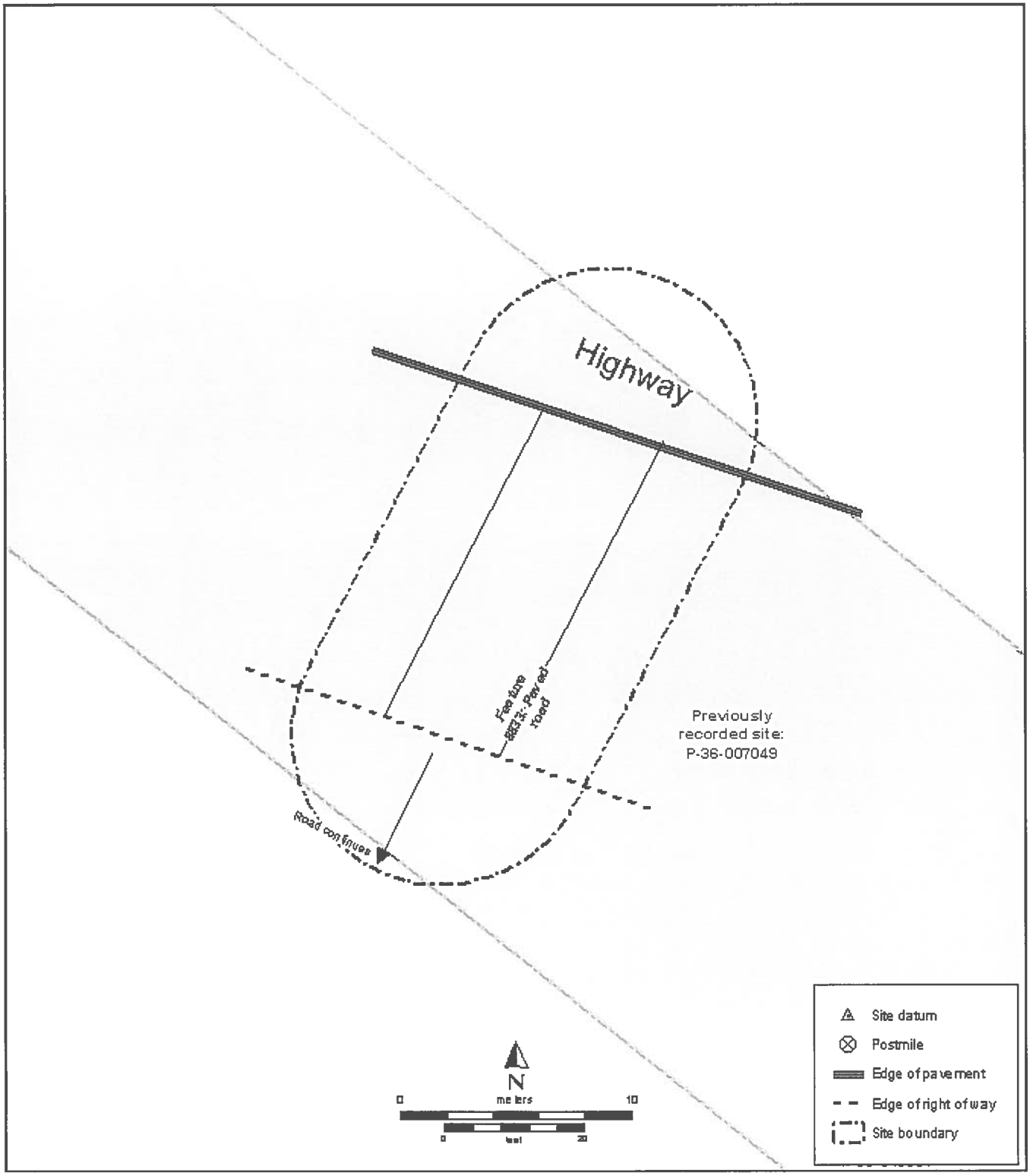
SKETCH MAP

Primary # P-36-007049
HRI #
Trinomial

*Resource Name or #: SRI-3556

*Drawn By: Joshua Trampier

*Date: 05/19/2011



*Required Information

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

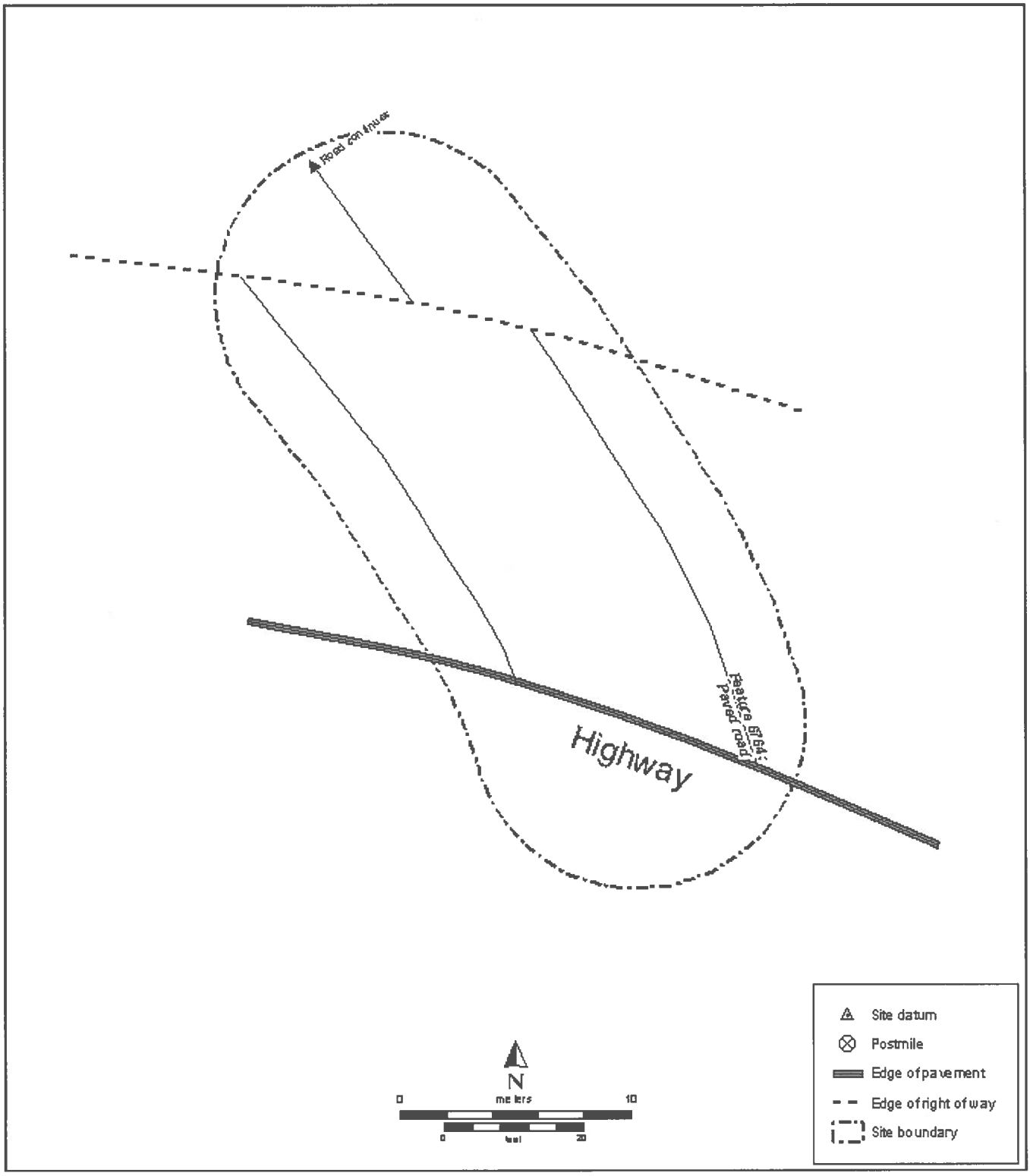
SKETCH MAP

Primary # P-36-007049
HRI #
Trinomial

*Resource Name or #: SRI-3556

*Drawn By: Joshua Trampier

*Date: 05/19/2011



*Required Information

P2b. USGS Quad
San Bernardino; 7.5' HARRISON MTN (2009)

P2b. Legal description
T 2N R 3W; SE¼ of SW¼ of Sec 19; SBBM
T 2N R 3W; SW¼ of SE¼ of Sec 19; SBBM
T 2N R 4W; SE¼ of SE¼ of Sec 25; SBBM

P2d. UTM
Zone 11; 477733 mE/ 3786955 mN NAD27 GPS
Zone 11; 478533 mE/ 3788467 mN NAD27 GPS
Zone 11; 478540 mE/ 3788481 mN NAD27 GPS
Zone 11; 504951 mE/ 3791847 mN NAD27 GPS
Zone 11; 504962 mE/ 3791829 mN NAD27 GPS

P4. Resources Present
[X] Other (linear)

P7. Owner and Address

SAN BERNARDINO NATIONAL FOREST
602 S. TIPPECANOE AVE.
SAN BERNARDINO, CA

STRAWBERRY FLAT PROPERTY OWNERS ASSN
P O BOX 31
TWIN PEAKS CA

A1. Method of determination
by Caltrans. The right-of-way extends 15 m from the edge of the pavement.

A1. Reliability of determination
previous site records, the road also crosses other parts of Highway 189 38, but these portions were not identified during survey.

A8. Nearest water
300 m south of Feature 6764.

L3. Description
west to east on the north side of Highway 18. The road segment is almost completely overgrown by vegetation, though the sloping approach of the road from west down to east can be seen from Highway 18. The entrance to the highway has been blocked by several large granite boulders.
The second segement of the road, called Rim of the World Drive (Feature 6764), is oriented relatively east to west at this segment and intersects Highway 38 from the west. Only the southern portion of the road, approximately half the road, is located within the right-of-way. Only this portion was recorded. This road extends passes through a residential area and provides access to downtown Fawnskin.
The third segment (Feature 8833) is a moderately maintained, asphalt-paved road/parking lot on Highway 189. Initially, as previous site records indicate, this site was a portion of the Crest Route. The Crest Route has since been incorporated into Highway 189, the parking lot for the Mountain High Market, and Mile Pine Road. Mile Pine Road is located behind the market and begins approximately 33 m south of Highway 189. The portion of the road located within the parking lot exhibits numerous asphalt patches. The road is oriented northwest to southeast and intersects Highway 189 from the southeast.
west to east on the north side of Highway 18. The road segment is almost completely overgrown by vegetation, though the sloping approach of the road from west down to east can be seen from Highway 18. The entrance to the highway has been blocked by several large granite boulders.
The second segement of the road, called Rim of the World Drive (Feature 6764), is oriented relatively east to west at this segment and intersects Highway 38 from the west. Only the southern portion of the road, approximately half the road, is located within the right-of-way. Only this portion was recorded. This road extends passes through a residential area and provides access to downtown Fawnskin.

The third segment (Feature 8833) is a moderately maintained, asphalt-paved road/parking lot on Highway 189. Initially, as previous site records indicate, this site was a portion of the Crest Route. The Crest Route has since been incorporated into Highway 189, the parking lot for the Mountain High Market, and Mile Pine Road. Mile Pine Road is located behind the market and begins approximately 33 m south of Highway 189. The portion of the road located within the parking lot exhibits numerous asphalt patches. The road is oriented northwest to southeast and intersects Highway 189 from the southeast.
west to east on the north side of Highway 18. The road segment is almost completely overgrown by vegetation, though the sloping approach of the road from west down to east can be seen from Highway 18. The entrance to the highway has been blocked by several large granite boulders.
The second segement of the road, called Rim of the World Drive (Feature 6764), is oriented relatively east to west at this segment and intersects Highway 38 from the west. Only the southern portion of the road, approximately half the road, is located within the right-of-way. Only this portion was recorded. This road extends passes through a residential area and provides access to downtown Fawnskin.
The third segment (Feature 8833) is a moderately maintained, asphalt-paved road/parking lot on Highway 189. Initially, as previous site records indicate, this site was a portion of the Crest Route. The Crest Route has since been incorporated into Highway 189, the parking lot for the Mountain High Market, and Mile Pine Road. Mile Pine Road is located behind the market and begins approximately 33 m south of Highway 189. The portion of the road located within the parking lot exhibits numerous asphalt patches. The road is oriented northwest to southeast and intersects Highway 189 from the southeast.

L7. Integrity considerations
road. Feature 8833 has long since been incorporated into the driveway/parking lot of the Mountain High Market. Numerous asphalt patches are visible on the surface of the road. Feature 6764 is in good condition.
road. Feature 8833 has long since been incorporated into the driveway/parking lot of the Mountain High Market. Numerous asphalt patches are visible on the surface of the road. Feature 6764 is in good condition.
road. Feature 8833 has long since been incorporated into the driveway/parking lot of the Mountain High Market. Numerous asphalt patches are visible on the surface of the road. Feature 6764 is in good condition.

Update 10/10

State of California — The Resources Agency DEPARTMENT OF PARKS AND RECREATION **CONTINUATION SHEET**	Primary # P36-007049 HRI# Trinomial CA-SBR-7049H

 *Resource Name or # Rim of the World Drive

*Recorded by: E. Denniston and J. Howard *Date: 06/10/2010 ☐ Continuation ☒ Update

Quad: Big Bear Lk

Completed in 1915, the original alignment of thE historic-age Rim of the World Drive was 101 miles long, extending through the San Bernardino National Forest. The route began at Waterman Canyon on the western end, turned to the east at Crestline, continued past Heaps Peak into Deep Creek, turned to the northeast across Green Valley to Fawnskin Valley, followed the north shore of Big Bear Lake, and turned to the southwest along Clark's Grade to the improved Santa Ana Canyon Road. Beginning in the 1920s, route adjustments and improvements had shifted the road's original route considerably. Thus, some segments of the original road have been incorporated into paved State Highways 18 and 38, where other segments are in use as unpaved Forest Service roads.

In 1991, Michael Lerch of Lerch and Associates, recorded a 2600-foot (800-meter) segment of the historic Rim of the World Drive. This segment is located near the mountain community of Twin Peaks, and described as a graded asphalt-paved roadway. This segment was part of the original 1915 route, but was bypassed by the construction of a newer road to the south in 1930.

In 1997, David Maxwell of Statistical Research Inc., recorded a 400-foot (125-meter) segment in Fawnskin Valley. This segment was described as a dirt road measuring 14 to 16 feet wide. Maxwell noted the presence of two modified trees that may have served as roadside markers.

In 2001, a 6.5-mile segment of the road was recorded by John D. Goodman of the San Bernardino National Forest. Goodman describes the segment as an engineered, well maintained, Forest Service road that receives considerable traffic. This segment begins in the area of Fawnskin Valley and extends southwest into upper Green Valley, overlapping the 400-foot segment recorded by Maxwell in 1997.

Also in 2001, the entire 1915 aligment was recorded by Daniel McCarthy and John Goodman of the San Bernardino National Forest. Early rock and chain guard rails and view point pull outs were recorded in association with the original alignment.

On June 10 2010, ECORP archaeologists E. Denniston and J. Howard visited two segments of the alignment. The first segment overlaps with Santa Ana Road as it runs through Manzanita Flats. The second is a small 150-foot segment that branches off of 7 Pines Road. No changes to the resource were noted and all previously recorded information appears accurate. Both segments of the site are well maintained, ungraded Forest Service roads.



Overview of segment near 7 Pines Road looking northwest, 06/10/2010. Photo No. SA06102010ED-0001.

References:

Goodman, John
2001 Site Record for CA-SBR-7049 (P36-007044). On file at the the San Bernardino Archaeological Information Center, San Bernardino County Museum, Redlands, California.

Lerch, Michael
1991 Site Record for CA-SBR-7049 (P36-007044). On file at the the San Bernardino Archaeological Information Center, San Bernardino County Museum, Redlands, California.

McCarthy, Daniel and Goodman, John
2001 Site Record for CA-SBR-7049 (P36-007044). On file at the the San Bernardino Archaeological Information Center, San Bernardino County Museum, Redlands, California.

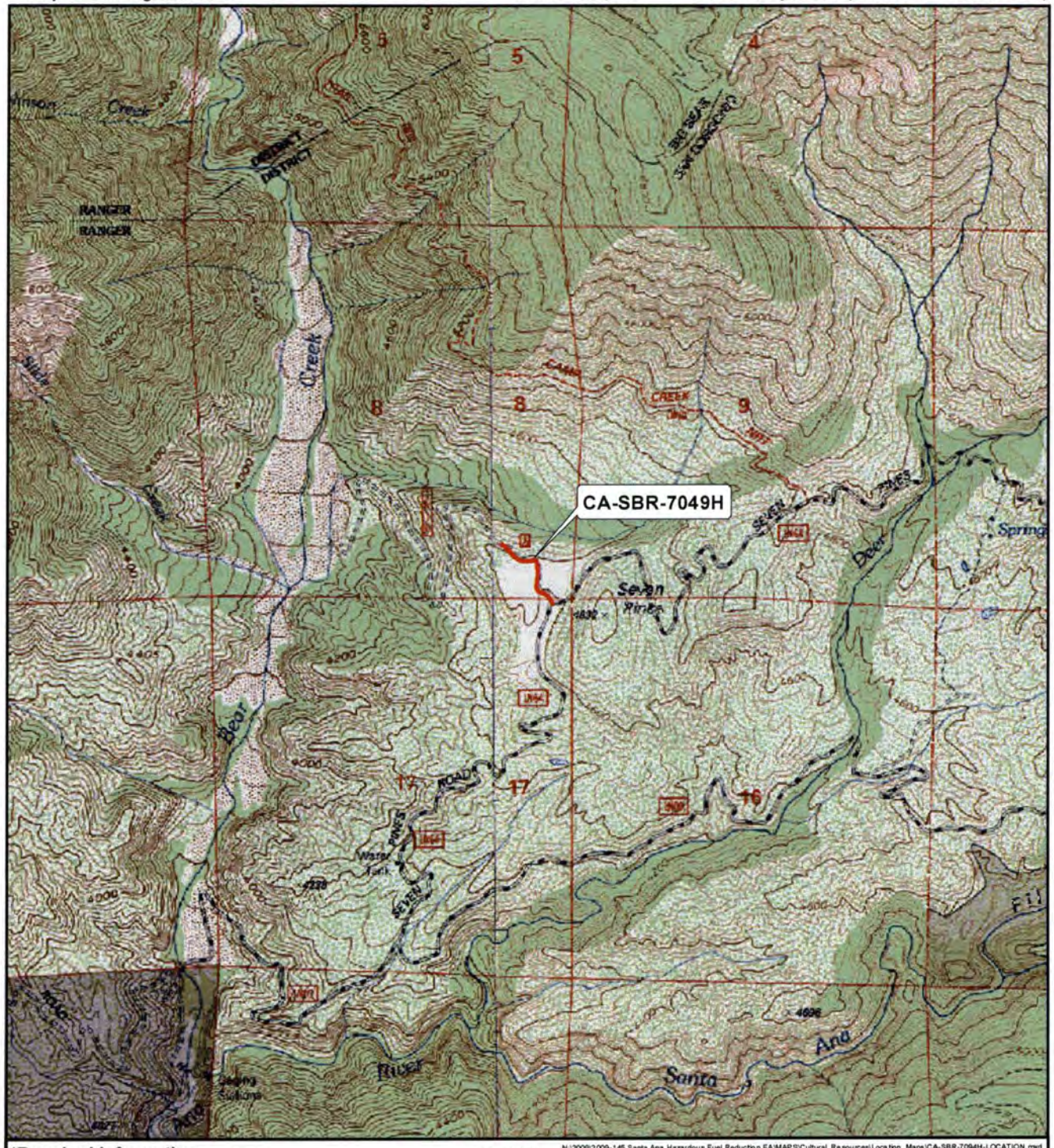
Maxwell, David
1997 Site Record for CA-SBR-7049 (P36-007044). On file at the the San Bernardino Archaeological Information Center, San Bernardino County Museum, Redlands, California.

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LOCATION MAP

Primary # P36-007049
HRI #
Trinomial CA-SBR-7049H

*Resource Name or #: Rim of the World Drive

*Map Name: Big Bear Lake *Scale: 1:24,000 *Date of Map: 1969 (Provisional Edition 1996)



*Required Information

1 " = 2,000 '

N:\2009\2009-145 Santa Ana Hazardous Fuel Reduction EA\MAPS\Cultural_Resources\Location_Maps\CA-SBR-7049H-LOCATION.mxd

0 1,000 2,000 4,000 Feet

0 250 500 1,000 Meters

DPR 523J (1/95)

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

PRIMARY RECORD

UPDATE 1/02

Primary #: P36-007049
HRI #:
Trinomial: CA- SBR-07049H
NRHP Status Code: 5
Other Listings:

Page 1 of 42 Review code: Reviewer: Date:

Resource Name or #: FS 05-12-51-061; FS 05-12-52-245; FS 05-12-53-080; FS 05-12-54-021 1915 Route

P1. Other Identifier: The San Bernardino Mountains Crest Drive; Rim of the World Drive; portions of State Highways 18, and 38; portions of various Forest Service roads; Clark's Grade; Santa Ana Canyon Wagon Road.

P2. Location: ☐**Not for Publication** ■ **Unrestricted**

a. County: San Bernardino **B.M.**

b. USGS 7.5' Quads:

San Bernardino North, Calif. 7.5' series, 1967
T. 1N; **R.** 4W; **Sections** 14,, 11, 2, and 3; **T.** 2N; **R.** 4W; **Sections** 34, 35, 28, 21, 22, 27, 26, and 25

Harrison Mountain, Calif. 7.5' series, 1967
T. 2N; **R.** 4W; **Section** 25; **T.** 2N; **R.** 3W; **Sections** 30, 29, 28, 27, 26, and 25; **T.** 2N; **R.** 2W; **Sections** 30, and 31

Keller Peak, Calif. 7.5' series, 1967
T. 2N; **R.** 2W; **Sections** 31, and 32; **T.** 1N; **R.** 2W; **Sections** 5 and 4; **T.** 2N; **R.** 2W; **Sections** 33, 28, 27, 22, 23, 24, and 13

Butler Peak, Calif. 7.5' series, 1971
T. 2N; **R.** 2W; **Sections** 23, 24, and 13; **T.** 2N; **R.** 1W; **Sections** 18, 17, 16, 9, 10, 3, 11, and 12; **T.** 2N; **R.** 1W; **Sections** 18, 17, and 8

Fawnskin, Calif. 7.5' series, 1971
T. 2N; **R.** 1W; **Sections** 8, 9, 16, 9, 10, 3, 11, 12 and 13

Big Bear Lake, Calif. 7.5' series, 1970
T. 2N; **R.** 1E; **Sections** 21, 20, and 19; **T.** 2N; **R.** 1W; **Sections** 25, 36, and 35; **T.** 1N; **R.** 1W; **Sections** 2, 11, 10, 9, 16, 8, and 17;

Keller Peak, Calif 7.5' series, 1967
T. 1N; **R.** 1W; **Sections** 8, 17, and 18; **T.** 1N; **R.** 2W; **Sections** 13, 24, 23, 26, 27, and 34

Yucaipa, Calif. 7.5' series, 1954
T. 1N; **R.** 2W; **Sections** 13, 24, 23, 26, 27, and 34

T. 1N; **R.** 4W; **Sections** 14,, 11, 2, and 3
T. 1S; **R.** 2W; **Sections** 3, 4, 9, and 8

Date: as noted above
c. Address: N/A **City**: **Zip**:
d. UTM: Zone 503598 mE / 3792989 mN; 494907 mE / 3789440 mN
e. Other Locational Data: Route begins at the mouth of Waterman Canyon going to the top of the crest of the San Bernardino Mountains and proceeds east throught Crestline, Heaps Peak, Hunsaker Flat (Running springs), Green Valley, north of Bulter Peak to Fawnskin Valley, Big Bear Lake, Pine Lake (Big Bear Lake), Clark Grade past Clark Ranch across Bear Creek, Keller Creek down to the Santa Ana Canyon road where it exits the mouth of the San Ana Canyon.

P3a. Description: Series of earlier roads dating from the turn of the century that were designated as Rim of the World Drive in 1915, a significant road in Southern California history. Route described here is the original route used between 1915 and 1916.

P3b. Resource Attributes: HP 37 (Highway/Trail)

4. Resources Present: ☐ Building ☐ Structure ☐ Object ■ Site ☐ District ☐ Element of District

PRIMARY RECORD (cont.)

Primary #: P36-007049
HRI #:
Trinomial: CA- SBR-07049H
NRHP Status Code: 5
Other Listings:

 Review code: Reviewer: Date:

Resource Name or #: FS 05-12-51-061; FS 05-12-52-245; FS 05-12-53-080; FS 05-12-54-021

P5a. Photograph or Drawing: (see attached maps)

P5b. Description of Drawings:

P6. Date Constructed/Age and Sources:
■ Historic (ca. 1915) ☐ Prehistoric ☐ Both

P7. Owner and Address: San Bernardino National Forest, 1824 S. Commercenter Circle, San Bernardino, CA 92408

P8. Recorded by: Daniel F. McCarthy and John D. Goodman II

P9. Date Recorded: 06-09-01; Jan 02

P10. Survey Type: n/a, historical map review

P11. Report Citation:

Attachments: ☐ NONE ■ Continuation Sheet ☐ District Record ☐ Rock Art Record ■ Location Map ■ Linear Feature Record ☐ Building, Structure, & Object Record ☐ Artifact Record ☐ Sketch Map ■ Archaeological Record ☐ Milling Station Record ☐ Photograph Record ■ Other (Maps)

LINEAR FEATURE RECORD

Primary #: P36-007049
HRI #
Trinomial: CA-SBR-07049H Update
NRHP Status Code: 5
Other Listings

 Review code: Reviewer: Date:

Resource Name: Rim of the World Drive

L1. Historic and/or Common Name: FS05-12-51-061; FS05-12-52-245; FS05-12-53-080; FS05-12-54-021

L2. a. Portion Described: _✓_ Entire Resource __Segment ___ Point Observation Designation:
b. Location of point or segment: Designated route begins at the mouth of Waterman Canyon and end at the mouth of Santa Ana Canyon.

L3. Description: Historic route of Rim of the World Drive as originally in use in 1915.

L4. Dimensions: This road has a varied width of between 16-20 feet. The original road length was hailed as being 101 miles.

L5. Associated Resources: Various features including early guard rails (rock and chain) and view point pull outs are associated. As road use increased communities grew and began to cater to the demands of visitors which provided stores and restaurants.

L6. Setting: Most of the road winds through drainages and ridges with steep mountain slopes on both sides of the road. Elevation ranges between 1400 and 7400 feet above sea level.

L7. Integrity Considerations: The original road has been rerouted several times after 1916 due to flooding and erosion. Portions of the original road have been incorporated into state highways (18 and 38) and are paved. Some segments were relocated to meet ongoing safety issues. Other segments are still in use today and designated as Forest Service roads and are not graded.

L8. Description of Maps: see Primary Record. Route was traced on the early USGS 15' series maps then transferred to the 7.5' quads. Entire route is shown in for series.

L9. Remarks: The recreational development of the western San Bernardino Mountains and "crest" areas was hampered by the paucity of good roads prior to the turn of the century. In the northwestern San Bernardino Mountains where considerable mining was occurring in the 1860s and later most of the ore wagons and general traffic was confined to the Coxey Road that traveled down the northern slopes of the mountains into the Hesperia area. From there, many entered the San Bernardino Valley via John Brown's Toll Road (1860) through Cajon Pass. On the south side of the mountains, a primary pack trail into the crest area was up the rugged Santa Ana Canyon Miner's Pack Trail. In 1891-1892, the crest area became accessible with the construction of the Arrowhead Reservoir Company's Waterman Canyon Toll Road. In 1905, this toll road became a free county road.

Portions of the route overlap with other older segments some of which date back to the 1890s. For example, during the 1880s freight wagons covered the distance between San Bernardino and Crestline or up through Santa Ana Canyon to Seven Oaks. Gus Knight and some other prominent ranchers and resort owners of the Big Bear area proposed to construct a road from Grout Bay to Fredalba. In 1891 G. Knight and J. Metcalf incorporated the Big Bear Wagon Road Company and sold shares to Bear Valley residents. By 1894 the road was completed (same route as FS Road 2N13), with its toll house located in Green Valley.

This road was also called the Fawnskin-Fredalba Toll Road (La Fuze 1971; Lilleberg 1975). In 1911 the road was taken over by the County and it became a toll free road. Apparently certain segments of the road were very bad with ruts and soft sand, although this road segment continued being part of the Rim of the World Drive (1915-1923).

Especially after the introduction of the automobile in 1904 along with greatly accelerated development of the San Bernardino Valley, weekend campers, resort developers, and others very much desired good automobile roads into the mountain crest areas overlooking the Valley. In 1915, the Rim of the World Drive was completed. Initially this 101 mile long road began at Waterman canyon leading into the mountains. In the vicinity of Crestline, it swung to the east and passed Heaps Peak down into Deep Creek; then headed northeastward across Green Valley to Fawnskin Valley followed the north shore of Big Bear Lake eastward; and then swung to the southwest where it followed the Clark Grade eventually reaching the improved Santa Ana Canyon Road. After the road flooded in the Santa Ana Canyon in 1916, the eastern end of the Drive was shifted to the Mill Creek-Mountain Home Canyon route (SBR-8915) into the Angeles Oaks area. Improvement and route adjustments were undertaken in the 1920s. The 1923 Deep Creek Cutoff moved the highway south of the Crafts Peak-Butler Peak divide between Snow Valley and Big Bear Lake (aka Artic Circle), replacing the Green Valley to Fawnskin route north of the divide. Today the "Rim of the World Scenic Byway" begins in the west at Cajon Junction along SR. 138 and continues along the south side of Silverwood Lake, Crestline along SR. 18, south of Lake Arrowhead, it goes around the north shore of Big Bear Lake along SR. 38 over Onyx Summit, through Barton Flat, and continues along SR. 38 into Mill Creek Canyon and terminates at the Mill Creek Ranger Station.

References:

Carrico, Richard, L., Frank Norris, Allan Schilz, and Richard Minnich, 1892. *Cultural Resource Overview, San Bernardino National Forest, California.* Vol. 1., WESTEC Services. San Diego, California.

La Fuze, Pauline B., 1971. Vol. 1, *Saga of the San Bernardinos.* Hogar Publishing Co., Colton, California.

Lilleberg, Einar, Sept. and Oct. 1975, The Green Valley Story in *San Bernardino Mountains Highlander*, Big Bear Lake; # 10, pp. 8-9, 12-13; #11, pp. 8-10

Robinson, John W., 1989. *The San Bernardinos: The Mountain Country from Cajon Pass to Oak Glen, Two Centuries of Changing Use.* Big Santa Anita Historical Society.

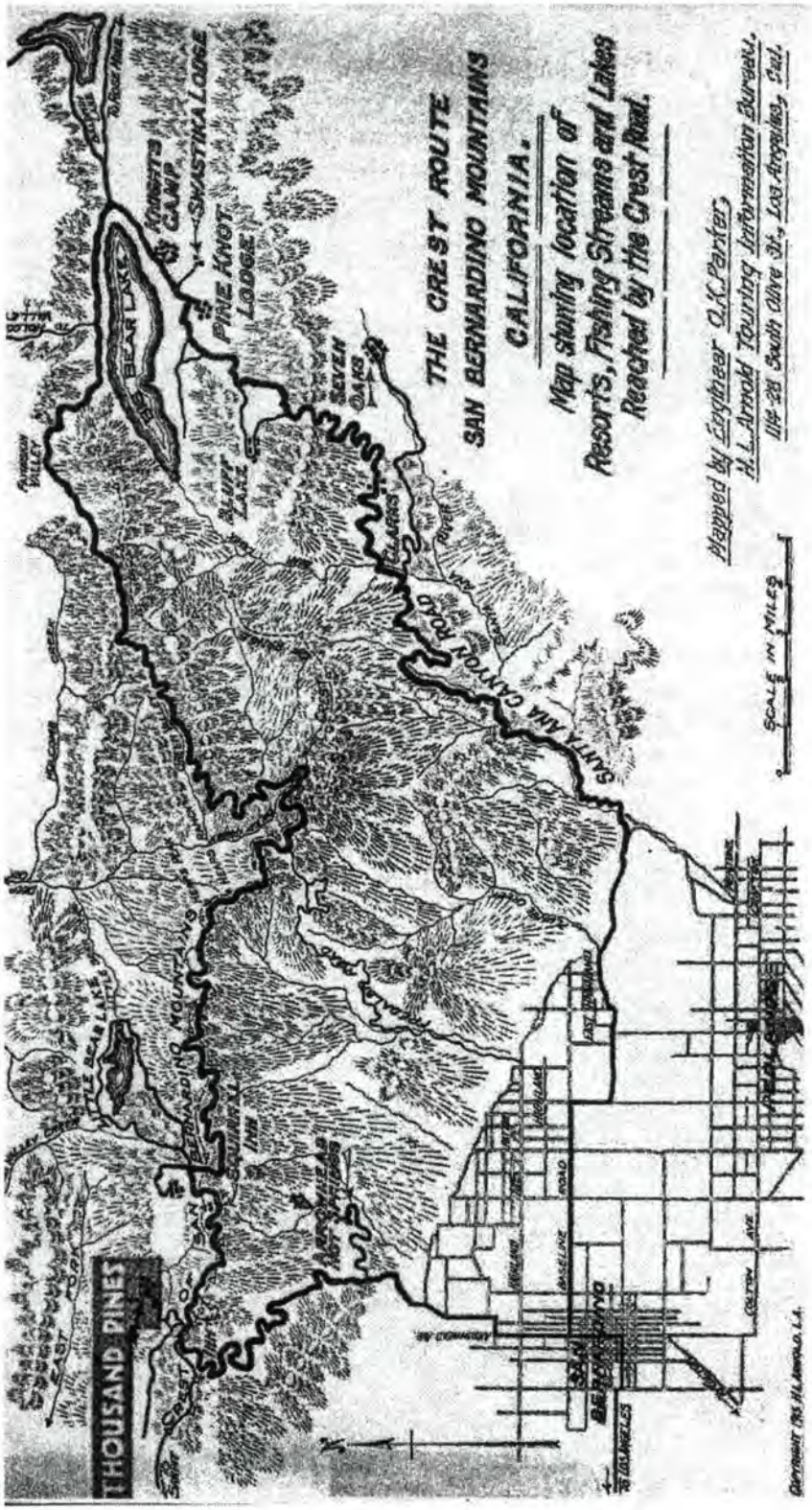
Scott, Ferris H., 1957, Rim of the World Guide. Western Resort Publications, Santa Ana, California

L10. Form Prepared by: Daniel F. McCarthy & John D. Goodman II. San Bernardino National Forest, Supervisor's Office, 1824 S Commercenter Circle, San Bernardino, CA 92408

L11. Date: 06-09-01

LOCATION MAP

Map Name: The Crest Route billed as the Rim of the World Drive. Map in brochure 101 Miles on the Rim of the World, 1915.

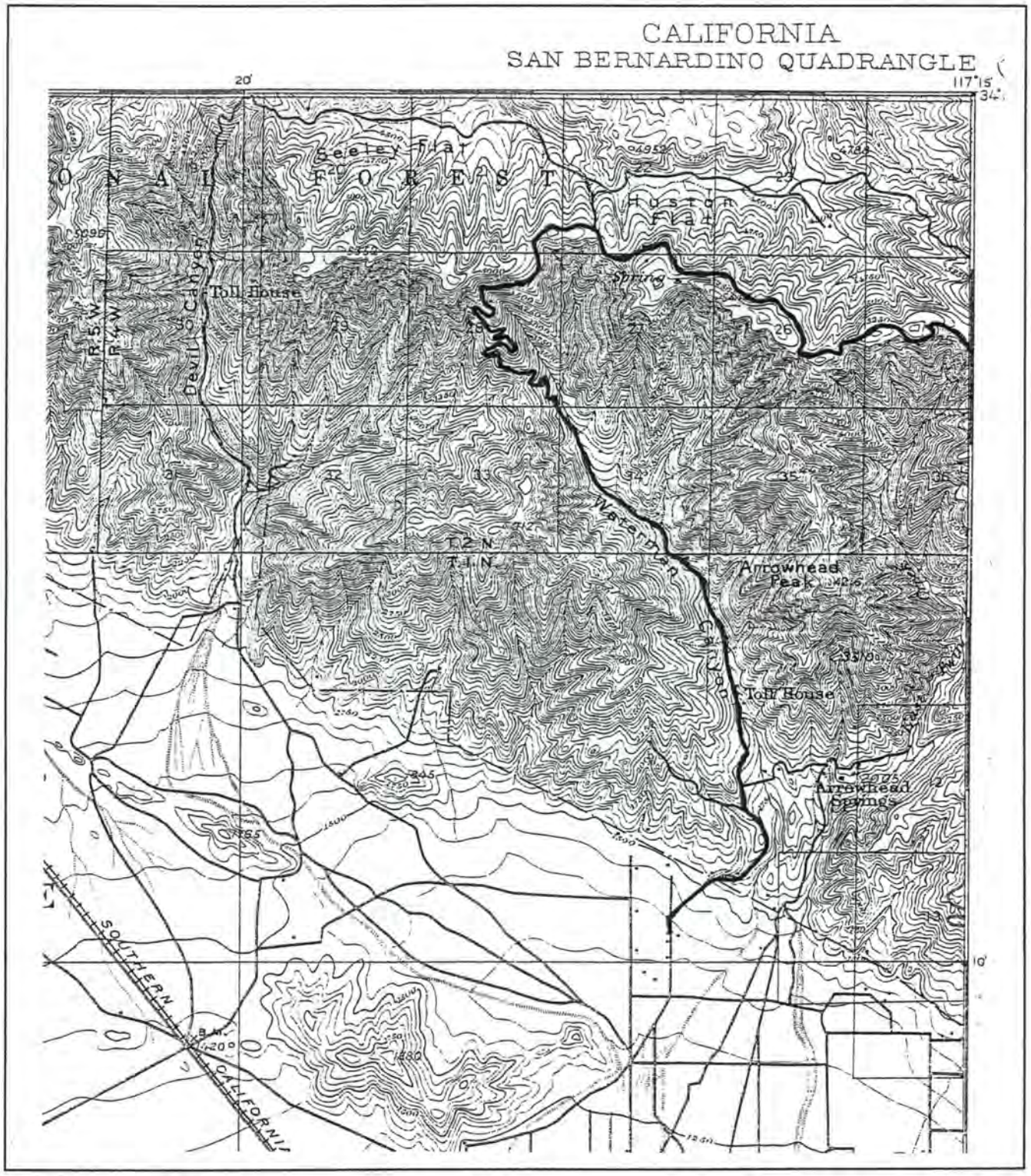


LOCATION MAP

Primary #: P36-007049
Trinomial: CA-SBR-07049H Update

 Resource Name or #: Rim of the World Drive

Map Name: San Bernardino, CA 15' series, 1901 (reprinted 1929)
Shows the original route up through Waterman Canyon to the top of the crest.

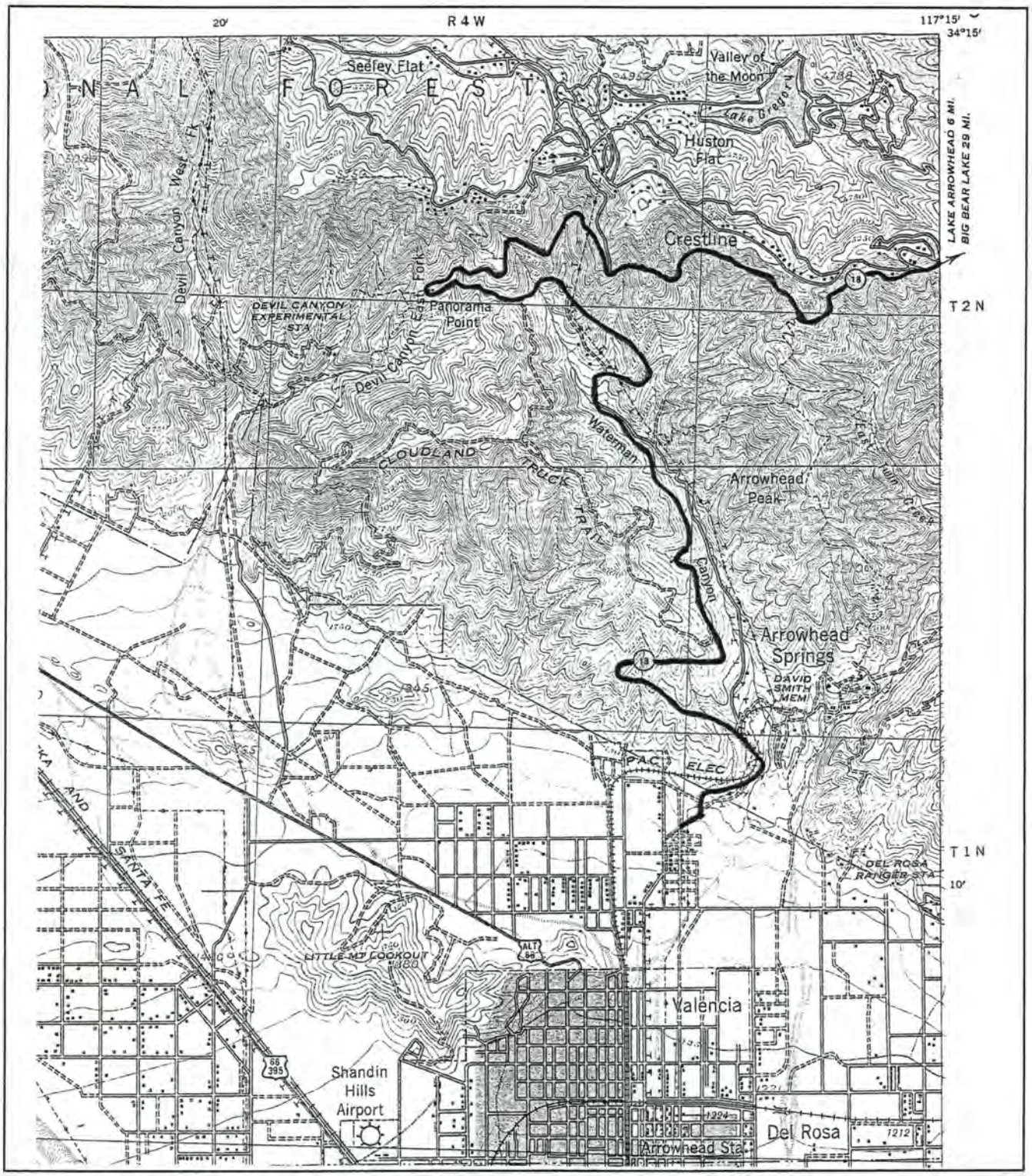


LOCATION MAP

Primary #: P36-007049
Trinomial: CA-SBR-07049H Update

 Resource Name or #: Rim of the World Drive

Map Name: San Bernardino, CA 15' series, 1942
Shows the reroute of this portion of the road up through Waterman Canyon.

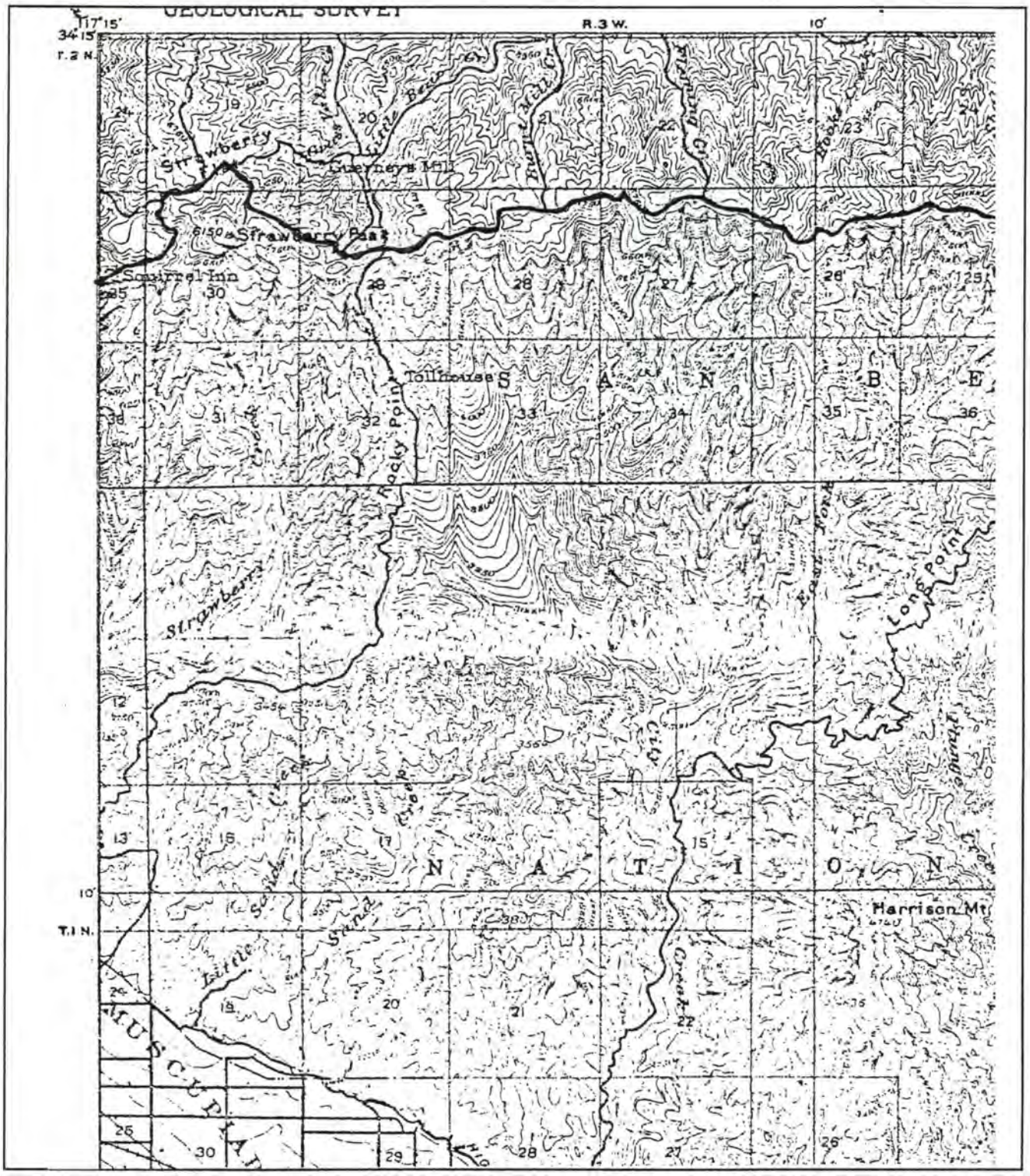


LOCATION MAP

Primary #: P36-007049
Trinomial: CA-SBR-07049H Update

 Resource Name or #: Rim of the World Drive

Map Name: Redlands, CA 15' series, 1901
Original route of Drive.

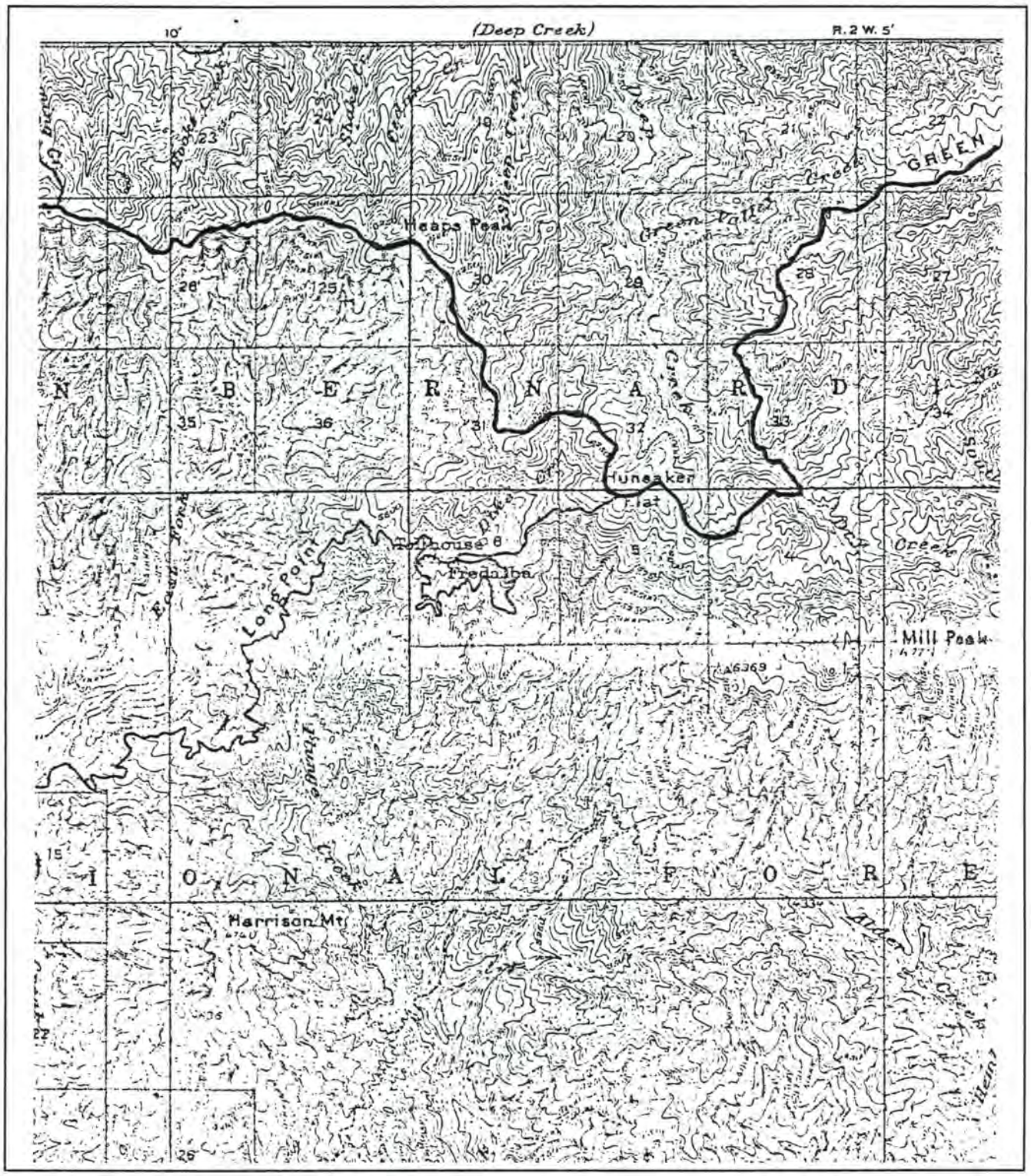


LOCATION MAP

Primary #: P36-007049
Trinomial: CA-SBR-07049H Update

Resource Name or #: Rim of the World Drive

Map Name: Redlands, CA 15' series, 1901
Original route of Drive.

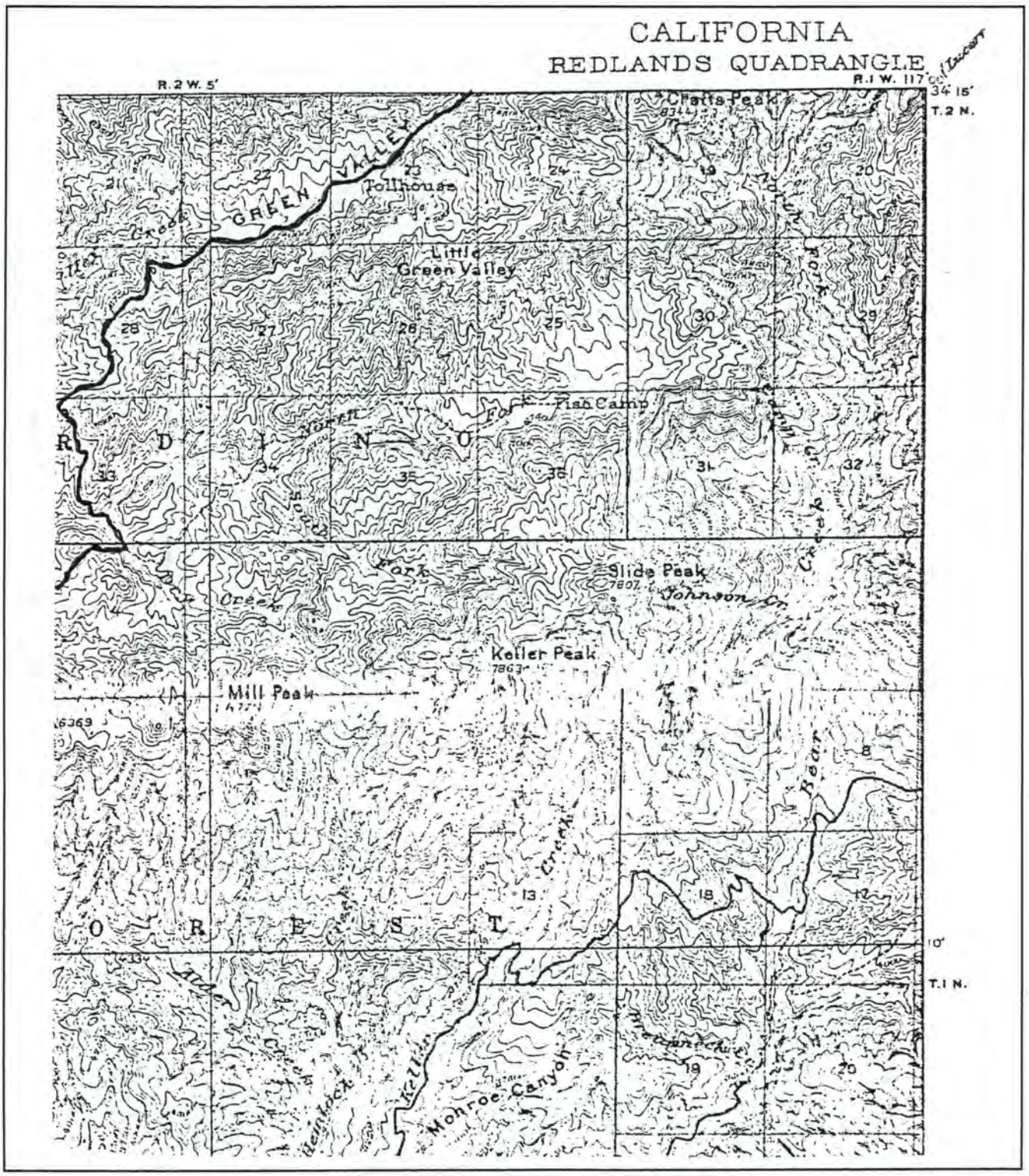


LOCATION MAP

Primary #: P36-007049
Trinomial: CA-SBR-07049H Update

 Resource Name or #: Rim of the World Drive

Map Name: Redlands, CA 15' series, 1901
Original route of Drive.



LOCATION MAP

Primary #: P36-007049
Trinomial: CA-SBR-07049H Update

Resource Name or #: Rim of the World Drive

Map Name: Deep Creek, CA 15' series, 1902
Original route of Drive



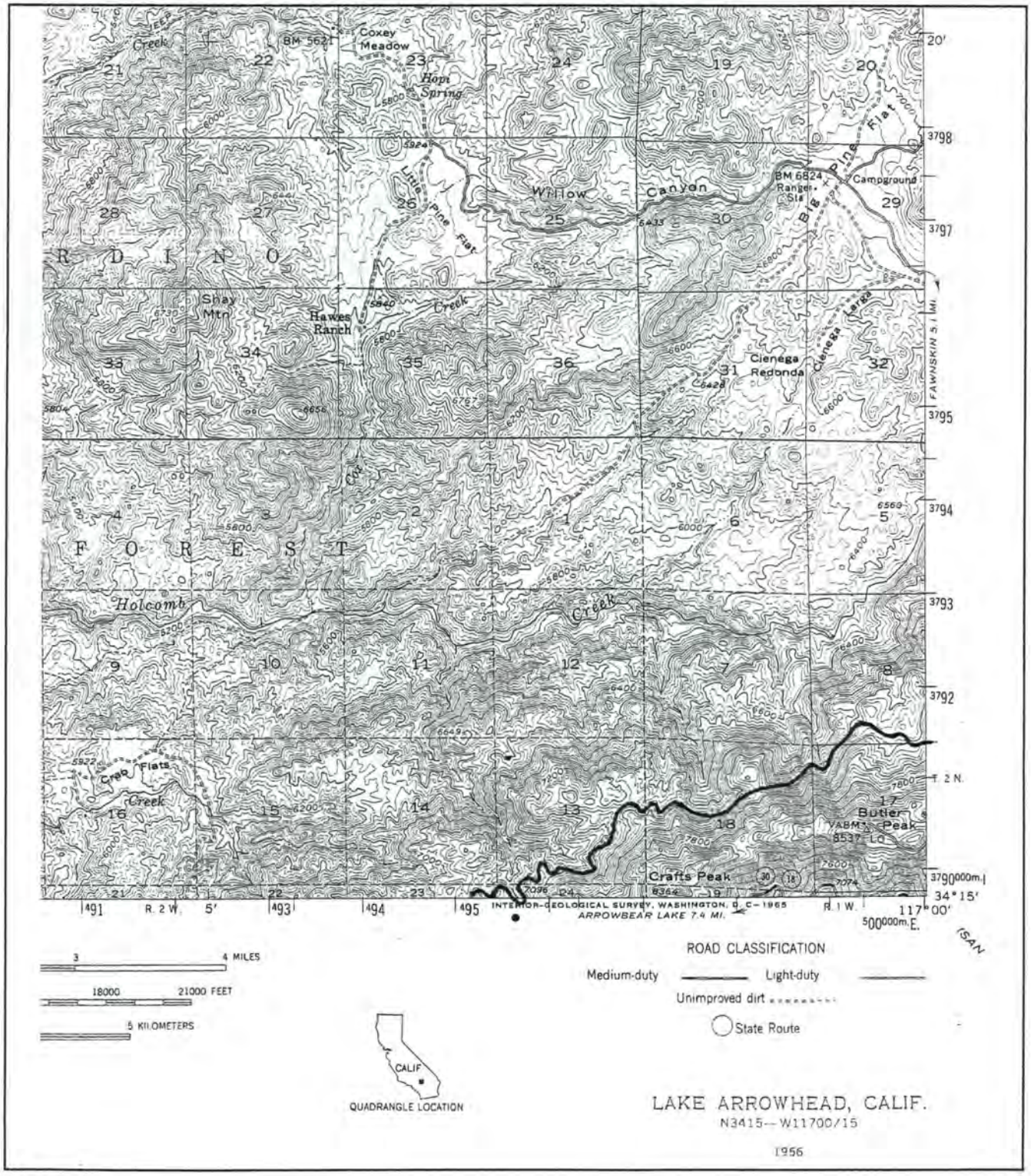
LOCATION MAP

Primary #: P36-007049
Trinomial: CA-SBR-07049H Update

 Resource Name or #: Rim of the World Drive

Map Name: Lake Arrowhead, CA 15' series, 1956

Shows the original route south of Big Bear Lake leading toward Clarks Grade. Broken line indicates likely route.

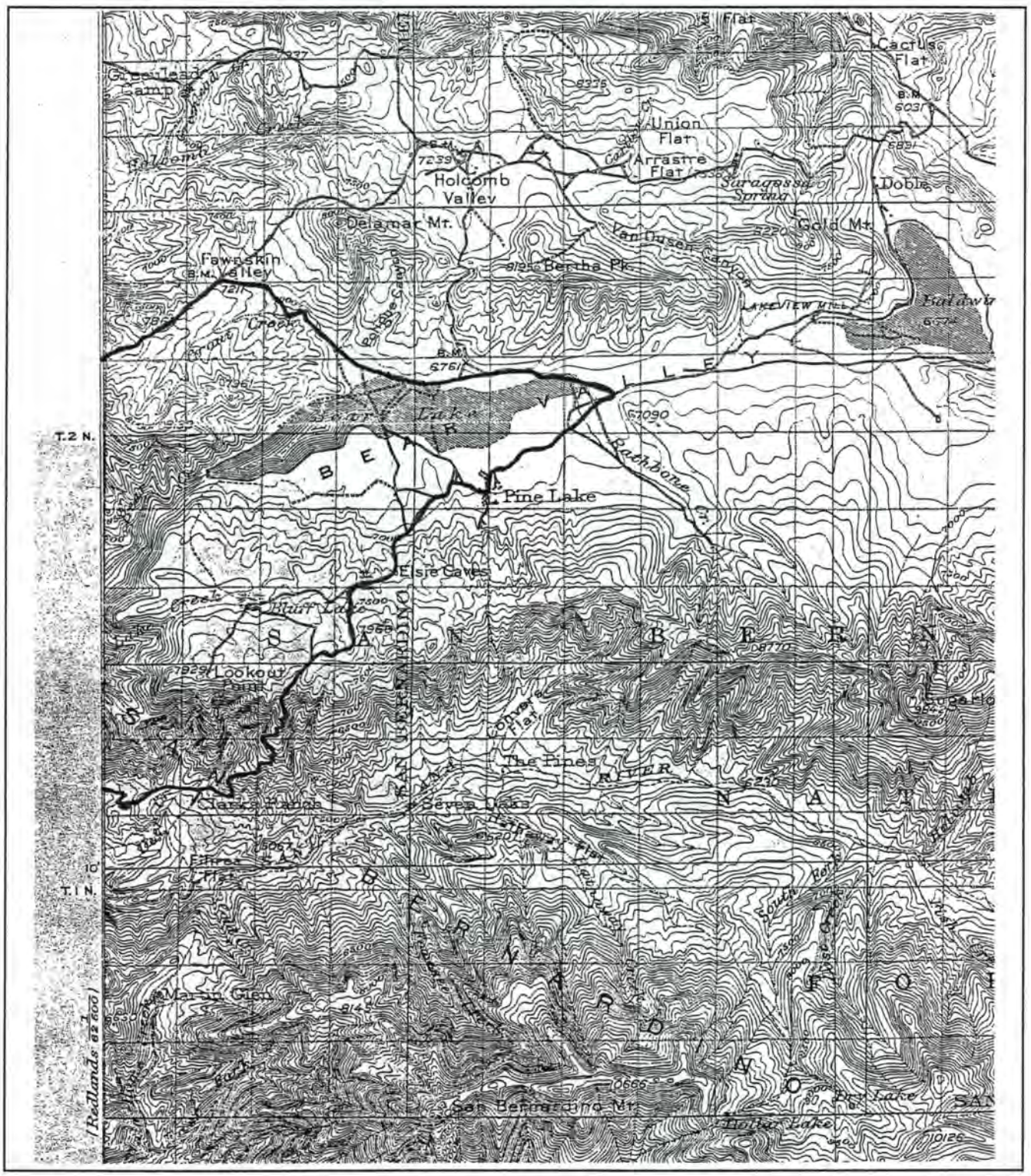


LOCATION MAP

Primary #: P36-007049
Trinomial: CA-SBR-07049H Update

 Resource Name or #: Rim of the World Drive

Map Name: San Gorgonio, CA 30' series, 1902

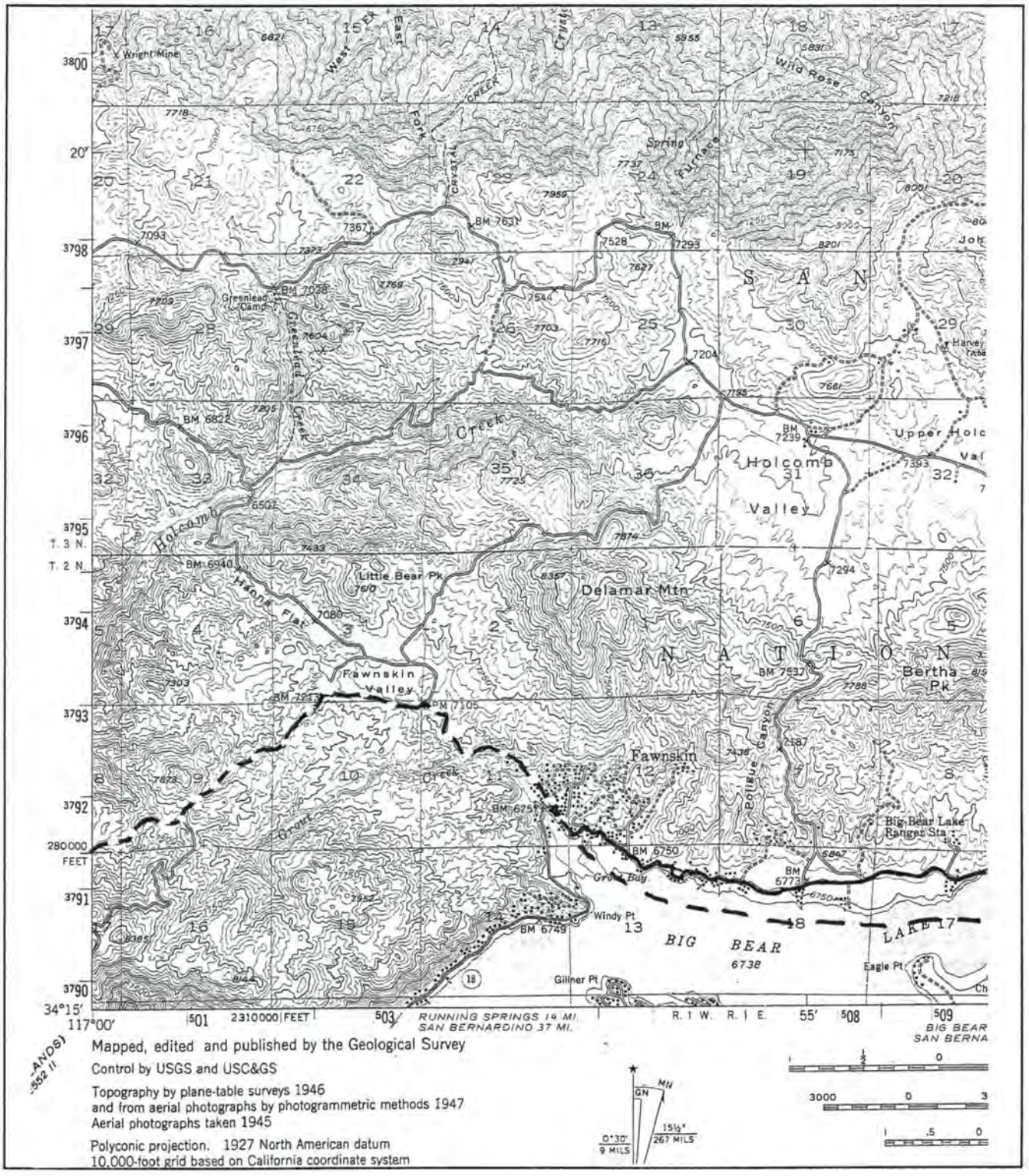


LOCATION MAP

Primary #: P36-007049
Trinomial: CA-SBR-07049H Update

 Resource Name or #: Rim of the World Drive

Map Name: Lucerne Valley, CA 15' series, 1947
– – – Original route of Drive.

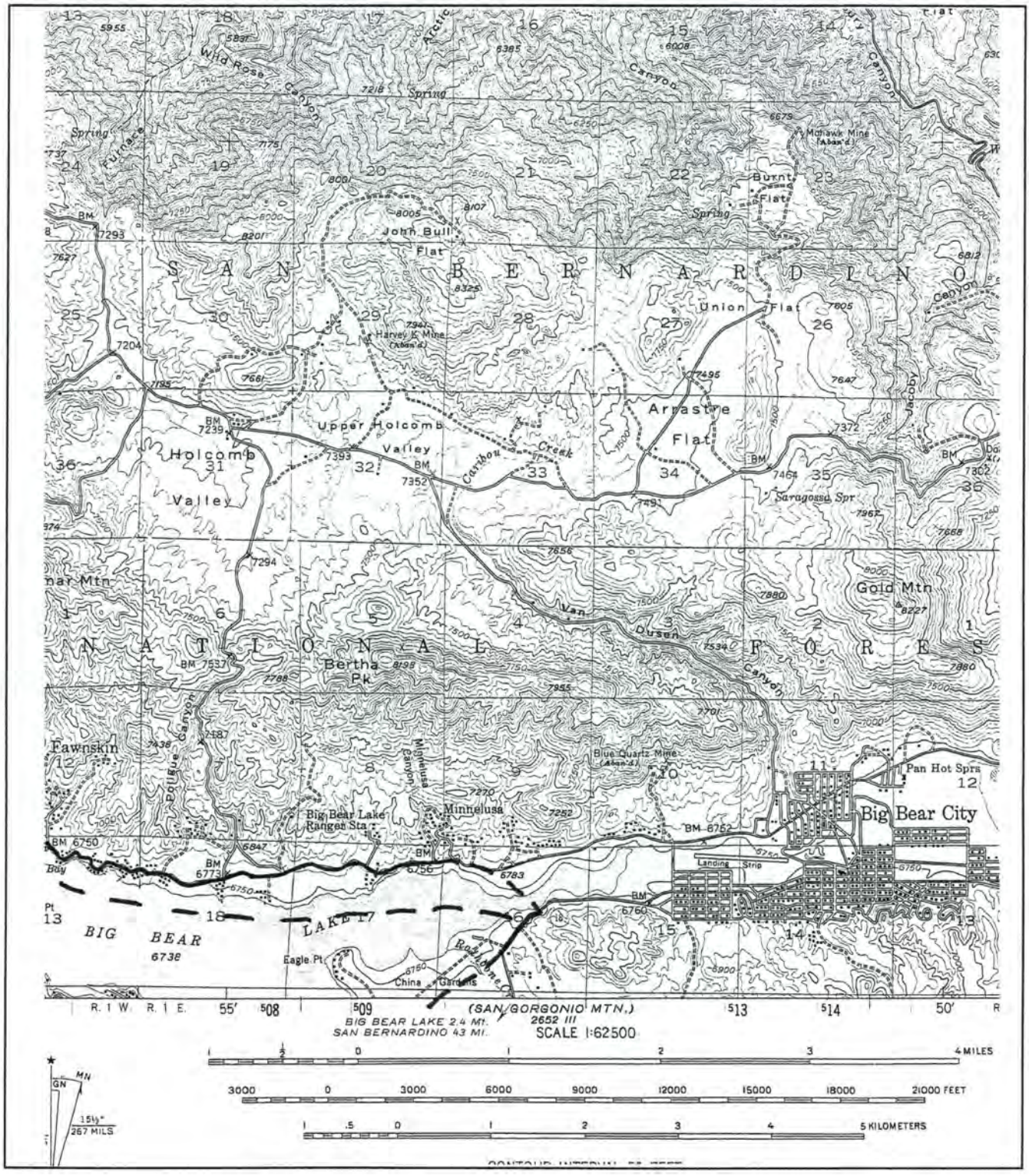


LOCATION MAP

Primary #: P36-007049
Trinomial: CA-SBR-07049H Update

 Resource Name or #: Rim of the World Drive

Map Name: Lucerne Valley, CA 15' series, 1947
– – – Original route of Drive.

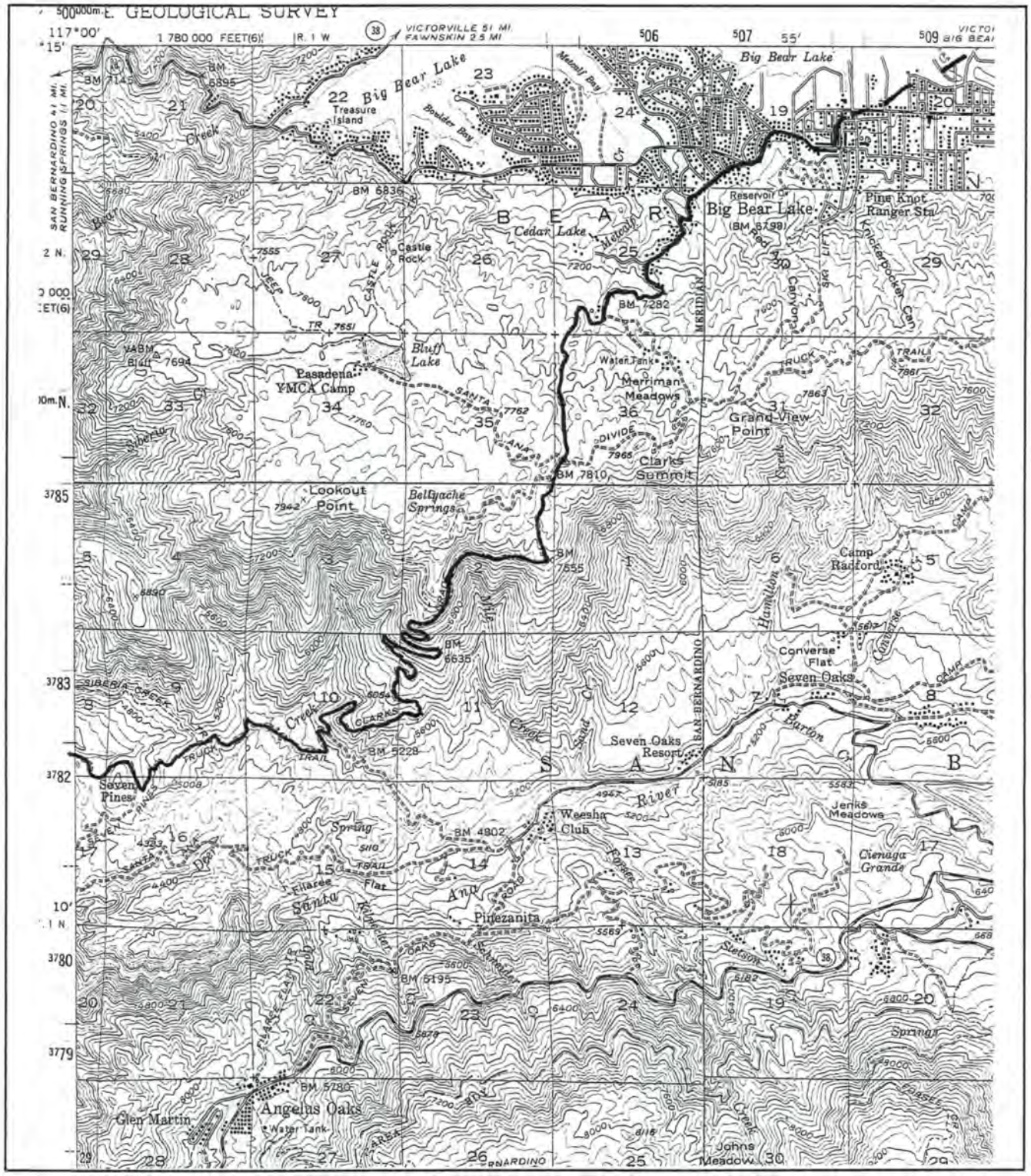


LOCATION MAP

Primary #: P36-007049
Trinomial: CA-SBR-07049H Update

 Resource Name or #: Rim of the World Drive

Map Name: San Gorgonio Mtn, CA 15' series, 1954
Original route of Drive.

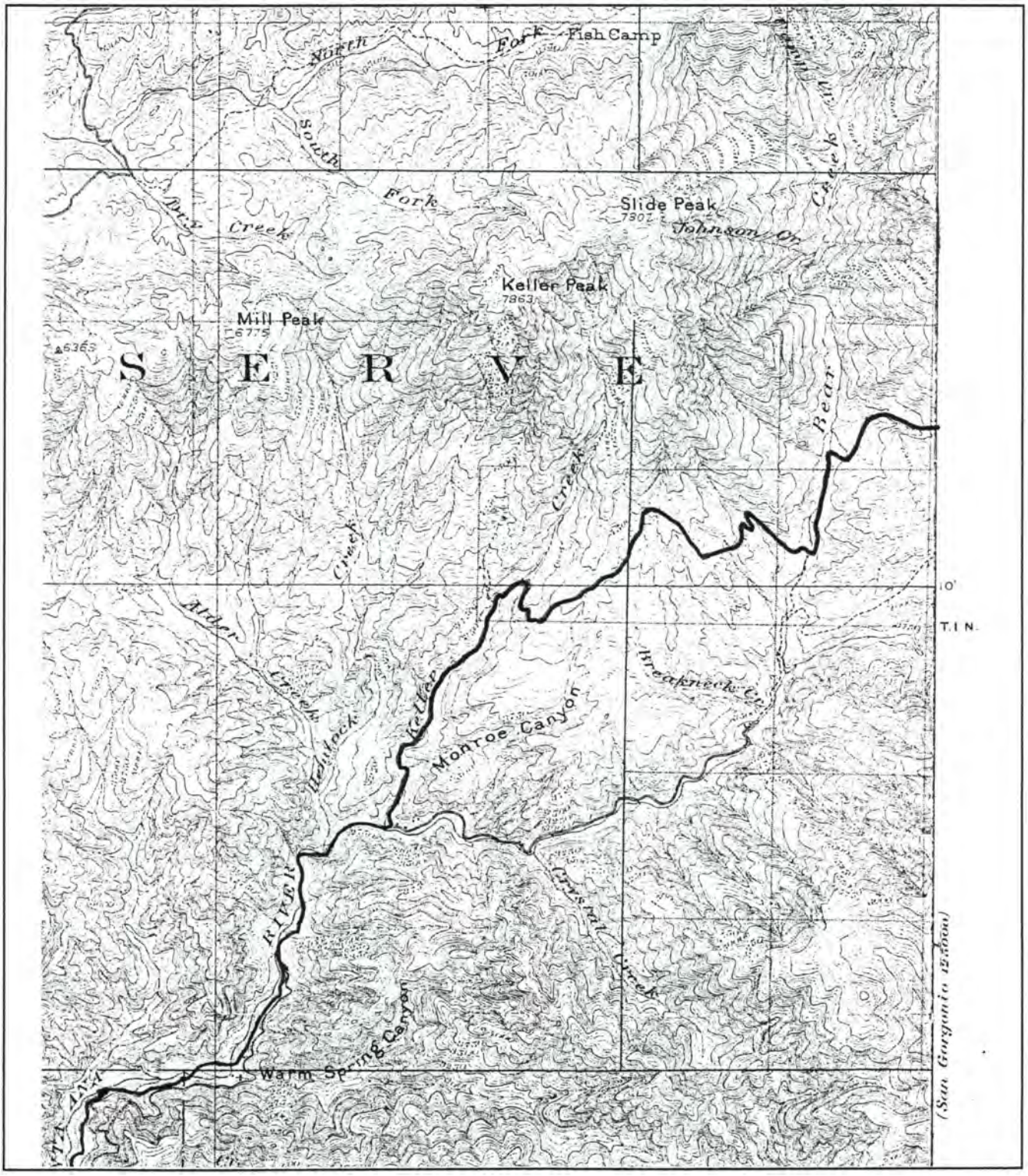


LOCATION MAP

Primary #: P36-007049
Trinomial: CA-SBR-07049H Update

 Resource Name or #: Rim of the World Drive

Map Name: Redlands, CA 15' series, 1901
Original route of Drive

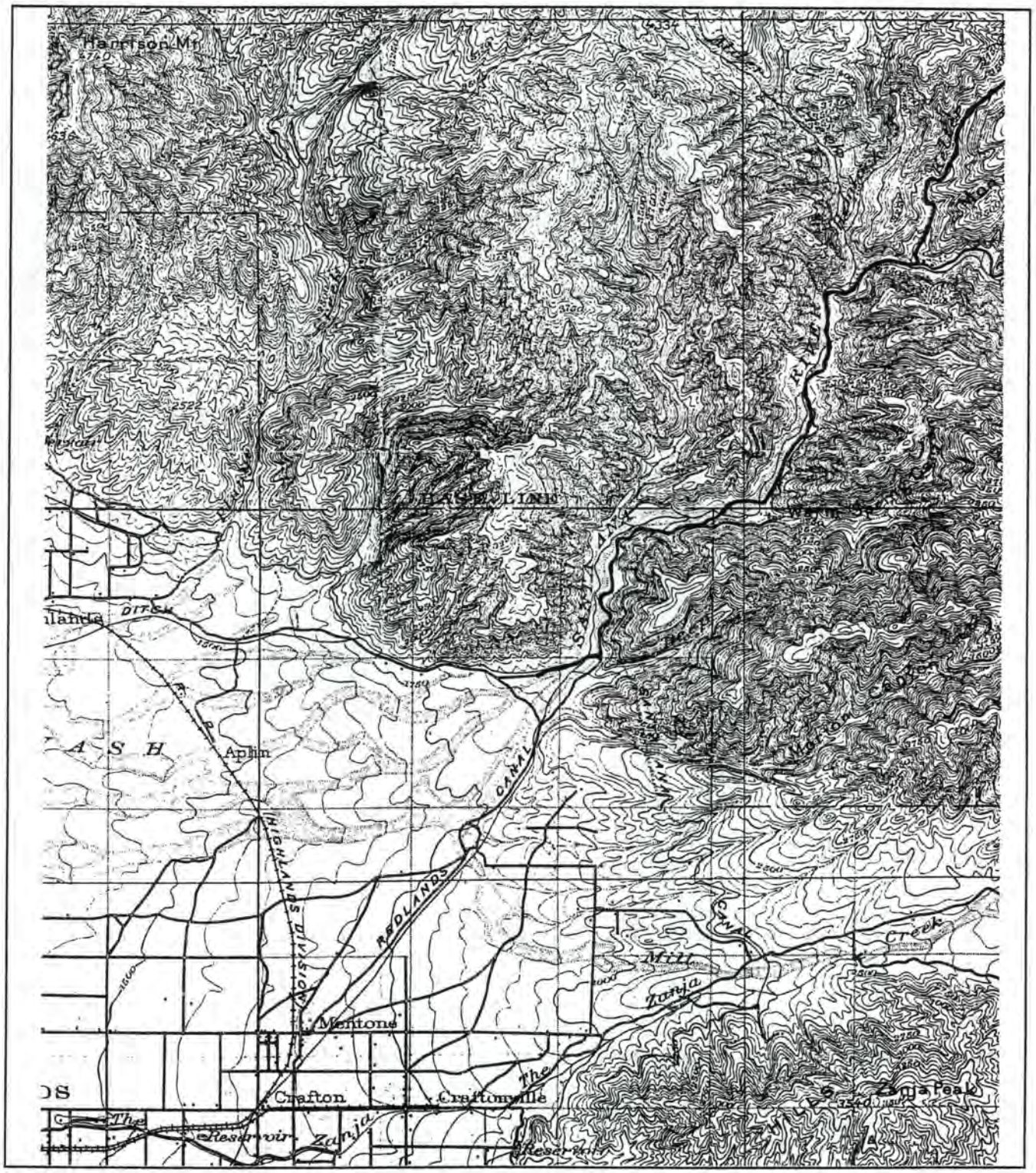


LOCATION MAP

Primary #: P36-007049
Trinomial: CA-SBR-07049H Update

Resource Name or #: Rim of the World Drive

Map Name: Redlands, CA 15' series, 1901

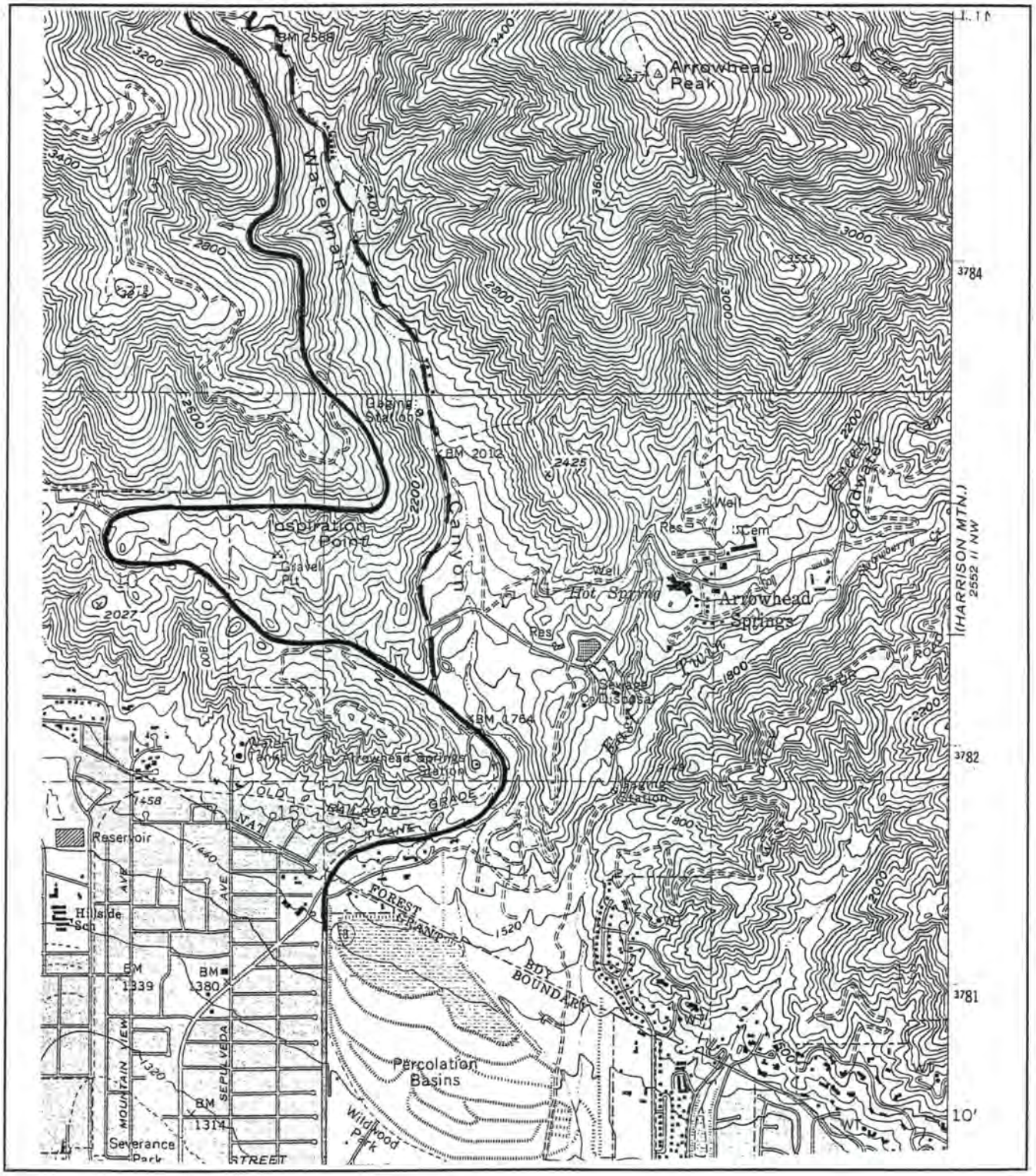


LOCATION MAP

Primary #: P36-007049
Trinomial: CA-SBR-07049H Update

 Resource Name or #: Rim of the World Drive

Map Name: San Bernardino North, CA 7.5' series, 1967
- - 1915 route ~~ current route

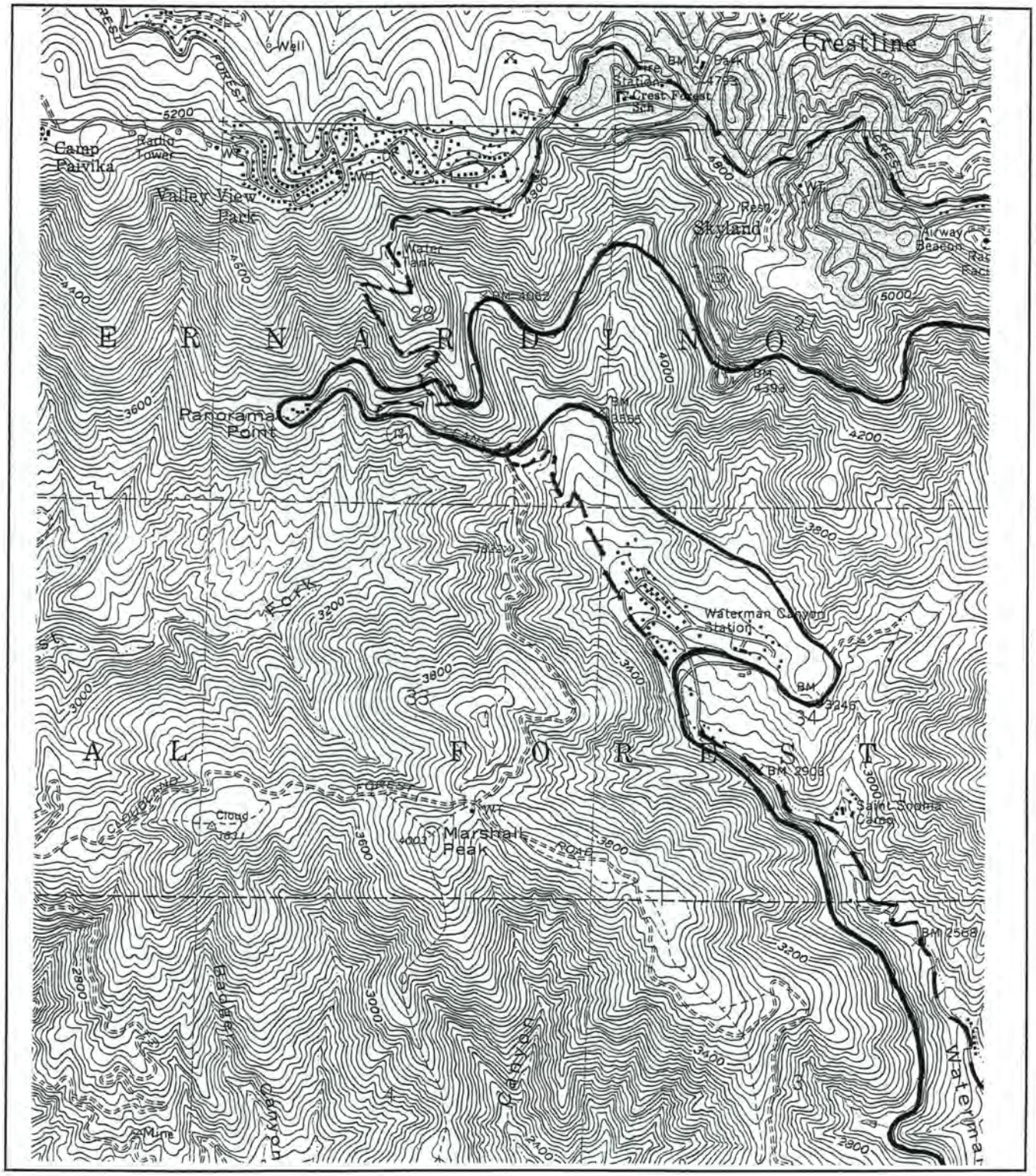


LOCATION MAP

Primary #: P36-007049
Trinomial: CA-SBR-07049H Update

 Resource Name or #: Rim of the World Drive

Map Name: San Bernardino North, CA 7.5' series, 1967
- - 1915 route ~ current route

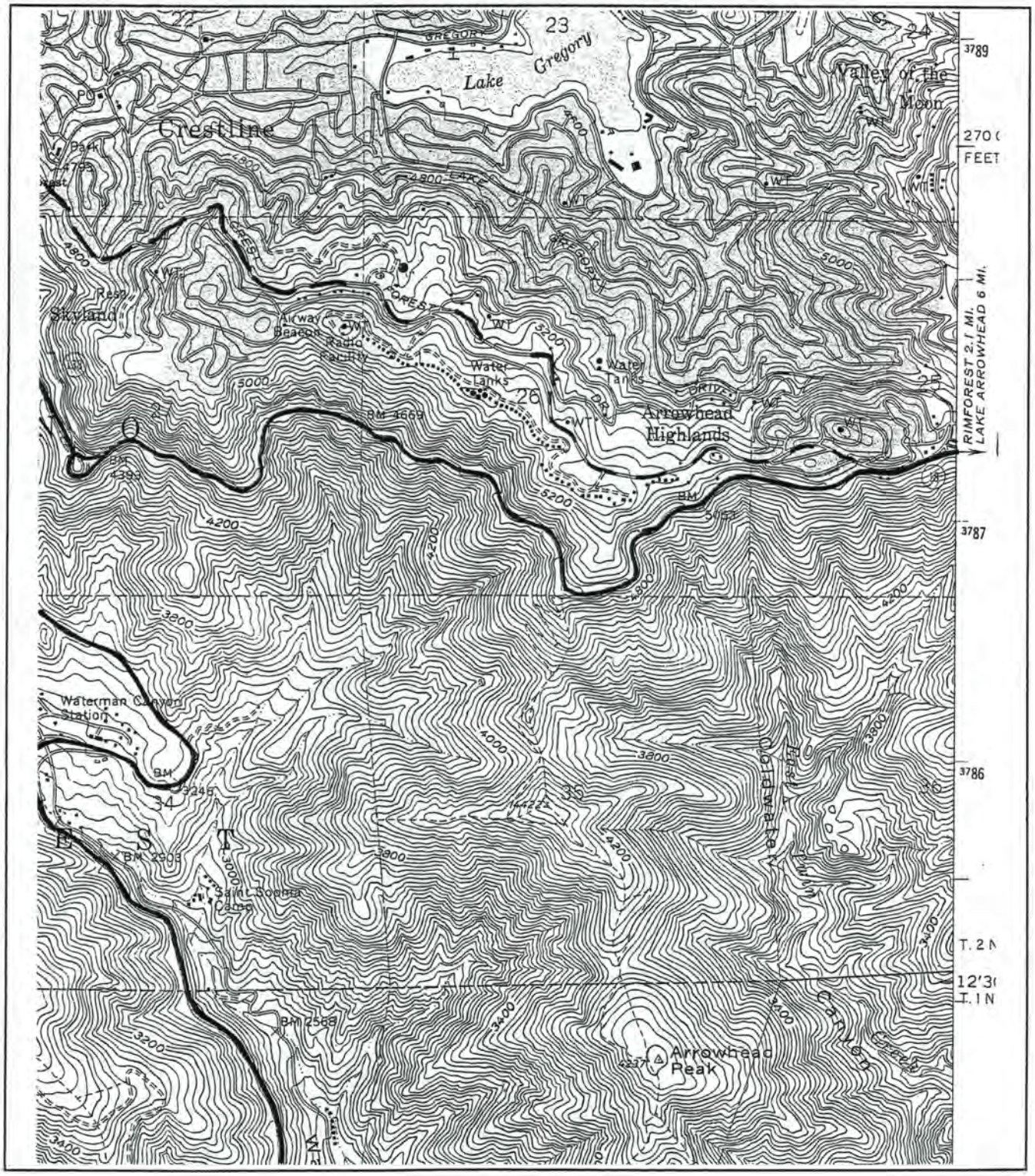


LOCATION MAP

Primary #: P36-007049
Trinomial: CA-SBR-07049H Update

 Resource Name or #: Rim of the World Drive

Map Name: San Bernardino North, CA 7.5' series, 1967
- - - 1915 route ~ current route

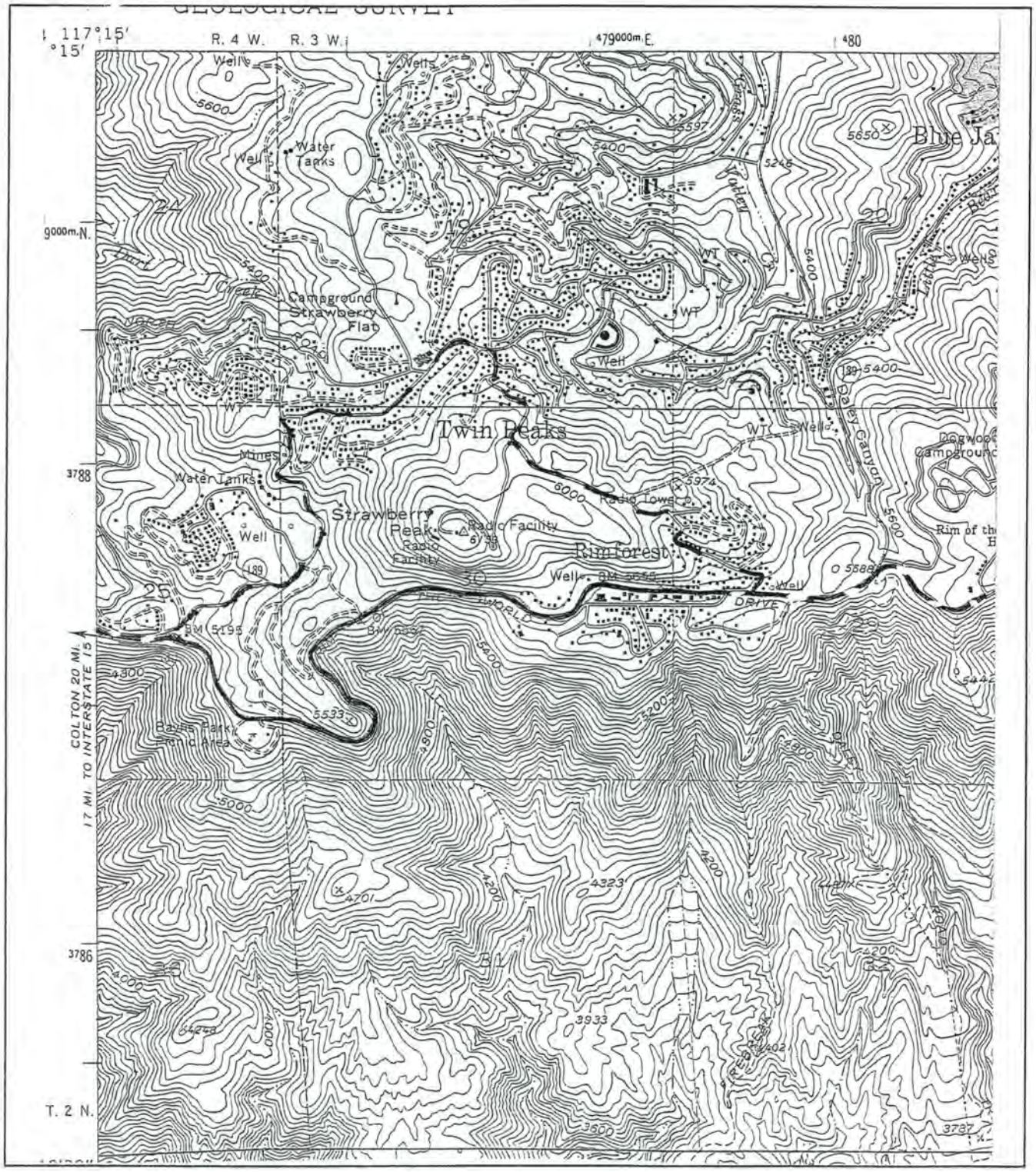


LOCATION MAP

Primary #: P36-007049
Trinomial: CA-SBR-07049H Update

Resource Name or #: Rim of the World Drive

Map Name: Harrison Mtn, CA 7.5' series, 1967
- - - 1915 route ▬▬ current route

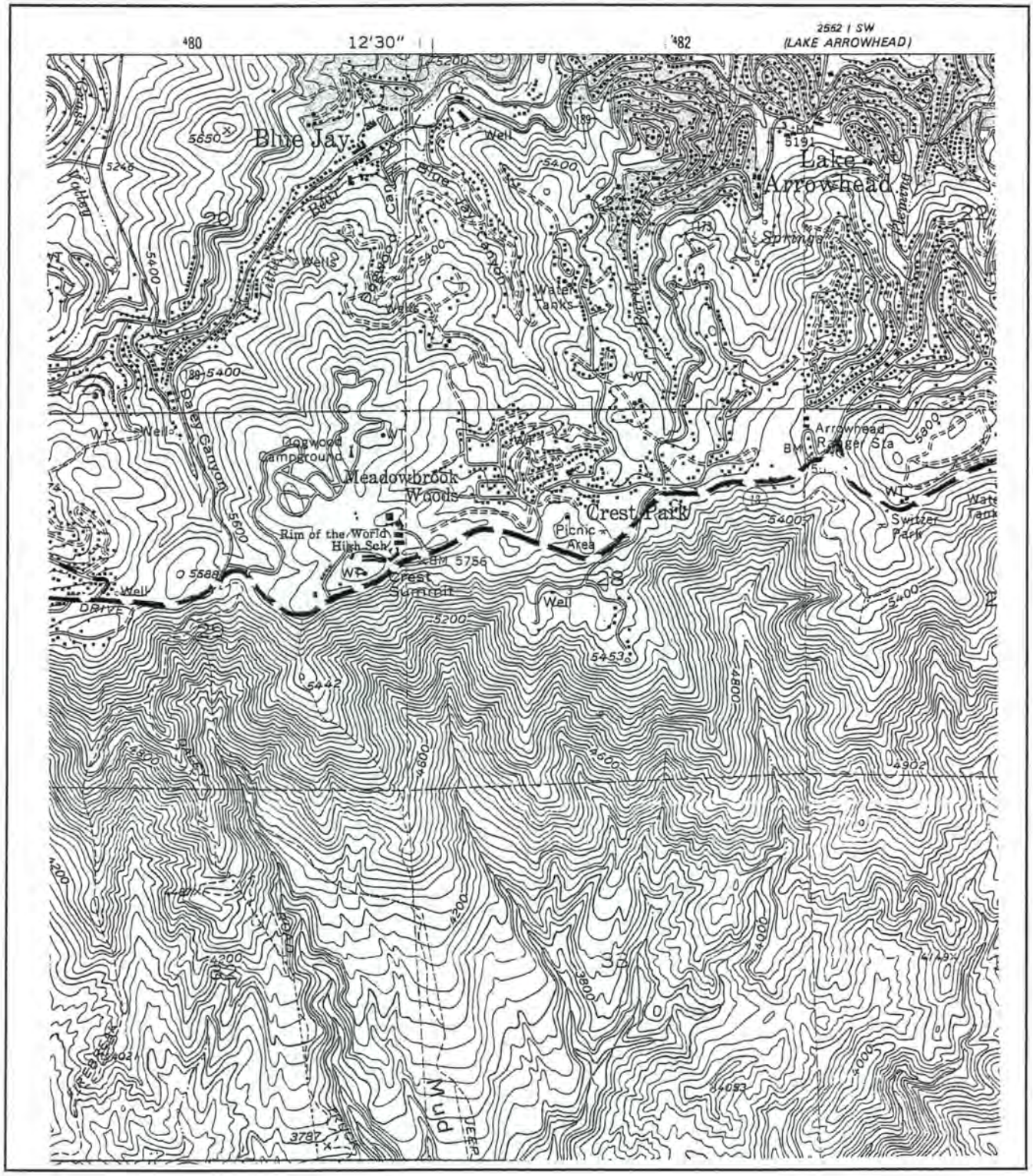


LOCATION MAP

Primary #: P36-007049
Trinomial: CA-SBR-07049H Update

 Resource Name or #: Rim of the World Drive

Map Name: Harrison Mtn, CA 7.5' series, 1967
– – – 1915 route – – – current route



LOCATION MAP

Primary #: P36-007049
Trinomial: CA-SBR-07049H Update

 Resource Name or #: Rim of the World Drive

Map Name: Harrison Mtn, CA 7.5' series, 1967
- - - 1915 route - - - current route

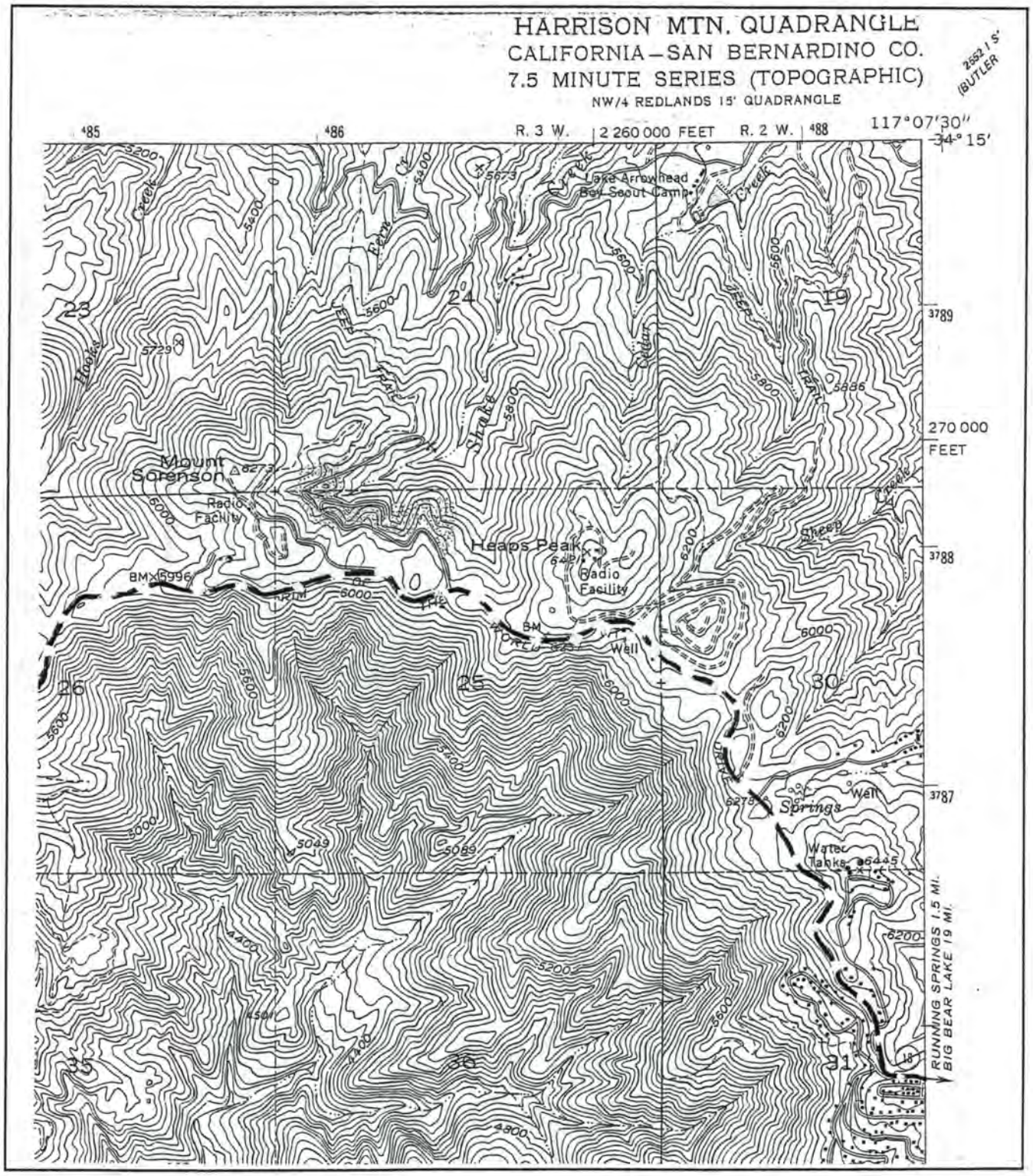


LOCATION MAP

Primary #: P36-007049
Trinomial: CA-SBR-07049H Update

Page 25 of 42 **Resource Name or #:** Rim of the World Drive

Map Name: Harrison Mtn, CA 7.5' series, 1967
- - - 1915 route - - - current route

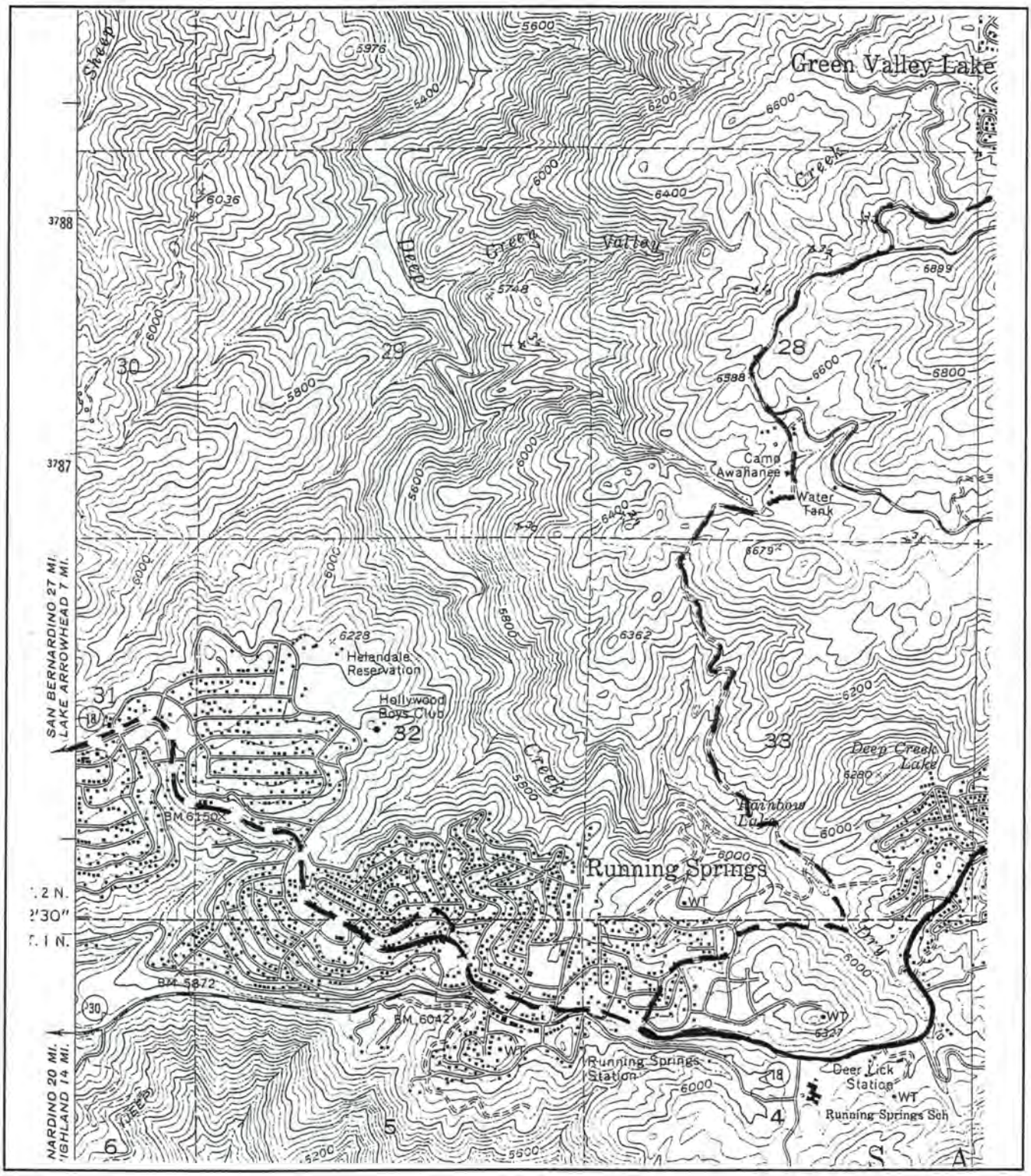


LOCATION MAP

Primary #: P36-007049
Trinomial: CA-SBR-07049H Update

 Resource Name or #: Rim of the World Drive

Map Name: Keller Peak, CA 7.5' series, 1967
- - - 1915 route ~~~ current route

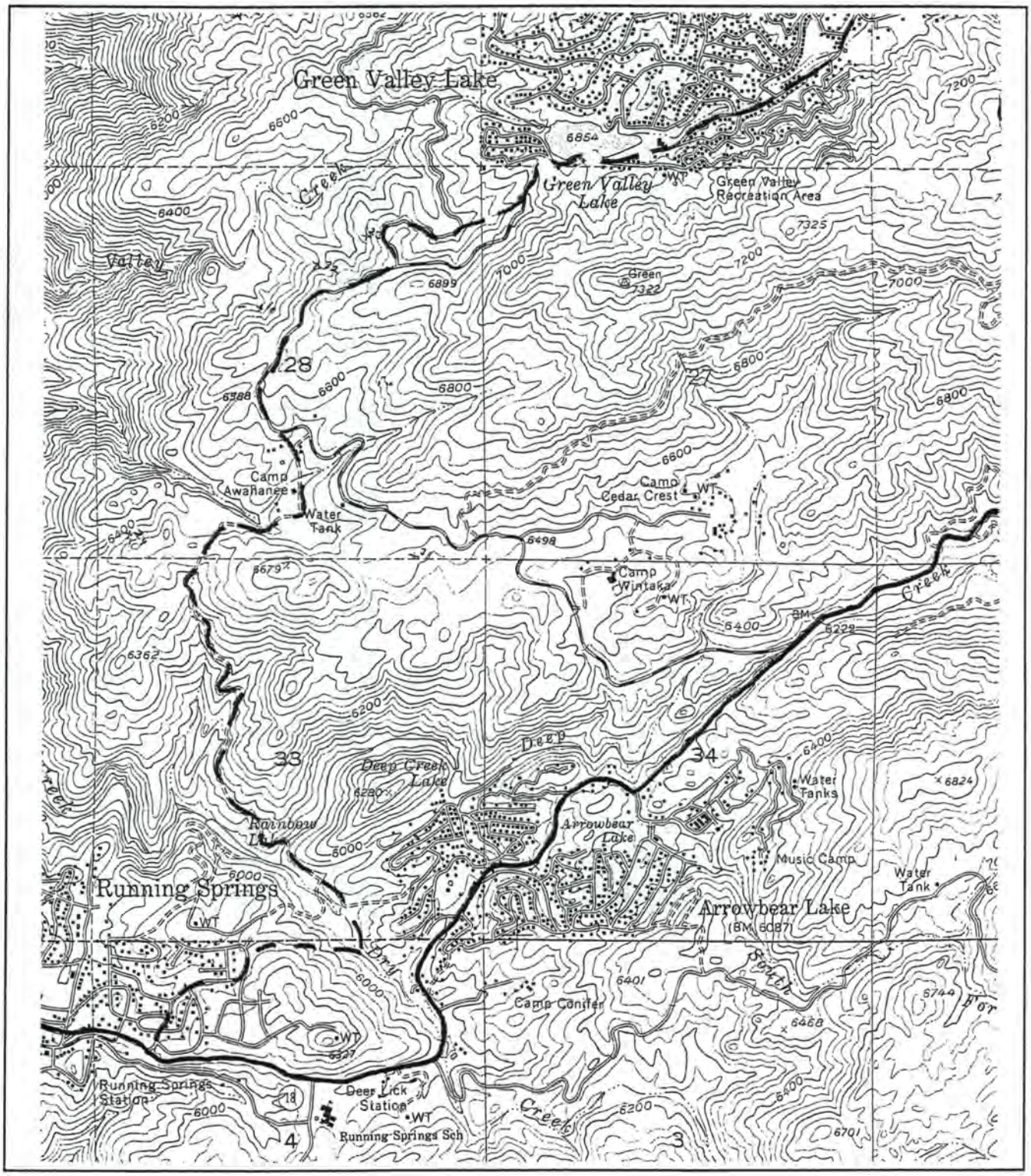


LOCATION MAP

Primary #: P36-007049
Trinomial: CA-SBR-07049H Update

 Resource Name or #: Rim of the World Drive

Map Name: Keller Peak, CA 7.5' series, 1967
- - - 1915 route ~~~ current route

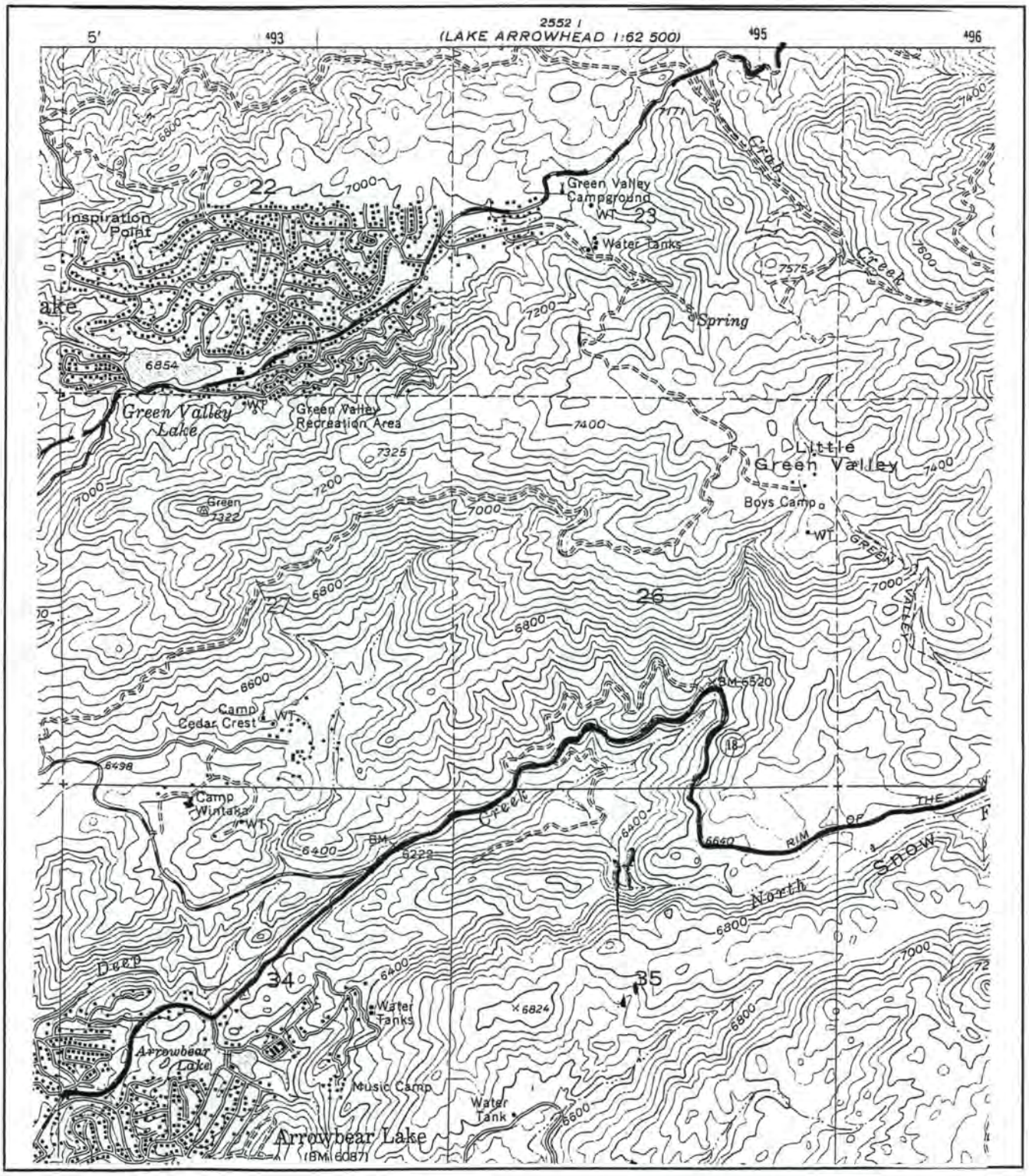


LOCATION MAP

Primary #: P36-007049
Trinomial: CA-SBR-07049H Update

 Resource Name or #: Rim of the World Drive

Map Name: Keller Peak, CA 7.5' series, 1967
- - - 1915 route ~~~ current route

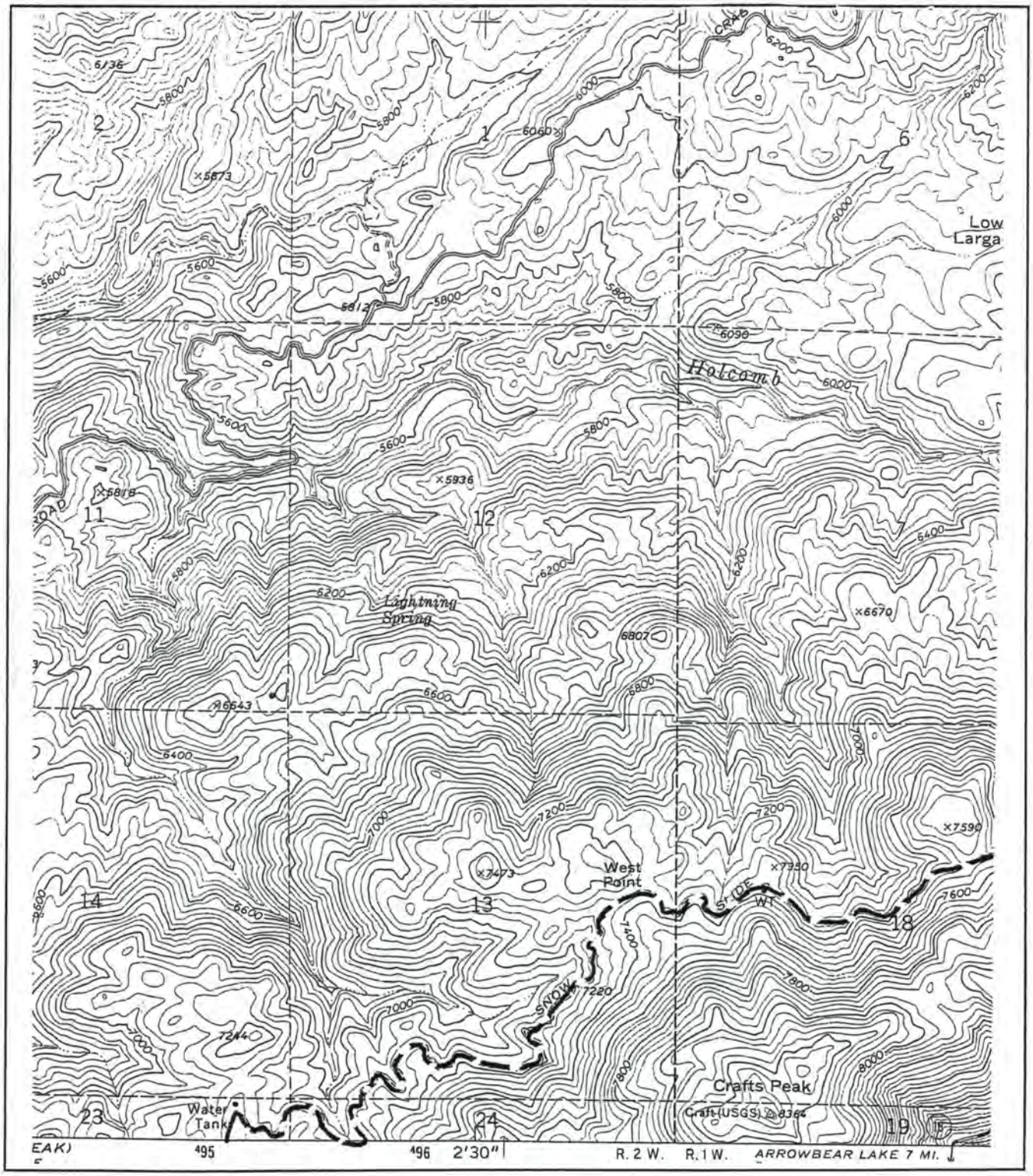


LOCATION MAP

Primary #: P36-007049
Trinomial: CA-SBR-07049H Update

 Resource Name or #: Rim of the World Drive

Map Name: Butler Peak, CA 7.5' series, 1971
– – – Old route ~~~ Current route

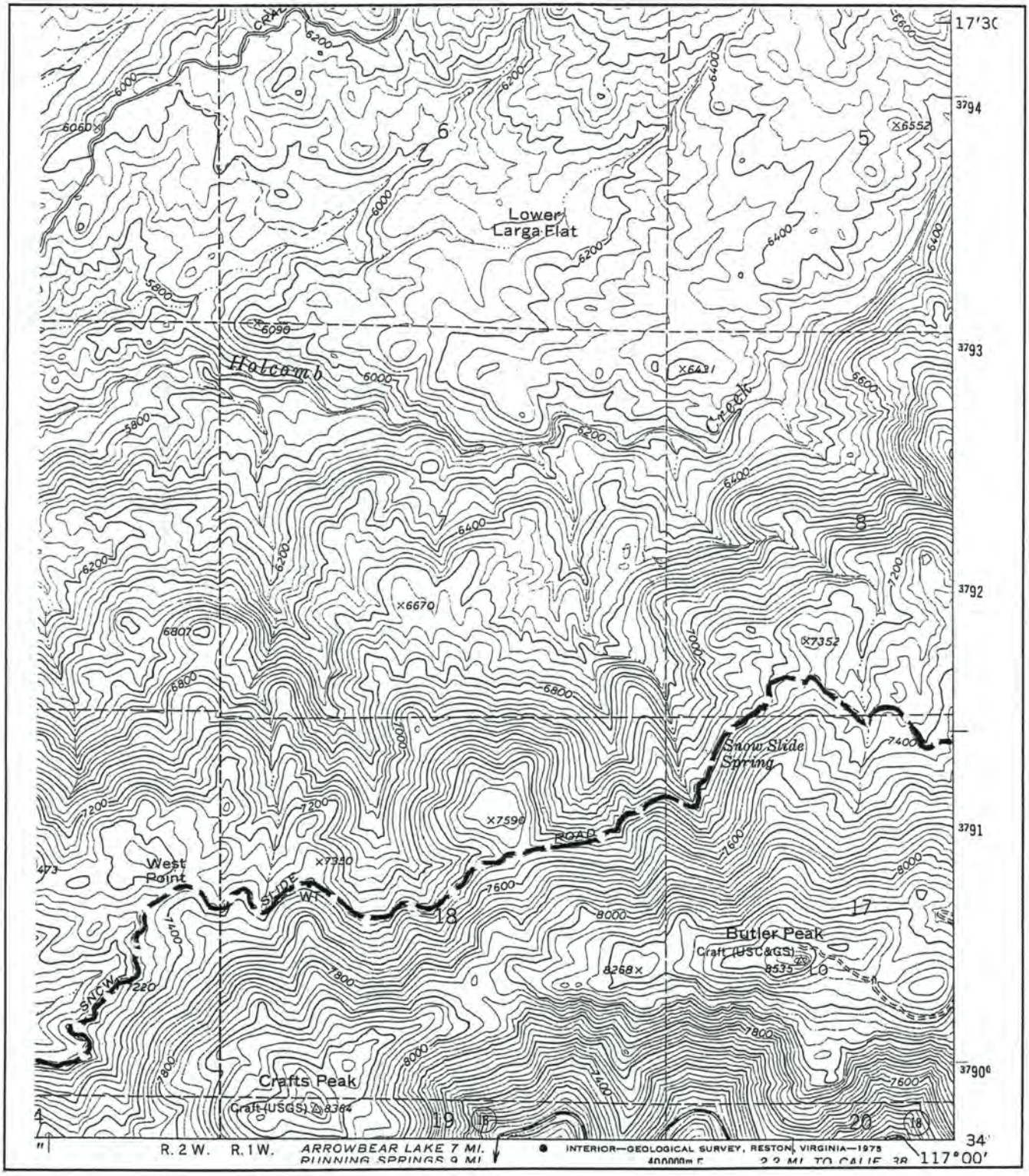


LOCATION MAP

Primary #: P36-007049
Trinomial: CA-SBR-07049H Update

 Resource Name or #: Rim of the World Drive

Map Name: : Butler Peak, CA 7.5' series, 1971
- - - Old route ~ Current route

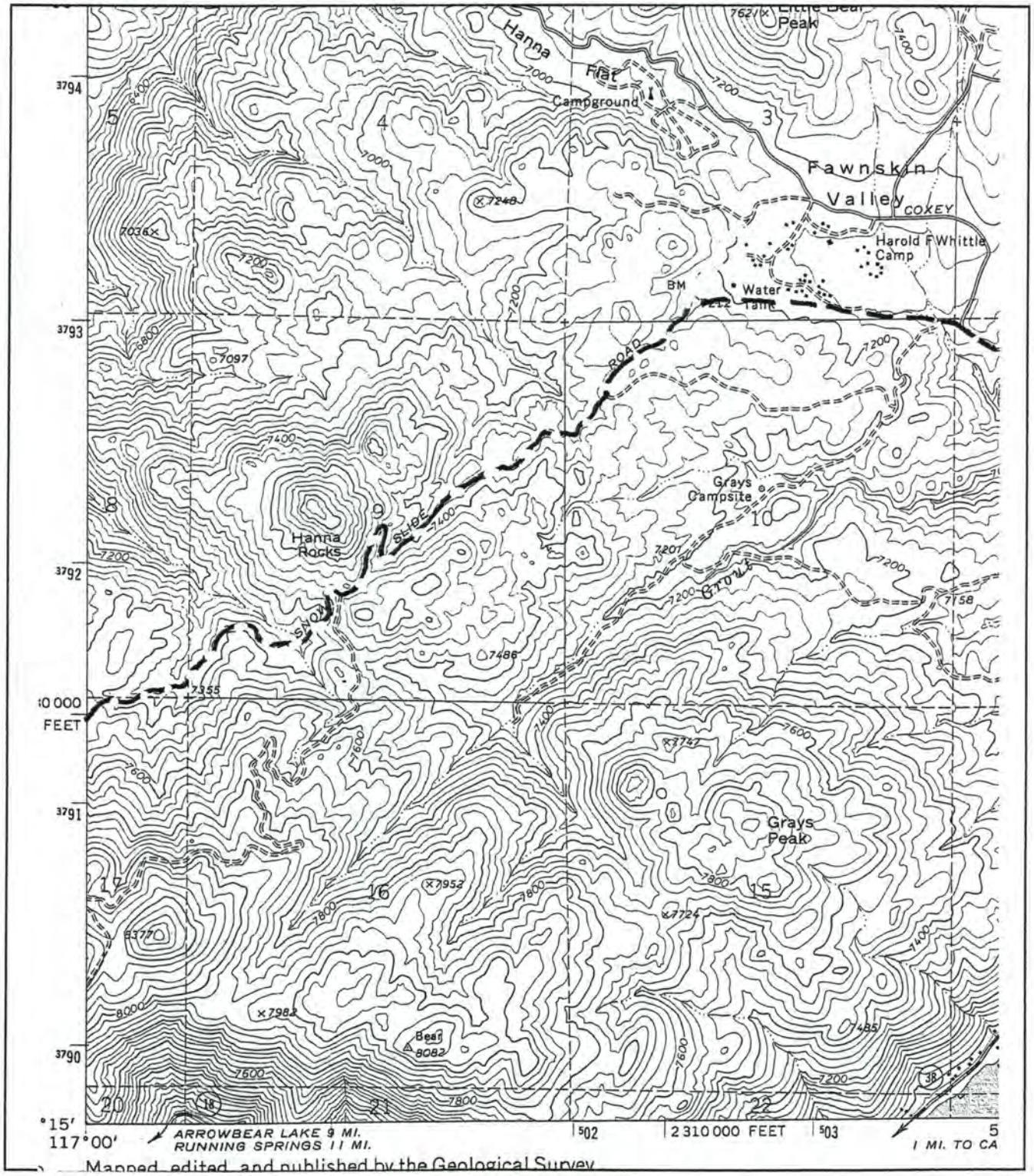


LOCATION MAP

Primary #: P36-007049
Trinomial: CA-SBR-07049H Update

 Resource Name or #: Rim of the World Drive

Map Name: Fawnskin, CA 7.5' series 1971
– – – Old route ~~~ Current route



Mapped, edited, and published by the Geological Survey

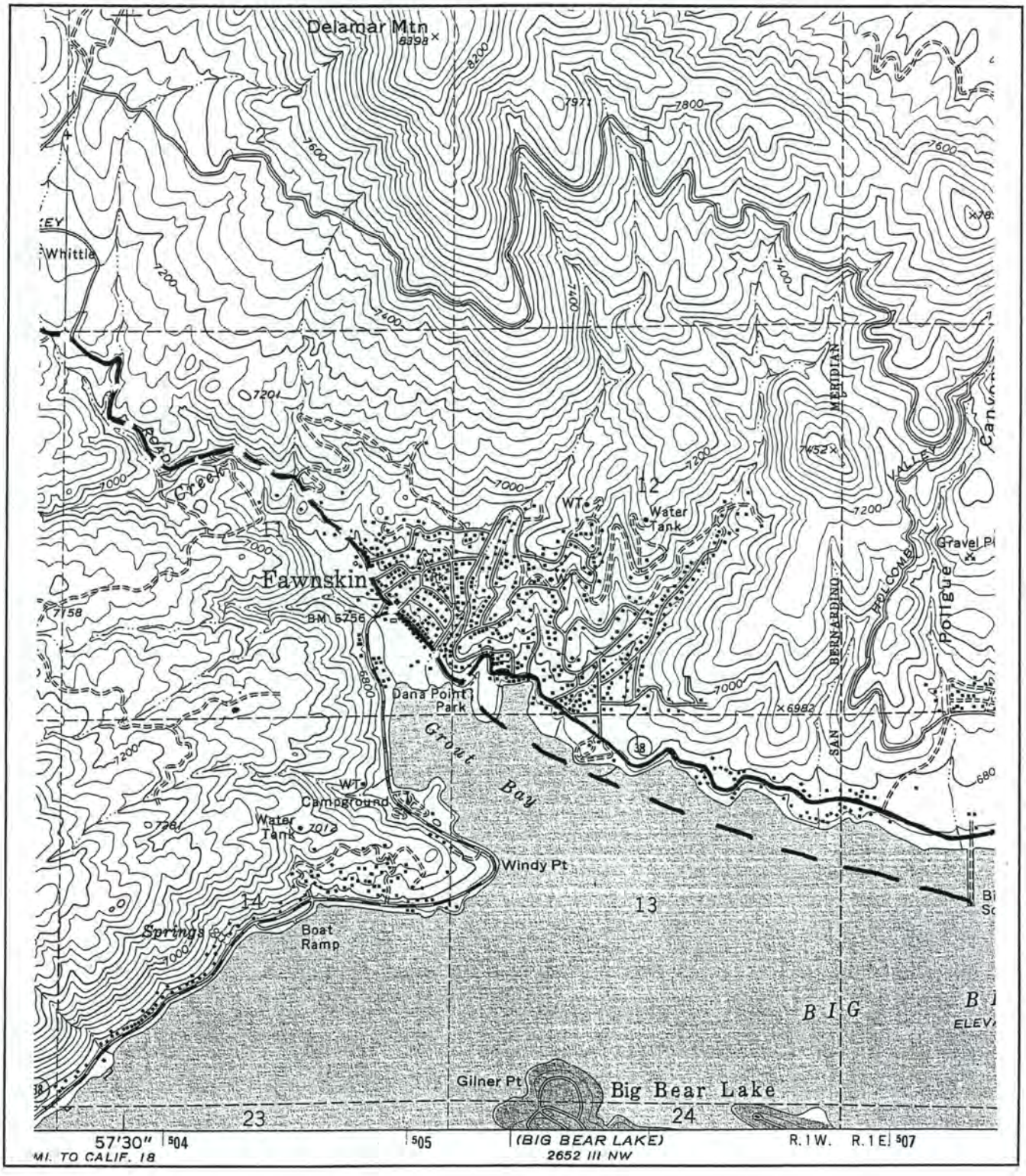
LOCATION MAP

Primary #: P36-007049
Trinomial: CA-SBR-07049H Update

 Resource Name or #: Rim of the World Drive

Map Name: 1971 Fawnskin, CA 7.5'

- - - Old route ~ Current route

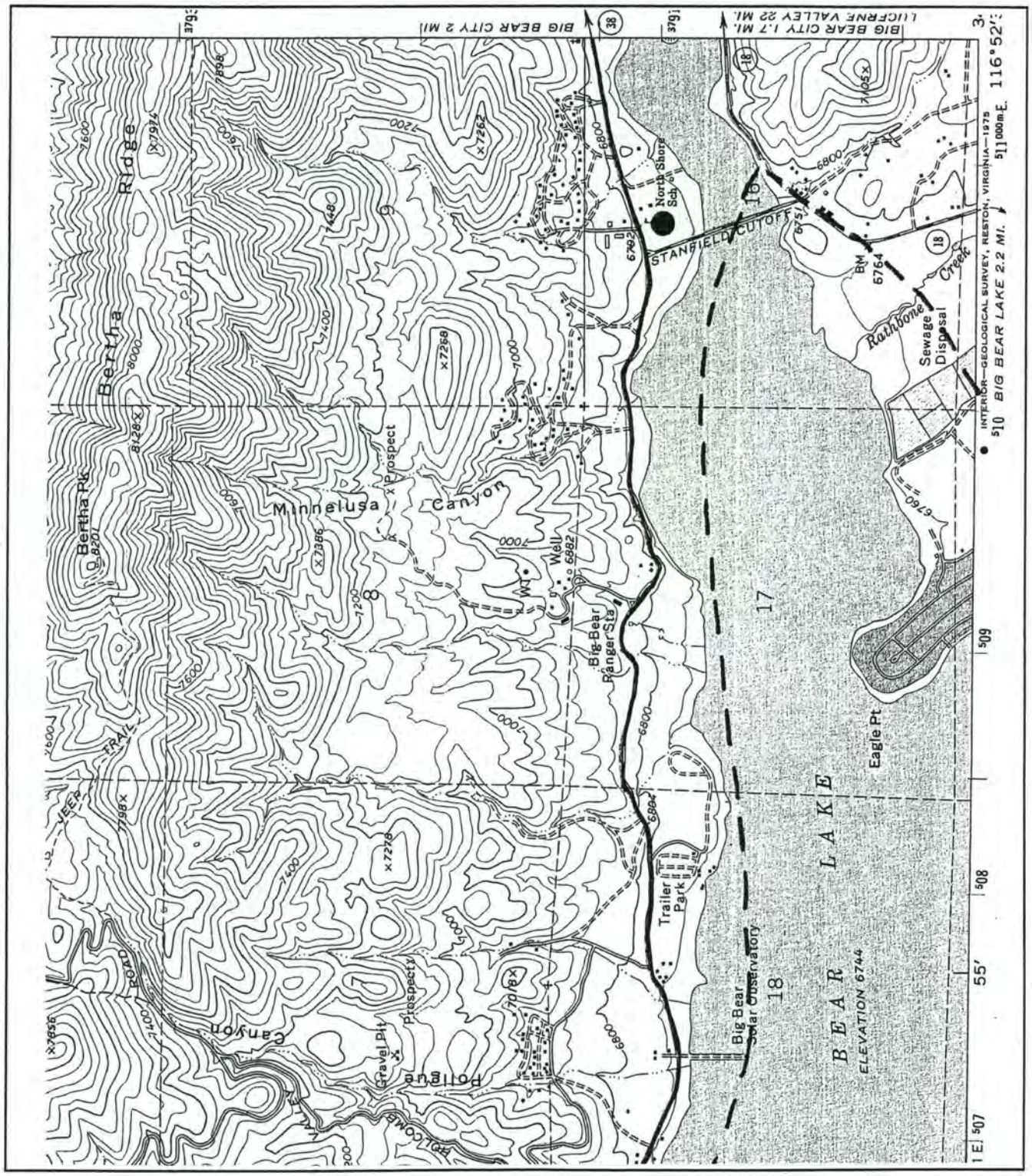


LOCATION MAP

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Trinomial: CA-SBR-07049H Update

 Resource Name or #: Rim of the World Drive

Map Name: 1971 Fawnskin, CA 7.5'
– – – Old route ~ Current route



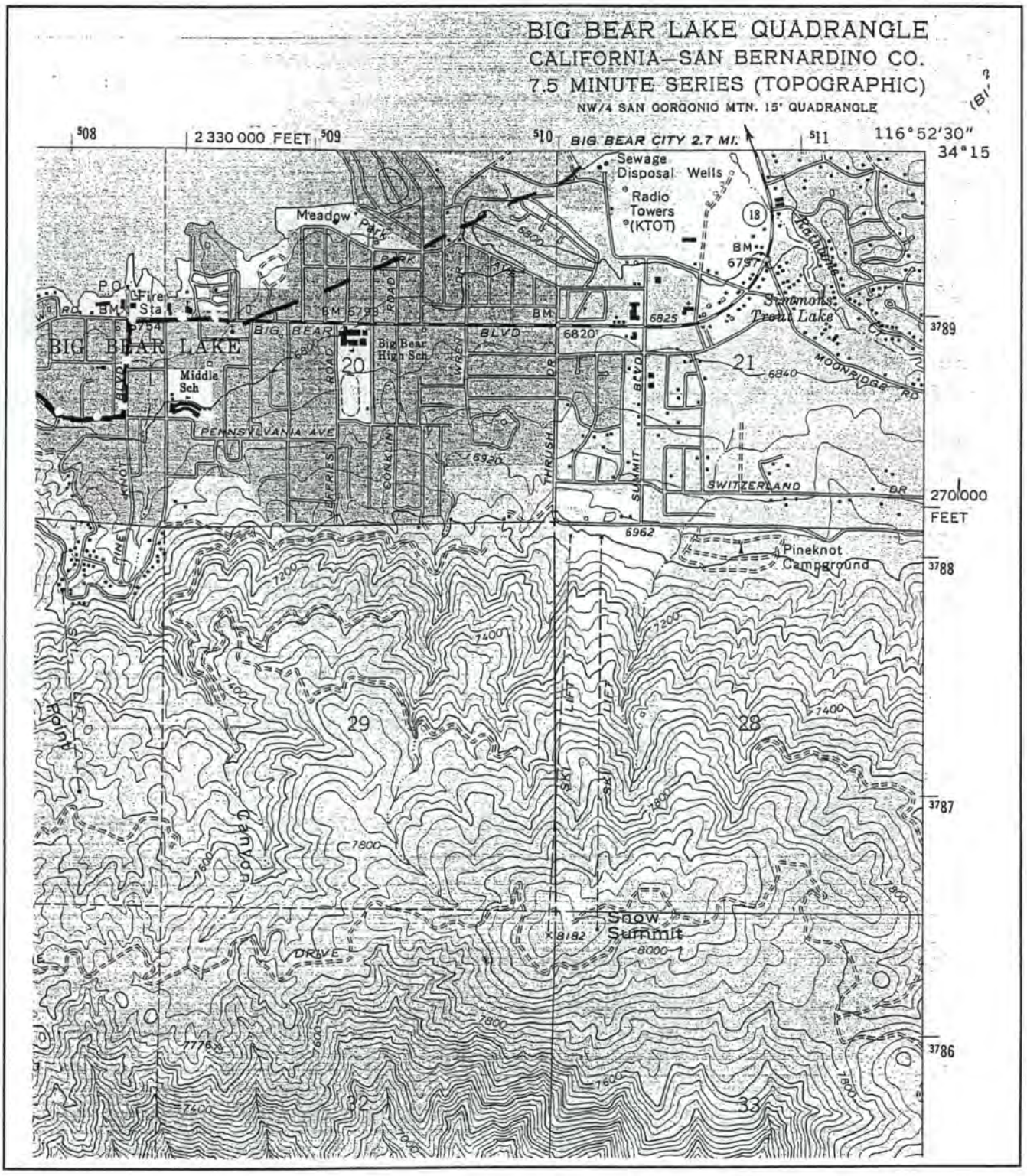
LOCATION MAP

Primary #: P36-007049
Trinomial: CA-SBR-07049H Update

Resource Name or #: Rim of the World Drive

Map Name: Big Bear Lake, CA 7.5' series, 1970

- - - Old route ~ Current route

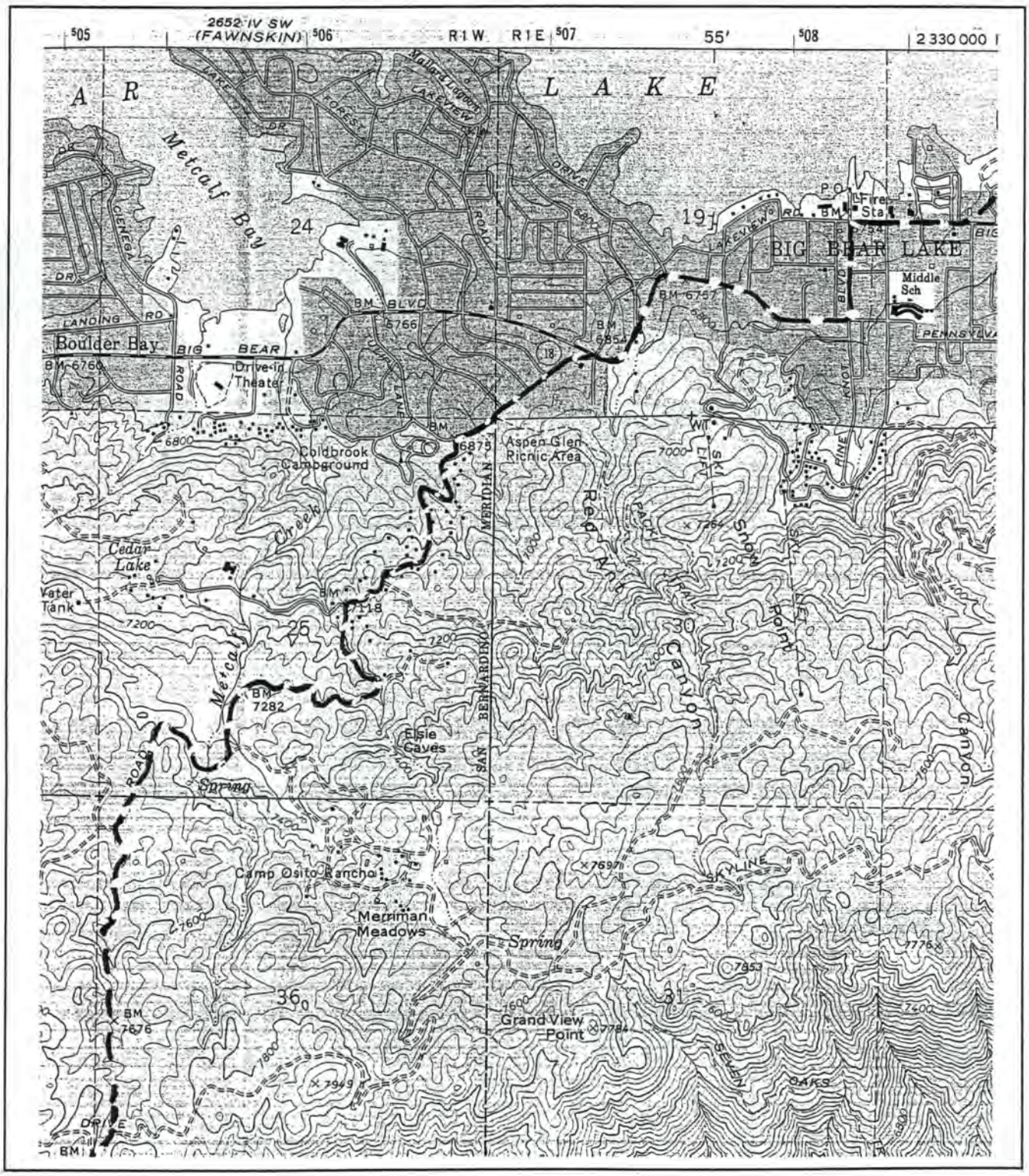


LOCATION MAP

Primary #: P36-007049
Trinomial: CA-SBR-07049H Update

 Resource Name or #: Rim of the World Drive

Map Name: Big Bear Lake, CA 7.5' series, 1970
- - - Old route ~ Current route



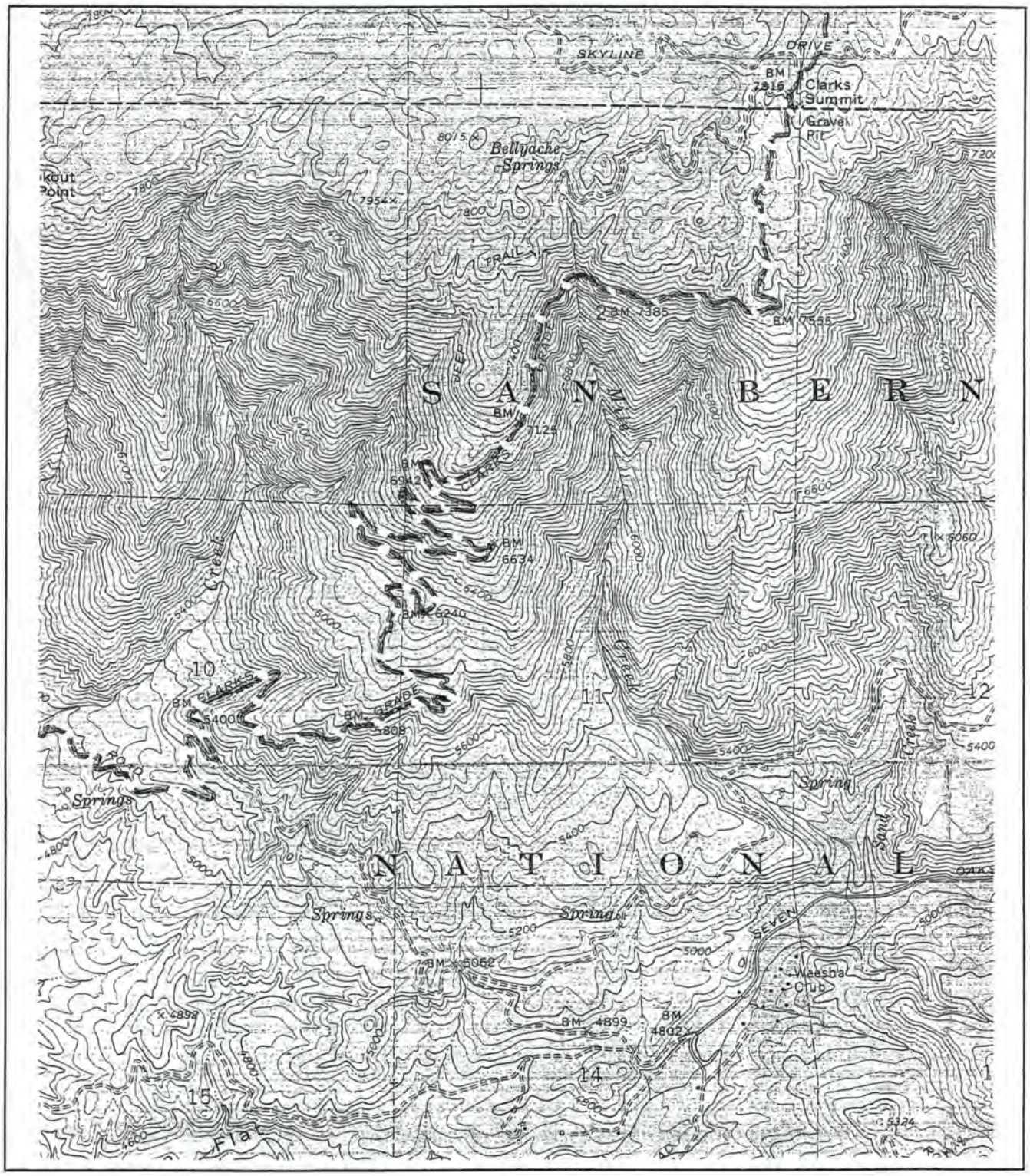
LOCATION MAP

Primary #: P36-007049
Trinomial: CA-SBR-07049H Update

Resource Name or #: Rim of the World Drive

Map Name: Big Bear Lake, CA 7.5' series, 1970

Old route Current route

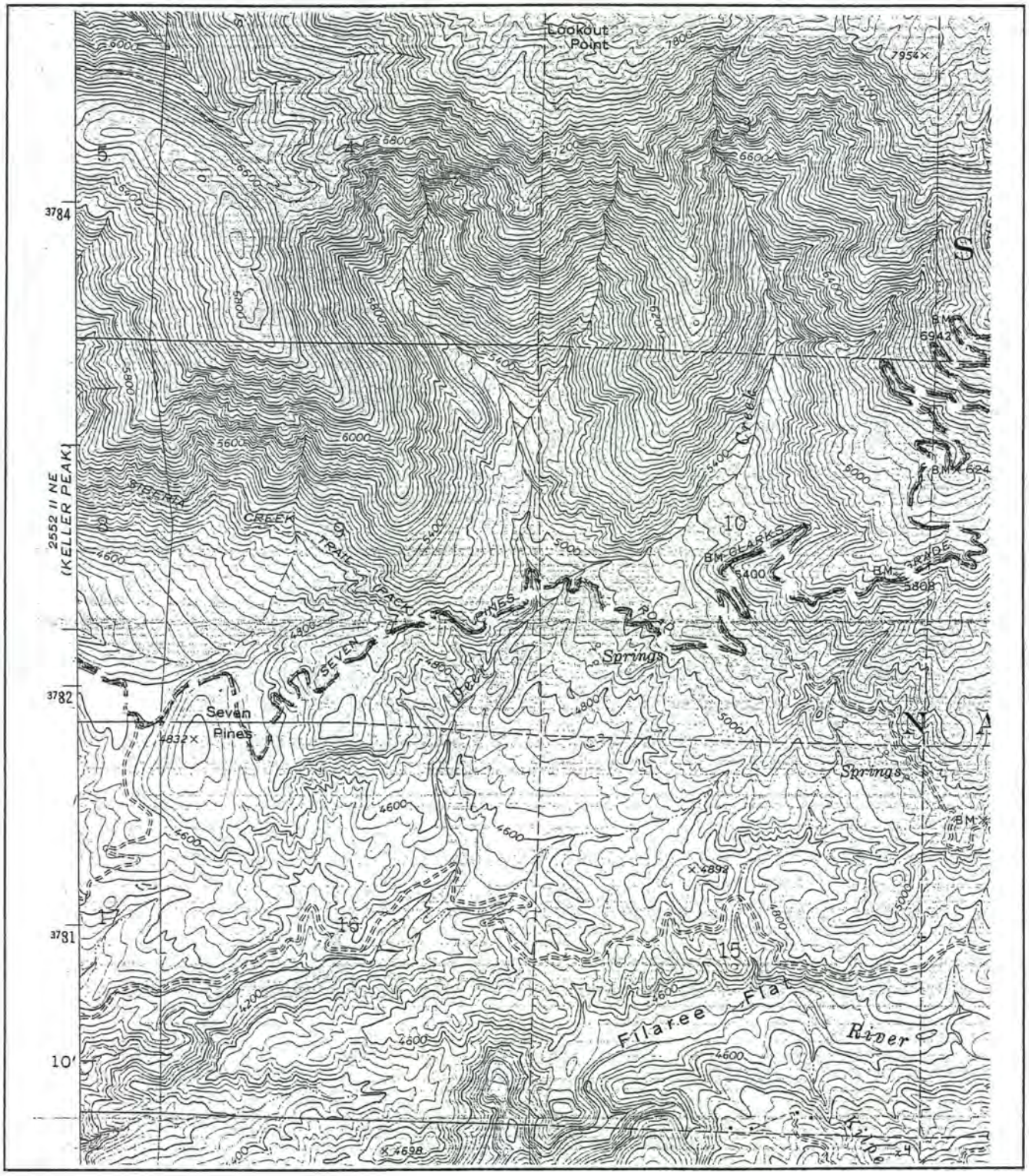


LOCATION MAP

Primary #: P36-007049
Trinomial: CA-SBR-07049H Update

 Resource Name or #: Rim of the World Drive

Map Name: Big Bear Lake, CA 7.5' series, 1970
Old route Current route



LOCATION MAP

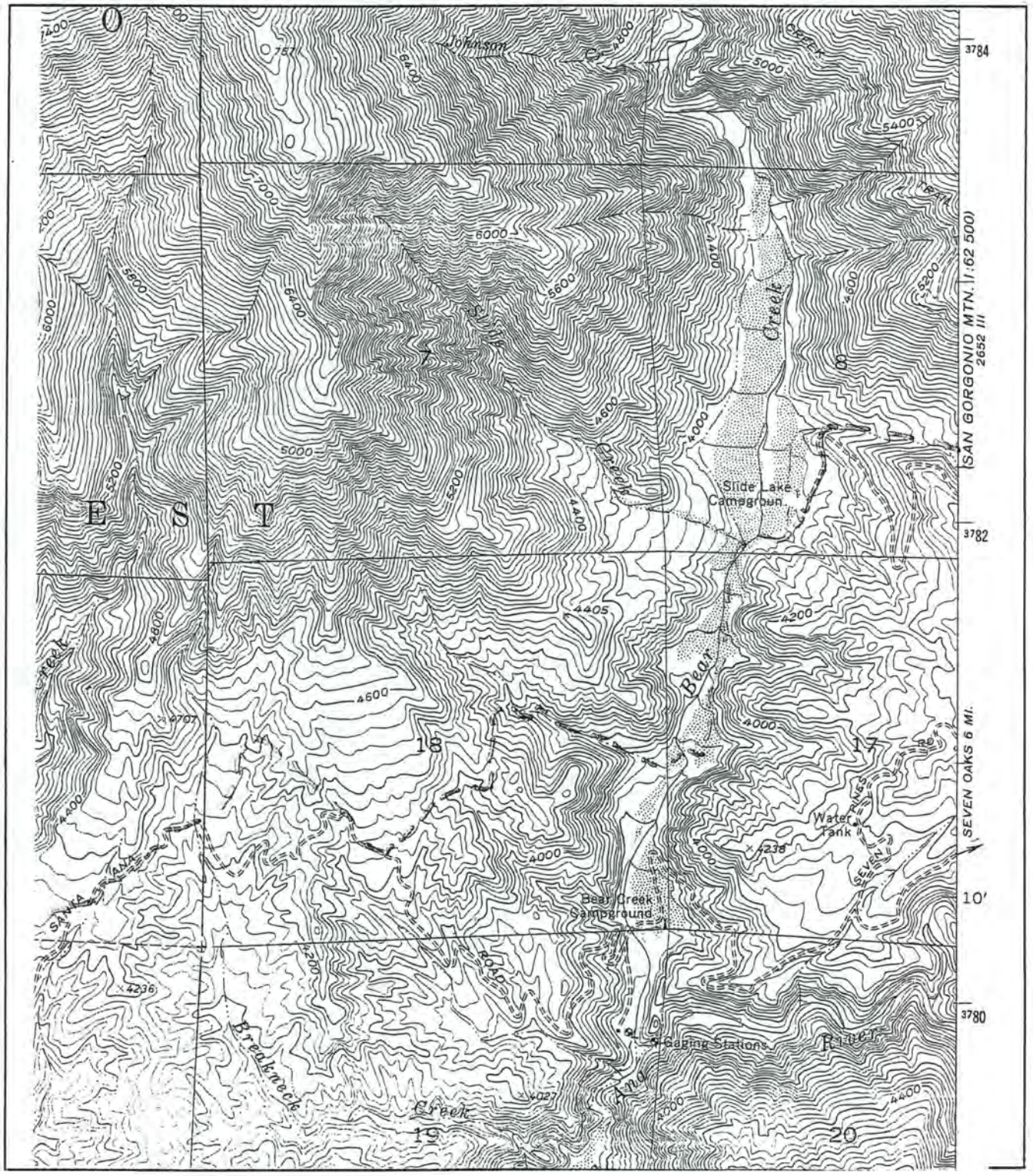
Primary #: P36-007049
Trinomial: CA-SBR-07049H Update

Resource Name or #: Rim of the World Drive

Map Name: Keller Peak, CA 7.5' series, 1967

Old route

Current route

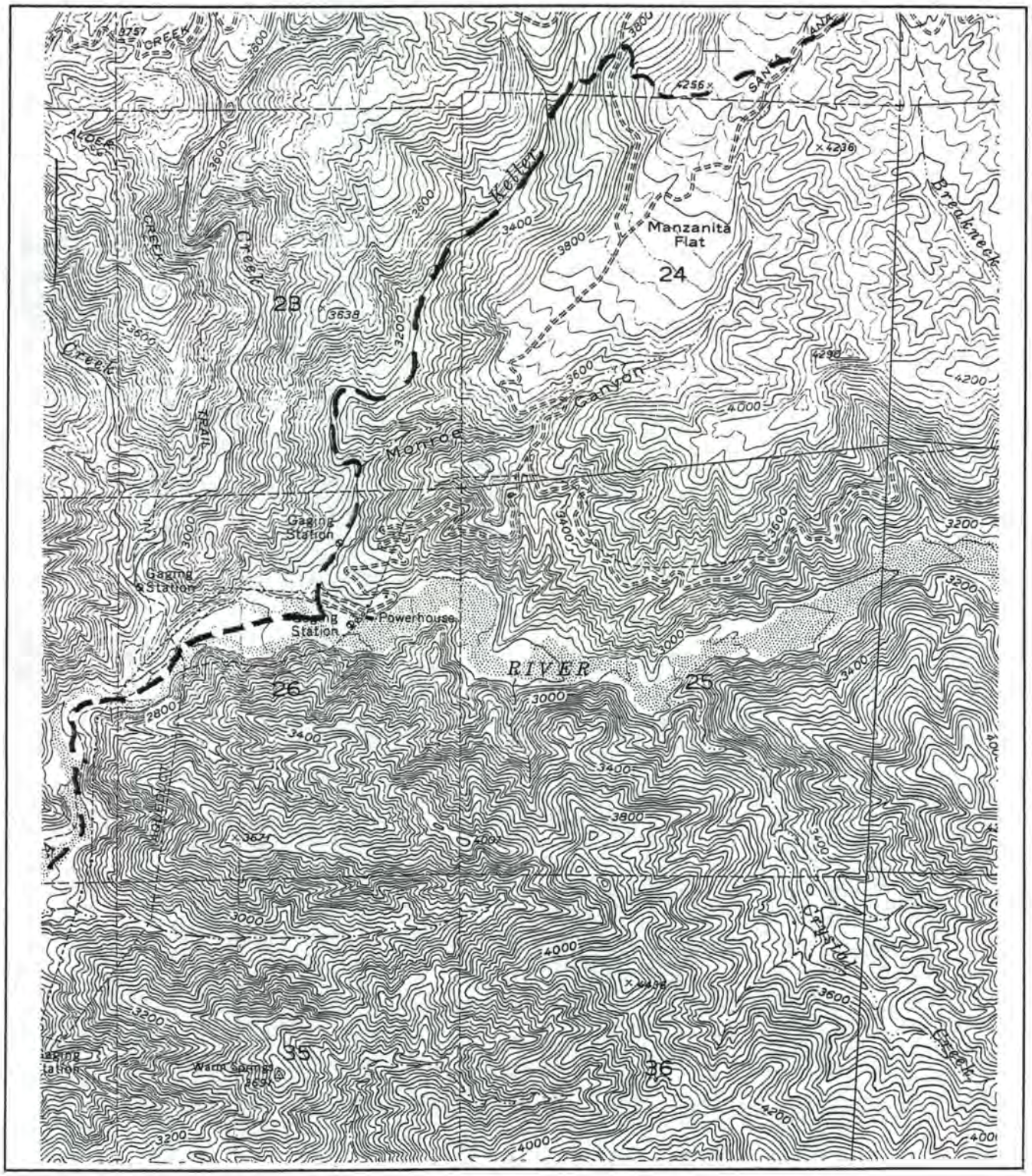


LOCATION MAP

Primary #: P36-007049
Trinomial: CA-SBR-07049H Update

 Resource Name or #: Rim of the World Drive

Map Name: Keller Peak, CA 7.5' series, 1967
~ — Old route ~ Current route

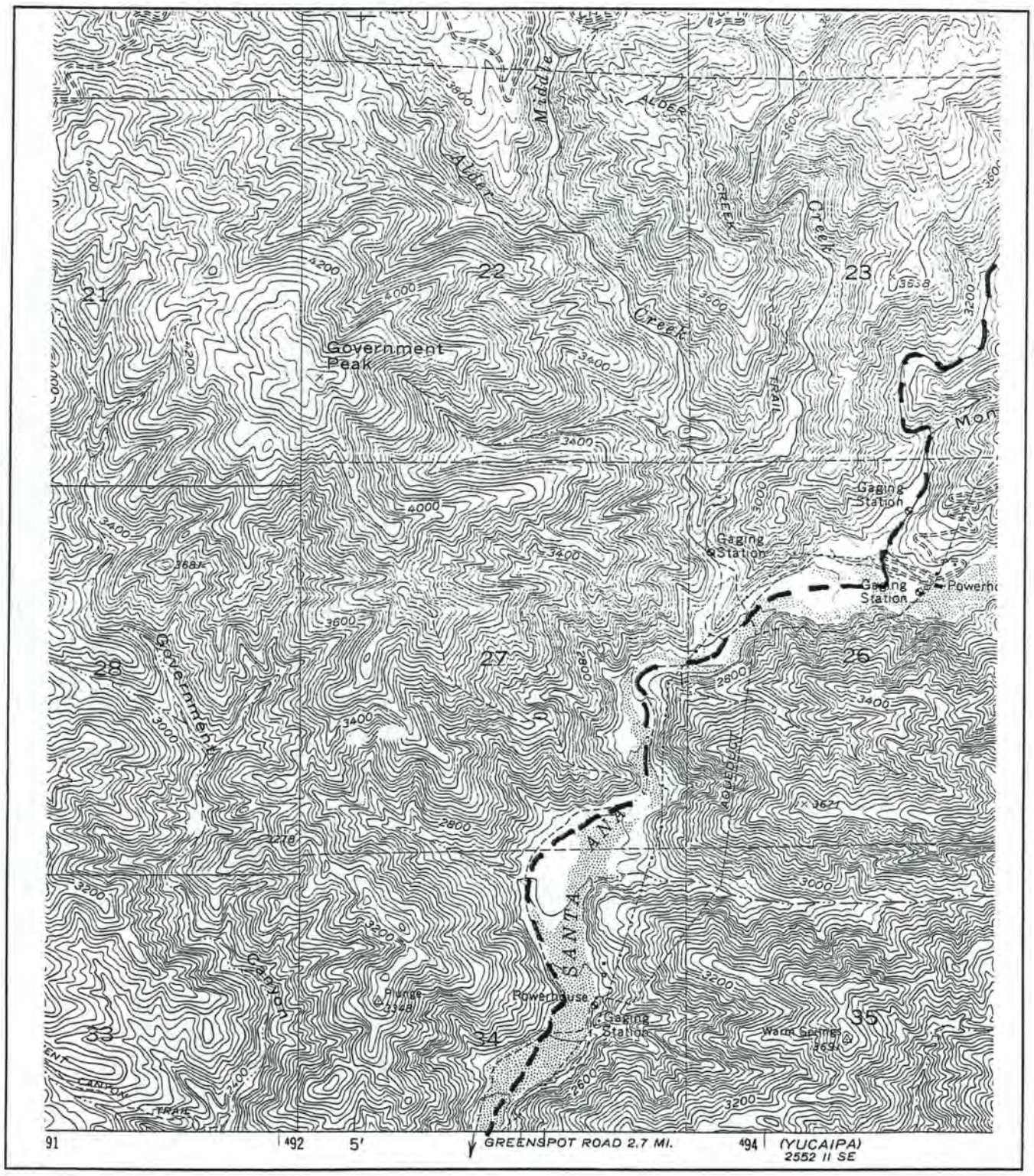


LOCATION MAP

Primary #: P36-007049
Trinomial: CA-SBR-07049H Update

Resource Name or #: Rim of the World Drive

Map Name: Keller Peak, CA 7.5' series, 1967



LOCATION MAP

Primary #: P36-007049
Trinomial: CA-SBR-07049H Update

Resource Name or #: Rim of the World Drive

Map Name: Yucaipa, CA 7.5' series, 1954

~ ~ Old route ~ Current route

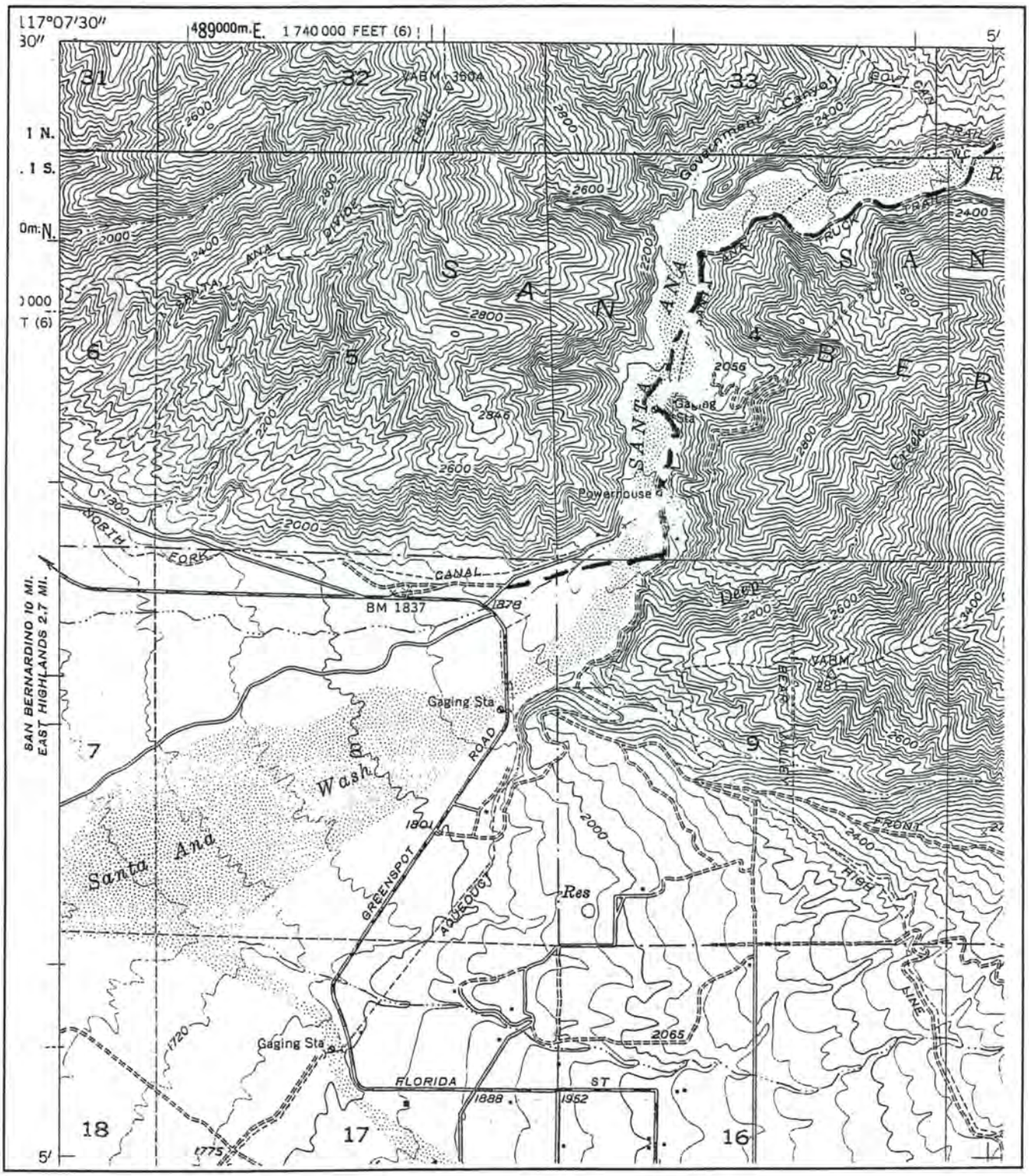


LOCATION MAP

Primary #: P36-007049
Trinomial: CA-SBR-07049H Update

 Resource Name or #: Rim of the World Drive

Map Name: Yucaipa, CA 7.5' series, 1954
— — Old route ~ Current route



P36-007049

1062

Archaeological Site Record

Trinomial: CA-SBr-7049H
Field No.: MKLA-9108-2
Site Name: Rim of the World Drive
1915 Route

Michael K. Lerch & Associates

1. County: San Bernardino
2. USGS Quad: Harrison Mtn. 7.5', 1967, photorevised 1988
3. UTM Coordinates: Zone 11; A: 477840 mE; 3787580 mN. B: 478730 mE; 3786940 mE.

4. T.2N R.4W; E ½ of SE ¼ of Sect. 25; T.2N R.3W; SW ¼ of SW ¼ of NW ¼ of Sect. 30; SBBM
5. Map Coordinates: mmS; mmE. 6. Elevation: 5,370-5450 feet
7. Location: Linear feature (road) running between USFS Baylis Park Picnic Area on SR 18 and Pinecrest Conference Center SR 189.

8. Prehistoric Historic X Protohistoric
9. Site Description: Original route of the Rim of the World Drive from its dedication on July 18, 1915 until it was bypassed to the south by construction of a newer high-gear road in 1930. The road probably existed as early as 1907 as a private connection between Pinecrest at its north end and South Park Lodge at its south end, both of which were owned by Dr. John N. Baylis. South Park Lodge was located at what is now Baylis Park.

10. Area: 4 m wide x 800 m long Method of Determination: scaled from map
11. Depth: 5 cm. Method of Determination: observed
12. Features: graded asphalt-paved roadway; stone entry monuments at north end are 6' x 6' at base, 4' x 4' at top, 10' high, with 3' dia. cap rocks and 12'-long wing abutments sloping from ground level up to 5' high at pillars
13. Artifacts: none
14. Non-artifactual constituents/Faunal Remains: none
15. Date Recorded: 2 October 1991 16. Recorded By: Michael K. Lerch, Mark Swanson
17. Affiliation and Address: Michael K. Lerch & Associates
P. O. Box 55134, Riverside, CA 92517-0134

18. Human Remains: none observed nor likely
19. Site Disturbance: moderate, asphalt eroded away on portions
20. Nearest Water: wet meadow/ wells 500 m north at Pinecrest
21. Vegetation Community (vicinity): western coniferous forest
22. Vegetation Community (onsite): same
23. Site Soil: gravelly silt 24. Surrounding Soil: same
25. Geology: granitic 26. Landform: hill slope
27. Slope: gentle to west 28. Exposure: open

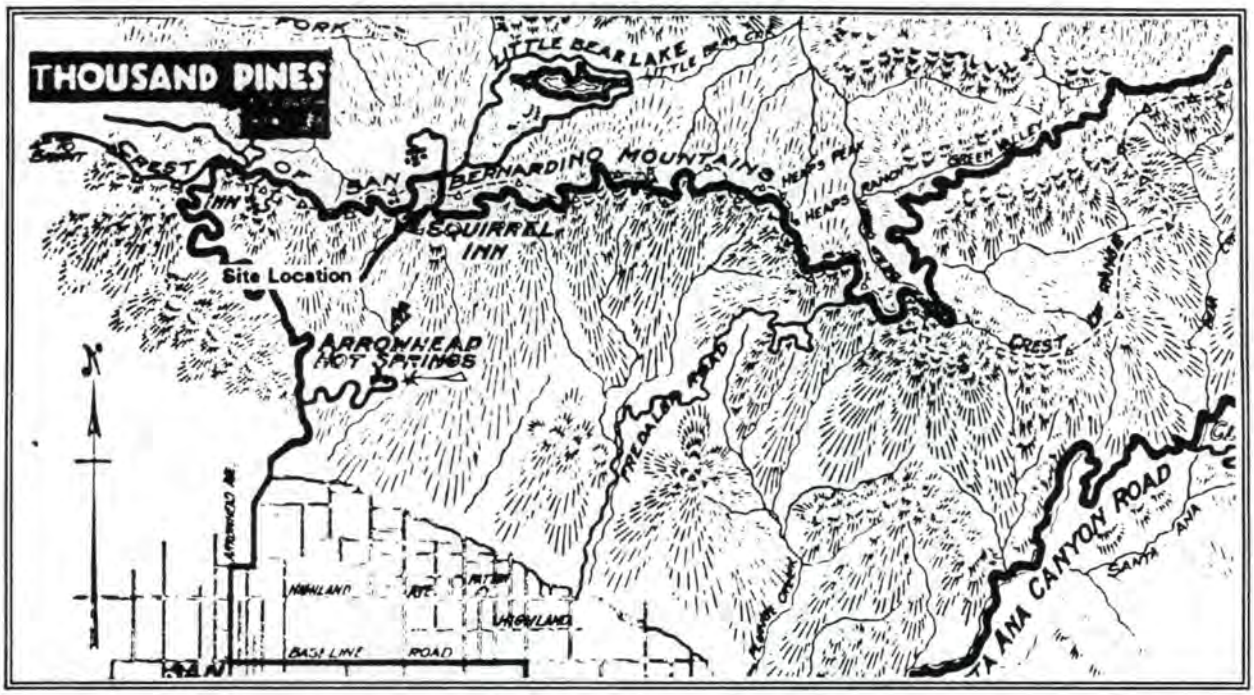
29. Landowner(s)/Tenants, Address: (Developer) Stubblefield Companies, 2258 Bradford Avenue, Highland, CA 92346
30. Remarks: Site is not considered eligible for listing in the NRHP or "important" per CEQA Guidelines Appendix K
31. References: Cultural Resources Assessment of Tentative Tracts 15261 and 15262, Pinecrest Planned Unit Development Phase II, Twin Peaks area, San Bernardino County, by Michael K. Lerch, October 1991
32. Name of Project: same
33. Type of Investigation: Intensive (Class III) Surface Inventory
34. Site Accession No.: -- Curated At: --
35. Photos: yes, see report

P36 007049

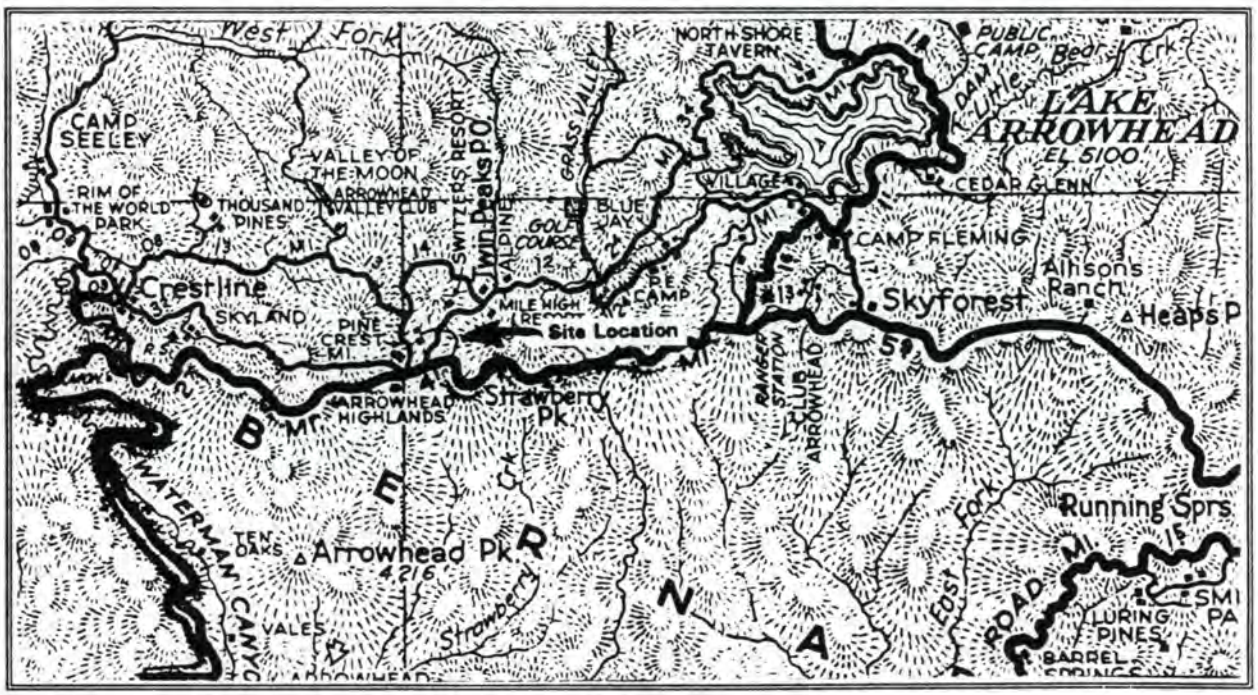
Historic Maps Showing Site

Michael K. Lerch & Associates

Trinomial: CA-SBr-7049H
Field No.: MKLA-9108-2
Site Name: Rim of the World Drive



Source: Map of the Crest Route, 1915 (in: *The San Bernardinos*, Robinson 1989:141)



Source: Automobile Club of Southern California, Map No. 1521, R. E. Klare, 1934

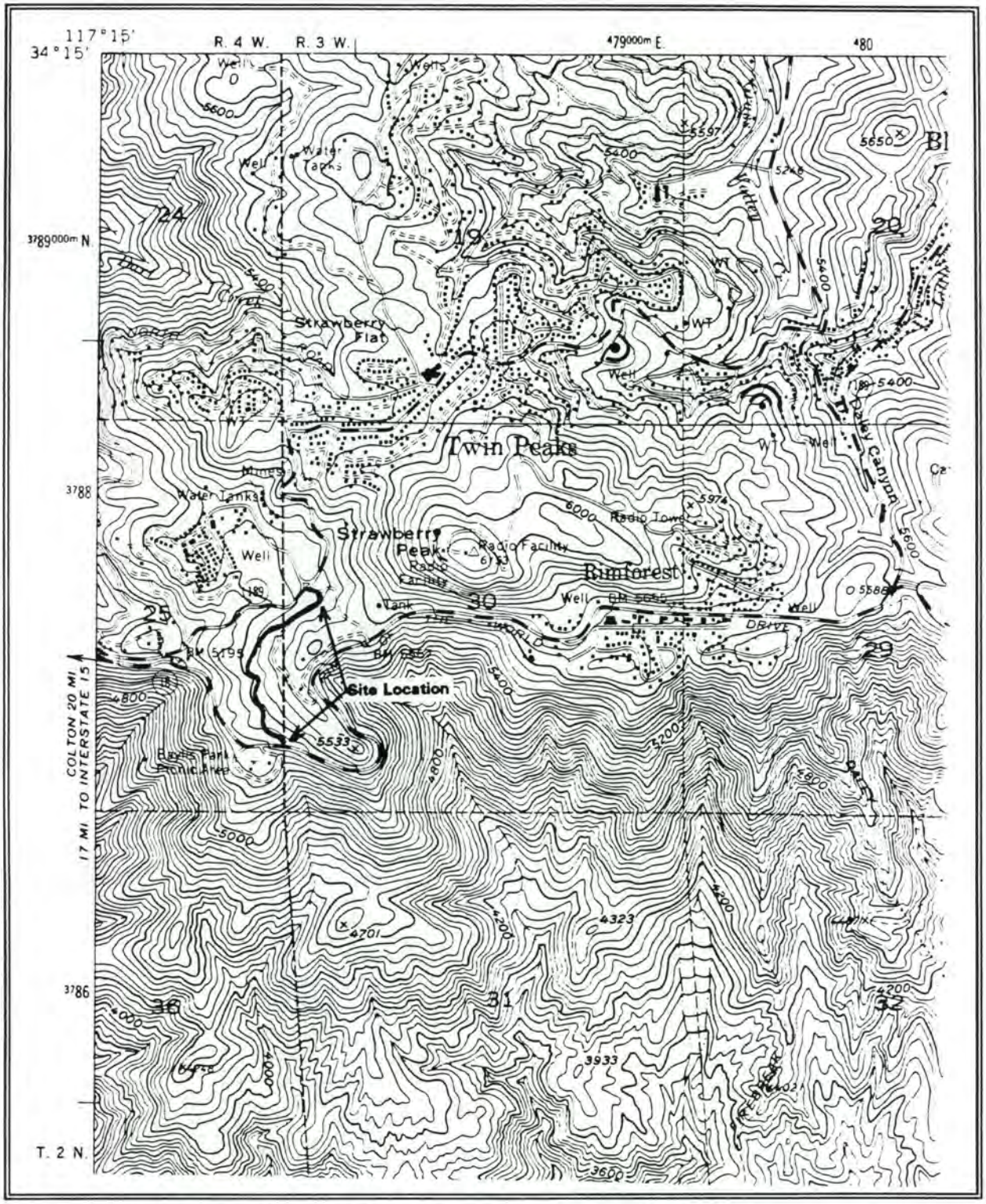
MKLA:rev.10/81

P36-007049

Archaeological Site Location Map

Michael K. Lerch & Associates

Trinomial: CA-SBr-7049H
Field No.: MKLA-9108-2
Site Name: Rim of the World Drive



Source: USGS Harrison Mtn. 7.5' quad, 1967, photorevised 1988

MKLA:rev.10/91

Update 3/05

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
CONTINUATION SHEET

Primary # 36-007049
HRI#
Trinomial CA-SBR-7049H - update

Page 1 of 1 *Resource Name or # (Assigned by recorder) CA-SBR-7049H

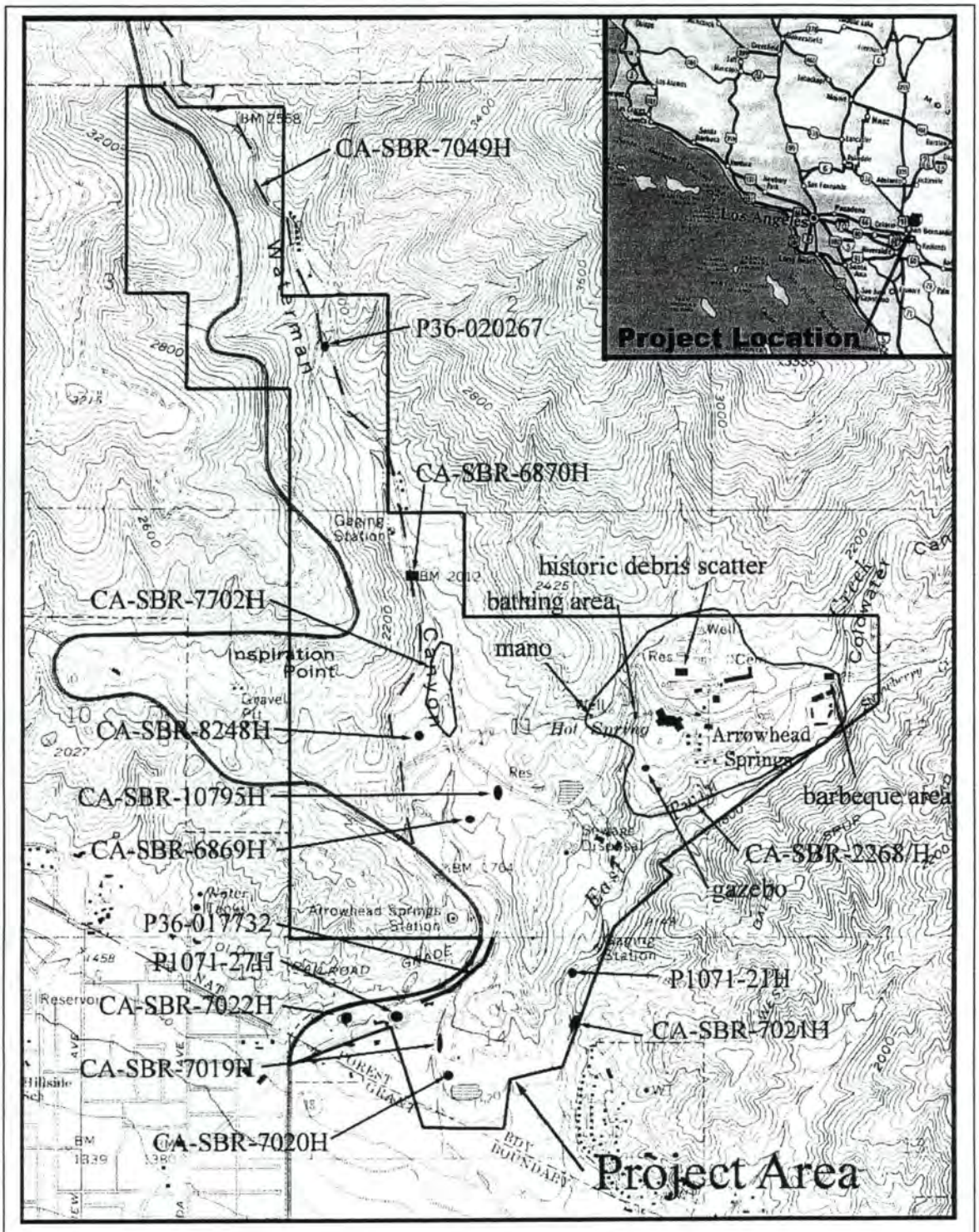
*Recorded by: Michael W. Tuma *Date: 01/13/2005 ☐ Continuation X Update

There were no apparent changes to the condition of the highway.

USGS San Bernardino North 7.5 Quad

P5a-2

DPR 523L (1/95) *Required information



Appendix D: Cultural resource locations within the Arrowhead Springs project area.

PRIMARY RECORD

Update 7049 #

Primary #: P36-~~010437~~
HRI #:
Trinomial: CA- SBR-~~10437H~~
NRHP Status Code: 5
Other Listings:

Page 1 of ~~8~~ 5 Review code: Reviewer: Date:

Resource Name or #: FS 05-12-52-245

P1. Other Identifier: Forest Service Road 2N13/historical Rim of the World Drive

P2. Location: ■ **Not for Publication** ☐ **Unrestricted**

a. County: San Bernardino **B.M.**

b. USGS 7.5' Quads: Butler Peak, Fawnskin, and Keller Peak, CA. **Date:** 1996

T. 3N; **R.** 1W; **Sections** 10, 9, 16, 8, 17, 18, 13, and 23

c. Address: N/A **City:** **Zip:**

d. UTM: Zone 503598 mE / 3792989 mN; 494907 mE / 3789440 mN

e. Other Locational Data: Branching to the southwest from FS road 3N14 in the southern Fawnskin Valley area south of Camp Whittle, FS road 2N13 parallels Grout Creek in the northeast, it continues in a southwesterly direction along the lower northern slopes of Butler Peak and Crafts Peak, and terminates in Green Valley.

P3a. Description: FS 2N13 is a maintained Forest Service road that spans a distance of approximately 6.5 miles and connects the Fawnskin Valley area to the Green Valley area. The beginning (northeastern) portion of this 1.5-mile-long road from the Fawnskin Valley area to where it merges with 2N68 dates to the 1970s. After the merge of 2N13 and 2N68 in the Hanna Rocks area, both roads become part of 2N13, which continues in a southwesterly direction into Green Valley. This merged section of the two roads follows the alignment of an early segment of the1915-1923 Rim of the World Drive (a significant road in Southern California history).

P3b. Resource Attributes: HP 37 (Highway/Trail)

4. Resources Present: ☐ Building ☐ Structure ☐ Object ■Site ☐ District ☐ Element of District

P5a. Photograph or Drawing: (see attached maps)

P5b. Description of Drawings:

P6. Date Constructed/Age and Sources:
■ Historic (ca. 1915) ☐ Prehistoric ☐ Both

P7. Owner and Address: San Bernardino National Forest, 1824 S. Commercenter Circle, San Bernardino, CA 92408

P8. Recorded by: John D. Goodman II

P9. Date Recorded: 06-09-01

P10. Survey Type: Intensive pedestrian survey

P11. Report Citation: Goodman, John D. II 2001 *Archaeological Assessment of the Charter Cable Company Project, Mountaintop Ranger District, San Bernardino National Forest, California.* (FS ARR 05-12-BB-109)

Attachments: ☐ NONE ■ Continuation Sheet ☐ District Record ☐ Rock Art Record ■ Location Map ■ Linear Feature Record ☐ Building, Structure, & Object Record ☐ Artifact Record ☐ Sketch Map ■ Archaeological Record ☐ Milling Station Record ☐ Photograph Record ■ Other (Maps)

***Resource Name or #:** FS 05-12-52-245

L1. Historic and/or Common Name: 2N13/Rim of the World Drive

L2. a. Portion Described: ___ Entire Resource X Segment ___ Point Observation Designation:
b. Location of point or segment: FS road 2N13 begins in the area of Fawnskin Valley (NE corner of Section 10) where it branches to the SW from 3N14; 2N13 parallels Grout Creek and then merges with 2N68 in the area of Hanna Rocks (a distance of approximately 1.5 miles SW of Fawnskin Valley). These two merged roads continue as part of 2N13, and the road then continues southwestward where it terminates in upper Green Valley.

L3. Description: This engineered Forest Service road receives considerable traffic and is well maintained (see L7).

L4. Dimensions: This road has a varied width of between 16-20 feet. The segment has a length of approximately 6.5 miles.

L5. Associated Resources: A number of historical isolated artifacts and refuse deposits dating to the turn of the century have been recorded on or close to this road, although none of these resources are particularly significant in regard to their association with the road other than representing roadside refuse.

L6. Setting: This high mountain road is in Pinyon-Juniper Woodlands. Most of the road winds through drainages and ridges with steep mountain slopes on both sides of the road. A long potion of this road flanks the northern slopes of Grays Peak, Butler Peak (elevation of 8535'), and Crafts Peak. In the southwest the road drops into Green Valley at an elevation of ~7000'.

L7. Integrity Considerations: This Forest Service road has been maintained since its initial construction; the road has been graded and other engineering features have been incorporated into the roadbed.

L8. Description of Maps: From examining various historic maps of the San Bernardino National Forest (SBNF) from the early 1900s to recent decades it was determined that the upper/northeastern portion of 2N13 was completed sometime in the 1970s.

The 1971 San Bernardino National Forest map indicates that the northern portion of 2N13 was completed to about 1-mile beyond Grays Campsite (also dating to the 1970s), following Grout Creek, although this approximately 1-mile-long road had not yet connected (swung northward) with 2N68. In the area of Hanna Rocks where 2N13 merges with 2N68 and both roads become 2N13, this portion of 2N13 and 2N68 are along the same route as the 1915-1923 Rim of the World Drive; this segment of the Drive was shifted to the south after 1923 probably to avoid having to go into Deep Creek.

L9. Remarks: The recreational development of the western San Bernardino Mountains and "crest" areas was hampered by the paucity of good roads prior to the turn of the century. In the northwestern San Bernardino Mountains where considerable mining was occurring in the 1860s and later most of the ore wagons and general traffic was confined to the Van Dusen/Coxey Road that traveled down the northern slopes of the mountains into the Hesperia area. From there, many entered the Valley via John Brown's Toll Road (1860) through Cajon Pass. On the south side of the mountains, a primary pack trail into the crest area was up the rugged Santa Ana Canyon Miner's Pack Trail. In 1891-1892, the crest area became accessible with the construction of the Arrowhead Reservoir Company's Waterman Canyon Toll Road. In 1905, this toll road became a free county road.

During the 1880s lumber was transported from the mills in the Fredalba area (now Smiley Park) to Highland via the City Creek Wagon Road. Durnig this period a lot of the lumber in the area was used for making crates to ship oranges Apparently it had been proposed to that a railroad be constructed to connect the mills with Highland, and that the track be extended to Grout Bay to allow ice shipments during winter months. Gus Knight and some other prominent ranchers and resort owners of the Big Bear area proposed to construct a road from Grout Bay to Fredalba. In 1891 G. Knight and J. Metcalf incorporated the Big Bear Wagon Road Company and sold shares to Bear Valley residents. By 1894 the road was completed (same route as FS Road 2N13), with its toll house located in Green Valley. This road was also called the Fawnskin-Fredalba Toll Road (La Fuze 1971; Lilleberg 1975). In 1911 the road was taken over by the County and it became a toll free road. Apparently certain segments of the road were very bad with ruts and soft sand, although this road segment continued being part of the Rim of the World Drive (1915-1923).

Especially after the introduction of the automobile in 1904 along with greatly accelerated development of the San Bernardino Valley, weekend campers, resort developers, and others very much desired good automobile roads into the mountain crest areas overlooking the Valley. In 1915, the Rim of the World Drive was completed. Initially this 101 mile long road began at Waterman canyon leading into the mountains. In the vicinity of Crestline, it swung to the east and passed Heaps Peak down into Deep Creek; then headed northeastward across Green Valley to Fawnskin Valley (the portion of the road discussed in this record); followed the east shore of Big Bear Lake; and then swung to the southwest where it eventually reached the improved Santa Ana Canyon Road. After the road flooded in the Santa Ana Canyon in 1916, the eastern end of the Drive was shifted to the Mill Creek-Mountain Home Canyon route into the Angeles Oaks area. Improvement and route adjustments were undertaken in the 1920s. The 1923 Deep Creek Cutoff moved the highway south of the Crafts Peak-Butler Peak divide between Snow Valley and Big Bear Lake, replacing the Green Valley to Fawnskin route north of the divide. Today the "Rim of the World Scenic Byway" begins in the west at Cajon Junction along SR. 138 and continues along the south side of Silverwood Lake, Crestline along SR. 18, south of Lake Arrowhead, it goes around the north shore of Big Bear Lake along SR. 38, and continues along SR. 38 into Mill Creek Canyon and terminates at the Mill Creek Ranger Station.

References:

Robinson, John W., 1989. *The San Bernardinos: The Mountain Country from Cajon Pass to Oak Glen, Two Centuries of Changing Use.* Big Santa Anita Historical Society.

La Fuze, Pauline B., 1971. Vol. 1, *Saga of the San Bernardinos.* Hogar Publishing Co., Colton, California.

Lilleberg, Einar, Sept. and Oct. 1975, The Green Valley Story in *San Bernardino Mountains Highlander*, Big Bear Lake; # 10, pp. 8-9, 12-13; #11, pp. 8-10

Carrico, Richard, L., Frank Norris, Allan Schilz, and Richard Minnich, 1892. *Cultural Resource Overview, San Bernardino National Forest, California.* Vol. 1., WESTEC Services. San Diego, California.

L10. Form Prepared by: John D. Goodman II. San Bernardino National Forest, Supervisor's Office, 1824 S Commercenter Circle, San Bernardino, CA 92408

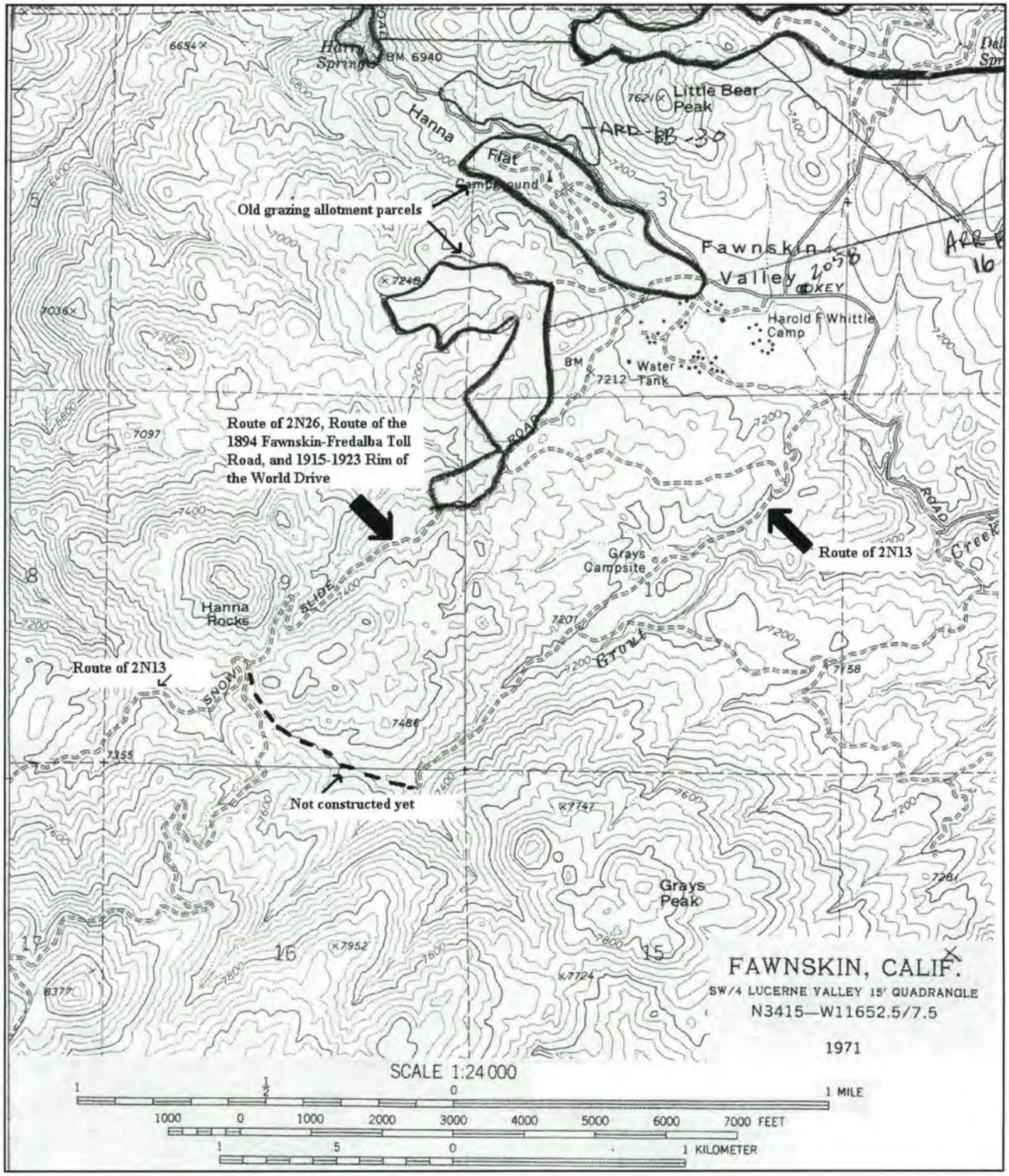
L11. Date: 06-09-01

LOCATION MAP

7049
Primary #: P36-~~010437~~
Trinomial: CA-SBR-~~10437H~~

Resource Name or #: FS 05-12-52-245

Map Name: 1971 Fawnskin, CA 7.5'



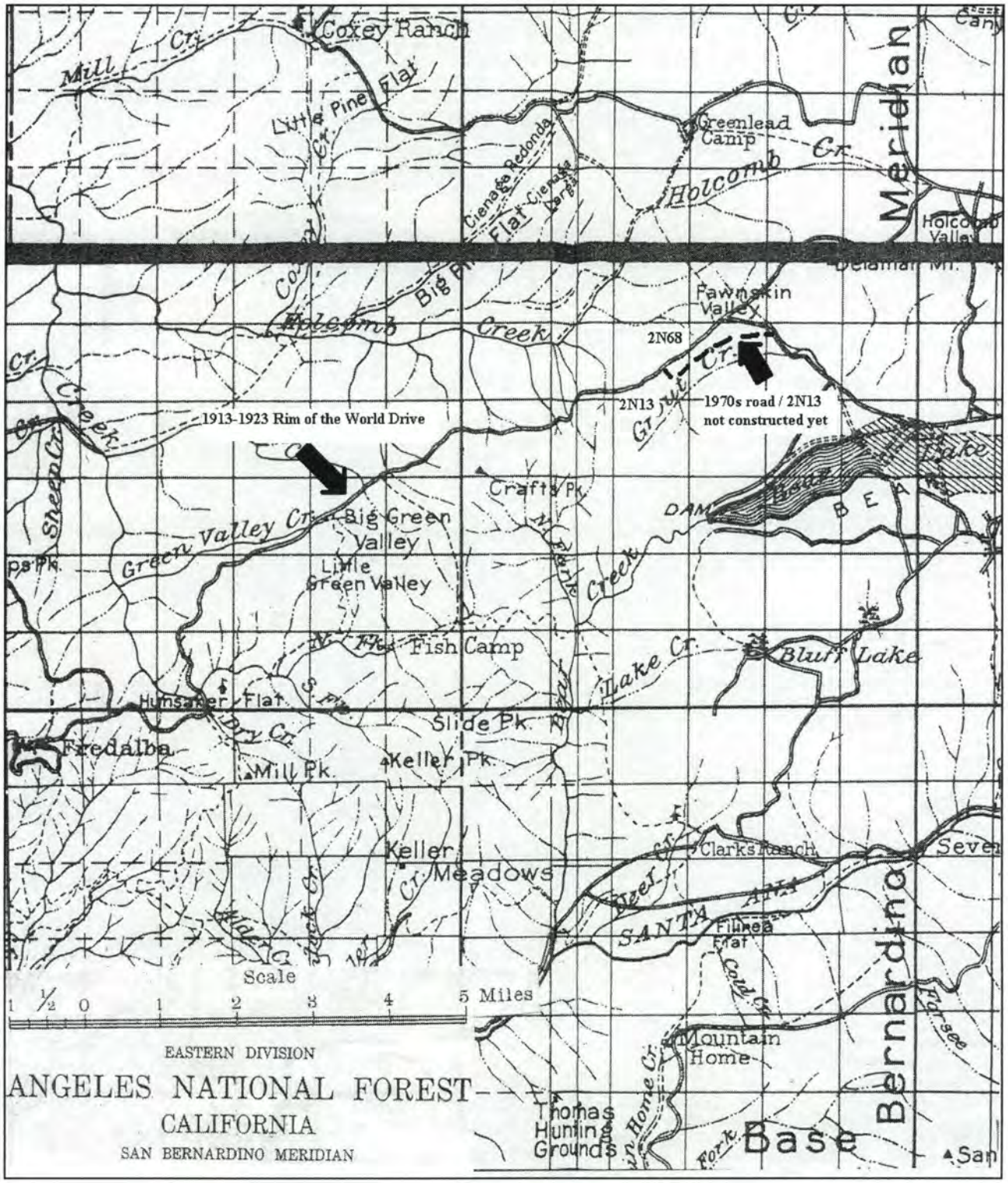
LOCATION MAP

7049

Primary #: P36-~~010437~~
Trinomial: CA-SBR-~~10437H~~

Resource Name or #: FS 05-12-52-245

Map Name: 1915 Angeles National Forest Map



State of California -- The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

PRIMARY RECORD

Primary # P36-008915 7049
HRI #
Trinomial CA-SBR-8915H 7049H
NRHP Status Code
Other Listings
Review Code Reviewer

Page 1 of 3 *Resource Name or #: (Assigned by recorder) Rim of the World Drive Segment

P1. Other Identifier:

*P2. Location: ☑ Not for Publication ☑ Unrestricted *a. County San Bernardino

and (P2b and P2c or P2d. Attach Location Map as necessary.)

*b. USGS 7.5' Quad Fawnskin Date 1971 T 2N ; R 1W ; 1/4 of 1/4 of Sec 3 ; SB B.M.

c. Address Camp Harrold F. Whittle, P.O. Box 70 City Fawnskin Zip 92333-0070

d. UTM: (Give more than one for large and/or linear resources) Zone 11 ; 503001 mE/ 3793005 mN

e. Other Locational Data (e.g., parcel #, directions to resource, elevation, etc., as appropriate)

Nourthwest boundary of camp Harrold F. Whittle

*P3a. Description: (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

Segment of Rim of the World Drive

*P3b. Resource Attributes: (List attributes and codes) AH7 (Roads/Trails/Railroad Grades)

*P4. Resources Present: ☐ Building ☐ Structure ☐ Object ☑ Site ☐ District ☐ Element of District ☐ Other (Isolates, etc.)

P5a. Photograph or Drawing (Photograph required for buildings, structures, and objects.)

P5b. Description of Photo: (View, date, accession #)

*P6. Date Constructed/Age and Sources: ☑ Historic ☐ Prehistoric ☐ Both

*P7. Owner and Address:

YMCA of Metropolitan Los Angeles, P.O. Box 70 Fawnskin, CA 92333-0070

*P8. Recorded by (Name, affiliation, and address):

David Maxwell
Statistical Research Inc
P.O. Box 390
Redlands, CA 92373

*P9. Date Recorded:

08-Aug-97

*P10. Survey Type: (Describe)

Intensive. Entire road was walked by 4 archaeologists, and a segment was swept with a

*P11. Report Citation: (Cite survey report and other sources, or enter "none."):

Maxwell, D (1997) An Archaeological Survey of Camp Harrold F. Whittle

*Attachments: ☐ NONE ☑ Location Map ☑ Sketch Map ☐ Continuation Sheet ☐ Building, Structure, and Object Record
☑ Archaeological Record ☐ District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record ☐ Artifact Record
☐ Photograph Record ☐ Other (List):

DPR 523A (1/95) *Required Information

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

LINEAR FEATURE RECORD

Primary # P36-008915 36-007049
HRI #
Trinomial ~~CA-SBR-6915H~~ SBR-7049H

Page 2 of 3 **Resource Name or #:** (Assigned by recorder) Rim of the World Drive

L1. **Historic and/or Common Name:** Rim of the World Drive

L2 a. **Portion Described:** ☐ Entire Resource ☑ Segment ☐ Point Observation **Designation:**

b. **Location of point or segment:** (Provide UTM coordinates, legal description, and any other useful locational data. Show the area that has been field inspected on a Location Map)

USGS 7.5' Fawnskin (1971) T2N, R1W, Sec 3; UTM Zone 11; ~~503001~~ mE, ~~3793005~~ mN; Camp Harold F. Whittle, P.O. Box 70, Fawnskin, CA 92333-0070

L3. **Description:** (Describe construction details, materials, and artifacts found at this segment/point. Provide plans/sections as appropriate.)

Segment of Rim of the World Drive; dirt road with modified trees (possible markers)

L4. **Dimensions:** (In feet for historic features and meters for prehistoric features)

a. **Top Width:** NA
b. **Bottom Width:** 14-16 ft
c. **Height or Depth:** NA
d. **Length of Segment:** 400 ft

L4e. Sketch of Cross-Section (include scale) **Facing:**

L5. **Associated Resources:**

Two features observed: both are modified trees along road side. These appear to be cut, possibly as roadside markers. The southernmost of these appears to have an arabic number "3," oriented perpendicularly to the tree trunk, carved into it.

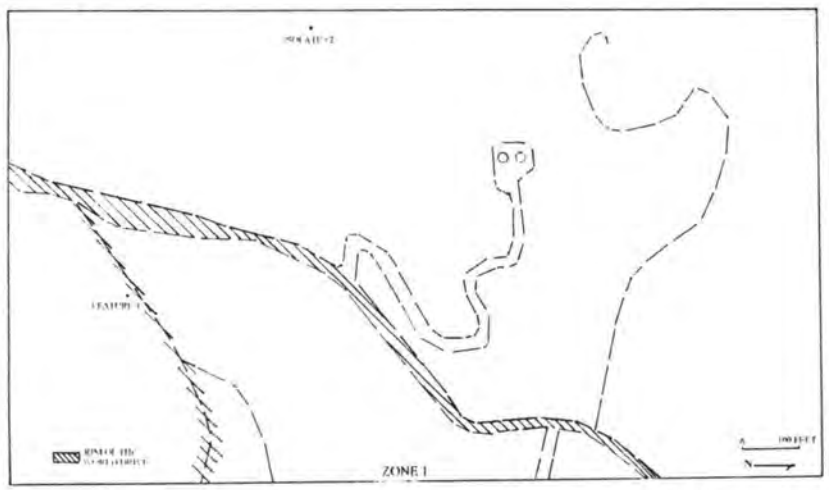
L6. **Setting:** (Describe natural features, landscape characteristics, slope, etc., as appropriate.)

Generally flat valley within rugged peaks. Pine forest with other scrub covering.

L7. **Integrity Considerations:**

Unknown

L8a. Photograph, Map or Drawing



L8b. Description of Photo, Map, or Drawing: (View, scale, etc.)

Map of section of Camp Harold F. Whittle, showing segment of road and location of marked trees.

L9. Remarks:

Road has been used as a horse trail by YMCA since late 1950s; may have seen similar use by Los Angeles Boys Camp or others prior to this.

L10. Form Prepared by: (Name, affiliation, an address)

David Maxwell, Statistical Research Inc, P.O. Box 390, Redlands, CA 92373

L11. Date: 8/22/97

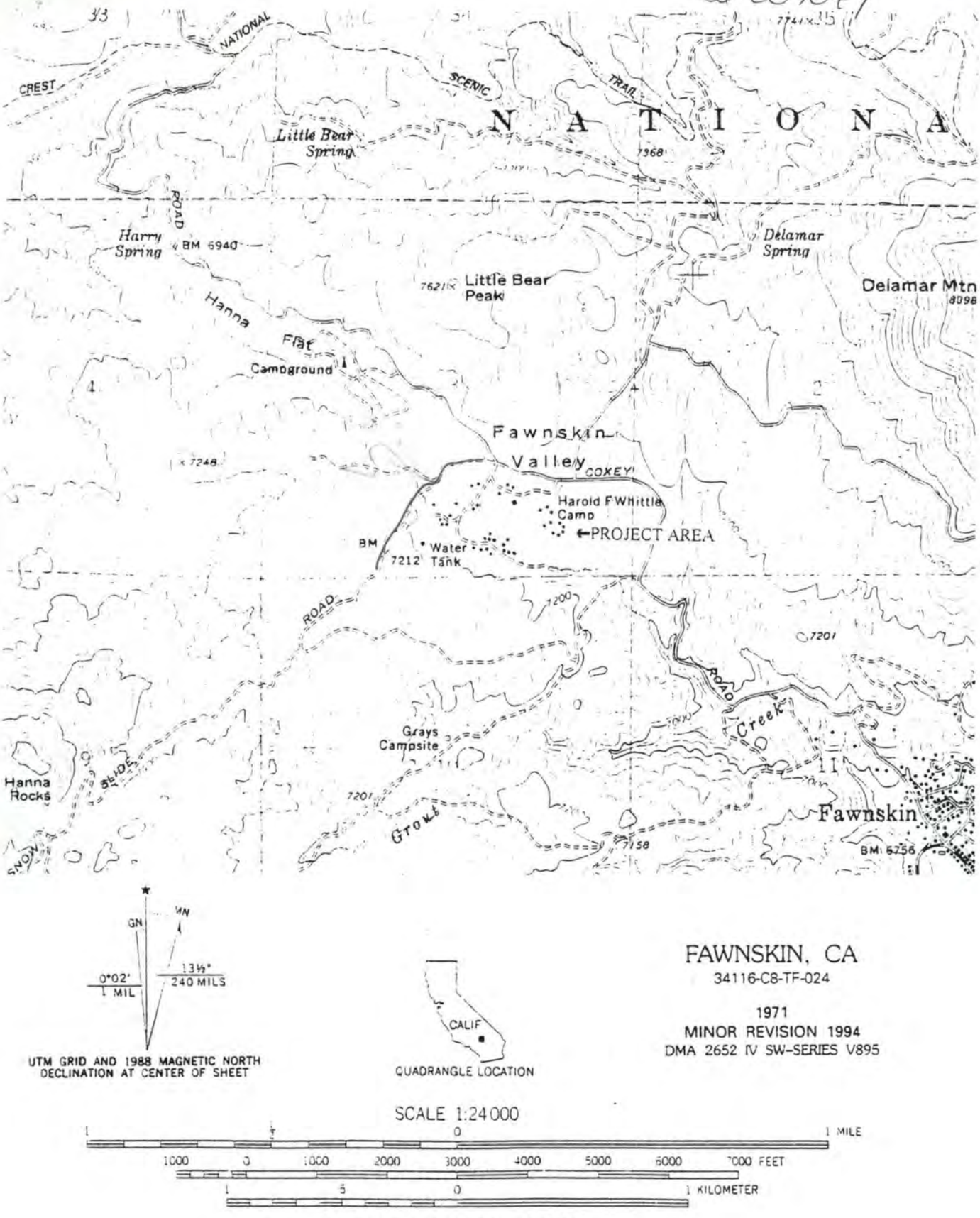


Figure 1: U.S.G.S Map of Fawnskin Quadrant showing project area.

***Recorded by:** E. Mills, J. Case ***Date:** 11/19/2022 ☐ Continuation ☒ Update

This resource location was visited by PaleoWest archaeologists on 11/19/2022, and part of the culrural resource survey for the Hume Socal Campground Cultural Resource Investigation. The original vicinity of the plotted isolated metate was surveyed intensively and was not located. The area has seen recent development from the adjacent camp. Additionally, archaeologists observed construction materials directly on top of the original plotted location of the isolated artifact. It is presumed the resource has been destroyed or was moved to a different, unknown location.



Photo of plotted location of Isolate metate, not located. Facing west.

Report Citation: 2023. Thomas, Roberta, Gena Severen, Evan Mills, and Michael Mirro. *Cultural Resources Investigation of the Hume Socal Campground Project, San Bernardino County, California*. Prepared by PaleoWest LLC, Redlands, CA.

2/06

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary # 36-012233
HRI #
Trinomial
NRHP Status Code

Other Listings
Review Code **Reviewer** **Date**

***Resource Name or #:** (Assigned by recorder) Æ-CCE-1

P1. Other Identifier:

***P2. Location:** ***a. County** San Bernardino, CA ☒ Not for Publication ☐ Unrestricted
***b. USGS 7.5' Quad** Keller Peak, CA **Date** 1996
T 2N; **R** 2W; NW ¼ **of** NE ¼ **of** **Sec** 33; **S.B.B.M.**
c. Address: 32355 Green Valley Rd. **City** Running Springs, CA **Zip** 92341
d. UTM **Zone** 11 491782 **mE/** 3786385 **mN**
e. Other Locational Data (e.g., parcel #, legal description, directions to resource, additional UTMs, etc., when appropriate): From State Highway 18 eastbound from Running Springs, CA, turn northbound onto Green Valley Lake Road and continue 1.8 miles to the Calvary Chapel Christian Camp entrance. Permission onto campgrounds must be obtained before entry. Past the entrance gate, continue 0.8 mile east to where paved road ends at which point follow dirt road left and continue in a southwesterly direction approximately 0.5 mile to the site.

***P3a. Description** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries): Æ-CCE-1 represents an isolate metate, found in two fragments. The core material of this metate is a fine-grained, pinkish, igneous rock and appears to be fire affected. The fragments are incorporated into a modern, one course tall assemblage of granite stones, stacked to augment a natural alcove created by a large granite boulder; the alcove measures approximately 30 cm x 60 cm. This boulder is to the west of the southwest corner of a standing, modern cabin by approximately 34 meters and is approximately 22.8 meters from a drinking fountain at an azimuth of 290°. The metate measures 34 cm x 21 cm x 15 cm. The area around the location of the metate fragments is conducive to prehistoric habitation, with a nearby intermittent creek and a spring, among other favorable natural features. Surface visibility in the vicinity of the metate fragments was excellent, with approximately 80 percent of the surface open. The construction of the nearby modern cabin and associated landscape resulted in significant grading of the area. A large patch of decorative lawn was observed approximately 10 m east of the boulder and metate fragments and may obscure other artifacts, if any are present.

***P3b. Resource Attributes** (List all attributes and codes): AP 1: Other, Isolate Metate

***P4. Resources Present:** ☐ Building ☐ Structure ☐ Object ☒ Site ☐ District ☐ Element of District ☐ Other:

P5. Photograph or Drawing: (Photograph required for buildings, structures, and objects.) Not applicable.

***P6. Date Constructed/Age and Source:** ☒ Prehistoric ☐ Historic ☐ Both

***P7. Owner and Address:** Calvary Chapel Christian Camp, P.O. Box 8560, 32355 Green Valley Lake Road, Green Valley Lake, CA 92341

***P8. Recorded by** (Name, affiliation, address): B. Sheets and M. Kile, Applied EarthWorks, Inc., 3292 E. Florida Ave., Suite A, Hemet, CA 92544.

P9. Date Recorded: December 20, 2005.

***P10. Type of Survey:** ☐ Intensive ☐ Reconnaissance ☒ Other
Describe: Intuitive Emergency Archaeological Survey for the NRCS.

***P11. Report Citation** (Provide full citation or enter "none"): None

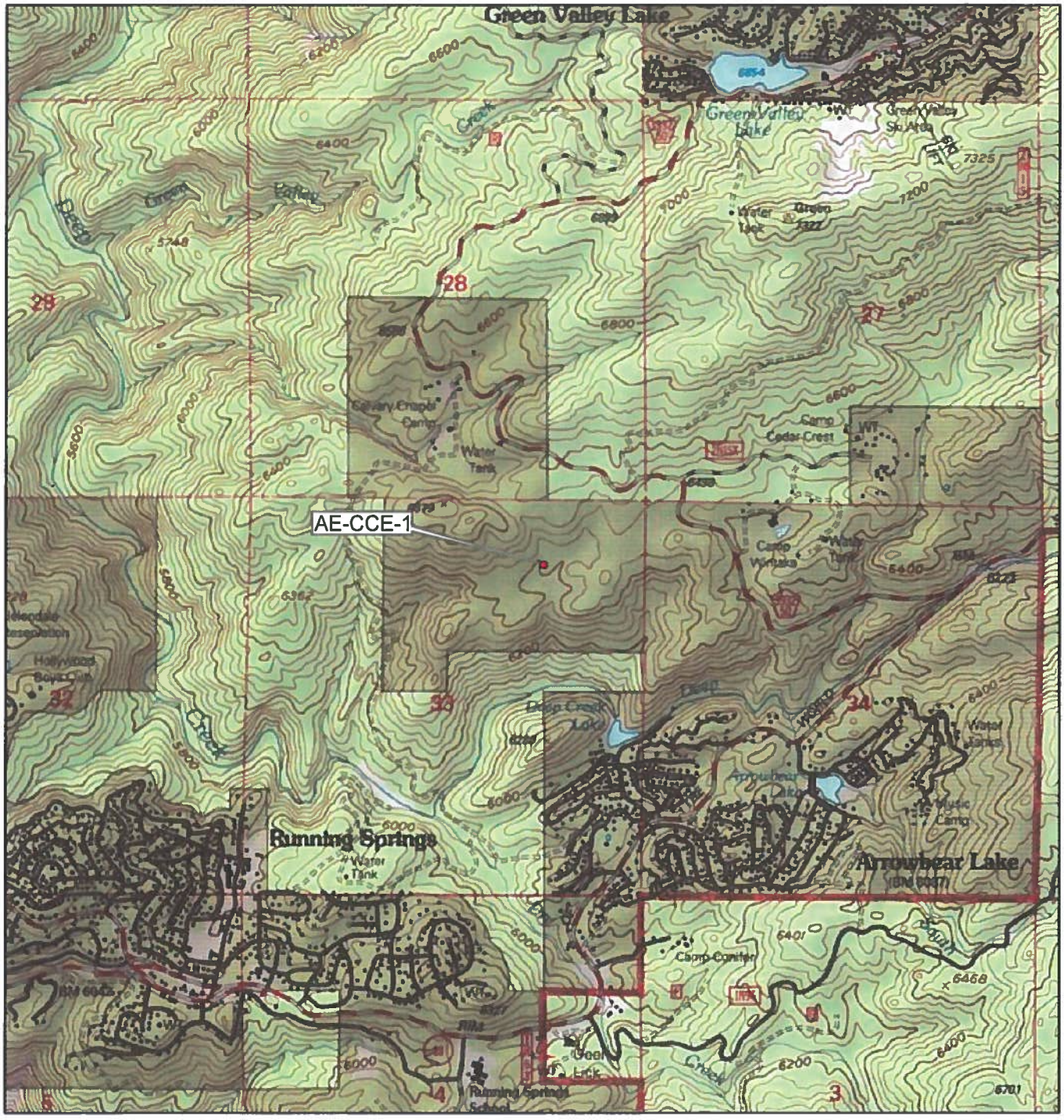
Attachments: ☐ None ☒ Location Map ☐ Sketch Map ☐ Continuation Sheet ☐ Building, Structure, and Object Record ☐ Archaeological Record ☐ District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record ☐ Artifact Record ☐ Photograph Record Other:

The State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

Primary #: 36-012233
HRI #:
Trinomial:

LOCATION MAP SHEET

Temporary Number/Resource Name: AE-CCE-1
Map Name: Keller Peak, CA
Scale: 1:24,000
Date: 2005



TRUE NORTH

0.25 0 0.25 0.5 0.75 1 Miles

500 0 500 1,000 Meters

1,000 0 1,000 2,000 Feet

DPR 523J (1/95)

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

PRIMARY RECORD

Primary #
HRI #
Trinomial
NRHP Status Code

Other Listings
Review Code | Reviewer | Date

 ***Resource Name or #:** 22-0563-01H

P1. Other Identifier:

***P2. Location:** ☒ **Not for Publication** ☐ **Unrestricted** ***a. County:** San Bernardino

and (P2b and P2c or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad:** Keller Peak **Date:** 1967 (PR1988) **T** 2N ; **R** 2W; NW¼ **of** SE¼ **of Sec** 28**;** S.B.**B.M.**

c. Address: City: Zip:

d. UTM: Zone: 11S; 491567mE/ 3787538mN (G.P.S.) Bad Elf

e. Other Locational Data: The truck is located 775 feet northeast of the front gate entrance of the Hume camp. The truck is in a subalpine forest of black oak, live oak, coulter and sugar pine, manzanita, willow, and low-lying brush. The landform is a west/southwest facing shallow slope with ridges to the north and south. Soils of the vicinity are all decomposing granite. Elevation: 6560' above mean sea level.

***P3a. Description:** This historic resource consists of an abandoned 1940s Chevrolet pickup truck. The truck is in poor condition and is stripped of all engine parts and the wheels. The truck may have been placed at this location at any time over the past 80 years. The area is within the boundaries of Hume campgrounds and is used by campers. There are small bridges, trails, and targets in the immediate vicinity, however, there are no other historic constituents in the area. There are no identifiers remaining on the truck, therefore very little information can be gathered. The truck has 'STONE and BRICK WORK" on the bed and was likely a work vehicle for a local business while in use.

As part of the current investigation, the resource was considered for listing on the California Register of Historic Resources. Very little information can be discerned about this abandoned resource; however, a review of the available data indicates that the resource does not meet the criteria for listing on the CRHR. The abandoned truck cannot be associated with events that have made a significant contribution to the broad patterns of history. It does not appear to be associated with the lives of persons significant in the past. It also does not embody the distinctive characteristics of a type, period, or method of construction. Finally, it is unlikely that this resource has the potential to broaden our understanding of the 20th century automotive industry, or to the history of the San Bernardino Mountains, California, or the United States.

***P3b. Resource Attributes:** (List attributes and codes) AH10 (Machinery) AH16 (Other, Vehicle)

***P4. Resources Present:** ☐Building ☐Structure ☒Object ☐Site ☐District ☐Element of District ☐Other (Isolates, etc.)

P5a. Photo or Drawing



P5b. Description of Photo: Overview of the truck facing SE

***P6. Date Constructed/Age and Sources:** ☒Historic ☐Prehistoric ☐Both

***P7. Owner and Address:** Hume SoCal Campground

***P8. Recorded by:** E. Mills, J. Case 301 9th St, Suite 114 Redlands, CA 92374

***P9. Date Recorded:** 11/7/2022

***P10. Survey Type:** Intensive Pedestrian

***P11. Report Citation:** 2023. Thomas, Roberta, Gena Severen, Evan Mills, and Michael Mirro. *Cultural Resources Investigation of the Hume Socal Campground Project, San Bernardino County, California*. Prepared by PaleoWest LLC, Redlands, CA.

***Attachments:** ☐NONE ☒Location Map ☐Sketch Map ☐Continuation Sheet ☐Building, Structure, and Object Record ☐Archaeological Record ☐District Record ☐Linear Feature Record ☐Milling Station Record ☐Rock Art Record ☐Artifact Record ☐Photograph Record ☐ Other (List):

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

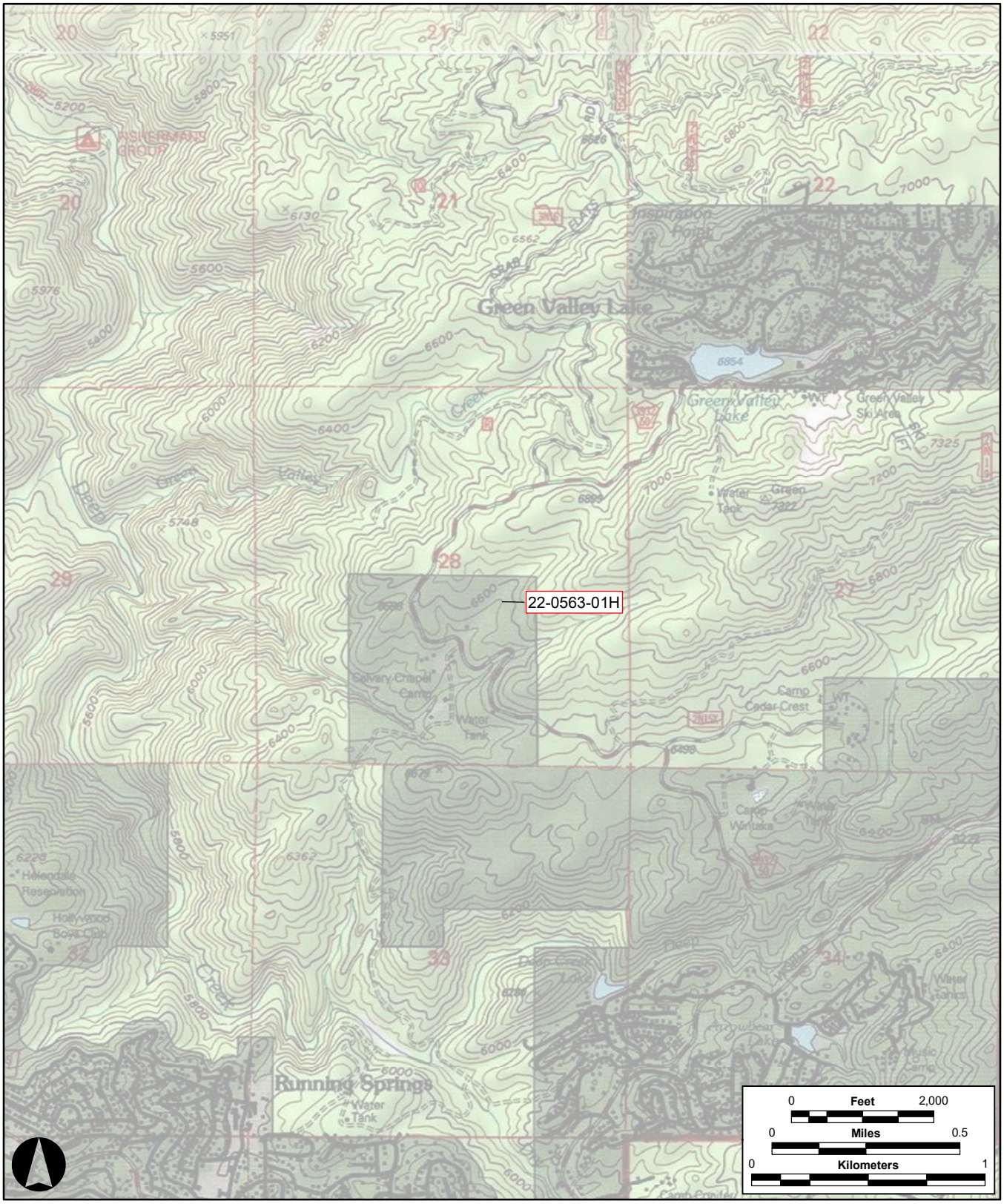
LOCATION MAP

Primary
HRI

Trinomial

Page 2 **of** 2 **Resource Name or #:** 22-0563-01H **Scale:** 1:24,000

Map Name: Keller Peak, Ca (1978) 7.5' USGS Quad. **Date:** 2022



Appendix E

Energy Assessment

MEMORANDUM

To: John Nsofor, Kimley-Horn and Associates

From: Alex Pohlman, Kimley-Horn and Associates

Date: August 27, 2025

Subject: Hume SoCal Camp Expansion Project – Energy Assessment

1.0 Purpose

The purpose of this technical memorandum is to evaluate potential energy consumption impacts of the Hume SoCal Camp Expansion Project (Project). The purpose of this Energy Technical Memorandum is to evaluate the potential construction and operational energy consumption associated with the Project and determine the level of impact the Project would have on the environment.

2.0 Project Location and Setting

The Project site is approximately 251 acres located in an unincorporated mountain region of San Bernardino County, along Green Valley Lake Road and approximately 0.4 miles northwest of State Route 18 (SR-18); refer to **Exhibit 1: Regional Location Map**. Surrounding the Project site is the Green Valley Lake Community to the north, the Running Springs to the southwest, and the City of Big Bear to the east, as shown in **Exhibit 2: Local Vicinity Map**.

A portion of the Project site is currently developed with improvements related to the existing Hume SoCal campground facilities. The remaining surrounding areas are vacant and contain forest land. The Project land use designation is Rural Living (RL) per the San Bernardino County General Plan (Countywide Plan). The RL land use area primarily allows for the development of residential development. Typical uses within RL land use areas also include public and quasi-public facilities such as parks, religious facilities and schools. The Project area is also located within the Hilltop Community Plan which allows for larger-scale master planned developments which can include a combination of residential, commercial, and/ or manufacturing activities that maximizes the utilization of natural and human-generated resources in rural areas.

3.0 Project Description

The Project involves the expansion of campground uses for the existing Southern California Hume Lake Christian Camp (Hume SoCal) campground to accommodate up to an additional 3,000 occupants. This would be accomplished with existing campground structures as well as the development of additional campground and recreational facilities and uses within a 251-acre area of the Green Valley

Lake community, refer to **Exhibit 3: Conceptual Site Plan**. New campground structures proposed for the Project would be developed in five phases.

Each phase of the Project would include the development of expanded infrastructure, additional amenities, support structures, and buildings necessary to accommodate expanded camper capacity as well as paved parking areas and paved access roadways.

Phase 1 of the Project would involve the development of facilities to be used as a Junior High Camp. Proposed residential structures within the Phase 1 area include an expanded welcome center, private administration and guest speaker residences, staff housing, and student dormitories. Phase 1 also includes the development of a gymnasium, bus parking, a snack shop, a chapel, converting an existing chapel to a small meeting space, an expansion to the existing dining hall, a maintenance building, an amphitheater, and restrooms. Outdoor recreation facilities include grass quads. Existing and proposed facilities within Phase 1 would accommodate up to 784 occupants.

Phase 2 of the Project would involve the development of facilities to be used as a High School Camp. Proposed residential structures within the Phase 2 area include staff housing buildings and student dormitories. Phase 2 also includes the development of a large dining hall, gymnasium, a chapel, amphitheater, and restrooms. Outdoor recreation facilities include grass quads, a swimming pool, and a recreation pond. Existing and proposed facilities within Phase 2 would accommodate up to 1,000 occupants.

Phase 3 of the Project proposes the development of an Adult Lodge. Phase 3 would include the development of one adult lodge with included access road. Existing and proposed facilities within Phase 3 would accommodate up to 140 occupants.

Phase 4 of the Project would include the development of an Elementary Age Camp and associated facilities. Proposed residential structures within Phase 4 include student yurt tents. Phase 4 also includes the development of restroom facilities with showers and an amphitheater. Outdoor recreation facilities include grass quads, a dining canopy, a swimming pool, and a recreation pond. Existing and proposed facilities within Phase 4 would accommodate up to 500 occupants.

Phase 5 of the Project proposes the creation of a tent-based youth camp, Wildwood Camp. Residential structures proposed for this phase consist of yurt tents. Phase 5 also includes the development of restroom facilities with showers and an amphitheater. Outdoor recreation facilities include grass quads, a dining canopy, a swimming pool, and a recreation pond. Existing and proposed facilities within Phase 5 would accommodate up to 130 occupants.

Project Phasing and Construction

Although the Project is anticipated to be constructed in five phases, to analyze a worst-case scenario, construction modeling assumed all five phases of the Project would be constructed simultaneously and completed within two years, beginning in June 2025 and finishing in June 2027.

4.0 Energy Conservation

In 1975, largely in response to the oil crisis of the 1970s, the California State Legislature adopted Assembly Bill 1575 (AB 1575), which created the California Energy Commission (CEC). The statutory mission of the CEC is to forecast future energy needs, license thermal power plants of 50 megawatts or larger, develop energy technologies and renewable energy resources, plan for and direct state responses to energy emergencies, and, perhaps most importantly, promote energy efficiency through the adoption and enforcement of appliance and building energy efficiency standards. AB 1575 also amended Public Resources Code Section 21100(b)(3) to require Environmental Impact Reports (EIRs) to consider the wasteful, inefficient, and unnecessary consumption of energy caused by a project. Thereafter, the State Resources Agency created Appendix F, *Energy Conservation*, in the California Environmental Quality Act Guidelines (CEQA Guidelines). CEQA Guidelines Appendix F is an advisory document that assists EIR preparers in determining whether a project will result in the inefficient, wasteful, and unnecessary consumption of energy.

In addition, the California Natural Resources Agency finalized updates to the CEQA Guidelines in December 2018. CEQA Guidelines Section 15126.2(b) treats "wasteful, inefficient, or unnecessary" energy consumption as a significant environmental impact. As a result, energy thresholds have been incorporated into Appendix G of the CEQA Guidelines. This technical memorandum has been prepared to assess energy impacts in accordance with Appendix G of the CEQA Guidelines.

Environmental Setting

Energy consumption is analyzed in this technical memorandum due to the potential direct and indirect environmental impacts associated with the Project. Such impacts include the depletion of nonrenewable resources during both construction and long-term operational phases.

Electricity Service

Southern California Edison (SCE) provides electrical services to the Project area through State-regulated public utility contracts. Over the past 15 years, electricity generation in California has undergone a transition. Historically, California has relied heavily on oil- and gas-fired plants to generate electricity. Spurred by regulatory measures and tax incentives, California's electrical system has become more reliant on renewable energy sources; including cogeneration, wind energy, solar energy, geothermal energy, biomass conversion, transformation plants, and small hydroelectric plants. Unlike petroleum production, electricity generation is not usually tied to the location of the

fuel source and can be delivered great distances via the electrical grid. The generating capacity of a unit of electricity is expressed in megawatts (MW). Net generation refers to the gross amount of energy produced by a unit, minus the amount of energy the unit consumes. Generation is typically measured in megawatt-hours (MWh), kilowatt-hours (kWh), or gigawatt-hours (GWh).

Natural Gas Services

Southern California Gas Company (SoCalGas) provides natural gas services to the Project area. Natural gas is a hydrocarbon fuel found in reservoirs beneath the Earth's surface and is composed primarily of methane (CH_4). It is used for space and water heating, process heating and electricity generation, and as transportation fuel. Use of natural gas to generate electricity is expected to increase in coming years because it is a relatively clean alternative to other fossil fuels (e.g., oil and coal). In California and throughout the western United States, many new electrical generation plants fired by natural gas are being brought online. Thus, there is great interest in importing liquefied natural gas from other parts of the world. California's natural gas-fired electric generation decreased by 1 percent between 2021 and 2022, accounting for 47.46 percent of in-state generation.[1]

Energy Usage

Energy usage is typically quantified using the British Thermal Unit (BTU). Total energy usage in California was 7,387.9 trillion BTUs in 2021 (the most recent year for which this specific data is available).[2] Of California's total energy usage, the breakdown by sector is 37.7 percent transportation, 23.1 percent industrial, 18.9 percent commercial, and 19.9 percent residential.[3] Electricity and natural gas in California are generally consumed by stationary users such as residences, commercial, and industrial facilities, whereas petroleum consumption is generally accounted for by transportation-related energy use. In 2022, taxable gasoline sales (including aviation gasoline) in California accounted for 13,919,678,835 gallons of gasoline.[4]

The electricity consumption attributable to the County from 2012 to 2022 is shown in **Table 1: Electricity Consumption in San Bernardino County 2012-2022**. As indicated in **Table 1**, in general electricity consumption in the County increased steadily, except in 2019 when electricity decreased slightly when compared with 2018.

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1 California Energy Commission, *2022 Total System Electric Generation*, https://www.energy.ca.gov/data-reports/energy-almanac/california-electricity-data/2022-total-system-electric-generation, accessed December 2023.

2 U.S. Energy Information Administration, *Table F33: Total energy consumption, price, and expenditure estimates, 2021,* https://www.eia.gov/state/seds/data.php?incfile=/state/seds/sep_fuel/html/fuel_te.html&sid=CA, accessed December 2023.

3 U.S. Energy Information Administration, *California State Profile and Energy Estimates*, *California Energy Consumption by End-Use Sector, 2020*, https://www.eia.gov/state/?sid=CA#tabs-2, accessed May 2023.

4 California Department of Tax and Fee Administration, *Motor Vehicle Fuel 10 Year Reports*, https://www.cdtfa.ca.gov/taxes-and-fees/spftrpts.htm, accessed May 2023.

Table 1: Electricity Consumption in San Bernardino County 2012-2022	
Year	**Electricity Consumption (in millions of kilowatt hours)**
2012	14,308
2013	14,315
2014	14,680
2015	14,685
2016	14,902
2017	15,237
2018	15,326
2019	15,259
2020	15,910
2021	16,169
2022	16,630
Source: California Energy Commission, *Electricity Consumption by County*, http://www.ecdms.energy.ca.gov/, accessed December 2023.	

The natural gas consumption attributable to the County from 2012 to 2022 is shown in **Table 2: Natural Gas Consumption in San Bernardino County 2012-2022**. Natural gas consumption in the County fluctuated with increases and decreases occurring annually.

Table 2: Natural Gas Consumption in San Bernardino County 2012-2022	
Year	**Natural Gas Consumption (in millions of therms)**
2012	489
2013	511
2014	469
2015	485
2016	494
2017	493
2018	500
2019	547
2020	527
2021	561
2022	562
Source: California Energy Commission, *Natural Gas Consumption by County*, http://www.ecdms.energy.ca.gov/, accessed December 2023.	

Automotive fuel consumption in the County from 2012 to 2022 is shown in **Table 3: Automotive Fuel Consumption in San Bernardino County 2012-2022**. As shown in **Table 3**, on-road automotive fuel consumption in the County increased each year until 2020 when vehicle traffic decreased due to the COVID-19 quarantine. Following 2020, automotive fuel consumption continued to increase each year.

Heavy-duty vehicle diesel fuel consumption increased annually until 2018 when diesel fuel consumption decreased. Following 2018, diesel fuel consumption continued to increase each year.

Table 3: Automotive Fuel Consumption in San Bernardino County 2012-2022

Year	On-Road Automotive Fuel Consumption (gallons)	Heavy-Duty Vehicle/Diesel Fuel Consumption (Construction Equipment) (gallons)
2012	823,998,577	221,468,396
2013	824,054,602	231,100,540
2014	834,846,492	233,757,358
2015	863,626,512	236,687,334
2016	888,752,451	251,535,041
2017	896,771,954	263,723,118
2018	897,385,756	259,783,109
2019	898,685,412	261,139,639
2020	767,569,916	265,477,739
2021	874,282,902	272,787,528
2022	873,015,917	276,240,473

Source: California Air Resources Board, EMFAC2021.

5.0 Regulatory Setting

The following is a description of Federal, State, and local environmental laws and policies related to energy consumption that are relevant to the proposed Project.

5.1 State of California

California's Energy Efficiency Standards for Residential and Non-Residential Buildings (Title 24)

Energy conservation standards for new residential and nonresidential buildings were adopted by the California Energy Resources Conservation and Development Commission (now the California Energy Commission) in June 1977 and are updated every three years (Title 24, Part 6, of the California Code of Regulations). Title 24 requires the design of building shells and building components to conserve energy. The standards are updated periodically to allow for consideration and possible incorporation of new energy efficiency technologies and methods. On June 10, 2015, the CEC adopted the 2016 Building Energy Efficiency Standards, which went into effect on January 1, 2017. On May 9, 2018, the CEC adopted the 2019 Building Energy Efficiency Standards, which took effect on January 1, 2020.

The 2016 Standards improved upon the previous 2013 Standards for new construction of and additions and alterations to residential and nonresidential buildings. Under the 2016 Standards, residential buildings are 28 percent more energy efficient and nonresidential buildings are 5 percent more energy efficient than under the 2013 Standards. Buildings that are constructed in accordance with the 2013 Building Energy Efficiency Standards are 25 percent (residential) to 30 percent

(nonresidential) more energy efficient than the prior 2008 standards as a result of better windows, insulation, lighting, ventilation systems, and other features.

The 2019 Standards improve upon the 2016 Standards. Under the 2019 Title 24 standards, residential buildings are about 7 percent more energy efficient, and when the required rooftop solar is factored in for low-rise residential construction, residential buildings that meet 2019 Title 24 standards use about 53 percent less energy than those built to meet the 2016 standards.

On August 11, 2021, the CEC adopted the 2022 Energy Code. In December, it was approved by the California Building Standards Commission for inclusion into the California Building Standards Code. Among other updates like strengthened ventilation standards for gas cooking appliances, the 2022 Energy Code includes updated standards in three major areas:

- New electric heat pump requirements for residential uses, schools, offices, banks, libraries, retail, and grocery stores.

- The promotion of electric-ready requirements for new homes including the addition of circuitry for electric appliances, battery storage panels, and dedicated infrastructure to allow for the conversion from natural gas to electricity.

- The expansion of solar photovoltaic and battery storage standards to additional land uses including high-rise multifamily residences, hotels and motels, tenant spaces, offices, (including medical offices and clinics), retail and grocery stores, restaurants, schools, and civic uses (including theaters auditoriums, and convention centers).

The California Green Building Standards Code (California Code of Regulations, Title 24, Part 11), commonly referred to as the CALGreen Code, is a statewide mandatory construction code that was developed and adopted by the California Building Standards Commission and the California Department of Housing and Community Development. CALGreen standards require new residential and commercial buildings to comply with mandatory measures under five topical areas: planning and design; energy efficiency; water efficiency and conservation; material conservation and resource efficiency; and environmental quality. CALGreen also provides voluntary measures (CALGreen Tier 1 and Tier 2) that local governments may adopt which encourage or require additional measures in the five green building topics. The most recent update to the CALGreen Code was adopted in 2019 and went into effect January 1, 2020. The CEC has approved the 2022 California Green Building Standards Code it will take effect January 1, 2023. Projects whose permit applications are applied for on or after January 1, 2023, must comply with the 2022 Energy Code.[5]

[5] California Energy Commission. 2022. *2022 Building Energy Efficiency Standards*, https://www.energy.ca.gov/programs-and-topics/programs/building-energy-efficiency-standards/2022-building-energy-efficiency.

California Public Utilities Commission Energy Efficiency Strategic Plan

The California Public Utilities Commission (CPUC) prepared an Energy Efficiency Strategic Plan in 2011 with the goal of promoting energy efficiency and a reduction in greenhouse gases. Assembly Bill 1109, adopted in 2007, also serves as a framework for lighting efficiency. This bill requires the State Energy Resources Conservation and Development Commission to adopt minimum energy efficiency standards as a means to reduce average Statewide electrical energy consumption by not less than 50 percent from the 2007 levels for indoor residential lighting and not less than 25 percent from the 2007 levels for indoor commercial and outdoor lighting by 2018. According to the Energy Efficiency Strategic Plan, lighting comprises approximately one-fourth of California's electricity use while non-residential sector exterior lighting (parking lot, area, walkway, and security lighting) usage comprises 1.4 percent of California's total electricity use, much of which occurs during limited occupancy periods.

Renewable Portfolio Standard

In 2002, California established its Renewable Portfolio Standard program with the goal of increasing the annual percentage of renewable energy in the state's electricity mix by the equivalent of at least 1 percent of sales, with an aggregate total of 20 percent by 2017. The California Public Utilities Commission subsequently accelerated that goal to 2010 for retail sellers of electricity (Public Utilities Code Section 399.15(b)(1)). Then-Governor Schwarzenegger signed Executive Order S-14-08 in 2008, increasing the target to 33 percent renewable energy by 2020. In September 2009, then-Governor Schwarzenegger continued California's commitment to the Renewable Portfolio Standard by signing Executive Order S-21-09, which directs the California Air Resources Board under its AB 32 authority to enact regulations to help the State meet its Renewable Portfolio Standard goal of 33 percent renewable energy by 2020. In September 2010, the California Air Resources Board adopted its Renewable Electricity Standard regulations, which require all of the State's load-serving entities to meet this target. In October 2015, then-Governor Brown signed into legislation Senate Bill 350, which requires retail sellers and publicly owned utilities to procure 50 percent of their electricity from eligible renewable energy resources by 2030. Signed in 2018, SB 100 revised the goal of the program to achieve the 50 percent renewable resources target by December 31, 2026, and to achieve a 60 percent target by December 31, 2030. SB 100 also established a further goal to have an electric grid that is entirely powered by clean energy by 2045. Under the bill, the State cannot increase carbon emissions elsewhere in the western grid or allow resource shuffling to achieve the 100 percent carbon-free electricity target.

5.2 County of San Bernardino

San Bernardino County Regional Greenhouse Gas Reduction Plan

In response to statewide GHG reduction initiatives, the San Bernardino Associated Governments (formerly SANBAG, now known as SBCOG), cooperated to compile an inventory of GHG emissions and an evaluation of reduction measures to be adopted by the cities partnering within SBCOG. Reduction measures in the GHG Reduction Plan (GHGRP) are targeting GHG goals for the year 2030. The policies listed in the GHGRP range from broadly supporting energy efficiency and sustainability to policies closely tied to specific GHG reduction measures.

6.0 CEQA Thresholds and Methodology

In accordance with CEQA Guidelines, the effects of a project are evaluated to determine whether they would result in a significant adverse impact on the environment. This memorandum will focus on these effects and offer mitigation measures to reduce or avoid any significant impacts that are identified. The criteria used to determine the significance of impacts may vary depending on the nature of the project. According to Appendix G of the CEQA Guidelines, the proposed Project would have a significant impact related to energy, if it would:

- Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during Project construction or operation; and/or

- Conflict with or obstruct a State or local plan for renewable energy or energy efficiency.

The impact analysis focuses on the three sources of energy that are relevant to the proposed Project: electricity, natural gas, and transportation fuel for vehicle trips associated with the Project as well as the fuel necessary for Project construction. The analysis of the Project's electricity and natural gas use is based on the California Emissions Estimator Model (CalEEMod), which quantifies energy use for occupancy. The results of CalEEMod are included in the Project's Air Quality Assessment, prepared by Kimley-Horn (2024). Modeling related to Project energy use was based primarily on the default settings in CalEEMod. The amount of operational fuel use was estimated using CalEEMod outputs for the Project and CARB Emissions Factor (EMFAC) 2021 computer program for typical daily fuel use in San Bernardino County. Construction fuel was calculated based on CalEEMod emissions outputs and conversion ratios from the Climate Registry.

7.0 Impacts and Mitigation Measures

Threshold 7.1 Would the project result in wasteful, inefficient, or unnecessary consumption of energy resources?

Construction-Related Energy

During construction, the Project would consume energy in two general forms: (1) the fuel energy consumed by construction vehicles and equipment; and (2) bound energy in construction materials, such as asphalt, steel, concrete, pipes, and manufactured or processed materials such as lumber and glass.

Fossil fuels used for construction vehicles and other energy-consuming equipment would be used during the demolition, site preparation, grading/infrastructure improvements, paving, and building construction phases. Fuel energy consumed during construction would be temporary in nature and would not represent a significant demand on energy resources. Some incidental energy conservation would occur during construction through compliance with State requirements that equipment not in use for more than five minutes be turned off. Project construction equipment would be required to comply with **MM AQ-1** in the Air Quality Assessment which would require all off-road equipment 50 horsepower or greater to meet California Air Resources Board (CARB) Tier 4 Final standards as well as the latest Environmental Protection Agency and CARB standards. These emissions standards require highly efficient combustion systems that maximize fuel efficiency and reduce unnecessary fuel consumption. Due to increasing transportation costs and fuel prices, contractors and owners also have a strong financial incentive to avoid wasteful, inefficient, and unnecessary consumption of energy during construction. Total energy demand from construction is shown in **Table 4, Project Energy Consumption - Construction**.

Table 4: Project Energy Consumption - Construction			
Project Source	**Annual Construction Energy**	**San Bernardino County Annual Energy**	**Percentage Increase Countywide**
Electricity Use		**GWh**	
Water Use[1]	0.0042	16,181	0.00003%
Diesel Use		**Gallons**	
On-Road Construction Trips[2]	47,728	280,907,070	0.0108%
Off-Road Construction Equipment[3]	30,204		0.0170%
Construction Diesel Total	77,932		0.0278%
Gasoline		**Gallons**	
On-Road Construction Trips	15,101	846,846,001	0.0018%

1. Energy consumption from water associated with water treatment and transportation during construction is based on acres disturbed per day and estimated water use per acre.
2. On-road mobile source fuel use based on vehicle miles traveled (VMT) from CalEEMod and fleet-average fuel consumption in gallons per mile from EMFAC2021 in San Bernardino County.
3. Construction fuel use was calculated based on CalEEMod emissions outputs and conversion ratios from the Climate Registry.

Substantial reductions in energy inputs for construction materials can be achieved by selecting building materials composed of recycled materials that require substantially less energy to produce than non-recycled materials. The incremental increase in the use of energy bound in construction materials such as asphalt, steel, concrete, pipes and manufactured or processed materials (e.g., lumber and gas) would not substantially increase demand for energy compared to overall local and regional demand for construction materials. It is reasonable to assume that production of building materials such as concrete, steel, etc., would employ all reasonable energy conservation practices in the interest in minimizing the cost of doing business.

As indicated in **Table 4**, the annual diesel fuel consumption during construction of the Project would be 77,932 gallons and gasoline consumption would be 15,101 gallons, which would constitute a nominal percentage (0.0278 percent and 0.0018 percent, respectively) of fuel use in the County. As such, Project construction would have a minimal effect on the local and regional energy supplies. It is noted that construction fuel use is temporary and would cease upon completion of construction activities. There are no unusual Project characteristics that would necessitate the use of construction equipment that would be less energy-efficient than at comparable construction sites in the region or state. Therefore, construction fuel consumption would not be any more inefficient, wasteful, or unnecessary than other similar development projects of this nature. A less than significant impact would occur in this regard.

Operational Energy

Transportation Energy Demand.

Pursuant to the Federal Energy Policy and Conservation Act of 1975, the National Highway Traffic and Safety Administration (NTSA) is responsible for establishing additional vehicle standards and for revising existing standards. Compliance with Federal fuel economy standards is not determined for each individual vehicle model. Rather, compliance is determined based on each manufacturer's average fuel economy for the portion of their vehicles produced for sale in the United States. **Table 5: Project Energy Consumption - Operations** provides an estimate of the daily fuel consumed by vehicles traveling to and from the Project site. As indicated in **Table 5**, Project operations are estimated to consume approximately 1,460 gallons of diesel fuel and 59,983 gallons of gasoline fuel per year, which would constitute approximately 0.0005 percent and 0.0072 percent, respectively, of Countywide automotive fuel consumption. The Project would not result in any unusual characteristics that would result in excessive long-term operational fuel consumption. Fuel consumption associated with vehicle trips generated by the Project would not be considered inefficient, wasteful, or unnecessary in comparison to other similar developments in the region.

Building Energy Demand.

Operations of the Project would result in an increase of approximately 3.95 GWh of electricity per year and approximately 93,743 therms of natural gas per year. The Project would be required to comply with Title 24 Building Energy Efficiency Standards, which provide efficiency standards related to various building features, including appliances; water, space heating, and cooling equipment; building insulation and roofing; and lighting.

Table 5: Project Energy Consumption - Operations

Energy Type	Project Annual Energy Consumption	San Bernardino County Annual Energy Consumption[1]	Percentage Increase Countywide
Operational Electricity and Natural Gas			
Electricity			
Project Consumption	3.95 GWh/yr	16,630 GWh/yr	0.0238%
Natural Gas			
Project Consumption	93,743 therms	562,123,065 therms	0.0167%
Automotive Fuel Consumption[3]			
Diesel			
Project	1,460 gallons	281,399,849 gallons	0.0005%
Gasoline			
Project	59,983 gallons	828,612,797 gallons	0.0072%

Notes:
1. The Project increases in electricity and natural gas consumption are compared with the total consumption in San Bernardino County in 2022.
2. Countywide fuel consumption is from the California Air Resources Board EMFAC2021 model.

As indicated in **Table 5**, operational energy consumption would represent approximately 0.0238 percent of electricity consumption over the current Countywide usage. The Project would adhere to all federal, state, and local requirements for energy efficiency, including the Title 24 standards. As such, the Project would not result in the inefficient, wasteful, or unnecessary consumption of building energy.

As shown in **Table 5**, the increase in electricity and automotive fuel consumption constitutes a minimal percentage (less than one percent) of existing consumption. For the reasons described above, the Project would not place a substantial demand on regional energy supply or require significant additional capacity, or significantly increase peak and base period electricity demand. Thus, the Project would not cause a wasteful, inefficient, and unnecessary consumption of energy during Project construction, operation, and/or maintenance, or preempt future energy development or future energy conservation. A less than significant impact would occur.

Threshold 7.2 Would the project conflict with or obstruct a state or local plan for renewable energy or energy efficiency?

Title 24 of the California Code of Regulations contains energy efficiency standards for residential and non-residential buildings based on a state mandate to reduce California's energy demand. Specifically, Title 24 addresses a number of energy efficiency measures that impact energy used for lighting, water heating, heating, and air conditioning, including the energy impact of the building envelope such as windows, doors, skylights, wall/floor/ceiling assemblies, attics, and roofs.

Part 6 of Title 24 specifically establishes energy efficiency standards for residential and nonresidential buildings constructed in the State of California in order to reduce energy demand and consumption. The Project would comply with Title 24, Part 6 per state regulations. In accordance with Title 24 Part 6, the Project would have: (a) sensor based lighting controls— for fixtures located near windows, the lighting would be adjusted by taking advantage of available natural light; and, (b) efficient process equipment—improved technology offers significant savings through more efficient processing equipment.

Title 24, Part 11, contains voluntary and mandatory energy measures that are applicable to the Project under the California Green Building Standards Code. As discussed above, the Project would result in an increased demand for electricity, natural gas, and petroleum. In accordance with Title 24 Part 11 mandatory compliance, the Applicant would have (a) 50 percent of its construction and demolition waste diverted from landfills; (b) mandatory inspections of energy systems to ensure optimal working efficiency; (c) low pollutant emitting exterior and interior finish materials, such as paints, carpets, vinyl flooring and particle boards; and (d) a 20% reduction in indoor water use. Compliance with all of these mandatory measures would decrease the consumption of electricity, natural gas, and petroleum.

The San Bernardino County GHGRP establishes a series of energy efficiency related goals intended to reduce greenhouse gas (GHG) emissions based on the AB 32 Scoping Plan. Those applicable to the Project are Renewables Portfolio Standard for Building Energy Use, Assembly Bill 1109 Energy Efficiency Standards for Lighting, Electricity Energy Efficiency, and Commercial Energy Efficiency Requirements.

Because the Project would comply with Parts 6 and 11 of Title 24 and with the San Bernardino GHGRP measures, no conflict with existing energy standards and regulations would occur. Therefore, impacts associated with renewable energy or energy efficiency plans would be considered less than significant.

8.0 References

California Air Resources Board, EMFAC2021.

California Energy Commission, *2019 Building Energy Efficiency Standards*, https://www.energy.ca.gov/title24/2019standards/documents/2018_Title_24_2019_Building_Standards_FAQ.pdf.

California Energy Commission, *2022 Building Energy Efficiency Standards*, https://www.energy.ca.gov/programs-and-topics/programs/building-energy-efficiency-standards/2022-building-energy-efficiency.

California Energy Commission, *Electricity Consumption by County*, http://www.ecdms.energy.ca.gov/.

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Southern California Edison, *The Clean Power and Electrification Pathway*, https://newsroom.edison.com/internal_redirect/cms.ipressroom.com.s3.amazonaws.com/166/files/20187/g17-pathway-to-2030-white-paper.pdf.

U.S. Energy Information Administration, *California State Profile and Energy Estimates*, *California Energy Consumption by End-Use Sector, 2021*, https://www.eia.gov/state/?sid=CA#tabs-2.

Appendix A

Energy Data

Construction Fuel Consumption

On-Site Diesel[1] (off-road construction Equipment)	$MTCO_2e$	Gallons of Fuel[4]	County Fuel in 2024 (Start of Construction)	Percent
Demolition	101	9,951		
Site Preparation/Grading	356	35,025		
Building Construction	591	58,227		
Paving	373	36,739		
Architectural Coating	33	3,242		
Total	1,453	143,183	280,907,070	0.0510%
Average Annual Fuel Consumption		47,728	280,907,070	0.0170%

Off-Site Diesel[1] (on-road construction trips)				
Demolition	0	0		
Site Preparation/Grading	650	64,039		
Building Construction	270	26,571		
Paving	0	0		
Architectural Coating	0	0		
Total	920	90,611	280,907,070	0.0323%
Average Annual Fuel Consumption		30,204	280,907,070	0.0108%

Off-Site Gasoline[2]				
Demolition	6	667		
Site Preparation/Grading	15	1,683		
Building Construction	275	31,226		
Paving	48	5,460		
Architectural Coating	55	6,266		
Total	399	45,302	846,846,001	0.0053%
Average Annual Fuel Consumption		15,101	846,846,001	0.0018%

Total Diesel Fuel		233,794	280,907,070	0.0832%
Total Gasoline Fuel		45,302	846,846,001	0.0053%
Total Construction Fuel	2,772	279,096		

Years of Construction Activity **3**

Construction Phase[3]	Demolition			Site Preparation			Grading/Infrastructure Improvements		
	On-Site Diesel (Off-Road)	Off-Site Diesel (Hauling/Vendor)	Off-Site Gasoline (Worker)	On-Site Diesel (Off-Road)	Off-Site Diesel (Hauling/Vendor)	Off-Site Gasoline (Worker)	On-Site Diesel (Off-Road)	Off-Site Diesel (Hauling/Vendor)	Off-Site Gasoline (Worker)
2025	101	0	6	157	0	7	132	650	5
2026									
2027	0	0	0	0	0	0	67	0	3
Total	**101**	**0**	**6**	**157**	**0**	**7**	**199**	**650**	**8**

Construction Phase[3]	Building Construction			Paving			Architectural Coating		
	On-Site Diesel (Off-Road)	Off-Site Diesel (Hauling/Vendor)	Off-Site Gasoline (Worker)	On-Site Diesel (Off-Road)	Off-Site Diesel (Hauling/Vendor)	Off-Site Gasoline (Worker)	On-Site Diesel (Off-Road)	Off-Site Diesel (Hauling/Vendor)	Off-Site Gasoline (Worker)
2025	166	77	79	105	0	14	9	0	16
2026	284	130	132	179	0	23	16	0	27
2027	141	63	64	89	0	11	8	0	13
Total	**591**	**270**	**275**	**373**	**0**	**48**	**33**	**0**	**55**

Notes:

[1] Fuel used for off-road, hauling, and vendor trips assumed to be diesel.

[2] Fuel used for worker trips assumed to be gasoline.

[3] $MTCO_2e$ rates from CalEEMod (3.0 Construction Emissions Details).

[4] For CO2e emissions, see Chapter 13 (page 94); Conversion Ratios: Climate Registry, General Reporting Protocol, 2016.

Construction Water Energy

Daily Soil Disturbance[1]	4.0	acres
Days of Soil Disturbance[2]	65	days
Water Concentration[3]	3,020	gallons/acre
Water Energy Intensity[4]	5,306	kWh/MG
Total Construction Water	0.79	million gallons
Construction Water Energy	4,166	kWh
	0.0042	GWh
San Bernardino County Annual Electricity	16,181	GWh
Percentage Increase	0.00003%	

Notes:

[1] Total daily acres disturbed from offroad equipment per CalEEMod (3.0 Construction Emissions Detail) and maximum SCAQMD LST values for soil-disturbing equipment.

[2] Number of days of construction with soil-disturbing equipment per CalEEMod (5.1 Construction Schedule).

[3] Water application rate per Air and Waste Management Association's Air Pollution Engineering Manual.

[4] Water energy intensity factor for subarea per CalEEMod User Guide, Appendix G, Tab G-32.

Operational Fuel

Vehicle Type	Percent	Annual VMT[1]	MPG[2]	Annual Fuel (Gallons)	Fuel Type	SB County Gallons[3]	RS Percent
Passenger Cars	0.98	1,295,625	21.6	59,983	Gas	828,612,797	0.0072%
Light/Medium Trucks	0.02	25,104	17.2	1,460	Diesel	281,399,849	0.0005%
Heavy Trucks/Other	0.00	0	6.1	0	Diesel	281,399,849	0.0000%
Trucks Total		25,104		1,460		281,399,849	0.0005%
Total		1,320,729					

Land Use[5]	LDA	LDT1	LDT2	MCY	MDV	LHD1	LHD2	MHD	OBUS	UBUS	SBUS	MH	HHD
Campground - cars	55.5180	3.8364	21.2035	2.0803	15.2799	0.0000	0.0000	1.7919	0.0000	0.0000	0.2900	0.0000	0.0000
Campground - trucks	55.6991	3.8364	21.2035	2.0803	15.2799	0.0000	0.0000	1.7919	0.0000	0.0000	0.1089	0.0000	0.0000

Notes:

[1] Total annual operational VMT based on annual VMT from CalEEMod (5.9 Operational Mobile Sources).

[2] Average fuel economy derived from Department of Transportation.

[3] Total annual county fuel per EMFAC 2021 model of projected operational fuel usage.

Operational Water Energy

Unmitigated Indoor	17.1	million gallons
Indoor Energy Intensity Factor[1]	6,807	kWh/MG
Unmitigated Outdoor	0	million gallons
Outdoor Energy Intensity Factor[2]	5,306	kWh/MG
Operational Water Energy	116,082	kWh
Operational Water Energy	0.1161	GWh
San Bernardino County Annual Electricity	16,181	GWh
Percentage Increase	0.0007%	

Land Use[3]	**gal/year**	
	Indoor	**Outdoor**
Hotel	1,217,605	0
Health Club	554,467	0
Place of Worship	145,869	0
General Office	3,899,478	0
Restaurant	10,703,813	0
Swimming Pool	35841	0
Arena	496247	0
Total Operational Water (MG/year)	**17**	**0**

Elecricity/Natural Gas Energy

	Project Annual Energy	San Bernardino County Annual Energy	Percentage Increase
Electricity (kWh/yr)	3,949,982	16,629,614,195	0.0238%
Electricity (GWh/yr)	3.9500	16,630	0.0238%
Natural Gas (kBTU/yr)	9,374,321	56,212,306,500	0.0167%
Natural Gas (therms/yr)	93,743	562,123,065	0.0167%

Land Use	**Electricity (kWh/yr)**	**Natural Gas (kBTU/yr)**
Hotel	2,185,629	4,091,242
Health Club	89,416	402,057
Place of Worship	44,465	199,935
General Office Buildings	382,894	602,034
Restaurant	1,236,591	4,029,648
Swimming Pool	0	0
Arena	10,987	49,405
Total Energy	**3,949,982**	**9,374,321**

Appendix F

Preliminary Geotechnical Report

PRELIMINARY GEOTECHNICAL REPORT
PROPOSED HUME SOCAL CAMPGROUND REDEVELOPMENT AND EXPANSION PROJECT
251-ACRES OF FORESTED LAND
UNINCORPORATED SAN BERNARDINO COUNTY CALIFORNIA

Prepared for: **KIMLEY-HORN AND ASSOCIATES, INC.**
3880 LEMON STREET, SUITE 420
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Prepared by: **LEIGHTON AND ASSOCIATES, INC.**
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IRVINE, CALIFORNIA 92612

Project Number CLA.0013655001

December 13, 2023

Leighton
a verdantas company

Leighton and Associates, Inc.

December 13, 2023

Project No. CLA.00136555001

Kimley-Horn and Associates, Inc.
3880 Lemon Street, Suite 420
Riverside, California 92501

Attention: Mr. John Nsofor

Subject: Preliminary Geotechnical Report
Proposed Hume SoCal Campground Redevelopment and Expansion Project
251-Acres of Forested Land
Unincorporated San Bernardino County, California

In accordance with our July 22, 2022 authorization, Leighton and Associates, Inc. (Leighton) is pleased to present this Geotechnical Exploration Report addressing redevelopment and expansion of the subject Hume SoCal Christian Campground facility, located on approximately 251-acres of partially developed forestland within unincorporated San Bernardino County, California. The purpose of our study was to evaluate subsurface soil, groundwater and geologic hazard conditions within the areas planned improvements and provide preliminary geotechnical recommendations for project design and construction.

We appreciate the opportunity to provide our services. If you have any questions or concerns, please contact us at your convenience. The undersigned can be reached at **(866) *LEIGHTON***, or directly at the phone extensions and e-mail addresses listed below.

Respectfully submitted,

LEIGHTON AND ASSOCIATES, INC.



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JLH/CD/dlm

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Figure 2 – Regional Geology Map
Figure 3 – Regional Fault and Historical Seismicity Map
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1.0 INTRODUCTION

1.1 Site Description

The boundaries of the site are roughly rectangular in shape and encompassing approximately 251 acres of forested mountain terrain, situated within the San Bernardino National Forest, unincorporated San Bernardino County, California. The regional site location is shown on attached Figure 1, *Site Location Map*. The property is developed sparsely as a 300-occupant campground facility, including various existing building structures, paved access roads, recreational ponds, pools, lawn areas and other appurtenant improvements. Similar undeveloped forest land borders the site on the north and northwest. Nearby local communities include Green Valley Lake, Arrowbear Lake and Running Springs to northeast, southeast, and southwest of the property, respectively. The site is accessed via Green Valley Lake Road, which transects through the property on the north, and forms its eastern boundary on the south. Based on a review of historical aerial photographs, construction of Green Valley Road and improvements on the stie commenced sometime between 1951 and 1955.

Site Coordinates:	USGS 7.5 Topographic Map
Latitude: N34.2268°	Keller Peak
Longitude: W-117.0941°	December 2021

A majority of the site terrain is manifest in a series of relatively narrow ridgelines and valleys with steeply sided slopes. Surface elevations range between approximately 6,400 and 6,600 feet above mean sea level (msl). Loal Areas of relatively flatter terrain exist as elevated paleo-stream terraces. Additional relatively localized flat terrain also occur within certain narrow valley-bottom areas resulting from more recent alluvial deposition. The main existing campground facilities are centrally located on the property, haven taken advantage of an area of naturally flatter surface relief. Existing building pads, access roads and minor slopes have been created by limited grading modification.

Our site reconnaissance, geologic mapping and auger borings reveal a large part of the site is mantled by thin deposits of residual soil, colluvium and/or alluvium. Large areas of bedrock are also exposed in surface outcrop, consisting of a Cretaceous-age granitic formation which is hard to very hard, massive, and slightly weathered. The general subsurface distribution of soil and bedrock units is depicted in a series of 20-scale cross sections prepared as transecting areas of planned improvements, attached as Plates 2A and 2B.

1.2 Proposed Development

We understand construction will be performed in five phases of work. Upon completion, the improvements will accommodate approximately 3,000 additional occupants. Based on a set of preliminary plans forwarded to our office, dated January 9, 2023, the phase numbers, phase names and general locations on the property are referred to herein as follows:

- Phase 1 – Junior High School Camp (central)
- Phase 2 – High School Camp (SE)
- Phase 3 – Adult Lodge (W)
- Phase 4 – Elementary School Camp (NE)
- Phase 5 – Wildwood Camp (NW)

The proposed location and layout of improvements for each phase are depicted on attached Plate 1, *Geotechnical Map*. Construction types will vary from phase to phase, including demolition and replacement of certain existing buildings, and conversions and/or additions to others. New structures will include multi-story dormitories, large open-ceiling chapels, dining facilities, pools, gymnasiums, snack shops, restrooms, maintenance facilities, parking lots, grass quads, outdoor amphitheaters and recreational ponds. We expect appurtenant improvements will include access roads with embankment fills and/or cut slopes, drainage control structures and underground utilities.

Given existing site geologic conditions, and preference to limit disturbance of natural terrain by grading, many lighter-load structures of limited footprint can be founded on systems of drilled rock-socketed piles and grade-beams. Floors may consist of raised and/or slab-on-grade construction. For larger buildings, especially in areas of formerly graded flat pads where existing buildings will be demolished, re-grading and use of conventional spread footings and slab-on-grade construction should be considered. Where building footprints will span sloped terrain, a combination of conventional spread footing and drilled rock-socketed pile foundations may be considered.

As of the date of this report, no grading or structural plans defining foundation design or load demands of structures have been prepared. Geotechnical recommendations for design are thus considered preliminary, and subject to revision or value engineering once plans become available.

1.3 Purpose and Scope

The purpose of our work was to evaluate site geotechnical conditions and geologic hazards pertinent to the proposed development, determine engineering properties of soil and bedrock, and provide preliminary geotechnical recommendations to aid in project planning. To accomplish these tasks we reviewed readily available published geologic reports and maps, conducted site geologic reconnaissance mapping and advanced small-diameter auger borings to determine the thickness of surface soils, depth to competent bedrock, and collection of samples for physical and chemical laboratory testing. We prepared this report to summarize the findings of our study, and aid in the preparation of project grading and foundation design plans. A list of documents consulted as part of our study are noted in attached Appendix A, *References*.

The scope of work performed is as follows:

- **Background Review:** Reviewed published geology reports/maps, and historical aerial photographs and topographic maps and Lidar imagery readily available and pertinent to the site.

- **Field Exploration:** For the purpose of site soil and bedrock exploration, assessment of groundwater conditions, and collection of samples for laboratory testing, we advanced fifty-five (55) small-diameter auger borings into select locations each of the five development phases, and collected representative samples of surficial bedrock boulders for coring and testing. A summary of subsurface boring data is attached in Appendix B1, *Auger Boring Summary*. A summary of our field exploration is attached in Appendix B2, *Field Exploration.*

- **Geotechnical Laboratory Testing:** Conducted certain laboratory tests on collected soil and bedrock samples including Modified Proctor Compaction (maximum dry density and optimum moisture content), R-Value, remolded direct shear, unconfined compressive strength, and corrosivity suite (sulfate and chloride content, resistivity and pH). The results of our laboratory testing are attached in Appendix C, *Laboratory Test Data*.

- **Analyses and Report Preparation:** Analyzed collected field data to determine soil properties for design. Prepared this report presenting our preliminary geotechnical findings, conclusions and recommendations.

2.0 GEOTECHNICAL FINDINGS

2.1 Regional Geologic Setting

From a regional perspective, the site exists within the eastern (San Bernardino Mountains) segment of the Transverse Ranges Geomorphic Province of California. The province is defined by an east-west trending series of steep mountain ranges and valleys trending obliquely to the typical northwesterly trend of coastal California. The regional extent of the province spans easterly from the San Bernardino Mountains as far as the offshore islands of San Miguel, Santa Rosa, and Santa Cruz. The San Bernardino Mountains are considered one of the most rapidly rising regions on earth. Over the past 11 million years they have been uplifted to heights over 11,000 feet above mean sea level (msl), largely in response to intense north-south tectonic compression and southward displacement along the San Andreas Fault. The bulk of bedrock underlying the San Bernardino Mountains, and the site, are composed of Mesozoic age granitoid and gneissose bedrock associated with the southern California Batholith, see attached Figure 2, *Regional Geology Map*, and Figure 3, *Regional Fault and Historical Seismicity Map*.

2.2 Local Geologic Setting

Based on the findings of our subsurface exploration and review of published geologic reports/maps, the site is underlain by units of relatively thin surficial deposits including artificial fill and colluvium/alluvium. Granitic bedrock occurs extensively in surface outcrop and at shallow depths below the surface soils. Due to the relative thin and variable thickness of the surficial units, they are not mappable at the scale of the attached geologic maps. While the soil units are excluded from Plate 1, they are shown in attached 20-scale cross sections to provide a generalized understanding of local conditions and relationship to improvement concepts.

A brief description of soil and bedrock units encountered on the site is presented below.

- *Artificial Fill (undocumented) (Map Symbol: Afu):* The deposits of fill encountered on the site typically consist of a loose to medium dense light yellowish-grey to tan coarse-grained sand, derived from weathered bedrock and containing roots and scattered cobbles. The fill thickness ranges from approximately 1 to 5 feet where encountered. The fill was identified as occurring in local slopes adjacent existing roadways, or as underlying certain leveled pads beneath existing buildings. No reports documenting placement of fill under engineered control were available. Thus, this unit is herein defined as undocumented. Where a grading solution is preferred to provide structural support of new improvements, the undocumented fill unit will require complete removal and replacement.

- *Quaternary Alluvium/Colluvium (Map Symbol: Qal/col):* Deposits of Alluvium and Colluvium are grouped together for the purposes of this report. The colluvium unit is defined as a thin mantle of soil typically covering slopes, derived from upslope erosion. The soils were found to consist of loose light grey to tan coarse-grained silts and sands with roots concentrated along their contact with underlying bedrock. The diameter of roots generally increases with depth below the surface. The thickness of the colluvium is generally less than 2 feet where encountered. Alluvium consist of loose sediments concentrated along canyon bottoms, and locally as deposits on elevated terrace areas. Given the potential compressible nature of the alluvium/colluvium unit, it will require complete removal and replacement in areas where a grading solution is preferred to provide structural support for new improvements.

  Cretaceous Granite (Map Symbol: Kk): The entire site is underlain by bedrock assigned as Cretaceous age Granite (USGS, 1998). The crystalline igneous rock occurs widely in surface outcrop or buried beneath thin deposits of alluvium/colluvium and/or fill units. It is hard to very hard, light in color, massive, and exhibits a widely spaced joint pattern. Where exposed at the surface it is altered by differential physical and chemical weathering processes resulting in rounded shapes bounded by open joints. The depth of weathering is on the order of a few feet thick, where fracturing and jointing are more pronounced. Rock hardness quickly increases with depth beneath the surface, as does the effects of open fracturing and jointing. Where surface erosion is focused along joints, localized precarious-pedestaled boulders take form which can become dislodged and prone to downslope movement as rockfalls. Fresh bedrock is considered suitable for structural support new fill, and/or rock-socketed piles.

  The depths to bedrock beneath the site surface was determined by drilling and logging a series of auger borings. The encountered thickness of surface soils and depths of bedrock are noted in attached Appendix B1, *Auger Boring Summary*. The depths to bedrock are considered representative of site conditions, however, it is possible that deeper soils may exist in areas beyond the locations of the auger borings.

2.3 Geologic Structure

Our field mapping indicates the bedrock structure is massive and absent any adverse through-going structures that would otherwise result in large-scale planes of weakness. If larger cut slopes are planned, the orientation of joint-sets should be mapped to determine any degree of potential surficial instability.

2.4 Groundwater

Local groundwater was encountered as a shallow perched condition above bedrock, confined to deposits of alluvium/colluvium adjacent to active stream channels. Sources of groundwater mainly relate to periods of precipitation in the form of rain or snow melt. Based on the encountered conditions, we expect groundwater will not pose any significant constraint to planned grading or proposed construction.

2.5 Surface Water

The most significant occurrence of surface water is limited to active stream channels on the site. Certain structures are planned to span the axes of dry and active stream channels on the site. If buildings cannot be relocated, the control of surface waters will be required to mitigate the potential impacts of current and potentially larger future flow of water and debris. Other areas of potential concentrated surface flow can be expected in side-slope swales. Through implementation of proper engineering control, the impacts of surface water are not expected to be a significant constraint to development.

2.6 Landslides and Slope Stability

No evidence of landslides or landslide deposits were observed during our site reconnaissance, nor identified during our review of historical aerial photographs. The massive nature of the granitic bedrock formation underlying the site is such that the potential for significant landslides or large-scale slope instability is considered very low. However, an assessment of slope stability should be made during and after excavations into the existing road cut are made. Slope stability analysis was not within the scope of this study. Furthermore, although no surficial signs of adverse geologic structure (adverse jointing and joint orientation) were observed in the areas of planned improvements at the time of our investigation, adverse structure could be exposed during construction. As such, a Geologist should be present at the time of any temporary or permanent cuts to observe and map exposed geologic structure, as needed.

2.7 Site Soil Properties

Based on the results of our field exploration and laboratory testing, certain engineering characteristics of on-site soils (fill and alluvium/colluvium) are discussed as follows.

2.7.1 Expansive Soil

Given the non-cohesive course-grained nature of on-site soils, no tests were performed to evaluate expansive potential.

2.8 Hydrocollapse and Compressible Soils

Based on the coarse-grained character of alluvium/colluvium soils, the relative thin presence of the soil, and recommendations for complete removal of the soil where grading is preferred, the potential for hydro-collapse is not a constraint to site development. The bedrock is hard and not prone to such hazards.

2.9 Soil Corrosivity

A screening of site soil units for corrosivity was performed to evaluate their potential effect on concrete and ferrous metals. The corrosion potential was evaluated using the results of laboratory tests on representative soil samples obtained during our subsurface evaluation. Resultant test parameters were determined for pH, minimum electrical resistivity, and chloride and soluble sulfate content. The testing results indicated an average values of 5.33 for pH, measured minimum electrical resistivity of 45,1400 ohm-cm, chloride content of 74.8 ppm, and soluble sulfate content of 157.8 ppm.

In general, several agencies list a set of conditions for soils to be considered a corrosive environment. The California Department of Transportation (Caltrans) considers a site to exhibit a corrosive environment if one or more of the following conditions exist: chloride concentration is 500 ppm or greater, sulfate concentration is 2000 ppm or greater, or pH is 5.5 or less (Caltrans, 2012).

In addition, the American Association of State Highway and Transportation Officials (AASHTO) considers a water condition detrimental potential piles where: chloride concentration is greater than 500 ppm, sulfate concentration is greater than 500 ppm, there is potential effluence of mine or industrial runoff, high organic content, a pH of less than 5.5, marine borers (biological), or piles exposed to wet/dry cycles.

The following table presents a summary of corrosion analysis, in addition to values where Caltrans and AASHTO consider an environment to be corrosive. Please note the summary is limited to ONLY the listed conditions expressed in the table. Not all conditions considered to be constituent, part or whole, to corrosion potential were considered during our exploration and as a result our assessment of onsite corrosion potential is considered preliminary. A corrosion engineer should be consulted for further analysis and recommendations.

Table 1. – Summary of Corrosion Potential

Constituent		Average Site Value (ppm)	Caltrans Values (ppm)	AASHTO Values (ppm)
Chloride Content (ppm)		74.8	500 or greater	500 or greater
Sulfate Content (ppm)		157.8	2,000 or greater	500 or greater
pH		5.33	5.5 or less	5.5 or less

Preliminary corrosion analysis indicate the site soils are generally considered not to host a corrosive environment; however, site soils in contact with buried uncoated ferrous metals is considered to pose a corrosion hazard and should be mitigated.

2.9.1 Soil Compressibility

While no in-situ samples of surficial alluvium/colluvium soils were collected for compressibility testing, their organic content and density suggest they are compressible and should not be relied upon for structural support of structures.

2.9.2 Shear Strength

Evaluation of shear strength characteristics included laboratory direct shear testing of composite remolded soils. The results of testing are attached in Appendix C, including graphs of angle of internal friction (ø) and cohesion (c) for use in geotechnical analysis.

2.9.3 Excavation Characteristics

Soil: It is anticipated on-site alluvium/colluvium and fill soils can be excavated with relative ease using conventional light- to heavy-duty construction equipment.

Bedrock: Bedrock ranges from moderately hard where weathered, and hard to very hard where unweathered. Its rippability depends on the degree of weathering, density of fractures and jointing. Given the interest to avoid grading, we do not anticipate that excavations of any significant depth, or modifications of the site surface other than to remove and replace existing soils are planned. If deeper cuts in bedrock are planned, we anticipate rippability will be difficult and require use of heavy grading equipment including but not limited to dozers with single-shank rippers. To further discern rippability characteristics where such grading is

planned, the use of geophysical refraction surveys may provide more specific information concerning the feasibility of bedrock excavations.

2.9.4 Infiltration

The location and types of stormwater or septic systems was not designated on the current site plan. Thus, Leighton did not evaluate the infiltration rates for site soils. We anticipate the employment of such systems would be limited to the thin on-site alluvium/colluvium soil unit, away from planned structures. The evaluation of infiltration rates should be performed once more detailed plans are available.

3.0 GEOLOGIC HAZARDS

Potential geologic hazards common to southern California and more directly constrained to an on-site condition commonly include surface fault rupture and landslides and rockfalls. A summary of these hazards is provided in the following sections.

3.1 Liquefaction Potential

Liquefaction is the phenomenon of the reduction in strength and stiffness of certain soil types that exist below the groundwater table when subjected to strong ground shaking such as typically associated with seismic activity. Soils most susceptible to liquefaction are saturated granular deposits that exhibit loose to medium dense relative density.
The San Bernardino County Geologic Hazard Overlay Maps (2010), indicate the site is not located within an area susceptible to liquefaction, and thus not warranting any required investigation for liquefaction.

3.2 Seismically-Induced Settlement

Seismically-induced settlement consists of dynamic settlement of unsaturated soil (above groundwater) and liquefaction-induced settlement (below groundwater). These settlements occur primarily within low density sandy soil due to reduction in volume during and shortly after an earthquake event. Given the relatively thin presence of soil deposits on the site, and intended use of pile foundation and/or grading solutions, the potential for seismically-induced settlement is expected to be negligible.

3.3 Seismically-Induced Lateral Displacements

On sites where a liquifiable soil mass exists, the lateral movement of a non-liquefied soil mass can occur, termed lateral spreading. The direction of mass movement is typically towards a nearby gap in local topography, such as a basin, channel or valley. As earth deposits on the subject site are not prone the occurrence of liquefaction which is instrumental for the occurrence of lateral spreading, the potential for lateral spreading is in turn considered remote.

3.4 Seismically-Induced Landsliding

Based on the geologic hazard overlay maps issued by the County of San Bernardino, and preponderance of underlying massive igneous bedrock, the potential occurrence of landslides at the site is considered low. Proposed slopes, if any, should be engineered and constructed at a gradient of 2:1 (horizontal:vertical) or flatter top facilitate overall stability.

3.5 Rockfalls

The subject site consists of rugged forested terrain with moderate to steep slopes and narrow valleys. In areas where bedrock is exposed at the surface and an advanced degree of spheroidic weathering has occurred, larger precariously perched boulders have formed, typically bounded by joints, which are subject to dislodging and sudden downslope movement. The movement is often triggered by ground-shaking during earthquakes, where the boulders are mobilized in a downslope direction. In natural areas upgradient of planned grading, rockfalls can pose a hazard to path of human life, improvements, and/or infrastructure. Leighton observed only localized areas on the site during our reconnaissance, where the potential for this hazard exists. During the development phase of the project, a qualified geologist should examine areas upslope of planned improvements in more detail, and designate boulders posing a potential rockfall hazard. The boulders should be eliminated as part of the construction process, by either removal or breaking the rock in-place.

3.6 Flooding

According to current flood hazard maps available on the ESRI ArcGIS on-line database, 2023, the site is not located within a 100-year flood zone. A map showing the site and location of nearby flood hazard zones is attached as Figure 4, *Flood Hazard Zone Map*. Based on the above, the potential for site flooding is considered low.

3.7 Debris Flows

Debris flows are typically defined as the down-gradient movement of a viscous saturated silt and sand laden slurry like mixture soils laden with cobbles, boulders, vegetation and other debris. These events are surface phenomenon typically confined to areas with vertical gradients, including slopes, side-hill swales and valley bottoms where volumes of sediment have accumulated. The impacts of potential debris flows often depend on the type and volume of soil present, water content, and degree of vegetation. Debris flows are common in recent wildfire burn areas where vegetation and root structure has been removed. The loss of soil support leads to the accumulation of moisture in the soil from rain events and a higher potential for structural failure. Debris flows are not exclusive to a post-fire areas, and can occur as a result of repeated heavy rain storms where soils become increasingly saturated by waters. Debris flows can travel a significant distance from its source area under the right conditions.

Our reconnaissance of the site revealed no direct evidence of recent surface scaring or accumulations of relatively thick soils at the toe of slopes relating to possible debris flows.

While our observations note the above, the potential for debris slows is considered a potential hazard at the site as areas surrounding planned improvements will remain undisturbed or subject to little modification. A consideration of this hazard should be evaluated a part of site development, especially where buildings are cited in canyon bottom areas or side-slopes. The mitigation of debris flow hazards can include installation of drainage diversion devices such as sandbags, K-Rails, Hydro Barriers, etc., placed along known flow paths to divert runoff.

3.8 Seiches and Tsunamis

Seiches are the occurrence of waves within enclosed water bodies in response to ground shaking. The waves have the potential to runup shorelines and overtop dams. The existing and future recreational ponds and pools on the site are considered subject to the occurrence of a seiche hazard in the event of large earthquakes.

Tsunamis are sea waves generated by the sudden displacement or movement of a sea floor. Tsunami waves can impact shorelines a great distance from their source. Based on the absence of any ocean body in proximity to the site, and significant altitude above mean sea level, the potential for a tsunami to impact the site is considered remote.

3.9 Dam Inundation

According to current flood hazard maps available on the ESRI ArcGIS on-line database, 2023, the site is not located within a 100-year flood zone. A map showing the site and location of nearby flood hazard zones is attached as Figure 4, *Flood Hazard Zone Map*. A map is also provided showing an absence of potential dam inundation hazards at the site, see Figure 6, *Dam Inundation Map*. Based on the above, the potential for site flooding is considered low.

4.0 SEISMIC HAZARDS

Seismic hazards common to southern California include surface fault rupture and strong ground shaking associated earthquake(s). Depending on site conditions, other secondary seismic effects may include liquefaction, seismically-induced settlement, dynamic settlement, lateral spreading, seismically-induced landslides, seismically-induced flooding, seiches and tsunamis. Attached Figure 5, *Seismic Hazard Map*, depicts potential state-designated seismic hazards in the site area. The following sections discuss seismic hazards and their potential effects on the subject site.

4.1 Surface Fault Rupture

The project site is located in a seismically active region of southern California crossed by multiple well-defined active and potentially active faults capable of inducing ground motions affecting wide areas including the subject site. Accordingly, to reduce seismic risk, project improvements should be designed using appropriate seismic design parameters promulgated by current codes and standards, including the "Minimum Statewide Safety Standard" in Chapter 2 of the California Geological Survey (CGS) Special Publication 117a (CGS, 2008).

Our review of available in-house and readily available literature indicates the presence of no known active faults within the site boundaries. And the site is not designated within a state-defined Alquist-Priolo Earthquake Fault Zone (Bryant and Hart, 2007). Therefore, the potential for surface fault rupture on the site is expected to be low and a surface fault rupture hazard evaluation is not mandated for this site.

The locations of active faults within 100 miles of the site was determined using the on-line program managed by the United States Geological Survey (USGS) Earthquake Hazards Program National Seismic Hazard Maps (USGS, 2008c). The nearest active faults with historical or latest Quaternary displacement occur within the San Andreas Fault Zone (SAFZ), San Jacinto Fault Zone (SJFZ), and Johnson Valley Fault Zone (JVFZ) located approximately 7.9, 15.5 and 36.7 miles from the site, respectively. The SAFZ is the largest active tectonic plate boundary in California. The SJFZ is considered one of the most active faults in southern California. And the JVFZ is considered an important component of the system in that it has experienced several more recent surface rupture events affecting the local area. Attached Figure 3, *Regional Faults and Historical Seismicity Map*, depicts these and other major faults in the vicinity of the subject site.

4.2 Seismicity and Ground Motion

The intensity of ground shaking at a given location depends primarily upon the earthquake magnitude, the distance from the source, and the site response characteristics. Peak horizontal ground accelerations are generally used to evaluate the intensity of ground motion. Using the SEAOC/OSHPD Seismic Design Maps Tool (https://seismicmaps.org/) to obtain seismic design parameter values from the United States Geological Survey (USGS), the peak ground acceleration for the Maximum Considered Earthquake (MCE_G) adjusted for the Site Class effects (PGA_M) is 0.71g. Based on the USGS online unified hazard tool program (USGS, 2023a), the modal seismic event is Moment Magnitude (M_W) 8.08 at a distance of 7.7 miles.

5.0 SUMMARY OF FINDINGS AND CONCLUSIONS

Presented below is a summary of findings based on the results of our site geotechnical exploration.

- The site is not located in a state-designated Alquist-Priolo Earthquake Fault Zone, nor fault hazard zone depicted on San Bernardino County Hazard Overlay Maps. The nearest known significant active faults are the San Andreas Fault Zone (SAFZ), San Jacinto Fault Zone (SJFZ), and Johnson Valley Fault Zone (JVFZ) located approximately 7.9, 15.5 and 36.7 miles from the site, respectively. An earthquake along any of these or other similar more distant faults in the southern California area, are capable of generating moderate to strong ground shaking at the site.

- The site is not located within an area shown as susceptible to liquefaction or landslides.

- The site is underlain by locally by up to approximately 4 to 5 feet of undocumented artificial fill. The fill typically underlies existing building pads and some slopes. The fill is not considered suitable for support of new buildings and will require removal and replacement in areas of planned grading.

- No areas of side-hill seepage or springs were encountered on the site. The occurrence of shallow perched groundwater conditions was encountered locally in thin scattered deposits of alluvium confined to valley bottoms associated with active stream flow.

- The shallow depth of bedrock on the site will permit use of rock-socked piers to support light-weight structures. On sloping ground it is possible that a combination of piers with raised floors and grading for slab-on-grade floors will be feasible. For larger relatively flat pad areas, especially where existing buildings are present, a grading solution is recommended for entire support of new buildings.

6.0 PRELIMINARY RECOMMENDATIONS

Preliminary geotechnical recommendations intended to assist in preparation of grading and foundation plans are presented in the following sections. The recommendations are considered sufficient at this preliminary stage to develop project plans in accordance with 2022 CBC requirements. The following recommendations may be superseded by more restrictive requirements of the architect, structural engineer, and/or local building official.

The client is also directed to attached Appendix E, *GBA Geotechnical Insert*, for more information concerning this report.

6.1 Earthwork

All site grading should be performed in accordance with the project specifications of appropriate design professionals. Attached are geotechnical specifications for use as a guideline in developing plans for earthwork grading, see Appendix D, *General Earthwork and Grading Recommendations*.

6.1.1 Site Preparation

Vegetation, debris, and other deleterious materials should be removed and disposed of offsite prior to the commencement of grading operations. Existing underground improvements, including utility lines, should be identified prior to the start of grading and abandoned or relocated as necessary. Trenches resulted from removal of existing improvements should be excavated to competent materials and properly backfilled under the observation and testing of the geotechnical engineer.

6.1.2 Overexcavation and Recompaction

Proposed foundations may be constructed on bedrock or a minimum of 2 feet of compacted fill. Existing near surface fill and alluvial/colluvial soils below the proposed foundation should be removed to expose bedrock and recompacted. The foundation for the proposed structures may then be constructed on undisturbed, competent bedrock or properly compacted structural fill, in order to reduce the potential for differential settlement. If fill soils or unsuitable native soils are exposed at the bottom of the excavation, they should be removed and replaced with engineered structural fill of uniform thickness. The compacted fill should extend a minimum 3 feet beyond outside edges of the foundation. If any of the planned structures are supported on a deep foundation system, then overexcavation is not required.

Pavement areas, driveway, concrete flatwork, and slab on grade should be underlain by a minimum 1 foot of compacted fill. Local conditions may be encountered which may require additional removals and recompaction. The exact extent of removals can best be determined during grading by the geotechnical engineer when direct observation and evaluation of materials are possible.

6.1.3 Subgrade Preparation

Prior to placing fill materials, the subgrade should be scarified to a minimum depth of 6 inches, moisture conditioned, and proof-rolled. Any soft and/or unsuitable materials encountered at the bottom of the excavations should be removed and replaced with fill material.

6.1.4 Fill Placement and Compaction

The onsite soils to be used as compacted structural fill should be free of organic material, construction debris or oversized material larger than 6 inches. Imported fill soils, if any, should be approved by the geotechnical engineer prior to placement as fill. Fill soils should be placed in loose lifts not exceeding 8 inches, moisture-conditioned as necessary to at least two percent above moisture optimum and compacted to a minimum of 90 percent of the maximum dry density as determined by ASTM D 1557.

6.2 Preliminary Foundation Design Parameters

New structures may be supported on shallow footings or Cast-in-Drilled-Hole (CIDH) concrete piles. Driven piles are not recommended due to the hardness of bedrock. Note that these values are preliminary, and supplemental field data including drill cores should be collected during pile drilling to confirm design parameters.

6.2.1 Shallow Foundations

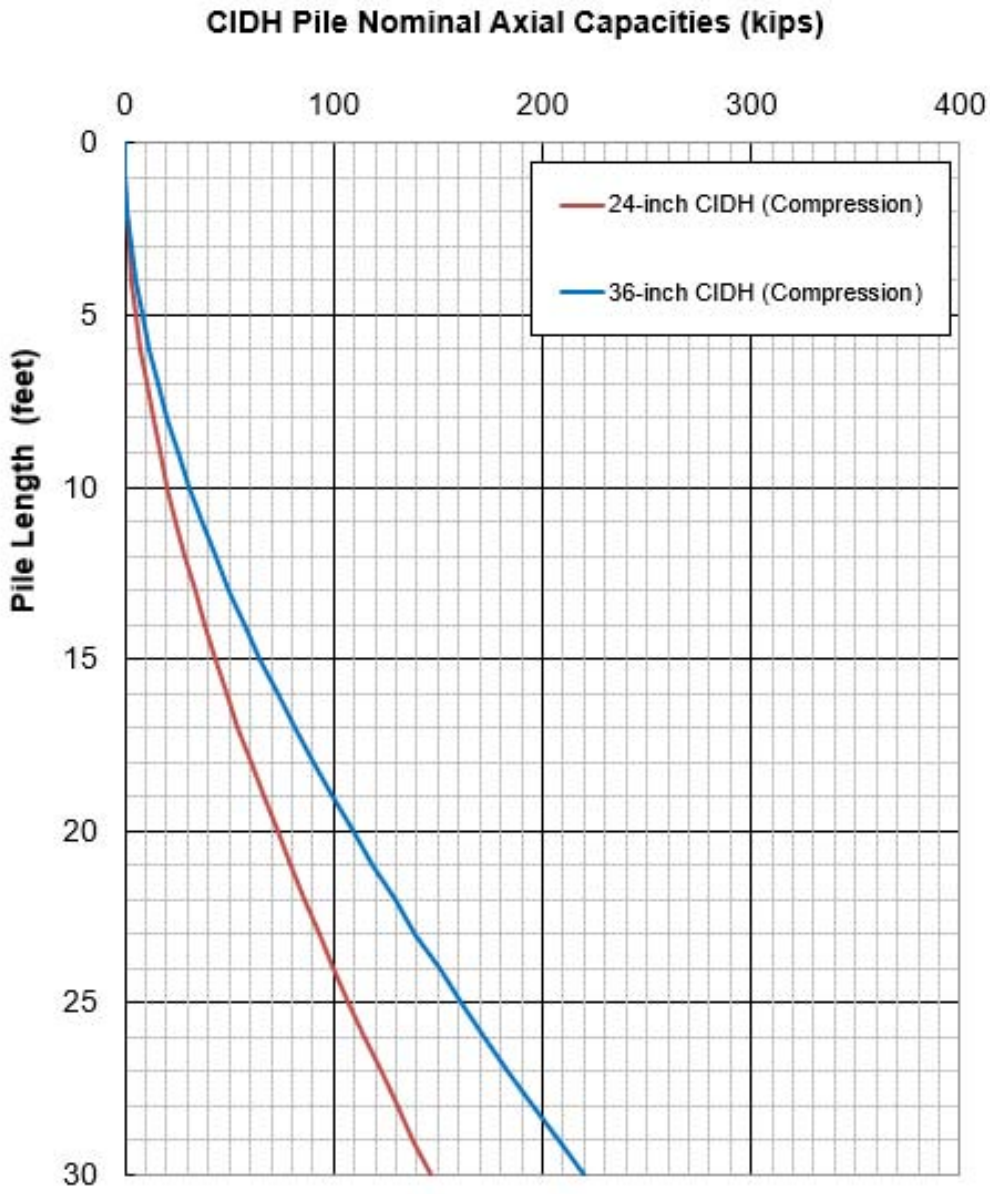
Following site grading recommended in Section 6.1, new structures may be supported on a conventional shallow foundation system. Footings may be designed using an allowable bearing capacity of 2,500 psf based on a minimum width of 12 inches and embedment depth of 12 inches below the lowest adjacent grade. This value may be increased by 250 psf for each additional foot of width or each additional foot of embedment to a maximum value of 4,000 psf. In addition, the bearing capacity may be increased by one-third for wind or seismic loading. The allowable bearing capacity incorporates a factor of safety of 3.0 and is based on a total static settlement of 1 inch and differential settlement of ½ inch over a

horizontal distance of 30 feet. Since settlement is a function of footing size and contact bearing pressure, differential settlement can be expected between adjacent columns or walls where a large differential loading condition exists. The settlement estimate should be reviewed by Leighton Consulting when final foundation plans and loads for the proposed structures become available.

Resistance to lateral loads will be provided by a combination of friction between the soils and foundation interface and passive pressure acting against the vertical portion of the foundation. A friction coefficient of 0.40 may be used at the soil-concrete interface for calculating the sliding resistance. A passive pressure based on an equivalent fluid pressure of 390 pounds per cubic foot (pcf) may be used for calculating the lateral passive resistance. The lateral passive resistance can be taken into account only if it is ensured that the soils against embedded structures will remain intact with time. The above values do not contain an appreciable factor of safety, so the structural engineer should apply the applicable factors of safety and/or load factors during design.

6.2.2 Deep Foundation

The axial capacities of 24-inch and 36-inch CIDH piles for frequently applied dead plus live load is presented in the figure below. A factor of safety of 2.0 may be used to obtain the allowable static pile capacities and a factor of safety of 1.0 may be used for transient loads such as wind or seismic forces. Uplift capacities may be taken as equal to 50 percent of the downward capacities. To avoid group effects, the pile on-center spacing should be at least three times its largest dimension.



Note:
1. A minimum factor of safety (FS) of 2.0 should be applied to estimate allowable capacities.
2. For seismic loading condition, a FS of 1.0 may be used to estimate allowable capacities.
3. The axial tension capacity may be taken as 50% of the axial compression capacity.

Pile design to provide lateral load resistance is recommended to be performed based upon the idealized subsurface profile and design parameters presented in the following table. If piles are used in a group with a pile cap, the passive pressure indicated in Section 6.5 may be used to calculate lateral resistance of the pile cap.

Table 2. – Preliminary Geotechnical Parameters for LPILE Analysis

Depth Range (feet)	Material	LPILE Model	Effective Unit Weight (lbs/ft^3)	Cohesion (lbs/ft^2)	ø (degrees)	ε50	k[(1)] (lbs/in^3)
0 - 5	Fill Soils, Alluvium/Colluvium	SAND	120	0	32	---	30
Below 5	Granitic Bedrock	SAND	130	0	38	---	225

Notes: (1) Modulus of Subgrade Reaction

P-multipliers dependent upon center-to-center (CTC) spacing. P-mult. = 1.0 for CTC = 3 oriented perpendicular to loading.

6.3 Slab-On-Grade

Concrete slabs-on-grade subjected to special loads should be designed by the structural engineer. Where conventional light floor loading conditions exist, the following minimum recommendations for conventional slabs-on-grade should be used. More stringent requirements may be required by local agencies, the structural engineer, the architect, or the CBC.

- A minimum slab thickness of 5 inches. Slab reinforcement should be designed by the structural engineer but as a minimum should consist of No. 3 rebar placed at 24 inches on center in each direction and provided with adequate concrete cover.
- A vapor barrier, 10-mil or thicker, should be placed below slabs where moisture-sensitive floor coverings or equipment is planned. The vapor barrier should be properly sealed at all joints and any penetrations.
- To reduce the potential for excessive cracking, concrete slabs-on-grade should be provided with construction or weakened plane joints at frequent intervals. Joints should be laid out to form approximately square panels.
- Subgrade for slab-on-grade should be thoroughly wetted prior to placement of rebar and concrete.

Our experience indicates that use of reinforcement in slabs can generally reduce the potential for drying and shrinkage cracking. Some cracking should be expected as the concrete cures. Minor cracking is considered normal; however, it is often aggravated by

a high water/cement ratio, high concrete temperature at the time of placement, small nominal aggregate size, and rapid moisture loss due to hot, dry, and/or windy weather conditions during placement and curing. Cracking due to temperature and moisture fluctuations can also be expected. The use of low slump concrete can reduce the potential for shrinkage cracking.

6.4 Seismic Design Parameters

Design parameters for minimum seismic load based on the 2022 California Building Code are included in Table 3 below.

Table 3. – 2022 CBC Based Seismic Design Parameters

Categorization/Coefficient	Design Value
Site Latitude	34.2268°
Site Longitude	-117.0941°
Site Class	C
Mapped Spectral Response Acceleration at Short Period (0.2 sec), S_S	1.50g
Mapped Spectral Response Acceleration at Long Period (1 sec), S_1	0.60g
Short Period (0.2 sec) Site Coefficient, F_a	1.2
Long Period (1 sec) Site Coefficient, F_v	1.4
Adjusted Spectral Response Acceleration at Short Period (0.2 sec), S_{MS}	1.80g
Adjusted Spectral Response Acceleration at Long Period (1 sec), S_{M1}	0.84g
Design Spectral Response Acceleration at Short Period (0.2 sec), S_{DS}	1.20g
Design Spectral Response Acceleration at Long Period (1 sec), S_{D1}	0.56g
Mapped Geometric Mean MCE_G Peak Ground Acceleration, PGA	0.59g
Site Coefficient, F_{PGA}	1.2
PGA adjusted for Site Class, $PGA_M = F_{PGA}$ *PGA	0.708g

6.5 Earth Retaining Structures

The following recommendations may be used for design and construction of retaining structures at the site. We recommend that any permanent earth retaining structures be backfilled with onsite or import soil with Expansion Index (EI) of not greater than 50 (per ASTM D 4829).

Table 4. – Equivalent Fluid Pressures

Condition	Level Backfill	2:1 Backfill
Active	37 pcf	89 pcf
At-Rest	57 pcf	63 pcf
Passive	390 pcf (Maximum of 3,900 psf)	
Seismic	20 pcf	48 pcf

Retaining walls retaining more than 6 feet of soil should consider a seismic earth pressure increment with an inverted triangular distribution in addition to the active earth pressure provided above. The seismic earth pressure increment is included in Table 3. The above values do not contain an appreciable factor of safety, so the structural engineer should apply the applicable factors of safety and/or load factors during design. Retaining walls should include provisions for wall drainage with a backdrain system in accordance with the recommendations provided on attached Figure 7, *Retaining Wall Backfill and Subdrain Detail (EI < 50)*, and the materials behind the wall should be free-draining (i.e., less than 5 percent passing the No. 200 sieve).

Cantilever walls that are designed for a deflection at the top of the wall of at least 0.001H, where H is equal to the wall height, may be designed using the active earth pressure condition. Rigid walls that are not free to rotate, walls that are braced at the top, and walls that provide indirect support for foundations should be designed using the at-rest condition.

Lateral load resistance will be provided by the sliding resistance at the base of the foundation and the passive pressure developed along the front of the foundation. A frictional resistance coefficient of 0.40 may be used at the concrete and soil interface.

In addition to the above lateral forces due to retained earth, the appropriate loads due to surcharges should be considered in the design of retaining structures.

6.6 Cement Type

In general, soil environments that are detrimental to concrete have high concentrations of soluble sulfates and/or pH values of less than 5.5. Section 4.3 of ACI 318 (ACI, 2018) provides specific guidelines for the concrete mix-design when the soluble sulfate content of the soil exceeds 0.1 percent by weight or 1,000 parts per million (ppm).

The results of laboratory testing indicated concentrations of soluble sulfate greater than 0.1 percent but less than 0.2 percent. The test results indicate a sulfate Exposure Class

designation of “S1” appears to be appropriate for the project site based upon criteria presented in ACI 318. If the concrete is expected to be in contact with reclaimed water, Type V cement and a water/cement ratio of 0.45 should be used. Samples should be collected from materials imported to the site as well as soils the compacted fill subgrade upon completion of grading to confirm the initial findings of this exploration.

6.7 Corrosion Protection Measures

In general, soil resistivity, which is a measure of how easily electrical current flows through soils, is the most influential factor for corrosion to ferrous metals. The following table presents an approximate relationship between soil resistivity and soil corrosiveness.

Table 5. – Soil Corrosivity as a Function of Resistivity

Soil Resistivity (ohm-cm)	Classification of Soil Corrosiveness
< 900	Very severe corrosion
900 to 2,300	Severely corrosive
2,300 to 5,000	Moderately corrosive
5,000 to 10,000	Mildly corrosive
10,000 to >100,000	Very mildly corrosive

Note: [1] ASTM STP 1013 titled *Effects of Soil Characteristics on Corrosion* (February, 1989).

In addition to resistivity, the concentration of chloride ions can also be used to evaluate corrosive potential to steel, either in the form of reinforcement protected by concrete cover or plain steel substructures, such as steel pipes. As a general guideline, the chloride threshold adopted by Caltrans is a concentration of 500 ppm or greater as determined by California Test 532. Concentrations of chloride ions above the stated concentration or other characteristics such as soil resistivity or redox potential may warrant special corrosion protection measures. The results of corrosivity testing are summarized in the following table.

Table 6. – Summary of Corrosivity Testing

Test Parameter	Test Results						General Classification of Hazard
	HA-5a	HA-15	HA-19	HA-27	HA-37	HA-17	
	0 to 1’	1’ to 2’	1’ to 1.5’	2’ to 2.5’	1.5’ to 2’	3’ to 3.5’	
Water-Soluble Sulfate in Soil (ppm)	72	283	219	98	99	176	Negligible to moderate
Water-Soluble Chloride in Soil (ppm)	144	42	53	41	44	125	Non-corrosive
pH	5.68	5.33	5.37	5.88	5.33	5.40	Moderately Acidic
Minimum Resistivity (saturated, ohm-cm)	47,000	50,500	20,600	39,600	23,000	45,000	Very mildly corrosive to buried ferrous pipes

The results of the resistivity tests indicate that the near surface soil exhibits very mildly corrosive potential to buried ferrous metals per ASTM STP 1013. The samples tested for water-soluble chloride content indicate a very low potential for corrosion of steel in concrete due to the chloride content of the soil.

Based on the available laboratory testing, the onsite soils are not considered to have low corrosion potential to ferrous metals. The corrosion information presented in this report should be provided to the underground utility subcontractors. We recommend that additional testing for general corrosion potential to ferrous materials and water-soluble sulfates in soils is performed during grading.

6.8 Pavement Design

Driveways and parking areas can be constructed using conventional asphalt concrete (AC) over aggregate base (AB). We have designed the pavement sections using a design R-value of 50 for different Traffic Indices (TI) and the minimum pavement thickness is presented in Table 6. The pavement design was performed using the method in *Caltrans Highway Design Manual*.

Table 7. – Pavement Sections

Traffic Index	Flexible Pavement (inches)	
	AC	AB
5 or less	3	4½
6	4	4½
7	4½	5
8	5	5½

Concrete pavement, if used, may consist of 6 inches of Portland Cement Concrete (PCC) over 4 inches of AB. The PCC pavement sections should be provided with crack-control joints spaced no more than 10 feet on-center each way, to control where cracks develop.

All pavement construction should be performed in accordance with the *Standard Specifications for Public Works Construction*. Field inspection and periodic testing, as needed during placement of the base course materials, should be undertaken to ensure that the requirements of the standard specifications are fulfilled. Prior to placement of aggregate base, the subgrade soil should be processed to a minimum depth of 8 inches, moisture-conditioned, as necessary, and recompacted to a minimum of 90 percent relative compaction. Localized areas of loose soils may be encountered that require deeper removal and recompaction. The actual extent of the removal depth will be best determined during construction when direct observation of the subgrade soils can be made.

Aggregate base should be moisture conditioned, as necessary, and compacted to a minimum of 95 percent relative compaction.

Aggregate base and asphalt materials should conform to Sections 200-2 and 203, respectively, of the *Standard Specifications for Public Works Construction*. PCC should conform to Section 201 of the *Standard Specifications for Public Works Construction*.

6.9 Surface Drainage

Positive drainage of surface water away from structures is very important. Water should not be allowed to pond adjacent to buildings or new site improvements. Water should not be allowed to flow directly over the slope faces. Positive drainage may be accomplished by providing drainage away at a minimum of 2 percent for earthen surfaces for a lateral distance of at least five feet and further maintained by a swale or drainage path at a gradient of at least 1 percent. Where necessary, drainage paths may be shortened by the use of area drains and collector pipes. Eave gutters are recommended and should

reduce water infiltration into the subgrade materials. Downspouts should be connected to appropriate outlet devices.

Irrigation of landscaping should be controlled to maintain, as much as possible, consistent moisture content sufficient to provide healthy plant growth without over watering. Where improvements are located within valley bottoms, use of diversion structures should be considered to control anticipated flood waters. Sub-slab drainage galleries

6.10 Additional Geotechnical Services

Geotechnical observation and testing should be provided during the following activities:

- Upon completion of site clearing, where applicable;
- During site earthwork;
- Compaction of all fill materials;
- During installation of temporary shoring, wherever needed;
- After foundation excavations and prior to placement of concrete;
- Foundation pile and retaining wall construction;
- Utility trench backfilling and compaction; and
- When any unusual conditions are encountered.

6.11 Plan Review

Final project grading and foundation plans should be reviewed by Leighton as part of the design development process to ensure that recommendations in this report are incorporated in project plans.

7.0 CONSTRUCTION CONSIDERATIONS

7.1 Rippability and Oversize Materials

Based on the results of our auger borings, existing surface soils are expected to be readily rippable using conventional equipment in good working condition. The rippability of weathered near-surface bedrock is expected to be difficult but feasible using heavy equipment, such as dozer with single-shank ripper tooth. Oversized material may be generated from bedrock removals.,

7.2 Trench Backfill

Utility trenches should be backfilled with compacted fill in accordance with Sections 306-1.2 and 306-1.3 of the Standard *Specifications for Public Works Construction,* (SSPWC, "Greenbook"), current edition. Utility trenches can be backfilled with onsite material free of rubble, debris, organic and oversized material up to 3 inches in largest dimension. Prior to backfilling trenches, pipes should be bedded in and covered with either:

(1) **Granular Bedding:** a) ½-inch open grade aggregate; or b) a uniform sand material with a Sand Equivalent (SE) greater-than-or-equal-to (≥) 30, passing the No. 4 U.S. Standard Sieve (or as specified by the pipe manufacturer).

(2) **CLSM:** Controlled Low Strength Material (CLSM) conforming to Section 201-6 of the SSPWC. CLSM bedding should be placed to 1 foot (0.3 m) over the top of the conduit, and vibrated.

Pipe bedding should extend at least 4 inches below the pipeline invert and at least 12 inches over the top of the pipeline. The bedding and shading sand is recommended to be densified in place by vibratory, lightweight compaction equipment.

Trench backfill over the pipe bedding zone may consist of native and clean fill soils. All backfill should be placed in thin lifts (appropriate for the type of compaction equipment), moisture conditioned above optimum, and mechanically compacted to at least 90 percent relative compaction, relative to the ASTM D 1557 laboratory maximum density.

7.3 Recreational Ponds

We anticipate recreation ponds will be constructed using down-gradient gravity dam structures consisting of reinforced concrete founded on bedrock. The structures should be designed by a specialty engineer experienced in dam design, and incorporate

elements to facilitate pass-through seepage conditions. The need for collection of future rock-rippability and other geotechnical studies can be precluded to aid in dam design.

7.4 Foundation Setback

We recommend a minimum horizontal setback distance from the face of slopes for all foundations, footings, and other settlement-sensitive structures as indicated on Table 8 below. The minimum recommended setback distance from the face of retaining wall is equal to 1.5 times the height of the retaining wall. This distance is measured from the outside bottom edge of the footing, horizontally to the slope or retaining wall face, and is based on the slope or wall height. However, the foundation setback distance may be revised by the geotechnical consultant on a case-by-case basis if the geotechnical conditions are different than anticipated.

Table 8. – Minimum Foundation Setback from Slope Faces

Slope Height	Setback
less than 5 feet	5 feet
5 to 15 feet	7 feet

Potential distress to improvements (retaining walls, fences, etc.) may be mitigated by use of deepened footings or grade beam systems for support.

In addition, open or backfilled utility trenches that parallel or nearly parallel structure footings should not encroach within an imaginary 2:1 (horizontal to vertical) downward sloping line starting 9 inches above the bottom edge of the footing and should also not be located closer than 18 inches from the face of the footing. Deepened footings should meet the setbacks as described above. Also, over-excavation should be accomplished such that deepening of footings to accomplish the setback will not introduce a cut/fill transition bearing condition.

Where pipes cross under footings, the footings should be specially designed. Pipe sleeves should be provided where pipes cross through footings or footing walls and sleeve clearances should provide for possible footing settlement, but not less than 1 inch around the pipe.

7.5 Temporary Excavations and Shoring Design

All temporary excavations should be performed in accordance with project plans, specifications, and all OSHA requirements. OSHA allows the sides of unbraced excavations, up to a maximum height of 20 feet, to be cut to a ¾H:1V (horizontal:vertical)

slope for Type A soils, 1H:1V for Type B soils, and 1½H:1V for Type C soils. The soil type should be verified or revised based on geotechnical observation and testing during construction, as soil classifications may vary over short horizontal distances. Excavations 5 feet or deeper should be laid back or shored in accordance with OSHA requirements before personnel are allowed to enter.

Typical cantilever shoring should be designed using an active earth pressure presented in Table 3. If excavations are braced at the top and at specific design intervals, the active pressure may then be approximated by a rectangular soil pressure distribution with the pressure per foot of width equal to 24H, where H is equal to the depth of the excavation being shored. These lateral earth pressures are for a drained condition. For an undrained condition, hydrostatic pressure should be included.

During construction, the soil conditions should be regularly evaluated to verify that conditions are as anticipated. The contractor should be responsible for providing the "competent person" required by OSHA standards to evaluate soil conditions. Close coordination between the competent person and the geotechnical engineer should be maintained to facilitate construction while providing safe excavations.

7.6 Rockfalls

Precariously perched bedrock boulders subject to potential dislodging and downslope movement as rock falls, exist locally on the site. Removal of the boulders can be accomplished using a variety of hand tools, or equipment such as excavators or dozers., is We recommended the removals of boulders be performed in conjunction with grading activities, and prior to construction of improvements located downslope of the hazard. A specialized contractor may be necessary to perform these activities.

If removal of the rock is not feasible due to access limitations or other reasons, the hazard may be mitigated by breaking up the rock in place to reduce the potential for dislodgement.

In some instances, boulders with a large flat side may be flipped onto the flat surface where they no longer pose a rolling potential and can then be left in place per the recommendations of a State Certified Engineering Geologist.

Possible ground disturbance resulting from these operations would likely consist of trampled brush and creation of rubble piles.

In areas where no mitigation is feasible, it is possible that barrier trenches, deflection walls or earthen berms may be constructed.

8.0 LIMITATIONS

Leighton's work was performed using the degree of care and skill ordinarily exercised, under similar circumstances, by reputable geotechnical consultants practicing in this or similar localities. No other warranty, express or implied, is made as to the conclusions and professional opinions included in this report.

As in many projects, conditions revealed in excavations may be at variance with preliminary findings. If this occurs, the changed conditions must be evaluated by the geotechnical consultant and additional recommendations be developed as needed.

The identification and testing of hazardous, toxic or contaminated materials was outside the scope of Leighton's work. Should such materials be encountered at any time, or their existence be suspected, all measures stipulated in local, County, State and Federal regulations, as applicable, should be implemented.

This report is issued with the understanding that it is the responsibility of the owner, or of his representative, to ensure that the information and recommendations contained herein are brought to the attention of the necessary design consultants for the project and incorporated into the plans; and that the necessary steps are taken to see that the contractors carry out such recommendations in the field.

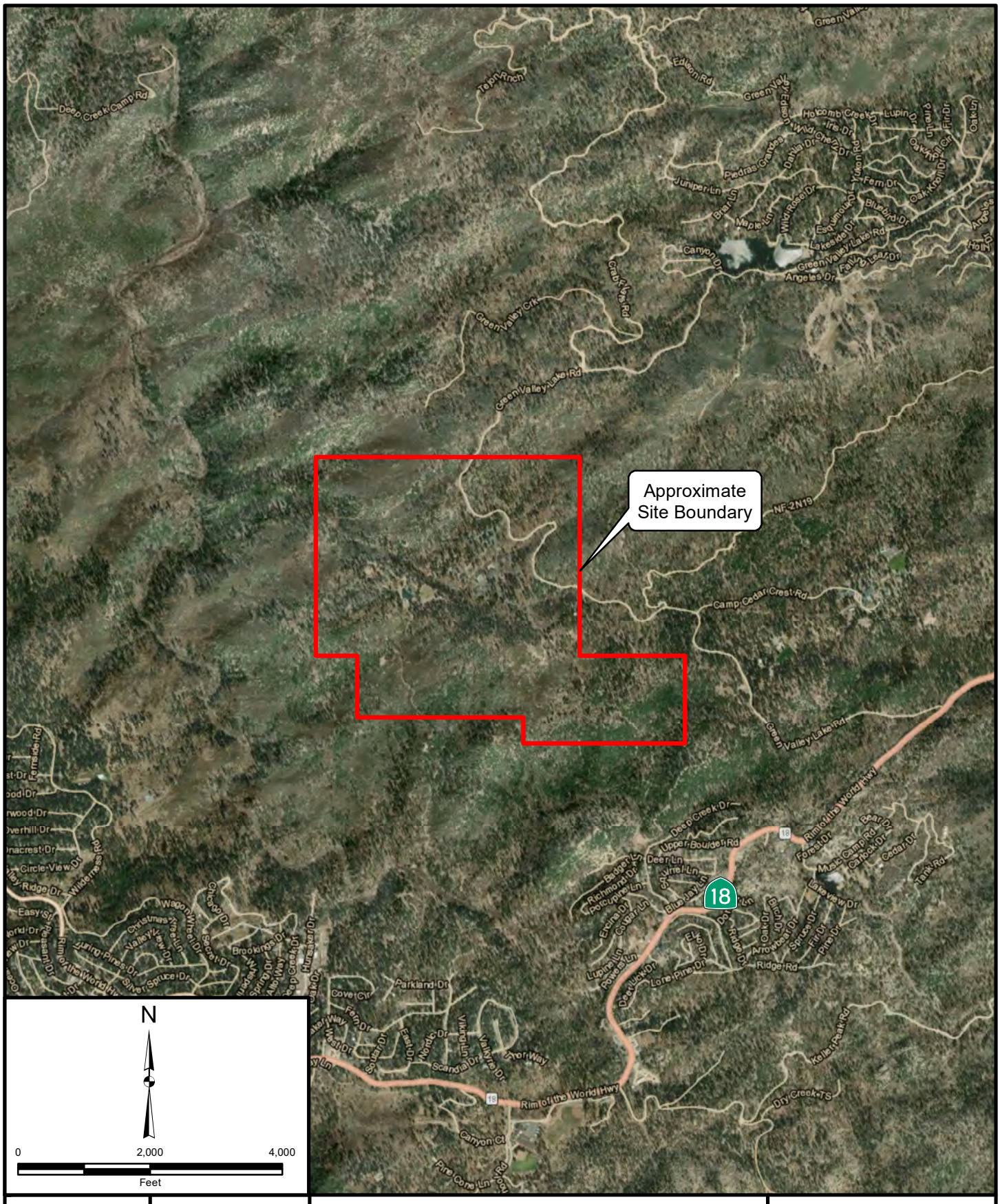
Changes in the conditions of a property can occur with the passage of time, whether due to natural processes or the work of man on the subject or adjacent properties. In addition, changes in standards of practice may occur from legislation or the broadening of knowledge. Accordingly, the findings of this report may at some future time be invalidated wholly or partially by changes outside Leighton's control.

The conclusions and recommendations in this report are based in part upon data that were obtained from a necessarily limited number of observations, site visits, excavations, samples and tests. Such information can be obtained only with respect to the specific locations explored, and therefore may not completely define all subsurface conditions throughout the site. The nature of many sites is that differing geotechnical or geological conditions can occur within small distances and under varying climatic conditions. Furthermore, changes in subsurface conditions can and do occur over time. Therefore, the findings, conclusions and recommendations presented in this report can be relied upon only if Leighton has the opportunity to observe the subsurface conditions during grading and construction of the project, in order to verify that our preliminary findings are representative of the site.

This report is intended only for the use of Kimley-Horn and Associates, Inc., and its design consultants, and only as related expressly to evaluation of the feasibility of developing the subject site with the proposed development and for preliminary planning and design.

If parties other than Leighton are engaged to provide construction geotechnical services, they must be notified that they will be required to assume complete responsibility for the geotechnical phase of the project by concurring with the findings and recommendations in this report or by providing alternative recommendations.

Any persons using this report for bidding or construction purposes should perform such independent explorations as they deem necessary to satisfy themselves as to the surface and subsurface conditions to be encountered and the procedures to be used in the performance of work on the subject site.



Project: 13655.001	Eng/Geol: JLH
Scale: 1 " = 2,000 '	Date: November 2023
Base Map: ESRI ArcGIS Online 2023 Author: (mmurphy)	

SITE LOCATION MAP

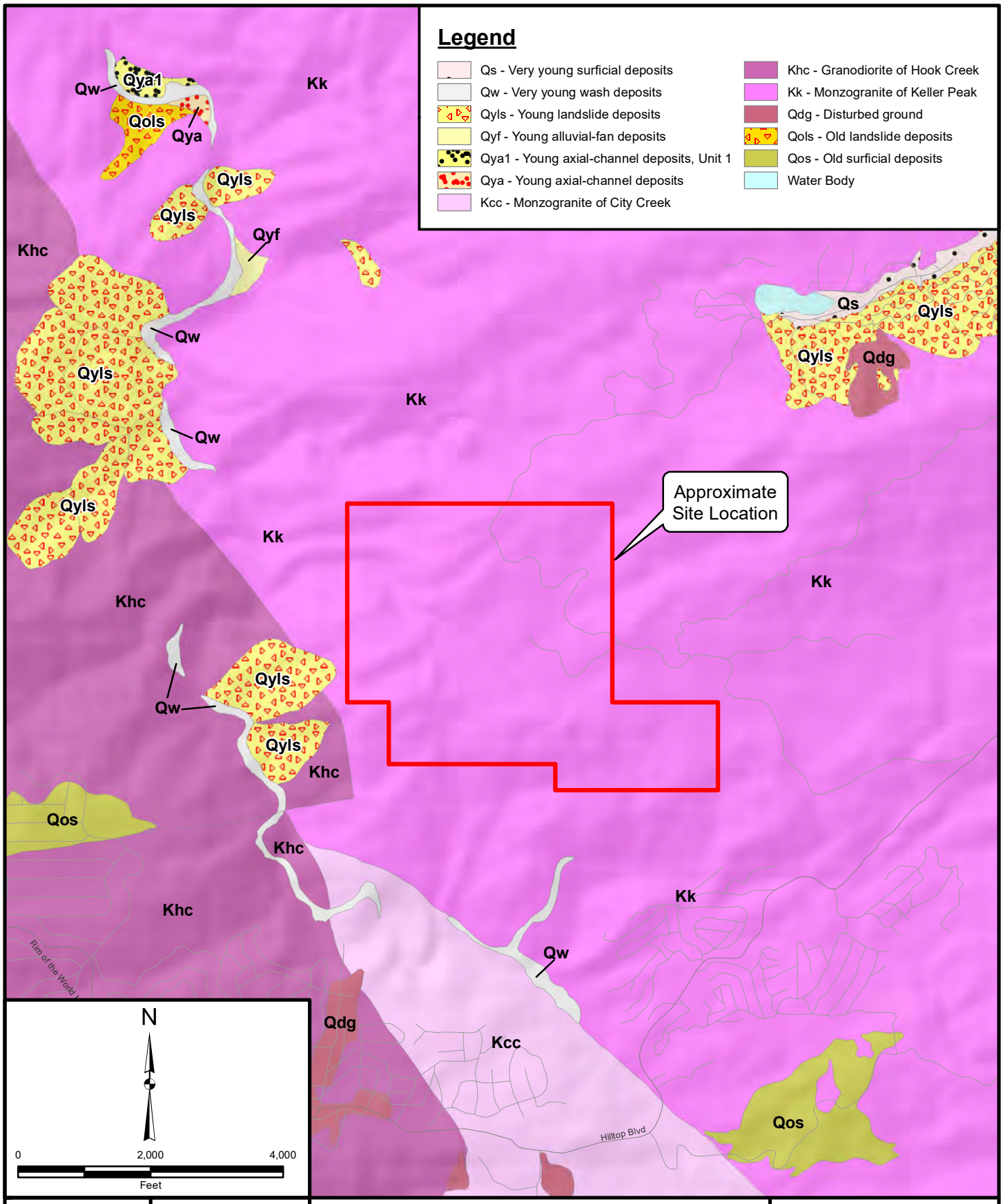
Hume SoCal

Green Valley Lake, California

FIGURE 1

Leighton

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Project: 13655.001	Eng/Geol: JLH
Scale: 1 " = 2,000 '	Date: November 2023

Reference: USGS, 2006 Geologic map of the San Bernardino and Santa Ana 30'x60 quadrangle, California Version 1,0 Open File Report 2006-1217.

REGIONAL GEOLOGY MAP

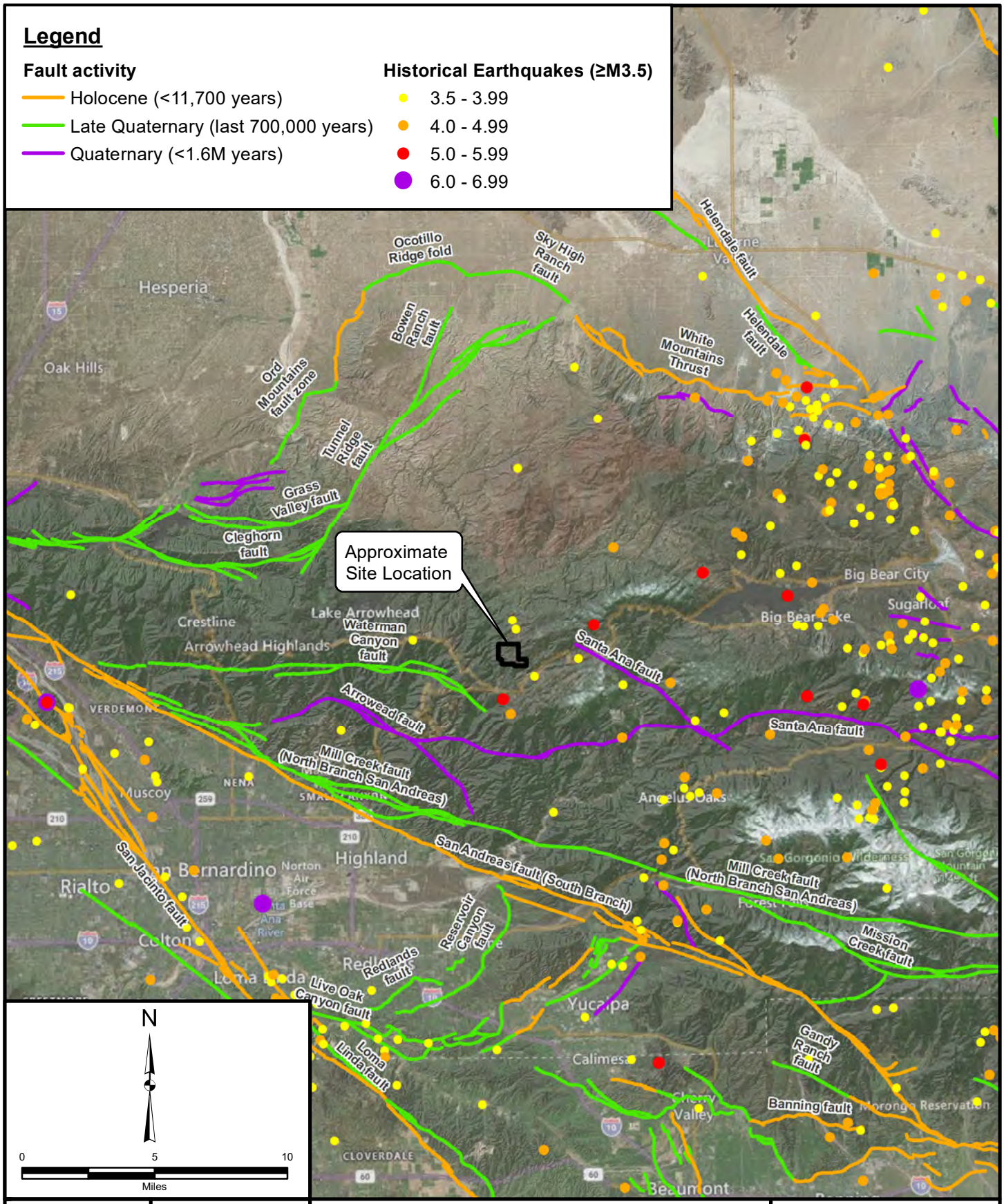
Hume SoCal

Green Valley Lake, California

FIGURE 2

Leighton

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Scale: 1 " = 5 miles	Date: November 2023

Base Map: ESRI ArcGIS Online 2023
Reference: maps.conservation.ca.gov

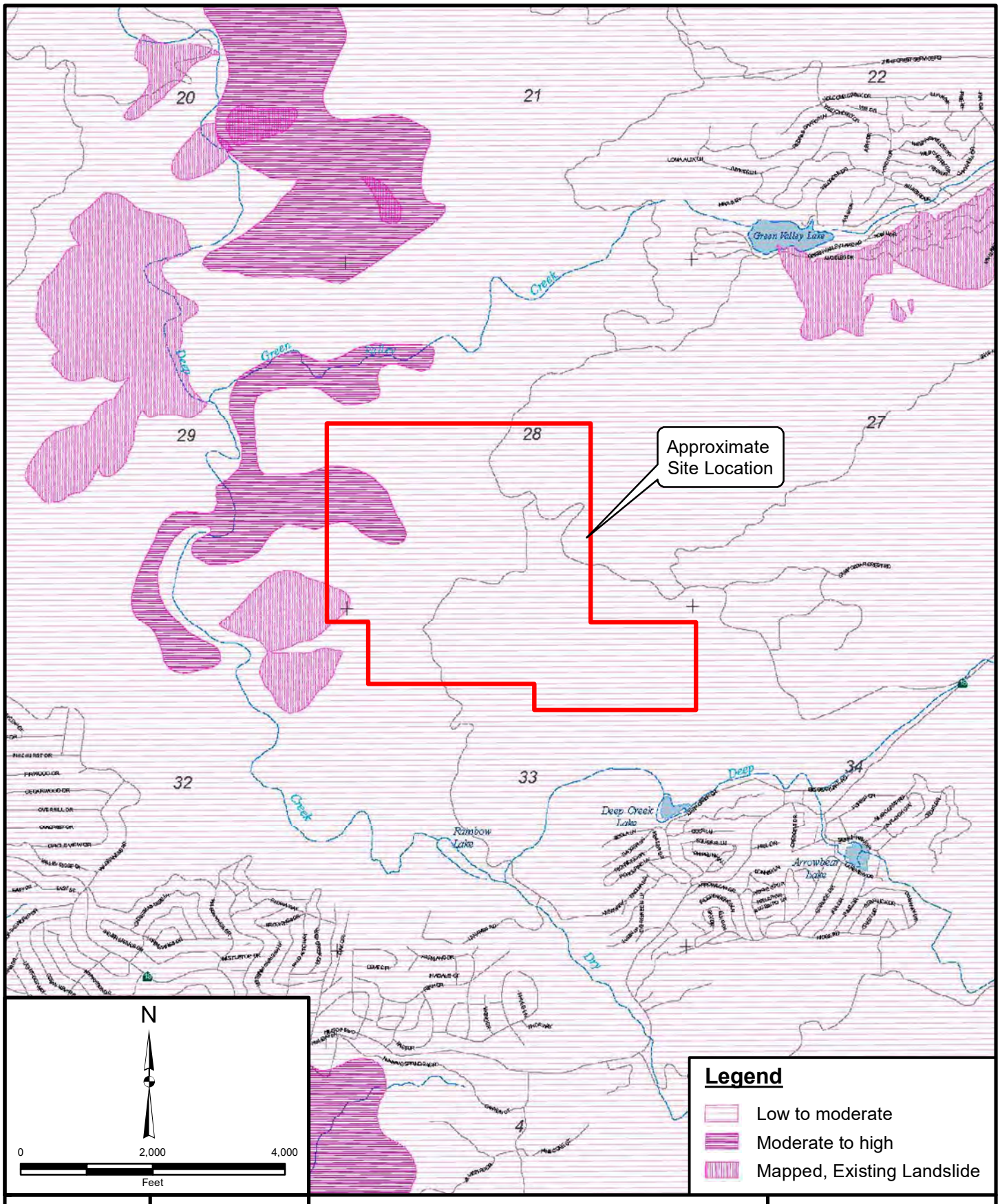
REGIONAL FAULTS AND HISTORIC SEISMICITY MAP

Hume SoCal
Green Valley Lake, California

FIGURE 3

Leighton

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Project: 13655.001	Eng/Geol: JLH
Scale: 1 " = 2,000 '	Date: November 2023

Base Map: San Bernardino County Land Use Plan GENERAL PLAN Geologic Hazard Overlays Map data originally compiled on 1:48,000 scale mosaicked maps photo-reduced from 7-1/2 minute USGS quads by D.M. Morton, U.S.Geological Survey, 1974 and by S.S. Tan, State Division of Mines and Geology, 1989.

SEISMIC HAZARD MAP

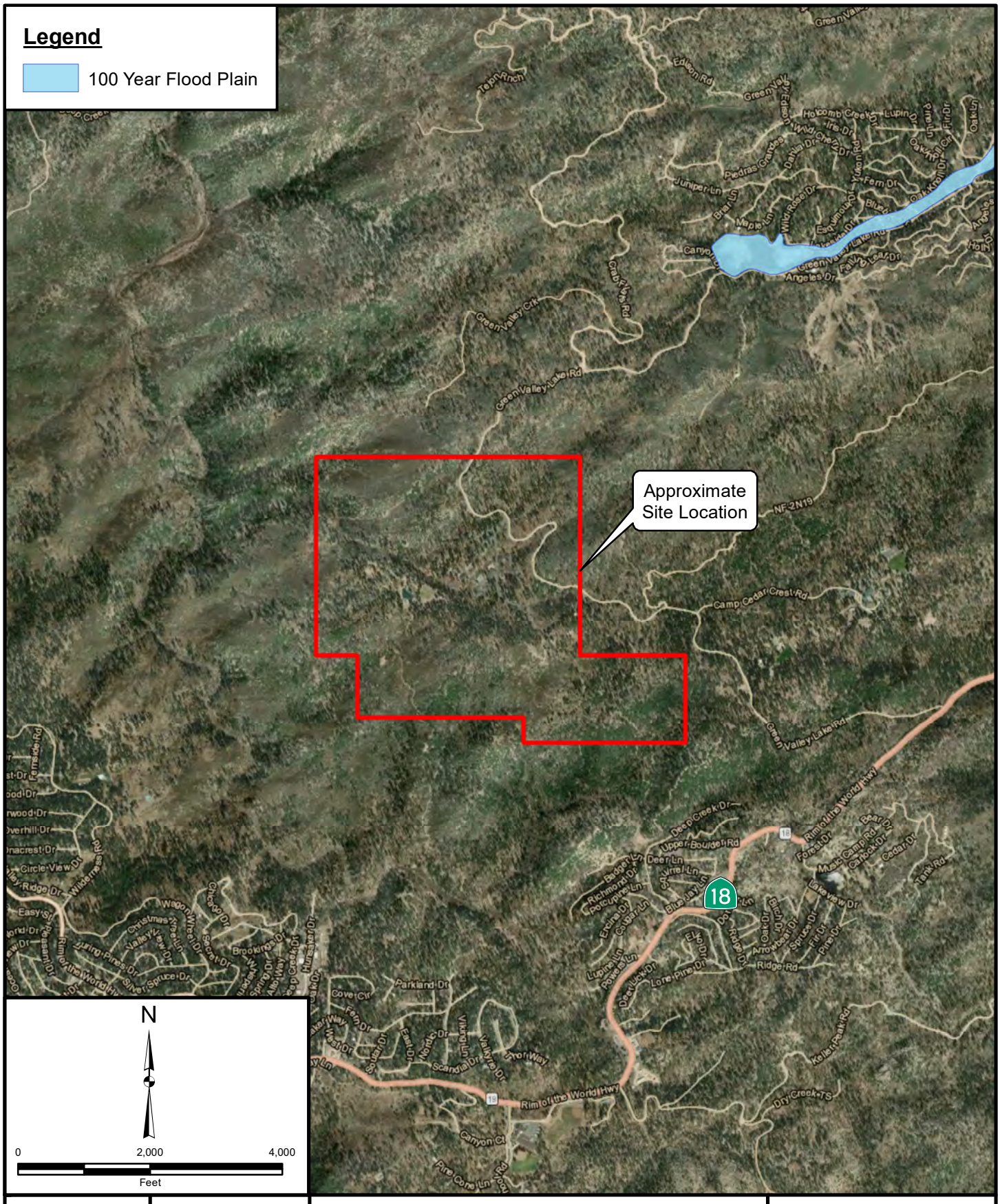
Hume SoCal

Green Valley Lake, California

FIGURE 4

Leighton

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Project: 13655.001	Eng/Geol: JLH
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Base Map: ESRI ArcGIS Online 2023
Reference: FEMA, DWR
Author: (mmurphy)

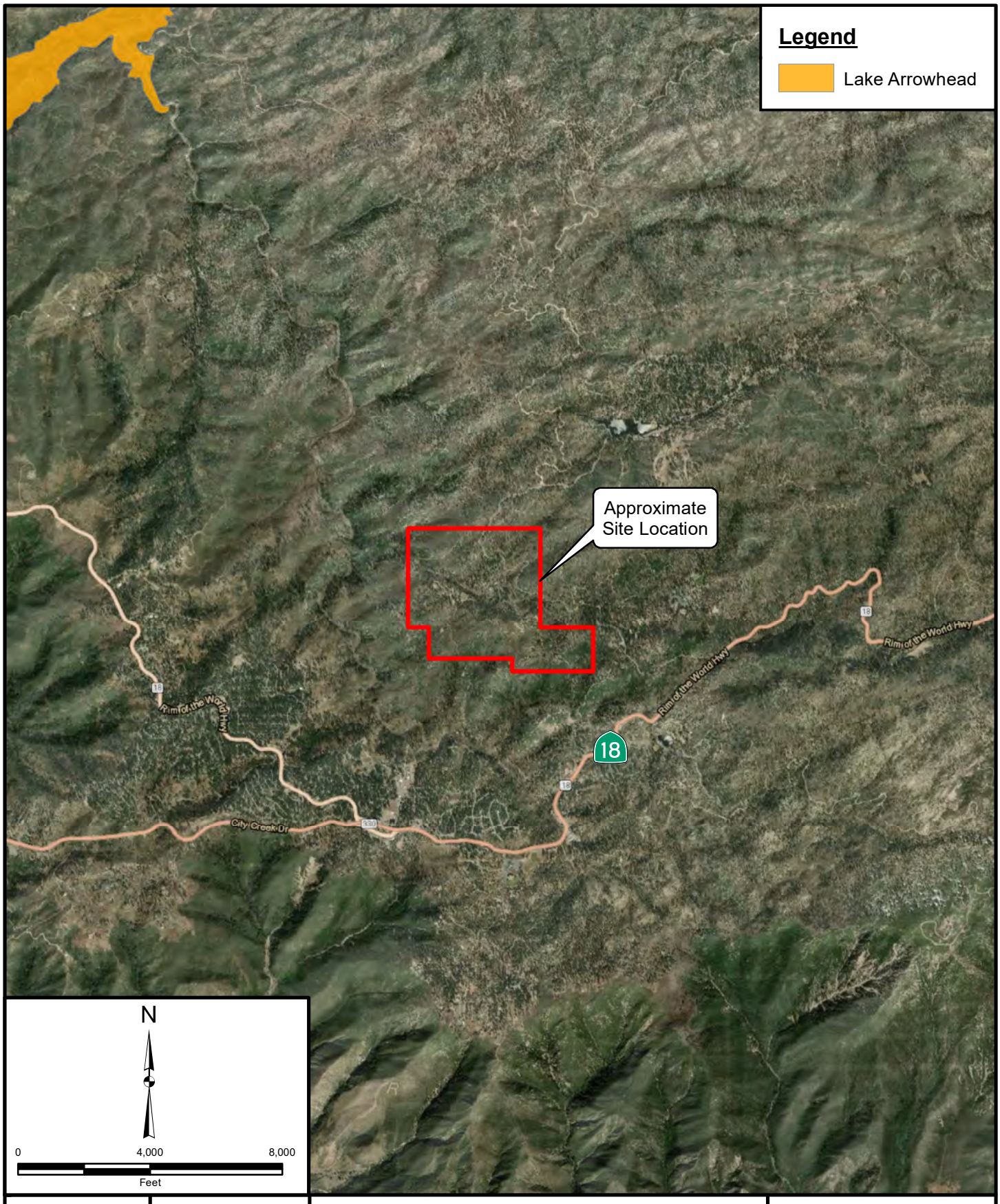
FLOOD HAZARD ZONE MAP

Hume SoCal
Green Valley Lake, California

FIGURE 5

Leighton

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Scale: 1 " = 4,000 '	Date: November 2023

Base Map: ESRI ArcGIS Online 2023
Reference: Office of Emergency Services (2007),
Dept of Safety of Dams (2021)
National Inventory of Dams, Army Corps of Engrs (2021)

DAM INUNDATION MAP

Hume SoCal

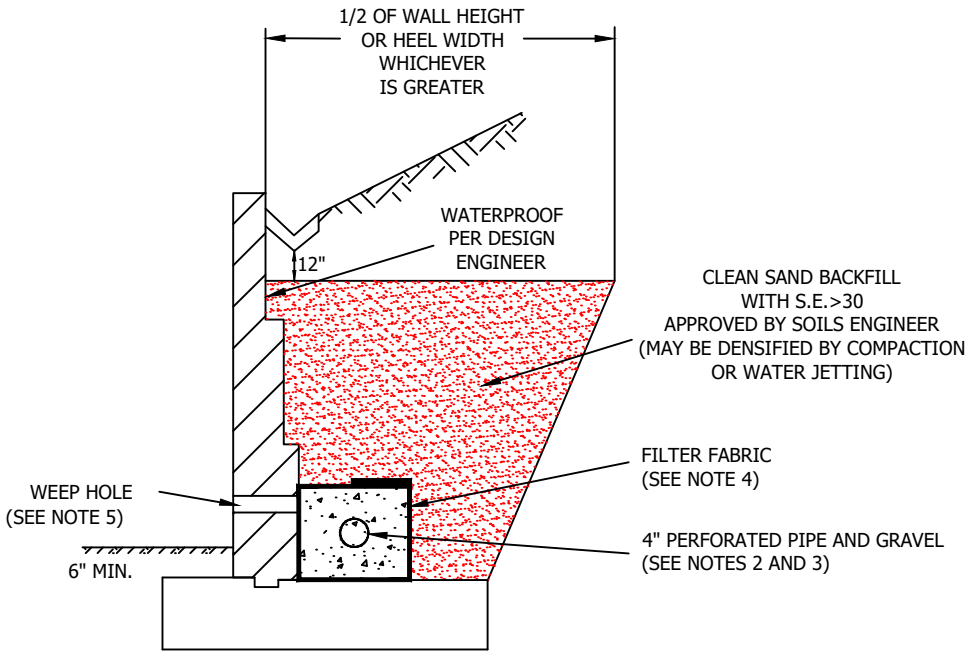
Green Valley Lake, California

FIGURE 6

Leighton

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SUBDRAIN OPTIONS AND BACKFILL WHEN NATIVE MATERIAL HAS EXPANSION INDEX OF >50



NOTE: AS AN ALTERNATE TO CLEAN SAND BACKFILL, CLEAN GRAVEL MAY BE UTILIZED WITH APPROVED FILTER FABRIC. A SECOND ALTERNATE IS TO UTILIZE AN AGGREGATE BASE MATERIAL COMPACTED TO 90% RELATIVE COMPACTION. A SAMPLE OF THE PROPOSED BASE MUST BE APPROVED BY THE GEOTECHNICAL CONSULTANT PRIOR TO BACKFILL FOR SUITABILITY. COMPACTION SHOULD BE ACHIEVED WITHOUT DAMAGING THE WALL.

GENERAL NOTES:

* Waterproofing should be provided where moisture nuisance problem through the wall is undesirable.
* Water proofing of the walls is not under purview of the geotechnical engineer
* All drains should have a gradient of 1 percent minimum
*Outlet portion of the subdrain should have a 4-inch diameter solid pipe discharged into a suitable disposal area designed by the project engineer. The subdrain pipe should be accessible for maintenance (rodding)
*Other subdrain backfill options are subject to the review by the geotechnical engineer and modification of design parameters.

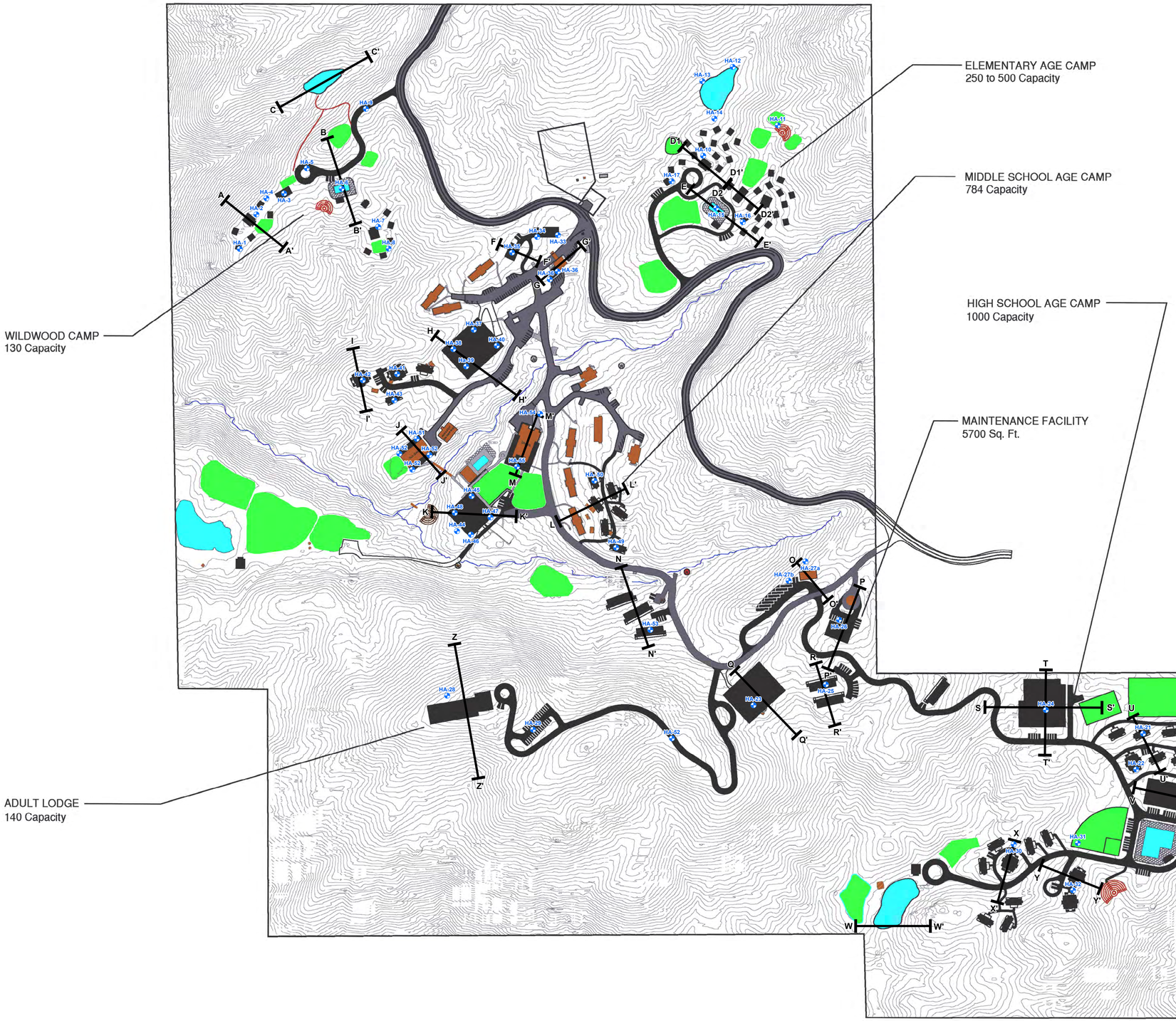
Notes:
1) Sand should have a sand equivalent of 30 or greater and may be densified by water jetting.
2) 1 Cu. ft. per ft. of 1/4- to 1 1/2-inch size gravel wrapped in filter fabric
3) Pipe type should be ASTM D1527 Acrylonitrile Butadiene Styrene (ABS) SDR35 or ASTM D1785 Polyvinyl Chloride plastic (PVC), Schedule 40, Armco A2000 PVC, or approved equivalent. Pipe should be installed with perforations down. Perforations should be 3/8 inch in diameter placed at the ends of a 120-degree arc in two rows at 3-inch on center (staggered)
4) Filter fabric should be Mirafi 140NC or approved equivalent.
5) Weephole should be 3-inch minimum diameter and provided at 10-foot maximum intervals. If exposure is permitted, weepholes should be located 12 inches above finished grade. If exposure is not permitted such as for a wall adjacent to a sidewalk/curb, a pipe under the sidewalk to be discharged through the curb face or equivalent should be provided. For a basement-type wall, a proper subdrain outlet system should be provided.
6) Retaining wall plans should be reviewed and approved by the geotechnical engineer.
7) Walls over six feet in height are subject to a special review by the geotechnical engineer and modifications to the above requirements.

FIGURE 7

RETAINING WALL BACKFILL AND SUBDRAIN DETAIL

WHEN NATIVE MATERIAL HAS EXPANSION INDEX OF >50

Leighton



LEGEND

HA-55 Approximate location auger boring

Z Z' Geologic Cross Section

N

0 200 400

Feet

GEOTECHNICAL MAP

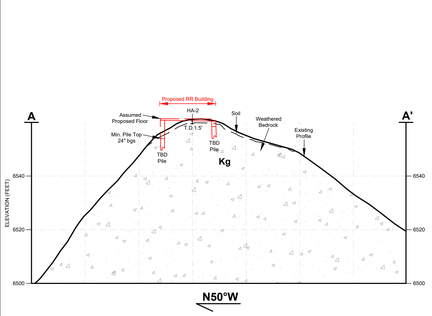
Hume SoCal
Green Valley Lake, California

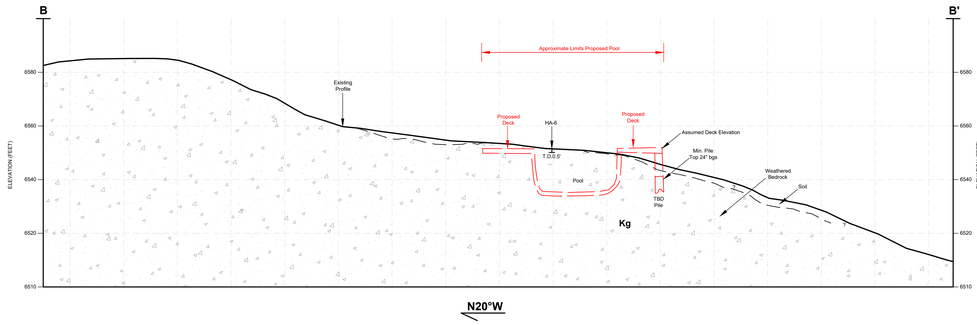
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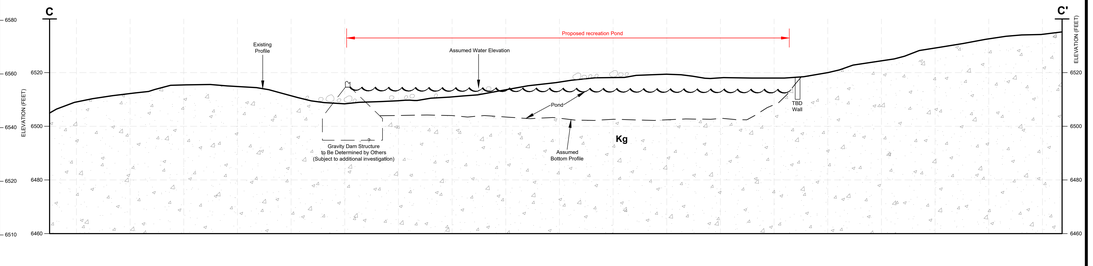
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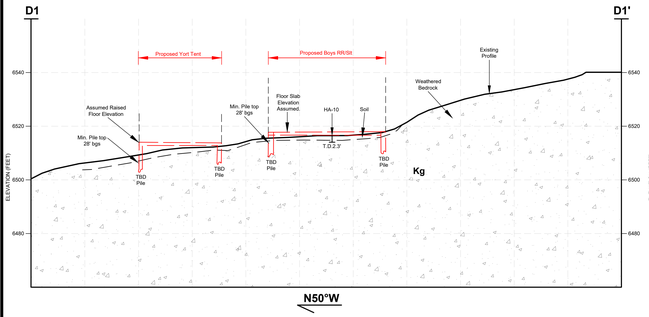
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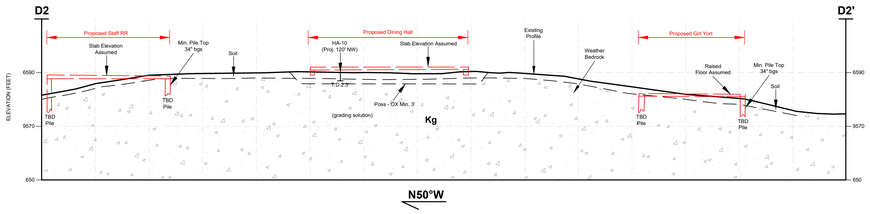
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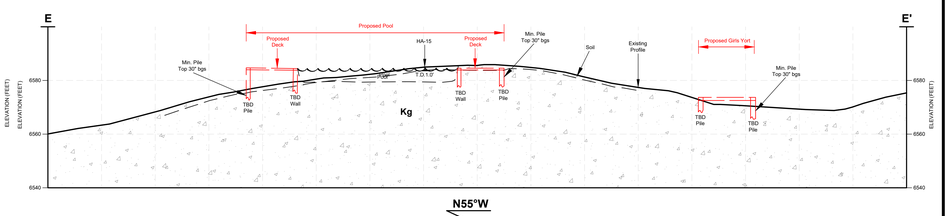


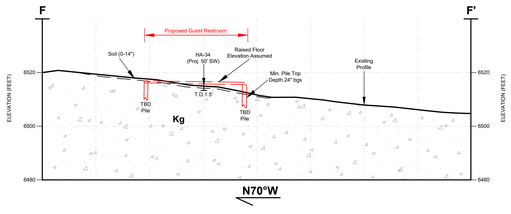


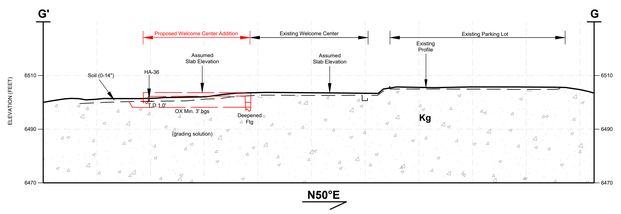


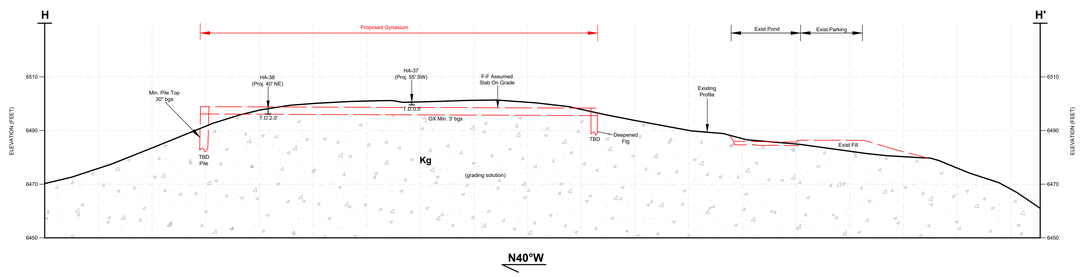


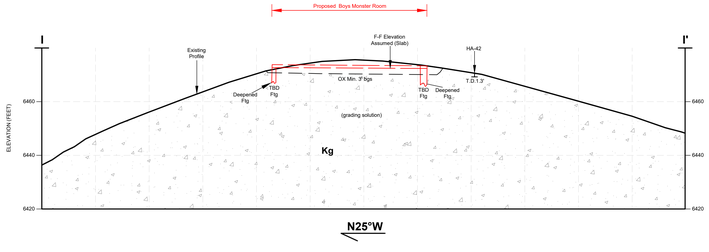


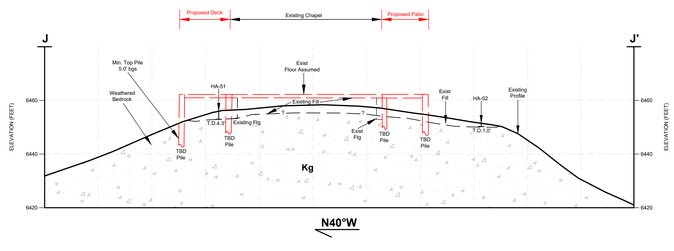


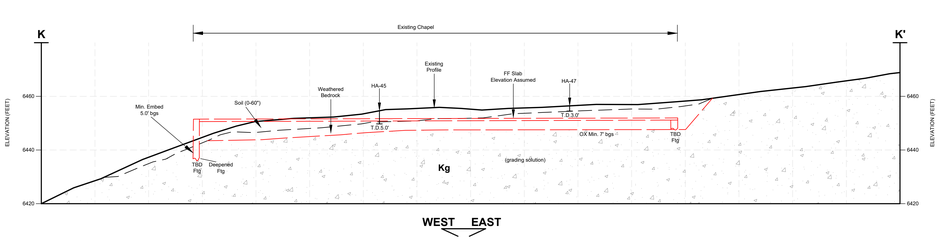


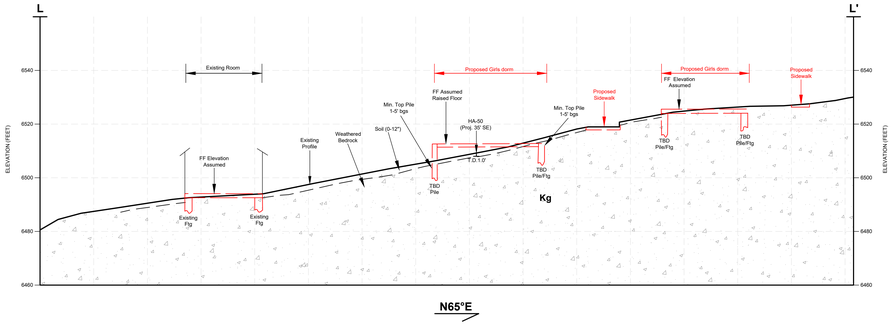


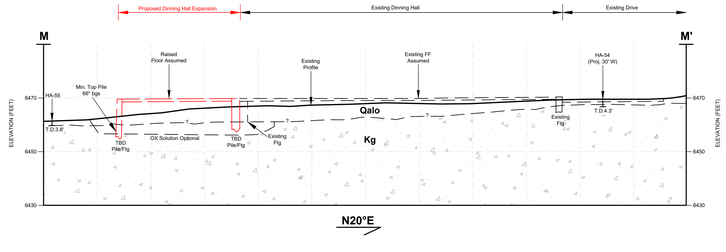






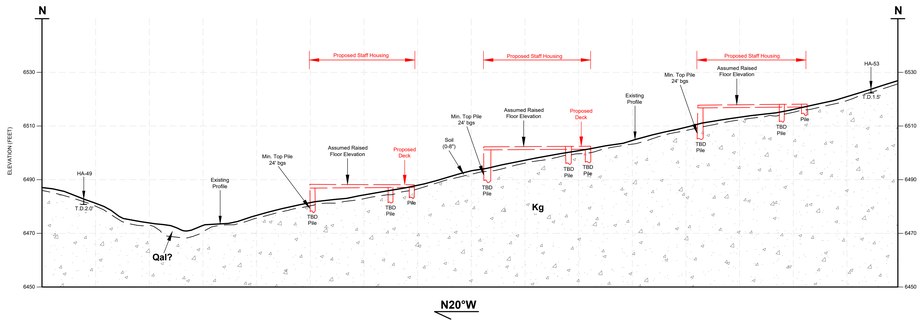


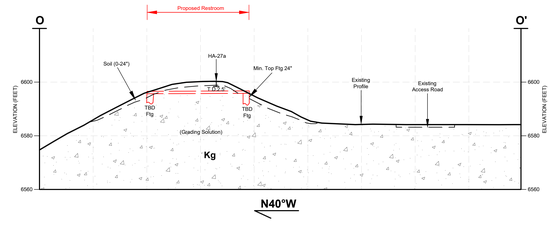


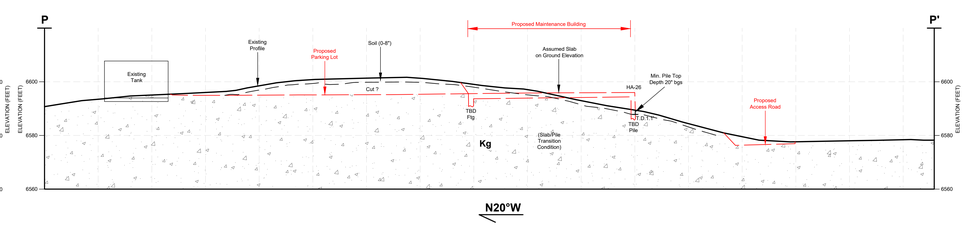


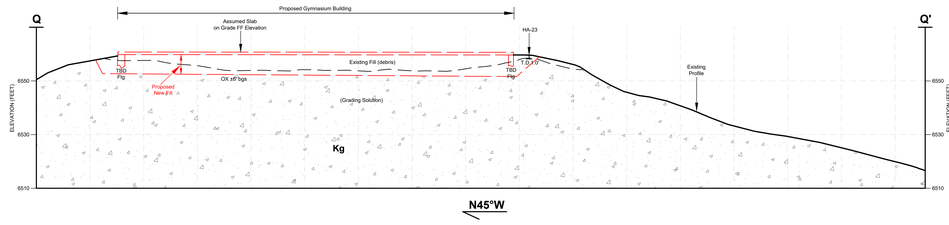
GEOTECHNICAL CROSS SECTIONS A-A' THROUGH M-M' Hume Socal Green Valley Lake, California	PLATE 2
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	Date: December 2023
Leighton	Proj: 13655.001
	Eng/Geol: JLH

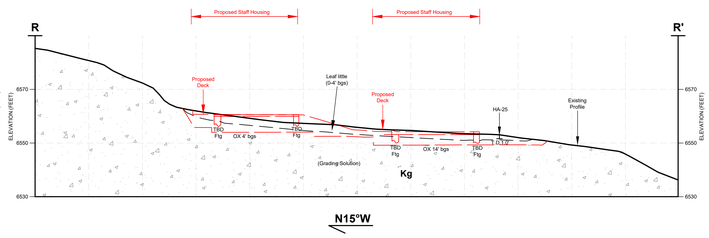
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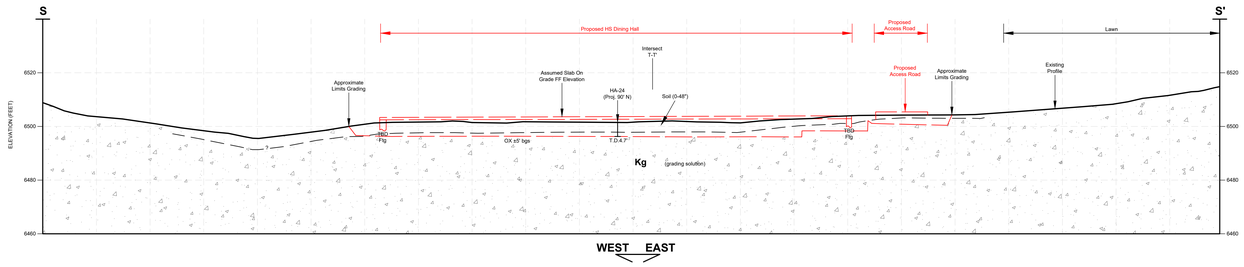


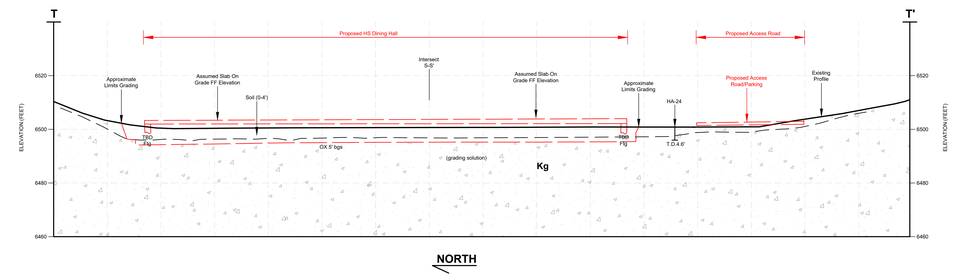


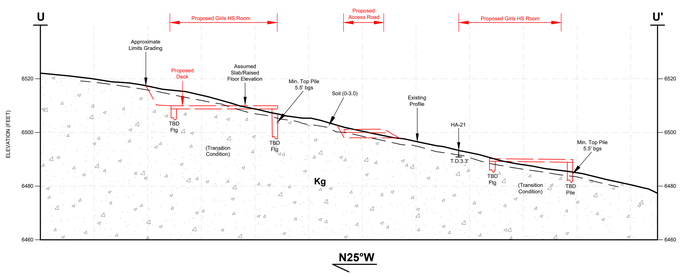


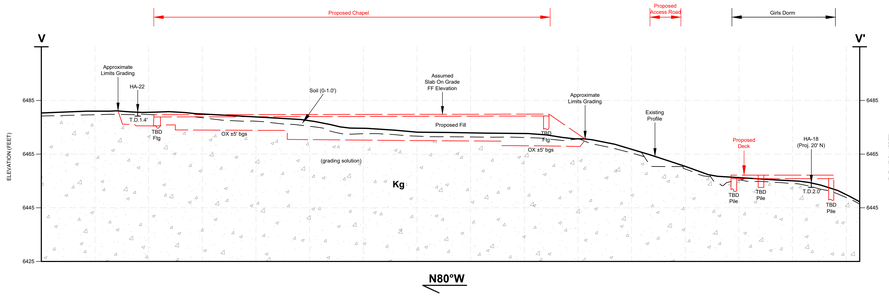


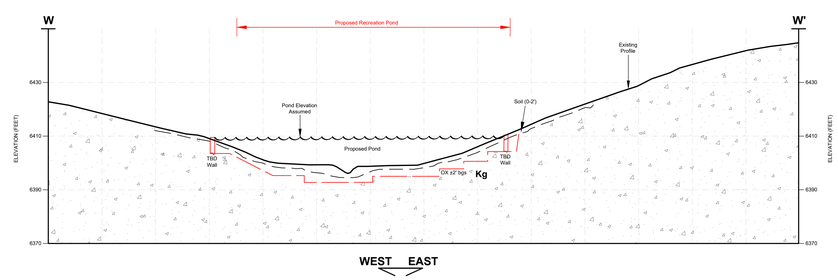


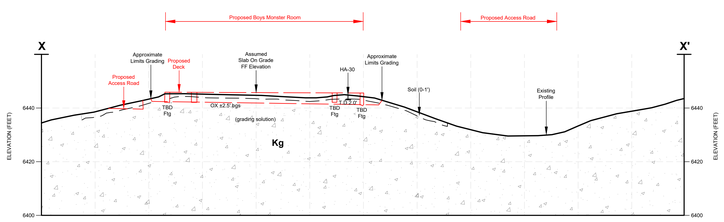


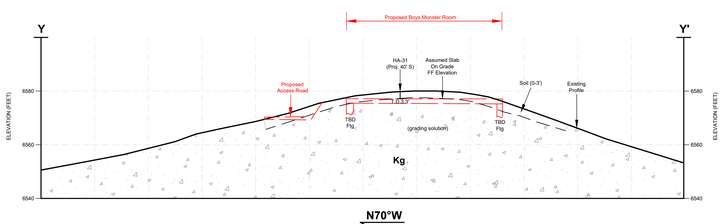


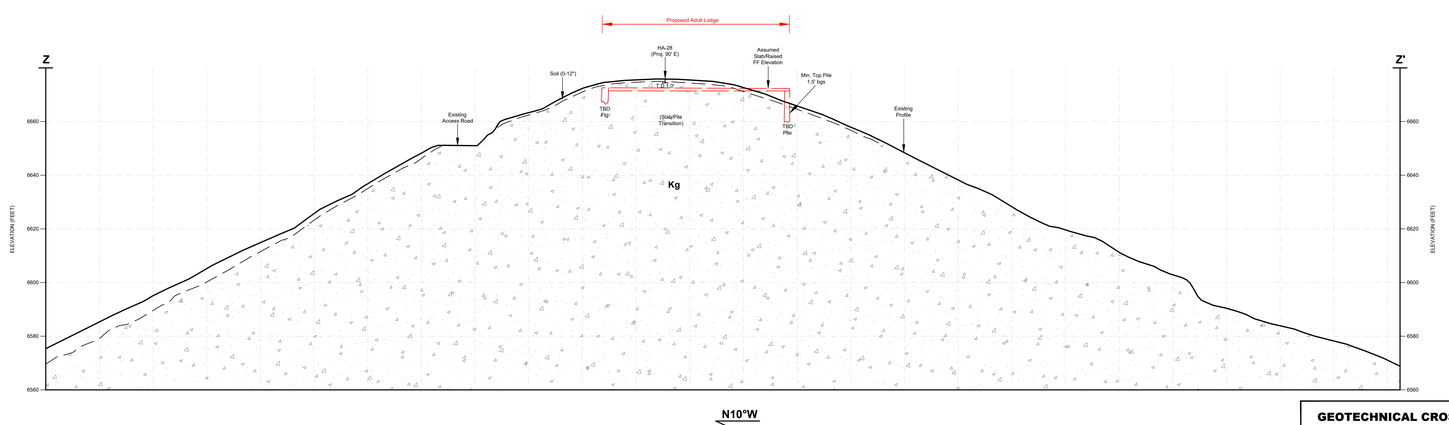












GEOTECHNICAL CROSS SECTIONS N-N' THROUGH Z-Z'

Hume Socal
Green Valley Lake, California

PLATE 3

Scale: 1"=20'

Date: December 2023

Leighton

Proj: 13655.001

Eng/Geol: JLH

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APPENDIX A

REFERENCES

APPENDIX A

REFERENCES

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APPENDIX B1

AUGER BORING SUMMARY

APPENDIX B - AUGER BORING SUMMARY

	Boring No.	TD (inches)	Soil (inches)	Weathered Bedrock	Harder Bedrock (inches)	Contingent Harder Bedrock (+6 inches) Top Pile Embedment	Location	Condition	Sample	Reference Cross Section	Prefered Structrual Support Solution
WILDWOOD CAMP	HA-1	16	0-10	10-16	16	22	Girls Dorm	Ridgeline Nose TOS			
	HA-2	18	0-16	16-18	18	24	Girls Restroom/Showers	Ridgeline TOS		A-A'	Piles
	HA-3	20	0-20	20-24	24	30	G. Dining Canopy	Ridgeline TOS to SE Facing 3:1	MB-1		
	HA-4	12	0-6	6-12	12	18	Girls Dorm	Ridgeline TOS to SE Facing 3:1			
	HA-5a/b	12	0-8	8-12	12	18	Access Road	Ridgeline TOS	MB-2/3		
	HA-6	6	0-6	6-8	8	14	Pool	Mid-Slope Terrace		B-B'	piles & grading
	HA-7	24	0-12	12-24	24	30	Boys Restroom/Showers	Mid-Slope Terrace			
	HA-8	28	0-20	20-28	28	34	Boys Dorm	S. Facing Slope 3:1			
	HA-9	6	6	0-6	6	12	Access Road	Existing Road level	MB-4a/b/c		
							Dining Hall			D2-D2'	grading
							Staff Restroom			D2-D2'	piles
							Girls Yort			D2-D2'	piles
ELEMENTARY CAMP	HA-10	28	0-24	24-28	28	34	Boys Restroom/Showers		MB-5	D1-D1'	piles & grading
	HA-11	20	0-16	16-20	20	26	Theater	2:1 west facing slope			
	HA-12	12	0-12		12	18	Pond	crk axis			
	HA-13	16	0-16	72"?	72"?	78?	Pond	n. side pond	refusal		
	HA-14	48	0-40	40-48	48	54	Pond	W. pond			
	HA-15	0-12	0-12	12-24	24	30	Pool	6:1 slope	MB-6	E-E'	grading
	HA-16						Girls Dorm				
	HA-17	54	0-42	54	54	60	Access Road		MB-7a/b		
HS CAMP	HA-18	24	0-24	24-36	36	42	Girls Dorm				
	HA-19								MB-8		
	HA-20	6	0-6	6	6	12	Girls Dorm	gentle slope			
	HA-21	40	0-36	36-40	60	66	Girls Dorm	4:1 slope	MB-9	U-U'	piles & grading
	HA-22	14	0-6	6-14	14	20	Chapel	False knob topo	MB-10	V-V'	grading
	HA-23	8	0-8	8	8	14	Gynmasium	toe of ridge slope		Q-Q'	grading
	HA-24	56	0-48	48-56	60	66	Dining	upper ponded channel lea area	MB-11	S-S'	grading
	HA-25	12	0-12	12	12	18	Staff Housing	Gently slopes	MB-12a/b	R-R'	grading
	HA-26	13	0-8	8-13	13	19	Maintenance Facility	4:1 slope	MB-13	P-P'	piles & grading
	HA-27a	30	0-24	24-30	30	36	Bus Pkg Restroom	1:1 to 2:1 slope	MB-14	O-O'	grading
	HA-27b	10	0-6	6-10	10	16	Bus Pkg Lot	channel axis and side slope	MB-15a		
	HA-28	12	0-12	12	12	18	Adult Lodge	nose of ridge 2:1		Z-Z'	piles & grading
	HA-29	36	0-24	24-36	36	42	Adult Lodge Pkg	saddle between peaks	MB-15b		
	HA-30	24	0-12	12-24	24	30	Boys Monster Dorm	axix of dry creek 5:1 to 2:1 slopes	MB-16	X-X'	grading
	HA-31	40	0-36	30-40	40	46	Boys Monster Dorm	amphatheater-like slope topo	MB-17	Y-Y'	grading
	HA-32	24	0-6	6-24	24	30	Boys Monster Dorm	saddle and W. facing 4:1 slope	MB-19		
JH CAMP	HA-33	52	0-42	42-48	48-52	58	Director Housing	meadow low-land	MB-20		
	HA-34	18	0-14	14-18	18	24	Director housing	terrace portion			
	HA-35	40	0-20	20-40	40	46	Guest Speaker housing	6:1 slope			
							Guest Restroom			F-F'	piles
	HA-36	12	0-12	12	12	18	Welcome Ctr Expansion	parking lot area		G-G'	grading
	HA-37						Gymnasium	existing maint/equip yard	gentle mesa slope	H-H'	piles & grading
	HA-38	24	0	0-24	24	30	Gymnasium	existing maint/equip yard	MB-21a	H-H'	piles & grading
	HA-39	48	0-48	48	48	56	Gymnasium	existing maint/equip yard	gentle mesa slope		
	HA-40	48	0-46	46-48	48	56	Gymnasium	existing maint/equip yard	top of 2:1 cut slope		
	HA-41	30	0-12	12-30	30	36	Monster Dorm East	nose of elevated bedrock ridge	existing tent cabin		
	HA-42	16	0-3	3-16			Monster Dorm West	nose of elevated bedrock ridge	MB-21b	I-I'	piles & grading
	HA-43	24	0	0-24	24	30	Dorm south	side slope 3:1	MB-22		
	HA-44	46	0-30	30-46	46	52	Chapel	level adja existing bldg	MB-24		
	HA-45	60	0-48	48-60	60	66	Chapel	level adja existing bldg	MB-23	K-K'	piles & grading
	HA-46	48	0-48	48-60	60	66	Chapel	TOP OF SLOPE			
	HA-47	36	0-36	36	36	42	Chapel	level adja existing bldg			
	HA-48	24	0-18	18-24	24	30	Chapel	sloped area perimeter			
	HA-49	24	0-3	3-24	24	30	Girls Dorm	sloped area w. 3:1	MB-25		
	HA-50	12	0-3	3-12	12	18	Girls Dorm	sloped area w. 3:1	MB-26	L-L'	piles
	HA-51	52	0-52	52	56	62	NW Chapel Deck	flat mesa	MB-27		
	HA-52a	12	0-12	12	12	18	NE Chapel Deck	flat mesa		J-J'	piles
	HA-52d	6	0	0-6	6	12	Adult Lodge Access Rd	flat mesa	MB-28		
	HA-53	18	0-8	8-18	18	24	Staff Housing	4:1 slope	MB-29	N-N'	piles
	HA-54	54	0-36	36-54	54	60	NE Dining Hall	2:1 slope	MB-30		
	HA-55	44	0-60	60	60	66	Staff Dining Hall	sloped terrace	MB-31	M-M'	grading

APPENDIX B2

FIELD EXPLORATION

Our exploration included a reconnaissance of accessible site areas to evaluate access and observe general geologic conditions and potential hazards. Once a conceptual site plan become available, our staff advanced a total of 55 small diameter borings were advanced using manual hand auger equipment and breaker bar efforts. The borings were cited in areas of planned improvements, and are generally representative of surrounding conditions. The borings were drilled until refusal in bedrock was encountered, typically less than 5 feet below the existing ground surface. Encountered soils were continuously logged in the field by our representative and described in accordance with the Unified Soil Classification System (ASTM D2488). A description of soil properties encountered in each boring and other related information are documented in a spreadsheet attached as Appendix B, *Auger Boring Log Summary*. Boring locations are plotted on attached Plate 1, *Geotechnical Map*.

Bulk samples of native soil and/or artificial fill were collected from the borings. In addition to representative soils, samples of bedrock were also collected for physical strength testing. Soil samples were transported to our Irvine geotechnical laboratory for geotechnical testing. After sampling and logging, all borings were immediately backfilled with excavated soils.

Boundaries (depths) between soil or geologic units noted on logs are based on field observations and results of geotechnical laboratory tests. The resultant logs were incorporated into a series of 27 cross sections. The sections depict the existing surface profile, distribution of underlying soil and bedrock, the footprint of proposed buildings with assumed floor elevations, and conceptualized layout of foundation types suitable for the prevailing conditions.

It is possible that passage of time could alter conditions due to environmental changes, fluctuations in groundwater, or occurrence of a significant geological event such as an earthquake.

APPENDIX C

LABORATORY TEST DATA

TESTS for SULFATE CONTENT
CHLORIDE CONTENT and pH of SOILS

Project Name: Hume SoCal Camp | Tested By : GEB/GB | Date: 08/16/23

Project No. : 13655.001 | Checked By: J. Ward | Date: 10/19/23

Boring No.	HA-5a	HA-15	HA-19	HA-27
Sample No.	MB-2a & b	MB-6	MB-8	MB-14
Sample Depth (ft)	0-12"	12-24"	12-16"	24-30"
Soil Identification:	Brownish gray SM, organics	Olive yellow SP	Olive yellow SP, organics	Olive yellow SP
Wet Weight of Soil + Container (g)	131.27	206.97	207.30	202.63
Dry Weight of Soil + Container (g)	129.32	201.06	199.07	198.23
Weight of Container (g)	52.66	57.50	59.21	61.62
Moisture Content (%)	2.54	4.12	5.88	3.22
Weight of Soaked Soil (g)	100.73	100.39	100.15	100.76

SULFATE CONTENT, DOT California Test 417, Part II

Beaker No.	404	5	8	17
Crucible No.	305	6	9	7
Furnace Temperature (°C)	860	860	860	860
Time In / Time Out	8:00/8:45	8:00/8:45	8:00/8:45	8:00/8:45
Duration of Combustion (min)	45	45	45	45
Wt. of Crucible + Residue (g)	60.8511	25.7529	22.5071	22.7095
Wt. of Crucible (g)	60.8494	25.7463	22.5021	22.7072
Wt. of Residue (g) (A)	0.0017	0.0066	0.0050	0.0023
PPM of Sulfate (A) x 41150	69.95	271.59	205.75	94.64
PPM of Sulfate, Dry Weight Basis	**72**	**283**	**219**	**98**

CHLORIDE CONTENT, DOT California Test 422

ml of Extract For Titration (B)	30	15	30	30
ml of $AgNO_3$ Soln. Used in Titration (C)	1.6	0.4	0.7	0.6
PPM of Chloride (C -0.2) * 100 * 30 / B	140	40	50	40
PPM of Chloride, Dry Wt. Basis	**144**	**42**	**53**	**41**

pH TEST, DOT California Test 643

pH Value	**5.68**	**5.33**	**5.37**	**5.88**
Temperature °C	22.0	22.7	22.7	22.5

SOIL RESISTIVITY TEST

DOT CA TEST 643

Project Name:	Hume SoCal Camp		Tested By :	G. Berdy	Date: 08/22/23
Project No. :	13655.001		Checked By:	J. Ward	Date: 10/19/23
Boring No.:	HA-5a		Depth (ft.) :	0-12"	
Sample No. :	MB-2a & b				

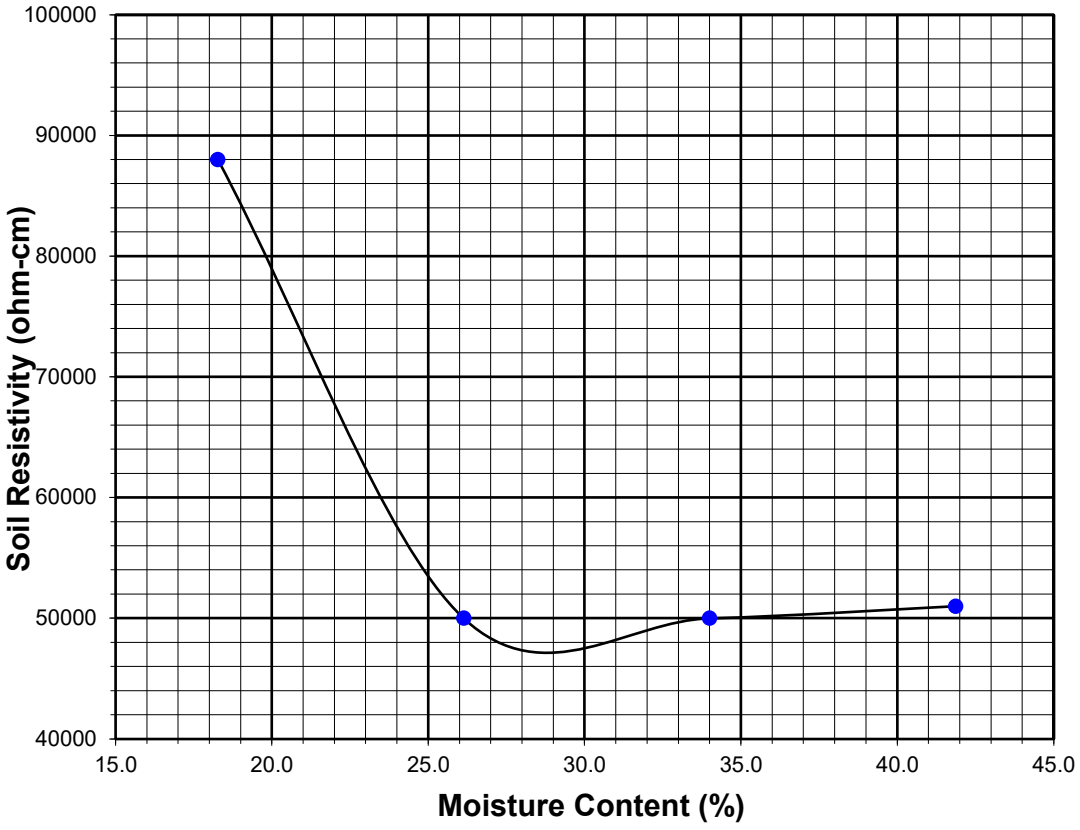
Soil Identification:* Brownish gray SM, organics

*California Test 643 requires soil specimens to consist only of portions of samples passing through the No. 8 US Standard Sieve before resistivity testing. Therefore, this test method may not be representative for coarser materials.

Specimen No.	Water Added (ml) (Wa)	Adjusted Moisture Content (MC)	Resistance Reading (ohm)	Soil Resistivity (ohm-cm)
1	20	18.27	88000	88000
2	30	26.14	50000	50000
3	40	34.00	50000	50000
4	50	41.86	51000	51000
5				

Moisture Content (%) (MCi)	2.54
Wet Wt. of Soil + Cont. (g)	131.27
Dry Wt. of Soil + Cont. (g)	129.32
Wt. of Container (g)	52.66
Container No.	
Initial Soil Wt. (g) (Wt)	130.40
Box Constant	1.000
MC =(((1+Mci/100)x(Wa/Wt+1))-1)x100	

Min. Resistivity (ohm-cm)	Moisture Content (%)	Sulfate Content (ppm)	Chloride Content (ppm)	Soil pH	
				pH	Temp. (°C)
DOT CA Test 643		DOT CA Test 417 Part II	DOT CA Test 422	DOT CA Test 643	
47000	**28.8**	**72**	**144**	**5.68**	**22.0**



SOIL RESISTIVITY TEST

DOT CA TEST 643

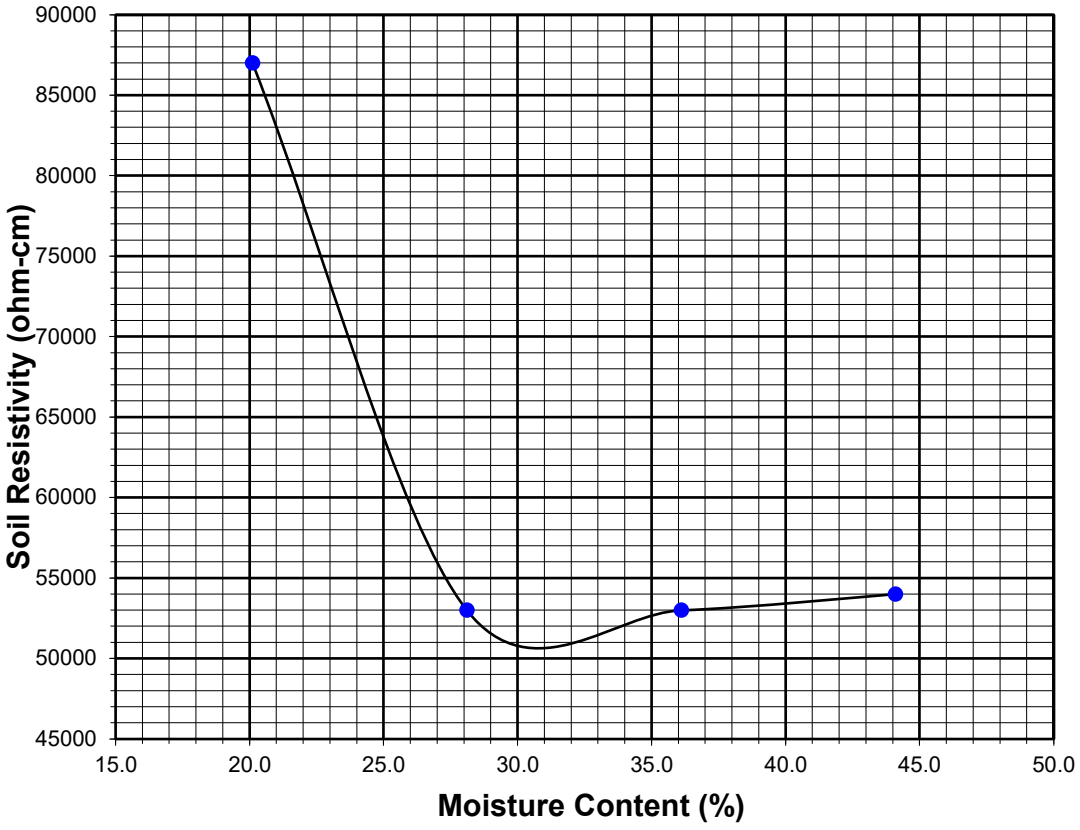
Project Name:	Hume SoCal Camp		Tested By :	G. Berdy	Date: 08/22/23
Project No. :	13655.001		Checked By:	J. Ward	Date: 10/19/23
Boring No.:	HA-15		Depth (ft.) :	12-24"	
Sample No. :	MB-6				
Soil Identification:*	Olive yellow SP				

*California Test 643 requires soil specimens to consist only of portions of samples passing through the No. 8 US Standard Sieve before resistivity testing. Therefore, this test method may not be representative for coarser materials.

Specimen No.	Water Added (ml) (Wa)	Adjusted Moisture Content (MC)	Resistance Reading (ohm)	Soil Resistivity (ohm-cm)
1	20	20.11	87000	87000
2	30	28.11	53000	53000
3	40	36.11	53000	53000
4	50	44.11	54000	54000
5				

Moisture Content (%) (MCi)	4.12
Wet Wt. of Soil + Cont. (g)	206.97
Dry Wt. of Soil + Cont. (g)	201.06
Wt. of Container (g)	57.50
Container No.	
Initial Soil Wt. (g) (Wt)	130.18
Box Constant	1.000
MC =(((1+Mci/100)x(Wa/Wt+1))-1)x100	

Min. Resistivity (ohm-cm)	Moisture Content (%)	Sulfate Content (ppm)	Chloride Content (ppm)	Soil pH	
				pH	Temp. (°C)
DOT CA Test 643		DOT CA Test 417 Part II	DOT CA Test 422	DOT CA Test 643	
50500	**30.7**	**283**	**42**	**5.33**	**22.7**



SOIL RESISTIVITY TEST

DOT CA TEST 643

Project Name:	Hume SoCal Camp		Tested By :	G. Berdy	Date: 08/22/23
Project No. :	13655.001		Checked By:	J. Ward	Date: 10/19/23
Boring No.:	HA-19		Depth (ft.) :	12-16"	
Sample No. :	MB-8				

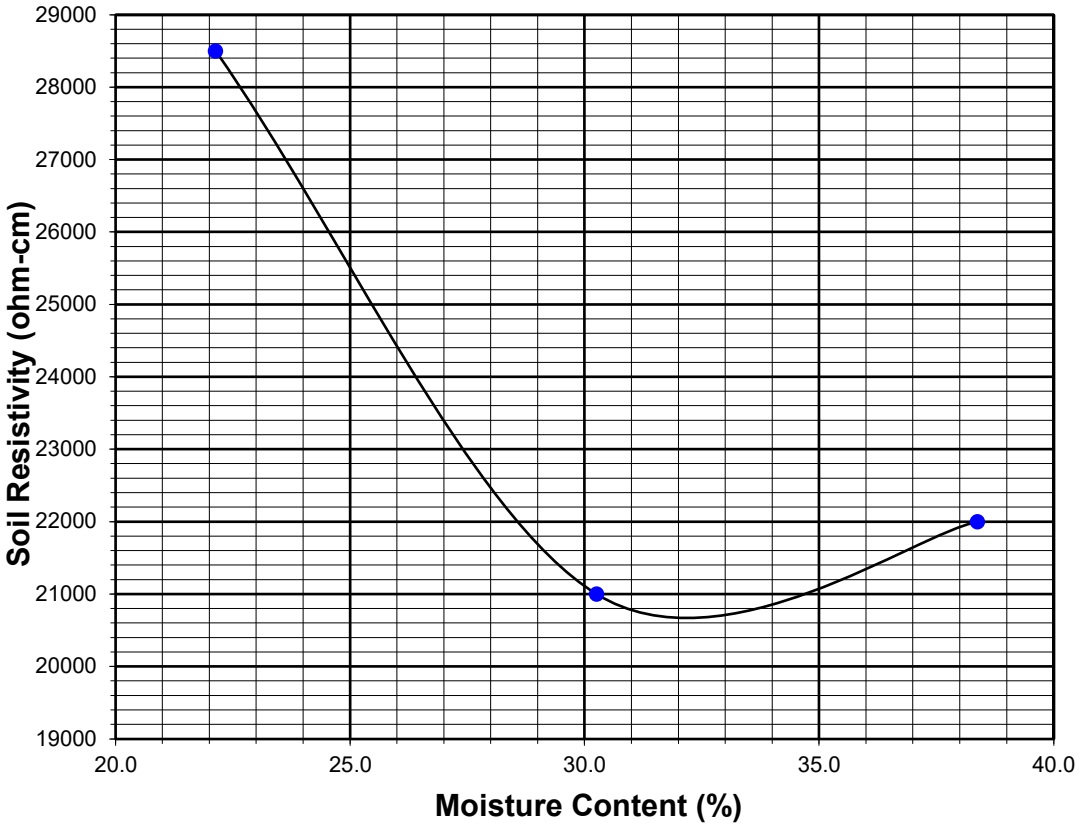
Soil Identification:* Olive yellow SP, organics

*California Test 643 requires soil specimens to consist only of portions of samples passing through the No. 8 US Standard Sieve before resistivity testing. Therefore, this test method may not be representative for coarser materials.

Specimen No.	Water Added (ml) (Wa)	Adjusted Moisture Content (MC)	Resistance Reading (ohm)	Soil Resistivity (ohm-cm)
1	20	22.13	28500	28500
2	30	30.25	21000	21000
3	40	38.38	22000	22000
4				
5				

Moisture Content (%) (MCi)	5.88
Wet Wt. of Soil + Cont. (g)	207.30
Dry Wt. of Soil + Cont. (g)	199.07
Wt. of Container (g)	59.21
Container No.	
Initial Soil Wt. (g) (Wt)	130.35
Box Constant	1.000
MC =(((1+Mci/100)x(Wa/Wt+1))-1)x100	

Min. Resistivity (ohm-cm)	Moisture Content (%)	Sulfate Content (ppm)	Chloride Content (ppm)	Soil pH	
				pH	Temp. (°C)
DOT CA Test 643		DOT CA Test 417 Part II	DOT CA Test 422	DOT CA Test 643	
20600	**32.1**	**219**	**53**	**5.37**	**22.7**



SOIL RESISTIVITY TEST

DOT CA TEST 643

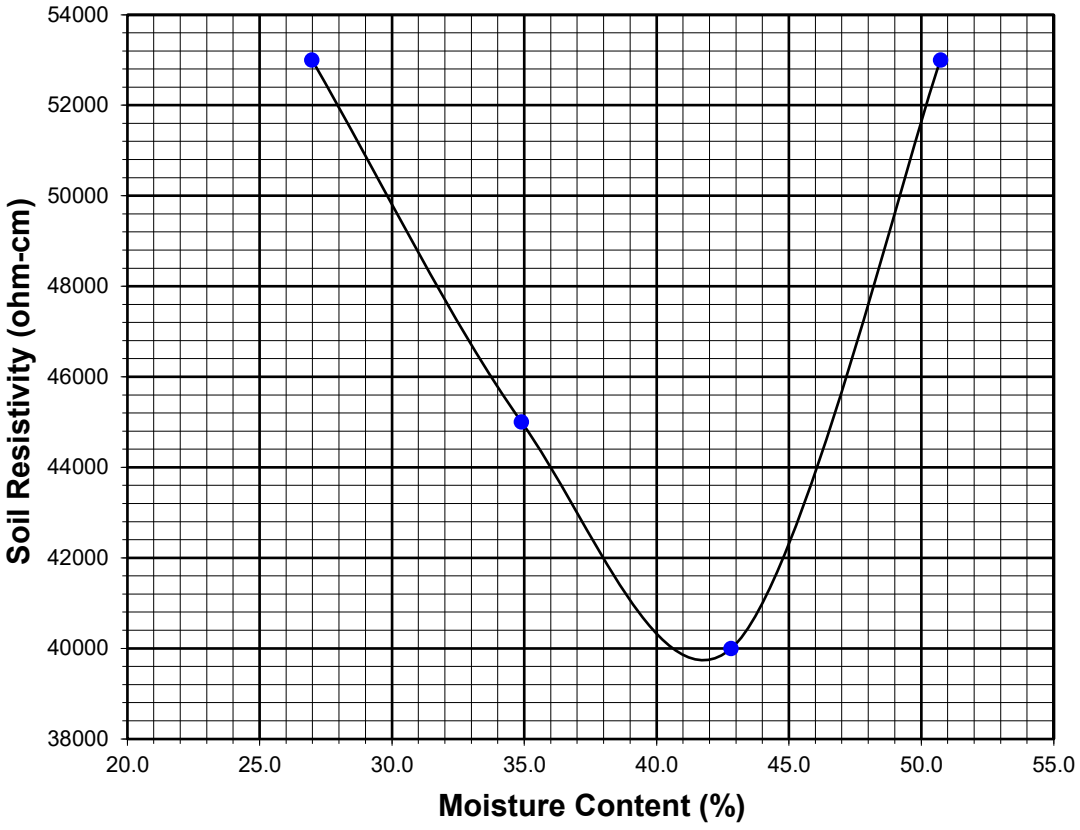
Project Name:	Hume SoCal Camp		Tested By :	G. Berdy	Date: 08/22/23
Project No. :	13655.001		Checked By:	J. Ward	Date: 10/19/23
Boring No.:	HA-27		Depth (ft.) :	24-30"	
Sample No. :	MB-14				
Soil Identification:*	Olive yellow SP				

*California Test 643 requires soil specimens to consist only of portions of samples passing through the No. 8 US Standard Sieve before resistivity testing. Therefore, this test method may not be representative for coarser materials.

Specimen No.	Water Added (ml) (Wa)	Adjusted Moisture Content (MC)	Resistance Reading (ohm)	Soil Resistivity (ohm-cm)
1	30	26.98	53000	53000
2	40	34.89	45000	45000
3	50	42.81	40000	40000
4	60	50.73	53000	53000
5				

Moisture Content (%) (MCi)	3.22
Wet Wt. of Soil + Cont. (g)	202.63
Dry Wt. of Soil + Cont. (g)	198.23
Wt. of Container (g)	61.62
Container No.	
Initial Soil Wt. (g) (Wt)	130.36
Box Constant	1.000
MC =(((1+Mci/100)x(Wa/Wt+1))-1)x100	

Min. Resistivity (ohm-cm)	Moisture Content (%)	Sulfate Content (ppm)	Chloride Content (ppm)	Soil pH	
				pH	Temp. (°C)
DOT CA Test 643		DOT CA Test 417 Part II	DOT CA Test 422	DOT CA Test 643	
39600	**41.8**	**98**	**41**	**5.88**	**22.5**



TESTS for SULFATE CONTENT
CHLORIDE CONTENT and pH of SOILS

Project Name: Hume SoCal Camp | Tested By : G. Berdy | Date: 08/16/23

Project No. : 13655.001 | Checked By: J. Ward | Date: 10/19/23

Boring No.	HA-37	HA-17		
Sample No.	MB-22a	MB-31		
Sample Depth (ft)	16-24"	36-40"		
Soil Identification:	Olive yellow SP, organics	Olive yellow SP, organics		
Wet Weight of Soil + Container (g)	159.39	218.25		
Dry Weight of Soil + Container (g)	151.89	211.60		
Weight of Container (g)	59.21	59.16		
Moisture Content (%)	8.09	4.36		
Weight of Soaked Soil (g)	100.12	100.12		

SULFATE CONTENT, DOT California Test 417, Part II

Beaker No.	403	92		
Crucible No.	4	2		
Furnace Temperature (°C)	860	860		
Time In / Time Out	8:00/8:45	8:00/8:45		
Duration of Combustion (min)	45	45		
Wt. of Crucible + Residue (g)	21.6323	28.7231		
Wt. of Crucible (g)	21.6301	28.7190		
Wt. of Residue (g) (A)	0.0022	0.0041		
PPM of Sulfate (A) x 41150	90.53	168.71		
PPM of Sulfate, Dry Weight Basis	**99**	**176**		

CHLORIDE CONTENT, DOT California Test 422

ml of Extract For Titration (B)	30	30		
ml of AgNO3 Soln. Used in Titration (C)	0.6	1.4		
PPM of Chloride (C -0.2) * 100 * 30 / B	40	120		
PPM of Chloride, Dry Wt. Basis	**44**	**125**		

pH TEST, DOT California Test 643

pH Value	**5.33**	**5.40**		
Temperature °C	22.8	22.6		

SOIL RESISTIVITY TEST

DOT CA TEST 643

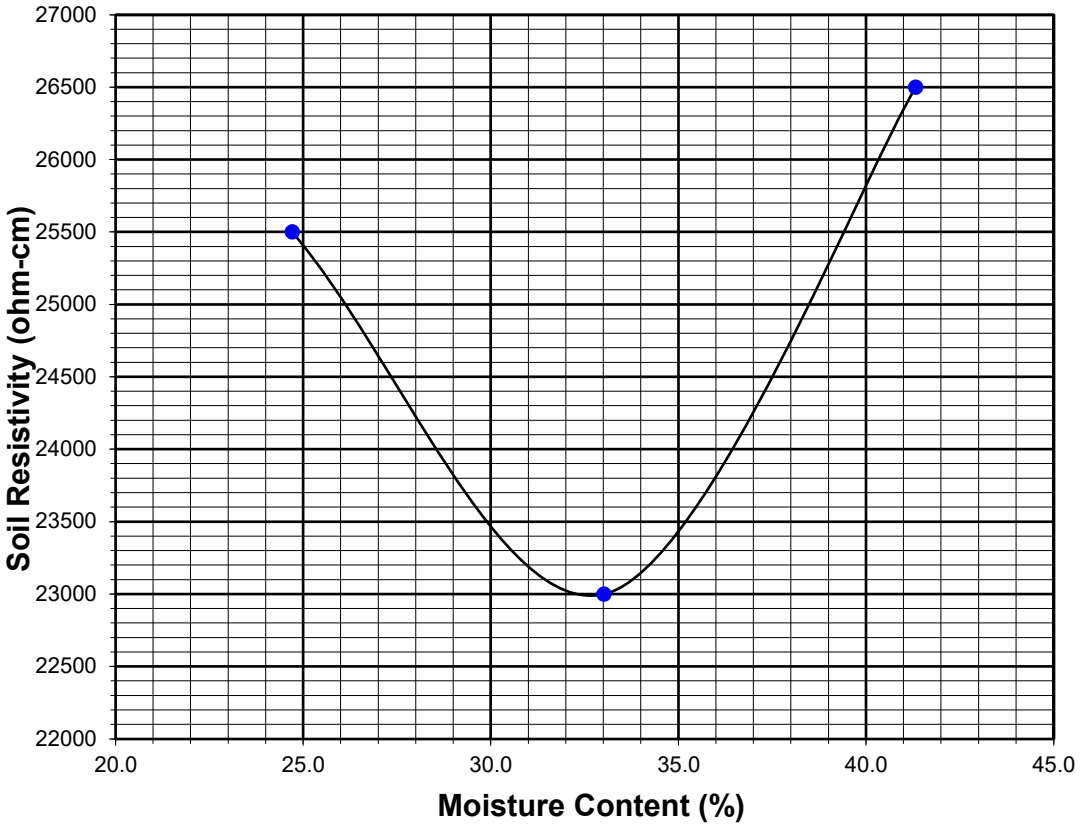
Project Name:	Hume SoCal Camp		Tested By :	G. Berdy	Date: 08/22/23
Project No. :	13655.001		Checked By:	J. Ward	Date: 10/19/23
Boring No.:	HA-37		Depth (ft.) :	16-24"	
Sample No. :	MB-22a				
Soil Identification:*	Olive yellow SP, organics				

*California Test 643 requires soil specimens to consist only of portions of samples passing through the No. 8 US Standard Sieve before resistivity testing. Therefore, this test method may not be representative for coarser materials.

Specimen No.	Water Added (ml) (Wa)	Adjusted Moisture Content (MC)	Resistance Reading (ohm)	Soil Resistivity (ohm-cm)
1	20	24.71	25500	25500
2	30	33.02	23000	23000
3	40	41.33	26500	26500
4				
5				

Moisture Content (%) (MCi)	8.09
Wet Wt. of Soil + Cont. (g)	159.39
Dry Wt. of Soil + Cont. (g)	151.89
Wt. of Container (g)	59.21
Container No.	
Initial Soil Wt. (g) (Wt)	130.10
Box Constant	1.000
MC =(((1+Mci/100)x(Wa/Wt+1))-1)x100	

Min. Resistivity (ohm-cm)	Moisture Content (%)	Sulfate Content (ppm)	Chloride Content (ppm)	Soil pH	
				pH	Temp. (°C)
DOT CA Test 643		DOT CA Test 417 Part II	DOT CA Test 422	DOT CA Test 643	
23000	**32.7**	**99**	**44**	**5.33**	**22.8**



SOIL RESISTIVITY TEST

DOT CA TEST 643

Project Name:	Hume SoCal Camp		Tested By :	G. Berdy	Date: 08/22/23
Project No. :	13655.001		Checked By:	J. Ward	Date: 10/19/23
Boring No.:	HA-17		Depth (ft.) :	36-40"	
Sample No. :	MB-31				

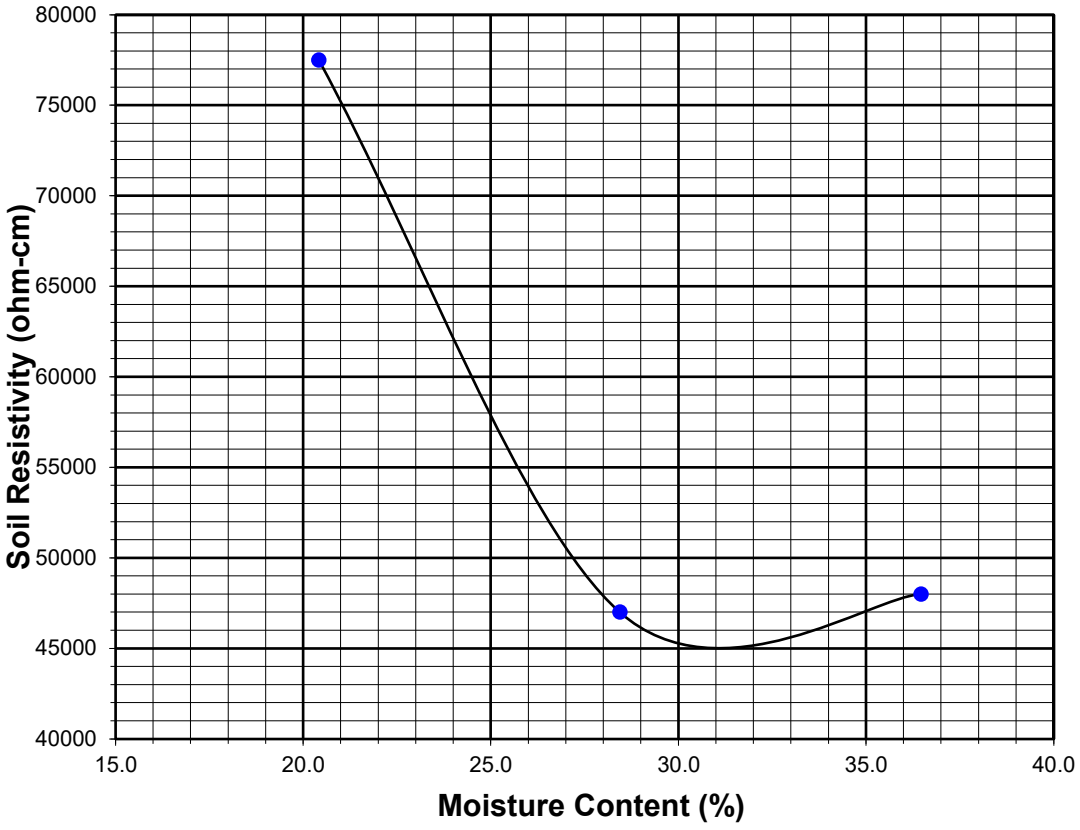
Soil Identification:* Olive yellow SP, organics

*California Test 643 requires soil specimens to consist only of portions of samples passing through the No. 8 US Standard Sieve before resistivity testing. Therefore, this test method may not be representative for coarser materials.

Specimen No.	Water Added (ml) (Wa)	Adjusted Moisture Content (MC)	Resistance Reading (ohm)	Soil Resistivity (ohm-cm)
1	20	20.41	77500	77500
2	30	28.44	47000	47000
3	40	36.47	48000	48000
4				
5				

Moisture Content (%) (MCi)	4.36
Wet Wt. of Soil + Cont. (g)	218.25
Dry Wt. of Soil + Cont. (g)	211.60
Wt. of Container (g)	59.16
Container No.	
Initial Soil Wt. (g) (Wt)	130.03
Box Constant	1.000
MC =(((1+Mci/100)x(Wa/Wt+1))-1)x100	

Min. Resistivity (ohm-cm)	Moisture Content (%)	Sulfate Content (ppm)	Chloride Content (ppm)	Soil pH	
				pH	Temp. (°C)
DOT CA Test 643		DOT CA Test 417 Part II	DOT CA Test 422	DOT CA Test 643	
45000	**31.1**	**176**	**125**	**5.40**	**22.6**

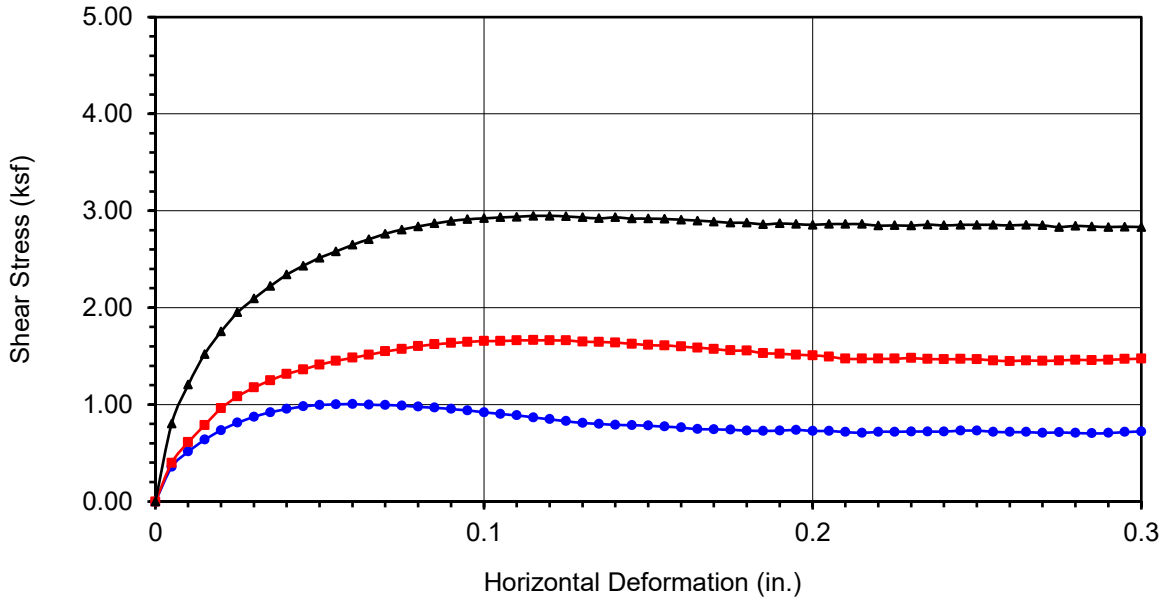


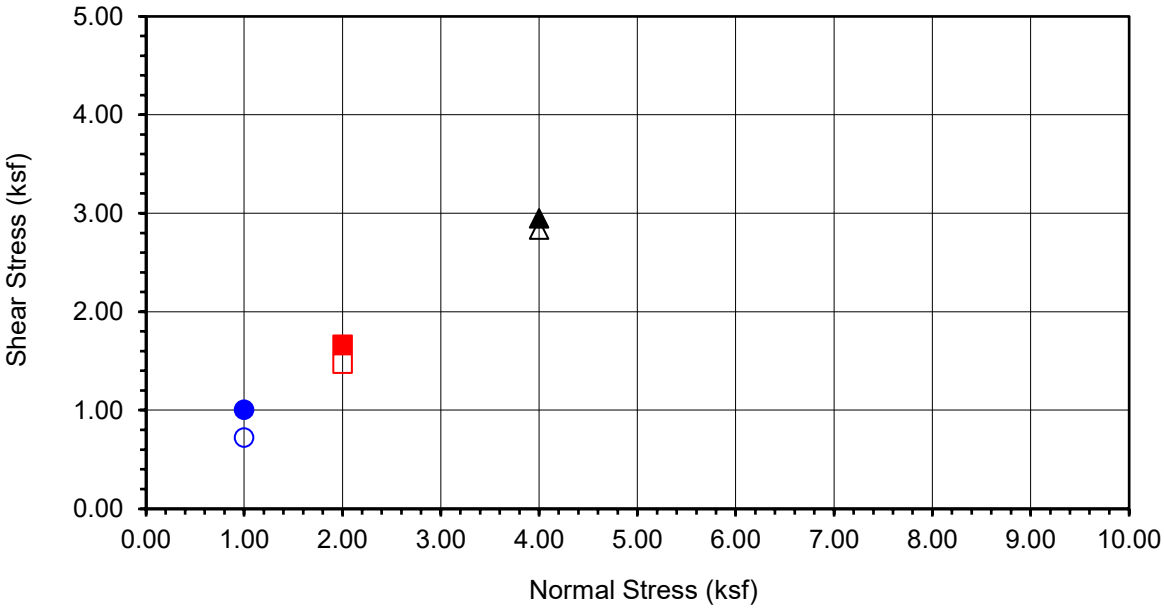
DIRECT SHEAR TEST

Consolidated Drained - ASTM D 3080

Project Name:	Hume SoCal Camp	Tested By:	G. Bathala	Date:	08/18/23
Project No.:	13655.001	Checked By:	J. Ward	Date:	10/19/23
Boring No.:	HA-23, 25a, 25b	Sample Type:	90% Remold		
Sample No.:	MB-11, 12a, 12b	Depth (ft.):	Composite		
Soil Identification:	Dark brown silty sand (SM)				

Sample Diameter(in):	2.415	2.415	2.415
Sample Thickness(in.):	1.000	1.000	1.000
Weight of Sample + ring(gm):	190.07	190.17	189.52
Weight of Ring(gm):	45.53	45.47	44.56
Before Shearing			
Weight of Wet Sample+Cont.(gm):	237.08	237.08	237.08
Weight of Dry Sample+Cont.(gm):	218.92	218.92	218.92
Weight of Container(gm):	64.19	64.19	64.19
Vertical Rdg.(in): Initial	0.2569	0.2315	0.0000
Vertical Rdg.(in): Final	0.2728	0.2531	-0.0276
After Shearing			
Weight of Wet Sample+Cont.(gm):	199.95	220.06	216.26
Weight of Dry Sample+Cont.(gm):	178.70	199.11	195.60
Weight of Container(gm):	52.01	71.79	67.68
Specific Gravity (Assumed):	2.70	2.70	2.70
Water Density(pcf):	62.43	62.43	62.43





Boring No.	**HA-23, 25a, 25b**
Sample No.	**MB-11, 12a, 12b**
Depth (ft)	**Composite**
Sample Type: 90% Remold	
Soil Identification: Dark brown silty sand (SM)	

Normal Stress (kip/ft²)	1.000	2.000	4.000
Peak Shear Stress (kip/ft²)	● 1.006	■ 1.666	▲ 2.949
Shear Stress @ End of Test (ksf)	○ 0.723	□ 1.474	△ 2.833
Deformation Rate (in./min.)	0.0025	0.0025	0.0025
Initial Sample Height (in.)	1.000	1.000	1.000
Diameter (in.)	2.415	2.415	2.415
Initial Moisture Content (%)	11.74	11.74	11.74
Dry Density (pcf)	107.6	107.7	107.9
Saturation (%)	55.9	56.1	56.4
Soil Height Before Shearing (in.)	0.9841	0.9784	0.9724
Final Moisture Content (%)	16.8	16.5	16.2

Leighton

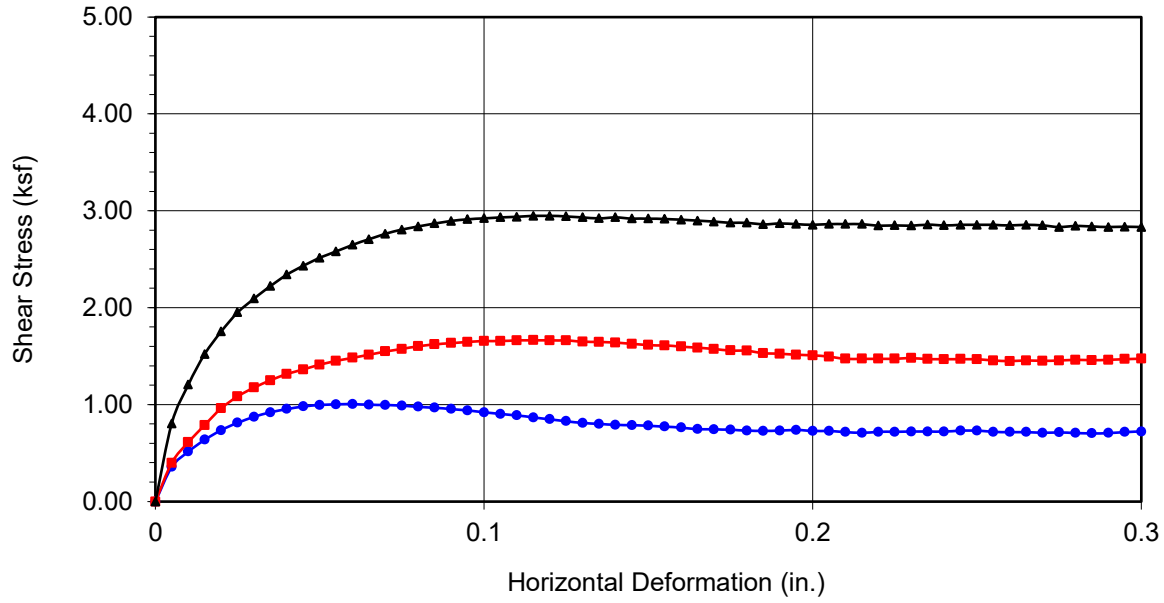
DIRECT SHEAR TEST RESULTS

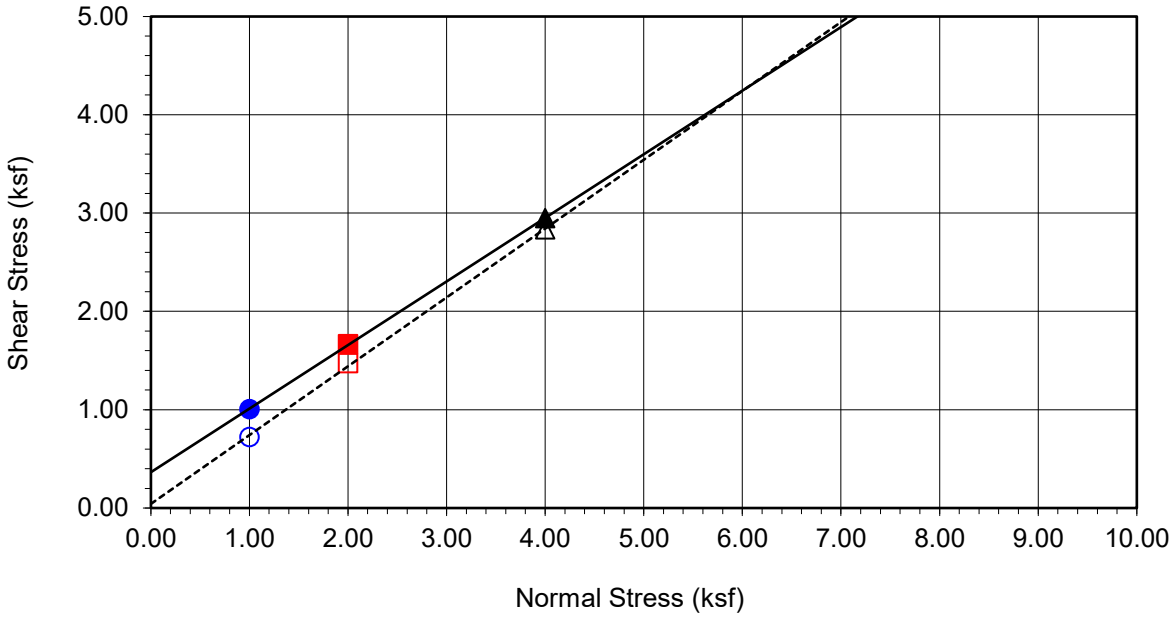
Consolidated Drained - ASTM D 3080

Project No.: 13655.001

Hume SoCal Camp

08-23





Boring No.	**HA-23, 25a, 25b**
Sample No.	**MB-11, 12a, 12b**
Depth (ft)	**Composite**
Sample Type:	90% Remold
Soil Identification:	Dark brown silty sand (SM)

Strength Parameters

	C (psf)	ϕ (°)
Peak	365	33
Ultimate	44	35

Normal Stress (kip/ft²)	1.000	2.000	4.000
Peak Shear Stress (kip/ft²)	● 1.006	■ 1.666	▲ 2.949
Shear Stress @ End of Test (ksf)	○ 0.723	□ 1.474	△ 2.833
Deformation Rate (in./min.)	0.0025	0.0025	0.0025
Initial Sample Height (in.)	1.000	1.000	1.000
Diameter (in.)	2.415	2.415	2.415
Initial Moisture Content (%)	11.74	11.74	11.74
Dry Density (pcf)	107.6	107.7	107.9
Saturation (%)	55.9	56.1	56.4
Soil Height Before Shearing (in.)	0.9841	0.9784	0.9724
Final Moisture Content (%)	16.8	16.5	16.2

Leighton

DIRECT SHEAR TEST RESULTS

Consolidated Drained - ASTM D 3080

Project No.: 13655.001

Hume SoCal Camp

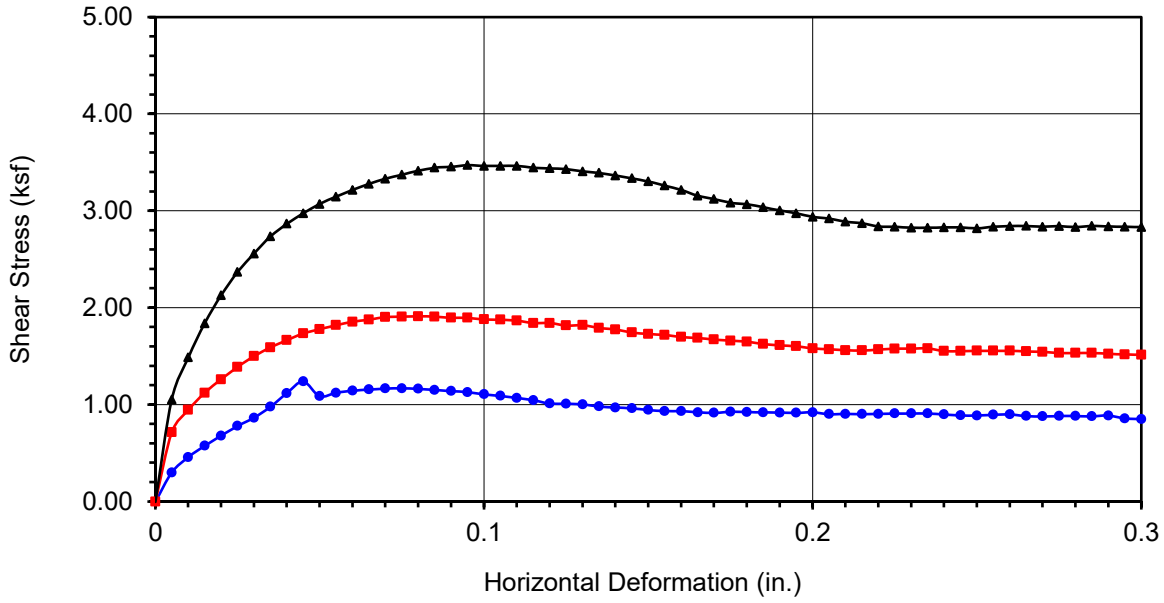
08-23

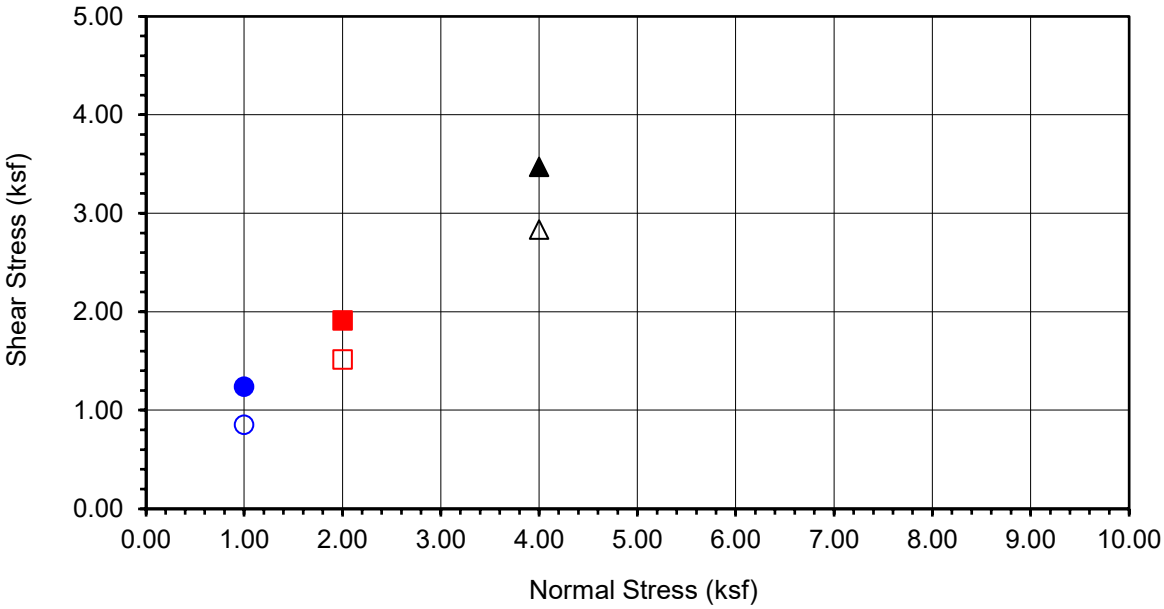
DIRECT SHEAR TEST

Consolidated Drained - ASTM D 3080

Project Name:	Hume SoCal Camp	Tested By:	G. Bathala	Date:	08/18/23
Project No.:	13655.001	Checked By:	J. Ward	Date:	10/19/23
Boring No.:	HA-31, 32, 30	Sample Type:	90% Remold		
Sample No.:	MB-18, 19, 30	Depth (ft.):	Composite		
Soil Identification:	Light brown silty sand (SM)				

Sample Diameter(in):	2.415	2.415	2.415
Sample Thickness(in.):	1.000	1.000	1.000
Weight of Sample + ring(gm):	191.74	190.98	192.11
Weight of Ring(gm):	45.38	44.61	45.58
Before Shearing			
Weight of Wet Sample+Cont.(gm):	168.49	168.49	168.49
Weight of Dry Sample+Cont.(gm):	158.00	158.00	158.00
Weight of Container(gm):	55.81	55.81	55.81
Vertical Rdg.(in): Initial	0.0000	0.2561	0.2530
Vertical Rdg.(in): Final	-0.0109	0.2780	0.2880
After Shearing			
Weight of Wet Sample+Cont.(gm):	219.68	216.64	206.79
Weight of Dry Sample+Cont.(gm):	199.25	196.91	187.37
Weight of Container(gm):	69.44	68.11	57.95
Specific Gravity (Assumed):	2.70	2.70	2.70
Water Density(pcf):	62.43	62.43	62.43





Boring No.	**HA-31, 32, 30**
Sample No.	**MB-18, 19, 30**
Depth (ft)	**Composite**
Sample Type:	
90% Remold	
Soil Identification:	
Light brown silty sand (SM)	

Normal Stress (kip/ft²)	1.000	2.000	4.000
Peak Shear Stress (kip/ft²)	● 1.239	■ 1.911	▲ 3.471
Shear Stress @ End of Test (ksf)	○ 0.852	□ 1.515	△ 2.833
Deformation Rate (in./min.)	0.0033	0.0033	0.0033
Initial Sample Height (in.)	1.000	1.000	1.000
Diameter (in.)	2.415	2.415	2.415
Initial Moisture Content (%)	10.27	10.27	10.27
Dry Density (pcf)	110.4	110.4	110.5
Saturation (%)	52.6	52.6	52.8
Soil Height Before Shearing (in.)	0.9891	0.9781	0.9650
Final Moisture Content (%)	15.7	15.3	15.0

Leighton

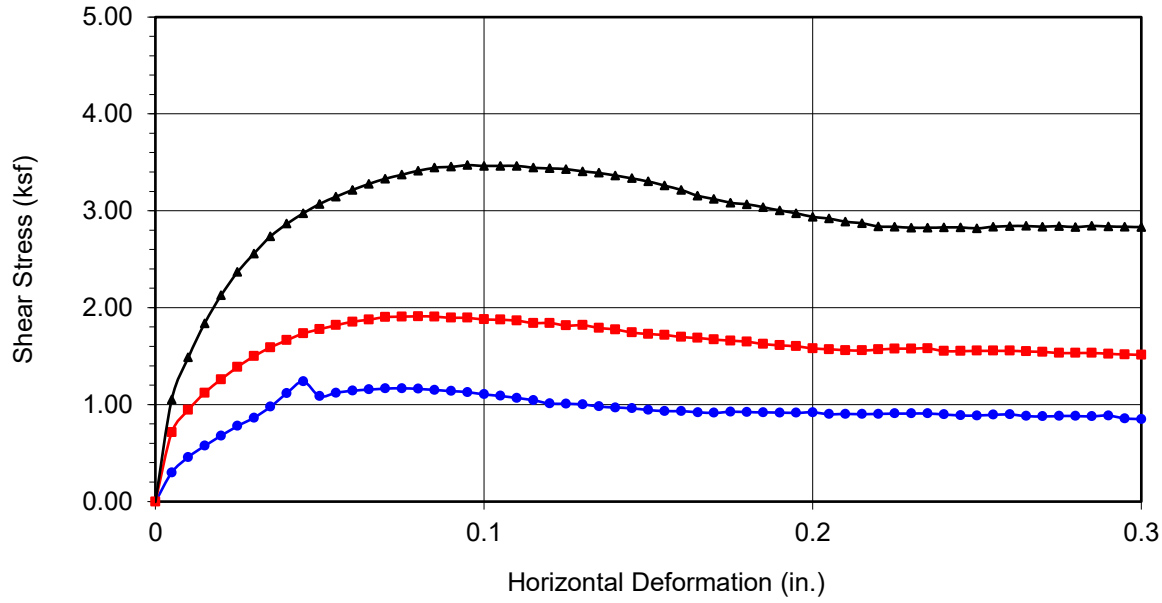
DIRECT SHEAR TEST RESULTS

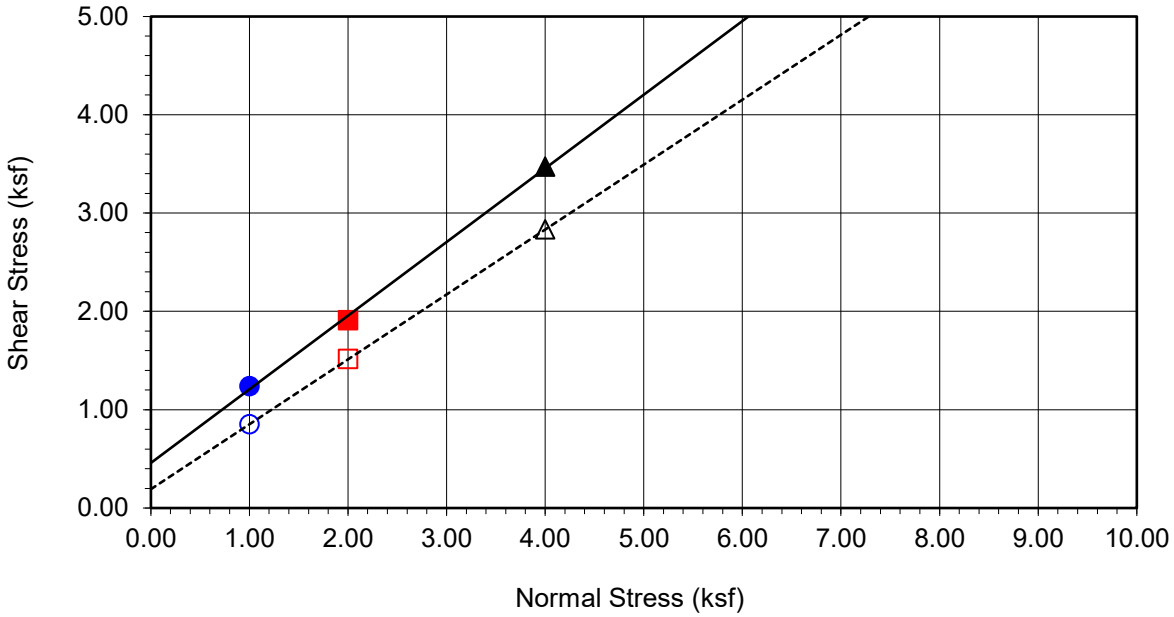
Consolidated Drained - ASTM D 3080

Project No.: 13655.001

Hume SoCal Camp

08-23





Boring No.	**HA-31, 32, 30**
Sample No.	**MB-18, 19, 30**
Depth (ft)	**Composite**
Sample Type:	90% Remold
Soil Identification:	Light brown silty sand (SM)

Strength Parameters

	C (psf)	ϕ (°)
Peak	459	37
Ultimate	193	33

Normal Stress (kip/ft²)	1.000	2.000	4.000
Peak Shear Stress (kip/ft²)	● 1.239	■ 1.911	▲ 3.471
Shear Stress @ End of Test (ksf)	○ 0.852	□ 1.515	△ 2.833
Deformation Rate (in./min.)	0.0033	0.0033	0.0033
Initial Sample Height (in.)	1.000	1.000	1.000
Diameter (in.)	2.415	2.415	2.415
Initial Moisture Content (%)	10.27	10.27	10.27
Dry Density (pcf)	110.4	110.4	110.5
Saturation (%)	52.6	52.6	52.8
Soil Height Before Shearing (in.)	0.9891	0.9781	0.9650
Final Moisture Content (%)	15.7	15.3	15.0

Leighton

DIRECT SHEAR TEST RESULTS

Consolidated Drained - ASTM D 3080

Project No.: 13655.001

Hume SoCal Camp

08-23

MODIFIED PROCTOR COMPACTION TEST

ASTM D 1557

Project Name:	Hume SoCal Camp	Tested By:	A. Santos	Date:	08/17/23
Project No.:	13655.001	Checked By:	ACS/JHW	Date:	08/18/23
Boring No.:	HA-23, HA-25a, HA-25b	Depth (ft.):	Composite		
Sample No.:	MB-11, MB-12a, MB-12b				
Soil Identification:	Dark brown silty sand (SM)				

Note: Corrected dry density calculation assumes specific gravity of 2.70 and moisture content of 1.0% for oversize particles

Preparation Method:	X	Moist	
		Dry	
Compaction Method	X	Mechanical Ram	
		Manual Ram	

Scalp Fraction (%)	
#3/4	
#3/8	
#4	6.1

Rammer Weight (lb.) = 10.0

Height of Drop (in.) = 18.0

Mold Volume (ft³) 0.03320

TEST NO.	1	2	3	4	5	6
Wt. Compacted Soil + Mold (g)	3747	3819	3774			
Weight of Mold (g)	1808	1808	1808			
Net Weight of Soil (g)	1939	2011	1966			
Wet Weight of Soil + Cont. (g)	402.3	418.9	475.4			
Dry Weight of Soil + Cont. (g)	370.1	378.2	421.7			
Weight of Container (g)	39.7	39.2	37.2			
Moisture Content (%)	9.75	12.01	13.97			
Wet Density (pcf)	128.8	133.5	130.5			
Dry Density (pcf)	117.3	119.2	114.6			

Maximum Dry Density (pcf) 119.5

Corrected Dry Density (pcf) 121.7

Optimum Moisture Content (%) 11.4

Corrected Moisture Content (%) 10.8

[X] **Procedure A**
Soil Passing No. 4 (4.75 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
May be used if +#4 is 20% or less

[ ] **Procedure B**
Soil Passing 3/8 in. (9.5 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
Use if +#4 is >20% and +3/8 in. is 20% or less

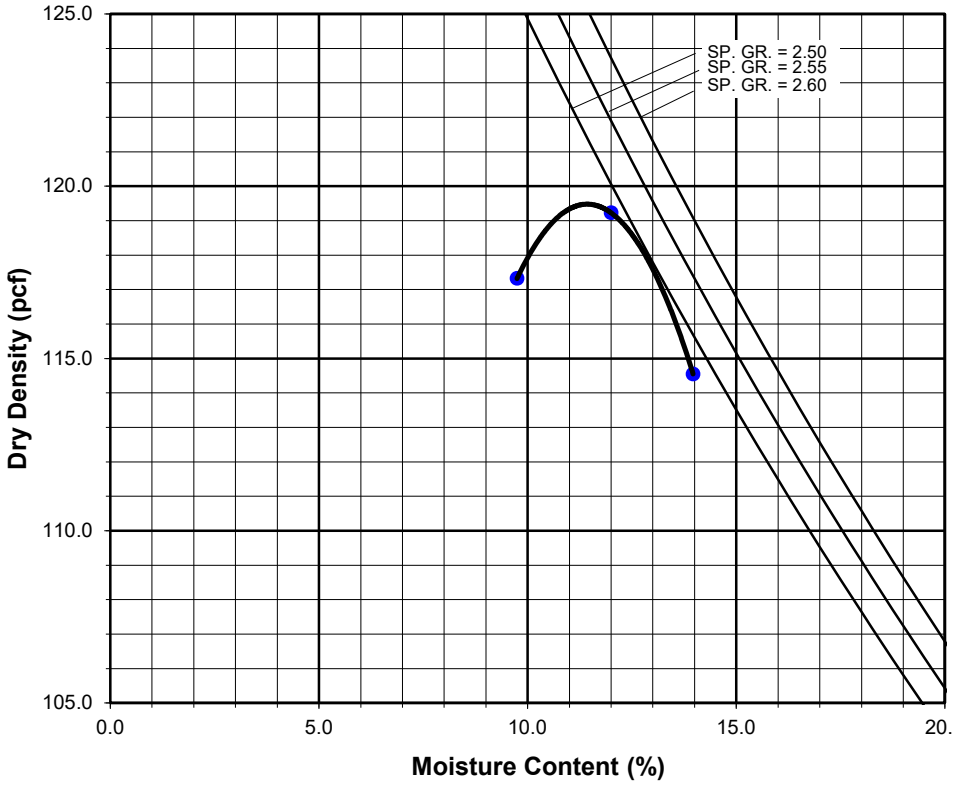
[ ] **Procedure C**
Soil Passing 3/4 in. (19.0 mm) Sieve
Mold : 6 in. (152.4 mm) diameter
Layers : 5 (Five)
Blows per layer : 56 (fifty-six)
Use if +3/8 in. is >20% and +¾ in. is <30%

Particle-Size Distribution:

GR:SA:FI

Atterberg Limits:

LL,PL,PI



MODIFIED PROCTOR COMPACTION TEST

ASTM D 1557

Project Name:	Hume SoCal Camp	Tested By:	A. Santos	Date:	08/17/23
Project No.:	13655.001	Checked By:	ACS/JHW	Date:	08/18/23
Boring No.:	HA-31, HA-32, HA-30	Depth (ft.):	Composite		
Sample No.:	MB-18, MB-19, MB-30				
Soil Identification:	Light brown silty sand (SM)				

Note: Corrected dry density calculation assumes specific gravity of 2.70 and moisture content of 1.0% for oversize particles

Preparation Method:	X	Moist	
		Dry	
Compaction Method	X	Mechanical Ram	
		Manual Ram	

Scalp Fraction (%)	
#3/4	
#3/8	
#4	8.4

Rammer Weight (lb.) = 10.0

Height of Drop (in.) = 18.0

Mold Volume (ft³) 0.03320

TEST NO.	1	2	3	4	5	6
Wt. Compacted Soil + Mold (g)	3737	3834	3844			
Weight of Mold (g)	1808	1808	1808			
Net Weight of Soil (g)	1929	2026	2036			
Wet Weight of Soil + Cont. (g)	623.2	433.7	465.9			
Dry Weight of Soil + Cont. (g)	585.0	397.7	418.8			
Weight of Container (g)	76.7	39.0	39.8			
Moisture Content (%)	7.52	10.03	12.43			
Wet Density (pcf)	128.1	134.5	135.2			
Dry Density (pcf)	119.1	122.3	120.2			

Maximum Dry Density (pcf) 122.3

Corrected Dry Density (pcf) 125.2

Optimum Moisture Content (%) 10.3

Corrected Moisture Content (%) 9.5

[X] **Procedure A**
Soil Passing No. 4 (4.75 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
May be used if +#4 is 20% or less

[ ] **Procedure B**
Soil Passing 3/8 in. (9.5 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
Use if +#4 is >20% and +3/8 in. is 20% or less

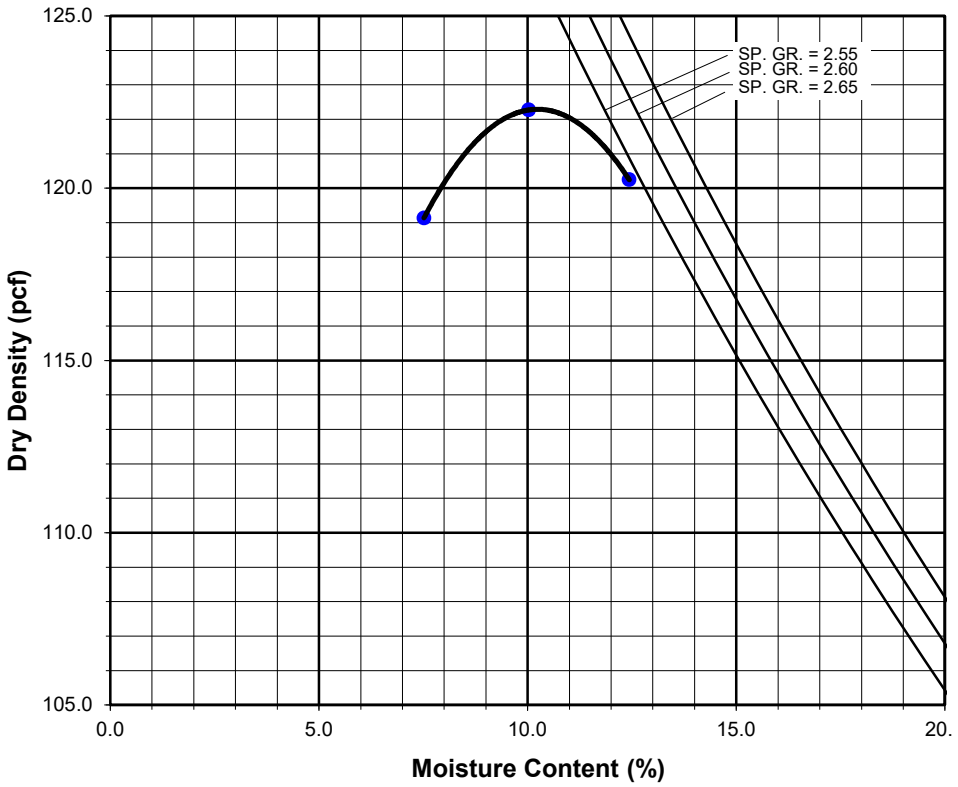
[ ] **Procedure C**
Soil Passing 3/4 in. (19.0 mm) Sieve
Mold : 6 in. (152.4 mm) diameter
Layers : 5 (Five)
Blows per layer : 56 (fifty-six)
Use if +3/8 in. is >20% and +¾ in. is <30%

Particle-Size Distribution:

GR:SA:FI

Atterberg Limits:

LL,PL,PI



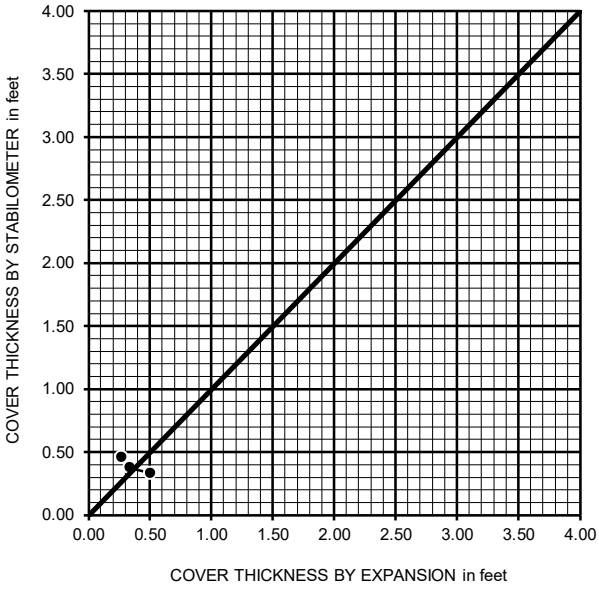
R-VALUE TEST RESULTS
DOT CA Test 301

PROJECT NAME:	Hume SoCal Camp	PROJECT NUMBER:	13655.001
BORING NUMBER:	HA-3, HA-5b, HA-9	DEPTH (FT.):	Composite
SAMPLE NUMBER:	MB-1, MB-3, MB-4	TECHNICIAN:	O. Figueroa
SAMPLE DESCRIPTION:	Brown poorly-graded sand with silt (SP-SM)	DATE COMPLETED:	8/23/2023

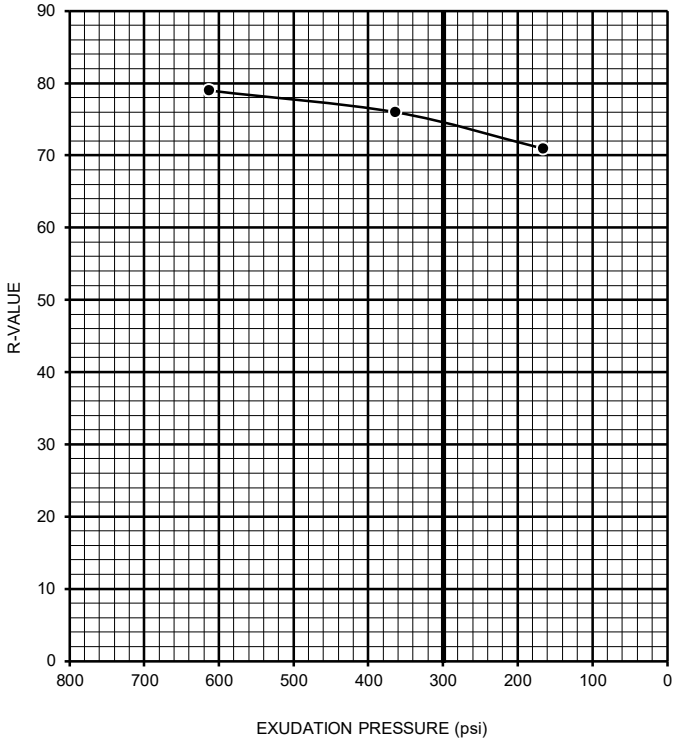
TEST SPECIMEN	a	b	c
MOISTURE AT COMPACTION %	10.5	11.1	12.0
HEIGHT OF SAMPLE, Inches	2.48	2.49	2.49
DRY DENSITY, pcf	117.0	116.8	114.9
COMPACTOR PRESSURE, psi	350	300	250
EXUDATION PRESSURE, psi	613	364	166
EXPANSION, Inches x 10exp-4	15	10	8
STABILITY Ph 2,000 lbs (160 psi)	18	20	24
TURNS DISPLACEMENT	5.35	5.65	5.92
R-VALUE UNCORRECTED	79	76	71
R-VALUE CORRECTED	79	76	71

DESIGN CALCULATION DATA	a	b	c
GRAVEL EQUIVALENT FACTOR	1.0	1.0	1.0
TRAFFIC INDEX	5.0	5.0	5.0
STABILOMETER THICKNESS, ft.	0.34	0.38	0.46
EXPANSION PRESSURE THICKNESS, ft.	0.50	0.33	0.27

EXPANSION PRESSURE CHART



EXUDATION PRESSURE CHART



R-VALUE BY EXPANSION:	77
R-VALUE BY EXUDATION:	74
EQUILIBRIUM R-VALUE:	74

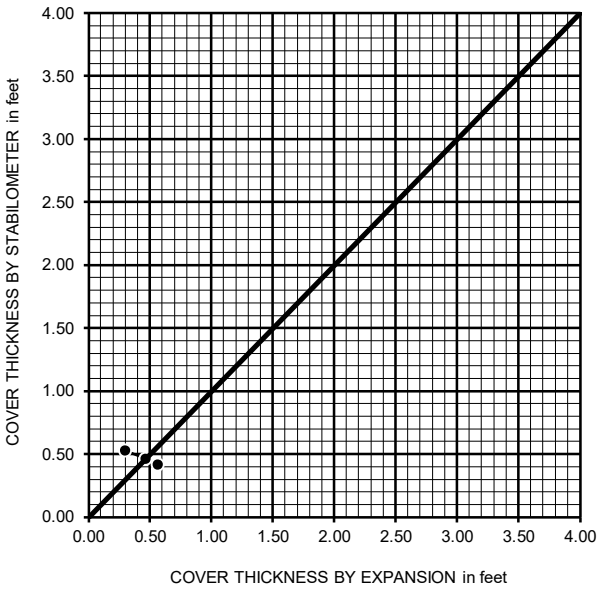
R-VALUE TEST RESULTS
DOT CA Test 301

PROJECT NAME:	Hume SoCal Camp	PROJECT NUMBER:	13655.001
BORING NUMBER:	HA-10, HA-17a, HA-17b	DEPTH (FT.):	Composite
SAMPLE NUMBER:	MB-5, MB-7a, MB-7b	TECHNICIAN:	O. Figueroa
SAMPLE DESCRIPTION:	Very dark brown silty sand (SM)	DATE COMPLETED:	8/18/2023

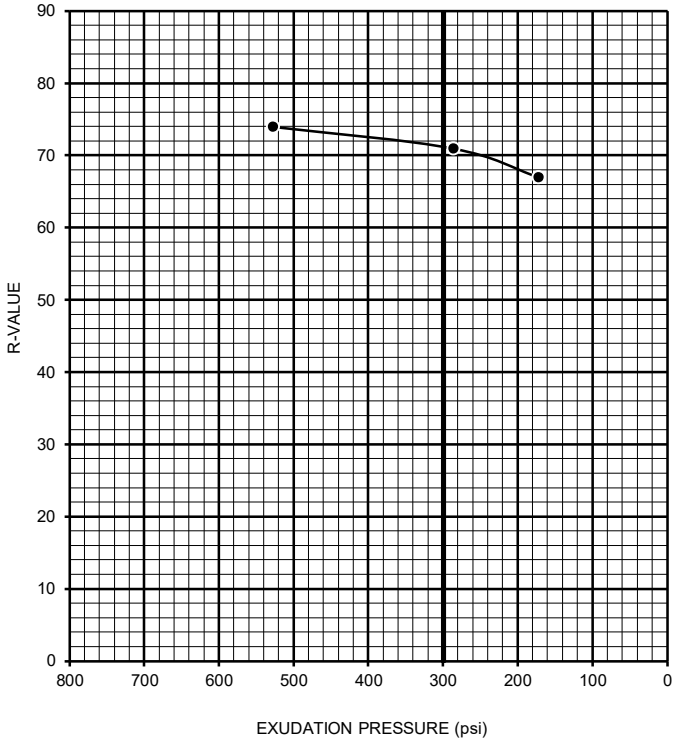
TEST SPECIMEN	a	b	c
MOISTURE AT COMPACTION %	12.5	13.4	14.1
HEIGHT OF SAMPLE, Inches	2.50	2.50	2.54
DRY DENSITY, pcf	111.8	110.5	108.9
COMPACTOR PRESSURE, psi	350	300	250
EXUDATION PRESSURE, psi	527	286	172
EXPANSION, Inches x 10exp-4	17	14	9
STABILITY Ph 2,000 lbs (160 psi)	23	26	30
TURNS DISPLACEMENT	5.25	5.38	5.41
R-VALUE UNCORRECTED	74	71	67
R-VALUE CORRECTED	74	71	67

DESIGN CALCULATION DATA	a	b	c
GRAVEL EQUIVALENT FACTOR	1.0	1.0	1.0
TRAFFIC INDEX	5.0	5.0	5.0
STABILOMETER THICKNESS, ft.	0.42	0.46	0.53
EXPANSION PRESSURE THICKNESS, ft.	0.57	0.47	0.30

EXPANSION PRESSURE CHART



EXUDATION PRESSURE CHART



R-VALUE BY EXPANSION:	71
R-VALUE BY EXUDATION:	71
EQUILIBRIUM R-VALUE:	71

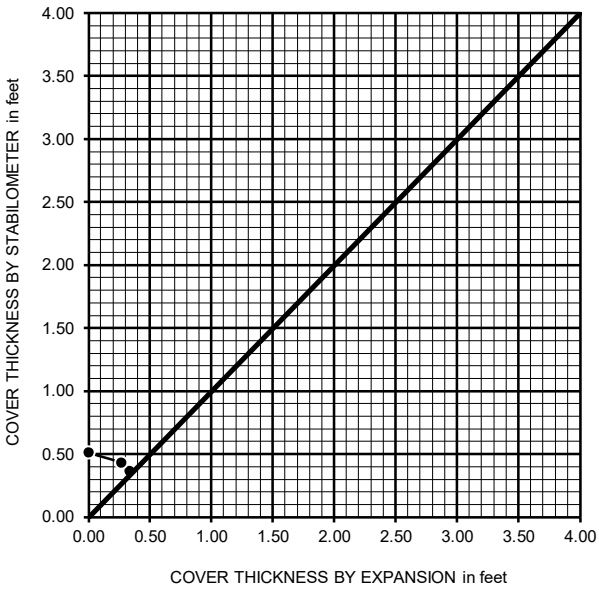
R-VALUE TEST RESULTS
DOT CA Test 301

PROJECT NAME:	Hume SoCal Camp	PROJECT NUMBER:	13655.001
BORING NUMBER:	HA-29	DEPTH (FT.):	6-36"
SAMPLE NUMBER:	MB-15	TECHNICIAN:	O. Figueroa
SAMPLE DESCRIPTION:	Dark brown silty sand (SM)	DATE COMPLETED:	8/23/2023

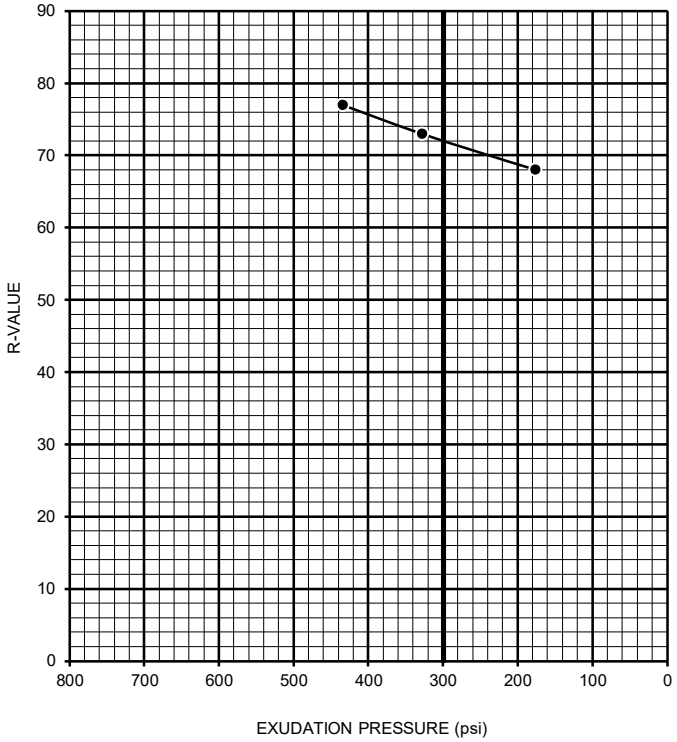
TEST SPECIMEN	a	b	c
MOISTURE AT COMPACTION %	13.0	13.4	14.3
HEIGHT OF SAMPLE, Inches	2.52	2.53	2.55
DRY DENSITY, pcf	110.9	110.2	108.0
COMPACTOR PRESSURE, psi	350	300	250
EXUDATION PRESSURE, psi	434	328	177
EXPANSION, Inches x 10exp-4	10	8	0
STABILITY Ph 2,000 lbs (160 psi)	20	23	28
TURNS DISPLACEMENT	5.10	5.40	5.65
R-VALUE UNCORRECTED	77	73	68
R-VALUE CORRECTED	77	73	68

DESIGN CALCULATION DATA	a	b	c
GRAVEL EQUIVALENT FACTOR	1.0	1.0	1.0
TRAFFIC INDEX	5.0	5.0	5.0
STABILOMETER THICKNESS, ft.	0.37	0.43	0.51
EXPANSION PRESSURE THICKNESS, ft.	0.33	0.27	0.00

EXPANSION PRESSURE CHART



EXUDATION PRESSURE CHART



R-VALUE BY EXPANSION:	78
R-VALUE BY EXUDATION:	72
EQUILIBRIUM R-VALUE:	72

16691 Millikan Ave.
Irvine, CA 92606
Tel. (949) 222-5321

Unconfined Compressive Strength

Project Name:	Hume SoCal Camp	Project No.	13655.001
Sampled By:	Jeff Hull	Sample Date:	7/21/2023

MATERIAL SAMPLE TYPE

Rock	Granite	Soil Cement	Concrete
X			

FOR LAB USE ONLY	DATE RECEIVED: 7/31/2023	By: Ryan Densmore

Laboratory Test Data

Laboratory No.	Age Days	Test Date	Height (in)	Diam. (in)	Area (sq. in.)	Load (lbs.)	Compr. (psi)	H/D Ratio	Corr. Factor	Compr. (psi)	Failure Type
A1	139	12/07/23	4.00	1.99	3.11	10590	3410	2.01	1.00	3410	N/A
A2	139	12/07/23	3.89	1.99	3.11	11470	3690	1.95	1.00	3690	N/A
B1	139	12/07/23	3.87	1.99	3.11	20800	6690	1.94	1.00	6690	N/A
B2	139	12/07/23	3.83	1.99	3.11	22030	7080	1.92	0.99	7010	N/A

Locations: A1, A2: Adult Lodge
B1, B2: RR at Existing Pond

APPENDIX D

GENERAL EARTHWORK AND GRADING GUIDE SPECIFICATIONS

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LEIGHTON AND ASSOCIATES, INC.

GENERAL EARTHWORK AND GRADING SPECIFICATIONS FOR ROUGH GRADING

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1.0 General

1.1 Intent

These General Earthwork and Grading Specifications are for the grading and earthwork shown on the approved grading plan(s) and/or indicated in the geotechnical report(s). These Specifications are a part of the recommendations contained in the geotechnical report(s). In case of conflict, the specific recommendations in the geotechnical report shall supersede these more general Specifications. Observations of the earthwork by the project Geotechnical Consultant during the course of grading may result in new or revised recommendations that could supersede these specifications or the recommendations in the geotechnical report(s).

1.2 The Geotechnical Consultant of Record

Prior to commencement of work, the owner shall employ the Geotechnical Consultant of Record (Geotechnical Consultant). The Geotechnical Consultants shall be responsible for reviewing the approved geotechnical report(s) and accepting the adequacy of the preliminary geotechnical findings, conclusions, and recommendations prior to the commencement of the grading.

Prior to commencement of grading, the Geotechnical Consultant shall review the "work plan" prepared by the Earthwork Contractor (Contractor) and schedule sufficient personnel to perform the appropriate level of observation, mapping, and compaction testing.

During the grading and earthwork operations, the Geotechnical Consultant shall observe, map, and document the subsurface exposures to verify the geotechnical design assumptions. If the observed conditions are found to be significantly different than the interpreted assumptions during the design phase, the Geotechnical Consultant shall inform the owner, recommend appropriate changes in design to accommodate the observed conditions, and notify the review agency where required. Subsurface areas to be geotechnically observed, mapped, elevations recorded, and/or tested include natural ground after it has been cleared for receiving fill but before fill is placed, bottoms of all "remedial removal" areas, all key bottoms, and benches made on sloping ground to receive fill.

The Geotechnical Consultant shall observe the moisture-conditioning and processing of the subgrade and fill materials and perform relative compaction testing of fill to determine the attained level of compaction. The Geotechnical Consultant shall provide the test results to the owner and the Contractor on a routine and frequent basis.

1.3 The Earthwork Contractor

The Earthwork Contractor (Contractor) shall be qualified, experienced, and knowledgeable in earthwork logistics, preparation and processing of ground to receive fill, moisture-conditioning and processing of fill, and compacting fill. The Contractor shall review and accept the plans, geotechnical report(s), and these Specifications prior to commencement of grading. The Contractor shall be solely responsible for performing the grading in accordance with the plans and specifications.

The Contractor shall prepare and submit to the owner and the Geotechnical Consultant a work plan that indicates the sequence of earthwork grading, the number of "spreads" of work and the estimated quantities of daily earthwork contemplated for the site prior to commencement of grading. The Contractor shall inform the owner and the Geotechnical Consultant of changes in work schedules and updates to the work plan at least 24 hours in advance of such changes so that appropriate observations and tests can be planned and accomplished. The Contractor shall not assume that the Geotechnical Consultant is aware of all grading operations.

The Contractor shall have the sole responsibility to provide adequate equipment and methods to accomplish the earthwork in accordance with the applicable grading codes and agency ordinances, these Specifications, and the recommendations in the approved geotechnical report(s) and grading plan(s). If, in the opinion of the Geotechnical Consultant, unsatisfactory conditions, such as unsuitable soil, improper moisture condition, inadequate compaction, insufficient buttress key size, adverse weather, etc., are resulting in a quality of work less than required in these specifications, the Geotechnical Consultant shall reject the work and may recommend to the owner that construction be stopped until the conditions are rectified.

2.0 Preparation of Areas to be Filled

2.1 Clearing and Grubbing

Vegetation, such as brush, grass, roots, and other deleterious material shall be sufficiently removed and properly disposed of in a method acceptable to the owner, governing agencies, and the Geotechnical Consultant.

The Geotechnical Consultant shall evaluate the extent of these removals depending on specific site conditions. Earth fill material shall not contain more than 1 percent of organic materials (by volume). No fill lift shall contain more than 5 percent of organic matter. Nesting of the organic materials shall not be allowed.

If potentially hazardous materials are encountered, the Contractor shall stop work in the affected area, and a hazardous material specialist shall be informed immediately for proper evaluation and handling of these materials prior to continuing to work in that area.

As presently defined by the State of California, most refined petroleum products (gasoline, diesel fuel, motor oil, grease, coolant, etc.) have chemical constituents that are considered to be hazardous waste. As such, the indiscriminate dumping or spillage of these fluids onto the ground may constitute a misdemeanor, punishable by fines and/or imprisonment, and shall not be allowed.

2.2 Processing

Existing ground that has been declared satisfactory for support of fill by the Geotechnical Consultant shall be scarified to a minimum depth of 6 inches. Existing ground that is not satisfactory shall be overexcavated as specified in the following section. Scarification shall continue until soils are broken down and free of large clay lumps or clods and the working surface is reasonably uniform, flat, and free of uneven features that would inhibit uniform compaction.

2.3 Overexcavation

In addition to removals and overexcavations recommended in the approved geotechnical report(s) and the grading plan, soft, loose, dry, saturated, spongy, organic-rich, highly fractured or otherwise unsuitable ground shall be overexcavated to competent ground as evaluated by the Geotechnical Consultant during grading.

2.4 Benching

Where fills are to be placed on ground with slopes steeper than 5:1 (horizontal to vertical units), the ground shall be stepped or benched. The lowest bench or key shall be a minimum of 15 feet wide and at least 2 feet deep, into competent material as evaluated by the Geotechnical Consultant. Other benches shall be excavated a minimum height of 4 feet into competent material or as otherwise recommended by the Geotechnical Consultant. Fill placed on ground sloping flatter than 5:1 shall also be benched or otherwise overexcavated to provide a flat subgrade for the fill.

2.5 Evaluation/Acceptance of Fill Areas

All areas to receive fill, including removal and processed areas, key bottoms, and benches, shall be observed, mapped, elevations recorded, and/or tested prior to being accepted by the Geotechnical Consultant as suitable to receive fill. The Contractor shall obtain a written acceptance from the Geotechnical Consultant prior to fill placement. A licensed surveyor shall provide the survey control for determining elevations of processed areas, keys, and benches.

3.0 Fill Material

3.1 General

Material to be used as fill shall be essentially free of organic matter and other deleterious substances evaluated and accepted by the Geotechnical Consultant prior to placement. Soils of poor quality, such as those with unacceptable gradation, high expansion potential, or low strength shall be placed in areas acceptable to the Geotechnical Consultant or mixed with other soils to achieve satisfactory fill material.

3.2 Oversize

Oversize material defined as rock, or other irreducible material with a maximum dimension greater than 8 inches, shall not be buried or placed in fill unless location, materials, and placement methods are specifically accepted by the Geotechnical Consultant. Placement operations shall be such that nesting of oversized material does not occur and such that oversize material is completely surrounded by compacted or densified fill. Oversize material shall not be placed within 10 vertical feet of finish grade or within 2 feet of future utilities or underground construction.

3.3 Import

If importing of fill material is required for grading, proposed import material shall meet the requirements of Section 3.1. The potential import source shall be given to the Geotechnical Consultant at least 48 hours (2 working days) before importing begins so that its suitability can be determined and appropriate tests performed.

4.0 Fill Placement and Compaction

4.1 Fill Layers

Approved fill material shall be placed in areas prepared to receive fill (per Section 3.0) in near-horizontal layers not exceeding 8 inches in loose thickness. The Geotechnical Consultant may accept thicker layers if testing indicates the grading procedures can adequately compact the thicker layers. Each layer shall be spread evenly and mixed thoroughly to attain relative uniformity of material and moisture throughout.

4.2 Fill Moisture Conditioning

Fill soils shall be watered, dried back, blended, and/or mixed, as necessary to attain a relatively uniform moisture content at or slightly over optimum. Maximum density and optimum soil moisture content tests shall be performed in accordance with the American Society of Testing and Materials (ASTM Test Method D1557).

4.3 Compaction of Fill

After each layer has been moisture-conditioned, mixed, and evenly spread, it shall be uniformly compacted to not less than 90 percent of maximum dry density (ASTM Test Method D1557). Compaction equipment shall be adequately sized and be either specifically designed for soil compaction or of proven reliability to efficiently achieve the specified level of compaction with uniformity.

4.4 Compaction of Fill Slopes

In addition to normal compaction procedures specified above, compaction of slopes shall be accomplished by backrolling of slopes with sheepsfoot rollers at increments of 3 to 4 feet in fill elevation, or by other methods producing satisfactory results acceptable to the Geotechnical Consultant. Upon completion of grading, relative compaction of the fill, out to the slope face, shall be at least 90 percent of maximum density per ASTM Test Method D1557.

4.5 Compaction Testing

Field-tests for moisture content and relative compaction of the fill soils shall be performed by the Geotechnical Consultant. Location and frequency of tests shall be at the Consultant's discretion based on field conditions encountered. Compaction test locations will not necessarily be selected on a random basis. Test locations shall be selected to verify adequacy of compaction levels in areas that are judged to be prone to inadequate compaction (such as close to slope faces and at the fill/bedrock benches).

4.6 Frequency of Compaction Testing

Tests shall be taken at intervals not exceeding 2 feet in vertical rise and/or 1,000 cubic yards of compacted fill soils embankment. In addition, as a guideline, at least one test shall be taken on slope faces for each 5,000 square feet of slope face and/or each 10 feet of vertical height of slope. The Contractor shall assure that fill construction is such that the testing schedule can be accomplished by the Geotechnical Consultant. The Contractor shall stop or slow down the earthwork construction if these minimum standards are not met.

4.7 Compaction Test Locations

The Geotechnical Consultant shall document the approximate elevation and horizontal coordinates of each test location. The Contractor shall coordinate with the project surveyor to assure that sufficient grade stakes are established so that the Geotechnical Consultant can determine the test locations with sufficient accuracy. At a minimum, two grade stakes within a horizontal distance of 100 feet and vertically less than 5 feet apart from potential test locations shall be provided.

5.0 Subdrain Installation

Subdrain systems shall be installed in accordance with the approved geotechnical report(s), the grading plan. The Geotechnical Consultant may recommend additional subdrains and/or changes in subdrain extent, location, grade, or material depending on conditions encountered during grading. All subdrains shall be surveyed by a land surveyor/civil engineer for line and grade after installation and prior to burial. Sufficient time should be allowed by the Contractor for these surveys.

6.0 Excavation

Excavations, as well as over-excavation for remedial purposes, shall be evaluated by the Geotechnical Consultant during grading. Remedial removal depths shown on geotechnical plans are estimates only. The actual extent of removal shall be determined by the Geotechnical Consultant based on the field evaluation of exposed conditions during grading. Where fill-over-cut slopes are to be graded, the cut portion of the slope shall be made, evaluated, and accepted by the Geotechnical Consultant prior to placement of materials for construction of the fill portion of the slope, unless otherwise recommended by the Geotechnical Consultant.

7.0 Trench Backfills

7.1 Safety

The Contractor shall follow all OSHA and Cal/OSHA requirements for safety of trench excavations.

7.2 Bedding and Backfill

All bedding and backfill of utility trenches shall be performed in accordance with the applicable provisions of Standard Specifications of Public Works Construction. Bedding material shall have a Sand Equivalent greater than 30 (SE>30). The bedding shall be placed to 1 foot over the top of the conduit and densified by jetting. Backfill shall be placed and densified to a minimum of 90 percent of relative compaction from 1 foot above the top of the conduit to the surface.

The Geotechnical Consultant shall test the trench backfill for relative compaction. At least one test should be made for every 300 feet of trench and 2 feet of fill.

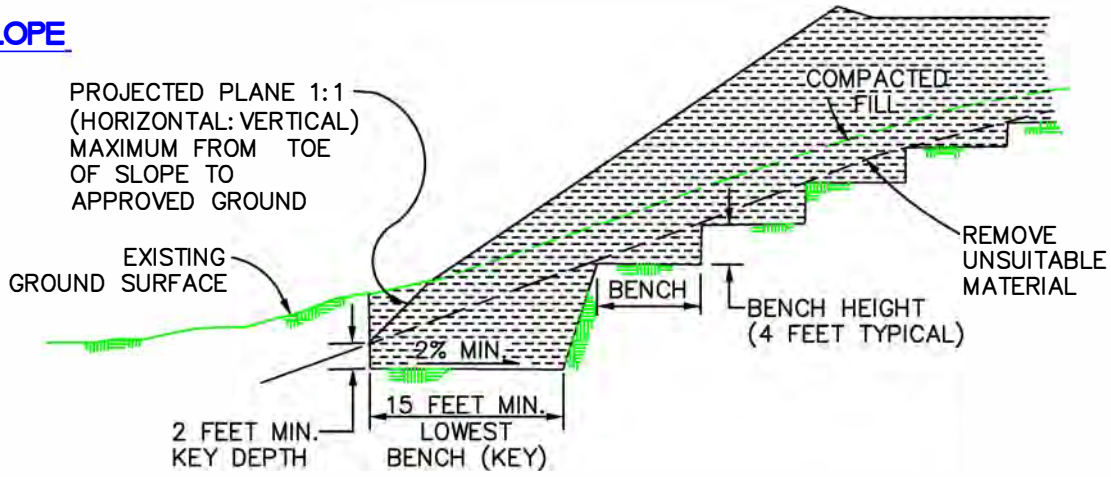
7.3 Lift Thickness

Lift thickness of trench backfill shall not exceed those allowed in the Standard Specifications of Public Works Construction unless the Contractor can demonstrate to the Geotechnical Consultant that the fill lift can be compacted to the minimum relative compaction by his alternative equipment and method.

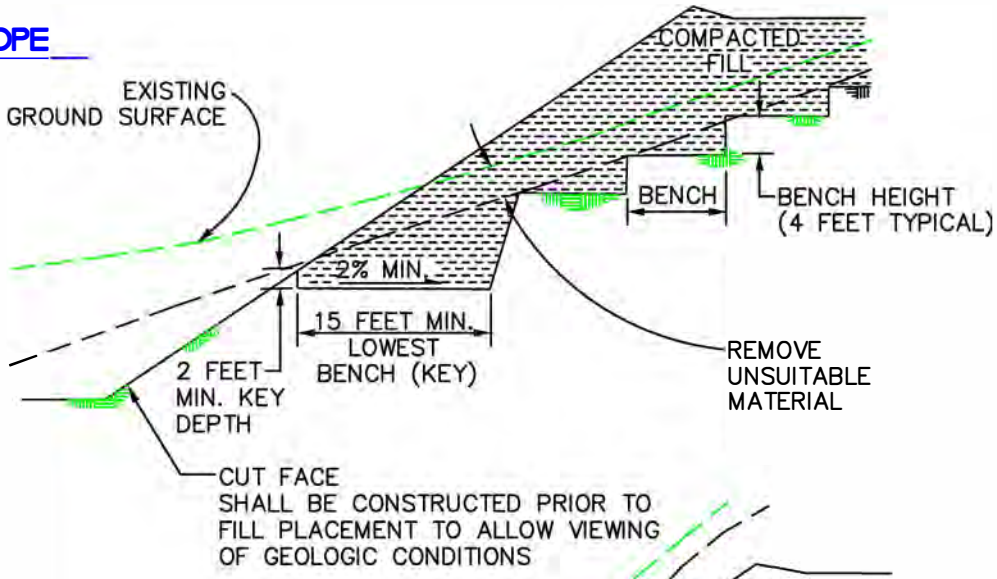
7.4 Observation and Testing

The jetting of the bedding around the conduits shall be observed by the Geotechnical Consultant.

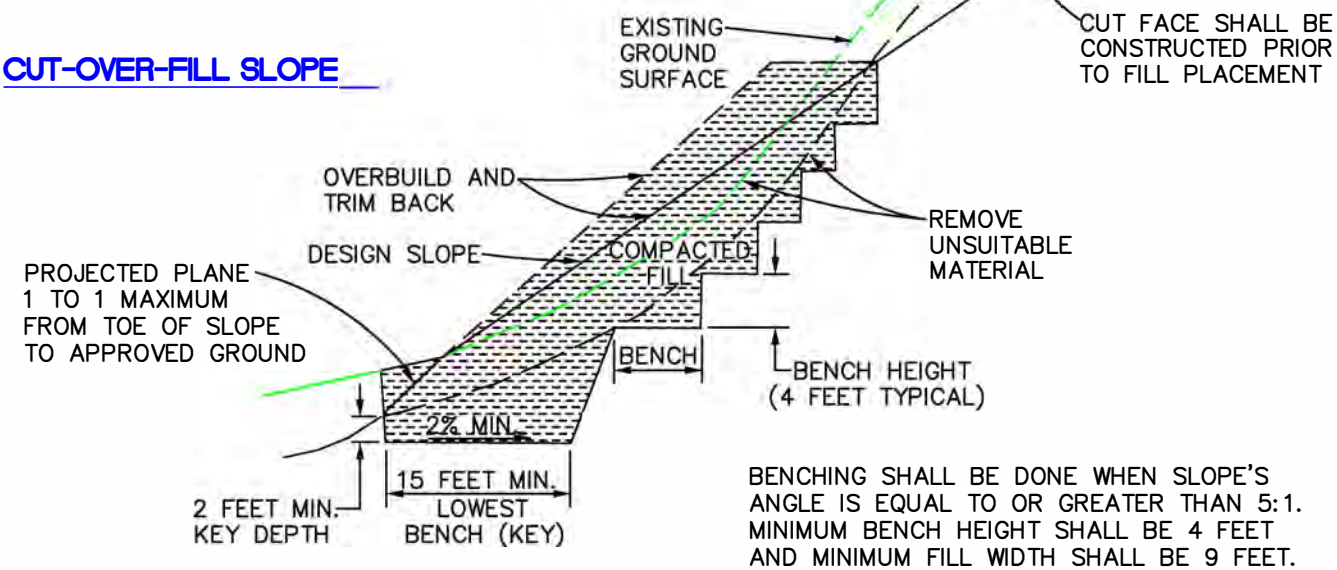
FILL SLOPE



FILL-OVER-CUT SLOPE

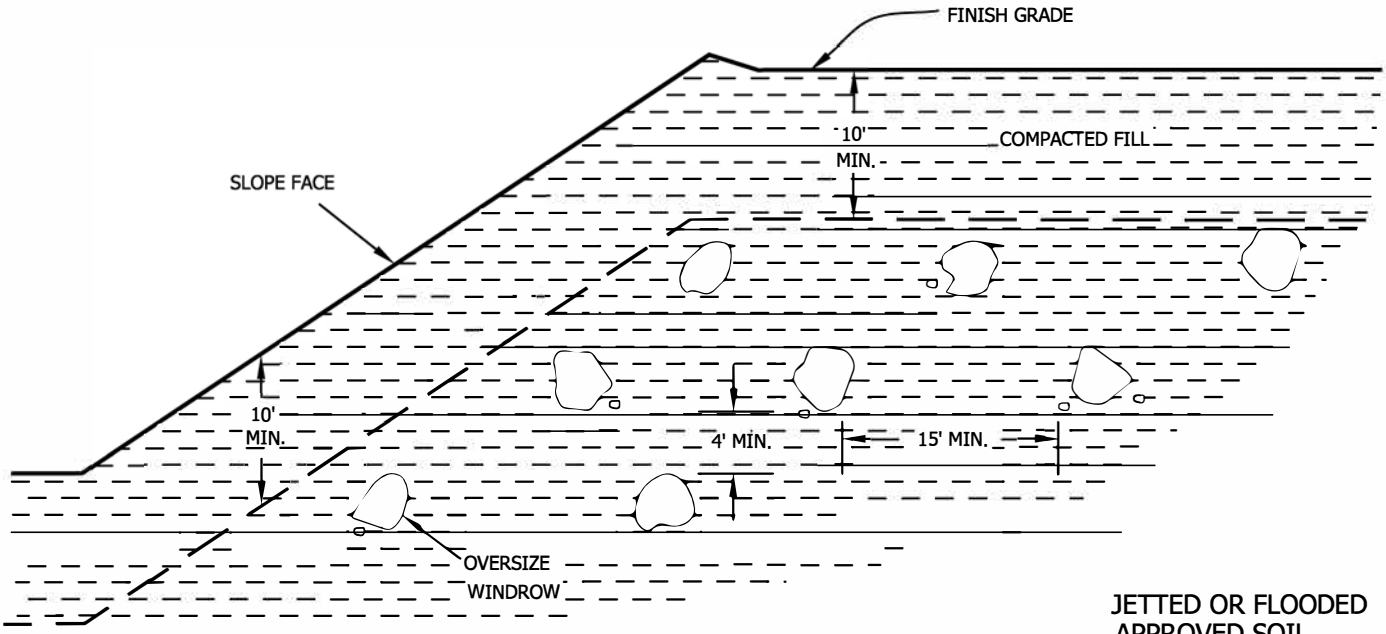


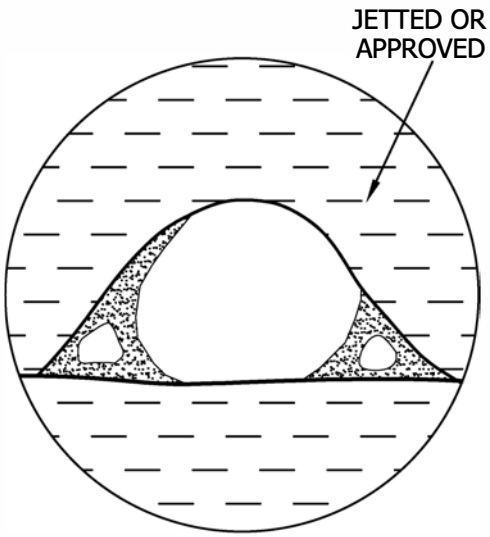
CUT-OVER-FILL SLOPE



BENCHING SHALL BE DONE WHEN SLOPE'S ANGLE IS EQUAL TO OR GREATER THAN 5:1. MINIMUM BENCH HEIGHT SHALL BE 4 FEET AND MINIMUM FILL WIDTH SHALL BE 9 FEET.

KEYING AND BENCHING	GENERAL EARTHWORK AND GRADING SPECIFICATIONS STANDARD DETAILS A	Leighton a verdantas company

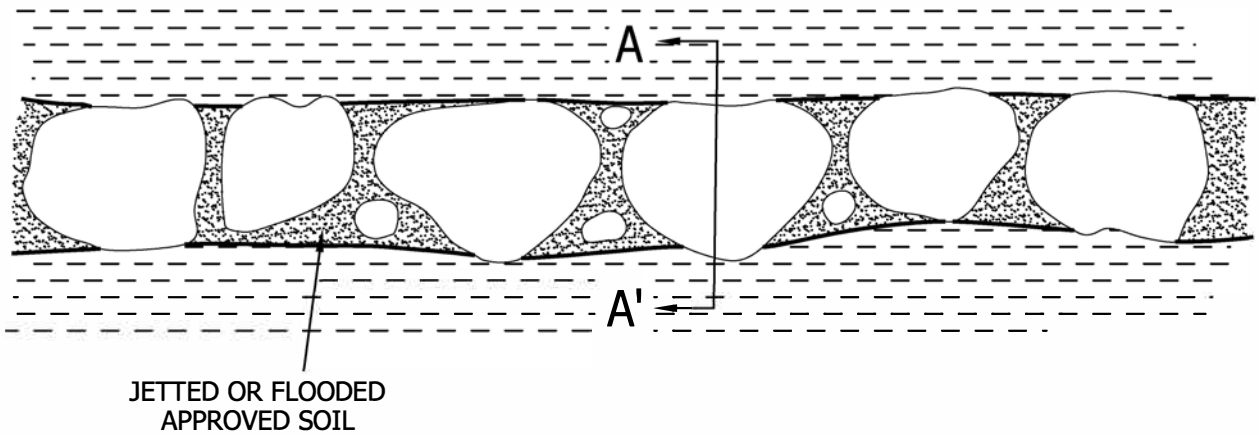




SECTION A-A'

- Oversize rock is larger than 8 inches in largest dimension.
- Backfill with approved soil jetted or flooded in place to fill all the voids.
- Do not bury rock within 10 feet of finish grade.
- Windrow of buried rock shall be parallel to the finished slope face.

PROFILE ALONG WINDROW

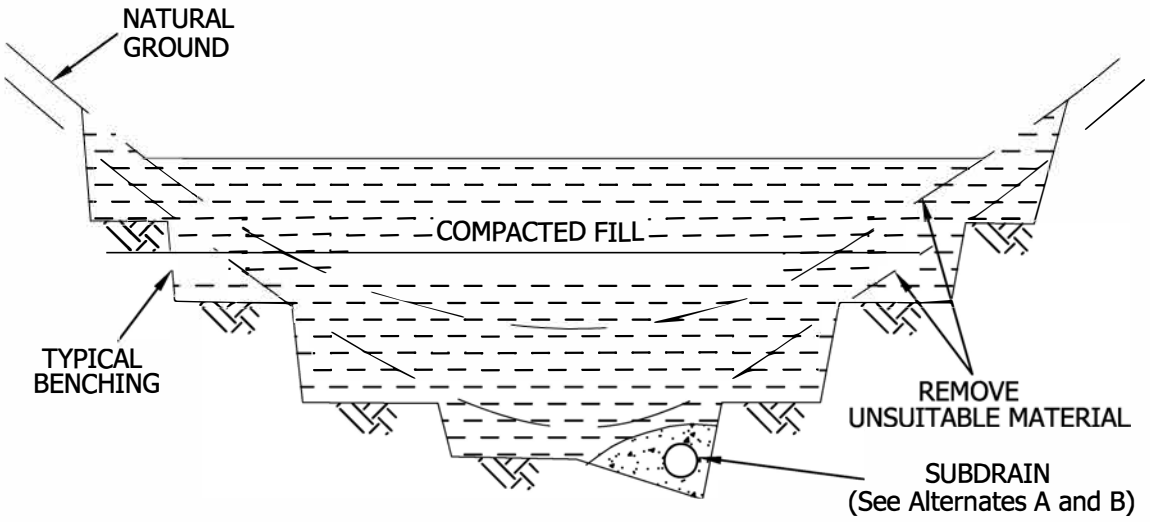


OVERSIZE ROCK DISPOSAL

GENERAL EARTHWORK AND GRADING
SPECIFICATIONS
STANDARD DETAILS B

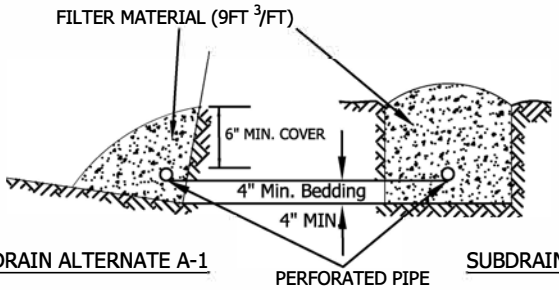
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SUBDRAIN ALTERNATE A

PERFORATED PIPE SURROUNDED WITH FILTER MATERIAL



SUBDRAIN ALTERNATE A-1 SUBDRAIN ALTERNATE A-2

FILTER MATERIAL

FILTER MATERIAL SHALL BE CLASS 2 PERMEABLE MATERIAL PER STATE OF CALIFORNIA STANDARD SPECIFICATION, OR APPROVED ALTERNATE. CLASS 2 GRADING AS FOLLOWS:

Sieve Size	Percent Passing
1"	100
3/4"	90-100
3/8"	40-100
No. 4	25-40
No. 8	18-33
No. 30	5-15
No. 50	0-7
No. 200	0-3

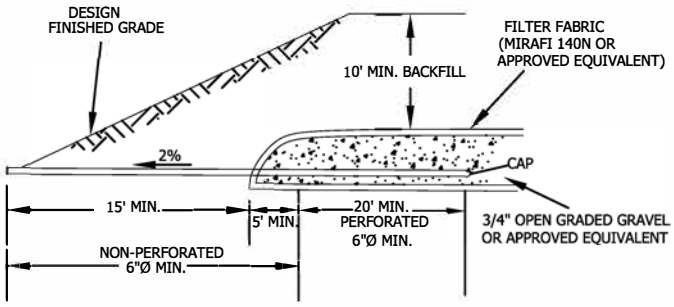
SUBDRAIN ALTERNATE B



ALTERNATE B-1 ALTERNATE B-2

○ PERFORATED PIPE IS OPTIONAL PER GOVERNING AGENCY'S REQUIREMENTS

DETAIL OF CANYON SUBDRAIN TERMINAL

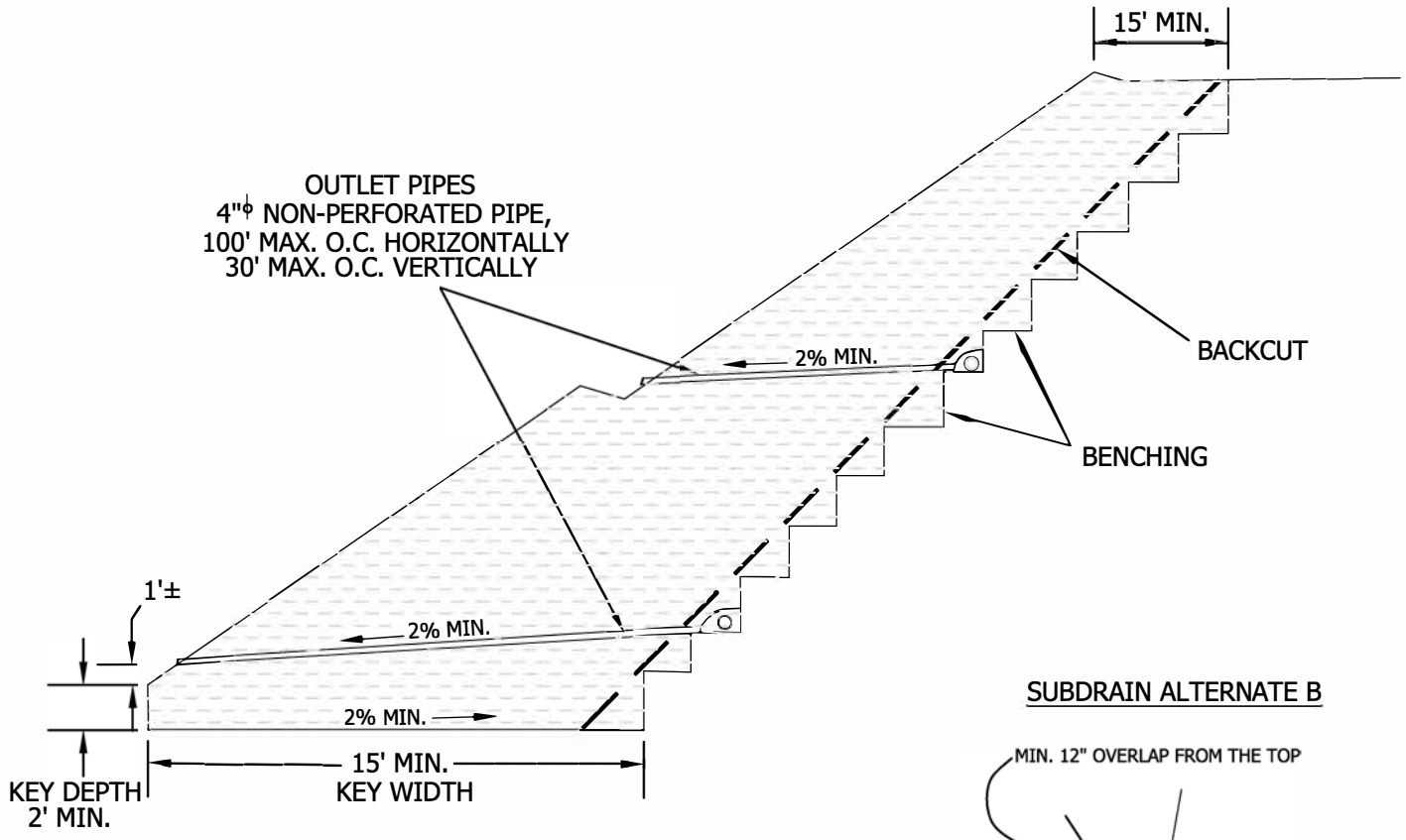


CANYON SUBDRAIN

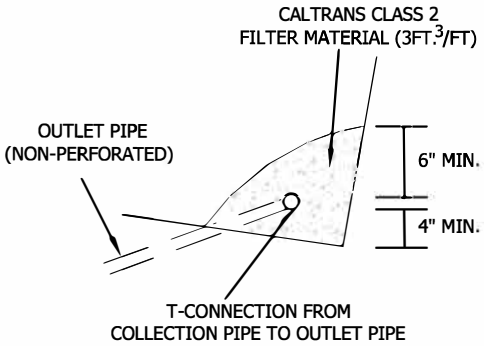
GENERAL EARTHWORK AND GRADING SPECIFICATIONS STANDARD DETAILS C

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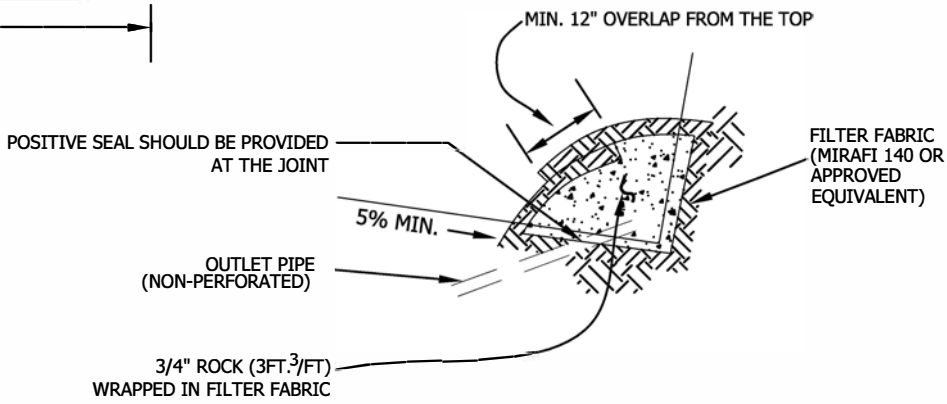
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SUBDRAIN ALTERNATE A



SUBDRAIN ALTERNATE B

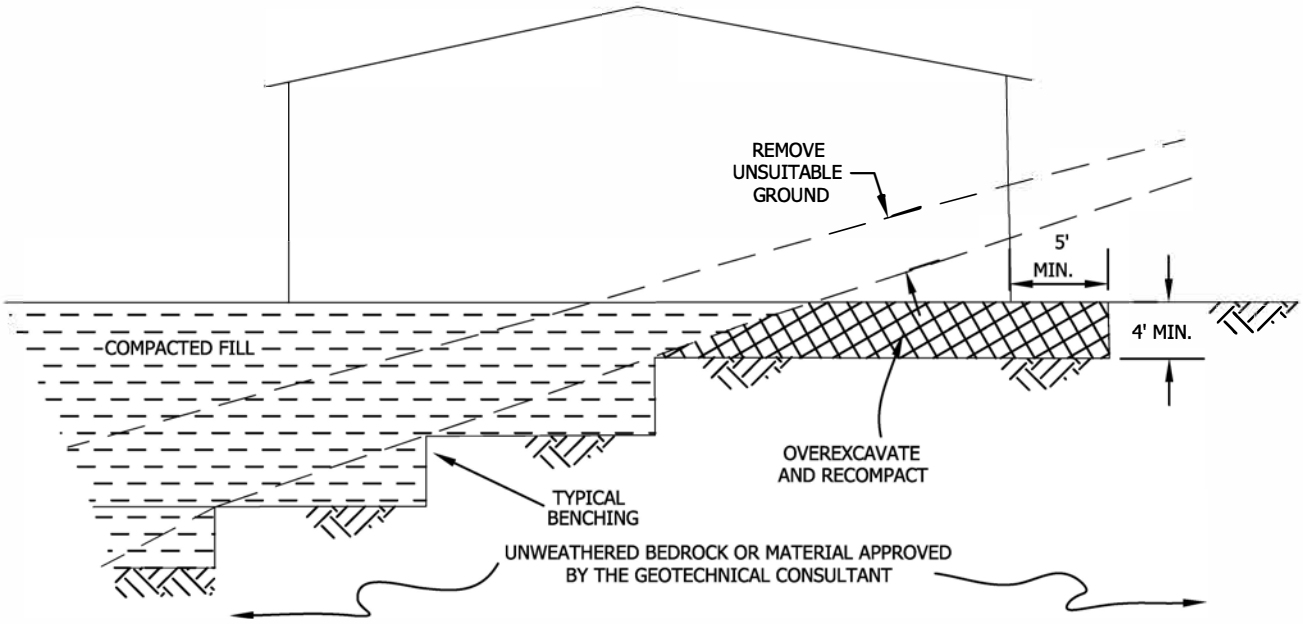


- SUBDRAIN INSTALLATION - Subdrain collector pipe shall be installed with perforations down or, unless otherwise designated by the geotechnical consultant. Outlet pipes shall be non-perforated pipe. The subdrain pipe shall have at least 8 perforations uniformly spaced per foot. Perforation shall be 1/4" to 1/2" if drilled holes are used. All subdrain pipes shall have a gradient at least 2% towards the outlet.
- SUBDRAIN PIPE - Subdrain pipe shall be ASTM D2751, ASTM D1527 (Schedule 40) or SDR 23.5 ABS pipe or ASTM D3034 (Schedule 40) or SDR 23.5 PVC pipe.
- All outlet pipe shall be placed in a trench and, after fill is placed above it, rodded to verify integrity.

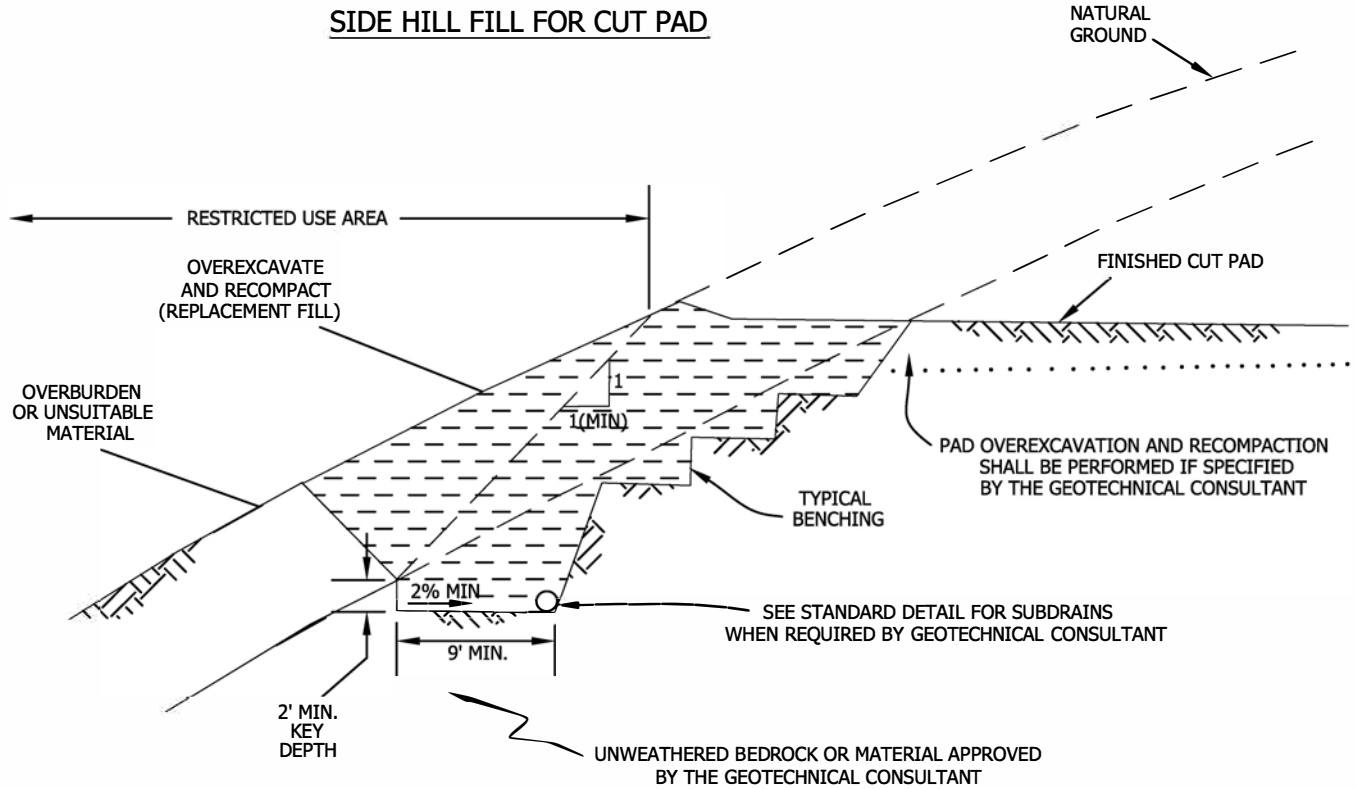
BUTTRESS OR REPLACEMENT FILL SUBDRAINS	GENERAL EARTHWORK AND GRADING SPECIFICATIONS STANDARD DETAILS D	Leighton a verdantas company

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CUT-FILL TRANSITION LOT OVEREXCAVATION



SIDE HILL FILL FOR CUT PAD



TRANSITION LOT FILLS AND SIDE HILL FILLS

GENERAL EARTHWORK AND GRADING SPECIFICATIONS
STANDARD DETAILS E

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APPENDIX E

GBA GEOTECHNICAL INSERT

Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative – interpret and apply this geotechnical-engineering report as effectively as possible. In that way, you can benefit from a lowered exposure to problems associated with subsurface conditions at project sites and development of them that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed herein, contact your GBA-member geotechnical engineer. Active engagement in GBA exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.

Understand the Geotechnical-Engineering Services Provided for this Report

Geotechnical-engineering services typically include the planning, collection, interpretation, and analysis of exploratory data from widely spaced borings and/or test pits. Field data are combined with results from laboratory tests of soil and rock samples obtained from field exploration (if applicable), observations made during site reconnaissance, and historical information to form one or more models of the expected subsurface conditions beneath the site. Local geology and alterations of the site surface and subsurface by previous and proposed construction are also important considerations. Geotechnical engineers apply their engineering training, experience, and judgment to adapt the requirements of the prospective project to the subsurface model(s). Estimates are made of the subsurface conditions that will likely be exposed during construction as well as the expected performance of foundations and other structures being planned and/or affected by construction activities.

The culmination of these geotechnical-engineering services is typically a geotechnical-engineering report providing the data obtained, a discussion of the subsurface model(s), the engineering and geologic engineering assessments and analyses made, and the recommendations developed to satisfy the given requirements of the project. These reports may be titled investigations, explorations, studies, assessments, or evaluations. Regardless of the title used, the geotechnical-engineering report is an engineering interpretation of the subsurface conditions within the context of the project and does not represent a close examination, systematic inquiry, or thorough investigation of all site and subsurface conditions.

Geotechnical-Engineering Services are Performed for Specific Purposes, Persons, and Projects, and At Specific imes

Geotechnical engineers structure their services to meet the specific needs, goals, and risk management preferences of their clients. A geotechnical-engineering study conducted for a given civil engineer will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client.

Likewise, geotechnical-engineering services are performed for a specific project and purpose. For example, it is unlikely that a geotechnical-engineering study for a refrigerated warehouse will be the same as one prepared for a parking garage; and a few borings drilled during a preliminary study to evaluate site feasibility will not be adequate to develop geotechnical design recommendations for the project.

Do not rely on this report if your geotechnical engineer prepared it:

- for a different client;
- for a different project or purpose;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, the reliability of a geotechnical-engineering report can be affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If you are the least bit uncertain* about the continued reliability of this report, contact your geotechnical engineer before applying the recommendations in it. A minor amount of additional testing or analysis after the passage of time – if any is required at all – could prevent major problems.

Read this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read the report in its entirety. Do not rely on an executive summary. Do not read selective elements only. *Read and refer to the report in full.*

You Need to Inform Your Geotechnical Engineer About Change

Your geotechnical engineer considered unique, project-specific factors when developing the scope of study behind this report and developing the confirmation-dependent recommendations the report conveys. Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the elevation, configuration, location, orientation, function or weight of the proposed structure and the desired performance criteria;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project or site changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept*

responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.

Most of the "Findings" Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site's subsurface using various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing is performed.* The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgement to form opinions about subsurface conditions throughout the site. Actual sitewide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team through project completion to obtain informed guidance quickly, whenever needed.

This Report's Recommendations Are Confirmation-Dependen

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, they are not final, because the geotechnical engineer who developed them relied heavily on judgement and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* exposed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation.*

This Report Could Be Misinterpreted

Other design professionals' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a continuing member of the design team, to:

- confer with other design-team members;
- help develop specifications;
- review pertinent elements of other design professionals' plans and specifications; and
- be available whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction-phase observations.

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note conspicuously that you've included the material for information purposes only.* To avoid misunderstanding, you may also want to note that "informational purposes" means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. This happens in part because soil and rock on project sites are typically heterogeneous and not manufactured materials with well-defined engineering properties like steel and concrete. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The personnel, equipment, and techniques used to perform an environmental study – e.g., a "phase-one" or "phase-two" environmental site assessment – differ significantly from those used to perform a geotechnical-engineering study. For that reason, a geotechnical-engineering report does not usually provide environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated subsurface environmental problems have led to project failures.* If you have not obtained your own environmental information about the project site, ask your geotechnical consultant for a recommendation on how to find environmental risk-management guidance.

Obtain Professional Assistance to Deal with Moisture Infiltration and Mol

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, the engineer's services were not designed, conducted, or intended to prevent migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, ***proper implementation of the geotechnical engineer's recommendations will not of itself be sufficient to prevent moisture infiltration. Confront the risk of moisture infiltration*** by including building-envelope or mold specialists on the design team. ***Geotechnical engineers are not building-envelope or mold specialists.***

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Appendix G

Preliminary Hydrology Report

County of San Bernardino
LAND DEVELOPMENT

PRELIMINARY
APPROVAL

THE APPROVAL OF THIS REPORT SHALL NOT BE CONSTRUED TO BE A PERMIT FOR ANY DEVELOPMENT OR SITE IMPROVEMENT

By: Timothy Cheng (D8256)
Date: 05/13/2025 4:02:33 PM

This report has Preliminary Approval. Prior to Final Approval of the report, all outstanding comments and requirements shall be met.

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PRELIMINARY HYDROLOGY REPORT

Hume SoCal

64144 Hume Lake Road
Hume, CA 93628

Preliminary DRNSTY-2024-00009
PROJ-2024-00046

APN: 0328-071-04, 0328-071-05, 0328-071-07, 0328-071-10, 0328-121-40, 0328-121-42

April 2025

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KHA Project # 195436002

This document, together with the concepts and designs presented herein, as an instrument of service, is intended only for the specific purpose and client for which it was prepared. Reuse of and improper reliance on this document without written authorization and adaptation by Kimley-Horn and Associates, Inc. shall be without liability to Kimley-Horn and Associates, Inc.

Certification by Engineer or Authorized Qualified Designee

I certify under penalty of law that this document and all attachments were prepared under my jurisdiction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathered the information, to the best of my knowledge and belief, the information submitted is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.



04/17/2025

Robert Otte, PE (No. 44120) Date



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References

Hydrology Manual. San Bernardino County, August 1986.

Section 100

100.0 Introduction

Kimley-Horn and Associates has been retained to prepare a Preliminary Drainage Study for the proposed Hume SoCal development. The 258.7-acre site is located along Green Valley Lake Road and Smokey Way in unincorporated Running Springs, San Bernardino County. The project site encompasses Parcel 07 and Parcel 10 of Tentative Parcel Map 032807 and Parcels 40 and 42 of Tentative Parcel Map 032812. The APNs for the project site are 0328-071-04, 0328-071-05, 0328-071-07, 0328-071-10, 0328-121-40, and 0328-121-42.

In the proposed condition, the site parcels will be split into five (5) separate phases as described below.

Parcel 10 is split into two (2) phases, Phase 4 and Phase 5. Phase 4 includes the development of the Elementary age camp and will consist of 32 proposed buildings varying in size and use. Phase 4 also includes landscaping, concrete hardscape, parking lots, three activity quads, a pool, and an amphitheater.

Phase 5 includes the development of the Wildwood camp and will consist of 16 proposed buildings varying in size and use. Phase 5 also includes landscaping, concrete hardscape, parking lots, three activity quads, a pool, and an amphitheater.

Parcel 07 will not be split into separate phases but will be developed as Phase 1. Phase 1 includes the development of the Middle School age camp and will consist of 25 proposed buildings and 12 existing buildings, all varying in size and use. Phase 1 also includes landscaping, concrete hardscape, parking lots, seven (7) activity quads, an existing pool, an existing pond, and an existing amphitheater.

Parcel 42 will not be split into separate phases but will be developed as Phase 3. Phase 3 includes the development of the adult camp and consists of one (1) proposed building. Phase 3 also includes landscaping, concrete hardscape, and parking lots.

Parcel 40 will not be split into separate phases but will be developed as Phase 2. Phase 2 includes the High School age camp and consists of 33 proposed buildings varying in size and use. Phase 2 also includes landscaping, concrete hardscape, parking lots, six (6) activity quads, a pool, and an amphitheater.

The purpose of this report is to provide information regarding the Storm Water Management System (SWMS) design for the proposed development. This investigation was conducted to evaluate the hydrologic conditions in the existing and proposed conditions of the site and to size the appropriate stormwater mitigation.

Since the project site is NOT located within the MS Phase I boundary, this report will NOT be accompanied by a Water Quality Management Plan (WQMP). There are no proposed BMPs on site since storm water runoff is not required to be treated. There will be off-site drainage conveyed through the site through the various existing streams located within the site limits. The off-site runoff remains unchanged from the existing to the proposed and is not anticipated to cause any negative impacts downstream or to proposed infrastructure. Using the retention volume achieved from routing impervious areas to pervious areas, the proposed development is expected to generate negligible

additional run-off downstream for storms up to the 100-year condition when compared to the existing condition. There are three (3) proposed detention basins to limit the peak outflow to 90% of the pre-development flow in areas that see an increase in runoff due to the proposed development.

100.1 Project Description

The proposed project consists of a proposed Elementary age camp, Middle School age camp, High School age camp, an adult age camp, and a Wildwood camp, with associated proposed buildings, landscaping, concrete hardscape, parking lots, activity quads, pools, and amphitheater. The proposed landscaping will consist of trees, shrubs, and drought tolerant native ground cover.

Land use of the proposed site will include indoor and outdoor entertainment/activity areas, dining halls, dormitories, pools, and bathroom buildings. The proposed project will also include trash enclosures. Expected waste will include food, grease from cooking, trash, and debris.

100.2 Location

The 258.7-acre site is located along Green Valley Lake Road and Smokey Way in the unincorporated Runnings Springs, San Bernardino County. The project is bounded by Green Valley Lake Road to the east, undeveloped land to the north, west, and south.

For reference, see **Appendix A**, *Vicinity Map*.

100.3 Methodology

This Preliminary Drainage Study is intended to comply with the requirements of the San Bernardino County Hydrology Manual to assist in the proposed development of the existing site into the proposed Hume SoCal campground. The report includes existing and proposed condition hydrologic analysis to determine if the proposed development's runoff will have any impact on downstream properties.

A rational method analysis for the 10-year and 100-year events in accordance with the San Bernardino Hydrology Manual (SBC, 1986) and the 2010 Addendum was completed to calculate the peak discharges for the existing and proposed project conditions. Results from the proposed condition rational method analysis were used for the proposed condition synthetic unit hydrograph analysis.

Drainage sub-areas were delineated utilizing existing and proposed contours once all critical blueline stream locations, discharge points, and confluences were identified throughout the Hume SoCal campground. At each of these locations, sub-areas were delineated to calculate the flows traveling through each blueline stream. Initial sub-areas, less than 10 acres and with a flow path less than 1,000 feet were identified at the most upstream end of each sub-area. Each sub-area delineated was less than 640 acres as outlined in the SBC, 1986 manual. Flow lengths for each initial sub-area were considered overland flow before becoming channelized flow within the blueline streams. Time of concentrations (TCs) were determined using the Time of Concentration nomograph for initial subarea per the SBC, 1986. Peak flows for each sub-area were calculated using each of the above-mentioned characteristics and the Advanced Engineering Software (AES).

Per the 2010 San Bernardino County Hydrology Manual Addendum, arid regions within San Bernardino County should use NOAA Atlas 14 rainfall atlas and the associated data base (NOAA, 2006) or other local rainfall gauge data for hydrology studies. After review of available data, the NOAA Atlas 14 rainfall data was chosen for this. NOAA Atlas 14 also provides information for the various peak durations required to complete the hydrology analysis for the current study.

According to NOAA Atlas 14, the following are the 1 hour-storm precipitation values that have been utilized for our study:

10-year storm 1-hour intensity (inch/hour)	=	1.40
100-year storm 1-hour intensity (inch/hour)	=	2.30

Appendix G contains the site-specific tabular output from NOAA Atlas 14.

The type of soil and soil conditions are major factors affecting infiltration/detention and resultant storm water runoff. The Natural Resources Conservation Service (NRCS) has classified the on-site soil into one of the general hydrologic soil groups for comparing infiltration and runoff rates. Each group is based on properties that influence runoff, such as water infiltration rate, texture, natural discharge and moisture condition. The runoff potential is based on the amount of runoff at the end of a long duration storm that occurs after wetting and swelling of the soil not protected by vegetation. Using the United States Department of Agriculture Natural Resources Conservation Service Web Soil Survey online tool and the Stormwater Facility Mapping online tool for San Bernardino National Forest Area, it was determined the hydrologic soil group classification is B and D. Soil group B is defined as soils having a moderate infiltration rate when thoroughly wet. Soil group D is defined as soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. See **Appendix G** for the Web Soil Survey Report.

The preliminary Geotechnical Investigation from Leighton and Associates, Inc. dated December 13, 2023, was conducted for the site. See **Appendix F** for the Geotechnical Report. Since the geotechnical investigation did not include percolation testing, an infiltration rate of 0.06 in/hr was assumed based on the NRCS soils report.

In addition, antecedent moisture condition (AMC) II was used to calculate the 10-year and AMC III for the 100-year peak flows based on the 2010 San Bernardino County Hydrology Manual Addendum. The land use for the existing drainage areas was selected as natural poor cover, based on the existing conditions. The land use for the proposed drainage areas were selected based on the percent of pervious area for each of the drainage areas, as shown on **Table 1**. The combination of the soil and coverage type was used as the basis for selecting the appropriate curve numbers used to calculate the soil loss rates. See **Appendix G** Figure C-4 for curve numbers based on hydrologic soil conditions for pervious areas.

Table 1: Proposed Drainage Area Pervious Percentages

Drainage Area	Drainage Area (AC)	Percent Pervious (%)	Percent Pervious utilized in Hydrosoft (%)
DMA-1	6.13	100	90
DMA-2	15.18	94.3	90
DMA-3	85.57	91.3	90
DMA-4	2.86	99.2	90
DMA-5	16.64	92.6	90
DMA-6	2.74	100	90
DMA-7	119.78	97.1	90
DMA-8	43.54	90.0	90
DMA-9	16.90	100	90
DMA-10	18.80	97.9	90
DMA-11	22.64	93.3	90
DMA-12	18.64	83.6	80
DMA-13	5.79	99.2	90
DMA-14	4.08	100	90
DMA-15	12.90	85.4	85
DMA-16	0.86	100	90
DMA-17	13.28	88.1	85
DMA-18	25.02	98.1	90
DMA-19	10.53	81.0	80

Using the data specific to the project site, as discussed above, Advanced Engineering Software (AES) Hydrosoft package was used to complete the rational method and the synthetic unit hydrograph analyses. The results of the analyses are included in **Appendix D and E**. The basin routing results are included in **Appendix E**.

100.4 Drainage Characteristics

The site is in Zone D per the Federal Emergency Management Administration (FEMA) Flood Insurance Rate Map (FIRM) panel 06071C8000H, dated August 28, 2008. Flood Zone D is defined by FEMA as an area with possible but undetermined flood hazard. No portion of the site is located within the special flood hazard area inundated by the 100-year flood. Therefore, there is no impact to the regulatory floodplain.

For reference, see **Appendix B**, *FIRM Map.*

Three (3) perennial drainage features and four (4) ephemeral drainage features were observed within the boundaries of the project site during field explorations and delineation. These blueline streams are shown and labeled within the drainage maps included in **Appendix D and E.**

For reference, see **Appendix F,** *Reference Materials* for detailed information on the Delineation of State and Federal Jurisdictional Waters.

100.4.1 Pre-development Condition

The existing condition of the project site is predominantly vacant, with existing special development-residential buildings encompassing only a minor portion of the project area. Currently, there is an existing bridge crossing an unnamed tributary, which runs through the middle of the site, and there are a couple existing storm culverts under Green Valley Lake Road that are not anticipated to be impacted by the development of this project. Under existing conditions, storm water runoff flows in a northeast-southwest direction, discharges into several unnamed streams through the site, continues west along until ultimately discharging into Deep Creek. The existing drainage paths will be maintained for the proposed development.

The existing surrounding adjacent areas are undeveloped and remain undeveloped in the proposed condition. In the existing condition, there are some off-site flows from the east that are conveyed through several existing streams located through the site. In the proposed condition the off-site flows will continue to be conveyed through the existing streams through the site. Therefore, off-site flows entering the site are not anticipated to negatively impact the proposed development associated with the project.

Table 2 shows a summary of the pre-development flows for 10 and 100-year storm events.

Table 2: Existing Hydrology Results

Sub-basin ID	Drainage Area (AC)	Q_{10} (cfs)	Q_{100} (cfs)
DA 1 (DMA-1)	6.13	23.66	39.58
DA 1 (DMA-4)	2.86	11.12	18.60
DA 2 (DMA-2)	14.39	48.53	81.35
DA 3 (DMA 3,5,6,7,8)	281.42	733.08	1248.92
DA 4 (DMA-9)	16.90	60.93	103.94
DA 5 (DMA-10)	19.20	63.05	107.90
DA 6 (DMA-11,12,13)	80.89	219.07	373.78
DA 7 (DMA-14)	4.08	14.09	23.62
DA 8 (DMA-15)	14.57	43.52	73.10
DA 9 (DMA-16)	0.96	3.49	5.84

See **Appendix D**, *Existing Drainage Map and Calculations*.

100.4.2 Post-development Condition

The proposed development includes the construction of proposed Elementary age camp, Middle School age camp, High School age camp, an adult age camp, and a Wildwood camp. The developed area is approximately 60-acres. The proposed development is spread across all parcels within the site, Parcels 07 and 10 of Tentative Parcel Map 032807 and Parcels 40 and 42 of Tentative Parcel Map 032812. In the proposed condition, the site parcels will be split into five (5) separate phases: Phase 1 – Middle

School Age Camp, Phase 2 – High School Age Camp, Phase 3 – Adult Camp, Phase 4 – Elementary Age Camp, and Phase 5 – Wildwood Camp.

In the proposed condition, Parcel 10 is split into two phases including Phase 4 and Phase 5, Parcel 07 will not be split into separate phases but will be developed as Phase 1, Parcel 42 will not be split into separate phases but will be developed as Phase 3, and Parcel 40 will not be split into separate phases but will be developed as Phase 2. Each Phase will consist of a variety of proposed buildings varying in size and use, landscaping, concrete hardscape, parking lots, activity quads, pools, and amphitheaters. See **Appendix C** for the project Site Plan and Grading Plan.

The grading proposed for all Parcels will maintain the natural flow pattern of the existing site, draining in the south-west direction, to the maximum extent possible. Proposed grading was completed to maximize the impervious areas flowing to on-site pervious areas and promote on-site infiltration. All Parcels will continue to ultimately discharge into Deep Creek.

The post-development drainage areas are comprised of nine (9) drainage areas with 19 subareas. See **Table 3** for sub-basin and drainage area breakdown.

Drainage for DA 1, DA 4, DA 7, and DA 9 remain undeveloped in the proposed condition. Drainage for DA 2, DA 5, and DA 6 will be self-mitigating.

DA 2 includes minor proposed development associated with the Wildwood camp located in a portion of Parcel 10. Storm water runoff from this basin will sheet and concentrated flow through the proposed roadway before being collected by proposed inlets and discharged to existing vegetated landscaping before ultimately discharging into Deep Creek.

DA 3 includes several different portions of the proposed Elementary, Middle School, and Wildwood camps located within portions of Parcels 07 and 10. Storm water runoff from these basins will sheet flow off proposed buildings, through proposed vegetated landscaping before concentrating in either proposed roadway or existing streams.

DA 5 includes minor proposed development associated with the adult camp located in a portion of Parcel 42. Storm water runoff from this basin will sheet and concentrated flow through the proposed roadway before being collected by proposed inlets and discharged to existing vegetated landscaping before ultimately discharging into Deep Creek.

DA 6 includes several different portions of the proposed High School and Adult camp located within portions of Parcels 07 and 40. Storm water runoff from these basins will sheet flow off proposed buildings, through proposed vegetated landscaping before concentrating in either proposed roadway or existing streams.

DA 8 includes proposed development associated with the High School camp located in a portion of Parcel 40. Storm water runoff from these basins will sheet flow off proposed buildings, through proposed vegetated landscaping before concentrating in either proposed roadway and collected in proposed inlets and discharging to an existing stream, before ultimately discharging into Deep Creek.

When comparing the flows tributary to the outfall of DA 3 and DA 8 from the proposed condition to the existing condition, the proposed condition is expected to increase the peak flows under the 100-year storm event. The peak flows will be mitigated to 90% of the predeveloped runoff using the proposed on-site detention basins.

Table 3 shows a summary of the unmitigated post-development flows for 10 and 100-year storm events.

Table 3: Proposed Hydrology Results (unmitigated)

Sub-basin ID	Drainage Area (AC)	Q_{10} (cfs)	Q_{100} (cfs)
DA 1 (DMA-1)	6.13	23.66	39.58
DA 1 (DMA-4)	2.86	10.89	18.22
DA 2 (DMA-2)	15.18	48.53	81.35
DA 3 (DMA 3,5,6,7,8,17)	281.55	751.42	1272.58
DA 4 (DMA-9)	16.90	60.93	103.94
DA 5 (DMA-10)	18.80	60.90	104.27
DA 6 (DMA-11,12,13,18,19)	82.62	193.26	334.96
DA 7 (DMA-14)	4.08	14.09	23.62
DA 8 (DMA-15)	12.90	45.65	77.78
DA 9 (DMA-16)	0.86	3.13	5.24

See **Appendix E**, *Proposed Drainage Map and Calculations.*

Table 4 shows a summary of the post-development rational method and the synthetic unit hydrograph analyses for each sub-area.

Table 4: Summary of AES Inputs

Sub-basin ID	Upstream Node ID	Upstream Node Elevation	Downstream Node ID	Downstream Node Elevation	Flow Length (FT)	Sub-area (AC)	Land Use	Soil Type	Ap (Decimal)	Curve Number	Rainfall Intensity
DA -1	1.1	6652.19	1.2	6591.92	291.50	6.461	Residential - 0.4 Dwelling/Acre	D	0.900	91	4.477
	1.2	6591.92	1.3	6414.01	619.40	4.74	Residential - 0.4 Dwelling/Acre	D	0.900	91	4.477
DA-2	2.1	6694.25	2.2	6619.24	487.50	1.63	Residential - 0.4 Dwelling/Acre	D	0.900	91	3.936
	2.2	6619.24	2.3	6372.85	1548.50	12.76	Residential - 0.4 Dwelling/Acre	D	0.900	91	3.936
DA-4	4.1	6549.82	4.2	6358.84	451.80	2.86	Residential - 0.4 Dwelling/Acre	D	0.900	91	4.418
DA-7	7.1	7336.42	7.2	7060.88	911.20	6.53	Residential - 0.4 Dwelling/Acre	D	0.900	91	3.653
	7.2	7060.88	7.3	6472.84	4642.50	102.45	Residential - 0.4 Dwelling/Acre	D	0.900	91	3.653
	7.3	6472.84	7.4	6404.98	953.33	10.33	Residential - 0.4 Dwelling/Acre	D	0.900	91	2.980
	7.4	6404.98	17.3	6378.96	486.30	6.63	Residential - 0.4 Dwelling/Acre	D	0.900	91	2.814
DA-3	3.1	7022.75	3.2	6906.51	570.40	1.09	Residential - 0.4 Dwelling/Acre	D	0.900	91	3.921
	3.2	6906.51	3.3	6598.45	1309.60	32.62	Residential - 0.4 Dwelling/Acre	D	0.900	91	3.921
	3.3	6598.45	7.3	6472.84	1872.50	51.85	Residential - 0.4 Dwelling/Acre	D	0.900	91	3.445

Sub-basin ID	Upstream Node ID	Upstream Node Elevation	Downstream Node ID	Downstream Node Elevation	Flow Length (FT)	Sub-area (AC)	Land Use	Soil Type	Ap (Decimal)	Curve Number	Rainfall Intensity
DA-8	8.1	6760.02	8.2	6589.39	584.70	2.35	Residential - 0.4 Dwelling/Acre	D	0.900	91	4.061
	8.2	6589.10	8.3	6472.97	897.40	16.79	Residential - 0.4 Dwelling/Acre	D	0.900	91	4.061
	8.4	6711.74	8.5	6532.00	757.10	1.30	Residential - 0.4 Dwelling/Acre	D	0.900	91	3.719
	8.5	6532.00	8.3	6472.97	426.20	1.43	Residential - 0.4 Dwelling/Acre	D	0.900	91	3.719
	8.3	6472.97	7.4	6404.98	1112.00	21.66	Residential - 0.4 Dwelling/Acre	D	0.900	91	3.539
DA-17	17.1	6510.50	17.2	6452.98	886.60	3.21	Public Park	D	0.850	91	3.145
	17.2	6452.98	17.3	6378.96	393.20	1.17	Public Park	D	0.850	91	3.145
	17.3	6378.96	17.4	6355.81	386.20	2.27	Public Park	D	0.850	91	2.775
	17.4	6355.81	6.2	6352.80	100.30	0.34	Public Park	D	0.850	91	2.745
DA-5	5.1	6584.65	5.2	6467.32	696.80	3.31	Residential - 0.4 Dwelling/Acre	D	0.900	91	3.627
	5.2	6467.32	17.4	6355.81	1035.00	13.33	Residential - 0.4 Dwelling/Acre	D	0.900	91	3.627
DA-6	6.1	6435.22	6.2	6352.80	236.40	0.35	Residential - 0.4 Dwelling/Acre	D	0.900	91	4.783
	6.2	6352.80	6.3	6334.97	138.70	2.05	Residential - 0.4 Dwelling/Acre	D	0.900	91	2.735
DA-9	9.1	6647.05	9.2	6532.00	392.70	1.12	Residential - 0.4 Dwelling/Acre	B	0.900	76	4.386
	9.2	6532.00	9.3	6353.41	504.40	15.78	Residential - 0.4 Dwelling/Acre	B	0.900	76	4.386
DA-10	10.1	6650.00	10.2	6529.00	553.80	3.88	Residential - 0.4 Dwelling/Acre	B	0.900	76	3.980
	10.2	6529.00	10.3	6335.41	445.30	14.925	Residential - 0.4 Dwelling/Acre	B	0.900	76	3.980

Sub-basin ID	Upstream Node ID	Upstream Node Elevation	Downstream Node ID	Downstream Node Elevation	Flow Length (FT)	Sub-area (AC)	Land Use	Soil Type	Ap (Decimal)	Curve Number	Rainfall Intensity
DA-18	18.1	6836.40	18.2	6643.42	965.90	6.56	Residential - 0.4 Dwelling/Acre	D	0.900	91	3.431
	18.2	6643.42	18.3	6483.82	1375.10	18.46	Residential - 0.4 Dwelling/Acre	D	0.900	91	3.431
	18.3	6483.82	19.3	6474.00	125.00		~Pipe Flow~				
DA-19	19.1	6606.25	19.2	6550.33	618.10	1.90	Residential - 1 Dwelling/Acre	D	0.800	91	3.523
	19.2	6550.33	19.3	6474.00	839.90	7.34	Residential - 1 Dwelling/Acre	D	0.800	91	3.273
	19.3	6474.00	19.4	6454.00	68.50	1.29	Residential - 1 Dwelling/Acre	D	0.800	91	4.880
	19.4	6454.00	12.4	6429.97	133.80		~Pipe Flow~				
DA-12	12.1	6594.43	12.2	6485.16	999.10	4.19	Residential - 1 Dwelling/Acre	D	0.800	91	3.287
	12.2	6485.16	12.3	6411.10	1028.70	7.36	Residential - 1 Dwelling/Acre	D	0.800	91	2.965
	12.4	6429.97	12.3	6411.10	543.90	2.79	Residential - 1 Dwelling/Acre	D	0.800	91	2.999
	12.3	6411.10	11.4	6371.00	651.10	4.30	Residential - 1 Dwelling/Acre	D	0.800	91	2.965
DA-11	11.1	6651.16	11.2	6565.95	991.60	1.36	Residential - 0.4 Dwelling/Acre	B	0.900	76	3.151
	11.2	6565.95	11.3	6546.53	251.20	2.07	Residential - 0.4 Dwelling/Acre	B	0.900	76	3.056
	11.3	6546.53	11.4	6371.00	1325.20	19.22	Residential - 0.4 Dwelling/Acre	B	0.900	76	3.056
	11.4	6371.00	13.2	6369.35	54.80	0.19	Residential - 0.4 Dwelling/Acre	B	0.900	76	2.751

Sub-basin ID	Upstream Node ID	Upstream Node Elevation	Downstream Node ID	Downstream Node Elevation	Flow Length (FT)	Sub-area (AC)	Land Use	Soil Type	Ap (Decimal)	Curve Number	Rainfall Intensity
DA-13	13.1	6506.32	13.2	6369.35	852.50	4.74	Residential - 0.4 Dwelling/Acre	D	0.900	91	3.440
	13.2	6369.35	13.3	6363.20	107.90	0.86	Residential - 0.4 Dwelling/Acre	D	0.900	91	2.742
DA-14	14.1	6509.56	14.2	6270.66	671.10	4.08	Residential - 0.4 Dwelling/Acre	D	0.900	91	4.027
DA-15	15.1	6527.52	15.2	6502.01	195.50	0.35	Public Park	D	0.850	91	4.607
	15.2	6502.01	15.3	6460.41	646.00	3.87	Public Park	D	0.850	91	4.111
	15.3	6460.41	15.4	6275.97	551.20	8.68	Public Park	D	0.850	91	4.111
DA-16	16.1	6532.31	16.2	6490.00	322.00	0.86	Residential - 0.4 Dwelling/Acre	D	0.900	91	4.228

100.5 Storm Water Mitigation

Drainage for DA 1, DA 4, DA 7, and DA 9 remain undeveloped in the proposed condition. Drainage for DA 2, DA 5, and DA 6 will be self-mitigating.

When comparing the flows tributary to the outfall of DA 3 and DA 8 from the proposed condition to the existing condition, the proposed condition is expected to increase the peak flows under the 100-year storm event. The peak flows will be mitigated to 90% of the predeveloped runoff using the three (3) proposed on-site detention basins. Detailed design and analysis of these proposed detention basins will occur with the Final Drainage Study for the project.

Table 5: Mitigated Flow Summary

Sub-basin ID	EX Q_{10} (cfs)	EX Q_{100} (cfs)	PR Q_{10} (cfs)	PR Q_{100} (cfs)	Proposed Mitigation**
DA 1 (DMA-1)	23.66	39.58	23.66	39.58	N/A*
DA 1 (DMA-4)	11.12	18.60	10.89	18.22	N/A*
DA 2 (DMA-2)	48.53	81.35	48.53	81.35	N/A*
DA 3 (DMA 3,5,6,7,8,17)	733.08	1248.92	751.42	1272.58	Pond DMA-3 & 8
DA 4 (DMA-9)	60.93	103.94	60.93	103.94	N/A*
DA 5 (DMA-10)	63.05	107.90	60.90	104.27	N/A*
DA 6 (DMA-11,12,13,18,19)	219.07	373.78	193.26	334.96	N/A*
DA 7 (DMA-14)	14.09	23.62	14.09	23.62	N/A*
DA 8 (DMA-15)	43.52	73.10	45.65	77.78	Pond DMA-15
DA 9 (DMA-16)	3.49	5.84	3.13	5.24	N/A*

** Detention not required; no development is proposed or proposed flow decreases from existing without mitigation.*
*** Proposed pond outflow to be mitigated to 90% of the pre-development inflow. See proposed drainage map for pond locations.*

100.6 Conclusion

The development of the existing camp site into the proposed Hume SoCal campground will not create any adverse impacts downstream for storm events up to the 100-year storm. The entire site will ultimately discharge into Deep Creek.

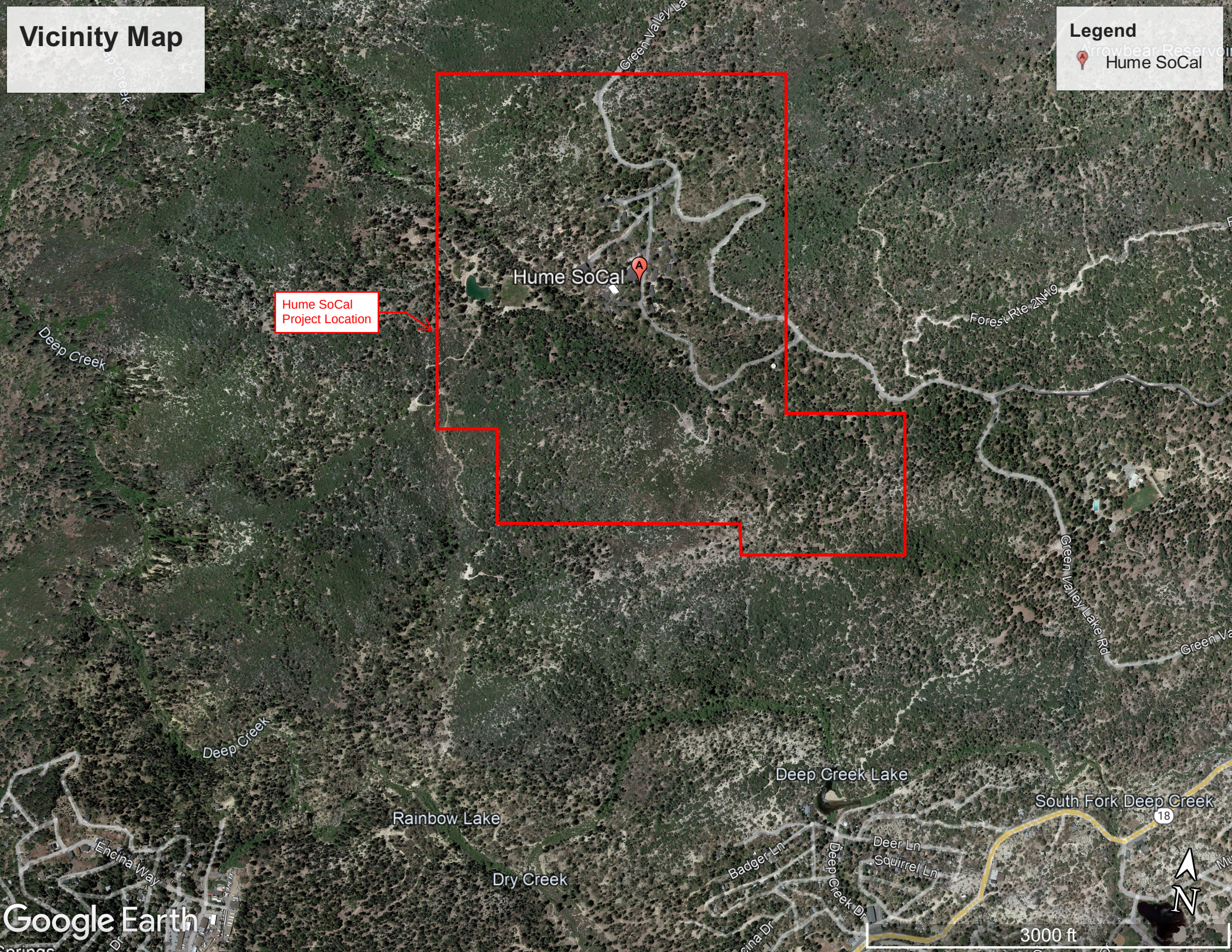
Since the project site is NOT located within the MS Phase I boundary, there are no proposed BMPs on site since storm water runoff is not required to be treated. There will be off-site drainage conveyed through the site through the various existing streams located within the site limits. The off-site runoff remains unchanged from the existing to the proposed and is not anticipated to cause any negative impacts downstream or to proposed infrastructure. Using the retention volume achieved from routing impervious areas to pervious areas, the proposed development is expected to generate negligible additional run-off downstream for storms up to the 100-year condition when compared to the existing condition. Drainage for DA 1, DA 4, DA 7, and DA 9 remain undeveloped in the proposed condition. Drainage for DA 2, DA 5, and DA 6 will be self-mitigating.

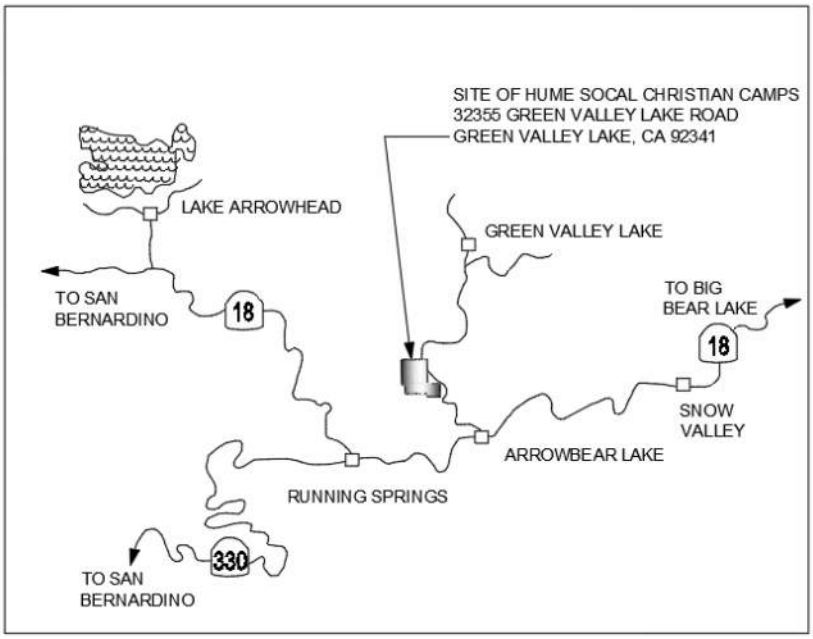
When comparing the flows tributary to the outfall of DA 3 and DA 8 from the proposed condition to the existing condition, the proposed condition is expected to increase the peak flows under the 100-year storm event. The peak flows will be mitigated to 90% of the predeveloped runoff using the three (3) proposed on-site detention basins. Detailed design and analysis of these proposed detention basins will occur with the Final Drainage Study for the project.

Appendix A

Vicinity Map

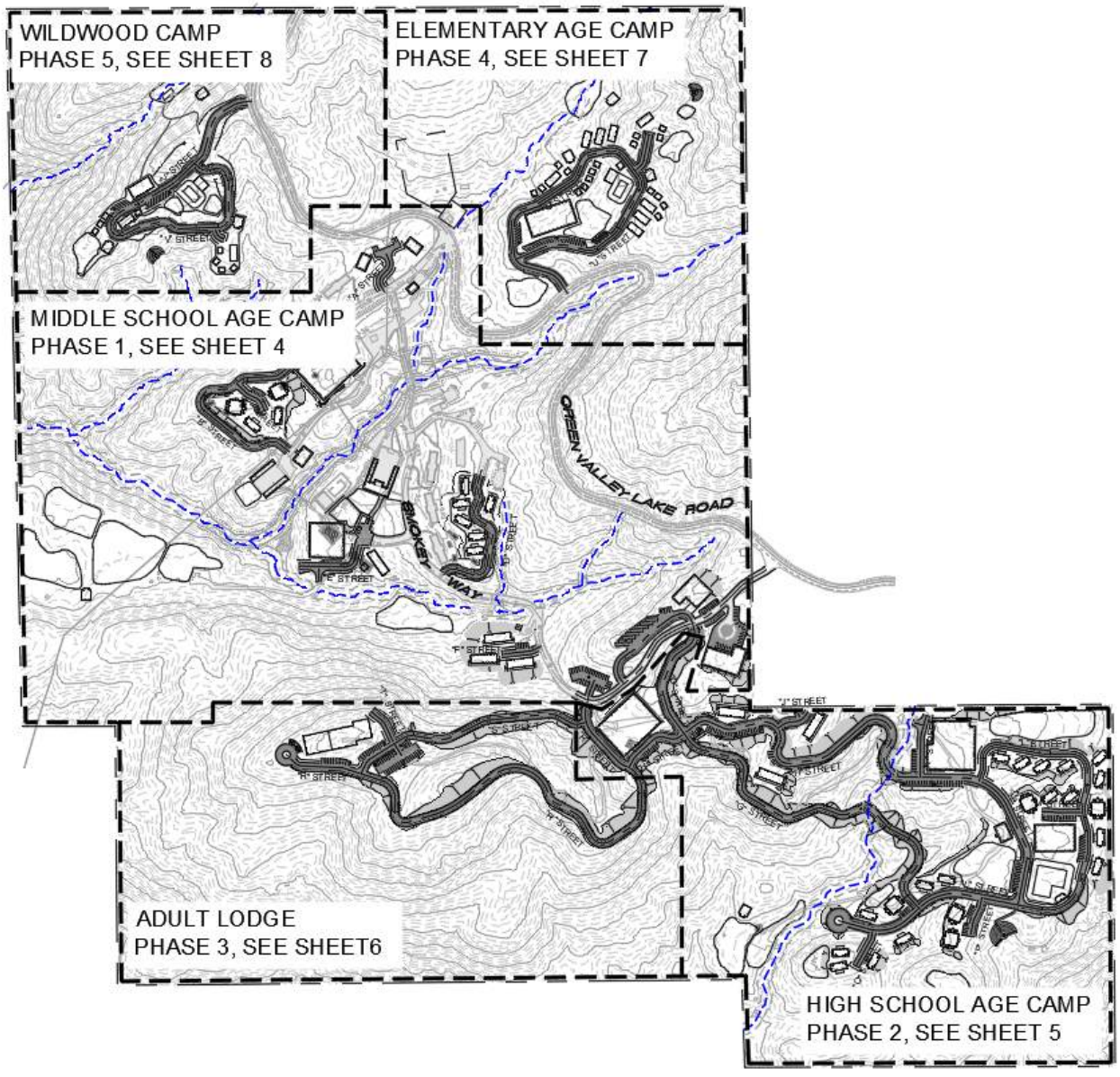
Vicinity Map





VICINITY MAP

NOT TO SCALE



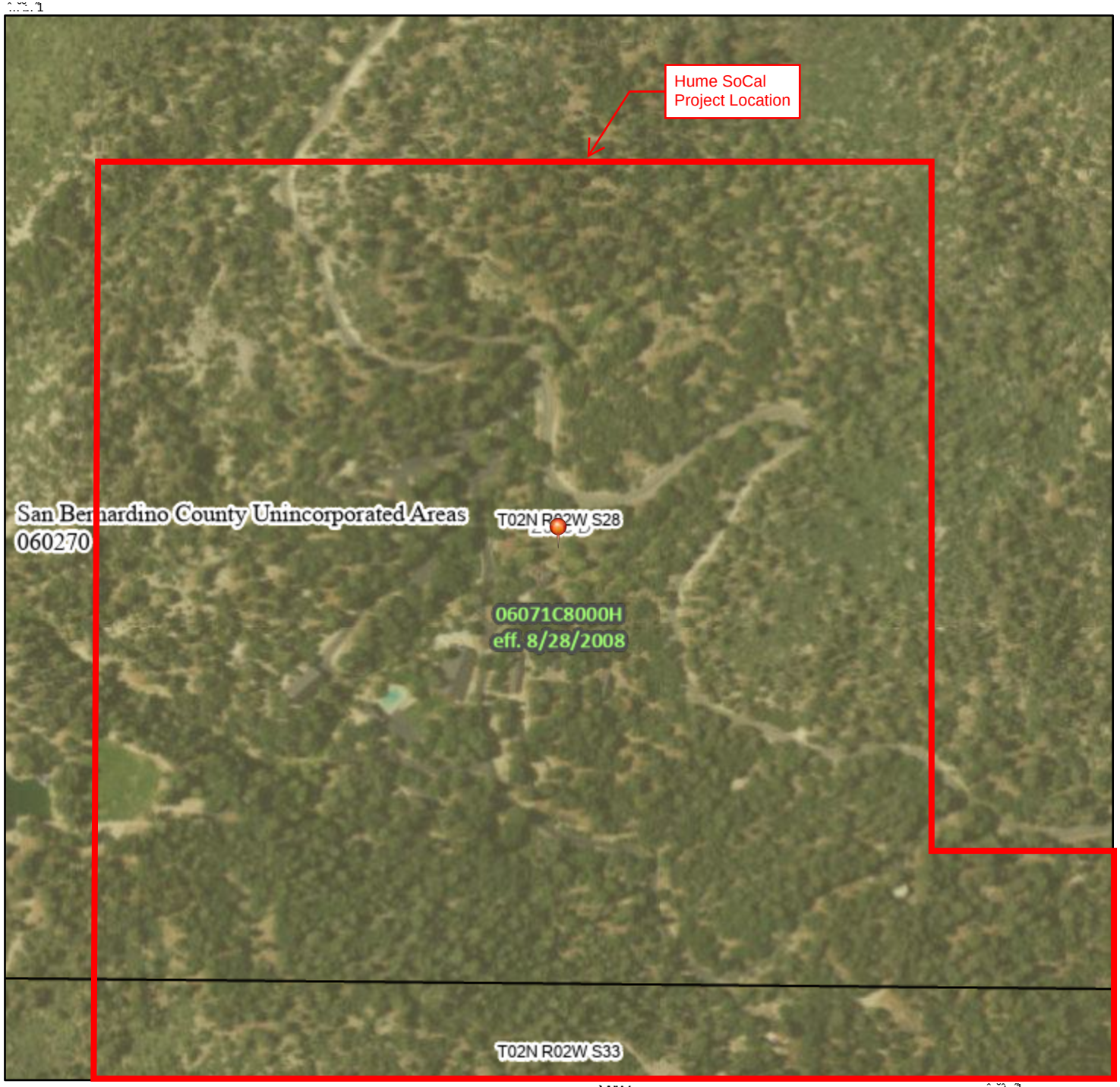
Appendix B

FEMA Map

DWR Best Available Map

1DWLRQDO)ORRG+D]DUG'DWD;6WWH

FEMA



)HHW

%DVHPDS,PDJHU\6RXUFH 86'$1DWLRQDO DS

/HJHQG

6()6$)(6(1(5$/5(6758&7,21

L:KHQRW%DVH)ORRG(OHYDWLRQ %)(
=RQH9
L:LWK%)(RUHQHUJK =RQH$(9(6$
5HGXFHG)ORRG5LVN'XH72/HYHH

$QQXDO &KDQFH)ORRG+D]DUG $UHDV
R DQQXDO FKDQFH IORRG ZDWHUV DYHUDJH
G+D WKDW HVW WKDQ RQH IRRW RU ZLWK GUDLQDJH
DUHDV R OHVV WKDQ RQH VTXDUH PLOH =RQH;

)XWXUH&RQGLWLRQV$QQXDO
&KDQFH)ORRG+D]DUG =RQH;
$UHDV ZLWK5HGXFHG)ORRG5LVNGXHWR
/HYHH6HH1RWH =RQH;
$UHDV ZLWK)ORRG5LVNGXHWR/HYHH =RQH'

$UHDV RI0LQLPDO)ORRG+D]DUG =RQH;
(IIHFWLYH%RXQGDU\
$UHDV 8QGHWHUPLQHG)ORRG+D]DUG =RQH'

&KDQQHO &OYHUW RU 6WUXFWXUH
/HYHH L'LNH RU)ORRGZDOO

&URVV6HFWLRQV ZLWK$QQXDO &KDQFH
DWHU 6XUIDFH(OHYDWLRQ
&RDVWDO 7UDQVHFW
%DVH)ORRG(OHYDWLRQ/LQH %)(
/LPLW R 6WUXFWXUH
-XULVGLFWLRQ%RXQGDU\
&RDVWDO 7UDQVHFW %DVH/LQH
3URFHVV%DVH/LQH
+GURGUDSKLF)HDWXUH

L'LWDO DWD$YDLODEOH
1R'LWDO DWD$YDLODEOH
8QPDSSHG

7KHSLQGLVSODHGRQWKHSLV DQDSSURSULDWH
SRQW VHOHFWHGEWKHXHU DQGGRHV QRW UHSUHV
DQDWKRULWDWLYHSURSHUW\ORFDWLRQ

7KLVPSFRROLHVZLWKJSV VWDQGDUGIRU WKHXHR
GLWDO IORRGPS/LI LW LVQRW YRLGV/GHVFULEHGEHORZ
7KHEDVHPS VKRZQFRROLHVZLWKJSVEDVHPS
DFFXUDWHVDQGGUG/

7KHIORRGKDUGLQRUPDWLRQLV GHULYHGLUHFWO\IURPWKH
DWKRULWDWLYHJHEVHUYLFHV SURYLGHGEJS 7KLVPS
ZVHSFRUWHGRQ DW ;3 DQGGRHV QW
UHOHFW FKDQHV RU DPGPQWV VXEVHTXHQW WR WKLVGDWH DQG
WLFI 7KHJHDGHIHFWLYHQRUPDWLRQPFKDQHRU
EHFRPVSUVHGEQHZGDWDRYHU WLFI

7KLVPSLPHLV YRLGLI WKHFHQRU RUHR WKHIOORZLQJPS
HOHPQWV GR QW DSSHDU, EDVHPSLPH\ IORRGJRQHODEHOV
OHHQG VFDOHEDU PSFUHDWLRQGDWH FRRQL W\LGHQWLILHUV
)5$DQG QWHU DQG)5$IHFWLYHGDWH DSLPHV IRU
XQPSSHGDQGXQRGHUQL}HGUHDV FDQQW EHXVHGIRU
UHJXODWRU\SUSRVHV

CALIFORNIA DEPARTMENT OF
WATER RESOURCES

Floodplain Information

Latitude: 34.22805, Longitude: -117.09846



County: (34.22805, -117.09846)

Floodplain Layer	100-YR	200-YR	500-YR
FEMA Effective	N✓	N/A	N✓
DWR Awareness	N✓	N/A	N/A
Regional/Special Studies	N✓	N/A	N✓
USACE Comp. Study	N✓	N✓	N✓

Y: The location is within the floodplain
N: The location is not within the floodplain
N/A: Data not available
✓ = Active Layer(s)

Floodplains are displayed using semi transparent colors. When viewing overlapping floodplains, the combination of multiple semi transparent colors will not match the legend colors. For accurate color representation, view floodplains individually.

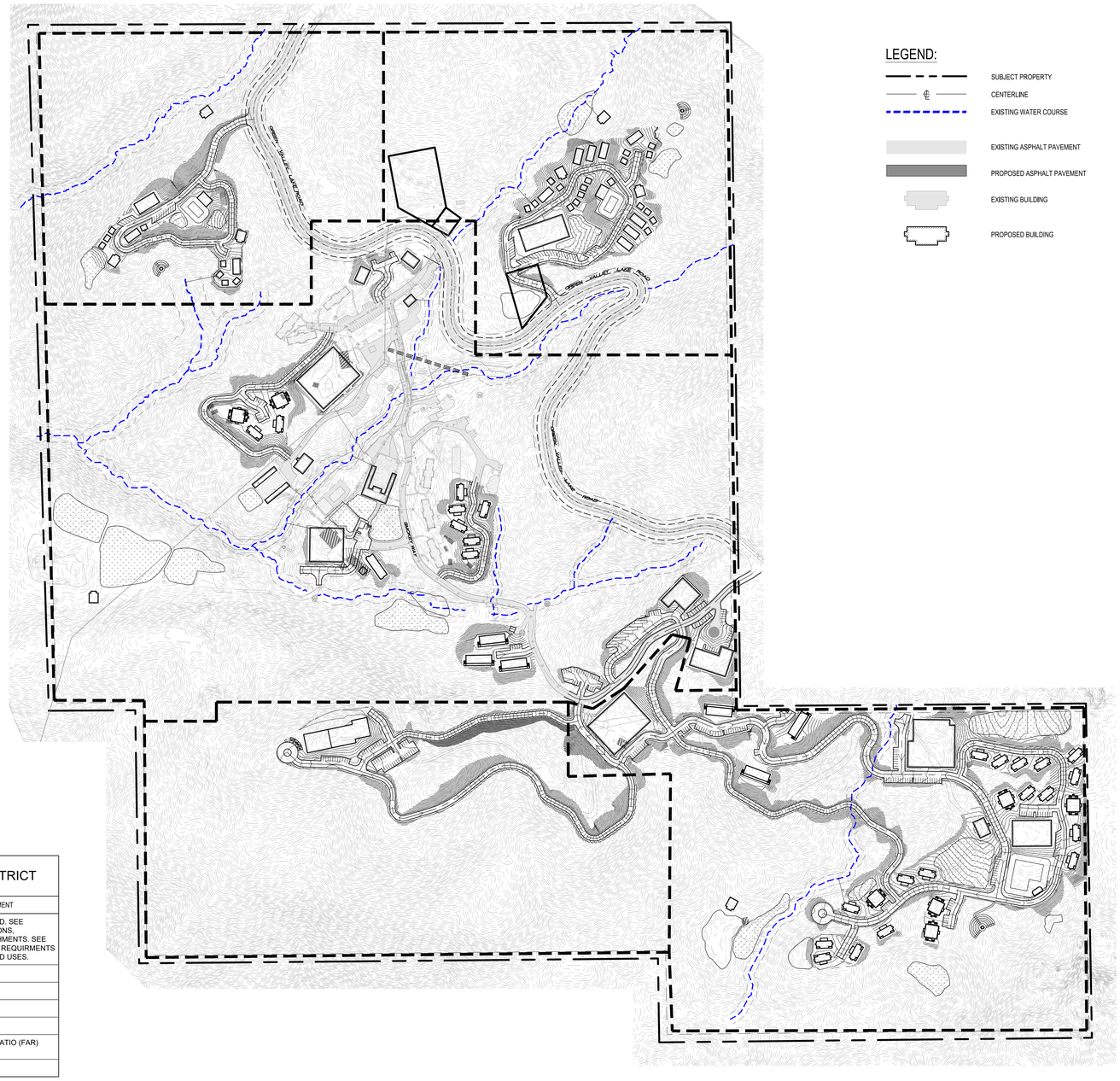
Appendix C

Reference Plans

IN THE COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA

SITE PLAN

BEING A PORTION OF THE EAST 1/2 OF THE SOUTHWEST 1/4 AND THE WEST 1/2 OF THE SOUTHEAST 1/4 OF SECTION 28, AND A PORTION OF THE NORTHEAST 1/4 AND THE NORTHEAST 1/4 OF THE NORTHWEST 1/4 OF SECTION 33, TOWNSHIP 2 NORTH, RANGE 2 WEST, SAN BERNARDINO BASE AND MERIDIAN, IN THE COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA, ACCORDING TO GOVERNMENT SURVEY.



LEGEND:

- SUBJECT PROPERTY
- CENTERLINE
- EXISTING WATER COURSE
- EXISTING ASPHALT PAVEMENT
- PROPOSED ASPHALT PAVEMENT
- EXISTING BUILDING
- PROPOSED BUILDING

REQUIRMENTS BY LAND USE ZONING DISTRICT

DEVELOPMENT FEATURE	SD SPECIAL DEVELOPMENT
SETBACKS	MINIMUM SETBACKS REQUIRED. SEE CHAPTER 83.02 FOR EXCEPTIONS, REDUCTIONS, AND ENCROACHMENTS. SEE DIVISION 5 FOR ANY SETBACK REQUIRMENTS APPLICABLE TO SPECIFIC LAND USES.
FRONT	15 FT.
SIDE - STREET SIDE	15 FT.
SIDE - INTERIOR (EACH)	10FT.
REAR	10FT.
FLOOR AREA RATIO (FAR)	MAXIMUM FLOOR AREA RATIO (FAR) ALLOWED
MAXIMUM FAR	.3:1

MIDDLE SCHOOL CAMP (PHASE 1)

DESCRIPTION	EXISTING SQ. FT.	PROPOSED SQ. FT. (EACH)	QUANTITY (EACH)	TOTAL PROPOSED SQ. FT.
DIRECTORS HOUSING	0	2,400	1	2,400
SPEAKERS HOUSING	0	2,400	1	2,400
WELCOME CENTER & RESTROOMS	825	1,248	1	2,073
MULTIPURPOSE REC/GYM	0	28500	1	28500
80-BED DORM	0	2,500	2	5000
40-BED DORM	0	1,580	8	12640
SNACK SHOP	3152	-21	1	3131
MULTIPURPOSE	5521	3,921	1	9442
RESTROOM & REC. EQUIPMENT	0	1,477	1	1477
MULTIPURPOSE CHAPEL	0	16,900	1	16900
GARAGE	450	155	1	605
STAFF HOUSING (MEDICAL)	2556	636	1	3192
DINNING	8816	6,832	1	15648
STAFF HOUSING	0	3,168	3	9504
MAINTENANCE BUILDING 1	0	11,900	1	11900
MAINTENANCE BUILDING 2	2194	7,281	1	9475
TOTALS		90877	26	134287

HIGH SCHOOL CAMP (PHASE 2)

DESCRIPTION	EXISTING SQ. FT.	PROPOSED SQ. FT. (EACH)	QUANTITY (EACH)	TOTAL PROPOSED SQ. FT.
MULTIPURPOSE REC/GYM	0	28500	1	28500
STAFF HOUSING	0	3,168	3	9504
DINING BUILDING	0	30,914	1	30914
80-BED DORM	0	2,500	5	12500
40-BED DORM	0	1,580	17	26860
MULTIPURPOSE CHAPEL	0	15,000	1	15000
SNACK BAR	0	3,131	1	3131
POOL HOUSE	0	770	1	770
OUTDOOR AMPHITHEATER (VICTORY CIRCLE)	0	3,228	1	3228
RESTROOM AND REC. EQUIPMENT	0	1,477	1	1477
TOTALS		90268	32	131884

ADULT LODGE (PHASE 3)

DESCRIPTION	EXISTING SQ. FT.	PROPOSED SQ. FT. (EACH)	QUANTITY (EACH)	TOTAL PROPOSED SQ. FT.
ADULT LODGE	0	18000	1	18000
TOTALS		18000	1	18000

ELEMENTARY (PHASE 4)

DESCRIPTION	EXISTING SQ. FT.	PROPOSED SQ. FT. (EACH)	QUANTITY (EACH)	TOTAL PROPOSED SQ. FT.
RESTROOM & SHOWERS	0	1477	2	2954
SEASONAL HOUSING PLATFORM TENT	0	480	17	8160
40-BED DORM	0	1,680	8	13440
RESTROOM AND REC EQUIPMENT	0	1,477	1	1477
OUTDOOR AMPHITHEATER (VICTORY CIRCLE)	0	3,228	1	3228
CRAFT REC PAVILION	0	579	1	579
DINING PAVILION	0	15,930	1	15930
POOL HOUSE & RESTROOMS	0	1,750	1	1750
TOTALS		26601	32	47518

WILDWOOD (PHASE 5)

DESCRIPTION	EXISTING SQ. FT.	PROPOSED SQ. FT. (EACH)	QUANTITY (EACH)	TOTAL PROPOSED SQ. FT.
RESTROOM & SHOWERS	0	1477	1	1477
SEASONAL HOUSING PLATFORM TENT	0	480	8	3840
40-BED DORM	0	1,680	2	3360
RESTROOM AND REC EQUIPMENT	0	1,477	2	2954
OUTDOOR AMPHITHEATER (VICTORY CIRCLE)	0	3,228	1	3228
DINING PAVILION	0	3,982	1	3982
POOL HOUSE & RESTROOMS	0	1,750	1	1750
TOTALS		14074	16	20591

ALL PHASES (1-5)

DESCRIPTION	EXISTING SQ. FT.	PROPOSED SQ. FT. (EACH)	TOTAL PROPOSED SQ. FT.
PHASE 1	58274	134287	192561
PHASE 2	643	131,884	132527
PHASE 3	0	18,000	18000
PHASE 4	0	47,518	47518
PHASE 5	0	20,591	20591
TOTALS		352280	411197

NORTH

GRAPHIC SCALE IN FEET
0 100 200 400

SCALE: 1" = 200' WHEN PRINTED AT FULL SIZE (30" X 42")

No.	REVISIONS	DATE	BY

Kimley»Horn

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PHONE: (951) 543-9868
WWW.KIMLEY-HORN.COM

KHA PROJECT	
DATE	3/11/2025
SCALE	AS SHOWN
DESIGNED BY	
DRAWN BY	
	___

HUME SOCAL - GREEN VALLEY LAKE, CA
PREPARED FOR
HUME LAKE CHRISTIAN CAMPS

MUNICIPALITY CA

SITE PLAN - TPM NO. 20840
PRELIMINARY SITE PLAN
SAN BERNARDINO COUNTY

SHEET NUMBER
1
OF
6

Plotted By:Ghodrat, Christina Sheet Set:Kha Layout:1 PRELIMINARY SITE PLAN March 11, 2025 10:28:59am K:\RIV_LDEV\195435002 - Hume SoCal Project\CAD\Exhibit\General Site Plan Overview\General Site Plan.dwg
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PARKING SUMMARY - PHASE 1

PROVIDED:

STAFF HOUSING AREA	= 11 SPACES
CHAPEL	= 6 SPACES
DINING AREA	= 0 SPACES
GIRLS' CABINS AREA	= 0 SPACES
BOYS' CABINS AREA	= 9 SPACES
MULTIPURPOSE ROOM AREA	= 0 SPACES
POOL AREA	= 0 SPACES
MAINTENANCE AREA	= 44 SPACES
PARKING LOT	= 25 SPACES
BUS PARKING AREA	= 8 SPACES
TOTAL PROVIDED:	= 103 SPACES

LEGEND:

- SUBJECT PROPERTY
- CENTERLINE
- EXISTING WATER COURSE
- EXISTING ASPHALT PAVEMENT
- PROPOSED ASPHALT PAVEMENT
- EXISTING BUILDING
- PROPOSED BUILDING

MIDDLE SCHOOL CAMP (PHASE 1)

DESCRIPTION	EXISTING SQ. FT.	PROPOSED SQ. FT. (EACH)	QUANTITY (EACH)	TOTAL PROPOSED SQ. FT.
DIRECTORS HOUSING	0	2,400	1	2,400
SPEAKERS HOUSING	0	2,400	1	2,400
WELCOME CENTER & RESTROOMS	825	1,248	1	2,073
MULTIPURPOSE REC/GYM	0	28500	1	28500
80-BED DORM	0	2,500	2	5000
40-BED DORM	0	1,580	8	12640
SNACK SHOP	3152	-21	1	3131
MULTIPURPOSE	5521	3,921	1	9442
RESTROOM & REC. EQUIPMENT	0	1,477	1	1477
MULTIPURPOSE CHAPEL	0	16,900	1	16900
GARAGE	450	155	1	605
STAFF HOUSING (MEDICAL)	2556	636	1	3192
DINNING	8816	6,832	1	15648
STAFF HOUSING	0	3,168	3	9504
MAINTENANCE BUILDING 1	0	11,900	1	11900
MAINTENANCE BUILDING 2	2194	7,281	1	9475
TOTALS		90877	26	134287

GRAPHIC SCALE IN FEET
0 40 80 160

SCALE: 1" = 80' WHEN PRINTED AT FULL SIZE (30" X 42")

No.	REVISIONS	DATE	BY

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KHA PROJECT

DATE 3/11/2025

SCALE AS SHOWN

DESIGNED BY

DRAWN BY

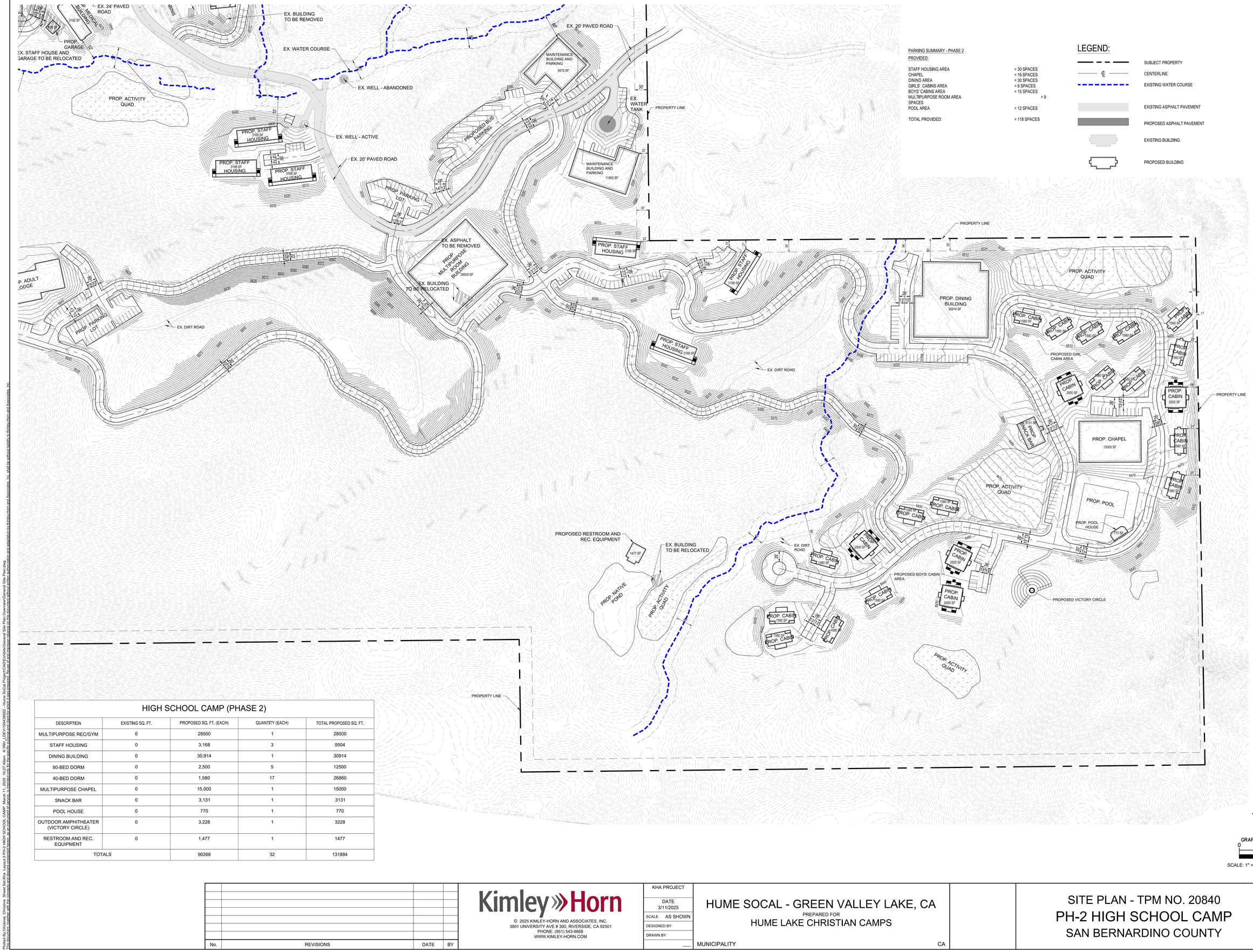
HUME SOCAL - GREEN VALLEY LAKE, CA
PREPARED FOR
HUME LAKE CHRISTIAN CAMPS

MUNICIPALITY CA

SITE PLAN - TPM NO. 20840
PH-1 MIDDLE SCHOOL
SAN BERNARDINO COUNTY

SHEET NUMBER 2 OF 6

Plotted By:Ghodrat, Christina Sheet Set:Khs Layout:2 PH-1 MIDDLE SCHOOL March 11, 2025 10:27:09am K:\RIV_LRD\119543002 - Hume SoCal Project\CADD\Exhibits\General Site Plan Overview\General Site Plan.dwg
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PARKING SUMMARY - PHASE 2

PROVIDED:

STAFF HOUSING AREA	= 30 SPACES
CHAPEL	= 16 SPACES
DINING AREA	= 30 SPACES
GIRLS' CABINS AREA	= 6 SPACES
BOYS' CABINS AREA	= 15 SPACES
MULTIPURPOSE ROOM AREA	= 9 SPACES
POOL AREA	= 12 SPACES
TOTAL PROVIDED:	= 118 SPACES

LEGEND:

- SUBJECT PROPERTY
- CENTERLINE
- EXISTING WATER COURSE
- EXISTING ASPHALT PAVEMENT
- PROPOSED ASPHALT PAVEMENT
- EXISTING BUILDING
- PROPOSED BUILDING

HIGH SCHOOL CAMP (PHASE 2)

DESCRIPTION	EXISTING SQ. FT.	PROPOSED SQ. FT. (EACH)	QUANTITY (EACH)	TOTAL PROPOSED SQ. FT.
MULTIPURPOSE REC/GYM	0	28500	1	28500
STAFF HOUSING	0	3,168	3	9504
DINING BUILDING	0	30,914	1	30914
80-BED DORM	0	2,500	5	12500
40-BED DORM	0	1,580	17	26860
MULTIPURPOSE CHAPEL	0	15,000	1	15000
SNACK BAR	0	3,131	1	3131
POOL HOUSE	0	770	1	770
OUTDOOR AMPHITHEATER (VICTORY CIRCLE)	0	3,228	1	3228
RESTROOM AND REC. EQUIPMENT	0	1,477	1	1477
TOTALS		90268	32	131884

No.	REVISIONS	DATE	BY

Kimley»Horn

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WWW.KIMLEY-HORN.COM

KHA PROJECT	
DATE	3/11/2025
SCALE	AS SHOWN
DESIGNED BY	
DRAWN BY	
	___

HUME SOCAL - GREEN VALLEY LAKE, CA
PREPARED FOR
HUME LAKE CHRISTIAN CAMPS

MUNICIPALITY CA

SITE PLAN - TPM NO. 20840
PH-2 HIGH SCHOOL CAMP
SAN BERNARDINO COUNTY

SHEET NUMBER 3 OF 6

Plotted By:Ghobrial, Christina Sheet Set:Kha Layout:3 PH-2 HIGH SCHOOL CAMP March 11, 2025 10:27:49am K:\RIV_LD\RIV\196436002 - Hume SoCal Project\CAD\Exhibits\General Site Plan Overview\General Site Plan.dwg
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EX. WELL - ACTIVE

EX. WATER COURSE

PROP. ACTIVITY QUAD

EX. WELL - ABANDONED

EX. WELL - ACTIVE

EX. 20' PAVED ROAD

PROP. STAFF 3168 SF HOUSING

PROP. STAFF 3168 SF HOUSING

PROP. STAFF 3168 SF HOUSING

70'

PROPOSED BUS PARKING

PROP. PARKING LOT

EX. ASPHALT TO BE REMOVED

PROP MULTIPURPOSE ROOM BUILDING

28500 SF

EX. BUILDING TO BE RELOCATED

PROP. ADULT LODGE

18000 SF

PROP. PARKING LOT

EX. DIRT ROAD

PARKING SUMMARY - PHASE 3

PROVIDED:

ADULT LODGE AREA	= 24 SPACES
PARKING LOT	= 31 SPACES
TOTAL PROVIDED:	= 55 SPACES

LEGEND:

- SUBJECT PROPERTY
- CENTERLINE
- EXISTING WATER COURSE
- EXISTING ASPHALT PAVEMENT
- PROPOSED ASPHALT PAVEMENT
- EXISTING BUILDING
- PROPOSED BUILDING

NORTH

GRAPHIC SCALE IN FEET
0 20 40 80

SCALE: 1" = 40' WHEN PRINTED AT FULL SIZE (30" X 42")

ADULT LODGE (PHASE 3)

DESCRIPTION	EXISTING SQ. FT.	PROPOSED SQ. FT. (EACH)	QUANTITY (EACH)	TOTAL PROPOSED SQ. FT.
ADULT LODGE	0	18000	1	18000
TOTALS		18000	1	18000

No.	REVISIONS	DATE	BY

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KHA PROJECT

DATE 3/11/2025

SCALE AS SHOWN

DESIGNED BY

DRAWN BY

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HUME SOCAL - GREEN VALLEY LAKE, CA
PREPARED FOR
HUME LAKE CHRISTIAN CAMPS

MUNICIPALITY CA

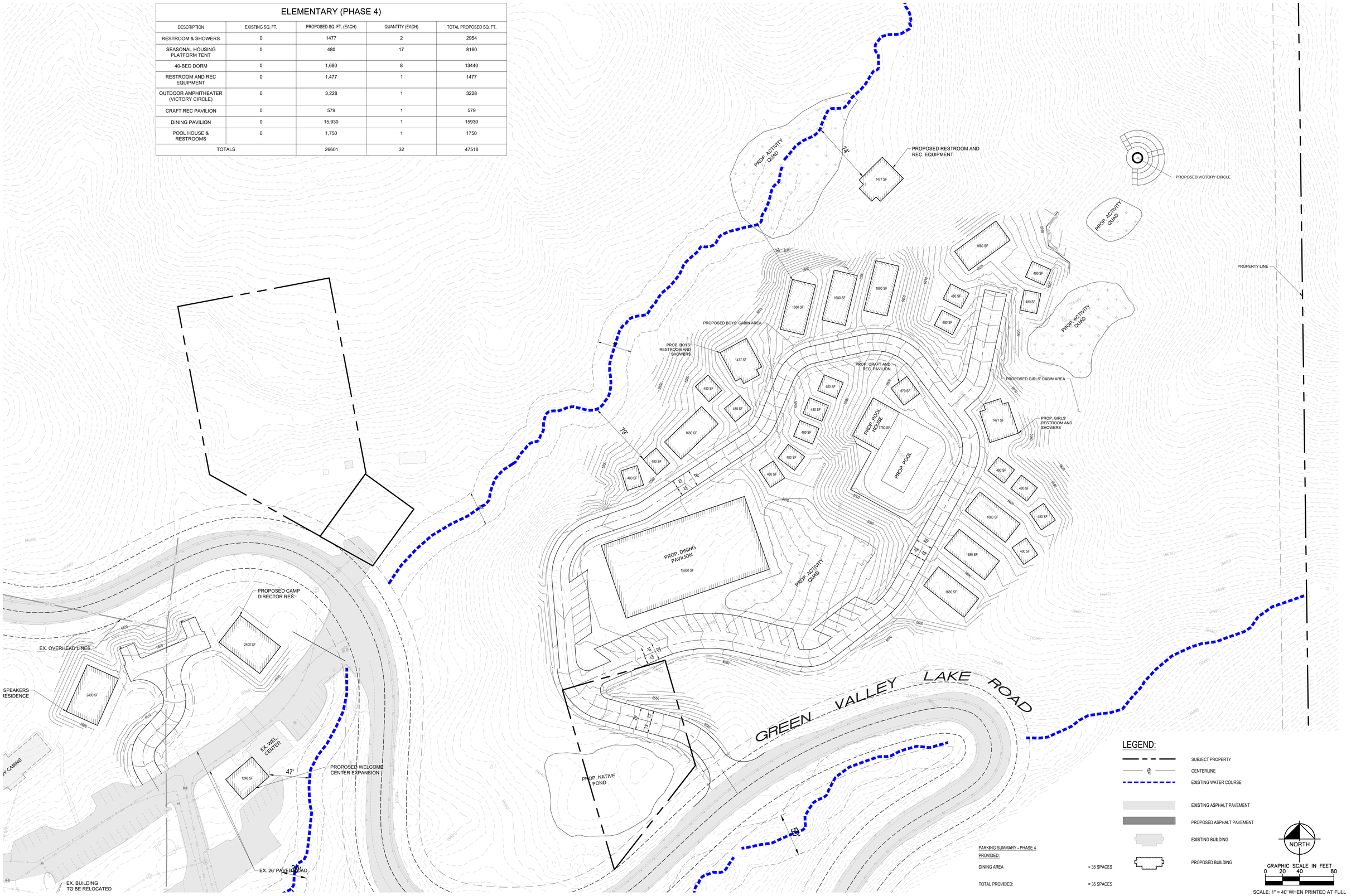
SITE PLAN - TPM NO. 20840
PH-3 ADULT LODGE
SAN BERNARDINO COUNTY

SHEET NUMBER 4 OF 6

Plotted By: Ghodrati, Christina Sheet Set: Kha Layout: 4 PH-3 ADULT LODGE March 11, 2025 10:28:24am K:\RIV_LDEV\195439002 - Hume SoCal Project\CAD\Exhibit\General Site Plan Overview\General Site Plan.dwg
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ELEMENTARY (PHASE 4)

DESCRIPTION	EXISTING SQ. FT.	PROPOSED SQ. FT. (EACH)	QUANTITY (EACH)	TOTAL PROPOSED SQ. FT.
RESTROOM & SHOWERS	0	1477	2	2954
SEASONAL HOUSING PLATFORM TENT	0	480	17	8160
40-BED DORM	0	1,680	8	13440
RESTROOM AND REC EQUIPMENT	0	1,477	1	1477
OUTDOOR AMPHITHEATER (VICTORY CIRCLE)	0	3,228	1	3228
CRAFT REC PAVILION	0	579	1	579
DINING PAVILION	0	15,930	1	15930
POOL HOUSE & RESTROOMS	0	1,750	1	1750
TOTALS		26601	32	47518



PARKING SUMMARY - PHASE 4

PROVIDED:

DINING AREA	= 35 SPACES
TOTAL PROVIDED:	= 35 SPACES

LEGEND:

- SUBJECT PROPERTY
- CENTERLINE
- EXISTING WATER COURSE
- EXISTING ASPHALT PAVEMENT
- PROPOSED ASPHALT PAVEMENT
- EXISTING BUILDING
- PROPOSED BUILDING

NORTH

GRAPHIC SCALE IN FEET
0 20 40 80

SCALE: 1" = 40' WHEN PRINTED AT FULL SIZE (30" X 42")

No.	REVISIONS	DATE	BY

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DATE 3/11/2025

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HUME LAKE CHRISTIAN CAMPS

MUNICIPALITY CA

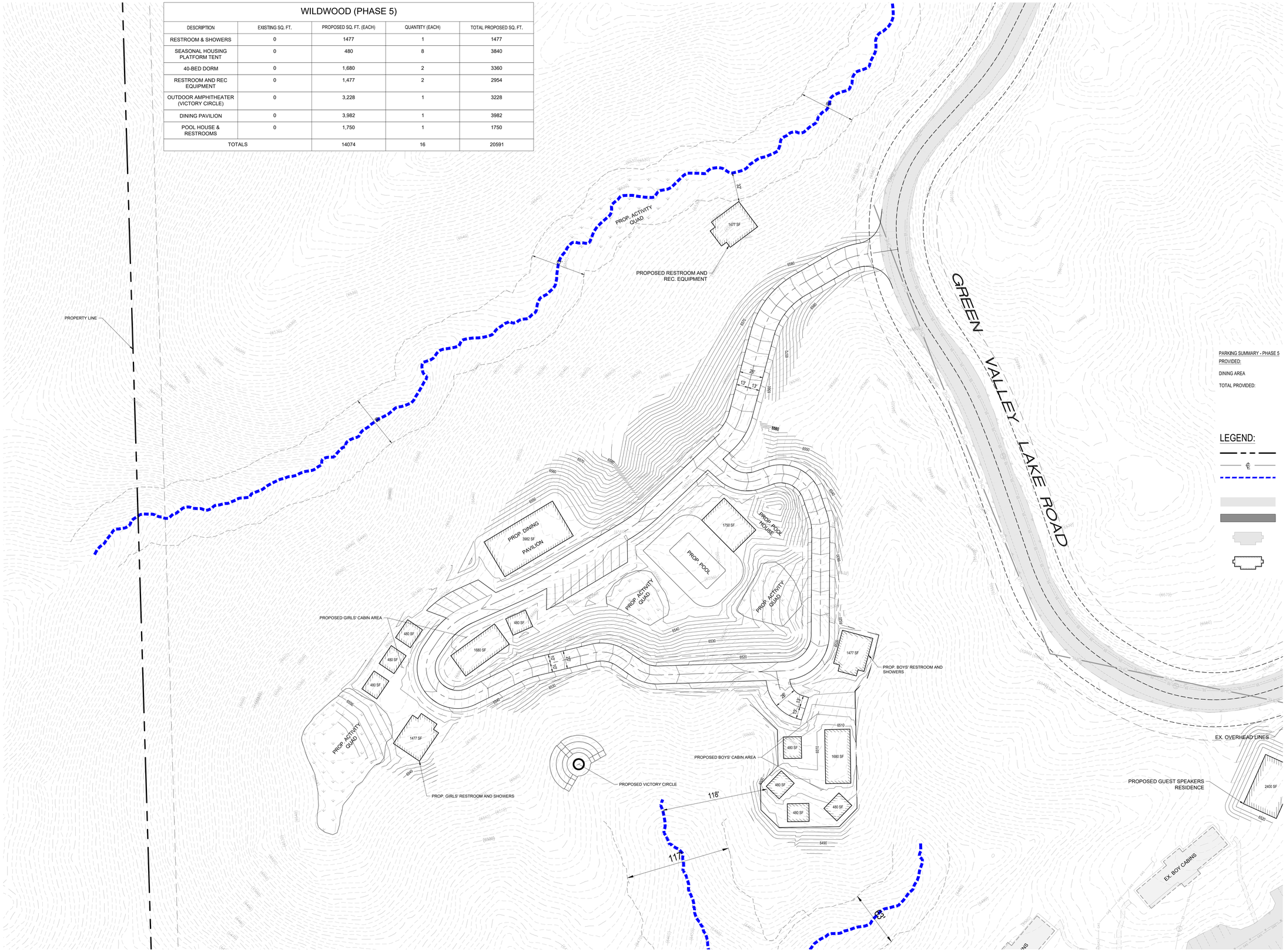
SITE PLAN - TPM NO. 20840
PH-4 ELEMENTARY AGE CAMP
SAN BERNARDINO COUNTY

SHEET NUMBER 5 OF 6

Plotted By:Ghodrati, Christina Sheet Set:Kha Layout:ES PH-4 ELEMENTARY AGE CAMP March 11, 2025 10:29:01am K:\RIV_LDEV\195435002 - Hume SoCal Project\CAD\Exhibits\General Site Plan Overview\General Site Plan.dwg
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WILDWOOD (PHASE 5)

DESCRIPTION	EXISTING SQ. FT.	PROPOSED SQ. FT. (EACH)	QUANTITY (EACH)	TOTAL PROPOSED SQ. FT.
RESTROOM & SHOWERS	0	1477	1	1477
SEASONAL HOUSING PLATFORM TENT	0	480	8	3840
40-BED DORM	0	1,680	2	3360
RESTROOM AND REC EQUIPMENT	0	1,477	2	2954
OUTDOOR AMPHITHEATER (VICTORY CIRCLE)	0	3,228	1	3228
DINING PAVILION	0	3,982	1	3982
POOL HOUSE & RESTROOMS	0	1,750	1	1750
TOTALS		14074	16	20591



PARKING SUMMARY - PHASE 5

PROVIDED:

DINING AREA	= 16 SPACES
TOTAL PROVIDED:	= 16 SPACES

LEGEND:

- SUBJECT PROPERTY
- CENTERLINE
- EXISTING WATER COURSE
- EXISTING ASPHALT PAVEMENT
- PROPOSED ASPHALT PAVEMENT
- EXISTING BUILDING
- PROPOSED BUILDING

NORTH

GRAPHIC SCALE IN FEET
0 20 40 80

SCALE: 1" = 40' WHEN PRINTED AT FULL SIZE (30" X 42")

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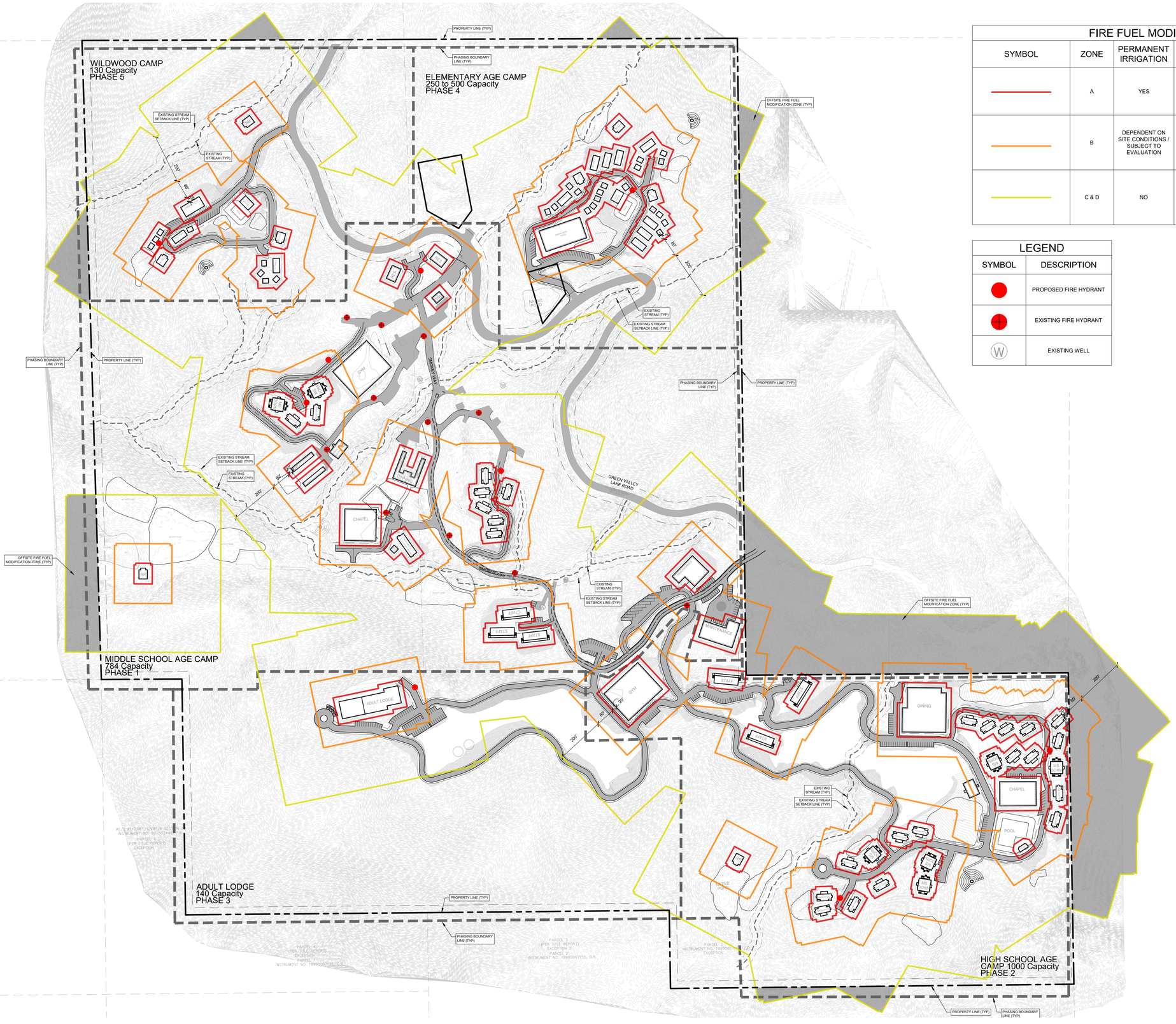
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HUME LAKE CHRISTIAN CAMPS

MUNICIPALITY CA

SITE PLAN - TPM NO. 20840
PH-5 WILDWOOD CAMP
SAN BERNARDINO COUNTY

SHEET NUMBER 6 OF 6

Plotted By:Ghidinelli, Christina Sheet Set:Kha Layout:6 PH-5 WILDWOOD CAMP March 11, 2025 10:29:37am K:\RIV_LDEV\195459002 - Hume SoCal Project\CAD\Exhibit\General Site Plan Overview\General Site Plan.dwg
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FIRE FUEL MODIFICATION ZONE LEGEND

SYMBOL	ZONE	PERMANENT IRRIGATION	ZONE WIDTH	DESCRIPTION (SEE SHEET FM-2 FOR MORE INFORMATION)
	A	YES	EXTENDS 20' FROM BUILDINGS, STRUCTURES, DECKS, ETC.	• 20-FOOT WIDE IRRIGATED AREA OF LOW-GROWING PLANTS WITH HIGH MOISTURE CONTENT IMMEDIATELY AROUND STRUCTURES. • HELPS PREVENT DIRECT FLAME IMPINGEMENT ON THE STRUCTURE AND IS FREE OF FINE RECEPTIVE FUELS WHERE EMBERS CAN IGNITE.
	B	DEPENDENT ON SITE CONDITIONS / SUBJECT TO EVALUATION	EXTENDS 80' FROM ZONE A	• USES APPROVED PLANTINGS, TYPICALLY IRRIGATED AND SPACED TO MINIMIZE FIRE TRANSMISSION. • DESIGNED TO SLOW FIRE'S PROGRESS, REDUCES INTENSITY BY ELIMINATING CONTINUOUS FUELS, AND MAINTAINS HIGHER FUEL MOISTURE LEVELS IN IRRIGATED VEGETATION.
	C & D	NO	EXTENDS UP TO 200' FROM ZONE B	• THINNED TO REMOVE DEAD VEGETATION AND PREVENT OVERGROWTH. • DESIGNED TO SLOW THE FIRE'S PROGRESS AND REDUCE ITS INTENSITY BY DECREASING THE AVAILABILITY OF CONTINUOUS FUELS. • NATIVE VEGETATION THINNED 40% IN ZONE C AND 30% IN ZONE D.

LEGEND

SYMBOL	DESCRIPTION
	PROPOSED FIRE HYDRANT
	EXISTING FIRE HYDRANT
W	EXISTING WELL

NORTH

GRAPHIC SCALE IN FEET
0 80 160 320

SCALE: 1" = 160' WHEN PRINTED AT FULL SIZE (30" X 42")

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DRAWN BY	GP
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HUME LAKE CHRISTIAN CAMPS
COUNTY OF SAN BERNARDINO CA

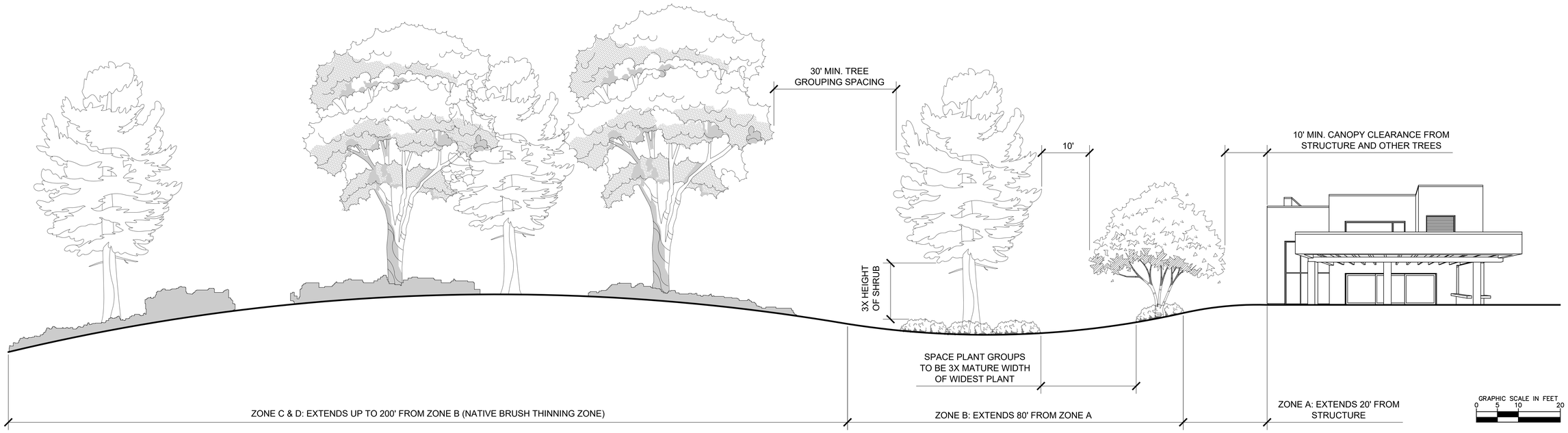
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JEROME LANDSCAPE ARCHITECTURE CORPORATION
NOT FOR CONSTRUCTION
3/31/2025
Date
3/11/2025
Date
STATE OF CALIFORNIA

PRELIMINARY FIRE FUEL MODIFICATION PLAN
TPM NO. 20840

SHEET NUMBER
FM-1

Plotted By:Ghoderdi, Christina Sheet Set:Kha Layout:FM-1 March 11, 2025 10:21:41am K:\RIV_LDEV\195430002 - Hume SoCal Project\CAD\Exhibits\Fire Fuel Modification\Fire Fuel Modification.dwg
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TYPICAL FIRE FUEL MODIFICATION SECTION (10-SCALE)



VERTICAL CLEARANCE

UNDERSTORY CLEARANCE:

- NEW AND EXISTING TREES, SHRUBS, AND TREE-FORM SHRUBS (NATURALLY REACHING OVER 2' IN HEIGHT), WHICH ARE BEING RETAINED WITH THE APPROVAL OF THE AGENCY HAVING JURISDICTION, SHALL BE PRUNED TO PROVIDE CLEARANCE OF THREE TIMES THE HEIGHT OF THE UNDER-STORY PLANT MATERIAL.

HORIZONTAL SEPARATION

PLANT GROUP CANOPY SPACING:

- ALL SHRUBS AND TREE-FORM SHRUBS OVER 2 FEET IN HEIGHT SHALL BE SINGLE SPECIMANS OR IN A MAXIMUM GROUPING OF 3 PLANTS. GROUPINGS SHALL BE SEPARATED BY A DISTANCE OF 3 TIMES THE WIDTH OF THE WIDEST SPECIMEN IN THE GROUP. OTHER GROUPING ARRANGEMENTS AND SPACING MAY BE ACCEPTABLE IF APPROVED BY THE SAN BERNARDINO COUNTY FIRE (SBCF).
- ALL TREES SHALL BE SINGLE SPECIMENS OR IN A MAXIMUM GROUPING OF 3. GROUPINGS SHALL BE SEPARATED BY A DISTANCE OF 30 FEET. OTHER GROUPING ARRANGEMENTS AND SPACING MY BE ACCEPTABLE IF APPROVED BY THE SBCF.
- SHRUBS AND TREE-FORM SHRUBS TALLER THAN 2 FEET IN HEIGHT SHALL BE NO CLOSER THAN 15 FEET FROM THE EDGE OF THE TREE CANOPY(S) MEASURED HORIZONTALLY TO MINIMIZE FUEL LADDER EFFECTS.

SAN BERNARDINO COUNTY MOUNTAIN AREA FIRE HAZARD ABATEMENT

- **MOUNTAIN AREA:** PORTION OF THE UNINCORPORATED AREA OF THE COUNTY OF SAN BERNARDINO LOCATED WITHIN THE FIRE SAFETY OVERLAY OF THE GENERAL PLAN, WHETHER PUBLICLY OR PRIVATELY OWNED.
- FLAMMABLE VEGETATION TO BE TREATED AND CLEARED PER THE GUIDELINES SET FORTH BELOW.
- FLAMMABLE VEGETATION WHICH CONSTITUTES A FIRE HAZARD IN THE MOUNTAIN AREA MEANS:
  - ALL FOLIAGE AND BRANCHES WITHIN 6' FROM THE GROUND ON TREES OVER 12' IN HEIGHT THAT STAND WITHIN 100' OF STRUCTURES. LIMBS SHOULD BE CUT NO LESS THAN 1/4" FROM THE TRUNK OF THE TREE TO PRESERVE THE HEALTH OF THE TREE.
  - ALL TREES THAT ARE WITHIN 30' OF STRUCTURES THAT ARE SMALLER THAN 4" IN DIAMETER THAT STAND WITHIN 10' FROM OTHER TREES (NOT TO INCLUDE LOW-ENERGY-RELEASE DECIDUOUS ORNAMENTAL TREES THAT ARE PRUNED AND FREE OF DEAD OR DAMAGED FOLIAGE).
  - ALL SHRUBS THAT ARE WITHIN 15' OF STRUCTURES THAT PRODUCE HIGH-ENERGY-RELEASE COMPONENTS AND ARE CONSIDERED HIGH FIRE FUELS, NOT TO INCLUDE LOW-ENERGY-RELEASE DECIDUOUS ORNAMENTAL PLANTS THAT ARE WELL-PRUNED, WELL-SPACED, AND FREE OF DEAD OR DAMAGED FOLIAGE.
    - HIGH-ENERGY-RELEASE SHRUBS INCLUDE, BUT ARE NOT LIMITED TO:
      - MANZANITA
      - SERVICE BERRY
      - MOUNTAIN WHITETHORN
      - SAGE
      - IRONWOOD
      - JUNIPER SHRUBS
      - SPANISH BROOM
      - ANY OTHER SPECIES AS DETERMINED BY THE COUNTY FIRE CHIEF/FIRE WARDEN OR OTHER DESIGNEE TO CONSTITUTE A FIRE HAZARD.
  - ALL HIGH-ENERGY-RELEASE SHRUBS THAT ARE SPACED TOGETHER LESS THAN DOUBLE THE HEIGHT OF THE TALLEST SHRUB AND STAND WITHIN 30' OF STRUCTURES (E.G. A 4'-TALL SHRUB SHOULD BE SPACED 8' OR MORE AWAY FROM THE NEXT SHRUB, PROVIDING THAT THE 4'-TALL SHRUB IS THE TALLEST OF THE TWO SHRUBS), NOT TO INCLUDE ORNAMENTAL PLANTS THAT ARE WELL-PRUNED, WELL-SPACED, AND FREE OF DEAD OR DAMAGED FOLIAGE.
  - PLANTING OF NATIVE, FIRE-WISE, DROUGHT-RESISTANT SPECIES IS ENCOURAGED FOR THE HEALTH OF THE FOREST.
  - LOWER FOLIAGE MEASURED AT LEAST 18" UP FROM THE GROUND AND ALL LEAF LITTER AND DEAD VEGETATION ON AND UNDER ALL SHRUBS THAT STAND WITHIN 100' OF ALL STRUCTURES.
  - DEAD BRANCHES AND LEAF LITTER IN AND UNDER ALL PLANTS, TREES, FOLIAGE, AND SHRUBS, AND ALL FLAMMABLE VEGETATION AT ALL HEIGHTS WITHIN 100' OF ALL STRUCTURES.
  - TREE LIMBS (NOT TRUNKS) LESS THAN 10' AWAY FROM CHIMNEYS AND STOVEPIPES.
  - GRASS OVER 4" IN HEIGHT.

FIRE FUEL MODIFICATION ZONE-SPECIFIC NOTES

ZONE A - IRRIGATED SETBACK ZONE

1. REMOVE ALL DEAD OR DYING VEGETATION
2. TRIM AND MAINTAIN TREE CANOPIES TO BE A MINIMUM OF 10' FROM ALL STRUCTURES AND OTHER TREES. PLEASE NOTE THAT TREES ARE GENERALLY NOT RECOMMENDED, EXCEPT FOR DWARF VARIETIES OR MATURE TREES SMALL IN STATURE.
3. REMOVE LADDER FUELS BY CREATING A SEPARATION BETWEEN LOW-LEVEL VEGETATION AND/OR TRIM LOW TREE BRANCHES.
4. REMOVE OR PRUNE VEGETATION NEAR WINDOWS.
5. REMOVE COMBUSTIBLE MATERIAL AND VEGETATION AROUND AND UNDER DECKS.
6. RELOCATE WOODPILES OR OTHER COMBUSTIBLE MATERIALS TO ZONE B.
7. REMOVE LEAF LITTER FROM YARD, ROOF, AND RAIN GUTTERS.
8. VINES AND CLIMBING PLANTS SHALL NOT BE ALLOWED ON ANY COMBUSTIBLE STRUCTURE REQUIRING REVIEW.
9. VEGETATION SHALL BE INHERENTLY FIRE-RESISTANT.
10. MAINTAIN A MINIMUM SPACING BETWEEN VEGETATION THAT IS 3X THE MATURE WIDTH OF THE PLANT.

ZONE B - IRRIGATED ZONE

1. REDUCE THE CONTINUITY OF FUELS BY REMOVING DEAD MATERIAL AND/OR THINNING VEGETATION.
2. REMOVE LADDER FUELS BY CREATING A SEPARATION BETWEEN LOW-LEVEL VEGETATION AND/OR TRIM LOW TREE BRANCHES.
3. CUT OR MOW ANNUAL GRASS DOWN TO 4" MAX. HEIGHT.
4. TRIM AND MAINTAIN TREE CANOPIES TO BE >10' FROM STRUCTURES AND OTHER TREES.
5. MAINTAIN A MINIMUM SPACING BETWEEN VEGETATION THAT IS 3X THE MATURE WIDTH OF THE PLANT.

ZONES C & D - NATIVE BUSH THINNING ZONE

1. REMOVE DEAD AND DYING VEGETATION.
2. THIN PLANTS TO PREVENT OVERGROWTH.
3. NATIVE VEGETATION THINNED TO 40% IN ZONE C AND 30% IN ZONE D.
4. GENERAL SPACING FOR EXISTING NATIVE TREES OR GROUPS OF TREES IS 30' BETWEEN CANOPIES. THIS DISTANCE MAY VERY DEPENDING ON THE SLOPE, ARRANGEMENT OF TREES IN RELATION TO SLOPE, AND THE TREE SPECIES.

GENERAL MAINTENANCE NOTES

ROUTINE MAINTENANCE SHALL BE REGULARLY PERFORMED IN ALL ZONES. REQUIREMENTS INCLUDE ITEMS IN THE FUEL MODIFICATION GUIDELINES, ZONE-SPECIFIC NOTES, AND THOSE OUTLINED BELOW:

1. REMOVAL OR THINNING OF UNDESIRABLE COMBUSTIBLE VEGETATION AND REMOVAL OF DEAD OR DYING PLANTS TO MEET MINIMUM BRUSH CLEARING REQUIREMENTS.
2. PRUNING AND THINNING TO REDUCE THE OVERALL FUEL LOAD AND CONTINUITY OF FUELS.
3. FUEL LOADS SHALL BE REDUCED BY PRUNING LOWER BRANCEHS OF TREES AND TREE-FORM SHRUBS TO 1/3 OF THEIR HEIGHT, OR 6' FROM THE LOWEST HANGING BRANCHES TO THE GROUND, TO HELP PREVENT FIRE FROM SPREADING AND MAKE MAINTENANCE EASIER. TREES WITH UNDERSTORY PLANTS SHOULD BE LIMBED UP TO AT LEAST 3X THE HEIGHT OF THE UNDERLYING VEGETATION OR UP TO 1/3 THE HEIGHT OF THE TREE, WHICHEVER IS LESS, TO HELP PREVENT FIRE FROM SPREADING UPWARD INTO THE CROWN.
4. ACCUMULATED PLANT LITTER AND DEAD WOOD SHALL BE REMOVED. DEBRIS AND TRIMMINGS PRODUCED BY MAINTENANCE SHOULD BE REMOVED FROM THE SITE OR CHIPPED AND EVENLY DISPERSED IN THE SAME AREA TO A MAXIMUM DEPTH OF 6 INCHES.
5. ALL INVASIVE SPECIES AND THEIR PARTS SHOULD BE REMOVED FROM THE SITE.
6. MANUAL AND AUTOMATIC IRRIGATION SYSTEMS SHALL BE MAINTAINED FOR OPERATIONAL INTEGRITY AND PROGRAMMING. EFFECTIVENESS SHOULD BE REGULARLY EVALUATED TO AVOID OVER OR UNDER-WATERING

PLANT REMOVAL METHODOLOGY

ALL UNDESIRABLE SPECIES ARE TO BE COMPLETELY REMOVED FROM SITE AND DISPOSED OF PROPERLY. REMOVAL INCLUDES TRUNKS, BRANCHES, LEAVES, FLOWERS, SEED PODS, ROOTBALL, AND SURFACE ROOTS. DO NOT USE ANY OF THIS DEBRIS FOR MULCH. CARE SHOULD BE TAKEN NOT TO DISTURB ROOT SYSTEMS OF ANY ADJACENT DESIRABLE PLANTS. WORK IS TO BE DONE MANUALLY AS MUCH AS POSSIBLE TO AVOID EROSION BY HEAVY EQUIPMENT. AFTER REMOVAL OF SPECIES, LEVEL AND MANUALLY COMPACT SOIL. APPLY A LAYER OF MULCH (2" MAX.).

EXISTING TREES

ALL EXISTING TREES NOT IMPACTED BY GRADING/CONSTRUCTION SHALL REMAIN IN PLACE AND BE MAINTAINED PER THE COUNTY OF SAN BERNARDINO FIRE FUEL STANDARDS.

UNDESIRABLE PLANT SPECIES

SOME PLANTS ARE PARTICULARLY SUSCEPTIBLE TO FIRE DUE TO THEIR CHARACTERISTICS. THESE CHARACTERISTICS CAN EITHER BE PHYSICAL OR CHEMICAL. ANY VEGETATION WITH THESE CHARACTERISTICS SHALL NOT BE PLANTED. SHOULD THE SPECIES LISTED BELOW EXIST WITHIN THE PROPERTY, THEY SHOULD BE **REMOVED OR AGGRESSIVELY MAINTAINED.** REPLANTING PROHIBITED EXISTING VEGETATION THAT BECOMES DEAD OR DISEASED SHALL BE REPLACED WITH VEGETATION THAT IS NOT INDICATED BELOW.

BOTANICAL NAME:	COMMON NAME:	BOTANICAL NAME:	COMMON NAME:
Archnophoenix cunninghamiana	King Palm	Eucalyptus spp.	Eucalyptus
Archnophoenix alexandrae	King Palm	Fremontodendron	Flannel Bush
Abies spp.	Firs	Helix canariensis	English Ivy
Acacia spp.	Acacia Species	Heterothaca grandiflora	Telegraph Plant
Adenostoma fasciculatum	Chamise, Greasewood	Hordeum leporinum	Wild Barley
Adenostoma sparsifolium	Red Shank	Howea forsteriana	Sentry Palm
Agonis juniperina	Juniper Myrtle	Jubaea chilensis	Chilea Wine Palm
Agropyron repens	Quackgrass	Juniperus spp.	Juniper
Anthemis cotula	Mayweed	Lactuca serriola	Prickly Lettuce
Araucaria spp.	Monkey Puzzle Tree	Larix spp.	Larch
Arbutus menxiezii	Madrone	Larrea tridentata	Creosote Bush
Arctostaphylos spp.	Manzanita	Leptospermum spp.	Tea Tree
Arenga engleri	Formosa Sugarpalm	Livistona chinensis	Chinese Fan Palm
Artemisia spp.	Mugwort / Sagebrush	Lolium multiflorum	Ryegrass
Arundo donax	Giant Reed	Lonicera japonica	Japanese Honeysuckle
Avena fatua	Wild Oat	Mahonia spp.	Mahonia
Bambusa spp.	Bamboo	Melaleuca spp.	Melaleuca
Baccharis pilularis	Coyote Brush	Mimulus aurantiacus	Sticky Monkeyflower
Bougainvillea spp.	Bougainvillea	Miscanthus	Eulalia Grasss
Brahea spp.	Hesper Palm	Muhlenbergia	Deer Grass
Brassica spp.	Mustard	Stipa tenuissima	Mexican Feathergrass
Bromus rubens	Foxtail	Nicotania spp.	Tobacco Plant
Butia capitata	Pindo Palm	Pennisetum spp.	Fountain Grass
Callistemon spp.	Bottlebrush	Perrovskia atriplicifloria	Russian Sage
Cardaria draba	Noary Cypress	Phoenix spp.	Palm Tree
Casuarina cunninghamiana	River She-oak	Phoradendron atroplicifolia	Mistletoe
Castanopsis chrysophylla	Giant Chinquapin	Pickeringia montana	Chaparral Pea
Cedrus spp.	Cedars	Picea spp.	Spruces
Chamaecyparis spp.	False Cypress	Platycladus orientalis	Oriental Arborvitae
Chamaerops humilis	Mediterranean Fan Palms	Psudotsuga menziesii	Douglas Fir
Cinnamomum camphora	Camphora	Rhus spp.	Sumac
Cirsium vulgare	Wild Artichoke	Ricinus communis	Caster Bean Plant
Conyza canadensis	Horseweed	Rosmarinus officinalis	Rosemary
Coprosma pumila	Prostrate Coprosma	Sabal palmetto	Cabbage Palm Tree
Cortaderia jubata	Chinquapin	Sacsola austalis	Russian Thistle
Cortaderia selloana	Pampas Grass	Salvia spp.	Sage
Crytomeria japonica	Japanese Crytomeria	Schinus spp.	Pepper Tree
Cupressus spp.	Cypress	Silybum marianum	Milk Thistle
Cynara cardunculus	Artichoke Thistle	Taxus spp.	Yew
Cystisus scoparius	Scotch Broom	Thuja spp.	Arborvitae
Dodonea viscose	Hopseed Bush	Trachycarpus	Palm Tree
Eriodictyon californicum	Yerba Santa	Washingtonia spp.	Fan Palm
Eriogonum spp.	Buckwheat		

RECOMMENDED IGNITION-RESISTANT PLANT MATERIAL FOR PROJECT LANDSCAPE AREAS

THE FIRE RESISTANCE OF ALL PLANTS CAN BE IMPROVED THROUGH APPROPRIATE IRRIGATION FREQUENCIES AND PLANT SPACING. MINIMIZE THE USE OF EVERGREEN SHRUBS AND TREES WITHIN 20' OF INHABITABLE STRUCTURES, AS THEY OFTEN CONTAIN OILS, RESINS, AND WAXES THAT CAUSE THESE PLANTS TO BURN WITH GREAT INTENSITY. USE ORNAMENTAL GRASSES AND BERRIES SPARINGLY, AS THEY CAN ALSO BE HIGHLY FLAMMABLE.

TREES

BOTANICAL NAME:	COMMON NAME:	ZONE:
Acer palmatum	Japanese Maple	A
Acer negundo	Box Elder	B
Aesculus californica	California Buckeye	B
Alnus rhombifolia	White Alder	B
Cercis occidentalis	Western Redbud	A
Chilopsis linearis	Desert Willow	A
Platanus racemosa	California Sycamore	B
Quercus spp.	Oak Tree	B

SHRUBS

BOTANICAL NAME:	COMMON NAME:	ZONE:
Achillea spp.	Yarrow	A
Agastache spp.	Hummingbird Mint	A
Carissa spp.	Natal Plum	A
Cistus spp.	Rockrose	B
Cotoneaster spp.	Cotoneaster	B
Dietes bicolor	Fortnight Lily	A
Hesperaloe parviflora	Red Yucca	B
Heuchera spp.	Coral Bells	A
Lavandula spp.	Lavender	A
Lupinus spp.	Lupine	B

GROUNDCOVER

BOTANICAL NAME:	COMMON NAME:	ZONE:
Arctostaphylos uva-ursi	Bearberry	B
Ceratostigma plumbaginoides	Dwarf plubmago	A
Ribes spp.	Currant	A
Rubus leucodermis	Whitebark raspberry	B

**ALL PROPOSED PLANT MATERIAL NOT INCLUDED IN THIS PLANT LIST SHALL BE APPROVED BY THE SAN BERNARDINO COUNTY FIRE DEPARTMENT.*

No.	REVISIONS	DATE	BY

Kimley»Horn

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KHA PROJECT	
DATE	3/11/2025
SCALE	AS SHOWN
DESIGNED BY	GP
DRAWN BY	GP
	___

HUME SOCAL - GREEN VALLEY LAKE, CA
PREPARED FOR
HUME LAKE CHRISTIAN CAMPS
COUNTY OF SAN BERNARDINO CA

PLA SEAL
CHRISTINA L. GHOBRIAL — No. 6504 — PROFESSIONAL LANDSCAPE ARCHITECT — STATE OF CALIFORNIA
NOT FOR CONSTRUCTION
3/31/2025
3/11/2025
DATE
STATE OF CALIFORNIA

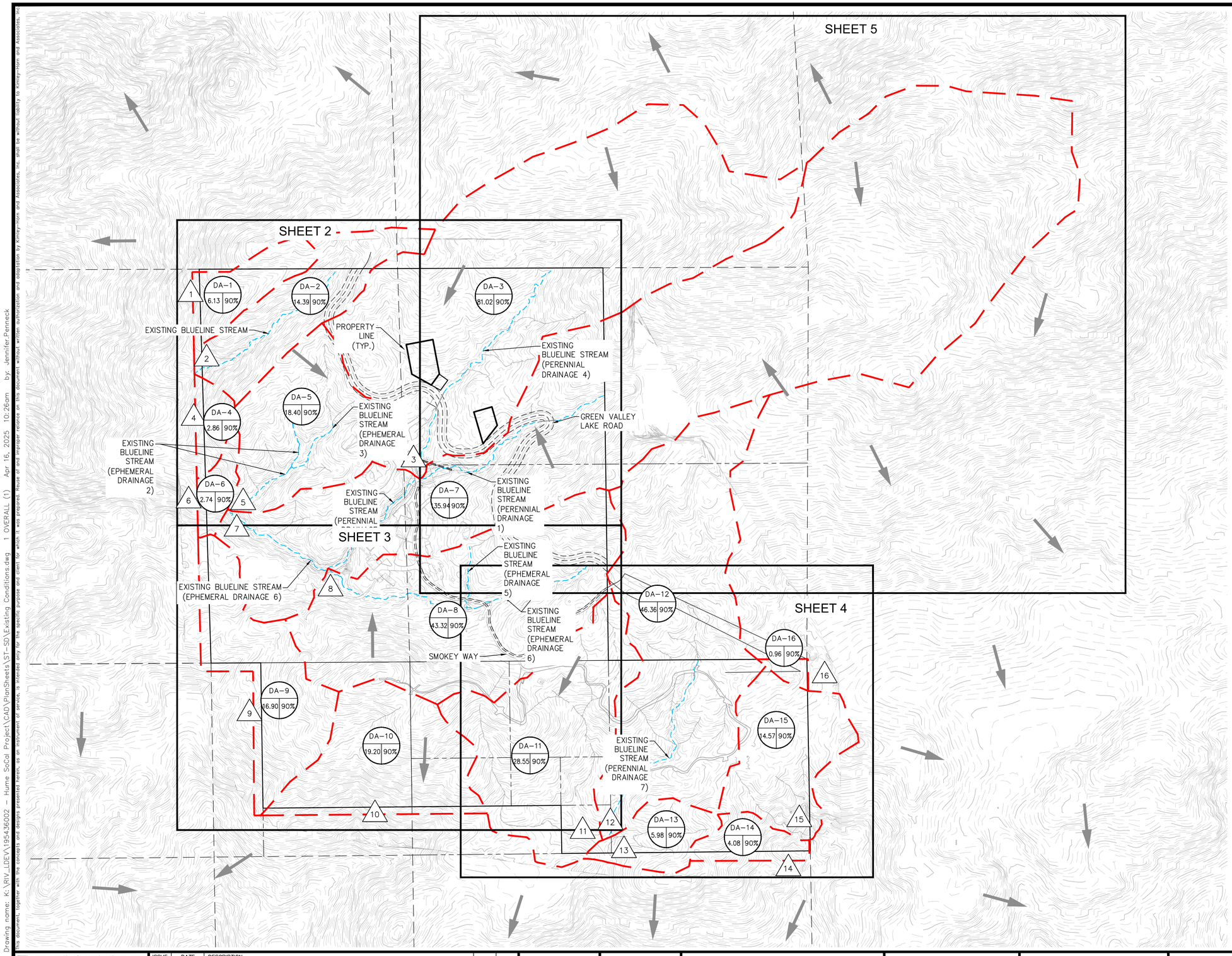
PRELIMINARY FIRE FUEL MODIFICATION PLAN
TPM NO. 20840

SHEET NUMBER
FM-2

Plotted By:Ghobrial, Christina Sheet Set:Fire Layout:FM-2 March 11, 2025 10:21:43am K:\RIV_LDEV\196456002 - Hume SoCal Projects\CAD\Exhibits\Fire Fuel Modification\Fire Fuel Modification.dwg
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Appendix D

Existing Drainage Map and Calculations



LEGEND

- PROPERTY BOUNDARY
- (XXXX) EXISTING MAJOR CONTOURS
- (XXXX) EXISTING MINOR CONTOURS
- EXISTING BLUELINE STREAM
- EXISTING DRAINAGEWAY
- EXISTING BLUELINE STREAM SETBACK
- EXISTING ROAD
- EXISTING DRAINAGE EASEMENT
- EXISTING DMA BOUNDARY
- DA-3 / B / C — A = SUBAREA ID; B = SUBAREA ACREAGE; C = PERCENT PERVIOUS (%)
- 1 — DMA DESIGN POINT
- EXISTING FLOW ARROW

NOTES:

1. REFER TO HUME SOCAL CAMPGROUND DELINEATION OF STATE AND FEDERAL JURISDICTIONAL WATERS REPORT FOR ADDITIONAL INFORMATION ON ALL DRAINAGEWAYS.
2. FOR BASINS THAT HAVE A PERVIOUS PERCENTAGE GREATER THAN OR EQUAL TO 90%, A 90% PERVIOUS VALUE WAS UTILIZED.

NORTH

GRAPHIC SCALE IN FEET
0 150 300 600

Drawing name: K:\RIV_LDEV\195436002 - Hume SoCal Project\CAD\PlanSheets\ST-SD\Existing Conditions.dwg 1 OVERALL (1) Apr 16, 2025 10:26am by: Jennifer Penneck
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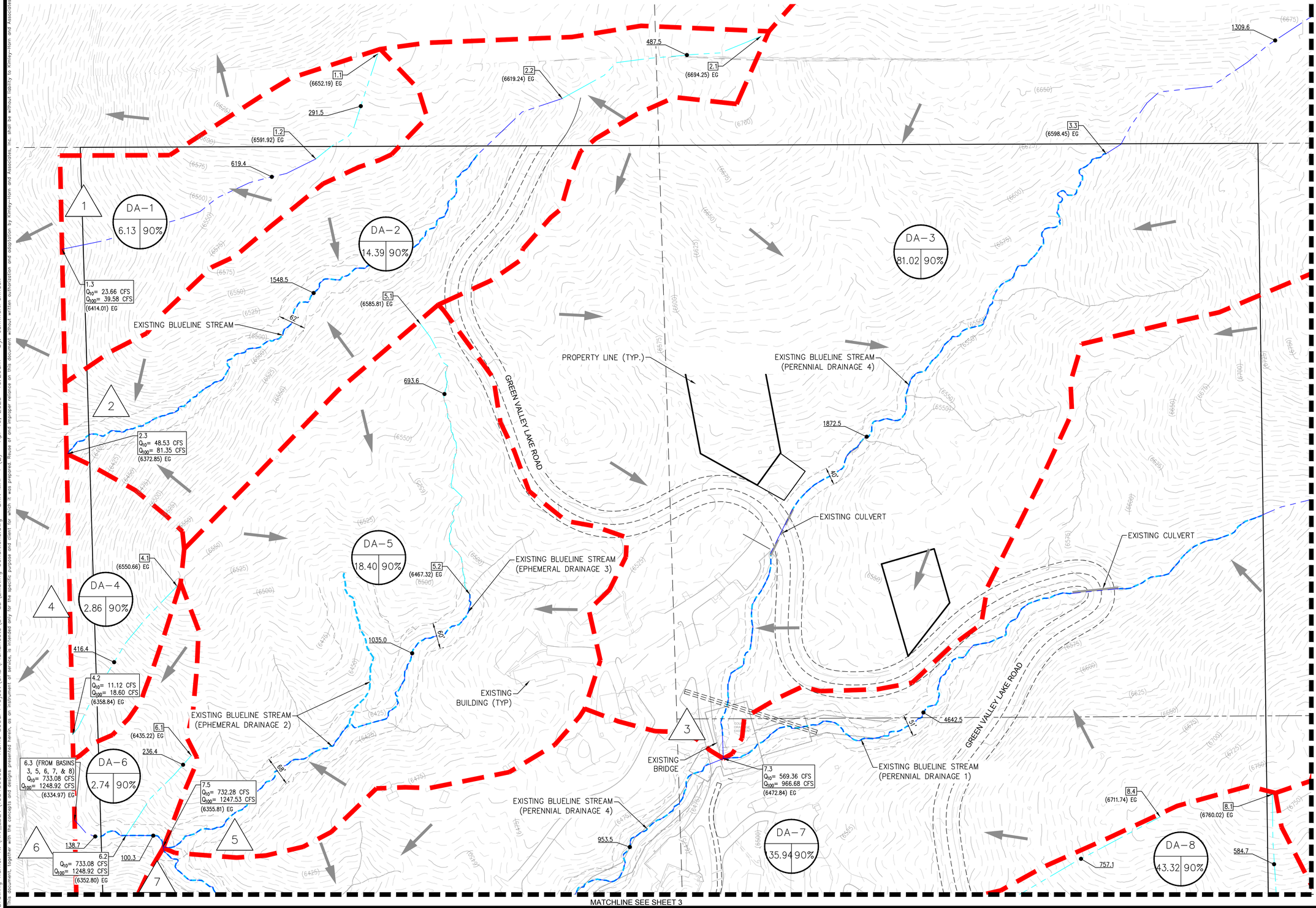
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HUME SOCAL - GREEN VALLEY LAKE, CA
PREPARED FOR
HUME LAKE
EXISTING DRAINAGE MAP OVERVIEW

SHEET 1 OF SHEETS 5
CITY PROJECT NO.

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MATCHLINE SEE SHEET 5

MATCHLINE SEE SHEET 3

LEGEND

- PROPERTY BOUNDARY
- EXISTING MAJOR CONTOURS
- EXISTING MINOR CONTOURS
- EXISTING BLUELINE STREAM
- EXISTING DRAINAGEWAY
- EXISTING BLUELINE STREAM SETBACK
- EXISTING ROAD
- EXISTING DRAINAGE EASEMENT
- EXISTING DMA BOUNDARY
- OVERLAND FLOW PATH
- CHANNELIZED FLOW PATH
- A = SUBAREA ID
- B = SUBAREA ACREAGE
- C = PERCENT PERVIOUS (%)
- DMA DESIGN POINT
- EXISTING FLOW ARROW
- NODE ID AND ELEVATION

NOTES:

1. REFER TO HUME SOCAL CAMPGROUND DELINEATION OF STATE AND FEDERAL JURISDICTIONAL WATERS REPORT FOR ADDITIONAL INFORMATION ON ALL DRAINAGEWAYS.
2. FOR BASINS THAT HAVE A PERVIOUS PERCENTAGE GREATER THAN OR EQUAL TO 90%, A 90% PERVIOUS VALUE WAS UTILIZED.

NORTH

GRAPHIC SCALE IN FEET
0 50 100 200

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HUME SOCAL - GREEN VALLEY LAKE, CA
PREPARED FOR
HUME LAKE
EXISTING DRAINAGE MAP

SHEET 2
OF
SHEETS 5
CITY PROJECT NO.

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MATCHLINE SEE SHEET 2

MATCHLINE SEE SHEET 4

DA-7
35.94 | 90%

DA-8
43.32 | 90%

DA-9
16.90 | 90%

DA-10
19.20 | 90%

DA-11
28.55 | 90%

7.4
Q_{10}= 684.51 CFS
Q_{100}= 1165.96 CFS
(6404.98) EG

8.3
Q_{10}= 74.77 CFS
Q_{100}= 125.40 CFS
(6472.97) EG

9.3
Q_{10}= 60.93 CFS
Q_{100}= 103.94 CFS
(6353.41) EG

10.3
Q_{10}= 63.05 CFS
Q_{100}= 107.90 CFS
(6335.41) EG

8.5
(6532.00) EG

8.2
(6589.39) EG

9.1
(6647.05) EG

9.2
(6532.00) EG

10.1
(6680.01) EG

10.2
(6529.00) EG

11.1
(6606.25) EG

11.2
(6540.00) EG

872.5
953.5
1112.0
757.1
584.7
426.2
897.4
643.3
392.7
575.8
504.4
445.3
1414.3

55'
35'
55'

EXISTING BUILDING (TYP)

SMOKEY WAY

SMOKEY WAY

GREEN VALLEY LAKE ROAD

EXISTING BLUELINE STREAM (EPHEMERAL DRAINAGE 5)

EXISTING BLUELINE STREAM (EPHEMERAL DRAINAGE 6)

EXISTING CULVERT

LEGEND

- PROPERTY BOUNDARY
- (XXXX) EXISTING MAJOR CONTOURS
- (XXXX) EXISTING MINOR CONTOURS
- EXISTING BLUELINE STREAM
- EXISTING DRAINAGEWAY
- EXISTING BLUELINE STREAM SETBACK
- EXISTING ROAD
- EXISTING DRAINAGE EASEMENT
- EXISTING DMA BOUNDARY
- OVERLAND FLOW PATH
- CHANNELIZED FLOW PATH
- A = SUBAREA ID
- B = SUBAREA ACREAGE
- C = PERCENT PERVIOUS (%)
- DMA DESIGN POINT
- EXISTING FLOW ARROW
- X.X (XXXX)EG NODE ID AND ELEVATION

NOTES:
1. REFER TO HUME SOCAL CAMPGROUND DELINEATION OF STATE AND FEDERAL JURISDICTIONAL WATERS REPORT FOR ADDITIONAL INFORMATION ON ALL DRAINAGEWAYS.
2. FOR BASINS THAT HAVE A PERVIOUS PERCENTAGE GREATER THAN OR EQUAL TO 90%, A 90% PERVIOUS VALUE WAS UTILIZED.

NORTH

GRAPHIC SCALE IN FEET
0 50 100 200

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HUME SOCAL - GREEN VALLEY LAKE, CA
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EXISTING DRAINAGE MAP

SHEET 3
OF
SHEETS 5
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MATCHLINE SEE SHEET 5

MATCHLINE SEE SHEET 3

EXISTING BLUELINE STREAM (EPHEMERAL DRAINAGE 6)

EXISTING CULVERT

8.3
Q_{10}= 74.77 CFS
Q_{100}= 125.40 CFS
(6472.97) EG

SMOKEY WAY

GREEN VALLEY LAKE ROAD

426.2

897.4

643.3

11.1
(6606.25) EG

2716.7

11.2
(6540.00) EG

40'

1414.3

EXISTING BLUELINE STREAM (PERENNIAL DRAINAGE 7)

852.5

665.6

627.0

671.1

DA–8
43.32 | 90%

DA–11
28.55 | 90%

DA–12
46.36 | 90%

DA–13
5.98 | 90%

DA–14
4.08 | 90%

DA–15
14.57 | 90%

DA–16
0.96 | 90%

11.3
Q_{10}= 206.37 CFS
Q_{100}= 351.85 CFS
(6371.00) EG

12

11

54.8

13.2
Q_{10}= 219.07 CFS
Q_{100}= 373.78 CFS
(6369.35) EG

107.9

13

13.3 (FROM BASINS 11, 12, 13)
Q_{10}= 219.07 CFS
Q_{100}= 373.78 CFS
(6363.20) EG

13.1
(6506.32) EG

14.1
(6509.56) EG

15

15.3
Q_{10}= 43.52 CFS
Q_{100}= 73.10 CFS
(6275.97) EG

14

14.2
Q_{10}= 14.09 CFS
Q_{100}= 23.62 CFS
(6270.66) EG

15.2
(6446.70) EG

16.2
Q_{10}= 3.49 CFS
Q_{100}= 5.84 CFS
(6490.00) EG

16.1
(6532.31) EG

322.0

15.1
(6528.66) EG

16

LEGEND

- PROPERTY BOUNDARY
- (XXXX) EXISTING MAJOR CONTOURS
- (XXXX) EXISTING MINOR CONTOURS
- EXISTING BLUELINE STREAM
- EXISTING DRAINAGEWAY
- EXISTING BLUELINE STREAM SETBACK
- EXISTING ROAD
- EXISTING DRAINAGE EASEMENT
- EXISTING DMA BOUNDARY
- OVERLAND FLOW PATH
- CHANNELIZED FLOW PATH
- A = SUBAREA ID
- B = SUBAREA ACREAGE
- C = PERCENT PERVIOUS (%)
- DMA DESIGN POINT
- EXISTING FLOW ARROW
- X.X (XXXX)EG NODE ID AND ELEVATION

NOTES:
1. REFER TO HUME SOCAL CAMPGROUND DELINEATION OF STATE AND FEDERAL JURISDICTIONAL WATERS REPORT FOR ADDITIONAL INFORMATION ON ALL DRAINAGEWAYS.
2. FOR BASINS THAT HAVE A PERVIOUS PERCENTAGE GREATER THAN OR EQUAL TO 90%, A 90% PERVIOUS VALUE WAS UTILIZED.

NORTH

GRAPHIC SCALE IN FEET
0 50 100 200

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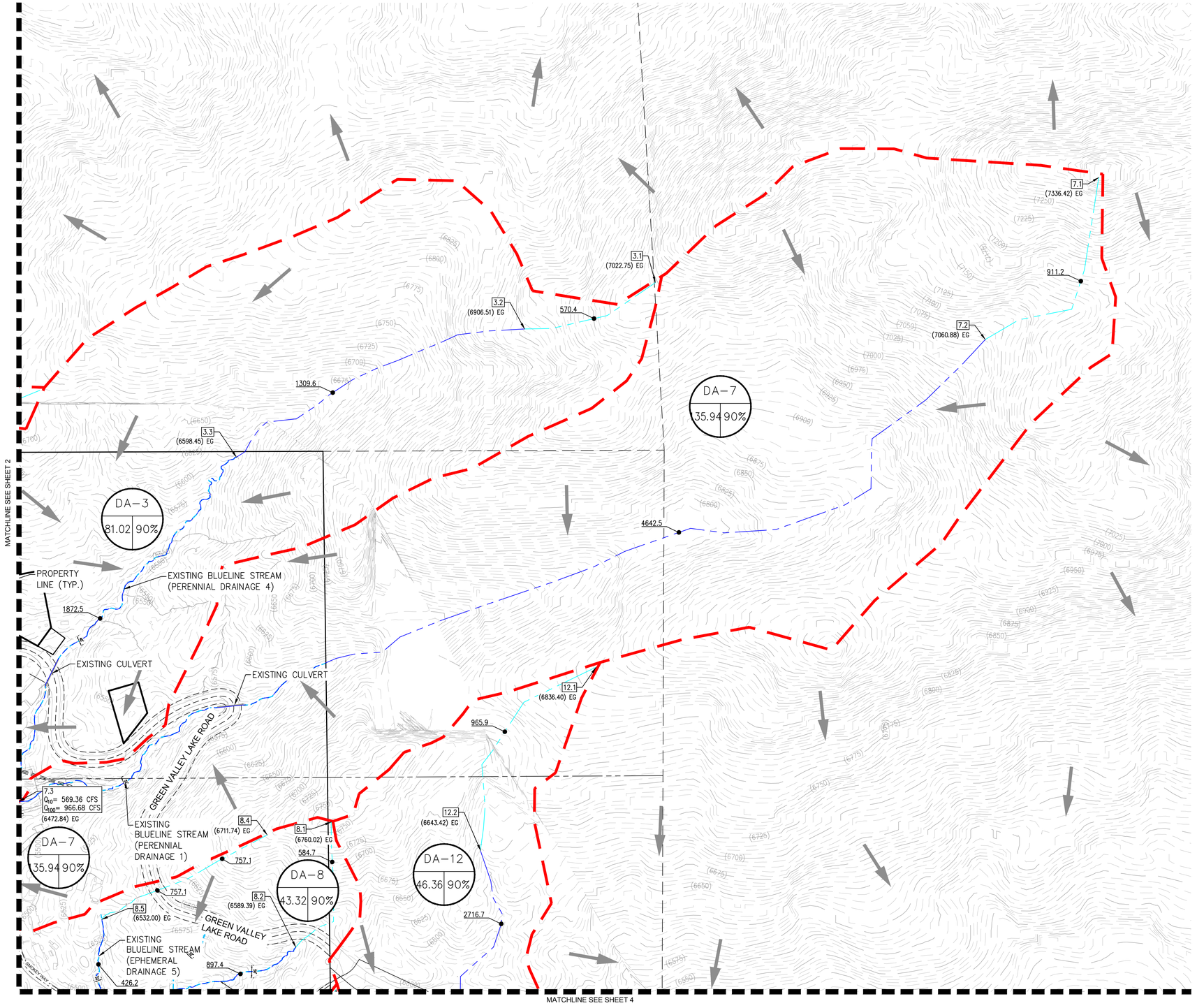
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HUME SOCAL - GREEN VALLEY LAKE, CA
PREPARED FOR
HUME LAKE
EXISTING DRAINAGE MAP

SHEET 4
OF
SHEETS 5
CITY PROJECT NO.

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LEGEND

- PROPERTY BOUNDARY
- (XXXX) EXISTING MAJOR CONTOURS
- (XXXX) EXISTING MINOR CONTOURS
- EXISTING BLUELINE STREAM
- EXISTING DRAINAGEWAY
- EXISTING BLUELINE STREAM SETBACK
- EXISTING ROAD
- EXISTING DRAINAGE EASEMENT
- EXISTING DMA BOUNDARY
- OVERLAND FLOW PATH
- CHANNELIZED FLOW PATH
- A / B / C — A = SUBAREA ID; B = SUBAREA ACREAGE; C = PERCENT PERVIOUS (%)
- 1 — DMA DESIGN POINT
- EXISTING FLOW ARROW
- X.X (XXXX)EG — NODE ID AND ELEVATION

NOTES:

1. REFER TO HUME SOCAL CAMPGROUND DELINEATION OF STATE AND FEDERAL JURISDICTIONAL WATERS REPORT FOR ADDITIONAL INFORMATION ON ALL DRAINAGEWAYS.
2. FOR BASINS THAT HAVE A PERVIOUS PERCENTAGE GREATER THAN OR EQUAL TO 90%, A 90% PERVIOUS VALUE WAS UTILIZED.

NORTH

GRAPHIC SCALE IN FEET
0 100 200 400

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HUME SOCAL - GREEN VALLEY LAKE, CA
PREPARED FOR
HUME LAKE
EXISTING DRAINAGE MAP

SHEET 5
OF SHEETS 5
CITY PROJECT NO.

Existing 10-year

```
**************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
         (Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
        (c) Copyright 1983-2011 Advanced Engineering Software (aes)
            Ver. 18.0  Release Date: 07/01/2011  License ID 1499

                          Analysis prepared by:
```

Kimley-Horn

```
 ************************* DESCRIPTION OF STUDY *************************
* Hume SoCal                                                            *
* Existing 10 year - 24 hour Conditions                                 *
* San Bernardino County, CA                                             *
 ************************************************************************

  FILE NAME: HUMEEX.DAT
  TIME/DATE OF STUDY: 15:15 01/25/2024
==========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==========================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *USER-DEFINED TABLED RAINFALL USED*
  NUMBER OF [TIME,INTENSITY] DATA PAIRS =  9
   1)    5.00;  4.880
   2)   10.00;  3.500
   3)   15.00;  2.820
   4)   30.00;  1.980
   5)   60.00;  1.400
   6)  120.00;  1.050
   7)  180.00;  0.907
   8)  360.00;  0.711
   9)  720.00;  0.532
  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
```

```
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE      1.10 TO NODE      1.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   291.50
  ELEVATION DATA: UPSTREAM(FEET) =   6652.19  DOWNSTREAM(FEET) =   6591.92

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.461
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.477
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        1.39      0.21     0.900    91    6.46
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      5.36
  TOTAL AREA(ACRES) =      1.39   PEAK FLOW RATE(CFS) =      5.36

****************************************************************************
  FLOW PROCESS FROM NODE      1.20 TO NODE      1.20 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    6.46
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.477
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        4.74      0.21     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    4.74      SUBAREA RUNOFF(CFS) =   18.29
  EFFECTIVE AREA(ACRES) =      6.13   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =        6.1       PEAK FLOW RATE(CFS) =      23.66

****************************************************************************
  FLOW PROCESS FROM NODE      1.20 TO NODE      1.30 IS CODE =  53
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6591.92  DOWNSTREAM(FEET) =   6414.01
  CHANNEL LENGTH THRU SUBAREA(FEET) =   619.40   CHANNEL SLOPE =  0.2872
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .1918 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =      23.66
  FLOW VELOCITY(FEET/SEC) =   7.03 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.47   Tc(MIN.) =    7.93
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.30 =     910.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      2.10 TO NODE      2.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   487.50
  ELEVATION DATA: UPSTREAM(FEET) =   6694.25  DOWNSTREAM(FEET) =   6619.24

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.420
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.936
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        1.63      0.21     0.900    91    8.42
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      5.50
  TOTAL AREA(ACRES) =      1.63   PEAK FLOW RATE(CFS) =      5.50

****************************************************************************
  FLOW PROCESS FROM NODE      2.20 TO NODE      2.20 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========================================================================
  MAINLINE Tc(MIN.) =    8.42
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.936
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D       12.76      0.21     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =   12.76      SUBAREA RUNOFF(CFS) =   43.03
  EFFECTIVE AREA(ACRES) =     14.39   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.90
```

```
  TOTAL AREA(ACRES) =       14.4       PEAK FLOW RATE(CFS) =      48.53

****************************************************************************
  FLOW PROCESS FROM NODE      2.20 TO NODE      2.30 IS CODE =  53
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6619.24  DOWNSTREAM(FEET) =   6372.85
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1548.50   CHANNEL SLOPE =  0.1591
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .1396 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =      48.53
  FLOW VELOCITY(FEET/SEC) =   7.62 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   3.39   Tc(MIN.) =   11.81
  LONGEST FLOWPATH FROM NODE      2.10 TO NODE      2.30 =    2036.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      4.10 TO NODE      4.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   416.40
  ELEVATION DATA: UPSTREAM(FEET) =   6550.66  DOWNSTREAM(FEET) =   6358.84

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.348
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.508
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        2.86      0.21     0.900    91    6.35
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =     11.12
  TOTAL AREA(ACRES) =      2.86   PEAK FLOW RATE(CFS) =     11.12

****************************************************************************
  FLOW PROCESS FROM NODE      7.10 TO NODE      7.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   911.20
  ELEVATION DATA: UPSTREAM(FEET) =   7336.42  DOWNSTREAM(FEET) =   7060.88

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.446
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.653
```

```
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        6.53      0.21     0.900    91    9.45
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =     20.36
  TOTAL AREA(ACRES) =      6.53   PEAK FLOW RATE(CFS) =     20.36

****************************************************************************
  FLOW PROCESS FROM NODE      7.20 TO NODE      7.20 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.45
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.653
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D      107.14      0.21     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =  107.14      SUBAREA RUNOFF(CFS) =  334.00
  EFFECTIVE AREA(ACRES) =    113.67   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =      113.7       PEAK FLOW RATE(CFS) =     354.36

****************************************************************************
  FLOW PROCESS FROM NODE      7.20 TO NODE      7.30 IS CODE =  53
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   7060.88  DOWNSTREAM(FEET) =   6472.84
  CHANNEL LENGTH THRU SUBAREA(FEET) =  4642.50   CHANNEL SLOPE =  0.1267
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .1194 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =     354.36
  FLOW VELOCITY(FEET/SEC) =  13.67 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   5.66   Tc(MIN.) =   15.11
  LONGEST FLOWPATH FROM NODE      7.10 TO NODE      7.30 =    5553.70 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.30 TO NODE      7.30 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
```

```
  TIME OF CONCENTRATION(MIN.) =   15.11
  RAINFALL INTENSITY(INCH/HR) =   2.81
  AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =     113.67
  TOTAL STREAM AREA(ACRES) =     113.67
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     354.36

****************************************************************************
  FLOW PROCESS FROM NODE      3.10 TO NODE      3.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   570.40
  ELEVATION DATA: UPSTREAM(FEET) =   7022.75  DOWNSTREAM(FEET) =   6906.51

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.476
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.921
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        1.09      0.21     0.900    91    8.48
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      3.66
  TOTAL AREA(ACRES) =      1.09   PEAK FLOW RATE(CFS) =      3.66

****************************************************************************
  FLOW PROCESS FROM NODE      3.20 TO NODE      3.20 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.48
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.921
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B       32.62      0.42     0.900    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =   32.62      SUBAREA RUNOFF(CFS) =  103.93
  EFFECTIVE AREA(ACRES) =     33.71   AREA-AVERAGED Fm(INCH/HR) =  0.37
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =       33.7       PEAK FLOW RATE(CFS) =     107.59

****************************************************************************
```

```
 FLOW PROCESS FROM NODE      3.20 TO NODE      3.30 IS CODE =  53
----------------------------------------------------------------------------
 >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   6906.51  DOWNSTREAM(FEET) =   6598.45
 CHANNEL LENGTH THRU SUBAREA(FEET) =  1309.60   CHANNEL SLOPE =  0.2352
 SLOPE ADJUSTMENT CURVE USED:
 EFFECTIVE SLOPE = .1751 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
 CHANNEL FLOW THRU SUBAREA(CFS) =     107.59
 FLOW VELOCITY(FEET/SEC) =  11.13 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
 TRAVEL TIME(MIN.) =   1.96   Tc(MIN.) =   10.44
 LONGEST FLOWPATH FROM NODE      3.10 TO NODE      3.30 =    1880.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      3.30 TO NODE      3.30 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   10.44
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.441
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B       47.30      0.42     0.900    76
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
 SUBAREA AREA(ACRES) =   47.30      SUBAREA RUNOFF(CFS) =  130.26
 EFFECTIVE AREA(ACRES) =     81.01   AREA-AVERAGED Fm(INCH/HR) =  0.38
 AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  0.90
 TOTAL AREA(ACRES) =       81.0       PEAK FLOW RATE(CFS) =     223.28

****************************************************************************
 FLOW PROCESS FROM NODE      3.30 TO NODE      7.30 IS CODE =  53
----------------------------------------------------------------------------
 >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   6598.45  DOWNSTREAM(FEET) =   6472.84
 CHANNEL LENGTH THRU SUBAREA(FEET) =  1872.50   CHANNEL SLOPE =  0.0671
 SLOPE ADJUSTMENT CURVE USED:
 EFFECTIVE SLOPE = .0671 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
 CHANNEL FLOW THRU SUBAREA(CFS) =     223.28
 FLOW VELOCITY(FEET/SEC) =   8.78 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
 TRAVEL TIME(MIN.) =   3.55   Tc(MIN.) =   13.99
 LONGEST FLOWPATH FROM NODE      3.10 TO NODE      7.30 =    3752.50 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      7.30 TO NODE      7.30 IS CODE =   1
----------------------------------------------------------------------------
```

```
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.99
  RAINFALL INTENSITY(INCH/HR) =   2.96
  AREA-AVERAGED Fm(INCH/HR) =  0.38
  AREA-AVERAGED Fp(INCH/HR) =  0.42
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =      81.01
  TOTAL STREAM AREA(ACRES) =      81.01
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     223.28

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      354.36   15.11    2.814  0.21( 0.19) 0.90     113.7       7.10
      2      223.28   13.99    2.957  0.42( 0.38) 0.90      81.0       3.10

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      569.36   13.99    2.957  0.30( 0.27) 0.90     186.3       3.10
      2      565.23   15.11    2.814  0.30( 0.27) 0.90     194.7       7.10

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     569.36    Tc(MIN.) =    13.99
  EFFECTIVE AREA(ACRES) =     186.28   AREA-AVERAGED Fm(INCH/HR) =  0.27
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =      194.7
  LONGEST FLOWPATH FROM NODE      7.10 TO NODE      7.30 =    5553.70 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.30 TO NODE      7.30 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.99
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.957
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D       10.63      0.21     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =   10.63      SUBAREA RUNOFF(CFS) =   26.48
```

```
  EFFECTIVE AREA(ACRES) =    196.91   AREA-AVERAGED Fm(INCH/HR) =  0.27
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =      205.3       PEAK FLOW RATE(CFS) =     569.36
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE      7.30 TO NODE      7.40 IS CODE =  53
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6472.84  DOWNSTREAM(FEET) =   6404.98
  CHANNEL LENGTH THRU SUBAREA(FEET) =   953.53   CHANNEL SLOPE =  0.0712
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .0712 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =     569.36
  FLOW VELOCITY(FEET/SEC) =  12.36 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.29   Tc(MIN.) =   15.28
  LONGEST FLOWPATH FROM NODE      7.10 TO NODE      7.40 =    6507.23 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.40 TO NODE      7.40 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      8.10 TO NODE      8.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   584.70
  ELEVATION DATA: UPSTREAM(FEET) =   6760.02  DOWNSTREAM(FEET) =   6589.39

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.967
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.061
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        2.35      0.21     0.900    91    7.97
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      8.19
  TOTAL AREA(ACRES) =      2.35   PEAK FLOW RATE(CFS) =      8.19

****************************************************************************
  FLOW PROCESS FROM NODE      8.20 TO NODE      8.20 IS CODE =  81
----------------------------------------------------------------------------
```

```
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =    7.97
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.061
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D       16.46      0.21     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =   16.46      SUBAREA RUNOFF(CFS) =   57.36
  EFFECTIVE AREA(ACRES) =     18.81   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =       18.8       PEAK FLOW RATE(CFS) =      65.55

********************************************************************************
  FLOW PROCESS FROM NODE      8.20 TO NODE      8.30 IS CODE =  53
--------------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6589.39  DOWNSTREAM(FEET) =   6472.97
  CHANNEL LENGTH THRU SUBAREA(FEET) =   897.40   CHANNEL SLOPE =  0.1297
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .1215 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =      65.55
  FLOW VELOCITY(FEET/SEC) =   7.86 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.90   Tc(MIN.) =    9.87
  LONGEST FLOWPATH FROM NODE      8.10 TO NODE      8.30 =    1482.10 FEET.

********************************************************************************
  FLOW PROCESS FROM NODE      8.30 TO NODE      8.30 IS CODE =   1
--------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.87
  RAINFALL INTENSITY(INCH/HR) =   3.54
  AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =      18.81
  TOTAL STREAM AREA(ACRES) =      18.81
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      65.55

********************************************************************************
  FLOW PROCESS FROM NODE      8.40 TO NODE      8.50 IS CODE =  21
--------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
```

```
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   757.10
  ELEVATION DATA: UPSTREAM(FEET) =   6711.74  DOWNSTREAM(FEET) =   6532.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.206
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.719
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        1.36      0.21     0.900    91    9.21
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      4.32
  TOTAL AREA(ACRES) =      1.36   PEAK FLOW RATE(CFS) =      4.32

****************************************************************************
  FLOW PROCESS FROM NODE      8.50 TO NODE      8.50 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.21
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.719
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        1.69      0.21     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    1.69      SUBAREA RUNOFF(CFS) =    5.37
  EFFECTIVE AREA(ACRES) =      3.05   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =        3.1       PEAK FLOW RATE(CFS) =       9.69

****************************************************************************
  FLOW PROCESS FROM NODE      8.50 TO NODE      8.30 IS CODE =  53
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6532.00  DOWNSTREAM(FEET) =   6472.97
  CHANNEL LENGTH THRU SUBAREA(FEET) =   426.20   CHANNEL SLOPE =  0.1385
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .1273 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =       9.69
  FLOW VELOCITY(FEET/SEC) =   4.26 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.67   Tc(MIN.) =   10.88
  LONGEST FLOWPATH FROM NODE      8.40 TO NODE      8.30 =    1183.30 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE      8.30 TO NODE      8.30 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.88
  RAINFALL INTENSITY(INCH/HR) =   3.38
  AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       3.05
  TOTAL STREAM AREA(ACRES) =       3.05
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       9.69

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       65.55    9.87    3.536  0.21( 0.19) 0.90      18.8       8.10
      2        9.69   10.88    3.381  0.21( 0.19) 0.90       3.1       8.40

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       74.77    9.87    3.536  0.21( 0.19) 0.90      21.6       8.10
      2       72.21   10.88    3.381  0.21( 0.19) 0.90      21.9       8.40

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      74.77    Tc(MIN.) =     9.87
  EFFECTIVE AREA(ACRES) =      21.58   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =       21.9
  LONGEST FLOWPATH FROM NODE      8.10 TO NODE      8.30 =    1482.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      8.30 TO NODE      8.30 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.87
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.536
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
```

```
  ".4 DWELLING/ACRE"         D       21.46      0.21     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =   21.46      SUBAREA RUNOFF(CFS) =   64.64
  EFFECTIVE AREA(ACRES) =     43.04   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =       43.3       PEAK FLOW RATE(CFS) =     129.64

****************************************************************************
  FLOW PROCESS FROM NODE      8.30 TO NODE      7.40 IS CODE =  53
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6472.97  DOWNSTREAM(FEET) =   6404.98
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1112.00   CHANNEL SLOPE =  0.0611
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .0611 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =     129.64
  FLOW VELOCITY(FEET/SEC) =   7.00 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   2.65   Tc(MIN.) =   12.52
  LONGEST FLOWPATH FROM NODE      8.10 TO NODE      7.40 =    2594.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.40 TO NODE      7.40 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      129.64   12.52    3.157  0.21( 0.19) 0.90      43.0       8.10
      2      124.45   13.56    3.016  0.21( 0.19) 0.90      43.3       8.40
  LONGEST FLOWPATH FROM NODE      8.10 TO NODE      7.40 =    2594.10 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      569.36   15.28    2.805  0.30( 0.27) 0.90     196.9       3.10
      2      565.23   16.40    2.742  0.29( 0.26) 0.90     205.3       7.10
  LONGEST FLOWPATH FROM NODE      7.10 TO NODE      7.40 =    6507.23 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      661.11   12.52    3.157  0.28( 0.25) 0.90     204.4       8.10
      2      671.93   13.56    3.016  0.28( 0.25) 0.90     218.1       8.40
      3      684.51   15.28    2.805  0.28( 0.25) 0.90     240.2       3.10
      4      677.62   16.40    2.742  0.28( 0.25) 0.90     248.6       7.10
    TOTAL AREA(ACRES) =       248.6
```

```
  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      684.51  Tc(MIN.) =   15.276
  EFFECTIVE AREA(ACRES) =    240.23  AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.28  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =      248.6
  LONGEST FLOWPATH FROM NODE      7.10 TO NODE      7.40 =    6507.23 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.40 TO NODE      7.40 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.28
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.805
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B       11.64      0.42     0.900    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =   11.64      SUBAREA RUNOFF(CFS) =   25.39
  EFFECTIVE AREA(ACRES) =    251.87   AREA-AVERAGED Fm(INCH/HR) =  0.26
  AREA-AVERAGED Fp(INCH/HR) =  0.29  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =      260.3       PEAK FLOW RATE(CFS) =     684.51
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE      7.40 TO NODE      7.50 IS CODE =  53
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6404.98  DOWNSTREAM(FEET) =   6355.81
  CHANNEL LENGTH THRU SUBAREA(FEET) =   872.50   CHANNEL SLOPE =  0.0564
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .0564 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =     684.51
  FLOW VELOCITY(FEET/SEC) =  11.69 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.24   Tc(MIN.) =   16.52
  LONGEST FLOWPATH FROM NODE      7.10 TO NODE      7.50 =    7379.73 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.50 TO NODE      7.50 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   16.52
```

```
  RAINFALL INTENSITY(INCH/HR) =   2.73
  AREA-AVERAGED Fm(INCH/HR) =  0.26
  AREA-AVERAGED Fp(INCH/HR) =  0.29
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =     251.87
  TOTAL STREAM AREA(ACRES) =     260.27
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     684.51

****************************************************************************
  FLOW PROCESS FROM NODE      5.10 TO NODE      5.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   693.60
  ELEVATION DATA: UPSTREAM(FEET) =   6585.81  DOWNSTREAM(FEET) =   6467.32

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.494
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.640
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        4.02      0.21     0.900    91    9.49
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =     12.48
  TOTAL AREA(ACRES) =      4.02   PEAK FLOW RATE(CFS) =     12.48

****************************************************************************
  FLOW PROCESS FROM NODE      5.20 TO NODE      5.20 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.49
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.640
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D       14.38      0.21     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =   14.38      SUBAREA RUNOFF(CFS) =   44.66
  EFFECTIVE AREA(ACRES) =     18.40   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =       18.4       PEAK FLOW RATE(CFS) =      57.14

****************************************************************************
  FLOW PROCESS FROM NODE      5.20 TO NODE      7.50 IS CODE =  53
```

```
------------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6467.32  DOWNSTREAM(FEET) =   6355.81
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1035.00   CHANNEL SLOPE =  0.1077
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .1058 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =      57.14
  FLOW VELOCITY(FEET/SEC) =   7.01 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   2.46   Tc(MIN.) =   11.96
  LONGEST FLOWPATH FROM NODE      5.10 TO NODE      7.50 =    1728.60 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.50 TO NODE      7.50 IS CODE =   1
------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.96
  RAINFALL INTENSITY(INCH/HR) =   3.23
  AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =      18.40
  TOTAL STREAM AREA(ACRES) =      18.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      57.14

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      661.11   13.78    2.986  0.29( 0.26) 0.90     216.0       8.10
      1      671.93   14.81    2.846  0.29( 0.26) 0.90     229.7       8.40
      1      684.51   16.52    2.735  0.29( 0.26) 0.90     251.9       3.10
      1      677.62   17.64    2.672  0.28( 0.26) 0.90     260.3       7.10
      2       57.14   11.96    3.234  0.21( 0.19) 0.90      18.4       5.10

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      682.94   11.96    3.234  0.28( 0.25) 0.90     205.9       5.10
      2      713.60   13.78    2.986  0.28( 0.25) 0.90     234.4       8.10
      3      721.78   14.81    2.846  0.28( 0.25) 0.90     248.1       8.40
      4      732.28   16.52    2.735  0.28( 0.25) 0.90     270.3       3.10
      5      724.21   17.64    2.672  0.28( 0.25) 0.90     278.7       7.10
```

```
  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     732.28    Tc(MIN.) =    16.52
  EFFECTIVE AREA(ACRES) =     270.27   AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.28  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =      278.7
  LONGEST FLOWPATH FROM NODE      7.10 TO NODE      7.50 =    7379.73 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.50 TO NODE      7.50 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.52
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.735
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.34      0.21     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    0.34      SUBAREA RUNOFF(CFS) =    0.78
  EFFECTIVE AREA(ACRES) =    270.61   AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.28  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =      279.0       PEAK FLOW RATE(CFS) =     732.28
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE      7.50 TO NODE      6.20 IS CODE =  53
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6355.81  DOWNSTREAM(FEET) =   6352.80
  CHANNEL LENGTH THRU SUBAREA(FEET) =   100.30   CHANNEL SLOPE =  0.0300
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .0300 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =     732.28
  FLOW VELOCITY(FEET/SEC) =   8.73 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.19   Tc(MIN.) =   16.71
  LONGEST FLOWPATH FROM NODE      7.10 TO NODE      6.20 =    7480.03 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.20 TO NODE      6.20 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   16.71
  RAINFALL INTENSITY(INCH/HR) =   2.72
```

```
  AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.28
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =     270.61
  TOTAL STREAM AREA(ACRES) =     279.01
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     732.28

****************************************************************************
  FLOW PROCESS FROM NODE      6.10 TO NODE      6.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   236.40
  ELEVATION DATA: UPSTREAM(FEET) =   6435.22  DOWNSTREAM(FEET) =   6352.80

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.352
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.783
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.35      0.21     0.900    91    5.35
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      1.45
  TOTAL AREA(ACRES) =      0.35   PEAK FLOW RATE(CFS) =      1.45

****************************************************************************
  FLOW PROCESS FROM NODE      6.20 TO NODE      6.20 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.35
  RAINFALL INTENSITY(INCH/HR) =   4.78
  AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       0.35
  TOTAL STREAM AREA(ACRES) =       0.35
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.45

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      682.94   12.15    3.207  0.28( 0.25) 0.90     206.2       5.10
      1      713.60   13.97    2.960  0.28( 0.25) 0.90     234.8       8.10
```

```
     1      721.78   15.00    2.820  0.28( 0.25) 0.90     248.5       8.40
     1      732.28   16.71    2.724  0.28( 0.25) 0.90     270.6       3.10
     1      724.21   17.84    2.661  0.28( 0.25) 0.90     279.0       7.10
     2        1.45    5.35    4.783  0.21( 0.19) 0.90       0.3       6.10

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1      462.53    5.35    4.783  0.28( 0.25) 0.90      91.2       6.10
     2      683.89   12.15    3.207  0.28( 0.25) 0.90     206.6       5.10
     3      714.48   13.97    2.960  0.28( 0.25) 0.90     235.1       8.10
     4      722.61   15.00    2.820  0.28( 0.25) 0.90     248.8       8.40
     5      733.08   16.71    2.724  0.28( 0.25) 0.90     271.0       3.10
     6      724.99   17.84    2.661  0.28( 0.25) 0.90     279.4       7.10

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     733.08    Tc(MIN.) =    16.71
  EFFECTIVE AREA(ACRES) =     270.96   AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.28  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =      279.4
  LONGEST FLOWPATH FROM NODE      7.10 TO NODE      6.20 =    7480.03 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.20 TO NODE      6.20 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.71
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.724
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        2.05      0.21     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    2.05      SUBAREA RUNOFF(CFS) =    4.68
  EFFECTIVE AREA(ACRES) =    273.01   AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.28  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =      281.4       PEAK FLOW RATE(CFS) =     733.08
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE      6.20 TO NODE      6.30 IS CODE =  53
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
```

```
  ELEVATION DATA: UPSTREAM(FEET) =   6352.80  DOWNSTREAM(FEET) =   6334.97
  CHANNEL LENGTH THRU SUBAREA(FEET) =   138.70   CHANNEL SLOPE =  0.1285
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .1207 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =     733.08
  FLOW VELOCITY(FEET/SEC) =  17.50 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.13   Tc(MIN.) =   16.84
  LONGEST FLOWPATH FROM NODE      7.10 TO NODE      6.30 =    7618.73 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      9.10 TO NODE      9.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   392.70
  ELEVATION DATA: UPSTREAM(FEET) =   6647.05  DOWNSTREAM(FEET) =   6532.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.789
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.386
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.12      0.42     0.900    76    6.79
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      4.04
  TOTAL AREA(ACRES) =      1.12   PEAK FLOW RATE(CFS) =      4.04

****************************************************************************
  FLOW PROCESS FROM NODE      9.20 TO NODE      9.20 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    6.79
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.386
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B       15.78      0.42     0.900    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =   15.78      SUBAREA RUNOFF(CFS) =   56.89
  EFFECTIVE AREA(ACRES) =     16.90   AREA-AVERAGED Fm(INCH/HR) =  0.38
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =       16.9       PEAK FLOW RATE(CFS) =      60.93

****************************************************************************
```

```
 FLOW PROCESS FROM NODE      9.20 TO NODE      9.30 IS CODE =  53
----------------------------------------------------------------------------
 >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   6532.00  DOWNSTREAM(FEET) =   6353.41
 CHANNEL LENGTH THRU SUBAREA(FEET) =   504.40   CHANNEL SLOPE =  0.3541
 SLOPE ADJUSTMENT CURVE USED:
 EFFECTIVE SLOPE = .2060 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
 CHANNEL FLOW THRU SUBAREA(CFS) =      60.93
 FLOW VELOCITY(FEET/SEC) =   9.99 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
 TRAVEL TIME(MIN.) =   0.84   Tc(MIN.) =    7.63
 LONGEST FLOWPATH FROM NODE      9.10 TO NODE      9.30 =     897.10 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     10.10 TO NODE     10.20 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   575.80
 ELEVATION DATA: UPSTREAM(FEET) =   6680.01  DOWNSTREAM(FEET) =   6529.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.089
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.027
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        3.91      0.42     0.900    76    8.09
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
 SUBAREA RUNOFF(CFS) =     12.83
 TOTAL AREA(ACRES) =      3.91   PEAK FLOW RATE(CFS) =     12.83

****************************************************************************
 FLOW PROCESS FROM NODE     10.20 TO NODE     10.20 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    8.09
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.027
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B       15.30      0.42     0.900    76
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
 SUBAREA AREA(ACRES) =   15.30      SUBAREA RUNOFF(CFS) =   50.22
```

```
  EFFECTIVE AREA(ACRES) =     19.21   AREA-AVERAGED Fm(INCH/HR) =  0.38
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =       19.2       PEAK FLOW RATE(CFS) =      63.05

****************************************************************************
  FLOW PROCESS FROM NODE     10.20 TO NODE     10.30 IS CODE =  53
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6529.00  DOWNSTREAM(FEET) =   6335.41
  CHANNEL LENGTH THRU SUBAREA(FEET) =   445.30   CHANNEL SLOPE =  0.4347
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .2182 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =      63.05
  FLOW VELOCITY(FEET/SEC) =  10.40 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.71   Tc(MIN.) =    8.80
  LONGEST FLOWPATH FROM NODE     10.10 TO NODE     10.30 =    1021.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.10 TO NODE     11.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   643.30
  ELEVATION DATA: UPSTREAM(FEET) =   6606.25  DOWNSTREAM(FEET) =   6540.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.194
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.474
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B        2.55      0.42     0.900    76   10.19
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      7.11
  TOTAL AREA(ACRES) =      2.55   PEAK FLOW RATE(CFS) =      7.11

****************************************************************************
  FLOW PROCESS FROM NODE     11.20 TO NODE     11.20 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.19
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.474
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
```

```
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B       25.99      0.42     0.900    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =   25.99      SUBAREA RUNOFF(CFS) =   72.35
  EFFECTIVE AREA(ACRES) =     28.54   AREA-AVERAGED Fm(INCH/HR) =  0.38
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =       28.5       PEAK FLOW RATE(CFS) =      79.46

****************************************************************************
  FLOW PROCESS FROM NODE     11.20 TO NODE     11.30 IS CODE =  53
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6540.00  DOWNSTREAM(FEET) =   6371.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1414.30   CHANNEL SLOPE =  0.1195
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .1146 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =      79.46
  FLOW VELOCITY(FEET/SEC) =   8.14 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   2.90   Tc(MIN.) =   13.09
  LONGEST FLOWPATH FROM NODE     11.10 TO NODE     11.30 =    2057.60 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.30 TO NODE     11.30 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.09
  RAINFALL INTENSITY(INCH/HR) =   3.08
  AREA-AVERAGED Fm(INCH/HR) =  0.38
  AREA-AVERAGED Fp(INCH/HR) =  0.42
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =      28.54
  TOTAL STREAM AREA(ACRES) =      28.54
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      79.46

****************************************************************************
  FLOW PROCESS FROM NODE     12.10 TO NODE     12.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   965.90
  ELEVATION DATA: UPSTREAM(FEET) =   6836.40  DOWNSTREAM(FEET) =   6643.42

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.505
```

```
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.431
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        6.55      0.21     0.900    91   10.50
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =     19.11
  TOTAL AREA(ACRES) =      6.55   PEAK FLOW RATE(CFS) =     19.11

****************************************************************************
  FLOW PROCESS FROM NODE     12.20 TO NODE     12.20 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.50
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.431
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D       39.80      0.21     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =   39.80      SUBAREA RUNOFF(CFS) =  116.14
  EFFECTIVE AREA(ACRES) =     46.35   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =       46.3       PEAK FLOW RATE(CFS) =     135.25

****************************************************************************
  FLOW PROCESS FROM NODE     12.20 TO NODE     11.30 IS CODE =  53
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6643.42  DOWNSTREAM(FEET) =   6371.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  2716.70   CHANNEL SLOPE =  0.1003
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .1002 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =     135.25
  FLOW VELOCITY(FEET/SEC) =   9.08 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   4.98   Tc(MIN.) =   15.49
  LONGEST FLOWPATH FROM NODE     12.10 TO NODE     11.30 =    3682.60 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.30 TO NODE     11.30 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
```

```
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   15.49
  RAINFALL INTENSITY(INCH/HR) =   2.79
  AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =      46.35
  TOTAL STREAM AREA(ACRES) =      46.35
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     135.25

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       79.46   13.09    3.080  0.42( 0.38) 0.90      28.5      11.10
      2      135.25   15.49    2.793  0.21( 0.19) 0.90      46.3      12.10

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      206.37   13.09    3.080  0.30( 0.27) 0.90      67.7      11.10
      2      206.26   15.49    2.793  0.29( 0.26) 0.90      74.9      12.10

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     206.37    Tc(MIN.) =    13.09
  EFFECTIVE AREA(ACRES) =      67.72   AREA-AVERAGED Fm(INCH/HR) =  0.27
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =       74.9
  LONGEST FLOWPATH FROM NODE     12.10 TO NODE     11.30 =    3682.60 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.30 TO NODE     11.30 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.09
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.080
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        0.19      0.21     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    0.19      SUBAREA RUNOFF(CFS) =    0.49
  EFFECTIVE AREA(ACRES) =     67.91   AREA-AVERAGED Fm(INCH/HR) =  0.27
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =       75.1       PEAK FLOW RATE(CFS) =     206.37
```

```
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE     11.30 TO NODE     13.20 IS CODE =  53
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6371.00  DOWNSTREAM(FEET) =   6369.35
  CHANNEL LENGTH THRU SUBAREA(FEET) =    54.80   CHANNEL SLOPE =  0.0301
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .0301 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =     206.37
  FLOW VELOCITY(FEET/SEC) =   5.73 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.16   Tc(MIN.) =   13.25
  LONGEST FLOWPATH FROM NODE     12.10 TO NODE     13.20 =    3737.40 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.20 TO NODE     13.20 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.25
  RAINFALL INTENSITY(INCH/HR) =   3.06
  AREA-AVERAGED Fm(INCH/HR) =  0.27
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =      67.91
  TOTAL STREAM AREA(ACRES) =      75.08
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     206.37

****************************************************************************
  FLOW PROCESS FROM NODE     13.10 TO NODE     13.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   852.50
  ELEVATION DATA: UPSTREAM(FEET) =   6506.32  DOWNSTREAM(FEET) =   6369.35

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.438
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.440
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        4.92      0.21     0.900    91   10.44
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =     14.40
  TOTAL AREA(ACRES) =      4.92   PEAK FLOW RATE(CFS) =     14.40

****************************************************************************
  FLOW PROCESS FROM NODE     13.20 TO NODE     13.20 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.44
  RAINFALL INTENSITY(INCH/HR) =   3.44
  AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       4.92
  TOTAL STREAM AREA(ACRES) =       4.92
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      14.40

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      206.37   13.25    3.058  0.30( 0.27) 0.90      67.9      11.10
      1      206.26   15.65    2.784  0.29( 0.26) 0.90      75.1      12.10
      2       14.40   10.44    3.440  0.21( 0.19) 0.90       4.9      13.10

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      199.27   10.44    3.440  0.29( 0.26) 0.90      58.4      13.10
      2      219.07   13.25    3.058  0.29( 0.26) 0.90      72.8      11.10
      3      217.75   15.65    2.784  0.29( 0.26) 0.90      80.0      12.10

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     219.07    Tc(MIN.) =    13.25
  EFFECTIVE AREA(ACRES) =      72.83   AREA-AVERAGED Fm(INCH/HR) =  0.26
  AREA-AVERAGED Fp(INCH/HR) =  0.29  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =       80.0
  LONGEST FLOWPATH FROM NODE     12.10 TO NODE     13.20 =    3737.40 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.20 TO NODE     13.20 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.25
```

```
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.058
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.86      0.21     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    0.86      SUBAREA RUNOFF(CFS) =    2.22
  EFFECTIVE AREA(ACRES) =     73.69   AREA-AVERAGED Fm(INCH/HR) =  0.26
  AREA-AVERAGED Fp(INCH/HR) =  0.29  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =       80.9       PEAK FLOW RATE(CFS) =     219.07
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE     13.20 TO NODE     13.30 IS CODE =  53
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6369.35  DOWNSTREAM(FEET) =   6363.20
  CHANNEL LENGTH THRU SUBAREA(FEET) =   107.90   CHANNEL SLOPE =  0.0570
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .0570 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =     219.07
  FLOW VELOCITY(FEET/SEC) =   8.05 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.22   Tc(MIN.) =   13.47
  LONGEST FLOWPATH FROM NODE     12.10 TO NODE     13.30 =    3845.30 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     14.10 TO NODE     14.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   671.10
  ELEVATION DATA: UPSTREAM(FEET) =   6509.56  DOWNSTREAM(FEET) =   6270.66

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.090
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.027
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        4.08      0.21     0.900    91    8.09
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =     14.09
  TOTAL AREA(ACRES) =      4.08   PEAK FLOW RATE(CFS) =     14.09
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     15.10 TO NODE     15.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   665.60
  ELEVATION DATA: UPSTREAM(FEET) =   6528.66  DOWNSTREAM(FEET) =   6446.70

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.971
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.508
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        5.64      0.21     0.900    91    9.97
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =     16.85
  TOTAL AREA(ACRES) =      5.64   PEAK FLOW RATE(CFS) =     16.85

****************************************************************************
  FLOW PROCESS FROM NODE     15.20 TO NODE     15.20 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.97
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.508
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        8.93      0.21     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    8.93      SUBAREA RUNOFF(CFS) =   26.67
  EFFECTIVE AREA(ACRES) =     14.57   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =       14.6       PEAK FLOW RATE(CFS) =      43.52

****************************************************************************
  FLOW PROCESS FROM NODE     15.20 TO NODE     15.30 IS CODE =  53
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6446.70  DOWNSTREAM(FEET) =   6275.97
  CHANNEL LENGTH THRU SUBAREA(FEET) =   627.00   CHANNEL SLOPE =  0.2723
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .1874 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
```

```
  CHANNEL FLOW THRU SUBAREA(CFS) =      43.52
  FLOW VELOCITY(FEET/SEC) =   8.52 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.23   Tc(MIN.) =   11.20
  LONGEST FLOWPATH FROM NODE     15.10 TO NODE     15.30 =    1292.60 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.10 TO NODE     16.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   322.00
  ELEVATION DATA: UPSTREAM(FEET) =   6532.31  DOWNSTREAM(FEET) =   6490.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.361
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.228
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
        LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.96      0.21     0.900    91    7.36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      3.49
  TOTAL AREA(ACRES) =      0.96   PEAK FLOW RATE(CFS) =      3.49
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        1.0  TC(MIN.) =      7.36
  EFFECTIVE AREA(ACRES) =      0.96  AREA-AVERAGED Fm(INCH/HR)=  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap = 0.900
  PEAK FLOW RATE(CFS)   =       3.49
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

Existing 100-year

```
**************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
         (Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
        (c) Copyright 1983-2011 Advanced Engineering Software (aes)
            Ver. 18.0  Release Date: 07/01/2011  License ID 1499

                          Analysis prepared by:
```

Kimley-Horn

```
 ************************* DESCRIPTION OF STUDY *************************
* Hume SoCal                                                            *
* Existing 100 year - 24 hour Conditions                                *
* San Bernardino County, CA                                             *
 ************************************************************************

  FILE NAME: HUMEEX.DAT
  TIME/DATE OF STUDY: 15:01 01/25/2024
==========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==========================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *USER-DEFINED TABLED RAINFALL USED*
  NUMBER OF [TIME,INTENSITY] DATA PAIRS =  9
   1)    5.00;  8.030
   2)   10.00;  5.750
   3)   15.00;  4.640
   4)   30.00;  3.260
   5)   60.00;  2.300
   6)  120.00;  1.740
   7)  180.00;  1.510
   8)  360.00;  1.190
   9)  720.00;  0.881
  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
```

```
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE      1.10 TO NODE      1.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   291.50
  ELEVATION DATA: UPSTREAM(FEET) =   6652.19  DOWNSTREAM(FEET) =   6591.92

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.461
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  7.364
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        1.39      0.21     0.900    91    6.46
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      8.98
  TOTAL AREA(ACRES) =      1.39   PEAK FLOW RATE(CFS) =      8.98

****************************************************************************
  FLOW PROCESS FROM NODE      1.20 TO NODE      1.20 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    6.46
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  7.364
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        4.74      0.21     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    4.74      SUBAREA RUNOFF(CFS) =   30.61
  EFFECTIVE AREA(ACRES) =      6.13   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =        6.1       PEAK FLOW RATE(CFS) =      39.58

****************************************************************************
  FLOW PROCESS FROM NODE      1.20 TO NODE      1.30 IS CODE =  53
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6591.92  DOWNSTREAM(FEET) =   6414.01
  CHANNEL LENGTH THRU SUBAREA(FEET) =   619.40   CHANNEL SLOPE =  0.2872
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .1918 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =      39.58
  FLOW VELOCITY(FEET/SEC) =   8.35 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.24   Tc(MIN.) =    7.70
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.30 =     910.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      2.10 TO NODE      2.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
================================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   487.50
  ELEVATION DATA: UPSTREAM(FEET) =   6694.25  DOWNSTREAM(FEET) =   6619.24

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.420
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.471
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        1.63      0.21     0.900    91    8.42
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      9.22
  TOTAL AREA(ACRES) =      1.63   PEAK FLOW RATE(CFS) =      9.22

****************************************************************************
  FLOW PROCESS FROM NODE      2.20 TO NODE      2.20 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =    8.42
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.471
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D       12.76      0.21     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =   12.76      SUBAREA RUNOFF(CFS) =   72.14
  EFFECTIVE AREA(ACRES) =     14.39   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.90
```

```
  TOTAL AREA(ACRES) =       14.4       PEAK FLOW RATE(CFS) =      81.35

****************************************************************************
  FLOW PROCESS FROM NODE      2.20 TO NODE      2.30 IS CODE =  53
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6619.24  DOWNSTREAM(FEET) =   6372.85
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1548.50   CHANNEL SLOPE =  0.1591
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .1396 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =      81.35
  FLOW VELOCITY(FEET/SEC) =   9.05 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   2.85   Tc(MIN.) =   11.27
  LONGEST FLOWPATH FROM NODE      2.10 TO NODE      2.30 =    2036.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      4.10 TO NODE      4.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   416.40
  ELEVATION DATA: UPSTREAM(FEET) =   6550.66  DOWNSTREAM(FEET) =   6358.84

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.348
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  7.415
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        2.86      0.21     0.900    91    6.35
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =     18.60
  TOTAL AREA(ACRES) =      2.86   PEAK FLOW RATE(CFS) =     18.60

****************************************************************************
  FLOW PROCESS FROM NODE      7.10 TO NODE      7.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   911.20
  ELEVATION DATA: UPSTREAM(FEET) =   7336.42  DOWNSTREAM(FEET) =   7060.88

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.446
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.003
```

```
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        6.53      0.21     0.900    91    9.45
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =     34.17
  TOTAL AREA(ACRES) =      6.53   PEAK FLOW RATE(CFS) =     34.17

****************************************************************************
  FLOW PROCESS FROM NODE      7.20 TO NODE      7.20 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.45
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.003
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D      107.14      0.21     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =  107.14      SUBAREA RUNOFF(CFS) =  560.57
  EFFECTIVE AREA(ACRES) =    113.67   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =      113.7       PEAK FLOW RATE(CFS) =     594.74

****************************************************************************
  FLOW PROCESS FROM NODE      7.20 TO NODE      7.30 IS CODE =  53
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   7060.88  DOWNSTREAM(FEET) =   6472.84
  CHANNEL LENGTH THRU SUBAREA(FEET) =  4642.50   CHANNEL SLOPE =  0.1267
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .1194 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =     594.74
  FLOW VELOCITY(FEET/SEC) =  16.24 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   4.76   Tc(MIN.) =   14.21
  LONGEST FLOWPATH FROM NODE      7.10 TO NODE      7.30 =    5553.70 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.30 TO NODE      7.30 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
```

```
  TIME OF CONCENTRATION(MIN.) =   14.21
  RAINFALL INTENSITY(INCH/HR) =   4.82
  AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =     113.67
  TOTAL STREAM AREA(ACRES) =     113.67
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     594.74

****************************************************************************
  FLOW PROCESS FROM NODE      3.10 TO NODE      3.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   570.40
  ELEVATION DATA: UPSTREAM(FEET) =   7022.75  DOWNSTREAM(FEET) =   6906.51

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.476
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.445
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        1.09      0.21     0.900    91    8.48
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      6.14
  TOTAL AREA(ACRES) =      1.09   PEAK FLOW RATE(CFS) =      6.14

****************************************************************************
  FLOW PROCESS FROM NODE      3.20 TO NODE      3.20 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.48
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.445
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B       32.62      0.42     0.900    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =   32.62      SUBAREA RUNOFF(CFS) =  178.04
  EFFECTIVE AREA(ACRES) =     33.71   AREA-AVERAGED Fm(INCH/HR) =  0.37
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =       33.7       PEAK FLOW RATE(CFS) =     184.18

****************************************************************************
```

```
  FLOW PROCESS FROM NODE      3.20 TO NODE      3.30 IS CODE =  53
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6906.51  DOWNSTREAM(FEET) =   6598.45
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1309.60   CHANNEL SLOPE =  0.2352
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .1751 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =     184.18
  FLOW VELOCITY(FEET/SEC) =  13.31 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.64   Tc(MIN.) =   10.12
  LONGEST FLOWPATH FROM NODE      3.10 TO NODE      3.30 =    1880.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      3.30 TO NODE      3.30 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.12
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.724
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B       47.30      0.42     0.900    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =   47.30      SUBAREA RUNOFF(CFS) =  227.48
  EFFECTIVE AREA(ACRES) =     81.01   AREA-AVERAGED Fm(INCH/HR) =  0.38
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =       81.0       PEAK FLOW RATE(CFS) =     389.79

****************************************************************************
  FLOW PROCESS FROM NODE      3.30 TO NODE      7.30 IS CODE =  53
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6598.45  DOWNSTREAM(FEET) =   6472.84
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1872.50   CHANNEL SLOPE =  0.0671
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .0671 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =     389.79
  FLOW VELOCITY(FEET/SEC) =  10.57 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   2.95   Tc(MIN.) =   13.07
  LONGEST FLOWPATH FROM NODE      3.10 TO NODE      7.30 =    3752.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.30 TO NODE      7.30 IS CODE =   1
----------------------------------------------------------------------------
```

```
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.07
  RAINFALL INTENSITY(INCH/HR) =   5.07
  AREA-AVERAGED Fm(INCH/HR) =  0.38
  AREA-AVERAGED Fp(INCH/HR) =  0.42
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =      81.01
  TOTAL STREAM AREA(ACRES) =      81.01
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     389.79

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      594.74   14.21    4.815  0.21( 0.19) 0.90     113.7       7.10
      2      389.79   13.07    5.069  0.42( 0.38) 0.90      81.0       3.10

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      966.68   13.07    5.069  0.30( 0.27) 0.90     185.5       3.10
      2      963.44   14.21    4.815  0.30( 0.27) 0.90     194.7       7.10

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     966.68    Tc(MIN.) =    13.07
  EFFECTIVE AREA(ACRES) =     185.53   AREA-AVERAGED Fm(INCH/HR) =  0.27
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =      194.7
  LONGEST FLOWPATH FROM NODE      7.10 TO NODE      7.30 =    5553.70 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.30 TO NODE      7.30 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.07
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.069
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D       10.63      0.21     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =   10.63      SUBAREA RUNOFF(CFS) =   46.69
```

```
  EFFECTIVE AREA(ACRES) =    196.16   AREA-AVERAGED Fm(INCH/HR) =  0.27
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =      205.3       PEAK FLOW RATE(CFS) =     966.68
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE      7.30 TO NODE      7.40 IS CODE =  53
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6472.84  DOWNSTREAM(FEET) =   6404.98
  CHANNEL LENGTH THRU SUBAREA(FEET) =   953.53   CHANNEL SLOPE =  0.0712
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .0712 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =     966.68
  FLOW VELOCITY(FEET/SEC) =  14.74 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.08   Tc(MIN.) =   14.15
  LONGEST FLOWPATH FROM NODE      7.10 TO NODE      7.40 =    6507.23 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.40 TO NODE      7.40 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      8.10 TO NODE      8.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   584.70
  ELEVATION DATA: UPSTREAM(FEET) =   6760.02  DOWNSTREAM(FEET) =   6589.39

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.967
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.677
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        2.35      0.21     0.900    91    7.97
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =     13.72
  TOTAL AREA(ACRES) =      2.35   PEAK FLOW RATE(CFS) =     13.72

****************************************************************************
  FLOW PROCESS FROM NODE      8.20 TO NODE      8.20 IS CODE =  81
----------------------------------------------------------------------------
```

```
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =    7.97
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.677
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D       16.46      0.21     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =   16.46      SUBAREA RUNOFF(CFS) =   96.12
  EFFECTIVE AREA(ACRES) =     18.81   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =       18.8       PEAK FLOW RATE(CFS) =     109.84

********************************************************************************
  FLOW PROCESS FROM NODE      8.20 TO NODE      8.30 IS CODE =  53
--------------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6589.39  DOWNSTREAM(FEET) =   6472.97
  CHANNEL LENGTH THRU SUBAREA(FEET) =   897.40   CHANNEL SLOPE =  0.1297
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .1215 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =     109.84
  FLOW VELOCITY(FEET/SEC) =   9.33 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.60   Tc(MIN.) =    9.57
  LONGEST FLOWPATH FROM NODE      8.10 TO NODE      8.30 =    1482.10 FEET.

********************************************************************************
  FLOW PROCESS FROM NODE      8.30 TO NODE      8.30 IS CODE =   1
--------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.57
  RAINFALL INTENSITY(INCH/HR) =   5.95
  AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =      18.81
  TOTAL STREAM AREA(ACRES) =      18.81
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     109.84

********************************************************************************
  FLOW PROCESS FROM NODE      8.40 TO NODE      8.50 IS CODE =  21
--------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
```

```
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   757.10
  ELEVATION DATA: UPSTREAM(FEET) =   6711.74  DOWNSTREAM(FEET) =   6532.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.206
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.112
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        1.36      0.21     0.900    91    9.21
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      7.25
  TOTAL AREA(ACRES) =      1.36   PEAK FLOW RATE(CFS) =      7.25

****************************************************************************
  FLOW PROCESS FROM NODE      8.50 TO NODE      8.50 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.21
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.112
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        1.69      0.21     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    1.69      SUBAREA RUNOFF(CFS) =    9.01
  EFFECTIVE AREA(ACRES) =      3.05   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =        3.1       PEAK FLOW RATE(CFS) =      16.26

****************************************************************************
  FLOW PROCESS FROM NODE      8.50 TO NODE      8.30 IS CODE =  53
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6532.00  DOWNSTREAM(FEET) =   6472.97
  CHANNEL LENGTH THRU SUBAREA(FEET) =   426.20   CHANNEL SLOPE =  0.1385
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .1273 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =      16.26
  FLOW VELOCITY(FEET/SEC) =   5.06 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.40   Tc(MIN.) =   10.61
  LONGEST FLOWPATH FROM NODE      8.40 TO NODE      8.30 =    1183.30 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE      8.30 TO NODE      8.30 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.61
  RAINFALL INTENSITY(INCH/HR) =   5.61
  AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       3.05
  TOTAL STREAM AREA(ACRES) =       3.05
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      16.26

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      109.84    9.57    5.946  0.21( 0.19) 0.90      18.8       8.10
      2       16.26   10.61    5.614  0.21( 0.19) 0.90       3.1       8.40

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      125.40    9.57    5.946  0.21( 0.19) 0.90      21.6       8.10
      2      119.76   10.61    5.614  0.21( 0.19) 0.90      21.9       8.40

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     125.40    Tc(MIN.) =     9.57
  EFFECTIVE AREA(ACRES) =      21.56   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =       21.9
  LONGEST FLOWPATH FROM NODE      8.10 TO NODE      8.30 =    1482.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      8.30 TO NODE      8.30 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.57
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.946
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
```

```
  ".4 DWELLING/ACRE"         D       21.46      0.21     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =   21.46      SUBAREA RUNOFF(CFS) =  111.20
  EFFECTIVE AREA(ACRES) =     43.02   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =       43.3       PEAK FLOW RATE(CFS) =     222.92

****************************************************************************
  FLOW PROCESS FROM NODE      8.30 TO NODE      7.40 IS CODE =  53
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6472.97  DOWNSTREAM(FEET) =   6404.98
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1112.00   CHANNEL SLOPE =  0.0611
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .0611 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =     222.92
  FLOW VELOCITY(FEET/SEC) =   8.38 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   2.21   Tc(MIN.) =   11.78
  LONGEST FLOWPATH FROM NODE      8.10 TO NODE      7.40 =    2594.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.40 TO NODE      7.40 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      222.92   11.78    5.355  0.21( 0.19) 0.90      43.0       8.10
      2      211.52   12.86    5.115  0.21( 0.19) 0.90      43.3       8.40
  LONGEST FLOWPATH FROM NODE      8.10 TO NODE      7.40 =    2594.10 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      966.68   14.15    4.830  0.30( 0.27) 0.90     196.2       3.10
      2      963.44   15.29    4.613  0.29( 0.26) 0.90     205.3       7.10
  LONGEST FLOWPATH FROM NODE      7.10 TO NODE      7.40 =    6507.23 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1     1120.63   11.78    5.355  0.28( 0.25) 0.90     206.4       8.10
      2     1145.36   12.86    5.115  0.28( 0.25) 0.90     221.7       8.40
      3     1165.96   14.15    4.830  0.28( 0.25) 0.90     239.5       3.10
      4     1153.43   15.29    4.613  0.28( 0.25) 0.90     248.6       7.10
    TOTAL AREA(ACRES) =       248.6
```

```
  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     1165.96  Tc(MIN.) =   14.145
  EFFECTIVE AREA(ACRES) =    239.48  AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.28  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =      248.6
  LONGEST FLOWPATH FROM NODE      7.10 TO NODE      7.40 =    6507.23 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.40 TO NODE      7.40 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.15
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.830
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B       11.64      0.42     0.900    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =   11.64      SUBAREA RUNOFF(CFS) =   46.61
  EFFECTIVE AREA(ACRES) =    251.12   AREA-AVERAGED Fm(INCH/HR) =  0.26
  AREA-AVERAGED Fp(INCH/HR) =  0.29  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =      260.3       PEAK FLOW RATE(CFS) =    1165.96
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE      7.40 TO NODE      7.50 IS CODE =  53
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6404.98  DOWNSTREAM(FEET) =   6355.81
  CHANNEL LENGTH THRU SUBAREA(FEET) =   872.50   CHANNEL SLOPE =  0.0564
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .0564 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =    1165.96
  FLOW VELOCITY(FEET/SEC) =  13.96 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.04   Tc(MIN.) =   15.19
  LONGEST FLOWPATH FROM NODE      7.10 TO NODE      7.50 =    7379.73 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.50 TO NODE      7.50 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   15.19
```

```
  RAINFALL INTENSITY(INCH/HR) =   4.62
  AREA-AVERAGED Fm(INCH/HR) =  0.26
  AREA-AVERAGED Fp(INCH/HR) =  0.29
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =     251.12
  TOTAL STREAM AREA(ACRES) =     260.27
  PEAK FLOW RATE(CFS) AT CONFLUENCE =    1165.96

****************************************************************************
  FLOW PROCESS FROM NODE      5.10 TO NODE      5.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   693.60
  ELEVATION DATA: UPSTREAM(FEET) =   6585.81  DOWNSTREAM(FEET) =   6467.32

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.494
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.981
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        4.02      0.21     0.900    91    9.49
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =     20.95
  TOTAL AREA(ACRES) =      4.02   PEAK FLOW RATE(CFS) =     20.95

****************************************************************************
  FLOW PROCESS FROM NODE      5.20 TO NODE      5.20 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.49
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.981
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D       14.38      0.21     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =   14.38      SUBAREA RUNOFF(CFS) =   74.96
  EFFECTIVE AREA(ACRES) =     18.40   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =       18.4       PEAK FLOW RATE(CFS) =      95.91

****************************************************************************
  FLOW PROCESS FROM NODE      5.20 TO NODE      7.50 IS CODE =  53
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6467.32  DOWNSTREAM(FEET) =   6355.81
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1035.00   CHANNEL SLOPE =  0.1077
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .1058 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =      95.91
  FLOW VELOCITY(FEET/SEC) =   8.33 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   2.07   Tc(MIN.) =   11.57
  LONGEST FLOWPATH FROM NODE      5.10 TO NODE      7.50 =    1728.60 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.50 TO NODE      7.50 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.57
  RAINFALL INTENSITY(INCH/HR) =   5.40
  AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =      18.40
  TOTAL STREAM AREA(ACRES) =      18.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      95.91

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1     1120.63   12.84    5.120  0.29( 0.26) 0.90     218.0       8.10
      1     1145.36   13.91    4.882  0.29( 0.26) 0.90     233.3       8.40
      1     1165.96   15.19    4.623  0.29( 0.26) 0.90     251.1       3.10
      1     1153.43   16.34    4.517  0.28( 0.26) 0.90     260.3       7.10
      2       95.91   11.57    5.402  0.21( 0.19) 0.90      18.4       5.10

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1     1164.21   11.57    5.402  0.28( 0.25) 0.90     214.9       5.10
      2     1211.35   12.84    5.120  0.28( 0.25) 0.90     236.4       8.10
      3     1231.71   13.91    4.882  0.28( 0.25) 0.90     251.7       8.40
      4     1247.53   15.19    4.623  0.28( 0.25) 0.90     269.5       3.10
      5     1233.05   16.34    4.517  0.28( 0.25) 0.90     278.7       7.10
```

```
  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =    1247.53    Tc(MIN.) =    15.19
  EFFECTIVE AREA(ACRES) =     269.52   AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.28  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =      278.7
  LONGEST FLOWPATH FROM NODE      7.10 TO NODE      7.50 =    7379.73 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.50 TO NODE      7.50 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.19
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.623
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.34      0.21     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    0.34      SUBAREA RUNOFF(CFS) =    1.36
  EFFECTIVE AREA(ACRES) =    269.86   AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.28  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =      279.0       PEAK FLOW RATE(CFS) =    1247.53
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE      7.50 TO NODE      6.20 IS CODE =  53
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6355.81  DOWNSTREAM(FEET) =   6352.80
  CHANNEL LENGTH THRU SUBAREA(FEET) =   100.30   CHANNEL SLOPE =  0.0300
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .0300 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =    1247.53
  FLOW VELOCITY(FEET/SEC) =  10.42 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.16   Tc(MIN.) =   15.35
  LONGEST FLOWPATH FROM NODE      7.10 TO NODE      6.20 =    7480.03 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.20 TO NODE      6.20 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   15.35
  RAINFALL INTENSITY(INCH/HR) =   4.61
```

```
  AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.28
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =     269.86
  TOTAL STREAM AREA(ACRES) =     279.01
  PEAK FLOW RATE(CFS) AT CONFLUENCE =    1247.53

****************************************************************************
  FLOW PROCESS FROM NODE      6.10 TO NODE      6.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   236.40
  ELEVATION DATA: UPSTREAM(FEET) =   6435.22  DOWNSTREAM(FEET) =   6352.80

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.352
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  7.870
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.35      0.21     0.900    91    5.35
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      2.42
  TOTAL AREA(ACRES) =      0.35   PEAK FLOW RATE(CFS) =      2.42

****************************************************************************
  FLOW PROCESS FROM NODE      6.20 TO NODE      6.20 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.35
  RAINFALL INTENSITY(INCH/HR) =   7.87
  AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       0.35
  TOTAL STREAM AREA(ACRES) =       0.35
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.42

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1     1164.21   11.73    5.366  0.28( 0.25) 0.90     215.2       5.10
      1     1211.35   13.00    5.084  0.28( 0.25) 0.90     236.8       8.10
```

```
     1     1231.71   14.07    4.846  0.28( 0.25) 0.90     252.1       8.40
     1     1247.53   15.35    4.608  0.28( 0.25) 0.90     269.9       3.10
     1     1233.05   16.50    4.502  0.28( 0.25) 0.90     279.0       7.10
     2        2.42    5.35    7.870  0.21( 0.19) 0.90       0.3       6.10

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      793.62    5.35    7.870  0.28( 0.25) 0.90      98.5       6.10
      2     1165.84   11.73    5.366  0.28( 0.25) 0.90     215.5       5.10
      3     1212.89   13.00    5.084  0.28( 0.25) 0.90     237.1       8.10
      4     1233.17   14.07    4.846  0.28( 0.25) 0.90     252.4       8.40
      5     1248.92   15.35    4.608  0.28( 0.25) 0.90     270.2       3.10
      6     1234.41   16.50    4.502  0.28( 0.25) 0.90     279.4       7.10

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =    1248.92    Tc(MIN.) =    15.35
  EFFECTIVE AREA(ACRES) =     270.21   AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.28  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =      279.4
  LONGEST FLOWPATH FROM NODE      7.10 TO NODE      6.20 =    7480.03 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.20 TO NODE      6.20 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.35
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.608
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        2.05      0.21     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    2.05      SUBAREA RUNOFF(CFS) =    8.15
  EFFECTIVE AREA(ACRES) =    272.26   AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.28  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =      281.4       PEAK FLOW RATE(CFS) =    1248.92
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE      6.20 TO NODE      6.30 IS CODE =  53
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
```

```
  ELEVATION DATA: UPSTREAM(FEET) =   6352.80  DOWNSTREAM(FEET) =   6334.97
  CHANNEL LENGTH THRU SUBAREA(FEET) =   138.70   CHANNEL SLOPE =  0.1285
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .1207 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =    1248.92
  FLOW VELOCITY(FEET/SEC) =  20.90 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.11   Tc(MIN.) =   15.46
  LONGEST FLOWPATH FROM NODE      7.10 TO NODE      6.30 =    7618.73 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      9.10 TO NODE      9.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   392.70
  ELEVATION DATA: UPSTREAM(FEET) =   6647.05  DOWNSTREAM(FEET) =   6532.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.789
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  7.214
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.12      0.42     0.900    76    6.79
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      6.89
  TOTAL AREA(ACRES) =      1.12   PEAK FLOW RATE(CFS) =      6.89

****************************************************************************
  FLOW PROCESS FROM NODE      9.20 TO NODE      9.20 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    6.79
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  7.214
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B       15.78      0.42     0.900    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =   15.78      SUBAREA RUNOFF(CFS) =   97.05
  EFFECTIVE AREA(ACRES) =     16.90   AREA-AVERAGED Fm(INCH/HR) =  0.38
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =       16.9       PEAK FLOW RATE(CFS) =     103.94

****************************************************************************
```

```
 FLOW PROCESS FROM NODE      9.20 TO NODE      9.30 IS CODE =  53
----------------------------------------------------------------------------
 >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   6532.00  DOWNSTREAM(FEET) =   6353.41
 CHANNEL LENGTH THRU SUBAREA(FEET) =   504.40   CHANNEL SLOPE =  0.3541
 SLOPE ADJUSTMENT CURVE USED:
 EFFECTIVE SLOPE = .2060 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
 CHANNEL FLOW THRU SUBAREA(CFS) =     103.94
 FLOW VELOCITY(FEET/SEC) =  11.93 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
 TRAVEL TIME(MIN.) =   0.70   Tc(MIN.) =    7.49
 LONGEST FLOWPATH FROM NODE      9.10 TO NODE      9.30 =     897.10 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     10.10 TO NODE     10.20 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   575.80
 ELEVATION DATA: UPSTREAM(FEET) =   6680.01  DOWNSTREAM(FEET) =   6529.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.089
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.621
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        3.91      0.42     0.900    76    8.09
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
 SUBAREA RUNOFF(CFS) =     21.96
 TOTAL AREA(ACRES) =      3.91   PEAK FLOW RATE(CFS) =     21.96

****************************************************************************
 FLOW PROCESS FROM NODE     10.20 TO NODE     10.20 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    8.09
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.621
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B       15.30      0.42     0.900    76
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
 SUBAREA AREA(ACRES) =   15.30      SUBAREA RUNOFF(CFS) =   85.94
```

```
  EFFECTIVE AREA(ACRES) =     19.21   AREA-AVERAGED Fm(INCH/HR) =  0.38
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =       19.2       PEAK FLOW RATE(CFS) =     107.90

****************************************************************************
  FLOW PROCESS FROM NODE     10.20 TO NODE     10.30 IS CODE =  53
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6529.00  DOWNSTREAM(FEET) =   6335.41
  CHANNEL LENGTH THRU SUBAREA(FEET) =   445.30   CHANNEL SLOPE =  0.4347
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .2182 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =     107.90
  FLOW VELOCITY(FEET/SEC) =  12.43 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.60   Tc(MIN.) =    8.69
  LONGEST FLOWPATH FROM NODE     10.10 TO NODE     10.30 =    1021.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.10 TO NODE     11.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   643.30
  ELEVATION DATA: UPSTREAM(FEET) =   6606.25  DOWNSTREAM(FEET) =   6540.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.194
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.707
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.55      0.42     0.900    76   10.19
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =     12.24
  TOTAL AREA(ACRES) =      2.55   PEAK FLOW RATE(CFS) =     12.24

****************************************************************************
  FLOW PROCESS FROM NODE     11.20 TO NODE     11.20 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.19
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.707
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
```

```
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B       25.99      0.42     0.900    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =   25.99      SUBAREA RUNOFF(CFS) =  124.59
  EFFECTIVE AREA(ACRES) =     28.54   AREA-AVERAGED Fm(INCH/HR) =  0.38
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =       28.5       PEAK FLOW RATE(CFS) =     136.83

****************************************************************************
  FLOW PROCESS FROM NODE     11.20 TO NODE     11.30 IS CODE =  53
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6540.00  DOWNSTREAM(FEET) =   6371.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1414.30   CHANNEL SLOPE =  0.1195
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .1146 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =     136.83
  FLOW VELOCITY(FEET/SEC) =   9.75 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   2.42   Tc(MIN.) =   12.61
  LONGEST FLOWPATH FROM NODE     11.10 TO NODE     11.30 =    2057.60 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.30 TO NODE     11.30 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.61
  RAINFALL INTENSITY(INCH/HR) =   5.17
  AREA-AVERAGED Fm(INCH/HR) =  0.38
  AREA-AVERAGED Fp(INCH/HR) =  0.42
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =      28.54
  TOTAL STREAM AREA(ACRES) =      28.54
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     136.83

****************************************************************************
  FLOW PROCESS FROM NODE     12.10 TO NODE     12.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   965.90
  ELEVATION DATA: UPSTREAM(FEET) =   6836.40  DOWNSTREAM(FEET) =   6643.42

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.505
```

```
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.638
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        6.55      0.21     0.900    91   10.50
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =     32.12
  TOTAL AREA(ACRES) =      6.55   PEAK FLOW RATE(CFS) =     32.12

****************************************************************************
  FLOW PROCESS FROM NODE     12.20 TO NODE     12.20 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.50
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.638
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D       39.80      0.21     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =   39.80      SUBAREA RUNOFF(CFS) =  195.18
  EFFECTIVE AREA(ACRES) =     46.35   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =       46.3       PEAK FLOW RATE(CFS) =     227.30

****************************************************************************
  FLOW PROCESS FROM NODE     12.20 TO NODE     11.30 IS CODE =  53
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6643.42  DOWNSTREAM(FEET) =   6371.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  2716.70   CHANNEL SLOPE =  0.1003
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .1002 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =     227.30
  FLOW VELOCITY(FEET/SEC) =  10.80 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   4.19   Tc(MIN.) =   14.70
  LONGEST FLOWPATH FROM NODE     12.10 TO NODE     11.30 =    3682.60 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.30 TO NODE     11.30 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
```

```
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   14.70
  RAINFALL INTENSITY(INCH/HR) =   4.71
  AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =      46.35
  TOTAL STREAM AREA(ACRES) =      46.35
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     227.30

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      136.83   12.61    5.170  0.42( 0.38) 0.90      28.5      11.10
      2      227.30   14.70    4.707  0.21( 0.19) 0.90      46.3      12.10

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      351.85   12.61    5.170  0.30( 0.27) 0.90      68.3      11.10
      2      350.90   14.70    4.707  0.29( 0.26) 0.90      74.9      12.10

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     351.85    Tc(MIN.) =    12.61
  EFFECTIVE AREA(ACRES) =      68.31   AREA-AVERAGED Fm(INCH/HR) =  0.27
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =       74.9
  LONGEST FLOWPATH FROM NODE     12.10 TO NODE     11.30 =    3682.60 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.30 TO NODE     11.30 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.61
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.170
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        0.19      0.21     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    0.19      SUBAREA RUNOFF(CFS) =    0.85
  EFFECTIVE AREA(ACRES) =     68.50   AREA-AVERAGED Fm(INCH/HR) =  0.27
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =       75.1       PEAK FLOW RATE(CFS) =     351.85
```

```
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE     11.30 TO NODE     13.20 IS CODE =  53
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6371.00  DOWNSTREAM(FEET) =   6369.35
  CHANNEL LENGTH THRU SUBAREA(FEET) =    54.80   CHANNEL SLOPE =  0.0301
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .0301 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =     351.85
  FLOW VELOCITY(FEET/SEC) =   6.85 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.13   Tc(MIN.) =   12.74
  LONGEST FLOWPATH FROM NODE     12.10 TO NODE     13.20 =    3737.40 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.20 TO NODE     13.20 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.74
  RAINFALL INTENSITY(INCH/HR) =   5.14
  AREA-AVERAGED Fm(INCH/HR) =  0.27
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =      68.50
  TOTAL STREAM AREA(ACRES) =      75.08
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     351.85

****************************************************************************
  FLOW PROCESS FROM NODE     13.10 TO NODE     13.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   852.50
  ELEVATION DATA: UPSTREAM(FEET) =   6506.32  DOWNSTREAM(FEET) =   6369.35

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.438
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.653
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        4.92      0.21     0.900    91   10.44
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =     24.19
  TOTAL AREA(ACRES) =      4.92   PEAK FLOW RATE(CFS) =     24.19

****************************************************************************
  FLOW PROCESS FROM NODE     13.20 TO NODE     13.20 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.44
  RAINFALL INTENSITY(INCH/HR) =   5.65
  AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       4.92
  TOTAL STREAM AREA(ACRES) =       4.92
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      24.19

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      351.85   12.74    5.141  0.30( 0.27) 0.90      68.5      11.10
      1      350.90   14.83    4.678  0.29( 0.26) 0.90      75.1      12.10
      2       24.19   10.44    5.653  0.21( 0.19) 0.90       4.9      13.10

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      342.66   10.44    5.653  0.29( 0.26) 0.90      61.0      13.10
      2      373.78   12.74    5.141  0.29( 0.26) 0.90      73.4      11.10
      3      370.77   14.83    4.678  0.29( 0.26) 0.90      80.0      12.10

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     373.78    Tc(MIN.) =    12.74
  EFFECTIVE AREA(ACRES) =      73.42   AREA-AVERAGED Fm(INCH/HR) =  0.26
  AREA-AVERAGED Fp(INCH/HR) =  0.29  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =       80.0
  LONGEST FLOWPATH FROM NODE     12.10 TO NODE     13.20 =    3737.40 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.20 TO NODE     13.20 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.74
```

```
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.141
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 ".4 DWELLING/ACRE"         D        0.86      0.21     0.900    91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
 SUBAREA AREA(ACRES) =    0.86      SUBAREA RUNOFF(CFS) =    3.83
 EFFECTIVE AREA(ACRES) =     74.28   AREA-AVERAGED Fm(INCH/HR) =  0.26
 AREA-AVERAGED Fp(INCH/HR) =  0.29  AREA-AVERAGED Ap =  0.90
 TOTAL AREA(ACRES) =       80.9       PEAK FLOW RATE(CFS) =     373.78
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
 FLOW PROCESS FROM NODE     13.20 TO NODE     13.30 IS CODE =  53
----------------------------------------------------------------------------
 >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   6369.35  DOWNSTREAM(FEET) =   6363.20
 CHANNEL LENGTH THRU SUBAREA(FEET) =   107.90   CHANNEL SLOPE =  0.0570
 SLOPE ADJUSTMENT CURVE USED:
 EFFECTIVE SLOPE = .0570 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
 CHANNEL FLOW THRU SUBAREA(CFS) =     373.78
 FLOW VELOCITY(FEET/SEC) =   9.61 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
 TRAVEL TIME(MIN.) =   0.19   Tc(MIN.) =   12.93
 LONGEST FLOWPATH FROM NODE     12.10 TO NODE     13.30 =    3845.30 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     14.10 TO NODE     14.20 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   671.10
 ELEVATION DATA: UPSTREAM(FEET) =   6509.56  DOWNSTREAM(FEET) =   6270.66

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.090
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.621
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 RESIDENTIAL
 ".4 DWELLING/ACRE"         D        4.08      0.21     0.900    91    8.09
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
 SUBAREA RUNOFF(CFS) =     23.62
 TOTAL AREA(ACRES) =      4.08   PEAK FLOW RATE(CFS) =     23.62
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     15.10 TO NODE     15.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   665.60
  ELEVATION DATA: UPSTREAM(FEET) =   6528.66  DOWNSTREAM(FEET) =   6446.70

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.971
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.763
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        5.64      0.21     0.900    91    9.97
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =     28.29
  TOTAL AREA(ACRES) =      5.64   PEAK FLOW RATE(CFS) =     28.29

****************************************************************************
  FLOW PROCESS FROM NODE     15.20 TO NODE     15.20 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.97
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.763
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        8.93      0.21     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    8.93      SUBAREA RUNOFF(CFS) =   44.80
  EFFECTIVE AREA(ACRES) =     14.57   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =       14.6       PEAK FLOW RATE(CFS) =      73.10

****************************************************************************
  FLOW PROCESS FROM NODE     15.20 TO NODE     15.30 IS CODE =  53
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6446.70  DOWNSTREAM(FEET) =   6275.97
  CHANNEL LENGTH THRU SUBAREA(FEET) =   627.00   CHANNEL SLOPE =  0.2723
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .1874 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
```

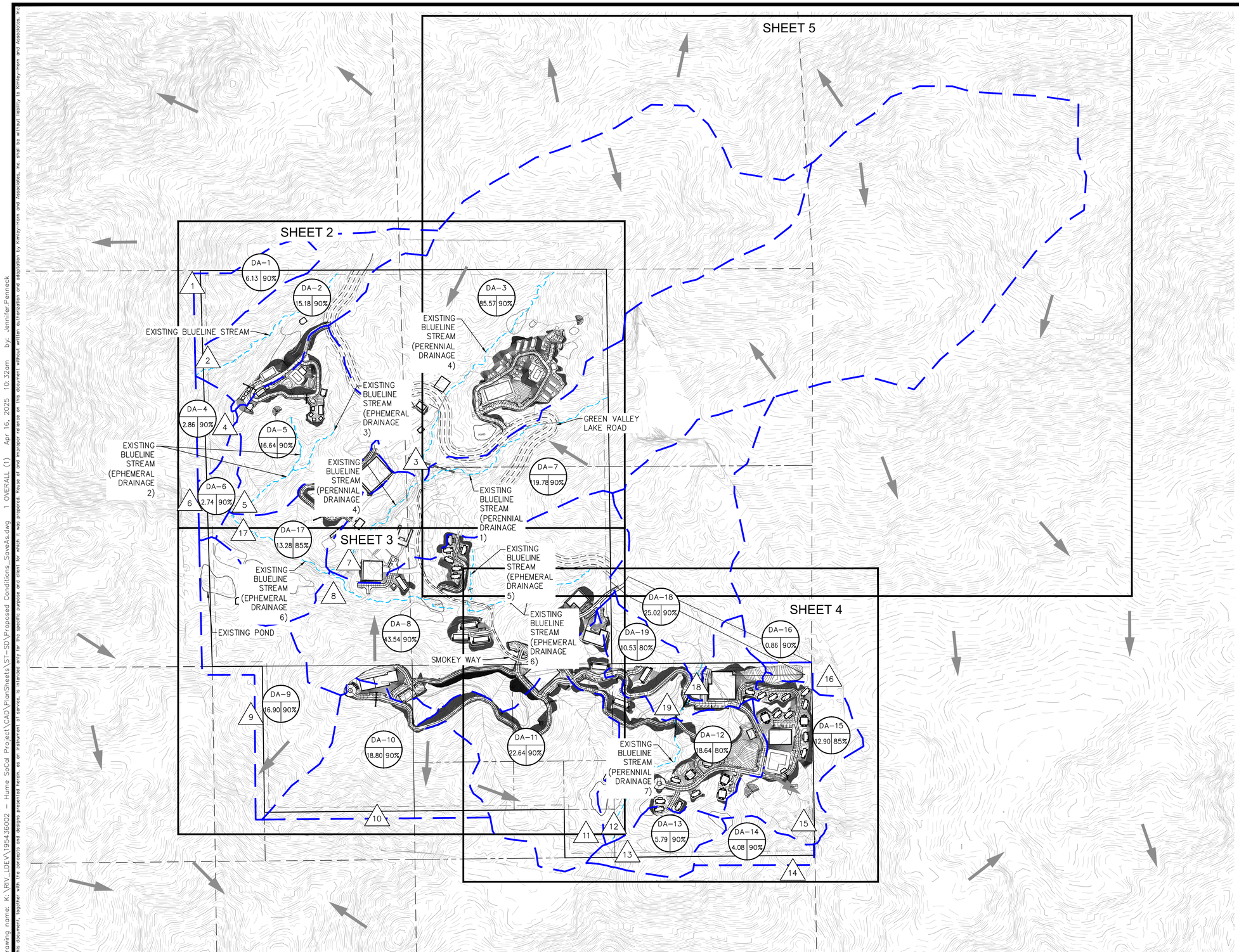
```
  CHANNEL FLOW THRU SUBAREA(CFS) =      73.10
  FLOW VELOCITY(FEET/SEC) =  10.12 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.03   Tc(MIN.) =   11.00
  LONGEST FLOWPATH FROM NODE     15.10 TO NODE     15.30 =    1292.60 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.10 TO NODE     16.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   322.00
  ELEVATION DATA: UPSTREAM(FEET) =   6532.31  DOWNSTREAM(FEET) =   6490.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.361
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.953
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.96      0.21     0.900    91    7.36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      5.84
  TOTAL AREA(ACRES) =      0.96   PEAK FLOW RATE(CFS) =      5.84
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        1.0  TC(MIN.) =      7.36
  EFFECTIVE AREA(ACRES) =      0.96  AREA-AVERAGED Fm(INCH/HR)=  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap = 0.900
  PEAK FLOW RATE(CFS)   =       5.84
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

Appendix E

Proposed Drainage Map and Calculations



LEGEND

- PROPERTY BOUNDARY
- (XXXX) EXISTING MAJOR CONTOURS
- (XXXX) EXISTING MINOR CONTOURS
- EXISTING BLUELINE STREAM
- EXISTING DRAINAGEWAY
- EXISTING BLUELINE STREAM SETBACK
- EXISTING ROAD
- EXISTING DRAINAGE EASEMENT
- PROPOSED DMA BOUNDARY
- DA-3 / B / C — A = SUBAREA ID; B = SUBAREA ACREAGE; C = PERCENT PERVIOUS (%)
- 1 — DMA DESIGN POINT
- EXISTING FLOW ARROW
- PROPOSED FLOW ARROW

NOTES:

1. REFER TO HUME SOCAL CAMPGROUND DELINEATION OF STATE AND FEDERAL JURISDICTIONAL WATERS REPORT FOR ADDITIONAL INFORMATION ON ALL DRAINAGEWAYS.
2. FOR BASINS THAT HAVE A PERVIOUS PERCENTAGE GREATER THAN OR EQUAL TO 90%, A 90% PERVIOUS VALUE WAS UTILIZED.
3. A 80% AND 85% PERVIOUS VALUE WAS UTILIZED FOR BASINS WITH A PERVIOUS PERCENTAGE BETWEEN 80-84% AND 85%-89%, RESPECTIVELY.

NORTH

GRAPHIC SCALE IN FEET
0 150 300 600

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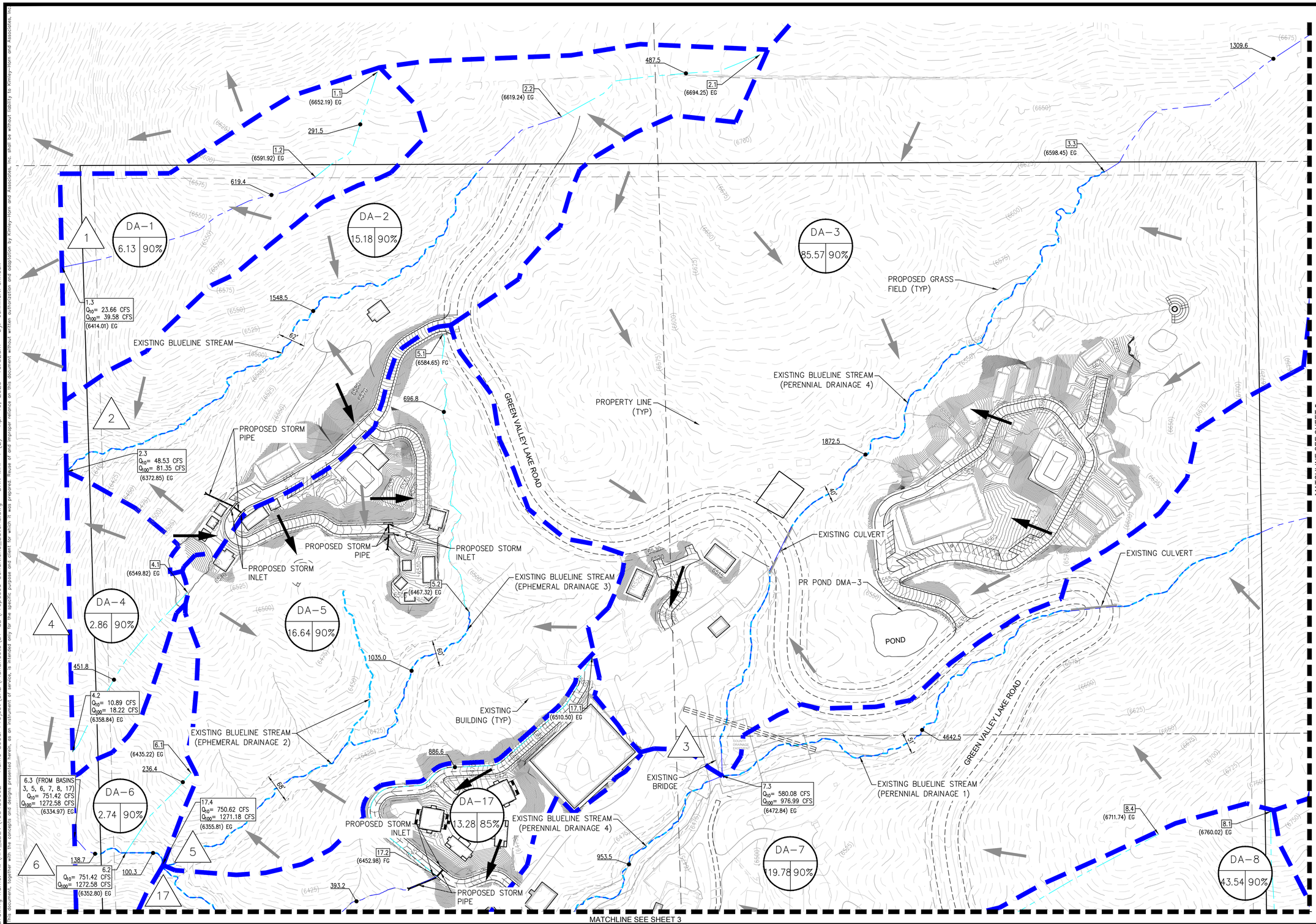
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HUME SOCAL - GREEN VALLEY LAKE, CA
PREPARED FOR
HUME LAKE
PROPOSED DRAINAGE MAP OVERVIEW

SHEET 1
OF
SHEETS 5
CITY PROJECT NO.



LEGEND

- PROPERTY BOUNDARY
- EXISTING MAJOR CONTOURS
- EXISTING MINOR CONTOURS
- EXISTING BLUELINE STREAM
- EXISTING DRAINAGEWAY
- EXISTING BLUELINE STREAM SETBACK
- EXISTING ROAD
- EXISTING DRAINAGE EASEMENT
- PROPOSED DMA BOUNDARY
- OVERLAND FLOW PATH
- CHANNELIZED FLOW PATH
- A = SUBAREA ID
- B = SUBAREA ACREAGE
- C = PERCENT PERVIOUS (%)
- DMA DESIGN POINT
- EXISTING FLOW ARROW
- PROPOSED FLOW ARROW
- 15.2 (XXXX)FG/EG — NODE ID AND ELEVATION

NOTES:

1. REFER TO HUME SOCAL CAMPGROUND DELINEATION OF STATE AND FEDERAL JURISDICTIONAL WATERS REPORT FOR ADDITIONAL INFORMATION ON ALL DRAINAGEWAYS.
2. FOR BASINS THAT HAVE A PERVIOUS PERCENTAGE GREATER THAN OR EQUAL TO 90%, A 90% PERVIOUS VALUE WAS UTILIZED.
3. A 80% AND 85% PERVIOUS VALUE WAS UTILIZED FOR BASINS WITH A PERVIOUS PERCENTAGE BETWEEN 80-84% AND 85%-89%, RESPECTIVELY.

NORTH

GRAPHIC SCALE IN FEET
0 50 100 200

MATCHLINE SEE SHEET 3

MATCHLINE SEE SHEET 5

Drawing name: K:\RIV_LDEV\195436002 - Hume SoCal Project\CAD\PlanSheets\ST-SD\Proposed Conditions_SaveAs.dwg DRN MAP 1 (2) Apr 16, 2025 10:32am by: Jennifer.Penneck
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HUME SOCAL - GREEN VALLEY LAKE, CA
PREPARED FOR
HUME LAKE
PROPOSED DRAINAGE MAP

SHEET 2 OF SHEETS 5
CITY PROJECT NO.

MATCHLINE SEE SHEET 2

MATCHLINE SEE SHEET 4

DA-17
13.28 | 85%

DA-7
19.78 | 90%

DA-8
43.54 | 90%

DA-9
16.90 | 90%

DA-10
18.80 | 90%

DA-11
22.64 | 90%

DA-12
18.64 | 80%

EXISTING POND

PROPOSED GRASS FIELD (TYP)

EXISTING BLUELINE STREAM (EPHEMERAL DRAINAGE 6)

EXISTING BLUELINE STREAM (PERENNIAL DRAINAGE 4)

EXISTING BUILDING (TYP)

PR POND DMA-8

POND

EXISTING CURB CUT

EXISTING CULVERT

SMOKEY WAY

GREEN VALLEY LAKE ROAD

EXISTING BLUELINE STREAM (EPHEMERAL DRAINAGE 5)

PROPOSED STORM INLET

PROPOSED STORM PIPE

17.3
Q_{10}= 707.14 CFS
Q_{100}= 1197.13 CFS
(6378.96) EG

7.4
Q_{10}= 696.25 CFS
Q_{100}= 1178.30 CFS
(6404.98) EG

8.3
Q_{10}= 74.93 CFS
Q_{100}= 125.65 CFS
(6472.97) EG

9.3
Q_{10}= 60.93 CFS
Q_{100}= 103.94 CFS
(6353.41) EG

10.3
Q_{10}= 60.90 CFS
Q_{100}= 104.27 CFS
(6335.41) EG

386.2 | 486.3 | 953.5 | 426.2 | 757.1 | 584.7 | 897.4 | 1112.0 | 618.1 | 999.1 | 991.6 | 1325.2 | 251.2 | 392.7 | 553.8 | 504.4 | 445.3 | 651.1

8.5 (6532.00) EG | 8.2 (6589.39) EG | 19.1 (6606.25) EG | 12.1 (6594.43) FG | 9.1 (6647.05) EG | 10.1 (6650.00) FG | 11.3 (6546.53) FG | 11.1 (6651.16) FG | 11.2 (6565.95) FG | 9.2 (6532.00) EG | 10.2 (6529.00) EG

LEGEND

- PROPERTY BOUNDARY
- EXISTING MAJOR CONTOURS
- EXISTING MINOR CONTOURS
- EXISTING BLUELINE STREAM
- EXISTING DRAINAGEWAY
- EXISTING BLUELINE STREAM SETBACK
- EXISTING ROAD
- EXISTING DRAINAGE EASEMENT
- PROPOSED DMA BOUNDARY
- OVERLAND FLOW PATH
- CHANNELIZED FLOW PATH
- A = SUBAREA ID
- B = SUBAREA ACREAGE
- C = PERCENT PERVIOUS (%)
- DMA DESIGN POINT
- EXISTING FLOW ARROW
- PROPOSED FLOW ARROW
- 15.2 (XXXX)FG/EG — NODE ID AND ELEVATION

NOTES:

1. REFER TO HUME SOCAL CAMPGROUND DELINEATION OF STATE AND FEDERAL JURISDICTIONAL WATERS REPORT FOR ADDITIONAL INFORMATION ON ALL DRAINAGEWAYS.
2. FOR BASINS THAT HAVE A PERVIOUS PERCENTAGE GREATER THAN OR EQUAL TO 90%, A 90% PERVIOUS VALUE WAS UTILIZED.
3. A 80% AND 85% PERVIOUS VALUE WAS UTILIZED FOR BASINS WITH A PERVIOUS PERCENTAGE BETWEEN 80-84% AND 85%-89%, RESPECTIVELY.

NORTH

GRAPHIC SCALE IN FEET
0 50 100 200

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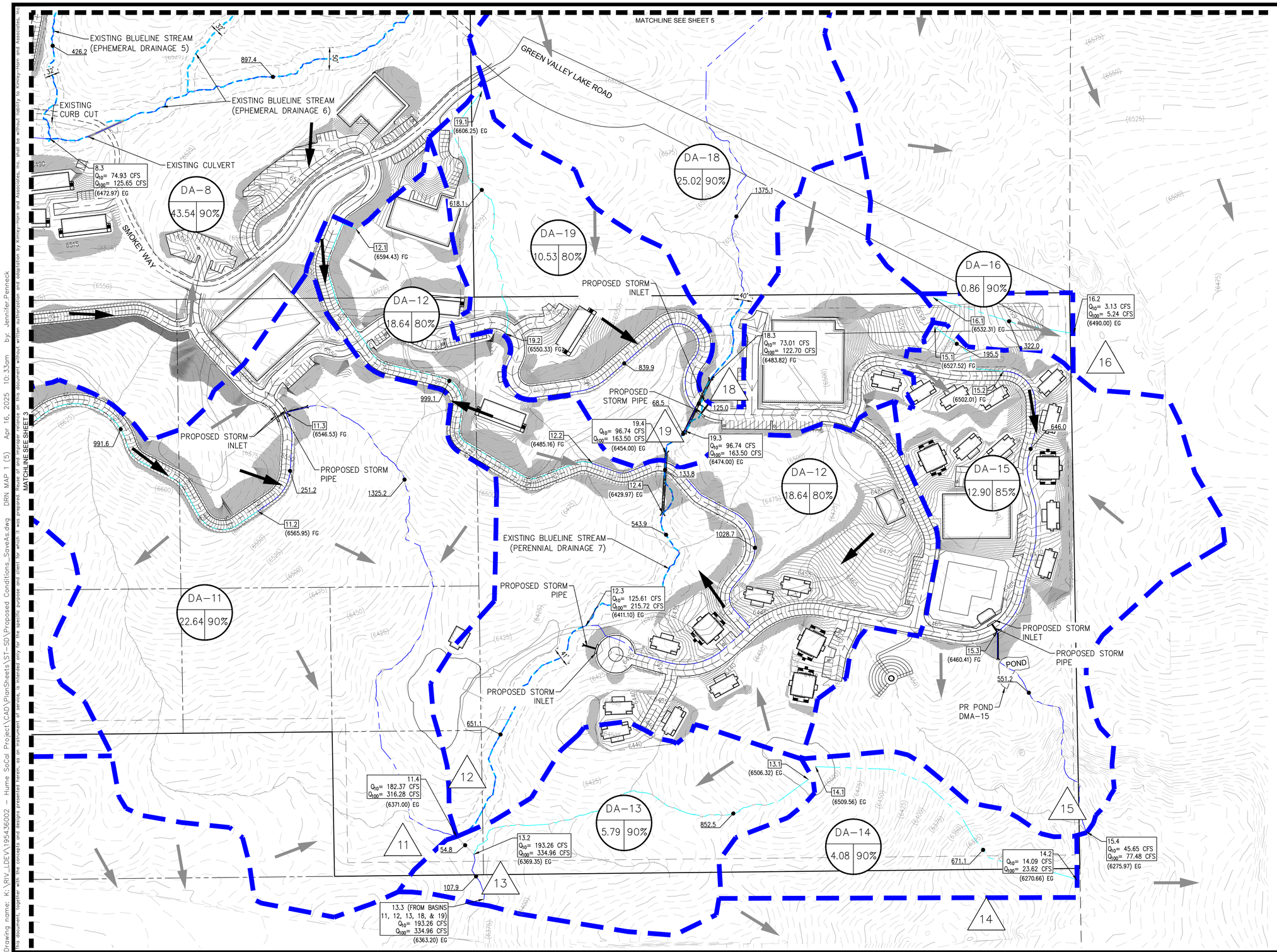
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HUME SOCAL - GREEN VALLEY LAKE, CA
PREPARED FOR
HUME LAKE
PROPOSED DRAINAGE MAP

SHEET 3
OF SHEETS 5
CITY PROJECT NO.



LEGEND

- PROPERTY BOUNDARY
- (XXXX) EXISTING MAJOR CONTOURS
- (XXXX) EXISTING MINOR CONTOURS
- EXISTING BLUELINE STREAM
- EXISTING DRAINAGEWAY
- EXISTING BLUELINE STREAM SETBACK
- EXISTING ROAD
- EXISTING DRAINAGE EASEMENT
- PROPOSED DMA BOUNDARY
- OVERLAND FLOW PATH
- CHANNELIZED FLOW PATH
- A = SUBAREA ID
- B = SUBAREA ACREAGE
- C = PERCENT PERVIOUS (%)
- 1 DMA DESIGN POINT
- EXISTING FLOW ARROW
- PROPOSED FLOW ARROW
- 15.2 (XXXX)FG/EG NODE ID AND ELEVATION

NOTES:

1. REFER TO HUME SOCAL CAMPGROUND DELINEATION OF STATE AND FEDERAL JURISDICTIONAL WATERS REPORT FOR ADDITIONAL INFORMATION ON ALL DRAINAGEWAYS.
2. FOR BASINS THAT HAVE A PERVIOUS PERCENTAGE GREATER THAN OR EQUAL TO 90%, A 90% PERVIOUS VALUE WAS UTILIZED.
3. A 80% AND 85% PERVIOUS VALUE WAS UTILIZED FOR BASINS WITH A PERVIOUS PERCENTAGE BETWEEN 80-84% AND 85%-89%, RESPECTIVELY.

NORTH

GRAPHIC SCALE IN FEET
0 50 100 200

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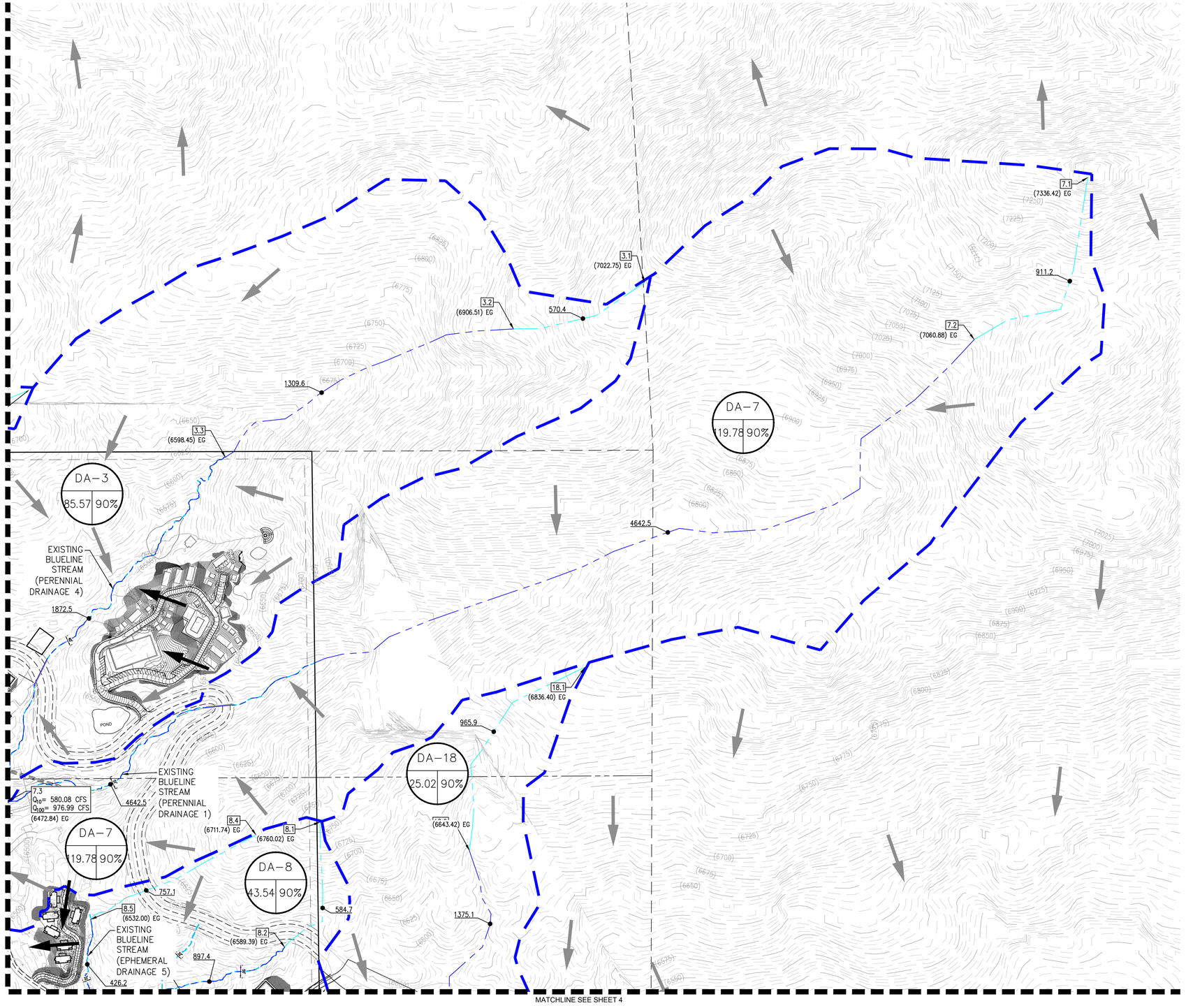
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PROPOSED DRAINAGE MAP

SHEET 4 OF SHEETS 5
CITY PROJECT NO.



LEGEND

- PROPERTY BOUNDARY
- (XXXX) EXISTING MAJOR CONTOURS
- (XXXX) EXISTING MINOR CONTOURS
- EXISTING BLUELINE STREAM
- EXISTING DRAINAGEWAY
- EXISTING BLUELINE STREAM SETBACK
- EXISTING ROAD
- EXISTING DRAINAGE EASEMENT
- PROPOSED DMA BOUNDARY
- OVERLAND FLOW PATH
- CHANNELIZED FLOW PATH
- A = SUBAREA ID
- B = SUBAREA ACREAGE
- C = PERCENT PERVIOUS (%)
- 1 DMA DESIGN POINT
- EXISTING FLOW ARROW
- PROPOSED FLOW ARROW
- 15.2 (XXXX)FG/EG NODE ID AND ELEVATION

NOTES:

1. REFER TO HUME SOCAL CAMPGROUND DELINEATION OF STATE AND FEDERAL JURISDICTIONAL WATERS REPORT FOR ADDITIONAL INFORMATION ON ALL DRAINAGEWAYS.
2. FOR BASINS THAT HAVE A PERVIOUS PERCENTAGE GREATER THAN OR EQUAL TO 90%, A 90% PERVIOUS VALUE WAS UTILIZED.
3. A 80% AND 85% PERVIOUS VALUE WAS UTILIZED FOR BASINS WITH A PERVIOUS PERCENTAGE BETWEEN 80-84% AND 85%-89%, RESPECTIVELY.

NORTH

GRAPHIC SCALE IN FEET
0 100 200 400

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PREPARED FOR
HUME LAKE
PROPOSED DRAINAGE MAP

SHEET 5
OF
SHEETS 5
CITY PROJECT NO.

Proposed 10-year

```
**************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
          (Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
         (c) Copyright 1983-2011 Advanced Engineering Software (aes)
             Ver. 18.0  Release Date: 07/01/2011  License ID 1499

                          Analysis prepared by:
```

Kimley-Horn

```
 ************************* DESCRIPTION OF STUDY *************************
* Hume SoCal                                                            *
* Proposed 10 year - 24 hours Conditions                                *
* San Bernardino County, CA                                             *
 ************************************************************************

  FILE NAME: HUMEPR.DAT
  TIME/DATE OF STUDY: 07:25 01/31/2024
==========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==========================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *USER-DEFINED TABLED RAINFALL USED*
  NUMBER OF [TIME,INTENSITY] DATA PAIRS =  9
   1)    5.00;  4.880
   2)   10.00;  3.500
   3)   15.00;  2.820
   4)   30.00;  1.980
   5)   60.00;  1.400
   6)  120.00;  1.050
   7)  180.00;  0.907
   8)  360.00;  0.711
   9)  720.00;  0.532
  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   15.0     10.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
```

```
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE      1.10 TO NODE      1.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   291.50
  ELEVATION DATA: UPSTREAM(FEET) =   6652.19  DOWNSTREAM(FEET) =   6591.92

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.461
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.477
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        1.39      0.21     0.900    91    6.46
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      5.36
  TOTAL AREA(ACRES) =      1.39   PEAK FLOW RATE(CFS) =      5.36

****************************************************************************
  FLOW PROCESS FROM NODE      1.20 TO NODE      1.20 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    6.46
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.477
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        4.74      0.21     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    4.74      SUBAREA RUNOFF(CFS) =   18.29
  EFFECTIVE AREA(ACRES) =      6.13   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =        6.1       PEAK FLOW RATE(CFS) =      23.66

****************************************************************************
  FLOW PROCESS FROM NODE      1.20 TO NODE      1.30 IS CODE =  53
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6591.92  DOWNSTREAM(FEET) =   6414.01
  CHANNEL LENGTH THRU SUBAREA(FEET) =   619.40   CHANNEL SLOPE =  0.2872
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .1918 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =      23.66
  FLOW VELOCITY(FEET/SEC) =   7.03 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.47   Tc(MIN.) =    7.93
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.30 =     910.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      2.10 TO NODE      2.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   487.50
  ELEVATION DATA: UPSTREAM(FEET) =   6694.25  DOWNSTREAM(FEET) =   6619.24

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.420
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.936
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        1.63      0.21     0.900    91    8.42
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      5.50
  TOTAL AREA(ACRES) =      1.63   PEAK FLOW RATE(CFS) =      5.50

****************************************************************************
  FLOW PROCESS FROM NODE      2.20 TO NODE      2.20 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========================================================================
  MAINLINE Tc(MIN.) =    8.42
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.936
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D       12.76      0.21     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =   12.76      SUBAREA RUNOFF(CFS) =   43.03
  EFFECTIVE AREA(ACRES) =     14.39   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.90
```

```
  TOTAL AREA(ACRES) =       14.4       PEAK FLOW RATE(CFS) =      48.53

****************************************************************************
  FLOW PROCESS FROM NODE      2.20 TO NODE      2.30 IS CODE =  53
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6619.24  DOWNSTREAM(FEET) =   6372.85
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1548.50   CHANNEL SLOPE =  0.1591
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .1396 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =      48.53
  FLOW VELOCITY(FEET/SEC) =   7.62 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   3.39   Tc(MIN.) =   11.81
  LONGEST FLOWPATH FROM NODE      2.10 TO NODE      2.30 =    2036.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      4.10 TO NODE      4.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   451.80
  ELEVATION DATA: UPSTREAM(FEET) =   6549.82  DOWNSTREAM(FEET) =   6358.84

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.673
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.418
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        2.86      0.21     0.900    91    6.67
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =     10.89
  TOTAL AREA(ACRES) =      2.86   PEAK FLOW RATE(CFS) =     10.89

****************************************************************************
  FLOW PROCESS FROM NODE      7.10 TO NODE      7.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   911.20
  ELEVATION DATA: UPSTREAM(FEET) =   7336.42  DOWNSTREAM(FEET) =   7060.88

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.446
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.653
```

```
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        6.53      0.21     0.900    91    9.45
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =     20.36
  TOTAL AREA(ACRES) =      6.53   PEAK FLOW RATE(CFS) =     20.36

****************************************************************************
  FLOW PROCESS FROM NODE      7.20 TO NODE      7.20 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.45
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.653
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D      102.45      0.21     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =  102.45      SUBAREA RUNOFF(CFS) =  319.38
  EFFECTIVE AREA(ACRES) =    108.98   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =      109.0       PEAK FLOW RATE(CFS) =     339.74

****************************************************************************
  FLOW PROCESS FROM NODE      7.20 TO NODE      7.30 IS CODE =  53
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   7060.88  DOWNSTREAM(FEET) =   6472.84
  CHANNEL LENGTH THRU SUBAREA(FEET) =  4642.50   CHANNEL SLOPE =  0.1267
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .1194 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =     339.74
  FLOW VELOCITY(FEET/SEC) =  13.48 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   5.74   Tc(MIN.) =   15.19
  LONGEST FLOWPATH FROM NODE      7.10 TO NODE      7.30 =    5553.70 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.30 TO NODE      7.30 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
```

```
  TIME OF CONCENTRATION(MIN.) =   15.19
  RAINFALL INTENSITY(INCH/HR) =   2.81
  AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =     108.98
  TOTAL STREAM AREA(ACRES) =     108.98
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     339.74

****************************************************************************
  FLOW PROCESS FROM NODE      3.10 TO NODE      3.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   570.40
  ELEVATION DATA: UPSTREAM(FEET) =   7022.75  DOWNSTREAM(FEET) =   6906.51

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.476
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.921
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        1.09      0.21     0.900    91    8.48
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      3.66
  TOTAL AREA(ACRES) =      1.09   PEAK FLOW RATE(CFS) =      3.66

****************************************************************************
  FLOW PROCESS FROM NODE      3.20 TO NODE      3.20 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.48
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.921
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D       32.62      0.21     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =   32.62      SUBAREA RUNOFF(CFS) =  109.56
  EFFECTIVE AREA(ACRES) =     33.71   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =       33.7       PEAK FLOW RATE(CFS) =     113.22

****************************************************************************
```

```
 FLOW PROCESS FROM NODE      3.20 TO NODE      3.30 IS CODE =  53
----------------------------------------------------------------------------
 >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   6906.51  DOWNSTREAM(FEET) =   6598.45
 CHANNEL LENGTH THRU SUBAREA(FEET) =  1309.60   CHANNEL SLOPE =  0.2352
 SLOPE ADJUSTMENT CURVE USED:
 EFFECTIVE SLOPE = .1751 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
 CHANNEL FLOW THRU SUBAREA(CFS) =     113.22
 FLOW VELOCITY(FEET/SEC) =  11.32 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
 TRAVEL TIME(MIN.) =   1.93   Tc(MIN.) =   10.40
 LONGEST FLOWPATH FROM NODE      3.10 TO NODE      3.30 =    1880.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      3.30 TO NODE      3.30 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   10.40
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.445
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 ".4 DWELLING/ACRE"         D       51.85      0.21     0.900    91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
 SUBAREA AREA(ACRES) =   51.85      SUBAREA RUNOFF(CFS) =  151.94
 EFFECTIVE AREA(ACRES) =     85.56   AREA-AVERAGED Fm(INCH/HR) =  0.19
 AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.90
 TOTAL AREA(ACRES) =       85.6       PEAK FLOW RATE(CFS) =     250.73

****************************************************************************
 FLOW PROCESS FROM NODE      3.30 TO NODE      7.30 IS CODE =  53
----------------------------------------------------------------------------
 >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   6598.45  DOWNSTREAM(FEET) =   6472.84
 CHANNEL LENGTH THRU SUBAREA(FEET) =  1872.50   CHANNEL SLOPE =  0.0671
 SLOPE ADJUSTMENT CURVE USED:
 EFFECTIVE SLOPE = .0671 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
 CHANNEL FLOW THRU SUBAREA(CFS) =     250.73
 FLOW VELOCITY(FEET/SEC) =   9.13 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
 TRAVEL TIME(MIN.) =   3.42   Tc(MIN.) =   13.82
 LONGEST FLOWPATH FROM NODE      3.10 TO NODE      7.30 =    3752.50 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      7.30 TO NODE      7.30 IS CODE =   1
----------------------------------------------------------------------------
```

```
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.82
  RAINFALL INTENSITY(INCH/HR) =   2.98
  AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =      85.56
  TOTAL STREAM AREA(ACRES) =      85.56
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     250.73

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      339.74   15.19    2.810  0.21( 0.19) 0.90     109.0       7.10
      2      250.73   13.82    2.980  0.21( 0.19) 0.90      85.6       3.10

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      580.08   13.82    2.980  0.21( 0.19) 0.90     184.8       3.10
      2      575.14   15.19    2.810  0.21( 0.19) 0.90     194.5       7.10

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     580.08    Tc(MIN.) =    13.82
  EFFECTIVE AREA(ACRES) =     184.75   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =      194.5
  LONGEST FLOWPATH FROM NODE      7.10 TO NODE      7.30 =    5553.70 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.30 TO NODE      7.30 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.82
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.980
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D       10.33      0.21     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =   10.33      SUBAREA RUNOFF(CFS) =   25.95
```

```
  EFFECTIVE AREA(ACRES) =    195.08   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =      204.9       PEAK FLOW RATE(CFS) =     580.08
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE      7.30 TO NODE      7.40 IS CODE =  53
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6472.84  DOWNSTREAM(FEET) =   6404.98
  CHANNEL LENGTH THRU SUBAREA(FEET) =   953.53   CHANNEL SLOPE =  0.0712
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .0712 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =     580.08
  FLOW VELOCITY(FEET/SEC) =  12.43 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.28   Tc(MIN.) =   15.10
  LONGEST FLOWPATH FROM NODE      7.10 TO NODE      7.40 =    6507.23 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.40 TO NODE      7.40 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      8.10 TO NODE      8.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   584.70
  ELEVATION DATA: UPSTREAM(FEET) =   6760.02  DOWNSTREAM(FEET) =   6589.39

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.967
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.061
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        2.35      0.21     0.900    91    7.97
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      8.19
  TOTAL AREA(ACRES) =      2.35   PEAK FLOW RATE(CFS) =      8.19

****************************************************************************
  FLOW PROCESS FROM NODE      8.20 TO NODE      8.20 IS CODE =  81
----------------------------------------------------------------------------
```

```
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =    7.97
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.061
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D       16.79      0.21     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =   16.79      SUBAREA RUNOFF(CFS) =   58.51
  EFFECTIVE AREA(ACRES) =     19.14   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =       19.1       PEAK FLOW RATE(CFS) =      66.70

********************************************************************************
  FLOW PROCESS FROM NODE      8.20 TO NODE      8.30 IS CODE =  53
--------------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6589.10  DOWNSTREAM(FEET) =   6472.97
  CHANNEL LENGTH THRU SUBAREA(FEET) =   897.40   CHANNEL SLOPE =  0.1294
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .1213 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =      66.70
  FLOW VELOCITY(FEET/SEC) =   7.90 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.89   Tc(MIN.) =    9.86
  LONGEST FLOWPATH FROM NODE      8.10 TO NODE      8.30 =    1482.10 FEET.

********************************************************************************
  FLOW PROCESS FROM NODE      8.30 TO NODE      8.30 IS CODE =   1
--------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.86
  RAINFALL INTENSITY(INCH/HR) =   3.54
  AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =      19.14
  TOTAL STREAM AREA(ACRES) =      19.14
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      66.70

********************************************************************************
  FLOW PROCESS FROM NODE      8.40 TO NODE      8.50 IS CODE =  21
--------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
```

```
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   757.10
  ELEVATION DATA: UPSTREAM(FEET) =   6711.74  DOWNSTREAM(FEET) =   6532.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.206
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.719
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        1.30      0.21     0.900    91    9.21
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      4.13
  TOTAL AREA(ACRES) =      1.30   PEAK FLOW RATE(CFS) =      4.13

****************************************************************************
  FLOW PROCESS FROM NODE      8.50 TO NODE      8.50 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.21
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.719
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        1.43      0.21     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    1.43      SUBAREA RUNOFF(CFS) =    4.54
  EFFECTIVE AREA(ACRES) =      2.73   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =        2.7       PEAK FLOW RATE(CFS) =       8.67

****************************************************************************
  FLOW PROCESS FROM NODE      8.50 TO NODE      8.30 IS CODE =  53
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6532.00  DOWNSTREAM(FEET) =   6472.97
  CHANNEL LENGTH THRU SUBAREA(FEET) =   426.20   CHANNEL SLOPE =  0.1385
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .1273 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =       8.67
  FLOW VELOCITY(FEET/SEC) =   4.10 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.73   Tc(MIN.) =   10.94
  LONGEST FLOWPATH FROM NODE      8.40 TO NODE      8.30 =    1183.30 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE      8.30 TO NODE      8.30 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.94
  RAINFALL INTENSITY(INCH/HR) =   3.37
  AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       2.73
  TOTAL STREAM AREA(ACRES) =       2.73
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.67

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       66.70    9.86    3.539  0.21( 0.19) 0.90      19.1       8.10
      2        8.67   10.94    3.372  0.21( 0.19) 0.90       2.7       8.40

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       74.93    9.86    3.539  0.21( 0.19) 0.90      21.6       8.10
      2       72.07   10.94    3.372  0.21( 0.19) 0.90      21.9       8.40

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      74.93    Tc(MIN.) =     9.86
  EFFECTIVE AREA(ACRES) =      21.60   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =       21.9
  LONGEST FLOWPATH FROM NODE      8.10 TO NODE      8.30 =    1482.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      8.30 TO NODE      8.30 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.86
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.539
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
```

```
  ".4 DWELLING/ACRE"         D       21.66      0.21     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =   21.66      SUBAREA RUNOFF(CFS) =   65.30
  EFFECTIVE AREA(ACRES) =     43.26   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =       43.5       PEAK FLOW RATE(CFS) =     130.41

****************************************************************************
  FLOW PROCESS FROM NODE      8.30 TO NODE      7.40 IS CODE =  53
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6472.97  DOWNSTREAM(FEET) =   6404.98
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1112.00   CHANNEL SLOPE =  0.0611
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .0611 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =     130.41
  FLOW VELOCITY(FEET/SEC) =   7.01 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   2.64   Tc(MIN.) =   12.50
  LONGEST FLOWPATH FROM NODE      8.10 TO NODE      7.40 =    2594.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.40 TO NODE      7.40 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      130.41   12.50    3.159  0.21( 0.19) 0.90      43.3       8.10
      2      124.72   13.62    3.008  0.21( 0.19) 0.90      43.5       8.40
  LONGEST FLOWPATH FROM NODE      8.10 TO NODE      7.40 =    2594.10 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      580.08   15.10    2.814  0.21( 0.19) 0.90     195.1       3.10
      2      575.14   16.47    2.738  0.21( 0.19) 0.90     204.9       7.10
  LONGEST FLOWPATH FROM NODE      7.10 TO NODE      7.40 =    6507.23 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      673.88   12.50    3.159  0.21( 0.19) 0.90     204.8       8.10
      2      686.45   13.62    3.008  0.21( 0.19) 0.90     219.5       8.40
      3      696.25   15.10    2.814  0.21( 0.19) 0.90     238.6       3.10
      4      687.92   16.47    2.738  0.21( 0.19) 0.90     248.4       7.10
    TOTAL AREA(ACRES) =       248.4
```

```
  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      696.25  Tc(MIN.) =   15.101
  EFFECTIVE AREA(ACRES) =    238.61  AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =      248.4
  LONGEST FLOWPATH FROM NODE      7.10 TO NODE      7.40 =    6507.23 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.40 TO NODE      7.40 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.10
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.814
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        6.63      0.21     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    6.63      SUBAREA RUNOFF(CFS) =   15.67
  EFFECTIVE AREA(ACRES) =    245.24   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =      255.0       PEAK FLOW RATE(CFS) =     696.25
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE      7.40 TO NODE     17.30 IS CODE =  53
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6404.98  DOWNSTREAM(FEET) =   6378.96
  CHANNEL LENGTH THRU SUBAREA(FEET) =   486.30   CHANNEL SLOPE =  0.0535
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .0535 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =     696.25
  FLOW VELOCITY(FEET/SEC) =  11.46 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.71   Tc(MIN.) =   15.81
  LONGEST FLOWPATH FROM NODE      7.10 TO NODE     17.30 =    6993.53 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     17.30 TO NODE     17.30 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   15.81
```

```
  RAINFALL INTENSITY(INCH/HR) =   2.77
  AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =     245.24
  TOTAL STREAM AREA(ACRES) =     255.03
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     696.25

****************************************************************************
  FLOW PROCESS FROM NODE     17.10 TO NODE     17.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   886.60
  ELEVATION DATA: UPSTREAM(FEET) =   6510.50  DOWNSTREAM(FEET) =   6452.98

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   12.607
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.145
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  PUBLIC PARK                D        3.21      0.21     0.850    91   12.61
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA RUNOFF(CFS) =      8.57
  TOTAL AREA(ACRES) =      3.21   PEAK FLOW RATE(CFS) =      8.57

****************************************************************************
  FLOW PROCESS FROM NODE     17.20 TO NODE     17.20 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.61
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.145
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                D        1.17      0.21     0.850    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA AREA(ACRES) =    1.17      SUBAREA RUNOFF(CFS) =    3.12
  EFFECTIVE AREA(ACRES) =      4.38   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.85
  TOTAL AREA(ACRES) =        4.4       PEAK FLOW RATE(CFS) =      11.70

****************************************************************************
  FLOW PROCESS FROM NODE     17.20 TO NODE     17.30 IS CODE =  53
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
```

```
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6452.98  DOWNSTREAM(FEET) =   6378.96
  CHANNEL LENGTH THRU SUBAREA(FEET) =   393.20   CHANNEL SLOPE =  0.1883
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .1541 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =      11.70
  FLOW VELOCITY(FEET/SEC) =   4.99 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.31   Tc(MIN.) =   13.92
  LONGEST FLOWPATH FROM NODE     17.10 TO NODE     17.30 =    1279.80 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     17.30 TO NODE     17.30 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.92
  RAINFALL INTENSITY(INCH/HR) =   2.97
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.21
  AREA-AVERAGED Ap =  0.85
  EFFECTIVE STREAM AREA(ACRES) =       4.38
  TOTAL STREAM AREA(ACRES) =       4.38
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      11.70

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      673.88   13.22    3.062  0.21( 0.19) 0.90     211.4       8.10
      1      686.45   14.33    2.911  0.21( 0.19) 0.90     226.1       8.40
      1      696.25   15.81    2.775  0.21( 0.19) 0.90     245.2       3.10
      1      687.92   17.18    2.698  0.21( 0.19) 0.90     255.0       7.10
      2       11.70   13.92    2.967  0.21( 0.18) 0.85       4.4      17.10

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      685.36   13.22    3.062  0.21( 0.19) 0.90     215.6       8.10
      2      693.51   13.92    2.967  0.21( 0.19) 0.90     225.1      17.10
      3      697.91   14.33    2.911  0.21( 0.19) 0.90     230.5       8.40
      4      707.14   15.81    2.775  0.21( 0.19) 0.90     249.6       3.10
      5      698.49   17.18    2.698  0.21( 0.19) 0.90     259.4       7.10

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     707.14    Tc(MIN.) =    15.81
```

```
  EFFECTIVE AREA(ACRES) =     249.62   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =      259.4
  LONGEST FLOWPATH FROM NODE      7.10 TO NODE     17.30 =    6993.53 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     17.30 TO NODE     17.30 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.81
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.775
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                 D        2.27      0.21     0.850    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA AREA(ACRES) =    2.27      SUBAREA RUNOFF(CFS) =    5.30
  EFFECTIVE AREA(ACRES) =    251.89   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =      261.7       PEAK FLOW RATE(CFS) =     707.14
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE     17.30 TO NODE     17.40 IS CODE =  53
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6378.96  DOWNSTREAM(FEET) =   6355.81
  CHANNEL LENGTH THRU SUBAREA(FEET) =   386.20   CHANNEL SLOPE =  0.0599
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .0599 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =     707.14
  FLOW VELOCITY(FEET/SEC) =  12.19 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.53   Tc(MIN.) =   16.34
  LONGEST FLOWPATH FROM NODE      7.10 TO NODE     17.40 =    7379.73 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     17.40 TO NODE     17.40 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   16.34
  RAINFALL INTENSITY(INCH/HR) =   2.75
  AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21
  AREA-AVERAGED Ap =  0.90
```

```
  EFFECTIVE STREAM AREA(ACRES) =     251.89
  TOTAL STREAM AREA(ACRES) =     261.68
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     707.14

****************************************************************************
  FLOW PROCESS FROM NODE      5.10 TO NODE      5.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   696.80
  ELEVATION DATA: UPSTREAM(FEET) =   6584.65  DOWNSTREAM(FEET) =   6467.32

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.539
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.627
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        3.31      0.21     0.900    91    9.54
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =     10.24
  TOTAL AREA(ACRES) =      3.31   PEAK FLOW RATE(CFS) =     10.24

****************************************************************************
  FLOW PROCESS FROM NODE      5.20 TO NODE      5.20 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.54
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.627
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D       13.33      0.21     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =   13.33      SUBAREA RUNOFF(CFS) =   41.25
  EFFECTIVE AREA(ACRES) =     16.64   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =       16.6       PEAK FLOW RATE(CFS) =      51.49

****************************************************************************
  FLOW PROCESS FROM NODE      5.20 TO NODE     17.40 IS CODE =  53
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
```

```
  ELEVATION DATA: UPSTREAM(FEET) =   6467.32  DOWNSTREAM(FEET) =   6355.81
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1035.00   CHANNEL SLOPE =  0.1077
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .1058 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =      51.49
  FLOW VELOCITY(FEET/SEC) =   6.77 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   2.55   Tc(MIN.) =   12.09
  LONGEST FLOWPATH FROM NODE      5.10 TO NODE     17.40 =    1731.80 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     17.40 TO NODE     17.40 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.09
  RAINFALL INTENSITY(INCH/HR) =   3.22
  AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =      16.64
  TOTAL STREAM AREA(ACRES) =      16.64
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      51.49

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      685.36   13.75    2.990  0.21( 0.19) 0.90     217.9       8.10
      1      693.51   14.45    2.894  0.21( 0.19) 0.90     227.4      17.10
      1      697.91   14.86    2.839  0.21( 0.19) 0.90     232.8       8.40
      1      707.14   16.34    2.745  0.21( 0.19) 0.90     251.9       3.10
      1      698.49   17.71    2.668  0.21( 0.19) 0.90     261.7       7.10
      2       51.49   12.09    3.216  0.21( 0.19) 0.90      16.6       5.10

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      702.58   12.09    3.216  0.21( 0.19) 0.90     208.1       5.10
      2      733.00   13.75    2.990  0.21( 0.19) 0.90     234.5       8.10
      3      739.53   14.45    2.894  0.21( 0.19) 0.90     244.0      17.10
      4      742.99   14.86    2.839  0.21( 0.19) 0.90     249.4       8.40
      5      750.62   16.34    2.745  0.21( 0.19) 0.90     268.5       3.10
      6      740.67   17.71    2.668  0.21( 0.19) 0.90     278.3       7.10

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     750.62    Tc(MIN.) =    16.34
```

```
  EFFECTIVE AREA(ACRES) =     268.53   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =      278.3
  LONGEST FLOWPATH FROM NODE      7.10 TO NODE     17.40 =    7379.73 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     17.40 TO NODE     17.40 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.34
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.745
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                 D        0.34      0.21     0.850    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA AREA(ACRES) =    0.34      SUBAREA RUNOFF(CFS) =    0.79
  EFFECTIVE AREA(ACRES) =    268.87   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =      278.7       PEAK FLOW RATE(CFS) =     750.62
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE     17.40 TO NODE      6.20 IS CODE =  53
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6355.81  DOWNSTREAM(FEET) =   6352.80
  CHANNEL LENGTH THRU SUBAREA(FEET) =   100.30   CHANNEL SLOPE =  0.0300
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .0300 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =     750.62
  FLOW VELOCITY(FEET/SEC) =   8.80 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.19   Tc(MIN.) =   16.53
  LONGEST FLOWPATH FROM NODE      7.10 TO NODE      6.20 =    7480.03 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.20 TO NODE      6.20 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   16.53
  RAINFALL INTENSITY(INCH/HR) =   2.73
  AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21
  AREA-AVERAGED Ap =  0.90
```

```
  EFFECTIVE STREAM AREA(ACRES) =     268.87
  TOTAL STREAM AREA(ACRES) =     278.66
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     750.62

****************************************************************************
  FLOW PROCESS FROM NODE      6.10 TO NODE      6.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   236.40
  ELEVATION DATA: UPSTREAM(FEET) =   6435.22  DOWNSTREAM(FEET) =   6352.80

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.352
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.783
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.35      0.21     0.900    91    5.35
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      1.45
  TOTAL AREA(ACRES) =      0.35   PEAK FLOW RATE(CFS) =      1.45

****************************************************************************
  FLOW PROCESS FROM NODE      6.20 TO NODE      6.20 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.35
  RAINFALL INTENSITY(INCH/HR) =   4.78
  AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       0.35
  TOTAL STREAM AREA(ACRES) =       0.35
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.45

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      702.58   12.28    3.190  0.21( 0.19) 0.90     208.5       5.10
      1      733.00   13.94    2.964  0.21( 0.19) 0.90     234.8       8.10
      1      739.53   14.64    2.868  0.21( 0.19) 0.90     244.3      17.10
      1      742.99   15.05    2.817  0.21( 0.19) 0.90     249.8       8.40
      1      750.62   16.53    2.735  0.21( 0.19) 0.90     268.9       3.10
```

```
     1      740.67   17.90    2.658  0.21( 0.19) 0.90     278.7       7.10
     2        1.45    5.35    4.783  0.21( 0.19) 0.90       0.3       6.10

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      470.13    5.35    4.783  0.21( 0.19) 0.90      91.2       6.10
      2      703.53   12.28    3.190  0.21( 0.19) 0.90     208.8       5.10
      3      733.87   13.94    2.964  0.21( 0.19) 0.90     235.2       8.10
      4      740.37   14.64    2.868  0.21( 0.19) 0.90     244.7      17.10
      5      743.81   15.05    2.817  0.21( 0.19) 0.90     250.1       8.40
      6      751.42   16.53    2.735  0.21( 0.19) 0.90     269.2       3.10
      7      741.44   17.90    2.658  0.21( 0.19) 0.90     279.0       7.10

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     751.42    Tc(MIN.) =    16.53
  EFFECTIVE AREA(ACRES) =     269.22   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =      279.0
  LONGEST FLOWPATH FROM NODE      7.10 TO NODE      6.20 =    7480.03 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.20 TO NODE      6.20 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.53
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.735
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        2.05      0.21     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    2.05      SUBAREA RUNOFF(CFS) =    4.70
  EFFECTIVE AREA(ACRES) =    271.27   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =      281.1       PEAK FLOW RATE(CFS) =     751.42
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE      6.20 TO NODE      6.30 IS CODE =  53
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6352.80  DOWNSTREAM(FEET) =   6334.97
```

```
  CHANNEL LENGTH THRU SUBAREA(FEET) =   138.70   CHANNEL SLOPE =  0.1285
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .1207 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =     751.42
  FLOW VELOCITY(FEET/SEC) =  17.65 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.13   Tc(MIN.) =   16.66
  LONGEST FLOWPATH FROM NODE      7.10 TO NODE      6.30 =    7618.73 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      9.10 TO NODE      9.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   392.70
  ELEVATION DATA: UPSTREAM(FEET) =   6647.05  DOWNSTREAM(FEET) =   6532.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.789
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.386
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B        1.12      0.42     0.900    76    6.79
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      4.04
  TOTAL AREA(ACRES) =      1.12   PEAK FLOW RATE(CFS) =      4.04

****************************************************************************
  FLOW PROCESS FROM NODE      9.20 TO NODE      9.20 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    6.79
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.386
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B       15.78      0.42     0.900    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =   15.78      SUBAREA RUNOFF(CFS) =   56.89
  EFFECTIVE AREA(ACRES) =     16.90   AREA-AVERAGED Fm(INCH/HR) =  0.38
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =       16.9       PEAK FLOW RATE(CFS) =      60.93

****************************************************************************
  FLOW PROCESS FROM NODE      9.20 TO NODE      9.30 IS CODE =  53
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6532.00  DOWNSTREAM(FEET) =   6353.41
  CHANNEL LENGTH THRU SUBAREA(FEET) =   504.40   CHANNEL SLOPE =  0.3541
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .2060 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =      60.93
  FLOW VELOCITY(FEET/SEC) =   9.99 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.84   Tc(MIN.) =    7.63
  LONGEST FLOWPATH FROM NODE      9.10 TO NODE      9.30 =     897.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     10.10 TO NODE     10.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   553.80
  ELEVATION DATA: UPSTREAM(FEET) =   6650.00  DOWNSTREAM(FEET) =   6529.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.260
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.980
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B        3.88      0.42     0.900    76    8.26
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =     12.57
  TOTAL AREA(ACRES) =      3.88   PEAK FLOW RATE(CFS) =     12.57

****************************************************************************
  FLOW PROCESS FROM NODE     10.20 TO NODE     10.20 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.26
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.980
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B       14.92      0.42     0.900    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =   14.92      SUBAREA RUNOFF(CFS) =   48.33
  EFFECTIVE AREA(ACRES) =     18.80   AREA-AVERAGED Fm(INCH/HR) =  0.38
```

```
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =       18.8       PEAK FLOW RATE(CFS) =      60.90

****************************************************************************
  FLOW PROCESS FROM NODE     10.20 TO NODE     10.30 IS CODE =  53
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6529.00  DOWNSTREAM(FEET) =   6335.41
  CHANNEL LENGTH THRU SUBAREA(FEET) =   445.30   CHANNEL SLOPE =  0.4347
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .2182 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =      60.90
  FLOW VELOCITY(FEET/SEC) =  10.28 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.72   Tc(MIN.) =    8.98
  LONGEST FLOWPATH FROM NODE     10.10 TO NODE     10.30 =     999.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     18.10 TO NODE     18.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   965.90
  ELEVATION DATA: UPSTREAM(FEET) =   6836.40  DOWNSTREAM(FEET) =   6643.42

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.505
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.431
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        6.56      0.21     0.900    91   10.50
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =     19.14
  TOTAL AREA(ACRES) =      6.56   PEAK FLOW RATE(CFS) =     19.14

****************************************************************************
  FLOW PROCESS FROM NODE     18.20 TO NODE     18.20 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.50
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.431
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
```

```
  ".4 DWELLING/ACRE"         D       18.46      0.21     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =   18.46      SUBAREA RUNOFF(CFS) =   53.87
  EFFECTIVE AREA(ACRES) =     25.02   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =       25.0       PEAK FLOW RATE(CFS) =      73.01

****************************************************************************
  FLOW PROCESS FROM NODE     18.20 TO NODE     18.30 IS CODE =  53
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6643.42  DOWNSTREAM(FEET) =   6483.82
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1375.10   CHANNEL SLOPE =  0.1161
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .1120 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =      73.01
  FLOW VELOCITY(FEET/SEC) =   7.82 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   2.93   Tc(MIN.) =   13.43
  LONGEST FLOWPATH FROM NODE     18.10 TO NODE     18.30 =    2341.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     18.30 TO NODE     19.30 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  6483.82  DOWNSTREAM(FEET) =  6474.00
  FLOW LENGTH(FEET) =   125.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  19.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  23.94
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      73.01
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =   13.52
  LONGEST FLOWPATH FROM NODE     18.10 TO NODE     19.30 =    2466.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     19.30 TO NODE     19.30 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.52
  RAINFALL INTENSITY(INCH/HR) =   3.02
  AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =      25.02
```

```
  TOTAL STREAM AREA(ACRES) =      25.02
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      73.01

****************************************************************************
  FLOW PROCESS FROM NODE     19.10 TO NODE     19.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   618.10
  ELEVATION DATA: UPSTREAM(FEET) =   6606.25  DOWNSTREAM(FEET) =   6550.33

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.915
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.523
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "1 DWELLING/ACRE"          D        1.90      0.21     0.800    91    9.92
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.800
  SUBAREA RUNOFF(CFS) =      5.74
  TOTAL AREA(ACRES) =      1.90   PEAK FLOW RATE(CFS) =      5.74

****************************************************************************
  FLOW PROCESS FROM NODE     19.20 TO NODE     19.30 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 6550.33  DOWNSTREAM ELEVATION(FEET) = 6474.00
  STREET LENGTH(FEET) =   839.90   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 15.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  10.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      16.00
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.42
    HALFSTREET FLOOD WIDTH(FEET) =   14.26
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    7.96
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    3.32
  STREET FLOW TRAVEL TIME(MIN.) =   1.76   Tc(MIN.) =   11.67
```

```
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.273
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "1 DWELLING/ACRE"          D        7.34      0.21     0.800    91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.800
 SUBAREA AREA(ACRES) =    7.34      SUBAREA RUNOFF(CFS) =   20.51
 EFFECTIVE AREA(ACRES) =      9.24    AREA-AVERAGED Fm(INCH/HR) =  0.17
 AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.80
 TOTAL AREA(ACRES) =        9.2        PEAK FLOW RATE(CFS) =      25.82

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.43   HALFSTREET FLOOD WIDTH(FEET) =  15.00
 FLOW VELOCITY(FEET/SEC.) =  8.14   DEPTH*VELOCITY(FT*FT/SEC.) =   3.51
 LONGEST FLOWPATH FROM NODE     19.10 TO NODE     19.30 =    1458.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     19.30 TO NODE     19.30 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   11.67
 RAINFALL INTENSITY(INCH/HR) =   3.27
 AREA-AVERAGED Fm(INCH/HR) =  0.17
 AREA-AVERAGED Fp(INCH/HR) =  0.21
 AREA-AVERAGED Ap =  0.80
 EFFECTIVE STREAM AREA(ACRES) =       9.24
 TOTAL STREAM AREA(ACRES) =       9.24
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      25.82

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       73.01   13.52    3.021  0.21( 0.19) 0.90      25.0      18.10
     2       25.82   11.67    3.273  0.21( 0.17) 0.80       9.2      19.10

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       94.44   11.67    3.273  0.21( 0.18) 0.87      30.8      19.10
     2       96.74   13.52    3.021  0.21( 0.18) 0.87      34.3      18.10

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
```

```
  PEAK FLOW RATE(CFS) =      96.74    Tc(MIN.) =    13.52
  EFFECTIVE AREA(ACRES) =      34.26   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.87
  TOTAL AREA(ACRES) =       34.3
  LONGEST FLOWPATH FROM NODE     18.10 TO NODE     19.30 =    2466.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     19.30 TO NODE     19.30 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    68.50
  ELEVATION DATA: UPSTREAM(FEET) =   6474.00  DOWNSTREAM(FEET) =   6454.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.880
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "1 DWELLING/ACRE"          D        1.29      0.21     0.800    91    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.800
  SUBAREA AREA(ACRES) =    1.29   INITIAL SUBAREA RUNOFF(CFS) =    5.47

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   13.52
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.021
  SUBAREA AREA(ACRES) =    1.29      SUBAREA RUNOFF(CFS) =    3.31
  EFFECTIVE AREA(ACRES) =     35.55   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.87
  TOTAL AREA(ACRES) =       35.5       PEAK FLOW RATE(CFS) =      96.74
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE     19.30 TO NODE     19.40 IS CODE =  53
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6474.00  DOWNSTREAM(FEET) =   6454.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    68.50   CHANNEL SLOPE =  0.2920
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .1930 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =      96.74
  FLOW VELOCITY(FEET/SEC) =  11.28 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.10   Tc(MIN.) =   13.62
  LONGEST FLOWPATH FROM NODE     18.10 TO NODE     19.40 =    2534.50 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     19.40 TO NODE     12.40 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  6454.00  DOWNSTREAM(FEET) =  6429.97
  FLOW LENGTH(FEET) =   133.80   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  17.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  35.36
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      96.74
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =   13.69
  LONGEST FLOWPATH FROM NODE     18.10 TO NODE     12.40 =    2668.30 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.40 TO NODE     12.40 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.69
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.999
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "1 DWELLING/ACRE"          D        2.79      0.21     0.800    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.800
  SUBAREA AREA(ACRES) =    2.79      SUBAREA RUNOFF(CFS) =    7.11
  EFFECTIVE AREA(ACRES) =     38.34   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.87
  TOTAL AREA(ACRES) =       38.3       PEAK FLOW RATE(CFS) =      97.21

****************************************************************************
  FLOW PROCESS FROM NODE     12.40 TO NODE     12.30 IS CODE =  53
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6429.97  DOWNSTREAM(FEET) =   6411.10
  CHANNEL LENGTH THRU SUBAREA(FEET) =   543.90   CHANNEL SLOPE =  0.0347
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .0347 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =      97.21
  FLOW VELOCITY(FEET/SEC) =   4.79 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.89   Tc(MIN.) =   15.58
  LONGEST FLOWPATH FROM NODE     18.10 TO NODE     12.30 =    3212.20 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.30 TO NODE     12.30 IS CODE =   1
```

```
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   15.58
  RAINFALL INTENSITY(INCH/HR) =   2.79
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.21
  AREA-AVERAGED Ap =  0.87
  EFFECTIVE STREAM AREA(ACRES) =      38.34
  TOTAL STREAM AREA(ACRES) =      38.34
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      97.21

****************************************************************************
  FLOW PROCESS FROM NODE     12.10 TO NODE     12.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   999.10
  ELEVATION DATA: UPSTREAM(FEET) =   6594.43  DOWNSTREAM(FEET) =   6485.16

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   11.567
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.287
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "1 DWELLING/ACRE"          D        4.19      0.21     0.800    91   11.57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.800
  SUBAREA RUNOFF(CFS) =     11.76
  TOTAL AREA(ACRES) =      4.19   PEAK FLOW RATE(CFS) =     11.76

****************************************************************************
  FLOW PROCESS FROM NODE     12.20 TO NODE     12.30 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 6485.16  DOWNSTREAM ELEVATION(FEET) = 6411.10
  STREET LENGTH(FEET) =  1028.70   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 15.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  10.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
```

```
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      21.03
    ***STREET FLOW SPLITS OVER STREET-CROWN***
    FULL DEPTH(FEET) =    0.43   FLOOD WIDTH(FEET) =   15.00
    FULL HALF-STREET VELOCITY(FEET/SEC.) =    7.25
    SPLIT DEPTH(FEET) =    0.32   SPLIT FLOOD WIDTH(FEET) =    8.87
    SPLIT FLOW(CFS) =    5.06   SPLIT VELOCITY(FEET/SEC.) =    5.64
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.43
    HALFSTREET FLOOD WIDTH(FEET) =   15.00
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    7.25
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    3.12
  STREET FLOW TRAVEL TIME(MIN.) =   2.37   Tc(MIN.) =   13.93
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.965
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "1 DWELLING/ACRE"          D        7.36      0.21     0.800    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.800
  SUBAREA AREA(ACRES) =    7.36      SUBAREA RUNOFF(CFS) =   18.53
  EFFECTIVE AREA(ACRES) =     11.55    AREA-AVERAGED Fm(INCH/HR) =  0.17
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.80
  TOTAL AREA(ACRES) =       11.6        PEAK FLOW RATE(CFS) =      29.08

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.43   HALFSTREET FLOOD WIDTH(FEET) =  15.00
  FLOW VELOCITY(FEET/SEC.) =  7.25   DEPTH*VELOCITY(FT*FT/SEC.) =   3.12
  LONGEST FLOWPATH FROM NODE     12.10 TO NODE     12.30 =    2027.80 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.30 TO NODE     12.30 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.93
  RAINFALL INTENSITY(INCH/HR) =   2.97
  AREA-AVERAGED Fm(INCH/HR) =  0.17
  AREA-AVERAGED Fp(INCH/HR) =  0.21
  AREA-AVERAGED Ap =  0.80
  EFFECTIVE STREAM AREA(ACRES) =      11.55
  TOTAL STREAM AREA(ACRES) =      11.55
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      29.08
```

```
 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       96.45   13.74    2.992  0.21( 0.18) 0.86      34.9      19.10
     1       97.21   15.58    2.788  0.21( 0.18) 0.87      38.3      18.10
     2       29.08   13.93    2.965  0.21( 0.17) 0.80      11.6      12.10

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1      125.39   13.74    2.992  0.21( 0.18) 0.85      46.3      19.10
     2      125.61   13.93    2.965  0.21( 0.18) 0.85      46.8      12.10
     3      124.44   15.58    2.788  0.21( 0.18) 0.85      49.9      18.10

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     125.61    Tc(MIN.) =    13.93
 EFFECTIVE AREA(ACRES) =      46.83   AREA-AVERAGED Fm(INCH/HR) =  0.18
 AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.85
 TOTAL AREA(ACRES) =       49.9
 LONGEST FLOWPATH FROM NODE     18.10 TO NODE     12.30 =    3212.20 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     12.30 TO NODE     12.30 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   13.93
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.965
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "1 DWELLING/ACRE"          D        4.30      0.21     0.800    91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.800
 SUBAREA AREA(ACRES) =    4.30      SUBAREA RUNOFF(CFS) =   10.82
 EFFECTIVE AREA(ACRES) =     51.13   AREA-AVERAGED Fm(INCH/HR) =  0.18
 AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.84
 TOTAL AREA(ACRES) =       54.2       PEAK FLOW RATE(CFS) =     128.31

****************************************************************************
 FLOW PROCESS FROM NODE     12.30 TO NODE     11.40 IS CODE =  53
----------------------------------------------------------------------------
 >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   6411.10  DOWNSTREAM(FEET) =   6371.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   651.10   CHANNEL SLOPE =  0.0616
```

```
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .0616 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =     128.31
  FLOW VELOCITY(FEET/SEC) =   7.00 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.55   Tc(MIN.) =   15.48
  LONGEST FLOWPATH FROM NODE     18.10 TO NODE     11.40 =    3863.30 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.40 TO NODE     11.40 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   15.48
  RAINFALL INTENSITY(INCH/HR) =   2.79
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.21
  AREA-AVERAGED Ap =  0.84
  EFFECTIVE STREAM AREA(ACRES) =      51.13
  TOTAL STREAM AREA(ACRES) =      54.19
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     128.31

****************************************************************************
  FLOW PROCESS FROM NODE     11.10 TO NODE     11.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   991.60
  ELEVATION DATA: UPSTREAM(FEET) =   6651.16  DOWNSTREAM(FEET) =   6565.95

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   12.567
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.151
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B        1.36      0.42     0.900    76   12.57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      3.39
  TOTAL AREA(ACRES) =      1.36   PEAK FLOW RATE(CFS) =      3.39

****************************************************************************
  FLOW PROCESS FROM NODE     11.20 TO NODE     11.30 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
```

```
 UPSTREAM ELEVATION(FEET) = 6565.95  DOWNSTREAM ELEVATION(FEET) = 6546.53
 STREET LENGTH(FEET) =   251.20   CURB HEIGHT(INCHES) =  8.0
 STREET HALFWIDTH(FEET) = 15.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  10.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.018
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.88
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.33
   HALFSTREET FLOOD WIDTH(FEET) =    9.41
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.97
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.97
 STREET FLOW TRAVEL TIME(MIN.) =   0.70   Tc(MIN.) =   13.27
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.056
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        2.07      0.42     0.900    76
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
 SUBAREA AREA(ACRES) =    2.07      SUBAREA RUNOFF(CFS) =    4.98
 EFFECTIVE AREA(ACRES) =      3.43    AREA-AVERAGED Fm(INCH/HR) =  0.38
 AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  0.90
 TOTAL AREA(ACRES) =        3.4        PEAK FLOW RATE(CFS) =       8.26

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  11.05
 FLOW VELOCITY(FEET/SEC.) =  6.43   DEPTH*VELOCITY(FT*FT/SEC.) =   2.31
 LONGEST FLOWPATH FROM NODE     11.10 TO NODE     11.30 =    1242.80 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     11.30 TO NODE     11.30 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   13.27
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.056
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B       19.22      0.42     0.900    76
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =   19.22      SUBAREA RUNOFF(CFS) =   46.27
  EFFECTIVE AREA(ACRES) =     22.65   AREA-AVERAGED Fm(INCH/HR) =  0.38
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =       22.6       PEAK FLOW RATE(CFS) =      54.53

****************************************************************************
  FLOW PROCESS FROM NODE     11.30 TO NODE     11.40 IS CODE =  53
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6546.53  DOWNSTREAM(FEET) =   6371.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1325.20   CHANNEL SLOPE =  0.1325
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .1233 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =      54.53
  FLOW VELOCITY(FEET/SEC) =   7.45 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   2.97   Tc(MIN.) =   16.23
  LONGEST FLOWPATH FROM NODE     11.10 TO NODE     11.40 =    2568.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.40 TO NODE     11.40 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   16.23
  RAINFALL INTENSITY(INCH/HR) =   2.75
  AREA-AVERAGED Fm(INCH/HR) =  0.38
  AREA-AVERAGED Fp(INCH/HR) =  0.42
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =      22.65
  TOTAL STREAM AREA(ACRES) =      22.65
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      54.53

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      128.21   15.29    2.804  0.21( 0.18) 0.84      50.6      19.10
      1      128.31   15.48    2.793  0.21( 0.18) 0.84      51.1      12.10
      1      127.29   17.13    2.701  0.21( 0.18) 0.85      54.2      18.10
      2       54.53   16.23    2.751  0.42( 0.38) 0.90      22.6      11.10

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
```

```
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      180.70   15.29    2.804  0.28( 0.24) 0.86      71.9      19.10
      2      181.24   15.48    2.793  0.28( 0.24) 0.86      72.7      12.10
      3      182.37   16.23    2.751  0.28( 0.24) 0.86      75.2      11.10
      4      180.66   17.13    2.701  0.28( 0.24) 0.86      76.8      18.10

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     182.37    Tc(MIN.) =    16.23
  EFFECTIVE AREA(ACRES) =      75.18   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.28  AREA-AVERAGED Ap =  0.86
  TOTAL AREA(ACRES) =       76.8
  LONGEST FLOWPATH FROM NODE     18.10 TO NODE     11.40 =    3863.30 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.40 TO NODE     11.40 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.23
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.751
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.19      0.21     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    0.19      SUBAREA RUNOFF(CFS) =    0.44
  EFFECTIVE AREA(ACRES) =     75.37   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.28  AREA-AVERAGED Ap =  0.86
  TOTAL AREA(ACRES) =       77.0       PEAK FLOW RATE(CFS) =     182.37
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE     11.40 TO NODE     13.20 IS CODE =  53
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6371.00  DOWNSTREAM(FEET) =   6369.35
  CHANNEL LENGTH THRU SUBAREA(FEET) =    54.80   CHANNEL SLOPE =  0.0301
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .0301 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =     182.37
  FLOW VELOCITY(FEET/SEC) =   5.50 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.17   Tc(MIN.) =   16.40
  LONGEST FLOWPATH FROM NODE     18.10 TO NODE     13.20 =    3918.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.20 TO NODE     13.20 IS CODE =   1
----------------------------------------------------------------------------
```

```
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   16.40
  RAINFALL INTENSITY(INCH/HR) =   2.74
  AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.28
  AREA-AVERAGED Ap =  0.86
  EFFECTIVE STREAM AREA(ACRES) =      75.37
  TOTAL STREAM AREA(ACRES) =      77.03
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     182.37

****************************************************************************
  FLOW PROCESS FROM NODE     13.10 TO NODE     13.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   852.50
  ELEVATION DATA: UPSTREAM(FEET) =   6506.32  DOWNSTREAM(FEET) =   6369.35

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.438
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.440
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        4.74      0.21     0.900    91   10.44
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =     13.87
  TOTAL AREA(ACRES) =      4.74   PEAK FLOW RATE(CFS) =     13.87

****************************************************************************
  FLOW PROCESS FROM NODE     13.20 TO NODE     13.20 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.44
  RAINFALL INTENSITY(INCH/HR) =   3.44
  AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       4.74
  TOTAL STREAM AREA(ACRES) =       4.74
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      13.87
```

```
  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      180.70   15.45    2.795  0.28( 0.24) 0.86      72.1      19.10
      1      181.24   15.65    2.784  0.28( 0.24) 0.86      72.9      12.10
      1      182.37   16.40    2.742  0.28( 0.24) 0.86      75.4      11.10
      1      180.66   17.30    2.691  0.28( 0.24) 0.86      77.0      18.10
      2       13.87   10.44    3.440  0.21( 0.19) 0.90       4.7      13.10

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      166.75   10.44    3.440  0.27( 0.23) 0.86      53.5      13.10
      2      191.82   15.45    2.795  0.27( 0.23) 0.86      76.9      19.10
      3      192.31   15.65    2.784  0.27( 0.23) 0.86      77.7      12.10
      4      193.26   16.40    2.742  0.27( 0.24) 0.86      80.1      11.10
      5      191.33   17.30    2.691  0.27( 0.23) 0.86      81.8      18.10

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     193.26    Tc(MIN.) =    16.40
  EFFECTIVE AREA(ACRES) =      80.11   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.27  AREA-AVERAGED Ap =  0.86
  TOTAL AREA(ACRES) =       81.8
  LONGEST FLOWPATH FROM NODE     18.10 TO NODE     13.20 =    3918.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.20 TO NODE     13.20 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.40
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.742
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.86      0.21     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    0.86      SUBAREA RUNOFF(CFS) =    1.98
  EFFECTIVE AREA(ACRES) =     80.97   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.27  AREA-AVERAGED Ap =  0.86
  TOTAL AREA(ACRES) =       82.6       PEAK FLOW RATE(CFS) =     193.26
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE     13.20 TO NODE     13.30 IS CODE =  53
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6369.35  DOWNSTREAM(FEET) =   6363.20
  CHANNEL LENGTH THRU SUBAREA(FEET) =   107.90   CHANNEL SLOPE =  0.0570
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .0570 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =     193.26
  FLOW VELOCITY(FEET/SEC) =   7.72 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.23   Tc(MIN.) =   16.63
  LONGEST FLOWPATH FROM NODE     18.10 TO NODE     13.30 =    4026.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     14.10 TO NODE     14.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   671.10
  ELEVATION DATA: UPSTREAM(FEET) =   6509.56  DOWNSTREAM(FEET) =   6270.66

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.090
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.027
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        4.08      0.21     0.900    91    8.09
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =     14.09
  TOTAL AREA(ACRES) =      4.08   PEAK FLOW RATE(CFS) =     14.09

****************************************************************************
  FLOW PROCESS FROM NODE     15.10 TO NODE     15.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   195.50
  ELEVATION DATA: UPSTREAM(FEET) =   6527.52  DOWNSTREAM(FEET) =   6502.01

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.988
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.607
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  PUBLIC PARK                 D        0.35      0.21     0.850    91    5.99
```

```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA RUNOFF(CFS) =      1.40
  TOTAL AREA(ACRES) =      0.35   PEAK FLOW RATE(CFS) =      1.40

****************************************************************************
  FLOW PROCESS FROM NODE     15.20 TO NODE     15.30 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 6502.01  DOWNSTREAM ELEVATION(FEET) = 6460.41
  STREET LENGTH(FEET) =   646.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 15.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  10.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       8.26
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.37
    HALFSTREET FLOOD WIDTH(FEET) =   11.52
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.99
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.20
  STREET FLOW TRAVEL TIME(MIN.) =   1.80   Tc(MIN.) =    7.79
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.111
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                D        3.87      0.21     0.850    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA AREA(ACRES) =    3.87      SUBAREA RUNOFF(CFS) =   13.70
  EFFECTIVE AREA(ACRES) =      4.22    AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.85
  TOTAL AREA(ACRES) =        4.2        PEAK FLOW RATE(CFS) =      14.94

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.43   HALFSTREET FLOOD WIDTH(FEET) =  14.96
  FLOW VELOCITY(FEET/SEC.) =  6.81   DEPTH*VELOCITY(FT*FT/SEC.) =   2.93
  LONGEST FLOWPATH FROM NODE     15.10 TO NODE     15.30 =     841.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     15.30 TO NODE     15.30 IS CODE =  81
----------------------------------------------------------------------------
```

```
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.79
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.111
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                D        8.68      0.21     0.850    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA AREA(ACRES) =    8.68      SUBAREA RUNOFF(CFS) =   30.72
  EFFECTIVE AREA(ACRES) =     12.90   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.85
  TOTAL AREA(ACRES) =       12.9       PEAK FLOW RATE(CFS) =      45.65

****************************************************************************
  FLOW PROCESS FROM NODE     15.30 TO NODE     15.40 IS CODE =  53
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6460.41  DOWNSTREAM(FEET) =   6275.97
  CHANNEL LENGTH THRU SUBAREA(FEET) =   551.20   CHANNEL SLOPE =  0.3346
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .2026 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =      45.65
  FLOW VELOCITY(FEET/SEC) =   9.00 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.02   Tc(MIN.) =    8.81
  LONGEST FLOWPATH FROM NODE     15.10 TO NODE     15.40 =    1392.70 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.10 TO NODE     16.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   322.00
  ELEVATION DATA: UPSTREAM(FEET) =   6532.31  DOWNSTREAM(FEET) =   6490.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.361
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.228
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.86      0.21     0.900    91    7.36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      3.13
  TOTAL AREA(ACRES) =      0.86   PEAK FLOW RATE(CFS) =      3.13
```

```
===============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        0.9  TC(MIN.) =      7.36
  EFFECTIVE AREA(ACRES) =      0.86  AREA-AVERAGED Fm(INCH/HR)=  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap = 0.900
  PEAK FLOW RATE(CFS)   =       3.13
===============================================================================
===============================================================================
  END OF RATIONAL METHOD ANALYSIS
```



Proposed 100-year

```
**************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
         (Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
        (c) Copyright 1983-2011 Advanced Engineering Software (aes)
            Ver. 18.0  Release Date: 07/01/2011  License ID 1499

                          Analysis prepared by:
```

Kimley-Horn

```
 ************************* DESCRIPTION OF STUDY *************************
* Hume SoCal                                                            *
* Proposed 100 year - 24 hours Conditions                               *
* San Bernardino County, CA                                             *
 ************************************************************************

  FILE NAME: HUMEPR.DAT
  TIME/DATE OF STUDY: 07:19 01/31/2024
==========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==========================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *USER-DEFINED TABLED RAINFALL USED*
  NUMBER OF [TIME,INTENSITY] DATA PAIRS =  9
   1)    5.00;  8.030
   2)   10.00;  5.750
   3)   15.00;  4.640
   4)   30.00;  3.260
   5)   60.00;  2.300
   6)  120.00;  1.740
   7)  180.00;  1.510
   8)  360.00;  1.190
   9)  720.00;  0.881
  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   15.0     10.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
```

```
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE      1.10 TO NODE      1.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   291.50
  ELEVATION DATA: UPSTREAM(FEET) =   6652.19  DOWNSTREAM(FEET) =   6591.92

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.461
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  7.364
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        1.39      0.21     0.900    91    6.46
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      8.98
  TOTAL AREA(ACRES) =      1.39   PEAK FLOW RATE(CFS) =      8.98

****************************************************************************
  FLOW PROCESS FROM NODE      1.20 TO NODE      1.20 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    6.46
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  7.364
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        4.74      0.21     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    4.74      SUBAREA RUNOFF(CFS) =   30.61
  EFFECTIVE AREA(ACRES) =      6.13   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =        6.1       PEAK FLOW RATE(CFS) =      39.58

****************************************************************************
  FLOW PROCESS FROM NODE      1.20 TO NODE      1.30 IS CODE =  53
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6591.92  DOWNSTREAM(FEET) =   6414.01
  CHANNEL LENGTH THRU SUBAREA(FEET) =   619.40   CHANNEL SLOPE =  0.2872
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .1918 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =      39.58
  FLOW VELOCITY(FEET/SEC) =   8.35 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.24   Tc(MIN.) =    7.70
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.30 =     910.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      2.10 TO NODE      2.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
================================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   487.50
  ELEVATION DATA: UPSTREAM(FEET) =   6694.25  DOWNSTREAM(FEET) =   6619.24

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.420
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.471
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        1.63      0.21     0.900    91    8.42
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      9.22
  TOTAL AREA(ACRES) =      1.63   PEAK FLOW RATE(CFS) =      9.22

****************************************************************************
  FLOW PROCESS FROM NODE      2.20 TO NODE      2.20 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =    8.42
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.471
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D       12.76      0.21     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =   12.76      SUBAREA RUNOFF(CFS) =   72.14
  EFFECTIVE AREA(ACRES) =     14.39   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.90
```

```
  TOTAL AREA(ACRES) =       14.4       PEAK FLOW RATE(CFS) =      81.35

****************************************************************************
  FLOW PROCESS FROM NODE      2.20 TO NODE      2.30 IS CODE =  53
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6619.24  DOWNSTREAM(FEET) =   6372.85
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1548.50   CHANNEL SLOPE =  0.1591
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .1396 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =      81.35
  FLOW VELOCITY(FEET/SEC) =   9.05 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   2.85   Tc(MIN.) =   11.27
  LONGEST FLOWPATH FROM NODE      2.10 TO NODE      2.30 =    2036.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      4.10 TO NODE      4.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   451.80
  ELEVATION DATA: UPSTREAM(FEET) =   6549.82  DOWNSTREAM(FEET) =   6358.84

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.673
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  7.267
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        2.86      0.21     0.900    91    6.67
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =     18.22
  TOTAL AREA(ACRES) =      2.86   PEAK FLOW RATE(CFS) =     18.22

****************************************************************************
  FLOW PROCESS FROM NODE      7.10 TO NODE      7.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   911.20
  ELEVATION DATA: UPSTREAM(FEET) =   7336.42  DOWNSTREAM(FEET) =   7060.88

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.446
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.003
```

```
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        6.53      0.21      0.900    91    9.45
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =     34.17
  TOTAL AREA(ACRES) =      6.53   PEAK FLOW RATE(CFS) =     34.17

****************************************************************************
  FLOW PROCESS FROM NODE      7.20 TO NODE      7.20 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.45
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.003
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D      102.45      0.21      0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =  102.45      SUBAREA RUNOFF(CFS) =  536.03
  EFFECTIVE AREA(ACRES) =    108.98   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =      109.0       PEAK FLOW RATE(CFS) =     570.20

****************************************************************************
  FLOW PROCESS FROM NODE      7.20 TO NODE      7.30 IS CODE =  53
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   7060.88  DOWNSTREAM(FEET) =   6472.84
  CHANNEL LENGTH THRU SUBAREA(FEET) =  4642.50   CHANNEL SLOPE =  0.1267
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .1194 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =     570.20
  FLOW VELOCITY(FEET/SEC) =  16.01 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   4.83   Tc(MIN.) =   14.28
  LONGEST FLOWPATH FROM NODE      7.10 TO NODE      7.30 =    5553.70 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.30 TO NODE      7.30 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
```

```
  TIME OF CONCENTRATION(MIN.) =   14.28
  RAINFALL INTENSITY(INCH/HR) =   4.80
  AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =     108.98
  TOTAL STREAM AREA(ACRES) =     108.98
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     570.20

****************************************************************************
  FLOW PROCESS FROM NODE      3.10 TO NODE      3.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   570.40
  ELEVATION DATA: UPSTREAM(FEET) =   7022.75  DOWNSTREAM(FEET) =   6906.51

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.476
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.445
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        1.09      0.21     0.900    91    8.48
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      6.14
  TOTAL AREA(ACRES) =      1.09   PEAK FLOW RATE(CFS) =      6.14

****************************************************************************
  FLOW PROCESS FROM NODE      3.20 TO NODE      3.20 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.48
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.445
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D       32.62      0.21     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =   32.62      SUBAREA RUNOFF(CFS) =  183.67
  EFFECTIVE AREA(ACRES) =     33.71   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =       33.7       PEAK FLOW RATE(CFS) =     189.81

****************************************************************************
```

```
 FLOW PROCESS FROM NODE      3.20 TO NODE      3.30 IS CODE =  53
----------------------------------------------------------------------------
 >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   6906.51  DOWNSTREAM(FEET) =   6598.45
 CHANNEL LENGTH THRU SUBAREA(FEET) =  1309.60   CHANNEL SLOPE =  0.2352
 SLOPE ADJUSTMENT CURVE USED:
 EFFECTIVE SLOPE = .1751 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
 CHANNEL FLOW THRU SUBAREA(CFS) =     189.81
 FLOW VELOCITY(FEET/SEC) =  13.44 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
 TRAVEL TIME(MIN.) =   1.62   Tc(MIN.) =   10.10
 LONGEST FLOWPATH FROM NODE      3.10 TO NODE      3.30 =    1880.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      3.30 TO NODE      3.30 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   10.10
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.728
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 ".4 DWELLING/ACRE"         D       51.85      0.21     0.900    91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
 SUBAREA AREA(ACRES) =   51.85      SUBAREA RUNOFF(CFS) =  258.48
 EFFECTIVE AREA(ACRES) =     85.56   AREA-AVERAGED Fm(INCH/HR) =  0.19
 AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.90
 TOTAL AREA(ACRES) =       85.6       PEAK FLOW RATE(CFS) =     426.52

****************************************************************************
 FLOW PROCESS FROM NODE      3.30 TO NODE      7.30 IS CODE =  53
----------------------------------------------------------------------------
 >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   6598.45  DOWNSTREAM(FEET) =   6472.84
 CHANNEL LENGTH THRU SUBAREA(FEET) =  1872.50   CHANNEL SLOPE =  0.0671
 SLOPE ADJUSTMENT CURVE USED:
 EFFECTIVE SLOPE = .0671 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
 CHANNEL FLOW THRU SUBAREA(CFS) =     426.52
 FLOW VELOCITY(FEET/SEC) =  10.90 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
 TRAVEL TIME(MIN.) =   2.86   Tc(MIN.) =   12.96
 LONGEST FLOWPATH FROM NODE      3.10 TO NODE      7.30 =    3752.50 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      7.30 TO NODE      7.30 IS CODE =   1
----------------------------------------------------------------------------
```

```
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.96
  RAINFALL INTENSITY(INCH/HR) =   5.09
  AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =      85.56
  TOTAL STREAM AREA(ACRES) =      85.56
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     426.52

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      570.20   14.28    4.800  0.21( 0.19) 0.90     109.0       7.10
      2      426.52   12.96    5.092  0.21( 0.19) 0.90      85.6       3.10

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      976.99   12.96    5.092  0.21( 0.19) 0.90     184.5       3.10
      2      971.34   14.28    4.800  0.21( 0.19) 0.90     194.5       7.10

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     976.99    Tc(MIN.) =    12.96
  EFFECTIVE AREA(ACRES) =     184.51   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =      194.5
  LONGEST FLOWPATH FROM NODE      7.10 TO NODE      7.30 =    5553.70 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.30 TO NODE      7.30 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.96
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.092
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D       10.33      0.21     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =   10.33      SUBAREA RUNOFF(CFS) =   45.58
```

```
  EFFECTIVE AREA(ACRES) =    194.84   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =      204.9       PEAK FLOW RATE(CFS) =     976.99
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE      7.30 TO NODE      7.40 IS CODE =  53
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6472.84  DOWNSTREAM(FEET) =   6404.98
  CHANNEL LENGTH THRU SUBAREA(FEET) =   953.53   CHANNEL SLOPE =  0.0712
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .0712 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =     976.99
  FLOW VELOCITY(FEET/SEC) =  14.79 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.07   Tc(MIN.) =   14.04
  LONGEST FLOWPATH FROM NODE      7.10 TO NODE      7.40 =    6507.23 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.40 TO NODE      7.40 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      8.10 TO NODE      8.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   584.70
  ELEVATION DATA: UPSTREAM(FEET) =   6760.02  DOWNSTREAM(FEET) =   6589.39

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.967
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.677
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        2.35      0.21     0.900    91    7.97
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =     13.72
  TOTAL AREA(ACRES) =      2.35   PEAK FLOW RATE(CFS) =     13.72

****************************************************************************
  FLOW PROCESS FROM NODE      8.20 TO NODE      8.20 IS CODE =  81
----------------------------------------------------------------------------
```

```
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =    7.97
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.677
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D       16.79      0.21     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =   16.79      SUBAREA RUNOFF(CFS) =   98.04
  EFFECTIVE AREA(ACRES) =     19.14   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =       19.1       PEAK FLOW RATE(CFS) =     111.77

********************************************************************************
  FLOW PROCESS FROM NODE      8.20 TO NODE      8.30 IS CODE =  53
--------------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6589.10  DOWNSTREAM(FEET) =   6472.97
  CHANNEL LENGTH THRU SUBAREA(FEET) =   897.40   CHANNEL SLOPE =  0.1294
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .1213 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =     111.77
  FLOW VELOCITY(FEET/SEC) =   9.38 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.59   Tc(MIN.) =    9.56
  LONGEST FLOWPATH FROM NODE      8.10 TO NODE      8.30 =    1482.10 FEET.

********************************************************************************
  FLOW PROCESS FROM NODE      8.30 TO NODE      8.30 IS CODE =   1
--------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.56
  RAINFALL INTENSITY(INCH/HR) =   5.95
  AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =      19.14
  TOTAL STREAM AREA(ACRES) =      19.14
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     111.77

********************************************************************************
  FLOW PROCESS FROM NODE      8.40 TO NODE      8.50 IS CODE =  21
--------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
```

```
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   757.10
  ELEVATION DATA: UPSTREAM(FEET) =   6711.74  DOWNSTREAM(FEET) =   6532.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.206
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.112
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        1.30      0.21     0.900    91    9.21
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      6.93
  TOTAL AREA(ACRES) =      1.30   PEAK FLOW RATE(CFS) =      6.93

****************************************************************************
  FLOW PROCESS FROM NODE      8.50 TO NODE      8.50 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.21
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.112
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        1.43      0.21     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    1.43      SUBAREA RUNOFF(CFS) =    7.62
  EFFECTIVE AREA(ACRES) =      2.73   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =        2.7       PEAK FLOW RATE(CFS) =      14.55

****************************************************************************
  FLOW PROCESS FROM NODE      8.50 TO NODE      8.30 IS CODE =  53
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6532.00  DOWNSTREAM(FEET) =   6472.97
  CHANNEL LENGTH THRU SUBAREA(FEET) =   426.20   CHANNEL SLOPE =  0.1385
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .1273 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =      14.55
  FLOW VELOCITY(FEET/SEC) =   4.87 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.46   Tc(MIN.) =   10.66
  LONGEST FLOWPATH FROM NODE      8.40 TO NODE      8.30 =    1183.30 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE      8.30 TO NODE      8.30 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.66
  RAINFALL INTENSITY(INCH/HR) =   5.60
  AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       2.73
  TOTAL STREAM AREA(ACRES) =       2.73
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      14.55

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      111.77    9.56    5.950  0.21( 0.19) 0.90      19.1       8.10
      2       14.55   10.66    5.603  0.21( 0.19) 0.90       2.7       8.40

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      125.65    9.56    5.950  0.21( 0.19) 0.90      21.6       8.10
      2      119.58   10.66    5.603  0.21( 0.19) 0.90      21.9       8.40

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     125.65    Tc(MIN.) =     9.56
  EFFECTIVE AREA(ACRES) =      21.59   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =       21.9
  LONGEST FLOWPATH FROM NODE      8.10 TO NODE      8.30 =    1482.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      8.30 TO NODE      8.30 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.56
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.950
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
```

```
  ".4 DWELLING/ACRE"         D       21.66      0.21     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =   21.66      SUBAREA RUNOFF(CFS) =  112.31
  EFFECTIVE AREA(ACRES) =     43.25   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =       43.5       PEAK FLOW RATE(CFS) =     224.24

****************************************************************************
  FLOW PROCESS FROM NODE      8.30 TO NODE      7.40 IS CODE =  53
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6472.97  DOWNSTREAM(FEET) =   6404.98
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1112.00   CHANNEL SLOPE =  0.0611
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .0611 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =     224.24
  FLOW VELOCITY(FEET/SEC) =   8.40 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   2.21   Tc(MIN.) =   11.77
  LONGEST FLOWPATH FROM NODE      8.10 TO NODE      7.40 =    2594.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.40 TO NODE      7.40 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      224.24   11.77    5.357  0.21( 0.19) 0.90      43.2       8.10
      2      212.09   12.91    5.104  0.21( 0.19) 0.90      43.5       8.40
  LONGEST FLOWPATH FROM NODE      8.10 TO NODE      7.40 =    2594.10 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      976.99   14.04    4.854  0.21( 0.19) 0.90     194.8       3.10
      2      971.34   15.35    4.607  0.21( 0.19) 0.90     204.9       7.10
  LONGEST FLOWPATH FROM NODE      7.10 TO NODE      7.40 =    6507.23 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1     1131.74   11.77    5.357  0.21( 0.19) 0.90     206.6       8.10
      2     1158.88   12.91    5.104  0.21( 0.19) 0.90     222.7       8.40
      3     1178.30   14.04    4.854  0.21( 0.19) 0.90     238.4       3.10
      4     1162.02   15.35    4.607  0.21( 0.19) 0.90     248.4       7.10
    TOTAL AREA(ACRES) =       248.4
```

```
  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     1178.30  Tc(MIN.) =   14.038
  EFFECTIVE AREA(ACRES) =    238.37  AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =      248.4
  LONGEST FLOWPATH FROM NODE      7.10 TO NODE      7.40 =    6507.23 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.40 TO NODE      7.40 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.04
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.854
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        6.63      0.21     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    6.63      SUBAREA RUNOFF(CFS) =   27.83
  EFFECTIVE AREA(ACRES) =    245.00   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =      255.0       PEAK FLOW RATE(CFS) =    1178.30
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE      7.40 TO NODE     17.30 IS CODE =  53
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6404.98  DOWNSTREAM(FEET) =   6378.96
  CHANNEL LENGTH THRU SUBAREA(FEET) =   486.30   CHANNEL SLOPE =  0.0535
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .0535 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =    1178.30
  FLOW VELOCITY(FEET/SEC) =  13.65 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.59   Tc(MIN.) =   14.63
  LONGEST FLOWPATH FROM NODE      7.10 TO NODE     17.30 =    6993.53 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     17.30 TO NODE     17.30 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   14.63
```

```
  RAINFALL INTENSITY(INCH/HR) =   4.72
  AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =     245.00
  TOTAL STREAM AREA(ACRES) =     255.03
  PEAK FLOW RATE(CFS) AT CONFLUENCE =    1178.30

****************************************************************************
  FLOW PROCESS FROM NODE     17.10 TO NODE     17.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   886.60
  ELEVATION DATA: UPSTREAM(FEET) =   6510.50  DOWNSTREAM(FEET) =   6452.98

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   12.607
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.171
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  PUBLIC PARK                D        3.21      0.21     0.850    91   12.61
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA RUNOFF(CFS) =     14.42
  TOTAL AREA(ACRES) =      3.21   PEAK FLOW RATE(CFS) =     14.42

****************************************************************************
  FLOW PROCESS FROM NODE     17.20 TO NODE     17.20 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.61
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.171
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                D        1.17      0.21     0.850    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA AREA(ACRES) =    1.17      SUBAREA RUNOFF(CFS) =    5.26
  EFFECTIVE AREA(ACRES) =      4.38   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.85
  TOTAL AREA(ACRES) =        4.4       PEAK FLOW RATE(CFS) =      19.68

****************************************************************************
  FLOW PROCESS FROM NODE     17.20 TO NODE     17.30 IS CODE =  53
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
```

```
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6452.98  DOWNSTREAM(FEET) =   6378.96
  CHANNEL LENGTH THRU SUBAREA(FEET) =   393.20   CHANNEL SLOPE =  0.1883
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .1541 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =      19.68
  FLOW VELOCITY(FEET/SEC) =   5.93 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.11   Tc(MIN.) =   13.71
  LONGEST FLOWPATH FROM NODE     17.10 TO NODE     17.30 =    1279.80 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     17.30 TO NODE     17.30 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.71
  RAINFALL INTENSITY(INCH/HR) =   4.93
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.21
  AREA-AVERAGED Ap =  0.85
  EFFECTIVE STREAM AREA(ACRES) =       4.38
  TOTAL STREAM AREA(ACRES) =       4.38
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      19.68

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1     1131.74   12.37    5.224  0.21( 0.19) 0.90     213.2       8.10
      1     1158.88   13.51    4.971  0.21( 0.19) 0.90     229.4       8.40
      1     1178.30   14.63    4.722  0.21( 0.19) 0.90     245.0       3.10
      1     1162.02   15.95    4.553  0.21( 0.19) 0.90     255.0       7.10
      2       19.68   13.71    4.926  0.21( 0.18) 0.85       4.4      17.10

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1     1150.61   12.37    5.224  0.21( 0.19) 0.90     217.2       8.10
      2     1178.45   13.51    4.971  0.21( 0.19) 0.90     233.7       8.40
      3     1182.07   13.71    4.926  0.21( 0.19) 0.90     236.6      17.10
      4     1197.13   14.63    4.722  0.21( 0.19) 0.90     249.4       3.10
      5     1180.16   15.95    4.553  0.21( 0.19) 0.90     259.4       7.10

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =    1197.13    Tc(MIN.) =    14.63
```

```
  EFFECTIVE AREA(ACRES) =     249.38   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =      259.4
  LONGEST FLOWPATH FROM NODE      7.10 TO NODE     17.30 =    6993.53 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     17.30 TO NODE     17.30 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.63
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.722
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                D        2.27      0.21     0.850    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA AREA(ACRES) =    2.27      SUBAREA RUNOFF(CFS) =    9.28
  EFFECTIVE AREA(ACRES) =    251.65   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =      261.7       PEAK FLOW RATE(CFS) =    1197.13
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE     17.30 TO NODE     17.40 IS CODE =  53
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6378.96  DOWNSTREAM(FEET) =   6355.81
  CHANNEL LENGTH THRU SUBAREA(FEET) =   386.20   CHANNEL SLOPE =  0.0599
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .0599 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =    1197.13
  FLOW VELOCITY(FEET/SEC) =  14.52 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.44   Tc(MIN.) =   15.07
  LONGEST FLOWPATH FROM NODE      7.10 TO NODE     17.40 =    7379.73 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     17.40 TO NODE     17.40 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   15.07
  RAINFALL INTENSITY(INCH/HR) =   4.63
  AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21
  AREA-AVERAGED Ap =  0.90
```

```
  EFFECTIVE STREAM AREA(ACRES) =     251.65
  TOTAL STREAM AREA(ACRES) =     261.68
  PEAK FLOW RATE(CFS) AT CONFLUENCE =    1197.13

****************************************************************************
  FLOW PROCESS FROM NODE      5.10 TO NODE      5.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   696.80
  ELEVATION DATA: UPSTREAM(FEET) =   6584.65  DOWNSTREAM(FEET) =   6467.32

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.539
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.960
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        3.31      0.21     0.900    91    9.54
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =     17.19
  TOTAL AREA(ACRES) =      3.31   PEAK FLOW RATE(CFS) =     17.19

****************************************************************************
  FLOW PROCESS FROM NODE      5.20 TO NODE      5.20 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.54
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.960
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D       13.33      0.21     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =   13.33      SUBAREA RUNOFF(CFS) =   69.24
  EFFECTIVE AREA(ACRES) =     16.64   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =       16.6       PEAK FLOW RATE(CFS) =      86.43

****************************************************************************
  FLOW PROCESS FROM NODE      5.20 TO NODE     17.40 IS CODE =  53
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
```

```
  ELEVATION DATA: UPSTREAM(FEET) =   6467.32  DOWNSTREAM(FEET) =   6355.81
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1035.00   CHANNEL SLOPE =  0.1077
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .1058 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =      86.43
  FLOW VELOCITY(FEET/SEC) =   8.04 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   2.15   Tc(MIN.) =   11.68
  LONGEST FLOWPATH FROM NODE      5.10 TO NODE     17.40 =    1731.80 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     17.40 TO NODE     17.40 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.68
  RAINFALL INTENSITY(INCH/HR) =   5.38
  AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =      16.64
  TOTAL STREAM AREA(ACRES) =      16.64
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      86.43

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1     1150.61   12.82    5.124  0.21( 0.19) 0.90     219.4       8.10
      1     1178.45   13.95    4.872  0.21( 0.19) 0.90     236.0       8.40
      1     1182.07   14.16    4.827  0.21( 0.19) 0.90     238.9      17.10
      1     1197.13   15.07    4.633  0.21( 0.19) 0.90     251.6       3.10
      1     1180.16   16.40    4.512  0.21( 0.19) 0.90     261.7       7.10
      2       86.43   11.68    5.376  0.21( 0.19) 0.90      16.6       5.10

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1     1188.71   11.68    5.376  0.21( 0.19) 0.90     216.6       5.10
      2     1232.84   12.82    5.124  0.21( 0.19) 0.90     236.1       8.10
      3     1256.48   13.95    4.872  0.21( 0.19) 0.90     252.6       8.40
      4     1259.35   14.16    4.827  0.21( 0.19) 0.90     255.5      17.10
      5     1271.18   15.07    4.633  0.21( 0.19) 0.90     268.3       3.10
      6     1252.18   16.40    4.512  0.21( 0.19) 0.90     278.3       7.10

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =    1271.18    Tc(MIN.) =    15.07
```

```
  EFFECTIVE AREA(ACRES) =     268.29   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =      278.3
  LONGEST FLOWPATH FROM NODE      7.10 TO NODE     17.40 =    7379.73 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     17.40 TO NODE     17.40 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.07
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.633
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                 D        0.34      0.21     0.850    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA AREA(ACRES) =    0.34      SUBAREA RUNOFF(CFS) =    1.36
  EFFECTIVE AREA(ACRES) =    268.63   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =      278.7       PEAK FLOW RATE(CFS) =    1271.18
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE     17.40 TO NODE      6.20 IS CODE =  53
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6355.81  DOWNSTREAM(FEET) =   6352.80
  CHANNEL LENGTH THRU SUBAREA(FEET) =   100.30   CHANNEL SLOPE =  0.0300
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .0300 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =    1271.18
  FLOW VELOCITY(FEET/SEC) =  10.48 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.16   Tc(MIN.) =   15.23
  LONGEST FLOWPATH FROM NODE      7.10 TO NODE      6.20 =    7480.03 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.20 TO NODE      6.20 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   15.23
  RAINFALL INTENSITY(INCH/HR) =   4.62
  AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21
  AREA-AVERAGED Ap =  0.90
```

```
  EFFECTIVE STREAM AREA(ACRES) =     268.63
  TOTAL STREAM AREA(ACRES) =     278.66
  PEAK FLOW RATE(CFS) AT CONFLUENCE =    1271.18

****************************************************************************
  FLOW PROCESS FROM NODE      6.10 TO NODE      6.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   236.40
  ELEVATION DATA: UPSTREAM(FEET) =   6435.22  DOWNSTREAM(FEET) =   6352.80

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.352
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  7.870
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.35      0.21     0.900    91    5.35
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      2.42
  TOTAL AREA(ACRES) =      0.35   PEAK FLOW RATE(CFS) =      2.42

****************************************************************************
  FLOW PROCESS FROM NODE      6.20 TO NODE      6.20 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.35
  RAINFALL INTENSITY(INCH/HR) =   7.87
  AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       0.35
  TOTAL STREAM AREA(ACRES) =       0.35
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.42

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1     1188.71   11.85    5.340  0.21( 0.19) 0.90     217.0       5.10
      1     1232.84   12.98    5.088  0.21( 0.19) 0.90     236.4       8.10
      1     1256.48   14.11    4.837  0.21( 0.19) 0.90     252.9       8.40
      1     1259.35   14.32    4.792  0.21( 0.19) 0.90     255.8      17.10
      1     1271.18   15.23    4.618  0.21( 0.19) 0.90     268.6       3.10
```

```
     1     1252.18   16.56    4.497  0.21( 0.19) 0.90     278.7       7.10
     2        2.42    5.35    7.870  0.21( 0.19) 0.90       0.3       6.10

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      803.11    5.35    7.870  0.21( 0.19) 0.90      98.4       6.10
      2     1190.33   11.85    5.340  0.21( 0.19) 0.90     217.3       5.10
      3     1234.39   12.98    5.088  0.21( 0.19) 0.90     236.8       8.10
      4     1257.95   14.11    4.837  0.21( 0.19) 0.90     253.3       8.40
      5     1260.80   14.32    4.792  0.21( 0.19) 0.90     256.2      17.10
      6     1272.58   15.23    4.618  0.21( 0.19) 0.90     269.0       3.10
      7     1253.54   16.56    4.497  0.21( 0.19) 0.90     279.0       7.10

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =    1272.58    Tc(MIN.) =    15.23
  EFFECTIVE AREA(ACRES) =     268.98   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =      279.0
  LONGEST FLOWPATH FROM NODE      7.10 TO NODE      6.20 =    7480.03 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.20 TO NODE      6.20 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.23
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.618
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        2.05      0.21     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    2.05      SUBAREA RUNOFF(CFS) =    8.17
  EFFECTIVE AREA(ACRES) =    271.03   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =      281.1       PEAK FLOW RATE(CFS) =    1272.58
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE      6.20 TO NODE      6.30 IS CODE =  53
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6352.80  DOWNSTREAM(FEET) =   6334.97
```

```
  CHANNEL LENGTH THRU SUBAREA(FEET) =   138.70   CHANNEL SLOPE =  0.1285
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .1207 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =    1272.58
  FLOW VELOCITY(FEET/SEC) =  21.03 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.11   Tc(MIN.) =   15.34
  LONGEST FLOWPATH FROM NODE      7.10 TO NODE      6.30 =    7618.73 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      9.10 TO NODE      9.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   392.70
  ELEVATION DATA: UPSTREAM(FEET) =   6647.05  DOWNSTREAM(FEET) =   6532.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.789
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  7.214
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B        1.12      0.42     0.900    76    6.79
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      6.89
  TOTAL AREA(ACRES) =      1.12   PEAK FLOW RATE(CFS) =      6.89

****************************************************************************
  FLOW PROCESS FROM NODE      9.20 TO NODE      9.20 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    6.79
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  7.214
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B       15.78      0.42     0.900    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =   15.78      SUBAREA RUNOFF(CFS) =   97.05
  EFFECTIVE AREA(ACRES) =     16.90   AREA-AVERAGED Fm(INCH/HR) =  0.38
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =       16.9       PEAK FLOW RATE(CFS) =     103.94

****************************************************************************
  FLOW PROCESS FROM NODE      9.20 TO NODE      9.30 IS CODE =  53
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6532.00  DOWNSTREAM(FEET) =   6353.41
  CHANNEL LENGTH THRU SUBAREA(FEET) =   504.40   CHANNEL SLOPE =  0.3541
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .2060 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =     103.94
  FLOW VELOCITY(FEET/SEC) =  11.93 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.70   Tc(MIN.) =    7.49
  LONGEST FLOWPATH FROM NODE      9.10 TO NODE      9.30 =     897.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     10.10 TO NODE     10.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   553.80
  ELEVATION DATA: UPSTREAM(FEET) =   6650.00  DOWNSTREAM(FEET) =   6529.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.260
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.543
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B        3.88      0.42     0.900    76    8.26
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =     21.52
  TOTAL AREA(ACRES) =      3.88   PEAK FLOW RATE(CFS) =     21.52

****************************************************************************
  FLOW PROCESS FROM NODE     10.20 TO NODE     10.20 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.26
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.543
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B       14.92      0.42     0.900    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =   14.92      SUBAREA RUNOFF(CFS) =   82.75
  EFFECTIVE AREA(ACRES) =     18.80   AREA-AVERAGED Fm(INCH/HR) =  0.38
```

```
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =       18.8       PEAK FLOW RATE(CFS) =     104.27

****************************************************************************
  FLOW PROCESS FROM NODE     10.20 TO NODE     10.30 IS CODE =  53
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6529.00  DOWNSTREAM(FEET) =   6335.41
  CHANNEL LENGTH THRU SUBAREA(FEET) =   445.30   CHANNEL SLOPE =  0.4347
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .2182 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =     104.27
  FLOW VELOCITY(FEET/SEC) =  12.29 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.60   Tc(MIN.) =    8.86
  LONGEST FLOWPATH FROM NODE     10.10 TO NODE     10.30 =     999.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     18.10 TO NODE     18.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   965.90
  ELEVATION DATA: UPSTREAM(FEET) =   6836.40  DOWNSTREAM(FEET) =   6643.42

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.505
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.638
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        6.56      0.21     0.900    91   10.50
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =     32.17
  TOTAL AREA(ACRES) =      6.56   PEAK FLOW RATE(CFS) =     32.17

****************************************************************************
  FLOW PROCESS FROM NODE     18.20 TO NODE     18.20 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.50
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.638
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
```

```
  ".4 DWELLING/ACRE"         D       18.46      0.21     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =   18.46      SUBAREA RUNOFF(CFS) =   90.53
  EFFECTIVE AREA(ACRES) =     25.02   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =       25.0       PEAK FLOW RATE(CFS) =     122.70

****************************************************************************
  FLOW PROCESS FROM NODE     18.20 TO NODE     18.30 IS CODE =  53
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6643.42  DOWNSTREAM(FEET) =   6483.82
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1375.10   CHANNEL SLOPE =  0.1161
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .1120 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =     122.70
  FLOW VELOCITY(FEET/SEC) =   9.30 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   2.46   Tc(MIN.) =   12.97
  LONGEST FLOWPATH FROM NODE     18.10 TO NODE     18.30 =    2341.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     18.30 TO NODE     19.30 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  6483.82  DOWNSTREAM(FEET) =  6474.00
  FLOW LENGTH(FEET) =   125.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  23.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  27.30
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     122.70
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   13.05
  LONGEST FLOWPATH FROM NODE     18.10 TO NODE     19.30 =    2466.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     19.30 TO NODE     19.30 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.05
  RAINFALL INTENSITY(INCH/HR) =   5.07
  AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =      25.02
```

```
  TOTAL STREAM AREA(ACRES) =      25.02
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     122.70

****************************************************************************
  FLOW PROCESS FROM NODE     19.10 TO NODE     19.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   618.10
  ELEVATION DATA: UPSTREAM(FEET) =   6606.25  DOWNSTREAM(FEET) =   6550.33

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.915
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.789
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "1 DWELLING/ACRE"          D        1.90      0.21     0.800    91    9.92
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.800
  SUBAREA RUNOFF(CFS) =      9.61
  TOTAL AREA(ACRES) =      1.90   PEAK FLOW RATE(CFS) =      9.61

****************************************************************************
  FLOW PROCESS FROM NODE     19.20 TO NODE     19.30 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 6550.33  DOWNSTREAM ELEVATION(FEET) = 6474.00
  STREET LENGTH(FEET) =   839.90   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 15.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  10.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      26.85
    ***STREET FLOW SPLITS OVER STREET-CROWN***
    FULL DEPTH(FEET) =    0.43   FLOOD WIDTH(FEET) =   15.00
    FULL HALF-STREET VELOCITY(FEET/SEC.) =    8.14
    SPLIT DEPTH(FEET) =    0.36   SPLIT FLOOD WIDTH(FEET) =   11.05
    SPLIT FLOW(CFS) =    8.91   SPLIT VELOCITY(FEET/SEC.) =    6.93
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
```

```
    STREET FLOW DEPTH(FEET) =  0.43
    HALFSTREET FLOOD WIDTH(FEET) =   15.00
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    8.14
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    3.51
  STREET FLOW TRAVEL TIME(MIN.) =   1.72   Tc(MIN.) =   11.63
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.387
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "1 DWELLING/ACRE"          D        7.34      0.21     0.800    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.800
  SUBAREA AREA(ACRES) =    7.34      SUBAREA RUNOFF(CFS) =   34.48
  EFFECTIVE AREA(ACRES) =      9.24    AREA-AVERAGED Fm(INCH/HR) =  0.17
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.80
  TOTAL AREA(ACRES) =        9.2        PEAK FLOW RATE(CFS) =      43.40

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.45   HALFSTREET FLOOD WIDTH(FEET) =  15.00
  FLOW VELOCITY(FEET/SEC.) =  8.79   DEPTH*VELOCITY(FT*FT/SEC.) =   3.94
  LONGEST FLOWPATH FROM NODE     19.10 TO NODE     19.30 =    1458.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     19.30 TO NODE     19.30 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.63
  RAINFALL INTENSITY(INCH/HR) =   5.39
  AREA-AVERAGED Fm(INCH/HR) =  0.17
  AREA-AVERAGED Fp(INCH/HR) =  0.21
  AREA-AVERAGED Ap =  0.80
  EFFECTIVE STREAM AREA(ACRES) =       9.24
  TOTAL STREAM AREA(ACRES) =       9.24
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      43.40

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      122.70   13.05    5.074  0.21( 0.19) 0.90      25.0      18.10
      2       43.40   11.63    5.387  0.21( 0.17) 0.80       9.2      19.10

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
```

```
 NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
    1      159.85   11.63    5.387  0.21( 0.18) 0.87      31.6      19.10
    2      163.50   13.05    5.074  0.21( 0.18) 0.87      34.3      18.10

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     163.50    Tc(MIN.) =    13.05
  EFFECTIVE AREA(ACRES) =      34.26   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.87
  TOTAL AREA(ACRES) =       34.3
  LONGEST FLOWPATH FROM NODE     18.10 TO NODE     19.30 =    2466.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     19.30 TO NODE     19.30 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    68.50
  ELEVATION DATA: UPSTREAM(FEET) =   6474.00  DOWNSTREAM(FEET) =   6454.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  8.030
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "1 DWELLING/ACRE"          D        1.29      0.21     0.800    91    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.800
  SUBAREA AREA(ACRES) =    1.29   INITIAL SUBAREA RUNOFF(CFS) =    9.13

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   13.05
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.074
  SUBAREA AREA(ACRES) =    1.29      SUBAREA RUNOFF(CFS) =    5.70
  EFFECTIVE AREA(ACRES) =     35.55   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.87
  TOTAL AREA(ACRES) =       35.5       PEAK FLOW RATE(CFS) =     163.50
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE     19.30 TO NODE     19.40 IS CODE =  53
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6474.00  DOWNSTREAM(FEET) =   6454.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    68.50   CHANNEL SLOPE =  0.2920
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .1930 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
```

```
  CHANNEL FLOW THRU SUBAREA(CFS) =     163.50
  FLOW VELOCITY(FEET/SEC) =  13.43 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.09   Tc(MIN.) =   13.13
  LONGEST FLOWPATH FROM NODE     18.10 TO NODE     19.40 =    2534.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     19.40 TO NODE     12.40 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  6454.00  DOWNSTREAM(FEET) =  6429.97
  FLOW LENGTH(FEET) =   133.80   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  23.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  39.31
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     163.50
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =   13.19
  LONGEST FLOWPATH FROM NODE     18.10 TO NODE     12.40 =    2668.30 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.40 TO NODE     12.40 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.19
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.042
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "1 DWELLING/ACRE"          D        2.79      0.21     0.800    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.800
  SUBAREA AREA(ACRES) =    2.79      SUBAREA RUNOFF(CFS) =   12.24
  EFFECTIVE AREA(ACRES) =     38.34   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.87
  TOTAL AREA(ACRES) =       38.3       PEAK FLOW RATE(CFS) =     167.72

****************************************************************************
  FLOW PROCESS FROM NODE     12.40 TO NODE     12.30 IS CODE =  53
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6429.97  DOWNSTREAM(FEET) =   6411.10
  CHANNEL LENGTH THRU SUBAREA(FEET) =   543.90   CHANNEL SLOPE =  0.0347
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .0347 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =     167.72
  FLOW VELOCITY(FEET/SEC) =   5.74 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
```

```
  TRAVEL TIME(MIN.) =   1.58   Tc(MIN.) =   14.77
  LONGEST FLOWPATH FROM NODE     18.10 TO NODE     12.30 =    3212.20 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.30 TO NODE     12.30 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   14.77
  RAINFALL INTENSITY(INCH/HR) =   4.69
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.21
  AREA-AVERAGED Ap =  0.87
  EFFECTIVE STREAM AREA(ACRES) =      38.34
  TOTAL STREAM AREA(ACRES) =      38.34
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     167.72

****************************************************************************
  FLOW PROCESS FROM NODE     12.10 TO NODE     12.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   999.10
  ELEVATION DATA: UPSTREAM(FEET) =   6594.43  DOWNSTREAM(FEET) =   6485.16

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   11.567
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.402
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "1 DWELLING/ACRE"          D        4.19      0.21     0.800    91   11.57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.800
  SUBAREA RUNOFF(CFS) =     19.74
  TOTAL AREA(ACRES) =      4.19   PEAK FLOW RATE(CFS) =     19.74

****************************************************************************
  FLOW PROCESS FROM NODE     12.20 TO NODE     12.30 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 6485.16  DOWNSTREAM ELEVATION(FEET) = 6411.10
  STREET LENGTH(FEET) =  1028.70   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 15.00
```

```
  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  10.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      35.43
    ***STREET FLOWING FULL***
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.44
    HALFSTREET FLOOD WIDTH(FEET) =   15.00
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    7.57
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    3.33
  STREET FLOW TRAVEL TIME(MIN.) =   2.26   Tc(MIN.) =   13.83
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.899
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "1 DWELLING/ACRE"          D        7.36      0.21     0.800    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.800
  SUBAREA AREA(ACRES) =    7.36      SUBAREA RUNOFF(CFS) =   31.34
  EFFECTIVE AREA(ACRES) =     11.55    AREA-AVERAGED Fm(INCH/HR) =  0.17
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.80
  TOTAL AREA(ACRES) =       11.6        PEAK FLOW RATE(CFS) =      49.18

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.47   HALFSTREET FLOOD WIDTH(FEET) =  15.00
  FLOW VELOCITY(FEET/SEC.) =  8.62   DEPTH*VELOCITY(FT*FT/SEC.) =   4.08
  LONGEST FLOWPATH FROM NODE     12.10 TO NODE     12.30 =    2027.80 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.30 TO NODE     12.30 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.83
  RAINFALL INTENSITY(INCH/HR) =   4.90
  AREA-AVERAGED Fm(INCH/HR) =  0.17
  AREA-AVERAGED Fp(INCH/HR) =  0.21
  AREA-AVERAGED Ap =  0.80
  EFFECTIVE STREAM AREA(ACRES) =      11.55
  TOTAL STREAM AREA(ACRES) =      11.55
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      49.18
```

```
 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1      165.94   13.36    5.004  0.21( 0.18) 0.86      35.6      19.10
     1      167.72   14.77    4.692  0.21( 0.18) 0.87      38.3      18.10
     2       49.18   13.83    4.899  0.21( 0.17) 0.80      11.6      12.10

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1      214.50   13.36    5.004  0.21( 0.18) 0.85      46.8      19.10
     2      215.72   13.83    4.899  0.21( 0.18) 0.85      48.1      12.10
     3      214.75   14.77    4.692  0.21( 0.18) 0.85      49.9      18.10

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     215.72    Tc(MIN.) =    13.83
 EFFECTIVE AREA(ACRES) =      48.09   AREA-AVERAGED Fm(INCH/HR) =  0.18
 AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.85
 TOTAL AREA(ACRES) =       49.9
 LONGEST FLOWPATH FROM NODE     18.10 TO NODE     12.30 =    3212.20 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     12.30 TO NODE     12.30 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   13.83
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.899
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "1 DWELLING/ACRE"          D        4.30      0.21     0.800    91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.800
 SUBAREA AREA(ACRES) =    4.30      SUBAREA RUNOFF(CFS) =   18.31
 EFFECTIVE AREA(ACRES) =     52.39   AREA-AVERAGED Fm(INCH/HR) =  0.18
 AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.84
 TOTAL AREA(ACRES) =       54.2       PEAK FLOW RATE(CFS) =     222.65

****************************************************************************
 FLOW PROCESS FROM NODE     12.30 TO NODE     11.40 IS CODE =  53
----------------------------------------------------------------------------
 >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   6411.10  DOWNSTREAM(FEET) =   6371.00
```

```
  CHANNEL LENGTH THRU SUBAREA(FEET) =   651.10   CHANNEL SLOPE =  0.0616
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .0616 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =     222.65
  FLOW VELOCITY(FEET/SEC) =   8.41 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.29   Tc(MIN.) =   15.12
  LONGEST FLOWPATH FROM NODE     18.10 TO NODE     11.40 =    3863.30 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.40 TO NODE     11.40 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   15.12
  RAINFALL INTENSITY(INCH/HR) =   4.63
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.21
  AREA-AVERAGED Ap =  0.84
  EFFECTIVE STREAM AREA(ACRES) =      52.39
  TOTAL STREAM AREA(ACRES) =      54.19
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     222.65

****************************************************************************
  FLOW PROCESS FROM NODE     11.10 TO NODE     11.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   991.60
  ELEVATION DATA: UPSTREAM(FEET) =   6651.16  DOWNSTREAM(FEET) =   6565.95

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   12.567
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.180
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B        1.36      0.42     0.900    76   12.57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      5.87
  TOTAL AREA(ACRES) =      1.36   PEAK FLOW RATE(CFS) =      5.87

****************************************************************************
  FLOW PROCESS FROM NODE     11.20 TO NODE     11.30 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
```

```
==========================================================================
  UPSTREAM ELEVATION(FEET) = 6565.95  DOWNSTREAM ELEVATION(FEET) = 6546.53
  STREET LENGTH(FEET) =   251.20   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 15.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  10.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      10.22
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.38
    HALFSTREET FLOOD WIDTH(FEET) =   12.15
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    6.76
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.56
  STREET FLOW TRAVEL TIME(MIN.) =   0.62   Tc(MIN.) =   13.19
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.043
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.07      0.42     0.900    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    2.07      SUBAREA RUNOFF(CFS) =    8.69
  EFFECTIVE AREA(ACRES) =      3.43    AREA-AVERAGED Fm(INCH/HR) =  0.38
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =        3.4        PEAK FLOW RATE(CFS) =      14.39

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.41   HALFSTREET FLOOD WIDTH(FEET) =  14.10
  FLOW VELOCITY(FEET/SEC.) =  7.31   DEPTH*VELOCITY(FT*FT/SEC.) =   3.03
  LONGEST FLOWPATH FROM NODE     11.10 TO NODE     11.30 =    1242.80 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.30 TO NODE     11.30 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.19
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.043
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B       19.22      0.42     0.900    76
```

```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =   19.22      SUBAREA RUNOFF(CFS) =   80.64
  EFFECTIVE AREA(ACRES) =     22.65   AREA-AVERAGED Fm(INCH/HR) =  0.38
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =       22.6       PEAK FLOW RATE(CFS) =      95.03

****************************************************************************
  FLOW PROCESS FROM NODE     11.30 TO NODE     11.40 IS CODE =  53
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6546.53  DOWNSTREAM(FEET) =   6371.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1325.20   CHANNEL SLOPE =  0.1325
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .1233 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =      95.03
  FLOW VELOCITY(FEET/SEC) =   8.96 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   2.47   Tc(MIN.) =   15.65
  LONGEST FLOWPATH FROM NODE     11.10 TO NODE     11.40 =    2568.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.40 TO NODE     11.40 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   15.65
  RAINFALL INTENSITY(INCH/HR) =   4.58
  AREA-AVERAGED Fm(INCH/HR) =  0.38
  AREA-AVERAGED Fp(INCH/HR) =  0.42
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =      22.65
  TOTAL STREAM AREA(ACRES) =      22.65
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      95.03

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      221.94   14.65    4.717  0.21( 0.18) 0.84      51.1      19.10
      1      222.65   15.12    4.629  0.21( 0.18) 0.84      52.4      12.10
      1      220.17   16.06    4.542  0.21( 0.18) 0.85      54.2      18.10
      2       95.03   15.65    4.580  0.42( 0.38) 0.90      22.6      11.10

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
```

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	313.81	14.65	4.717	0.28(0.24)	0.86	72.3	19.10
2	315.54	15.12	4.629	0.28(0.24)	0.86	74.3	12.10
3	316.28	15.65	4.580	0.28(0.24)	0.86	76.1	11.10
4	314.35	16.06	4.542	0.28(0.24)	0.86	76.8	18.10

```
  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     316.28    Tc(MIN.) =    15.65
  EFFECTIVE AREA(ACRES) =      76.05   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.28  AREA-AVERAGED Ap =  0.86
  TOTAL AREA(ACRES) =       76.8
  LONGEST FLOWPATH FROM NODE     18.10 TO NODE     11.40 =    3863.30 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.40 TO NODE     11.40 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.65
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.580
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.19      0.21     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    0.19      SUBAREA RUNOFF(CFS) =    0.75
  EFFECTIVE AREA(ACRES) =     76.24   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.28  AREA-AVERAGED Ap =  0.86
  TOTAL AREA(ACRES) =       77.0       PEAK FLOW RATE(CFS) =     316.28
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE     11.40 TO NODE     13.20 IS CODE =  53
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6371.00  DOWNSTREAM(FEET) =   6369.35
  CHANNEL LENGTH THRU SUBAREA(FEET) =    54.80   CHANNEL SLOPE =  0.0301
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .0301 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =     316.28
  FLOW VELOCITY(FEET/SEC) =   6.61 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.14   Tc(MIN.) =   15.79
  LONGEST FLOWPATH FROM NODE     18.10 TO NODE     13.20 =    3918.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.20 TO NODE     13.20 IS CODE =   1
```

```
------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
========================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   15.79
  RAINFALL INTENSITY(INCH/HR) =   4.57
  AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.28
  AREA-AVERAGED Ap =  0.86
  EFFECTIVE STREAM AREA(ACRES) =      76.24
  TOTAL STREAM AREA(ACRES) =      77.03
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     316.28

************************************************************************
  FLOW PROCESS FROM NODE     13.10 TO NODE     13.20 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   852.50
  ELEVATION DATA: UPSTREAM(FEET) =   6506.32  DOWNSTREAM(FEET) =   6369.35

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.438
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.653
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        4.74      0.21     0.900    91   10.44
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =     23.31
  TOTAL AREA(ACRES) =      4.74   PEAK FLOW RATE(CFS) =     23.31

************************************************************************
  FLOW PROCESS FROM NODE     13.20 TO NODE     13.20 IS CODE =   1
------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
========================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.44
  RAINFALL INTENSITY(INCH/HR) =   5.65
  AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       4.74
  TOTAL STREAM AREA(ACRES) =       4.74
```

```
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      23.31

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      313.81   14.79    4.686  0.28( 0.24) 0.86      72.5      19.10
      1      315.54   15.26    4.616  0.28( 0.24) 0.86      74.5      12.10
      1      316.28   15.79    4.567  0.28( 0.24) 0.86      76.2      11.10
      1      314.35   16.20    4.530  0.28( 0.24) 0.86      77.0      18.10
      2       23.31   10.44    5.653  0.21( 0.19) 0.90       4.7      13.10

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      292.86   10.44    5.653  0.27( 0.23) 0.86      55.9      13.10
      2      332.99   14.79    4.686  0.27( 0.23) 0.86      77.2      19.10
      3      334.42   15.26    4.616  0.27( 0.23) 0.86      79.2      12.10
      4      334.96   15.79    4.567  0.27( 0.24) 0.86      81.0      11.10
      5      332.86   16.20    4.530  0.27( 0.23) 0.86      81.8      18.10

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     334.96    Tc(MIN.) =    15.79
  EFFECTIVE AREA(ACRES) =      80.98   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.27  AREA-AVERAGED Ap =  0.86
  TOTAL AREA(ACRES) =       81.8
  LONGEST FLOWPATH FROM NODE     18.10 TO NODE     13.20 =    3918.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.20 TO NODE     13.20 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.79
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.567
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.86      0.21     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    0.86      SUBAREA RUNOFF(CFS) =    3.39
  EFFECTIVE AREA(ACRES) =     81.84   AREA-AVERAGED Fm(INCH/HR) =  0.23
  AREA-AVERAGED Fp(INCH/HR) =  0.27  AREA-AVERAGED Ap =  0.86
  TOTAL AREA(ACRES) =       82.6       PEAK FLOW RATE(CFS) =     334.96
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
```

```
  FLOW PROCESS FROM NODE     13.20 TO NODE     13.30 IS CODE =  53
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6369.35  DOWNSTREAM(FEET) =   6363.20
  CHANNEL LENGTH THRU SUBAREA(FEET) =   107.90   CHANNEL SLOPE =  0.0570
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .0570 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =     334.96
  FLOW VELOCITY(FEET/SEC) =   9.27 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.19   Tc(MIN.) =   15.98
  LONGEST FLOWPATH FROM NODE     18.10 TO NODE     13.30 =    4026.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     14.10 TO NODE     14.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   671.10
  ELEVATION DATA: UPSTREAM(FEET) =   6509.56  DOWNSTREAM(FEET) =   6270.66

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.090
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.621
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        4.08      0.21     0.900    91    8.09
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =     23.62
  TOTAL AREA(ACRES) =      4.08   PEAK FLOW RATE(CFS) =     23.62

****************************************************************************
  FLOW PROCESS FROM NODE     15.10 TO NODE     15.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   195.50
  ELEVATION DATA: UPSTREAM(FEET) =   6527.52  DOWNSTREAM(FEET) =   6502.01

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.988
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  7.579
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
```

```
  PUBLIC PARK                D        0.35      0.21     0.850    91    5.99
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA RUNOFF(CFS) =      2.33
  TOTAL AREA(ACRES) =      0.35   PEAK FLOW RATE(CFS) =      2.33

****************************************************************************
  FLOW PROCESS FROM NODE     15.20 TO NODE     15.30 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 6502.01  DOWNSTREAM ELEVATION(FEET) = 6460.41
  STREET LENGTH(FEET) =   646.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 15.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  10.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      13.97
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.42
    HALFSTREET FLOOD WIDTH(FEET) =   14.49
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    6.75
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.85
  STREET FLOW TRAVEL TIME(MIN.) =   1.59   Tc(MIN.) =    7.58
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.852
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                D        3.87      0.21     0.850    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA AREA(ACRES) =    3.87      SUBAREA RUNOFF(CFS) =   23.24
  EFFECTIVE AREA(ACRES) =      4.22    AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.85
  TOTAL AREA(ACRES) =        4.2        PEAK FLOW RATE(CFS) =      25.35

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.43   HALFSTREET FLOOD WIDTH(FEET) =  15.00
  FLOW VELOCITY(FEET/SEC.) =  6.86   DEPTH*VELOCITY(FT*FT/SEC.) =   2.95
  LONGEST FLOWPATH FROM NODE     15.10 TO NODE     15.30 =     841.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     15.30 TO NODE     15.30 IS CODE =  81
```

```
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.58
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.852
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                D        8.68      0.21     0.850    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA AREA(ACRES) =    8.68      SUBAREA RUNOFF(CFS) =   52.14
  EFFECTIVE AREA(ACRES) =     12.90   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.85
  TOTAL AREA(ACRES) =       12.9       PEAK FLOW RATE(CFS) =      77.48

****************************************************************************
  FLOW PROCESS FROM NODE     15.30 TO NODE     15.40 IS CODE =  53
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6460.41  DOWNSTREAM(FEET) =   6275.97
  CHANNEL LENGTH THRU SUBAREA(FEET) =   551.20   CHANNEL SLOPE =  0.3346
  SLOPE ADJUSTMENT CURVE USED:
  EFFECTIVE SLOPE = .2026 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  CHANNEL FLOW THRU SUBAREA(CFS) =      77.48
  FLOW VELOCITY(FEET/SEC) =  10.73 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.86   Tc(MIN.) =    8.44
  LONGEST FLOWPATH FROM NODE     15.10 TO NODE     15.40 =    1392.70 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.10 TO NODE     16.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   322.00
  ELEVATION DATA: UPSTREAM(FEET) =   6532.31  DOWNSTREAM(FEET) =   6490.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.361
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.953
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.86      0.21     0.900    91    7.36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      5.24
```

```
  TOTAL AREA(ACRES) =      0.86   PEAK FLOW RATE(CFS) =      5.24
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        0.9  TC(MIN.) =      7.36
  EFFECTIVE AREA(ACRES) =      0.86  AREA-AVERAGED Fm(INCH/HR)=  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap = 0.900
  PEAK FLOW RATE(CFS)   =       5.24
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```



Appendix F

Geotechnical Investigation Report

PRELIMINARY GEOTECHNICAL REPORT
PROPOSED HUME SOCAL CAMPGROUND REDEVELOPMENT AND EXPANSION PROJECT
251-ACRES OF FORESTED LAND
UNINCORPORATED SAN BERNARDINO COUNTY CALIFORNIA

Prepared for: **KIMLEY-HORN AND ASSOCIATES, INC.**
3880 LEMON STREET, SUITE 420
RIVERSIDE, CALIFORNIA 92501

Prepared by: **LEIGHTON AND ASSOCIATES, INC.**
2600 MICHELSON DRIVE, SUITE 400
IRVINE, CALIFORNIA 92612

Project Number CLA.0013655001

December 13, 2023

Leighton
a verdantas company

Leighton and Associates, Inc.

December 13, 2023

Project No. CLA.00136555001

Kimley-Horn and Associates, Inc.
3880 Lemon Street, Suite 420
Riverside, California 92501

Attention: Mr. John Nsofor

Subject: Preliminary Geotechnical Report
Proposed Hume SoCal Campground Redevelopment and Expansion Project
251-Acres of Forested Land
Unincorporated San Bernardino County, California

In accordance with our July 22, 2022 authorization, Leighton and Associates, Inc. (Leighton) is pleased to present this Geotechnical Exploration Report addressing redevelopment and expansion of the subject Hume SoCal Christian Campground facility, located on approximately 251-acres of partially developed forestland within unincorporated San Bernardino County, California. The purpose of our study was to evaluate subsurface soil, groundwater and geologic hazard conditions within the areas planned improvements and provide preliminary geotechnical recommendations for project design and construction.

We appreciate the opportunity to provide our services. If you have any questions or concerns, please contact us at your convenience. The undersigned can be reached at **(866) *LEIGHTON***, or directly at the phone extensions and e-mail addresses listed below.



Respectfully submitted,

LEIGHTON AND ASSOCIATES, INC.

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JLH/CD/dlm

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Figure 1 – Site Location Map
Figure 2 – Regional Geology Map
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Plate 1 – Geotechnical Map
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1.0 INTRODUCTION

1.1 Site Description

The boundaries of the site are roughly rectangular in shape and encompassing approximately 251 acres of forested mountain terrain, situated within the San Bernardino National Forest, unincorporated San Bernardino County, California. The regional site location is shown on attached Figure 1, *Site Location Map*. The property is developed sparsely as a 300-occupant campground facility, including various existing building structures, paved access roads, recreational ponds, pools, lawn areas and other appurtenant improvements. Similar undeveloped forest land borders the site on the north and northwest. Nearby local communities include Green Valley Lake, Arrowbear Lake and Running Springs to northeast, southeast, and southwest of the property, respectively. The site is accessed via Green Valley Lake Road, which transects through the property on the north, and forms its eastern boundary on the south. Based on a review of historical aerial photographs, construction of Green Valley Road and improvements on the stie commenced sometime between 1951 and 1955.

Site Coordinates:	USGS 7.5 Topographic Map
Latitude: N34.2268°	Keller Peak
Longitude: W-117.0941°	December 2021

A majority of the site terrain is manifest in a series of relatively narrow ridgelines and valleys with steeply sided slopes. Surface elevations range between approximately 6,400 and 6,600 feet above mean sea level (msl). Loal Areas of relatively flatter terrain exist as elevated paleo-stream terraces. Additional relatively localized flat terrain also occur within certain narrow valley-bottom areas resulting from more recent alluvial deposition. The main existing campground facilities are centrally located on the property, haven taken advantage of an area of naturally flatter surface relief. Existing building pads, access roads and minor slopes have been created by limited grading modification.

Our site reconnaissance, geologic mapping and auger borings reveal a large part of the site is mantled by thin deposits of residual soil, colluvium and/or alluvium. Large areas of bedrock are also exposed in surface outcrop, consisting of a Cretaceous-age granitic formation which is hard to very hard, massive, and slightly weathered. The general subsurface distribution of soil and bedrock units is depicted in a series of 20-scale cross sections prepared as transecting areas of planned improvements, attached as Plates 2A and 2B.

1.2 Proposed Development

We understand construction will be performed in five phases of work. Upon completion, the improvements will accommodate approximately 3,000 additional occupants. Based on a set of preliminary plans forwarded to our office, dated January 9, 2023, the phase numbers, phase names and general locations on the property are referred to herein as follows:

- Phase 1 – Junior High School Camp (central)
- Phase 2 – High School Camp (SE)
- Phase 3 – Adult Lodge (W)
- Phase 4 – Elementary School Camp (NE)
- Phase 5 – Wildwood Camp (NW)

The proposed location and layout of improvements for each phase are depicted on attached Plate 1, *Geotechnical Map*. Construction types will vary from phase to phase, including demolition and replacement of certain existing buildings, and conversions and/or additions to others. New structures will include multi-story dormitories, large open-ceiling chapels, dining facilities, pools, gymnasiums, snack shops, restrooms, maintenance facilities, parking lots, grass quads, outdoor amphitheaters and recreational ponds. We expect appurtenant improvements will include access roads with embankment fills and/or cut slopes, drainage control structures and underground utilities.

Given existing site geologic conditions, and preference to limit disturbance of natural terrain by grading, many lighter-load structures of limited footprint can be founded on systems of drilled rock-socketed piles and grade-beams. Floors may consist of raised and/or slab-on-grade construction. For larger buildings, especially in areas of formerly graded flat pads where existing buildings will be demolished, re-grading and use of conventional spread footings and slab-on-grade construction should be considered. Where building footprints will span sloped terrain, a combination of conventional spread footing and drilled rock-socketed pile foundations may be considered.

As of the date of this report, no grading or structural plans defining foundation design or load demands of structures have been prepared. Geotechnical recommendations for design are thus considered preliminary, and subject to revision or value engineering once plans become available.

1.3 Purpose and Scope

The purpose of our work was to evaluate site geotechnical conditions and geologic hazards pertinent to the proposed development, determine engineering properties of soil and bedrock, and provide preliminary geotechnical recommendations to aid in project planning. To accomplish these tasks we reviewed readily available published geologic reports and maps, conducted site geologic reconnaissance mapping and advanced small-diameter auger borings to determine the thickness of surface soils, depth to competent bedrock, and collection of samples for physical and chemical laboratory testing. We prepared this report to summarize the findings of our study, and aid in the preparation of project grading and foundation design plans. A list of documents consulted as part of our study are noted in attached Appendix A, *References*.

The scope of work performed is as follows:

- **Background Review:** Reviewed published geology reports/maps, and historical aerial photographs and topographic maps and Lidar imagery readily available and pertinent to the site.

- **Field Exploration:** For the purpose of site soil and bedrock exploration, assessment of groundwater conditions, and collection of samples for laboratory testing, we advanced fifty-five (55) small-diameter auger borings into select locations each of the five development phases, and collected representative samples of surficial bedrock boulders for coring and testing. A summary of subsurface boring data is attached in Appendix B1, *Auger Boring Summary*. A summary of our field exploration is attached in Appendix B2, *Field Exploration.*

- **Geotechnical Laboratory Testing:** Conducted certain laboratory tests on collected soil and bedrock samples including Modified Proctor Compaction (maximum dry density and optimum moisture content), R-Value, remolded direct shear, unconfined compressive strength, and corrosivity suite (sulfate and chloride content, resistivity and pH). The results of our laboratory testing are attached in Appendix C, *Laboratory Test Data*.

- **Analyses and Report Preparation:** Analyzed collected field data to determine soil properties for design. Prepared this report presenting our preliminary geotechnical findings, conclusions and recommendations.

2.0 GEOTECHNICAL FINDINGS

2.1 Regional Geologic Setting

From a regional perspective, the site exists within the eastern (San Bernardino Mountains) segment of the Transverse Ranges Geomorphic Province of California. The province is defined by an east-west trending series of steep mountain ranges and valleys trending obliquely to the typical northwesterly trend of coastal California. The regional extent of the province spans easterly from the San Bernardino Mountains as far as the offshore islands of San Miguel, Santa Rosa, and Santa Cruz. The San Bernardino Mountains are considered one of the most rapidly rising regions on earth. Over the past 11 million years they have been uplifted to heights over 11,000 feet above mean sea level (msl), largely in response to intense north-south tectonic compression and southward displacement along the San Andreas Fault. The bulk of bedrock underlying the San Bernardino Mountains, and the site, are composed of Mesozoic age granitoid and gneissose bedrock associated with the southern California Batholith, see attached Figure 2, *Regional Geology Map*, and Figure 3, *Regional Fault and Historical Seismicity Map*.

2.2 Local Geologic Setting

Based on the findings of our subsurface exploration and review of published geologic reports/maps, the site is underlain by units of relatively thin surficial deposits including artificial fill and colluvium/alluvium. Granitic bedrock occurs extensively in surface outcrop and at shallow depths below the surface soils. Due to the relative thin and variable thickness of the surficial units, they are not mappable at the scale of the attached geologic maps. While the soil units are excluded from Plate 1, they are shown in attached 20-scale cross sections to provide a generalized understanding of local conditions and relationship to improvement concepts.

A brief description of soil and bedrock units encountered on the site is presented below.

- *Artificial Fill (undocumented) (Map Symbol: Afu):* The deposits of fill encountered on the site typically consist of a loose to medium dense light yellowish-grey to tan coarse-grained sand, derived from weathered bedrock and containing roots and scattered cobbles. The fill thickness ranges from approximately 1 to 5 feet where encountered. The fill was identified as occurring in local slopes adjacent existing roadways, or as underlying certain leveled pads beneath existing buildings. No reports documenting placement of fill under engineered control were available. Thus, this unit is herein defined as undocumented. Where a grading solution is preferred to provide structural support of new improvements, the undocumented fill unit will require complete removal and replacement.

- *Quaternary Alluvium/Colluvium (Map Symbol: Qal/col):* Deposits of Alluvium and Colluvium are grouped together for the purposes of this report. The colluvium unit is defined as a thin mantle of soil typically covering slopes, derived from upslope erosion. The soils were found to consist of loose light grey to tan coarse-grained silts and sands with roots concentrated along their contact with underlying bedrock. The diameter of roots generally increases with depth below the surface. The thickness of the colluvium is generally less than 2 feet where encountered. Alluvium consist of loose sediments concentrated along canyon bottoms, and locally as deposits on elevated terrace areas. Given the potential compressible nature of the alluvium/colluvium unit, it will require complete removal and replacement in areas where a grading solution is preferred to provide structural support for new improvements.

  Cretaceous Granite (Map Symbol: Kk): The entire site is underlain by bedrock assigned as Cretaceous age Granite (USGS, 1998). The crystalline igneous rock occurs widely in surface outcrop or buried beneath thin deposits of alluvium/colluvium and/or fill units. It is hard to very hard, light in color, massive, and exhibits a widely spaced joint pattern. Where exposed at the surface it is altered by differential physical and chemical weathering processes resulting in rounded shapes bounded by open joints. The depth of weathering is on the order of a few feet thick, where fracturing and jointing are more pronounced. Rock hardness quickly increases with depth beneath the surface, as does the effects of open fracturing and jointing. Where surface erosion is focused along joints, localized precarious-pedestaled boulders take form which can become dislodged and prone to downslope movement as rockfalls. Fresh bedrock is considered suitable for structural support new fill, and/or rock-socketed piles.

  The depths to bedrock beneath the site surface was determined by drilling and logging a series of auger borings. The encountered thickness of surface soils and depths of bedrock are noted in attached Appendix B1, *Auger Boring Summary*. The depths to bedrock are considered representative of site conditions, however, it is possible that deeper soils may exist in areas beyond the locations of the auger borings.

2.3 Geologic Structure

Our field mapping indicates the bedrock structure is massive and absent any adverse through-going structures that would otherwise result in large-scale planes of weakness. If larger cut slopes are planned, the orientation of joint-sets should be mapped to determine any degree of potential surficial instability.

2.4 Groundwater

Local groundwater was encountered as a shallow perched condition above bedrock, confined to deposits of alluvium/colluvium adjacent to active stream channels. Sources of groundwater mainly relate to periods of precipitation in the form of rain or snow melt. Based on the encountered conditions, we expect groundwater will not pose any significant constraint to planned grading or proposed construction.

2.5 Surface Water

The most significant occurrence of surface water is limited to active stream channels on the site. Certain structures are planned to span the axes of dry and active stream channels on the site. If buildings cannot be relocated, the control of surface waters will be required to mitigate the potential impacts of current and potentially larger future flow of water and debris. Other areas of potential concentrated surface flow can be expected in side-slope swales. Through implementation of proper engineering control, the impacts of surface water are not expected to be a significant constraint to development.

2.6 Landslides and Slope Stability

No evidence of landslides or landslide deposits were observed during our site reconnaissance, nor identified during our review of historical aerial photographs. The massive nature of the granitic bedrock formation underlying the site is such that the potential for significant landslides or large-scale slope instability is considered very low. However, an assessment of slope stability should be made during and after excavations into the existing road cut are made. Slope stability analysis was not within the scope of this study. Furthermore, although no surficial signs of adverse geologic structure (adverse jointing and joint orientation) were observed in the areas of planned improvements at the time of our investigation, adverse structure could be exposed during construction. As such, a Geologist should be present at the time of any temporary or permanent cuts to observe and map exposed geologic structure, as needed.

2.7 Site Soil Properties

Based on the results of our field exploration and laboratory testing, certain engineering characteristics of on-site soils (fill and alluvium/colluvium) are discussed as follows.

2.7.1 Expansive Soil

Given the non-cohesive course-grained nature of on-site soils, no tests were performed to evaluate expansive potential.

2.8 Hydrocollapse and Compressible Soils

Based on the coarse-grained character of alluvium/colluvium soils, the relative thin presence of the soil, and recommendations for complete removal of the soil where grading is preferred, the potential for hydro-collapse is not a constraint to site development. The bedrock is hard and not prone to such hazards.

2.9 Soil Corrosivity

A screening of site soil units for corrosivity was performed to evaluate their potential effect on concrete and ferrous metals. The corrosion potential was evaluated using the results of laboratory tests on representative soil samples obtained during our subsurface evaluation. Resultant test parameters were determined for pH, minimum electrical resistivity, and chloride and soluble sulfate content. The testing results indicated an average values of 5.33 for pH, measured minimum electrical resistivity of 45,1400 ohm-cm, chloride content of 74.8 ppm, and soluble sulfate content of 157.8 ppm.

In general, several agencies list a set of conditions for soils to be considered a corrosive environment. The California Department of Transportation (Caltrans) considers a site to exhibit a corrosive environment if one or more of the following conditions exist: chloride concentration is 500 ppm or greater, sulfate concentration is 2000 ppm or greater, or pH is 5.5 or less (Caltrans, 2012).

In addition, the American Association of State Highway and Transportation Officials (AASHTO) considers a water condition detrimental potential piles where: chloride concentration is greater than 500 ppm, sulfate concentration is greater than 500 ppm, there is potential effluence of mine or industrial runoff, high organic content, a pH of less than 5.5, marine borers (biological), or piles exposed to wet/dry cycles.

The following table presents a summary of corrosion analysis, in addition to values where Caltrans and AASHTO consider an environment to be corrosive. Please note the summary is limited to ONLY the listed conditions expressed in the table. Not all conditions considered to be constituent, part or whole, to corrosion potential were considered during our exploration and as a result our assessment of onsite corrosion potential is considered preliminary. A corrosion engineer should be consulted for further analysis and recommendations.

Table 1. – Summary of Corrosion Potential

Constituent		Average Site Value (ppm)	Caltrans Values (ppm)	AASHTO Values (ppm)
Chloride Content (ppm)		74.8	500 or greater	500 or greater
Sulfate Content (ppm)		157.8	2,000 or greater	500 or greater
pH		5.33	5.5 or less	5.5 or less

Preliminary corrosion analysis indicate the site soils are generally considered not to host a corrosive environment; however, site soils in contact with buried uncoated ferrous metals is considered to pose a corrosion hazard and should be mitigated.

2.9.1 Soil Compressibility

While no in-situ samples of surficial alluvium/colluvium soils were collected for compressibility testing, their organic content and density suggest they are compressible and should not be relied upon for structural support of structures.

2.9.2 Shear Strength

Evaluation of shear strength characteristics included laboratory direct shear testing of composite remolded soils. The results of testing are attached in Appendix C, including graphs of angle of internal friction (ø) and cohesion (c) for use in geotechnical analysis.

2.9.3 Excavation Characteristics

Soil: It is anticipated on-site alluvium/colluvium and fill soils can be excavated with relative ease using conventional light- to heavy-duty construction equipment.

Bedrock: Bedrock ranges from moderately hard where weathered, and hard to very hard where unweathered. Its rippability depends on the degree of weathering, density of fractures and jointing. Given the interest to avoid grading, we do not anticipate that excavations of any significant depth, or modifications of the site surface other than to remove and replace existing soils are planned. If deeper cuts in bedrock are planned, we anticipate rippability will be difficult and require use of heavy grading equipment including but not limited to dozers with single-shank rippers. To further discern rippability characteristics where such grading is

planned, the use of geophysical refraction surveys may provide more specific information concerning the feasibility of bedrock excavations.

2.9.4 Infiltration

The location and types of stormwater or septic systems was not designated on the current site plan. Thus, Leighton did not evaluate the infiltration rates for site soils. We anticipate the employment of such systems would be limited to the thin on-site alluvium/colluvium soil unit, away from planned structures. The evaluation of infiltration rates should be performed once more detailed plans are available.

3.0 GEOLOGIC HAZARDS

Potential geologic hazards common to southern California and more directly constrained to an on-site condition commonly include surface fault rupture and landslides and rockfalls. A summary of these hazards is provided in the following sections.

3.1 Liquefaction Potential

Liquefaction is the phenomenon of the reduction in strength and stiffness of certain soil types that exist below the groundwater table when subjected to strong ground shaking such as typically associated with seismic activity. Soils most susceptible to liquefaction are saturated granular deposits that exhibit loose to medium dense relative density.
The San Bernardino County Geologic Hazard Overlay Maps (2010), indicate the site is not located within an area susceptible to liquefaction, and thus not warranting any required investigation for liquefaction.

3.2 Seismically-Induced Settlement

Seismically-induced settlement consists of dynamic settlement of unsaturated soil (above groundwater) and liquefaction-induced settlement (below groundwater). These settlements occur primarily within low density sandy soil due to reduction in volume during and shortly after an earthquake event. Given the relatively thin presence of soil deposits on the site, and intended use of pile foundation and/or grading solutions, the potential for seismically-induced settlement is expected to be negligible.

3.3 Seismically-Induced Lateral Displacements

On sites where a liquifiable soil mass exists, the lateral movement of a non-liquefied soil mass can occur, termed lateral spreading. The direction of mass movement is typically towards a nearby gap in local topography, such as a basin, channel or valley. As earth deposits on the subject site are not prone the occurrence of liquefaction which is instrumental for the occurrence of lateral spreading, the potential for lateral spreading is in turn considered remote.

3.4 Seismically-Induced Landsliding

Based on the geologic hazard overlay maps issued by the County of San Bernardino, and preponderance of underlying massive igneous bedrock, the potential occurrence of landslides at the site is considered low. Proposed slopes, if any, should be engineered and constructed at a gradient of 2:1 (horizontal:vertical) or flatter top facilitate overall stability.

3.5 Rockfalls

The subject site consists of rugged forested terrain with moderate to steep slopes and narrow valleys. In areas where bedrock is exposed at the surface and an advanced degree of spheroidic weathering has occurred, larger precariously perched boulders have formed, typically bounded by joints, which are subject to dislodging and sudden downslope movement. The movement is often triggered by ground-shaking during earthquakes, where the boulders are mobilized in a downslope direction. In natural areas upgradient of planned grading, rockfalls can pose a hazard to path of human life, improvements, and/or infrastructure. Leighton observed only localized areas on the site during our reconnaissance, where the potential for this hazard exists. During the development phase of the project, a qualified geologist should examine areas upslope of planned improvements in more detail, and designate boulders posing a potential rockfall hazard. The boulders should be eliminated as part of the construction process, by either removal or breaking the rock in-place.

3.6 Flooding

According to current flood hazard maps available on the ESRI ArcGIS on-line database, 2023, the site is not located within a 100-year flood zone. A map showing the site and location of nearby flood hazard zones is attached as Figure 4, *Flood Hazard Zone Map*. Based on the above, the potential for site flooding is considered low.

3.7 Debris Flows

Debris flows are typically defined as the down-gradient movement of a viscous saturated silt and sand laden slurry like mixture soils laden with cobbles, boulders, vegetation and other debris. These events are surface phenomenon typically confined to areas with vertical gradients, including slopes, side-hill swales and valley bottoms where volumes of sediment have accumulated. The impacts of potential debris flows often depend on the type and volume of soil present, water content, and degree of vegetation. Debris flows are common in recent wildfire burn areas where vegetation and root structure has been removed. The loss of soil support leads to the accumulation of moisture in the soil from rain events and a higher potential for structural failure. Debris flows are not exclusive to a post-fire areas, and can occur as a result of repeated heavy rain storms where soils become increasingly saturated by waters. Debris flows can travel a significant distance from its source area under the right conditions.

Our reconnaissance of the site revealed no direct evidence of recent surface scaring or accumulations of relatively thick soils at the toe of slopes relating to possible debris flows.

While our observations note the above, the potential for debris slows is considered a potential hazard at the site as areas surrounding planned improvements will remain undisturbed or subject to little modification. A consideration of this hazard should be evaluated a part of site development, especially where buildings are cited in canyon bottom areas or side-slopes. The mitigation of debris flow hazards can include installation of drainage diversion devices such as sandbags, K-Rails, Hydro Barriers, etc., placed along known flow paths to divert runoff.

3.8 Seiches and Tsunamis

Seiches are the occurrence of waves within enclosed water bodies in response to ground shaking. The waves have the potential to runup shorelines and overtop dams. The existing and future recreational ponds and pools on the site are considered subject to the occurrence of a seiche hazard in the event of large earthquakes.

Tsunamis are sea waves generated by the sudden displacement or movement of a sea floor. Tsunami waves can impact shorelines a great distance from their source. Based on the absence of any ocean body in proximity to the site, and significant altitude above mean sea level, the potential for a tsunami to impact the site is considered remote.

3.9 Dam Inundation

According to current flood hazard maps available on the ESRI ArcGIS on-line database, 2023, the site is not located within a 100-year flood zone. A map showing the site and location of nearby flood hazard zones is attached as Figure 4, *Flood Hazard Zone Map*. A map is also provided showing an absence of potential dam inundation hazards at the site, see Figure 6, *Dam Inundation Map*. Based on the above, the potential for site flooding is considered low.

4.0 SEISMIC HAZARDS

Seismic hazards common to southern California include surface fault rupture and strong ground shaking associated earthquake(s). Depending on site conditions, other secondary seismic effects may include liquefaction, seismically-induced settlement, dynamic settlement, lateral spreading, seismically-induced landslides, seismically-induced flooding, seiches and tsunamis. Attached Figure 5, *Seismic Hazard Map*, depicts potential state-designated seismic hazards in the site area. The following sections discuss seismic hazards and their potential effects on the subject site.

4.1 Surface Fault Rupture

The project site is located in a seismically active region of southern California crossed by multiple well-defined active and potentially active faults capable of inducing ground motions affecting wide areas including the subject site. Accordingly, to reduce seismic risk, project improvements should be designed using appropriate seismic design parameters promulgated by current codes and standards, including the "Minimum Statewide Safety Standard" in Chapter 2 of the California Geological Survey (CGS) Special Publication 117a (CGS, 2008).

Our review of available in-house and readily available literature indicates the presence of no known active faults within the site boundaries. And the site is not designated within a state-defined Alquist-Priolo Earthquake Fault Zone (Bryant and Hart, 2007). Therefore, the potential for surface fault rupture on the site is expected to be low and a surface fault rupture hazard evaluation is not mandated for this site.

The locations of active faults within 100 miles of the site was determined using the on-line program managed by the United States Geological Survey (USGS) Earthquake Hazards Program National Seismic Hazard Maps (USGS, 2008c). The nearest active faults with historical or latest Quaternary displacement occur within the San Andreas Fault Zone (SAFZ), San Jacinto Fault Zone (SJFZ), and Johnson Valley Fault Zone (JVFZ) located approximately 7.9, 15.5 and 36.7 miles from the site, respectively. The SAFZ is the largest active tectonic plate boundary in California. The SJFZ is considered one of the most active faults in southern California. And the JVFZ is considered an important component of the system in that it has experienced several more recent surface rupture events affecting the local area. Attached Figure 3, *Regional Faults and Historical Seismicity Map*, depicts these and other major faults in the vicinity of the subject site.

4.2 Seismicity and Ground Motion

The intensity of ground shaking at a given location depends primarily upon the earthquake magnitude, the distance from the source, and the site response characteristics. Peak horizontal ground accelerations are generally used to evaluate the intensity of ground motion. Using the SEAOC/OSHPD Seismic Design Maps Tool (https://seismicmaps.org/) to obtain seismic design parameter values from the United States Geological Survey (USGS), the peak ground acceleration for the Maximum Considered Earthquake (MCE_G) adjusted for the Site Class effects (PGA_M) is 0.71g. Based on the USGS online unified hazard tool program (USGS, 2023a), the modal seismic event is Moment Magnitude (M_W) 8.08 at a distance of 7.7 miles.

5.0 SUMMARY OF FINDINGS AND CONCLUSIONS

Presented below is a summary of findings based on the results of our site geotechnical exploration.

- The site is not located in a state-designated Alquist-Priolo Earthquake Fault Zone, nor fault hazard zone depicted on San Bernardino County Hazard Overlay Maps. The nearest known significant active faults are the San Andreas Fault Zone (SAFZ), San Jacinto Fault Zone (SJFZ), and Johnson Valley Fault Zone (JVFZ) located approximately 7.9, 15.5 and 36.7 miles from the site, respectively. An earthquake along any of these or other similar more distant faults in the southern California area, are capable of generating moderate to strong ground shaking at the site.

- The site is not located within an area shown as susceptible to liquefaction or landslides.

- The site is underlain by locally by up to approximately 4 to 5 feet of undocumented artificial fill. The fill typically underlies existing building pads and some slopes. The fill is not considered suitable for support of new buildings and will require removal and replacement in areas of planned grading.

- No areas of side-hill seepage or springs were encountered on the site. The occurrence of shallow perched groundwater conditions was encountered locally in thin scattered deposits of alluvium confined to valley bottoms associated with active stream flow.

- The shallow depth of bedrock on the site will permit use of rock-socked piers to support light-weight structures. On sloping ground it is possible that a combination of piers with raised floors and grading for slab-on-grade floors will be feasible. For larger relatively flat pad areas, especially where existing buildings are present, a grading solution is recommended for entire support of new buildings.

6.0 PRELIMINARY RECOMMENDATIONS

Preliminary geotechnical recommendations intended to assist in preparation of grading and foundation plans are presented in the following sections. The recommendations are considered sufficient at this preliminary stage to develop project plans in accordance with 2022 CBC requirements. The following recommendations may be superseded by more restrictive requirements of the architect, structural engineer, and/or local building official.

The client is also directed to attached Appendix E, *GBA Geotechnical Insert*, for more information concerning this report.

6.1 Earthwork

All site grading should be performed in accordance with the project specifications of appropriate design professionals. Attached are geotechnical specifications for use as a guideline in developing plans for earthwork grading, see Appendix D, *General Earthwork and Grading Recommendations*.

6.1.1 Site Preparation

Vegetation, debris, and other deleterious materials should be removed and disposed of offsite prior to the commencement of grading operations. Existing underground improvements, including utility lines, should be identified prior to the start of grading and abandoned or relocated as necessary. Trenches resulted from removal of existing improvements should be excavated to competent materials and properly backfilled under the observation and testing of the geotechnical engineer.

6.1.2 Overexcavation and Recompaction

Proposed foundations may be constructed on bedrock or a minimum of 2 feet of compacted fill. Existing near surface fill and alluvial/colluvial soils below the proposed foundation should be removed to expose bedrock and recompacted. The foundation for the proposed structures may then be constructed on undisturbed, competent bedrock or properly compacted structural fill, in order to reduce the potential for differential settlement. If fill soils or unsuitable native soils are exposed at the bottom of the excavation, they should be removed and replaced with engineered structural fill of uniform thickness. The compacted fill should extend a minimum 3 feet beyond outside edges of the foundation. If any of the planned structures are supported on a deep foundation system, then overexcavation is not required.

Pavement areas, driveway, concrete flatwork, and slab on grade should be underlain by a minimum 1 foot of compacted fill. Local conditions may be encountered which may require additional removals and recompaction. The exact extent of removals can best be determined during grading by the geotechnical engineer when direct observation and evaluation of materials are possible.

6.1.3 Subgrade Preparation

Prior to placing fill materials, the subgrade should be scarified to a minimum depth of 6 inches, moisture conditioned, and proof-rolled. Any soft and/or unsuitable materials encountered at the bottom of the excavations should be removed and replaced with fill material.

6.1.4 Fill Placement and Compaction

The onsite soils to be used as compacted structural fill should be free of organic material, construction debris or oversized material larger than 6 inches. Imported fill soils, if any, should be approved by the geotechnical engineer prior to placement as fill. Fill soils should be placed in loose lifts not exceeding 8 inches, moisture-conditioned as necessary to at least two percent above moisture optimum and compacted to a minimum of 90 percent of the maximum dry density as determined by ASTM D 1557.

6.2 Preliminary Foundation Design Parameters

New structures may be supported on shallow footings or Cast-in-Drilled-Hole (CIDH) concrete piles. Driven piles are not recommended due to the hardness of bedrock. Note that these values are preliminary, and supplemental field data including drill cores should be collected during pile drilling to confirm design parameters.

6.2.1 Shallow Foundations

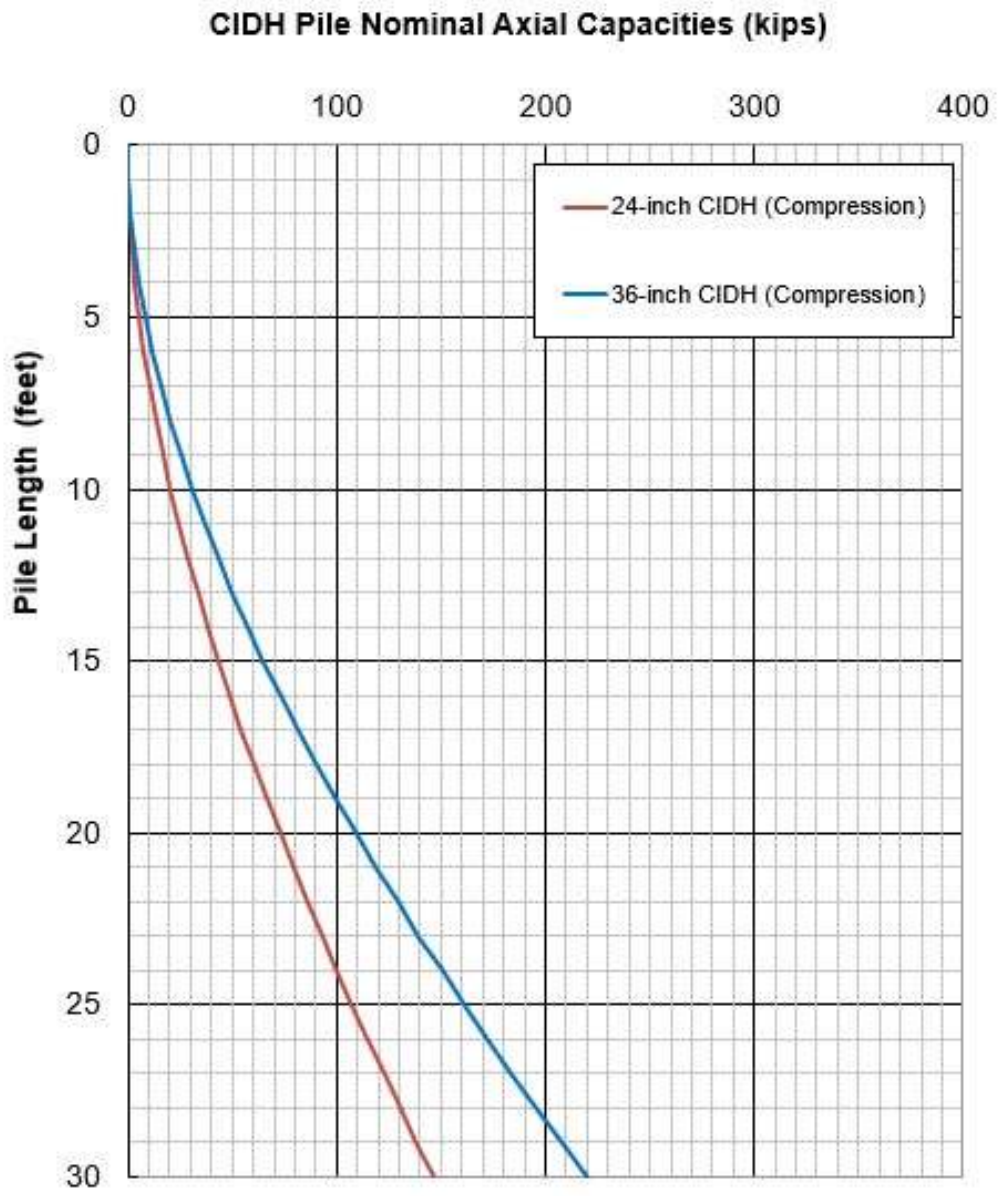
Following site grading recommended in Section 6.1, new structures may be supported on a conventional shallow foundation system. Footings may be designed using an allowable bearing capacity of 2,500 psf based on a minimum width of 12 inches and embedment depth of 12 inches below the lowest adjacent grade. This value may be increased by 250 psf for each additional foot of width or each additional foot of embedment to a maximum value of 4,000 psf. In addition, the bearing capacity may be increased by one-third for wind or seismic loading. The allowable bearing capacity incorporates a factor of safety of 3.0 and is based on a total static settlement of 1 inch and differential settlement of ½ inch over a

horizontal distance of 30 feet. Since settlement is a function of footing size and contact bearing pressure, differential settlement can be expected between adjacent columns or walls where a large differential loading condition exists. The settlement estimate should be reviewed by Leighton Consulting when final foundation plans and loads for the proposed structures become available.

Resistance to lateral loads will be provided by a combination of friction between the soils and foundation interface and passive pressure acting against the vertical portion of the foundation. A friction coefficient of 0.40 may be used at the soil-concrete interface for calculating the sliding resistance. A passive pressure based on an equivalent fluid pressure of 390 pounds per cubic foot (pcf) may be used for calculating the lateral passive resistance. The lateral passive resistance can be taken into account only if it is ensured that the soils against embedded structures will remain intact with time. The above values do not contain an appreciable factor of safety, so the structural engineer should apply the applicable factors of safety and/or load factors during design.

6.2.2 Deep Foundation

The axial capacities of 24-inch and 36-inch CIDH piles for frequently applied dead plus live load is presented in the figure below. A factor of safety of 2.0 may be used to obtain the allowable static pile capacities and a factor of safety of 1.0 may be used for transient loads such as wind or seismic forces. Uplift capacities may be taken as equal to 50 percent of the downward capacities. To avoid group effects, the pile on-center spacing should be at least three times its largest dimension.



Note:
1. A minimum factor of safety (FS) of 2.0 should be applied to estimate allowable capacities.
2. For seismic loading condition, a FS of 1.0 may be used to estimate allowable capacities.
3. The axial tension capacity may be taken as 50% of the axial compression capacity.

Pile design to provide lateral load resistance is recommended to be performed based upon the idealized subsurface profile and design parameters presented in the following table. If piles are used in a group with a pile cap, the passive pressure indicated in Section 6.5 may be used to calculate lateral resistance of the pile cap.

Table 2. – Preliminary Geotechnical Parameters for LPILE Analysis

Depth Range (feet)	Material	LPILE Model	Effective Unit Weight (lbs/ft^3)	Cohesion (lbs/ft^2)	ø (degrees)	ε50	k[(1)] (lbs/in^3)
0 - 5	Fill Soils, Alluvium/Colluvium	SAND	120	0	32	---	30
Below 5	Granitic Bedrock	SAND	130	0	38	---	225

Notes: (1) Modulus of Subgrade Reaction

P-multipliers dependent upon center-to-center (CTC) spacing. P-mult. = 1.0 for CTC = 3 oriented perpendicular to loading.

6.3 Slab-On-Grade

Concrete slabs-on-grade subjected to special loads should be designed by the structural engineer. Where conventional light floor loading conditions exist, the following minimum recommendations for conventional slabs-on-grade should be used. More stringent requirements may be required by local agencies, the structural engineer, the architect, or the CBC.

- A minimum slab thickness of 5 inches. Slab reinforcement should be designed by the structural engineer but as a minimum should consist of No. 3 rebar placed at 24 inches on center in each direction and provided with adequate concrete cover.
- A vapor barrier, 10-mil or thicker, should be placed below slabs where moisture-sensitive floor coverings or equipment is planned. The vapor barrier should be properly sealed at all joints and any penetrations.
- To reduce the potential for excessive cracking, concrete slabs-on-grade should be provided with construction or weakened plane joints at frequent intervals. Joints should be laid out to form approximately square panels.
- Subgrade for slab-on-grade should be thoroughly wetted prior to placement of rebar and concrete.

Our experience indicates that use of reinforcement in slabs can generally reduce the potential for drying and shrinkage cracking. Some cracking should be expected as the concrete cures. Minor cracking is considered normal; however, it is often aggravated by

a high water/cement ratio, high concrete temperature at the time of placement, small nominal aggregate size, and rapid moisture loss due to hot, dry, and/or windy weather conditions during placement and curing. Cracking due to temperature and moisture fluctuations can also be expected. The use of low slump concrete can reduce the potential for shrinkage cracking.

6.4 Seismic Design Parameters

Design parameters for minimum seismic load based on the 2022 California Building Code are included in Table 3 below.

Table 3. – 2022 CBC Based Seismic Design Parameters

Categorization/Coefficient	Design Value
Site Latitude	34.2268°
Site Longitude	-117.0941°
Site Class	C
Mapped Spectral Response Acceleration at Short Period (0.2 sec), S_S	1.50g
Mapped Spectral Response Acceleration at Long Period (1 sec), S_1	0.60g
Short Period (0.2 sec) Site Coefficient, F_a	1.2
Long Period (1 sec) Site Coefficient, F_v	1.4
Adjusted Spectral Response Acceleration at Short Period (0.2 sec), S_{MS}	1.80g
Adjusted Spectral Response Acceleration at Long Period (1 sec), S_{M1}	0.84g
Design Spectral Response Acceleration at Short Period (0.2 sec), S_{DS}	1.20g
Design Spectral Response Acceleration at Long Period (1 sec), S_{D1}	0.56g
Mapped Geometric Mean MCE_G Peak Ground Acceleration, PGA	0.59g
Site Coefficient, F_{PGA}	1.2
PGA adjusted for Site Class, $PGA_M = F_{PGA}$ *PGA	0.708g

6.5 Earth Retaining Structures

The following recommendations may be used for design and construction of retaining structures at the site. We recommend that any permanent earth retaining structures be backfilled with onsite or import soil with Expansion Index (EI) of not greater than 50 (per ASTM D 4829).

Table 4. – Equivalent Fluid Pressures

Condition	Level Backfill	2:1 Backfill
Active	37 pcf	89 pcf
At-Rest	57 pcf	63 pcf
Passive	390 pcf (Maximum of 3,900 psf)	
Seismic	20 pcf	48 pcf

Retaining walls retaining more than 6 feet of soil should consider a seismic earth pressure increment with an inverted triangular distribution in addition to the active earth pressure provided above. The seismic earth pressure increment is included in Table 3. The above values do not contain an appreciable factor of safety, so the structural engineer should apply the applicable factors of safety and/or load factors during design. Retaining walls should include provisions for wall drainage with a backdrain system in accordance with the recommendations provided on attached Figure 7, *Retaining Wall Backfill and Subdrain Detail (EI < 50)*, and the materials behind the wall should be free-draining (i.e., less than 5 percent passing the No. 200 sieve).

Cantilever walls that are designed for a deflection at the top of the wall of at least 0.001H, where H is equal to the wall height, may be designed using the active earth pressure condition. Rigid walls that are not free to rotate, walls that are braced at the top, and walls that provide indirect support for foundations should be designed using the at-rest condition.

Lateral load resistance will be provided by the sliding resistance at the base of the foundation and the passive pressure developed along the front of the foundation. A frictional resistance coefficient of 0.40 may be used at the concrete and soil interface.

In addition to the above lateral forces due to retained earth, the appropriate loads due to surcharges should be considered in the design of retaining structures.

6.6 Cement Type

In general, soil environments that are detrimental to concrete have high concentrations of soluble sulfates and/or pH values of less than 5.5. Section 4.3 of ACI 318 (ACI, 2018) provides specific guidelines for the concrete mix-design when the soluble sulfate content of the soil exceeds 0.1 percent by weight or 1,000 parts per million (ppm).

The results of laboratory testing indicated concentrations of soluble sulfate greater than 0.1 percent but less than 0.2 percent. The test results indicate a sulfate Exposure Class

designation of “S1” appears to be appropriate for the project site based upon criteria presented in ACI 318. If the concrete is expected to be in contact with reclaimed water, Type V cement and a water/cement ratio of 0.45 should be used. Samples should be collected from materials imported to the site as well as soils the compacted fill subgrade upon completion of grading to confirm the initial findings of this exploration.

6.7 Corrosion Protection Measures

In general, soil resistivity, which is a measure of how easily electrical current flows through soils, is the most influential factor for corrosion to ferrous metals. The following table presents an approximate relationship between soil resistivity and soil corrosiveness.

Table 5. – Soil Corrosivity as a Function of Resistivity

Soil Resistivity (ohm-cm)	Classification of Soil Corrosiveness
< 900	Very severe corrosion
900 to 2,300	Severely corrosive
2,300 to 5,000	Moderately corrosive
5,000 to 10,000	Mildly corrosive
10,000 to >100,000	Very mildly corrosive

Note: [1] ASTM STP 1013 titled *Effects of Soil Characteristics on Corrosion* (February, 1989).

In addition to resistivity, the concentration of chloride ions can also be used to evaluate corrosive potential to steel, either in the form of reinforcement protected by concrete cover or plain steel substructures, such as steel pipes. As a general guideline, the chloride threshold adopted by Caltrans is a concentration of 500 ppm or greater as determined by California Test 532. Concentrations of chloride ions above the stated concentration or other characteristics such as soil resistivity or redox potential may warrant special corrosion protection measures. The results of corrosivity testing are summarized in the following table.

Table 6. – Summary of Corrosivity Testing

Test Parameter	Test Results						General Classification of Hazard
	HA-5a	HA-15	HA-19	HA-27	HA-37	HA-17	
	0 to 1’	1’ to 2’	1’ to 1.5’	2’ to 2.5’	1.5’ to 2’	3’ to 3.5’	
Water-Soluble Sulfate in Soil (ppm)	72	283	219	98	99	176	Negligible to moderate
Water-Soluble Chloride in Soil (ppm)	144	42	53	41	44	125	Non-corrosive
pH	5.68	5.33	5.37	5.88	5.33	5.40	Moderately Acidic
Minimum Resistivity (saturated, ohm-cm)	47,000	50,500	20,600	39,600	23,000	45,000	Very mildly corrosive to buried ferrous pipes

The results of the resistivity tests indicate that the near surface soil exhibits very mildly corrosive potential to buried ferrous metals per ASTM STP 1013. The samples tested for water-soluble chloride content indicate a very low potential for corrosion of steel in concrete due to the chloride content of the soil.

Based on the available laboratory testing, the onsite soils are not considered to have low corrosion potential to ferrous metals. The corrosion information presented in this report should be provided to the underground utility subcontractors. We recommend that additional testing for general corrosion potential to ferrous materials and water-soluble sulfates in soils is performed during grading.

6.8 Pavement Design

Driveways and parking areas can be constructed using conventional asphalt concrete (AC) over aggregate base (AB). We have designed the pavement sections using a design R-value of 50 for different Traffic Indices (TI) and the minimum pavement thickness is presented in Table 6. The pavement design was performed using the method in *Caltrans Highway Design Manual*.

Table 7. – Pavement Sections

Traffic Index	Flexible Pavement (inches)	
	AC	AB
5 or less	3	4½
6	4	4½
7	4½	5
8	5	5½

Concrete pavement, if used, may consist of 6 inches of Portland Cement Concrete (PCC) over 4 inches of AB. The PCC pavement sections should be provided with crack-control joints spaced no more than 10 feet on-center each way, to control where cracks develop.

All pavement construction should be performed in accordance with the *Standard Specifications for Public Works Construction*. Field inspection and periodic testing, as needed during placement of the base course materials, should be undertaken to ensure that the requirements of the standard specifications are fulfilled. Prior to placement of aggregate base, the subgrade soil should be processed to a minimum depth of 8 inches, moisture-conditioned, as necessary, and recompacted to a minimum of 90 percent relative compaction. Localized areas of loose soils may be encountered that require deeper removal and recompaction. The actual extent of the removal depth will be best determined during construction when direct observation of the subgrade soils can be made.

Aggregate base should be moisture conditioned, as necessary, and compacted to a minimum of 95 percent relative compaction.

Aggregate base and asphalt materials should conform to Sections 200-2 and 203, respectively, of the *Standard Specifications for Public Works Construction*. PCC should conform to Section 201 of the *Standard Specifications for Public Works Construction*.

6.9 Surface Drainage

Positive drainage of surface water away from structures is very important. Water should not be allowed to pond adjacent to buildings or new site improvements. Water should not be allowed to flow directly over the slope faces. Positive drainage may be accomplished by providing drainage away at a minimum of 2 percent for earthen surfaces for a lateral distance of at least five feet and further maintained by a swale or drainage path at a gradient of at least 1 percent. Where necessary, drainage paths may be shortened by the use of area drains and collector pipes. Eave gutters are recommended and should

reduce water infiltration into the subgrade materials. Downspouts should be connected to appropriate outlet devices.

Irrigation of landscaping should be controlled to maintain, as much as possible, consistent moisture content sufficient to provide healthy plant growth without over watering. Where improvements are located within valley bottoms, use of diversion structures should be considered to control anticipated flood waters. Sub-slab drainage galleries

6.10 Additional Geotechnical Services

Geotechnical observation and testing should be provided during the following activities:

- Upon completion of site clearing, where applicable;
- During site earthwork;
- Compaction of all fill materials;
- During installation of temporary shoring, wherever needed;
- After foundation excavations and prior to placement of concrete;
- Foundation pile and retaining wall construction;
- Utility trench backfilling and compaction; and
- When any unusual conditions are encountered.

6.11 Plan Review

Final project grading and foundation plans should be reviewed by Leighton as part of the design development process to ensure that recommendations in this report are incorporated in project plans.

7.0 CONSTRUCTION CONSIDERATIONS

7.1 Rippability and Oversize Materials

Based on the results of our auger borings, existing surface soils are expected to be readily rippable using conventional equipment in good working condition. The rippability of weathered near-surface bedrock is expected to be difficult but feasible using heavy equipment, such as dozer with single-shank ripper tooth. Oversized material may be generated from bedrock removals.,

7.2 Trench Backfill

Utility trenches should be backfilled with compacted fill in accordance with Sections 306-1.2 and 306-1.3 of the Standard *Specifications for Public Works Construction,* (SSPWC, "Greenbook"), current edition. Utility trenches can be backfilled with onsite material free of rubble, debris, organic and oversized material up to 3 inches in largest dimension. Prior to backfilling trenches, pipes should be bedded in and covered with either:

(1) **Granular Bedding:** a) ½-inch open grade aggregate; or b) a uniform sand material with a Sand Equivalent (SE) greater-than-or-equal-to (≥) 30, passing the No. 4 U.S. Standard Sieve (or as specified by the pipe manufacturer).

(2) **CLSM:** Controlled Low Strength Material (CLSM) conforming to Section 201-6 of the SSPWC. CLSM bedding should be placed to 1 foot (0.3 m) over the top of the conduit, and vibrated.

Pipe bedding should extend at least 4 inches below the pipeline invert and at least 12 inches over the top of the pipeline. The bedding and shading sand is recommended to be densified in place by vibratory, lightweight compaction equipment.

Trench backfill over the pipe bedding zone may consist of native and clean fill soils. All backfill should be placed in thin lifts (appropriate for the type of compaction equipment), moisture conditioned above optimum, and mechanically compacted to at least 90 percent relative compaction, relative to the ASTM D 1557 laboratory maximum density.

7.3 Recreational Ponds

We anticipate recreation ponds will be constructed using down-gradient gravity dam structures consisting of reinforced concrete founded on bedrock. The structures should be designed by a specialty engineer experienced in dam design, and incorporate

elements to facilitate pass-through seepage conditions. The need for collection of future rock-rippability and other geotechnical studies can be precluded to aid in dam design.

7.4 Foundation Setback

We recommend a minimum horizontal setback distance from the face of slopes for all foundations, footings, and other settlement-sensitive structures as indicated on Table 8 below. The minimum recommended setback distance from the face of retaining wall is equal to 1.5 times the height of the retaining wall. This distance is measured from the outside bottom edge of the footing, horizontally to the slope or retaining wall face, and is based on the slope or wall height. However, the foundation setback distance may be revised by the geotechnical consultant on a case-by-case basis if the geotechnical conditions are different than anticipated.

Table 8. – Minimum Foundation Setback from Slope Faces

Slope Height	Setback
less than 5 feet	5 feet
5 to 15 feet	7 feet

Potential distress to improvements (retaining walls, fences, etc.) may be mitigated by use of deepened footings or grade beam systems for support.

In addition, open or backfilled utility trenches that parallel or nearly parallel structure footings should not encroach within an imaginary 2:1 (horizontal to vertical) downward sloping line starting 9 inches above the bottom edge of the footing and should also not be located closer than 18 inches from the face of the footing. Deepened footings should meet the setbacks as described above. Also, over-excavation should be accomplished such that deepening of footings to accomplish the setback will not introduce a cut/fill transition bearing condition.

Where pipes cross under footings, the footings should be specially designed. Pipe sleeves should be provided where pipes cross through footings or footing walls and sleeve clearances should provide for possible footing settlement, but not less than 1 inch around the pipe.

7.5 Temporary Excavations and Shoring Design

All temporary excavations should be performed in accordance with project plans, specifications, and all OSHA requirements. OSHA allows the sides of unbraced excavations, up to a maximum height of 20 feet, to be cut to a ¾H:1V (horizontal:vertical)

slope for Type A soils, 1H:1V for Type B soils, and 1½H:1V for Type C soils. The soil type should be verified or revised based on geotechnical observation and testing during construction, as soil classifications may vary over short horizontal distances. Excavations 5 feet or deeper should be laid back or shored in accordance with OSHA requirements before personnel are allowed to enter.

Typical cantilever shoring should be designed using an active earth pressure presented in Table 3. If excavations are braced at the top and at specific design intervals, the active pressure may then be approximated by a rectangular soil pressure distribution with the pressure per foot of width equal to 24H, where H is equal to the depth of the excavation being shored. These lateral earth pressures are for a drained condition. For an undrained condition, hydrostatic pressure should be included.

During construction, the soil conditions should be regularly evaluated to verify that conditions are as anticipated. The contractor should be responsible for providing the "competent person" required by OSHA standards to evaluate soil conditions. Close coordination between the competent person and the geotechnical engineer should be maintained to facilitate construction while providing safe excavations.

7.6 Rockfalls

Precariously perched bedrock boulders subject to potential dislodging and downslope movement as rock falls, exist locally on the site. Removal of the boulders can be accomplished using a variety of hand tools, or equipment such as excavators or dozers., is We recommended the removals of boulders be performed in conjunction with grading activities, and prior to construction of improvements located downslope of the hazard. A specialized contractor may be necessary to perform these activities.

If removal of the rock is not feasible due to access limitations or other reasons, the hazard may be mitigated by breaking up the rock in place to reduce the potential for dislodgement.

In some instances, boulders with a large flat side may be flipped onto the flat surface where they no longer pose a rolling potential and can then be left in place per the recommendations of a State Certified Engineering Geologist.

Possible ground disturbance resulting from these operations would likely consist of trampled brush and creation of rubble piles.

In areas where no mitigation is feasible, it is possible that barrier trenches, deflection walls or earthen berms may be constructed.

8.0 LIMITATIONS

Leighton's work was performed using the degree of care and skill ordinarily exercised, under similar circumstances, by reputable geotechnical consultants practicing in this or similar localities. No other warranty, express or implied, is made as to the conclusions and professional opinions included in this report.

As in many projects, conditions revealed in excavations may be at variance with preliminary findings. If this occurs, the changed conditions must be evaluated by the geotechnical consultant and additional recommendations be developed as needed.

The identification and testing of hazardous, toxic or contaminated materials was outside the scope of Leighton's work. Should such materials be encountered at any time, or their existence be suspected, all measures stipulated in local, County, State and Federal regulations, as applicable, should be implemented.

This report is issued with the understanding that it is the responsibility of the owner, or of his representative, to ensure that the information and recommendations contained herein are brought to the attention of the necessary design consultants for the project and incorporated into the plans; and that the necessary steps are taken to see that the contractors carry out such recommendations in the field.

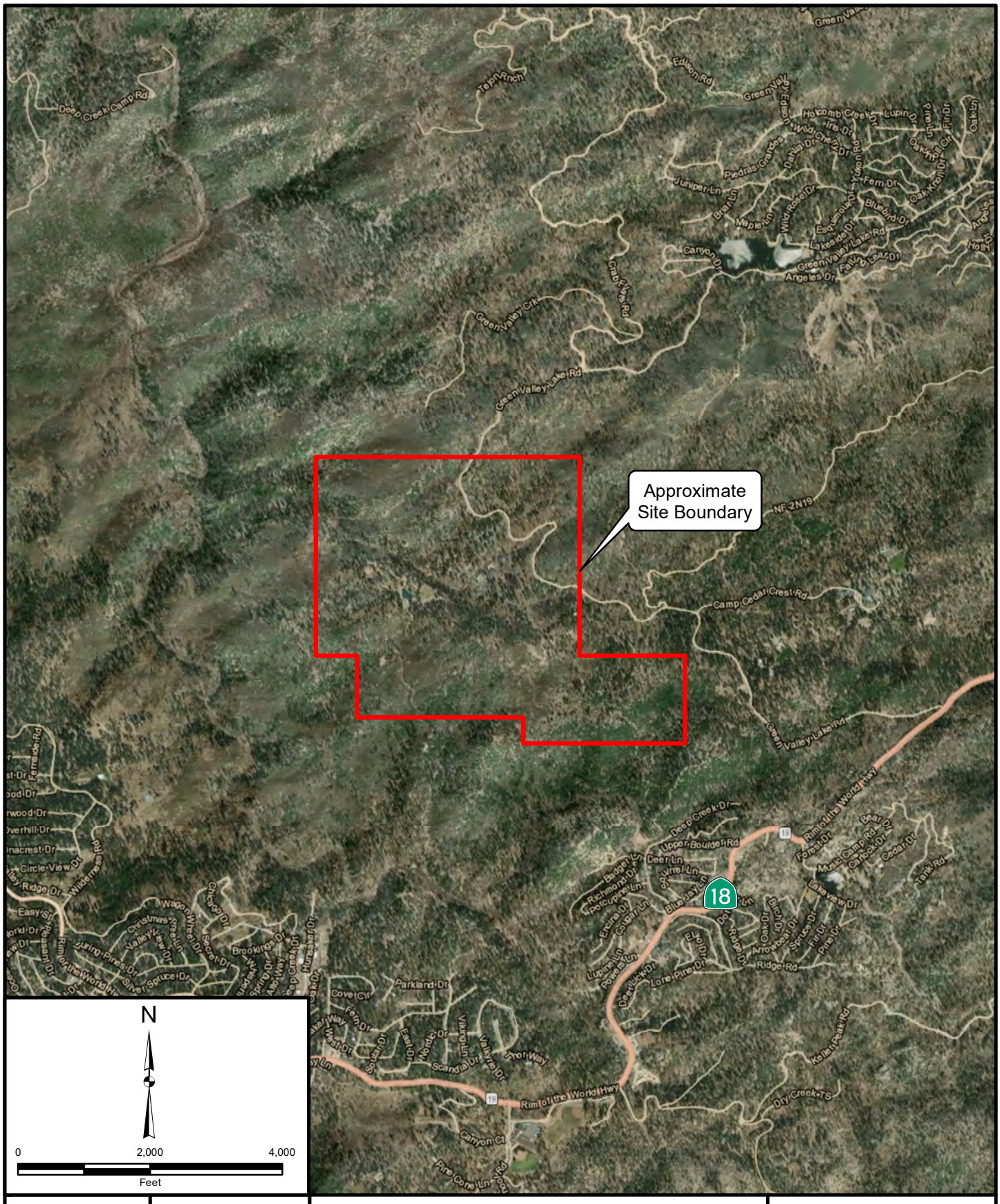
Changes in the conditions of a property can occur with the passage of time, whether due to natural processes or the work of man on the subject or adjacent properties. In addition, changes in standards of practice may occur from legislation or the broadening of knowledge. Accordingly, the findings of this report may at some future time be invalidated wholly or partially by changes outside Leighton's control.

The conclusions and recommendations in this report are based in part upon data that were obtained from a necessarily limited number of observations, site visits, excavations, samples and tests. Such information can be obtained only with respect to the specific locations explored, and therefore may not completely define all subsurface conditions throughout the site. The nature of many sites is that differing geotechnical or geological conditions can occur within small distances and under varying climatic conditions. Furthermore, changes in subsurface conditions can and do occur over time. Therefore, the findings, conclusions and recommendations presented in this report can be relied upon only if Leighton has the opportunity to observe the subsurface conditions during grading and construction of the project, in order to verify that our preliminary findings are representative of the site.

This report is intended only for the use of Kimley-Horn and Associates, Inc., and its design consultants, and only as related expressly to evaluation of the feasibility of developing the subject site with the proposed development and for preliminary planning and design.

If parties other than Leighton are engaged to provide construction geotechnical services, they must be notified that they will be required to assume complete responsibility for the geotechnical phase of the project by concurring with the findings and recommendations in this report or by providing alternative recommendations.

Any persons using this report for bidding or construction purposes should perform such independent explorations as they deem necessary to satisfy themselves as to the surface and subsurface conditions to be encountered and the procedures to be used in the performance of work on the subject site.



Project: 13655.001	Eng/Geol: JLH
Scale: 1 " = 2,000 '	Date: November 2023
Base Map: ESRI ArcGIS Online 2023 Author: (mmurphy)	

SITE LOCATION MAP

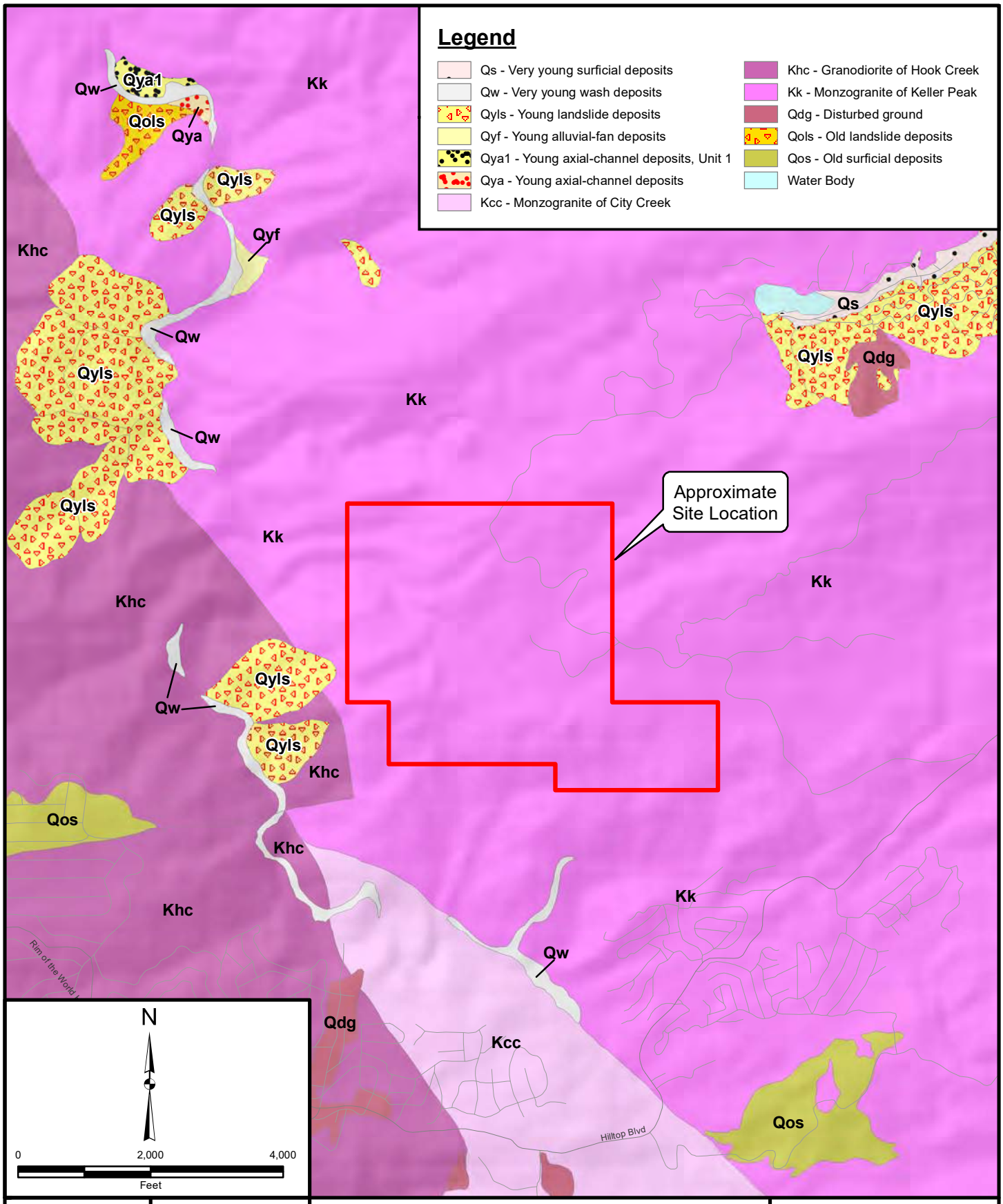
Hume SoCal

Green Valley Lake, California

FIGURE 1

Leighton

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Project: 13655.001	Eng/Geol: JLH
Scale: 1 " = 2,000 '	Date: November 2023

Reference: USGS, 2006 Geologic map of the San Bernardino and Santa Ana 30'x60 quadrangle, California Version 1,0 Open File Report 2006-1217.

REGIONAL GEOLOGY MAP

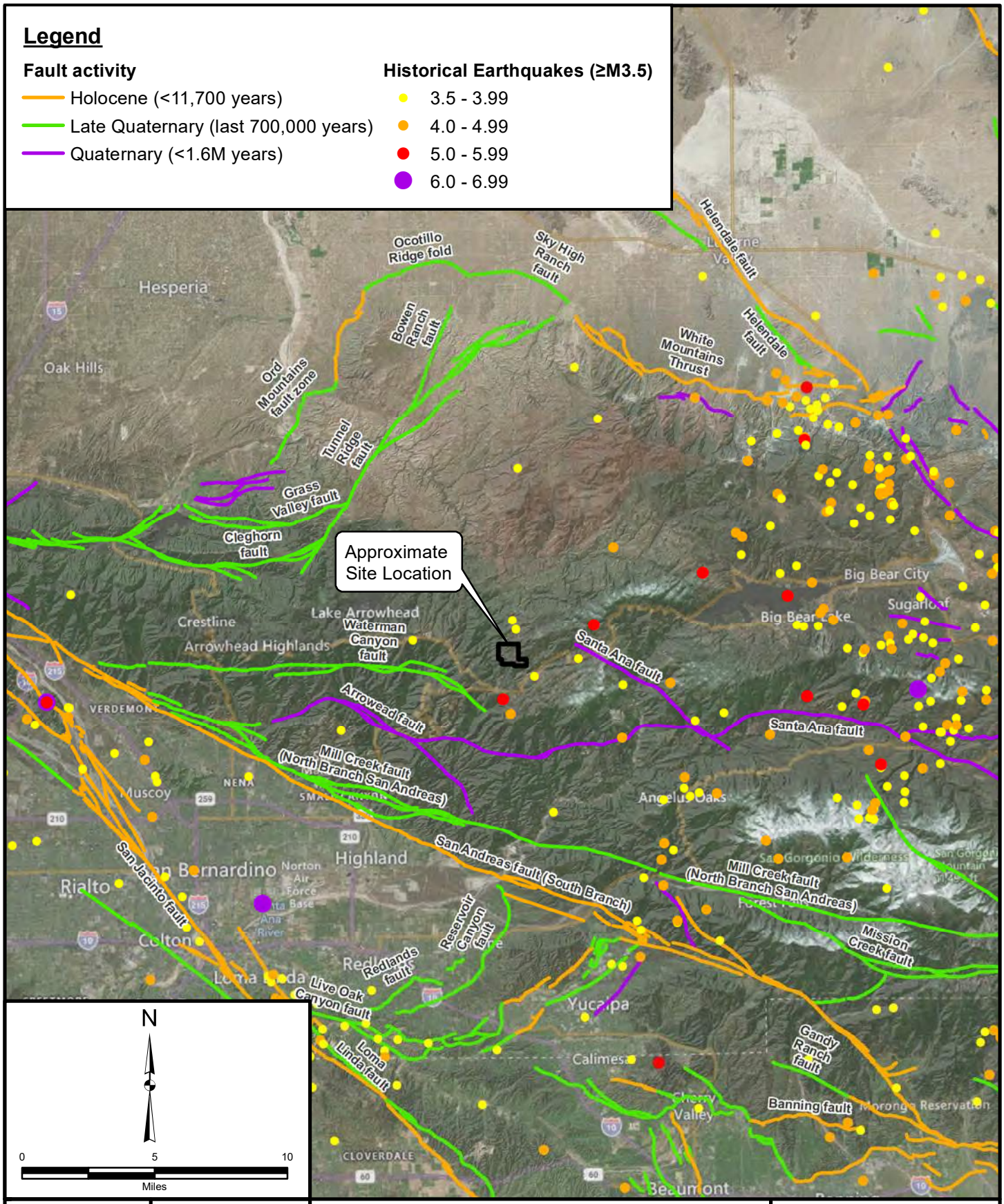
Hume SoCal

Green Valley Lake, California

FIGURE 2

Leighton

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Scale: 1 " = 5 miles	Date: November 2023

Base Map: ESRI ArcGIS Online 2023
Reference: maps.conservation.ca.gov

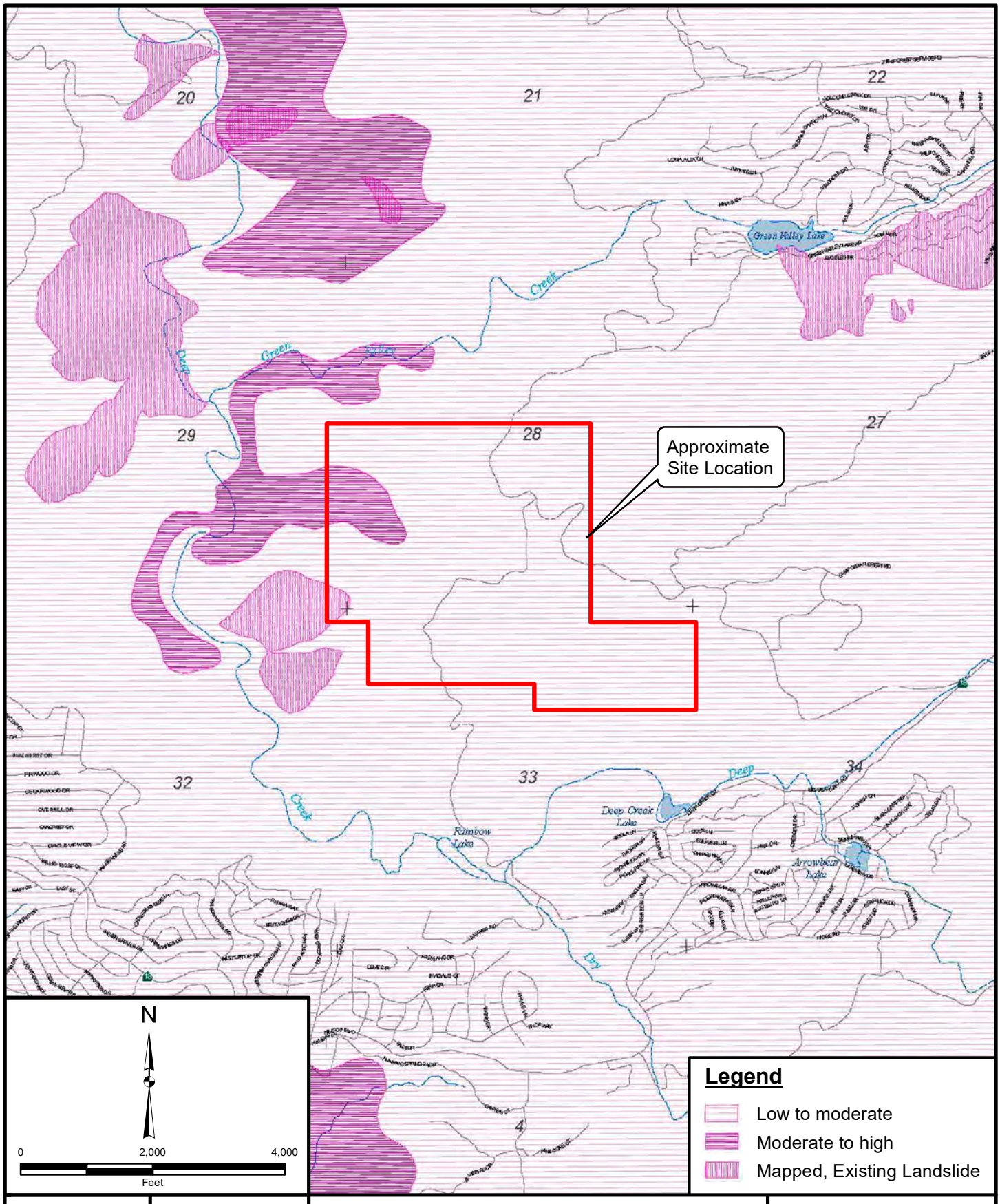
REGIONAL FAULTS AND HISTORIC SEISMICITY MAP

Hume SoCal
Green Valley Lake, California

FIGURE 3

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Project: 13655.001	Eng/Geol: JLH
Scale: 1 " = 2,000 '	Date: November 2023

Base Map: San Bernardino County Land Use Plan GENERAL PLAN Geologic Hazard Overlays Map data originally compiled on 1:48,000 scale mosaicked maps photo-reduced from 7-1/2 minute USGS quads by D.M. Morton, U.S.Geological Survey, 1974 and by S.S. Tan, State Division of Mines and Geology, 1989.

SEISMIC HAZARD MAP

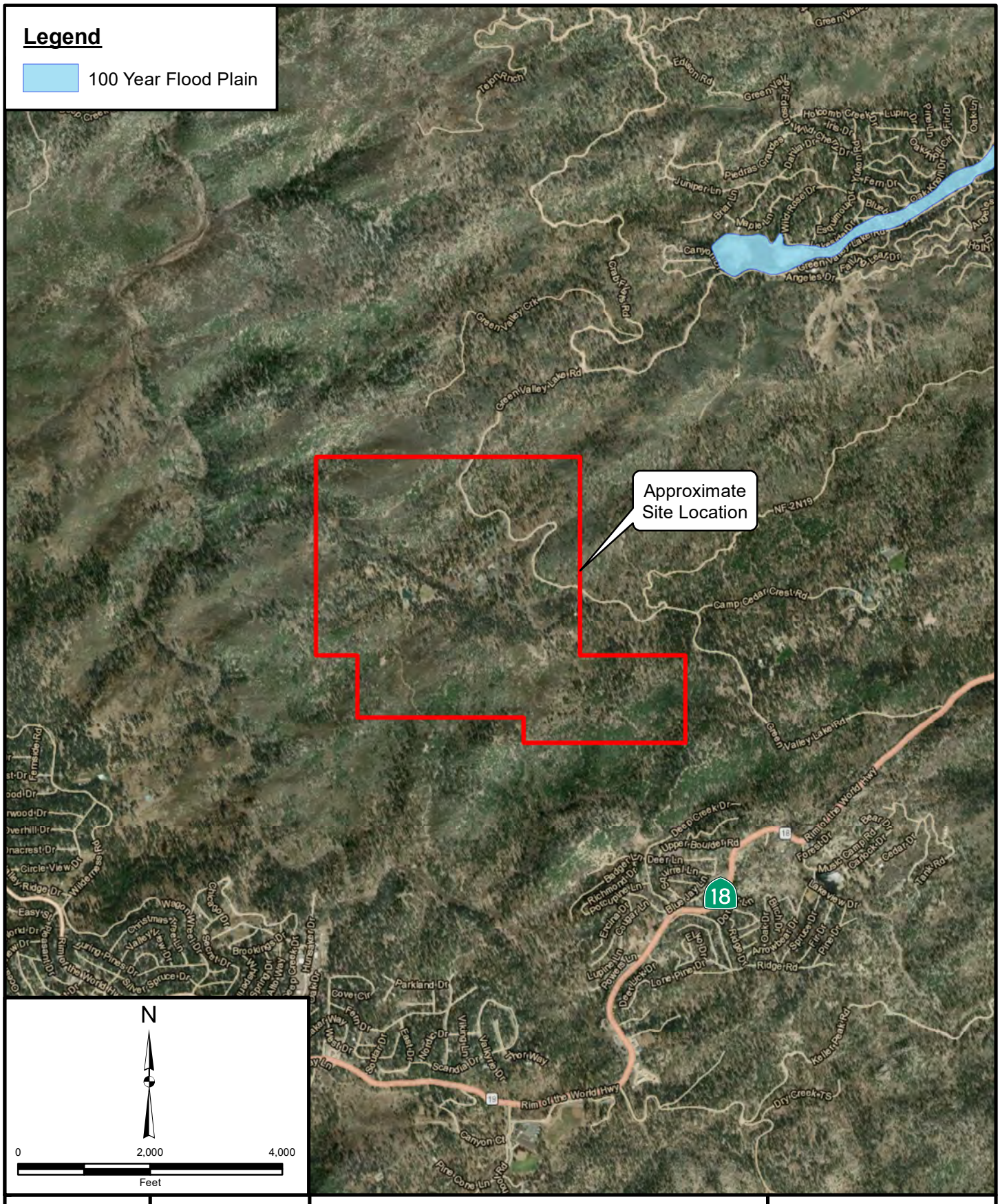
Hume SoCal

Green Valley Lake, California

FIGURE 4

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Project: 13655.001	Eng/Geol: JLH
Scale: 1 " = 2,000 '	Date: November 2023

Base Map: ESRI ArcGIS Online 2023
Reference: FEMA, DWR
Author: (mmurphy)

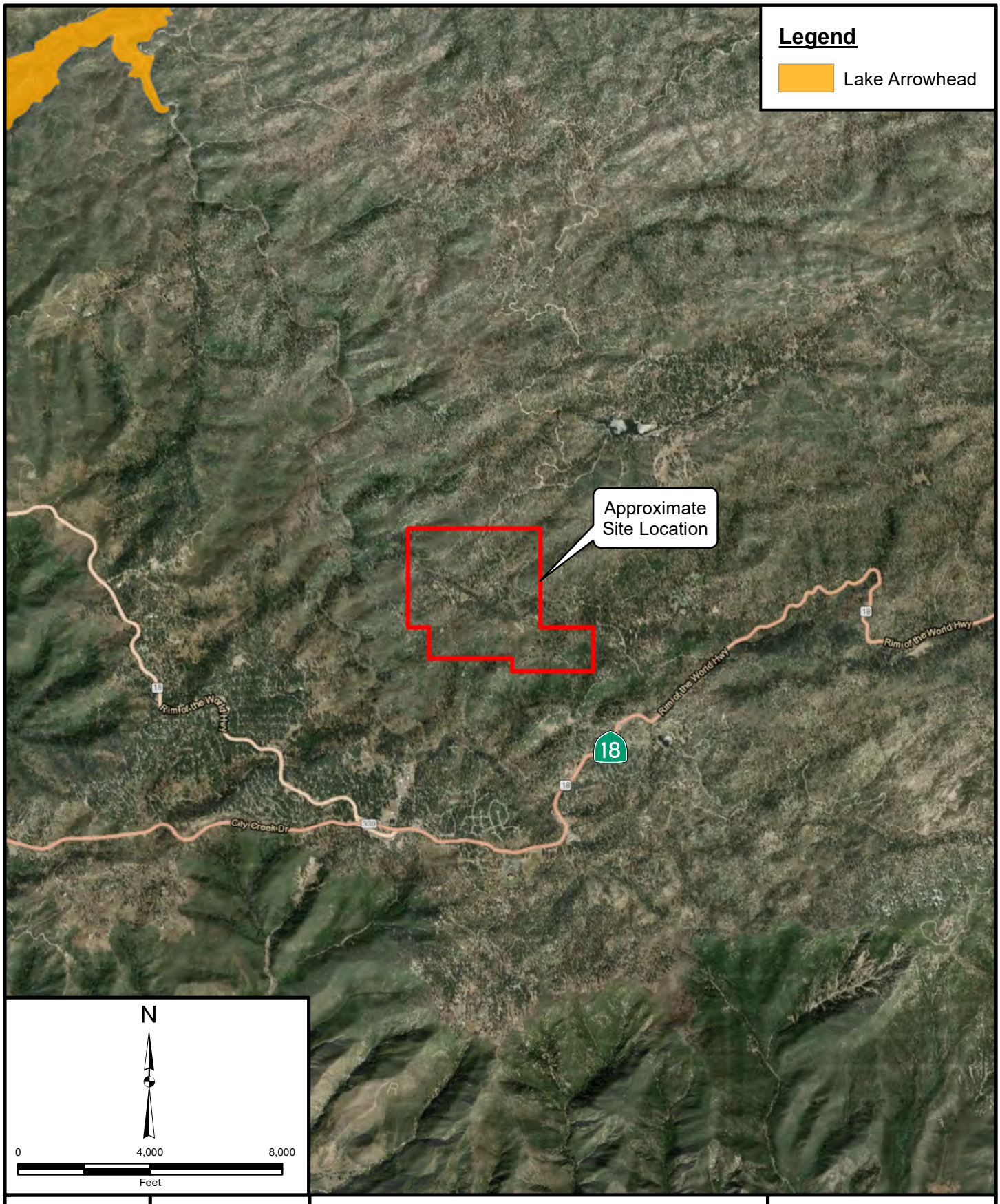
FLOOD HAZARD ZONE MAP

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Green Valley Lake, California

FIGURE 5

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Scale: 1 " = 4,000 '	Date: November 2023

Base Map: ESRI ArcGIS Online 2023
Reference: Office of Emergency Services (2007),
Dept of Safety of Dams (2021)
National Inventory of Dams, Army Corps of Engrs (2021)

DAM INUNDATION MAP

Hume SoCal

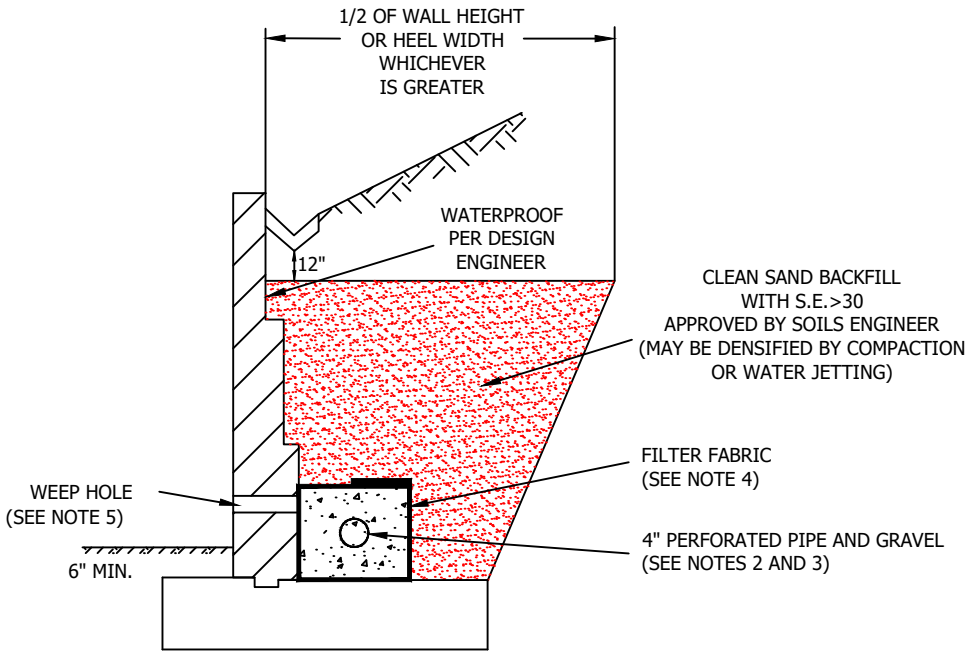
Green Valley Lake, California

FIGURE 6

Leighton

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SUBDRAIN OPTIONS AND BACKFILL WHEN NATIVE MATERIAL HAS EXPANSION INDEX OF >50



NOTE: AS AN ALTERNATE TO CLEAN SAND BACKFILL, CLEAN GRAVEL MAY BE UTILIZED WITH APPROVED FILTER FABRIC. A SECOND ALTERNATE IS TO UTILIZE AN AGGREGATE BASE MATERIAL COMPACTED TO 90% RELATIVE COMPACTION. A SAMPLE OF THE PROPOSED BASE MUST BE APPROVED BY THE GEOTECHNICAL CONSULTANT PRIOR TO BACKFILL FOR SUITABILITY. COMPACTION SHOULD BE ACHIEVED WITHOUT DAMAGING THE WALL.

GENERAL NOTES:

* Waterproofing should be provided where moisture nuisance problem through the wall is undesirable.
* Water proofing of the walls is not under purview of the geotechnical engineer
* All drains should have a gradient of 1 percent minimum
*Outlet portion of the subdrain should have a 4-inch diameter solid pipe discharged into a suitable disposal area designed by the project engineer. The subdrain pipe should be accessible for maintenance (rodding)
*Other subdrain backfill options are subject to the review by the geotechnical engineer and modification of design parameters.

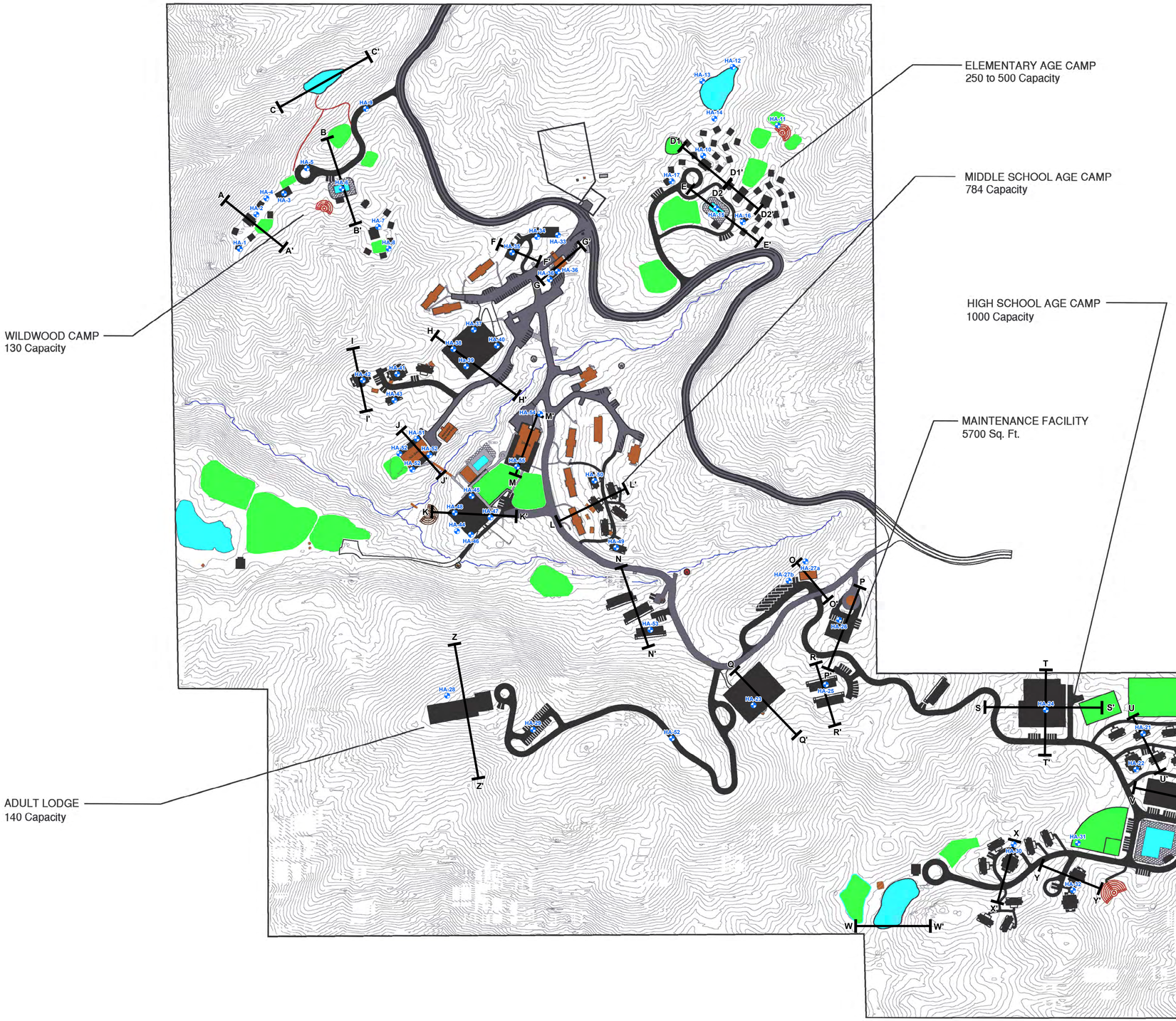
Notes:
1) Sand should have a sand equivalent of 30 or greater and may be densified by water jetting.
2) 1 Cu. ft. per ft. of 1/4- to 1 1/2-inch size gravel wrapped in filter fabric
3) Pipe type should be ASTM D1527 Acrylonitrile Butadiene Styrene (ABS) SDR35 or ASTM D1785 Polyvinyl Chloride plastic (PVC), Schedule 40, Armco A2000 PVC, or approved equivalent. Pipe should be installed with perforations down. Perforations should be 3/8 inch in diameter placed at the ends of a 120-degree arc in two rows at 3-inch on center (staggered)
4) Filter fabric should be Mirafi 140NC or approved equivalent.
5) Weephole should be 3-inch minimum diameter and provided at 10-foot maximum intervals. If exposure is permitted, weepholes should be located 12 inches above finished grade. If exposure is not permitted such as for a wall adjacent to a sidewalk/curb, a pipe under the sidewalk to be discharged through the curb face or equivalent should be provided. For a basement-type wall, a proper subdrain outlet system should be provided.
6) Retaining wall plans should be reviewed and approved by the geotechnical engineer.
7) Walls over six feet in height are subject to a special review by the geotechnical engineer and modifications to the above requirements.

FIGURE 7

RETAINING WALL BACKFILL AND SUBDRAIN DETAIL

WHEN NATIVE MATERIAL HAS EXPANSION INDEX OF >50

Leighton



LEGEND

HA-55 Approximate location auger boring

Z Z' Geologic Cross Section

N

0 200 400

Feet

GEOTECHNICAL MAP

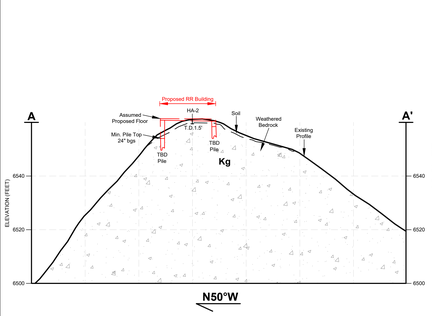
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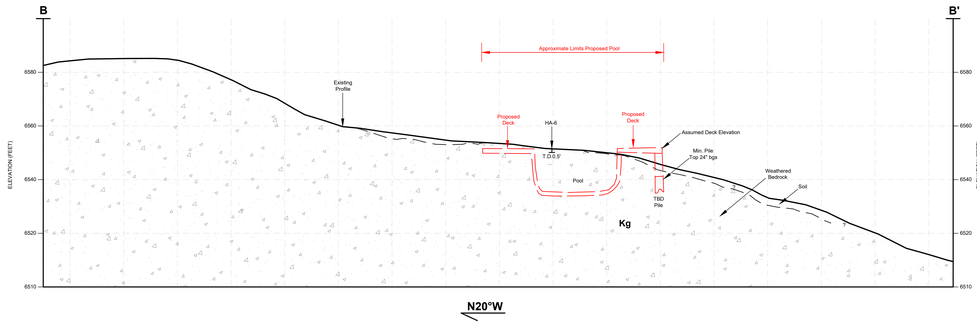
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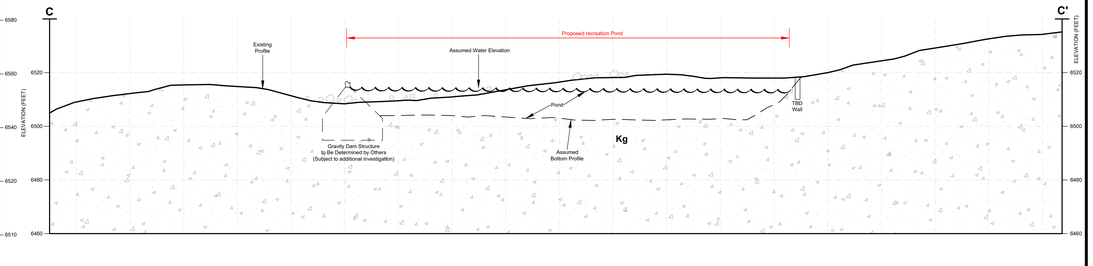
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Eng/Geol: JLH

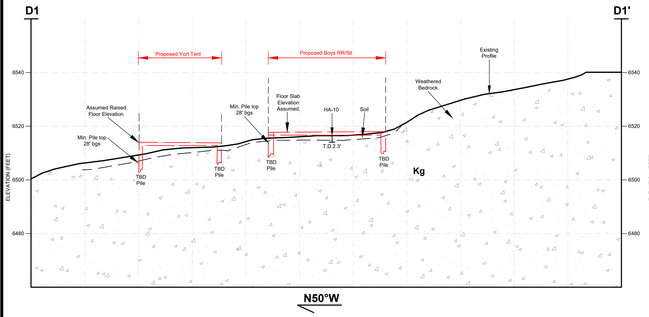
Base Map: Preliminary Plan, January 9, 2023

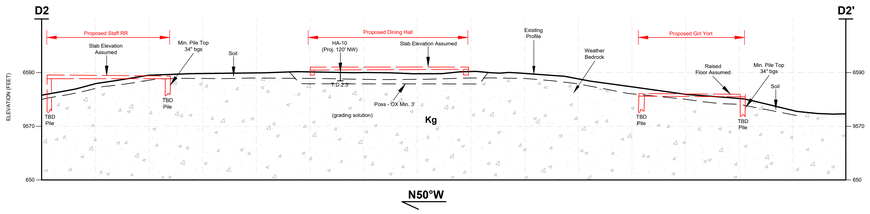
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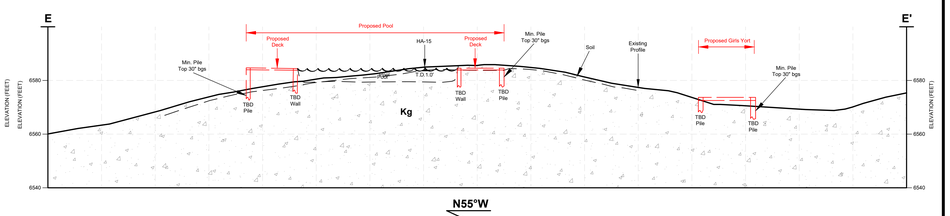


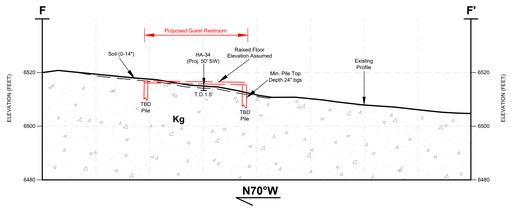


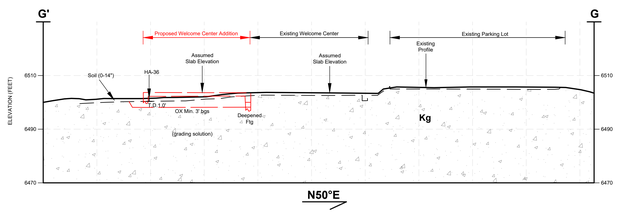


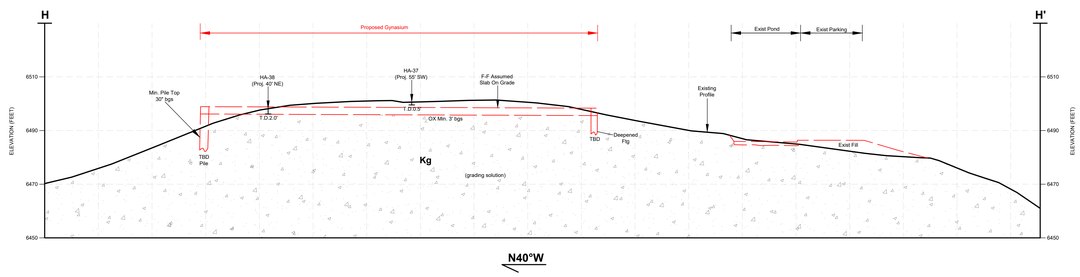


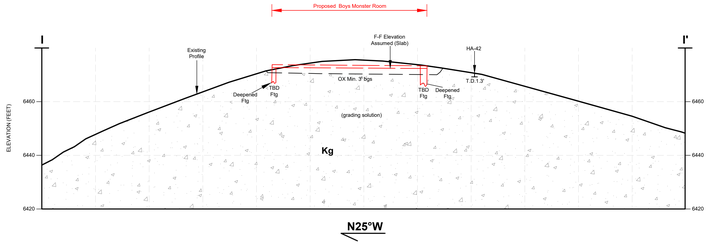


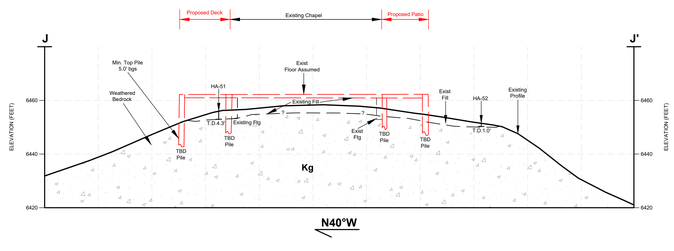


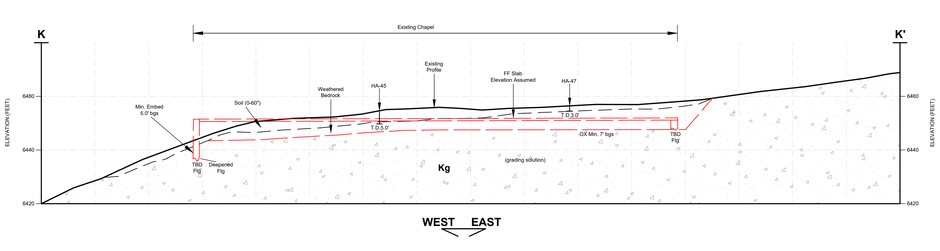


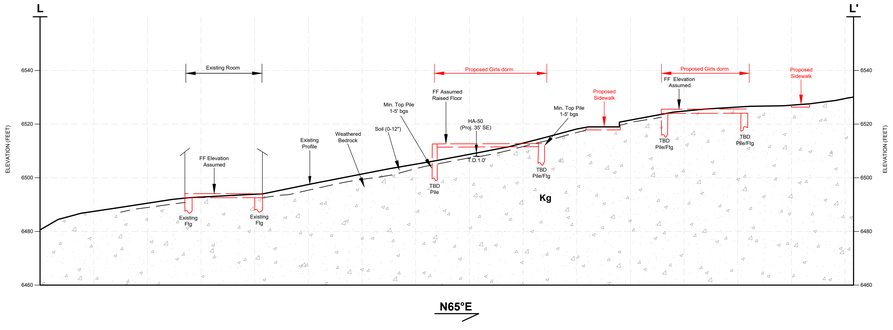


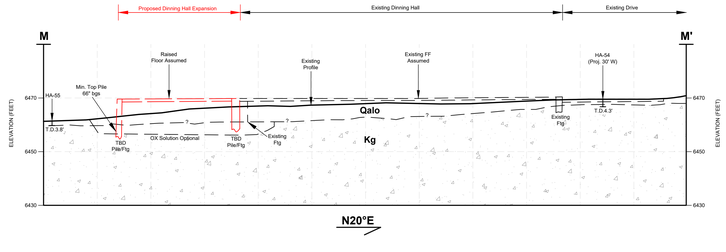






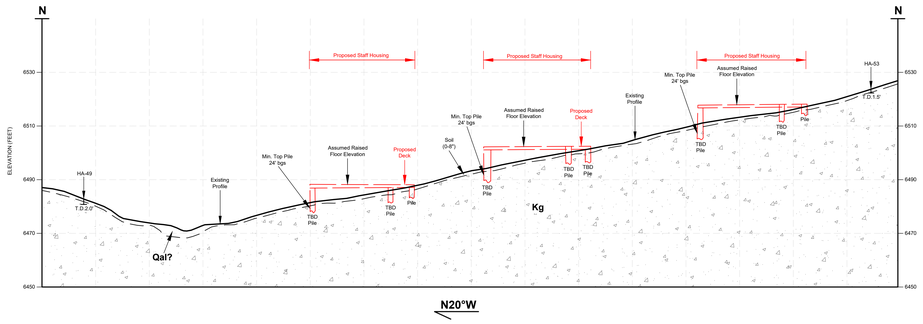


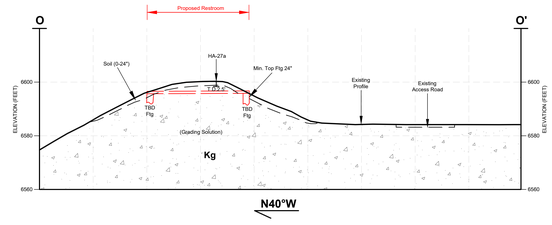


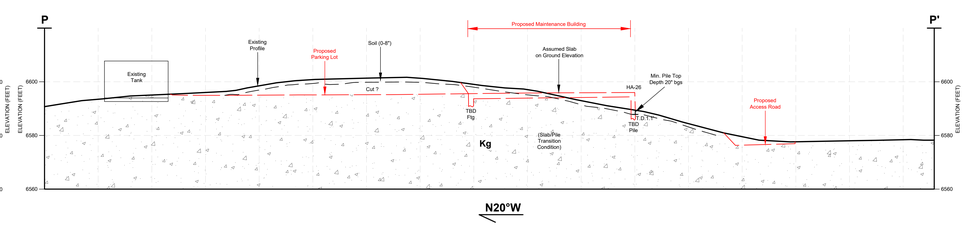


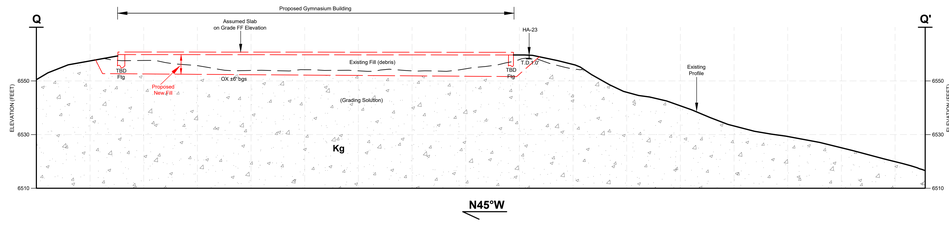
GEOTECHNICAL CROSS SECTIONS A-A' THROUGH M-M' Hume Socal Green Valley Lake, California	PLATE 2
	Scale: 1"=20'
	Date: December 2023
Leighton	Proj: 13655.001
	Eng/Geol: JLH

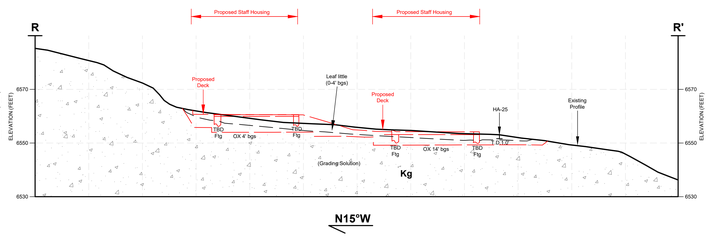
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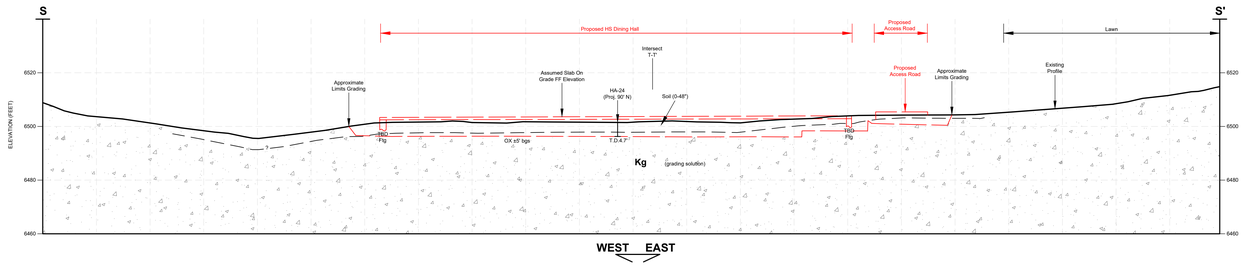


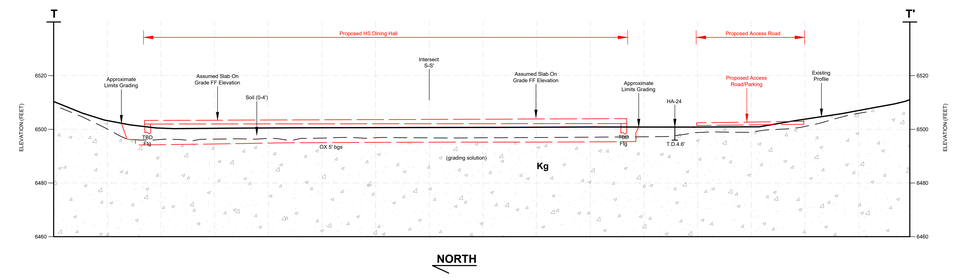


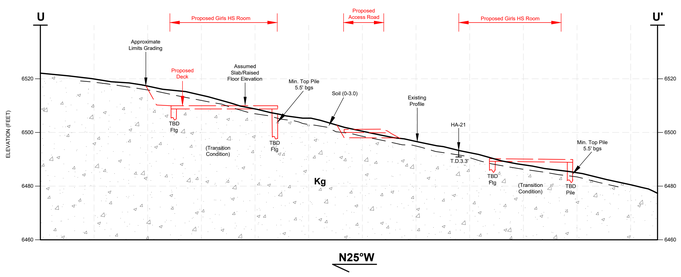


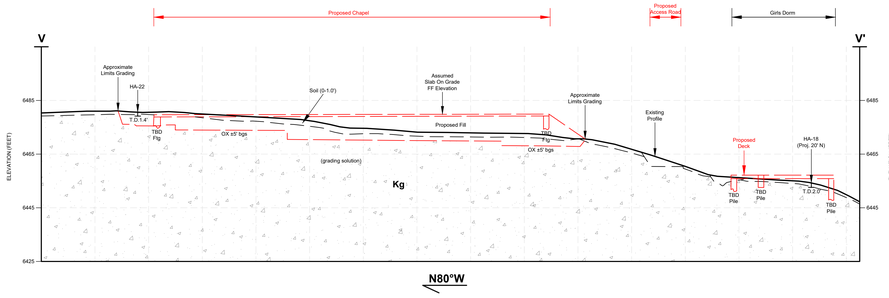


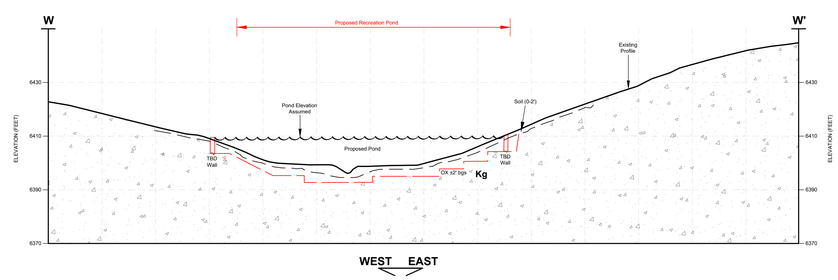


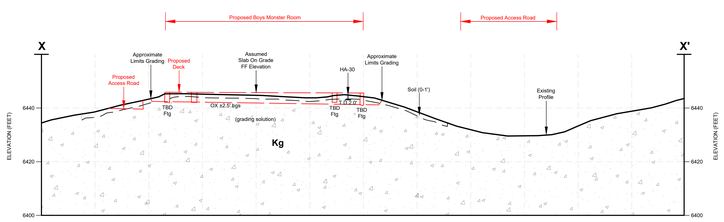


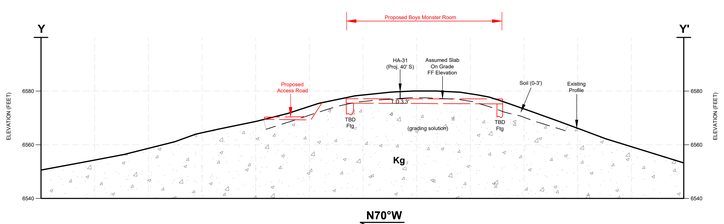


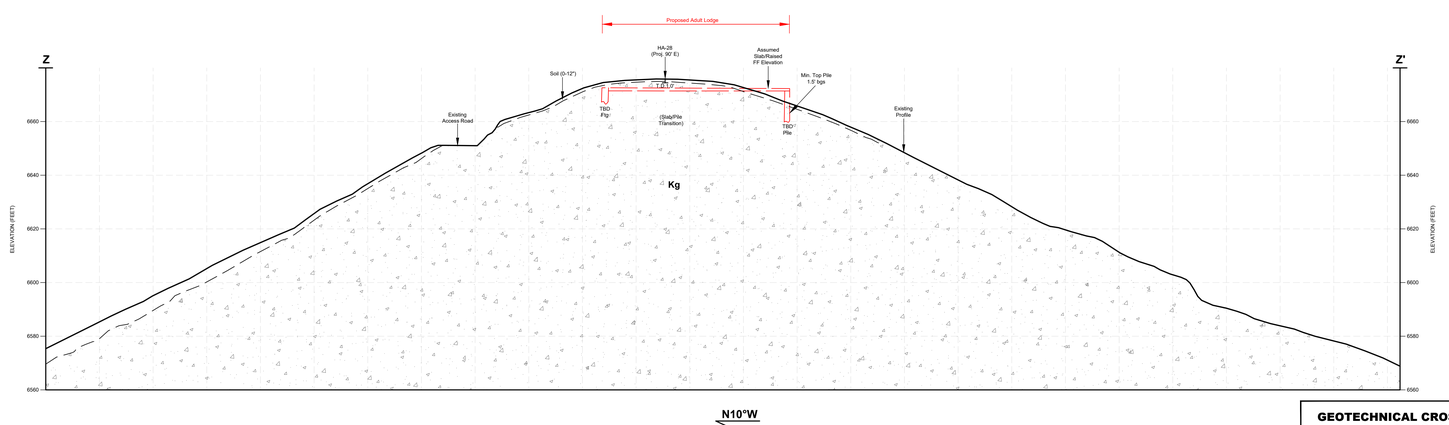












GEOTECHNICAL CROSS SECTIONS N-N' THROUGH Z-Z'

Hume Socal
Green Valley Lake, California

PLATE 3

Scale: 1"=20'

Date: December 2023

Leighton

Proj: 13655.001

Eng/Geol: JLH

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APPENDIX A

REFERENCES

APPENDIX A

REFERENCES

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APPENDIX B1

AUGER BORING SUMMARY

APPENDIX B - AUGER BORING SUMMARY

	Boring No.	TD (inches)	Soil (inches)	Weathered Bedrock	Harder Bedrock (inches)	Contingent Harder Bedrock (+6 inches) Top Pile Embedment	Location	Condition	Sample	Reference Cross Section	Prefered Structrual Support Solution
WILDWOOD CAMP	HA-1	16	0-10	10-16	16	22	Girls Dorm	Ridgeline Nose TOS			
	HA-2	18	0-16	16-18	18	24	Girls Restroom/Showers	Ridgeline TOS		A-A'	Piles
	HA-3	20	0-20	20-24	24	30	G. Dining Canopy	Ridgeline TOS to SE Facing 3:1	MB-1		
	HA-4	12	0-6	6-12	12	18	Girls Dorm	Ridgeline TOS to SE Facing 3:1			
	HA-5a/b	12	0-8	8-12	12	18	Access Road	Ridgeline TOS	MB-2/3		
	HA-6	6	0-6	6-8	8	14	Pool	Mid-Slope Terrace		B-B'	piles & grading
	HA-7	24	0-12	12-24	24	30	Boys Restroom/Showers	Mid-Slope Terrace			
	HA-8	28	0-20	20-28	28	34	Boys Dorm	S. Facing Slope 3:1			
	HA-9	6	6	0-6	6	12	Access Road	Existing Road level	MB-4a/b/c		
							Dining Hall			D2-D2'	grading
							Staff Restroom			D2-D2'	piles
							Girls Yort			D2-D2'	piles
ELEMENTARY CAMP	HA-10	28	0-24	24-28	28	34	Boys Restroom/Showers		MB-5	D1-D1'	piles & grading
	HA-11	20	0-16	16-20	20	26	Theater	2:1 west facing slope			
	HA-12	12	0-12		12	18	Pond	crk axis			
	HA-13	16	0-16	72"?	72"?	78?	Pond	n. side pond	refusal		
	HA-14	48	0-40	40-48	48	54	Pond	W. pond			
	HA-15	0-12	0-12	12-24	24	30	Pool	6:1 slope	MB-6	E-E'	grading
	HA-16						Girls Dorm				
	HA-17	54	0-42	54	54	60	Access Road		MB-7a/b		
HS CAMP	HA-18	24	0-24	24-36	36	42	Girls Dorm				
	HA-19								MB-8		
	HA-20	6	0-6	6	6	12	Girls Dorm	gentle slope			
	HA-21	40	0-36	36-40	60	66	Girls Dorm	4:1 slope	MB-9	U-U'	piles & grading
	HA-22	14	0-6	6-14	14	20	Chapel	False knob topo	MB-10	V-V'	grading
	HA-23	8	0-8	8	8	14	Gynmasium	toe of ridge slope		Q-Q'	grading
	HA-24	56	0-48	48-56	60	66	Dining	upper ponded channel lea area	MB-11	S-S'	grading
	HA-25	12	0-12	12	12	18	Staff Housing	Gently slopes	MB-12a/b	R-R'	grading
	HA-26	13	0-8	8-13	13	19	Maintenance Facility	4:1 slope	MB-13	P-P'	piles & grading
	HA-27a	30	0-24	24-30	30	36	Bus Pkg Restroom	1:1 to 2:1 slope	MB-14	O-O'	grading
	HA-27b	10	0-6	6-10	10	16	Bus Pkg Lot	channel axis and side slope	MB-15a		
	HA-28	12	0-12	12	12	18	Adult Lodge	nose of ridge 2:1		Z-Z'	piles & grading
	HA-29	36	0-24	24-36	36	42	Adult Lodge Pkg	saddle between peaks	MB-15b		
	HA-30	24	0-12	12-24	24	30	Boys Monster Dorm	axix of dry creek 5:1 to 2:1 slopes	MB-16	X-X'	grading
	HA-31	40	0-36	30-40	40	46	Boys Monster Dorm	amphatheater-like slope topo	MB-17	Y-Y'	grading
	HA-32	24	0-6	6-24	24	30	Boys Monster Dorm	saddle and W. facing 4:1 slope	MB-19		
JH CAMP	HA-33	52	0-42	42-48	48-52	58	Director Housing	meadow low-land	MB-20		
	HA-34	18	0-14	14-18	18	24	Director housing	terrace portion			
	HA-35	40	0-20	20-40	40	46	Guest Speaker housing	6:1 slope			
							Guest Restroom			F-F'	piles
	HA-36	12	0-12	12	12	18	Welcome Ctr Expansion	parking lot area		G-G'	grading
	HA-37						Gymnasium	existing maint/equip yard	gentle mesa slope	H-H'	piles & grading
	HA-38	24	0	0-24	24	30	Gymnasium	existing maint/equip yard	MB-21a	H-H'	piles & grading
	HA-39	48	0-48	48	48	56	Gymnasium	existing maint/equip yard	gentle mesa slope		
	HA-40	48	0-46	46-48	48	56	Gymnasium	existing maint/equip yard	top of 2:1 cut slope		
	HA-41	30	0-12	12-30	30	36	Monster Dorm East	nose of elevated bedrock ridge	existing tent cabin		
	HA-42	16	0-3	3-16			Monster Dorm West	nose of elevated bedrock ridge	MB-21b	I-I'	piles & grading
	HA-43	24	0	0-24	24	30	Dorm south	side slope 3:1	MB-22		
	HA-44	46	0-30	30-46	46	52	Chapel	level adja existing bldg	MB-24		
	HA-45	60	0-48	48-60	60	66	Chapel	level adja existing bldg	MB-23	K-K'	piles & grading
	HA-46	48	0-48	48-60	60	66	Chapel	TOP OF SLOPE			
	HA-47	36	0-36	36	36	42	Chapel	level adja existing bldg			
	HA-48	24	0-18	18-24	24	30	Chapel	sloped area perimeter			
	HA-49	24	0-3	3-24	24	30	Girls Dorm	sloped area w. 3:1	MB-25		
	HA-50	12	0-3	3-12	12	18	Girls Dorm	sloped area w. 3:1	MB-26	L-L'	piles
	HA-51	52	0-52	52	56	62	NW Chapel Deck	flat mesa	MB-27		
	HA-52a	12	0-12	12	12	18	NE Chapel Deck	flat mesa		J-J'	piles
	HA-52d	6	0	0-6	6	12	Adult Lodge Access Rd	flat mesa	MB-28		
	HA-53	18	0-8	8-18	18	24	Staff Housing	4:1 slope	MB-29	N-N'	piles
	HA-54	54	0-36	36-54	54	60	NE Dining Hall	2:1 slope	MB-30		
	HA-55	44	0-60	60	60	66	Staff Dining Hall	sloped terrace	MB-31	M-M'	grading

APPENDIX B2

FIELD EXPLORATION

Our exploration included a reconnaissance of accessible site areas to evaluate access and observe general geologic conditions and potential hazards. Once a conceptual site plan become available, our staff advanced a total of 55 small diameter borings were advanced using manual hand auger equipment and breaker bar efforts. The borings were cited in areas of planned improvements, and are generally representative of surrounding conditions. The borings were drilled until refusal in bedrock was encountered, typically less than 5 feet below the existing ground surface. Encountered soils were continuously logged in the field by our representative and described in accordance with the Unified Soil Classification System (ASTM D2488). A description of soil properties encountered in each boring and other related information are documented in a spreadsheet attached as Appendix B, *Auger Boring Log Summary*. Boring locations are plotted on attached Plate 1, *Geotechnical Map*.

Bulk samples of native soil and/or artificial fill were collected from the borings. In addition to representative soils, samples of bedrock were also collected for physical strength testing. Soil samples were transported to our Irvine geotechnical laboratory for geotechnical testing. After sampling and logging, all borings were immediately backfilled with excavated soils.

Boundaries (depths) between soil or geologic units noted on logs are based on field observations and results of geotechnical laboratory tests. The resultant logs were incorporated into a series of 27 cross sections. The sections depict the existing surface profile, distribution of underlying soil and bedrock, the footprint of proposed buildings with assumed floor elevations, and conceptualized layout of foundation types suitable for the prevailing conditions.

It is possible that passage of time could alter conditions due to environmental changes, fluctuations in groundwater, or occurrence of a significant geological event such as an earthquake.

APPENDIX C

LABORATORY TEST DATA

TESTS for SULFATE CONTENT
CHLORIDE CONTENT and pH of SOILS

Project Name: Hume SoCal Camp | Tested By : GEB/GB | Date: 08/16/23

Project No. : 13655.001 | Checked By: J. Ward | Date: 10/19/23

Boring No.	HA-5a	HA-15	HA-19	HA-27
Sample No.	MB-2a & b	MB-6	MB-8	MB-14
Sample Depth (ft)	0-12"	12-24"	12-16"	24-30"
Soil Identification:	Brownish gray SM, organics	Olive yellow SP	Olive yellow SP, organics	Olive yellow SP
Wet Weight of Soil + Container (g)	131.27	206.97	207.30	202.63
Dry Weight of Soil + Container (g)	129.32	201.06	199.07	198.23
Weight of Container (g)	52.66	57.50	59.21	61.62
Moisture Content (%)	2.54	4.12	5.88	3.22
Weight of Soaked Soil (g)	100.73	100.39	100.15	100.76

SULFATE CONTENT, DOT California Test 417, Part II

Beaker No.	404	5	8	17
Crucible No.	305	6	9	7
Furnace Temperature (°C)	860	860	860	860
Time In / Time Out	8:00/8:45	8:00/8:45	8:00/8:45	8:00/8:45
Duration of Combustion (min)	45	45	45	45
Wt. of Crucible + Residue (g)	60.8511	25.7529	22.5071	22.7095
Wt. of Crucible (g)	60.8494	25.7463	22.5021	22.7072
Wt. of Residue (g) (A)	0.0017	0.0066	0.0050	0.0023
PPM of Sulfate (A) x 41150	69.95	271.59	205.75	94.64
PPM of Sulfate, Dry Weight Basis	**72**	**283**	**219**	**98**

CHLORIDE CONTENT, DOT California Test 422

ml of Extract For Titration (B)	30	15	30	30
ml of $AgNO_3$ Soln. Used in Titration (C)	1.6	0.4	0.7	0.6
PPM of Chloride (C -0.2) * 100 * 30 / B	140	40	50	40
PPM of Chloride, Dry Wt. Basis	**144**	**42**	**53**	**41**

pH TEST, DOT California Test 643

pH Value	**5.68**	**5.33**	**5.37**	**5.88**
Temperature °C	22.0	22.7	22.7	22.5

SOIL RESISTIVITY TEST

DOT CA TEST 643

Project Name:	Hume SoCal Camp		Tested By :	G. Berdy	Date: 08/22/23
Project No. :	13655.001		Checked By:	J. Ward	Date: 10/19/23
Boring No.:	HA-5a		Depth (ft.) :	0-12"	
Sample No. :	MB-2a & b				

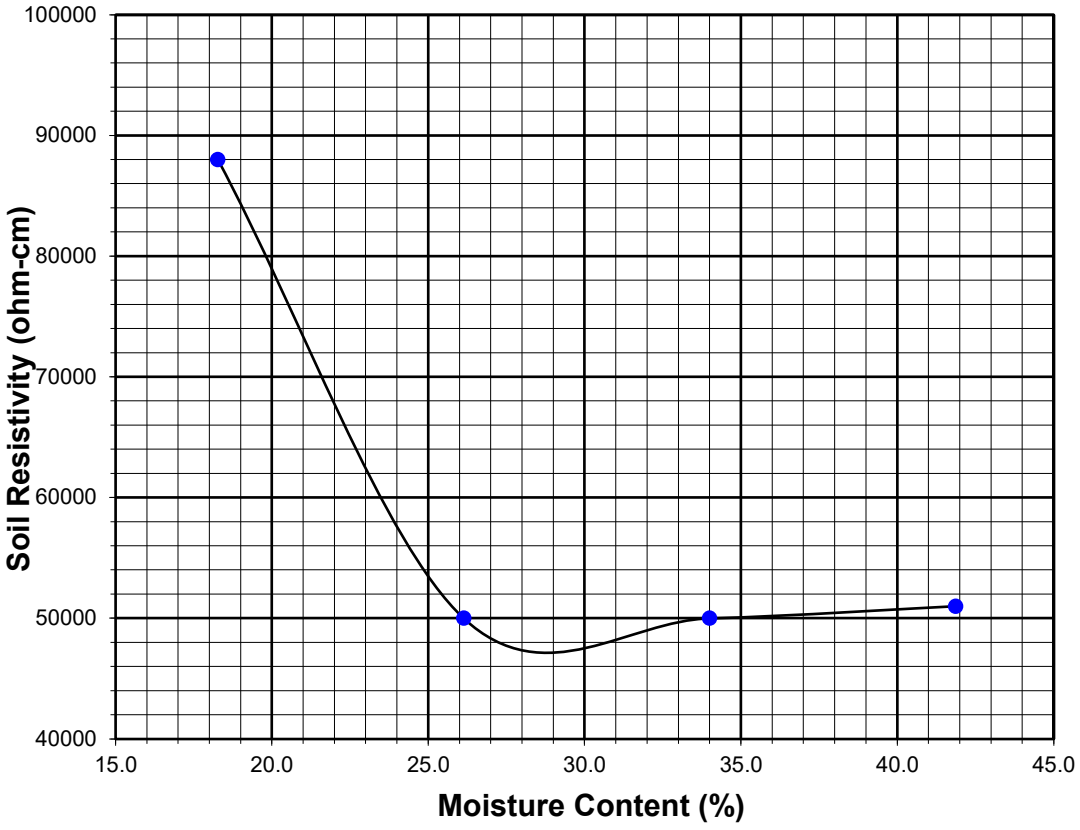
Soil Identification:* Brownish gray SM, organics

*California Test 643 requires soil specimens to consist only of portions of samples passing through the No. 8 US Standard Sieve before resistivity testing. Therefore, this test method may not be representative for coarser materials.

Specimen No.	Water Added (ml) (Wa)	Adjusted Moisture Content (MC)	Resistance Reading (ohm)	Soil Resistivity (ohm-cm)
1	20	18.27	88000	88000
2	30	26.14	50000	50000
3	40	34.00	50000	50000
4	50	41.86	51000	51000
5				

Moisture Content (%) (MCi)	2.54
Wet Wt. of Soil + Cont. (g)	131.27
Dry Wt. of Soil + Cont. (g)	129.32
Wt. of Container (g)	52.66
Container No.	
Initial Soil Wt. (g) (Wt)	130.40
Box Constant	1.000
MC =(((1+Mci/100)x(Wa/Wt+1))-1)x100	

Min. Resistivity (ohm-cm)	Moisture Content (%)	Sulfate Content (ppm)	Chloride Content (ppm)	Soil pH	
				pH	Temp. (°C)
DOT CA Test 643		DOT CA Test 417 Part II	DOT CA Test 422	DOT CA Test 643	
47000	**28.8**	**72**	**144**	**5.68**	**22.0**



SOIL RESISTIVITY TEST

DOT CA TEST 643

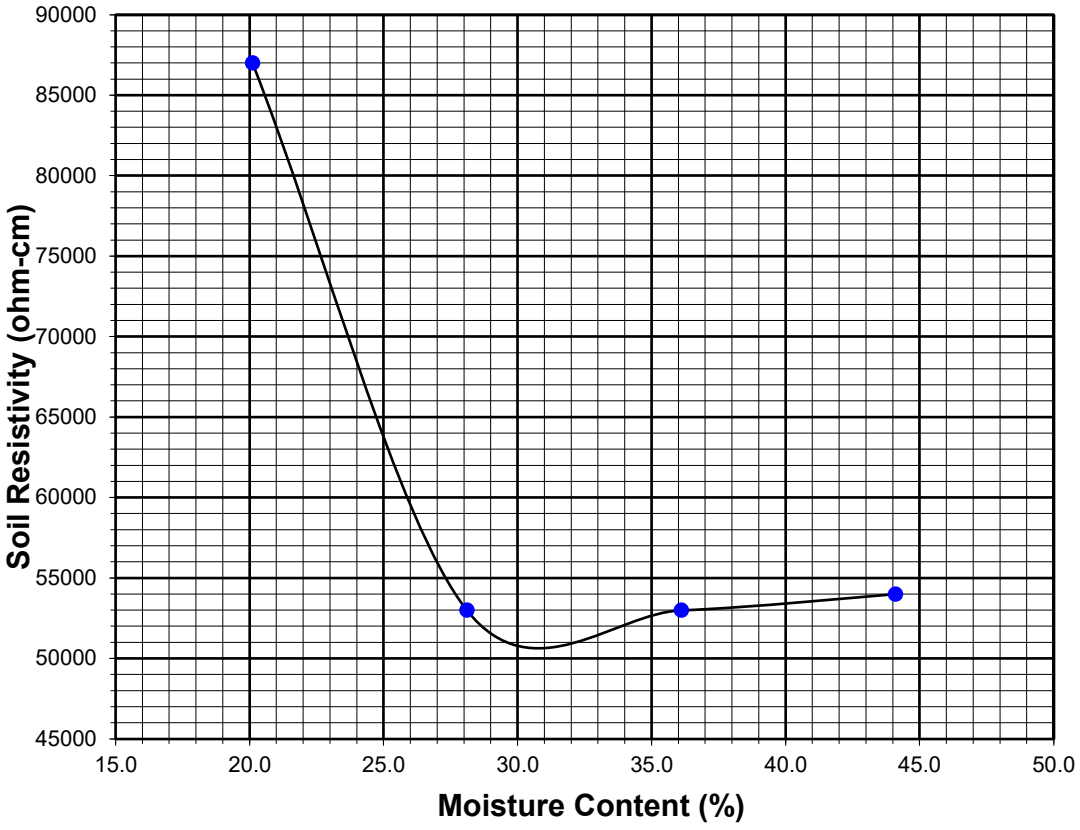
Project Name:	Hume SoCal Camp		Tested By :	G. Berdy	Date: 08/22/23
Project No. :	13655.001		Checked By:	J. Ward	Date: 10/19/23
Boring No.:	HA-15		Depth (ft.) :	12-24"	
Sample No. :	MB-6				
Soil Identification:*	Olive yellow SP				

*California Test 643 requires soil specimens to consist only of portions of samples passing through the No. 8 US Standard Sieve before resistivity testing. Therefore, this test method may not be representative for coarser materials.

Specimen No.	Water Added (ml) (Wa)	Adjusted Moisture Content (MC)	Resistance Reading (ohm)	Soil Resistivity (ohm-cm)
1	20	20.11	87000	87000
2	30	28.11	53000	53000
3	40	36.11	53000	53000
4	50	44.11	54000	54000
5				

Moisture Content (%) (MCi)	4.12
Wet Wt. of Soil + Cont. (g)	206.97
Dry Wt. of Soil + Cont. (g)	201.06
Wt. of Container (g)	57.50
Container No.	
Initial Soil Wt. (g) (Wt)	130.18
Box Constant	1.000
MC =(((1+Mci/100)x(Wa/Wt+1))-1)x100	

Min. Resistivity (ohm-cm)	Moisture Content (%)	Sulfate Content (ppm)	Chloride Content (ppm)	Soil pH	
				pH	Temp. (°C)
DOT CA Test 643		DOT CA Test 417 Part II	DOT CA Test 422	DOT CA Test 643	
50500	**30.7**	**283**	**42**	**5.33**	**22.7**



SOIL RESISTIVITY TEST

DOT CA TEST 643

Project Name:	Hume SoCal Camp		Tested By :	G. Berdy	Date: 08/22/23
Project No. :	13655.001		Checked By:	J. Ward	Date: 10/19/23
Boring No.:	HA-19		Depth (ft.) :	12-16"	
Sample No. :	MB-8				

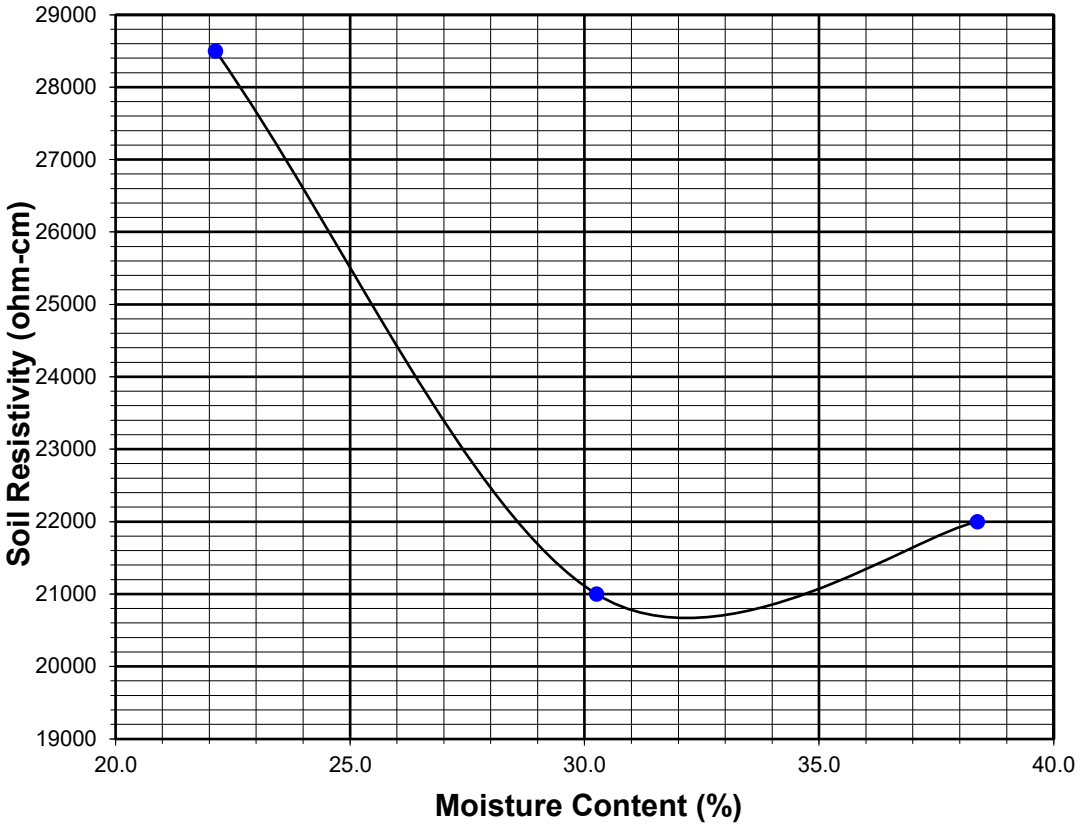
Soil Identification:* Olive yellow SP, organics

*California Test 643 requires soil specimens to consist only of portions of samples passing through the No. 8 US Standard Sieve before resistivity testing. Therefore, this test method may not be representative for coarser materials.

Specimen No.	Water Added (ml) (Wa)	Adjusted Moisture Content (MC)	Resistance Reading (ohm)	Soil Resistivity (ohm-cm)
1	20	22.13	28500	28500
2	30	30.25	21000	21000
3	40	38.38	22000	22000
4				
5				

Moisture Content (%) (MCi)	5.88
Wet Wt. of Soil + Cont. (g)	207.30
Dry Wt. of Soil + Cont. (g)	199.07
Wt. of Container (g)	59.21
Container No.	
Initial Soil Wt. (g) (Wt)	130.35
Box Constant	1.000
MC =(((1+Mci/100)x(Wa/Wt+1))-1)x100	

Min. Resistivity (ohm-cm)	Moisture Content (%)	Sulfate Content (ppm)	Chloride Content (ppm)	Soil pH	
				pH	Temp. (°C)
DOT CA Test 643		DOT CA Test 417 Part II	DOT CA Test 422	DOT CA Test 643	
20600	**32.1**	**219**	**53**	**5.37**	**22.7**



SOIL RESISTIVITY TEST

DOT CA TEST 643

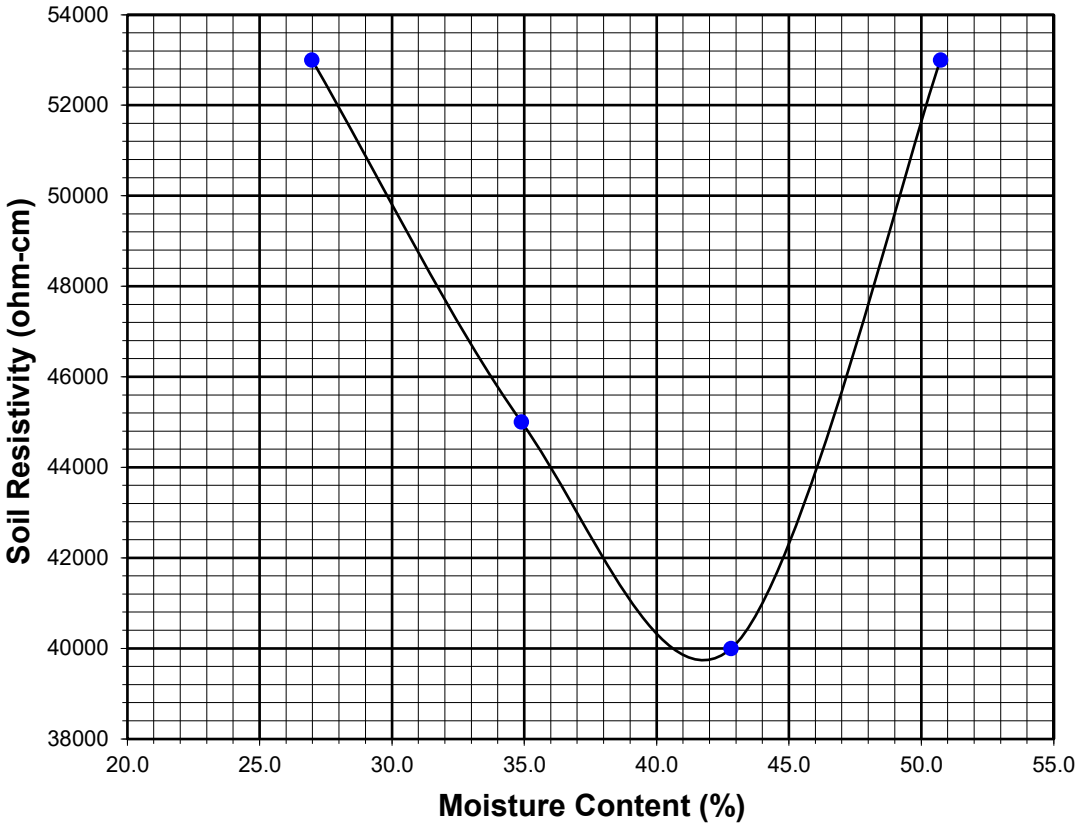
Project Name:	Hume SoCal Camp		Tested By :	G. Berdy	Date: 08/22/23
Project No. :	13655.001		Checked By:	J. Ward	Date: 10/19/23
Boring No.:	HA-27		Depth (ft.) :	24-30"	
Sample No. :	MB-14				
Soil Identification:*	Olive yellow SP				

*California Test 643 requires soil specimens to consist only of portions of samples passing through the No. 8 US Standard Sieve before resistivity testing. Therefore, this test method may not be representative for coarser materials.

Specimen No.	Water Added (ml) (Wa)	Adjusted Moisture Content (MC)	Resistance Reading (ohm)	Soil Resistivity (ohm-cm)
1	30	26.98	53000	53000
2	40	34.89	45000	45000
3	50	42.81	40000	40000
4	60	50.73	53000	53000
5				

Moisture Content (%) (MCi)	3.22
Wet Wt. of Soil + Cont. (g)	202.63
Dry Wt. of Soil + Cont. (g)	198.23
Wt. of Container (g)	61.62
Container No.	
Initial Soil Wt. (g) (Wt)	130.36
Box Constant	1.000
MC =(((1+Mci/100)x(Wa/Wt+1))-1)x100	

Min. Resistivity (ohm-cm)	Moisture Content (%)	Sulfate Content (ppm)	Chloride Content (ppm)	Soil pH	
				pH	Temp. (°C)
DOT CA Test 643		DOT CA Test 417 Part II	DOT CA Test 422	DOT CA Test 643	
39600	**41.8**	**98**	**41**	**5.88**	**22.5**



TESTS for SULFATE CONTENT
CHLORIDE CONTENT and pH of SOILS

Project Name: Hume SoCal Camp | Tested By : G. Berdy | Date: 08/16/23

Project No. : 13655.001 | Checked By: J. Ward | Date: 10/19/23

Boring No.	HA-37	HA-17		
Sample No.	MB-22a	MB-31		
Sample Depth (ft)	16-24"	36-40"		
Soil Identification:	Olive yellow SP, organics	Olive yellow SP, organics		
Wet Weight of Soil + Container (g)	159.39	218.25		
Dry Weight of Soil + Container (g)	151.89	211.60		
Weight of Container (g)	59.21	59.16		
Moisture Content (%)	8.09	4.36		
Weight of Soaked Soil (g)	100.12	100.12		

SULFATE CONTENT, DOT California Test 417, Part II

Beaker No.	403	92		
Crucible No.	4	2		
Furnace Temperature (°C)	860	860		
Time In / Time Out	8:00/8:45	8:00/8:45		
Duration of Combustion (min)	45	45		
Wt. of Crucible + Residue (g)	21.6323	28.7231		
Wt. of Crucible (g)	21.6301	28.7190		
Wt. of Residue (g) (A)	0.0022	0.0041		
PPM of Sulfate (A) x 41150	90.53	168.71		
PPM of Sulfate, Dry Weight Basis	**99**	**176**		

CHLORIDE CONTENT, DOT California Test 422

ml of Extract For Titration (B)	30	30		
ml of AgNO3 Soln. Used in Titration (C)	0.6	1.4		
PPM of Chloride (C -0.2) * 100 * 30 / B	40	120		
PPM of Chloride, Dry Wt. Basis	**44**	**125**		

pH TEST, DOT California Test 643

pH Value	**5.33**	**5.40**		
Temperature °C	22.8	22.6		

SOIL RESISTIVITY TEST

DOT CA TEST 643

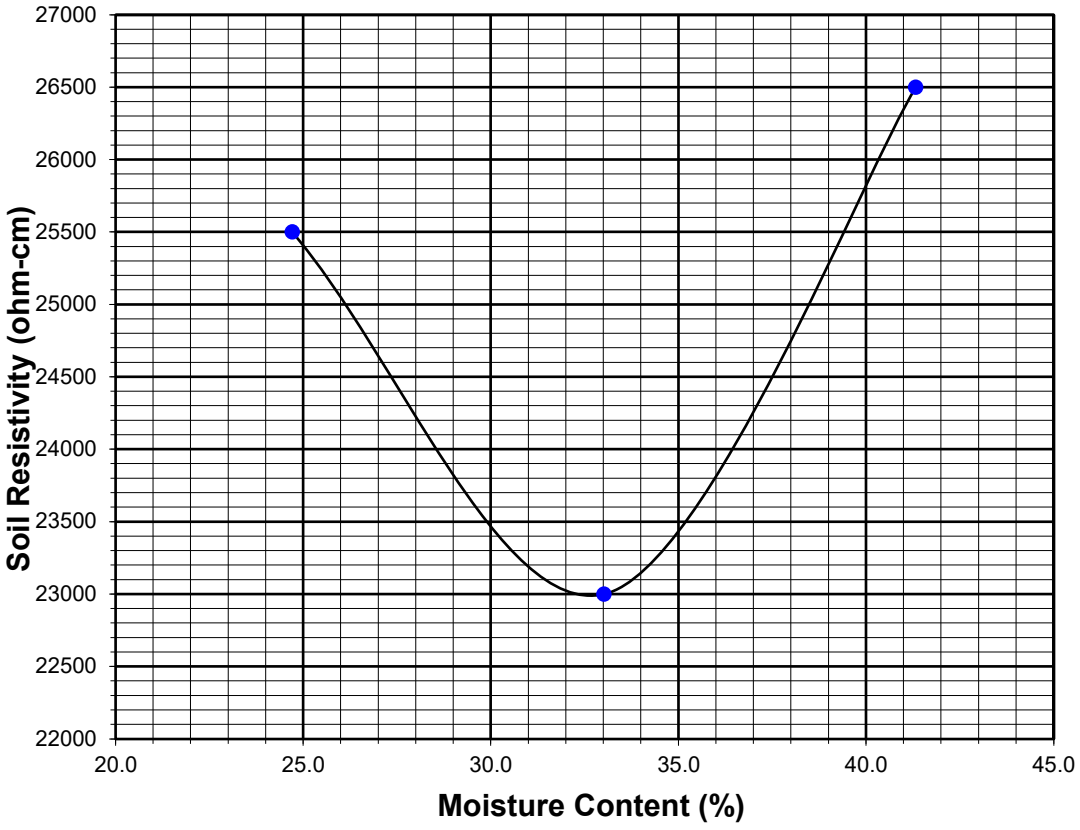
Project Name:	Hume SoCal Camp		Tested By :	G. Berdy	Date: 08/22/23
Project No. :	13655.001		Checked By:	J. Ward	Date: 10/19/23
Boring No.:	HA-37		Depth (ft.) :	16-24"	
Sample No. :	MB-22a				
Soil Identification:*	Olive yellow SP, organics				

*California Test 643 requires soil specimens to consist only of portions of samples passing through the No. 8 US Standard Sieve before resistivity testing. Therefore, this test method may not be representative for coarser materials.

Specimen No.	Water Added (ml) (Wa)	Adjusted Moisture Content (MC)	Resistance Reading (ohm)	Soil Resistivity (ohm-cm)
1	20	24.71	25500	25500
2	30	33.02	23000	23000
3	40	41.33	26500	26500
4				
5				

Moisture Content (%) (MCi)	8.09
Wet Wt. of Soil + Cont. (g)	159.39
Dry Wt. of Soil + Cont. (g)	151.89
Wt. of Container (g)	59.21
Container No.	
Initial Soil Wt. (g) (Wt)	130.10
Box Constant	1.000
MC =(((1+Mci/100)x(Wa/Wt+1))-1)x100	

Min. Resistivity (ohm-cm)	Moisture Content (%)	Sulfate Content (ppm)	Chloride Content (ppm)	Soil pH	
				pH	Temp. (°C)
DOT CA Test 643		DOT CA Test 417 Part II	DOT CA Test 422	DOT CA Test 643	
23000	**32.7**	**99**	**44**	**5.33**	**22.8**



SOIL RESISTIVITY TEST

DOT CA TEST 643

Project Name:	Hume SoCal Camp		Tested By :	G. Berdy	Date: 08/22/23
Project No. :	13655.001		Checked By:	J. Ward	Date: 10/19/23
Boring No.:	HA-17		Depth (ft.) :	36-40"	
Sample No. :	MB-31				

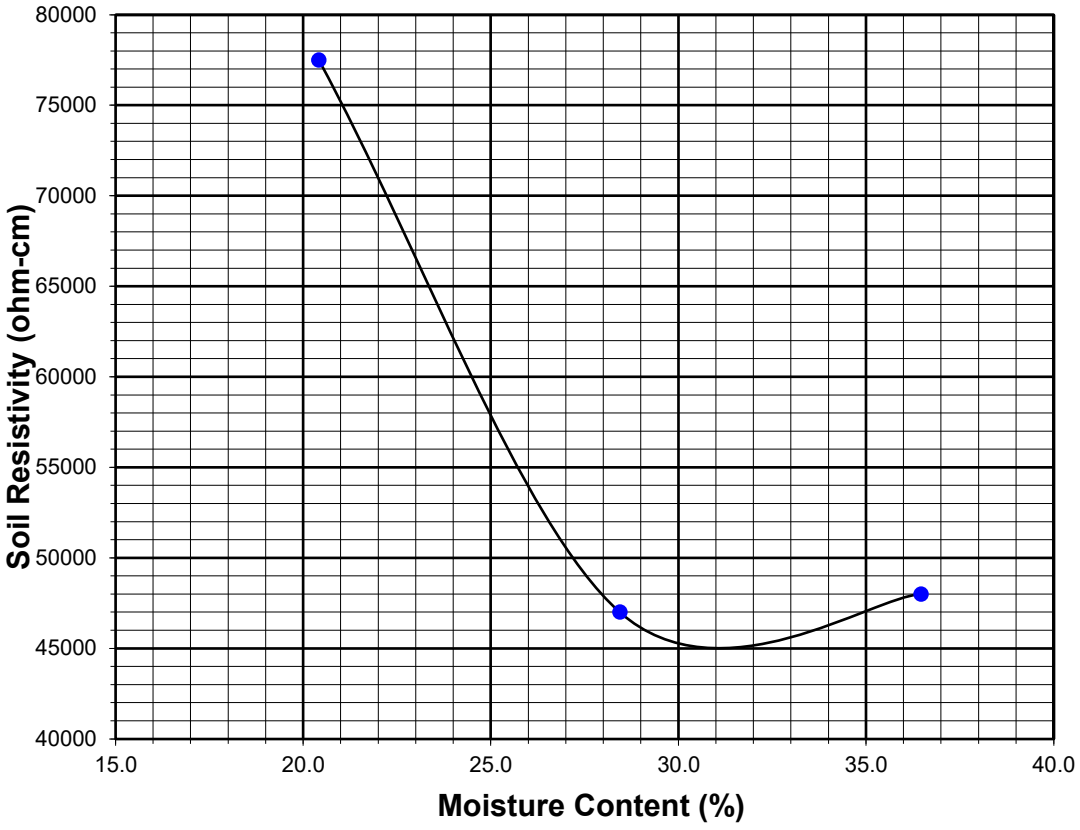
Soil Identification:* Olive yellow SP, organics

*California Test 643 requires soil specimens to consist only of portions of samples passing through the No. 8 US Standard Sieve before resistivity testing. Therefore, this test method may not be representative for coarser materials.

Specimen No.	Water Added (ml) (Wa)	Adjusted Moisture Content (MC)	Resistance Reading (ohm)	Soil Resistivity (ohm-cm)
1	20	20.41	77500	77500
2	30	28.44	47000	47000
3	40	36.47	48000	48000
4				
5				

Moisture Content (%) (MCi)	4.36
Wet Wt. of Soil + Cont. (g)	218.25
Dry Wt. of Soil + Cont. (g)	211.60
Wt. of Container (g)	59.16
Container No.	
Initial Soil Wt. (g) (Wt)	130.03
Box Constant	1.000
MC =(((1+Mci/100)x(Wa/Wt+1))-1)x100	

Min. Resistivity (ohm-cm)	Moisture Content (%)	Sulfate Content (ppm)	Chloride Content (ppm)	Soil pH	
				pH	Temp. (°C)
DOT CA Test 643		DOT CA Test 417 Part II	DOT CA Test 422	DOT CA Test 643	
45000	**31.1**	**176**	**125**	**5.40**	**22.6**

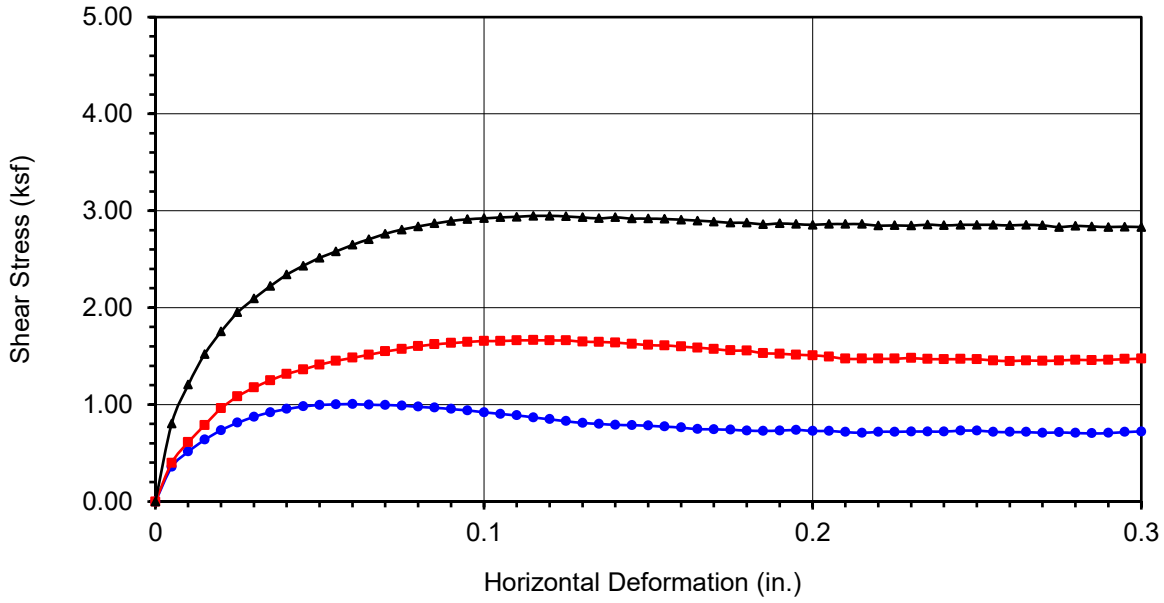


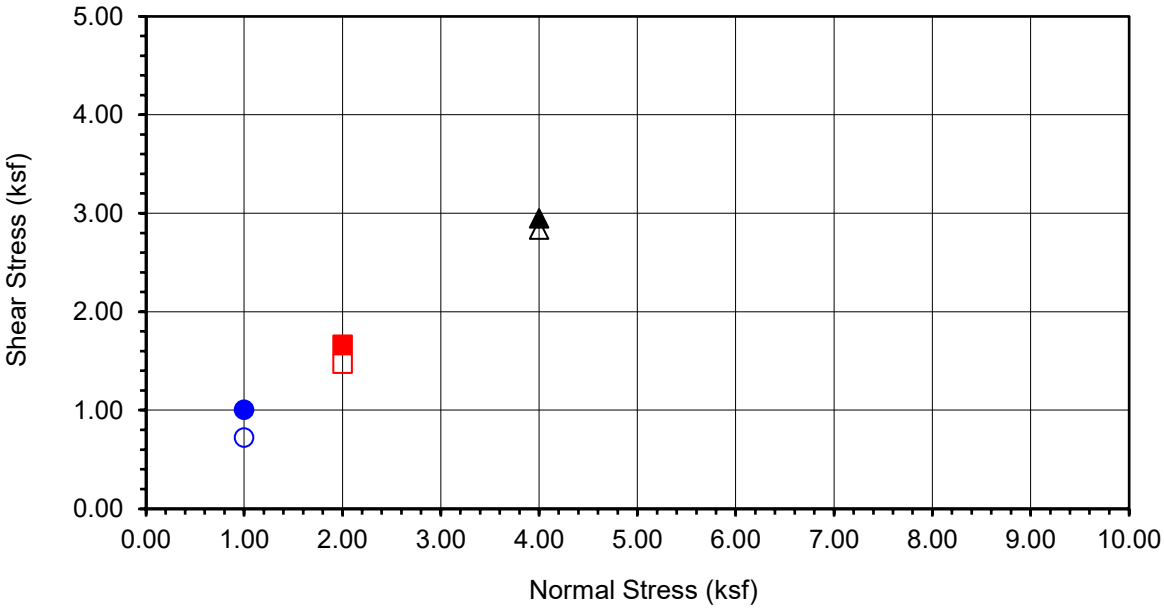
DIRECT SHEAR TEST

Consolidated Drained - ASTM D 3080

Project Name:	Hume SoCal Camp	Tested By:	G. Bathala	Date:	08/18/23
Project No.:	13655.001	Checked By:	J. Ward	Date:	10/19/23
Boring No.:	HA-23, 25a, 25b	Sample Type:	90% Remold		
Sample No.:	MB-11, 12a, 12b	Depth (ft.):	Composite		
Soil Identification:	Dark brown silty sand (SM)				

Sample Diameter(in):	2.415	2.415	2.415
Sample Thickness(in.):	1.000	1.000	1.000
Weight of Sample + ring(gm):	190.07	190.17	189.52
Weight of Ring(gm):	45.53	45.47	44.56
Before Shearing			
Weight of Wet Sample+Cont.(gm):	237.08	237.08	237.08
Weight of Dry Sample+Cont.(gm):	218.92	218.92	218.92
Weight of Container(gm):	64.19	64.19	64.19
Vertical Rdg.(in): Initial	0.2569	0.2315	0.0000
Vertical Rdg.(in): Final	0.2728	0.2531	-0.0276
After Shearing			
Weight of Wet Sample+Cont.(gm):	199.95	220.06	216.26
Weight of Dry Sample+Cont.(gm):	178.70	199.11	195.60
Weight of Container(gm):	52.01	71.79	67.68
Specific Gravity (Assumed):	2.70	2.70	2.70
Water Density(pcf):	62.43	62.43	62.43





Boring No.	**HA-23, 25a, 25b**
Sample No.	**MB-11, 12a, 12b**
Depth (ft)	**Composite**
Sample Type: 90% Remold	
Soil Identification: Dark brown silty sand (SM)	

Normal Stress (kip/ft²)	1.000	2.000	4.000
Peak Shear Stress (kip/ft²)	● 1.006	■ 1.666	▲ 2.949
Shear Stress @ End of Test (ksf)	○ 0.723	□ 1.474	△ 2.833
Deformation Rate (in./min.)	0.0025	0.0025	0.0025
Initial Sample Height (in.)	1.000	1.000	1.000
Diameter (in.)	2.415	2.415	2.415
Initial Moisture Content (%)	11.74	11.74	11.74
Dry Density (pcf)	107.6	107.7	107.9
Saturation (%)	55.9	56.1	56.4
Soil Height Before Shearing (in.)	0.9841	0.9784	0.9724
Final Moisture Content (%)	16.8	16.5	16.2

Leighton

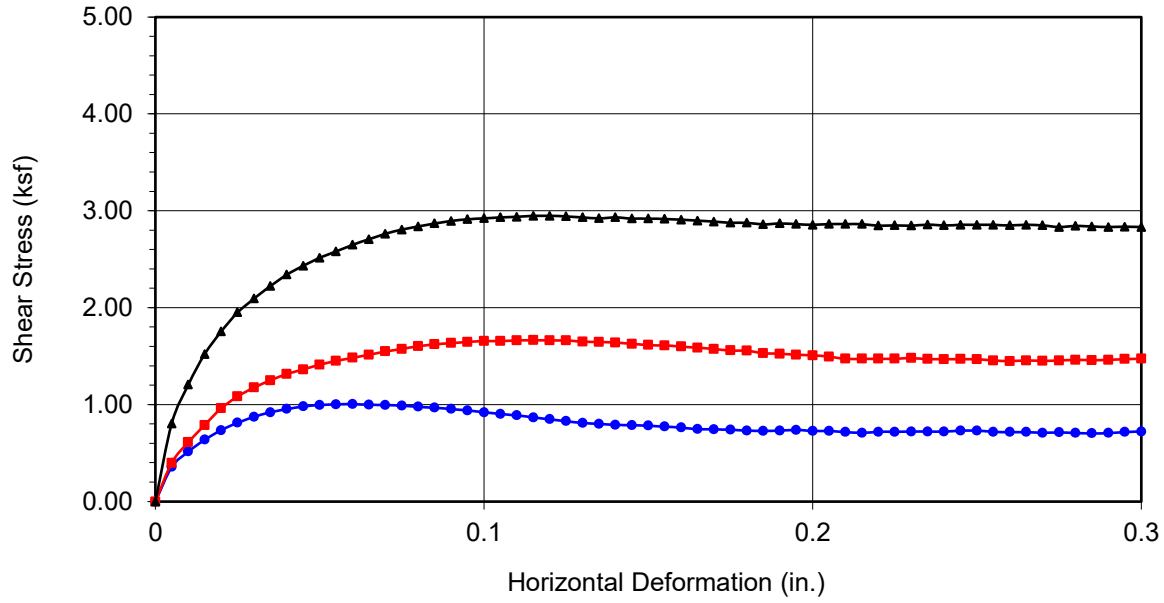
DIRECT SHEAR TEST RESULTS

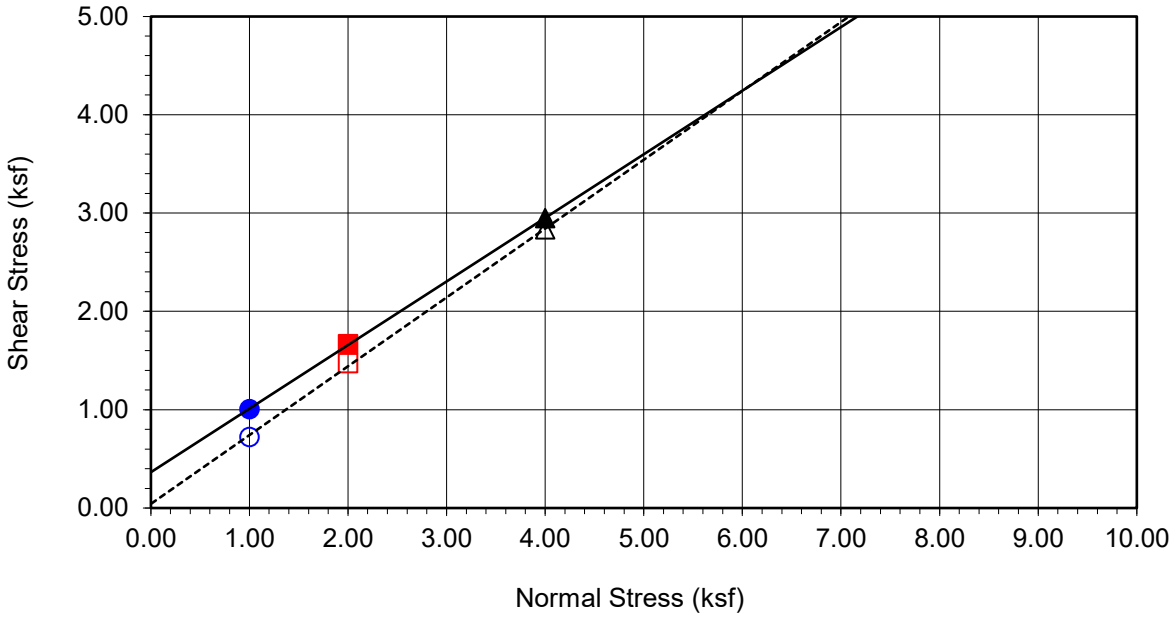
Consolidated Drained - ASTM D 3080

Project No.: 13655.001

Hume SoCal Camp

08-23





Boring No.	**HA-23, 25a, 25b**
Sample No.	**MB-11, 12a, 12b**
Depth (ft)	**Composite**
Sample Type:	90% Remold
Soil Identification:	Dark brown silty sand (SM)

Strength Parameters

	C (psf)	ϕ (°)
Peak	365	33
Ultimate	44	35

Normal Stress (kip/ft²)	1.000	2.000	4.000
Peak Shear Stress (kip/ft²)	● 1.006	■ 1.666	▲ 2.949
Shear Stress @ End of Test (ksf)	○ 0.723	□ 1.474	△ 2.833
Deformation Rate (in./min.)	0.0025	0.0025	0.0025
Initial Sample Height (in.)	1.000	1.000	1.000
Diameter (in.)	2.415	2.415	2.415
Initial Moisture Content (%)	11.74	11.74	11.74
Dry Density (pcf)	107.6	107.7	107.9
Saturation (%)	55.9	56.1	56.4
Soil Height Before Shearing (in.)	0.9841	0.9784	0.9724
Final Moisture Content (%)	16.8	16.5	16.2

Leighton

DIRECT SHEAR TEST RESULTS

Consolidated Drained - ASTM D 3080

Project No.: 13655.001

Hume SoCal Camp

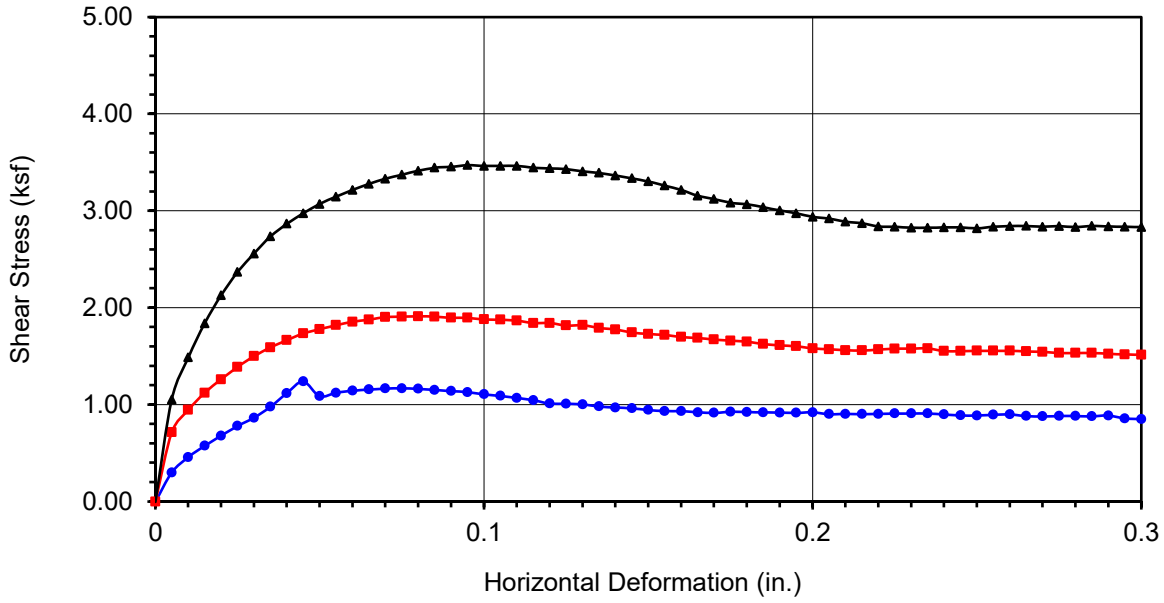
08-23

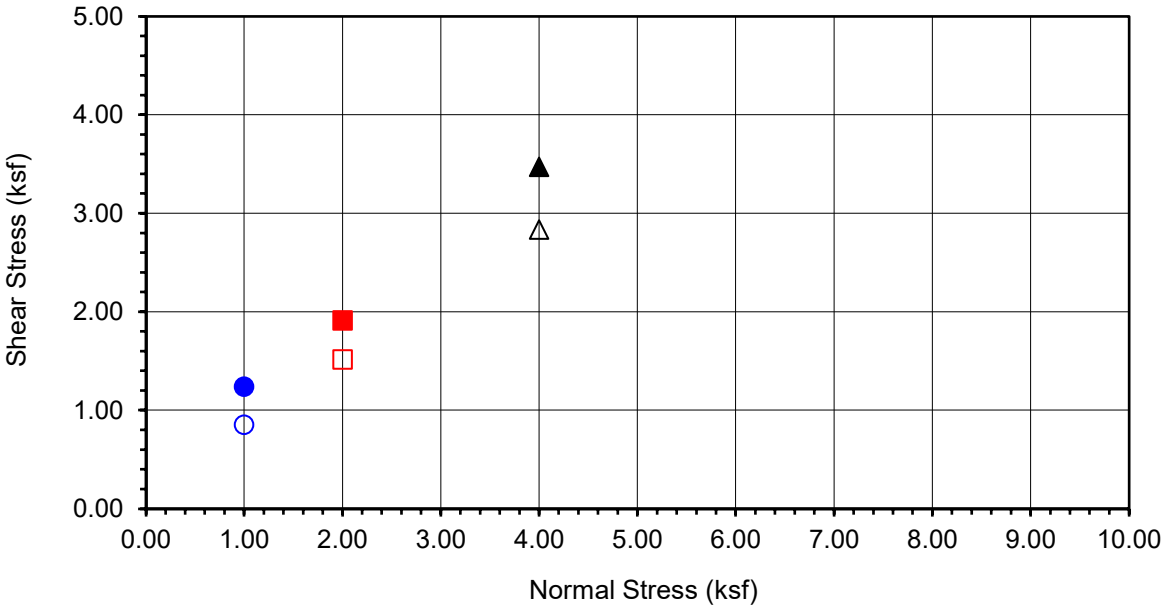
DIRECT SHEAR TEST

Consolidated Drained - ASTM D 3080

Project Name:	Hume SoCal Camp	Tested By:	G. Bathala	Date:	08/18/23
Project No.:	13655.001	Checked By:	J. Ward	Date:	10/19/23
Boring No.:	HA-31, 32, 30	Sample Type:	90% Remold		
Sample No.:	MB-18, 19, 30	Depth (ft.):	Composite		
Soil Identification:	Light brown silty sand (SM)				

Sample Diameter(in):	2.415	2.415	2.415
Sample Thickness(in.):	1.000	1.000	1.000
Weight of Sample + ring(gm):	191.74	190.98	192.11
Weight of Ring(gm):	45.38	44.61	45.58
Before Shearing			
Weight of Wet Sample+Cont.(gm):	168.49	168.49	168.49
Weight of Dry Sample+Cont.(gm):	158.00	158.00	158.00
Weight of Container(gm):	55.81	55.81	55.81
Vertical Rdg.(in): Initial	0.0000	0.2561	0.2530
Vertical Rdg.(in): Final	-0.0109	0.2780	0.2880
After Shearing			
Weight of Wet Sample+Cont.(gm):	219.68	216.64	206.79
Weight of Dry Sample+Cont.(gm):	199.25	196.91	187.37
Weight of Container(gm):	69.44	68.11	57.95
Specific Gravity (Assumed):	2.70	2.70	2.70
Water Density(pcf):	62.43	62.43	62.43





Boring No.	**HA-31, 32, 30**
Sample No.	**MB-18, 19, 30**
Depth (ft)	**Composite**
Sample Type:	
90% Remold	
Soil Identification:	
Light brown silty sand (SM)	

Normal Stress (kip/ft²)	1.000	2.000	4.000
Peak Shear Stress (kip/ft²)	● 1.239	■ 1.911	▲ 3.471
Shear Stress @ End of Test (ksf)	○ 0.852	□ 1.515	△ 2.833
Deformation Rate (in./min.)	0.0033	0.0033	0.0033
Initial Sample Height (in.)	1.000	1.000	1.000
Diameter (in.)	2.415	2.415	2.415
Initial Moisture Content (%)	10.27	10.27	10.27
Dry Density (pcf)	110.4	110.4	110.5
Saturation (%)	52.6	52.6	52.8
Soil Height Before Shearing (in.)	0.9891	0.9781	0.9650
Final Moisture Content (%)	15.7	15.3	15.0

Leighton

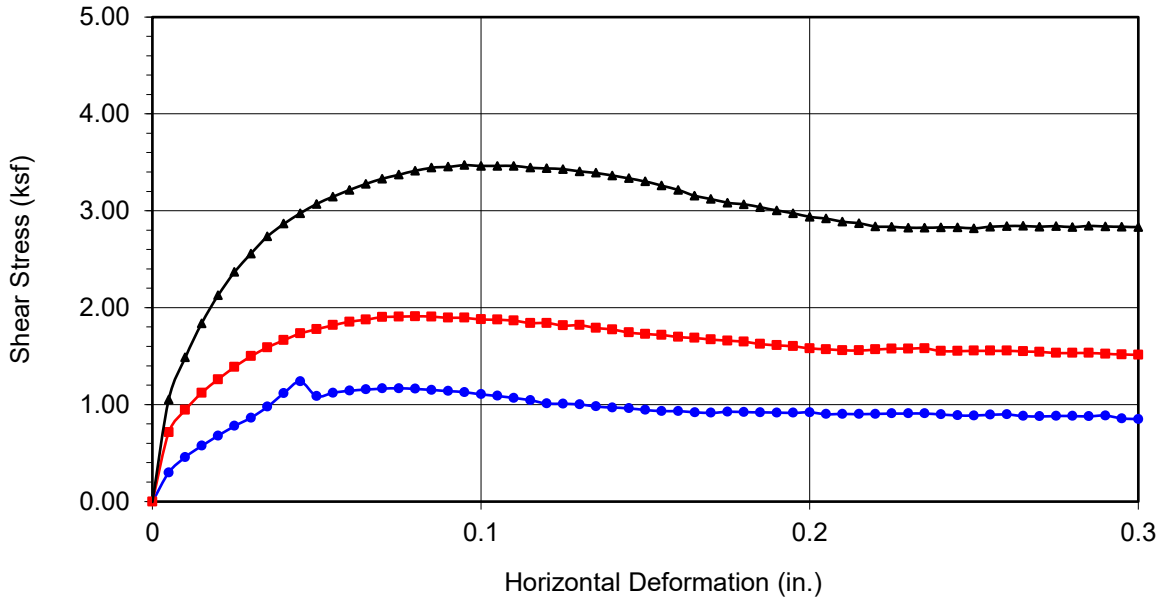
DIRECT SHEAR TEST RESULTS

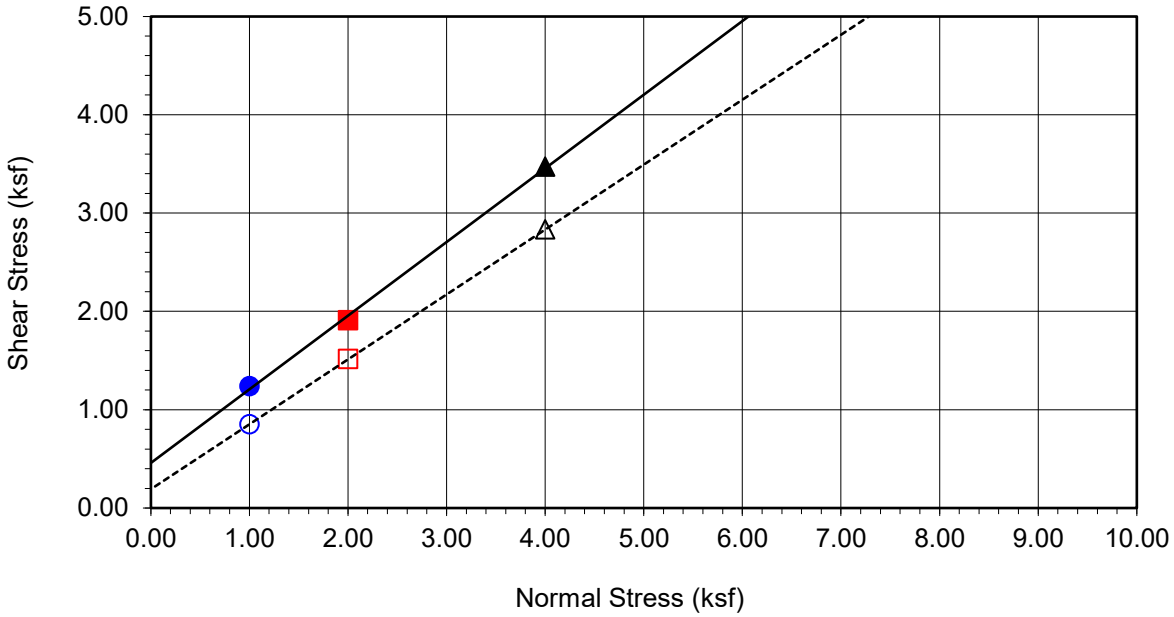
Consolidated Drained - ASTM D 3080

Project No.: 13655.001

Hume SoCal Camp

08-23





Boring No.	**HA-31, 32, 30**
Sample No.	**MB-18, 19, 30**
Depth (ft)	**Composite**
Sample Type:	90% Remold
Soil Identification:	Light brown silty sand (SM)

Strength Parameters

	C (psf)	ϕ (°)
Peak	459	37
Ultimate	193	33

Normal Stress (kip/ft²)	1.000	2.000	4.000
Peak Shear Stress (kip/ft²)	● 1.239	■ 1.911	▲ 3.471
Shear Stress @ End of Test (ksf)	○ 0.852	□ 1.515	△ 2.833
Deformation Rate (in./min.)	0.0033	0.0033	0.0033
Initial Sample Height (in.)	1.000	1.000	1.000
Diameter (in.)	2.415	2.415	2.415
Initial Moisture Content (%)	10.27	10.27	10.27
Dry Density (pcf)	110.4	110.4	110.5
Saturation (%)	52.6	52.6	52.8
Soil Height Before Shearing (in.)	0.9891	0.9781	0.9650
Final Moisture Content (%)	15.7	15.3	15.0

Leighton

DIRECT SHEAR TEST RESULTS

Consolidated Drained - ASTM D 3080

Project No.: 13655.001

Hume SoCal Camp

08-23

MODIFIED PROCTOR COMPACTION TEST

ASTM D 1557

Project Name:	Hume SoCal Camp	Tested By:	A. Santos	Date:	08/17/23
Project No.:	13655.001	Checked By:	ACS/JHW	Date:	08/18/23
Boring No.:	HA-23, HA-25a, HA-25b	Depth (ft.):	Composite		
Sample No.:	MB-11, MB-12a, MB-12b				
Soil Identification:	Dark brown silty sand (SM)				

Note: Corrected dry density calculation assumes specific gravity of 2.70 and moisture content of 1.0% for oversize particles

Preparation Method:	X	Moist	
		Dry	
Compaction Method	X	Mechanical Ram	
		Manual Ram	

Scalp Fraction (%)	
#3/4	
#3/8	
#4	6.1

Rammer Weight (lb.) = 10.0

Height of Drop (in.) = 18.0

Mold Volume (ft³) 0.03320

TEST NO.	1	2	3	4	5	6
Wt. Compacted Soil + Mold (g)	3747	3819	3774			
Weight of Mold (g)	1808	1808	1808			
Net Weight of Soil (g)	1939	2011	1966			
Wet Weight of Soil + Cont. (g)	402.3	418.9	475.4			
Dry Weight of Soil + Cont. (g)	370.1	378.2	421.7			
Weight of Container (g)	39.7	39.2	37.2			
Moisture Content (%)	9.75	12.01	13.97			
Wet Density (pcf)	128.8	133.5	130.5			
Dry Density (pcf)	117.3	119.2	114.6			

Maximum Dry Density (pcf) 119.5

Corrected Dry Density (pcf) 121.7

Optimum Moisture Content (%) 11.4

Corrected Moisture Content (%) 10.8

[X] **Procedure A**
Soil Passing No. 4 (4.75 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
May be used if +#4 is 20% or less

[ ] **Procedure B**
Soil Passing 3/8 in. (9.5 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
Use if +#4 is >20% and +3/8 in. is 20% or less

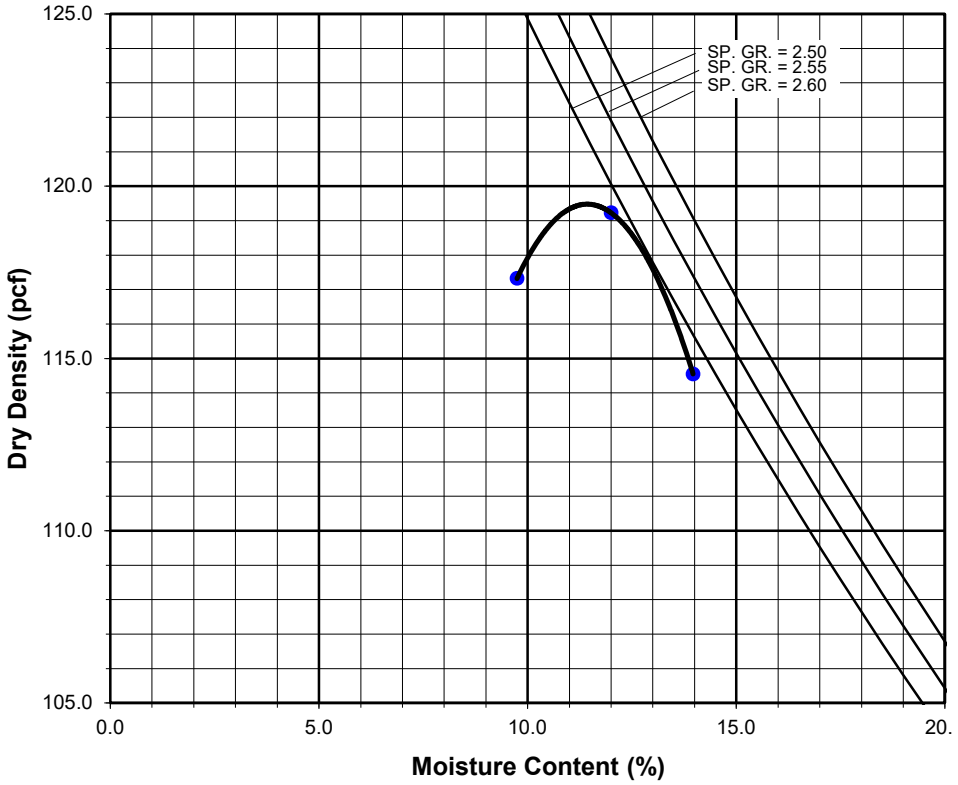
[ ] **Procedure C**
Soil Passing 3/4 in. (19.0 mm) Sieve
Mold : 6 in. (152.4 mm) diameter
Layers : 5 (Five)
Blows per layer : 56 (fifty-six)
Use if +3/8 in. is >20% and +¾ in. is <30%

Particle-Size Distribution:

GR:SA:FI

Atterberg Limits:

LL,PL,PI



MODIFIED PROCTOR COMPACTION TEST

ASTM D 1557

Project Name:	Hume SoCal Camp	Tested By:	A. Santos	Date:	08/17/23
Project No.:	13655.001	Checked By:	ACS/JHW	Date:	08/18/23
Boring No.:	HA-31, HA-32, HA-30	Depth (ft.):	Composite		
Sample No.:	MB-18, MB-19, MB-30				
Soil Identification:	Light brown silty sand (SM)				

Note: Corrected dry density calculation assumes specific gravity of 2.70 and moisture content of 1.0% for oversize particles

Preparation Method:	X	Moist	
		Dry	
Compaction Method	X	Mechanical Ram	
		Manual Ram	

Scalp Fraction (%)	
#3/4	
#3/8	
#4	8.4

Rammer Weight (lb.) = 10.0

Height of Drop (in.) = 18.0

Mold Volume (ft³) 0.03320

TEST NO.	1	2	3	4	5	6
Wt. Compacted Soil + Mold (g)	3737	3834	3844			
Weight of Mold (g)	1808	1808	1808			
Net Weight of Soil (g)	1929	2026	2036			
Wet Weight of Soil + Cont. (g)	623.2	433.7	465.9			
Dry Weight of Soil + Cont. (g)	585.0	397.7	418.8			
Weight of Container (g)	76.7	39.0	39.8			
Moisture Content (%)	7.52	10.03	12.43			
Wet Density (pcf)	128.1	134.5	135.2			
Dry Density (pcf)	119.1	122.3	120.2			

Maximum Dry Density (pcf) 122.3

Corrected Dry Density (pcf) 125.2

Optimum Moisture Content (%) 10.3

Corrected Moisture Content (%) 9.5

[X] **Procedure A**
Soil Passing No. 4 (4.75 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
May be used if +#4 is 20% or less

[ ] **Procedure B**
Soil Passing 3/8 in. (9.5 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
Use if +#4 is >20% and +3/8 in. is 20% or less

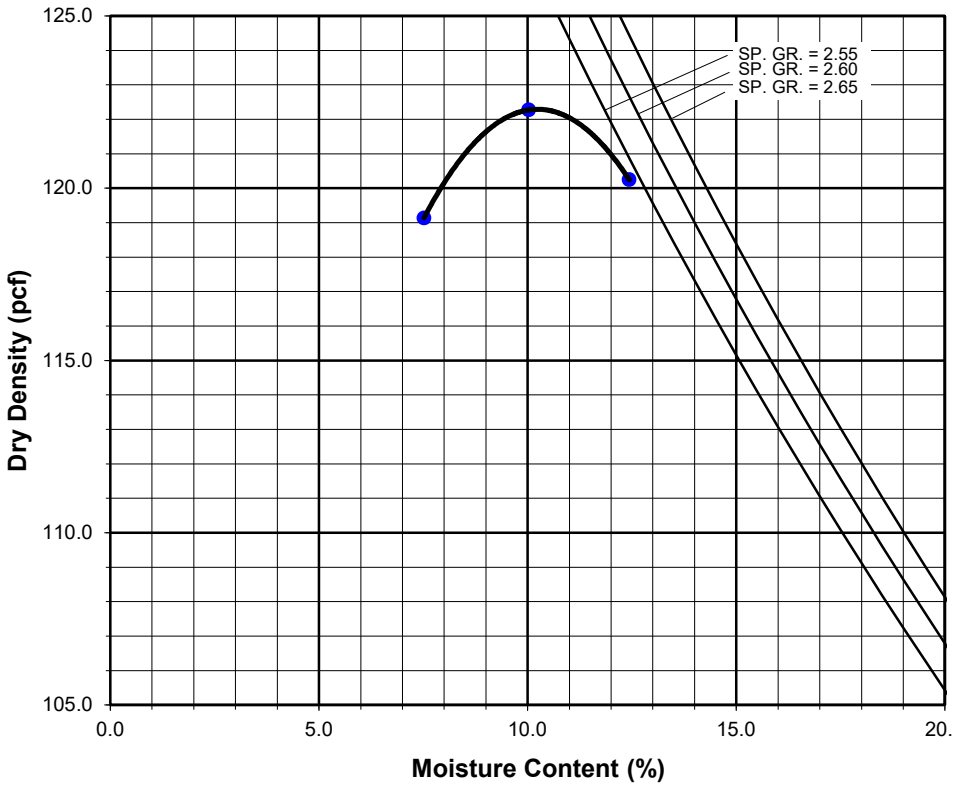
[ ] **Procedure C**
Soil Passing 3/4 in. (19.0 mm) Sieve
Mold : 6 in. (152.4 mm) diameter
Layers : 5 (Five)
Blows per layer : 56 (fifty-six)
Use if +3/8 in. is >20% and +¾ in. is <30%

Particle-Size Distribution:

GR:SA:FI

Atterberg Limits:

LL,PL,PI



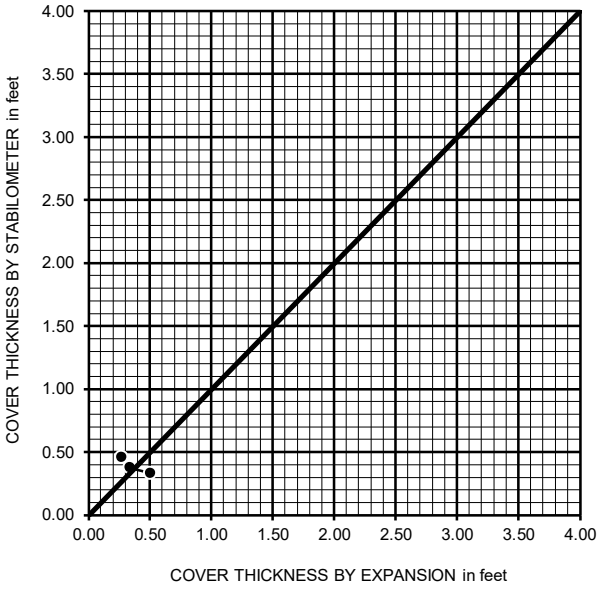
R-VALUE TEST RESULTS
DOT CA Test 301

PROJECT NAME:	Hume SoCal Camp	PROJECT NUMBER:	13655.001
BORING NUMBER:	HA-3, HA-5b, HA-9	DEPTH (FT.):	Composite
SAMPLE NUMBER:	MB-1, MB-3, MB-4	TECHNICIAN:	O. Figueroa
SAMPLE DESCRIPTION:	Brown poorly-graded sand with silt (SP-SM)	DATE COMPLETED:	8/23/2023

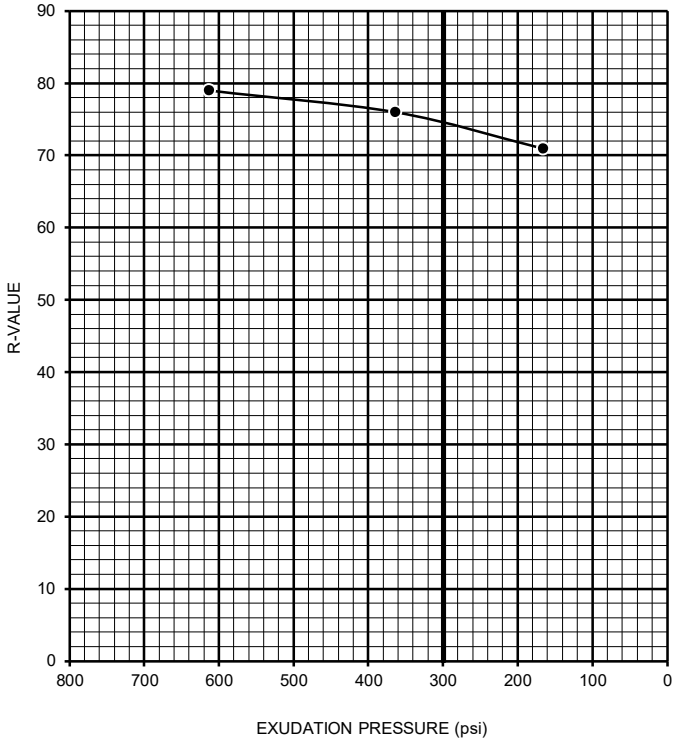
TEST SPECIMEN	a	b	c
MOISTURE AT COMPACTION %	10.5	11.1	12.0
HEIGHT OF SAMPLE, Inches	2.48	2.49	2.49
DRY DENSITY, pcf	117.0	116.8	114.9
COMPACTOR PRESSURE, psi	350	300	250
EXUDATION PRESSURE, psi	613	364	166
EXPANSION, Inches x 10exp-4	15	10	8
STABILITY Ph 2,000 lbs (160 psi)	18	20	24
TURNS DISPLACEMENT	5.35	5.65	5.92
R-VALUE UNCORRECTED	79	76	71
R-VALUE CORRECTED	79	76	71

DESIGN CALCULATION DATA	a	b	c
GRAVEL EQUIVALENT FACTOR	1.0	1.0	1.0
TRAFFIC INDEX	5.0	5.0	5.0
STABILOMETER THICKNESS, ft.	0.34	0.38	0.46
EXPANSION PRESSURE THICKNESS, ft.	0.50	0.33	0.27

EXPANSION PRESSURE CHART



EXUDATION PRESSURE CHART



R-VALUE BY EXPANSION:	77
R-VALUE BY EXUDATION:	74
EQUILIBRIUM R-VALUE:	74

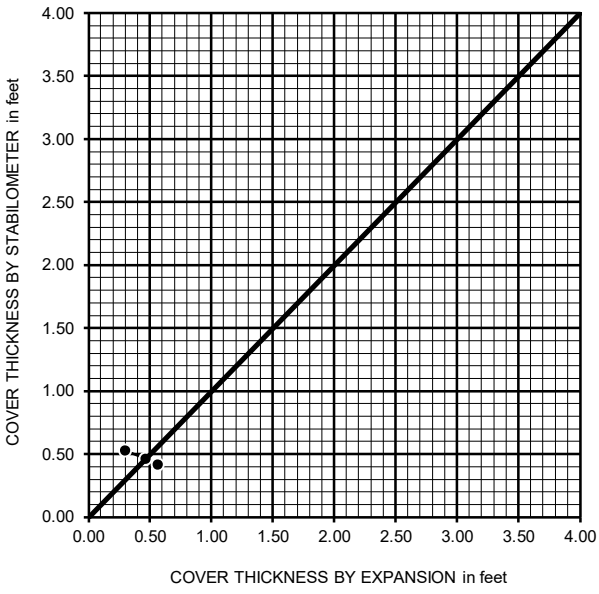
R-VALUE TEST RESULTS
DOT CA Test 301

PROJECT NAME:	Hume SoCal Camp	PROJECT NUMBER:	13655.001
BORING NUMBER:	HA-10, HA-17a, HA-17b	DEPTH (FT.):	Composite
SAMPLE NUMBER:	MB-5, MB-7a, MB-7b	TECHNICIAN:	O. Figueroa
SAMPLE DESCRIPTION:	Very dark brown silty sand (SM)	DATE COMPLETED:	8/18/2023

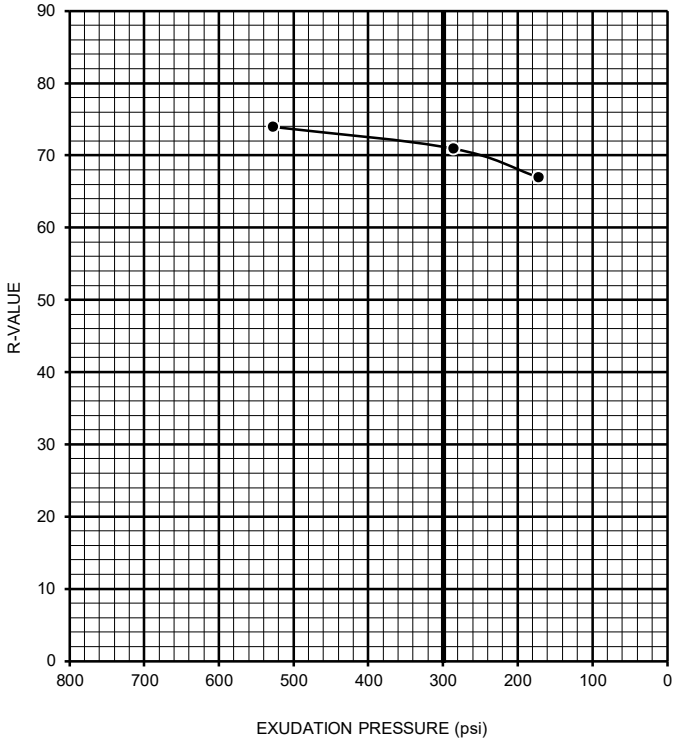
TEST SPECIMEN	a	b	c
MOISTURE AT COMPACTION %	12.5	13.4	14.1
HEIGHT OF SAMPLE, Inches	2.50	2.50	2.54
DRY DENSITY, pcf	111.8	110.5	108.9
COMPACTOR PRESSURE, psi	350	300	250
EXUDATION PRESSURE, psi	527	286	172
EXPANSION, Inches x 10exp-4	17	14	9
STABILITY Ph 2,000 lbs (160 psi)	23	26	30
TURNS DISPLACEMENT	5.25	5.38	5.41
R-VALUE UNCORRECTED	74	71	67
R-VALUE CORRECTED	74	71	67

DESIGN CALCULATION DATA	a	b	c
GRAVEL EQUIVALENT FACTOR	1.0	1.0	1.0
TRAFFIC INDEX	5.0	5.0	5.0
STABILOMETER THICKNESS, ft.	0.42	0.46	0.53
EXPANSION PRESSURE THICKNESS, ft.	0.57	0.47	0.30

EXPANSION PRESSURE CHART



EXUDATION PRESSURE CHART



R-VALUE BY EXPANSION:	71
R-VALUE BY EXUDATION:	71
EQUILIBRIUM R-VALUE:	71

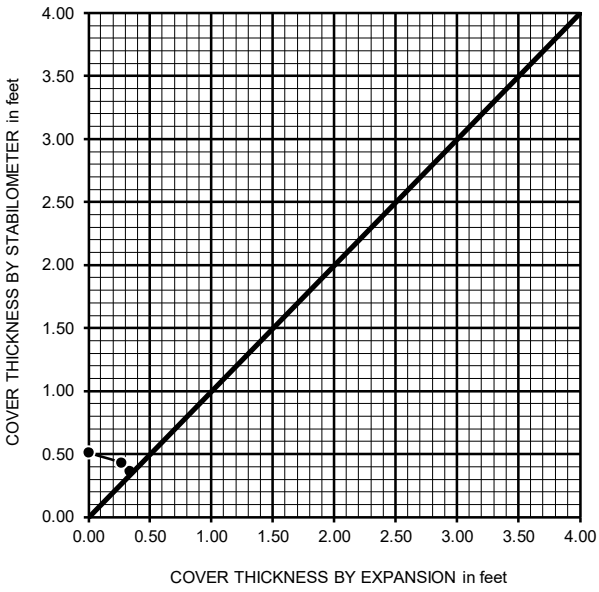
R-VALUE TEST RESULTS
DOT CA Test 301

PROJECT NAME:	Hume SoCal Camp	PROJECT NUMBER:	13655.001
BORING NUMBER:	HA-29	DEPTH (FT.):	6-36"
SAMPLE NUMBER:	MB-15	TECHNICIAN:	O. Figueroa
SAMPLE DESCRIPTION:	Dark brown silty sand (SM)	DATE COMPLETED:	8/23/2023

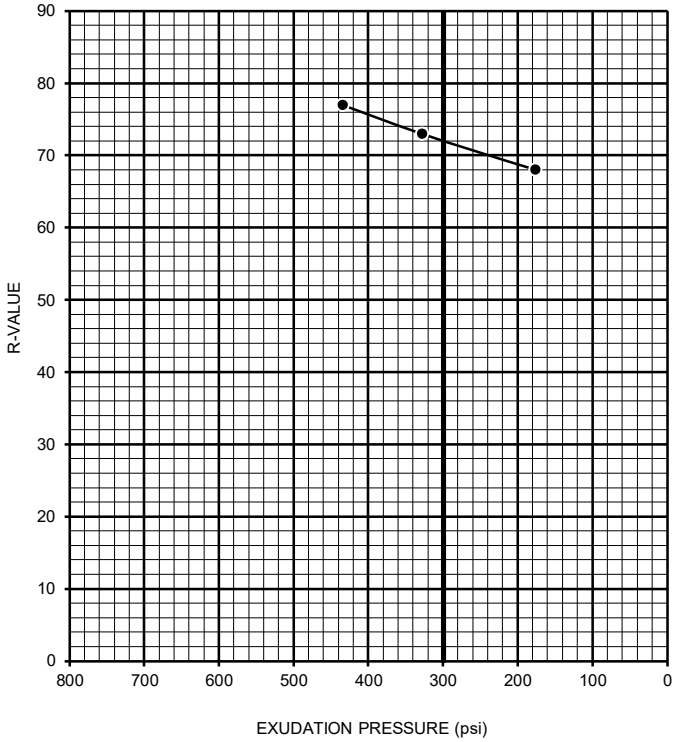
TEST SPECIMEN	a	b	c
MOISTURE AT COMPACTION %	13.0	13.4	14.3
HEIGHT OF SAMPLE, Inches	2.52	2.53	2.55
DRY DENSITY, pcf	110.9	110.2	108.0
COMPACTOR PRESSURE, psi	350	300	250
EXUDATION PRESSURE, psi	434	328	177
EXPANSION, Inches x 10exp-4	10	8	0
STABILITY Ph 2,000 lbs (160 psi)	20	23	28
TURNS DISPLACEMENT	5.10	5.40	5.65
R-VALUE UNCORRECTED	77	73	68
R-VALUE CORRECTED	77	73	68

DESIGN CALCULATION DATA	a	b	c
GRAVEL EQUIVALENT FACTOR	1.0	1.0	1.0
TRAFFIC INDEX	5.0	5.0	5.0
STABILOMETER THICKNESS, ft.	0.37	0.43	0.51
EXPANSION PRESSURE THICKNESS, ft.	0.33	0.27	0.00

EXPANSION PRESSURE CHART



EXUDATION PRESSURE CHART



R-VALUE BY EXPANSION:	78
R-VALUE BY EXUDATION:	72
EQUILIBRIUM R-VALUE:	72

16691 Millikan Ave.
Irvine, CA 92606
Tel. (949) 222-5321

Unconfined Compressive Strength

Project Name:	Hume SoCal Camp	Project No.	13655.001
Sampled By:	Jeff Hull	Sample Date:	7/21/2023

MATERIAL SAMPLE TYPE

Rock	Granite	Soil Cement	Concrete
X			

FOR LAB USE ONLY	DATE RECEIVED: 7/31/2023	By: Ryan Densmore

Laboratory Test Data

Laboratory No.	Age Days	Test Date	Height (in)	Diam. (in)	Area (sq. in.)	Load (lbs.)	Compr. (psi)	H/D Ratio	Corr. Factor	Compr. (psi)	Failure Type
A1	139	12/07/23	4.00	1.99	3.11	10590	3410	2.01	1.00	3410	N/A
A2	139	12/07/23	3.89	1.99	3.11	11470	3690	1.95	1.00	3690	N/A
B1	139	12/07/23	3.87	1.99	3.11	20800	6690	1.94	1.00	6690	N/A
B2	139	12/07/23	3.83	1.99	3.11	22030	7080	1.92	0.99	7010	N/A

Locations: A1, A2: Adult Lodge
B1, B2: RR at Existing Pond

APPENDIX D

GENERAL EARTHWORK AND GRADING GUIDE SPECIFICATIONS

Leighton
a verdantas company

LEIGHTON AND ASSOCIATES, INC.

GENERAL EARTHWORK AND GRADING SPECIFICATIONS FOR ROUGH GRADING

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Standard Details

A - Keying and Benching	Rear of Text
B - Oversize Rock Disposal	Rear of Text
C - Canyon Subdrains	Rear of Text
D - Buttress or Replacement Fill Subdrains	Rear of Text
E - Transition Lot Fills and Side Hill Fills	Rear of Text

1.0 General

1.1 Intent

These General Earthwork and Grading Specifications are for the grading and earthwork shown on the approved grading plan(s) and/or indicated in the geotechnical report(s). These Specifications are a part of the recommendations contained in the geotechnical report(s). In case of conflict, the specific recommendations in the geotechnical report shall supersede these more general Specifications. Observations of the earthwork by the project Geotechnical Consultant during the course of grading may result in new or revised recommendations that could supersede these specifications or the recommendations in the geotechnical report(s).

1.2 The Geotechnical Consultant of Record

Prior to commencement of work, the owner shall employ the Geotechnical Consultant of Record (Geotechnical Consultant). The Geotechnical Consultants shall be responsible for reviewing the approved geotechnical report(s) and accepting the adequacy of the preliminary geotechnical findings, conclusions, and recommendations prior to the commencement of the grading.

Prior to commencement of grading, the Geotechnical Consultant shall review the "work plan" prepared by the Earthwork Contractor (Contractor) and schedule sufficient personnel to perform the appropriate level of observation, mapping, and compaction testing.

During the grading and earthwork operations, the Geotechnical Consultant shall observe, map, and document the subsurface exposures to verify the geotechnical design assumptions. If the observed conditions are found to be significantly different than the interpreted assumptions during the design phase, the Geotechnical Consultant shall inform the owner, recommend appropriate changes in design to accommodate the observed conditions, and notify the review agency where required. Subsurface areas to be geotechnically observed, mapped, elevations recorded, and/or tested include natural ground after it has been cleared for receiving fill but before fill is placed, bottoms of all "remedial removal" areas, all key bottoms, and benches made on sloping ground to receive fill.

The Geotechnical Consultant shall observe the moisture-conditioning and processing of the subgrade and fill materials and perform relative compaction testing of fill to determine the attained level of compaction. The Geotechnical Consultant shall provide the test results to the owner and the Contractor on a routine and frequent basis.

1.3 The Earthwork Contractor

The Earthwork Contractor (Contractor) shall be qualified, experienced, and knowledgeable in earthwork logistics, preparation and processing of ground to receive fill, moisture-conditioning and processing of fill, and compacting fill. The Contractor shall review and accept the plans, geotechnical report(s), and these Specifications prior to commencement of grading. The Contractor shall be solely responsible for performing the grading in accordance with the plans and specifications.

The Contractor shall prepare and submit to the owner and the Geotechnical Consultant a work plan that indicates the sequence of earthwork grading, the number of "spreads" of work and the estimated quantities of daily earthwork contemplated for the site prior to commencement of grading. The Contractor shall inform the owner and the Geotechnical Consultant of changes in work schedules and updates to the work plan at least 24 hours in advance of such changes so that appropriate observations and tests can be planned and accomplished. The Contractor shall not assume that the Geotechnical Consultant is aware of all grading operations.

The Contractor shall have the sole responsibility to provide adequate equipment and methods to accomplish the earthwork in accordance with the applicable grading codes and agency ordinances, these Specifications, and the recommendations in the approved geotechnical report(s) and grading plan(s). If, in the opinion of the Geotechnical Consultant, unsatisfactory conditions, such as unsuitable soil, improper moisture condition, inadequate compaction, insufficient buttress key size, adverse weather, etc., are resulting in a quality of work less than required in these specifications, the Geotechnical Consultant shall reject the work and may recommend to the owner that construction be stopped until the conditions are rectified.

2.0 Preparation of Areas to be Filled

2.1 Clearing and Grubbing

Vegetation, such as brush, grass, roots, and other deleterious material shall be sufficiently removed and properly disposed of in a method acceptable to the owner, governing agencies, and the Geotechnical Consultant.

The Geotechnical Consultant shall evaluate the extent of these removals depending on specific site conditions. Earth fill material shall not contain more than 1 percent of organic materials (by volume). No fill lift shall contain more than 5 percent of organic matter. Nesting of the organic materials shall not be allowed.

If potentially hazardous materials are encountered, the Contractor shall stop work in the affected area, and a hazardous material specialist shall be informed immediately for proper evaluation and handling of these materials prior to continuing to work in that area.

As presently defined by the State of California, most refined petroleum products (gasoline, diesel fuel, motor oil, grease, coolant, etc.) have chemical constituents that are considered to be hazardous waste. As such, the indiscriminate dumping or spillage of these fluids onto the ground may constitute a misdemeanor, punishable by fines and/or imprisonment, and shall not be allowed.

2.2 Processing

Existing ground that has been declared satisfactory for support of fill by the Geotechnical Consultant shall be scarified to a minimum depth of 6 inches. Existing ground that is not satisfactory shall be overexcavated as specified in the following section. Scarification shall continue until soils are broken down and free of large clay lumps or clods and the working surface is reasonably uniform, flat, and free of uneven features that would inhibit uniform compaction.

2.3 Overexcavation

In addition to removals and overexcavations recommended in the approved geotechnical report(s) and the grading plan, soft, loose, dry, saturated, spongy, organic-rich, highly fractured or otherwise unsuitable ground shall be overexcavated to competent ground as evaluated by the Geotechnical Consultant during grading.

2.4 Benching

Where fills are to be placed on ground with slopes steeper than 5:1 (horizontal to vertical units), the ground shall be stepped or benched. The lowest bench or key shall be a minimum of 15 feet wide and at least 2 feet deep, into competent material as evaluated by the Geotechnical Consultant. Other benches shall be excavated a minimum height of 4 feet into competent material or as otherwise recommended by the Geotechnical Consultant. Fill placed on ground sloping flatter than 5:1 shall also be benched or otherwise overexcavated to provide a flat subgrade for the fill.

2.5 Evaluation/Acceptance of Fill Areas

All areas to receive fill, including removal and processed areas, key bottoms, and benches, shall be observed, mapped, elevations recorded, and/or tested prior to being accepted by the Geotechnical Consultant as suitable to receive fill. The Contractor shall obtain a written acceptance from the Geotechnical Consultant prior to fill placement. A licensed surveyor shall provide the survey control for determining elevations of processed areas, keys, and benches.

3.0 Fill Material

3.1 General

Material to be used as fill shall be essentially free of organic matter and other deleterious substances evaluated and accepted by the Geotechnical Consultant prior to placement. Soils of poor quality, such as those with unacceptable gradation, high expansion potential, or low strength shall be placed in areas acceptable to the Geotechnical Consultant or mixed with other soils to achieve satisfactory fill material.

3.2 Oversize

Oversize material defined as rock, or other irreducible material with a maximum dimension greater than 8 inches, shall not be buried or placed in fill unless location, materials, and placement methods are specifically accepted by the Geotechnical Consultant. Placement operations shall be such that nesting of oversized material does not occur and such that oversize material is completely surrounded by compacted or densified fill. Oversize material shall not be placed within 10 vertical feet of finish grade or within 2 feet of future utilities or underground construction.

3.3 Import

If importing of fill material is required for grading, proposed import material shall meet the requirements of Section 3.1. The potential import source shall be given to the Geotechnical Consultant at least 48 hours (2 working days) before importing begins so that its suitability can be determined and appropriate tests performed.

4.0 Fill Placement and Compaction

4.1 Fill Layers

Approved fill material shall be placed in areas prepared to receive fill (per Section 3.0) in near-horizontal layers not exceeding 8 inches in loose thickness. The Geotechnical Consultant may accept thicker layers if testing indicates the grading procedures can adequately compact the thicker layers. Each layer shall be spread evenly and mixed thoroughly to attain relative uniformity of material and moisture throughout.

4.2 Fill Moisture Conditioning

Fill soils shall be watered, dried back, blended, and/or mixed, as necessary to attain a relatively uniform moisture content at or slightly over optimum. Maximum density and optimum soil moisture content tests shall be performed in accordance with the American Society of Testing and Materials (ASTM Test Method D1557).

4.3 Compaction of Fill

After each layer has been moisture-conditioned, mixed, and evenly spread, it shall be uniformly compacted to not less than 90 percent of maximum dry density (ASTM Test Method D1557). Compaction equipment shall be adequately sized and be either specifically designed for soil compaction or of proven reliability to efficiently achieve the specified level of compaction with uniformity.

4.4 Compaction of Fill Slopes

In addition to normal compaction procedures specified above, compaction of slopes shall be accomplished by backrolling of slopes with sheepsfoot rollers at increments of 3 to 4 feet in fill elevation, or by other methods producing satisfactory results acceptable to the Geotechnical Consultant. Upon completion of grading, relative compaction of the fill, out to the slope face, shall be at least 90 percent of maximum density per ASTM Test Method D1557.

4.5 Compaction Testing

Field-tests for moisture content and relative compaction of the fill soils shall be performed by the Geotechnical Consultant. Location and frequency of tests shall be at the Consultant's discretion based on field conditions encountered. Compaction test locations will not necessarily be selected on a random basis. Test locations shall be selected to verify adequacy of compaction levels in areas that are judged to be prone to inadequate compaction (such as close to slope faces and at the fill/bedrock benches).

4.6 Frequency of Compaction Testing

Tests shall be taken at intervals not exceeding 2 feet in vertical rise and/or 1,000 cubic yards of compacted fill soils embankment. In addition, as a guideline, at least one test shall be taken on slope faces for each 5,000 square feet of slope face and/or each 10 feet of vertical height of slope. The Contractor shall assure that fill construction is such that the testing schedule can be accomplished by the Geotechnical Consultant. The Contractor shall stop or slow down the earthwork construction if these minimum standards are not met.

4.7 Compaction Test Locations

The Geotechnical Consultant shall document the approximate elevation and horizontal coordinates of each test location. The Contractor shall coordinate with the project surveyor to assure that sufficient grade stakes are established so that the Geotechnical Consultant can determine the test locations with sufficient accuracy. At a minimum, two grade stakes within a horizontal distance of 100 feet and vertically less than 5 feet apart from potential test locations shall be provided.

5.0 Subdrain Installation

Subdrain systems shall be installed in accordance with the approved geotechnical report(s), the grading plan. The Geotechnical Consultant may recommend additional subdrains and/or changes in subdrain extent, location, grade, or material depending on conditions encountered during grading. All subdrains shall be surveyed by a land surveyor/civil engineer for line and grade after installation and prior to burial. Sufficient time should be allowed by the Contractor for these surveys.

6.0 Excavation

Excavations, as well as over-excavation for remedial purposes, shall be evaluated by the Geotechnical Consultant during grading. Remedial removal depths shown on geotechnical plans are estimates only. The actual extent of removal shall be determined by the Geotechnical Consultant based on the field evaluation of exposed conditions during grading. Where fill-over-cut slopes are to be graded, the cut portion of the slope shall be made, evaluated, and accepted by the Geotechnical Consultant prior to placement of materials for construction of the fill portion of the slope, unless otherwise recommended by the Geotechnical Consultant.

7.0 Trench Backfills

7.1 Safety

The Contractor shall follow all OSHA and Cal/OSHA requirements for safety of trench excavations.

7.2 Bedding and Backfill

All bedding and backfill of utility trenches shall be performed in accordance with the applicable provisions of Standard Specifications of Public Works Construction. Bedding material shall have a Sand Equivalent greater than 30 (SE>30). The bedding shall be placed to 1 foot over the top of the conduit and densified by jetting. Backfill shall be placed and densified to a minimum of 90 percent of relative compaction from 1 foot above the top of the conduit to the surface.

The Geotechnical Consultant shall test the trench backfill for relative compaction. At least one test should be made for every 300 feet of trench and 2 feet of fill.

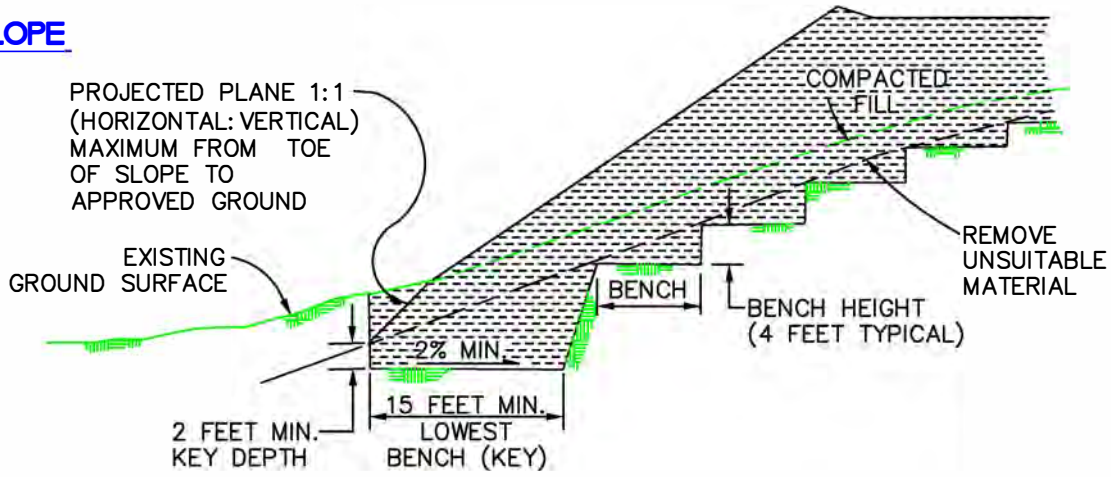
7.3 Lift Thickness

Lift thickness of trench backfill shall not exceed those allowed in the Standard Specifications of Public Works Construction unless the Contractor can demonstrate to the Geotechnical Consultant that the fill lift can be compacted to the minimum relative compaction by his alternative equipment and method.

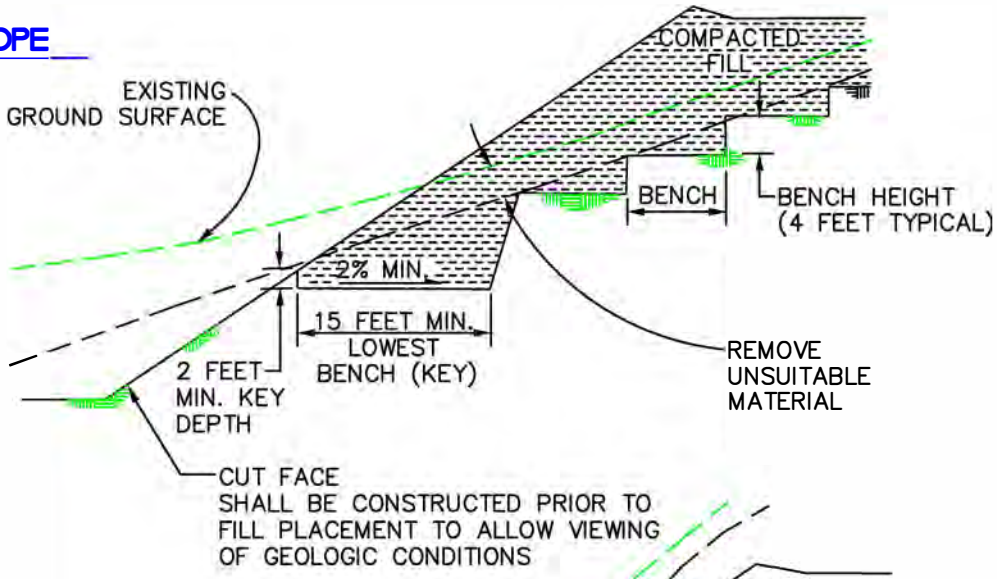
7.4 Observation and Testing

The jetting of the bedding around the conduits shall be observed by the Geotechnical Consultant.

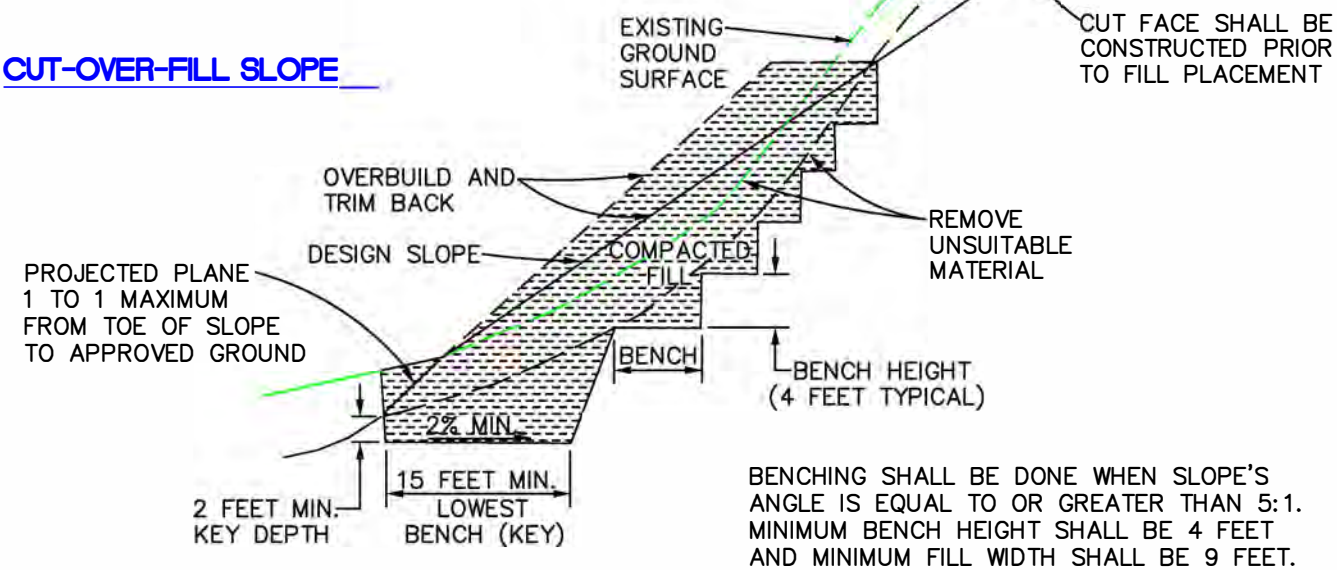
FILL SLOPE



FILL-OVER-CUT SLOPE

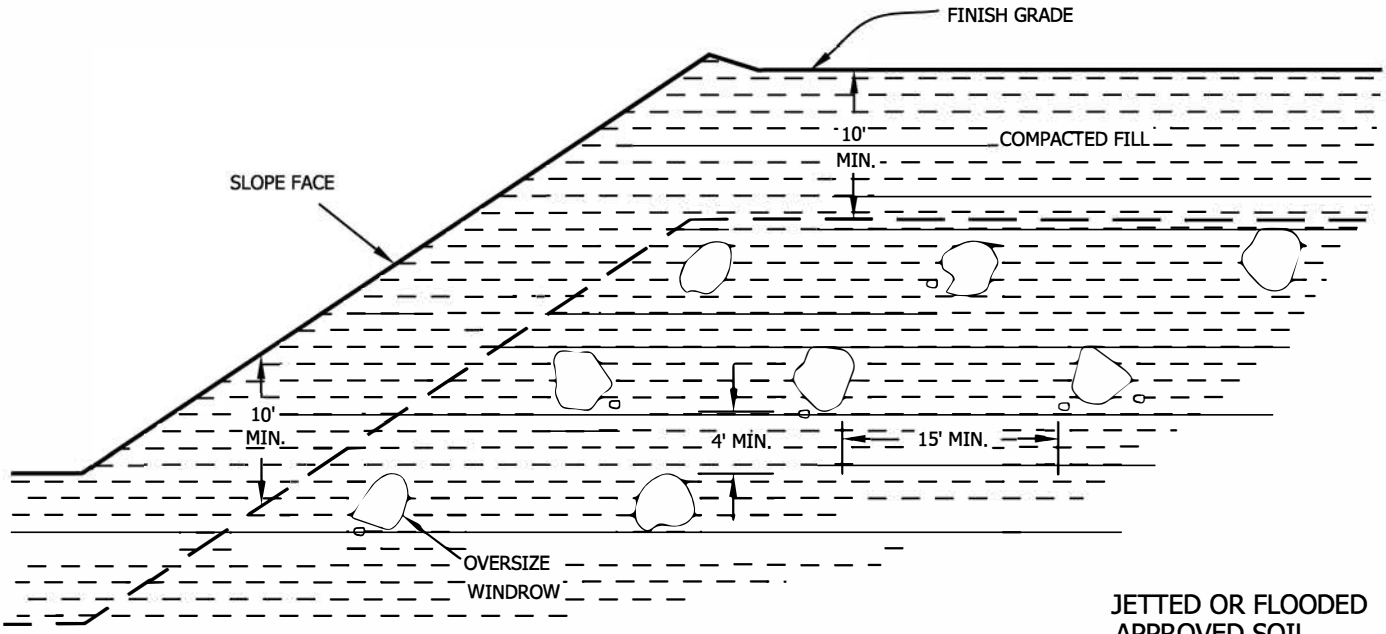


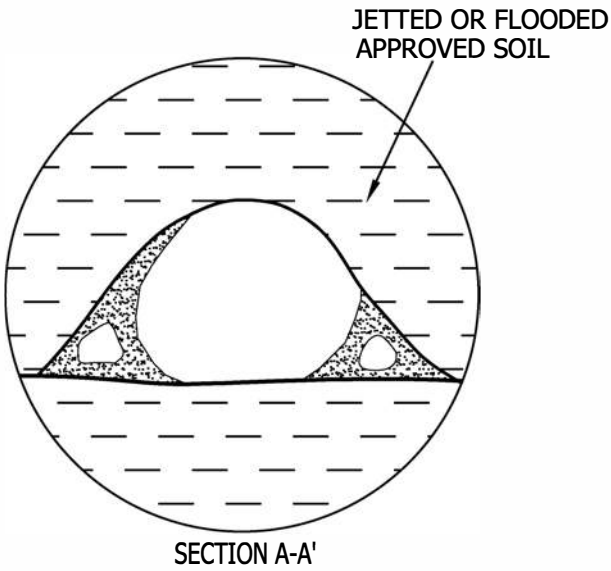
CUT-OVER-FILL SLOPE



BENCHING SHALL BE DONE WHEN SLOPE'S ANGLE IS EQUAL TO OR GREATER THAN 5:1. MINIMUM BENCH HEIGHT SHALL BE 4 FEET AND MINIMUM FILL WIDTH SHALL BE 9 FEET.

KEYING AND BENCHING	GENERAL EARTHWORK AND GRADING SPECIFICATIONS STANDARD DETAILS A	Leighton a verdantas company

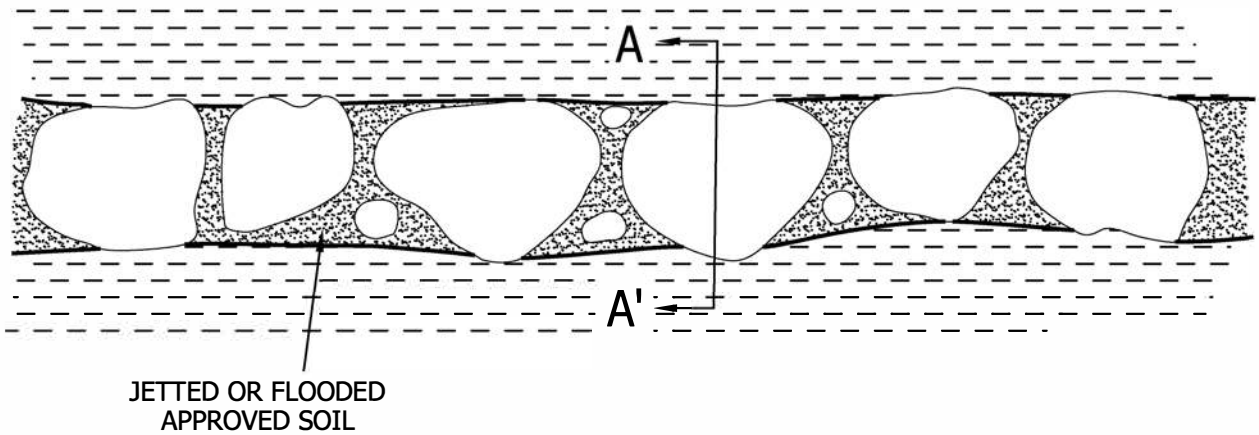




SECTION A-A'

- Oversize rock is larger than 8 inches in largest dimension.
- Backfill with approved soil jetted or flooded in place to fill all the voids.
- Do not bury rock within 10 feet of finish grade.
- Windrow of buried rock shall be parallel to the finished slope face.

PROFILE ALONG WINDROW

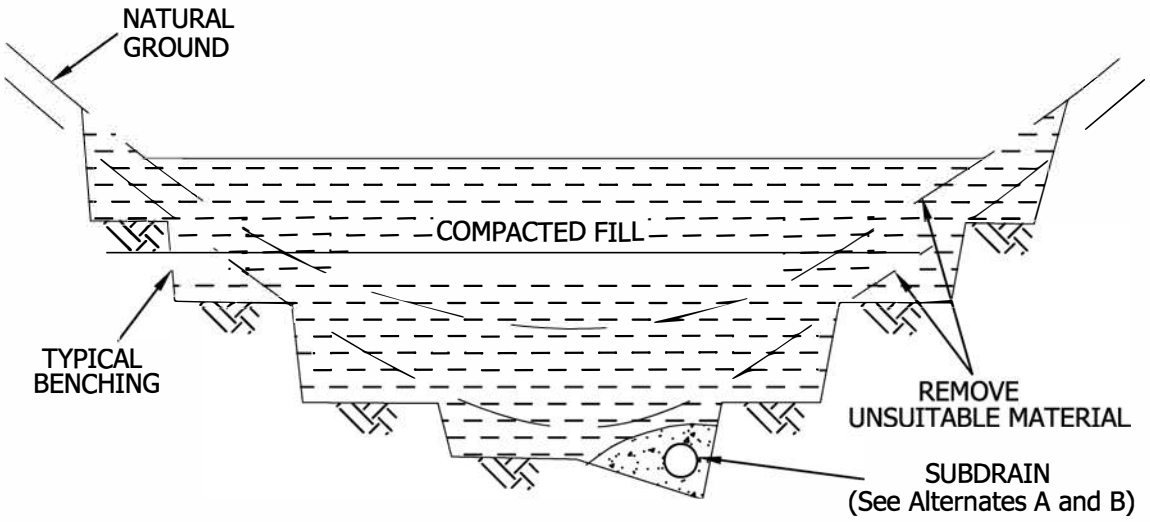


OVERSIZE ROCK DISPOSAL

GENERAL EARTHWORK AND GRADING SPECIFICATIONS
STANDARD DETAILS B

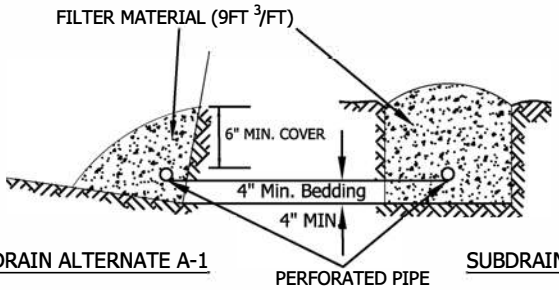
Leighton

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SUBDRAIN ALTERNATE A

PERFORATED PIPE SURROUNDED WITH FILTER MATERIAL



SUBDRAIN ALTERNATE A-1 SUBDRAIN ALTERNATE A-2

FILTER MATERIAL

FILTER MATERIAL SHALL BE CLASS 2 PERMEABLE MATERIAL PER STATE OF CALIFORNIA STANDARD SPECIFICATION, OR APPROVED ALTERNATE. CLASS 2 GRADING AS FOLLOWS:

Sieve Size	Percent Passing
1"	100
3/4"	90-100
3/8"	40-100
No. 4	25-40
No. 8	18-33
No. 30	5-15
No. 50	0-7
No. 200	0-3

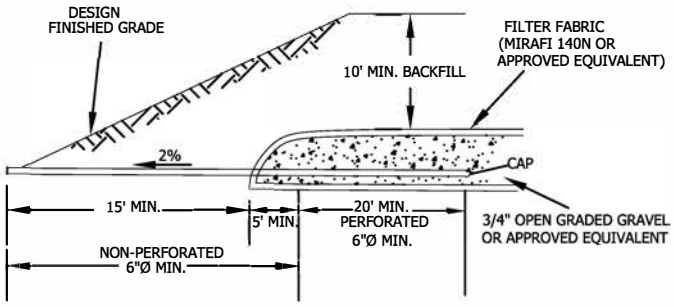
SUBDRAIN ALTERNATE B



ALTERNATE B-1 ALTERNATE B-2

○ PERFORATED PIPE IS OPTIONAL PER GOVERNING AGENCY'S REQUIREMENTS

DETAIL OF CANYON SUBDRAIN TERMINAL

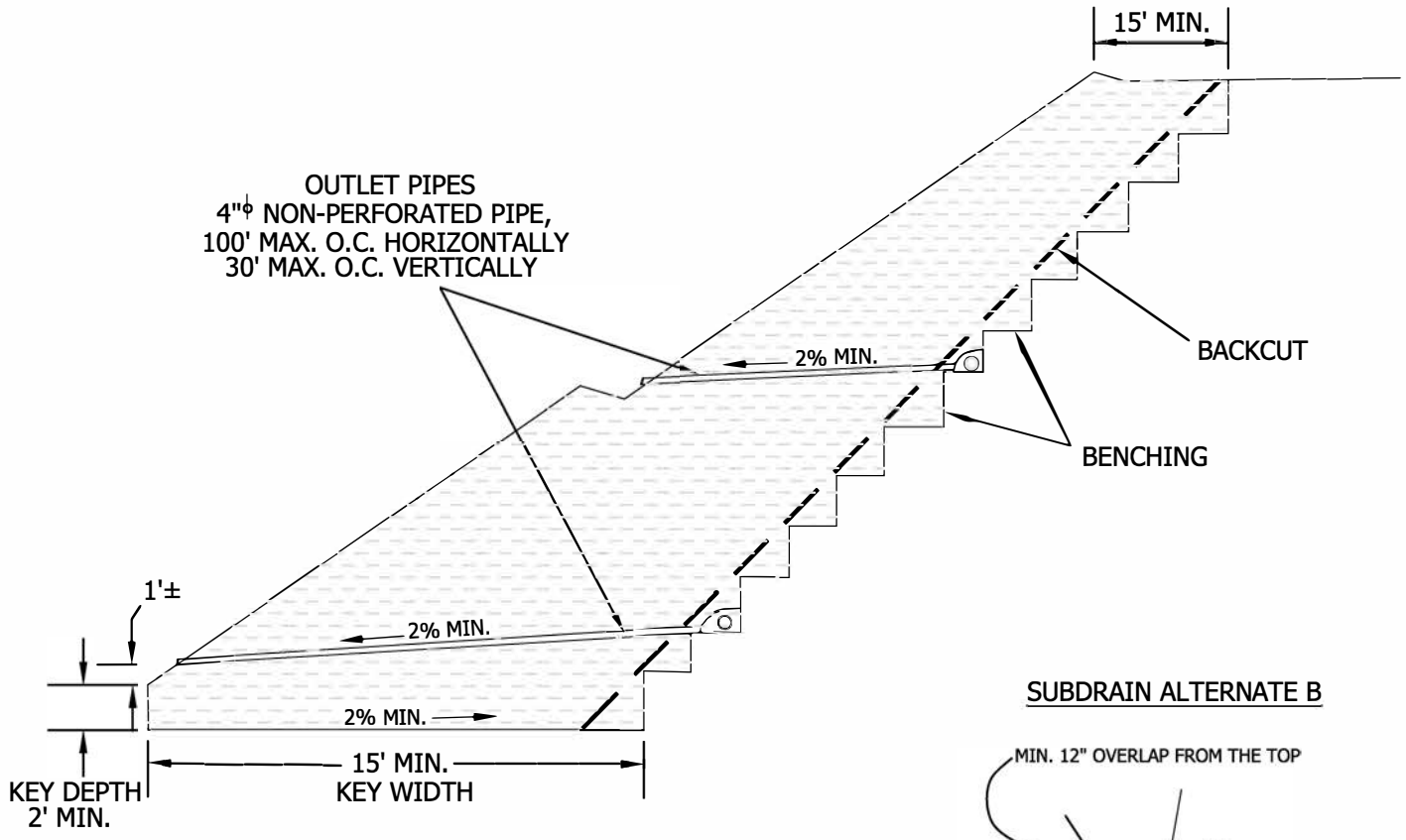


CANYON SUBDRAIN

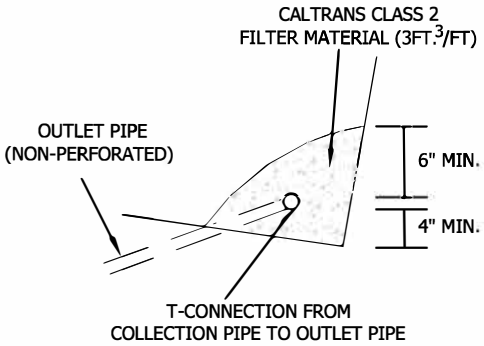
GENERAL EARTHWORK AND GRADING SPECIFICATIONS STANDARD DETAILS C

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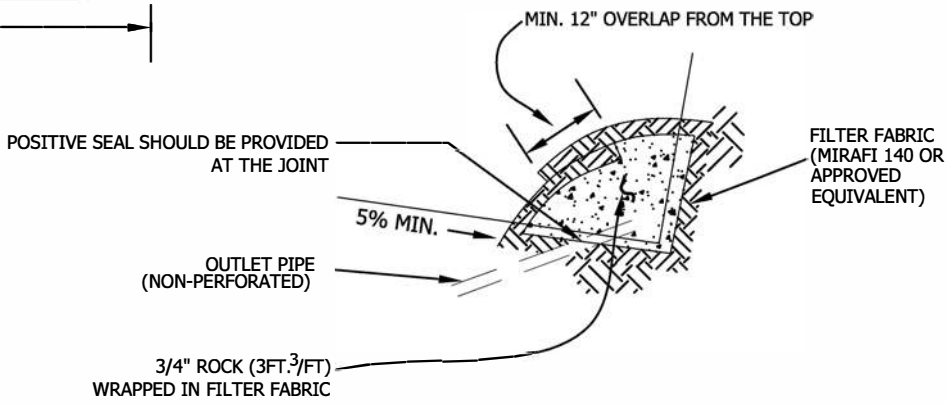
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SUBDRAIN ALTERNATE A



SUBDRAIN ALTERNATE B

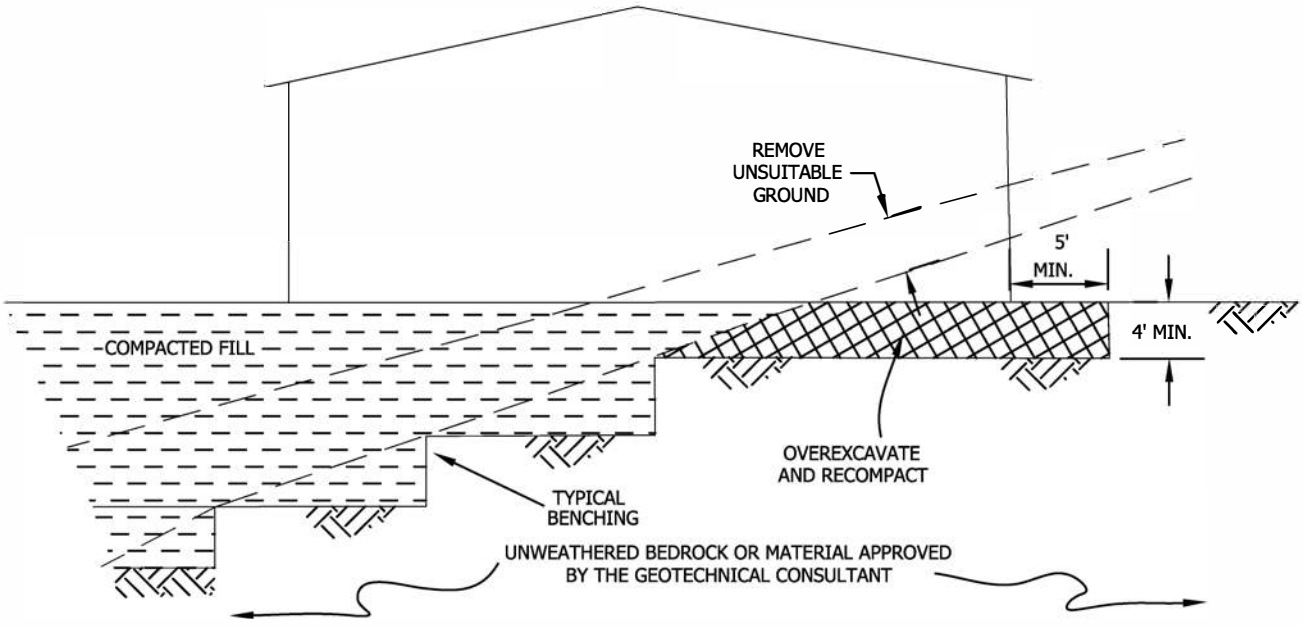


- SUBDRAIN INSTALLATION - Subdrain collector pipe shall be installed with perforations down or, unless otherwise designated by the geotechnical consultant. Outlet pipes shall be non-perforated pipe. The subdrain pipe shall have at least 8 perforations uniformly spaced per foot. Perforation shall be 1/4" to 1/2" if drilled holes are used. All subdrain pipes shall have a gradient at least 2% towards the outlet.
- SUBDRAIN PIPE - Subdrain pipe shall be ASTM D2751, ASTM D1527 (Schedule 40) or SDR 23.5 ABS pipe or ASTM D3034 (Schedule 40) or SDR 23.5 PVC pipe.
- All outlet pipe shall be placed in a trench and, after fill is placed above it, rodded to verify integrity.

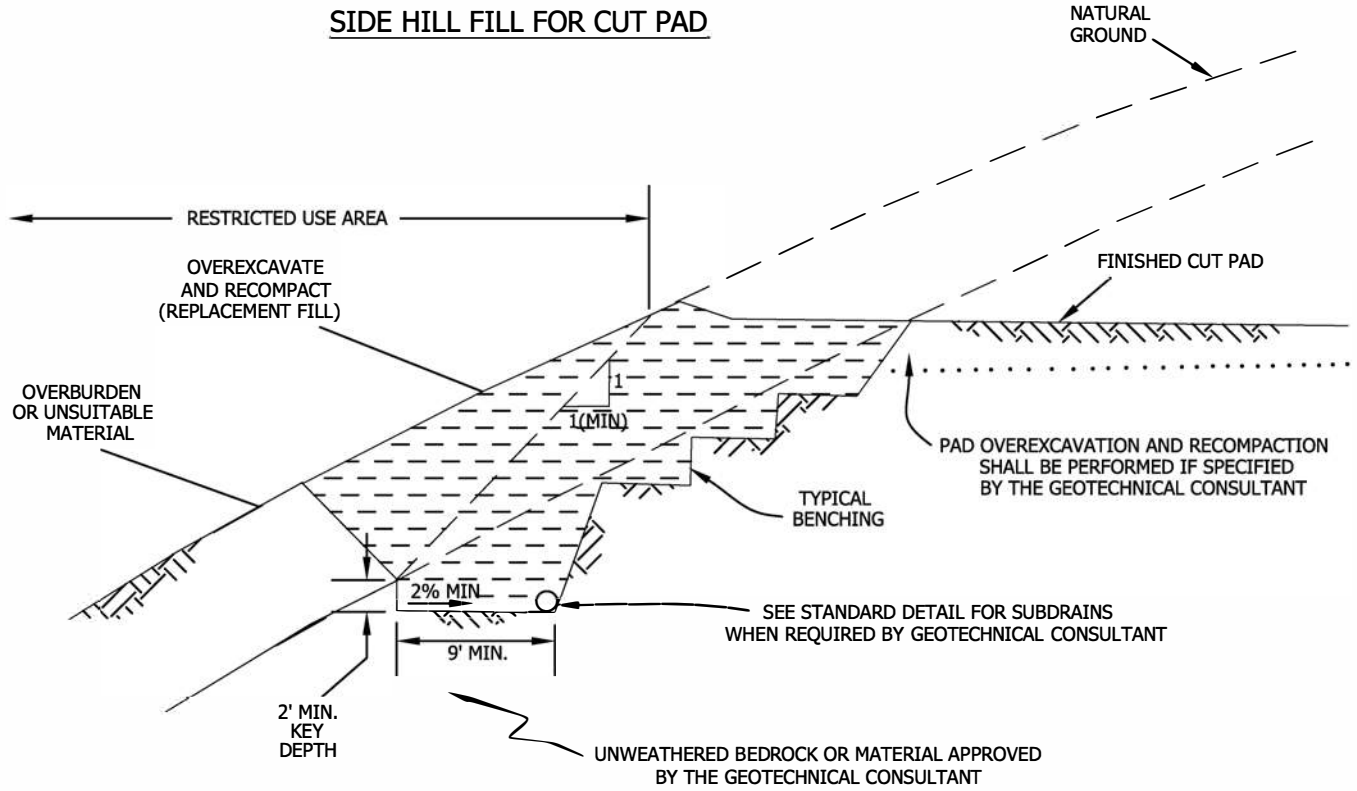
BUTTRESS OR REPLACEMENT FILL SUBDRAINS	GENERAL EARTHWORK AND GRADING SPECIFICATIONS STANDARD DETAILS D	Leighton a verdantas company

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CUT-FILL TRANSITION LOT OVEREXCAVATION



SIDE HILL FILL FOR CUT PAD



TRANSITION LOT FILLS AND SIDE HILL FILLS

GENERAL EARTHWORK AND GRADING SPECIFICATIONS
STANDARD DETAILS E

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APPENDIX E

GBA GEOTECHNICAL INSERT

Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative – interpret and apply this geotechnical-engineering report as effectively as possible. In that way, you can benefit from a lowered exposure to problems associated with subsurface conditions at project sites and development of them that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed herein, contact your GBA-member geotechnical engineer. Active engagement in GBA exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.

Understand the Geotechnical-Engineering Services Provided for this Report

Geotechnical-engineering services typically include the planning, collection, interpretation, and analysis of exploratory data from widely spaced borings and/or test pits. Field data are combined with results from laboratory tests of soil and rock samples obtained from field exploration (if applicable), observations made during site reconnaissance, and historical information to form one or more models of the expected subsurface conditions beneath the site. Local geology and alterations of the site surface and subsurface by previous and proposed construction are also important considerations. Geotechnical engineers apply their engineering training, experience, and judgment to adapt the requirements of the prospective project to the subsurface model(s). Estimates are made of the subsurface conditions that will likely be exposed during construction as well as the expected performance of foundations and other structures being planned and/or affected by construction activities.

The culmination of these geotechnical-engineering services is typically a geotechnical-engineering report providing the data obtained, a discussion of the subsurface model(s), the engineering and geologic engineering assessments and analyses made, and the recommendations developed to satisfy the given requirements of the project. These reports may be titled investigations, explorations, studies, assessments, or evaluations. Regardless of the title used, the geotechnical-engineering report is an engineering interpretation of the subsurface conditions within the context of the project and does not represent a close examination, systematic inquiry, or thorough investigation of all site and subsurface conditions.

Geotechnical-Engineering Services are Performed for Specific Purposes, Persons, and Projects, and At Specific imes

Geotechnical engineers structure their services to meet the specific needs, goals, and risk management preferences of their clients. A geotechnical-engineering study conducted for a given civil engineer will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client.

Likewise, geotechnical-engineering services are performed for a specific project and purpose. For example, it is unlikely that a geotechnical-engineering study for a refrigerated warehouse will be the same as one prepared for a parking garage; and a few borings drilled during a preliminary study to evaluate site feasibility will not be adequate to develop geotechnical design recommendations for the project.

Do not rely on this report if your geotechnical engineer prepared it:

- for a different client;
- for a different project or purpose;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, the reliability of a geotechnical-engineering report can be affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If you are the least bit uncertain* about the continued reliability of this report, contact your geotechnical engineer before applying the recommendations in it. A minor amount of additional testing or analysis after the passage of time – if any is required at all – could prevent major problems.

Read this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read the report in its entirety. Do not rely on an executive summary. Do not read selective elements only. *Read and refer to the report in full.*

You Need to Inform Your Geotechnical Engineer About Change

Your geotechnical engineer considered unique, project-specific factors when developing the scope of study behind this report and developing the confirmation-dependent recommendations the report conveys. Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the elevation, configuration, location, orientation, function or weight of the proposed structure and the desired performance criteria;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project or site changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept*

responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.

Most of the "Findings" Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site's subsurface using various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing is performed.* The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgement to form opinions about subsurface conditions throughout the site. Actual sitewide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team through project completion to obtain informed guidance quickly, whenever needed.

This Report's Recommendations Are Confirmation-Dependen

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, they are not final, because the geotechnical engineer who developed them relied heavily on judgement and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* exposed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation.*

This Report Could Be Misinterpreted

Other design professionals' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a continuing member of the design team, to:

- confer with other design-team members;
- help develop specifications;
- review pertinent elements of other design professionals' plans and specifications; and
- be available whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction-phase observations.

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note conspicuously that you've included the material for information purposes only.* To avoid misunderstanding, you may also want to note that "informational purposes" means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. This happens in part because soil and rock on project sites are typically heterogeneous and not manufactured materials with well-defined engineering properties like steel and concrete. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The personnel, equipment, and techniques used to perform an environmental study – e.g., a "phase-one" or "phase-two" environmental site assessment – differ significantly from those used to perform a geotechnical-engineering study. For that reason, a geotechnical-engineering report does not usually provide environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated subsurface environmental problems have led to project failures.* If you have not obtained your own environmental information about the project site, ask your geotechnical consultant for a recommendation on how to find environmental risk-management guidance.

Obtain Professional Assistance to Deal with Moisture Infiltration and Mol

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, the engineer's services were not designed, conducted, or intended to prevent migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, ***proper implementation of the geotechnical engineer's recommendations will not of itself be sufficient to prevent moisture infiltration. Confront the risk of moisture infiltration*** by including building-envelope or mold specialists on the design team. ***Geotechnical engineers are not building-envelope or mold specialists.***

GEOPROFESSIONAL BUSINESS ASSOCIATION

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e-mail: info@geoprofessional.org www.geoprofessional.org

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Appendix G

Reference Materials

NOAA Atlas 14, Volume 6, Version 2
Location name: Green Valley Lake, California, USA*
Latitude: 34.2257°, Longitude: -117.0941°
Elevation: 6464 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches/hour)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	2.18 (1.81-2.65)	2.96 (2.46-3.61)	4.01 (3.31-4.91)	4.88 (4.00-6.02)	6.10 (4.82-7.76)	7.04 (5.46-9.18)	8.03 (6.07-10.7)	9.07 (6.67-12.5)	10.5 (7.42-15.0)	11.7 (7.93-17.3)
10-min	1.56 (1.30-1.90)	2.12 (1.76-2.59)	2.87 (2.38-3.52)	3.50 (2.87-4.31)	4.37 (3.46-5.57)	5.05 (3.92-6.58)	5.75 (4.36-7.69)	6.50 (4.78-8.92)	7.53 (5.31-10.8)	8.35 (5.69-12.4)
15-min	1.26 (1.04-1.54)	1.71 (1.42-2.09)	2.32 (1.92-2.84)	2.82 (2.31-3.48)	3.52 (2.79-4.49)	4.07 (3.16-5.30)	4.64 (3.51-6.20)	5.24 (3.85-7.20)	6.07 (4.28-8.69)	6.73 (4.58-9.98)
30-min	0.884 (0.734-1.08)	1.20 (0.996-1.47)	1.63 (1.34-1.99)	1.98 (1.62-2.44)	2.47 (1.96-3.15)	2.86 (2.22-3.72)	3.26 (2.46-4.35)	3.68 (2.70-5.05)	4.26 (3.01-6.10)	4.72 (3.22-7.01)
60-min	0.624 (0.517-0.760)	0.848 (0.702-1.03)	1.15 (0.948-1.40)	1.40 (1.14-1.72)	1.74 (1.38-2.22)	2.02 (1.56-2.62)	2.30 (1.74-3.07)	2.59 (1.91-3.56)	3.00 (2.12-4.30)	3.33 (2.27-4.94)
2-hr	0.473 (0.393-0.577)	0.638 (0.529-0.778)	0.862 (0.712-1.05)	1.05 (0.860-1.29)	1.31 (1.04-1.68)	1.52 (1.18-1.99)	1.74 (1.32-2.33)	1.98 (1.46-2.72)	2.31 (1.63-3.30)	2.57 (1.75-3.81)
3-hr	0.408 (0.338-0.497)	0.550 (0.456-0.671)	0.744 (0.614-0.910)	0.907 (0.743-1.12)	1.14 (0.900-1.45)	1.32 (1.02-1.72)	1.51 (1.14-2.02)	1.72 (1.26-2.36)	2.01 (1.42-2.87)	2.24 (1.53-3.32)
6-hr	0.315 (0.261-0.384)	0.428 (0.355-0.522)	0.582 (0.480-0.712)	0.711 (0.582-0.877)	0.892 (0.707-1.14)	1.04 (0.804-1.35)	1.19 (0.899-1.59)	1.35 (0.992-1.85)	1.57 (1.11-2.26)	1.76 (1.20-2.60)
12-hr	0.224 (0.186-0.273)	0.314 (0.260-0.383)	0.433 (0.358-0.530)	0.532 (0.435-0.656)	0.667 (0.528-0.850)	0.772 (0.599-1.01)	0.881 (0.666-1.18)	0.994 (0.731-1.36)	1.15 (0.811-1.65)	1.27 (0.867-1.89)
24-hr	0.161 (0.143-0.186)	0.232 (0.206-0.268)	0.326 (0.288-0.377)	0.402 (0.352-0.469)	0.506 (0.428-0.609)	0.585 (0.486-0.720)	0.667 (0.540-0.839)	0.750 (0.591-0.971)	0.864 (0.654-1.17)	0.953 (0.697-1.33)
2-day	0.100 (0.088-0.115)	0.146 (0.129-0.169)	0.207 (0.183-0.240)	0.258 (0.225-0.300)	0.327 (0.277-0.394)	0.381 (0.316-0.468)	0.436 (0.353-0.549)	0.494 (0.389-0.639)	0.573 (0.434-0.773)	0.636 (0.465-0.887)
3-day	0.073 (0.065-0.084)	0.107 (0.095-0.124)	0.153 (0.135-0.177)	0.191 (0.167-0.223)	0.244 (0.207-0.294)	0.286 (0.237-0.352)	0.329 (0.267-0.415)	0.375 (0.296-0.486)	0.439 (0.332-0.592)	0.489 (0.358-0.683)
4-day	0.059 (0.052-0.068)	0.087 (0.077-0.100)	0.124 (0.109-0.143)	0.155 (0.136-0.181)	0.199 (0.169-0.240)	0.234 (0.194-0.288)	0.271 (0.219-0.341)	0.310 (0.244-0.401)	0.364 (0.276-0.492)	0.408 (0.298-0.570)
7-day	0.039 (0.035-0.045)	0.057 (0.050-0.066)	0.082 (0.072-0.095)	0.103 (0.090-0.120)	0.134 (0.113-0.162)	0.159 (0.132-0.196)	0.186 (0.151-0.235)	0.216 (0.170-0.279)	0.258 (0.195-0.348)	0.293 (0.214-0.409)
10-day	0.029 (0.026-0.034)	0.042 (0.038-0.049)	0.061 (0.054-0.071)	0.077 (0.067-0.090)	0.101 (0.085-0.121)	0.120 (0.100-0.148)	0.141 (0.114-0.178)	0.165 (0.130-0.213)	0.199 (0.150-0.268)	0.227 (0.166-0.317)
20-day	0.018 (0.016-0.021)	0.026 (0.023-0.030)	0.037 (0.032-0.043)	0.046 (0.041-0.054)	0.061 (0.051-0.073)	0.073 (0.060-0.090)	0.086 (0.069-0.108)	0.100 (0.079-0.130)	0.122 (0.092-0.164)	0.139 (0.102-0.195)
30-day	0.014 (0.012-0.016)	0.020 (0.018-0.023)	0.028 (0.025-0.033)	0.036 (0.031-0.042)	0.047 (0.039-0.056)	0.056 (0.046-0.069)	0.066 (0.053-0.083)	0.076 (0.060-0.099)	0.092 (0.070-0.125)	0.106 (0.077-0.148)
45-day	0.011 (0.010-0.013)	0.016 (0.014-0.018)	0.022 (0.020-0.026)	0.028 (0.025-0.033)	0.036 (0.031-0.044)	0.043 (0.036-0.053)	0.051 (0.041-0.064)	0.059 (0.046-0.076)	0.070 (0.053-0.095)	0.080 (0.059-0.112)
60-day	0.010 (0.009-0.011)	0.014 (0.012-0.016)	0.019 (0.017-0.023)	0.024 (0.021-0.028)	0.031 (0.026-0.038)	0.037 (0.030-0.045)	0.043 (0.035-0.054)	0.049 (0.039-0.064)	0.059 (0.044-0.079)	0.066 (0.048-0.093)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

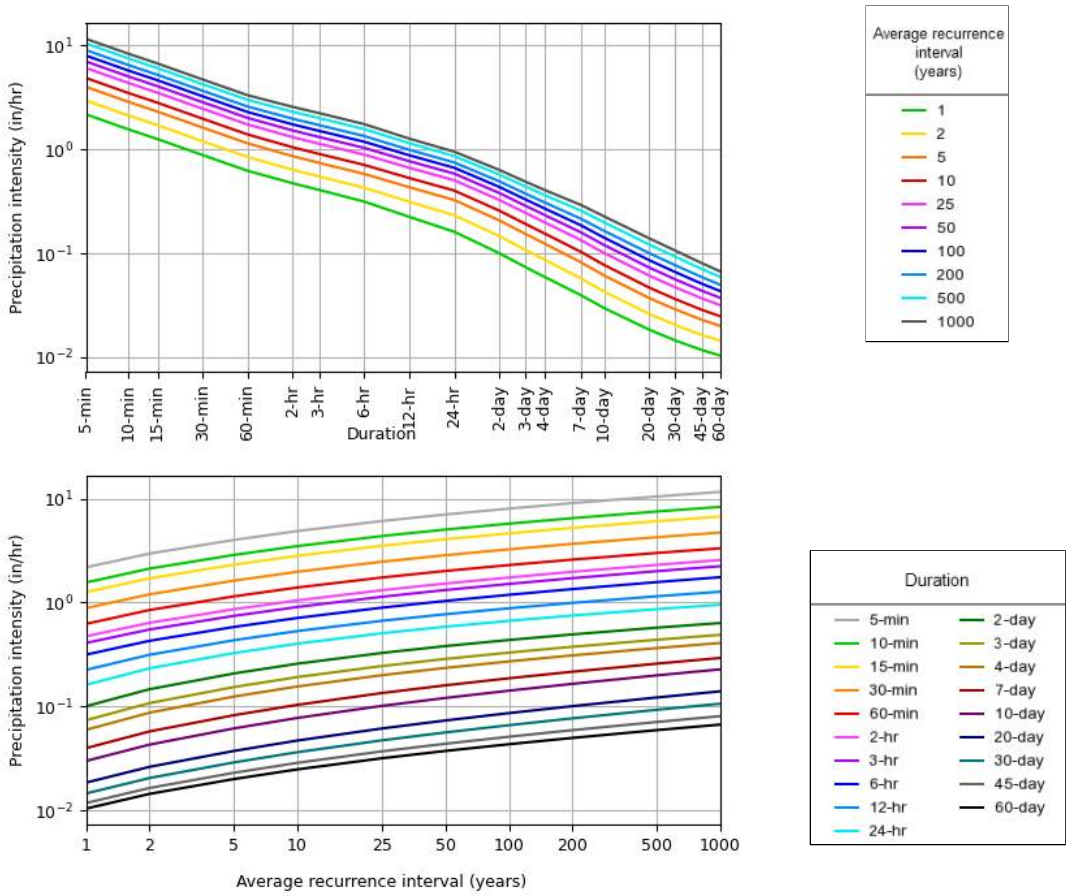
Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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PF graphical

PDS-based intensity-duration-frequency (IDF) curves
Latitude: 34.2257°, Longitude: -117.0941°



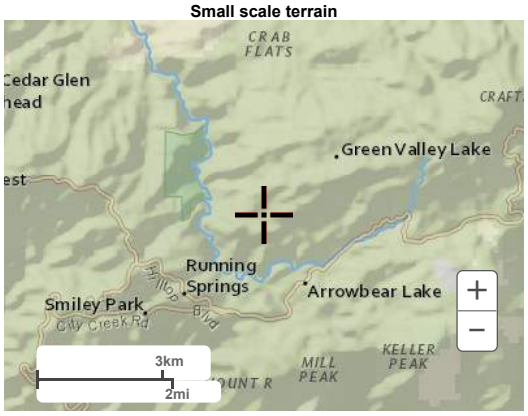
NOAA Atlas 14, Volume 6, Version 2

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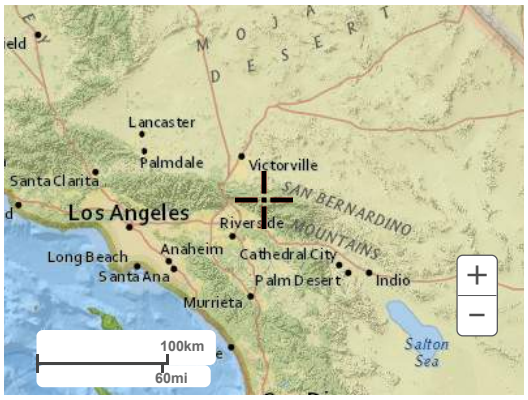
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Maps & aerials

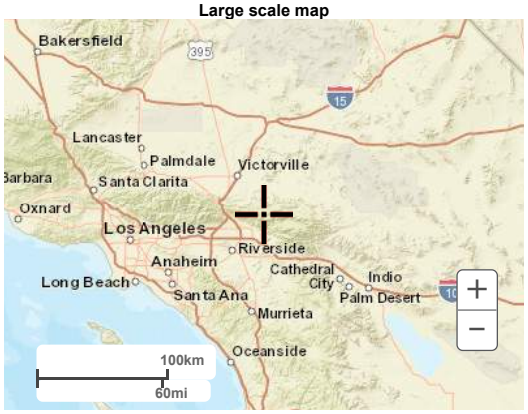
Small scale terrain



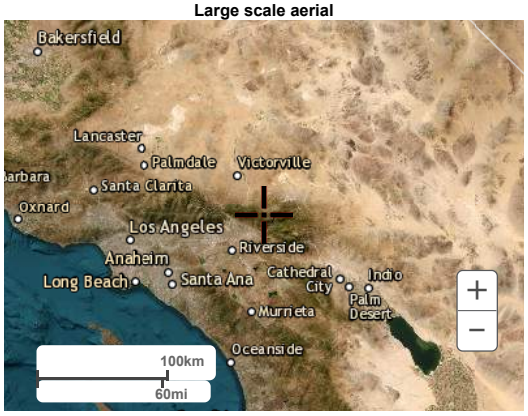
Large scale terrain



Large scale map



Large scale aerial



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National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

NOAA Atlas 14, Volume 6, Version 2
Location name: Green Valley Lake, California, USA*
Latitude: 34.2257°, Longitude: -117.0941°
Elevation: 6464 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.182 (0.151-0.221)	0.247 (0.205-0.301)	0.334 (0.276-0.409)	0.407 (0.333-0.502)	0.508 (0.402-0.647)	0.587 (0.455-0.765)	0.669 (0.506-0.893)	0.756 (0.556-1.04)	0.875 (0.618-1.25)	0.971 (0.661-1.44)
10-min	0.260 (0.216-0.317)	0.354 (0.293-0.432)	0.479 (0.396-0.586)	0.583 (0.478-0.719)	0.728 (0.576-0.928)	0.841 (0.653-1.10)	0.959 (0.726-1.28)	1.08 (0.797-1.49)	1.26 (0.885-1.80)	1.39 (0.948-2.06)
15-min	0.315 (0.261-0.384)	0.428 (0.355-0.522)	0.579 (0.479-0.709)	0.705 (0.578-0.870)	0.880 (0.697-1.12)	1.02 (0.789-1.32)	1.16 (0.878-1.55)	1.31 (0.963-1.80)	1.52 (1.07-2.17)	1.68 (1.15-2.50)
30-min	0.442 (0.367-0.539)	0.601 (0.498-0.733)	0.813 (0.672-0.995)	0.990 (0.811-1.22)	1.24 (0.979-1.58)	1.43 (1.11-1.86)	1.63 (1.23-2.17)	1.84 (1.35-2.52)	2.13 (1.50-3.05)	2.36 (1.61-3.50)
60-min	0.624 (0.517-0.760)	0.848 (0.702-1.03)	1.15 (0.948-1.40)	1.40 (1.14-1.72)	1.74 (1.38-2.22)	2.02 (1.56-2.62)	2.30 (1.74-3.07)	2.59 (1.91-3.56)	3.00 (2.12-4.30)	3.33 (2.27-4.94)
2-hr	0.947 (0.786-1.15)	1.28 (1.06-1.56)	1.72 (1.42-2.11)	2.10 (1.72-2.59)	2.63 (2.08-3.35)	3.05 (2.36-3.97)	3.49 (2.64-4.66)	3.96 (2.91-5.44)	4.62 (3.26-6.61)	5.14 (3.50-7.63)
3-hr	1.23 (1.02-1.50)	1.65 (1.37-2.02)	2.24 (1.85-2.73)	2.72 (2.23-3.36)	3.41 (2.70-4.35)	3.96 (3.08-5.16)	4.54 (3.44-6.07)	5.16 (3.80-7.08)	6.03 (4.25-8.63)	6.73 (4.58-9.98)
6-hr	1.89 (1.57-2.30)	2.57 (2.13-3.13)	3.49 (2.88-4.26)	4.26 (3.49-5.25)	5.35 (4.24-6.82)	6.21 (4.82-8.09)	7.12 (5.39-9.50)	8.08 (5.94-11.1)	9.43 (6.65-13.5)	10.5 (7.16-15.6)
12-hr	2.71 (2.25-3.30)	3.79 (3.14-4.62)	5.23 (4.32-6.39)	6.41 (5.25-7.90)	8.04 (6.37-10.3)	9.31 (7.22-12.1)	10.6 (8.03-14.2)	12.0 (8.81-16.5)	13.9 (9.78-19.8)	15.3 (10.5-22.7)
24-hr	3.88 (3.44-4.46)	5.59 (4.95-6.45)	7.83 (6.91-9.06)	9.66 (8.46-11.3)	12.1 (10.3-14.6)	14.1 (11.7-17.3)	16.0 (13.0-20.2)	18.0 (14.2-23.3)	20.8 (15.7-28.0)	22.9 (16.7-31.9)
2-day	4.82 (4.27-5.55)	7.04 (6.23-8.12)	9.97 (8.80-11.5)	12.4 (10.8-14.4)	15.7 (13.3-18.9)	18.3 (15.2-22.5)	21.0 (17.0-26.4)	23.7 (18.7-30.7)	27.5 (20.8-37.1)	30.5 (22.3-42.6)
3-day	5.30 (4.70-6.10)	7.77 (6.87-8.96)	11.1 (9.77-12.8)	13.8 (12.1-16.1)	17.6 (14.9-21.2)	20.6 (17.1-25.4)	23.8 (19.3-29.9)	27.0 (21.3-35.0)	31.6 (23.9-42.6)	35.2 (25.8-49.2)
4-day	5.71 (5.06-6.58)	8.36 (7.40-9.64)	11.9 (10.5-13.8)	15.0 (13.1-17.4)	19.2 (16.3-23.1)	22.5 (18.7-27.7)	26.1 (21.1-32.8)	29.8 (23.5-38.6)	35.0 (26.5-47.2)	39.2 (28.7-54.8)
7-day	6.67 (5.91-7.68)	9.66 (8.55-11.1)	13.8 (12.2-16.0)	17.4 (15.3-20.3)	22.6 (19.2-27.2)	26.8 (22.3-33.0)	31.4 (25.4-39.5)	36.3 (28.6-47.0)	43.4 (32.8-58.5)	49.3 (36.0-68.7)
10-day	7.17 (6.35-8.25)	10.3 (9.12-11.9)	14.7 (13.0-17.1)	18.6 (16.3-21.7)	24.3 (20.6-29.2)	29.0 (24.0-35.6)	34.1 (27.6-42.9)	39.6 (31.3-51.3)	47.8 (36.2-64.5)	54.7 (40.0-76.3)
20-day	8.87 (7.86-10.2)	12.6 (11.1-14.5)	17.9 (15.8-20.7)	22.6 (19.8-26.3)	29.4 (24.9-35.4)	35.2 (29.2-43.2)	41.4 (33.6-52.2)	48.4 (38.1-62.6)	58.6 (44.3-79.0)	67.2 (49.1-93.7)
30-day	10.5 (9.27-12.1)	14.7 (13.1-17.0)	20.8 (18.4-24.1)	26.2 (22.9-30.5)	34.0 (28.8-40.9)	40.5 (33.6-49.8)	47.6 (38.6-59.9)	55.4 (43.7-71.7)	66.9 (50.6-90.2)	76.6 (56.0-107)
45-day	12.7 (11.2-14.6)	17.7 (15.7-20.4)	24.8 (21.9-28.7)	31.0 (27.1-36.1)	39.9 (33.8-48.1)	47.3 (39.2-58.1)	55.2 (44.7-69.5)	63.9 (50.4-82.7)	76.6 (57.9-103)	87.2 (63.7-122)
60-day	15.0 (13.2-17.2)	20.7 (18.4-23.9)	28.8 (25.4-33.3)	35.7 (31.3-41.6)	45.6 (38.7-55.0)	53.7 (44.6-66.1)	62.4 (50.5-78.6)	71.7 (56.6-92.9)	85.2 (64.5-115)	96.4 (70.5-134)

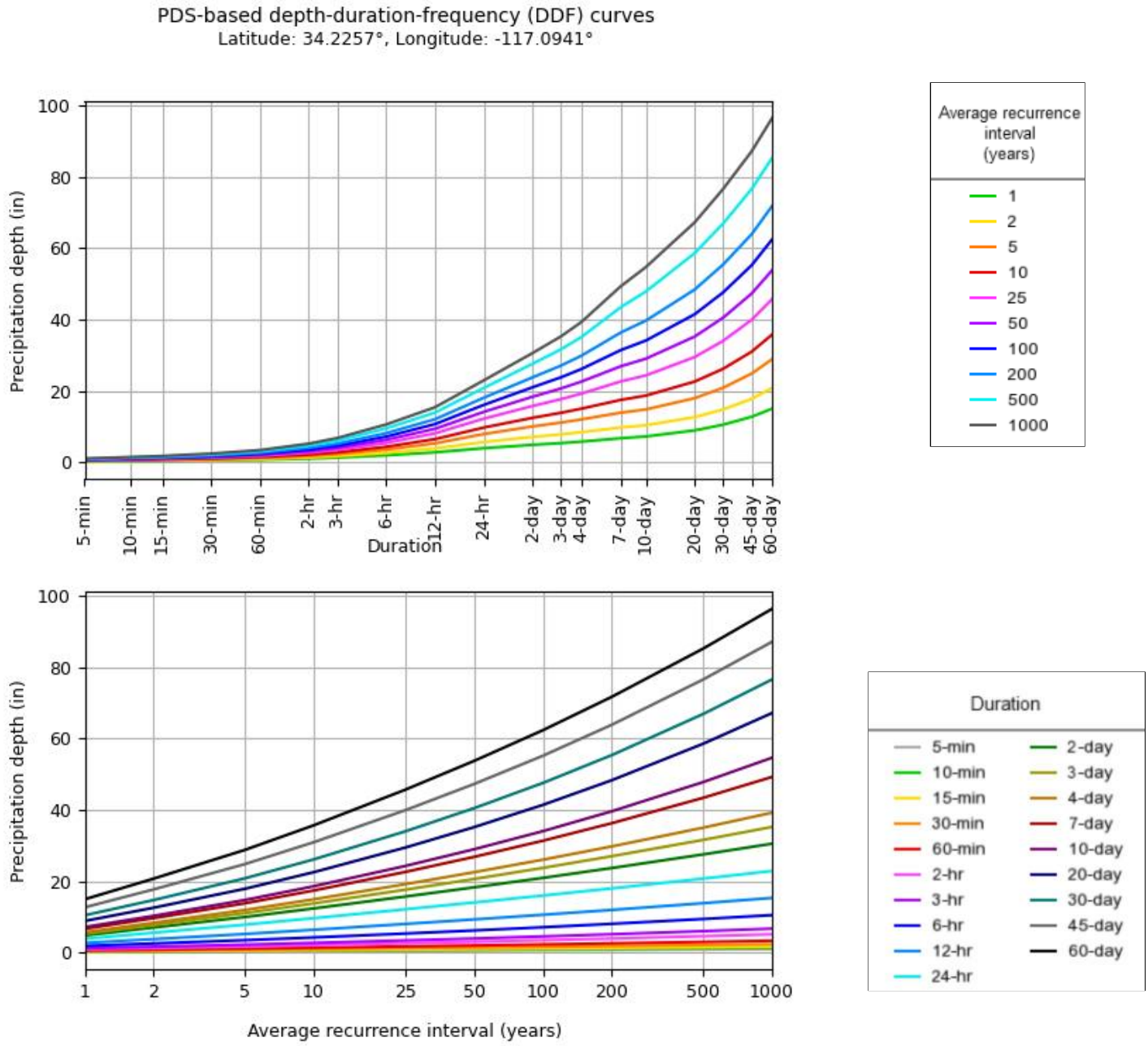
[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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PF graphical



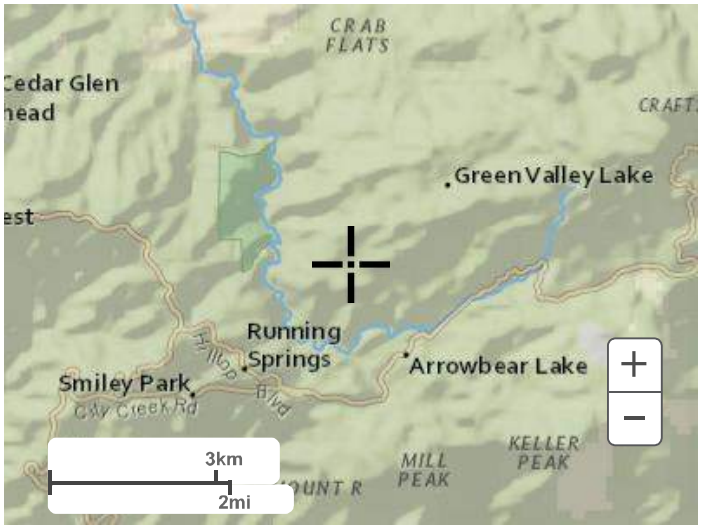
NOAA Atlas 14, Volume 6, Version 2

Created (GMT): Wed Jan 10 21:42:43 2024

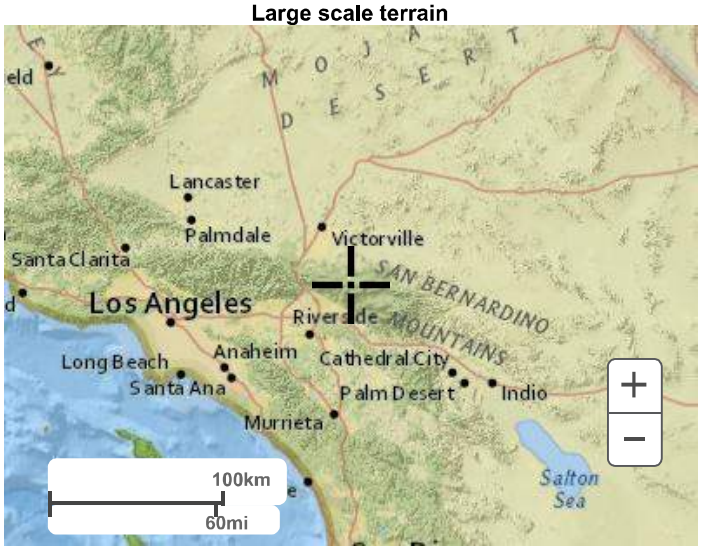
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Maps & aerials

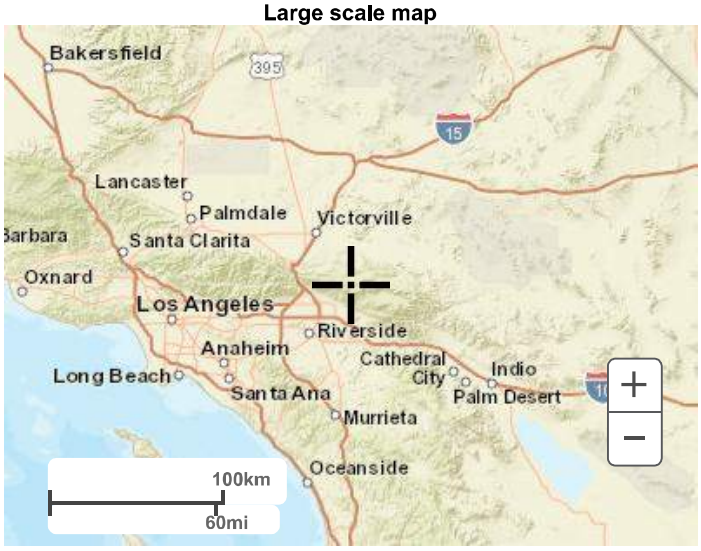
Small scale terrain



Large scale terrain



Large scale map



Large scale aerial



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Disclaimer

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for San Bernardino National Forest Area, California



November 13, 2023

Custom Soil Resource Report
Soil Map



Map Scale: 1:10,000 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 100 200 400 600

Feet
0 450 900 1800 2700

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: San Bernardino National Forest Area, California
Survey Area Data: Version 15, Aug 30, 2023

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 17, 2022—Jun 12, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
106	Cedarpines-Stargazer-Urban land complex, 15 to 30 percent slopes	20.8	5.7%
112	Cedarpines-Plaskett-Stargazer complex, 30 to 50 percent slopes	85.1	23.5%
121	Rock outcrop-Cedarpines-Plaskett complex, 15 to 35 percent slopes	36.3	10.0%
123	Runningsprings-Cedarpines-Plaskett complex, 15 to 35 percent slopes	176.4	48.6%
135	Urban land	10.7	2.9%
DaG	Wapi-Pacifico families-Rock outcrop complex, 50 to 75 percent slopes	33.4	9.2%
Totals for Area of Interest		**362.7**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a

given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

San Bernardino National Forest Area, California

106—Cedarpines-Stargazer-Urban land complex, 15 to 30 percent slopes

Map Unit Setting

National map unit symbol: 2dvlx
Elevation: 4,330 to 6,460 feet
Mean annual precipitation: 26 to 41 inches
Mean annual air temperature: 52 to 55 degrees F
Frost-free period: 150 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Cedarpines and similar soils: 45 percent
Stargazer and similar soils: 25 percent
Urban land: 15 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cedarpines

Setting

Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Colluvium and/or residuum weathered from granitoid

Typical profile

A - 0 to 5 inches: cobbly sandy loam
Bw - 5 to 20 inches: cobbly sandy loam
C - 20 to 24 inches: extremely cobbly sand
Cr - 24 to 39 inches: bedrock

Properties and qualities

Slope: 15 to 30 percent
Depth to restrictive feature: 24 inches to paralithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Ecological site: F019XG914CA - Loamy Hills >30"ppt
Hydric soil rating: No

Description of Stargazer

Setting

Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Colluvium and/or residuum weathered from granitoid

Typical profile

Oe - 0 to 3 inches: moderately decomposed plant material
A - 3 to 16 inches: sandy loam
Bt1 - 16 to 28 inches: clay loam
Bt2 - 28 to 51 inches: loam
Cr - 51 to 61 inches: bedrock

Properties and qualities

Slope: 15 to 30 percent
Surface area covered with cobbles, stones or boulders: 1.0 percent
Depth to restrictive feature: 39 to 69 inches to paralithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 8.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: C
Ecological site: F019XG914CA - Loamy Hills >30"ppt
Hydric soil rating: No

Description of Urban Land

Setting

Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex
Across-slope shape: Convex

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: D
Ecological site: F019XG913CA - Loamy Hills <30"ppt

Minor Components

Heapspeak

Percent of map unit: 5 percent
Landform: Ridges

Landform position (two-dimensional): Summit
Landform position (three-dimensional): Mountaintop
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Canyonspring

Percent of map unit: 5 percent
Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Runningsprings

Percent of map unit: 5 percent
Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

112—Cedarpines-Plaskett-Stargazer complex, 30 to 50 percent slopes

Map Unit Setting

National map unit symbol: 2dvm3
Elevation: 4,080 to 6,820 feet
Mean annual precipitation: 28 to 41 inches
Mean annual air temperature: 50 to 55 degrees F
Frost-free period: 150 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Cedarpines and similar soils: 45 percent
Plaskett and similar soils: 25 percent
Stargazer and similar soils: 15 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cedarpines

Setting

Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex

Across-slope shape: Convex
Parent material: Colluvium and/or residuum weathered from granitoid

Typical profile

A - 0 to 5 inches: cobbly sandy loam
Bw - 5 to 20 inches: cobbly sandy loam
C - 20 to 24 inches: extremely cobbly sand
Cr - 24 to 39 inches: bedrock

Properties and qualities

Slope: 30 to 50 percent
Depth to restrictive feature: 24 inches to paralithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Ecological site: F019XG914CA - Loamy Hills >30"ppt
Hydric soil rating: No

Description of Plaskett

Setting

Landform: Ridges
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Mountaintop
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Residuum weathered from granitoid

Typical profile

Oi - 0 to 4 inches: slightly decomposed plant material
A - 4 to 13 inches: very gravelly sandy loam
AB - 13 to 23 inches: very gravelly sandy loam
R - 23 to 33 inches: bedrock

Properties and qualities

Slope: 30 to 50 percent
Surface area covered with cobbles, stones or boulders: 10.0 percent
Depth to restrictive feature: 12 to 28 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to low (0.00 to 0.01 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Ecological site: F019XG914CA - Loamy Hills >30"ppt
Hydric soil rating: No

Description of Stargazer

Setting

Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Colluvium and/or residuum weathered from granitoid

Typical profile

Oe - 0 to 3 inches: moderately decomposed plant material
A - 3 to 16 inches: sandy loam
Bt1 - 16 to 28 inches: clay loam
Bt2 - 28 to 51 inches: loam
Cr - 51 to 61 inches: bedrock

Properties and qualities

Slope: 30 to 50 percent
Surface area covered with cobbles, stones or boulders: 1.0 percent
Depth to restrictive feature: 39 to 69 inches to paralithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 8.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: C
Ecological site: F019XG914CA - Loamy Hills >30"ppt
Hydric soil rating: No

Minor Components

Runningsprings

Percent of map unit: 7 percent
Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Waterman

Percent of map unit: 5 percent
Landform: Ridges
Landform position (two-dimensional): Summit

Landform position (three-dimensional): Mountaintop
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Rock outcrop

Percent of map unit: 2 percent
Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex
Across-slope shape: Convex

Canyonspring

Percent of map unit: 1 percent
Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

121—Rock outcrop-Cedarpines-Plaskett complex, 15 to 35 percent slopes

Map Unit Setting

National map unit symbol: 2dvmc
Elevation: 6,080 to 7,070 feet
Mean annual precipitation: 28 to 41 inches
Mean annual air temperature: 49 to 52 degrees F
Frost-free period: 150 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Rock outcrop: 45 percent
Cedarpines and similar soils: 25 percent
Plaskett and similar soils: 15 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Rock Outcrop

Setting

Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex
Across-slope shape: Convex

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8

Description of Cedarpines

Setting

Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Colluvium and/or residuum weathered from granitoid

Typical profile

A - 0 to 5 inches: cobbly sandy loam
Bw - 5 to 20 inches: cobbly sandy loam
C - 20 to 24 inches: extremely cobbly sand
Cr - 24 to 39 inches: bedrock

Properties and qualities

Slope: 15 to 35 percent
Depth to restrictive feature: 24 inches to paralithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Ecological site: F019XG914CA - Loamy Hills >30"ppt
Hydric soil rating: No

Description of Plaskett

Setting

Landform: Ridges
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Mountaintop
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Residuum weathered from granitoid

Typical profile

Oi - 0 to 4 inches: slightly decomposed plant material
A - 4 to 13 inches: very gravelly sandy loam
AB - 13 to 23 inches: very gravelly sandy loam
R - 23 to 33 inches: bedrock

Properties and qualities

Slope: 15 to 35 percent
Surface area covered with cobbles, stones or boulders: 10.0 percent

Depth to restrictive feature: 12 to 28 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to low (0.00 to 0.01 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Ecological site: F019XG914CA - Loamy Hills >30"ppt
Hydric soil rating: No

Minor Components

Runningsprings

Percent of map unit: 5 percent
Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Canyonspring

Percent of map unit: 5 percent
Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Stargazer

Percent of map unit: 5 percent
Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

123—Runningsprings-Cedarpines-Plaskett complex, 15 to 35 percent slopes

Map Unit Setting

National map unit symbol: 2dvmf
Elevation: 4,620 to 6,770 feet
Mean annual precipitation: 25 to 43 inches
Mean annual air temperature: 50 to 55 degrees F
Frost-free period: 150 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Runningsprings and similar soils: 45 percent
Cedarpines and similar soils: 25 percent
Plaskett and similar soils: 15 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Runningsprings

Setting

Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from granitoid

Typical profile

A - 0 to 9 inches: sandy loam
Bw - 9 to 18 inches: sandy loam
Cr - 18 to 28 inches: bedrock

Properties and qualities

Slope: 15 to 35 percent
Surface area covered with cobbles, stones or boulders: 2.0 percent
Depth to restrictive feature: 10 to 20 inches to paralithic bedrock
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D
Ecological site: F019XG914CA - Loamy Hills >30"ppt
Hydric soil rating: No

Description of Cedarpines

Setting

Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Colluvium and/or residuum weathered from granitoid

Typical profile

A - 0 to 5 inches: cobbly sandy loam
Bw - 5 to 20 inches: cobbly sandy loam
C - 20 to 24 inches: extremely cobbly sand
Cr - 24 to 39 inches: bedrock

Properties and qualities

Slope: 15 to 35 percent
Depth to restrictive feature: 24 inches to paralithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Ecological site: F019XG914CA - Loamy Hills >30"ppt
Hydric soil rating: No

Description of Plaskett

Setting

Landform: Ridges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Mountaintop
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from granitoid

Typical profile

Oi - 0 to 4 inches: slightly decomposed plant material
A - 4 to 13 inches: very gravelly sandy loam
AB - 13 to 23 inches: very gravelly sandy loam
R - 23 to 33 inches: bedrock

Properties and qualities

Slope: 15 to 35 percent
Surface area covered with cobbles, stones or boulders: 10.0 percent

Depth to restrictive feature: 12 to 28 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to low (0.00 to 0.01 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Ecological site: F019XG914CA - Loamy Hills >30"ppt
Hydric soil rating: No

Minor Components

Heapspeak

Percent of map unit: 5 percent
Landform: Ridges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Mountaintop
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Stargazer

Percent of map unit: 5 percent
Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Canyonspring

Percent of map unit: 3 percent
Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Rock outcrop

Percent of map unit: 2 percent
Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex
Across-slope shape: Convex

135—Urban land

Map Unit Setting

National map unit symbol: 2dvmt
Elevation: 4,400 to 6,870 feet
Mean annual precipitation: 21 to 42 inches
Mean annual air temperature: 48 to 55 degrees F
Frost-free period: 110 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Setting

Landform: Alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: D
Ecological site: R019XG911CA - Loamy Fan

Minor Components

Xerorthents

Percent of map unit: 5 percent
Landform: Alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

DaG—Wapi-Pacifico families-Rock outcrop complex, 50 to 75 percent slopes

Map Unit Setting

National map unit symbol: htrp
Elevation: 4,000 to 7,800 feet
Mean annual precipitation: 20 to 35 inches
Mean annual air temperature: 46 to 54 degrees F
Frost-free period: 120 to 175 days
Farmland classification: Not prime farmland

Map Unit Composition

Wapi family and similar soils: 35 percent
Pacifico family and similar soils: 30 percent
Rock outcrop: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wapi Family

Setting

Landform: Mountains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Residuum weathered from granodiorite

Typical profile

H1 - 0 to 7 inches: loamy sand
H2 - 7 to 10 inches: gravelly loamy sand
H3 - 10 to 15 inches: weathered bedrock
H4 - 15 to 19 inches: unweathered bedrock

Properties and qualities

Slope: 50 to 75 percent
Depth to restrictive feature: 10 to 15 inches to paralithic bedrock; 15 to 19 inches to lithic bedrock
Drainage class: Somewhat excessively drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 0.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D

Ecological site: F019XG915CA - Sandy Hills <30"ppt
Hydric soil rating: No

Description of Pacifico Family

Setting

Landform: Mountains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Residuum weathered from granodiorite

Typical profile

H1 - 0 to 3 inches: loamy coarse sand
H2 - 3 to 15 inches: loamy coarse sand
H3 - 15 to 19 inches: weathered bedrock

Properties and qualities

Slope: 50 to 75 percent
Depth to restrictive feature: 15 to 19 inches to paralithic bedrock
Drainage class: Somewhat excessively drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 1.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D
Ecological site: F019XG915CA - Sandy Hills <30"ppt
Hydric soil rating: No

Description of Rock Outcrop

Setting

Landform: Mountains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Residuum weathered from granodiorite

Typical profile

H1 - 0 to 4 inches: unweathered bedrock

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8e
Hydric soil rating: No

HUME SOCAL CAMPGROUND PROJECT

SAN BERNARDINO COUNTY, CALIFORNIA

KELLER PEAK USGS 7.5-MINUTE TOPOGRAPHIC QUADRANGLE
SECTIONS 28 AND 33, TOWNSHIP 2 NORTH, RANGE 2 WEST
APN: 0328-071-05, -07, AND -10, AND 0328-121-40 AND -42

Delineation of State and Federal Jurisdictional Waters

Prepared For:

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September 2023

HUME SOCAL CAMPGROUND PROJECT

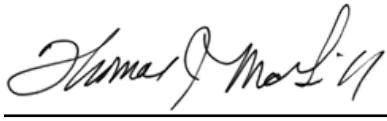
SAN BERNARDINO COUNTY, CALIFORNIA

Delineation of State and Federal Jurisdictional Waters

The undersigned certify that the statements furnished in this report and exhibits present data and information required for this biological evaluation, and the facts, statements, and information presented is a complete and accurate account of the findings and conclusions to the best of our knowledge and beliefs.



Travis J. McGill
Biologist/Director



Thomas J. McGill, Ph.D.
Managing Director

September 2023

Executive Summary

ELMT Consulting (ELMT) has prepared this Delineation of State and Federal Jurisdictional Waters Report for the proposed Hume SoCal Campground Project located within Assessor Parcel Numbers (APNs) 0328-071-05, -07, -10, 121-40, and 121-42 (project site or site) located in the City of Green Valley Lake, San Bernardino County, California. The jurisdictional delineation documents the regulatory authority of the U.S. Army Corps of Engineers (Corps), the Regional Water Quality Control Board (Regional Board), and the California Department of Fish and Wildlife (CDFW) pursuant to Section 401 and 404 of the Federal Clean Water Act (CWA), the California Porter-Cologne Water Quality Control Act, and Sections 1600 *et. seq.* of the California Fish and Game Code.[1]

A total of seven (7) drainage features (Drainages 1-7) were observed within the boundaries of the project site during the field delineation. The on-site drainage features, after flowing off-site, flow into Deep Creek before ultimately flowing into the Mojave River. Therefore, the onsite drainage features would qualify as waters of the United States under the jurisdiction of the Corps, and would qualify as "waters of the State" under the regulatory authority of the Regional Board and CDFW. Refer to Table ES-1 for a summary of on-site jurisdictional areas.

Table ES-1: Jurisdictional Areas

Jurisdictional Feature	Stream Flow	Cowardin Class	Class of Aquatic Resource	Corps/Regional Board Waters of the State		CDFW Streambed		
				On-Site Jurisdiction		On-Site Jurisdictional Streambed		Associated Habitat
				Acreage	Linear Feet	Acreage	Linear Feet	Acreage
Drainage 1	Perennial	Riverine	Non-Section 10 Non-Wetland	0.95	3,382	0.95	3,382	1.48
Drainage 2	Ephemeral	Riverine	Non-Section 10 Non-Wetland	0.18	875	0.18	875	0
Drainage 3	Ephemeral	Riverine	Non-Section 10 Non-Wetland	0.03	303	0.03	303	0
Drainage 4	Perennial	Riverine	Non-Section 10 Non-Wetland	0.28	1,613	0.28	1,613	0.73
Drainage 5	Ephemeral	Riverine	Non-Section 10 Non-Wetland	0.094	1,504	0.094	1,504	0
Drainage 6	Ephemeral	Riverine	Non-Section 10 Non-Wetland	0.055	620	0.055	620	0
Drainage 7	Perennial	Riverine	Non-Section 10 Non-Wetland	0.25	1,523	0.25	1,523	0.75
			TOTALS	**1.839**	**9,820**	**1.839**	**9,820**	**2.96**

[1] The field surveys for this jurisdictional delineation were conducted on November 17, 2021 pursuant to the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region, Version 2.0* (Corps 2008); and *Minimum Standards for Acceptance of Aquatic Resources Delineation Reports* (Corps 2017); *The MESA Field Guide: Mapping Episodic Stream Activity* (CDFW 2014); and a *Review of Stream Processes and Forms in Dryland Watersheds* (CDFW 2010).

Approximately 1.839 acres (9,820 linear feet) of waters of the United States occur on-site. Likewise, the on-site drainage features exhibit characteristics consistent with CDFW's methodology and would be considered CDFW streambed totaling 4.8 acres (9,820 linear feet).

Any impacts to the on-site jurisdictional areas will require a Corps Clean Water Act Section 404 Permit, Regional Board CWA Section 401 Water Quality Certification, and a CDFW Section 1602 Lake and Streambed Alteration Agreement prior to Project implementation. However, based on the proposed project footprint, all of the onsite jurisdictional areas will be avoided and no impacts will occur. Refer to Sections 1-7 for a detailed analysis of site conditions and regulatory requirements.

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Appendix A Documentation
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Section 1 Introduction

This delineation has been prepared for the Hume SoCal Campground Project (project site, site) located near Green Valley Lake within Assessor Parcel Numbers 0328-071-05, -07, and -10, and 0328-121-40 and -42 in the unincorporated community of Green Valley Lake, San Bernardino County, California (Project) in order to document the potential jurisdictional authority of the U.S. Army Corps of Engineers (Corps), the Regional Water Quality Control Board (Regional Board), and the California Department of Fish and Wildlife (CDFW) pursuant to Section 401 and 404 of the Federal Clean Water Act (CWA), the California Porter-Cologne Water Quality Control Act and Sections 1600 *et seq.* of the California Fish and Game Code. The analysis presented in this report is supported by field surveys and verification of site conditions conducted on July 31, 2023 and August 2, 2023.

This jurisdictional delineation explains the methodology undertaken by ELMT Consulting (ELMT) to define the regulatory authority of the aforementioned regulatory agencies and documents the findings made by ELMT. This report documents the jurisdictional boundaries using the most up-to-date regulations, written policy, and guidance from the regulatory agencies.

1.1 PROJECT LOCATION

The project site is generally located north, west, and south of State Route 18, and southeast of Lake Arrowhead within the San Bernardino Mountains in the unincorporated Community of Green Valley Lake, San Bernardino County, California (Exhibit 1, *Regional Vicinity*). The site is depicted on the *Keller Peak* quadrangle of the United States Geological Survey's (USGS) 7.5-minute topographic map series within Sections 28 and 33 of Township 2 North, Range 2 West (Exhibit 2, *Site Vicinity*). Specifically, the approximately 251-acre project site is transected by Green Valley Lake Road and roughly centered around the existing Hume SoCal campground facility within Assessor's Parcel Numbers (APN) 0328-071-05, -07, and -10, and 0328-121-40 and -42 (Exhibit 3, *Project Site*).

1.2 PROJECT DESCRIPTION

The Project involves the expansion of campground uses for the existing Hume SoCal campground to accommodate up to 2,854 total occupants. This would be accomplished through the continued use of existing campground structures as well as the development of additional campground and recreational structures and uses within a 251-acre area of the Green Valley Lake community. Development of the Project site would be completed in five phases.

Each phase of the Project would include the development of expanded infrastructure, additional amenities, support structures, and buildings necessary to accommodate expanded camper capacity as well as paved parking areas and paved access roadways. Refer to Appendix A, *Site Plans*.

Phase 1 of the Project would involve the development of facilities to be used as a Junior High Camp. Proposed residential structures within the Phase 1 area include an expanded welcome center, private administration and guest speaker residencies, staff housing, and student dormitories. Phase 1 also includes the development of a gymnasium, bus parking, a snack shop, a chapel, converting an existing chapel to a

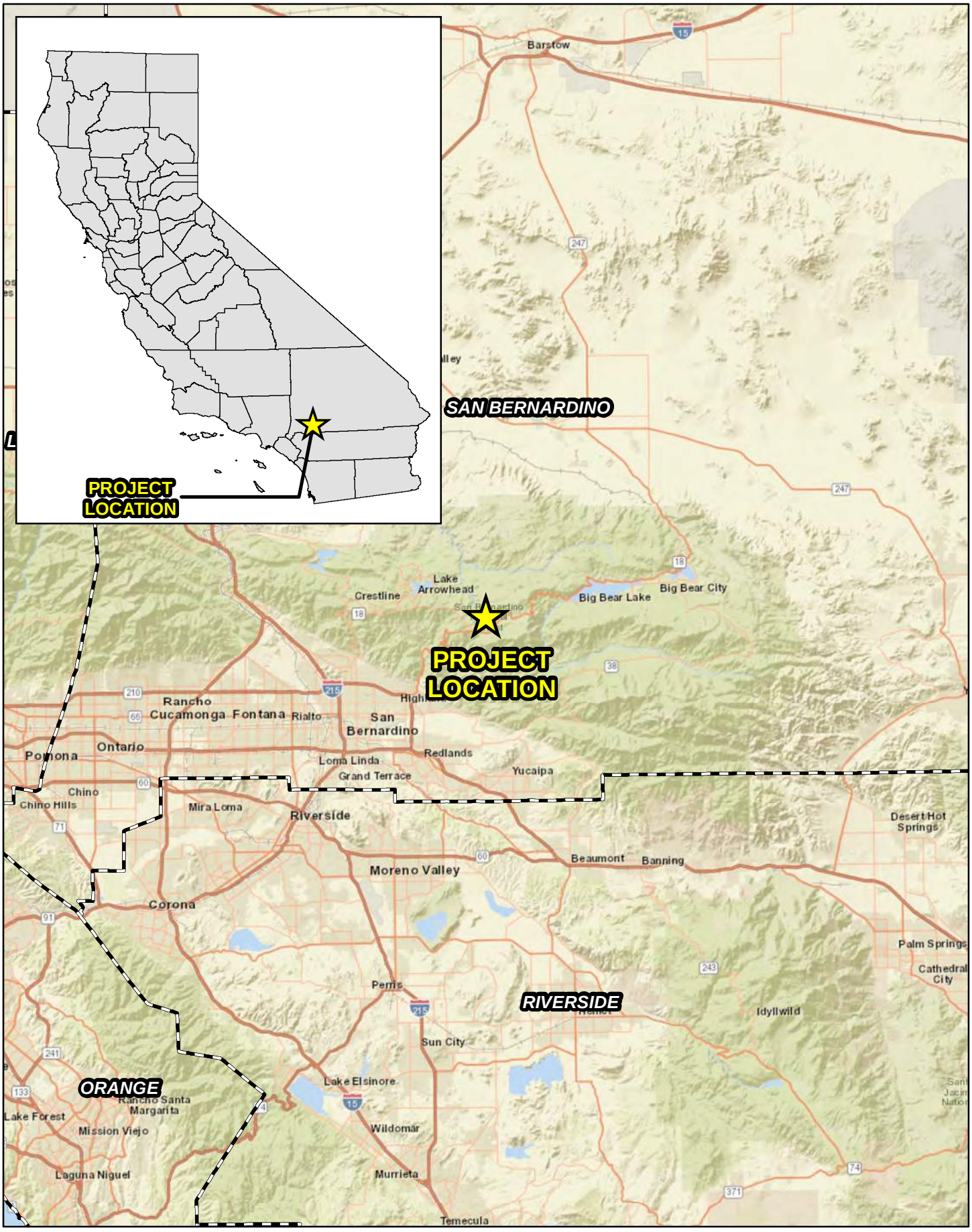
small meeting space, an expansion to the existing dining hall, a maintenance building, an amphitheater, and restrooms. Outdoor recreation facilities include grass quads. Existing and proposed facilities within Phase 1 would accommodate up to 988 guest occupants.

Phase 2 of the Project would involve the development of facilities to be used as a High School Camp. Proposed residential structures within the Phase 2 area include staff housing buildings, and student dormitories. Phase 2 also includes the development of a large dining hall, gymnasium, a chapel, amphitheater, and restrooms. Outdoor recreation facilities include grass quads, a swimming pool, and a recreation pond. Existing and proposed facilities within Phase 2 would accommodate up to 1,096 occupants.

Phase 3 of the Project proposes the development of an Adult Lodge. Phase 3 would include the development of one adult lodge with included access road. Existing and proposed facilities within Phase 3 would accommodate up to 140 occupants.

Phase 4 of the Project would include the development of an Elementary Age Camp and associated facilities. Proposed residential structures within Phase 4 include semi-permanent insulated tent structures for students. Phase 4 also includes the development of restroom facilities with showers and an amphitheater. Outdoor recreation facilities include grass quads, a dining canopy, a swimming pool, and a recreation pond. Existing and proposed facilities within Phase 4 would accommodate up to 500 occupants.

Phase 5 of the Project proposes the creation of a tent-based youth camp, Wildwood Camp. Residential structures proposed for this phase consist of semi-permanent insulated tent structures. Phase 5 also includes the development of restroom facilities with showers and an amphitheater. Outdoor recreation facilities include grass quads, a dining canopy, a swimming pool, and a recreation pond. Existing and proposed facilities within Phase 5 would accommodate up to 130 occupants.

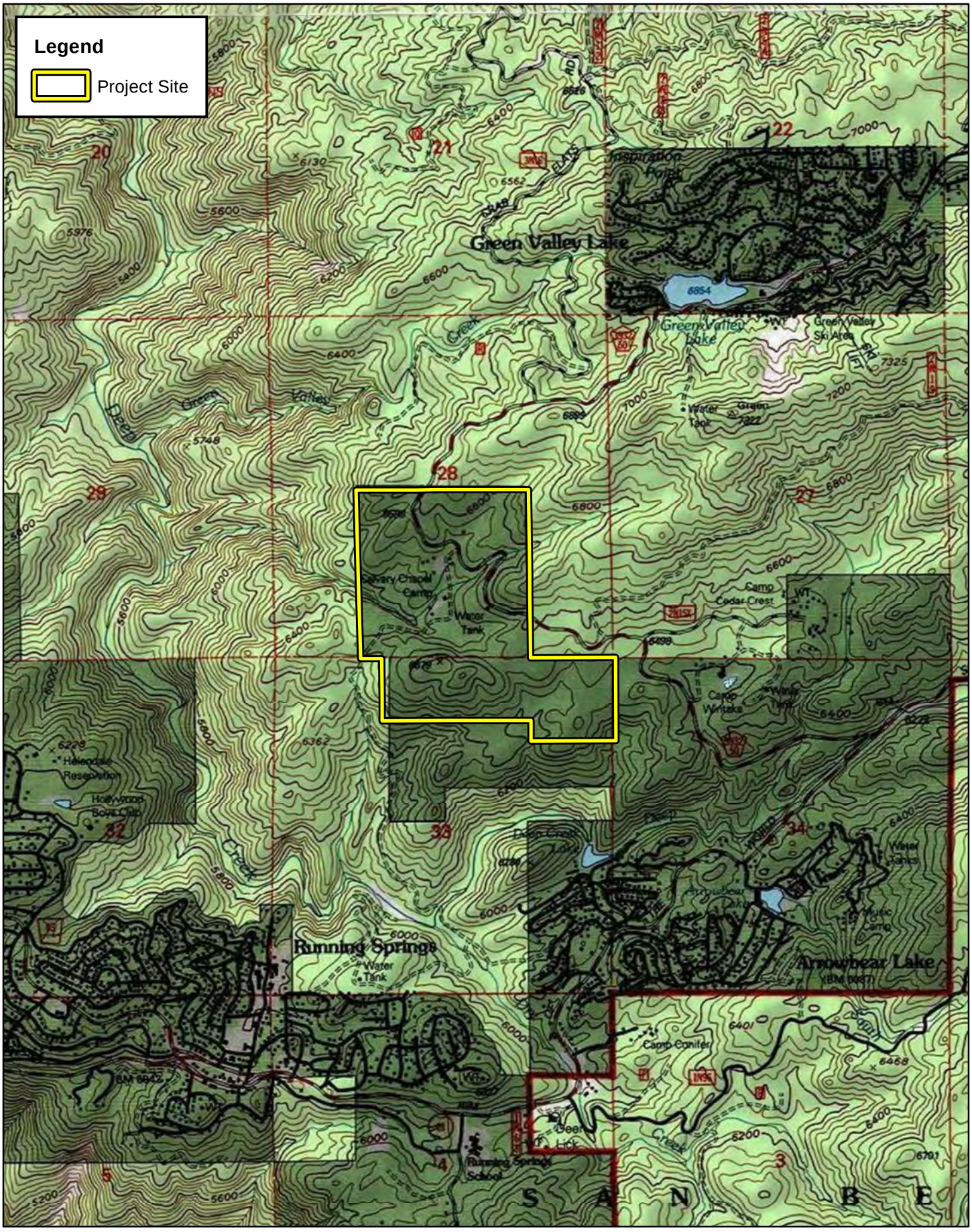


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HUME SO CAL CAMPGROUND PROJECT

Regional Vicinity

Exhibit 1



ELMT CONSULTING

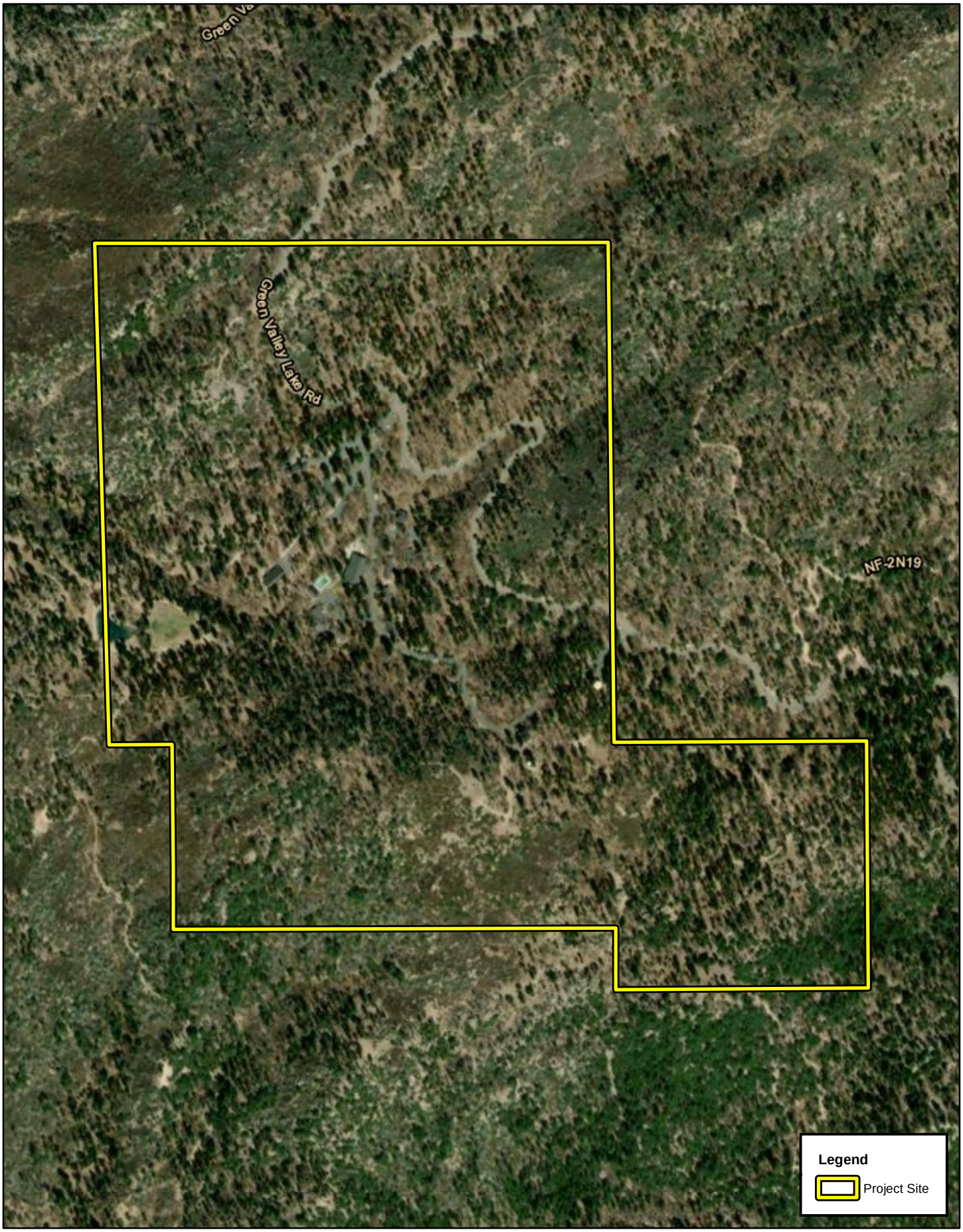
0 1,000 2,000 4,000 Feet

Source: USA Topographic Map, San Bernardino County

HUME SO CAL CAMPGROUND PROJECT

Site Vicinity

Exhibit 2



ELMT CONSULTING

0 500 1,000 2,000 Feet

HUME SO CAL CAMPGROUND PROJECT

Project Site

Source: ESRI Aerial Imagery, San Bernardino County

Exhibit 3

Section 2 Regulations

There are three key agencies that regulate activities within inland streams, wetlands, and riparian areas in California. The Corps Regulatory Division regulates activities pursuant to Section 404 of the CWA, Section 10 of the Rivers and Harbors Act, and Section 103 of the Marine Protection, Research, and Sanctuaries Act. The Regional Board regulates activities pursuant to Section 401 of the CWA and the California Porter-Cologne Water Quality Control Act and the CDFW regulates activities under Sections 1600 *et seq*. of the California Fish and Game Code.

2.1 U.S. ARMY CORPS OF ENGINEERS

Since 1972, the Corps and U.S. Environmental Protection Agency (EPA) have jointly regulated the discharge of dredged or fill material into waters of the United States, including wetlands, pursuant to Section 404 of the CWA. The Corps and EPA define "fill material" to include any "material placed in waters of the United States where the material has the effect of: (i) replacing any portion of a water of the United States with dry land; or (ii) changing the bottom elevation of any portion of the waters of the United States." Examples include, but are not limited to, sand, rock, clay, construction debris, wood chips, and "materials used to create any structure or infrastructure in the waters of the United States."

2.2 REGIONAL WATER QUALITY CONTROL BOARD

Pursuant to Section 401 of the CWA, any applicant for a federal license or permit to conduct any activity which may result in any discharge to waters of the United States must provide certification from the State or Indian tribe in which the discharge originates. This certification provides for the protection of the physical, chemical, and biological integrity of waters, addresses impacts to water quality that may result from issuance of federal permits and helps insure that federal actions will not violate water quality standards of the State or Indian tribe. In California, there are nine Regional Boards that issue or deny certification for discharges to waters of the United States and waters of the State, including wetlands, within their geographical jurisdiction. The State Water Resources Control Board (SWRCB) assumes this responsibility when a project has the potential to result in the discharge to waters within multiple Regional Boards.

Additionally, the California Porter-Cologne Water Quality Control Act gives the State very broad authority to regulate waters of the State, which are defined as any surface water or groundwater, including saline waters. The Porter-Cologne Water Quality Control Act has become an important tool post *Solid Waste Agency of Northern Cook County vs. United States Corps of Engineers*[2] (SWANCC) and *Rapanos v. United States*[3] (Rapanos) court cases with respect to the State's regulatory authority over isolated and insignificant waters. Generally, any applicant proposing to discharge waste into a water body must file a Report of Waste Discharge in the event that there is no Section 404/401 nexus. Although "waste" is partially defined as any waste substance associated with human habitation, the Regional Board also interprets this to include discharge of dredged and fill material into water bodies.

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2 Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers, 531 U.S. 159 (2001)
3 Rapanos v. United States, 547 U.S. 715 (2006)

Under the State Water Resources Control Board Sate Wetland Definition, an area is a wetland if, under normal circumstances, (1) the area has continuous or recurrent saturation of the upper substrate caused by groundwater, or shallow surface water, or both; (2) the duration of such saturation is sufficient to cause anaerobic conditions in the upper substrate; and (3) the area's vegetation is dominated by hydrophytes or the area lacks vegetation.

2.3 CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE

Sections 1600 *et seq.* of the California Fish and Game Code establishes a fee-based process to ensure that projects conducted in and around lakes, rivers, or streams do not substantially adversely impact fish and wildlife resources, or, when adverse impacts cannot be avoided, ensures that adequate mitigation and/or compensation is provided. Pursuant to Section 1602 of the California Fish and Game Code, a notification must be submitted to the CDFW for any activity that will divert or obstruct the natural flow or alter the bed, channel, or bank (which may include associated biological resources) of a river or stream or use material from a streambed. One CDFW guidance document, although not a formally adopted rule or policy, requires notification for activities taking place within rivers or streams that flow perennially or episodically and that are defined by the area in which surface water currently flows, or has flowed, over a given course during the historic hydrologic regime, and where the width of its course can reasonably be identified by physical and biological indicators. If the project will not "substantially adversely affect an existing fish or wildlife resource," following notification to CDFW, the project may commence without an agreement with CDFW. (Fish & G. Code, § 1602(a)(4)(A)(i).)

Section 3 Methodology

The analysis presented in this report is supported by field surveys and verification of site conditions conducted on July 31, 2023 and August 2, 2023. ELMT conducted a field delineation to determine the jurisdictional limits of "waters of the State" and jurisdictional streambed (including potential wetlands), located within the boundaries of the project site. While in the field, jurisdictional features were recorded on an aerial base map at a scale of 1" = 50' using topographic contours and visible landmarks as guidelines. Data points were obtained with a Garmin Map62 Global Positioning System to record and identify specific widths for ordinary high water mark (OHWM) indicators and the locations of photographs, soil pits, and other pertinent jurisdictional features, if present. This data was then transferred as a .shp file and added to the Project's jurisdictional exhibits. The jurisdictional exhibits were prepared using ESRI ArcInfo Version 10 software.

3.1 WATERS OF THE UNITED STATES

In the absence of adjacent wetlands, the limits of the Corps jurisdiction in non-tidal waters extend to the OHWM, which is defined as "*. . . that line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas.*"[4] Indicators of an OHWM are defined in *A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States* (Corps 2008). An OHWM can be determined by the observation of a natural line impressed on the bank; shelving; changes in the character of the soil; destruction of terrestrial vegetation; presence of litter and debris; wracking; vegetation matted down, bent, or absent; sediment sorting; leaf litter disturbed or washed away; scour; deposition; multiple observed flow events; bed and banks; water staining; and/or change in plant community. The Regional Board shares the Corps' jurisdictional methodology, unless SWANCC or Rapanos conditions are present. In the latter case, the Regional Board considers such drainage features to be jurisdictional waters of the State.

In accordance with the Revised Definition of "Waters of the United States"; Conforming (September 8, 2023), "waters of the United Sates" are defined as follows:

(a) ***Waters of the United States*** means:

(1) Waters which are:
(i) Currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;
(ii) The territorial seas; or
(iii) Interstate waters;

[4] CWA regulations 33 CFR §328.3(e).

(2) Impoundments of waters otherwise defined as waters of the United States under this definition, other than impoundments of waters identified under paragraph (a)(5) of this section;

(3) Tributaries of waters identified in paragraph (a)(1) or (2) of this section that are relatively permanent, standing or continuously flowing bodies of water;

(4) Wetlands adjacent to the following waters:
(i) Waters identified in paragraph (a)(1) of this section; or
(ii) Relatively permanent, standing or continuously flowing bodies of water identified in paragraph (a)(2) or (a)(3) of this section and with a continuous surface connection to those waters;

(5) Intrastate lakes and ponds not identified in paragraphs (a)(1) through (4) of this section that are relatively permanent, standing or continuously flowing bodies of water with a continuous surface connection to the waters identified in paragraph (a)(1) or (a)(3) of this section

(b) The following are not "waters of the United States" even where they otherwise meet the terms of paragraphs (a)(2) through (5) of this section:

(1) Waste treatment systems, including treatment ponds or lagoons, designed to meet the requirements of the Clean Water Act;

(2) Prior converted cropland designated by the Secretary of Agriculture. The exclusion would cease upon a change of use, which means that the area is no longer available for the production of agricultural commodities. Notwithstanding the determination of an area's status as prior converted cropland by any other Federal agency, for the purposes of the Clean Water Act, the final authority regarding Clean Water Act jurisdiction remains with EPA;

(3) Ditches (including roadside ditches) excavated wholly in and draining only dry land and that do not carry a relatively permanent flow of water;

(4) Artificially irrigated areas that would revert to dry land if the irrigation ceased;
(5) Artificial lakes or ponds created by excavating or diking dry land to collect and retain water and which are used exclusively for such purposes as stock watering, irrigation, settling basins, or rice growing;
(6) Artificial reflecting or swimming pools or other small ornamental bodies of water created by excavating or diking dry land to retain water for primarily aesthetic reasons;

(7) Waterfilled depressions created in dry land incidental to construction activity and pits excavated in dry land for the purpose of obtaining fill, sand, or gravel unless and until the construction or excavation operation is abandoned and the resulting body of water meets the definition of waters of the United States; and

(8) Swales and erosional features (*e.g.,* gullies, small washes) characterized by low volume, infrequent, or short duration flow.

(c) In this section, the following definitions apply:

(1) ***Wetlands*** means those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

(2) ***Adjacent*** means having a continuous surface connection

(3) ***High tide line*** means the line of intersection of the land with the water's surface at the maximum height reached by a rising tide. The high tide line may be determined, in the absence of actual data, by a line of oil or scum along shore objects, a more or less continuous deposit of fine shell or debris on the foreshore or berm, other physical markings or characteristics, vegetation lines, tidal gages, or other suitable means that delineate the general height reached by a rising tide. The line encompasses spring high tides and other high tides that occur with periodic frequency but does not include storm surges in which there is a departure from the normal or predicted reach of the tide due to the piling up of water against a coast by strong winds such as those accompanying a hurricane or other intense storm.

(4) ***Ordinary high water mark*** means that line on the shore established by the fluctuations of water and indicated by physical characteristics such as clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas.

(5) ***Tidal waters*** means those waters that rise and fall in a predictable and measurable rhythm or cycle due to the gravitational pulls of the moon and sun. Tidal waters end where the rise and fall of the water surface can no longer be practically measured in a predictable rhythm due to masking by hydrologic, wind, or other effects.

Pursuant to the Corps Wetland Delineation Manual (Corps 1987), the identification of wetlands is based on a three-parameter approach involving indicators of hydrophytic vegetation, hydric soils, and wetland hydrology. In order to qualify as a wetland, a feature must exhibit at least minimal characteristics within each of these three parameters. It should also be noted that both the Regional Board and CDFW follow the methods utilized by the Corps to identify wetlands. For this project location, Corps jurisdictional wetlands are delineated using the methods outlined in the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region, Version 2.0* (Corps 2008).

3.2 WATERS OF THE STATE

3.2.1 REGIONAL WATER QUALITY CONTROL BOARD

The California *Porter-Cologne Water Quality Control Act* gives the Regional Board very broad authority to regulate waters of the State, which are defined as any surface water or groundwater, including saline waters. The Regional Board shares the Corps' methodology for delineating the limits of jurisdiction based on the identification of OHWM indicators and utilizing the three parameter approach for wetlands.

3.2.2 CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE

Sections 1600 *et seq*. of the California Fish and Game Code applies to all perennial, intermittent, and ephemeral rivers, streams, and lakes in the State. CDFW Regulations define "stream" as "a body of water that flows at least periodically or intermittently through a bed or channel having banks and that supports fish or other aquatic life. This includes watercourses having a surface or subsurface flow that supports or has supported riparian vegetation." (14 Cal. Code Regs., § 1.72.) For this project location, CDFW jurisdictional limits were delineated using this definition of "stream."

Section 4 Literature Review

ELMT conducted a thorough review of relevant literature and materials to preliminarily identify areas that may fall under the jurisdiction of the regulatory agencies. A summary of materials utilized during ELMT's literature review is provided below and in Appendix A, *Documentation*. In addition, refer to Section 8 for a complete list of references used throughout the course of this delineation.

4.1 WATERSHED REVIEW

The project site is located near the southern limits of the Mojave Watershed (HUC 18090208). The Mojave Watershed is a large, closed basin in the western Mojave Desert that occurs within central and western San Bernardino County and drains approximately 4,500 square miles. The primary geographic and hydrologic feature of the Mojave Watershed is the Mojave River, which occurs approximately 11.2 miles to the northwest of the site. The headwaters of the Mojave River are in the San Bernardino Mountains, which annually receives greater than forty inches of precipitation at its highest elevations. Much of the winter precipitation in the San Bernardino Mountains falls in the form of snow, which provides spring recharge to the Mojave River system. This results in an annual recharge to the Mojave River of approximately 75,000 acre-feet. The Mojave River transects the watershed north and east to its terminus at Silver Lake, just north of the Community of Baker. Elevations within the watershed range from 8,500 feet above mean sea level at Butler Peak in the San Bernardino Mountains to 1,400 feet above mean sea level at Afton Canyon near the terminus of the Mojave River. There are multiple intermittent or ephemeral waterways in the eastern portion of the watershed which convey surface water runoff to Silver Lake during extreme rain events. Silver Lake remains dry most of the year. Aside from extreme rain events, the Mojave River channel is typically dry downstream of the Mojave Forks Dam, except in certain locations where groundwater is forced to the surface by geologic influences.

South of Mojave Forks Dam, the Mojave River is fed by the West Fork Mojave River to the west, which also forms the Mojave River Forks Reservoir, and Deep Creek to the east. The headwater tributaries of Deep Creek occur within the surrounding 2 to 3 miles surrounding the site, and the nearest portions of Deep Creek to the site occur approximately 0.22 miles to the south and 0.46 miles to the west, circling around the site along local topography before flowing northward.

4.2 LOCAL CLIMATE

Southwestern San Bernardino County features a somewhat cooler version of a Mediterranean climate, or semi-arid climate, with warm, sunny, dry summers and cool, rainy, mild winters. Relative to other areas in Southern California, the upper elevations of the San Bernardino Mountains are influenced by a steppe climate, with colder, snowy winters and cold morning temperatures common. Climatological data obtained for the nearby City of Big Bear Lake indicates the annual precipitation averages 12.56 inches per year. The majority of precipitation in the form of rain occurs in the months between December and March, with hardly any occurring between the months of May and June. The wettest months are January and February, with monthly average total precipitation of 1.93 and 2.24 inches, respectively, and the driest months are May and June, with monthly average total precipitation of 0.47 and 0.20 inches, respectively. The average maximum and minimum temperatures are 61.1- and 41.1-degrees Fahrenheit (° F), respectively, with July

(monthly average high 77.7° F) being the hottest month and February (monthly average lows 29.5° F) being the coldest. The temperature during both site visits was in the mid-70s ° F with clear skies and calm winds.

4.3 USGS TOPOGRAPHIC QUADRANGLE

The USGS 7.5 Minute Series Topographic Quadrangle maps show geological formations and their characteristics, describing the physical setting of an area through contour lines and major surface features including lakes, rivers, streams, buildings, landmarks, and other factors that may fall under an agency's jurisdiction. Additionally, the maps depict topography through color and contour lines, which are helpful in determining elevations and latitude and longitude within the project site.

The project site is depicted on the Keller Peak quadrangle of the United States Geological Survey's (USGS) 7.5-minute topographic map series within Sections 28 and 33 of Township 2 North, Range 2 West. According to the topographic map, the project site consists almost entirely of vacant/undeveloped land that supports natural plant communities with campground facilities and other infrastructure scattered throughout.

Elevation on project site ranges from to 6,280 to 6,760 feet above mean sea level and is highly variable, consisting of steep slopes and valleys generally sloping from north to south.

4.4 AERIAL PHOTOGRAPHS

Prior to conducting the field delineation, ELMT reviewed current and historical aerial photographs (1985-2022) of the project as available from Google Earth Pro Imaging. Aerial photographs can be useful during the delineation process, as they often indicate the presence of drainage features and riverine habitat within the boundaries of the project site, if any.

According to the 1995 through 2022 aerial photographs, the project site has supported the majority of existing campground facilities, roads, and infrastructure since 1995. The only major observable changes occurring on-site since 1995 are occasional paving/resurfacing of access roads and parking areas, and the installation of a paved parking are and adjoining facilities structures along the southern limits of the existing campground between 2015 and 2016.

Despite the presence of structures, access roads, and existing land uses associated with campground activities, undeveloped portions of the project site generally support natural plant communities consistent with nearby open spaces. Undeveloped portions of the site support sprawling forests and riparian woodlands are present along perennial waterways. In addition, the site supports two (2) land cover types that would be classified as disturbed and developed. Refer to Appendix B, *Site Photographs*.

4.5 SOILS

Soils within and adjacent to the Project site were researched prior to the field delineation using the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Custom Soil Resource Report for San Bernardino National Forest Area, California. Soil surveys furnish soil maps and

interpretations originally needed in providing technical assistance to farmers and ranchers; in guiding other decisions about soil selection, use, and management; and in planning, research, and disseminating the results of the research. In addition, soil surveys are now heavily utilized in order to obtain soil information with respect to potential wetland environments and jurisdictional areas (i.e., soil characteristics, drainage, and color).

Based on the NRCS USDA Web Soil Survey, the project site is underlain by Cedarpines-Plaskett-Stargazer complex (30 to 50 percent slopes), Cedarpines-Stargazer-Urban land complex (15 to 30 percent slopes), Rock outcrop-Cedarpines-Plaskett complex (15 to 35 percent slopes), Runningsprings-Cedarpines-Plaskett complex (15 to 35 percent slopes), and Urban land. Soils underlying the camp portions of the site have been disturbed and compacted by on-site and surrounding development, infrastructure, and dirt and paved roads.

4.6 HYDRIC SOILS LIST OF CALIFORNIA

ELMT reviewed the USDA NRCS Hydric Soils List of California in an effort to verify whether on-site soils are considered to be hydric[5]. It should be noted that lists of hydric soils along with soil survey maps provide off-site ancillary tools to assist in wetland determinations, but they are not a substitute for field investigations. The presence of hydric soils is initially investigated by comparing the mapped soil series for the site to the County list of hydric soils. According to the hydric soils list, none of the soil types mapped as underlying the project site have been listed as hydric in San Bernardino National Forest, California.

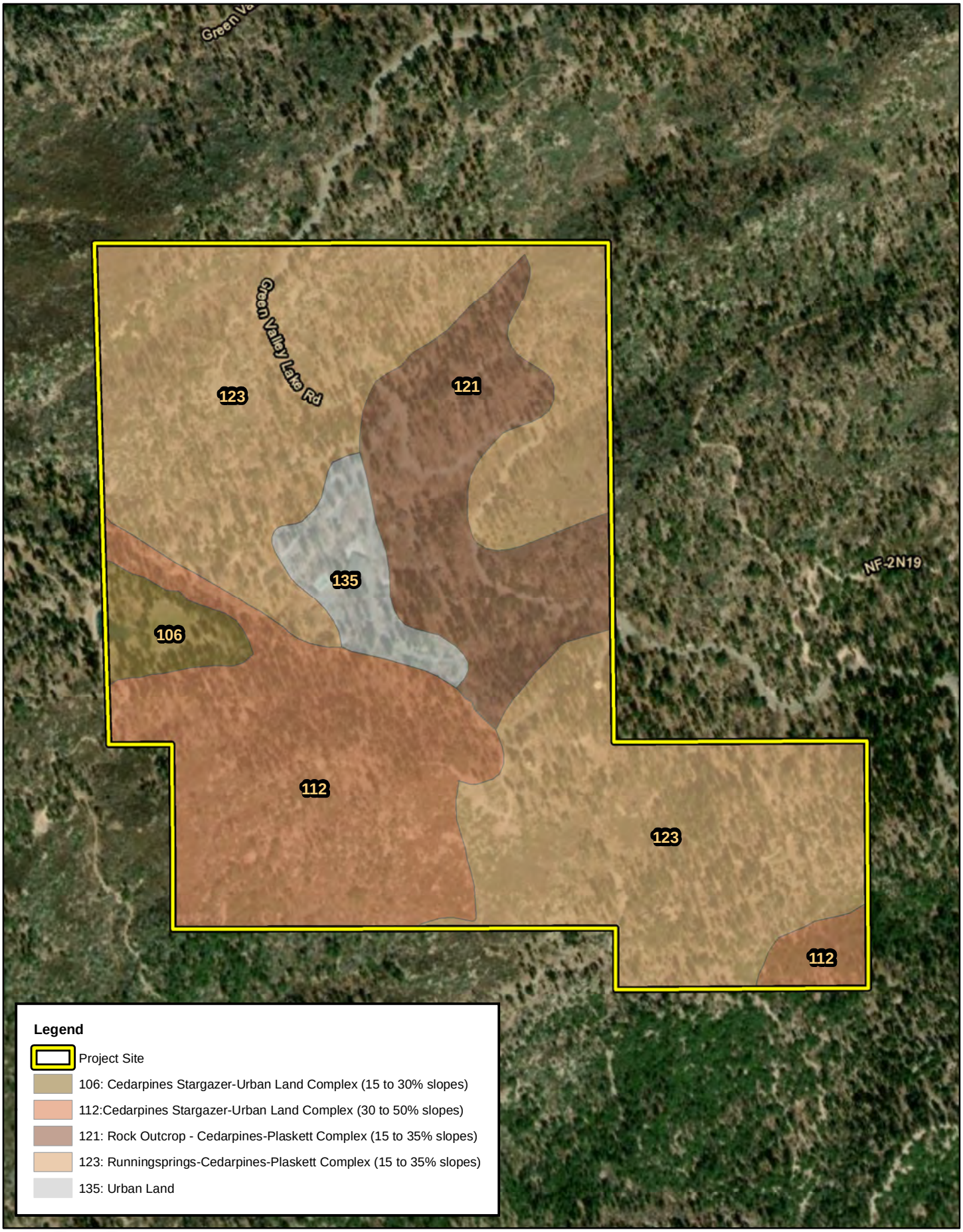
4.7 NATIONAL WETLANDS INVENTORY

ELMT reviewed the U.S. Fish and Wildlife Service's (USFWS) National Wetland Inventory maps. Based on this review, no wetland features have been mapped within the boundaries of the project site. One (1) riverine resource was mapped on-site, entering the northern portion of the eastern boundary and traversing southwest towards the western portion of the site, then veering northwest to exit the northern portion of the western boundary. This feature is mapped in association with a tributary of Deep Creek, the named portion of which flows westward out of the valleys to the east and south of the site before veering north to the west of the site. Refer to Appendix A, *Documentation*.

4.8 FLOOD ZONE

The Federal Emergency Management Act (FEMA) website was searched for flood data for the project site. Based on Flood Insurance Rate Map No. 06071C8000H, the project site is located within Zone D – areas with flood risk due to levees. Refer to Appendix A, *Documentation.*

[5] A hydric soil is a soil that formed under conditions of saturation, flooding or ponding long enough during the growing season to develop anaerobic conditions in the upper part.



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Soils

Source: ESRI Aerial Imagery, Soil Survey Geographic Database, San Bernardino County

Exhibit 4

Section 5 Site Conditions

ELMT biologists Jacob H. Lloyd Davies, Rachael A. Lyons, and Megan E. Peukert conducted a field delineation on July 31, 2023, and August 2, 2023 to verify existing site conditions and document the extent of potential jurisdictional areas within the boundaries of the project site. ELMT field staff encountered no limitations during the field delineation.

5.1 ON-SITE FEATURES

5.1.1 DRAINAGE FEATURES

Three (3) perennial drainage features and four (4) ephemeral drainage features were observed within the boundaries of the project site during the field delineation (refer to Exhibit 5, *Jurisdictional Areas*). ELMT carefully assessed the site for depressions, inundation, presence of hydrophytic vegetation, staining, cracked soil, ponding, and indicators of active surface flow and corresponding physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris. Suspected jurisdictional areas were checked for the presence of definable channels, soils, and hydrology. The drainage features mapped on-site are numbered from west to east as they occur within the project site.

Drainage 1

Drainage 1 corresponds to the mapped riverine resource documented in the NWI query and is the largest and main drainage supported on the project site. This drainage is a perennial creek and traverses the entire site in an overall westerly direction. This drainage enters the northern portion of the eastern boundary and traverses to the southwest and then northwest until exiting the site near the middle of the western boundary. Flows within Drainage 1 are conveyed for approximately 2,964 linear feet before exiting the site. Surface water was present throughout most of Drainage 1. Further evidence of an OHWM was observed via scour, changes in substrate, shelving, and lack of vegetation. The OHWM of Drainage 1 ranged from approximately 2 to 35 feet. Riparian vegetation is supported along most of the middle and eastern portions of Drainage 1. The channel bottom consists of exposed bedrock, cobble, and silty substrates. After flowing off-site, Drainage 1 is a direct tributary to Deep Creek, which occurs approximately 3,560 linear feet downstream to the east.

Two (2) plant communities occur along Drainage 1: Mixed Conifer Forest and Willow Riparian Woodland. The Mixed Conifer Forest plant community is co-dominated by conifer species such as Jeffrey pine (*Pinus jeffreyi*), sugar pine (*Pinus lambertiana*), and bigcone Douglas-fir (*Pseudotsuga macrocarpa*), and supports lesser dominance of oak species such as California black oak (*Quercus kelloggii*) and canyon live oak (*Quercus chrysolepis*). Understories are variable, with some areas supporting dense understories of shrubs and a dense herbaceous later, and some areas relatively lacking understories. Other common plant species observed in this plant community include bigberry manzanita (*Arctostaphylos glauca*), Sierra lotus (*Acmispon decumbens*), California false indigo (*Amorpha californica*, FAC), coffee berry (*Frangula californica*), diffuse groundsmoke (*Gayophytum diffusum*), California aster (*Corethrogyne filaginifolia*), woollypod milkweed (*Asclepias eriocarpa*), goldenstar (*Bloomeria crocea*), giant red Indian paintbrush

(*Castilleja miniate*, FAC), mountain gooseberry (*Ribes montigenum*), Grinnell's beardtongue (*Penstemon grinnellii*), Bridge's penstemon (*Penstemon rostriflorus*), snowplant (*Sarcodes sanguinea*), western wallflower (*Erysimum capitatum*), giant woollystar (*Eriastrum densifolium*), yarrow (*Achillea millefolium* FACU), common bracken fern (*Pteridium aquilinum*, FACU), woodland strawberry (*Fragaria vesca*, UPL), California fuchsia (*Epilobium canum*), and rainbow iris (*Iris hartwegii*, FACU).

The Willow Riparian Woodland plant community is consolidated to riparian areas along much of the middle and eastern portions of Drainage 1, where underlying substrates and immediate topography allows associated species to establish. This plant community is dominated by arroyo willow (*Salix lasiolepis*, FACW), Pacific willow (*Salix lasiandra*, FACW), Scouler willow (*Salix scouleriana*, FAC), and typically supports densely vegetated understories with a varied shrub layer and robust herbaceous layer. Other common species observed in this plant community include yarrow, woodland strawberry, western columbine (*Aquilegia formosa*, FAC), musk monkeyflower (*Erythranthe moschata*, FACW), seep monkeyflower (*Erythranthe guttata*, FAC), cardinal monkeyflower (*Erythranthe cardinalis*, FACW), broadleaf lupine (*Lupinus latifolius*, FACW), mountain pink currant (*Ribes nevadense*, FAC), silver maple (*Acer saccharinum*, FAC), quaking aspen (*Populus tremuloides*, FACU), soft rush (*Juncus effusus*, FACW), willow dock (*Rumex salicifolius*, FACW), watercress (*Nasturtium officinale*, OBL), willow herb (*Epilobium ciliatum*, FACW), perennial pepperweed (*Lepidium latifolium*, FAC), common water weed (*Elodea canadensis*, OBL), and fragile sheathed sedge (*Carex fracta*, FAC).

Drainage 2

Drainage 2 is an ephemeral drainage feature that originates on a south-facing slope in the northwest portion of the project site. This drainage conveys flows south and southwest for approximately 893 linear feet until its confluence with Drainage 1. No surface water was present within Drainage 2. Evidence of an OHWM was observed via scour, changes in substrate, shelving, and lack of vegetation. The OHWM of Drainage 2 ranged from approximately 2 to 20 feet. No riparian vegetation is present within Drainage 2, which only supports upland plant species. This drainage supports a Mixed Conifer Forest and Willow Riparian Woodland plant community similar to that observed in Drainage 1.

Drainage 3

Drainage 3 is an ephemeral drainage feature that originates on a south-facing slope in the northwest portion of the project site. This drainage conveys flows to the southwest for approximately 324 linear feet until its confluence with Drainage 1. No surface water was present within Drainage 2. Evidence of an OHWM was observed via scour, changes in substrate, shelving, and lack of vegetation. The OHWM of Drainage 2 ranged from approximately 2 to 7 feet. No riparian vegetation is present within Drainage 2, which only supports upland plant species. This drainage supports a Mixed Conifer Forest and Willow Riparian Woodland plant community similar to that observed in Drainage 1.

Drainage 4

Drainage 4 is a perennial creek that originates off-site to the north. This drainage enters the eastern portion of the northern boundary of the project site and conveys flows to the southwest until converging with Drainage 1. Flows are conveyed beneath Green Valley Lake Road via a 4-foot-wide culvert into an earthen spillway, which also receives surface flows from Green Valley Lake Road. Flows within Drainage 4 are conveyed for approximately 1,622 linear feet before entering Drainage 1. Surface water was present

throughout Drainage 4. Further evidence of an OHWM was observed via scour, changes in substrate, shelving, and lack of vegetation. The OHWM of Drainage 4 ranged from approximately 2 to 20 feet. Riparian vegetation is supported along the majority of the drainage. The channel bottom consists of exposed bedrock, cobble, and silty substrates. Drainage 4 supports the same Mixed Conifer Forest and Willow Riparian Woodland plant communities observed in Drainage 1.

Drainage 5

Drainage 5 is an ephemeral drainage feature that originates on a south-facing slope in the middle portion of the project site near Green Valley Lake Road. This feature conveys surface flows south and west for approximately 1,504 linear feet until its confluence with Drainage 1. No surface water was present within Drainage 5, although riparian vegetation was present. Evidence of an OHWM was observed via scour, changes in substrate, shelving, and lack of vegetation. The OHWM of Drainage 5 ranged from approximately 2 to 6 feet. This drainage supports a Mixed Conifer Forest and Willow Riparian Woodland plant community similar to that observed in Drainage 1.

Drainage 6

Drainage 6 is an ephemeral drainage feature that originates on a south-facing slope in the middle portion of the project site near Green Valley Lake Road. This feature conveys surface flows southwest for approximately 620 linear feet until its confluence with Drainage 5. No surface water was present within Drainage 5, although riparian vegetation was present. Evidence of an OHWM was observed via scour, changes in substrate, shelving, and lack of vegetation. The OHWM of Drainage 6 ranged from approximately 2 to 4 feet. This drainage supports a Mixed Conifer Forest and Willow Riparian Woodland plant community similar to that observed in Drainage 1.

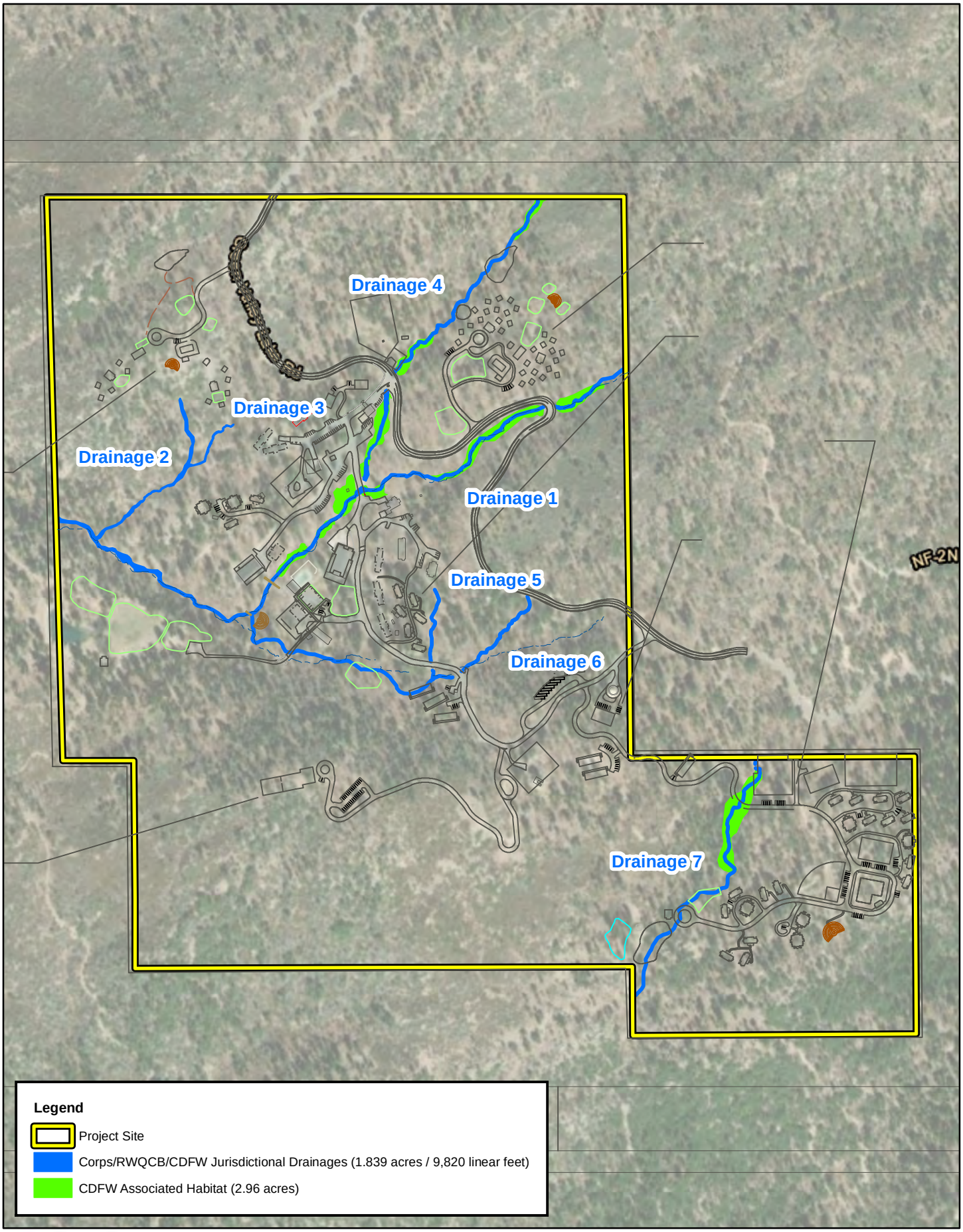
Drainage 7

Drainage 7 includes both ephemeral and perennial drainage features. The upper limits of Drainage 7 are ephemeral in nature and originate off-site near Green Valley Lake Road, just north of the southeast portion of the project site. Flows are collected from Green Valley Lake Road and are conveyed to the southwest towards a culvert beneath an access road. Just beyond this access road, perennial flows enter the drainage via a series of culverts and are conveyed further southwest until exiting site boundaries and continuing southwest along local topography. No surface water was observed upstream of the access road, but is present just downstream of the access road, where riparian vegetation and a narrow patch of wetland is present. Drainage 7 conveys flows for approximately 1,523 linear feet while within site boundaries. Further evidence of an OHWM was observed via scour, changes in substrate, shelving, changes in vegetation, and static water conditions. The OHWM of Drainage 7 ranged from approximately 2 to 16 feet. Riparian vegetation is supported along the majority of the drainage. The channel bottom consists of exposed bedrock, cobble, and silty substrates. Drainage 7 supports the same Mixed Conifer Forest and Willow Riparian Woodland plant communities observed in Drainage 1. After flowing off-site, Drainage 7 is a direct tributary to Deep Creek, which occurs approximately 1,400 linear feet downstream to the south.

5.1.2 WETLAND FEATURES

In order to qualify as a wetland, a feature must exhibit all three wetland parameters (i.e., vegetation, soils, and hydrology) described in the Corps Arid West Regional Supplement. Although evidence of hydrology

(i.e., scour, changes in substrate, shelving) and open water are present, no hydric soils have been mapped as occurring on-site and no anaerobic conditions were observed. While hydrophytic vegetation was observed in portions of Drainages 1, 4, 5, 6, and 7, flows within these drainage features remain sufficiently consistent to prevent the establishment of wetland conditions. Areas with open water tend to be underlain by exposed bedrock with limited, scattered pockets of silty deposits approximately 2 to 6 inches in depth, and surface flows constantly replace existing open water, preventing the development of hydric soil (anaerobic) conditions. As a result, no features on-site meet the Corps' or Regional Board's wetland definition to qualify as jurisdictional wetlands.



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Source: ESRI Aerial Imagery, San Bernardino County

HUME SO CAL CAMPGROUND PROJECT

Jurisdictional Areas

Exhibit 5

Section 6 Findings

This report presents ELMT's best effort at determining the extent of jurisdictional features using the most up-to-date regulations, written policy, and guidance from the regulatory agencies.

6.1 U.S. ARMY CORPS OF ENGINEERS DETERMINATION

6.1.1 WATERS OF THE UNITED STATES DETERMINATION

Prior to leaving the site, surface flows from Drainages 2 through 6 are conveyed to Drainage 1, which exits the western boundary of the site and conveys flows westward to Deep Creek. Drainage 7 also bears a direct connection to Deep Creek, conveying flows off-site to the south. Deep Creek conveys flows along local topography to the northwest until its confluence with Mojave Fork West at Mojave Forks Dam, which consolidates flows from these features and directs them northward within the Mojave River.

All of the onsite drainage features have a surface hydrologic connection to downstream waters of the United States. Approximately 1.839 acres (9,820 linear feet) of waters of the United States occur on-site.

6.1.2 FEDERAL WETLAND DETERMINATION

An area must exhibit all three wetland parameters described in the Corps Arid West Regional Supplement to be considered a jurisdictional wetland. Based on the results of the field delineation, it was determined that no areas within the project site met all three wetland parameters. Therefore, no jurisdictional wetland features exist within the project site.

6.2 REGIONAL WATER QUALITY CONTROL BOARD

6.2.1 WATERS OF THE STATE DETERMINATION

The on-site drainage feature exhibits characteristics consistent with the Regional Board's methodology and would likely be considered jurisdictional waters of the State. Approximately 1.839 acres (9,820 linear feet) of non-wetland waters of the State occur on-site.

6.2.2 STATE WETLAND DETERMINATION

Under the State Water Resources Control Board Sate Wetland Definition, an area is a wetland if, under normal circumstances, (1) the area has continuous or recurrent saturation of the upper substrate caused by groundwater, or shallow surface water, or both; (2) the duration of such saturation is sufficient to cause anaerobic conditions in the upper substrate; and (3) the area's vegetation is dominated by hydrophytes or the area lacks vegetation.

Based on the results of the field delineation, it was determined that no areas within the project site meet the State Wetland Definition. Therefore, no state wetland features exist within the project site.

6.3 CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE

The on-site drainage features exhibit characteristics consistent with CDFW's methodology and would be considered CDFW streambed. Approximately 4.8 acres (9,820 linear feet) of CDFW jurisdiction was mapped within boundaries of the Project site.

Section 7 Regulatory Approval Process

The following is a summary of the various permits, certifications, and agreements that may be necessary prior to construction and/or alteration within jurisdictional areas. Ultimately the regulatory agencies make the final determination of jurisdictional boundaries and permitting requirements.

7.1 UNITED STATES ARMY CORPS OF ENGINEERS

The Corps regulates discharges of dredged or fill materials into waters of the United States, including wetlands, pursuant to Section 404 of the CWA. If any impacts occur to the onsite drainage features, it will be necessary for the Applicant to acquire a CWA Section 404 permit prior to impacts occurring within Corps jurisdictional areas. If impacts from the proposed Project will result in the loss of less than 1/2-acre of Corps jurisdiction (non-wetland waters), the proposed Project can be authorized via a Nationwide Permit (NWP). However, if impacts will be greater than 1/2-acre, the proposed Project will need to be processed under a Standard Individual Permit.

Based on the proposed design plan, no impacts to Corps jurisdictional areas are expected to occur from project implementation.

7.2 REGIONAL WATER QUALITY CONTROL BOARD

The Regional Board regulates discharges to surface waters pursuant to Section 401 of the CWA and the California Porter-Cologne Water Quality Control Act. The Regional Board's jurisdiction extends to all waters of the State and U.S., including wetlands. A Section 401 Water Quality Certification from the Regional Board will be required for impacts to the onsite drainage features. The Regional Board also requires a Section 401 Certification Application Fee, which is dependent on the amount and type of impacts (i.e., acreage, linear feet, and project type). It should also be noted that the Regional Board requires that California Environmental Quality Act (CEQA) compliance be obtained prior to issuance of the water quality certification.

Based on the proposed design plan, no impacts to Regional Board jurisdictional areas are expected to occur from project implementation.

7.3 CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE

Pursuant to Section 1602 of the California Fish and Game Code, the CDFW regulates any activity that will divert or obstruct the natural flow or alter the bed, channel, or bank (which may include associated biological resources) of a river or stream. Therefore, any impacts to the on-site jurisdictional areas will require a Section 1602 Streambed Alteration Agreement from the CDFW prior to project implementation, if the project will have a substantial adverse impact on an existing fish or wildlife resource. The notification fee is based on the term and cost of a project. The Section 1602 Streambed Alteration Agreement will not be issued until all fees are paid to the CDFW.

Based on the proposed design plan, no impacts to CDFW jurisdictional areas are expected to occur from project implementation.

7.4 RECOMMENDATIONS

It is recommended that this delineation be forwarded to the regulatory agencies for their review and concurrence. The concurrence/receipt would solidify findings noted within this report.

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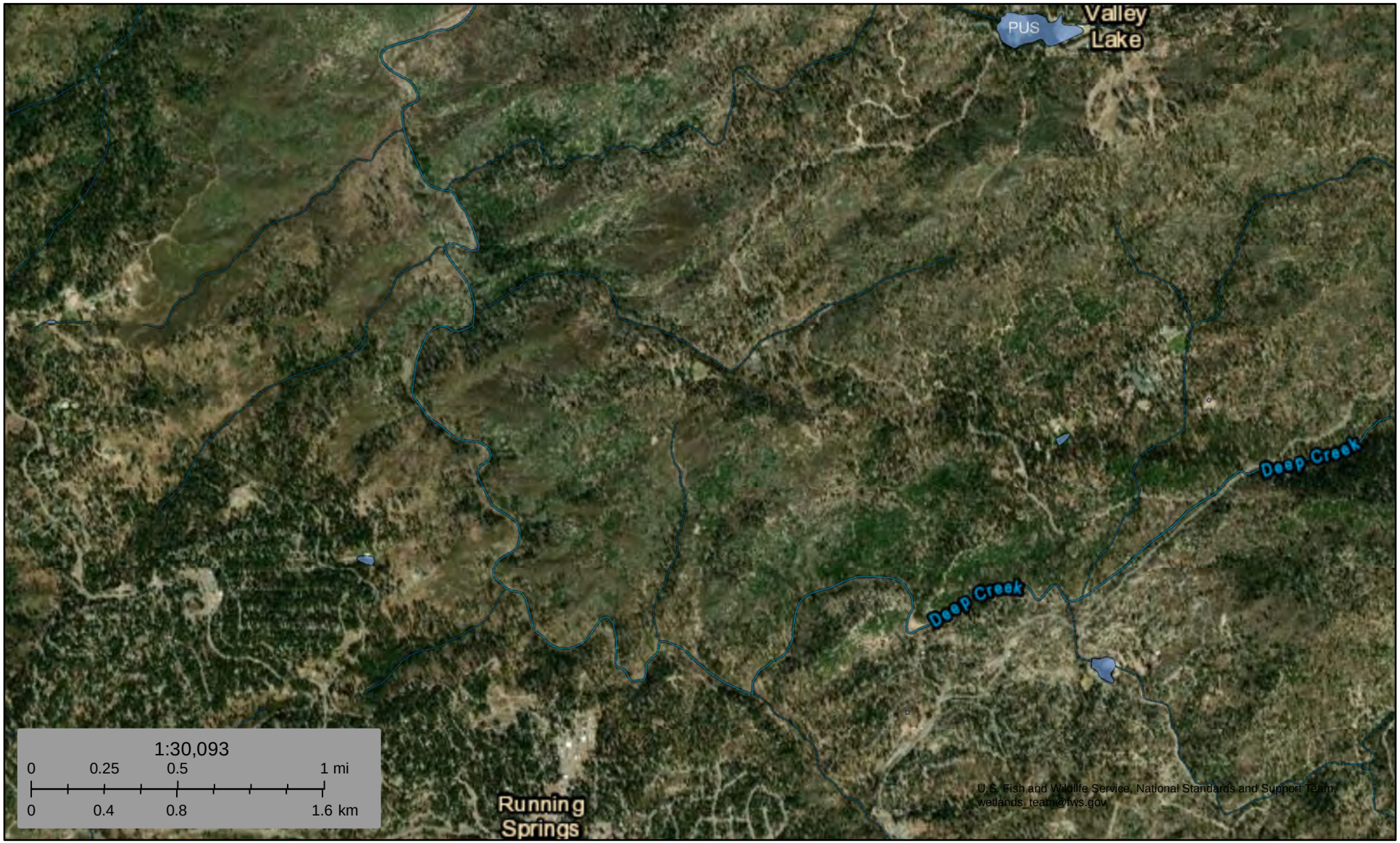
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Appendix A Documentation

U.S. Fish and Wildlife Service
National Wetlands Inventory

Hume SoCal Campground



October 11, 2023

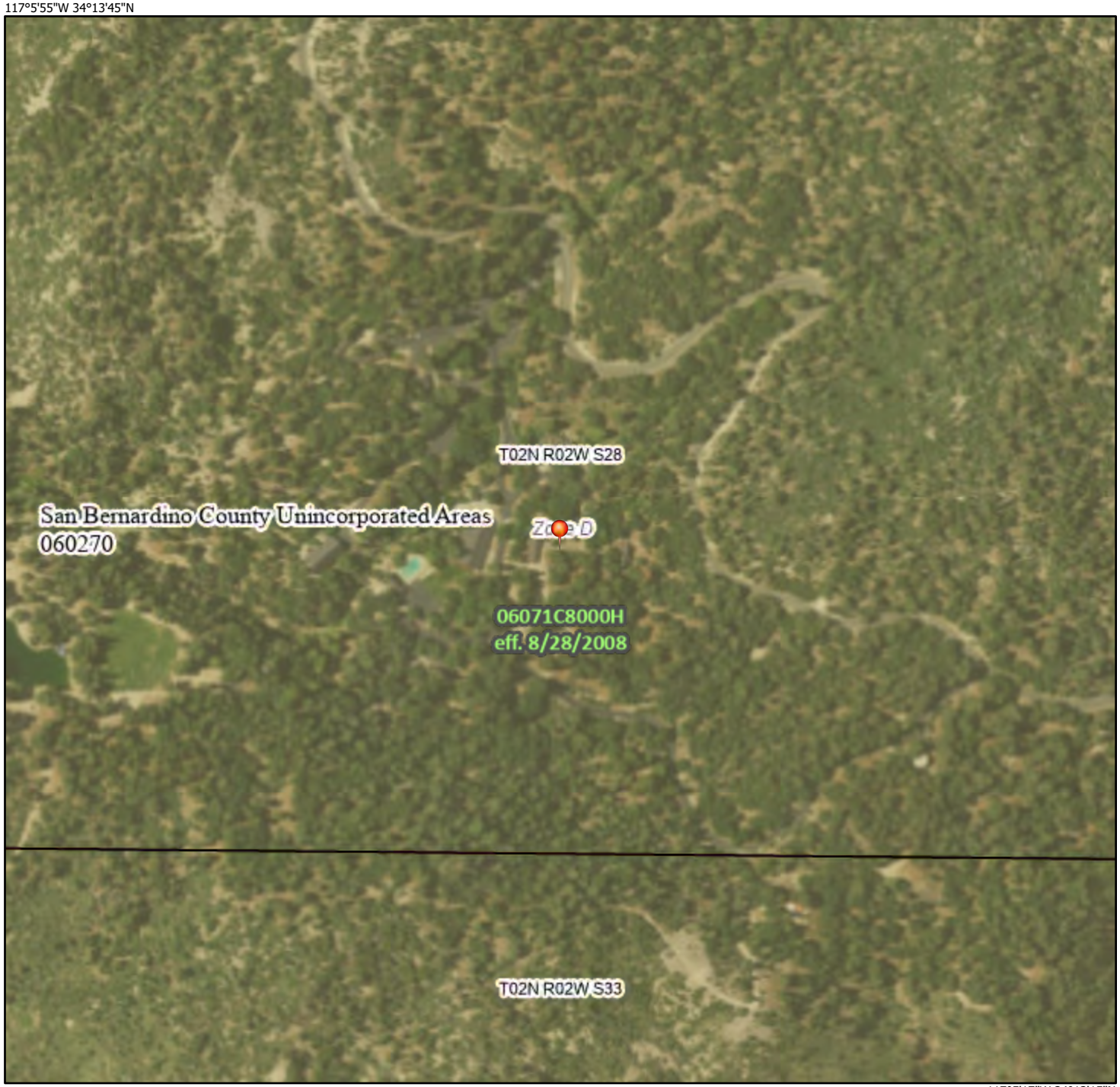
Wetlands

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

National Flood Hazard Layer FIRMette

FEMA



Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 10/31/2022 at 6:45 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

Appendix B Site Photographs



Photograph 1: From Green Valley Lake Road looking upstream (northeast) along Drainage 1.



Photograph 2: From Green Valley Lake Road looking south along Drainage 1.



Photograph 3: Looking upstream (north) along Drainage 2. Ephemeral drainages supported on-site are bounded by a Mixed Conifer Forest plant community.



Photograph 4: Looking upstream (northeast) along Drainage 3.



Photograph 5: Looking north along Drainage 4 near the entrance to the Hume SoCal Campground at Green Valley Lake Road. Upper portions of Drainage 4 are visible beyond Green Valley Lake Road.



Photograph 6: The confluence of Drainages 1 and 4 support a robust Willow Riparian Woodland plant community.



Photograph 7: Looking upstream (north) along the upper limits of Drainage 5.



Photograph 8: Looking upstream (north) along the upper limits of Drainage 6.



Photograph 9: Drainages 5 and 6 support narrow swathes of Willow Riparian Woodland immediately south of Smokey Way.



Photograph 10: Lower portions of Drainage 1, downstream of existing campground facilities, bear little to no surface water and are bounded by a Mixed Conifer Woodland plant community.



Photograph 11: Looking downstream (southwest) along the upper limits of Drainage 7, north of the access road.



Photograph 12: Looking downstream (southwest) along the middle portion of Drainage 7, where surface water is no longer present and supported vegetation shifts from a Willow Riparian plant community to Mixed Conifer Forest.

Appendix C Methodology

WATERS OF THE UNITED STATES

In accordance with the Revised Definition of "Waters of the United States"; Conforming (September 8, 2023), "waters of the United Sates" are defined as follows:

(a) ***Waters of the United States*** means:

(1) Waters which are:
(i) Currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;
(ii) The territorial seas; or
(iii) Interstate waters;

(2) Impoundments of waters otherwise defined as waters of the United States under this definition, other than impoundments of waters identified under paragraph (a)(5) of this section;

(3) Tributaries of waters identified in paragraph (a)(1) or (2) of this section that are relatively permanent, standing or continuously flowing bodies of water;

(4) Wetlands adjacent to the following waters:
(i) Waters identified in paragraph (a)(1) of this section; or
(ii) Relatively permanent, standing or continuously flowing bodies of water identified in paragraph (a)(2) or (a)(3) of this section and with a continuous surface connection to those waters;

(5) Intrastate lakes and ponds not identified in paragraphs (a)(1) through (4) of this section that are relatively permanent, standing or continuously flowing bodies of water with a continuous surface connection to the waters identified in paragraph (a)(1) or (a)(3) of this section

(b) The following are not "waters of the United States" even where they otherwise meet the terms of paragraphs (a)(2) through (5) of this section:

(1) Waste treatment systems, including treatment ponds or lagoons, designed to meet the requirements of the Clean Water Act;

(2) Prior converted cropland designated by the Secretary of Agriculture. The exclusion would cease upon a change of use, which means that the area is no longer available for the production of agricultural commodities. Notwithstanding the determination of an area's status as prior converted cropland by any other Federal agency, for the purposes of the Clean Water Act, the final authority regarding Clean Water Act jurisdiction remains with EPA;

(3) Ditches (including roadside ditches) excavated wholly in and draining only dry land and that do not carry a relatively permanent flow of water;

(4) Artificially irrigated areas that would revert to dry land if the irrigation ceased;

(5) Artificial lakes or ponds created by excavating or diking dry land to collect and retain water and which are used exclusively for such purposes as stock watering, irrigation, settling basins, or rice growing;
(6) Artificial reflecting or swimming pools or other small ornamental bodies of water created by excavating or diking dry land to retain water for primarily aesthetic reasons;

(7) Waterfilled depressions created in dry land incidental to construction activity and pits excavated in dry land for the purpose of obtaining fill, sand, or gravel unless and until the construction or excavation operation is abandoned and the resulting body of water meets the definition of waters of the United States; and

(8) Swales and erosional features (*e.g.*, gullies, small washes) characterized by low volume, infrequent, or short duration flow.

(c) In this section, the following definitions apply:

(1) ***Wetlands*** means those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

(2) ***Adjacent*** means having a continuous surface connection

(3) ***High tide line*** means the line of intersection of the land with the water's surface at the maximum height reached by a rising tide. The high tide line may be determined, in the absence of actual data, by a line of oil or scum along shore objects, a more or less continuous deposit of fine shell or debris on the foreshore or berm, other physical markings or characteristics, vegetation lines, tidal gages, or other suitable means that delineate the general height reached by a rising tide. The line encompasses spring high tides and other high tides that occur with periodic frequency but does not include storm surges in which there is a departure from the normal or predicted reach of the tide due to the piling up of water against a coast by strong winds such as those accompanying a hurricane or other intense storm.

(4) ***Ordinary high water mark*** means that line on the shore established by the fluctuations of water and indicated by physical characteristics such as clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas.

(5) ***Tidal waters*** means those waters that rise and fall in a predictable and measurable rhythm or cycle due to the gravitational pulls of the moon and sun. Tidal waters end where the rise and fall of the water surface can no longer be practically measured in a predictable rhythm due to masking by hydrologic, wind, or other effects.

WETLANDS

For this project location, Corps jurisdictional wetlands are delineated using the methods outlined in the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region, Version 2.0* (Corps 2008). This document is one of a series of Regional Supplements to the Corps Wetland Delineation Manual (Corps 1987). The identification of wetlands is based on a three-parameter approach involving indicators of hydrophytic vegetation, hydric soil, and wetland hydrology. In order to be considered a wetland, an area must exhibit at least minimal characteristics within these three (3) parameters. The Regional Supplement presents wetland indicators, delineation guidance, and other information that is specific to the Arid West Region. In the field, vegetation, soils, and evidence of hydrology are examined using the methodology listed below and documented on Corps wetland data sheets, when applicable. It should be noted that both the Regional Board and the CDFW jurisdictional wetlands encompass those of the Corps.

Vegetation

Nearly 5,000 plant types in the United States may occur in wetlands. These plants, often referred to as hydrophytic vegetation, are listed in regional publications by the U.S. Fish and Wildlife Service (USFWS). In general, hydrophytic vegetation is present when the plant community is dominated by species that can tolerate prolonged inundation or soil saturation during growing season. Hydrophytic vegetation decisions are based on the assemblage of plant species growing on a site, rather than the presence or absence of particular indicator species. Vegetation strata are sampled separately when evaluating indicators of hydrophytic vegetation. A stratum for sampling purposes is defined as having 5 percent or more total plant cover. The following vegetation strata are recommended for use across the Arid West:

- *Tree Stratum:* Consists of woody plants 3 inches or more in diameter at breast height (DBH), regardless of height;
- *Sapling/shrub stratum:* Consists of woody plants less than 3 inches DBH, regardless of height;
- *Herb stratum:* Consists of all herbaceous (non-woody) plants, including herbaceous vines, regardless of size; and,
- *Woody vines:* Consists of all woody vines, regardless of size.

The following indicator is applied per the test method below.[1] Hydrophytic vegetation is present if any of the indicators are satisfied.

[1] Although the Dominance Test is utilized in the majority of wetland delineations, other indicator tests may be employed. If one indicator of hydric soil and one primary or two secondary indicators of wetland hydrology are present, then the Prevalence Test (Indicator 2) may be performed. If the plant community satisfies the Prevalence Test, then the vegetation is hydric. If the Prevalence Test fails, then the Morphological Adaptation Test may be performed, where the delineator analyzes the vegetation for potential morphological features.

Indicator 1 – Dominance Test

Cover of vegetation is estimated and is ranked according to their dominance. Species that contribute to a cumulative total of 50% of the total dominant coverage, plus any species that comprise at least 20% (also known as the "50/20 rule") of the total dominant coverage, are recorded on a wetland data sheet. Wetland indicator status in California (Region 0) is assigned to each species using the *National Wetland Plant List, version 2.4.0* (Corps 2012). If greater than 50% of the dominant species from all strata were Obligate, Facultative-wetland, or Facultative species, the criteria for wetland vegetation is considered to be met. Plant indicator status categories are described below:

- *Obligate Wetland (OBL):* Plants that almost always occur in wetlands;
- *Facultative Wetland (FACW):* Plants that usually occur in wetlands, but may occur in non-wetlands;
- *Facultative (FAC):* Plants that occur in wetlands and non-wetlands;
- *Facultative Upland (FACU):* Plants that usually occur in non-wetlands, but may occur in wetlands; and,
- *Obligate Upland (UPL):* Plants that almost never occur in wetlands.

Hydrology

Wetland hydrology indicators are presented in four (4) groups, which include:

Group A – Observation of Surface Water or Saturated Soils

Group A is based on the direct observation of surface water or groundwater during the site visit.

Group B – Evidence of Recent Inundation

Group B consists of evidence that the site is subject to flooding or ponding, although it may not be inundated currently. These indicators include water marks, drift deposits, sediment deposits, and similar features.

Group C – Evidence of Recent Soil Saturation

Group C consists of indirect evidence that the soil was saturated recently. Some of these indicators, such as oxidized rhizospheres surrounding living roots and the presence of reduced iron or sulfur in the soil profile, indicate that the soil has been saturated for an extended period.

Group D – Evidence from Other Site Conditions or Data

Group D consists of vegetation and soil features that indicate contemporary rather than historical wet conditions, and include shallow aquitard and the FAC-neutral test.

If wetland vegetation criteria is met, the presence of wetland hydrology is evaluated at each transect by recording the extent of observed surface flows, depth of inundation, depth to saturated soils, and depth to free water in the soil test pits. The lateral extent of the hydrology indicators are used as a guide for locating soil pits for evaluation of hydric soils and jurisdictional areas. In portions of the stream where the flow is divided by multiple channels with intermediate sand bars, the entire area between the channels is considered within the OHWM and the wetland hydrology indicator is considered met for the entire area.

Soils

A hydric soil is a soil that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper 16-20 inches.[2] The concept of hydric soils includes soils developed under sufficiently wet conditions to support the growth and regeneration of hydrophytic vegetation. Soils that are sufficiently wet because of artificial measures are included in the concept of hydric soils. It should also be noted that the limits of wetland hydrology indicators are used as a guide for locating soil pits. If any hydric soil features are located, progressive pits are dug moving laterally away from the active channel until hydric features are no longer present within the top 20 inches of the soil profile.

Once in the field, soil characteristics are verified by digging soil pits along each transect to an excavation depth of 20 inches; in areas of high sediment deposition, soil pit depth may be increased. Soil pit locations are usually placed within the drainage invert or within adjoining vegetation. At each soil pit, the soil texture and color are recorded by comparison with standard plates within a *Munsell Soil Chart* (2009). Munsell Soil Charts aid in designating color labels to soils, based by degrees of three simple variables – hue, value, and chroma. Any indicators of hydric soils, such as organic accumulation, iron reduction, translocation, and accumulation, and sulfate reduction, are also recorded.

Hydric soil indicators are present in three groups, which include:

<u>All Soils</u>

"All soils" refers to soils with any United States Department of Agriculture (USDA) soil texture. Hydric soil indicators within this group include histosol, histic epipedon, black histic, hydrogen sulfide, stratified layers, 1 cm muck, depleted below dark surface, and thick dark surface.

<u>Sandy Soils</u>

"Sandy soils" refers to soil materials with a USDA soil texture of loamy fine sand and coarser. Hydric soil indicators within this group include sandy mucky mineral, sandy gleyed matrix, sandy redox, and stripped matrix.

[2] According to the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region, Version 2.0 (Corps 2008), growing season dates are determined through on-site observations of the following indicators of biological activity in a given year: (1) above-ground growth and development of vascular plants, and/or (2) soil temperature.

Loamy and Clayey Soils

"Loamy and clayey soils" refers to soil materials with a USDA soil texture of loamy very fine sand and finer. Hydric soil indicators within this group include loamy mucky mineral, loamy gleyed matrix, depleted matrix, redox dark surface, depleted dark surface, redox depressions, and vernal pools.

SWANCC WATERS

The term "isolated waters" is generally applied to waters/wetlands that are not connected by surface water to a river, lake, ocean, or other body of water. In the presence of isolated conditions, the Regional Board and CDFW take jurisdiction through the application of the OHWM/streambed and/or the 3 parameter wetland methodology utilized by the Corps.

Appendix H

Greenhouse Gas Emissions Assessment

Greenhouse Gas Emissions Assessment
Hume SoCal Camp Expansion Project
County of San Bernardino, California

Prepared by:

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August 2025

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APPENDIX

Appendix A: Greenhouse Gas Emissions Modeling Data

LIST OF ABBREVIATED TERMS

AB	Assembly Bill
CARB	California Air Resource Board
CCR	California Code of Regulations
CalEEMod	California Emissions Estimator Model
CEQA	California Environmental Quality Act
CALGreen Code	California Green Building Standards Code
CPUC	California Public Utilities Commission
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
CFC	Chlorofluorocarbon
CPP	Clean Power Plan
cy	cubic yard
FCAA	Federal Clean Air Act
FR	Federal Register
GHG	greenhouse gas
HCFC	Hydrochlorofluorocarbon
HFC	Hydrofluorocarbon
LCFS	Low Carbon Fuel Standard
CH_4	Methane
$MMTCO_2e$	million metric tons of carbon dioxide equivalent
$MTCO_2e$	metric tons of carbon dioxide equivalent
NHTSA	National Highway Traffic Safety Administration
NF_3	nitrogen trifluoride
N_2O	nitrous oxide
PFC	Perfluorocarbon
RTP/SCS	Regional Transportation Plan/Sustainable Communities Strategy
SB	Senate Bill
SCAB	South Coast Air Basin
SCAQMD	South Coast Air Quality Management District
SCAG	Southern California Association of Government
SF	square foot
SF_6	sulfur hexafluoride
TAC	toxic air contaminants
U.S. EPA	U.S. Environmental Protection Agency

1 INTRODUCTION

This report documents the results of a Greenhouse Gas (GHG) Emissions Assessment completed for the Hume SoCal Camp Expansion Project ("Project" or "Proposed Project"). The purpose of this GHG Emissions Assessment is to evaluate the potential construction and operational emissions associated with the Project and determine the level of impact the Project would have on the environment.

1.1 Project Location and Setting

The Project site is approximately 251 acres located in an unincorporated mountain region of San Bernardino County, along Green Valley Lake Road and approximately 0.4 miles northwest of State Route 18 (SR-18); refer to **Exhibit 1: Regional Location Map**. Surrounding the Project site is the Green Valley Lake Community to the north, the Running Springs to the southwest, and the City of Big Bear to the east, as shown in **Exhibit 2: Local Vicinity Map**.

A portion of the Project site is currently developed with improvements related to the existing Hume SoCal campground facilities. The remaining surrounding areas are vacant and contain forest land. The Project land use designation is Rural Living (RL) per the San Bernardino County General Plan (Countywide Plan). The RL land use area primarily allows for the development of residential development. Typical uses within RL land use areas also include public and quasi-public facilities such as parks, religious facilities and schools. The Project area is also located within the Hilltop Community Plan which allows for larger-scale master planned developments which can include a combination of residential, commercial, and/ or manufacturing activities that maximizes the utilization of natural and human-generated resources in rural areas.

1.2 Project Description

The Project involves the expansion of campground uses for the existing Southern California Hume Lake Christian Camp (Hume SoCal) campground to accommodate up to an additional 3,000 occupants. This would be accomplished through the use of existing campground structures as well as the development of additional campground and recreational facilities and uses within a 251-acre area of the Green Valley Lake community, refer to **Exhibit 3: Conceptual Site Plan**. New campground structures proposed for the Project would be developed in five phases.

Each phase of the Project would include the development of expanded infrastructure, additional amenities, support structures, and buildings necessary to accommodate expanded camper capacity as well as paved parking areas and paved access roadways.

Phase 1 of the Project would involve the development of facilities to be used as a Junior High Camp. Proposed residential structures within the Phase 1 area include an expanded welcome center, private administration and guest speaker residences, staff housing, and student dormitories. Phase 1 also includes the development of a gymnasium, bus parking, a snack shop, a chapel, converting an existing chapel to a small meeting space, an expansion to the existing dining hall, a maintenance building, an amphitheater, and restrooms. Outdoor recreation facilities include grass quads. Existing and proposed facilities within Phase 1 would accommodate up to 784 occupants.

Phase 2 of the Project would involve the development of facilities to be used as a High School Camp. Proposed residential structures within the Phase 2 area include staff housing buildings and student dormitories. Phase 2 also includes the development of a large dining hall, gymnasium, a chapel, amphitheater, and restrooms. Outdoor recreation facilities include grass quads, a swimming pool, and a recreation pond. Existing and proposed facilities within Phase 2 would accommodate up to 1,000 occupants.

Phase 3 of the Project proposes the development of an Adult Lodge. Phase 3 would include the development of one adult lodge with included access road. Existing and proposed facilities within Phase 3 would accommodate up to 140 occupants.

Phase 4 of the Project would include the development of an Elementary Age Camp and associated facilities. Proposed residential structures within Phase 4 include student yurt tents. Phase 4 also includes the development of restroom facilities with showers and an amphitheater. Outdoor recreation facilities include grass quads, a dining canopy, a swimming pool, and a recreation pond. Existing and proposed facilities within Phase 4 would accommodate up to 500 occupants.

Phase 5 of the Project proposes the creation of a tent-based youth camp, Wildwood Camp. Residential structures proposed for this phase consist of yurt tents. Phase 5 also includes the development of restroom facilities with showers and an amphitheater. Outdoor recreation facilities include grass quads, a dining canopy, a swimming pool, and a recreation pond. Existing and proposed facilities within Phase 5 would accommodate up to 130 occupants.

Project Phasing and Construction

Although the Project is anticipated to be constructed in five phases, to analyze a worst-case scenario, construction modeling assumed all five phases of the Project would be constructed simultaneously and completed within two years, beginning in June 2025 and finishing in June 2027.

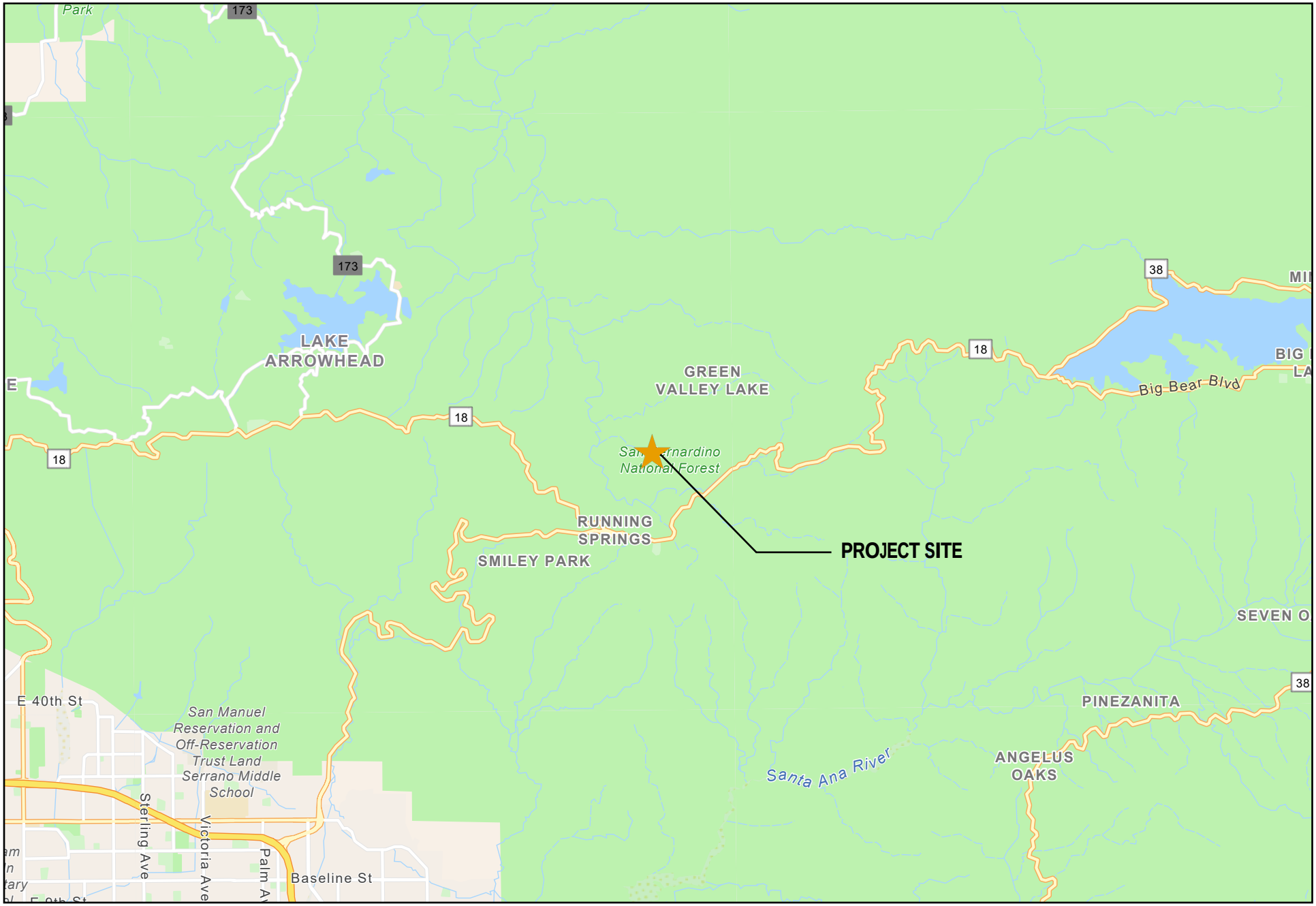


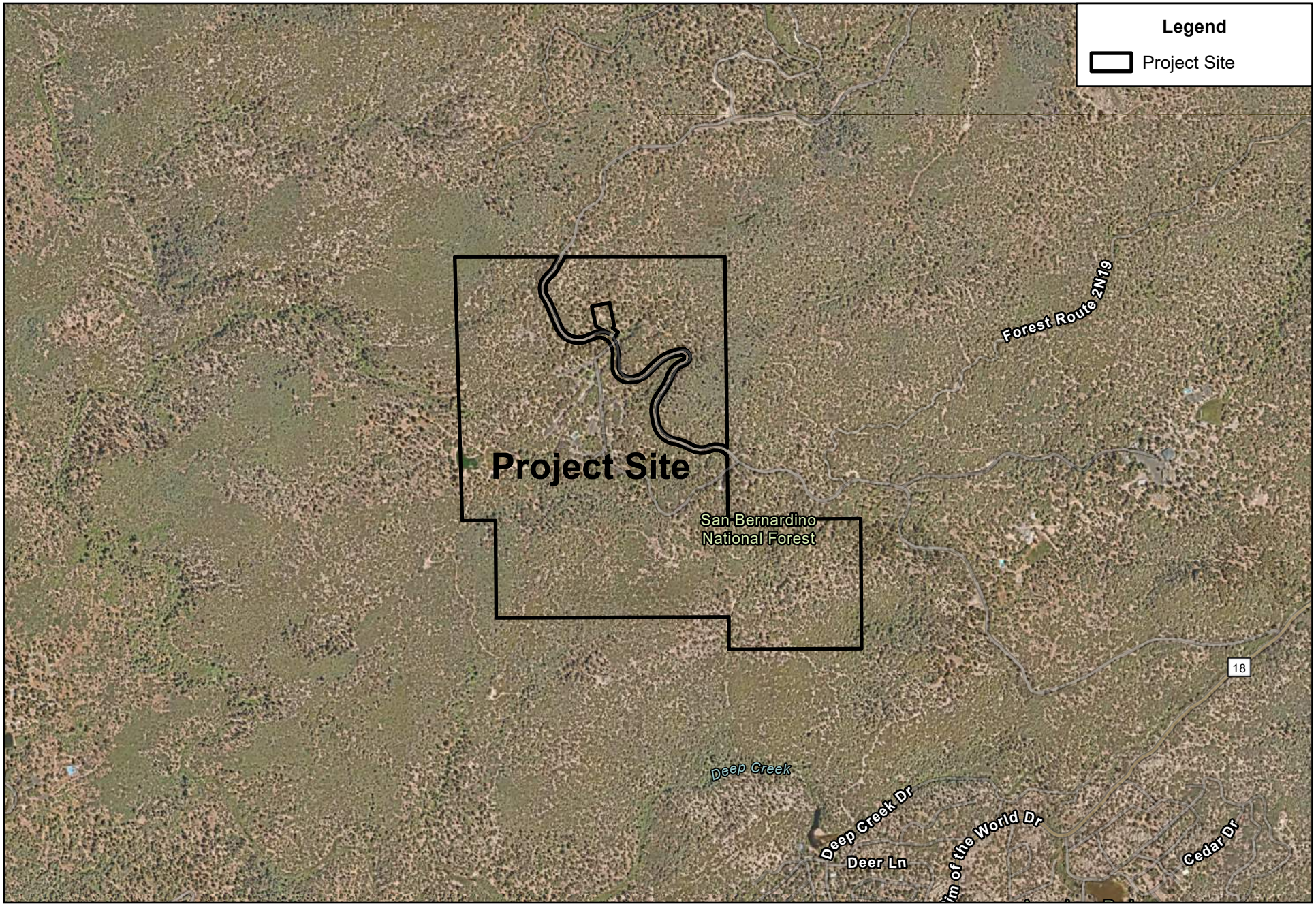
Exhibit 1: Regional Location Map

Hume SoCal Campground Expansion Project

San Bernardino County

Not to scale

Kimley»Horn



Source: Nearmap, 2023.

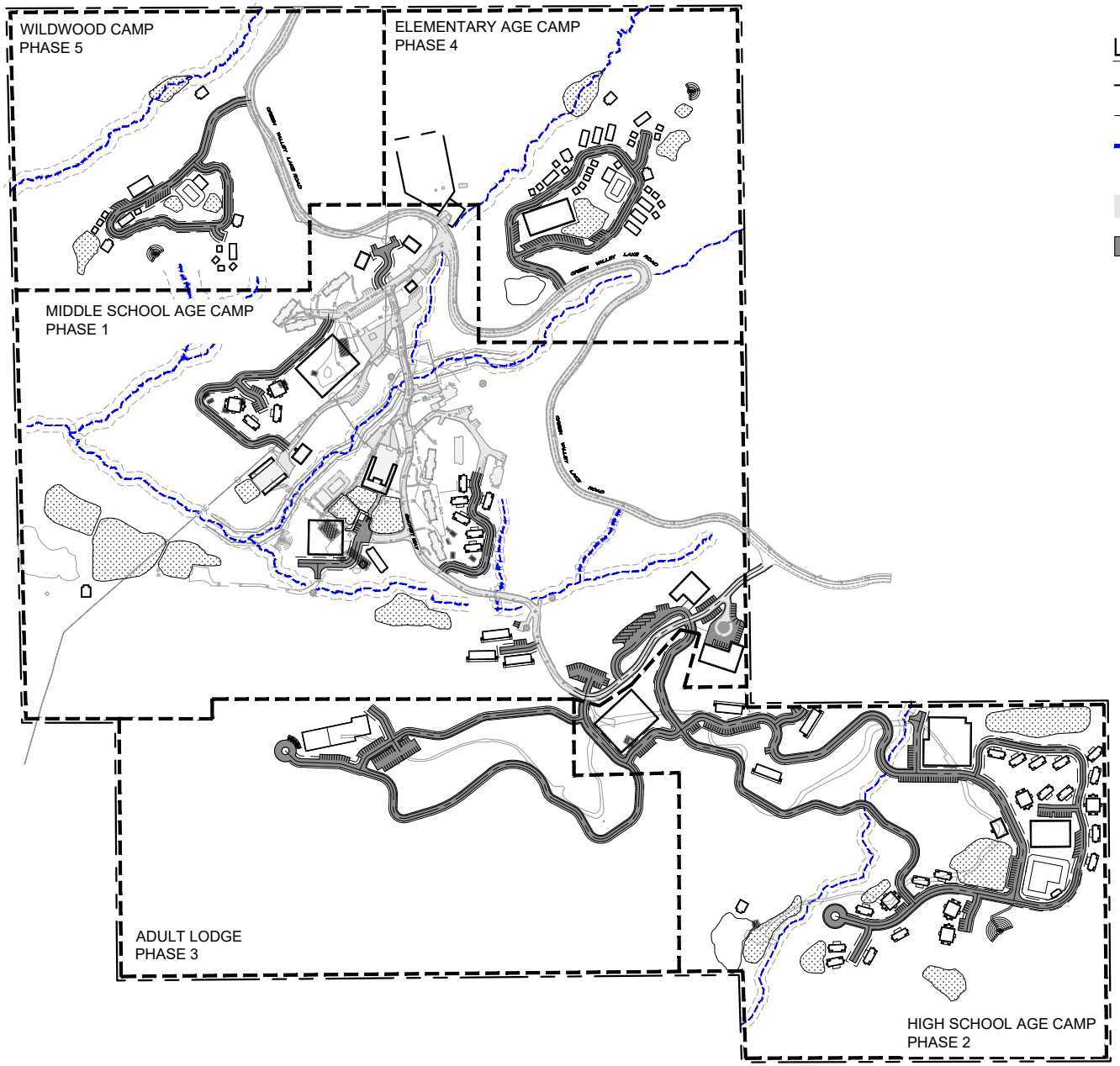
Exhibit 2: Local Vicinity Map

Hume SoCal Campground Expansion Project

San Bernardino County

Not to scale

Kimley»Horn



Source: Kimley-Horn, 2025.

Exhibit 3: Conceptual Site Plan

Hume SoCal Campground Expansion Project
San Bernardino County

Not to scale

Kimley»Horn

2 ENVIRONMENTAL SETTING

2.1 Greenhouse Gases and Climate Change

Certain gases in the earth's atmosphere classified as GHGs, play a critical role in determining the earth's surface temperature. Solar radiation enters the earth's atmosphere from space. A portion of the radiation is absorbed by the earth's surface and a smaller portion of this radiation is reflected back toward space. This absorbed radiation is then emitted from the earth as low-frequency infrared radiation. The frequencies at which bodies emit radiation are proportional to temperature. Because the earth has a much lower temperature than the sun, it emits lower-frequency radiation. Most solar radiation passes through GHGs; however, infrared radiation is absorbed by these gases. As a result, radiation that otherwise would have escaped back into space is instead "trapped," resulting in a warming of the atmosphere. This phenomenon, known as the greenhouse effect, is responsible for maintaining a habitable climate on earth.

The atmospheric impact of GHG is based on the global warming potential (GWP) of that gas. GWP is a measure of the heat trapping ability of one unit of a gas over 100 years relative to one unit of carbon dioxide (CO_2). The GWP of CO_2 is one while the GWP of N_2O for example is 273. This number is calculated by the Intergovernmental Panel on Climate Change (IPCC), based on the intensity of infrared absorption by each GHG and how long emissions remain in the atmosphere.[1] The primary GHGs contributing to the greenhouse effect are CO_2, methane (CH_4), and nitrous oxide (N_2O). Fluorinated gases also make up a small fraction of the GHGs that contribute to climate change. Examples of fluorinated gases include chlorofluorocarbons (CFCs), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF_6), and nitrogen trifluoride (NF_3); however, it is noted that these gases are not associated with typical land use development. Human-caused emissions of GHGs exceeding natural ambient concentrations are believed to be responsible for intensifying the greenhouse effect and leading to a trend of unnatural warming of the Earth's climate, known as global climate change or global warming.

GHGs are global pollutants, unlike criteria air pollutants and toxic air contaminants (TACs), which are pollutants of regional and local concern. Whereas pollutants with localized air quality effects have relatively short atmospheric lifetimes (about one day), GHGs have long atmospheric lifetimes (one to several thousand years). GHGs persist in the atmosphere for long enough time periods to be dispersed around the globe. Although the exact lifetime of a GHG molecule is dependent on multiple variables and cannot be pinpointed, more CO_2 is emitted into the atmosphere than is sequestered by ocean uptake, vegetation, or other forms of carbon sequestration. Of the total annual human-caused CO_2 emissions, approximately 55 percent is sequestered through ocean and land uptakes every year, averaged over the last 50 years, whereas the remaining 45 percent of human-caused CO_2 emissions remains stored in the atmosphere.[2] **Table 1: Description of Greenhouse Gases** describes the primary GHGs attributed to global climate change, including their physical properties.

[1] U.S. EPA, *Understanding Global Warming Potentials*. 2023. https://www.epa.gov/ghgemissions/understanding-global-warming-potentials

[2] Intergovernmental Panel on Climate Change, *Carbon and Other Biogeochemical Cycles. In: Climate Change 2013: The Physical Science Basis*, *Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*, 2013. http://www.climatechange2013.org/ images/report/WG1AR5_ALL_FINAL.pdf.

Table 1: Description of Greenhouse Gases

Greenhouse Gas	Description
Carbon Dioxide (CO_2)	CO_2 is a colorless, odorless gas that is emitted naturally and through human activities. Natural sources include decomposition of dead organic matter; respiration of bacteria, plants, animals, and fungus; evaporation from oceans; and volcanic outgassing. Anthropogenic sources are from burning coal, oil, natural gas, and wood. The largest source of CO_2 emissions globally is the combustion of fossil fuels such as coal, oil, and gas in power plants, automobiles, and industrial facilities. The atmospheric lifetime of CO_2 is variable because it is readily exchanged in the atmosphere. CO_2 is the most widely emitted GHG and is the reference gas (Global Warming Potential of 1) for determining Global Warming Potentials for other GHGs.
Nitrous Oxide (N_2O)	N_2O is largely attributable to agricultural practices and soil management. Primary human-related sources of N_2O include agricultural soil management, sewage treatment, combustion of fossil fuels, and adipic and nitric acid production. N_2O is produced from biological sources in soil and water, particularly microbial action in wet tropical forests. The atmospheric lifetime of N_2O is approximately 120 years. The Global Warming Potential of N_2O is 273.
Methane (CH_4)	CH_4, a highly potent GHG, primarily results from off-gassing (the release of chemicals from nonmetallic substances under ambient or greater pressure conditions) and is largely associated with agricultural practices and landfills. Methane is the major component of natural gas, about 87 percent by volume. Human-related sources include fossil fuel production, animal husbandry, rice cultivation, biomass burning, and waste management. Natural sources of CH_4 include wetlands, gas hydrates, termites, oceans, freshwater bodies, non-wetland soils, and wildfires. The atmospheric lifetime of CH_4 is about 12 years and the Global Warming Potential is 25.
Hydrofluorocarbons (HFCs)	HFCs are typically used as refrigerants for both stationary refrigeration and mobile air conditioning. The use of HFCs for cooling and foam blowing is increasing, as the continued phase out of CFCs and HCFCs gains momentum. The 100-year Global Warming Potential of HFCs range from 124 for HFC-152 to 14,800 for HFC-23.
Perfluorocarbons (PFCs)	PFCs have stable molecular structures and only break down by ultraviolet rays about 60 kilometers above Earth's surface. Because of this, they have long lifetimes, between 10,000 and 50,000 years. Two main sources of PFCs are primary aluminum production and semiconductor manufacturing. Global Warming Potentials range from 6,500 to 9,200.
Chlorofluorocarbons (CFCs)	CFCs are gases formed synthetically by replacing all hydrogen atoms in methane or ethane with chlorine and/or fluorine atoms. They are nontoxic, nonflammable, insoluble, and chemically unreactive in the troposphere (the level of air at the earth's surface). CFCs were synthesized in 1928 for use as refrigerants, aerosol propellants, and cleaning solvents. The Montreal Protocol on Substances that Deplete the Ozone Layer prohibited their production in 1987. Global Warming Potentials for CFCs range from 3,800 to 14,400.
Sulfur Hexafluoride (SF_6)	SF_6 is an inorganic, odorless, colorless, and nontoxic, nonflammable gas. It has a lifetime of 3,200 years. This gas is manmade and used for insulation in electric power transmission equipment, in the magnesium industry, in semiconductor manufacturing, and as a tracer gas. The Global Warming Potential of SF_6 is 23,900.
Hydrochlorofluorocarbons (HCFCs)	HCFCs are solvents, similar in use and chemical composition to CFCs. The main uses of HCFCs are for refrigerant products and air conditioning systems. As part of the Montreal Protocol, HCFCs are subject to a consumption cap and gradual phase out. The United States is scheduled to achieve a 100 percent reduction to the cap by 2030. The 100-year Global Warming Potentials of HCFCs range from 90 for HCFC-123 to 1,800 for HCFC-142b.
Nitrogen Trifluoride (NF_3)	NF_3 was added to Health and Safety Code section 38505(g)(7) as a GHG of concern. This gas is used in electronics manufacture for semiconductors and liquid crystal displays. It has a high global warming potential of 17,200.

Source: Compiled from U.S. EPA, *Overview of Greenhouse Gases*, April 11, 2018 (https://www.epa.gov/ghgemissions/overview-greenhouse-gases); U.S. EPA, *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2016*, 2018; Intergovernmental Panel on Climate Change, *Climate Change 2007: The Physical Science Basis*, 2007; National Research Council, Advancing the Science of Climate Change, 2010; U.S. EPA, *Methane and Nitrous Oxide Emission from Natural Sources*, April 2010.

3 REGULATORY SETTING

3.1 Federal

To date, national standards have not been established for nationwide GHG reduction targets, nor have any regulations or legislation been enacted specifically to address climate change and GHG emissions reduction at the project level. Various efforts have been promulgated at the federal level to improve fuel economy and energy efficiency to address climate change and its associated effects.

Energy Independence and Security Act of 2007

The Energy Independence and Security Act of 2007 (December 2007), among other key measures, requires the following, which would aid in the reduction of national GHG emissions:

- Increase the supply of alternative fuel sources by setting a mandatory Renewable Fuel Standard requiring fuel producers to use at least 36 billion gallons of biofuel in 2022.

- Set a target of 35 miles per gallon for the combined fleet of cars and light trucks by model year 2020 and direct the National Highway Traffic Safety Administration (NHTSA) to establish a fuel economy program for medium- and heavy-duty trucks and create a separate fuel economy standard for work trucks.

- Prescribe or revise standards affecting regional efficiency for heating and cooling products and procedures for new or amended standards, energy conservation, energy efficiency labeling for consumer electronic products, residential boiler efficiency, electric motor efficiency, and home appliances.

U.S. Environmental Protection Agency Endangerment Finding

The U.S. Environmental Protection Agency's (U.S. EPA) authority to regulate GHG emissions stems from the U.S. Supreme Court decision in *Massachusetts v. EPA* (2007). The Supreme Court ruled that GHGs meet the definition of air pollutants under the existing Federal Clean Air Act (FCAA) and must be regulated if these gases could be reasonably anticipated to endanger public health or welfare. Responding to the Court's ruling, the U.S. EPA finalized an endangerment finding in December 2009. Based on scientific evidence it found that six GHGs (CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6) constitute a threat to public health and welfare. Thus, it is the Supreme Court's interpretation of the existing FCAA and the U.S. EPA's assessment of the scientific evidence that form the basis for the U.S. EPA's regulatory actions.

Federal Vehicle Standards

In response to the U.S. Supreme Court ruling discussed above, Executive Order 13432 was issued in 2007 directing the U.S. EPA, the Department of Transportation, and the Department of Energy to establish regulations that reduce GHG emissions from motor vehicles, non-road vehicles, and non-road engines by 2008. In 2009, the NHTSA issued a final rule regulating fuel efficiency and GHG emissions from cars and light-duty trucks for model year 2011, and in 2010, the U.S. EPA and NHTSA issued a final rule regulating cars and light-duty trucks for model years 2012–2016.

In 2010, an Executive Memorandum was issued directing the Department of Transportation, Department of Energy, U.S. EPA, and NHTSA to establish additional standards regarding fuel efficiency and GHG reduction, clean fuels, and advanced vehicle infrastructure. In response to this directive, the U.S. EPA and NHTSA proposed stringent, coordinated federal GHG and fuel economy standards for model years 2017–2025 light-duty vehicles. The proposed standards projected to achieve 163 grams per mile of CO_2 in model year 2025, on an average industry fleet-wide basis, which is equivalent to 54.5 miles per gallon if this level were achieved solely through fuel efficiency. The final rule was adopted in 2012 for model years 2017–2021, and NHTSA intends to set standards for model years 2022–2025 in a future rulemaking. On January 12, 2017, the U.S. EPA finalized its decision to maintain the current GHG emissions standards for model years 2022–2025 cars and light trucks.

In addition to the regulations applicable to cars and light-duty trucks described above, in 2011, the U.S. EPA and NHTSA announced fuel economy and GHG standards for medium- and heavy-duty trucks for model years 2014–2018. The standards for CO_2 emissions and fuel consumption are tailored to three main vehicle categories: combination tractors, heavy-duty pickup trucks and vans, and vocational vehicles. According to the U.S. EPA, this regulatory program will reduce GHG emissions and fuel consumption for the affected vehicles by 6 to 23 percent over the 2010 baseline.

In August 2016, the U.S. EPA and NHTSA announced the adoption of the phase two program related to the fuel economy and GHG standards for medium- and heavy-duty trucks. The phase two program will apply to vehicles with model year 2018 through 2027 for certain trailers, and model years 2021 through 2027 for semi-trucks, large pickup trucks, vans, and all types and sizes of buses and work trucks. The final standards are expected to lower CO_2 emissions by approximately 1.1 billion metric tons and reduce oil consumption by up to 2 billion barrels over the lifetime of the vehicles sold under the program.[3]

On September 27, 2019, the U.S. EPA and the NHTSA published the "Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule Part One: One National Program." (84 Fed. Reg. 51,310 (Sept. 27, 2019.)[4] The SAFE Rule (Part One) revoked California's authority to set its own GHG emissions standards and set zero-emission vehicle mandates in California. On March 31, 2020, the U.S. EPA and NHTSA finalized rulemaking for SAFE Part Two sets CO_2 emissions standards and corporate average fuel economy (CAFE) standards for passenger vehicles and light duty trucks, covering model years 2021-2026. The current U.S. EPA administration has repealed SAFE Rule Part One, effective January 28, 2022, and is reconsidering Part Two.

In December 2021, the U.S. EPA finalized federal GHG emissions standards for passenger cars and light trucks for Model Years 2023 through 2026. These standards are the strongest vehicle emissions standards ever established for the light-duty vehicle sector and are based on sound science and grounded in a rigorous assessment of current and future technologies. The updated standards will result in avoiding more than 3 billion tons of GHG emissions through 2050.[5]

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3 U.S. EPA and NHTSA, *Greenhouse Gas Emissions and Fuel Efficiency Standards for Medium and Heavy-Duty Engines and Vehicles – Phase 2,* 2016. Available at: https://www.gpo.gov/fdsys/pkg/FR-2016-10-25/pdf/2016-21203.pdf. Accessed: February 2024.

4 U.S. EPA and NHTSA, Federal Register, Vol. 84, No. 188, *The Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule Part One: One National Program*, September 27, 2019. Available at: https://www.govinfo.gov/content/pkg/FR-2019-09-27/pdf/2019-20672.pdf. Accessed: February 2024.

5 U.S. EPA, *Final Rule to Revise Existing National GHG Emissions Standards for Passenger Cars and Light Trucks Through Model Year 2026,* 2021. Available at: https://www.epa.gov/regulations-emissions-vehicles-and-engines/final-rule-revise-existing-national-ghg-emissions. Accessed: February 2024.

3.2 State of California

California Air Resources Board

The California Air Resources Board (CARB) is responsible for the coordination and oversight of State and local air pollution control programs in California. Various statewide and local initiatives to reduce California's contribution to GHG emissions have raised awareness about climate change and its potential for severe long-term adverse environmental, social, and economic effects. California is a significant emitter of CO_2 equivalents (CO_2e) in the world and produced 369 million metric tons of carbon dioxide equivalent ($MMTCO_2e$) in 2020.[6] The transportation sector is the State's largest emitter of GHGs, followed by industrial operations such as manufacturing and oil and gas extraction.

The State of California legislature has enacted a series of bills that constitute the most aggressive program to reduce GHGs of any state in the nation. Some legislation, such as the landmark Assembly Bill (AB) 32, *California Global Warming Solutions Act of 2006*, was specifically enacted to address GHG emissions. Other legislation, such as Title 24 building efficiency standards and Title 20 appliance energy standards, were originally adopted for other purposes such as energy and water conservation, but also provide GHG reductions. This section describes the legislation's major provisions.

Assembly Bill 32 (California Global Warming Solutions Act of 2006)

AB 32 instructs the CARB to develop and enforce regulations for the reporting and verifying statewide GHG emissions. AB 32 also directed CARB to set a GHG emissions limit based on 1990 levels, to be achieved by 2020. It set a timeline for adopting a scoping plan for achieving GHG reductions in a technologically and economically feasible manner.

California Air Resource Board Scoping Plan

CARB adopted the Scoping Plan to achieve AB 32 goals. The Scoping Plan establishes an overall framework for the measures that would be adopted to reduce California's GHG emissions. CARB determined that achieving the 1990 emissions level would require a reduction of GHG emissions of approximately 29 percent below what would otherwise occur in 2020 in the absence of new laws and regulations (referred to as "business-as-usual"). The Scoping Plan evaluates opportunities for sector-specific reductions, integrates early actions and additional GHG reduction measures by both CARB and the State's Climate Action Team, identifies additional measures to be pursued as regulations, and outlines the adopted role of a cap-and-trade program. Additional development of these measures and adoption of the appropriate regulations occurred through the end of 2013. Key Scoping Plan elements include:

- Expanding and strengthening existing energy efficiency programs, as well as building and appliance standards.
- Achieving a statewide renewables energy mix of 33 percent by 2020.

[6] California Air Resources Board, *Current California GHG Emissions Inventory Data, 2000-2020 GHG inventory (2022 Edition)*, https://ww2.arb.ca.gov/ghg-inventory-data, accessed December 2022.

- Developing a California cap-and-trade program that links with other programs to create a regional market system and caps sources contributing 85 percent of California's GHG emissions (adopted in 2011).

- Establishing targets for transportation-related GHG emissions for regions throughout California and pursuing policies and incentives to achieve those targets (several sustainable community strategies have been adopted).

- Adopting and implementing measures pursuant to existing State laws and policies, including California's clean car standards, heavy-duty truck measures, the Low Carbon Fuel Standard (amendments to the Pavley Standard adopted 2009; Advanced Clean Car standard adopted 2012), goods movement measures, and the Low Carbon Fuel Standard (adopted 2009).

- Creating targeted fees, including a public goods charge on water use, fees on gasses with high global warming potential, and a fee to fund the administrative costs of the State of California's long-term commitment to AB 32 implementation.

- The California Sustainable Freight Action Plan was developed in 2016 and provides a vision for California's transition to a more efficient, more economically competitive, and less polluting freight transport system. This transition of California's freight transport system is essential to supporting the State's economic development in coming decades while reducing pollution.

- CARB's Mobile Source Strategy demonstrates how the State can simultaneously meet air quality standards, achieve GHG emission reduction targets, decrease health risk from transportation emissions, and reduce petroleum consumption over the next fifteen years. The mobile Source Strategy includes increasing ZEV buses and trucks.

In 2012, CARB released revised estimates of the expected 2020 emissions reductions. The revised analysis relied on emissions projections updated in light of current economic forecasts that accounted for the economic downturn since 2008, reduction measures already approved and put in place relating to future fuel and energy demand, and other factors. This update reduced the projected 2020 emissions from 596 $MMTCO_2e$ to 545 $MMTCO_2e$. The reduction in forecasted 2020 emissions means that the revised business-as-usual reduction necessary to achieve AB 32's goal of reaching 1990 levels by 2020 is now 21.7 percent, down from 29 percent. CARB also provided a lower 2020 inventory forecast that incorporated State-led GHG emissions reduction measures already in place. When this lower forecast is considered, the necessary reduction from business-as-usual needed to achieve the goals of AB 32 is approximately 16 percent.

CARB adopted the first major update to the Scoping Plan on May 22, 2014. The updated Scoping Plan summarizes the most recent science related to climate change, including anticipated impacts to California and the levels of GHG emissions reductions necessary to likely avoid risking irreparable damage. It identifies the actions California has already taken to reduce GHG emissions and focuses on areas where further reductions could be achieved to help meet the 2020 target established by AB 32. By 2016, California had reduced GHG emissions below 1990 levels, achieving AB 32's 2020 goal four years ahead of schedule.

In 2016, the Legislature passed Senate Bill (SB) 32, which codifies a 2030 GHG emissions reduction target of 40 percent below 1990 levels. With SB 32, the Legislature passed companion legislation, AB 197, which provides additional direction for developing the Scoping Plan. On December 14, 2017, CARB adopted a second update to the Scoping Plan.[7] The 2017 Scoping Plan details how the State will reduce GHG emissions to meet the 2030 target set by Executive Order B-30-15 and codified by SB 32. Other objectives listed in the 2017 Scoping Plan are to provide direct GHG emissions reductions; support climate investment in disadvantaged communities; and support other Federal actions.

Adopted December 15, 2022, CARB's *2022 Scoping Plan for Achieving Carbon Neutrality* (2022 Scoping Plan) sets a path to achieve targets for carbon neutrality and reduce anthropogenic GHG emissions by 85 percent below 1990 levels by 2045 in accordance with AB 1279. To achieve the targets of AB 1279, the 2022 Scoping Plan relies on existing and emerging fossil fuel alternatives and clean technologies, as well as carbon capture and storage. Specifically, the 2022 Scoping Plan focuses on zero-emission transportation; phasing out use of fossil gas use for heating homes and buildings; reducing chemical and refrigerants with high global warming potential (GWP); providing communities with sustainable options for walking, biking, and public transit; displacement of fossil-fuel fired electrical generation through use of renewable energy alternatives (e.g., solar arrays and wind turbines); and scaling up new options such as green hydrogen. The 2022 Scoping Plan sets one of the most aggressive approaches to reach carbon neutrality in the world. Unlike the 2017 Scoping Plan, CARB no longer includes a numeric per capita threshold and instead advocates for compliance with a local GHG reduction strategy (i.e., Climate Action Plan) consistent with CEQA Guidelines section 15183.5.

The key elements of the 2022 CARB Scoping Plan focus on transportation. Specifically, the 2022 Scoping Plan aims to rapidly move towards zero-emission transportation (i.e., electrifying cars, buses, trains, and trucks), which constitutes California's single largest source of GHGs. The regulations that impact the transportation sector are adopted and enforced by CARB on vehicle manufacturers and are outside the jurisdiction and control of local governments. The 2022 Scoping Plan accelerates development of new regulations as well as amendments to strengthen regulations and programs already in place.

Included in the 2022 Scoping Plan is a set of Local Actions (2022 Scoping Plan Appendix D) aimed at providing local jurisdictions with tools to reduce GHGs and assist the state in meeting the ambitious targets set forth in the 2022 Scoping Plan. Appendix D to the 2022 Scoping Plan includes a section on evaluating plan-level and project-level alignment with the State's Climate Goals in CEQA GHG analyses. In this section, CARB identifies several recommendations and strategies that should be considered for new development in order to determine consistency with the 2022 Scoping Plan. Notably, this section is focused on Residential and Mixed-Use Projects.[8] CARB specifically states that Appendix D does not address other land uses (e.g., industrial).[9] However, CARB plans to explore new approaches for other land use types in the future.[10]

Senate Bill 32 (California Global Warming Solutions Act of 2006: Emissions Limit)

Signed into law in September 2016, SB 32 codifies the 2030 GHG reduction target in Executive Order B-30-15 (40 percent below 1990 levels by 2030). The bill authorizes CARB to adopt an interim GHG emissions level target to be achieved by 2030. CARB also must adopt rules and regulations in an open

[7] California Air Resources Board, *California's 2017 Climate Change Scoping Plan,* November 2017.
[8] California Air Resources Board, *2022 Scoping Plan for Achieving Carbon Neutrality*, *Appendix D: Local Actions*, Page 21, November 2022.
[9] California Air Resources Board, *2022 Scoping Plan for Achieving Carbon Neutrality*, *Appendix D: Local Actions*, Page 4, November 2022.
[10] California Air Resources Board, *2022 Scoping Plan for Achieving Carbon Neutrality*, *Appendix D: Local Actions*, Page 21, November 2022.

public process to achieve the maximum, technologically feasible, and cost-effective GHG reductions. With SB 32, the Legislature passed companion legislation, AB 197, which provides additional direction for developing the Scoping Plan.

SB 375 (The Sustainable Communities and Climate Protection Act of 2008)

Signed into law on September 30, 2008, SB 375 provides a process to coordinate land use planning, regional transportation plans, and funding priorities to help California meet AB 32's GHG reduction goals. SB 375 requires metropolitan planning organizations to include sustainable community strategies in their regional transportation plans for reducing GHG emissions, aligns planning for transportation and housing, and creates specified incentives for the implementation of the strategies.

AB 1493 (Pavley Regulations and Fuel Efficiency Standards)

AB 1493, enacted on July 22, 2002, required CARB to develop and adopt regulations that reduce GHGs emitted by passenger vehicles and light duty trucks. Implementation of the regulation was delayed by lawsuits filed by automakers and by the U.S. EPA's denial of an implementation waiver. The U.S. EPA subsequently granted the requested waiver in 2009, which was upheld by the by the U.S. District Court for the District of Columbia in 2011. The regulations establish one set of emission standards for passenger vehicle and light duty truck model years 2009–2016 and a second set of emissions standards for model years 2017 to 2025. By 2025, when all rules will be fully implemented, new passenger vehicles are anticipated to emit 34 percent fewer CO_2e emissions and 75 percent fewer smog-forming emissions.

SB 1368 (Emission Performance Standards)

SB 1368, which is AB 32's companion bill, directs the California Public Utilities Commission (CPUC) to adopt a performance standard for GHG emissions for the future power purchases of California utilities. SB 1368 limits carbon emissions associated with electrical energy consumed in California by forbidding procurement arrangements for energy longer than 5 years from resources that exceed the emissions of a relatively clean, combined cycle natural gas power plant. The new law effectively prevents California's utilities from investing in, otherwise financially supporting, or purchasing power from new coal plants located in or out of the State. The CPUC adopted the regulations required by SB 1368 on August 29, 2007. The regulations implementing SB 1368 establish a standard for baseload generation owned by, or under long-term contract to publicly owned utilities, for 1,100 pounds of CO_2 per megawatt-hour.

SB 1078 and SBX1-2 (Renewable Electricity Standards)

SB 1078 (2002) requires California to generate 20 percent of its electricity from renewable energy by 2017. SB 107 (2006) changed the due date to 2010 instead of 2017. On November 17, 2008, Governor Arnold Schwarzenegger signed Executive Order S-14-08, which established a Renewable Portfolio Standard (RPS) target for California requiring that all retail sellers of electricity serve 33 percent of their load with renewable energy by 2020. Executive Order S-21-09 also directed CARB to adopt a regulation by July 31, 2010, requiring the State's load serving entities to meet a 33 percent renewable energy target by 2020. CARB approved the Renewable Electricity Standard on September 23, 2010 by Resolution 10-23. SBX1-2 (2011) codified the 33 percent by 2020 goal.

SB 350 (Clean Energy and Pollution Reduction Act of 2015)

Signed into law on October 7, 2015, SB 350 implements Executive Order B-30-15's goals. The SB 350 objectives are to increase the procurement of electricity from renewable sources from 33 percent to 50 percent (with interim targets of 40 percent by 2024, and 45 percent by 2027) and to double the energy efficiency savings in electricity and natural gas end uses of retail customers through energy efficiency and conservation. SB 350 also reorganizes the Independent System Operator to develop more regional electricity transmission markets and improve accessibility in these markets, which will facilitate the growth of renewable energy markets in the western United States.

AB 398 (Market-Based Compliance Mechanisms)

Signed on July 25, 2017, AB 398 extended the duration of the Cap-and-Trade program from 2020 to 2030. AB 398 required CARB to update the Scoping Plan and for all GHG rules and regulations adopted by the State. It also designated CARB as the statewide regulatory body responsible for ensuring that California meets its statewide carbon pollution reduction targets, while retaining local air districts' responsibility and authority to curb toxic air contaminants and criteria pollutants from local sources that severely impact public health. AB 398 also decreased free carbon allowances over 40 percent by 2030 and prioritized Cap-and-Trade spending to various programs including reducing diesel emissions in impacted communities.

SB 150 (Regional Transportation Plans)

Signed on October 10, 2017, SB 150 aligns local and regional GHG reduction targets with State targets (i.e., 40 percent below their 1990 levels by 2030). SB 150 creates a process to include communities in discussions on how to monitor their regions' progress on meeting these goals. The bill also requires the CARB to regularly report on that progress, as well as on the successes and the challenges regions experience associated with achieving their targets. SB 150 provides for accounting of climate change efforts and GHG reductions and identify effective reduction strategies.

SB 100 (California Renewables Portfolio Standard Program: Emissions of Greenhouse Gases)

Signed into law in September 2018, SB 100 increased California's renewable electricity portfolio from 50 to 60 percent by 2030. SB 100 also established a further goal to have an electric grid that is entirely powered by clean energy by 2045.

AB 1346 (Air Pollution: Small Off-Road Engines)

Signed into Law in October 2021, AB 1346 requires CARB, to adopt cost-effective and technologically feasible regulations to prohibit engine exhaust and evaporative emissions from new small off-road engines, consistent with federal law, by July 1, 2022. The bill requires CARB to identify and, to the extent feasible, make available funding for commercial rebates or similar incentive funding as part of any updates to existing applicable funding program guidelines to local air pollution control districts and air quality management districts to implement to support the transition to zero-emission small off-road equipment operations.

AB 1279 (The California Climate Crisis Act)

AB 1279 establishes the policy of the state to achieve carbon neutrality as soon as possible, but no later than 2045; to maintain net negative GHG emissions thereafter; and to ensure that by 2045 statewide anthropogenic GHG emissions are reduced at least 85 percent below 1990 levels. The bill requires CARB to ensure that Scoping Plan updates identify and recommend measures to achieve carbon neutrality, and to identify and implement policies and strategies that enable CO_2 removal solutions and carbon capture, utilization, and storage technologies.

SB 1020 (100 Percent Clean Electric Grid)

Signed on September 16, 2022, SB 1020 provides additional goals for the path to the 2045 goal of 100 percent clean electricity retail sales. It creates a target of 90 percent clean electricity retail sales by 2035 and 95 percent clean electricity retail sales by 2040.

SB 905 (Capturing and Removing Carbon Pollution)

Signed on September 16, 2022, SB 905 establishes regulatory framework and policies that involve carbon removal, carbon capture, utilization, and sequestration. It also prohibits the injecting of concentrated carbon dioxide fluid into a Class II injection well for the purpose of enhanced oil recovery.

AB 1757 (Nature-Based Solutions)

Signed on September 16, 2022, AB 1757 requires state agencies to develop a range of targets for natural carbon sequestration and nature-based climate solutions that reduce GHG emissions to meet the 2030, 2038, and 2045 goals which would be integrated into a scoping plan addressing natural and working lands.

Executive Orders Related to GHG Emissions

California's Executive Branch has taken several actions to reduce GHGs using executive orders. Although not regulatory, they set the tone for the State and guide the actions of state agencies.

Executive Order S-3-05. Executive Order S-3-05 was issued on June 1, 2005, which established the following GHG emissions reduction targets:

- By 2010, reduce GHG emissions to 2000 levels.
- By 2020, reduce GHG emissions to 1990 levels.
- By 2050, reduce GHG emissions to 80 percent below 1990 levels.

The 2050 reduction goal represents what some scientists believe is necessary to reach levels that will stabilize the climate. The 2020 goal was established to be a mid-term target. Because this is an executive order, the goals are not legally enforceable for local governments or the private sector.

Executive Order S-01-07. Issued on January 18, 2007, Executive Order S 01-07 mandates that a statewide goal shall be established to reduce the carbon intensity of California's transportation fuels by

at least 10 percent by 2020. The executive order established a Low Carbon Fuel Standard (LCFS) and directed the Secretary for Environmental Protection to coordinate the actions of the California Energy Commission (CEC), CARB, the University of California, and other agencies to develop and propose protocols for measuring the "life-cycle carbon intensity" of transportation fuels. CARB adopted the LCFS on April 23, 2009.

Executive Order S-13-08. Issued on November 14, 2008, Executive Order S-13-08 facilitated the California Natural Resources Agency development of the 2009 California Climate Adaptation Strategy. Objectives include analyzing risks of climate change in California, identifying and exploring strategies to adapt to climate change, and specifying a direction for future research.

Executive Order S-14-08. Issued on November 17, 2008, Executive Order S-14-08 expands the State's Renewable Energy Standard to 33 percent renewable power by 2020. Additionally, Executive Order S-21-09 (signed on September 15, 2009) directs CARB to adopt regulations requiring 33 percent of electricity sold in the State come from renewable energy by 2020. CARB adopted the Renewable Electricity Standard on September 23, 2010, which requires 33 percent renewable energy by 2020 for most publicly owned electricity retailers.

Executive Order S-21-09. Issued on July 17, 2009, Executive Order S-21-09 directs CARB to adopt regulations to increase California's RPS to 33 percent by 2020. This builds upon SB 1078 (2002), which established the California RPS program, requiring 20 percent renewable energy by 2017, and SB 107 (2006), which advanced the 20 percent deadline to 2010, a goal which was expanded to 33 percent by 2020 in the 2005 Energy Action Plan II.

Executive Order B-30-15. Issued on April 29, 2015, Executive Order B-30-15 established a California GHG reduction target of 40 percent below 1990 levels by 2030 and directs CARB to update the Climate Change Scoping Plan to express the 2030 target in terms of $MMTCO_2e$. The 2030 target acts as an interim goal on the way to achieving reductions of 80 percent below 1990 levels by 2050, a goal set by Executive Order S-3-05. The executive order also requires the State's climate adaptation plan to be updated every three years and for the State to continue its climate change research program, among other provisions. With the enactment of SB 32 in 2016, the Legislature codified the goal of reducing GHG emissions by 2030 to 40 percent below 1990 levels.

Executive Order B-55-18. Issued on September 10, 2018, Executive Order B-55-18 establishes a goal to achieve carbon neutrality as soon as possible, and no later than 2045, and achieve and maintain net negative emissions thereafter. This goal is in addition to the existing statewide targets of reducing GHG emissions. The executive order requires CARB to work with relevant state agencies to develop a framework for implementing this goal. It also requires CARB to update the Scoping Plan to identify and recommend measures to achieve carbon neutrality. The executive order also requires state agencies to develop sequestration targets in the Natural and Working Lands Climate Change Implementation Plan.

Executive Order N-79-20. Signed in September 2020, Executive Order N-79-20 establishes as a goal that where feasible, all new passenger cars and trucks, as well as all drayage/cargo trucks and off-road vehicles and equipment, sold in California, will be zero-emission by 2035. The executive order sets a similar goal requiring that all medium and heavy-duty vehicles will be zero-emission by 2045 where feasible. It also directs CARB to develop and propose rulemaking for passenger vehicles and trucks, medium-and heavy-duty fleets where feasible, drayage trucks, and off-road vehicles and equipment "requiring increasing volumes" of new zero emission vehicles (ZEVs) "towards the target of 100

percent." The executive order directs the California Environmental Protection Agency, the California Geologic Energy Management Division, and the California Natural Resources Agency to transition and repurpose oil production facilities with a goal toward meeting carbon neutrality by 2045. Executive Order N-79-20 builds upon the CARB Advanced Clean Trucks regulation, which was adopted by CARB in July 2020.

California Regulations and Building Codes

California has a long history of adopting regulations to improve energy efficiency in new and remodeled buildings. These regulations have kept California's energy consumption relatively flat even with rapid population growth.

Title 20 Appliance Efficiency Regulations. The appliance efficiency regulations (California Code of Regulations [CCR] Title 20, Sections 1601-1608) include standards for new appliances. Twenty-three categories of appliances are included in the scope of these regulations. These standards include minimum levels of operating efficiency, and other cost-effective measures, to promote the use of energy- and water-efficient appliances.

Title 24 Building Energy Efficiency Standards. California's Energy Efficiency Standards for Residential and Nonresidential Buildings (CCR Title 24, Part 6) was first adopted in 1978 in response to a legislative mandate to reduce California's energy consumption. The standards are updated periodically to allow consideration and possible incorporation of new energy efficient technologies and methods. Energy efficient buildings require less electricity; therefore, increased energy efficiency reduces fossil fuel consumption and decreases GHG emissions. The California Energy Commission (CEC) adopted the 2022 Energy Code on August 11, 2021, which was subsequently approved by the California Building Standards Commission for inclusion into the California Building Standards Code. The 2022 Title 24 standards will result in less energy use, thereby reducing air pollutant emissions associated with energy consumption across California. For example, the 2022 Title 24 standards require efficient electric heat pumps, establishes electric-ready requirements for new homes, expands solar photovoltaic and battery storage standards, and strengthens ventilation standards.

Title 24 California Green Building Standards Code. The California Green Building Standards Code (CCR Title 24, Part 11 code) commonly referred to as the CALGreen Code, is a statewide mandatory construction code developed and adopted by the California Building Standards Commission and the Department of Housing and Community Development. The CALGreen standards require new residential and commercial buildings to comply with mandatory measures under the topics of planning and design, energy efficiency, water efficiency/conservation, material conservation and resource efficiency, and environmental quality. CALGreen also provides voluntary tiers and measures that local governments may adopt that encourage or require additional measures in the five green building topics. Updates to the 2019 CALGreen Code took effect on January 1, 2023 (2022 CALGreen). The 2022 CALGreen standards has improved upon the 2019 standards for new construction of, and additions and alterations to, residential and nonresidential buildings.

3.3 Regional

South Coast Air Quality Management District Thresholds

The South Coast Air Quality Management District (SCAQMD) formed a GHG California Environmental Quality Act (CEQA) Significance Threshold Working Group to provide guidance to local lead agencies on determining significance for GHG emissions in their CEQA documents. This working group was formed to assist SCAQMD's efforts to develop a GHG significance threshold and is composed of a wide variety of stakeholders including the State Office of Planning and Research, CARB, the Attorney General's Office, a variety of city and county planning departments in the SCAB, various utilities such as sanitation and power companies throughout the SCAB, industry groups, and environmental and professional organizations. The Working Group has proposed a tiered approach to evaluating GHG emissions for development projects where SCAQMD is not the lead agency, wherein projects are evaluated sequentially through a series of "tiers" to determine whether the project is likely to result in a potentially significant impact due to GHG emissions.

With the tiered approach, a project is compared against the requirements of each tier sequentially and would not result in a significant impact if it complies with any tier. Tier 1 excludes projects that are specifically exempt from SB 97 from resulting in a significant impact. Tier 2 excludes projects that are consistent with a GHG reduction plan that has a certified final CEQA document and complies with AB 32 GHG reduction goals. Tier 3 excludes projects with annual emissions lower than a screening threshold. The SCAQMD has adopted a threshold of 10,000 $MTCO_2e$ per year for industrial projects and a 3,000 $MTCO_2e$ threshold was proposed for non-industrial projects but has not been adopted. During Working Group Meeting #7 it was explained that this threshold was derived using a 90 percent capture rate of a large sampling of industrial facilities. During Meeting #8, the Working Group defined industrial uses as production, manufacturing, and fabrication activities or storage and distribution. The Working Group indicated that the 10,000 $MTCO_2e$ per year threshold applies to both emissions from construction and operational phases plus indirect emissions (electricity, water use, etc.). The SCAQMD concluded that projects with emissions less than the screening threshold would not result in a significant cumulative impact.

Tier 4 consists of three decision tree options. Under the Tier 4 first option, SCAQMD initially outlined that a project would be excluded if design features and/or mitigation measures resulted in emissions 30 percent lower than business as usual emissions. However, the Working Group did not provide a recommendation for this approach. The Working Group folded the Tier 4 second option into the third option. Under the Tier 4 third option, a project would be excluded if it was below an efficiency-based threshold of 4.8 $MTCO_2e$ per service population per year. Tier 5 would exclude projects that implement offsite mitigation (GHG reduction projects) or purchase offsets to reduce GHG emission impacts to less than the proposed screening level.

Tier 3 Screening Thresholds

When the tiered approach is applied to a proposed project, and the project is found not to comply with Tier 1 or Tier 2, the project's emissions are compared against a screening threshold, as described above, for Tier 3. The screening threshold formally adopted by SCAQMD is an "interim" screening threshold for stationary source industrial projects where the SCAQMD is the lead agency under CEQA. The threshold was termed "interim" because, at the time, SCAQMD anticipated that CARB would be adopting a statewide significance threshold that would inform and provide guidance to SCAQMD in its adoption of a

final threshold. However, no statewide threshold was ever adopted, and the interim threshold remains in effect.

For projects for which SCAQMD is not a lead agency, no screening thresholds have been formally adopted. However, the SCAQMD Working Group has recommended a threshold of 10,000 $MTCO_2e$/year for industrial projects and 3,000 $MTCO_2e$/year for residential and commercial projects. SCAQMD determined that these thresholds would "capture" 90 percent of GHG emissions from these sectors, "capture" meaning that 90 percent of total emissions from all new projects would be subject to some type of CEQA analysis (i.e., found potentially significant).[11]

Southern California Association of Governments

On September 3, 2020, SCAG's Regional Council adopted Connect SoCal (2024 - 2050 Regional Transportation Plan/Sustainable Communities Strategy [2024 RTP/SCS]). The RTP/SCS charts a course for closely integrating land use and transportation so that the region can grow smartly and sustainably. The strategy was prepared through a collaborative, continuous, and comprehensive process with input from local governments, county transportation commissions, tribal governments, non-profit organizations, businesses and local stakeholders within the counties of Imperial, Los Angeles, Orange, Riverside, San Bernardino, and Ventura. The RTP/SCS is a long-range vision plan that balances future mobility and housing needs with economic, environmental, and public health goals. The SCAG region strives toward sustainability through integrated land use and transportation planning. The SCAG region must achieve specific federal air quality standards and is required by state law to lower regional GHG emissions.

3.4 Local

County of San Bernardino Regional Greenhouse Gas Reduction Plan Update

San Bernardino County first adopted the Greenhouse Gas Reduction Plan in September 2011 and an update to the Greenhouse Gas Reduction Plan was adopted in September 2021. The Greenhouse Gas Reduction Plan provides an inventory of GHG emissions within unincorporated areas of the County and establishes GHG emissions reduction targets for unincorporated areas of the County that would comply with the mandate of SB 32 (i.e., 40 percent below 2020 levels by the year 2030).

The Greenhouse Gas Reduction Plan also provides guidance on the methodology to be used to analyze the GHG emissions of proposed development projects within unincorporated areas of San Bernardino County, establishes the criteria to be used to determine the significance of the GHG emissions during the CEQA review process, and establishes a list of standard conditions of approval that would be applied to all development projects to reduce County-wide GHG emissions. Related to CEQA review, the Greenhouse Gas Reduction Plan establishes a two-step for development projects. First, a screening threshold of 3,000 metric tons of carbon dioxide equivalent ($MTCO_2e$) per year is used to determine if further analysis is required. If a development project were to produce GHG emissions of less than 3,000 $MTCO_2e$ per year, then that Project would be considered to be a "less than significant" emitter of GHGs that would not prevent the County of achieving the GHG reduction mandate of SB 32. If a development project were to produce more than 3,000 $MTCO_2e$ per year, then the project is required to either

[11] SCAQMD, "Staff Report: Interim CEQA GHG Significance Threshold for Stationary Sources, Rules and Plans," December 5, 2008, Attachment E: "Draft Guidance Document – Interim CEQA Greenhouse Gas (GHG) Significance Threshold," October 2008, p. 3-2.

achieve a minimum of 100 points from the applicable screening tables provided in the Greenhouse Gas Reduction Plan or provide alternative mitigation that would achieve GHG emissions reductions equivalent to those that would be realized by achieving 100 points from the applicable screening table. Upon achieving at least 100 points from the screening table, or equivalent GHG emissions reductions, the development project would be considered to have a less than significant effect from GHG emissions and would be consistent with the County's GHG emissions reduction target to satisfy SB 32.

San Bernardino Countywide Plan (General Plan)

The Countywide Plan sets forth goals and policies related to GHG emissions. The Natural Resources Element contains goals and policies that work to promote health and wellness of residents in San Bernardino County through improvements in locally generated emissions. The following policies are applicable to the Proposed Project:

Goal NR-1 **Air Quality**. Air quality that promotes health and wellness of residents in San Bernardino County through improvements in locally-generated emissions.

Policy NR-1.7 **Greenhouse gas reduction targets**. We strive to meet the 2040 and 2050 greenhouse gas emission reduction targets in accordance with state law.

Policy NR-1.9 **Building design and upgrades**. We use the CALGreen Code to meet energy efficiency standards for new buildings and encourage the upgrading of existing buildings to incorporate design elements, building materials, and fixtures that improve environmental sustainability and reduce emissions.

County of San Bernardino Development Code

The San Bernardino County Development Code implements the goals and policies of the General Plan by regulating land uses within the unincorporated areas of the County. The development Code contains the following standards for greenhouse gas emissions that would apply to the Project:

§ 84.30.030 GHG Performance Standards.

All new residential, commercial, industrial, and institutional development shall comply with the development standards provided in Appendix F to the GHG Emissions Reduction Plan.

§ 85.03.040 Environmental Review

(c) Greenhouse Gas (GHG) Emissions Review. All land use applications that are subject to CEQA review shall have the potential impacts of the project's GHG emissions evaluated pursuant to the procedures entitled Review of GHG Emissions, Land Use Service Department Standard Policy/Procedures Manual, Section 9 (Environmental Review Guidelines).

§ 83.07.020 San Bernardino County Light Trespass Ordinance

(h) Promote lighting practices and systems which conserve energy, decrease dependence on fossil fuels and limit greenhouse gas emissions consistent with the California Global Warming Solutions Act and other applicable state and federal laws.

4 SIGNIFICANCE CRITERIA AND METHODOLOGY

4.1 Thresholds and significant criteria

Based upon the criteria derived from State CEQA Guidelines Appendix G, a project normally would have a significant effect on the environment if it would:

- Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment, based on any applicable threshold of significance; or

- Conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of GHGs.

Addressing GHG emissions generation impacts requires an agency to determine what constitutes a significant impact. The State CEQA Guidelines specifically allow lead agencies to determine thresholds of significance that illustrate the extent of an impact and are a basis from which to apply mitigation measures. This means that each agency is left to determine whether a project's GHG emissions will have a "significant" impact on the environment. The guidelines direct that agencies are to use "careful judgment" and "make a good-faith effort, based to the extent possible on scientific and factual data, to describe, calculate or estimate" the project's GHG emissions.[12]

GHG Thresholds

A qualified Climate Action Plan (CAP) meets the requirements in CEQA Guidelines Section 15183.5(b) so that future development projects requiring environmental review under State law can streamline GHG impact analyses by demonstrating consistency with the CAP. San Bernardino County and it's 25 Partnership Cities developed its qualified CAP, the Greenhouse Gas Reduction Plan. The San Bernardino County Greenhouse Gas Reduction Plan included a GHG Development Review Process that specifies a two-step approach in quantifying GHG emissions. First, a screening threshold of 3,000 $MTCO_2e$/yr is used to determine if additional analysis is required. Projects that exceed the 3,000 $MTCO_2e$/yr are required to either achieve a minimum 100 points per the Screening Tables or a 31 percent reduction over 2007 emissions levels. Consistent with CEQA guidelines, such projects would be determined to have a less than significant individual and cumulative impact for GHG emissions.

To show the Project does not conflict with applicable plans to reduce GHG emissions, the Project must demonstrate consistency with CARB's 2022 Scoping Plan, SCAG's RTP/SCS, and the San Bernardino County Regional Greenhouse Gas Reduction Plan. Consistency with these plans will demonstrate that the proposed Project will have a less than significant impact on GHG emissions.

4.2 Methodology

Global climate change is, by definition, a cumulative impact of GHG emissions. Therefore, there is no project-level analysis. The baseline against which to compare potential impacts of the project includes the natural and anthropogenic drivers of global climate change, including world-wide GHG emissions from human activities which almost doubled between 1970 and 2010 from approximately 27 gigatonnes

[12] 14 California Code of Regulations, Section 15064.4a

(Gt) of CO_2/year to nearly 49 $GtCO_2$/year.[13] As such, the geographic extent of climate change and GHG emissions cumulative impact discussion is worldwide.

The Project's construction and operational emissions were calculated using the California Emissions Estimator Model version 2022.1 (CalEEMod). Details of the modeling assumptions and emission factors are provided in **Appendix A: Greenhouse Gas Emissions Data**.

Construction

The Project's construction and operational emissions were calculated using the California Emissions Estimator Model version 2022.1.1.20 (CalEEMod). Details of the modeling assumptions and emission factors are provided in Appendix A. For construction, CalEEMod calculates emissions from off-road equipment usage and on-road vehicle travel associated with haul, delivery, and construction worker trips. GHG emissions during construction were forecasted based on the proposed construction schedule and applying the mobile-source and fugitive dust emissions factors derived from CalEEMod. The Project's construction-related GHG emissions would be generated from off-road construction equipment, on-road hauling and vendor (material delivery) trucks, and worker vehicles. The Project's construction is anticipated to occur over a duration of approximately two years, beginning in 2025.

Operations

The Project's operational GHG emissions would be generated by vehicular traffic, off-road equipment, area sources (e.g., landscaping maintenance, consumer products), electrical generation, natural gas consumption, water supply and wastewater treatment, solid waste, air conditioning, and refrigeration. These emissions categories are discussed below.

- **Area Sources**. Area source emissions occur from architectural coatings, landscaping equipment, and consumer products. Landscaping and consumer products (i.e., personal care products, home, lawn, and garden products, disinfectants, sanitizers, polishes, cosmetics, and floor finishes) would be part of the emissions from area sources. Additionally, the primary emissions from architectural coatings are volatile organic compounds, which are relatively insignificant as direct GHG emissions. Area source emissions for the Project are calculated in CalEEMod based on consumer product use, architectural coatings, and landscape maintenance equipment.

- **Energy Consumption**. Energy consumption consists of emissions from project consumption of electricity and natural gas. Primary uses of electricity and natural gas by the Project would be for space heating and cooling, water heating, ventilation, lighting, appliances, and electronics. Energy emissions are calculated based on consumption rates and emissions factors in CalEEMod.

- **Solid Waste**. Solid waste releases GHG emissions in the form of methane when these materials decompose. Solid waste emissions are calculated based on generation rates and emissions factors in CalEEMod.

[13] Intergovernmental Panel on Climate Change, *Climate Change 2014 Mitigation of Climate Change Working Group III Contribution to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*, 2014.

- **Water and Wastewater**. Project GHG emissions would be generated from energy consumption associated with water and wastewater conveyance and treatment. No changes were made to the default water usage consumption rates or emissions factors.

- **Refrigerants**. Project refrigerants includes fugitive GHG emissions associated with building air conditioning and refrigeration equipment. Different types of refrigeration equipment are used by different types of land uses. For example, an office may use various types of air conditioning equipment, while a supermarket may use both air conditioning equipment and refrigeration equipment. CalEEMod automatically generates a default air conditioning and refrigeration equipment inventory for each project land use subtype based on industry data from the U.S. EPA.[14]

- **Mobile Sources**. Project-generated vehicle emissions are conservatively based on trip generation rates for Project land uses and are incorporated into CalEEMod as recommended by the SCAQMD. The Project would generate 700 trips per week or a daily average of 100 trips per day. Employee and visitor trip lengths use CalEEMod default lengths for projects located in San Bernardino County. Based on these estimates the Project is anticipated to generate 1,320,729 vehicle miles traveled (VMT) per year.

[14] U.S. Environmental Protection Agency, *Accounting Tool to Support Federal Reporting of Hydrofluorocarbon Emissions: Supporting Documentation,* October 2016.

5 POTENTIAL IMPACTS AND MITIGATION

5.1 Greenhouse Gas Emissions

Threshold 5.1 Would the Project generate GHG emissions, either directly or indirectly, that could have a significant impact on the environment?

Construction-Related Greenhouse Gas Emissions

Project construction activities would generate direct CO_2, N_2O, and CH_4 emissions from construction equipment, transport of materials, and construction workers commuting to and from the Project site. Total GHG emissions generated during all construction phases were combined and are presented in **Table 2: Construction-Related Greenhouse Gas Emissions**.

Table 2: Construction-Related Greenhouse Gas Emissions

Category	$MTCO_2e$
2025 Construction	1,523
2026 Construction	791
2027 Construction	389
Total Construction	*2,703*
30-Year Amortized Construction	*90.1*

Source: CalEEMod version 2022.1.1.20. Refer to Appendix A for model outputs.

As indicated in **Table 2**, the Project would result in the generation of approximately 2,703 $MTCO_2e$ over the course of construction. Construction GHG emissions are typically summed and amortized over a 30-year period, then added to the operational emissions.[15] The amortized Project construction emissions would be 90.1 $MTCO_2e$ per year. Once construction is complete, construction-related GHG emissions would cease.

Operational Greenhouse Gas Emissions

Operational emissions would occur over the Project's lifetime. GHG emissions would result from direct emissions such as Project generated vehicular traffic, on-site combustion of natural gas, and operation of any landscaping equipment. Operational GHG emissions would also result from indirect sources, such as off-site generation of electrical power, the energy required to convey water to, and wastewater from the Project, the emissions associated with solid waste generated from the Project, and any fugitive refrigerants from air conditioning or refrigerators.

The Project's operational GHG emissions are provided in **Table 3: Project Greenhouse Gas Emissions**. As shown in **Table 3**, the Project would generate approximately 1,939.1 $MTCO_2e$ annually from both construction and operations.

[15] The amortization period is 30 years per the South Coast Air Quality Management District (South Coast Air Quality Management District, *Minutes for the GHG CEQA Significance Threshold Stakeholder Working Group #13,* August 26, 2009).

Table 3: Project Greenhouse Gas Emissions

Emissions Source	$MTCO_2e$ per Year
Construction Amortized Over 30 Years	90.1
Area Source	4.26
Energy	1,123
Mobile	464
Waste	172
Water and Wastewater	41.5
Refrigerants	44.6
Total	1,939.1
County of San Bernardino Screening Threshold	*3,000*
Exceeds Threshold?	**No**

Source: CalEEMod version 2022.1.1.20. Refer to Appendix A for model outputs.

The San Bernardino County Greenhouse Gas Reduction Plan employs a GHG Development Review Process that specifies a two-step approach in quantifying GHG emissions. First, a screening threshold of 3,000 $MTCO_2e$ per year is used to determine if additional analysis is required. Projects that exceed the 3,000 $MTCO_2e$ per year screening threshold will be required to achieve a minimum 100 points per the Screening Tables or a 31 percent reduction over 2007 emissions levels. Consistent with CEQA guidelines, such projects would be determined to have a less than significant individual and cumulative impact for GHG emissions.

As shown in **Table 3**, the Project would result in approximately 1,939.1 $MTCO_2e$ per year; which would not exceed the screening threshold of 3,000 $MTCO_2e$/yr. As a result, the Project's GHG emissions would be considered less than significant and additional GHG emissions analysis would not be required.

Mitigation Measures: No mitigation is required.

Level of Significance: Less than significant impact.

5.2 Greenhouse Gas Reduction Plan Compliance

Threshold 5.2 Would the Project conflict with an applicable plan, policy, or regulation of an agency adopted for the purpose of reducing GHG emissions?

County of San Bernardino Greenhouse Gas Reduction Plan

As discussed above, the County's GHG Reduction Plan includes a review standard of 3,000 $MTCO_2e$ per year to identify projects that require the use of Screening Tables or a project-specific technical analysis to quantify and mitigate project emissions. The purpose of the Screening Tables is to provide guidance in measuring the reduction of GHG emissions attributable to certain design and construction measures incorporated into development projects. As noted above, projects that exceed 3,000 $MTCO_2e$/year of GHG emissions, the applicant may choose to either utilize the Screening Tables or achieve a 31 percent

reduction over 2007 emissions levels. **Table 3** shows that the Project would not exceed the 3,000 $MTCO_2e$ per year threshold, therefore the Project would be consistent with the County's GHG emissions reduction plan.

CEQA Guidelines require lead agencies to describe, calculate, or estimate the amount of GHG emissions that would result from a project. CEQA Guidelines (Section 15183.5) also allow individual projects to tier off of a qualified GHG reduction plan. Thus, individual projects do not need to each conduct a GHG analysis to comply with CEQA if they can demonstrate consistency with a qualified plan. Projects in jurisdictions with a qualified plan can be considered less than significant under CEQA if they show consistency with their qualified plan. As such, the additional discussion provided for RTP and CARB Scoping Plan is provided optionally and further demonstrates the project consistency with applicable plan, policy, or regulation of an agency adopted for the purpose of reducing GHG emissions.

Regional Transportation Plan/Sustainable Communities Strategy Consistency

The 2024 RTP/SCS is a long-range visioning plan that balances future mobility and housing needs with economic, environmental, and public health goals. The RTP/SCS embodies a collective vision for the region's future and is developed with input from local governments, county transportation commissions, tribal governments, nonprofit organizations, businesses, and local stakeholders in the counties of Imperial, Los Angeles, Orange, Riverside, San Bernardino, and Ventura. SCAG's RTP/SCS establishes GHG emissions goals to reduce GHG emissions in the region by eight percent from 2005 levels by 2020 and by 19 percent by 2035. Connect SoCal is a long-range vision plan that balances future mobility and housing needs with economic, environmental, and public health goals. The 2024 Connect SoCal is supported by a combination of transportation and land use strategies that help the region achieve state GHG emissions reduction goals and FCAA requirements, increased housing production, improved equity and resilience, the preservation of natural lands, improvement of public health, increased transportation safety, support for the region's vital goods movement industries and more efficient use of resources. GHG emissions resulting from land development-related mobile sources are the most potent source of emissions, and therefore project comparison to the 2024 Connect SoCal is an appropriate indicator of whether the project would inhibit the post-2020 GHG reduction goals promulgated by the state. The Project's consistency with the RTP/SCS goals is analyzed in detail in **Table 4: Regional Transportation Plan/Sustainable Communities Strategy Consistency**.

Table 4: Regional Transportation Plan/Sustainable Communities Strategy Consistency	
SCAG Goals	**Compliance**
Mobility: Build and maintain an integrated multimodal transportation network.	
Support investments that are well-maintained and operated, coordinated, resilient and result in improved safety, improved air quality and minimized greenhouse gas emissions	**Consistent:** This measure is to be taken at the regional level. Project implementation would not conflict with the goal. The project would be constructed in accordance with the Title 24 of the California Building Standards Code, Title 20 of the California Code of Regulations, and CALGreen Code standards.
Ensure that reliable, accessible, affordable, and appealing travel options are readily available, while striving to enhance equity in the offerings in high-need communities	**Consistent:** This measure is to be taken at the regional level. Project implementation would not conflict with the goal. The Project will use buses to transport approximately 50 student passengers per trip, minimizing the number of vehicles accessing the site and reducing GHG emissions.
Support planning for people of all ages, abilities, and backgrounds	**Not Applicable:** This is not a project-specific policy and is therefore not applicable.
Communities: Develop, connect, and sustain communities that are livable and thriving	
Create human-centered communities in urban, suburban, and rural settings to increase mobility options and reduce travel distances	**Consistent**: The Project involves the development of a campground in the San Bernardino Mountains, in a rural area near SR-18. The project will use buses to transport students to the camp, reducing VMT.
Produce and preserve diverse housing types in an effort to improve affordability, accessibility, and opportunities for all households	**Not Applicable:** The Project involves development of a campground but does not include permanent housing. Therefore, this goal is not applicable.
Environment: Create a healthy region for the people of today and tomorrow	
Develop communities that are resilient and can mitigate, adapt to, and respond to chronic and acute stresses and disruptions, such as climate change	**Consistent**. The project would be developed in a rural area near SR-18 however the Project will use buses to transport students to the camp, reducing VMT. The project would be constructed in accordance with Title 24 of the California Building Standards Code, Title 20 of the California Code of Regulations, and CALGreen Code standards. In addition, the project would comply with all applicable efficiency requirements. The project thus promotes GHG-reduction strategies by educating students about the benefits of environmental preservation and is well suited to maintaining resiliency against the effects of climate change.
Integrate the region's development pattern and transportation network to improve air quality, reduce greenhouse gas emissions and enable more sustainable use of energy and water	**Consistent**. Although the project does not include transportation improvements, the Project would use buses to transport students to camp, reducing the number of vehicle trips which would reduce GHG and air quality emissions. The reduction of energy use, improvement of air quality, and promotion of more environmentally sustainable development are encouraged through green design techniques for buildings, and other energy-reducing techniques, such as, compliance with the provisions of the California Building Energy Efficiency Standards and the CALGreen Code.
Conserve the region's resources	**Consistent**. This Project is a campground located in the mountain area of San Bernardino County. The Project will promote the conservation of natural lands by educating

Table 4: Regional Transportation Plan/Sustainable Communities Strategy Consistency

SCAG Goals	Compliance
	students about the benefits of environmental preservation.
Economy: Support a sustainable, efficient, and productive regional economic environment that provides opportunities for all people in the region	
Improve access to jobs and educational resources	**Consistent.** The expansion of the campground and development of the site would contribute to regional economic prosperity. Therefore, the project location would improve access to job opportunities and would educate students about conservation.
Advance a resilient and efficient goods movement system that supports the economic vitality of the region, attainment of clean air and quality of life for our communities	**Consistent:** This measure is to be taken at the regional level. Project implementation would not conflict with the goal. As stated above, the project would result in less than significant air quality and health risk impacts.
VMT = vehicle miles traveled; CALGreen = California Green Building Standards; SCAG = Southern California Association of Governments; SCAQMD = South Coast Air Quality Management District; TAC = toxic air contaminant	
Source: Southern California Association of Governments, *Connect SoCal (2024 – 2050 Regional Transportation Plan/Sustainable Communities Strategy*), 2024.	

As presented in Table **4**, the project would be consistent with the stated goals of the 2024 Connect SoCal. Therefore, the project would not result in any significant impacts or interfere with SCAG's ability to achieve the region's GHG emission reduction targets. Impacts would be less than significant, and no mitigation is required.

California Air Resource Board Scoping Plan Consistency

Adopted December 15, 2022, CARB's 2022 Scoping Plan for Achieving Carbon Neutrality (2022 Scoping Plan) sets a path to achieve targets for carbon neutrality and reduce anthropogenic GHG emissions by 85 percent below 1990 levels by 2045 in accordance with AB 1279. To achieve the targets of AB 1279, the 2022 Scoping Plan relies on existing and emerging fossil fuel alternatives and clean technologies, as well as carbon capture and storage. Specifically, the 2022 Scoping Plan focuses on zero-emission transportation; phasing out use of fossil gas use for heating homes and buildings; reducing chemical and refrigerants with high GWP; providing communities with sustainable options for walking, biking, and public transit; displacement of fossil-fuel fired electrical generation through use of renewable energy alternatives (e.g., solar arrays and wind turbines); and scaling up new options such as green hydrogen. The 2022 Scoping Plan sets one of the most aggressive approaches to reach carbon neutrality in the world. Unlike the 2017 Scoping Plan, CARB no longer includes a numeric per capita threshold and instead advocates for compliance with a local GHG reduction strategy (i.e., Climate Action Plan) consistent with CEQA Guidelines Section 15183.5.

The key elements of the 2022 CARB Scoping Plan focus on transportation. Specifically, the 2022 Scoping Plan aims to rapidly move towards zero-emission (ZE) transportation (i.e., electrifying cars, buses, trains, and trucks), which constitutes California's single largest source of GHGs. The regulations that impact the transportation sector are adopted and enforced by CARB on vehicle manufacturers and are outside the jurisdiction and control of local governments. The 2022 Scoping Plan accelerates development of new

regulations as well as amendments to strengthen regulations and programs already in place. Statewide strategies to reduce GHG emissions in the latest 2022 Scoping Plan include:

- Implementing SB 100 (achieve 100 percent clean electricity by 2045);
- Achieving 100 percent zero emission vehicle sales in 2035 through Advanced Clean Cars II; and
- Implementing the Advanced Clean Fleets regulation to deploy zero-emission vehicle (ZEV) buses and trucks.
- Implementing VMT reduction initiatives to achieve a 30 percent VMT reduction below 2019 levels by 2045.

The Scoping Plan notes that efforts to support VMT reduction include coordination across state agencies on affordable housing measures. Fostering more compact, transportation-efficient development in infill areas and increasing transportation choices with the goal of reducing VMT not only reduces demand for transportation fuel but also requires less energy for buildings and helps to conserve natural and working lands that sequester carbon. The multiple and often interwoven actions that reduce VMT both reduce emissions from the transportation sector and support reductions needed in other sectors.

Additional transportation policies include the Off-Road Zero-Emission Targeted Manufacturer rule, Clean Off-Road Fleet Recognition Program, In-use Off-Road Diesel-Fueled Fleets Regulation, Clean Off-Road Fleet Recognition Program, and Amendments to the In-use Off-Road Diesel-Fueled Fleets Regulation. The 2022 Scoping Plan would continue to implement SB 375. GHGs would be further reduced through the Cap-and-Trade Program carbon pricing and SB 905. SB 905 requires CARB to create the Carbon Capture, Removal, Utilization, and Storage Program to evaluate, demonstrate, and regulate carbon dioxide removal projects and technology.
As indicated above, GHG reductions are also achieved as a result of State of California energy and water efficiency requirements for new commercial/retail developments. These efficiency improvements correspond to reductions in secondary GHG emissions. For example, in 2021 approximately 38 percent of the total electricity net generation in California was derived from natural gas combustion. Therefore, energy saving measures, such as Title 24, reduces GHG emissions from the power generation facilities by reducing load demand.

As discussed previously, the County of San Bernardino Greenhouse Gas Reduction Plan has adopted a 3,000 $MTCO_2e$ significance threshold to determine if additional analysis is required. As shown in **Table 3**, the Project would not exceed the threshold and is consistent with the San Bernardino GHG reduction plan. As noted in Scoping Plan Appendix D, consistency with a qualified CAP ensures consistency with the Scoping Plan, therefore the Project is consistent with 2022 Scoping Plan.

The Project would be required to comply with applicable regulatory requirements promulgated through the 2022 Scoping Plan and would not conflict with any applicable actions. As such, the Project would be consistent with the 2022 Scoping Plan.

Mitigation Measures: No mitigation is required.

Level of Significance: Less than significant impact.

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Appendix A

Greenhouse Gas Emissions Data

Hume Campground Detailed Report

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1. Basic Project Information

1.1. Basic Project Information

Data Field	Value
Project Name	Hume Campground
Construction Start Date	6/2/2025
Operational Year	2027
Lead Agency	—
Land Use Scale	Project/site
Analysis Level for Defaults	County
Windspeed (m/s)	2.50
Precipitation (days)	11.2
Location	34.225431095364584, -117.09470743545103
County	San Bernardino-South Coast
City	Unincorporated
Air District	South Coast AQMD
Air Basin	South Coast
TAZ	5153
EDFZ	10
Electric Utility	Southern California Edison
Gas Utility	Southern California Gas
App Version	2022.1.1.20

1.2. Land Use Types

Land Use Subtype	Size	Unit	Lot Acreage	Building Area (sq ft)	Landscape Area (sq ft)	Special Landscape Area (sq ft)	Population	Description

Hotel	48.0	Room	3.14	136,966	0.00	0.00	159	Dorms
Health Club	9.38	1000sqft	0.22	9,375	0.00	0.00	—	Multipurpose Rec/Gym
Place of Worship	4.66	1000sqft	0.11	4,662	0.00	0.00	—	Chapels
General Office Building	21.9	1000sqft	0.50	21,940	0.00	0.00	—	Misc Buildings, restrooms
Other Non-Asphalt Surfaces	106	1000sqft	2.43	0.00	0.00	0.00	—	platforms for seasonal tents
Other Asphalt Surfaces	216	1000sqft	4.95	0.00	0.00	0.00	—	roads
High Turnover (Sit Down Restaurant)	35.3	1000sqft	0.81	35,264	0.00	0.00	—	Kitchen and Dining
Recreational Swimming Pool	0.61	1000sqft	0.01	606	0.00	0.00	—	Pools
Arena	1.15	1000sqft	0.37	1,152	0.00	0.00	—	Outdoor Amphitheater

1.3. User-Selected Emission Reduction Measures by Emissions Sector

Sector	#	Measure Title
Construction	C-5	Use Advanced Engine Tiers

2. Emissions Summary

2.1. Construction Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Un/Mit.	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	18.0	16.2	141	137	0.40	4.74	39.9	44.6	4.39	16.7	21.0	—	53,752	53,752	4.22	5.46	77.6	55,562

Mit.	6.95	7.25	55.9	143	0.40	0.80	39.9	40.7	0.80	16.7	17.5	—	53,752	53,752	4.22	5.46	77.6	55,562
% Reduced	61%	55%	60%	-4%	—	83%	—	9%	82%	—	17%	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	3.12	6.35	20.6	31.7	0.05	0.82	1.84	2.66	0.76	0.44	1.20	—	6,632	6,632	0.32	0.25	0.24	6,715
Mit.	1.20	4.81	7.21	34.0	0.05	0.12	1.84	1.96	0.12	0.44	0.56	—	6,632	6,632	0.32	0.25	0.24	6,715
% Reduced	62%	24%	65%	-7%	—	85%	—	26%	84%	—	53%	—	—	—	—	—	—	—
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	3.48	4.44	26.5	28.7	0.07	0.95	6.49	7.44	0.87	2.72	3.60	—	8,957	8,957	0.63	0.74	5.27	9,198
Mit.	1.24	3.41	9.59	29.9	0.07	0.14	6.49	6.64	0.14	2.72	2.86	—	8,957	8,957	0.63	0.74	5.27	9,198
% Reduced	64%	23%	64%	-4%	—	85%	—	11%	84%	—	20%	—	—	—	—	—	—	—
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.64	0.81	4.84	5.25	0.01	0.17	1.19	1.36	0.16	0.50	0.66	—	1,483	1,483	0.10	0.12	0.87	1,523
Mit.	0.23	0.62	1.75	5.45	0.01	0.03	1.19	1.21	0.03	0.50	0.52	—	1,483	1,483	0.10	0.12	0.87	1,523
% Reduced	64%	23%	64%	-4%	—	85%	—	11%	84%	—	20%	—	—	—	—	—	—	—
Exceeds (Daily Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Threshold	—	75.0	100	550	150	—	—	150	—	—	55.0	—	—	—	—	—	—	—
Unmit.	—	No	Yes	No	No	—	—	No	—	—	No	—	—	—	—	—	—	—
Mit.	—	No	No	No	No	—	—	No	—	—	No	—	—	—	—	—	—	—
Exceeds (Average Daily)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Threshol	—	75.0	100	550	150	—	—	150	—	—	55.0	—	—	—	—	—	—	—
Unmit.	—	No	No	No	No	—	—	No	—	—	No	—	—	—	—	—	—	—
Mit.	—	No	No	No	No	—	—	No	—	—	No	—	—	—	—	—	—	—

2.2. Construction Emissions by Year, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Year	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2025	18.0	16.2	141	137	0.40	4.74	39.9	44.6	4.39	16.7	21.0	—	53,752	53,752	4.22	5.46	77.6	55,562
2026	3.00	6.25	19.4	33.2	0.05	0.74	1.84	2.58	0.68	0.44	1.12	—	6,717	6,717	0.31	0.25	8.34	6,807
2027	2.88	6.15	18.7	32.5	0.05	0.67	1.84	2.51	0.62	0.44	1.06	—	6,665	6,665	0.26	0.24	7.48	6,751
Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2025	3.12	6.35	20.6	31.7	0.05	0.82	1.84	2.66	0.76	0.44	1.20	—	6,632	6,632	0.32	0.25	0.24	6,715
2026	2.97	6.21	19.5	31.1	0.05	0.74	1.84	2.58	0.68	0.44	1.12	—	6,582	6,582	0.26	0.25	0.22	6,664
2027	2.85	6.12	18.8	30.6	0.05	0.67	1.84	2.51	0.62	0.44	1.06	—	6,533	6,533	0.26	0.24	0.19	6,612
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2025	3.48	4.16	26.5	28.7	0.07	0.95	6.49	7.44	0.87	2.72	3.60	—	8,957	8,957	0.63	0.74	5.27	9,198
2026	2.12	4.44	14.0	22.4	0.03	0.53	1.30	1.83	0.49	0.31	0.80	—	4,716	4,716	0.19	0.18	2.57	4,777
2027	1.01	2.17	6.66	10.9	0.02	0.24	0.65	0.88	0.22	0.16	0.37	—	2,321	2,321	0.09	0.09	1.14	2,350
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2025	0.64	0.76	4.84	5.25	0.01	0.17	1.19	1.36	0.16	0.50	0.66	—	1,483	1,483	0.10	0.12	0.87	1,523
2026	0.39	0.81	2.55	4.10	0.01	0.10	0.24	0.33	0.09	0.06	0.15	—	781	781	0.03	0.03	0.43	791
2027	0.18	0.40	1.22	1.99	< 0.005	0.04	0.12	0.16	0.04	0.03	0.07	—	384	384	0.02	0.01	0.19	389

2.3. Construction Emissions by Year, Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Year	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2025	6.95	7.25	55.9	143	0.40	0.80	39.9	40.7	0.80	16.7	17.5	—	53,752	53,752	4.22	5.46	77.6	55,562
2026	1.20	4.81	6.99	35.5	0.05	0.12	1.84	1.96	0.12	0.44	0.56	—	6,717	6,717	0.31	0.25	8.34	6,807
2027	1.17	4.78	6.89	34.9	0.05	0.12	1.84	1.96	0.12	0.44	0.56	—	6,665	6,665	0.26	0.24	7.48	6,751
Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2025	1.20	4.81	7.21	34.0	0.05	0.12	1.84	1.96	0.12	0.44	0.56	—	6,632	6,632	0.32	0.25	0.24	6,715
2026	1.17	4.77	7.09	33.4	0.05	0.12	1.84	1.96	0.12	0.44	0.56	—	6,582	6,582	0.26	0.25	0.22	6,664
2027	1.14	4.75	6.99	32.9	0.05	0.12	1.84	1.96	0.12	0.44	0.56	—	6,533	6,533	0.26	0.24	0.19	6,612
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2025	1.24	2.35	9.59	29.9	0.07	0.14	6.49	6.64	0.14	2.72	2.86	—	8,957	8,957	0.63	0.74	5.27	9,198
2026	0.84	3.41	5.11	24.1	0.03	0.09	1.30	1.39	0.08	0.31	0.40	—	4,716	4,716	0.19	0.18	2.57	4,777
2027	0.40	1.68	2.49	11.8	0.02	0.04	0.65	0.69	0.04	0.16	0.20	—	2,321	2,321	0.09	0.09	1.14	2,350
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2025	0.23	0.43	1.75	5.45	0.01	0.03	1.19	1.21	0.03	0.50	0.52	—	1,483	1,483	0.10	0.12	0.87	1,523
2026	0.15	0.62	0.93	4.40	0.01	0.02	0.24	0.25	0.02	0.06	0.07	—	781	781	0.03	0.03	0.43	791
2027	0.07	0.31	0.46	2.15	< 0.005	0.01	0.12	0.13	0.01	0.03	0.04	—	384	384	0.02	0.01	0.19	389

2.4. Operations Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Un/Mit.	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	2.56	7.24	3.55	21.2	0.04	0.23	2.57	2.79	0.22	0.65	0.87	329	9,817	10,146	33.7	0.25	279	11,340
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.91	5.72	3.55	10.0	0.04	0.21	2.57	2.78	0.21	0.65	0.86	329	9,594	9,923	33.7	0.25	270	11,109
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	2.02	6.74	3.62	16.6	0.04	0.22	2.55	2.77	0.22	0.65	0.86	329	9,648	9,977	33.7	0.25	273	11,168
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.37	1.23	0.66	3.04	0.01	0.04	0.47	0.51	0.04	0.12	0.16	54.5	1,597	1,652	5.58	0.04	45.3	1,849
Exceeds (Daily Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Threshold	—	55.0	55.0	550	150	—	—	150	—	—	55.0	—	—	—	—	—	—	—
Unmit.	—	No	No	No	No	—	—	No	—	—	No	—	—	—	—	—	—	—
Exceeds (Average Daily)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Threshold	—	55.0	55.0	550	150	—	—	150	—	—	55.0	—	—	—	—	—	—	—
Unmit.	—	No	No	No	No	—	—	No	—	—	No	—	—	—	—	—	—	—

2.5. Operations Emissions by Sector, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Sector	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.66	0.55	0.96	10.0	0.03	0.02	2.57	2.58	0.02	0.65	0.67	—	2,918	2,918	0.10	0.12	9.19	2,964
Area	1.62	6.56	0.08	9.11	< 0.005	0.02	—	0.02	0.01	—	0.01	—	37.4	37.4	< 0.005	< 0.005	—	37.6
Energy	0.28	0.14	2.52	2.12	0.02	0.19	—	0.19	0.19	—	0.19	—	6,751	6,751	0.62	0.05	—	6,781
Water	—	—	—	—	—	—	—	—	—	—	—	32.7	110	143	3.36	0.08	—	251
Waste	—	—	—	—	—	—	—	—	—	—	—	296	0.00	296	29.6	0.00	—	1,037
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	269	269
Total	2.56	7.24	3.55	21.2	0.04	0.23	2.57	2.79	0.22	0.65	0.87	329	9,817	10,146	33.7	0.25	279	11,340
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.63	0.52	1.03	7.93	0.03	0.02	2.57	2.58	0.02	0.65	0.67	—	2,733	2,733	0.10	0.12	0.24	2,771
Area	—	5.06	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Energy	0.28	0.14	2.52	2.12	0.02	0.19	—	0.19	0.19	—	0.19	—	6,751	6,751	0.62	0.05	—	6,781
Water	—	—	—	—	—	—	—	—	—	—	—	32.7	110	143	3.36	0.08	—	251
Waste	—	—	—	—	—	—	—	—	—	—	—	296	0.00	296	29.6	0.00	—	1,037
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	269	269
Total	0.91	5.72	3.55	10.0	0.04	0.21	2.57	2.78	0.21	0.65	0.86	329	9,594	9,923	33.7	0.25	270	11,109
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.63	0.52	1.05	8.28	0.03	0.02	2.55	2.57	0.02	0.65	0.66	—	2,762	2,762	0.10	0.12	3.97	2,804
Area	1.11	6.09	0.05	6.24	< 0.005	0.01	—	0.01	0.01	—	0.01	—	25.6	25.6	< 0.005	< 0.005	—	25.7
Energy	0.28	0.14	2.52	2.12	0.02	0.19	—	0.19	0.19	—	0.19	—	6,751	6,751	0.62	0.05	—	6,781
Water	—	—	—	—	—	—	—	—	—	—	—	32.7	110	143	3.36	0.08	—	251
Waste	—	—	—	—	—	—	—	—	—	—	—	296	0.00	296	29.6	0.00	—	1,037
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	269	269
Total	2.02	6.74	3.62	16.6	0.04	0.22	2.55	2.77	0.22	0.65	0.86	329	9,648	9,977	33.7	0.25	273	11,168

Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.12	0.09	0.19	1.51	< 0.005	< 0.005	0.47	0.47	< 0.005	0.12	0.12	—	457	457	0.02	0.02	0.66	464
Area	0.20	1.11	0.01	1.14	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	4.25	4.25	< 0.005	< 0.005	—	4.26
Energy	0.05	0.03	0.46	0.39	< 0.005	0.03	—	0.03	0.03	—	0.03	—	1,118	1,118	0.10	0.01	—	1,123
Water	—	—	—	—	—	—	—	—	—	—	—	5.41	18.2	23.6	0.56	0.01	—	41.5
Waste	—	—	—	—	—	—	—	—	—	—	—	49.1	0.00	49.1	4.90	0.00	—	172
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	44.6	44.6
Total	0.37	1.23	0.66	3.04	0.01	0.04	0.47	0.51	0.04	0.12	0.16	54.5	1,597	1,652	5.58	0.04	45.3	1,849

2.6. Operations Emissions by Sector, Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Sector	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.66	0.55	0.96	10.0	0.03	0.02	2.57	2.58	0.02	0.65	0.67	—	2,918	2,918	0.10	0.12	9.19	2,964
Area	1.62	6.56	0.08	9.11	< 0.005	0.02	—	0.02	0.01	—	0.01	—	37.4	37.4	< 0.005	< 0.005	—	37.6
Energy	0.28	0.14	2.52	2.12	0.02	0.19	—	0.19	0.19	—	0.19	—	6,751	6,751	0.62	0.05	—	6,781
Water	—	—	—	—	—	—	—	—	—	—	—	32.7	110	143	3.36	0.08	—	251
Waste	—	—	—	—	—	—	—	—	—	—	—	296	0.00	296	29.6	0.00	—	1,037
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	269	269
Total	2.56	7.24	3.55	21.2	0.04	0.23	2.57	2.79	0.22	0.65	0.87	329	9,817	10,146	33.7	0.25	279	11,340
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.63	0.52	1.03	7.93	0.03	0.02	2.57	2.58	0.02	0.65	0.67	—	2,733	2,733	0.10	0.12	0.24	2,771
Area	—	5.06	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Energy	0.28	0.14	2.52	2.12	0.02	0.19	—	0.19	0.19	—	0.19	—	6,751	6,751	0.62	0.05	—	6,781
Water	—	—	—	—	—	—	—	—	—	—	—	32.7	110	143	3.36	0.08	—	251

Waste	—	—	—	—	—	—	—	—	—	—	—	296	0.00	296	29.6	0.00	—	1,037
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	269	269
Total	0.91	5.72	3.55	10.0	0.04	0.21	2.57	2.78	0.21	0.65	0.86	329	9,594	9,923	33.7	0.25	270	11,109
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.63	0.52	1.05	8.28	0.03	0.02	2.55	2.57	0.02	0.65	0.66	—	2,762	2,762	0.10	0.12	3.97	2,804
Area	1.11	6.09	0.05	6.24	< 0.005	0.01	—	0.01	0.01	—	0.01	—	25.6	25.6	< 0.005	< 0.005	—	25.7
Energy	0.28	0.14	2.52	2.12	0.02	0.19	—	0.19	0.19	—	0.19	—	6,751	6,751	0.62	0.05	—	6,781
Water	—	—	—	—	—	—	—	—	—	—	—	32.7	110	143	3.36	0.08	—	251
Waste	—	—	—	—	—	—	—	—	—	—	—	296	0.00	296	29.6	0.00	—	1,037
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	269	269
Total	2.02	6.74	3.62	16.6	0.04	0.22	2.55	2.77	0.22	0.65	0.86	329	9,648	9,977	33.7	0.25	273	11,168
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.12	0.09	0.19	1.51	< 0.005	< 0.005	0.47	0.47	< 0.005	0.12	0.12	—	457	457	0.02	0.02	0.66	464
Area	0.20	1.11	0.01	1.14	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	4.25	4.25	< 0.005	< 0.005	—	4.26
Energy	0.05	0.03	0.46	0.39	< 0.005	0.03	—	0.03	0.03	—	0.03	—	1,118	1,118	0.10	0.01	—	1,123
Water	—	—	—	—	—	—	—	—	—	—	—	5.41	18.2	23.6	0.56	0.01	—	41.5
Waste	—	—	—	—	—	—	—	—	—	—	—	49.1	0.00	49.1	4.90	0.00	—	172
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	44.6	44.6
Total	0.37	1.23	0.66	3.04	0.01	0.04	0.47	0.51	0.04	0.12	0.16	54.5	1,597	1,652	5.58	0.04	45.3	1,849

3. Construction Emissions Details

3.1. Demolition (2025) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	2.86	2.40	22.2	19.9	0.03	0.92	—	0.92	0.84	—	0.84	—	3,425	3,425	0.14	0.03	—	3,437
Demolition	—	—	—	—	—	—	0.00	0.00	—	0.00	0.00	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.51	0.43	3.95	3.55	0.01	0.16	—	0.16	0.15	—	0.15	—	610	610	0.02	< 0.005	—	612
Demolition	—	—	—	—	—	—	0.00	0.00	—	0.00	0.00	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.09	0.08	0.72	0.65	< 0.005	0.03	—	0.03	0.03	—	0.03	—	101	101	< 0.005	< 0.005	—	101
Demolition	—	—	—	—	—	—	0.00	0.00	—	0.00	0.00	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.08	0.07	0.07	1.17	0.00	0.00	0.20	0.20	0.00	0.05	0.05	—	211	211	0.01	0.01	0.78	215
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.17	0.00	0.00	0.03	0.03	0.00	0.01	0.01	—	35.0	35.0	< 0.005	< 0.005	0.06	35.5
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.03	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	5.79	5.79	< 0.005	< 0.005	0.01	5.88
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.2. Demolition (2025) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.36	0.36	4.51	18.2	0.03	0.06	—	0.06	0.06	—	0.06	—	3,425	3,425	0.14	0.03	—	3,437
Demolition	—	—	—	—	—	—	0.00	0.00	—	0.00	0.00	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.06	0.06	0.80	3.24	0.01	0.01	—	0.01	0.01	—	0.01	—	610	610	0.02	< 0.005	—	612
Demolition	—	—	—	—	—	—	0.00	0.00	—	0.00	0.00	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.01	0.15	0.59	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	101	101	< 0.005	< 0.005	—	101
Demolition	—	—	—	—	—	—	0.00	0.00	—	0.00	0.00	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.08	0.07	0.07	1.17	0.00	0.00	0.20	0.20	0.00	0.05	0.05	—	211	211	0.01	0.01	0.78	215
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.17	0.00	0.00	0.03	0.03	0.00	0.01	0.01	—	35.0	35.0	< 0.005	< 0.005	0.06	35.5
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.03	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	5.79	5.79	< 0.005	< 0.005	0.01	5.88

Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.3. Site Preparation (2025) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	3.94	3.31	31.6	30.2	0.05	1.37	—	1.37	1.26	—	1.26	—	5,295	5,295	0.21	0.04	—	5,314
Dust From Material Movement	—	—	—	—	—	—	19.7	19.7	—	10.1	10.1	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.70	0.59	5.63	5.37	0.01	0.24	—	0.24	0.22	—	0.22	—	943	943	0.04	0.01	—	946
Dust From Material Movement	—	—	—	—	—	—	3.50	3.50	—	1.80	1.80	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	0.13	0.11	1.03	0.98	< 0.005	0.04	—	0.04	0.04	—	0.04	—	156	156	0.01	< 0.005	—	157
Dust From Material Movement	—	—	—	—	—	—	0.64	0.64	—	0.33	0.33	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.09	0.08	0.08	1.36	0.00	0.00	0.23	0.23	0.00	0.05	0.05	—	247	247	0.01	0.01	0.91	250
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.02	0.19	0.00	0.00	0.04	0.04	0.00	0.01	0.01	—	40.8	40.8	< 0.005	< 0.005	0.07	41.4
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.04	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	6.76	6.76	< 0.005	< 0.005	0.01	6.86
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.4. Site Preparation (2025) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e

Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.50	0.50	2.59	28.3	0.05	0.10	—	0.10	0.10	—	0.10	—	5,295	5,295	0.21	0.04	—	5,314
Dust From Material Movement	—	—	—	—	—	—	19.7	19.7	—	10.1	10.1	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.09	0.09	0.46	5.04	0.01	0.02	—	0.02	0.02	—	0.02	—	943	943	0.04	0.01	—	946
Dust From Material Movement	—	—	—	—	—	—	3.50	3.50	—	1.80	1.80	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.02	0.08	0.92	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	156	156	0.01	< 0.005	—	157
Dust From Material Movement	—	—	—	—	—	—	0.64	0.64	—	0.33	0.33	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.09	0.08	0.08	1.36	0.00	0.00	0.23	0.23	0.00	0.05	0.05	—	247	247	0.01	0.01	0.91	250
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.02	0.19	0.00	0.00	0.04	0.04	0.00	0.01	0.01	—	40.8	40.8	< 0.005	< 0.005	0.07	41.4
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.04	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	6.76	6.76	< 0.005	< 0.005	0.01	6.86
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.5. Grading (2025) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	3.80	3.20	29.7	28.3	0.06	1.23	—	1.23	1.14	—	1.14	—	6,599	6,599	0.27	0.05	—	6,622

Dust From Material Movement	—	—	—	—	—	—	9.39	9.39	—	3.68	3.68	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.46	0.39	3.58	3.41	0.01	0.15	—	0.15	0.14	—	0.14	—	795	795	0.03	0.01	—	798
Dust From Material Movement	—	—	—	—	—	—	1.13	1.13	—	0.44	0.44	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.08	0.07	0.65	0.62	< 0.005	0.03	—	0.03	0.02	—	0.02	—	132	132	0.01	< 0.005	—	132
Dust From Material Movement	—	—	—	—	—	—	0.21	0.21	—	0.08	0.08	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.10	0.09	0.09	1.56	0.00	0.00	0.26	0.26	0.00	0.06	0.06	—	282	282	0.01	0.01	1.05	286
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	3.94	0.66	37.1	20.8	0.21	0.39	8.29	8.69	0.39	2.27	2.66	—	30,923	30,923	3.25	5.06	65.7	32,577

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.15	0.00	0.00	0.03	0.03	0.00	0.01	0.01	—	31.6	31.6	< 0.005	< 0.005	0.05	32.0
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.47	0.08	4.72	2.52	0.02	0.05	0.99	1.04	0.05	0.27	0.32	—	3,728	3,728	0.39	0.61	3.43	3,924
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.03	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	5.23	5.23	< 0.005	< 0.005	0.01	5.30
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.09	0.01	0.86	0.46	< 0.005	0.01	0.18	0.19	0.01	0.05	0.06	—	617	617	0.06	0.10	0.57	650

3.6. Grading (2025) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.64	0.64	4.43	35.3	0.06	0.12	—	0.12	0.12	—	0.12	—	6,599	6,599	0.27	0.05	—	6,622
Dust From Material Movement	—	—	—	—	—	—	9.39	9.39	—	3.68	3.68	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.08	0.08	0.53	4.26	0.01	0.01	—	0.01	0.01	—	0.01	—	795	795	0.03	0.01	—	798
Dust From Material Movement	—	—	—	—	—	—	1.13	1.13	—	0.44	0.44	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.01	0.10	0.78	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	132	132	0.01	< 0.005	—	132
Dust From Material Movement	—	—	—	—	—	—	0.21	0.21	—	0.08	0.08	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.10	0.09	0.09	1.56	0.00	0.00	0.26	0.26	0.00	0.06	0.06	—	282	282	0.01	0.01	1.05	286
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	3.94	0.66	37.1	20.8	0.21	0.39	8.29	8.69	0.39	2.27	2.66	—	30,923	30,923	3.25	5.06	65.7	32,577
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.15	0.00	0.00	0.03	0.03	0.00	0.01	0.01	—	31.6	31.6	< 0.005	< 0.005	0.05	32.0
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Hauling	0.47	0.08	4.72	2.52	0.02	0.05	0.99	1.04	0.05	0.27	0.32	—	3,728	3,728	0.39	0.61	3.43	3,924
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.03	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	5.23	5.23	< 0.005	< 0.005	0.01	5.30
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.09	0.01	0.86	0.46	< 0.005	0.01	0.18	0.19	0.01	0.05	0.06	—	617	617	0.06	0.10	0.57	650

3.7. Building Construction (2025) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.35	1.13	10.4	13.0	0.02	0.43	—	0.43	0.40	—	0.40	—	2,398	2,398	0.10	0.02	—	2,406
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.35	1.13	10.4	13.0	0.02	0.43	—	0.43	0.40	—	0.40	—	2,398	2,398	0.10	0.02	—	2,406
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.56	0.47	4.35	5.44	0.01	0.18	—	0.18	0.17	—	0.17	—	999	999	0.04	0.01	—	1,003
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	0.10	0.09	0.79	0.99	< 0.005	0.03	—	0.03	0.03	—	0.03	—	165	165	0.01	< 0.005	—	166
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.44	0.39	0.38	6.70	0.00	0.00	1.12	1.12	0.00	0.26	0.26	—	1,212	1,212	0.05	0.04	4.49	1,230
Vendor	0.11	0.03	1.18	0.64	0.01	0.02	0.29	0.31	0.02	0.08	0.10	—	1,062	1,062	0.08	0.16	2.99	1,115
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.41	0.37	0.42	5.05	0.00	0.00	1.12	1.12	0.00	0.26	0.26	—	1,111	1,111	0.05	0.04	0.12	1,125
Vendor	0.10	0.03	1.23	0.64	0.01	0.02	0.29	0.31	0.02	0.08	0.10	—	1,062	1,062	0.08	0.16	0.08	1,112
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.17	0.15	0.19	2.22	0.00	0.00	0.47	0.47	0.00	0.11	0.11	—	470	470	0.02	0.02	0.81	476
Vendor	0.04	0.01	0.52	0.26	< 0.005	0.01	0.12	0.13	0.01	0.03	0.04	—	443	443	0.03	0.07	0.54	464
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.03	0.03	0.03	0.41	0.00	0.00	0.08	0.08	0.00	0.02	0.02	—	77.7	77.7	< 0.005	< 0.005	0.13	78.8
Vendor	0.01	< 0.005	0.09	0.05	< 0.005	< 0.005	0.02	0.02	< 0.005	0.01	0.01	—	73.3	73.3	0.01	0.01	0.09	76.8
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.8. Building Construction (2025) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e

Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.35	0.33	2.82	14.8	0.02	0.08	—	0.08	0.07	—	0.07	—	2,398	2,398	0.10	0.02	—	2,406
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.35	0.33	2.82	14.8	0.02	0.08	—	0.08	0.07	—	0.07	—	2,398	2,398	0.10	0.02	—	2,406
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.15	0.14	1.18	6.18	0.01	0.03	—	0.03	0.03	—	0.03	—	999	999	0.04	0.01	—	1,003
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.03	0.03	0.21	1.13	< 0.005	0.01	—	0.01	0.01	—	0.01	—	165	165	0.01	< 0.005	—	166
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.44	0.39	0.38	6.70	0.00	0.00	1.12	1.12	0.00	0.26	0.26	—	1,212	1,212	0.05	0.04	4.49	1,230
Vendor	0.11	0.03	1.18	0.64	0.01	0.02	0.29	0.31	0.02	0.08	0.10	—	1,062	1,062	0.08	0.16	2.99	1,115
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.41	0.37	0.42	5.05	0.00	0.00	1.12	1.12	0.00	0.26	0.26	—	1,111	1,111	0.05	0.04	0.12	1,125
Vendor	0.10	0.03	1.23	0.64	0.01	0.02	0.29	0.31	0.02	0.08	0.10	—	1,062	1,062	0.08	0.16	0.08	1,112
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.17	0.15	0.19	2.22	0.00	0.00	0.47	0.47	0.00	0.11	0.11	—	470	470	0.02	0.02	0.81	476
Vendor	0.04	0.01	0.52	0.26	< 0.005	0.01	0.12	0.13	0.01	0.03	0.04	—	443	443	0.03	0.07	0.54	464
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.03	0.03	0.03	0.41	0.00	0.00	0.08	0.08	0.00	0.02	0.02	—	77.7	77.7	< 0.005	< 0.005	0.13	78.8
Vendor	0.01	< 0.005	0.09	0.05	< 0.005	< 0.005	0.02	0.02	< 0.005	0.01	0.01	—	73.3	73.3	0.01	0.01	0.09	76.8
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.9. Building Construction (2026) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.28	1.07	9.85	13.0	0.02	0.38	—	0.38	0.35	—	0.35	—	2,397	2,397	0.10	0.02	—	2,405
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	1.28	1.07	9.85	13.0	0.02	0.38	—	0.38	0.35	—	0.35	—	2,397	2,397	0.10	0.02	—	2,405
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.91	0.77	7.04	9.26	0.02	0.27	—	0.27	0.25	—	0.25	—	1,712	1,712	0.07	0.01	—	1,718
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.17	0.14	1.28	1.69	< 0.005	0.05	—	0.05	0.05	—	0.05	—	283	283	0.01	< 0.005	—	284
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.41	0.37	0.34	6.19	0.00	0.00	1.12	1.12	0.00	0.26	0.26	—	1,187	1,187	0.05	0.04	4.06	1,204
Vendor	0.10	0.02	1.13	0.61	0.01	0.02	0.29	0.31	0.02	0.08	0.10	—	1,044	1,044	0.07	0.16	2.76	1,096
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.39	0.35	0.38	4.68	0.00	0.00	1.12	1.12	0.00	0.26	0.26	—	1,088	1,088	0.02	0.04	0.11	1,102
Vendor	0.10	0.02	1.17	0.62	0.01	0.02	0.29	0.31	0.02	0.08	0.10	—	1,044	1,044	0.07	0.16	0.07	1,094
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.28	0.25	0.30	3.51	0.00	0.00	0.80	0.80	0.00	0.19	0.19	—	788	788	0.01	0.03	1.25	799
Vendor	0.07	0.01	0.84	0.44	0.01	0.01	0.21	0.22	0.01	0.06	0.07	—	746	746	0.05	0.11	0.85	782

Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.05	0.05	0.05	0.64	0.00	0.00	0.15	0.15	0.00	0.03	0.03	—	131	131	< 0.005	0.01	0.21	132
Vendor	0.01	< 0.005	0.15	0.08	< 0.005	< 0.005	0.04	0.04	< 0.005	0.01	0.01	—	123	123	0.01	0.02	0.14	130
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.10. Building Construction (2026) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.35	0.33	2.82	14.8	0.02	0.07	—	0.07	0.07	—	0.07	—	2,397	2,397	0.10	0.02	—	2,405
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.35	0.33	2.82	14.8	0.02	0.07	—	0.07	0.07	—	0.07	—	2,397	2,397	0.10	0.02	—	2,405
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.25	0.23	2.01	10.6	0.02	0.05	—	0.05	0.05	—	0.05	—	1,712	1,712	0.07	0.01	—	1,718
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	0.05	0.04	0.37	1.93	< 0.005	0.01	—	0.01	0.01	—	0.01	—	283	283	0.01	< 0.005	—	284
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.41	0.37	0.34	6.19	0.00	0.00	1.12	1.12	0.00	0.26	0.26	—	1,187	1,187	0.05	0.04	4.06	1,204
Vendor	0.10	0.02	1.13	0.61	0.01	0.02	0.29	0.31	0.02	0.08	0.10	—	1,044	1,044	0.07	0.16	2.76	1,096
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.39	0.35	0.38	4.68	0.00	0.00	1.12	1.12	0.00	0.26	0.26	—	1,088	1,088	0.02	0.04	0.11	1,102
Vendor	0.10	0.02	1.17	0.62	0.01	0.02	0.29	0.31	0.02	0.08	0.10	—	1,044	1,044	0.07	0.16	0.07	1,094
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.28	0.25	0.30	3.51	0.00	0.00	0.80	0.80	0.00	0.19	0.19	—	788	788	0.01	0.03	1.25	799
Vendor	0.07	0.01	0.84	0.44	0.01	0.01	0.21	0.22	0.01	0.06	0.07	—	746	746	0.05	0.11	0.85	782
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.05	0.05	0.05	0.64	0.00	0.00	0.15	0.15	0.00	0.03	0.03	—	131	131	< 0.005	0.01	0.21	132
Vendor	0.01	< 0.005	0.15	0.08	< 0.005	< 0.005	0.04	0.04	< 0.005	0.01	0.01	—	123	123	0.01	0.02	0.14	130
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.11. Building Construction (2027) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e

Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.23	1.03	9.39	12.9	0.02	0.34	—	0.34	0.31	—	0.31	—	2,397	2,397	0.10	0.02	—	2,405
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.23	1.03	9.39	12.9	0.02	0.34	—	0.34	0.31	—	0.31	—	2,397	2,397	0.10	0.02	—	2,405
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.44	0.36	3.33	4.58	0.01	0.12	—	0.12	0.11	—	0.11	—	849	849	0.03	0.01	—	852
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.08	0.07	0.61	0.84	< 0.005	0.02	—	0.02	0.02	—	0.02	—	141	141	0.01	< 0.005	—	141
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.40	0.35	0.30	5.76	0.00	0.00	1.12	1.12	0.00	0.26	0.26	—	1,163	1,163	0.01	0.04	3.66	1,179
Vendor	0.10	0.02	1.08	0.59	0.01	0.02	0.29	0.31	0.02	0.08	0.10	—	1,024	1,024	0.07	0.15	2.46	1,074
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.37	0.33	0.34	4.34	0.00	0.00	1.12	1.12	0.00	0.26	0.26	—	1,067	1,067	0.02	0.04	0.09	1,079
Vendor	0.09	0.02	1.13	0.59	0.01	0.02	0.29	0.31	0.02	0.08	0.10	—	1,025	1,025	0.07	0.15	0.06	1,072
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.13	0.12	0.13	1.61	0.00	0.00	0.40	0.40	0.00	0.09	0.09	—	383	383	0.01	0.01	0.56	388
Vendor	0.03	0.01	0.40	0.21	< 0.005	0.01	0.10	0.11	0.01	0.03	0.03	—	363	363	0.03	0.05	0.38	380
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02	0.02	0.02	0.29	0.00	0.00	0.07	0.07	0.00	0.02	0.02	—	63.4	63.4	< 0.005	< 0.005	0.09	64.3
Vendor	0.01	< 0.005	0.07	0.04	< 0.005	< 0.005	0.02	0.02	< 0.005	0.01	0.01	—	60.1	60.1	< 0.005	0.01	0.06	62.9
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.12. Building Construction (2027) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.35	0.33	2.82	14.8	0.02	0.07	—	0.07	0.07	—	0.07	—	2,397	2,397	0.10	0.02	—	2,405
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	0.35	0.33	2.82	14.8	0.02	0.07	—	0.07	0.07	—	0.07	—	2,397	2,397	0.10	0.02	—	2,405
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.12	0.12	1.00	5.25	0.01	0.03	—	0.03	0.03	—	0.03	—	849	849	0.03	0.01	—	852
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.02	0.18	0.96	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	141	141	0.01	< 0.005	—	141
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.40	0.35	0.30	5.76	0.00	0.00	1.12	1.12	0.00	0.26	0.26	—	1,163	1,163	0.01	0.04	3.66	1,179
Vendor	0.10	0.02	1.08	0.59	0.01	0.02	0.29	0.31	0.02	0.08	0.10	—	1,024	1,024	0.07	0.15	2.46	1,074
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.37	0.33	0.34	4.34	0.00	0.00	1.12	1.12	0.00	0.26	0.26	—	1,067	1,067	0.02	0.04	0.09	1,079
Vendor	0.09	0.02	1.13	0.59	0.01	0.02	0.29	0.31	0.02	0.08	0.10	—	1,025	1,025	0.07	0.15	0.06	1,072
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.13	0.12	0.13	1.61	0.00	0.00	0.40	0.40	0.00	0.09	0.09	—	383	383	0.01	0.01	0.56	388
Vendor	0.03	0.01	0.40	0.21	< 0.005	0.01	0.10	0.11	0.01	0.03	0.03	—	363	363	0.03	0.05	0.38	380

Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02	0.02	0.02	0.29	0.00	0.00	0.07	0.07	0.00	0.02	0.02	—	63.4	63.4	< 0.005	< 0.005	0.09	64.3
Vendor	0.01	< 0.005	0.07	0.04	< 0.005	< 0.005	0.02	0.02	< 0.005	0.01	0.01	—	60.1	60.1	< 0.005	0.01	0.06	62.9
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.13. Paving (2025) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.95	0.80	7.45	9.98	0.01	0.35	—	0.35	0.32	—	0.32	—	1,511	1,511	0.06	0.01	—	1,517
Paving	—	0.02	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.95	0.80	7.45	9.98	0.01	0.35	—	0.35	0.32	—	0.32	—	1,511	1,511	0.06	0.01	—	1,517
Paving	—	0.02	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.40	0.33	3.11	4.16	0.01	0.15	—	0.15	0.13	—	0.13	—	630	630	0.03	0.01	—	632
Paving	—	0.01	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.07	0.06	0.57	0.76	< 0.005	0.03	—	0.03	0.02	—	0.02	—	104	104	< 0.005	< 0.005	—	105
Paving	—	< 0.005	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.08	0.07	0.07	1.17	0.00	0.00	0.20	0.20	0.00	0.05	0.05	—	211	211	0.01	0.01	0.78	215
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07	0.06	0.07	0.88	0.00	0.00	0.20	0.20	0.00	0.05	0.05	—	194	194	0.01	0.01	0.02	196
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.03	0.03	0.03	0.39	0.00	0.00	0.08	0.08	0.00	0.02	0.02	—	81.9	81.9	< 0.005	< 0.005	0.14	83.1
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	< 0.005	0.01	0.07	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	13.6	13.6	< 0.005	< 0.005	0.02	13.8
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.14. Paving (2025) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.16	0.16	1.93	10.6	0.01	0.03	—	0.03	0.03	—	0.03	—	1,511	1,511	0.06	0.01	—	1,517
Paving	—	0.02	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.16	0.16	1.93	10.6	0.01	0.03	—	0.03	0.03	—	0.03	—	1,511	1,511	0.06	0.01	—	1,517
Paving	—	0.02	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.07	0.07	0.81	4.42	0.01	0.01	—	0.01	0.01	—	0.01	—	630	630	0.03	0.01	—	632
Paving	—	0.01	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.01	0.15	0.81	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	104	104	< 0.005	< 0.005	—	105
Paving	—	< 0.005	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.08	0.07	0.07	1.17	0.00	0.00	0.20	0.20	0.00	0.05	0.05	—	211	211	0.01	0.01	0.78	215
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07	0.06	0.07	0.88	0.00	0.00	0.20	0.20	0.00	0.05	0.05	—	194	194	0.01	0.01	0.02	196
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.03	0.03	0.03	0.39	0.00	0.00	0.08	0.08	0.00	0.02	0.02	—	81.9	81.9	< 0.005	< 0.005	0.14	83.1
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	< 0.005	0.01	0.07	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	13.6	13.6	< 0.005	< 0.005	0.02	13.8
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.15. Paving (2026) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.91	0.76	7.12	9.94	0.01	0.32	—	0.32	0.29	—	0.29	—	1,511	1,511	0.06	0.01	—	1,516
Paving	—	0.02	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.91	0.76	7.12	9.94	0.01	0.32	—	0.32	0.29	—	0.29	—	1,511	1,511	0.06	0.01	—	1,516
Paving	—	0.02	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.65	0.54	5.08	7.10	0.01	0.23	—	0.23	0.21	—	0.21	—	1,079	1,079	0.04	0.01	—	1,083
Paving	—	0.02	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.12	0.10	0.93	1.30	< 0.005	0.04	—	0.04	0.04	—	0.04	—	179	179	0.01	< 0.005	—	179
Paving	—	< 0.005	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Worker	0.07	0.06	0.06	1.08	0.00	0.00	0.20	0.20	0.00	0.05	0.05	—	207	207	0.01	0.01	0.71	210
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07	0.06	0.07	0.82	0.00	0.00	0.20	0.20	0.00	0.05	0.05	—	190	190	< 0.005	0.01	0.02	192
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.05	0.04	0.05	0.61	0.00	0.00	0.14	0.14	0.00	0.03	0.03	—	138	138	< 0.005	0.01	0.22	139
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.11	0.00	0.00	0.03	0.03	0.00	0.01	0.01	—	22.8	22.8	< 0.005	< 0.005	0.04	23.1
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.16. Paving (2026) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.16	0.16	1.93	10.6	0.01	0.03	—	0.03	0.03	—	0.03	—	1,511	1,511	0.06	0.01	—	1,516
Paving	—	0.02	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.16	0.16	1.93	10.6	0.01	0.03	—	0.03	0.03	—	0.03	—	1,511	1,511	0.06	0.01	—	1,516
Paving	—	0.02	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.11	0.11	1.38	7.57	0.01	0.02	—	0.02	0.02	—	0.02	—	1,079	1,079	0.04	0.01	—	1,083
Paving	—	0.02	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.02	0.25	1.38	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	179	179	0.01	< 0.005	—	179
Paving	—	< 0.005	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07	0.06	0.06	1.08	0.00	0.00	0.20	0.20	0.00	0.05	0.05	—	207	207	0.01	0.01	0.71	210
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Worker	0.07	0.06	0.07	0.82	0.00	0.00	0.20	0.20	0.00	0.05	0.05	—	190	190	< 0.005	0.01	0.02	192
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.05	0.04	0.05	0.61	0.00	0.00	0.14	0.14	0.00	0.03	0.03	—	138	138	< 0.005	0.01	0.22	139
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.11	0.00	0.00	0.03	0.03	0.00	0.01	0.01	—	22.8	22.8	< 0.005	< 0.005	0.04	23.1
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.17. Paving (2027) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.88	0.74	6.94	9.95	0.01	0.30	—	0.30	0.27	—	0.27	—	1,511	1,511	0.06	0.01	—	1,516
Paving	—	0.02	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.88	0.74	6.94	9.95	0.01	0.30	—	0.30	0.27	—	0.27	—	1,511	1,511	0.06	0.01	—	1,516

Paving	—	0.02	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.31	0.26	2.46	3.53	< 0.005	0.11	—	0.11	0.10	—	0.10	—	535	535	0.02	< 0.005	—	537
Paving	—	0.01	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.06	0.05	0.45	0.64	< 0.005	0.02	—	0.02	0.02	—	0.02	—	88.6	88.6	< 0.005	< 0.005	—	88.9
Paving	—	< 0.005	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07	0.06	0.05	1.01	0.00	0.00	0.20	0.20	0.00	0.05	0.05	—	203	203	< 0.005	0.01	0.64	206
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07	0.06	0.06	0.76	0.00	0.00	0.20	0.20	0.00	0.05	0.05	—	186	186	< 0.005	0.01	0.02	188
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02	0.02	0.02	0.28	0.00	0.00	0.07	0.07	0.00	0.02	0.02	—	66.8	66.8	< 0.005	< 0.005	0.10	67.7

Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.05	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	11.1	11.1	< 0.005	< 0.005	0.02	11.2
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.18. Paving (2027) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.16	0.16	1.93	10.6	0.01	0.03	—	0.03	0.03	—	0.03	—	1,511	1,511	0.06	0.01	—	1,516
Paving	—	0.02	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.16	0.16	1.93	10.6	0.01	0.03	—	0.03	0.03	—	0.03	—	1,511	1,511	0.06	0.01	—	1,516
Paving	—	0.02	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.06	0.06	0.68	3.75	< 0.005	0.01	—	0.01	0.01	—	0.01	—	535	535	0.02	< 0.005	—	537

Paving	—	0.01	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.01	0.12	0.69	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	88.6	88.6	< 0.005	< 0.005	—	88.9
Paving	—	< 0.005	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07	0.06	0.05	1.01	0.00	0.00	0.20	0.20	0.00	0.05	0.05	—	203	203	< 0.005	0.01	0.64	206
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07	0.06	0.06	0.76	0.00	0.00	0.20	0.20	0.00	0.05	0.05	—	186	186	< 0.005	0.01	0.02	188
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02	0.02	0.02	0.28	0.00	0.00	0.07	0.07	0.00	0.02	0.02	—	66.8	66.8	< 0.005	< 0.005	0.10	67.7
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.05	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	11.1	11.1	< 0.005	< 0.005	0.02	11.2
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.19. Architectural Coating (2025) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.15	0.13	0.88	1.14	< 0.005	0.03	—	0.03	0.03	—	0.03	—	134	134	0.01	< 0.005	—	134
Architectural Coatings	—	3.74	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.15	0.13	0.88	1.14	< 0.005	0.03	—	0.03	0.03	—	0.03	—	134	134	0.01	< 0.005	—	134
Architectural Coatings	—	3.74	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.06	0.05	0.37	0.48	< 0.005	0.01	—	0.01	0.01	—	0.01	—	55.7	55.7	< 0.005	< 0.005	—	55.8
Architectural Coatings	—	1.56	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.01	0.07	0.09	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	9.21	9.21	< 0.005	< 0.005	—	9.25
Architectural Coatings	—	0.28	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.09	0.08	0.08	1.34	0.00	0.00	0.22	0.22	0.00	0.05	0.05	—	242	242	0.01	0.01	0.90	246
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.08	0.07	0.08	1.01	0.00	0.00	0.22	0.22	0.00	0.05	0.05	—	222	222	0.01	0.01	0.02	225
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.03	0.03	0.04	0.44	0.00	0.00	0.09	0.09	0.00	0.02	0.02	—	93.9	93.9	< 0.005	< 0.005	0.16	95.2
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.08	0.00	0.00	0.02	0.02	0.00	< 0.005	< 0.005	—	15.5	15.5	< 0.005	< 0.005	0.03	15.8
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.20. Architectural Coating (2025) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.02	0.65	0.96	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	134	134	0.01	< 0.005	—	134
Architectural Coatings	—	3.74	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.02	0.65	0.96	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	134	134	0.01	< 0.005	—	134
Architectural Coatings	—	3.74	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.01	0.27	0.40	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	55.7	55.7	< 0.005	< 0.005	—	55.8
Architectural Coatings	—	1.56	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.05	0.07	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	9.21	9.21	< 0.005	< 0.005	—	9.25
Architectural Coatings	—	0.28	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.09	0.08	0.08	1.34	0.00	0.00	0.22	0.22	0.00	0.05	0.05	—	242	242	0.01	0.01	0.90	246
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.08	0.07	0.08	1.01	0.00	0.00	0.22	0.22	0.00	0.05	0.05	—	222	222	0.01	0.01	0.02	225
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.03	0.03	0.04	0.44	0.00	0.00	0.09	0.09	0.00	0.02	0.02	—	93.9	93.9	< 0.005	< 0.005	0.16	95.2
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.08	0.00	0.00	0.02	0.02	0.00	< 0.005	< 0.005	—	15.5	15.5	< 0.005	< 0.005	0.03	15.8
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.21. Architectural Coating (2026) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.15	0.12	0.86	1.13	< 0.005	0.02	—	0.02	0.02	—	0.02	—	134	134	0.01	< 0.005	—	134
Architectural Coatings	—	3.74	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.15	0.12	0.86	1.13	< 0.005	0.02	—	0.02	0.02	—	0.02	—	134	134	0.01	< 0.005	—	134
Architectural Coatings	—	3.74	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.10	0.09	0.61	0.81	< 0.005	0.02	—	0.02	0.02	—	0.02	—	95.4	95.4	< 0.005	< 0.005	—	95.7
Architectural Coatings	—	2.67	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.02	0.11	0.15	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	15.8	15.8	< 0.005	< 0.005	—	15.8
Architectural Coatings	—	0.49	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.08	0.07	0.07	1.24	0.00	0.00	0.22	0.22	0.00	0.05	0.05	—	237	237	0.01	0.01	0.81	241
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.08	0.07	0.08	0.94	0.00	0.00	0.22	0.22	0.00	0.05	0.05	—	218	218	< 0.005	0.01	0.02	220
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.06	0.05	0.06	0.70	0.00	0.00	0.16	0.16	0.00	0.04	0.04	—	158	158	< 0.005	0.01	0.25	160
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.13	0.00	0.00	0.03	0.03	0.00	0.01	0.01	—	26.1	26.1	< 0.005	< 0.005	0.04	26.5
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.22. Architectural Coating (2026) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.02	0.65	0.96	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	134	134	0.01	< 0.005	—	134
Architectural Coatings	—	3.74	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.02	0.65	0.96	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	134	134	0.01	< 0.005	—	134
Architectural Coatings	—	3.74	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.02	0.46	0.69	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	95.4	95.4	< 0.005	< 0.005	—	95.7
Architectural Coatings	—	2.67	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.08	0.13	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	15.8	15.8	< 0.005	< 0.005	—	15.8
Architectural Coatings	—	0.49	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.08	0.07	0.07	1.24	0.00	0.00	0.22	0.22	0.00	0.05	0.05	—	237	237	0.01	0.01	0.81	241
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.08	0.07	0.08	0.94	0.00	0.00	0.22	0.22	0.00	0.05	0.05	—	218	218	< 0.005	0.01	0.02	220
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.06	0.05	0.06	0.70	0.00	0.00	0.16	0.16	0.00	0.04	0.04	—	158	158	< 0.005	0.01	0.25	160
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.13	0.00	0.00	0.03	0.03	0.00	0.01	0.01	—	26.1	26.1	< 0.005	< 0.005	0.04	26.5
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.23. Architectural Coating (2027) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.14	0.11	0.83	1.13	< 0.005	0.02	—	0.02	0.02	—	0.02	—	134	134	0.01	< 0.005	—	134
Architectural Coatings	—	3.74	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.14	0.11	0.83	1.13	< 0.005	0.02	—	0.02	0.02	—	0.02	—	134	134	0.01	< 0.005	—	134
Architectural Coatings	—	3.74	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.05	0.04	0.29	0.40	< 0.005	0.01	—	0.01	0.01	—	0.01	—	47.3	47.3	< 0.005	< 0.005	—	47.5
Architectural Coatings	—	1.32	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.01	0.05	0.07	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	7.83	7.83	< 0.005	< 0.005	—	7.86
Architectural Coatings	—	0.24	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.08	0.07	0.06	1.15	0.00	0.00	0.22	0.22	0.00	0.05	0.05	—	233	233	< 0.005	0.01	0.73	236
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07	0.07	0.07	0.87	0.00	0.00	0.22	0.22	0.00	0.05	0.05	—	213	213	< 0.005	0.01	0.02	216
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.03	0.02	0.03	0.32	0.00	0.00	0.08	0.08	0.00	0.02	0.02	—	76.6	76.6	< 0.005	< 0.005	0.11	77.6
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.06	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	12.7	12.7	< 0.005	< 0.005	0.02	12.9
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.24. Architectural Coating (2027) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.02	0.65	0.96	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	134	134	0.01	< 0.005	—	134
Architectural Coatings	—	3.74	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.02	0.65	0.96	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	134	134	0.01	< 0.005	—	134
Architectural Coatings	—	3.74	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.01	0.23	0.34	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	47.3	47.3	< 0.005	< 0.005	—	47.5
Architectural Coatings	—	1.32	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.04	0.06	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	7.83	7.83	< 0.005	< 0.005	—	7.86
Architectural Coatings	—	0.24	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.08	0.07	0.06	1.15	0.00	0.00	0.22	0.22	0.00	0.05	0.05	—	233	233	< 0.005	0.01	0.73	236
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07	0.07	0.07	0.87	0.00	0.00	0.22	0.22	0.00	0.05	0.05	—	213	213	< 0.005	0.01	0.02	216
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.03	0.02	0.03	0.32	0.00	0.00	0.08	0.08	0.00	0.02	0.02	—	76.6	76.6	< 0.005	< 0.005	0.11	77.6
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.06	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	12.7	12.7	< 0.005	< 0.005	0.02	12.9
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

4. Operations Emissions Details

4.1. Mobile Emissions by Land Use

4.1.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	0.66	0.55	0.96	10.0	0.03	0.02	2.57	2.58	0.02	0.65	0.67	—	2,918	2,918	0.10	0.12	9.19	2,964
Health Club	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Place of Worship	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
General Office Building	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
High Turnover (Sit Down Restaurant)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Recreational Swimmin Pool	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Arena	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.66	0.55	0.96	10.0	0.03	0.02	2.57	2.58	0.02	0.65	0.67	—	2,918	2,918	0.10	0.12	9.19	2,964
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	0.63	0.52	1.03	7.93	0.03	0.02	2.57	2.58	0.02	0.65	0.67	—	2,733	2,733	0.10	0.12	0.24	2,771
Health Club	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Place of Worship	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
General Office Building	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
High Turnover (Sit Down Restaurant)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Recreational Swimming Pool	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Arena	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.63	0.52	1.03	7.93	0.03	0.02	2.57	2.58	0.02	0.65	0.67	—	2,733	2,733	0.10	0.12	0.24	2,771
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Hotel	0.12	0.09	0.19	1.51	< 0.005	< 0.005	0.47	0.47	< 0.005	0.12	0.12	—	457	457	0.02	0.02	0.66	464
Health Club	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Place of Worship	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
General Office Building	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
High Turnover (Sit Down Restaurant)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Recreational Swimming Pool	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Arena	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.12	0.09	0.19	1.51	< 0.005	< 0.005	0.47	0.47	< 0.005	0.12	0.12	—	457	457	0.02	0.02	0.66	464

4.1.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	0.66	0.55	0.96	10.0	0.03	0.02	2.57	2.58	0.02	0.65	0.67	—	2,918	2,918	0.10	0.12	9.19	2,964

Health Club	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Place of Worship	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
General Office Building	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
High Turnover (Sit Down Restaurant)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Recreational Swimming Pool	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Arena	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.66	0.55	0.96	10.0	0.03	0.02	2.57	2.58	0.02	0.65	0.67	—	2,918	2,918	0.10	0.12	9.19	2,964
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	0.63	0.52	1.03	7.93	0.03	0.02	2.57	2.58	0.02	0.65	0.67	—	2,733	2,733	0.10	0.12	0.24	2,771
Health Club	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Place of Worship	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
General Office Building	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
High Turnover (Sit Down Restaurant)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Recreational Swimming Pool	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Arena	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.63	0.52	1.03	7.93	0.03	0.02	2.57	2.58	0.02	0.65	0.67	—	2,733	2,733	0.10	0.12	0.24	2,771
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	0.12	0.09	0.19	1.51	< 0.005	< 0.005	0.47	0.47	< 0.005	0.12	0.12	—	457	457	0.02	0.02	0.66	464
Health Club	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Place of Worship	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
General Office Building	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
High Turnover (Sit Down Restaurant)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Recreati Swimming Pool	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Arena	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.12	0.09	0.19	1.51	< 0.005	< 0.005	0.47	0.47	< 0.005	0.12	0.12	—	457	457	0.02	0.02	0.66	464

4.2. Energy

4.2.1. Electricity Emissions By Land Use - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	—	—	—	—	—	—	—	—	—	—	—	—	2,073	2,073	0.20	0.02	—	2,085
Health Club	—	—	—	—	—	—	—	—	—	—	—	—	84.8	84.8	0.01	< 0.005	—	85.3
Place of Worship	—	—	—	—	—	—	—	—	—	—	—	—	42.2	42.2	< 0.005	< 0.005	—	42.4
General Office Building	—	—	—	—	—	—	—	—	—	—	—	—	363	363	0.03	< 0.005	—	365
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	—	—	1,173	1,173	0.11	0.01	—	1,180

Recreati Swimming Pool	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Arena	—	—	—	—	—	—	—	—	—	—	—	—	10.4	10.4	< 0.005	< 0.005	—	10.5
Total	—	—	—	—	—	—	—	—	—	—	—	—	3,746	3,746	0.36	0.04	—	3,768
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	—	—	—	—	—	—	—	—	—	—	—	—	2,073	2,073	0.20	0.02	—	2,085
Health Club	—	—	—	—	—	—	—	—	—	—	—	—	84.8	84.8	0.01	< 0.005	—	85.3
Place of Worship	—	—	—	—	—	—	—	—	—	—	—	—	42.2	42.2	< 0.005	< 0.005	—	42.4
General Office Building	—	—	—	—	—	—	—	—	—	—	—	—	363	363	0.03	< 0.005	—	365
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	—	—	1,173	1,173	0.11	0.01	—	1,180
Recreational Swimming Pool	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Arena	—	—	—	—	—	—	—	—	—	—	—	—	10.4	10.4	< 0.005	< 0.005	—	10.5
Total	—	—	—	—	—	—	—	—	—	—	—	—	3,746	3,746	0.36	0.04	—	3,768
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	—	—	—	—	—	—	—	—	—	—	—	—	343	343	0.03	< 0.005	—	345

Health Club	—	—	—	—	—	—	—	—	—	—	—	—	14.0	14.0	< 0.005	< 0.005	—	14.1
Place of Worship	—	—	—	—	—	—	—	—	—	—	—	—	6.98	6.98	< 0.005	< 0.005	—	7.02
General Office Building	—	—	—	—	—	—	—	—	—	—	—	—	60.1	60.1	0.01	< 0.005	—	60.5
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	—	—	194	194	0.02	< 0.005	—	195
Recreational Swimming Pool	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Arena	—	—	—	—	—	—	—	—	—	—	—	—	1.73	1.73	< 0.005	< 0.005	—	1.74
Total	—	—	—	—	—	—	—	—	—	—	—	—	620	620	0.06	0.01	—	624

4.2.2. Electricity Emissions By Land Use - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	—	—	—	—	—	—	—	—	—	—	—	—	2,073	2,073	0.20	0.02	—	2,085

Health Club	—	—	—	—	—	—	—	—	—	—	—	—	84.8	84.8	0.01	< 0.005	—	85.3
Place of Worship	—	—	—	—	—	—	—	—	—	—	—	—	42.2	42.2	< 0.005	< 0.005	—	42.4
General Office Building	—	—	—	—	—	—	—	—	—	—	—	—	363	363	0.03	< 0.005	—	365
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	—	—	1,173	1,173	0.11	0.01	—	1,180
Recreational Swimming Pool	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Arena	—	—	—	—	—	—	—	—	—	—	—	—	10.4	10.4	< 0.005	< 0.005	—	10.5
Total	—	—	—	—	—	—	—	—	—	—	—	—	3,746	3,746	0.36	0.04	—	3,768
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	—	—	—	—	—	—	—	—	—	—	—	—	2,073	2,073	0.20	0.02	—	2,085
Health Club	—	—	—	—	—	—	—	—	—	—	—	—	84.8	84.8	0.01	< 0.005	—	85.3
Place of Worship	—	—	—	—	—	—	—	—	—	—	—	—	42.2	42.2	< 0.005	< 0.005	—	42.4
General Office Building	—	—	—	—	—	—	—	—	—	—	—	—	363	363	0.03	< 0.005	—	365

Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	—	—	1,173	1,173	0.11	0.01	—	1,180
Recreational Swimming Pool	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Arena	—	—	—	—	—	—	—	—	—	—	—	—	10.4	10.4	< 0.005	< 0.005	—	10.5
Total	—	—	—	—	—	—	—	—	—	—	—	—	3,746	3,746	0.36	0.04	—	3,768
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	—	—	—	—	—	—	—	—	—	—	—	—	343	343	0.03	< 0.005	—	345
Health Club	—	—	—	—	—	—	—	—	—	—	—	—	14.0	14.0	< 0.005	< 0.005	—	14.1
Place of Worship	—	—	—	—	—	—	—	—	—	—	—	—	6.98	6.98	< 0.005	< 0.005	—	7.02
General Office Building	—	—	—	—	—	—	—	—	—	—	—	—	60.1	60.1	0.01	< 0.005	—	60.5
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	—	—	194	194	0.02	< 0.005	—	195

Recreati Swimming Pool	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Arena	—	—	—	—	—	—	—	—	—	—	—	—	1.73	1.73	< 0.005	< 0.005	—	1.74
Total	—	—	—	—	—	—	—	—	—	—	—	—	620	620	0.06	0.01	—	624

4.2.3. Natural Gas Emissions By Land Use - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	0.12	0.06	1.10	0.92	0.01	0.08	—	0.08	0.08	—	0.08	—	1,311	1,311	0.12	< 0.005	—	1,315
Health Club	0.01	0.01	0.11	0.09	< 0.005	0.01	—	0.01	0.01	—	0.01	—	129	129	0.01	< 0.005	—	129
Place of Worship	0.01	< 0.005	0.05	0.05	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	64.1	64.1	0.01	< 0.005	—	64.3
General Office Building	0.02	0.01	0.16	0.14	< 0.005	0.01	—	0.01	0.01	—	0.01	—	193	193	0.02	< 0.005	—	193
Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
High Turnover (Sit Down Restaurant)	0.12	0.06	1.08	0.91	0.01	0.08	—	0.08	0.08	—	0.08	—	1,291	1,291	0.11	< 0.005	—	1,295

Recreational Swimming	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Arena	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	15.8	15.8	< 0.005	< 0.005	—	15.9
Total	0.28	0.14	2.52	2.12	0.02	0.19	—	0.19	0.19	—	0.19	—	3,004	3,004	0.27	0.01	—	3,013
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	0.12	0.06	1.10	0.92	0.01	0.08	—	0.08	0.08	—	0.08	—	1,311	1,311	0.12	< 0.005	—	1,315
Health Club	0.01	0.01	0.11	0.09	< 0.005	0.01	—	0.01	0.01	—	0.01	—	129	129	0.01	< 0.005	—	129
Place of Worship	0.01	< 0.005	0.05	0.05	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	64.1	64.1	0.01	< 0.005	—	64.3
General Office Building	0.02	0.01	0.16	0.14	< 0.005	0.01	—	0.01	0.01	—	0.01	—	193	193	0.02	< 0.005	—	193
Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
High Turnover (Sit Down Restaurant)	0.12	0.06	1.08	0.91	0.01	0.08	—	0.08	0.08	—	0.08	—	1,291	1,291	0.11	< 0.005	—	1,295
Recreational Swimming Pool	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Arena	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	15.8	15.8	< 0.005	< 0.005	—	15.9
Total	0.28	0.14	2.52	2.12	0.02	0.19	—	0.19	0.19	—	0.19	—	3,004	3,004	0.27	0.01	—	3,013
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Hotel	0.02	0.01	0.20	0.17	< 0.005	0.02	—	0.02	0.02	—	0.02	—	217	217	0.02	< 0.005	—	218
Health Club	< 0.005	< 0.005	0.02	0.02	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	21.3	21.3	< 0.005	< 0.005	—	21.4
Place of Worship	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	10.6	10.6	< 0.005	< 0.005	—	10.6
General Office Building	< 0.005	< 0.005	0.03	0.02	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	31.9	31.9	< 0.005	< 0.005	—	32.0
Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
High Turnover (Sit Down Restaurant)	0.02	0.01	0.20	0.17	< 0.005	0.02	—	0.02	0.02	—	0.02	—	214	214	0.02	< 0.005	—	214
Recreational Swimming Pool	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Arena	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	2.62	2.62	< 0.005	< 0.005	—	2.63
Total	0.05	0.03	0.46	0.39	< 0.005	0.03	—	0.03	0.03	—	0.03	—	497	497	0.04	< 0.005	—	499

4.2.4. Natural Gas Emissions By Land Use - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	0.12	0.06	1.10	0.92	0.01	0.08	—	0.08	0.08	—	0.08	—	1,311	1,311	0.12	< 0.005	—	1,315

Health Club	0.01	0.01	0.11	0.09	< 0.005	0.01	—	0.01	0.01	—	0.01	—	129	129	0.01	< 0.005	—	129
Place of Worship	0.01	< 0.005	0.05	0.05	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	64.1	64.1	0.01	< 0.005	—	64.3
General Office Building	0.02	0.01	0.16	0.14	< 0.005	0.01	—	0.01	0.01	—	0.01	—	193	193	0.02	< 0.005	—	193
Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
High Turnover (Sit Down Restaurant)	0.12	0.06	1.08	0.91	0.01	0.08	—	0.08	0.08	—	0.08	—	1,291	1,291	0.11	< 0.005	—	1,295
Recreational Swimming Pool	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Arena	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	15.8	15.8	< 0.005	< 0.005	—	15.9
Total	0.28	0.14	2.52	2.12	0.02	0.19	—	0.19	0.19	—	0.19	—	3,004	3,004	0.27	0.01	—	3,013
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	0.12	0.06	1.10	0.92	0.01	0.08	—	0.08	0.08	—	0.08	—	1,311	1,311	0.12	< 0.005	—	1,315
Health Club	0.01	0.01	0.11	0.09	< 0.005	0.01	—	0.01	0.01	—	0.01	—	129	129	0.01	< 0.005	—	129
Place of Worship	0.01	< 0.005	0.05	0.05	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	64.1	64.1	0.01	< 0.005	—	64.3
General Office Building	0.02	0.01	0.16	0.14	< 0.005	0.01	—	0.01	0.01	—	0.01	—	193	193	0.02	< 0.005	—	193

Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
High Turnover (Sit Down Restaurant)	0.12	0.06	1.08	0.91	0.01	0.08	—	0.08	0.08	—	0.08	—	1,291	1,291	0.11	< 0.005	—	1,295
Recreational Swimming Pool	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Arena	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	15.8	15.8	< 0.005	< 0.005	—	15.9
Total	0.28	0.14	2.52	2.12	0.02	0.19	—	0.19	0.19	—	0.19	—	3,004	3,004	0.27	0.01	—	3,013
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	0.02	0.01	0.20	0.17	< 0.005	0.02	—	0.02	0.02	—	0.02	—	217	217	0.02	< 0.005	—	218
Health Club	< 0.005	< 0.005	0.02	0.02	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	21.3	21.3	< 0.005	< 0.005	—	21.4
Place of Worship	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	10.6	10.6	< 0.005	< 0.005	—	10.6
General Office Building	< 0.005	< 0.005	0.03	0.02	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	31.9	31.9	< 0.005	< 0.005	—	32.0
Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
High Turnover (Sit Down Restaurant)	0.02	0.01	0.20	0.17	< 0.005	0.02	—	0.02	0.02	—	0.02	—	214	214	0.02	< 0.005	—	214

Recreati Swimming Pool	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Arena	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	2.62	2.62	< 0.005	< 0.005	—	2.63
Total	0.05	0.03	0.46	0.39	< 0.005	0.03	—	0.03	0.03	—	0.03	—	497	497	0.04	< 0.005	—	499

4.3. Area Emissions by Source

4.3.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Source	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	—	4.51	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	—	0.56	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Landscape Equipment	1.62	1.50	0.08	9.11	< 0.005	0.02	—	0.02	0.01	—	0.01	—	37.4	37.4	< 0.005	< 0.005	—	37.6
Total	1.62	6.56	0.08	9.11	< 0.005	0.02	—	0.02	0.01	—	0.01	—	37.4	37.4	< 0.005	< 0.005	—	37.6
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	—	4.51	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	—	0.56	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Total	—	5.06	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	—	0.82	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	—	0.10	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Landscape Equipment	0.20	0.19	0.01	1.14	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	4.25	4.25	< 0.005	< 0.005	—	4.26
Total	0.20	1.11	0.01	1.14	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	4.25	4.25	< 0.005	< 0.005	—	4.26

4.3.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Source	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	—	4.51	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	—	0.56	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Landscape Equipment	1.62	1.50	0.08	9.11	< 0.005	0.02	—	0.02	0.01	—	0.01	—	37.4	37.4	< 0.005	< 0.005	—	37.6
Total	1.62	6.56	0.08	9.11	< 0.005	0.02	—	0.02	0.01	—	0.01	—	37.4	37.4	< 0.005	< 0.005	—	37.6
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Consum Products	—	4.51	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	—	0.56	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	5.06	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	—	0.82	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	—	0.10	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Landscape Equipment	0.20	0.19	0.01	1.14	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	4.25	4.25	< 0.005	< 0.005	—	4.26
Total	0.20	1.11	0.01	1.14	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	4.25	4.25	< 0.005	< 0.005	—	4.26

4.4. Water Emissions by Land Use

4.4.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	—	—	—	—	—	—	—	—	—	—	—	2.33	7.86	10.2	0.24	0.01	—	17.9
Health Club	—	—	—	—	—	—	—	—	—	—	—	1.06	3.58	4.64	0.11	< 0.005	—	8.16
Place of Worship	—	—	—	—	—	—	—	—	—	—	—	0.28	0.94	1.22	0.03	< 0.005	—	2.15

General Office Building	—	—	—	—	—	—	—	—	—	—	—	7.47	25.2	32.6	0.77	0.02	—	57.4
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	—	20.5	69.1	89.6	2.11	0.05	—	157
Recreational Swimming Pool	—	—	—	—	—	—	—	—	—	—	—	0.07	0.23	0.30	0.01	< 0.005	—	0.53
Arena	—	—	—	—	—	—	—	—	—	—	—	0.95	3.20	4.16	0.10	< 0.005	—	7.30
Total	—	—	—	—	—	—	—	—	—	—	—	32.7	110	143	3.36	0.08	—	251
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	—	—	—	—	—	—	—	—	—	—	—	2.33	7.86	10.2	0.24	0.01	—	17.9
Health Club	—	—	—	—	—	—	—	—	—	—	—	1.06	3.58	4.64	0.11	< 0.005	—	8.16
Place of Worship	—	—	—	—	—	—	—	—	—	—	—	0.28	0.94	1.22	0.03	< 0.005	—	2.15
General Office Building	—	—	—	—	—	—	—	—	—	—	—	7.47	25.2	32.6	0.77	0.02	—	57.4
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00

Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	—	20.5	69.1	89.6	2.11	0.05	—	157
Recreational Swimming Pool	—	—	—	—	—	—	—	—	—	—	—	0.07	0.23	0.30	0.01	< 0.005	—	0.53
Arena	—	—	—	—	—	—	—	—	—	—	—	0.95	3.20	4.16	0.10	< 0.005	—	7.30
Total	—	—	—	—	—	—	—	—	—	—	—	32.7	110	143	3.36	0.08	—	251
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	—	—	—	—	—	—	—	—	—	—	—	0.39	1.30	1.69	0.04	< 0.005	—	2.97
Health Club	—	—	—	—	—	—	—	—	—	—	—	0.18	0.59	0.77	0.02	< 0.005	—	1.35
Place of Worship	—	—	—	—	—	—	—	—	—	—	—	0.05	0.16	0.20	< 0.005	< 0.005	—	0.36
General Office Building	—	—	—	—	—	—	—	—	—	—	—	1.24	4.17	5.41	0.13	< 0.005	—	9.50
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	—	3.40	11.4	14.8	0.35	0.01	—	26.1

Recreational Swimming	—	—	—	—	—	—	—	—	—	—	—	0.01	0.04	0.05	< 0.005	< 0.005	—	0.09
Arena	—	—	—	—	—	—	—	—	—	—	—	0.16	0.53	0.69	0.02	< 0.005	—	1.21
Total	—	—	—	—	—	—	—	—	—	—	—	5.41	18.2	23.6	0.56	0.01	—	41.5

4.4.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	—	—	—	—	—	—	—	—	—	—	—	2.33	7.86	10.2	0.24	0.01	—	17.9
Health Club	—	—	—	—	—	—	—	—	—	—	—	1.06	3.58	4.64	0.11	< 0.005	—	8.16
Place of Worship	—	—	—	—	—	—	—	—	—	—	—	0.28	0.94	1.22	0.03	< 0.005	—	2.15
General Office Building	—	—	—	—	—	—	—	—	—	—	—	7.47	25.2	32.6	0.77	0.02	—	57.4
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	—	20.5	69.1	89.6	2.11	0.05	—	157

Recreational Swimmin Pool	—	—	—	—	—	—	—	—	—	—	—	0.07	0.23	0.30	0.01	< 0.005	—	0.53
Arena	—	—	—	—	—	—	—	—	—	—	—	0.95	3.20	4.16	0.10	< 0.005	—	7.30
Total	—	—	—	—	—	—	—	—	—	—	—	32.7	110	143	3.36	0.08	—	251
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	—	—	—	—	—	—	—	—	—	—	—	2.33	7.86	10.2	0.24	0.01	—	17.9
Health Club	—	—	—	—	—	—	—	—	—	—	—	1.06	3.58	4.64	0.11	< 0.005	—	8.16
Place of Worship	—	—	—	—	—	—	—	—	—	—	—	0.28	0.94	1.22	0.03	< 0.005	—	2.15
General Office Building	—	—	—	—	—	—	—	—	—	—	—	7.47	25.2	32.6	0.77	0.02	—	57.4
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	—	20.5	69.1	89.6	2.11	0.05	—	157
Recreational Swimming Pool	—	—	—	—	—	—	—	—	—	—	—	0.07	0.23	0.30	0.01	< 0.005	—	0.53
Arena	—	—	—	—	—	—	—	—	—	—	—	0.95	3.20	4.16	0.10	< 0.005	—	7.30
Total	—	—	—	—	—	—	—	—	—	—	—	32.7	110	143	3.36	0.08	—	251
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Hotel	—	—	—	—	—	—	—	—	—	—	—	0.39	1.30	1.69	0.04	< 0.005	—	2.97
Health Club	—	—	—	—	—	—	—	—	—	—	—	0.18	0.59	0.77	0.02	< 0.005	—	1.35
Place of Worship	—	—	—	—	—	—	—	—	—	—	—	0.05	0.16	0.20	< 0.005	< 0.005	—	0.36
General Office Building	—	—	—	—	—	—	—	—	—	—	—	1.24	4.17	5.41	0.13	< 0.005	—	9.50
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	—	3.40	11.4	14.8	0.35	0.01	—	26.1
Recreational Swimming Pool	—	—	—	—	—	—	—	—	—	—	—	0.01	0.04	0.05	< 0.005	< 0.005	—	0.09
Arena	—	—	—	—	—	—	—	—	—	—	—	0.16	0.53	0.69	0.02	< 0.005	—	1.21
Total	—	—	—	—	—	—	—	—	—	—	—	5.41	18.2	23.6	0.56	0.01	—	41.5

4.5. Waste Emissions by Land Use

4.5.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	—	—	—	—	—	—	—	—	—	—	—	14.2	0.00	14.2	1.42	0.00	—	49.6
Health Club	—	—	—	—	—	—	—	—	—	—	—	28.8	0.00	28.8	2.88	0.00	—	101
Place of Worship	—	—	—	—	—	—	—	—	—	—	—	14.3	0.00	14.3	1.43	0.00	—	50.1
General Office Building	—	—	—	—	—	—	—	—	—	—	—	11.0	0.00	11.0	1.10	0.00	—	38.5
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	—	226	0.00	226	22.6	0.00	—	791
Recreational Swimming Pool	—	—	—	—	—	—	—	—	—	—	—	1.86	0.00	1.86	0.19	0.00	—	6.51
Arena	—	—	—	—	—	—	—	—	—	—	—	0.02	0.00	0.02	< 0.005	0.00	—	0.06
Total	—	—	—	—	—	—	—	—	—	—	—	296	0.00	296	29.6	0.00	—	1,037
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	—	—	—	—	—	—	—	—	—	—	—	14.2	0.00	14.2	1.42	0.00	—	49.6
Health Club	—	—	—	—	—	—	—	—	—	—	—	28.8	0.00	28.8	2.88	0.00	—	101

Place of Worship	—	—	—	—	—	—	—	—	—	—	—	14.3	0.00	14.3	1.43	0.00	—	50.1
General Office Building	—	—	—	—	—	—	—	—	—	—	—	11.0	0.00	11.0	1.10	0.00	—	38.5
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	—	226	0.00	226	22.6	0.00	—	791
Recreational Swimming Pool	—	—	—	—	—	—	—	—	—	—	—	1.86	0.00	1.86	0.19	0.00	—	6.51
Arena	—	—	—	—	—	—	—	—	—	—	—	0.02	0.00	0.02	< 0.005	0.00	—	0.06
Total	—	—	—	—	—	—	—	—	—	—	—	296	0.00	296	29.6	0.00	—	1,037
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	—	—	—	—	—	—	—	—	—	—	—	2.34	0.00	2.34	0.23	0.00	—	8.20
Health Club	—	—	—	—	—	—	—	—	—	—	—	4.77	0.00	4.77	0.48	0.00	—	16.7
Place of Worship	—	—	—	—	—	—	—	—	—	—	—	2.37	0.00	2.37	0.24	0.00	—	8.30
General Office Building	—	—	—	—	—	—	—	—	—	—	—	1.82	0.00	1.82	0.18	0.00	—	6.37
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00

Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	—	37.4	0.00	37.4	3.74	0.00	—	131
Recreational Swimming Pool	—	—	—	—	—	—	—	—	—	—	—	0.31	0.00	0.31	0.03	0.00	—	1.08
Arena	—	—	—	—	—	—	—	—	—	—	—	< 0.005	0.00	< 0.005	< 0.005	0.00	—	0.01
Total	—	—	—	—	—	—	—	—	—	—	—	49.1	0.00	49.1	4.90	0.00	—	172

4.5.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	—	—	—	—	—	—	—	—	—	—	—	14.2	0.00	14.2	1.42	0.00	—	49.6
Health Club	—	—	—	—	—	—	—	—	—	—	—	28.8	0.00	28.8	2.88	0.00	—	101
Place of Worship	—	—	—	—	—	—	—	—	—	—	—	14.3	0.00	14.3	1.43	0.00	—	50.1
General Office Building	—	—	—	—	—	—	—	—	—	—	—	11.0	0.00	11.0	1.10	0.00	—	38.5
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00

Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	—	226	0.00	226	22.6	0.00	—	791
Recreational Swimming Pool	—	—	—	—	—	—	—	—	—	—	—	1.86	0.00	1.86	0.19	0.00	—	6.51
Arena	—	—	—	—	—	—	—	—	—	—	—	0.02	0.00	0.02	< 0.005	0.00	—	0.06
Total	—	—	—	—	—	—	—	—	—	—	—	296	0.00	296	29.6	0.00	—	1,037
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	—	—	—	—	—	—	—	—	—	—	—	14.2	0.00	14.2	1.42	0.00	—	49.6
Health Club	—	—	—	—	—	—	—	—	—	—	—	28.8	0.00	28.8	2.88	0.00	—	101
Place of Worship	—	—	—	—	—	—	—	—	—	—	—	14.3	0.00	14.3	1.43	0.00	—	50.1
General Office Building	—	—	—	—	—	—	—	—	—	—	—	11.0	0.00	11.0	1.10	0.00	—	38.5
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	—	226	0.00	226	22.6	0.00	—	791

Recreational	—	—	—	—	—	—	—	—	—	—	—	1.86	0.00	1.86	0.19	0.00	—	6.51
Arena	—	—	—	—	—	—	—	—	—	—	—	0.02	0.00	0.02	< 0.005	0.00	—	0.06
Total	—	—	—	—	—	—	—	—	—	—	—	296	0.00	296	29.6	0.00	—	1,037
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	—	—	—	—	—	—	—	—	—	—	—	2.34	0.00	2.34	0.23	0.00	—	8.20
Health Club	—	—	—	—	—	—	—	—	—	—	—	4.77	0.00	4.77	0.48	0.00	—	16.7
Place of Worship	—	—	—	—	—	—	—	—	—	—	—	2.37	0.00	2.37	0.24	0.00	—	8.30
General Office Building	—	—	—	—	—	—	—	—	—	—	—	1.82	0.00	1.82	0.18	0.00	—	6.37
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	—	37.4	0.00	37.4	3.74	0.00	—	131
Recreational Swimming Pool	—	—	—	—	—	—	—	—	—	—	—	0.31	0.00	0.31	0.03	0.00	—	1.08
Arena	—	—	—	—	—	—	—	—	—	—	—	< 0.005	0.00	< 0.005	< 0.005	0.00	—	0.01
Total	—	—	—	—	—	—	—	—	—	—	—	49.1	0.00	49.1	4.90	0.00	—	172

4.6. Refrigerant Emissions by Land Use

4.6.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	214	214
Health Club	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.05	0.05
Place of Worship	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.02	0.02
General Office Building	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.05	0.05
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	55.1	55.1
Recreational Swimming Pool	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	< 0.005	< 0.005
Arena	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.01	0.01
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	269	269
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	214	214
Health Club	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.05	0.05
Place of Worship	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.02	0.02

General Office Building	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.05	0.05
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	55.1	55.1
Recreational Swimming Pool	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	< 0.005	< 0.005
Arena	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.01	0.01
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	269	269
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	35.4	35.4
Health Club	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.01	0.01
Place of Worship	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	< 0.005	< 0.005
General Office Building	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.01	0.01
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	9.13	9.13
Recreational Swimming Pool	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	< 0.005	< 0.005
Arena	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	< 0.005	< 0.005
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	44.6	44.6

4.6.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	214	214
Health Club	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.05	0.05
Place of Worship	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.02	0.02
General Office Building	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.05	0.05
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	55.1	55.1
Recreational Swimming Pool	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	< 0.005	< 0.005
Arena	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.01	0.01
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	269	269
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	214	214
Health Club	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.05	0.05
Place of Worship	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.02	0.02

General Office Building	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.05	0.05
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	55.1	55.1
Recreational Swimming Pool	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	< 0.005	< 0.005
Arena	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.01	0.01
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	269	269
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	35.4	35.4
Health Club	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.01	0.01
Place of Worship	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	< 0.005	< 0.005
General Office Building	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.01	0.01
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	9.13	9.13
Recreational Swimming Pool	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	< 0.005	< 0.005
Arena	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	< 0.005	< 0.005
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	44.6	44.6

4.7. Offroad Emissions By Equipment Type

4.7.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.7.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.8. Stationary Emissions By Equipment Type

4.8.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.8.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.9. User Defined Emissions By Equipment Type

4.9.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.9.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10. Soil Carbon Accumulation By Vegetation Type

4.10.1. Soil Carbon Accumulation By Vegetation Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Vegetation	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.2. Above and Belowground Carbon Accumulation by Land Use Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.3. Avoided and Sequestered Emissions by Species - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Species	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.4. Soil Carbon Accumulation By Vegetation Type - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Vegetation	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.5. Above and Belowground Carbon Accumulation by Land Use Type - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.6. Avoided and Sequestered Emissions by Species - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Species	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Remove	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

5. Activity Data

5.1. Construction Schedule

Phase Name	Phase Type	Start Date	End Date	Days Per Week	Work Days per Phase	Phase Description
Demolition	Demolition	6/2/2025	8/29/2025	5.00	65.0	—
Site Preparation	Site Preparation	6/2/2025	8/29/2025	5.00	65.0	—
Grading	Grading	6/2/2025	7/31/2025	5.00	44.0	—
Building Construction	Building Construction	6/2/2025	6/30/2027	5.00	543	—
Paving	Paving	6/2/2025	6/30/2027	5.00	543	—
Architectural Coating	Architectural Coating	6/2/2025	6/30/2027	5.00	543	—

5.2. Off-Road Equipment

5.2.1. Unmitigated

Phase Name	Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor
Demolition	Rubber Tired Dozers	Diesel	Average	2.00	8.00	367	0.40
Demolition	Excavators	Diesel	Average	3.00	8.00	36.0	0.38
Demolition	Concrete/Industrial Saws	Diesel	Average	1.00	8.00	33.0	0.73
Site Preparation	Rubber Tired Dozers	Diesel	Average	3.00	8.00	367	0.40
Site Preparation	Tractors/Loaders/Backhoes	Diesel	Average	4.00	8.00	84.0	0.37
Grading	Graders	Diesel	Average	1.00	8.00	148	0.41
Grading	Excavators	Diesel	Average	2.00	8.00	36.0	0.38
Grading	Tractors/Loaders/Backhoes	Diesel	Average	2.00	8.00	84.0	0.37
Grading	Scrapers	Diesel	Average	2.00	8.00	423	0.48
Grading	Rubber Tired Dozers	Diesel	Average	1.00	8.00	367	0.40
Building Construction	Forklifts	Diesel	Average	3.00	8.00	82.0	0.20
Building Construction	Generator Sets	Diesel	Average	1.00	8.00	14.0	0.74
Building Construction	Cranes	Diesel	Average	1.00	7.00	367	0.29

Building Construction	Welders	Diesel	Average	1.00	8.00	46.0	0.45
Building Construction	Tractors/Loaders/Backhoes	Diesel	Average	3.00	7.00	84.0	0.37
Paving	Pavers	Diesel	Average	2.00	8.00	81.0	0.42
Paving	Paving Equipment	Diesel	Average	2.00	8.00	89.0	0.36
Paving	Rollers	Diesel	Average	2.00	8.00	36.0	0.38
Architectural Coating	Air Compressors	Diesel	Average	1.00	6.00	37.0	0.48

5.2.2. Mitigated

Phase Name	Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor
Demolition	Rubber Tired Dozers	Diesel	Tier 4 Final	2.00	8.00	367	0.40
Demolition	Excavators	Diesel	Tier 4 Final	3.00	8.00	36.0	0.38
Demolition	Concrete/Industrial Saws	Diesel	Tier 4 Final	1.00	8.00	33.0	0.73
Site Preparation	Rubber Tired Dozers	Diesel	Tier 4 Final	3.00	8.00	367	0.40
Site Preparation	Tractors/Loaders/Backhoes	Diesel	Tier 4 Final	4.00	8.00	84.0	0.37
Grading	Graders	Diesel	Tier 4 Final	1.00	8.00	148	0.41
Grading	Excavators	Diesel	Tier 4 Final	2.00	8.00	36.0	0.38
Grading	Tractors/Loaders/Backhoes	Diesel	Tier 4 Final	2.00	8.00	84.0	0.37
Grading	Scrapers	Diesel	Tier 4 Final	2.00	8.00	423	0.48
Grading	Rubber Tired Dozers	Diesel	Tier 4 Final	1.00	8.00	367	0.40
Building Construction	Forklifts	Diesel	Tier 4 Final	3.00	8.00	82.0	0.20
Building Construction	Generator Sets	Diesel	Average	1.00	8.00	14.0	0.74
Building Construction	Cranes	Diesel	Tier 4 Final	1.00	7.00	367	0.29
Building Construction	Welders	Diesel	Tier 4 Final	1.00	8.00	46.0	0.45
Building Construction	Tractors/Loaders/Backhoes	Diesel	Tier 4 Final	3.00	7.00	84.0	0.37

Paving	Pavers	Diesel	Tier 4 Final	2.00	8.00	81.0	0.42
Paving	Paving Equipment	Diesel	Tier 4 Final	2.00	8.00	89.0	0.36
Paving	Rollers	Diesel	Tier 4 Final	2.00	8.00	36.0	0.38
Architectural Coating	Air Compressors	Diesel	Tier 4 Final	1.00	6.00	37.0	0.48

5.3. Construction Vehicles

5.3.1. Unmitigated

Phase Name	Trip Type	One-Way Trips per Day	Miles per Trip	Vehicle Mix
Demolition	—	—	—	—
Demolition	Worker	15.0	18.5	LDA,LDT1,LDT2
Demolition	Vendor	—	10.2	HHDT,MHDT
Demolition	Hauling	0.00	20.0	HHDT
Demolition	Onsite truck	—	—	HHDT
Site Preparation	—	—	—	—
Site Preparation	Worker	17.5	18.5	LDA,LDT1,LDT2
Site Preparation	Vendor	—	10.2	HHDT,MHDT
Site Preparation	Hauling	0.00	20.0	HHDT
Site Preparation	Onsite truck	—	—	HHDT
Grading	—	—	—	—
Grading	Worker	20.0	18.5	LDA,LDT1,LDT2
Grading	Vendor	—	10.2	HHDT,MHDT
Grading	Hauling	447	20.0	HHDT
Grading	Onsite truck	—	—	HHDT
Building Construction	—	—	—	—
Building Construction	Worker	86.0	18.5	LDA,LDT1,LDT2
Building Construction	Vendor	34.4	10.2	HHDT,MHDT

Building Construction	Hauling	0.00	20.0	HHDT
Building Construction	Onsite truck	—	—	HHDT
Paving	—	—	—	—
Paving	Worker	15.0	18.5	LDA,LDT1,LDT2
Paving	Vendor	—	10.2	HHDT,MHDT
Paving	Hauling	0.00	20.0	HHDT
Paving	Onsite truck	—	—	HHDT
Architectural Coating	—	—	—	—
Architectural Coating	Worker	17.2	18.5	LDA,LDT1,LDT2
Architectural Coating	Vendor	—	10.2	HHDT,MHDT
Architectural Coating	Hauling	0.00	20.0	HHDT
Architectural Coating	Onsite truck	—	—	HHDT

5.3.2. Mitigated

Phase Name	Trip Type	One-Way Trips per Day	Miles per Trip	Vehicle Mix
Demolition	—	—	—	—
Demolition	Worker	15.0	18.5	LDA,LDT1,LDT2
Demolition	Vendor	—	10.2	HHDT,MHDT
Demolition	Hauling	0.00	20.0	HHDT
Demolition	Onsite truck	—	—	HHDT
Site Preparation	—	—	—	—
Site Preparation	Worker	17.5	18.5	LDA,LDT1,LDT2
Site Preparation	Vendor	—	10.2	HHDT,MHDT
Site Preparation	Hauling	0.00	20.0	HHDT
Site Preparation	Onsite truck	—	—	HHDT
Grading	—	—	—	—
Grading	Worker	20.0	18.5	LDA,LDT1,LDT2

Grading	Vendor	—	10.2	HHDT,MHDT
Grading	Hauling	447	20.0	HHDT
Grading	Onsite truck	—	—	HHDT
Building Construction	—	—	—	—
Building Construction	Worker	86.0	18.5	LDA,LDT1,LDT2
Building Construction	Vendor	34.4	10.2	HHDT,MHDT
Building Construction	Hauling	0.00	20.0	HHDT
Building Construction	Onsite truck	—	—	HHDT
Paving	—	—	—	—
Paving	Worker	15.0	18.5	LDA,LDT1,LDT2
Paving	Vendor	—	10.2	HHDT,MHDT
Paving	Hauling	0.00	20.0	HHDT
Paving	Onsite truck	—	—	HHDT
Architectural Coating	—	—	—	—
Architectural Coating	Worker	17.2	18.5	LDA,LDT1,LDT2
Architectural Coating	Vendor	—	10.2	HHDT,MHDT
Architectural Coating	Hauling	0.00	20.0	HHDT
Architectural Coating	Onsite truck	—	—	HHDT

5.4. Vehicles

5.4.1. Construction Vehicle Control Strategies

Non-applicable. No control strategies activated by user.

5.5. Architectural Coatings

Phase Name	Residential Interior Area Coated (sq ft)	Residential Exterior Area Coated (sq ft)	Non-Residential Interior Area Coated (sq ft)	Non-Residential Exterior Area Coated (sq ft)	Parking Area Coated (sq ft)
Architectural Coating	0.00	0.00	314,039	104,680	19,282

5.6. Dust Mitigation

5.6.1. Construction Earthmoving Activities

Phase Name	Material Imported (cy)	Material Exported (cy)	Acres Graded (acres)	Material Demolished (sq. ft.)	Acres Paved (acres)
Demolition	0.00	0.00	0.00	—	—
Site Preparation	—	—	97.5	0.00	—
Grading	—	157,414	132	0.00	—
Paving	0.00	0.00	0.00	0.00	7.38

5.6.2. Construction Earthmoving Control Strategies

Non-applicable. No control strategies activated by user.

5.7. Construction Paving

Land Use	Area Paved (acres)	% Asphalt
Hotel	0.00	0%
Health Club	0.00	0%
Place of Worship	0.00	0%
General Office Building	0.00	0%
Other Non-Asphalt Surfaces	2.43	0%
Other Asphalt Surfaces	4.95	100%
High Turnover (Sit Down Restaurant)	0.00	0%
Recreational Swimming Pool	0.00	0%
Arena	0.00	0%

5.8. Construction Electricity Consumption and Emissions Factors

kWh per Year and Emission Factor (lb/MWh)

Year	kWh per Year	CO2	CH4	N2O

2025	0.00	532	0.03	< 0.005
2026	0.00	532	0.03	< 0.005
2027	0.00	532	0.03	< 0.005

5.9. Operational Mobile Sources

5.9.1. Unmitigated

Land Use Type	Trips/Weekday	Trips/Saturday	Trips/Sunday	Trips/Year	VMT/Weekday	VMT/Saturday	VMT/Sunday	VMT/Year
Hotel	100	100	100	36,500	3,618	3,618	3,618	1,320,729
Health Club	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Place of Worship	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
General Office Building	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
High Turnover (Sit Down Restaurant)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Recreational Swimming Pool	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Arena	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

5.9.2. Mitigated

Land Use Type	Trips/Weekday	Trips/Saturday	Trips/Sunday	Trips/Year	VMT/Weekday	VMT/Saturday	VMT/Sunday	VMT/Year
Hotel	100	100	100	36,500	3,618	3,618	3,618	1,320,729
Health Club	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Place of Worship	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

General Office Building	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
High Turnover (Sit Down Restaurant)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Recreational Swimming Pool	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Arena	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

5.10. Operational Area Sources

5.10.1. Hearths

5.10.1.1. Unmitigated

5.10.1.2. Mitigated

5.10.2. Architectural Coatings

Residential Interior Area Coated (sq ft)	Residential Exterior Area Coated (sq ft)	Non-Residential Interior Area Coated (sq ft)	Non-Residential Exterior Area Coated (sq ft)	Parking Area Coated (sq ft)
0	0.00	314,039	104,680	19,282

5.10.3. Landscape Equipment

Season	Unit	Value
Snow Days	day/yr	0.00
Summer Days	day/yr	250

5.10.4. Landscape Equipment - Mitigated

Season	Unit	Value
Snow Days	day/yr	0.00
Summer Days	day/yr	250

5.11. Operational Energy Consumption

5.11.1. Unmitigated

Electricity (kWh/yr) and CO2 and CH4 and N2O and Natural Gas (kBTU/yr)

Land Use	Electricity (kWh/yr)	CO2	CH4	N2O	Natural Gas (kBTU/yr)
Hotel	2,185,629	346	0.0330	0.0040	4,091,242
Health Club	89,416	346	0.0330	0.0040	402,057
Place of Worship	44,465	346	0.0330	0.0040	199,935
General Office Building	382,894	346	0.0330	0.0040	602,034
Other Non-Asphalt Surfaces	0.00	346	0.0330	0.0040	0.00
Other Asphalt Surfaces	0.00	346	0.0330	0.0040	0.00
High Turnover (Sit Down Restaurant)	1,236,591	346	0.0330	0.0040	4,029,648
Recreational Swimming Pool	0.00	346	0.0330	0.0040	0.00
Arena	10,987	346	0.0330	0.0040	49,405

5.11.2. Mitigated

Electricity (kWh/yr) and CO2 and CH4 and N2O and Natural Gas (kBTU/yr)

Land Use	Electricity (kWh/yr)	CO2	CH4	N2O	Natural Gas (kBTU/yr)
Hotel	2,185,629	346	0.0330	0.0040	4,091,242
Health Club	89,416	346	0.0330	0.0040	402,057
Place of Worship	44,465	346	0.0330	0.0040	199,935

General Office Building	382,894	346	0.0330	0.0040	602,034
Other Non-Asphalt Surfaces	0.00	346	0.0330	0.0040	0.00
Other Asphalt Surfaces	0.00	346	0.0330	0.0040	0.00
High Turnover (Sit Down Restaurant)	1,236,591	346	0.0330	0.0040	4,029,648
Recreational Swimming Pool	0.00	346	0.0330	0.0040	0.00
Arena	10,987	346	0.0330	0.0040	49,405

5.12. Operational Water and Wastewater Consumption

5.12.1. Unmitigated

Land Use	Indoor Water (gal/year)	Outdoor Water (gal/year)
Hotel	1,217,605	0.00
Health Club	554,467	0.00
Place of Worship	145,869	0.00
General Office Building	3,899,478	0.00
Other Non-Asphalt Surfaces	0.00	0.00
Other Asphalt Surfaces	0.00	0.00
High Turnover (Sit Down Restaurant)	10,703,813	0.00
Recreational Swimming Pool	35,841	0.00
Arena	496,247	0.00

5.12.2. Mitigated

Land Use	Indoor Water (gal/year)	Outdoor Water (gal/year)
Hotel	1,217,605	0.00
Health Club	554,467	0.00
Place of Worship	145,869	0.00

General Office Building	3,899,478	0.00
Other Non-Asphalt Surfaces	0.00	0.00
Other Asphalt Surfaces	0.00	0.00
High Turnover (Sit Down Restaurant)	10,703,813	0.00
Recreational Swimming Pool	35,841	0.00
Arena	496,247	0.00

5.13. Operational Waste Generation

5.13.1. Unmitigated

Land Use	Waste (ton/year)	Cogeneration (kWh/year)
Hotel	26.3	—
Health Club	53.4	—
Place of Worship	26.6	—
General Office Building	20.4	—
Other Non-Asphalt Surfaces	0.00	—
Other Asphalt Surfaces	0.00	—
High Turnover (Sit Down Restaurant)	420	—
Recreational Swimming Pool	3.45	—
Arena	0.03	—

5.13.2. Mitigated

Land Use	Waste (ton/year)	Cogeneration (kWh/year)
Hotel	26.3	—
Health Club	53.4	—
Place of Worship	26.6	—
General Office Building	20.4	—

Other Non-Asphalt Surfaces	0.00	—
Other Asphalt Surfaces	0.00	—
High Turnover (Sit Down Restaurant)	420	—
Recreational Swimming Pool	3.45	—
Arena	0.03	—

5.14. Operational Refrigeration and Air Conditioning Equipment

5.14.1. Unmitigated

Land Use Type	Equipment Type	Refrigerant	GWP	Quantity (kg)	Operations Leak Rate	Service Leak Rate	Times Serviced
Hotel	Household refrigerators and/or freezers	R-134a	1,430	0.00	0.60	0.00	1.00
Hotel	Other commercial A/C and heat pumps	R-410A	2,088	1.80	4.00	4.00	18.0
Hotel	Walk-in refrigerators and freezers	R-404A	3,922	< 0.005	7.50	7.50	20.0
Health Club	Other commercial A/C and heat pumps	R-410A	2,088	< 0.005	4.00	4.00	18.0
Health Club	Stand-alone retail refrigerators and freezers	R-134a	1,430	0.04	1.00	0.00	1.00
Place of Worship	Household refrigerators and/or freezers	R-134a	1,430	0.02	0.60	0.00	1.00
Place of Worship	Other commercial A/C and heat pumps	R-410A	2,088	< 0.005	4.00	4.00	18.0
Place of Worship	Stand-alone retail refrigerators and freezers	R-134a	1,430	< 0.005	1.00	0.00	1.00
Place of Worship	Walk-in refrigerators and freezers	R-404A	3,922	< 0.005	7.50	7.50	20.0
General Office Building	Household refrigerators and/or freezers	R-134a	1,430	0.02	0.60	0.00	1.00

General Office Building	Other commercial A/C and heat pumps	R-410A	2,088	< 0.005	4.00	4.00	18.0
High Turnover (Sit Down Restaurant)	Household refrigerators and/or freezers	R-134a	1,430	0.00	0.60	0.00	1.00
High Turnover (Sit Down Restaurant)	Other commercial A/C and heat pumps	R-410A	2,088	1.80	4.00	4.00	18.0
High Turnover (Sit Down Restaurant)	Walk-in refrigerators and freezers	R-404A	3,922	< 0.005	7.50	7.50	20.0
Recreational Swimming Pool	Other commercial A/C and heat pumps	R-410A	2,088	< 0.005	4.00	4.00	18.0
Recreational Swimming Pool	Stand-alone retail refrigerators and freezers	R-134a	1,430	0.04	1.00	0.00	1.00
Arena	Other commercial A/C and heat pumps	R-410A	2,088	< 0.005	4.00	4.00	18.0
Arena	Stand-alone retail refrigerators and freezers	R-134a	1,430	0.04	1.00	0.00	1.00
Arena	Walk-in refrigerators and freezers	R-404A	3,922	< 0.005	7.50	7.50	20.0

5.14.2. Mitigated

Land Use Type	Equipment Type	Refrigerant	GWP	Quantity (kg)	Operations Leak Rate	Service Leak Rate	Times Serviced
Hotel	Household refrigerators and/or freezers	R-134a	1,430	0.00	0.60	0.00	1.00
Hotel	Other commercial A/C and heat pumps	R-410A	2,088	1.80	4.00	4.00	18.0
Hotel	Walk-in refrigerators and freezers	R-404A	3,922	< 0.005	7.50	7.50	20.0
Health Club	Other commercial A/C and heat pumps	R-410A	2,088	< 0.005	4.00	4.00	18.0

Health Club	Stand-alone retail refrigerators and freezers	R-134a	1,430	0.04	1.00	0.00	1.00
Place of Worship	Household refrigerators and/or freezers	R-134a	1,430	0.02	0.60	0.00	1.00
Place of Worship	Other commercial A/C and heat pumps	R-410A	2,088	< 0.005	4.00	4.00	18.0
Place of Worship	Stand-alone retail refrigerators and freezers	R-134a	1,430	< 0.005	1.00	0.00	1.00
Place of Worship	Walk-in refrigerators and freezers	R-404A	3,922	< 0.005	7.50	7.50	20.0
General Office Building	Household refrigerators and/or freezers	R-134a	1,430	0.02	0.60	0.00	1.00
General Office Building	Other commercial A/C and heat pumps	R-410A	2,088	< 0.005	4.00	4.00	18.0
High Turnover (Sit Down Restaurant)	Household refrigerators and/or freezers	R-134a	1,430	0.00	0.60	0.00	1.00
High Turnover (Sit Down Restaurant)	Other commercial A/C and heat pumps	R-410A	2,088	1.80	4.00	4.00	18.0
High Turnover (Sit Down Restaurant)	Walk-in refrigerators and freezers	R-404A	3,922	< 0.005	7.50	7.50	20.0
Recreational Swimming Pool	Other commercial A/C and heat pumps	R-410A	2,088	< 0.005	4.00	4.00	18.0
Recreational Swimming Pool	Stand-alone retail refrigerators and freezers	R-134a	1,430	0.04	1.00	0.00	1.00
Arena	Other commercial A/C and heat pumps	R-410A	2,088	< 0.005	4.00	4.00	18.0
Arena	Stand-alone retail refrigerators and freezers	R-134a	1,430	0.04	1.00	0.00	1.00
Arena	Walk-in refrigerators and freezers	R-404A	3,922	< 0.005	7.50	7.50	20.0

5.15. Operational Off-Road Equipment

5.15.1. Unmitigated

Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor

5.15.2. Mitigated

Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor

5.16. Stationary Sources

5.16.1. Emergency Generators and Fire Pumps

Equipment Type	Fuel Type	Number per Day	Hours per Day	Hours per Year	Horsepower	Load Factor

5.16.2. Process Boilers

Equipment Type	Fuel Type	Number	Boiler Rating (MMBtu/hr)	Daily Heat Input (MMBtu/day)	Annual Heat Input (MMBtu/yr)

5.17. User Defined

Equipment Type	Fuel Type

5.18. Vegetation

5.18.1. Land Use Change

5.18.1.1. Unmitigated

Vegetation Land Use Type	Vegetation Soil Type	Initial Acres	Final Acres

5.18.1.2. Mitigated

Vegetation Land Use Type	Vegetation Soil Type	Initial Acres	Final Acres

5.18.1. Biomass Cover Type

5.18.1.1. Unmitigated

Biomass Cover Type	Initial Acres	Final Acres

5.18.1.2. Mitigated

Biomass Cover Type	Initial Acres	Final Acres

5.18.2. Sequestration

5.18.2.1. Unmitigated

Tree Type	Number	Electricity Saved (kWh/year)	Natural Gas Saved (btu/year)

5.18.2.2. Mitigated

Tree Type	Number	Electricity Saved (kWh/year)	Natural Gas Saved (btu/year)

6. Climate Risk Detailed Report

6.1. Climate Risk Summary

Cal-Adapt midcentury 2040–2059 average projections for four hazards are reported below for your project location. These are under Representation Concentration Pathway (RCP) 8.5 which assumes GHG emissions will continue to rise strongly through 2050 and then plateau around 2100.

Climate Hazard	Result for Project Location	Unit
Temperature and Extreme Heat	29.8	annual days of extreme heat

Extreme Precipitation	13.3	annual days with precipitation above 20 mm
Sea Level Rise	—	meters of inundation depth
Wildfire	30.1	annual hectares burned

Temperature and Extreme Heat data are for grid cell in which your project are located. The projection is based on the 98th historical percentile of daily maximum/minimum temperatures from observed historical data (32 climate model ensemble from Cal-Adapt, 2040–2059 average under RCP 8.5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.
Extreme Precipitation data are for the grid cell in which your project are located. The threshold of 20 mm is equivalent to about ¾ an inch of rain, which would be light to moderate rainfall if received over a full day or heavy rain if received over a period of 2 to 4 hours. Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.
Sea Level Rise data are for the grid cell in which your project are located. The projections are from Radke et al. (2017), as reported in Cal-Adapt (Radke et al., 2017, CEC-500-2017-008), and consider inundation location and depth for the San Francisco Bay, the Sacramento-San Joaquin River Delta and California coast resulting different increments of sea level rise coupled with extreme storm events. Users may select from four scenarios to view the range in potential inundation depth for the grid cell. The four scenarios are: No rise, 0.5 meter, 1.0 meter, 1.41 meters
Wildfire data are for the grid cell in which your project are located. The projections are from UC Davis, as reported in Cal-Adapt (2040–2059 average under RCP 8.5), and consider historical data of climate, vegetation, population density, and large (> 400 ha) fire history. Users may select from four model simulations to view the range in potential wildfire probabilities for the grid cell. The four simulations make different assumptions about expected rainfall and temperature are: Warmer/drier (HadGEM2-ES), Cooler/wetter (CNRM-CM5), Average conditions (CanESM2), Range of different rainfall and temperature possibilities (MIROC5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.

6.2. Initial Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score	Vulnerability Score
Temperature and Extreme Heat	4	0	0	N/A
Extreme Precipitation	N/A	N/A	N/A	N/A
Sea Level Rise	1	0	0	N/A
Wildfire	1	0	0	N/A
Flooding	N/A	N/A	N/A	N/A
Drought	N/A	N/A	N/A	N/A
Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	0	0	0	N/A

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.
The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.
The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores do not include implementation of climate risk reduction measures.

6.3. Adjusted Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score	Vulnerability Score
Temperature and Extreme Heat	4	1	1	4
Extreme Precipitation	N/A	N/A	N/A	N/A
Sea Level Rise	1	1	1	2
Wildfire	1	1	1	2
Flooding	N/A	N/A	N/A	N/A
Drought	N/A	N/A	N/A	N/A
Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	1	1	1	2

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.
The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.
The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores include implementation of climate risk reduction measures.

6.4. Climate Risk Reduction Measures

7. Health and Equity Details

7.1. CalEnviroScreen 4.0 Scores

The maximum CalEnviroScreen score is 100. A high score (i.e., greater than 50) reflects a higher pollution burden compared to other census tracts in the state.

Indicator	Result for Project Census Tract
Exposure Indicators	—
AQ-Ozone	99.1
AQ-PM	15.3
AQ-DPM	2.59
Drinking Water	42.0
Lead Risk Housing	36.7
Pesticides	0.00

Toxic Releases	35.8
Traffic	3.75
Effect Indicators	—
CleanUp Sites	5.64
Groundwater	35.0
Haz Waste Facilities/Generators	0.00
Impaired Water Bodies	58.7
Solid Waste	87.2
Sensitive Population	—
Asthma	45.6
Cardio-vascular	75.6
Low Birth Weights	10.6
Socioeconomic Factor Indicators	—
Education	15.8
Housing	72.6
Linguistic	—
Poverty	53.9
Unemployment	—

7.2. Healthy Places Index Scores

The maximum Health Places Index score is 100. A high score (i.e., greater than 50) reflects healthier community conditions compared to other census tracts in the state.

Indicator	Result for Project Census Tract
Economic	—
Above Poverty	42.38419094
Employed	31.70794303
Median HI	23.4826126
Education	—

Bachelor's or higher	43.17977672
High school enrollment	100
Preschool enrollment	60.00256641
Transportation	—
Auto Access	40.33106634
Active commuting	1.039394328
Social	—
2-parent households	59.01450019
Voting	84.80687797
Neighborhood	—
Alcohol availability	79.49441807
Park access	81.35506224
Retail density	0.757089696
Supermarket access	2.399589375
Tree canopy	94.6875401
Housing	—
Homeownership	69.85756448
Housing habitability	33.99204414
Low-inc homeowner severe housing cost burden	18.91441037
Low-inc renter severe housing cost burden	42.409855
Uncrowded housing	86.21840113
Health Outcomes	—
Insured adults	85.29449506
Arthritis	0.0
Asthma ER Admissions	72.4
High Blood Pressure	0.0
Cancer (excluding skin)	0.0

Asthma	0.0
Coronary Heart Disease	0.0
Chronic Obstructive Pulmonary Disease	0.0
Diagnosed Diabetes	0.0
Life Expectancy at Birth	57.5
Cognitively Disabled	35.0
Physically Disabled	41.1
Heart Attack ER Admissions	74.1
Mental Health Not Good	0.0
Chronic Kidney Disease	0.0
Obesity	0.0
Pedestrian Injuries	77.9
Physical Health Not Good	0.0
Stroke	0.0
Health Risk Behaviors	—
Binge Drinking	0.0
Current Smoker	0.0
No Leisure Time for Physical Activity	0.0
Climate Change Exposures	—
Wildfire Risk	95.4
SLR Inundation Area	0.0
Children	3.5
Elderly	53.1
English Speaking	84.3
Foreign-born	0.6
Outdoor Workers	23.8
Climate Change Adaptive Capacity	—

Impervious Surface Cover	92.5
Traffic Density	7.9
Traffic Access	23.0
Other Indices	—
Hardship	40.2
Other Decision Support	—
2016 Voting	86.2

7.3. Overall Health & Equity Scores

Metric	Result for Project Census Tract
CalEnviroScreen 4.0 Score for Project Location (a)	34.0
Healthy Places Index Score for Project Location (b)	48.0
Project Located in a Designated Disadvantaged Community (Senate Bill 535)	No
Project Located in a Low-Income Community (Assembly Bill 1550)	Yes
Project Located in a Community Air Protection Program Community (Assembly Bill 617)	No

a: The maximum CalEnviroScreen score is 100. A high score (i.e., greater than 50) reflects a higher pollution burden compared to other census tracts in the state.
b: The maximum Health Places Index score is 100. A high score (i.e., greater than 50) reflects healthier community conditions compared to other census tracts in the state.

7.4. Health & Equity Measures

No Health & Equity Measures selected.

7.5. Evaluation Scorecard

Health & Equity Evaluation Scorecard not completed.

7.6. Health & Equity Custom Measures

No Health & Equity Custom Measures created.

8. User Changes to Default Data

Screen	Justification

Characteristics: Project Details	changed locational context from NA to Rural
Land Use	Land uses entered to match project description, hotel rooms = dorm buildings
Construction: Construction Phases	Construction phases updated to match applicant construction schedule
Operations: Vehicle Data	Updated vehicle trip data to match traffic study, 7-day average ADT: employee trips 50 per day, bus trips with 50 student campers per bus = 29, adults 21 trips per day. total ADT =100

Appendix I

Acoustical Assessment

Acoustical Assessment
Hume SoCal Camp Expansion Project
County of San Bernardino, California

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Appendix A: Existing Ambient Noise Measurements
Appendix B: Noise Modeling Data

LIST OF ABBREVIATED TERMS

ADT	average daily traffic
dBA	A-weighted sound level
CEQA	California Environmental Quality Act
CNEL	community equivalent noise level
L_{dn}	day-night noise level
dB	decibel
L_{eq}	equivalent noise level
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
HVAC	heating ventilation and air conditioning
Hz	hertz
in/sec	inches per second
L_{max}	maximum noise level
µPa	micropascals
L_{min}	minimum noise level
PPV	peak particle velocity
RMS	root mean square
VdB	vibration velocity decibels

1 INTRODUCTION

This report documents the results of an Acoustical Assessment completed for the Hume SoCal Camp Expansion Project ("Project" or "Proposed Project"). The purpose of this Acoustical Assessment is to evaluate the potential construction and operational noise and vibration levels associated with the Project and determine the level of impact the Project would have on the environment.

1.1 Project Location and Setting

The Project site is approximately 251 acres located in an unincorporated mountain region of San Bernardino County, along Green Valley Lake Road and approximately 0.4 miles northwest of State Route 18 (SR-18); refer to **Exhibit 1: Regional Location Map**. Surrounding the Project site is the Green Valley Lake Community to the north, the Running Springs to the southwest, and the City of Big Bear to the east, as shown in **Exhibit 2: Local Vicinity Map**.

A portion of the Project site is currently developed with improvements related to the existing Hume SoCal campground facilities. The remaining surrounding areas are vacant and contain forest land. The Project land use designation is Rural Living (RL) per the San Bernardino County General Plan (Countywide Plan). The RL land use area primarily allows for the development of residential development. Typical uses within RL land use areas also include public and quasi-public facilities such as parks, religious facilities and schools. The Project area is also located within the Hilltop Community Plan which allows for larger-scale master planned developments which can include a combination of residential, commercial, and/ or manufacturing activities that maximizes the utilization of natural and human-generated resources in rural areas.

1.2 Project Description

The Project involves the expansion of campground uses for the existing Southern California Hume Lake Christian Camp (Hume SoCal) campground to accommodate up to an additional 3,000 occupants. This would be accomplished with existing campground structures as well as the development of additional campground and recreational facilities and uses within a 251-acre area of the Green Valley Lake community, refer to **Exhibit 3: Conceptual Site Plan**. New campground structures proposed for the Project would be developed in five phases.

Each phase of the Project would include the development of expanded infrastructure, additional amenities, support structures, and buildings necessary to accommodate expanded camper capacity as well as paved parking areas and paved access roadways.

Phase 1 of the Project would involve the development of facilities to be used as a Junior High Camp. Proposed residential structures within the Phase 1 area include an expanded welcome center, private administration and guest speaker residences, staff housing, and student dormitories. Phase 1 also includes the development of a gymnasium, bus parking, a snack shop, a chapel, converting an existing chapel to a small meeting space, an expansion to the existing dining hall, a maintenance building, an amphitheater, and restrooms. Outdoor recreation facilities include grass quads. Existing and proposed facilities within Phase 1 would accommodate up to 784 occupants.

Phase 2 of the Project would involve the development of facilities to be used as a High School Camp. Proposed residential structures within the Phase 2 area include staff housing buildings and student dormitories. Phase 2 also includes the development of a large dining hall, gymnasium, a chapel, amphitheater, and restrooms. Outdoor recreation facilities include grass quads, a swimming pool, and a recreation pond. Existing and proposed facilities within Phase 2 would accommodate up to 1,000 occupants.

Phase 3 of the Project proposes the development of an Adult Lodge. Phase 3 would include the development of one adult lodge with included access road. Existing and proposed facilities within Phase 3 would accommodate up to 140 occupants.

Phase 4 of the Project would include the development of an Elementary Age Camp and associated facilities. Proposed residential structures within Phase 4 include student yurt tents. Phase 4 also includes the development of restroom facilities with showers and an amphitheater. Outdoor recreation facilities include grass quads, a dining canopy, a swimming pool, and a recreation pond. Existing and proposed facilities within Phase 4 would accommodate up to 500 occupants.

Phase 5 of the Project proposes the creation of a tent-based youth camp, Wildwood Camp. Residential structures proposed for this phase consist of yurt tents. Phase 5 also includes the development of restroom facilities with showers and an amphitheater. Outdoor recreation facilities include grass quads, a dining canopy, a swimming pool, and a recreation pond. Existing and proposed facilities within Phase 5 would accommodate up to 130 occupants.

Project Phasing and Construction

Although the Project is anticipated to be constructed in five phases, to analyze a worst-case scenario, construction modeling assumed all five phases of the Project would be constructed simultaneously and completed within two years, beginning in June 2025 and finishing in June 2027.

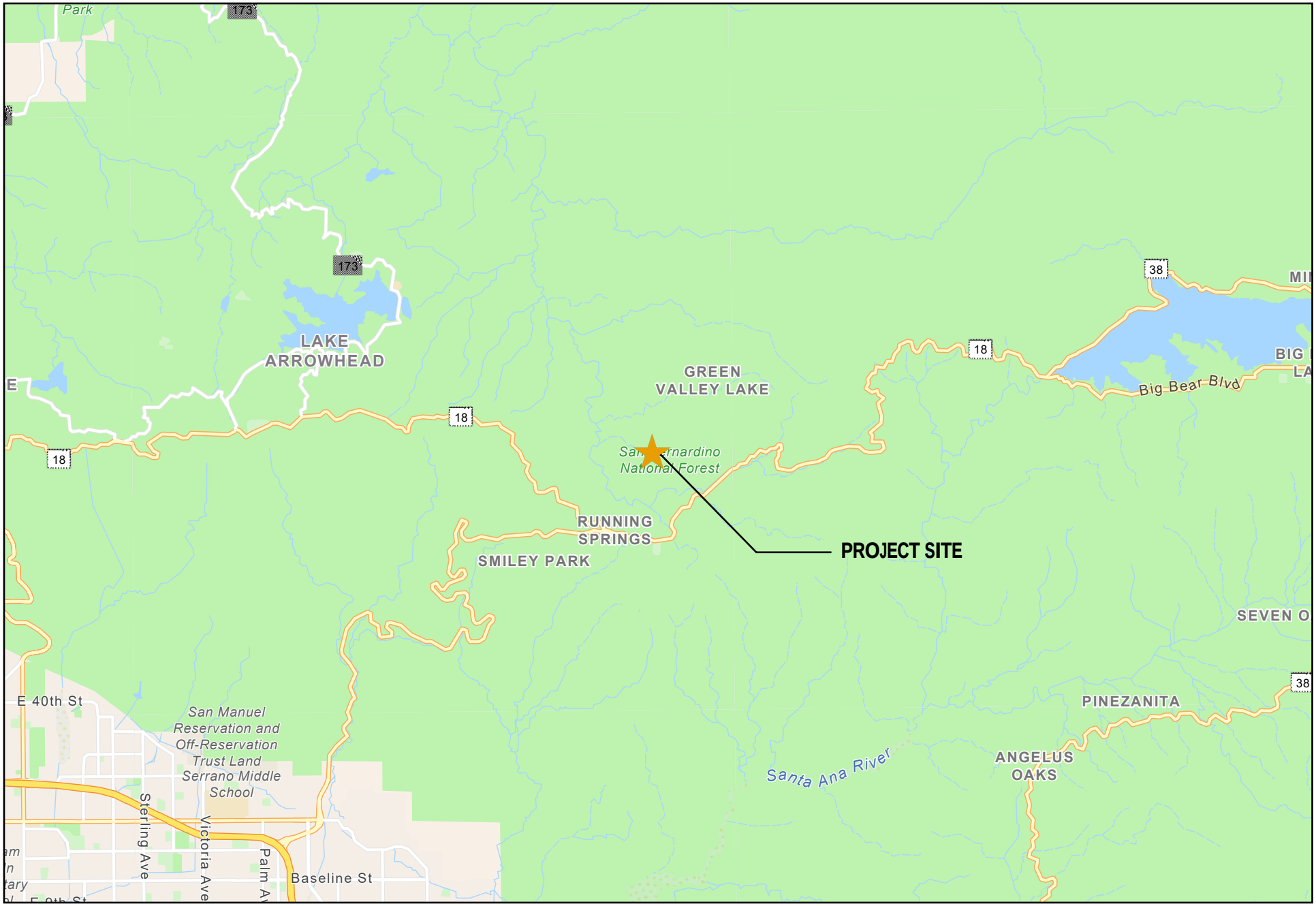


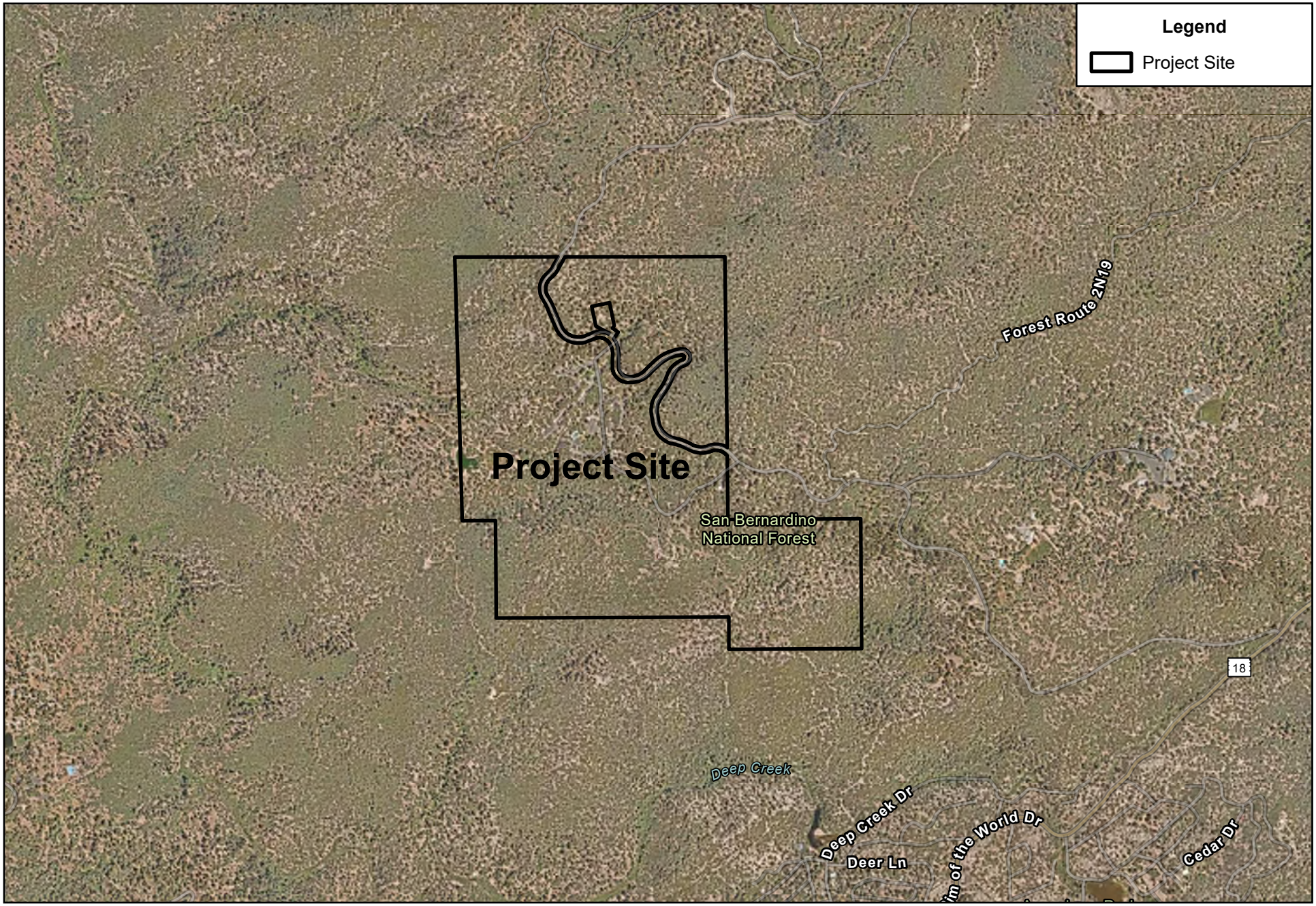
Exhibit 1: Regional Location Map

Hume SoCal Campground Expansion Project

San Bernardino County

Not to scale

Kimley»Horn



Source: Nearmap, 2023.

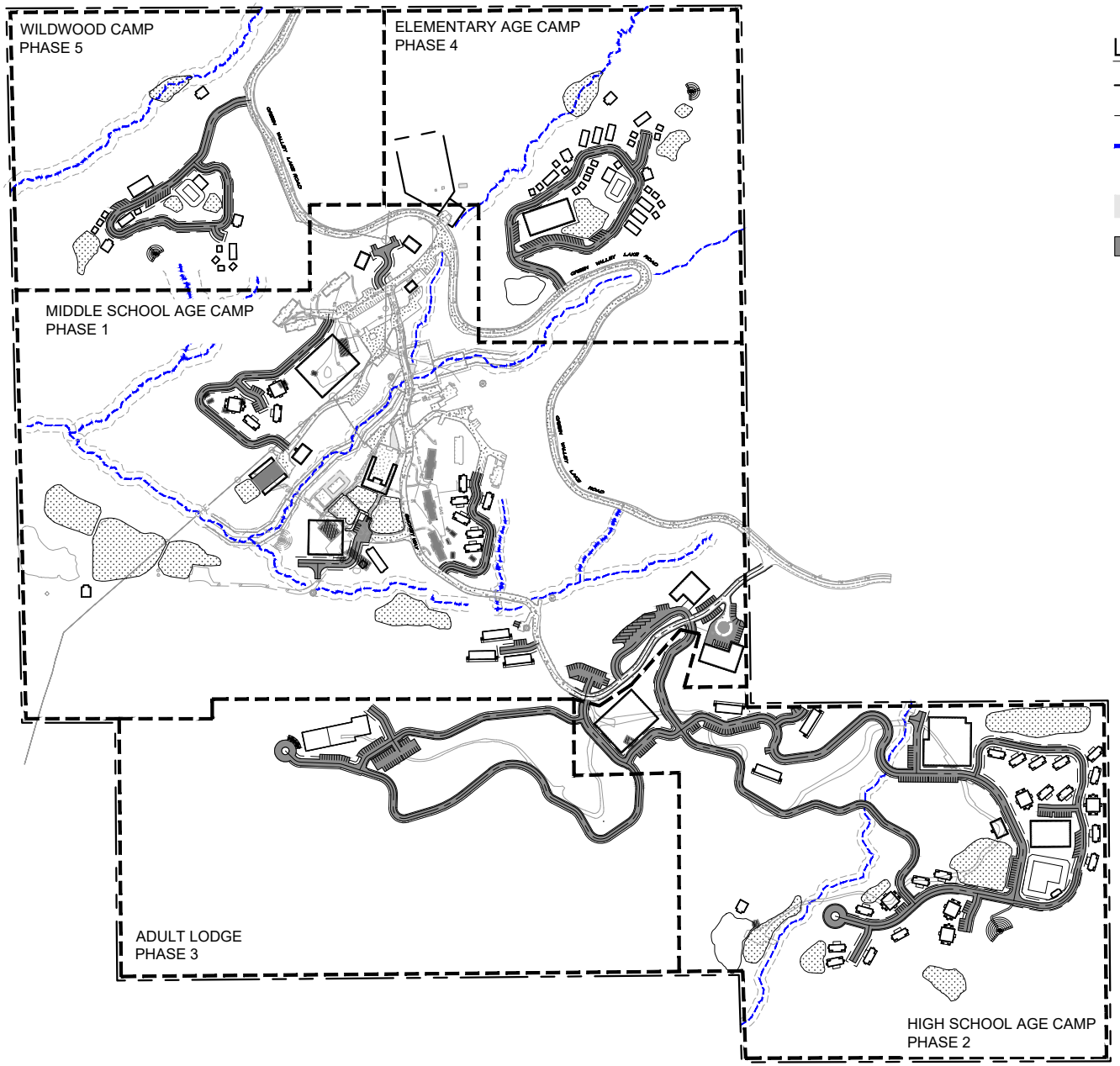
Exhibit 2: Local Vicinity Map

Hume SoCal Campground Expansion Project

San Bernardino County

Not to scale

Kimley»Horn



Source: Kimley-Horn, 2025.

Exhibit 3: Conceptual Site Plan

Hume SoCal Campground Expansion Project
San Bernardino County

Not to scale

Kimley»Horn

2 ACOUSTIC FUNDAMENTALS

2.1 Sound and Environmental Noise

Acoustics is the science of sound. Sound can be described as the mechanical energy of a vibrating object transmitted by pressure waves through a medium (e.g., air) to human (or animal) ear. If the pressure variations occur frequently enough (at least 20 times per second), they can be heard and are called sound. The number of pressure variations per second is called the frequency of sound and is expressed as cycles per second, or hertz (Hz).

Noise is defined as loud, unexpected, or annoying sound. The fundamental acoustics model consists of a noise source, a receptor, and the propagation path between the two. The loudness of the noise source, obstructions, or atmospheric factors affecting the propagation path, determine the perceived sound level and noise characteristics at the receptor. Acoustics deal primarily with the propagation and control of sound. A typical noise environment consists of a base of steady background noise that is the sum of many distant and indistinguishable noise sources. The sound from individual local sources is superimposed on this background noise. These sources can vary from an occasional aircraft or train passing by to continuous noise from traffic on a major highway. Perceptions of sound and noise are highly subjective from person to person.

Measuring sound directly in terms of pressure would require a large range of numbers. To avoid this, the decibel (dB) scale was devised. The dB scale uses the hearing threshold of 20 micropascals (µPa) as a point of reference, defined as 0 dB. Other sound pressures are then compared to this reference pressure, and the logarithm is taken to keep the numbers in a practical range. The dB scale allows a million-fold increase in pressure to be expressed as 120 dB, and changes in levels correspond closely to human perception of relative loudness. **Table 1: Typical Noise Levels** provides typical noise levels.

Table 1: Typical Noise Levels

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	– 110 –	Rock Band
Jet fly-over at 1,000 feet		
	– 100 –	
Gas lawnmower at 3 feet		
	– 90 –	
Diesel truck at 50 feet at 50 miles per hour		Food blender at 3 feet
	– 80 –	Garbage disposal at 3 feet
Noisy urban area, daytime		
Gas lawnmower, 100 feet	**– 70 –**	Vacuum cleaner at 10 feet
Commercial area		Normal Speech at 3 feet
Heavy traffic at 300 feet	**– 60 –**	
		Large business office
Quiet urban daytime	**– 50 –**	Dishwasher in next room
Quiet urban nighttime	**– 40 –**	Theater, large conference room (background)
Quiet suburban nighttime		
	– 30 –	Library
Quiet rural nighttime		Bedroom at night, concert hall (background)
	– 20 –	
		Broadcast/recording studio
	– 10 –	
Lowest threshold of human hearing	**– 0 –**	Lowest threshold of human hearing

Source: California Department of Transportation, *Technical Noise Supplement to the Traffic Noise Analysis Protocol*, September 2013.

Noise Descriptors

The dB scale alone does not adequately characterize how humans perceive noise. The dominant frequencies of a sound have a substantial effect on the human response to that sound. Several rating scales have been developed to analyze the adverse effect of community noise on people. Because environmental noise fluctuates over time, these scales consider that the effect of noise on people is largely dependent on the total acoustical energy content of the noise, as well as the time of day when the noise occurs. Most commonly, environmental sounds are described in terms of equivalent noise level (L_{eq}) that has the same acoustical energy as the summation of all the time-varying events. While L_{eq} represents the continuous sound pressure level over the measurement period, the day-night noise level (L_{dn}) and Community Equivalent Noise Level (CNEL) are measures of energy average during a 24-hour period, with dB weighted sound levels from 7:00 p.m. to 7:00 a.m. Each is applicable to this analysis and defined in **Table 2: Definitions of Acoustical Terms**.

Table 2: Definitions of Acoustical Terms

Term	Definitions
Decibel (dB)	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure. The reference pressure for air is 20.
Sound Pressure Level	Sound pressure is the sound force per unit area, usually expressed in µPa (or 20 micronewtons per square meter), where 1 pascal is the pressure resulting from a force of 1 newton exerted over an area of 1 square meter. The sound pressure level is expressed in dB as 20 times the logarithm to the base 10 of the ratio between the pressures exerted by the sound to a reference sound pressure (e.g., 20 µPa). Sound pressure level is the quantity that is directly measured by a sound level meter.
Frequency (Hz)	The number of complete pressure fluctuations per second above and below atmospheric pressure. Normal human hearing is between 20 Hz and 20,000 Hz. Infrasonic sound are below 20 Hz and ultrasonic sounds are above 20,000 Hz.
A-Weighted Sound Level (dBA)	The sound pressure level in dB as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise.
Equivalent Noise Level (L_{eq})	The average acoustic energy content of noise for a stated period of time. Thus, the L_{eq} of a time-varying noise and that of a steady noise are the same if they deliver the same acoustic energy to the ear during exposure. For evaluating community impacts, this rating scale does not vary, regardless of whether the noise occurs during the day or the night.
Maximum Noise Level (L_{max}) Minimum Noise Level (L_{min})	The maximum and minimum dBA during the measurement period.
Exceeded Noise Levels (L_{01}, L_{10}, L_{50}, L_{90})	The dBA values that are exceeded 1%, 10%, 50%, and 90% of the time during the measurement period.
Day-Night Noise Level (L_{dn})	A 24-hour average L_{eq} with a 10 dBA weighting added to noise during the hours of 10:00 p.m. to 7:00 a.m. to account for noise sensitivity at nighttime. The logarithmic effect of these additions is that a 60 dBA 24-hour L_{eq} would result in a measurement of 66.4 dBA L_{dn}.
Community Noise Equivalent Level (CNEL)	A 24-hour average L_{eq} with a 5 dBA weighting during the hours of 7:00 a.m. to 10:00 a.m. and a 10 dBA weighting added to noise during the hours of 10:00 p.m. to 7:00 a.m. to account for noise sensitivity in the evening and nighttime, respectively. The logarithmic effect of these additions is that a 60 dBA 24-hour L_{eq} would result in a measurement of 66.7 dBA CNEL.
Ambient Noise Level	The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.

Table 2: Definitions of Acoustical Terms	
Term	**Definitions**
Intrusive	That noise which intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends on its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level.

Because sound levels can vary markedly over a short period of time, a method for describing either the sound's average character (L_{eq}) or the variations' statistical behavior (L_{XX}) must be utilized. The scientific instrument used to measure noise is the sound level meter. Sound level meters can accurately measure environmental noise levels to within about plus or minus 1 dBA. Various computer models are used to predict environmental noise levels from sources, such as roadways and airports. The predicted models' accuracy depends on various factors, such as the distance between the noise receptor and the noise source, the character of the ground surface (e.g., hard or soft), and the presence or absence of structures (e.g., walls or buildings) or topography, and how well model inputs reflect these conditions.

A-Weighted Decibels

The perceived loudness of sounds is dependent on many factors, including sound pressure level and frequency content. However, within the usual range of environmental noise levels, perception of loudness is relatively predictable and can be approximated by dBA values. There is a strong correlation between dBA and the way the human ear perceives sound. For this reason, the dBA has become the standard tool of environmental noise assessment. All noise levels reported in this document are in terms of dBA, but are expressed as dB, unless otherwise noted.

Addition of Decibels

The dB scale is logarithmic, not linear, and therefore sound levels cannot be added or subtracted through ordinary arithmetic. Two sound levels 10 dB apart differ in acoustic energy by a factor of 10.[1] When the standard logarithmic dB is A-weighted, an increase of 10 dBA is generally perceived as a doubling in loudness. For example, a 70-dBA sound is half as loud as an 80-dBA sound and twice as loud as a 60-dBA sound.[2] When two identical sources are each producing sound of the same loudness, the resulting sound level at a given distance would be 3 dBA higher than one source under the same conditions.[3] Under the dB scale, three sources of equal loudness together would produce an increase of approximately 5 dBA.

Sound Propagation and Attenuation

Sound spreads (propagates) uniformly outward in a spherical pattern, and the sound level decreases (attenuates) at a rate of approximately 6 dB for each doubling of distance from a stationary or point source. Sound from a line source, such as a highway, propagates outward in a cylindrical pattern. Sound levels attenuate at a rate of approximately 3 dB for each doubling of distance from a line source, such as a roadway, depending on ground surface characteristics.[4] No excess attenuation is assumed for hard

1 California Department of Transportation, Technical Noise Supplement to the Traffic Noise Analysis Protocol, September 2013.

2 *Noise Sources and Their Effects*. Available at: https://www.chem.purdue.edu/chemsafety/Training/PPETrain/dblevels.htm

3 FHWA, *Noise Fundamentals,* 2017. Available at: https://www.fhwa.dot.gov/environMent/noise/regulations_and_guidance/polguide/polguide02.cfm

4 California Department of Transportation, *Technical Noise Supplement to the Traffic Noise Analysis Protocol*, Page 2-29, September 2013.

surfaces like a parking lot or a body of water. Soft surfaces, such as soft dirt or grass, can absorb sound, so an excess ground-attenuation value of 1.5 dB per doubling of distance is normally assumed in this report.

Noise levels may also be reduced by intervening structures; generally, a single row of buildings between the noise receptor and the noise source reduces the noise level by about 5 dBA, while a solid wall or berm can reduce noise levels by 5 to 15 dBA.[5] The way older homes in California were constructed generally provides a reduction of exterior-to-interior noise levels of about 20 to 25 dBA with closed windows. The exterior-to-interior reduction of newer residential units is generally 30 dBA or more.

Human Response to Noise

The human response to environmental noise is subjective and varies considerably from individual to individual. Noise in the community has often been cited as a health problem, not in terms of actual physiological damage, such as hearing impairment, but in terms of inhibiting general well-being and contributing to undue stress and annoyance. The health effects of noise in the community arise from interference with human activities, including sleep, speech, recreation, and tasks that demand concentration or coordination. Hearing loss can occur at the highest noise intensity levels.

Noise environments and consequences of human activities are usually well represented by median noise levels during the day or night or over a 24-hour period. Environmental noise levels are generally considered low when the CNEL is below 60 dBA, moderate in the 60 to 70 dBA range, and high above 70 dBA. Examples of low daytime levels are isolated, natural settings with noise levels as low as 20 dBA and quiet, suburban, residential streets with noise levels around 40 dBA.[6] Noise levels above 45 dBA at night can disrupt sleep. Examples of moderate-level noise environments are urban residential or semi-commercial areas (typically 55 to 60 dBA) and commercial locations (typically 60 dBA). People may consider louder environments adverse, but most will accept the higher levels associated with noisier urban residential or residential-commercial areas (60 to 75 dBA) or dense urban or industrial areas (65 to 80 dBA). Regarding increases in dBA, the following relationships should be noted[7]:

- Except in carefully controlled laboratory experiments, a 1-dBA change cannot be perceived by humans.
- Outside of the laboratory, a 3-dBA change is considered a just-perceivable difference.
- A minimum 5-dBA change is required before any noticeable change in community response would be expected. A 5-dBA increase is typically considered substantial.
- A 10-dBA change is subjectively heard as an approximate doubling in loudness and would almost certainly cause an adverse change in community response.

5 Federal Highway Administration, Highway Traffic and Construction Noise - Problem and Response**,** April 2006.

6 Compiled from James P. Cowan, *Handbook of Environmental Acoustics,* 1994 and Cyril M. Harris, Handbook of Noise Control, 1979.

7 Compiled from California Department of Transportation, *Technical Noise Supplement to the Traffic Noise Analysis Protocol*, September 2013, and FHWA, *Noise Fundamentals,* 2017.

Effects of Noise on People

Hearing Loss. While physical damage to the ear from an intense noise impulse is rare, a degradation of auditory acuity can occur even within a community noise environment. Hearing loss occurs mainly due to chronic exposure to excessive noise but may be due to a single event such as an explosion. Natural hearing loss associated with aging may also be accelerated from chronic exposure to loud noise. The Occupational Safety and Health Administration has a noise exposure standard that is set at the noise threshold where hearing loss may occur from long-term exposures. The maximum allowable level is 90 dBA averaged over 8 hours. If the noise is above 90 dBA, the allowable exposure time is correspondingly shorter.[8]

Annoyance. Attitude surveys are used for measuring the annoyance felt in a community for noises intruding into homes or affecting outdoor activity areas. In these surveys, it was determined that causes for annoyance include interference with speech, radio and television, house vibrations, and interference with sleep and rest. The L_{dn} as a measure of noise has been found to provide a valid correlation of noise level and the percentage of people annoyed. People have been asked to judge the annoyance caused by aircraft noise and ground transportation noise. There continues to be disagreement about the relative annoyance of these different sources. A noise level of about 55 dBA L_{dn} is the threshold at which a substantial percentage of people begin to report annoyance.[9]

2.2 Groundborne Vibration

Sources of groundborne vibrations include natural phenomena (earthquakes, volcanic eruptions, sea waves, landslides, etc.) or man-made causes (explosions, machinery, traffic, trains, construction equipment, etc.). Vibration sources may be continuous (e.g., factory machinery) or transient (e.g., explosions or heavy equipment use during construction). Ground vibration consists of rapidly fluctuating motions or waves with an average motion of zero. Several different methods are typically used to quantify vibration amplitude. One is the peak particle velocity (PPV); another is the root mean square (RMS) velocity. The PPV is defined as the maximum instantaneous positive or negative peak of the vibration wave and is expressed in terms of inches-per- second (in/sec). The RMS velocity is defined as the average of the squared amplitude of the signal and is expressed in terms of velocity decibels (VdB). The PPV and RMS vibration velocity amplitudes are used to evaluate human response to vibration.

Table 3: Human Reaction and Damage to Buildings for Continuous or Frequent Intermittent Vibrations, displays the reactions of people and the effects on buildings produced by continuous vibration levels. The annoyance levels shown in the table should be interpreted with care since vibration may be found to be annoying at much lower levels than those listed, depending on the level of activity or the individual's sensitivity. To sensitive individuals, vibrations approaching the threshold of perception can be annoying. Low-level vibrations frequently cause irritating secondary vibration, such as a slight rattling of windows, doors, or stacked dishes. The rattling sound can give rise to exaggerated vibration complaints, even though there is very little risk of actual structural damage. In high noise environments, which are more prevalent where groundborne vibration approaches perceptible levels, this rattling phenomenon may also be produced by loud airborne environmental noise causing induced vibration in exterior doors and windows.

[8] U.S. Department of Labor, Occupational Safety and Health Standards, *29 CFR 1910* (Occupational Noise Exposure).
[9] Federal Interagency Committee on Noise, Federal Agency Review of Selected Airport Noise Analysis Issues, August 1992.

Ground vibration can be a concern in instances where buildings shake, and substantial rumblings occur. However, it is unusual for vibration from typical urban sources such as buses and heavy trucks to be perceptible. Common sources for groundborne vibration are planes, trains, and construction activities such as earth-moving which requires the use of heavy-duty earth moving equipment. For the purposes of this analysis, a PPV descriptor with units of inches per second (in/sec) is used to evaluate construction-generated vibration for building damage and human complaints.

Table 3: Human Reaction and Damage to Buildings for Continuous or Frequent Intermittent Vibrations

Maximum PPV (in/sec)	Vibration Annoyance Potential Criteria	Vibration Damage Potential Threshold Criteria	FTA Vibration Damage Criteria
0.008	--	Extremely fragile historic buildings, ruins, ancient monuments	--
0.01	Barely Perceptible	--	--
0.04	Distinctly Perceptible	--	--
0.1	Strongly Perceptible	Fragile buildings	--
0.12	--	--	Buildings extremely susceptible to vibration damage
0.2	--	--	Non-engineered timber and masonry buildings
0.25	--	Historic and some old buildings	--
0.3	--	Older residential structures	Engineered concrete and masonry (no plaster)
0.4	Severe	--	--
0.5	--	New residential structures, Modern industrial/commercial buildings	Reinforced-concrete, steel or timber (no plaster)

PPV = peak particle velocity; in/sec = inches per second; FTA = Federal Transit Administration

Source: California Department of Transportation, *Transportation and Construction Vibration Guidance Manual*, 2020 and Federal Transit administration, Transit Noise and Vibration Assessment Manual, 2018.

3 REGULATORY SETTING

To limit population exposure to physically or psychologically damaging as well as intrusive noise levels, the federal government, the State of California, various county governments, and most municipalities in the State have established standards and ordinances to control noise.

3.1 Federal

Federal Transit Administration Noise and Vibration Guidance

The Federal Transit Administration (FTA) has published the Transit Noise and Vibration Impact Assessment Report to provide guidance on procedures for assessing impacts at different stages of transit Project development. The report covers both construction and operational noise impacts and describes a range of measures for controlling excessive noise and vibration. The report establishes a threshold of 80 dBA (8-hour L_{eq}) for residential uses and 85 dBA (8-hour L_{eq}) for non-residential uses to evaluate construction noise impacts.[10] In general, the primary concern regarding vibration relates to potential damage from construction. The guidance document establishes criteria for evaluating the potential for damage for various structural categories from vibration.

3.2 State of California

California Government Code

California Government Code Section 65302(f) mandates that the legislative body of each county and city adopt a noise element as part of its comprehensive general plan. The local noise element must recognize the land use compatibility guidelines established by the State Department of Health Services. The guidelines rank noise land use compatibility in terms of "normally acceptable", "conditionally acceptable", "normally unacceptable", and "clearly unacceptable" noise levels for various land use types. Single-family homes are "normally acceptable" in exterior noise environments up to 60 CNEL and "conditionally acceptable" up to 70 CNEL. Multiple-family residential uses are "normally acceptable" up to 65 CNEL and "conditionally acceptable" up to 70 CNEL. Schools, libraries, and churches are "normally acceptable" up to 70 CNEL, as are office buildings and business, commercial, and professional uses.

Title 24 – Building Code

The State's noise insulation standards are codified in the California Code of Regulations, Title 24: Part 1, Building Standards Administrative Code, and Part 2, California Building Code. These noise standards are applied to new construction in California for interior noise compatibility from exterior noise sources. The regulations specify that acoustical studies must be prepared when noise-sensitive structures, such as residential buildings, schools, hotel rooms, or hospitals, are located near major transportation noise sources, and where such noise sources create an exterior noise level of 65 dBA CNEL or higher. Acoustical studies that accompany building plans must demonstrate that the structure has been designed to limit interior noise in habitable rooms to acceptable noise levels. For new multi-family residential buildings and habitable rooms (including hotels), the acceptable interior noise limit for new construction is 45 dBA CNEL.

[10] Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual, Table 7-2, Page 179, September 2018.

3.3 Local

County of San Bernardino General Plan

The San Bernardino County Countywide Plan was adopted in October 2020. The Hazards Element aims to protect life, property, and commerce from impacts associated with natural hazards, human-generated hazards, and increased risk due to climate change. The following policies are applicable to the Project:

Goal HZ-2: Human-Generated Hazards

Policy HZ-2.8: **Proximity to noise generating uses**. We limit or restrict new noise sensitive land uses in proximity to existing conforming noise generating uses and planned industrial areas.

Policy HZ-2.9: **Control sound at the source.** We prioritize noise mitigation measures that control sound at the source before buffers, soundwalls, and other perimeter measures.

County of San Bernardino Development Code

The County implements and enforces noise control through the San Bernardino County Development Code (SBCDC). The County's Noise Ordinance is included in SBCDC Chapter 83.01.080, Noise. The following sections of the SBCDC are relevant to the analysis:

Section 83.01.080(B), *Noise Impacted Areas*, identifies noise-sensitive land uses as residential uses, schools, hospitals, nursing homes, religious institutions, libraries, and similar uses.

Section 83.01.080(C)(1), *Noise Standards*, provides noise standards for stationary noise sources as shown in as shown in **Table 4: Noise Standards for Stationary Noise Sources**.

Table 4: Noise Standards for Stationary Noise Sources

Affected Land Uses (Receiving Noise)	7:00 a.m. – 10:00 p.m. L_{eq}	10:00 p.m. – 7:00 a.m. L_{eq}
Residential	55 dBA	45 dBA
Professional Services	55 dBA	55 dBA
Other Commercial	60 dBA	60 dBA
Industrial	70 dBA	70 dBA

L_{eq} = (Equivalent Energy Level). The sound level corresponding to a steady-state sound level containing the same total energy as a time-varying signal over a given sample period, typically one, eight or 24 hours. dBA = (A-weighted Sound Pressure Level). The sound pressure level, in decibels, as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound, placing greater emphasis on those frequencies within the sensitivity range of the human ear.
Source: San Bernardino County Development Code Section 83.01.080(C)(1)

Section 83.01.080(C)(2), *Noise Limit Categories*, provides noise limit categories. No person shall operate or cause to be operated a source of sound at a location or allow the creation of noise on property owned, leased, occupied, or otherwise controlled by the person, which causes the noise level, when measured on another property, either incorporated or unincorporated, to exceed any one of the following:

a) The noise standard for the receiving land use as specified in Section 83.01.080(B), above, for a cumulative period of more than 30 minutes in any hour.

b) The noise standard plus five dB(A) for a cumulative period of more than 15 minutes in any hour.

c) The noise standard plus ten dB(A) for a cumulative period of more than five minutes in any hour.

d) The noise standard plus 15 dB(A) for a cumulative period of more than one minute in any hour.

e) The noise standard plus 20 dB(A) for any period of time.

Section 83.01.080(D), *Noise Standards for Adjacent Mobile Noise Sources*, provides noise standards for adjacent mobile noise sources as shown in **Table 5: Noise Standards for Adjacent Mobile Noise Sources**. Noise from mobile sources that affects adjacent properties adversely shall be mitigated for any new development to a level that shall not exceed the standards described in **Table 5**.

Table 5: Noise Standards for Adjacent Mobile Noise Sources

Land Use		L_{dn} (or CNEL) dBA	
Categories	**Uses**	**Interior**	**Exterior**
Commercial	Hotel, motel, transient housing	45	60
Open Space	Park	N/A	65

CNEL = (Community Noise Equivalent Level). The average equivalent A-weighted sound level during a 24-hour day, obtained after addition of approximately five decibels to sound levels in the evening from 7:00 p.m. to 10:00 p.m. and ten decibels to sound levels in the night from 10:00 p.m. to 7:00 a.m. dBA = (A-weighted Sound Pressure Level). The sound pressure level, in decibels, as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound, placing greater emphasis on those frequencies within the sensitivity range of the human ear. Source: San Bernardino County Development Code Section 83.01.080(D)

Section 83.01.080(G), *Exempt Noise*, identifies noise sources that are exempt from the noise standards discussed above. Temporary construction, maintenance, repair, or demolition activities that occur between the hours of 7:00 a.m. and 7:00 p.m., except on Sundays and Federal holidays, are exempt from the noise standards.

Section 83.01.090(A), *Vibration Standard*, states that no ground vibration shall be allowed that can be felt without the aid of instruments at or beyond the lot line, nor shall any vibration be allowed which produces a particle velocity greater than or equal to two-tenths inches per second measured at or beyond the lot line.

4 EXISTING CONDITIONS

4.1 Existing Noise Sources

The Project area is characterized as a rural environment. The area is dominated by forest with scattered campgrounds and residential communities. Noise levels within the Project area depend on the proximity to roadways and various camp activities. Transportation related noise is the primary noise source in the area.

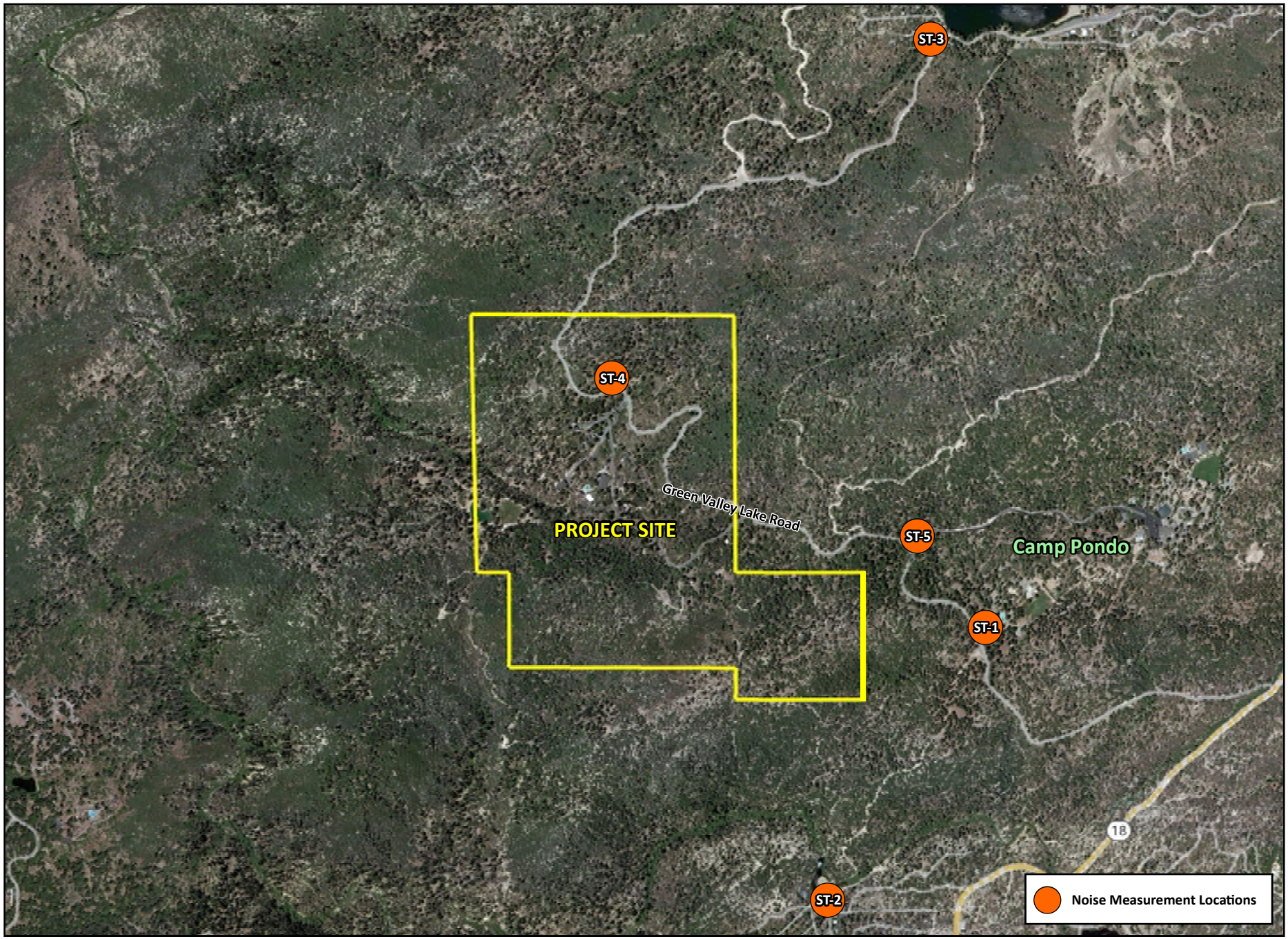
4.2 Noise Measurements

The Project area is primarily occupied by commercial (campground) uses. To quantify existing ambient noise levels in the Project area, Kimley-Horn conducted five short-term noise measurements on November 1, 2023; see **Appendix A: Existing Ambient Noise Measurements**. The noise measurement sites were representative of typical existing noise exposure within and immediately adjacent to the Project site. The 10-minute measurements were taken between 9:19 a.m. and 10:45 a.m. on a Wednesday. Measurements of L_{eq} are considered representative of the noise levels throughout the day. The average noise levels and sources of noise measured at each location are listed in **Table 6: Existing Noise Measurements** and shown on **Exhibit 4: Noise Measurement Locations**.

Table 6: Existing Noise Measurements

Site	Location	Measurement Period	Duration	L_{eq} (dBA)
Short-Term Noise Measurements				
ST-1	Northeast corner of Green Valley Lake Road and Camp Pondo entrance	9:19 – 9:29 a.m.	10 Minutes	57.8
ST-2	Northwest corner of Badger Lane and Deep Creek Drive	10:35 – 10:45 a.m.	10 Minutes	42.8
ST-3	Near overhead transformer	10:11 – 10:21 a.m.	10 Minutes	51.8
ST-4	Southeast corner of private driveway on Green Valley Lake Road	9:52 – 10:02 a.m.	10 Minutes	50.3
ST-5	Southeast corner of Camp Cedar Road and Green Valley Lake Road	9:35 – 9:45 a.m.	10 Minutes	60.3

Source: Noise measurements taken by Kimley-Horn, November 1, 2023. See **Appendix A** for noise measurement results.



Source: Google Earth

EXHIBIT 4: Noise Measurement Locations
Hume SoCal Camp Expansion Project

Not To Scale

Kimley»Horn

4.3 Sensitive Receptors

Noise exposure goals for various types of land uses reflect the varying noise sensitivities associated with those uses. Noise sensitive uses typically include residences, hospitals, schools, childcare facilities, and places of assembly. Vibration sensitive receivers are generally similar to noise sensitive receivers but may also include businesses, such as research facilities and laboratories that use vibration-sensitive equipment. The Project site is surrounded by natural forests with a mix of campgrounds and residential developments. Noise sensitive land uses nearest to the Project site are listed in **Table 7: Sensitive Receptors**.

Table 7: Sensitive Receptors

Receptor Description	Distance and Direction from the Project
Camp Pondo	1,200 feet to the east
Single-family Residences	1,540 feet to the south
Single-family Residences	3,000 feet to the northeast

Source: Google Earth

5 SIGNIFICANCE CRITERIA AND METHODOLOGY

5.1 CEQA Thresholds

State CEQA Guidelines Appendix G contains analysis guidelines related to noise and vibration. These guidelines have been used by the County to develop thresholds of significance for this analysis. A project would create a significant environmental impact if it would:

- Generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the Project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;
- Generate excessive groundborne vibration or groundborne noise levels; and
- For a Project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, expose people residing or working in the Project area to excessive noise levels.

Thresholds

Construction Noise

The San Bernardino Countywide Plan and Development Code does not establish maximum numerical construction noise levels for potentially affected receivers, which would allow for a quantified determination of what CEQA constitutes as the generation of noise levels in excess of standards or as a substantial temporary or periodic noise increase. To evaluate whether the Project will generate potentially significant temporary construction noise levels at sensitive receiver locations, a construction-related noise level threshold has been adopted from the Federal Transit Administration (FTA) *Transit Noise and Vibration Impact Assessment Manual*. Due to the lack of standardized construction noise thresholds, the FTA provides guidelines that can be considered reasonable criteria for evaluating construction noise impacts. Therefore, this analysis conservatively uses the FTA's threshold of 80 dBA (8-hour L_{eq}) for residential uses and 85 dBA (8-hour L_{eq}) for non-residential uses (campgrounds).[11]

Operational Noise

Non-Transportation Noise

Non-transportation related noise generators are commonly called "stationary," "fixed," "area," or "point" sources of noise. Industrial processing, mechanical equipment, pumping stations, and heating, ventilating, and air conditioning (HVAC) equipment are examples of fixed location, non-transportation noise sources. Stationary noise is evaluated based on the standards within the County's Noise Ordinance, Section 83.01.080(C)(1). A significant impact may exist if exterior noise levels exceed the County's 55 dBA daytime (7:00 a.m. to 10:00 p.m.) and 45 dBA nighttime (10:00 p.m. to 7:00 a.m.) standards (see **Table 4**).

[11] Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual*, Table 7-3, Page 179, September 2018.

Mobile Noise

Traffic generated noise impacts are evaluated based on standards within the General Plan. A project will normally have a significant effect on the environment related to noise if it will substantially increase the ambient noise levels for adjoining areas. Most people can detect changes in sound levels of approximately 3 dBA under normal, quiet conditions, and changes of 1 to 3 dBA are detectable under quiet, controlled conditions. Changes of less than 1 dBA are usually indiscernible. A change of 5 dBA is readily discernible to most people in an exterior environment.

Vibration

The County has defined a vibration standard in the development code. Section 83.01.090(A) states that no particle velocity greater than or equal to two-tenths inches per second measured at or beyond the lot line.

5.2 Methodology

Construction

Construction noise levels were based on typical noise levels generated by construction equipment published by the Federal Transit Administration (FTA) and the Federal Highway Administration (FHWA). Construction noise is assessed in dBA L_{eq}. This unit is appropriate because L_{eq} can be used to describe noise level from operation of each piece of equipment separately, and levels can be combined to represent the noise level from all equipment operating during a given period.

Construction noise modeling was conducting using the FHWA Roadway Construction Noise Model (RCNM). Reference noise levels are used to estimate operational noise levels at nearby noise-sensitive receptors based on a standard noise attenuation rate of 6 dB per doubling of distance (line-of-sight method of sound attenuation for point sources of noise). Noise level estimates do not account for the presence of intervening structures or topography, which may reduce noise levels at receptor locations. Therefore, the noise levels presented herein represent a conservative, reasonable worst-case estimate of actual temporary construction noise. The County does not have establish quantitative construction noise standards. As noted above, this analysis conservatively uses the FTA's threshold of 80 dBA (8-hour L_{eq}) for residential uses and 85 dBA (8-hour L_{eq}) for commercial/non-residential uses to evaluate construction noise impacts.

Operations

Project implementation would generate increased traffic volumes along Green Valley Lake Road and Project area roadways. According to the trip generation analysis, the Project would result in 100 average daily vehicle trips. The Project's increase in traffic would result in noise increases on Project area roadways. In general, a 3-dBA increase in traffic noise is barely perceptible to people, while a 5-dBA increase is readily noticeable. Traffic volumes on Project area roadways would have to approximately double for the resulting traffic noise levels to generate a 3-dBA increase.[12]

[12] According to the California Department of Transportation, *Technical Noise Supplement to Traffic Noise Analysis Protocol* (September 2013), it takes a doubling of traffic to create a noticeable (i.e., 3 dBA) noise increase.

Vibration

Groundborne vibration levels associated with Project construction-related activities were evaluated utilizing typical groundborne vibration levels associated with construction equipment, obtained from FTA published data for construction equipment. Potential groundborne vibration impacts related to building/structure damage and interference with sensitive existing operations were evaluated, considering the distance from construction activities to nearby land uses and typically applied criteria. Project construction would not include pile driving.

6 POTENTIAL IMPACTS AND MITIGATION

6.1 Acoustical Impacts

Threshold 6.1 Would the Project generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

Construction

Construction noise typically occurs intermittently and varies depending on the construction activity's nature or phase (e.g., land clearing, grading, excavation, paving). Noise generated by construction equipment, including earth movers, material handlers, and portable generators, can reach high levels. During construction, exterior noise levels could affect noise-sensitive receptors near the construction site. However, the nearest sensitive receptors to the Project site construction area is existing campground, Camp Pondo, with the nearest building located approximately 1,200 feet east of the Project. However, it is noted that construction activities would occur throughout the Project site and would not be concentrated at a single point near noise-sensitive receptors.

Construction activities would include demolition, site preparation, grading, building construction, paving, and architectural coating. Such activities would require:

- Industrial saws, excavators, and dozers during demolition;
- Dozers and tractors during site preparation;
- Excavators, graders, dozers, scrapers, and tractors during grading;
- Cranes, forklifts, generators, tractors, and welders during building construction;
- Pavers, rollers, and paving equipment during paving; and
- Air compressors during architectural coating.

Typical noise levels associated with individual construction equipment are listed in **Table 8: Typical Construction Equipment Noise Levels**.

Table 8: Typical Construction Equipment Noise Levels

Equipment	Typical Noise Level (dBA) at 50 feet from Source	Typical Noise Level (dBA) at 1,200 feet from Source[1]
Air Compressor	80	52
Backhoe	80	52
Compactor	82	54
Concrete Mixer	85	57
Concrete Pump	82	54
Concrete Vibrator	76	48
Crane, Mobile	83	55
Dozer	85	57
Generator	82	54
Grader	85	57
Impact Wrench	85	57
Jack Hammer	88	60

Table 8: Typical Construction Equipment Noise Levels		
Equipment	**Typical Noise Level (dBA) at 50 feet from Source**	**Typical Noise Level (dBA) at 1,200 feet from Source[1]**
Loader	80	52
Paver	85	57
Pneumatic Tool	85	57
Pump	77	49
Roller	85	57
Saw	76	48
Scraper	85	57
Shovel	82	54
Truck	84	56
1. Calculated using the inverse square law formula for sound attenuation: $dBA_2 = dBA_1+20Log(d_1/d_2)$ Where: dBA_2 = estimated noise level at receptor; dBA_1 = reference noise level; d_1 = reference distance; d_2 = receptor location distance		
Source: Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual*, September 2018.		

Typical operating cycles for these types of construction equipment may involve one or two minutes of full power operation followed by three to four minutes at lower power settings. Other primary sources of acoustical disturbance would be random incidents, which would last less than one minute (such as dropping large pieces of equipment or the hydraulic movement of machinery lifts).

Although the construction equipment noise levels in **Table 8** are from FTA's 2018 *Transit Noise and Vibration Impact Assessment Manual*, the noise levels are based on measured data from a U.S. Environmental Protection Agency report which uses data from the 1970s,[13] the FHWA Roadway Construction Noise Model which uses data from the early 1990s, and other measured data. Since that time, construction equipment has been required to meet more stringent emissions standards and the additional necessary exhaust systems also reduce noise from what is shown in the table.

Section 83.01.080(G) (Exempt Noise) of the San Bernardino County Development Code exempts noise sources associated with construction activities from the County's established noise standards as long as the activities only take place between the hours of 7:00 a.m. to 7:00 p.m. on weekdays and Saturdays, excluding Federal holidays. While the County establishes limits to the hours during which construction activity may take place, it does not identify specific noise level limits for construction noise levels. However, this analysis conservatively uses the FTA's threshold of 80 dBA and 85 dBA (8-hour L_{eq}) to evaluate construction noise impacts for residential and commercial uses, respectively.[14]

Project Construction Noise Levels

The noise levels calculated in **Table 9: Construction Noise Levels** show estimated exterior construction noise. Construction noise levels drop off at a rate of about 6 dBA per doubling of distance between the noise source and receptor. Construction equipment would operate throughout the Project site and the associated noise levels would not occur at a fixed location for extended periods of time. The nearest sensitive receptors are located at Camp Pondo, approximately 1,200 feet to the east. There are also single-

[13] U.S. Environmental Protection Agency, *Noise from Construction Equipment and Operations, Building Equipment and Home Appliances, NTID300.1*, December 31, 1971.

[14] Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual*, Table 7-2, Page 179, September 2018.

family residential uses located approximately 1,540 feet to the south, however these residential uses are located on the opposite side of a hill and would be shielded from Project noise. It is noted that construction equipment would move around on-site and not all equipment would operate at the closest point to sensitive receptors to the center of the construction activity area. Therefore, the analysis assumed simultaneous operation of the two loudest pieces of equipment closest to sensitive receptors (1,200 feet) and the remaining equipment at an average distance (1,840 feet). The construction area would encompass a large area and would not concentrate all equipment at the construction area boundary. The nature of construction is such that all equipment is not (1) used simultaneously and (2) not used at the exact same location (because equipment serves different purpose) and equipment is spread across the construction area. This analysis assumes that the noisiest equipment would operate concurrently at the construction boundary closest to the nearest sensitive receptor reflects a conservative analysis. Construction noise levels shown in **Table 9** focus on the closest receptors. Noise levels at receptors further away would be lower.

Table 9 shows that construction noise levels would not exceed the 85-dBA threshold.[15] Additionally, compliance with Section 83.01.080(G) (Exempt Noise) of the County of San Bernardino Development Code would minimize impacts from construction noise, as construction would be limited to daytime hours. Therefore, construction activities would result in a less than significant noise impact.

Table 9: Construction Noise Levels

Construction Activities	Modeled Exterior Construction Noise Level at Nearest Receptor (dBA L_{eq})	Noise Threshold (dBA L_{eq})	Exceed Threshold?	Ambient Noise Level (dBA L_{eq})	Construction + Ambient Combined Noise Level (dBA L_{eq})	Exceed Threshold?
Demolition	57.5	85	No	57.8	60.7	No[1]
Site Preparation	58.0		No		60.9	No[1]
Grading	58.1		No		61.7	No[1]
Construction	58.5		No		61.2	No[1]
Paving	51.7		No		58.8	No[1]
Architectural Coating	46.1		No		58.1	No[1]
Combined Activities[2]	64.7		No		65.5	No[1]

1. Combined construction noise and ambient noise levels remain below the 85 dBA construction noise threshold for commercial/non-residential uses.
2. Although the Project construction schedule states that all construction activities will overlap during the early stages of construction, these activities could not all occur in the same geographic location. However, to model a worst-case scenario, this analysis assumes all construction activities would occur simultaneously nearest to the closest receptor.

Source: Federal Highway Administration, *Roadway Construction Noise Model,* 2006. Refer to ***Appendix B*** for noise modeling results.

Construction Traffic Noise

Construction noise may be generated by large trucks moving materials to and from the Project site. Grading would require approximately 157,415 cubic yards of export which would result in approximately 224 roundtrip truck hauling trips per day during the grading phase. Construction would result in approximately 171 worker trips per day. Noise generated from construction traffic would increase short-

[15] The nearest receptor, Camp Pondo, located 1,200 feet to the east is considered a commercial use. The nearest residential use is located approximately 1,540 feet to the south. Therefore, the FTA threshold of 85 dBA for commercial uses is appropriate.

term noise; however, these noise levels are temporary and would cease once construction is complete. The trucks associated with construction would occur during the allowable hours for construction specified in the Development Code (7:00 a.m. to 7:00 p.m. on weekdays and Saturdays, excluding Federal holidays). Trucks (including trucks hauling excavated material) would also occur during the allowable daytime hours only. Delivery trucks, haul trucks, and worker vehicles associated with the construction of the proposed Project would vary from day to day, with the highest volumes generally occurring during construction initiation.

Green Valley Lake Road, the access road to the Project is identified in the Countywide Plan as a Mountain Secondary Highway. Although traffic for Green Valley Lake Road is not addressed in the Transportation Impact Analysis prepared for the Countywide Plan EIR, other Mountain Secondary Highways range between 656 and 11,534 average daily traffic trips (ADT), with an average ADT of 3,575. In general, a 3-dBA increase in traffic noise is barely perceptible to people, while a 5-dBA increase is readily noticeable. Traffic volumes on Project area roadways would have to approximately double for the resulting traffic noise levels to generate a 3-dBA increase.[16] Assuming Green Valley Lake Road traffic is comparable to the lower end of other Mountain Secondary Highways, construction traffic could result in a barely perceptible 3-dBA increase in traffic noise. This 3-dBA increase when combined with the ambient noise levels recorded on November 1 at a location nearest to a sensitive receptor (refer to **Table 6**, ST-1) would increase noise to 60.8 dBA. Exterior noise levels at the nearest sensitive receptor, approximately 160 feet from the centerline of the road, were calculated using the following calculation for line source distance attenuation:

$$Lp(R2) = Lp(R1) - 10xLog_{10}(R2/R1)$$

Where:
Lp(R1) = Known sound pressure level at the first location (typically measured data) (60.8)
Lp(R2) = Unknown sound pressure level at the second location
R1 = Distance from the noise source to location of known sound pressure level (20 feet)
R2 = Distance from noise source to the second location (160 feet)

As noted previously in **Table 5**, the exterior noise standards for mobile sources near commercial land uses (Camp Pondo) is 60 dBA CNEL. Based on the above calculation, construction traffic noise would attenuate to 51.8 dBA.[17] Therefore, although construction traffic may result in a barely perceptible increase to traffic noise, noise levels would not exceed the County's standard for mobile sources. As a result, construction traffic noise would be less than significant.

Operations

The Project would expand the existing Hume SoCal campground to accommodate up to 2,854 occupants within a 251-acre site. Recreational activities at the Project site would include varied outdoor activities (e.g., zip line, climbing, hiking, craft projects, recreational games, etc.) that would produce nominal noise at the nearest sensitive receptors (Camp Pondo campers located approximately 1,200 feet to the east of the Project boundary and single-family residents located approximately 1,540 feet to the south. Although the nearest single-family residential property is located 1,540 feet as a crow flies, it is located on the

[16] According to the California Department of Transportation, *Technical Noise Supplement to Traffic Noise Analysis Protocol* (September 2013), it takes a doubling of traffic to create a noticeable (i.e., 3 dBA) noise increase.

[17] Noise attenuation calculation does not take into account shielding from trees or the difference in elevation of the noise source and receiver, both of which would reduce noise levels further.

opposite side of the hill and would be shielded from Project noises). The primary noise sources associated with the campground would be an outdoor public address (PA) system, live music, campground noise, and off-site traffic noise.

Public Address System

Operations at the campground would include occasional announcements from the PA system, presented through a distributed loudspeaker system located throughout the park. A typical PA system can produce noise levels of approximately 87.5 dBA at 20 feet from the source.[18] The nearest sensitive receptors would be located approximately 1,200 feet from the boundary of the Project site. At this distance, the noise levels generated by the PA system would result in a noise level of approximately 51.9 dBA at the nearest sensitive receptor. As a result, the proposed PA system for announcements, music, etc. would not exceed the County's 60 dBA threshold (daytime and nighttime) for commercial uses (Camp Pondo) from stationary noise sources. Furthermore, additional noise attenuation would be provided by surrounding intervening terrain between the Project site and sensitive receptors. A less than significant impact would occur in this regard.

Live Music

The campground would provide occasional live music events on the Project site. Live music typically generates noise levels of 88 dBA at 20 feet from the source.[19] The nearest sensitive receptors are located approximately 1,200 feet from the boundary of the Project site. At this distance, the noise levels generated by live music would result in a noise level of approximately 52.4 dBA based on distance attenuation alone. As a result, live music at the Project site would not exceed the County's 60 dBA threshold for commercial uses from stationary noise sources. A less than significant impact would occur in this regard.

Campground Activities

Noise associated with the campground would include crowd noise from various outdoor activities. Noise associated with activities at the campground would include conversations, children playing, music, people walking along trails, and periodic maintenance, etc. These activities would generally produce low to moderate levels of noise. Campground noise is approximately 85 dBA at a distance of 20 feet.[20] As the nearest sensitive receptors are approximately 1,200 feet from the campground, noise levels would be approximately 49.4 dBA. As such, campground noise would be below the San Bernardino County's 60 dBA standard for commercial uses from stationary noise sources. A less than significant impact would occur in this regard.

Off-Site Traffic Noise

Project implementation would generate increased traffic volumes along Green Valley Lake Road and Project area roadways. According to the *Scope for the Traffic Study* and *Vehicle Miles Traveled (VMT) Screening Assessment* prepared by Kimley Horn and Associates (June 2023) (Trip Generation Analysis), the

[18] Edward L. Pack Associates, Inc., Noise Assessment Study for the Planned Pavilion, Boulder Ridge Country Club, Santa Clara County, May 2, 2008.
[19] Ibid.
[20] Dudek & Associates, *Malibu Parks Public Access Enhancement Plan-Public Works Plan Final Environmental Impact Report*, August 2010.

Project would result in 700 average daily vehicle trips per week, with 225 trips occurring on Sundays, and 7-day average of 100 trips per day. The Project's increase in traffic would result in noise increases on Project area roadways.

As discussed previously under construction traffic noise, Green Valley Lake Road, the access road to the Project is identified in the Countywide Plan as a Mountain Secondary Highway. Although traffic for Green Valley Lake Road is not addressed in the Transportation Impact Analysis prepared for the Countywide Plan EIR, other Mountain Secondary Highways range between 656 and 11,534 ADT. In general, a 3-dBA increase in traffic noise is barely perceptible to people, while a 5-dBA increase is readily noticeable. Traffic volumes on Project area roadways would have to approximately double for the resulting traffic noise levels to generate a 3-dBA increase.[21] Assuming Green Valley Lake Road traffic is comparable to the lower end of other Mountain Secondary Highways, the maximum traffic generated by the Project, 225 ADT on Sundays, would not be sufficient to result in a permanent 3-dBA increase in ambient noise levels. Therefore, noise impacts associated with traffic would be less than significant.

Mitigation Measures: No mitigation is required.

Level of Significance: Less than significant impact.

Threshold 6.2 Would the Project generate excessive groundborne vibration or groundborne noise levels?

Construction Vibration

Construction can generate varying degrees of ground vibration, depending on the construction procedures and equipment. Operation of construction equipment generates vibrations that spread through the ground and diminish with distance from the source. Construction on the project site would have the potential to result in varying degrees of temporary groundborne vibration, depending on the specific construction equipment used and the operations involved.

The FTA has published standard vibration velocities for construction equipment operations. As previously noted, County Development Code Section 83.01.090(A), Vibration Standard, sets a ground vibration standard of 0.2 in/sec PPV. No ground vibration shall be allowed that can be felt without the aid of instruments at or beyond the lot line, nor shall any vibration be allowed which produces a particle velocity greater than or equal to .2 in/sec PPV measured at or beyond the lot line.

Table 10: Typical Construction Equipment Vibration Levels, lists vibration levels at 25 feet for typical construction equipment. Based on preliminary site plans, construction nearest to the Project boundary would occur in the southeast portion of the Project Site, approximately 25 feet from the Project boundary. As indicated in **Table 10**, based on FTA data, vibration velocities from typical heavy construction equipment operations that would be used during Project construction range from 0.003 to 0.089 in/sec PPV at 25 feet from the source of activity.

[21] According to the California Department of Transportation, *Technical Noise Supplement to Traffic Noise Analysis Protocol* (September 2013), it takes a doubling of traffic to create a noticeable (i.e., 3 dBA) noise increase.

Table 10: Typical Construction Equipment Vibration Levels	
Equipment	**Peak Particle Velocity at 25 Feet (in/sec)**
Large Bulldozer	0.089
Caisson Drilling	0.089
Loaded Trucks	0.076
Jackhammer	0.035
Small Bulldozer/Tractors	0.003
Source: Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual*, 2018.	

Table 10 shows that at the lot line, 25 feet from construction activity, the vibration velocities from construction equipment would not exceed 0.089 in/sec PPV, which is below the County's 0.2 in/sec PPV threshold. It is also acknowledged that construction activities would occur throughout the project site and would not only be located at the boundary closest to other properties. Therefore, vibration impacts associated with Project construction would be less than significant.

Operational Vibration

Once operational, the Project would not be a significant source of groundborne vibration. Groundborne vibration surrounding the Project currently result from heavy-duty vehicular travel (e.g., refuse trucks, heavy duty trucks, delivery trucks, and transit buses) on the nearby local roadways. Operations of the Project would include activities associated with campgrounds that typically would not cause excessive ground-borne vibrations. Due to the rapid drop-off rate of groundborne vibration and the short duration of the associated events, vehicular traffic-induced groundborne vibration is rarely perceptible beyond the roadway right-of-way, and rarely results in vibration levels that cause damage to buildings in the vicinity. According to the FTA Noise and Vibration Manual, trucks rarely create vibration levels that exceed 0.012 in/sec PPV when they are on roadways. Therefore, automobiles accessing the project site or traveling along surrounding roadways would not exceed the County's vibration threshold. Impacts would be less than significant in this regard.

Mitigation Measures: No mitigation is required.

Level of Significance: Less than significant impact.

Threshold 6.3 For a Project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the Project expose people residing or working in the Project area to excessive noise levels?

The nearest airport to the project site is the Redlands Municipal Airport located approximately 10 miles to the southwest. The Project is not within 2.0 miles of a public airport or within an airport land use plan. Additionally, there are no private airstrips located within the Project vicinity. Therefore, the Project would not expose people residing or working in the Project area to excessive airport- or airstrip-related noise levels and no mitigation is required.

Mitigation Measures: No mitigation is required.

Level of Significance: Less than significant impact.

7 REFERENCES

1. California Department of Transportation, *California Vehicle Noise Emission Levels*, 1987.
2. California Department of Transportation, *Traffic Noise Analysis Protocol*, 2020.
3. California Department of Transportation, *Technical Noise Supplement to the Traffic Noise Analysis Protocol*, 2013.
4. California Department of Transportation, *Transportation and Construction Vibration Guidance Manual*, 2020.
5. Cowan, James P., *Handbook of Environmental Acoustics*, 1994.
6. Federal Highway Administration, *Noise Fundamentals*, 2017.
7. Federal Highway Administration, *Noise Measurement Handbook – Final Report*, 2018.
8. Federal Highway Administration, *Roadway Construction Noise Model*, 2006.
9. Federal Highway Administration, *Roadway Construction Noise Model User's Guide Final Report*, 2006.
10. Federal Interagency Committee on Noise, *Federal Agency Review of Selected Airport Noise Analysis Issues*, 1992.
11. Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual*, 2018.
12. Linscott Law & Greenspan Engineers, *Traffic Circulation Analysis Scope of Work for Related Bristol Project*, 2022.
13. San Bernardino County, Development Code, 2023
14. San Bernardino County, General Plan, 2020
15. United States Environmental Protection Agency, *Protective Noise Levels (EPA 550/9-79-100)*, 1979.

Appendix A

Existing Ambient Noise Measurements

Noise Measurement Field Data

Project:	Hume SoCal	**Job Number:**	
Site No.:	ST-1	**Date:**	11/1/2023
Analyst:	Eric Wang & Tori Bucy	**Time:**	9:19 - 9-29 AM
Location:	NEC Green Valley Lake Rd, Camp Pondo entrance		
Noise Sources:	Traffic (autos), general nature		
Comments:			

Results (dBA):

Leq:	Lmin:	Lmax:	Peak:
57.8	25.9	77.6	91.8

Equipment	
Sound Level Meter:	LD SoundExpert LxT
Calibrator:	CAL200
Response Time:	Slow
Weighting:	A
Microphone Height:	5 feet

Weather	
Temp. (degrees F):	50
Wind (mph):	<5
Sky:	Clear
Bar. Pressure:	30.01
Humidity:	15%

Photo:



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Summary

File Name on Meter	ST-1.030.s
File Name on PC	LxTse_0007061-20231101 091932-ST-1.(
Serial Number	0007061
Model	SoundExpert® LxT
Firmware Version	2.404
User	
Location	
Job Description	
Note	

Measurement

Description	
Start	2023-11-01 09:19:32
Stop	2023-11-01 09:29:32
Duration	00:10:00.0
Run Time	00:10:00.0
Pause	00:00:00.0
Pre-Calibration	2023-11-01 08:51:15
Post-Calibration	None
Calibration Deviation	---

Overall Settings

RMS Weight	A Weighting
Peak Weight	A Weighting
Detector	Slow
Preamplifier	Direct
Microphone Correction	FF:90 2116
Integration Method	Linear
OBA Range	Normal
OBA Bandwidth	1/1 and 1/3
OBA Frequency Weighting	A Weighting
OBA Max Spectrum	At LMax
Overload	122.4
	A
Under Range Peak	**78.6**
Under Range Limit	**14.5**
Noise Floor	5.4
	First
Instrument Identification	

Results	
LA_{eq}	57.8
LAE	85.6
EA	40.171
$LA_{peak\ (max)}$	2023-11-01 09:23:16
LAS_{max}	2023-11-01 09:23:17
LAS_{min}	2023-11-01 09:25:22
SEA	-99.9

	Exceedance Counts
LAS > 85.0 dB	0
LAS > 115.0 dB	0
LA_{peak} > 135.0 dB	0
LA_{peak} > 137.0 dB	0
LA_{peak} > 140.0 dB	0

Community Noise	**Ldn**
	57.8

LC_{eq}	62.2
LA_{eq}	57.8
LC_{eq} - LA_{eq}	4.4
LAI_{eq}	60.7
LA_{eq}	57.8
LAI_{eq} - LA_{eq}	2.9

	dB
L_{eq}	57.8
$L_{S(max)}$	77.6
$L_{S(min)}$	25.9
$L_{Peak(max)}$	91.8

Overload Count	0
Overload Duration	0.0
OBA Overload Count	0
OBA Overload Duration	0.0

Noise Measurement Field Data

Project:	Hume SoCal	**Job Number:**	
Site No.:	ST-2	**Date:**	11/1/2023
Analyst:	Eric Wang & Tori Bucy	**Time:**	10:35 - 10:45 AM
Location:	NWC Badger Ln and Deep Creek Dr		
Noise Sources:	Breaker box, nature, traffic (ped and auto)		
Comments:			

Results (dBA):

Leq:	Lmin:	Lmax:	Peak:
42.8	35.5	57.6	75.8

Equipment	
Sound Level Meter:	LD SoundExpert LxT
Calibrator:	CAL200
Response Time:	Slow
Weighting:	A
Microphone Height:	5 feet

Weather	
Temp. (degrees F):	57
Wind (mph):	>5
Sky:	Clear
Bar. Pressure:	30.08
Humidity:	10%

Photo:



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Summary

File Name on Meter	ST-1.034.s
File Name on PC	LxTse_0007061-20231101 103513-ST-1.(
Serial Number	0007061
Model	SoundExpert® LxT
Firmware Version	2.404
User	
Location	
Job Description	
Note	

Measurement

Description	
Start	2023-11-01 10:35:13
Stop	2023-11-01 10:45:13
Duration	00:10:00.0
Run Time	00:10:00.0
Pause	00:00:00.0
Pre-Calibration	2023-11-01 08:51:15
Post-Calibration	None
Calibration Deviation	---

Overall Settings

RMS Weight	A Weighting
Peak Weight	A Weighting
Detector	Slow
Preamplifier	Direct
Microphone Correction	FF:90 2116
Integration Method	Linear
OBA Range	Normal
OBA Bandwidth	1/1 and 1/3
OBA Frequency Weighting	A Weighting
OBA Max Spectrum	At LMax
Overload	122.4
	A
Under Range Peak	**78.6**
Under Range Limit	**14.5**
Noise Floor	5.4
	First
Instrument Identification	

Results	
LAeq	42.8
LAE	70.6
EA	1.270
LApeak (max)	2023-11-01 10:42:34
LASmax	2023-11-01 10:35:13
LASmin	2023-11-01 10:44:12
SEA	-99.9

	Exceedance Counts
LAS > 85.0 dB	0
LAS > 115.0 dB	0
LApeak > 135.0 dB	0
LApeak > 137.0 dB	0
LApeak > 140.0 dB	0

Community Noise	**Ldn**
	42.8

LCeq	57.0
LAeq	42.8
LCeq - LAeq	14.2
LAIeq	47.0
LAeq	42.8
LAIeq - LAeq	4.2

	dB
Leq	42.8
LS(max)	57.6
LS(min)	35.5
LPeak(max)	75.8

Overload Count	0
Overload Duration	0.0
OBA Overload Count	0
OBA Overload Duration	0.0

Noise Measurement Field Data

Project:	Hume SoCal	**Job Number:**	
Site No.:	ST-3	**Date:**	11/1/2023
Analyst:	Eric Wang & Tori Bucy	**Time:**	10:11-10:21 AM
Location:	By overhead transformer		
Noise Sources:	Nature, dogs, traffic (autos)		
Comments:			

Results (dBA):

Leq:	Lmin:	Lmax:	Peak:
51.8	21.8	69.3	87.1

Equipment	
Sound Level Meter:	LD SoundExpert LxT
Calibrator:	CAL200
Response Time:	Slow
Weighting:	A
Microphone Height:	5 feet

Weather	
Temp. (degrees F):	50
Wind (mph):	<5
Sky:	Clear
Bar. Pressure:	30.01
Humidity:	15%

Photo:



Kimley»Horn

Summary

File Name on Meter	ST-1.033.s
File Name on PC	LxTse_0007061-20231101 101154-ST-1.(
Serial Number	0007061
Model	SoundExpert® LxT
Firmware Version	2.404
User	
Location	
Job Description	
Note	

Measurement

Description	
Start	2023-11-01 10:11:54
Stop	2023-11-01 10:21:54
Duration	00:10:00.0
Run Time	00:10:00.0
Pause	00:00:00.0
Pre-Calibration	2023-11-01 08:51:15
Post-Calibration	None
Calibration Deviation	---

Overall Settings

RMS Weight	A Weighting
Peak Weight	A Weighting
Detector	Slow
Preamplifier	Direct
Microphone Correction	FF:90 2116
Integration Method	Linear
OBA Range	Normal
OBA Bandwidth	1/1 and 1/3
OBA Frequency Weighting	A Weighting
OBA Max Spectrum	At LMax
Overload	122.4
	A
Under Range Peak	**78.6**
Under Range Limit	**14.5**
Noise Floor	5.4
	First
Instrument Identification	

Results	
LA_{eq}	51.8
LAE	79.6
EA	10.090
$LA_{peak\ (max)}$	2023-11-01 10:16:39
LAS_{max}	2023-11-01 10:13:36
LAS_{min}	2023-11-01 10:21:13
SEA	-99.9

	Exceedance Counts
LAS > 85.0 dB	0
LAS > 115.0 dB	0
LA_{peak} > 135.0 dB	0
LA_{peak} > 137.0 dB	0
LA_{peak} > 140.0 dB	0

Community Noise	**Ldn**
	51.8

LC_{eq}	56.1
LA_{eq}	51.8
LC_{eq} - LA_{eq}	4.3
LAI_{eq}	54.3
LA_{eq}	51.8
LAI_{eq} - LA_{eq}	2.5

	dB
L_{eq}	51.8
$L_{S(max)}$	69.3
$L_{S(min)}$	21.8
$L_{Peak(max)}$	87.1

Overload Count	0
Overload Duration	0.0
OBA Overload Count	0
OBA Overload Duration	0.0

Noise Measurement Field Data

Project:	Hume SoCal	**Job Number:**	
Site No.:	ST-4	**Date:**	11/1/2023
Analyst:	Eric Wang & Tori Bucy	**Time:**	9:52 - 10:02 AM
Location:	SEC of private driveway on Green Valley Lake Rd		
Noise Sources:	Landscaping, nature, traffic (autos)		
Comments:			

Results (dBA):

Leq:	Lmin:	Lmax:	Peak:
50.3	21.9	70.4	85.0

Equipment	
Sound Level Meter:	LD SoundExpert LxT
Calibrator:	CAL200
Response Time:	Slow
Weighting:	A
Microphone Height:	5 feet

Weather	
Temp. (degrees F):	50
Wind (mph):	<5
Sky:	Clear
Bar. Pressure:	30.01
Humidity:	15%

Photo:



Kimley»Horn

Summary

File Name on Meter	ST-1.032.s
File Name on PC	LxTse_0007061-20231101 095223-ST-1.(
Serial Number	0007061
Model	SoundExpert® LxT
Firmware Version	2.404
User	
Location	
Job Description	
Note	

Measurement

Description	
Start	2023-11-01 09:52:23
Stop	2023-11-01 10:02:23
Duration	00:10:00.0
Run Time	00:10:00.0
Pause	00:00:00.0
Pre-Calibration	2023-11-01 08:51:15
Post-Calibration	None
Calibration Deviation	---

Overall Settings

RMS Weight	A Weighting
Peak Weight	A Weighting
Detector	Slow
Preamplifier	Direct
Microphone Correction	FF:90 2116
Integration Method	Linear
OBA Range	Normal
OBA Bandwidth	1/1 and 1/3
OBA Frequency Weighting	A Weighting
OBA Max Spectrum	At LMax
Overload	122.4
	A
Under Range Peak	**78.6**
Under Range Limit	**14.5**
Noise Floor	5.4
	First
Instrument Identification	

Results	
L_{Aeq}	50.3
LAE	78.1
EA	7.143
$LA_{peak\ (max)}$	2023-11-01 09:59:52
LAS_{max}	2023-11-01 09:59:53
LAS_{min}	2023-11-01 09:56:27
SEA	-99.9

	Exceedance Counts
LAS > 85.0 dB	0
LAS > 115.0 dB	0
LA_{peak} > 135.0 dB	0
LA_{peak} > 137.0 dB	0
LA_{peak} > 140.0 dB	0

Community Noise	**Ldn**
	50.3

LC_{eq}	57.7
LA_{eq}	50.3
LC_{eq} - LA_{eq}	7.4
LAI_{eq}	52.8
LA_{eq}	50.3
LAI_{eq} - LA_{eq}	2.5

	dB
L_{eq}	50.3
$L_{S(max)}$	70.4
$L_{S(min)}$	21.9
$L_{Peak(max)}$	85.0

Overload Count	0
Overload Duration	0.0
OBA Overload Count	0
OBA Overload Duration	0.0

Noise Measurement Field Data

Project:	Hume SoCal	**Job Number:**	
Site No.:	ST-5	**Date:**	11/1/2023
Analyst:	Eric Wang & Tori Bucy	**Time:**	9:35 - 9:45 AM
Location:	SEC of Camp Cedar Crest Rd and Green Valley Lake Rd		
Noise Sources:	Traffic (auto and trucks), general nature, woodpecker		
Comments:			

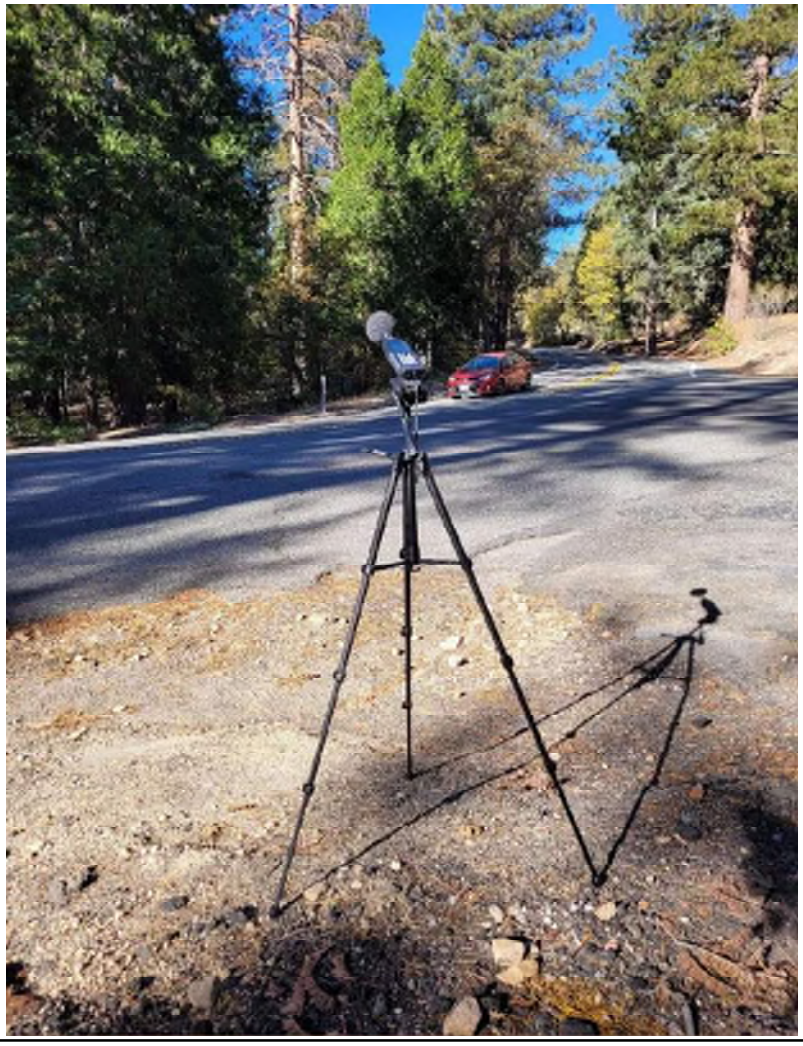
Results (dBA):

Leq:	Lmin:	Lmax:	Peak:
60.3	22.3	78.7	90.4

Equipment	
Sound Level Meter:	LD SoundExpert LxT
Calibrator:	CAL200
Response Time:	Slow
Weighting:	A
Microphone Height:	5 feet

Weather	
Temp. (degrees F):	50
Wind (mph):	<5
Sky:	Clear
Bar. Pressure:	30.01
Humidity:	15%

Photo:



Kimley»Horn

Summary

File Name on Meter	ST-1.031.s
File Name on PC	LxTse_0007061-20231101 093522-ST-1.(
Serial Number	0007061
Model	SoundExpert® LxT
Firmware Version	2.404
User	
Location	
Job Description	
Note	

Measurement

Description	
Start	2023-11-01 09:35:22
Stop	2023-11-01 09:45:22
Duration	00:10:00.0
Run Time	00:10:00.0
Pause	00:00:00.0
Pre-Calibration	2023-11-01 08:51:15
Post-Calibration	None
Calibration Deviation	---

Overall Settings

RMS Weight	A Weighting
Peak Weight	A Weighting
Detector	Slow
Preamplifier	Direct
Microphone Correction	FF:90 2116
Integration Method	Linear
OBA Range	Normal
OBA Bandwidth	1/1 and 1/3
OBA Frequency Weighting	A Weighting
OBA Max Spectrum	At LMax
Overload	122.4
	A
Under Range Peak	**78.6**
Under Range Limit	**14.5**
Noise Floor	5.4
	First
Instrument Identification	

Results	
LA_{eq}	60.3
LAE	88.1
EA	71.435
$LA_{peak\ (max)}$	2023-11-01 09:42:11
LAS_{max}	2023-11-01 09:42:12
LAS_{min}	2023-11-01 09:43:43
SEA	-99.9

	Exceedance Counts
LAS > 85.0 dB	0
LAS > 115.0 dB	0
LA_{peak} > 135.0 dB	0
LA_{peak} > 137.0 dB	0
LA_{peak} > 140.0 dB	0

Community Noise	**Ldn**
	60.3

LC_{eq}	66.4
LA_{eq}	60.3
LC_{eq} - LA_{eq}	6.1
LAI_{eq}	61.3
LA_{eq}	60.3
LAI_{eq} - LA_{eq}	1.0

	dB
L_{eq}	60.3
$L_{S(max)}$	78.7
$L_{S(min)}$	22.3
$L_{Peak(max)}$	90.4

Overload Count	0
Overload Duration	0.0
OBA Overload Count	0
OBA Overload Duration	0.0

Appendix B

Noise Modeling Data

Project: **Hume SoCal Campground Expansion**

Construction Noise Impact on Sensitive Receptors

Parameters

Construction Hours:	Daytime hours (7 am to 7 pm)	8
	Evening hours (7 pm to 10 pm)	0
	Nighttime hours (10 pm to 7 am)	0
Leq to L10 factor		3

	Receptor (Land Use)	Distance to: Closest Receptor (feet)	Avg Dist. (feet)	Shielding	Direction
1	Campground (Commercial)	1200	1,840	0	E

						RECEPTOR	1
Construction Phase	**Equipment Type**	**No. of Equip.**	**Acoustical Usage Factor**	**Reference Noise Level at 50ft per Unit, Lmax**	**Distance**	**Noise Level at Receptor 1, Lmax**	**Noise Level at Receptor 1, Leq**
Demolition							
	Concrete Saw	1	20%	90	1200	62.0	55.0
	Excavator	3	40%	81	1840	54.2	50.2
	Dozer	1	40%	82	1840	50.4	46.4
	Dozer	1	40%	82	1200	54.1	50.1
Combined LEQ							**57.5**
Site Preparation							
	Tractor	1	40%	84	1200	56.4	52.4
	Tractor	1	40%	84	1200	56.4	52.4
	Tractor	2	40%	84	1840	55.7	51.7
	Dozer	3	40%	82	1840	55.2	51.2
Combined LEQ							**58.0**
Grading							
	Tractor	1	40%	84	1200	56.4	52.4
	Grader	1	40%	85	1200	57.4	53.4
	Dozer	1	40%	82	1840	50.4	46.4
	Scraper	2	40%	84	1840	55.3	51.3
	Tractor	1	40%	84	1840	52.7	48.7
Combined LEQ							**58.1**
Building Construction							
	Tractor	2	40%	84	1200	59.4	55.4
	Tractor	4	40%	84	1840	58.7	54.7
	Generator	1	50%	81	1840	49.3	46.3
	Crane	1	16%	81	1840	49.3	41.3
	Welder/Torch	1	40%	74	1840	42.7	38.7
Combined LEQ							**58.5**
Paving							
	Roller	2	20%	80	1200	55.4	48.4
	Paver	4	50%	77	1840	51.9	48.9
Combined LEQ							**51.7**
Architectural Coating							
	Compressor (air)	1	40%	78	1200	50.1	46.1
Combined LEQ							**46.1**

Source for Ref. Noise Levels: RCNM, 2005

Appendix J

Traffic Analysis

Traffic Analysis

for:

Hume SoCal Expansion Project

In San Bernardino County

Prepared for:

Hume Lake Christian Camps

June 2025

Kimley»Horn

TRAFFIC ANALYSIS
FOR THE PROPOSED
HUME SOCAL EXPANSION PROJECT
IN SAN BERNARDINO COUNTY

Prepared by:

Kimley-Horn and Associates, Inc.
3801 University Avenue, Suite 300
Riverside, California 92501

June 2025

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TRAFFIC ANALYSIS
FOR THE PROPOSED
HUME SOCAL EXPANSION PROJECT
IN SAN BERNARDINO COUNTY

INTRODUCTION

Purpose and Study Objectives

This traffic analysis has been prepared to address the traffic-related impacts of the proposed Hume SoCal Expansion ("Project") in the County of San Bernardino. This traffic analysis has been conducted in accordance with the San Bernardino County *Transportation Impact Study Guidelines* (July 2019), and in accordance with the San Bernardino Association of Governments (SANBAG) Congestion Management Program (CMP) requirements (June 2016).

This report includes a description of existing traffic conditions in the surrounding area, estimated project trip generation and distribution, future traffic growth, VMT screening, and an assessment of project-related effects on the roadway system. Where necessary, circulation system improvements have been identified to mitigate significant project effects at the study locations.

Project Overview

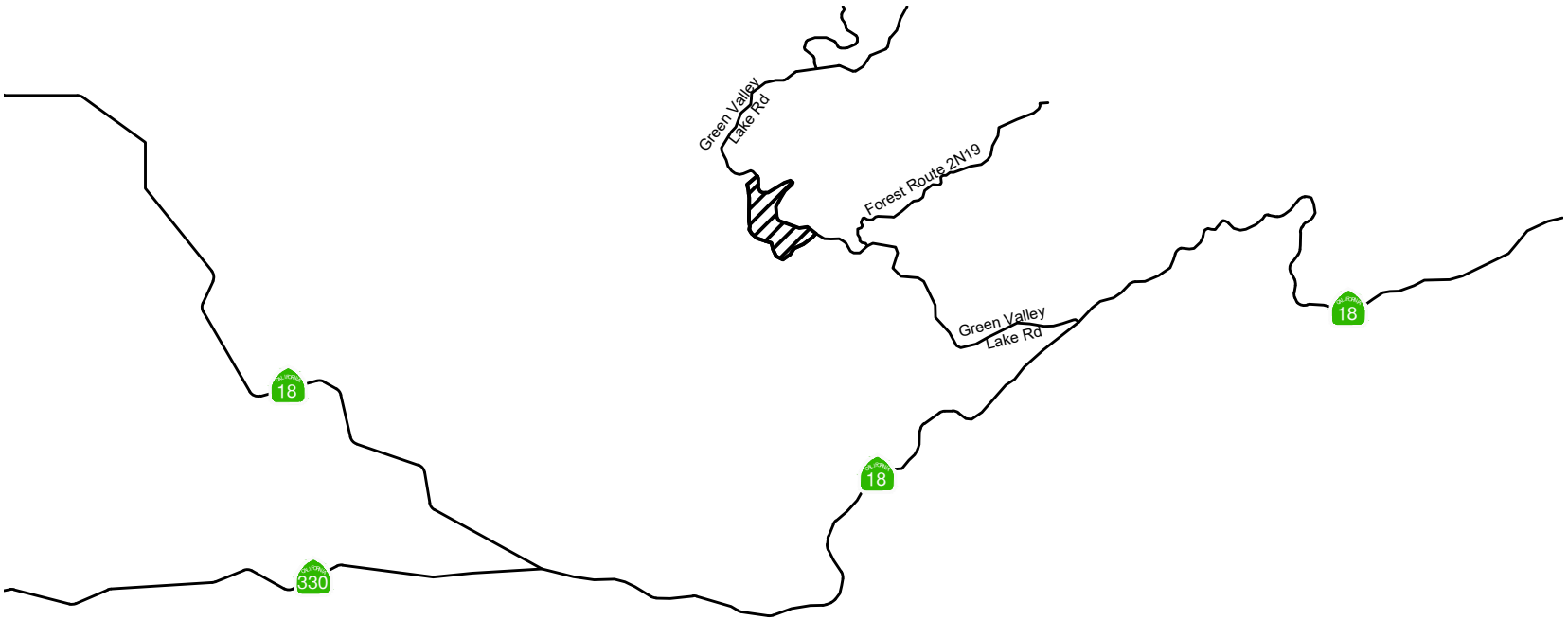
The Hume SoCal project area is located within the Green Valley Lake Community in the mountain region of San Bernardino County. The Project is located immediately west of Green Valley Lake Road and approximately 1.5 miles northwest of State Route 18. The Project would be developed on five parcels totaling approximately 251 acres. The site is shown in its regional setting on **Figure 1.**

The Project involves the expansion of campground uses for the existing Hume SoCal campground to accommodate up to approximately 2,700 additional guests, users, and visitors. This would be accomplished through the continued use of existing campground structures as well as the development of additional campground and recreational structures and uses within a 251-acre area of the Green Valley Lake community. A copy of the project site plan is provided on **Figure 2**.

The potential construction phasing of the expansion project is provided below for reference and is based on how structures, amenities, and features are grouped and located on the project site:

- Phase 1 – Camp Middle School (approximately 784-person capacity)
- Phase 2 – Camp High School (approximately 1,000-person capacity)
- Phase 3 – Camp Adult Lodge (approximately 100-140-person capacity)
- Phase 4 – Camp Elementary (approximately 250-500-person capacity)
- Phase 5 – Camp Wildwood (approximately 120-person capacity)

As a worst-case scenario, the "Plus Project" scenarios in this traffic analysis assume full build out of the Hume SoCal Expansion project.



NOT TO SCALE

LEGEND:

= Project Site

FIGURE 1
VICINITY MAP

NOT TO SCALE

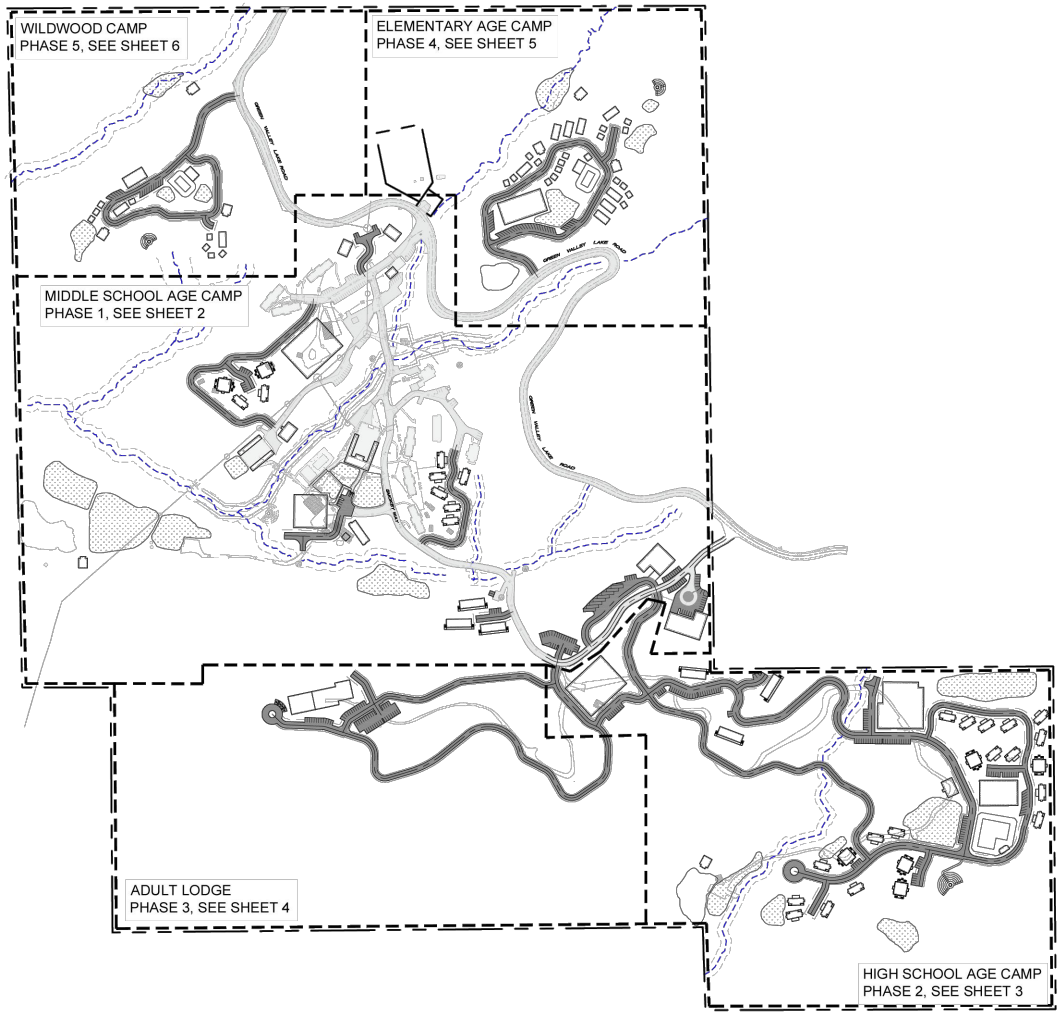


FIGURE 2
PROJECT SITE PLAN

Regional access to the site is provided primarily by State Route 18 (SR-18). Local access to the project area is provided primarily via Green Valley Lake Road. Direct vehicular access provisions for the project site would consist of two full-movement unsignalized driveways on Green Valley Lake Road.

ANALYSIS SCENARIOS AND METHODOLOGY

Study Locations

The study locations were established in consultation with County staff through the Scoping Agreement process (Scope of Study Form of the San Bernardino County *Transportation Impact Study Guidelines*). A copy of the approved Traffic Scope Approval Form is provided in ***Appendix A***.

Study Intersections:

1. Green Valley Lake Road at SR-18
D1. Green Valley Lake Road at South Project Driveway
D2. Green Valley Lake Road at North Project Driveway

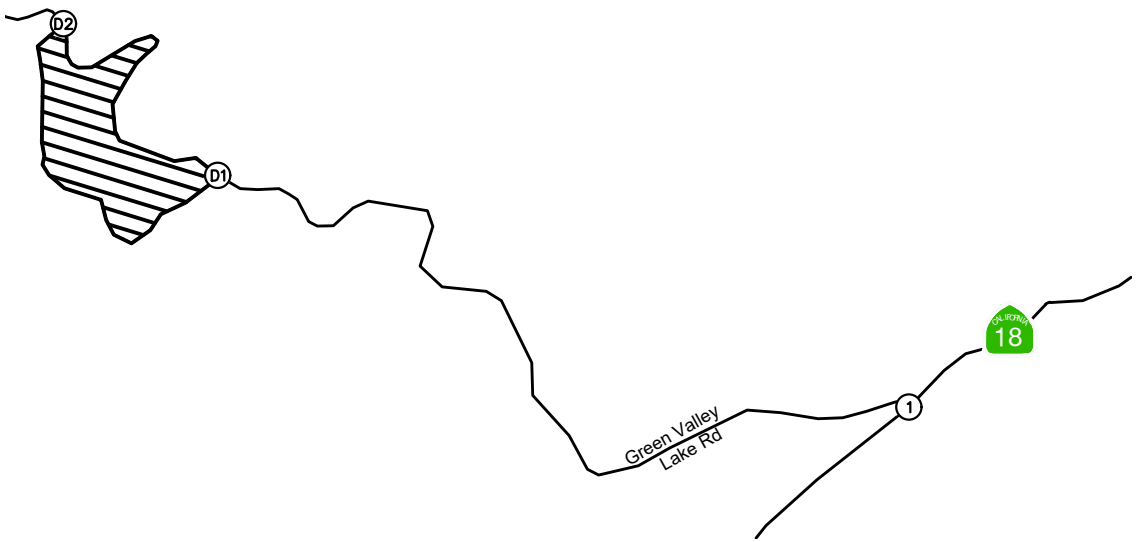
Existing lane configurations and traffic control at the study intersections are shown on **Figure 3**.

Analysis Scenarios

Based on discussion with County staff during the Scoping agreement process, the project will be evaluated in the Friday evening and Sunday mid-day (MD) peak hours for the following conditions:

- Existing Conditions
- Opening Year 2027 Cumulative
- Opening Year 2027 Cumulative Plus Project
- Horizon Year 2040
- Horizon Year 2040 Plus Project

NOT TO SCALE



1. Green Valley Lake Rd at SR 18		D1. Green Valley Lake Rd at South Project Driveway		D2. Green Valley Lake Rd at North Project Driveway	

LEGEND:
- = Study Intersection
- = Turn or Through Lane
- = Signal
- = Stop Sign

FIGURE 3
EXISTING LANE CONFIGURATION AND TRAFFIC CONTROL

Intersection Analysis – HCM Methodology

Peak hour intersection operations were evaluated using the methodology outlined in the Highway Capacity Manual (HCM) 7th Edition, consistent with the requirements of the San Bernardino County CMP. The intersection analysis was conducted using the Vistro software program and using the input parameters specified in the San Bernardino County CMP.

Per the HCM methodology, Level of Service (LOS) for signalized intersections is defined in terms of average vehicle delay. Specifically, LOS criteria are stated in terms of the average control delay per vehicle during the peak hours. The average control delay includes initial deceleration delay, queue move-up time, and final acceleration time in addition to the stop delay.

The procedure for unsignalized intersection analysis determines the average total delay, expressed in seconds of delay per vehicle, for left turns from the major street and from the stop-controlled minor street traffic stream. Delay values are calculated based on the relationship between traffic on the major street and the availability of acceptable "gaps" in this stream through which conflicting traffic movements can be made.

The following charts provide a description of the operating characteristics of each Level of Service and average seconds of delay for signalized and unsignalized intersections.

LEVEL OF SERVICE DEFINITIONS	
Level of Service	**Description**
A	No approach phase is fully utilized by traffic and no vehicle waits longer than one red indication. Typically, the approach appears quite open, turns are made easily and nearly all drivers find freedom of operation.
B	This service level represents stable operation, where an occasional approach phase is fully utilized and a substantial number are approaching full use. Many drivers begin to feel restricted within platoons of vehicles.
C	This level still represents stable operating conditions. Occasionally drivers may have to wait through more than one red signal indication, and backups may develop behind turning vehicles. Most drivers feel somewhat restricted but not objectionably so.
D	This level encompasses a zone of increasing restriction, approaching instability at the intersection. Delays to approaching vehicles may be substantial during short peaks within the peak period; however, enough cycles with lower demand occur to permit periodic clearance of developing queues, thus preventing excessive backups.
E	Capacity occurs at the upper end of this service level. It represents the most vehicles that any particular intersection approach can accommodate. Full utilization of every signal cycle is seldom attained no matter how great the demand.
F	This level describes forced flow operations at low speeds, where volumes exceed capacity. These conditions usually result from queues of vehicles backing up from a restriction downstream. Speeds are reduced substantially and stoppages may occur for short or long periods of time due to the congestion. In the extreme case, both speed and volume can drop to zero.

LEVEL OF SERVICE CRITERIA FOR SIGNALIZED AND UNSIGNALIZED INTERSECTIONS		
Level of Service [1]	**Signalized Intersection (Average delay per vehicle, in seconds) [2]**	**Unsignalized Intersections (Average delay per vehicle, in seconds) [3]**
A	≤ 10	0 – 10
B	> 10 – 20	> 10 – 15
C	> 20 – 35	> 15 – 25
D	> 35 – 55	> 25 – 35
E	> 55 – 80	> 35 – 50
F	> 80	> 50

[1] Per the San Bernardino County CMP, intersections will be considered deficient (LOS F) if the critical v/c ratio equals or exceeds 1.0.

[2] Source: Highway Capacity Manual (HCM 7th Edition), Exhibit 18-4.

[3] Source: Highway Capacity Manual (HCM 7th Edition), Exhibits 19-1 and 20-2.

Level of Service Standards and Measure of Significance

The County of San Bernardino minimum Level of Service standards require that intersections in the Valley regions operate at LOS D or better during peak hours.

Traffic effects at signalized intersections are considered locally significant when any of the following occurs between the "without project" and the "plus project" conditions:

- Any signalized study intersection in the Valley region that is operating at an acceptable LOS D or better without project traffic in which the addition of project traffic causes the intersection to degrade to an LOS E or F shall identify improvements to improve operations to LOS D or better.
- Any signalized study intersection in the Valley region that is operating at LOS E or F without project traffic where the project increases delay by 5.0 or more seconds shall identify improvements to offset the increase in delay.

Unsignalized intersections will require operational improvements if the study determines either section a) or both sections b) and c) occur:

a) The addition of project-related traffic causes the intersection to degrade from an LOS D or better to an LOS E or worse in the Valley region.
b) The project adds 5.0 seconds or more of delay to an intersection that is already projected to operate without project traffic at an LOS E or F in the Valley region.
c) One or both of the following conditions are met:
    i. The project adds ten (10) or more trips to any minor street approach
    ii. The intersection meets the peak hour traffic signal warrant after the addition of project traffic.

New development is required to identify improvements at intersections that show a locally significant project effect as shown above and operate at LOS E or worse under "Plus Project" conditions. The Level of Service must be improved to LOS D or better for study intersections.

General Plan Circulation Plan

The San Bernardino County Transportation & Mobility Element (October 2020) provide roadway designations for the roadway system serving the project site and the surrounding vicinity. A copy of the County's Circulation Plan is provided on **Figure 4**.

EXISTING TRAFFIC CONDITIONS

Existing Street System

Regional access to the site is provided primarily by the State Route 18 (SR-18). The SR-18 Freeway is located approximately 1.5 miles southeast of the project site. Local access to the project area is provided primarily via Green Valley Lake Road. The following provides a description of the roadways surrounding the project site.

State Route 18 (SR-18) is generally an east-west undivided roadway with one lane in each direction. The posted speed limit is 40 miles per hour (mph) and on-street parking is not permitted on both sides. SR-18 is designated as a Mountain Major Highway in the San Bernardino County Transportation & Mobility Element, Policy Map TM-1B.

Green Valley Lake Road is a north-south roadway with one lane in each direction. On-street parking is not permitted on both sides. Green Valley Lake Road is designated as a Mountain Secondary Highway in the San Bernardino County Transportation & Mobility Element. Green Valley Lake Road would provide access to the Project site via two full-movement unsignalized driveways.

Existing Transit Service

There is no bus stop that provides regular service within a ½ mile walk of the project site.

Existing Traffic Volumes

Existing peak hour turning movement volumes were collected in August 2023. Based on the peak operation of the proposed project, existing Friday evening and Sunday midday peak hour intersection volumes are presented on **Figure 5**. Traffic data collection worksheets are provided in ***Appendix B***.

NOT TO SCALE

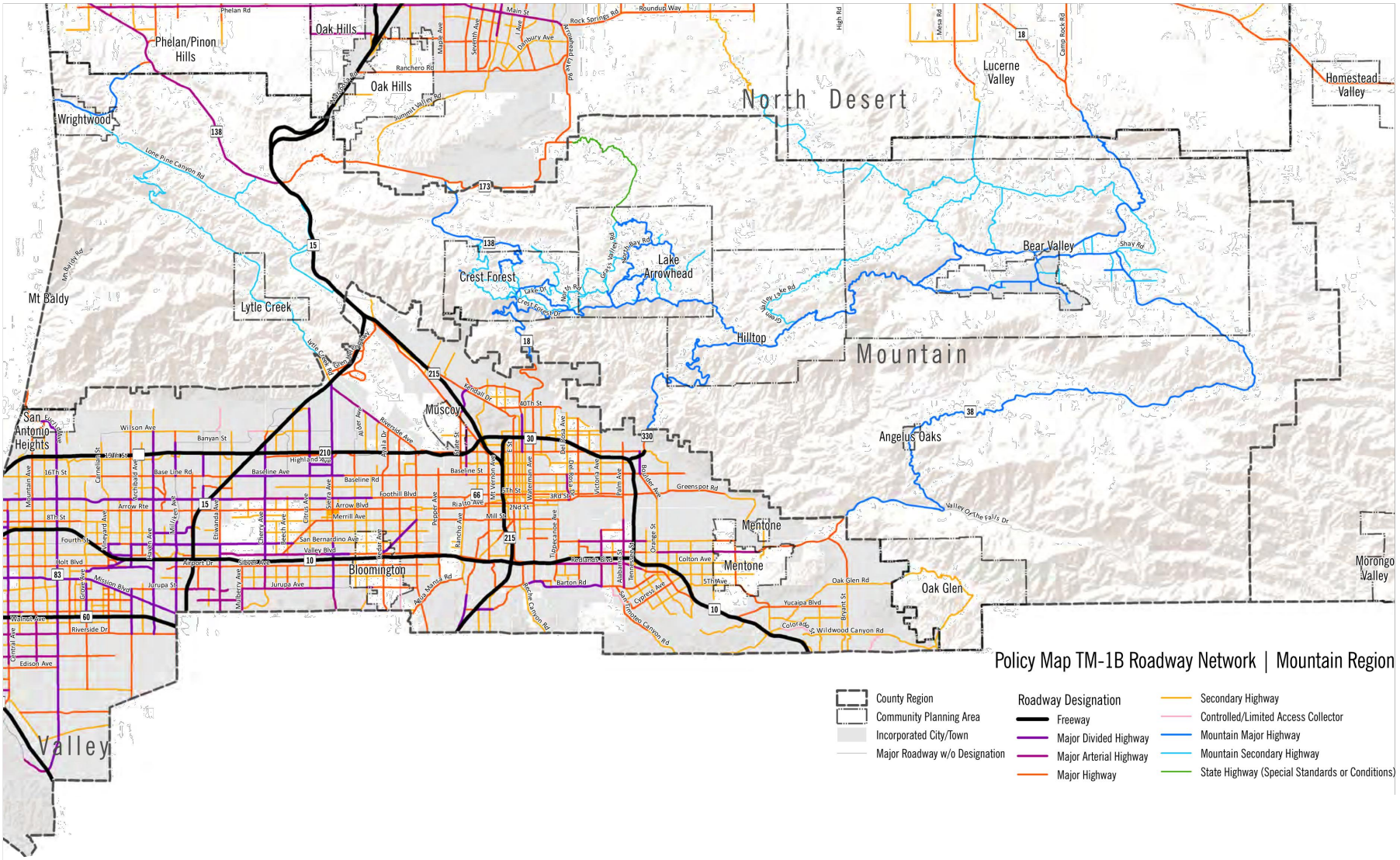
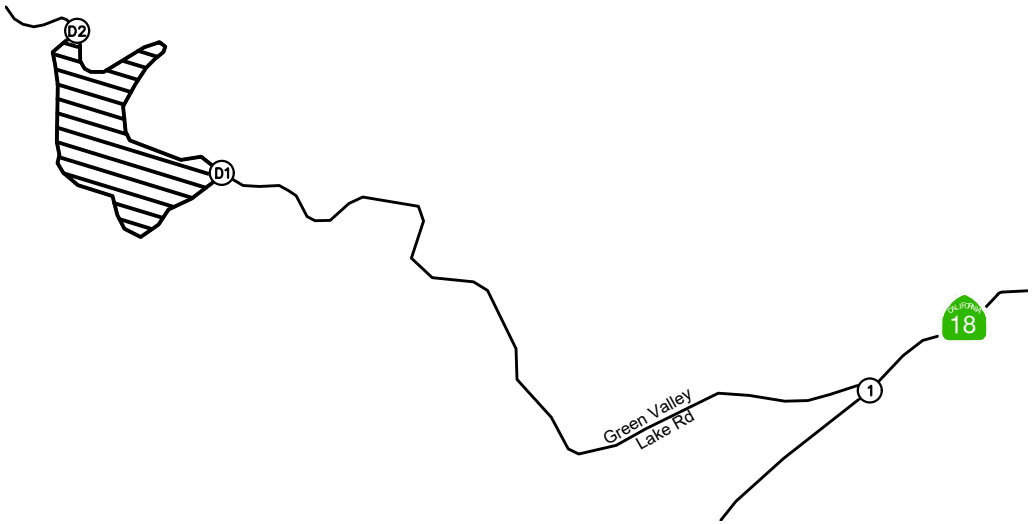


FIGURE 4
COUNTY OF SAN BERNARDINO ROADWAY NETWORK MAP

NOT TO SCALE



1. Green Valley Lake Rd at SR 18	D1. Green Valley Lake Rd at South Project Driveway	D2. Green Valley Lake Rd at North Project Driveway
6/10 ↙ 265/951 ↓ 5/9 → 52/64 → ↑ 58/42 ↑ 439/309	47/77 ↓ ↑ 64/52	0/1 ↙ 43/71 ↓ 3/1 → 2/7 → ↑ 1/2 ↑ 64/48

LEGEND:

(X) = Study Intersection

XX/YY = PM/MD Peak Hour Turning Movement Volumes

FIGURE 5
EXISTING TRAFFIC VOLUMES

Existing Operating Conditions

Peak Hour Operating Conditions

An intersection Level of Service analysis was conducted for the Friday evening and Sunday midday peak hours using the analysis procedures and assumptions described previously in this report. The results are shown on **Table 1**. Review of this table indicates that all study intersections currently operate at an acceptable Level of Service during both peak hours. Copies of the intersection analysis worksheets are provided in ***Appendix C***.

OPENING YEAR 2027 CUMULATIVE

The project Opening Year is anticipated to be Year 2027. An ambient growth rate of 2.0% per year was applied to existing traffic volumes to develop Opening Year 2027 base forecasts.

Cumulative Projects

In addition to ambient growth, traffic volumes from Cumulative Projects in the Project vicinity were added to develop Opening Year 2027 Cumulative forecasts. Cumulative Projects consist of any project that has been approved and is not yet occupied, as well as projects that are in various stages of the application and approval process, but have not yet been approved.

Based on information provided by County staff, the following Cumulative Projects were identified:

- Boat Storage Facility in Arrowbear (approximately 2.2 miles from project site)
- Motel in Running Springs (approximately 5.3 miles from project site)

Due to the distance and limited amount of Cumulative Projects, it is anticipated that the 2% ambient annual growth rate to Year 2027(8% total growth rate) would reflect the addition of Cumulative Project traffic. However, as a conservative approach, an additional 2% growth (10% total growth from existing) was applied to Opening Year 2027 base volumes to account for Cumulative Project traffic. The resulting Opening Year 2027 Cumulative traffic volumes are shown on **Figure 6**.

Peak Hour Operating Conditions

An intersection Level of Service analysis was conducted for Opening Year 2027 Cumulative conditions. The results are shown on **Table 2**. Intersection analysis worksheets are provided in ***Appendix C***. Review of this table indicates that, with the addition of Cumulative Project traffic, the following intersection would operate at an unacceptable Level of Service under Opening Year 2027 Cumulative conditions:

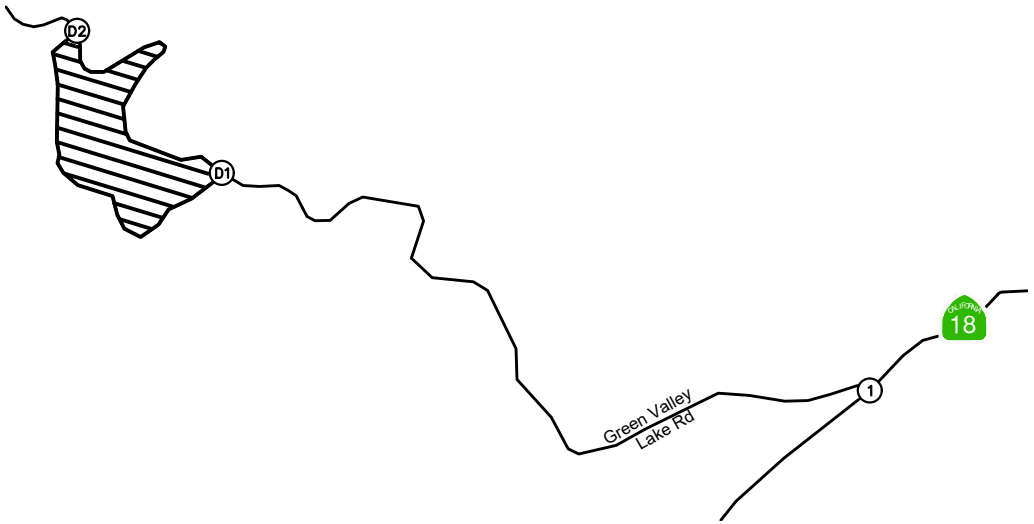
- #1 - Green Valley Lake Road at SR-18: MD – LOS E

TABLE 1
SUMMARY OF INTERSECTION OPERATION
EXISTING CONDITIONS

Int. #	Intersection	Traffic Control	Friday PM Peak Hour		Sunday MD Peak Hour	
			Delay	LOS	Delay	LOS
1	Green Valley Lake Road at SR-18	U	16.8	C	34.4	D
D1	Green Valley Lake Road at South Driveway	U	0.0	A	0.0	A
D2	Green Valley Lake Road at North Driveway	U	9.2	A	9.3	A

Notes:
- Bold and Shaded values indicate intersections operating at an unacceptable Level of Service
- Delay values for unsignalized intersections represent the average vehicle delay on the worst (highest delay) intersection approach.
- S = Signalized
- U = Unsignalized

NOT TO SCALE



1. Green Valley Lake Rd at SR 18	D1. Green Valley Lake Rd at South Project Driveway	D2. Green Valley Lake Rd at North Project Driveway
7/11 ↓ 292/1046 ↓ 6/10 → 57/70 → ↑ 64/46 ↑ 483/340	52/85 ↓ ↑ 70/57	0/1 ↓ 47/78 ↓ 3/1 → 2/8 → ↑ 1/2 ↑ 70/53

LEGEND:

(X) = Study Intersection

XX/YY = PM/MD Peak Hour Turning Movement Volumes

FIGURE 6
OPENING YEAR 2027 CUMULATIVE TRAFFIC VOLUMES

TABLE 2
SUMMARY OF INTERSECTION OPERATION
OPENING YEAR 2027 CUMULATIVE

Int. #	Intersection	Traffic Control	Friday PM Peak Hour		Sunday MD Peak Hour	
			Delay	LOS	Delay	LOS
1	Green Valley Lake Road at SR-18	U	18.0	C	40.4	E
D1	Green Valley Lake Road at South Driveway	U	0.0	A	0.0	A
D2	Green Valley Lake Road at North Driveway	U	9.2	A	9.4	A

Notes:
- Bold and Shaded values indicate intersections operating at an unacceptable Level of Service
- Delay values for unsignalized intersections represent the average vehicle delay on the worst (highest delay) intersection approach.
- S = Signalized
- U = Unsignalized

The Level of Service for an unsignalized intersection is reported based on the single approach movement with the highest delay, which in this case, would be the eastbound approach for intersection #1. The side street traffic at this intersection experiences delay during the peak hours while waiting for an acceptable gap in traffic on SR-18. While the side street approach operates at a deficient Level of Service based on the highest delay approach, the overall intersection delay would be acceptable. Any queuing that occurs on the side street is contained on the minor intersection approach and does not impact the progression of traffic on the main arterial.

PROJECT TRAFFIC

Project Trip Generation

Due to the unique characteristics of the proposed project, the number of trips anticipated to be generated by the proposed project was approximated using site-specific information provided by the applicant. The estimated daily trips for a typical week during the summer/peak season and the shoulder/off season are provided in ***Appendix D***. A summary of estimated trips during the summer/peak and shoulder/off seasons is provided in **Table 3**. Based on review of Table 3, under summer/peak season conditions, the proposed is estimated to generate approximately 25 trips during the typical weekday AM and PM peak hours (25 inbound in the AM peak hour, and 25 outbound in the PM peak hour), and 88 trips (25 inbound and 63 outbound) during the weekend peak hour. As a conservative analysis, the weekend peak hour trips during the summer/peak season were assumed to be added during both the Friday PM and Sunday midday peak hours.

As noted earlier, the potential construction phasing of the proposed project is provided below for reference:

- Phase 1 – Camp Middle School (approximately 784-person capacity)
- Phase 2 – Camp High School (approximately 1,000-person capacity)
- Phase 3 – Camp Adult Lodge (approximately 100-140-person capacity)
- Phase 4 – Camp Elementary (approximately 250-500-person capacity)
- Phase 5 – Camp Wildwood (approximately 120-person capacity)

As a worst-case scenario, the "Plus Project" scenarios in this traffic analysis assume full build out of the Hume SoCal Expansion project.

Trip Distribution and Assignment

Project trip distribution assumptions for the project site were developed taking into account the proposed site uses, existing travel patterns, and routes to and from the regional roadway system. Trip distribution assumptions are shown on **Figure 7**.

Trip distribution percentages at each study intersection were applied to the project trip generation to determine the project trips through each intersection. The resulting project-related peak hour trips are shown on **Figure 8**.

TABLE 3
SUMMARY OF PROJECT TRIP GENERATION
HUME SOCAL PROJECT

Trip Generation Estimates										
Land Use	Daily[1]	Weekday AM Peak Hour			Weekday PM Peak Hour			Weekend PM Peak Hour[2,3]		
		In	Out	Total	In	Out	Total	In	Out	Total
Youth Camp and Adult Retreat Center (Summer/Peak Season)	100	25	0	25	0	25	25	25	63	88
Youth Camp and Adult Retreat Center (Shoulder/Off Season)	39	4	0	4	0	4	4	4	46	50

Notes:

[1] Based on 7-day average daily trip (see Appendix D)

[2] Weekend peak hour trip generation estimates based on the following assumptions:
- Inbound traffic: Employees entering project site during peak hour.
- Outbound traffic: 50% of student buses and 50% of adult vehicles leaving the project site during the peak hour (see Appendix D)

[3] Because of this characteristic of the project, the traffic counts were collected on Friday and Sunday.

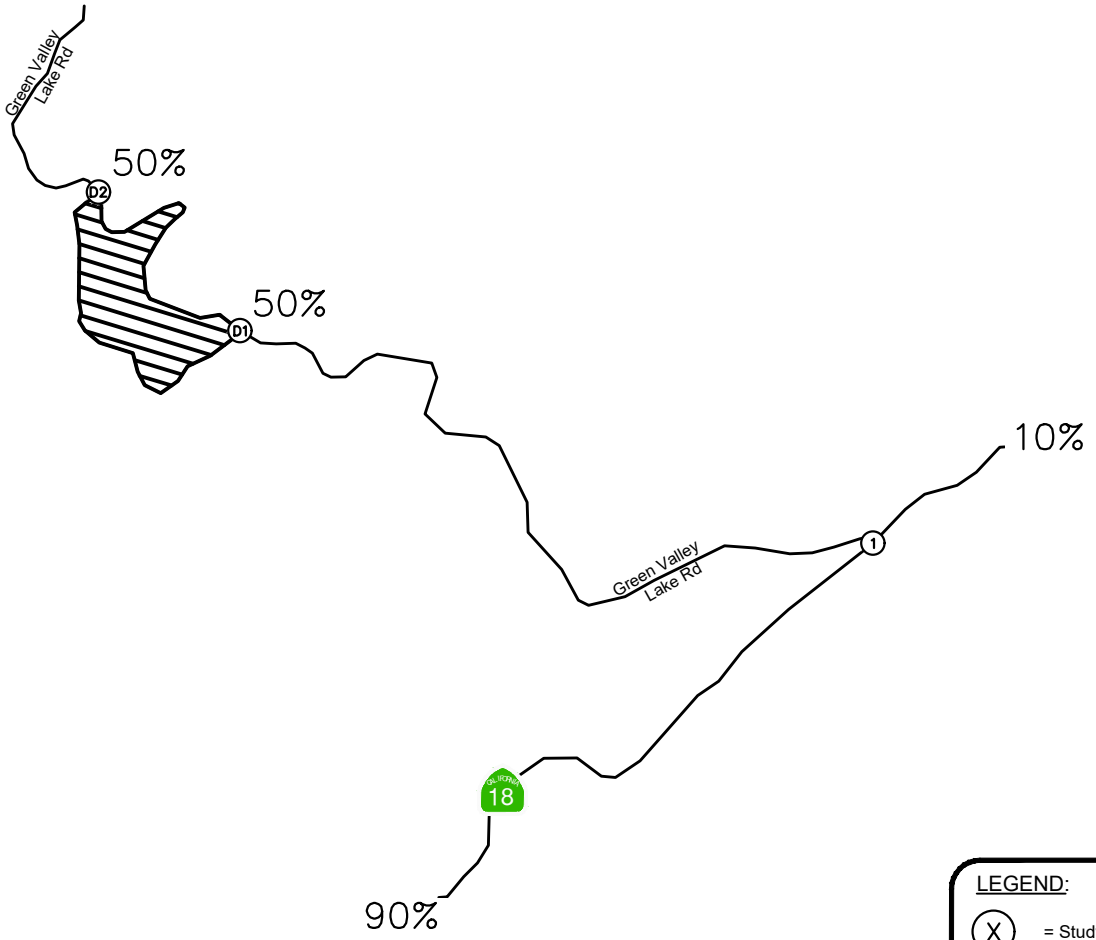
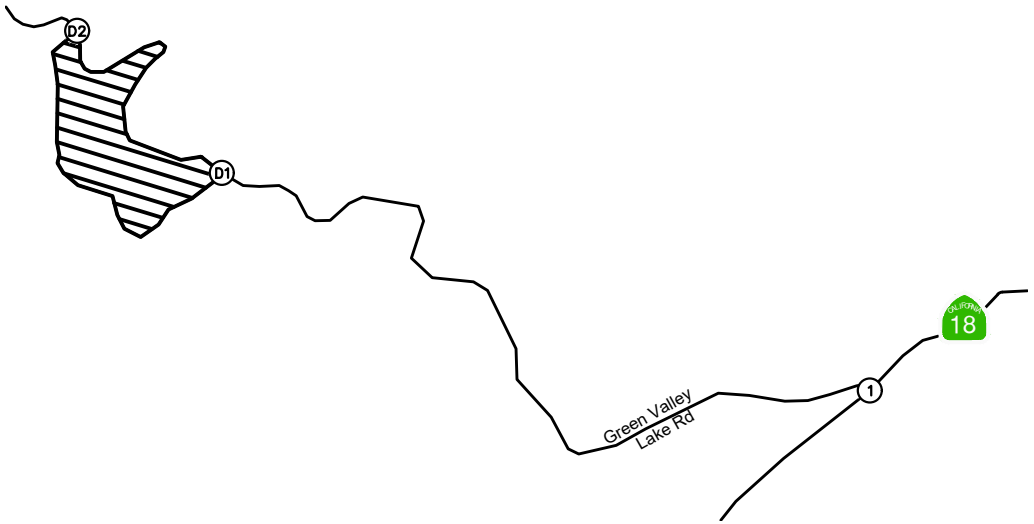


FIGURE 7
PROJECT TRIP DISTRIBUTION

NOT TO SCALE



1. Green Valley Lake Rd at SR 18	D1. Green Valley Lake Rd at South Project Driveway	D2. Green Valley Lake Rd at North Project Driveway
3/3 ↙ 6/6 → 57/57 → ↑ 23/23	32/32 ↓ 32/32 → ↑ 13/13 ↑ 13/13	32/32 → ↑ 13/13

LEGEND:

(X) = Study Intersection

XX/YY = PM/MD Peak Hour Turning Movement Volumes

FIGURE 8
PROJECT-RELATED TRAFFIC VOLUMES

OPENING YEAR 2027 CUMULATIVE PLUS PROJECT

Project-related traffic was added to Opening Year 2027 Cumulative traffic volumes to develop Opening Year 2027 Cumulative Plus Project forecasts. The resulting traffic volumes are shown on **Figure 9**.

Peak Hour Operating Conditions

An intersection Level of Service analysis was conducted for Opening Year 2027 Cumulative Plus Project conditions. The results are shown on **Table 4**. Copies of the intersection analysis worksheets are provided in ***Appendix C***.

Review of table 4 indicates that, with the addition of Project traffic, the following intersection would continue to operate at an unacceptable Level of Service under Opening Year 2027 Cumulative Plus Project conditions:

- #1 - Green Valley Lake Road at SR-18: MD – LOS F

HORIZON YEAR 2040 CONDITIONS

To derive the Horizon Year 2040 volumes, an ambient growth rate of 1.0% per year was applied to existing traffic volumes to develop Horizon Year 2040 forecasts. The resulting traffic volumes for Horizon Year 2040 are shown on **Figure 10**.

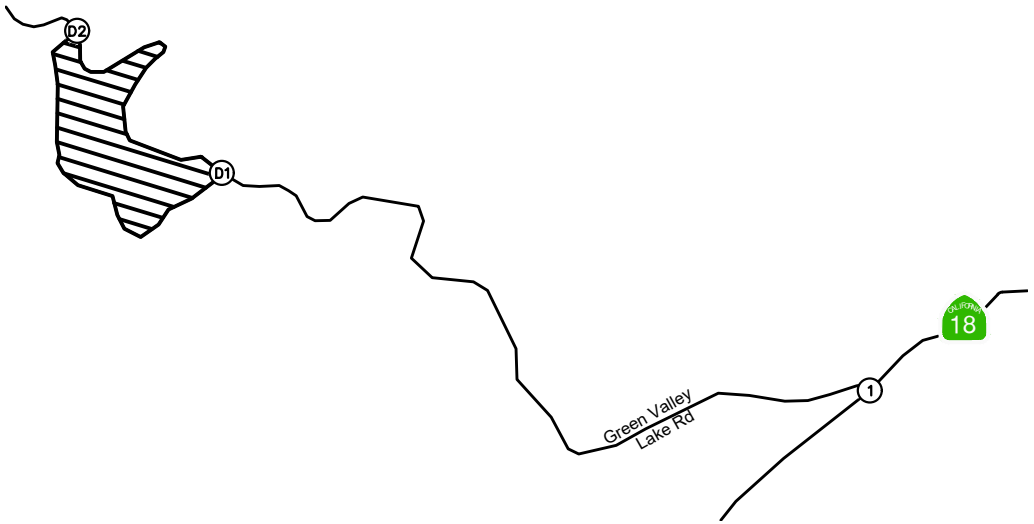
Peak Hour Operating Conditions

An intersection Level of Service analysis was conducted for Horizon Year 2040 conditions, and the results are shown on **Table 5**. Copies of intersection analysis worksheets are provided in ***Appendix C***.

Review of Table 5 indicates that the following intersection would continue to operate at an unacceptable Level of Service under Horizon Year 2040 conditions:

- #1 - Green Valley Lake Road at SR-18: MD – LOS F

NOT TO SCALE



1. Green Valley Lake Rd at SR 18	D1. Green Valley Lake Rd at South Project Driveway	D2. Green Valley Lake Rd at North Project Driveway
10/14 ↓, 292/1046 ↓ 12/16 → 114/127 → 87/69 ↰, 483/340 ↑	84/117 ↓ 32/32 → 13/13 ↰, 83/70 ↑	0/1 ↓, 47/78 ↓ 3/1 → 34/40 → 14/15 ↰, 70/53 ↑

LEGEND:

(X) = Study Intersection

XX/YY = PM/MD Peak Hour Turning Movement Volumes

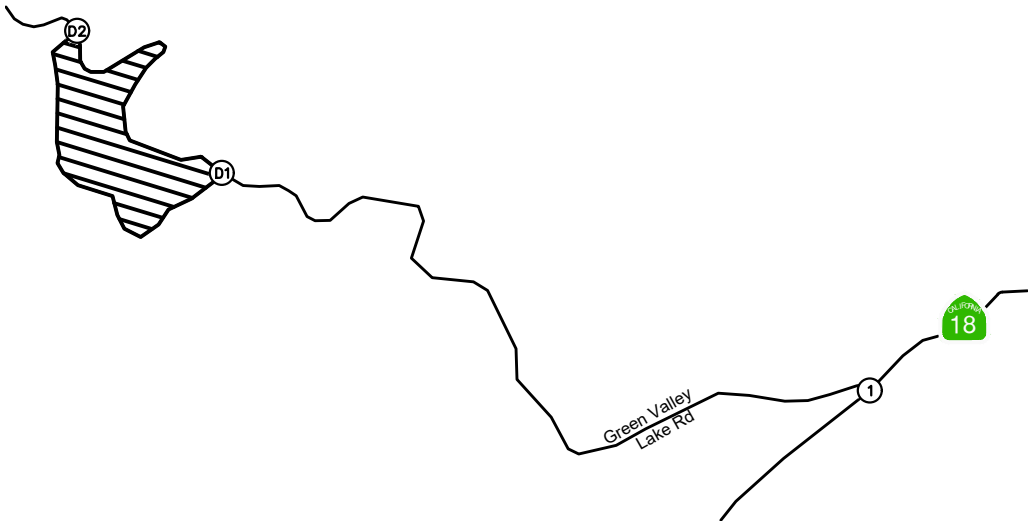
FIGURE 9
OPENING YEAR 2027 CUMULATIVE PLUS PROJECT TRAFFIC VOLUMES

TABLE 4
SUMMARY OF INTERSECTION OPERATION
OPENING YEAR 2027 CUMULATIVE PLUS PROJECT

Int. #	Intersection	Traffic Control	Friday PM Peak Hour						Sunday MD Peak Hour					
			Without Project		With Project		Change in Delay	Cumulative Effect?	Without Project		With Project		Change in Delay	Cumulative Effect?
			Delay	LOS	Delay	LOS			Delay	LOS	Delay	LOS		
1	Green Valley Lake Road at SR-18	U	18.0	C	19.9	C	1.9	No	40.4	E	56.7	F	16.3	Yes
D1	Green Valley Lake Road at South Driveway	U	0.0	A	8.9	A	8.9	No	0.0	A	9.1	A	9.1	No
D2	Green Valley Lake Road at North Driveway	U	9.3	A	9.6	A	0.3	No	9.4	A	9.7	A	0.3	No

Notes:
- Bold and Shaded values indicate intersections operating at an unacceptable Level of Service
- Delay values for unsignalized intersections represent the average vehicle delay on the worst (highest delay) intersection approach.
- S = Signalized
- U = Unsignalized

NOT TO SCALE



1. Green Valley Lake Rd at SR 18	D1. Green Valley Lake Rd at South Project Driveway	D2. Green Valley Lake Rd at North Project Driveway
7/12 ↓ 310/1113 6/11 → ↑ 68/49 514/362 61/75 ↘	55/90 ↓ ↑ 75/61	0/1 ↓ 50/83 4/1 → ↑ 1/2 75/56 2/8 ↘

LEGEND:

(X) = Study Intersection

XX/YY = PM/MD Peak Hour Turning Movement Volumes

FIGURE 10
HORIZON YEAR 2040 TRAFFIC VOLUMES

TABLE 5
SUMMARY OF INTERSECTION OPERATION
HORIZON YEAR 2040

Int. #	Intersection	Traffic Control	Friday PM Peak Hour		Sunday MD Peak Hour	
			Delay	LOS	Delay	LOS
1	Green Valley Lake Road at SR-18	U	19.7	C	52.0	F
D1	Green Valley Lake Road at South Driveway	U	0.0	A	0.0	A
D2	Green Valley Lake Road at North Driveway	U	9.3	A	9.4	A

Notes:
- Bold and Shaded values indicate intersections operating at an unacceptable Level of Service
- Delay values for unsignalized intersections represent the average vehicle delay on the worst (highest delay) intersection approach.
- S = Signalized
- U = Unsignalized

HORIZON YEAR 2040 PLUS PROJECT CONDITIONS

Project-related traffic was added to Horizon Year 2040 traffic volumes to develop Horizon Year 2040 Plus Project traffic volumes. The resulting traffic volumes are shown on **Figure 11**.

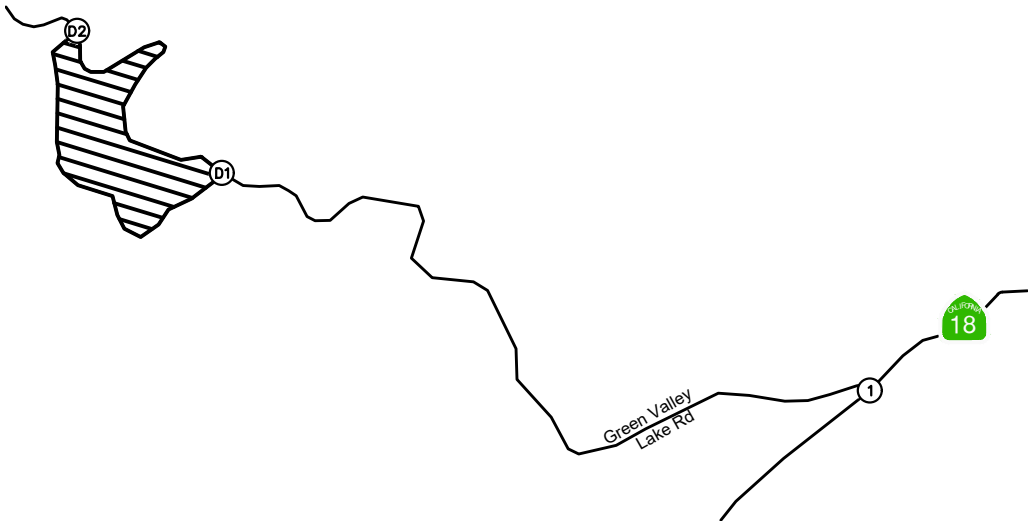
Peak Hour Operating Conditions

An intersection Level of Service analysis was conducted for Horizon Year 2040 Plus Project conditions, and the results are shown on **Table 6.** Copies of intersection analysis worksheets are provided in ***Appendix C***.

Review of Table 6 indicates that, with the addition of Project traffic, the following intersection would continue to operate at an unacceptable Level of Service under Horizon Year 2040 Plus Project conditions:

- #1 - Green Valley Lake Road at SR-18: MD – LOS F

NOT TO SCALE



1. Green Valley Lake Rd at SR 18	D1. Green Valley Lake Rd at South Project Driveway	D2. Green Valley Lake Rd at North Project Driveway
10/15 ↓ 310/1113 ↓ 12/17 → 118/132 ← 91/72 ↑ 514/362 ↑	87/122 ↓ 32/32 ← 13/13 ↑ 88/74 ↑	0/1 ↓ 50/83 ↓ 4/1 → 34/40 ← 14/15 ↑ 75/56 ↑

LEGEND:

X = Study Intersection

XX/YY = PM/MD Peak Hour Turning Movement Volumes

FIGURE 11
HORIZON YEAR 2040 PLUS PROJECT TRAFFIC VOLUMES

TABLE 6
SUMMARY OF INTERSECTION OPERATION
HORIZON YEAR 2040 PLUS PROJECT

Int. #	Intersection	Traffic Control	Friday PM Peak Hour						Sunday MD Peak Hour					
			Without Project		With Project		Change in Delay	Cumulative Effect?	Without Project		With Project		Change in Delay	Cumulative Effect?
			Delay	LOS	Delay	LOS			Delay	LOS	Delay	LOS		
1	Green Valley Lake Road at SR-18	U	19.7	C	21.9	C	2.2	No	52.0	F	82.9	F	30.9	Yes
D1	Green Valley Lake Road at South Driveway	U	0.0	A	8.9	A	8.9	No	0.0	A	9.2	A	9.2	No
D2	Green Valley Lake Road at North Driveway	U	9.3	A	9.7	A	0.4	No	9.4	A	9.8	A	0.4	No

Notes:
- Bold and Shaded values indicate intersections operating at an unacceptable Level of Service
- Delay values for unsignalized intersections represent the average vehicle delay on the worst (highest delay) intersection approach.
- S = Signalized
- U = Unsignalized

TRAFFIC SIGNAL WARRANT ANALYSIS

A traffic signal warrant analysis was conducted for the following unsignalized intersection:

- #1 – Green Valley Lake Road at SR-18

Signal warrants were based on the 2014 California Manual on Uniform Traffic Control Devices (CA MUTCD). The warrants were conducted using Warrant 3 (Peak Hour Warrant) for the following scenarios:

- Opening Year 2027 Cumulative
- Opening Year 2027 Cumulative Plus Project
- Horizon Year 2040
- Horizon Year 2040 Plus Project

Traffic Signal Warrant Analysis worksheets are provided in ***Appendix E***. Based on the signal warrant analysis, Warrant 3 was met during the following scenarios:

- Opening Year 2027 Cumulative
- Opening Year 2027 Cumulative Plus Project
- Horizon Year 2040
- Horizon Year 2040 Plus Project

The CA MUTCD specifically states that, "The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal." The reference document goes on to state a number of other factors to take into account when considering a signal for a specific location, including whether or not a signal would improve the overall safety of the intersection, whether it would benefit or disrupt progressive traffic flow, frequency of peak hours, and consideration of site-specific characteristics such as queuing, signal spacing, and overall delay to the main street through movements.

The decision to install a traffic signal should be based on engineering judgement, and not solely upon satisfying a single peak hour warrant. It is recommended that a decision about signalization at the intersection should be made based on future observations as well as engineering judgement, based on the factors listed above.

As noted earlier, the Level of Service for an unsignalized intersection is reported based on the single approach movement with the highest delay, which in this case, would be the eastbound approach for intersection #1. The side street traffic at this intersection experiences delay during the peak hours while waiting for an acceptable gap in traffic on SR-18. While the side street approach operates at a deficient Level of Service based on the highest delay approach, the overall intersection delay would be acceptable. Any queuing that occurs on the side street is contained on the minor intersection approach and does not impact the progression of traffic on the main arterial.

IMPROVEMENTS AND RECOMMENDATIONS

Intersection Improvements

Based on the San Bernardino County TIA Guidelines and significance thresholds presented earlier in this report, under Opening Year 2027 Cumulative Plus Project and Horizon Year 2040 Plus Project scenarios, the following study intersection would experience a project-related effect due to the increase in delay caused by the addition of project traffic:

- #1 – Green Valley Lake Road at SR-18 (Cumulative effect)

Implementation of the following improvements under applicable Opening Year 2027 Cumulative Plus Project and Horizon Year 2040 Plus Project scenarios are recommended to address the LOS deficiency at the following study intersection:

<u>#1 – Green Valley Lake Road at SR-18</u>

- Install traffic signal

A summary of the intersection operation before and after implementation of the recommended improvements is provided on **Table 7**. Copies of intersection analysis worksheets with improvements are provided in ***Appendix C.*** Recommended improvements may include a combination of fee payments to established programs, construction of specific improvements, payment of a fair-share contribution toward future improvements, or a combination of these approaches. The project fair share proportion for non-programmed improvements at the deficient study intersection under Opening Year 2027 Cumulative Plus Project and Horizon Year 2040 Plus Project scenarios are shown on **Table 8 and 9** respectively.

TABLE 7
SUMMARY OF INTERSECTION OPERATION
RECOMMENDED IMPROVEMENTS

Int. #	Intersection	Improvements	Peak Hour	Proposed Traffic Control	OPENING YEAR 2027 CUMULATIVE						Horizon YEAR 2040					
					Without Project		With Project		With Improvements		Without Project		With Project		With Improvements	
					Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1	Green Valley Lake Road at SR-18	•Install traffic signal	Friday PM	S	18.0	C	19.9	C	7.2	A	19.7	C	21.9	C	7.2	A
			Sunday MD	S	40.4	**E**	56.7	**F**	12.8	B	52.0	**F**	82.9	**F**	15.6	C

Notes:
- Bold values indicate intersections operating at an unacceptable Level of Service
- Delay values for unsignalized intersections represent the average vehicle delay on the worst (highest delay) intersection approach.

S = Signalized
U = Unsignalized

TABLE 8

SUMMARY OF PROJECT FAIR SHARE - OPENING YEAR 2027 CUMULATIVE PLUS PROJECT

		Friday PM					Sunday MD				
		Total Volume		Total	Project		Total Volume		Total	Project	
Int. #	Intersection	2024	2027	Growth	Trips	%-age	2024	2027	Growth	Trips	%-age
1	Green Valley Lake Road at SR-18	825	998	173	89	8.9%	1,385	1,612	227	89	5.5%

Notes:
- Fair Share percentage is calculated based on the ratio of Project trips to total volume in the Opening Year.

TABLE 9

SUMMARY OF PROJECT FAIR SHARE - HORIZON YEAR 2040 PLUS PROJECT

Int. #	Intersection	Friday PM					Sunday MD				
		Total Volume		Total	Project		Total Volume		Total	Project	
		2024	2040	Growth	Trips	%-age	2024	2040	Growth	Trips	%-age
1	Green Valley Lake Road at SR-18	825	1,055	230	89	8.4%	1,385	1,711	326	89	5.2%

Notes:
- Fair Share percentage is calculated based on the ratio of Project trips to total volume in the Horizon Year.

CEQA VEHICLE MILES TRAVELED (VMT) ASSESSMENT

Senate Bill 743 (SB 743) was approved by California legislature in September 2013. SB 743 requires changes to California Environmental Quality Act (CEQA), specifically directing the Governor's Office of Planning and Research (OPR) to develop alternative metrics to the use of vehicular "Level of Service" (LOS) for evaluating transportation projects. OPR has prepared a technical advisory ("OPR Technical Advisory") for evaluating transportation impacts in CEQA and has recommended that Vehicle Miles Traveled (VMT) replace LOS as the primary measure of transportation impacts. The Natural Resources Agency has adopted updates to CEQA Guidelines to incorporate SB 743 that requires VMT for the purposes of determining a significant transportation impact under CEQA.

The San Bernardino County Transportation Impact Study Guidelines (July 2019) provide details on appropriate screening thresholds that can be used to identify when a proposed land use project is anticipated to result in a less-than-significant impact without conducting a more detailed level analysis. Screening thresholds are broken down into the following three criteria:

1. Project Type Screening
2. Transit Priority Area (TPA) Screening
3. Low VMT Area Screening

Land development projects that meet one or more of the above screening thresholds may be presumed to create a less-than-significant impact on transportation and circulation. The screening thresholds were reviewed and evaluated for this project.

Project Type Screening

The San Bernardino County *Transportation Impact Study Guidelines* identify that the following project types would be presumed to have a less-than-significant VMT impact:

- K-12 schools
- Local-serving retail less than 50,000 sq. ft.
- Local parks
- Day care centers
- Local serving gas stations
- Local serving banks
- Student housing projects
- Local serving community colleges that are consistent with the assumptions noted in the RTP/SCS
- Projects generating less than 110 daily vehicle trips
    - This generally corresponds to the following "typical" development potentials:
        - 11 single family housing units
        - 16 multi-family, condominiums, or townhouse housing units
        - 10,000 sq. ft. of office

- 15,000 sq. ft. of light industrial
- 63,000 sq. ft. of warehousing
- 79,000 sq. ft. of high cube transload and short-term storage warehouse
- 12 hotel rooms

The project will involve the construction of a summer camp that generates less than 110 average daily trips; therefore, the project would be screened out based on project type.

The Project Type Screening threshold is met.

Low VMT Generating Area

A project located within a low VMT generating area as determined by the County's guidelines and the SBCTA VMT Screening Tool would be considered to not have a less-than-significant transportation impact. Based on the County's guidelines and the SBCTA VMT Screening Tool, the proposed project is not located within a low VMT generating area. Results of the SBCTA VMT Screening Tool are provided in **Figure 12**.

The Low VMT Generating Area threshold is not met.

Transit Priority Area (TPA) Screening

A project located within a TPA as determined by the San Bernardino County Transportation Authority (SBCTA) VMT Screening Tool would be considered to have a less-than-significant transportation impact. Based on the SBCTA VMT Screening Tool, the proposed project is not located within a TPA.

The Transit Priority Area threshold is not met.

NOT TO SCALE

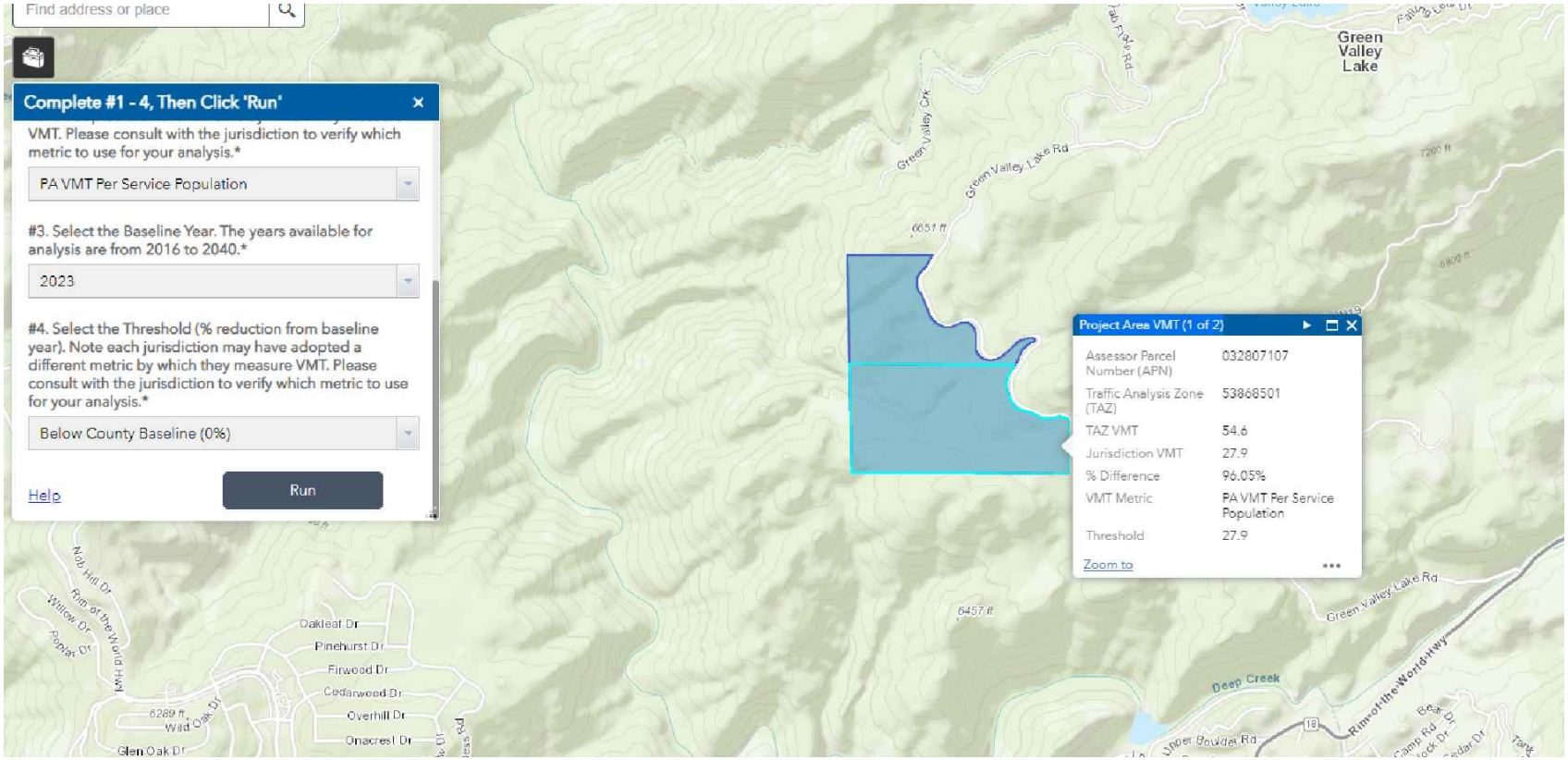


FIGURE 12
SBCTA VMT SCREENING MAP

FINDINGS AND CONCLUSIONS

- The Project involves the expansion of campground uses for the existing Hume SoCal campground to accommodate up to 2,854 total occupants.

- Under Existing Conditions, all study intersections currently operate at an acceptable Level of Service.

- The Opening Year 2027 conditions includes a 2% ambient annual growth rate. To be conservative, an additional 2% growth rate (10% total growth from existing) was applied to account for Cumulative Project traffic. Under Opening Year 2027 Cumulative Conditions, the following intersection would operate at an unacceptable Level of Service:

    - #1 – Green Valley Lake Road at SR-18

- The proposed project is estimated to generate 88 trips (25 inbound and 63 outbound) during the summer/peak season weekend peak hour. As a conservative analysis, the weekend peak hour trips during the summer/peak season were assumed to be added during both the Friday PM and Sunday midday peak hours.

- Project traffic was added to Opening Year 2027 Cumulative conditions to establish Opening Year Cumulative Plus Project conditions. Under Opening Year 2027 Cumulative Plus Project conditions, the following intersection would continue to operate at an unacceptable Level of Service:

    - #1 – Green Valley Lake Road at SR-18 (Cumulative effect)

- Under Horizon Year 2040 Conditions, the following intersection would continue to operate at an unacceptable Level of Service:

    - #1 – Green Valley Lake Road at SR-18

- Project traffic was added to Horizon Year 2040 traffic volumes to establish Horizon Year 2040 Plus Project conditions. Under Horizon Year 2040 Plus Project conditions, the following intersection would continue to operate at an unacceptable Level of Service:

    - #1 – Green Valley Lake Road at SR-18 (Cumulative effect)

- Based on San Bernardino County VMT Screening thresholds, the proposed project would screen out of further VMT analysis as the project will involve the construction of a summer camp that generates less than 110 average daily trips. Therefore, the project would have a less-than-significant VMT impact and no further VMT analysis is required for the proposed project.

- Recommended improvements under applicable Opening Year 2027 Cumulative Plus Project condition were provided to address the project's effect at study intersections.

- Recommended improvements may include a combination of fee payments to established programs, construction of specific improvements, payment of a fair-share contribution toward future improvements, or a combination of these approaches. Conditions placed upon the applicant for the recommended improvements should be coordinated with the Public Works Director and City Engineer.

APPENDIX A

APPROVED
SCOPE OF STUDY
FORM

SCOPE FOR TRAFFIC STUDY

Project Name:	Hume SoCal Project

This Scope for Traffic Study acknowledges San Bernardino County Department of Public Works, Traffic Division requirements of traffic impact analysis for the project and is subject to change:
Available on the Department of Public Works Website:
http://cms.sbcounty.gov/dpw/Transportation/Traffic.aspx

Project Address/APN	APN: 0328-071-10		
Project Description	Youth Camp and Adult Retreat Center		
City	Green Valley Lake, California		
Project Horizon Year	2040	**Project Buildout Year**	2027
Closest Intersection (Xtn) to the Project			
Xtn N/S Street Name	Green Valley Lake Road		
Xtn E/W Street Name	California State Route 18		
County Supervisorial District	3	**Ambient Growth Rate per Year Valley 2%, Desert 1%**	2%

	Traffic Engineer	**Owner/Developer**
Company	Kimley-Horn and Associates, Inc.	Hume Lake Christian Camps
Name	Trevor Briggs	Rick Parkinson
Address	1100 Town and Country Road, Suite 700	5545 Hume Lake Road
City, State, Zip Code	Orange, CA 92868	Fresno, CA 93727
Phone #	714-939-1030	
Email address	trevor.briggs@kimley-horn.com	rparkinson@hume.org

Prepared By: 

Print Name: Trevor Briggs, P.E.

Owner/Engineer **Date** 01/17/2024

SCOPE FOR TRAFFIC STUDY

Project Name:	Hume SoCal Project

1. Traffic Distribution: Please insert or attach Figure(s) illustrating project trip distribution in percentages and volumes at the study intersections analyzed.

2. Trip Credit: Exact amount of credit subject to approval by Traffic Division.

Transportation Demand Management (TDM)	No	
Existing Active Land Use	No	
Previous Land Use	No	
Internal Trip Reduction	No	
Pass-by Trip Reduction	No	

3. Related Projects: Consultant should check with Planning in the San Bernardino County Department of Land Use Services and planning departments of adjoining Cities. Documentation of the consultation from these agencies shall be included in the traffic study. Related projects list shall be submitted to Traffic Division for our review and approval before being incorporated in the study.

4. Freeway Analysis: The potential traffic impact on the following Freeway(s) must be considered.

The applicant shall consult with the State of California Department of Transportation (Caltrans) to determine the California Environmental Quality Act levels of significance with regard to traffic impacts on Caltrans' freeway facilities. This consultation shall also include a determination of Caltrans requirements for the study of traffic impacts to its facilities and the mitigation of any such impacts. This analysis must follow the most current Caltrans' Vehicle Miles Traveled-Focused Transportation Impact Study Guide (May 2020) and can be obtained from https://dot.ca.gov/-/media/dot-media/programs/transportation-planning/documents/sb-743/2020-05-20-approved-vmt-focused-tisg-a11y.pdf. If Caltrans finds that the project has a significant impact on the freeway, Caltrans shall be requested to include the basis for this finding in their response. If fees are proposed to mitigate the freeway impact, Caltrans shall be requested to identify the specific project to which the fees will apply. These written comments from Caltrans shall be included with the traffic study and submitted to Public Works for review and approval. If a documented good faith effort is made to consult with Caltrans and written comments cannot be obtained from within a reasonable amount of time, an analysis of the freeway impact shall be made using HCM procedures. Appendix A of the San Bernardino County Transportation Authority CMP outlines allowable modifications to these procedures. The San Bernardino County Transportation Authority CMP can be viewed online at: https://www.gosbcta.com/planning-sustainability/?term=249

SCOPE FOR TRAFFIC STUDY

Project Name:	Hume SoCal Project

5. Trip Generation

Trip Generation Rate(s) Source: ITE Trip Generation	**I – Institute of Transportation Engineers; S – San Diego Traffic Generators; C – County; O – Other:**	**Edition:**	11th

Land Use Code	**Land Use**	**Rate Based on**	**Qty**	***AVTE vs**	**ADT(a)**	Weekday a.m. peak		Weekday p.m. peak		Weekend peak hour(b)(c)	
						In	Out	In	Out	In	Out
-	Youth Camp and Adult Retreat Center (Summer/Peak Season)				100	25	0	0	25	25	63
-	Youth Camp and Adult Retreat Center (Shoulder/Off Season)				39	4	0	0	4	4	46

(a) Based on 7-Day Average (See Attachment A)

(b) Weekend peak hour trip generation estimates based on the following assumption:

- Inbound traffic: Employees entering project site during peak hour.
- Outbound traffic: 50% of student buses and 50% of adult vehicles leaving the project site during the peak hour. (See Attachment A)

(c) Because of the characteristic of this project, the traffic counts will be collected on Saturday or Sunday.

* - Average Vehicle Trip Ends.
For ITE Land Uses provide number and name of Land Use. e.g. LU 814 - Variety Store

SCOPE FOR TRAFFIC STUDY

Project Name:	Hume SoCal Project

6. Study Intersections: At minimum, the study shall include the following intersections. The list is subject to change after related projects, trip generation and distribution are determined. Consultant should check with adjoining Cities regarding their requirements in addition to the following County/City intersections. Documentation of the consultation from these agencies shall be included in the traffic study. (See Attachment 1)

Xtn #	% County	% City	N-S/E-W Street Name	City	Signalized	CMP
1	100%	0%	Green Valley Lake Rd/SR 18	SB County / Caltrans	No	No
2	100%	0%	Green Valley Lake Rd/South Project Driveway	SB County	No	No
3	100%	0%	Green Valley Lake Rd/North Project Driveway	SB County	No	No

Cities/agencies to be consulted: CALTRANS

SCOPE FOR TRAFFIC STUDY

Project Name:	Hume SoCal Project

7. Other:

Traffic counts may be conducted immediately per the following:
• Must be taken on Tuesdays, Wednesdays or Thursdays. • Certain projects may need to collect traffic counts on Friday or Sunday
• Must exclude holidays, and the first weekdays before and after the holiday.
• Must be taken on days when local schools or colleges are in session.
• Must be taken on days of good weather, and avoid atypical conditions (e.g., road construction, detours, or major traffic incidents).
• Traffic counts used for other traffic studies in the area shall **NOT** be reused again, unless 25% of the counts conducted for that particular traffic study are validated with new counts. The difference in volumes between the old and new counts at each corresponding movement should not be more than 10%.
• New traffic counts shall be checked to ensure the difference in volumes at corresponding approaches, if applicable, between two adjacent intersections is no more than 10% unless the difference can be justified.
• For all proposed mitigation measures, a conceptual plan for the improvements shall be submitted to our Traffic Studies section for review and approval prior to the approval of the Traffic Impact Analysis. All proposed improvements shall be within the right-of-way.
• For all cumulative mitigation measures, a cost estimate for the improvement shall be submitted.
• Raw traffic counts data must be included with traffic analysis study
• Traffic Counts must not be older than 2018

This analysis must follow the most current Traffic Impact Study Guidelines for the County as stated in the County's Road Planning and Design Standards.

8. Fees

The County charges on an actual cost basis for review of traffic studies. An initial deposit of $3400 is required at the time that a land use application is filed with the Department of Land Use Services If the review costs exceed the initial deposit, the applicant will be expected to provide additional funds and the review will be suspended until the additional funds are deposited.

Project Name:	Hume SoCal Project

9. Contact Information:

Please submit a signed copy of this scope for approval by the Traffic Division. Draft scopes may be sent electronically. Final scope with signature should be submitted in person or by US Mail to:

County of San Bernardino
Dept. of Public Works, Traffic Division
825 E. 3rd Street, Rm 115
San Bernardino, CA 92415-0835

Phone: 909-387-8186
Fax: 909-387-7809
Email: Maria.Miranda@dpw.sbcounty.gov or Jeremy.Johnson@dpw.sbcounty.gov

ATTACHMENT A – TRIP GENERATION

Summer: Up on Sunday from 9am – 1pm; Down on Saturday from 9am to 11am

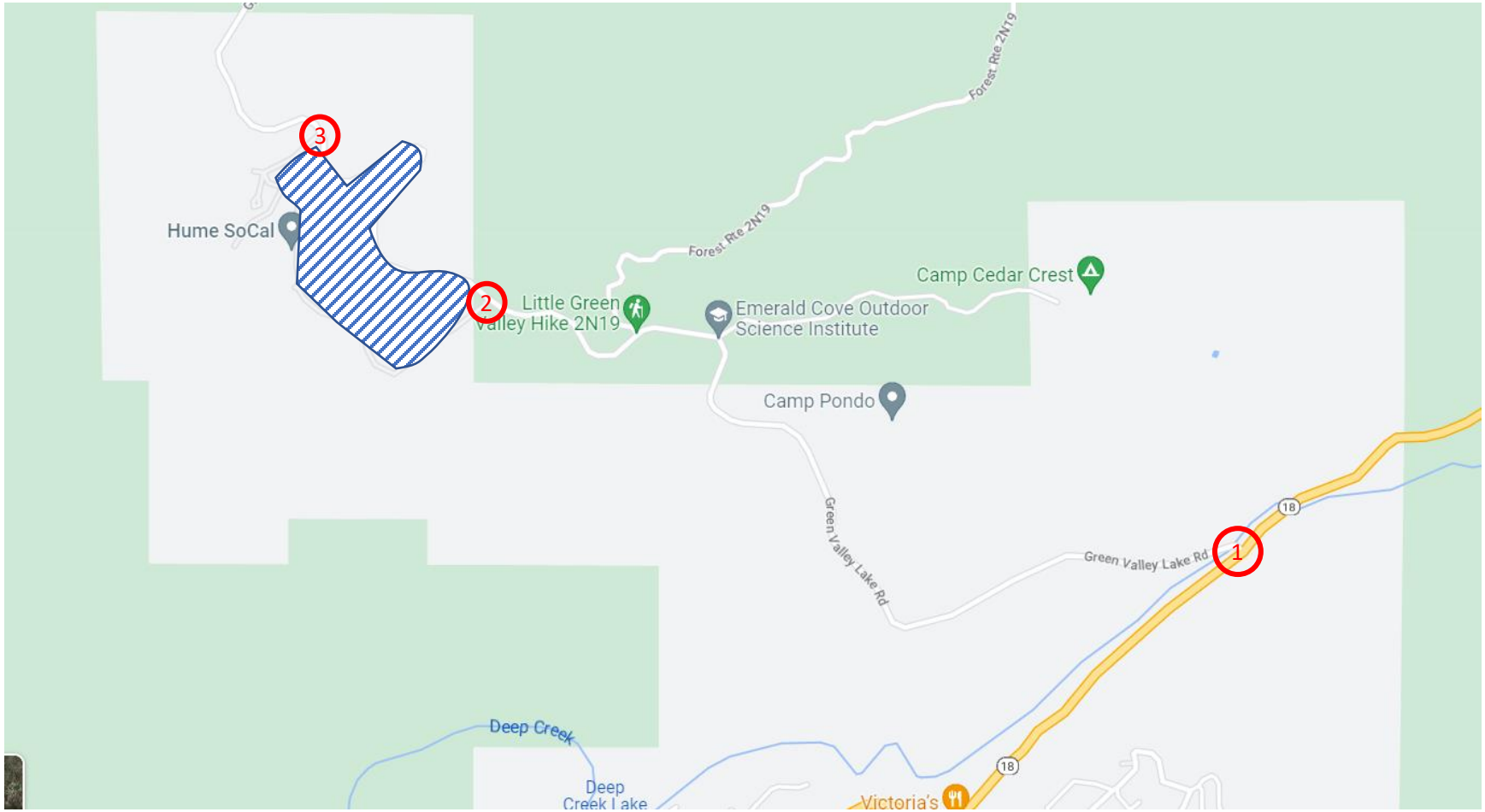
	Summer	Trip	Assumption	Mon	Tue	Wed	Thu	Fri	Sat	Sun	7-day Average
Employees	250	50	90% live on Site. 10% make trips	50	50	50	50	50	50	50	50
Student Campers	2500	50	Buses @50 students per bus	0	0	0	0	0	100	100	29
Adults	150	75	Vehicle Occupancy - 2	0	0	0	0	75	0	75	21
				50	50	50	50	125	150	225	**100**

- Peak day trips are on Sunday – 225 trips. On weekdays, there are 50 trips generated by 10% employees who don't live on the site.
- Seven-day average daily trips are 100, less than 110.
- In Shoulder season (non-summer), peak daily trips are 39.

Shoulder: Up on Friday from 3pm – 7pm; Down on Sunday from 10am – 12pm

	Shoulder	Trip	Assumption	Mon	Tue	Wed	Thu	Fri	Sat	Sun	7-day Average
Employees	40	8	90% live on Site. 10% make trips	8	8	8	8	8	8	8	8
Student Campers	800	16	Buses @50 students per bus	0	0	0	0	32	0	32	9
Adults	150	75	Vehicle Occupancy - 2	0	0	0	0	75	0	75	22
				8	8	8	8	115	8	115	**39**

ATTACHMENT B – STUDY AREA



Legend:

- Project Site
- Study Intersection
- Project Driveway

Study Intersections:

1. Green Valley Lake Rd/SR 18
2. Green Valley Lake Rd/South Project Driveway
3. Green Valley Lake Rd/North Project Driveway

APPENDIX B

TRAFFIC COUNT
DATA SHEETS

Counts Unlimited, Inc.
PO Box 1178
Corona, CA 92878
(951) 268-6268

County of San Bernardino
N/S: Green Valley Lake Road
E/W: SR-18
Weather: Clear

File Name : 01_CSB_Green VL_SR-18 Fr PM
Site Code : 10823695
Start Date : 8/4/2023
Page No : 1

Groups Printed- Total Volume

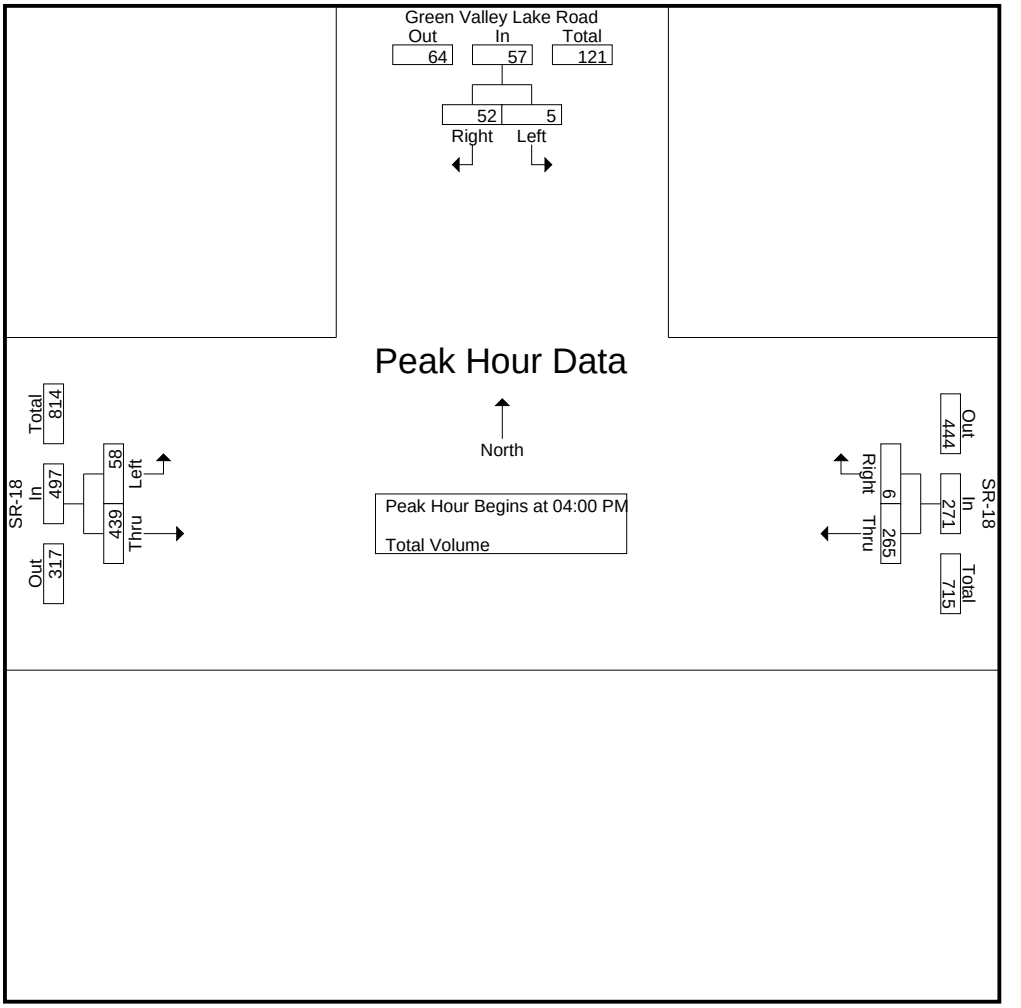
	Green Valley Lake Road Southbound			SR-18 Westbound			SR-18 Eastbound			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
04:00 PM	0	12	12	66	1	67	14	118	132	211
04:15 PM	0	13	13	68	3	71	17	117	134	218
04:30 PM	5	16	21	71	0	71	10	100	110	202
04:45 PM	0	11	11	60	2	62	17	104	121	194
Total	5	52	57	265	6	271	58	439	497	825
05:00 PM	1	10	11	53	2	55	17	98	115	181
05:15 PM	1	17	18	58	2	60	8	98	106	184
05:30 PM	1	9	10	46	2	48	12	108	120	178
05:45 PM	0	16	16	47	4	51	18	124	142	209
Total	3	52	55	204	10	214	55	428	483	752
Grand Total	8	104	112	469	16	485	113	867	980	1577
Apprch %	7.1	92.9		96.7	3.3		11.5	88.5		
Total %	0.5	6.6	7.1	29.7	1	30.8	7.2	55	62.1	

	Green Valley Lake Road Southbound			SR-18 Westbound			SR-18 Eastbound			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:00 PM										
04:00 PM	0	12	12	66	1	67	14	**118**	132	211
04:15 PM	0	13	13	68	**3**	**71**	**17**	117	**134**	**218**
04:30 PM	**5**	**16**	**21**	**71**	0	71	10	100	110	202
04:45 PM	0	11	11	60	2	62	17	104	121	194
Total Volume	5	52	57	265	6	271	58	439	497	825
% App. Total	8.8	91.2		97.8	2.2		11.7	88.3		
PHF	.250	.813	.679	.933	.500	.954	.853	.930	.927	.946

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County of San Bernardino
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File Name : 01_CSB_Green VL_SR-18 Fr PM
Site Code : 10823695
Start Date : 8/4/2023
Page No : 2



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:30 PM			04:00 PM			04:00 PM		
+0 mins.	**5**	16	**21**	66	1	67	14	**118**	132
+15 mins.	0	11	11	68	**3**	**71**	**17**	117	**134**
+30 mins.	1	10	11	**71**	0	71	10	100	110
+45 mins.	1	**17**	18	60	2	62	17	104	121
Total Volume	7	54	61	265	6	271	58	439	497
% App. Total	11.5	88.5		97.8	2.2		11.7	88.3	
PHF	.350	.794	.726	.933	.500	.954	.853	.930	.927

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County of San Bernardino
N/S: Green Valley Lake Road
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Weather: Clear

File Name : 01_CSB_Green VL_SR-18 Sun MD
Site Code : 10823695
Start Date : 8/6/2023
Page No : 1

Groups Printed- Total Volume

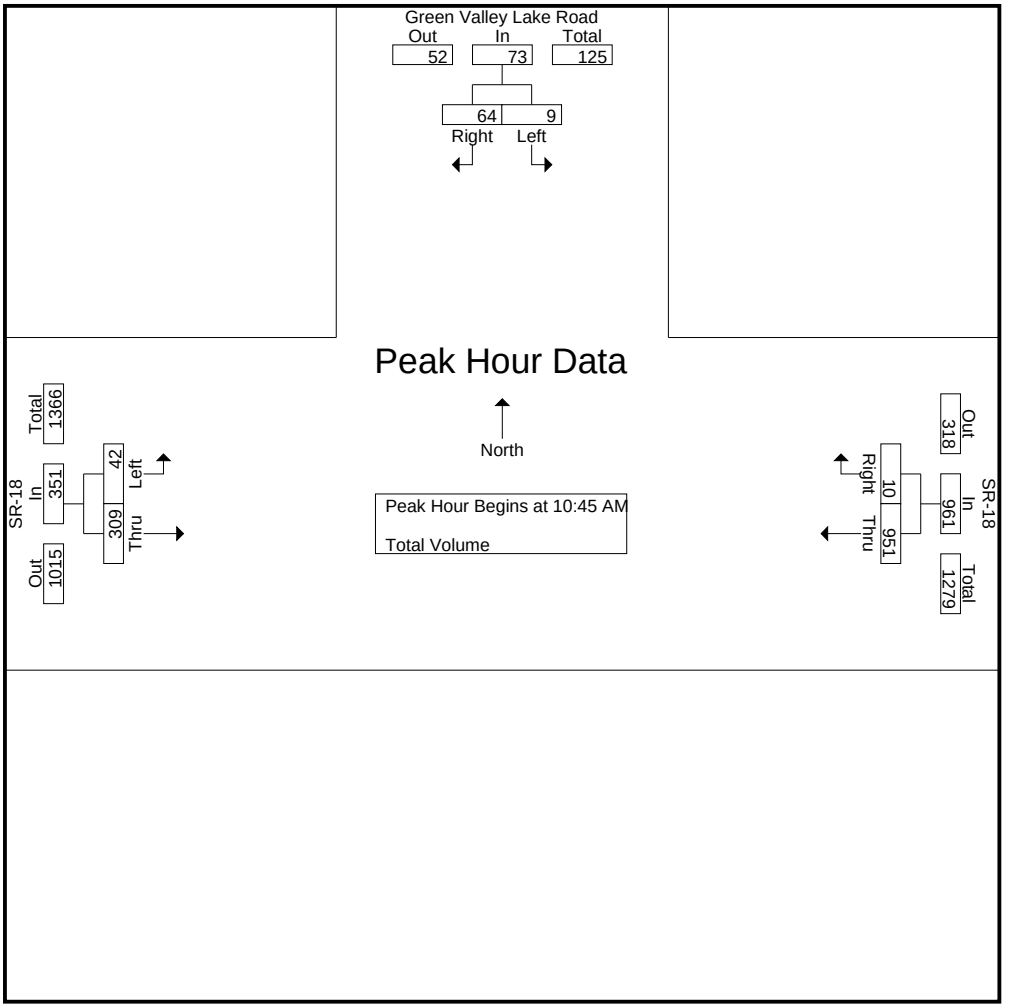
	Green Valley Lake Road Southbound			SR-18 Westbound			SR-18 Eastbound			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
10:00 AM	1	14	15	197	5	202	6	81	87	304
10:15 AM	3	16	19	202	0	202	8	71	79	300
10:30 AM	0	21	21	250	1	251	10	68	78	350
10:45 AM	0	19	19	227	3	230	7	84	91	340
Total	4	70	74	876	9	885	31	304	335	1294
11:00 AM	2	15	17	246	2	248	22	66	88	353
11:15 AM	3	14	17	234	2	236	6	77	83	336
11:30 AM	4	16	20	244	3	247	7	82	89	356
11:45 AM	1	11	12	213	2	215	8	89	97	324
Total	10	56	66	937	9	946	43	314	357	1369
Grand Total	14	126	140	1813	18	1831	74	618	692	2663
Apprch %	10	90		99	1		10.7	89.3		
Total %	0.5	4.7	5.3	68.1	0.7	68.8	2.8	23.2	26	

	Green Valley Lake Road Southbound			SR-18 Westbound			SR-18 Eastbound			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
Peak Hour Analysis From 10:00 AM to 11:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 10:45 AM										
10:45 AM	0	**19**	19	227	**3**	230	7	**84**	**91**	340
11:00 AM	2	15	17	**246**	2	**248**	**22**	66	88	353
11:15 AM	3	14	17	234	2	236	6	77	83	336
11:30 AM	**4**	16	**20**	244	3	247	7	82	89	**356**
Total Volume	9	64	73	951	10	961	42	309	351	1385
% App. Total	12.3	87.7		99	1		12	88		
PHF	.563	.842	.913	.966	.833	.969	.477	.920	.964	.973

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County of San Bernardino
N/S: Green Valley Lake Road
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Weather: Clear

File Name : 01_CSB_Green VL_SR-18 Sun MD
Site Code : 10823695
Start Date : 8/6/2023
Page No : 2



Peak Hour Analysis From 10:00 AM to 11:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	10:15 AM			10:30 AM			11:00 AM		
+0 mins.	**3**	16	19	**250**	1	**251**	**22**	66	88
+15 mins.	0	**21**	**21**	227	**3**	230	6	77	83
+30 mins.	0	19	19	246	2	248	7	82	89
+45 mins.	2	15	17	234	2	236	8	**89**	**97**
Total Volume	5	71	76	957	8	965	43	314	357
% App. Total	6.6	93.4		99.2	0.8		12	88	
PHF	.417	.845	.905	.957	.667	.961	.489	.882	.920

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(951) 268-6268

County of San Bernardino
N/S: Green Valley Lake Road
E/W: Hume SoCal South Driveway
Weather: Clear

File Name : 02_CSB_Green VL_H S DW Fr PM
Site Code : 10823695
Start Date : 8/4/2023
Page No : 1

Groups Printed- Total Volume

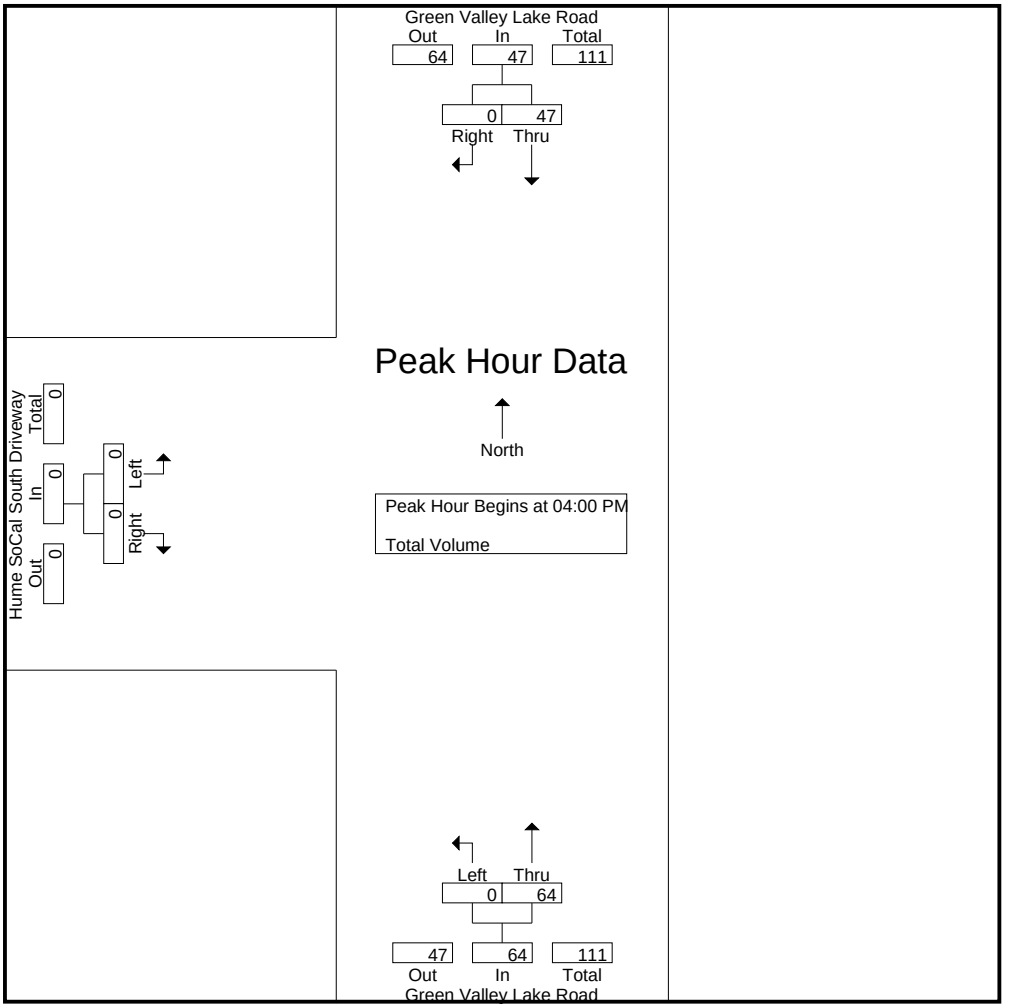
	Green Valley Lake Road Southbound			Green Valley Lake Road Northbound			Hume SoCal South Driveway Eastbound			
Start Time	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	Int. Total
04:00 PM	9	0	9	0	17	17	0	0	0	26
04:15 PM	15	0	15	0	16	16	0	0	0	31
04:30 PM	15	0	15	0	11	11	0	0	0	26
04:45 PM	8	0	8	0	20	20	0	0	0	28
Total	47	0	47	0	64	64	0	0	0	111
05:00 PM	12	0	12	0	14	14	0	0	0	26
05:15 PM	13	0	13	0	15	15	0	0	0	28
05:30 PM	11	0	11	0	11	11	0	0	0	22
05:45 PM	13	0	13	0	18	18	0	0	0	31
Total	49	0	49	0	58	58	0	0	0	107
Grand Total	96	0	96	0	122	122	0	0	0	218
Apprch %	100	0		0	100		0	0		
Total %	44	0	44	0	56	56	0	0	0	

	Green Valley Lake Road Southbound			Green Valley Lake Road Northbound			Hume SoCal South Driveway Eastbound			
Start Time	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:00 PM										
04:00 PM	9	0	9	0	17	17	0	0	0	26
04:15 PM	**15**	0	**15**	0	16	16	0	0	0	**31**
04:30 PM	15	0	15	0	11	11	0	0	0	26
04:45 PM	8	0	8	0	**20**	**20**	0	0	0	28
Total Volume	47	0	47	0	64	64	0	0	0	111
% App. Total	100	0		0	100		0	0		
PHF	.783	.000	.783	.000	.800	.800	.000	.000	.000	.895

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County of San Bernardino
N/S: Green Valley Lake Road
E/W: Hume SoCal South Driveway
Weather: Clear

File Name : 02_CSB_Green VL_H S DW Fr PM
Site Code : 10823695
Start Date : 8/4/2023
Page No : 2



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:15 PM			04:00 PM			04:00 PM		
+0 mins.	**15**	0	**15**	0	17	17	0	0	0
+15 mins.	15	0	15	0	16	16	0	0	0
+30 mins.	8	0	8	0	11	11	0	0	0
+45 mins.	12	0	12	0	**20**	**20**	0	0	0
Total Volume	50	0	50	0	64	64	0	0	0
% App. Total	100	0		0	100		0	0	
PHF	.833	.000	.833	.000	.800	.800	.000	.000	.000

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County of San Bernardino
N/S: Green Valley Lake Road
E/W: Hume SoCal South Driveway
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File Name : 02_CSB_Green VL_H S DW Sun MD
Site Code : 10823695
Start Date : 8/6/2023
Page No : 1

Groups Printed- Total Volume

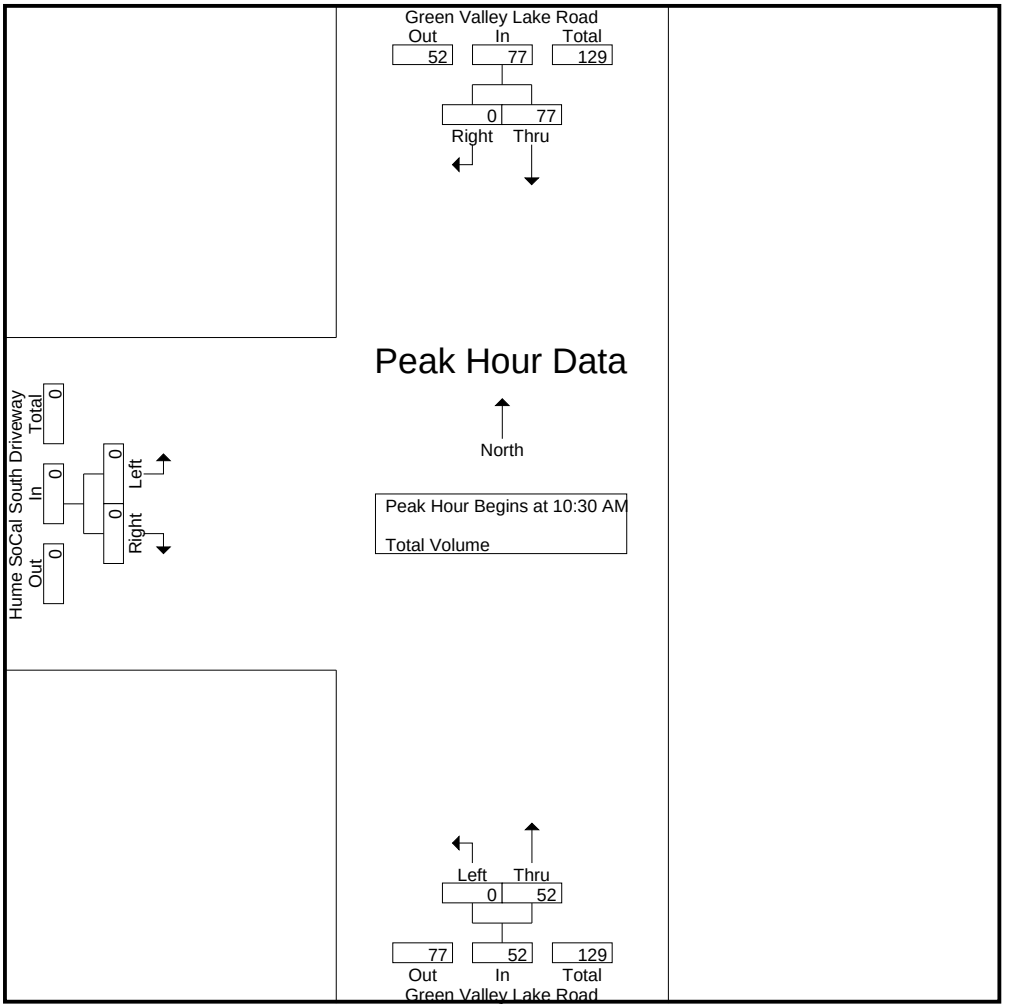
	Green Valley Lake Road Southbound			Green Valley Lake Road Northbound			Hume SoCal South Driveway Eastbound			
Start Time	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	Int. Total
10:00 AM	17	0	17	0	10	10	0	0	0	27
10:15 AM	17	0	17	0	8	8	0	0	0	25
10:30 AM	19	0	19	0	10	10	0	0	0	29
10:45 AM	23	0	23	0	10	10	0	0	0	33
Total	76	0	76	0	38	38	0	0	0	114
11:00 AM	22	0	22	0	16	16	0	0	0	38
11:15 AM	13	0	13	0	16	16	0	0	0	29
11:30 AM	15	0	15	0	8	8	0	0	0	23
11:45 AM	8	0	8	0	10	10	0	0	0	18
Total	58	0	58	0	50	50	0	0	0	108
Grand Total	134	0	134	0	88	88	0	0	0	222
Apprch %	100	0		0	100		0	0		
Total %	60.4	0	60.4	0	39.6	39.6	0	0	0	

	Green Valley Lake Road Southbound			Green Valley Lake Road Northbound			Hume SoCal South Driveway Eastbound			
Start Time	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	Int. Total
Peak Hour Analysis From 10:00 AM to 11:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 10:30 AM										
10:30 AM	19	0	19	0	10	10	0	0	0	29
10:45 AM	**23**	0	**23**	0	10	10	0	0	0	33
11:00 AM	22	0	22	0	**16**	**16**	0	0	0	**38**
11:15 AM	13	0	13	0	16	16	0	0	0	29
Total Volume	77	0	77	0	52	52	0	0	0	129
% App. Total	100	0		0	100		0	0		
PHF	.837	.000	.837	.000	.813	.813	.000	.000	.000	.849

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County of San Bernardino
N/S: Green Valley Lake Road
E/W: Hume SoCal South Driveway
Weather: Clear

File Name : 02_CSB_Green VL_H S DW Sun MD
Site Code : 10823695
Start Date : 8/6/2023
Page No : 2



Peak Hour Analysis From 10:00 AM to 11:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	10:15 AM			10:30 AM			10:00 AM		
+0 mins.	17	0	17	0	10	10	0	0	0
+15 mins.	19	0	19	0	10	10	0	0	0
+30 mins.	**23**	0	**23**	0	**16**	**16**	0	0	0
+45 mins.	22	0	22	0	16	16	0	0	0
Total Volume	81	0	81	0	52	52	0	0	0
% App. Total	100	0		0	100		0	0	
PHF	.880	.000	.880	.000	.813	.813	.000	.000	.000

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County of San Bernardino
N/S: Green Valley Lake Road
E/W: Hume SoCal North DW(Larrys Camp Rd)
Weather: Clear

File Name : 03_CSB_Green VL_H N DW Fr PM
Site Code : 10823695
Start Date : 8/4/2023
Page No : 1

Groups Printed- Total Volume

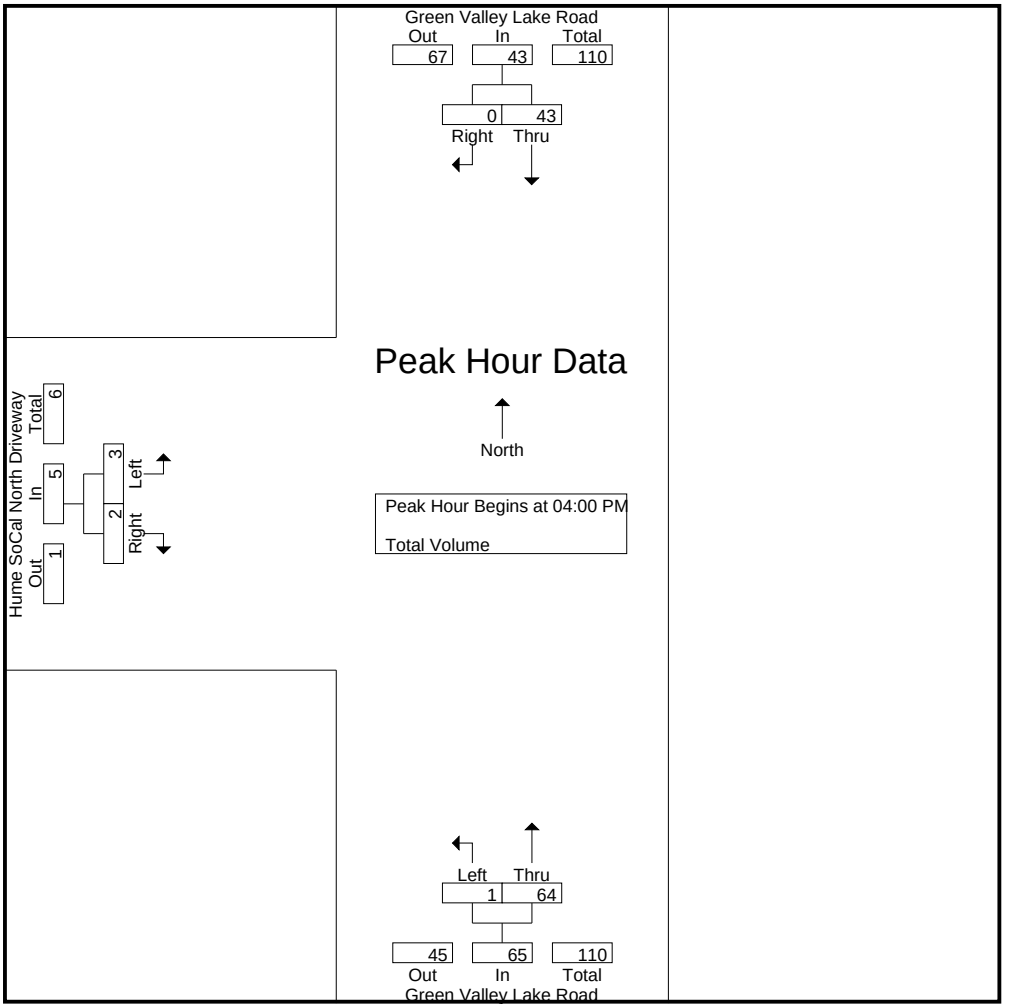
	Green Valley Lake Road Southbound			Green Valley Lake Road Northbound			Hume SoCal North Driveway Eastbound			
Start Time	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	Int. Total
04:00 PM	9	0	9	1	19	20	0	1	1	30
04:15 PM	16	0	16	0	16	16	1	0	1	33
04:30 PM	11	0	11	0	10	10	1	1	2	23
04:45 PM	7	0	7	0	19	19	1	0	1	27
Total	43	0	43	1	64	65	3	2	5	113
05:00 PM	12	0	12	0	15	15	0	1	1	28
05:15 PM	12	1	13	1	14	15	1	1	2	30
05:30 PM	7	2	9	0	10	10	0	3	3	22
05:45 PM	11	0	11	1	15	16	0	2	2	29
Total	42	3	45	2	54	56	1	7	8	109
Grand Total	85	3	88	3	118	121	4	9	13	222
Apprch %	96.6	3.4		2.5	97.5		30.8	69.2		
Total %	38.3	1.4	39.6	1.4	53.2	54.5	1.8	4.1	5.9	

	Green Valley Lake Road Southbound			Green Valley Lake Road Northbound			Hume SoCal North Driveway Eastbound			
Start Time	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:00 PM										
04:00 PM	9	0	9	**1**	**19**	**20**	0	**1**	1	30
04:15 PM	**16**	0	**16**	0	16	16	**1**	0	1	**33**
04:30 PM	11	0	11	0	10	10	1	1	**2**	23
04:45 PM	7	0	7	0	19	19	1	0	1	27
Total Volume	43	0	43	1	64	65	3	2	5	113
% App. Total	100	0		1.5	98.5		60	40		
PHF	.672	.000	.672	.250	.842	.813	.750	.500	.625	.856

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(951) 268-6268

County of San Bernardino
N/S: Green Valley Lake Road
E/W: Hume SoCal North DW(Larrys Camp Rd)
Weather: Clear

File Name : 03_CSB_Green VL_H N DW Fr PM
Site Code : 10823695
Start Date : 8/4/2023
Page No : 2



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:15 PM			04:00 PM			05:00 PM		
+0 mins.	**16**	0	**16**	**1**	**19**	**20**	0	1	1
+15 mins.	11	0	11	0	16	16	**1**	1	2
+30 mins.	7	0	7	0	10	10	0	**3**	**3**
+45 mins.	12	0	12	0	19	19	0	2	2
Total Volume	46	0	46	1	64	65	1	7	8
% App. Total	100	0		1.5	98.5		12.5	87.5	
PHF	.719	.000	.719	.250	.842	.813	.250	.583	.667

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County of San Bernardino
N/S: Green Valley Lake Road
E/W: Hume SoCal North DW(Larrys Camp Rd)
Weather: Clear

File Name : 03_CSB_Green VL_H N DW Sun MD
Site Code : 10823695
Start Date : 8/6/2023
Page No : 1

Groups Printed- Total Volume

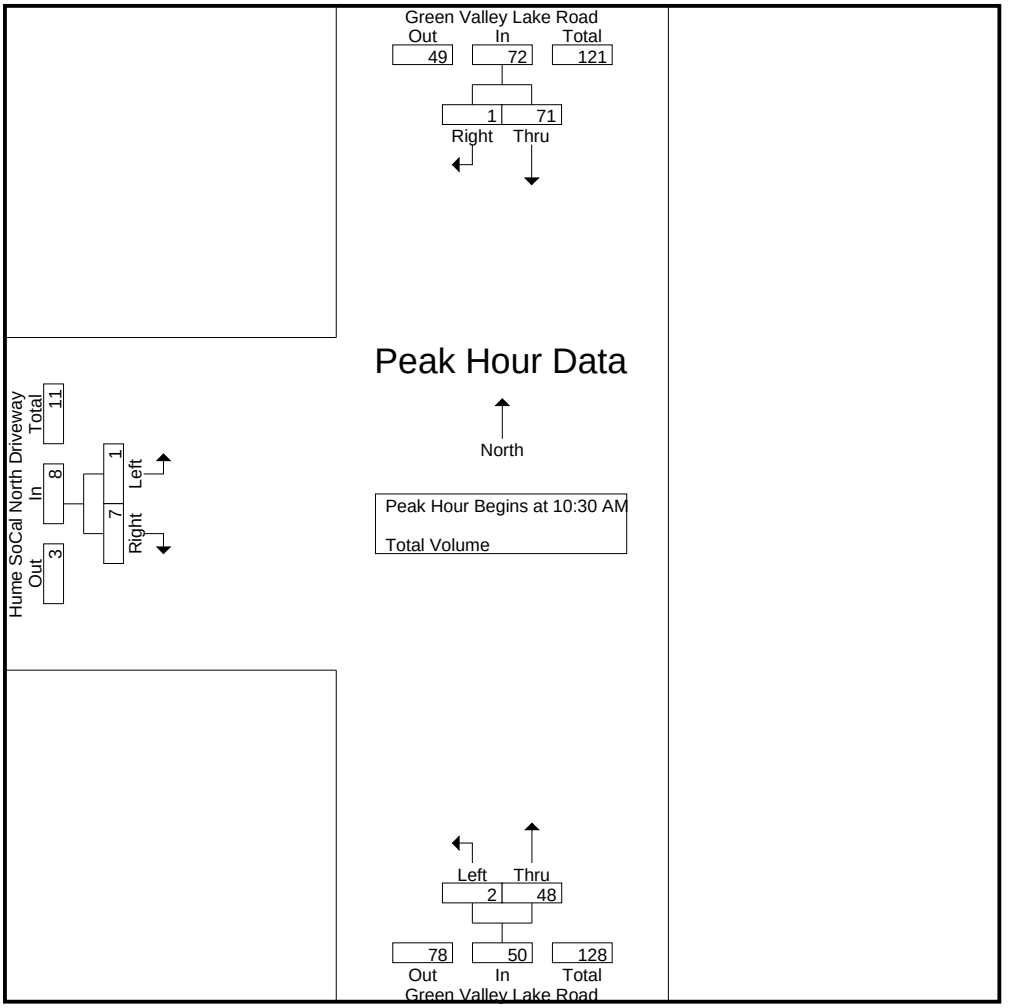
	Green Valley Lake Road Southbound			Green Valley Lake Road Northbound			Hume SoCal North Driveway Eastbound			
Start Time	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	Int. Total
10:00 AM	14	0	14	0	7	7	0	0	0	21
10:15 AM	19	0	19	1	9	10	0	0	0	29
10:30 AM	16	1	17	0	10	10	1	3	4	31
10:45 AM	19	0	19	1	9	10	0	2	2	31
Total	68	1	69	2	35	37	1	5	6	112
11:00 AM	21	0	21	1	15	16	0	1	1	38
11:15 AM	15	0	15	0	14	14	0	1	1	30
11:30 AM	13	0	13	0	10	10	1	0	1	24
11:45 AM	10	0	10	0	10	10	0	0	0	20
Total	59	0	59	1	49	50	1	2	3	112
Grand Total	127	1	128	3	84	87	2	7	9	224
Apprch %	99.2	0.8		3.4	96.6		22.2	77.8		
Total %	56.7	0.4	57.1	1.3	37.5	38.8	0.9	3.1	4	

	Green Valley Lake Road Southbound			Green Valley Lake Road Northbound			Hume SoCal North Driveway Eastbound			
Start Time	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	Int. Total
Peak Hour Analysis From 10:00 AM to 11:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 10:30 AM										
10:30 AM	16	**1**	17	0	10	10	**1**	**3**	**4**	31
10:45 AM	19	0	19	**1**	9	10	0	2	2	31
11:00 AM	**21**	0	**21**	1	**15**	**16**	0	1	1	**38**
11:15 AM	15	0	15	0	14	14	0	1	1	30
Total Volume	71	1	72	2	48	50	1	7	8	130
% App. Total	98.6	1.4		4	96		12.5	87.5		
PHF	.845	.250	.857	.500	.800	.781	.250	.583	.500	.855

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County of San Bernardino
N/S: Green Valley Lake Road
E/W: Hume SoCal North DW(Larrys Camp Rd)
Weather: Clear

File Name : 03_CSB_Green VL_H N DW Sun MD
Site Code : 10823695
Start Date : 8/6/2023
Page No : 2



Peak Hour Analysis From 10:00 AM to 11:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	10:15 AM			10:30 AM			10:30 AM		
+0 mins.	19	0	19	0	10	10	**1**	**3**	**4**
+15 mins.	16	**1**	17	**1**	9	10	0	2	2
+30 mins.	19	0	19	1	**15**	**16**	0	1	1
+45 mins.	**21**	0	**21**	0	14	14	0	1	1
Total Volume	75	1	76	2	48	50	1	7	8
% App. Total	98.7	1.3		4	96		12.5	87.5	
PHF	.893	.250	.905	.500	.800	.781	.250	.583	.500

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County of San Bernardino
Green Valley Lake Road
W/ State Route 18
72 Hour Directional Volume Count

CSB002
Site Code: 108-23695

Start Time	7/28/23 Fri	Eastbound Morning	Eastbound Afternoon	Hour Totals Morning	Hour Totals Afternoon	Westbound Morning	Westbound Afternoon	Hour Totals Morning	Hour Totals Afternoon	Combined Totals Morning	Combined Totals Afternoon
12:00		0	12			3	12				
12:15		2	8			1	14				
12:30		0	16			3	7				
12:45		0	11	2	47	1	14	8	47	10	94
01:00		1	12			0	14				
01:15		0	11			1	**20**				
01:30		0	**18**			1	**20**				
01:45		1	**13**	2	54	0	**14**	2	68	4	122
02:00		0	**15**			0	**21**				
02:15		1	**13**			0	12				
02:30		0	16			0	15				
02:45		0	13	1	57	0	16	0	64	1	121
03:00		1	7			0	13				
03:15		0	14			0	17				
03:30		0	12			1	17				
03:45		2	10	3	43	0	15	1	62	4	105
04:00		2	12			0	4				
04:15		1	13			1	24				
04:30		1	10			0	17				
04:45		2	12	6	47	1	20	2	65	8	112
05:00		4	12			0	13				
05:15		1	8			4	17				
05:30		4	7			2	17				
05:45		6	16	15	43	0	15	6	62	21	105
06:00		6	9			5	18				
06:15		10	20			4	22				
06:30		3	13			3	8				
06:45		3	6	22	48	6	10	18	58	40	106
07:00		5	4			2	18				
07:15		5	4			9	15				
07:30		3	11			4	14				
07:45		7	6	20	25	9	13	24	60	44	85
08:00		6	9			7	14				
08:15		4	6			14	4				
08:30		10	3			7	4				
08:45		11	8	31	26	8	8	36	30	67	56
09:00		**15**	4			13	8				
09:15		**10**	0			11	7				
09:30		**12**	2			19	8				
09:45		**23**	2	60	8	8	2	51	25	111	33
10:00		12	2			6	5				
10:15		12	1			11	3				
10:30		10	3			8	3				
10:45		16	3	50	9	**13**	2	38	13	88	22
11:00		6	2			**13**	10				
11:15		17	1			**16**	4				
11:30		12	1			**10**	2				
11:45		22	4	57	8	10	2	49	18	106	26
Total		269	415	269	415	235	572	235	572	504	987
Combined Total		684		684		807		807		1491	
AM Peak	-	09:00	-	-	-	10:45	-	-	-	-	-
Vol.	-	60	-	-	-	52	-	-	-	-	-
P.H.F.		0.652				0.684					
PM Peak	-	-	01:30	-	-	-	01:15	-	-	-	-
Vol.	-	-	59	-	-	-	75	-	-	-	-
P.H.F.			0.819				0.893				
Percentage		39.3%	60.7%			29.1%	70.9%				

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County of San Bernardino
Green Valley Lake Road
W/ State Route 18
72 Hour Directional Volume Count

CSB002
Site Code: 108-23695

Start Time	7/29/23 Sat	Eastbound Morning	Eastbound Afternoon	Hour Totals Morning	Hour Totals Afternoon	Westbound Morning	Westbound Afternoon	Hour Totals Morning	Hour Totals Afternoon	Combined Totals Morning	Combined Totals Afternoon
12:00		0	29			0	9				
12:15		0	14			4	22				
12:30		0	19			2	18				
12:45		1	**17**	1	79	0	12	6	61	7	140
01:00		0	**25**			1	11				
01:15		3	**15**			0	**24**				
01:30		1	**27**			3	**18**				
01:45		0	15	4	82	1	**22**	5	75	9	157
02:00		0	13			1	**15**				
02:15		1	16			2	12				
02:30		0	9			1	16				
02:45		0	14	1	52	0	26	4	69	5	121
03:00		2	18			0	17				
03:15		2	12			0	13				
03:30		0	19			0	16				
03:45		1	20	5	69	0	12	0	58	5	127
04:00		0	20			0	23				
04:15		1	12			1	16				
04:30		0	13			0	14				
04:45		1	7	2	52	0	17	1	70	3	122
05:00		0	13			0	10				
05:15		1	17			5	10				
05:30		1	11			7	9				
05:45		1	9	3	50	7	13	19	42	22	92
06:00		1	9			5	7				
06:15		5	9			7	8				
06:30		1	21			3	14				
06:45		3	16	10	55	6	7	21	36	31	91
07:00		2	9			4	6				
07:15		6	5			8	10				
07:30		13	8			13	16				
07:45		4	5	25	27	7	8	32	40	57	67
08:00		10	1			22	6				
08:15		10	12			14	3				
08:30		8	7			15	5				
08:45		15	3	43	23	11	5	62	19	105	42
09:00		32	5			13	5				
09:15		17	2			**27**	2				
09:30		16	1			**22**	1				
09:45		**25**	3	90	11	**15**	2	77	10	167	21
10:00		**15**	2			**18**	4				
10:15		**33**	0			17	3				
10:30		**18**	2			20	1				
10:45		9	2	75	6	14	3	69	11	144	17
11:00		19	1			13	1				
11:15		13	1			12	2				
11:30		14	2			11	2				
11:45		21	1	67	5	38	0	74	5	141	10
Total		326	511	326	511	370	496	370	496	696	1007
Combined Total		837		837		866		866		1703	
AM Peak	-	09:45	-	-	-	09:15	-	-	-	-	-
Vol.	-	91	-	-	-	82	-	-	-	-	-
P.H.F.		0.689				0.759					
PM Peak	-	-	00:45	-	-	-	01:15	-	-	-	-
Vol.	-	-	84	-	-	-	79	-	-	-	-
P.H.F.			0.778				0.823				
Percentage		38.9%	61.1%			42.7%	57.3%				

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County of San Bernardino
Green Valley Lake Road
W/ State Route 18
72 Hour Directional Volume Count

CSB002
Site Code: 108-23695

Start Time	7/30/23 Sun	Eastbound Morning	Eastbound Afternoon	Hour Totals Morning	Hour Totals Afternoon	Westbound Morning	Westbound Afternoon	Hour Totals Morning	Hour Totals Afternoon	Combined Totals Morning	Combined Totals Afternoon
12:00		2	27			2	8				
12:15		0	13			1	18				
12:30		0	18			1	9				
12:45		0	**22**	2	80	2	8	6	43	8	123
01:00		1	**17**			0	10				
01:15		0	**20**			3	15				
01:30		0	**23**			1	14				
01:45		0	18	1	78	1	17	5	56	6	134
02:00		2	19			0	14				
02:15		0	15			1	10				
02:30		0	16			0	22				
02:45		0	13	2	63	0	13	1	59	3	122
03:00		0	21			1	18				
03:15		0	11			0	12				
03:30		1	18			0	10				
03:45		0	17	1	67	0	13	1	53	2	120
04:00		0	12			0	**33**				
04:15		0	16			0	**17**				
04:30		0	18			0	**10**				
04:45		1	12	1	58	0	**14**	0	74	1	132
05:00		0	13			0	12				
05:15		1	10			0	13				
05:30		3	10			0	8				
05:45		0	7	4	40	0	9	0	42	4	82
06:00		3	12			1	6				
06:15		5	3			1	11				
06:30		1	17			4	10				
06:45		6	11	15	43	1	3	7	30	22	73
07:00		6	10			7	14				
07:15		6	7			7	4				
07:30		7	13			9	9				
07:45		10	13	29	43	6	8	29	35	58	78
08:00		8	4			3	17				
08:15		16	6			4	10				
08:30		14	8			5	7				
08:45		13	10	51	28	9	3	21	37	72	65
09:00		4	1			19	1				
09:15		8	3			18	5				
09:30		5	1			9	3				
09:45		11	2	28	7	24	3	70	12	98	19
10:00		14	4			24	2				
10:15		11	1			18	2				
10:30		15	1			20	3				
10:45		19	1	59	7	**27**	2	89	9	148	16
11:00		**14**	2			**35**	1				
11:15		**14**	3			**43**	3				
11:30		**15**	1			**23**	1				
11:45		**22**	1	65	7	15	0	116	5	181	12
Total		258	521	258	521	345	455	345	455	603	976
Combined Total		779		779		800		800		1579	
AM Peak	-	11:00	-	-	-	10:45	-	-	-	-	-
Vol.	-	65	-	-	-	128	-	-	-	-	-
P.H.F.		0.739				0.744					
PM Peak	-	-	00:45	-	-	-	04:00	-	-	-	-
Vol.	-	-	82	-	-	-	74	-	-	-	-
P.H.F.			0.891				0.561				
Percentage		33.1%	66.9%			43.1%	56.9%				
ADT/AADT		ADT 1,591		AADT 1,591							

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County of San Bernardino
State Route 18
S/ Green Valley Lake Road
72 Hour Directional Volume Count

CSB001
Site Code: 108-23695

Start Time	7/28/23 Fri	Northbound Morning	Northbound Afternoon	Hour Totals Morning	Hour Totals Afternoon	Southbound Morning	Southbound Afternoon	Hour Totals Morning	Hour Totals Afternoon	Combined Totals Morning	Combined Totals Afternoon
12:00		10	92			1	81				
12:15		8	193			7	60				
12:30		5	87			1	**90**				
12:45		10	154	33	526	1	**76**	10	307	43	833
01:00		5	**143**			1	**85**				
01:15		5	**128**			1	**79**				
01:30		2	**155**			1	69				
01:45		2	**160**	14	586	1	58	4	291	18	877
02:00		1	126			0	92				
02:15		2	110			2	96				
02:30		2	122			0	72				
02:45		0	132	5	490	2	64	4	324	9	814
03:00		5	142			2	73				
03:15		1	128			3	83				
03:30		2	112			3	83				
03:45		0	118	8	500	3	69	11	308	19	808
04:00		9	141			7	59				
04:15		3	116			4	69				
04:30		5	127			4	63				
04:45		6	119	23	503	5	68	20	259	43	762
05:00		9	119			5	69				
05:15		10	118			11	56				
05:30		16	114			10	54				
05:45		8	80	43	431	13	60	39	239	82	670
06:00		36	97			22	71				
06:15		30	132			30	57				
06:30		38	88			13	50				
06:45		50	118	154	435	21	36	86	214	240	649
07:00		35	108			23	39				
07:15		48	129			25	42				
07:30		45	102			32	64				
07:45		52	112	180	451	31	25	111	170	291	621
08:00		53	98			29	38				
08:15		75	88			44	32				
08:30		74	72			39	29				
08:45		71	68	273	326	54	21	166	120	439	446
09:00		81	67			61	20				
09:15		81	86			56	14				
09:30		94	47			73	18				
09:45		86	50	342	250	87	16	277	68	619	318
10:00		83	46			81	12				
10:15		71	45			91	12				
10:30		112	34			92	8				
10:45		83	34	349	159	82	8	346	40	695	199
11:00		**111**	31			**78**	9				
11:15		**114**	19			**91**	9				
11:30		**108**	20			**90**	6				
11:45		**103**	18	436	88	**93**	7	352	31	788	119
Total		1860	4745	1860	4745	1426	2371	1426	2371	3286	7116
Combined Total		6605		6605		3797		3797		10402	
AM Peak	-	11:00	-	-	-	11:00	-	-	-	-	-
Vol.	-	436	-	-	-	352	-	-	-	-	-
P.H.F.		0.956				0.946					
PM Peak	-	-	01:00	-	-	-	00:30	-	-	-	-
Vol.	-	-	586	-	-	-	330	-	-	-	-
P.H.F.			0.916				0.917				
Percentage		28.2%	71.8%			37.6%	62.4%				

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County of San Bernardino
State Route 18
S/ Green Valley Lake Road
72 Hour Directional Volume Count

CSB001
Site Code: 108-23695

Start Time	7/29/23 Sat	Northbound Morning	Northbound Afternoon	Hour Totals Morning	Hour Totals Afternoon	Southbound Morning	Southbound Afternoon	Hour Totals Morning	Hour Totals Afternoon	Combined Totals Morning	Combined Totals Afternoon
12:00		18	121			5	103				
12:15		9	**148**			0	78				
12:30		15	**142**			3	104				
12:45		11	**131**	53	542	3	76	11	361	64	903
01:00		6	**133**			4	99				
01:15		6	129			3	86				
01:30		8	126			1	102				
01:45		4	129	24	517	9	87	17	374	41	891
02:00		6	109			4	86				
02:15		10	119			3	94				
02:30		5	96			2	93				
02:45		4	130	25	454	1	98	10	371	35	825
03:00		4	106			3	88				
03:15		3	121			3	103				
03:30		2	76			4	**124**				
03:45		2	92	11	395	3	**103**	13	418	24	813
04:00		4	108			0	**138**				
04:15		11	69			4	**114**				
04:30		3	88			3	109				
04:45		9	72	27	337	5	107	12	468	39	805
05:00		8	54			3	128				
05:15		20	64			2	107				
05:30		13	60			16	104				
05:45		25	34	66	212	5	99	26	438	92	650
06:00		26	44			14	82				
06:15		17	45			17	97				
06:30		35	38			8	99				
06:45		38	37	116	164	15	75	54	353	170	517
07:00		51	32			19	57				
07:15		42	32			14	58				
07:30		52	38			29	83				
07:45		85	30	230	132	24	49	86	247	316	379
08:00		121	31			30	42				
08:15		96	27			43	47				
08:30		119	25			30	52				
08:45		114	32	450	115	50	42	153	183	603	298
09:00		110	34			87	45				
09:15		159	33			58	35				
09:30		125	18			74	27				
09:45		120	26	514	111	**94**	25	313	132	827	243
10:00		121	19			**73**	27				
10:15		109	18			**82**	19				
10:30		134	17			**90**	16				
10:45		119	11	483	65	57	13	302	75	785	140
11:00		**136**	17			87	12				
11:15		**113**	17			87	7				
11:30		**151**	10			93	13				
11:45		**176**	9	576	53	69	7	336	39	912	92
Total		2575	3097	2575	3097	1333	3459	1333	3459	3908	6556
Combined Total		5672		5672		4792		4792		10464	
AM Peak	-	11:00	-	-	-	09:45	-	-	-	-	-
Vol.	-	576	-	-	-	339	-	-	-	-	-
P.H.F.		0.818				0.902					
PM Peak	-	-	00:15	-	-	-	03:30	-	-	-	-
Vol.	-	-	554	-	-	-	479	-	-	-	-
P.H.F.			0.936				0.868				
Percentage		45.4%	54.6%			27.8%	72.2%				

Counts Unlimited, Inc.

PO Box 1178
Corona, CA 92878
Phone: (951) 268-6268
email: counts@countsunlimited.com

County of San Bernardino
State Route 18
S/ Green Valley Lake Road
72 Hour Directional Volume Count

CSB001
Site Code: 108-23695

Start Time	7/30/23 Sun	Northbound Morning	Northbound Afternoon	Hour Totals Morning	Hour Totals Afternoon	Southbound Morning	Southbound Afternoon	Hour Totals Morning	Hour Totals Afternoon	Combined Totals Morning	Combined Totals Afternoon
12:00		11	**101**			7	**221**				
12:15		11	**112**			3	**223**				
12:30		11	**101**			2	**222**				
12:45		9	**93**	42	407	3	**171**	15	837	57	1244
01:00		5	75			5	189				
01:15		11	94			1	213				
01:30		3	79			2	216				
01:45		6	79	25	327	4	181	12	799	37	1126
02:00		3	103			3	190				
02:15		3	79			2	186				
02:30		0	102			1	172				
02:45		4	75	10	359	2	210	8	758	18	1117
03:00		1	78			0	147				
03:15		3	84			2	144				
03:30		1	77			6	189				
03:45		1	86	6	325	1	198	9	678	15	1003
04:00		1	80			7	132				
04:15		0	77			5	164				
04:30		3	66			4	181				
04:45		2	43	6	266	7	153	23	630	29	896
05:00		4	68			4	157				
05:15		4	53			5	108				
05:30		8	44			7	99				
05:45		15	38	31	203	12	115	28	479	59	682
06:00		11	43			15	58				
06:15		15	47			13	76				
06:30		15	30			17	105				
06:45		15	34	56	154	20	87	65	326	121	480
07:00		29	23			30	74				
07:15		40	38			25	72				
07:30		27	33			31	65				
07:45		101	25	197	119	36	60	122	271	319	390
08:00		63	40			62	69				
08:15		62	32			63	55				
08:30		78	22			63	47				
08:45		91	15	294	109	82	45	270	216	564	325
09:00		79	20			93	26				
09:15		63	29			104	33				
09:30		94	22			125	23				
09:45		95	16	331	87	153	12	475	94	806	181
10:00		75	12			166	15				
10:15		90	13			153	8				
10:30		86	13			**252**	11				
10:45		101	14	352	52	**247**	8	818	42	1170	94
11:00		**79**	12			**242**	7				
11:15		**81**	11			**292**	5				
11:30		**111**	9			242	8				
11:45		**105**	4	376	36	242	4	1018	24	1394	60
Total		1726	2444	1726	2444	2863	5154	2863	5154	4589	7598
Combined Total		4170		4170		8017		8017		12187	
AM Peak	-	11:00	-	-	-	10:30	-	-	-	-	-
Vol.	-	376	-	-	-	1033	-	-	-	-	-
P.H.F.		0.847				0.884					
PM Peak	-	-	12:00	-	-	-	12:00	-	-	-	-
Vol.	-	-	407	-	-	-	837	-	-	-	-
P.H.F.			0.908				0.938				
Percentage		41.4%	58.6%			35.7%	64.3%				
ADT/AADT		ADT 11,018		AADT 11,018							

APPENDIX C

INTERSECTION ANALYSIS WORKSHEETS

Hume SoCal Project

Vistro File: K:\...\Hume SoCal PM_2024-04-26.vistro
Report File: K:\...\0. EX PM.pdf

Scenario 1 EX PM
4/26/2024

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Green Valley Lake Rd/SR 18	Two-way stop	HCM 7th Edition	EB Left	0.016	16.8	C
2	Green Valley Lake Rd/South Project Driveway	Two-way stop	HCM 7th Edition	NB Thru	0.001	0.0	A
3	Green Valley Lake Rd/North Project Driveway	Two-way stop	HCM 7th Edition	EB Left	0.005	9.2	A

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: Green Valley Lake Rd/SR 18

Control Type:	Two-way stop	Delay (sec / veh):	16.8
Analysis Method:	HCM 7th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.016

Intersection Setup

Name	SR 18		SR 18		Green Valley Lake Rd	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	0	0	0
Entry Pocket Length [ft]	85.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00		40.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		Yes	

Volumes

Name	SR 18		SR 18		Green Valley Lake Rd	
Base Volume Input [veh/h]	58	439	265	6	5	52
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	58	439	265	6	5	52
Peak Hour Factor	0.9730	0.9730	0.9730	0.9730	0.9730	0.9730
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	15	113	68	2	1	13
Total Analysis Volume [veh/h]	60	451	272	6	5	53
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	100
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.05	0.00	0.00	0.00	0.02	0.07
d_M, Delay for Movement [s/veh]	7.94	0.00	0.00	0.00	16.84	10.21
Movement LOS	A	A	A	A	C	B
95th-Percentile Queue Length [veh/ln]	0.15	0.00	0.00	0.00	0.28	0.28
95th-Percentile Queue Length [ft/ln]	3.67	0.00	0.00	0.00	6.96	6.96
d_A, Approach Delay [s/veh]	0.93		0.00		10.78	
Approach LOS	A		A		B	
d_I, Intersection Delay [s/veh]	1.30					
Intersection LOS	C					

Intersection Level Of Service Report
Intersection 2: Green Valley Lake Rd/South Project Driveway

Control Type:	Two-way stop	Delay (sec / veh):	0.0
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.001

Intersection Setup

Name	Green Valley Lake Rd		Green Valley Lake Rd		South Project Driveway	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		25.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		Yes	

Volumes

Name	Green Valley Lake Rd		Green Valley Lake Rd		South Project Driveway	
Base Volume Input [veh/h]	0	64	47	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	64	47	0	0	0
Peak Hour Factor	0.8490	0.8490	0.8490	0.8490	0.8490	0.8490
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	19	14	0	0	0
Total Analysis Volume [veh/h]	0	75	55	0	0	0
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	7.32	0.00	0.00	0.00	9.17	8.56
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	0.00	0.00	0.00	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	0.00		0.00		8.86	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	0.00					
Intersection LOS	A					

Intersection Level Of Service Report
Intersection 3: Green Valley Lake Rd/North Project Driveway

Control Type:	Two-way stop	Delay (sec / veh):	9.2
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.005

Intersection Setup

Name	Green Valley Lake Rd		Green Valley Lake Rd		North Project Driveway	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		25.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		Yes	

Volumes

Name	Green Valley Lake Rd		Green Valley Lake Rd		North Project Driveway	
Base Volume Input [veh/h]	1	64	43	0	3	2
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1	64	43	0	3	2
Peak Hour Factor	0.8550	0.8550	0.8550	0.8550	0.8550	0.8550
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	19	13	0	1	1
Total Analysis Volume [veh/h]	1	75	50	0	4	2
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	7.31	0.00	0.00	0.00	9.18	8.56
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.00	0.00	0.02	0.02
95th-Percentile Queue Length [ft/ln]	0.04	0.04	0.00	0.00	0.50	0.50
d_A, Approach Delay [s/veh]	0.10		0.00		8.97	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	0.46					
Intersection LOS	A					

Hume SoCal Project

Vistro File: K:\...\Hume SoCal MD_2024-04-26.vistro
Report File: K:\...\0. EX SUN MD.pdf

Scenario 1 EX MD
4/26/2024

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Green Valley Lake Rd/SR 18	Two-way stop	HCM 7th Edition	EB Left	0.061	34.4	D
2	Green Valley Lake Rd/South Project Driveway	Two-way stop	HCM 7th Edition	SB Thru	0.001	0.0	A
3	Green Valley Lake Rd/North Project Driveway	Two-way stop	HCM 7th Edition	EB Left	0.001	9.3	A

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: Green Valley Lake Rd/SR 18

Control Type:	Two-way stop	Delay (sec / veh):	34.4
Analysis Method:	HCM 7th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.061

Intersection Setup

Name	SR 18		SR 18		Green Valley Lake Rd	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	0	0	0
Entry Pocket Length [ft]	85.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00		40.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		Yes	

Volumes

Name	SR 18		SR 18		Green Valley Lake Rd	
Base Volume Input [veh/h]	42	309	951	10	9	64
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	42	309	951	10	9	64
Peak Hour Factor	0.9730	0.9730	0.9730	0.9730	0.9730	0.9730
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	11	79	244	3	2	16
Total Analysis Volume [veh/h]	43	318	977	10	9	66
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	100
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.06	0.00	0.01	0.00	0.06	0.22
d_M, Delay for Movement [s/veh]	10.48	0.00	0.00	0.00	34.42	22.02
Movement LOS	B	A	A	A	D	C
95th-Percentile Queue Length [veh/ln]	0.20	0.00	0.00	0.00	1.11	1.11
95th-Percentile Queue Length [ft/ln]	4.90	0.00	0.00	0.00	27.77	27.77
d_A, Approach Delay [s/veh]	1.25		0.00		23.51	
Approach LOS	A		A		C	
d_I, Intersection Delay [s/veh]	1.56					
Intersection LOS	D					

Intersection Level Of Service Report
Intersection 2: Green Valley Lake Rd/South Project Driveway

Control Type:	Two-way stop	Delay (sec / veh):	0.0
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.001

Intersection Setup

Name	Green Valley Lake Rd		Green Valley Lake Rd		South Project Driveway	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		25.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		Yes	

Volumes

Name	Green Valley Lake Rd		Green Valley Lake Rd		South Project Driveway	
Base Volume Input [veh/h]	0	52	77	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	52	77	0	0	0
Peak Hour Factor	0.8490	0.8490	0.8490	0.8490	0.8490	0.8490
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	15	23	0	0	0
Total Analysis Volume [veh/h]	0	61	91	0	0	0
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	7.39	0.00	0.00	0.00	9.29	8.72
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	0.00	0.00	0.00	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	0.00		0.00		9.01	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	0.00					
Intersection LOS	A					

Intersection Level Of Service Report
Intersection 3: Green Valley Lake Rd/North Project Driveway

Control Type:	Two-way stop	Delay (sec / veh):	9.3
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.001

Intersection Setup

Name	Green Valley Lake Rd		Green Valley Lake Rd		North Project Driveway	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		25.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		Yes	

Volumes

Name	Green Valley Lake Rd		Green Valley Lake Rd		North Project Driveway	
Base Volume Input [veh/h]	2	48	71	1	1	7
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	2	48	71	1	1	7
Peak Hour Factor	0.8550	0.8550	0.8550	0.8550	0.8550	0.8550
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	14	21	0	0	2
Total Analysis Volume [veh/h]	2	56	83	1	1	8
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.00	0.01
d_M, Delay for Movement [s/veh]	7.38	0.00	0.00	0.00	9.28	8.72
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.00	0.00	0.03	0.03
95th-Percentile Queue Length [ft/ln]	0.08	0.08	0.00	0.00	0.71	0.71
d_A, Approach Delay [s/veh]	0.25		0.00		8.79	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	0.62					
Intersection LOS	A					

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Scenario 3 OY 2027 CP PM
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Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Green Valley Lake Rd/SR 18	Two-way stop	HCM 7th Edition	EB Left	0.021	18.0	C
2	Green Valley Lake Rd/South Project Driveway	Two-way stop	HCM 7th Edition	NB Thru	0.001	0.0	A
3	Green Valley Lake Rd/North Project Driveway	Two-way stop	HCM 7th Edition	EB Left	0.005	9.2	A

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: Green Valley Lake Rd/SR 18

Control Type:	Two-way stop	Delay (sec / veh):	18.0
Analysis Method:	HCM 7th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.021

Intersection Setup

Name	SR 18		SR 18		Green Valley Lake Rd	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	0	0	0
Entry Pocket Length [ft]	85.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00		40.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		Yes	

Volumes

Name	SR 18		SR 18		Green Valley Lake Rd	
Base Volume Input [veh/h]	58	439	265	6	5	52
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.1000	1.1000	1.1000	1.1000	1.1000	1.1000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	64	483	292	7	6	57
Peak Hour Factor	1.0000	1.0000	1.0000	0.9730	0.9730	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	16	121	73	2	2	14
Total Analysis Volume [veh/h]	64	483	292	7	6	57
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	100
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.05	0.00	0.00	0.00	0.02	0.08
d_M, Delay for Movement [s/veh]	8.00	0.00	0.00	0.00	17.98	10.44
Movement LOS	A	A	A	A	C	B
95th-Percentile Queue Length [veh/ln]	0.16	0.00	0.00	0.00	0.32	0.32
95th-Percentile Queue Length [ft/ln]	4.00	0.00	0.00	0.00	8.05	8.05
d_A, Approach Delay [s/veh]	0.94		0.00		11.16	
Approach LOS	A		A		B	
d_I, Intersection Delay [s/veh]	1.34					
Intersection LOS	C					

Intersection Level Of Service Report
Intersection 2: Green Valley Lake Rd/South Project Driveway

Control Type:	Two-way stop	Delay (sec / veh):	0.0
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.001

Intersection Setup

Name	Green Valley Lake Rd		Green Valley Lake Rd		South Project Driveway	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		25.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		Yes	

Volumes

Name	Green Valley Lake Rd		Green Valley Lake Rd		South Project Driveway	
Base Volume Input [veh/h]	0	64	47	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.1000	1.1000	1.1000	1.1000	1.1000	1.1000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	70	52	0	0	0
Peak Hour Factor	0.8490	0.8490	0.8490	0.8490	0.8490	0.8490
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	21	15	0	0	0
Total Analysis Volume [veh/h]	0	82	61	0	0	0
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	7.33	0.00	0.00	0.00	9.24	8.59
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	0.00	0.00	0.00	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	0.00		0.00		8.91	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	0.00					
Intersection LOS	A					

Intersection Level Of Service Report
Intersection 3: Green Valley Lake Rd/North Project Driveway

Control Type:	Two-way stop	Delay (sec / veh):	9.2
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.005

Intersection Setup

Name	Green Valley Lake Rd		Green Valley Lake Rd		North Project Driveway	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		25.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		Yes	

Volumes

Name	Green Valley Lake Rd		Green Valley Lake Rd		North Project Driveway	
Base Volume Input [veh/h]	1	64	43	0	3	2
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.1000	1.1000	1.1000	1.1000	1.1000	1.1000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1	70	47	0	3	2
Peak Hour Factor	0.8550	0.8550	0.8550	0.8550	0.8550	0.8550
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	20	14	0	1	1
Total Analysis Volume [veh/h]	1	82	55	0	4	2
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	7.32	0.00	0.00	0.00	9.24	8.58
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.00	0.00	0.02	0.02
95th-Percentile Queue Length [ft/ln]	0.04	0.04	0.00	0.00	0.50	0.50
d_A, Approach Delay [s/veh]	0.09		0.00		9.02	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	0.43					
Intersection LOS	A					

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Scenario 3 OY 2027 CP MD
4/27/2024

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Green Valley Lake Rd/SR 18	Two-way stop	HCM 7th Edition	EB Left	0.078	40.4	E
2	Green Valley Lake Rd/South Project Driveway	Two-way stop	HCM 7th Edition	SB Thru	0.001	0.0	A
3	Green Valley Lake Rd/North Project Driveway	Two-way stop	HCM 7th Edition	EB Left	0.001	9.4	A

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: Green Valley Lake Rd/SR 18

Control Type:	Two-way stop	Delay (sec / veh):	40.4
Analysis Method:	HCM 7th Edition	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.078

Intersection Setup

Name	SR 18		SR 18		Green Valley Lake Rd	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	0	0	0
Entry Pocket Length [ft]	85.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00		40.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		Yes	

Volumes

Name	SR 18		SR 18		Green Valley Lake Rd	
Base Volume Input [veh/h]	42	309	951	10	9	64
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.1000	1.1000	1.1000	1.1000	1.1000	1.1000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	46	340	1046	11	10	70
Peak Hour Factor	1.0000	1.0000	1.0000	0.9730	0.9730	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	12	85	262	3	3	18
Total Analysis Volume [veh/h]	46	340	1046	11	10	70
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	100
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.07	0.00	0.01	0.00	0.08	0.25
d_M, Delay for Movement [s/veh]	10.87	0.00	0.00	0.00	40.40	25.34
Movement LOS	B	A	A	A	E	D
95th-Percentile Queue Length [veh/ln]	0.22	0.00	0.00	0.00	1.40	1.40
95th-Percentile Queue Length [ft/ln]	5.61	0.00	0.00	0.00	34.90	34.90
d_A, Approach Delay [s/veh]	1.30		0.00		27.22	
Approach LOS	A		A		D	
d_I, Intersection Delay [s/veh]	1.76					
Intersection LOS	E					

Intersection Level Of Service Report
Intersection 2: Green Valley Lake Rd/South Project Driveway

Control Type:	Two-way stop	Delay (sec / veh):	0.0
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.001

Intersection Setup

Name	Green Valley Lake Rd		Green Valley Lake Rd		South Project Driveway	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		25.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		Yes	

Volumes

Name	Green Valley Lake Rd		Green Valley Lake Rd		South Project Driveway	
Base Volume Input [veh/h]	0	52	77	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.1000	1.1000	1.1000	1.1000	1.1000	1.1000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	57	85	0	0	0
Peak Hour Factor	0.8490	0.8490	0.8490	0.8490	0.8490	0.8490
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	17	25	0	0	0
Total Analysis Volume [veh/h]	0	67	100	0	0	0
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	7.41	0.00	0.00	0.00	9.37	8.77
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	0.00	0.00	0.00	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	0.00		0.00		9.07	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	0.00					
Intersection LOS	A					

Intersection Level Of Service Report
Intersection 3: Green Valley Lake Rd/North Project Driveway

Control Type:	Two-way stop	Delay (sec / veh):	9.4
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.001

Intersection Setup

Name	Green Valley Lake Rd		Green Valley Lake Rd		North Project Driveway	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		25.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		Yes	

Volumes

Name	Green Valley Lake Rd		Green Valley Lake Rd		North Project Driveway	
Base Volume Input [veh/h]	2	48	71	1	1	7
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.1000	1.1000	1.1000	1.1000	1.1000	1.1000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	2	53	78	1	1	8
Peak Hour Factor	0.8550	0.8550	0.8550	0.8550	0.8550	0.8550
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	15	23	0	0	2
Total Analysis Volume [veh/h]	2	62	91	1	1	9
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.00	0.01
d_M, Delay for Movement [s/veh]	7.40	0.00	0.00	0.00	9.36	8.77
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.00	0.00	0.03	0.03
95th-Percentile Queue Length [ft/ln]	0.08	0.08	0.00	0.00	0.80	0.80
d_A, Approach Delay [s/veh]	0.23		0.00		8.83	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	0.62					
Intersection LOS	A					

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Green Valley Lake Rd/SR 18	Two-way stop	HCM 7th Edition	EB Left	0.045	19.9	C
2	Green Valley Lake Rd/South Project Driveway	Two-way stop	HCM 7th Edition	EB Right	0.040	8.9	A
3	Green Valley Lake Rd/North Project Driveway	Two-way stop	HCM 7th Edition	EB Left	0.005	9.6	A

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: Green Valley Lake Rd/SR 18

Control Type:	Two-way stop	Delay (sec / veh):	19.9
Analysis Method:	HCM 7th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.045

Intersection Setup

Name	SR 18		SR 18		Green Valley Lake Rd	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	0	0	0
Entry Pocket Length [ft]	85.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00		40.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		Yes	

Volumes

Name	SR 18		SR 18		Green Valley Lake Rd	
Base Volume Input [veh/h]	58	439	265	6	5	52
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.1000	1.1000	1.1000	1.1000	1.1000	1.1000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	23	0	0	3	6	57
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	87	483	292	10	12	114
Peak Hour Factor	1.0000	1.0000	1.0000	0.9730	0.9730	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	22	121	73	3	3	29
Total Analysis Volume [veh/h]	87	483	292	10	12	114
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	100
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.07	0.00	0.00	0.00	0.04	0.15
d_M, Delay for Movement [s/veh]	8.07	0.00	0.00	0.00	19.87	11.25
Movement LOS	A	A	A	A	C	B
95th-Percentile Queue Length [veh/ln]	0.22	0.00	0.00	0.00	0.73	0.73
95th-Percentile Queue Length [ft/ln]	5.56	0.00	0.00	0.00	18.36	18.36
d_A, Approach Delay [s/veh]	1.23		0.00		12.07	
Approach LOS	A		A		B	
d_I, Intersection Delay [s/veh]	2.23					
Intersection LOS	C					

Intersection Level Of Service Report
Intersection 2: Green Valley Lake Rd/South Project Driveway

Control Type:	Two-way stop	Delay (sec / veh):	8.9
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.040

Intersection Setup

Name	Green Valley Lake Rd		Green Valley Lake Rd		South Project Driveway	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		25.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		Yes	

Volumes

Name	Green Valley Lake Rd		Green Valley Lake Rd		South Project Driveway	
Base Volume Input [veh/h]	0	64	47	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.1000	1.1000	1.1000	1.1000	1.1000	1.1000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	13	13	32	0	0	32
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	13	83	84	0	0	32
Peak Hour Factor	0.8490	0.8490	0.8490	0.8490	0.8490	0.8490
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	4	24	25	0	0	9
Total Analysis Volume [veh/h]	15	98	99	0	0	38
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.01	0.00	0.00	0.00	0.00	0.04
d_M, Delay for Movement [s/veh]	7.43	0.00	0.00	0.00	9.94	8.92
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.03	0.03	0.00	0.00	0.12	0.12
95th-Percentile Queue Length [ft/ln]	0.63	0.63	0.00	0.00	3.10	3.10
d_A, Approach Delay [s/veh]	0.99		0.00		8.92	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	1.80					
Intersection LOS	A					

Intersection Level Of Service Report
Intersection 3: Green Valley Lake Rd/North Project Driveway

Control Type:	Two-way stop	Delay (sec / veh):	9.6
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.005

Intersection Setup

Name	Green Valley Lake Rd		Green Valley Lake Rd		North Project Driveway	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		25.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		Yes	

Volumes

Name	Green Valley Lake Rd		Green Valley Lake Rd		North Project Driveway	
Base Volume Input [veh/h]	1	64	43	0	3	2
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.1000	1.1000	1.1000	1.1000	1.1000	1.1000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	13	0	0	0	0	32
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	14	70	47	0	3	34
Peak Hour Factor	0.8550	0.8550	0.8550	0.8550	0.8550	0.8550
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	4	20	14	0	1	10
Total Analysis Volume [veh/h]	16	82	55	0	4	40
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.01	0.00	0.00	0.00	0.00	0.04
d_M, Delay for Movement [s/veh]	7.34	0.00	0.00	0.00	9.60	8.73
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.03	0.03	0.00	0.00	0.14	0.14
95th-Percentile Queue Length [ft/ln]	0.67	0.67	0.00	0.00	3.49	3.49
d_A, Approach Delay [s/veh]	1.20		0.00		8.81	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	2.56					
Intersection LOS	A					

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Green Valley Lake Rd/SR 18	Two-way stop	HCM 7th Edition	EB Left	0.139	56.7	F
2	Green Valley Lake Rd/South Project Driveway	Two-way stop	HCM 7th Edition	EB Right	0.042	9.1	A
3	Green Valley Lake Rd/North Project Driveway	Two-way stop	HCM 7th Edition	EB Left	0.001	9.8	A

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: Green Valley Lake Rd/SR 18

Control Type:	Two-way stop	Delay (sec / veh):	56.7
Analysis Method:	HCM 7th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.139

Intersection Setup

Name	SR 18		SR 18		Green Valley Lake Rd	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	0	0	0
Entry Pocket Length [ft]	85.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00		40.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		Yes	

Volumes

Name	SR 18		SR 18		Green Valley Lake Rd	
Base Volume Input [veh/h]	42	309	951	10	9	64
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.1000	1.1000	1.1000	1.1000	1.1000	1.1000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	23	0	0	3	6	57
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	69	340	1046	14	16	127
Peak Hour Factor	1.0000	1.0000	1.0000	0.9730	0.9730	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	17	85	262	4	4	32
Total Analysis Volume [veh/h]	69	340	1046	14	16	127
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	100
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.11	0.00	0.01	0.00	0.14	0.46
d_M, Delay for Movement [s/veh]	11.12	0.00	0.00	0.00	56.73	38.56
Movement LOS	B	A	A	A	F	E
95th-Percentile Queue Length [veh/ln]	0.35	0.00	0.00	0.00	3.49	3.49
95th-Percentile Queue Length [ft/ln]	8.76	0.00	0.00	0.00	87.29	87.29
d_A, Approach Delay [s/veh]	1.88		0.00		40.59	
Approach LOS	A		A		E	
d_I, Intersection Delay [s/veh]	4.08					
Intersection LOS	F					

Intersection Level Of Service Report
Intersection 2: Green Valley Lake Rd/South Project Driveway

Control Type:	Two-way stop	Delay (sec / veh):	9.1
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.042

Intersection Setup

Name	Green Valley Lake Rd		Green Valley Lake Rd		South Project Driveway	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		25.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		Yes	

Volumes

Name	Green Valley Lake Rd		Green Valley Lake Rd		South Project Driveway	
Base Volume Input [veh/h]	0	52	77	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.1000	1.1000	1.1000	1.1000	1.1000	1.1000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	13	13	32	0	0	32
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	13	70	117	0	0	32
Peak Hour Factor	0.8490	0.8490	0.8490	0.8490	0.8490	0.8490
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	4	21	34	0	0	9
Total Analysis Volume [veh/h]	15	82	138	0	0	38
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.01	0.00	0.00	0.00	0.00	0.04
d_M, Delay for Movement [s/veh]	7.51	0.00	0.00	0.00	10.10	9.13
Movement LOS	A	A	A	A	B	A
95th-Percentile Queue Length [veh/ln]	0.03	0.03	0.00	0.00	0.13	0.13
95th-Percentile Queue Length [ft/ln]	0.63	0.63	0.00	0.00	3.26	3.26
d_A, Approach Delay [s/veh]	1.16		0.00		9.13	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	1.68					
Intersection LOS	A					

Intersection Level Of Service Report
Intersection 3: Green Valley Lake Rd/North Project Driveway

Control Type:	Two-way stop	Delay (sec / veh):	9.8
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.001

Intersection Setup

Name	Green Valley Lake Rd		Green Valley Lake Rd		North Project Driveway	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		25.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		Yes	

Volumes

Name	Green Valley Lake Rd		Green Valley Lake Rd		North Project Driveway	
Base Volume Input [veh/h]	2	48	71	1	1	7
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.1000	1.1000	1.1000	1.1000	1.1000	1.1000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	13	0	0	0	0	32
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	15	53	78	1	1	40
Peak Hour Factor	0.8550	0.8550	0.8550	0.8550	0.8550	0.8550
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	4	15	23	0	0	12
Total Analysis Volume [veh/h]	18	62	91	1	1	47
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.01	0.00	0.00	0.00	0.00	0.05
d_M, Delay for Movement [s/veh]	7.42	0.00	0.00	0.00	9.76	8.92
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.03	0.03	0.00	0.00	0.16	0.16
95th-Percentile Queue Length [ft/ln]	0.76	0.76	0.00	0.00	3.94	3.94
d_A, Approach Delay [s/veh]	1.67		0.00		8.94	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	2.56					
Intersection LOS	A					

Hume SoCal Project

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Scenario 5 HY 2040 PM
4/26/2024

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Green Valley Lake Rd/SR 18	Two-way stop	HCM 7th Edition	EB Left	0.023	19.7	C
2	Green Valley Lake Rd/South Project Driveway	Two-way stop	HCM 7th Edition	NB Thru	0.001	0.0	A
3	Green Valley Lake Rd/North Project Driveway	Two-way stop	HCM 7th Edition	EB Left	0.006	9.3	A

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: Green Valley Lake Rd/SR 18

Control Type:	Two-way stop	Delay (sec / veh):	19.7
Analysis Method:	HCM 7th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.023

Intersection Setup

Name	SR 18		SR 18		Green Valley Lake Rd	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	0	0	0
Entry Pocket Length [ft]	85.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00		40.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		Yes	

Volumes

Name	SR 18		SR 18		Green Valley Lake Rd	
Base Volume Input [veh/h]	58	439	265	6	5	52
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.1700	1.1700	1.1700	1.1700	1.1700	1.1700
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	68	514	310	7	6	61
Peak Hour Factor	0.9730	0.9730	0.9730	0.9730	0.9730	0.9730
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	17	132	80	2	2	16
Total Analysis Volume [veh/h]	70	528	319	7	6	63
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	100
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.06	0.01	0.00	0.00	0.02	0.09
d_M, Delay for Movement [s/veh]	8.09	0.00	0.00	0.00	19.70	10.73
Movement LOS	A	A	A	A	C	B
95th-Percentile Queue Length [veh/ln]	0.18	0.00	0.00	0.00	0.37	0.37
95th-Percentile Queue Length [ft/ln]	4.51	0.00	0.00	0.00	9.31	9.31
d_A, Approach Delay [s/veh]	0.95		0.00		11.51	
Approach LOS	A		A		B	
d_I, Intersection Delay [s/veh]	1.37					
Intersection LOS	C					

Intersection Level Of Service Report
Intersection 2: Green Valley Lake Rd/South Project Driveway

Control Type:	Two-way stop	Delay (sec / veh):	0.0
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.001

Intersection Setup

Name	Green Valley Lake Rd		Green Valley Lake Rd		South Project Driveway	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		25.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		Yes	

Volumes

Name	Green Valley Lake Rd		Green Valley Lake Rd		South Project Driveway	
Base Volume Input [veh/h]	0	64	47	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.1700	1.1700	1.1700	1.1700	1.1700	1.1700
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	75	55	0	0	0
Peak Hour Factor	0.8490	0.8490	0.8490	0.8490	0.8490	0.8490
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	22	16	0	0	0
Total Analysis Volume [veh/h]	0	88	65	0	0	0
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	7.34	0.00	0.00	0.00	9.29	8.60
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	0.00	0.00	0.00	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	0.00		0.00		8.95	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	0.00					
Intersection LOS	A					

Intersection Level Of Service Report
Intersection 3: Green Valley Lake Rd/North Project Driveway

Control Type:	Two-way stop	Delay (sec / veh):	9.3
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.006

Intersection Setup

Name	Green Valley Lake Rd		Green Valley Lake Rd		North Project Driveway	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		25.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		Yes	

Volumes

Name	Green Valley Lake Rd		Green Valley Lake Rd		North Project Driveway	
Base Volume Input [veh/h]	1	64	43	0	3	2
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.1700	1.1700	1.1700	1.1700	1.1700	1.1700
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1	75	50	0	4	2
Peak Hour Factor	0.8550	0.8550	0.8550	0.8550	0.8550	0.8550
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	22	15	0	1	1
Total Analysis Volume [veh/h]	1	88	58	0	5	2
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.01	0.00
d_M, Delay for Movement [s/veh]	7.33	0.00	0.00	0.00	9.30	8.60
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.00	0.00	0.02	0.02
95th-Percentile Queue Length [ft/ln]	0.04	0.04	0.00	0.00	0.60	0.60
d_A, Approach Delay [s/veh]	0.08		0.00		9.10	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	0.46					
Intersection LOS	A					

Hume SoCal Project

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Scenario 5 HY 2040 MD
4/26/2024

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Green Valley Lake Rd/SR 18	Two-way stop	HCM 7th Edition	EB Left	0.106	52.0	F
2	Green Valley Lake Rd/South Project Driveway	Two-way stop	HCM 7th Edition	SB Thru	0.001	0.0	A
3	Green Valley Lake Rd/North Project Driveway	Two-way stop	HCM 7th Edition	EB Left	0.001	9.4	A

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: Green Valley Lake Rd/SR 18

Control Type:	Two-way stop	Delay (sec / veh):	52.0
Analysis Method:	HCM 7th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.106

Intersection Setup

Name	SR 18		SR 18		Green Valley Lake Rd	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	0	0	0
Entry Pocket Length [ft]	85.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00		40.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		Yes	

Volumes

Name	SR 18		SR 18		Green Valley Lake Rd	
Base Volume Input [veh/h]	42	309	951	10	9	64
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.1700	1.1700	1.1700	1.1700	1.1700	1.1700
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	49	362	1113	12	11	75
Peak Hour Factor	0.9730	0.9730	0.9730	0.9730	0.9730	0.9730
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	13	93	286	3	3	19
Total Analysis Volume [veh/h]	50	372	1144	12	11	77
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	100
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.08	0.00	0.01	0.00	0.11	0.32
d_M, Delay for Movement [s/veh]	11.49	0.00	0.00	0.00	51.99	32.20
Movement LOS	B	A	A	A	F	D
95th-Percentile Queue Length [veh/ln]	0.27	0.00	0.00	0.00	1.96	1.96
95th-Percentile Queue Length [ft/ln]	6.74	0.00	0.00	0.00	49.01	49.01
d_A, Approach Delay [s/veh]	1.36		0.00		34.68	
Approach LOS	A		A		D	
d_I, Intersection Delay [s/veh]	2.18					
Intersection LOS	F					

Intersection Level Of Service Report
Intersection 2: Green Valley Lake Rd/South Project Driveway

Control Type:	Two-way stop	Delay (sec / veh):	0.0
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.001

Intersection Setup

Name	Green Valley Lake Rd		Green Valley Lake Rd		South Project Driveway	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		25.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		Yes	

Volumes

Name	Green Valley Lake Rd		Green Valley Lake Rd		South Project Driveway	
Base Volume Input [veh/h]	0	52	77	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.1700	1.1700	1.1700	1.1700	1.1700	1.1700
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	61	90	0	0	0
Peak Hour Factor	0.8490	0.8490	0.8490	0.8490	0.8490	0.8490
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	18	27	0	0	0
Total Analysis Volume [veh/h]	0	72	106	0	0	0
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	7.42	0.00	0.00	0.00	9.44	8.80
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	0.00	0.00	0.00	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	0.00		0.00		9.12	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	0.00					
Intersection LOS	A					

Intersection Level Of Service Report
Intersection 3: Green Valley Lake Rd/North Project Driveway

Control Type:	Two-way stop	Delay (sec / veh):	9.4
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.001

Intersection Setup

Name	Green Valley Lake Rd		Green Valley Lake Rd		North Project Driveway	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		25.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		Yes	

Volumes

Name	Green Valley Lake Rd		Green Valley Lake Rd		North Project Driveway	
Base Volume Input [veh/h]	2	48	71	1	1	7
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.1700	1.1700	1.1700	1.1700	1.1700	1.1700
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	2	56	83	1	1	8
Peak Hour Factor	0.8550	0.8550	0.8550	0.8550	0.8550	0.8550
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	16	24	0	0	2
Total Analysis Volume [veh/h]	2	65	97	1	1	9
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.00	0.01
d_M, Delay for Movement [s/veh]	7.41	0.00	0.00	0.00	9.42	8.80
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.00	0.00	0.03	0.03
95th-Percentile Queue Length [ft/ln]	0.08	0.08	0.00	0.00	0.80	0.80
d_A, Approach Delay [s/veh]	0.22		0.00		8.86	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	0.59					
Intersection LOS	A					

Hume SoCal Project

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Scenario 6 HY 2040 WP PM
4/26/2024

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Green Valley Lake Rd/SR 18	Two-way stop	HCM 7th Edition	EB Left	0.051	21.9	C
2	Green Valley Lake Rd/South Project Driveway	Two-way stop	HCM 7th Edition	EB Right	0.040	8.9	A
3	Green Valley Lake Rd/North Project Driveway	Two-way stop	HCM 7th Edition	EB Left	0.006	9.7	A

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: Green Valley Lake Rd/SR 18

Control Type:	Two-way stop	Delay (sec / veh):	21.9
Analysis Method:	HCM 7th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.051

Intersection Setup

Name	SR 18		SR 18		Green Valley Lake Rd	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	0	0	0
Entry Pocket Length [ft]	85.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00		40.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		Yes	

Volumes

Name	SR 18		SR 18		Green Valley Lake Rd	
Base Volume Input [veh/h]	58	439	265	6	5	52
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.1700	1.1700	1.1700	1.1700	1.1700	1.1700
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	23	0	0	3	6	57
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	91	514	310	10	12	118
Peak Hour Factor	0.9730	0.9730	0.9730	0.9730	0.9730	0.9730
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	23	132	80	3	3	30
Total Analysis Volume [veh/h]	94	528	319	10	12	121
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	100
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.08	0.01	0.00	0.00	0.05	0.17
d_M, Delay for Movement [s/veh]	8.17	0.00	0.00	0.00	21.95	11.69
Movement LOS	A	A	A	A	C	B
95th-Percentile Queue Length [veh/ln]	0.25	0.00	0.00	0.00	0.83	0.83
95th-Percentile Queue Length [ft/ln]	6.19	0.00	0.00	0.00	20.82	20.82
d_A, Approach Delay [s/veh]	1.23		0.00		12.61	
Approach LOS	A		A		B	
d_I, Intersection Delay [s/veh]	2.26					
Intersection LOS	C					

Intersection Level Of Service Report
Intersection 2: Green Valley Lake Rd/South Project Driveway

Control Type:	Two-way stop	Delay (sec / veh):	8.9
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.040

Intersection Setup

Name	Green Valley Lake Rd		Green Valley Lake Rd		South Project Driveway	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		25.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		Yes	

Volumes

Name	Green Valley Lake Rd		Green Valley Lake Rd		South Project Driveway	
Base Volume Input [veh/h]	0	64	47	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.1700	1.1700	1.1700	1.1700	1.1700	1.1700
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	13	13	32	0	0	32
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	13	88	87	0	0	32
Peak Hour Factor	0.8490	0.8490	0.8490	0.8490	0.8490	0.8490
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	4	26	26	0	0	9
Total Analysis Volume [veh/h]	15	104	102	0	0	38
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.01	0.00	0.00	0.00	0.00	0.04
d_M, Delay for Movement [s/veh]	7.43	0.00	0.00	0.00	9.99	8.93
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.03	0.03	0.00	0.00	0.12	0.12
95th-Percentile Queue Length [ft/ln]	0.63	0.63	0.00	0.00	3.11	3.11
d_A, Approach Delay [s/veh]	0.94		0.00		8.93	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	1.74					
Intersection LOS	A					

Intersection Level Of Service Report
Intersection 3: Green Valley Lake Rd/North Project Driveway

Control Type:	Two-way stop	Delay (sec / veh):	9.7
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.006

Intersection Setup

Name	Green Valley Lake Rd		Green Valley Lake Rd		North Project Driveway	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		25.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		Yes	

Volumes

Name	Green Valley Lake Rd		Green Valley Lake Rd		North Project Driveway	
Base Volume Input [veh/h]	1	64	43	0	3	2
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.1700	1.1700	1.1700	1.1700	1.1700	1.1700
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	13	0	0	0	0	32
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	14	75	50	0	4	34
Peak Hour Factor	0.8550	0.8550	0.8550	0.8550	0.8550	0.8550
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	4	22	15	0	1	10
Total Analysis Volume [veh/h]	16	88	58	0	5	40
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.01	0.00	0.00	0.00	0.01	0.04
d_M, Delay for Movement [s/veh]	7.35	0.00	0.00	0.00	9.66	8.75
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.03	0.03	0.00	0.00	0.14	0.14
95th-Percentile Queue Length [ft/ln]	0.67	0.67	0.00	0.00	3.60	3.60
d_A, Approach Delay [s/veh]	1.13		0.00		8.85	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	2.49					
Intersection LOS	A					

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Green Valley Lake Rd/SR 18	Two-way stop	HCM 7th Edition	EB Left	0.184	82.9	F
2	Green Valley Lake Rd/South Project Driveway	Two-way stop	HCM 7th Edition	EB Right	0.042	9.2	A
3	Green Valley Lake Rd/North Project Driveway	Two-way stop	HCM 7th Edition	EB Left	0.001	9.8	A

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: Green Valley Lake Rd/SR 18

Control Type:	Two-way stop	Delay (sec / veh):	82.9
Analysis Method:	HCM 7th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.184

Intersection Setup

Name	SR 18		SR 18		Green Valley Lake Rd	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	0	0	0
Entry Pocket Length [ft]	85.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00		40.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		Yes	

Volumes

Name	SR 18		SR 18		Green Valley Lake Rd	
Base Volume Input [veh/h]	42	309	951	10	9	64
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.1700	1.1700	1.1700	1.1700	1.1700	1.1700
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	23	0	0	3	6	57
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	72	362	1113	15	17	132
Peak Hour Factor	0.9730	0.9730	0.9730	0.9730	0.9730	0.9730
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	18	93	286	4	4	34
Total Analysis Volume [veh/h]	74	372	1144	15	17	136
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	100
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.12	0.00	0.01	0.00	0.18	0.56
d_M, Delay for Movement [s/veh]	11.81	0.00	0.00	0.00	82.94	58.96
Movement LOS	B	A	A	A	F	F
95th-Percentile Queue Length [veh/ln]	0.42	0.00	0.00	0.00	5.02	5.02
95th-Percentile Queue Length [ft/ln]	10.43	0.00	0.00	0.00	125.41	125.41
d_A, Approach Delay [s/veh]	1.96		0.00		61.63	
Approach LOS	A		A		F	
d_I, Intersection Delay [s/veh]	5.86					
Intersection LOS	F					

Intersection Level Of Service Report
Intersection 2: Green Valley Lake Rd/South Project Driveway

Control Type:	Two-way stop	Delay (sec / veh):	9.2
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.042

Intersection Setup

Name	Green Valley Lake Rd		Green Valley Lake Rd		South Project Driveway	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		25.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		Yes	

Volumes

Name	Green Valley Lake Rd		Green Valley Lake Rd		South Project Driveway	
Base Volume Input [veh/h]	0	52	77	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.1700	1.1700	1.1700	1.1700	1.1700	1.1700
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	13	13	32	0	0	32
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	13	74	122	0	0	32
Peak Hour Factor	0.8490	0.8490	0.8490	0.8490	0.8490	0.8490
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	4	22	36	0	0	9
Total Analysis Volume [veh/h]	15	87	144	0	0	38
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.01	0.00	0.00	0.00	0.00	0.04
d_M, Delay for Movement [s/veh]	7.52	0.00	0.00	0.00	10.18	9.16
Movement LOS	A	A	A	A	B	A
95th-Percentile Queue Length [veh/ln]	0.03	0.03	0.00	0.00	0.13	0.13
95th-Percentile Queue Length [ft/ln]	0.63	0.63	0.00	0.00	3.29	3.29
d_A, Approach Delay [s/veh]	1.11		0.00		9.16	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	1.62					
Intersection LOS	A					

Intersection Level Of Service Report
Intersection 3: Green Valley Lake Rd/North Project Driveway

Control Type:	Two-way stop	Delay (sec / veh):	9.8
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.001

Intersection Setup

Name	Green Valley Lake Rd		Green Valley Lake Rd		North Project Driveway	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		25.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		Yes	

Volumes

Name	Green Valley Lake Rd		Green Valley Lake Rd		North Project Driveway	
Base Volume Input [veh/h]	2	48	71	1	1	7
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.1700	1.1700	1.1700	1.1700	1.1700	1.1700
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	13	0	0	0	0	32
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	15	56	83	1	1	40
Peak Hour Factor	0.8550	0.8550	0.8550	0.8550	0.8550	0.8550
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	4	16	24	0	0	12
Total Analysis Volume [veh/h]	18	65	97	1	1	47
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.01	0.00	0.00	0.00	0.00	0.05
d_M, Delay for Movement [s/veh]	7.43	0.00	0.00	0.00	9.81	8.96
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.03	0.03	0.00	0.00	0.16	0.16
95th-Percentile Queue Length [ft/ln]	0.76	0.76	0.00	0.00	3.97	3.97
d_A, Approach Delay [s/veh]	1.61		0.00		8.97	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	2.46					
Intersection LOS	A					

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Option 1: Add TS

Number	1					
Intersection	Green Valley Lake Rd/SR 18					
Control Type	Signalized					
Analysis Method	HCM 7th Edition					
Name	SR 18		SR 18		Green Valley Lake Rd	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Base Volume Input [veh/h]	58	439	265	6	5	52
Total Analysis Volume [veh/h]	87	483	292	10	12	114

Intersection Settings

Cycle Length [s]	60					
Active Pattern	Pattern 1					
Coordination Type	Time of Day Pattern Coordinated					
Actuation Type	Semi-actuated					
Lost time [s]	0.00					
Control Type	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive
Signal Group	0	6	2	0	3	0
Auxiliary Signal Groups						
Lead / Lag	-	-	-	-	Lead	-
Minimum Green [s]	0	10	10	0	5	0
Maximum Green [s]	0	79	79	0	33	0
Amber [s]	0.0	3.0	3.0	0.0	3.0	0.0
All red [s]	0.0	1.0	1.0	0.0	1.0	0.0
Split [s]	0	41	41	0	19	0
Walk [s]	0	5	5	0	5	0
Pedestrian Clearance [s]	0	10	7	0	10	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0
l1, Start-Up Lost Time [s]	0.0	2.0	2.0	0.0	2.0	0.0
Minimum Recall		No	No		No	
Maximum Recall		No	No		No	
Pedestrian Recall		No	No		No	
Pedestrian Signal Group	0					
Pedestrian Walk [s]	0					
Pedestrian Clearance [s]	0					

Lane Group Calculations

g / C, Green / Cycle	0.76	0.76	0.76	0.11
(v / s)_i Volume / Saturation Flow Rate	0.09	0.29	0.18	0.09
so, Base Saturation Flow per Lane [pc/h/ln]	1900	1900	1900	1900
Arrival type	3		3	3
s, saturation flow rate [veh/h]	969	1683	1673	1445
c, Capacity [veh/h]	756	1275	1267	158
X, volume / capacity	0.12	0.38	0.24	0.80
d, Delay for Lane Group [s/veh]	4.22	3.34	2.60	34.89

Lane Group LOS	A	A	A	C
Critical Lane Group	No	Yes	No	Yes
50th-Percentile Queue Length [veh/ln]	0.29	0.77	0.41	2.04
50th-Percentile Queue Length [ft/ln]	7.30	19.13	10.18	51.05
95th-Percentile Queue Length [veh/ln]	0.53	1.38	0.73	3.68
95th-Percentile Queue Length [ft/ln]	13.13	34.44	18.32	91.88

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	4.22	3.34	2.60	2.60	34.89	34.89
Movement LOS	A	A	A	A	C	C
Critical Movement	No	No	No	No	No	Yes
d_A, Approach Delay [s/veh]	3.47		2.60		34.89	
Approach LOS	A		A		C	
d_I, Intersection Delay [s/veh]	7.17					
Intersection LOS	A					
Intersection V/C	0.374					

Option 1: Instal TS

Number	1					
Intersection	Green Valley Lake Rd/SR 18					
Control Type	Signalized					
Analysis Method	HCM 7th Edition					
Name	SR 18		SR 18		Green Valley Lake Rd	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Base Volume Input [veh/h]	42	309	951	10	9	64
Total Analysis Volume [veh/h]	69	340	1046	14	16	127

Intersection Settings

Cycle Length [s]	60					
Active Pattern	Pattern 1					
Coordination Type	Time of Day Pattern Coordinated					
Actuation Type	Semi-actuated					
Lost time [s]	0.00					
Control Type	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive
Signal Group	0	6	2	0	3	0
Auxiliary Signal Groups						
Lead / Lag	-	-	-	-	Lead	-
Minimum Green [s]	0	10	10	0	5	0
Maximum Green [s]	0	192	192	0	30	0
Amber [s]	0.0	3.0	3.0	0.0	3.0	0.0
All red [s]	0.0	1.0	1.0	0.0	1.0	0.0
Split [s]	0	48	48	0	12	0
Walk [s]	0	5	5	0	5	0
Pedestrian Clearance [s]	0	10	7	0	10	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0
l1, Start-Up Lost Time [s]	0.0	2.0	2.0	0.0	2.0	0.0
Minimum Recall		No	No		No	
Maximum Recall		No	No		No	
Pedestrian Recall		No	No		No	
Pedestrian Signal Group	0					
Pedestrian Walk [s]	0					
Pedestrian Clearance [s]	0					

Lane Group Calculations

g / C, Green / Cycle	0.75	0.75	0.75	0.12
(v / s)_i Volume / Saturation Flow Rate	0.14	0.20	0.63	0.10
so, Base Saturation Flow per Lane [pc/h/ln]	1900	1900	1900	1900
Arrival type	3		3	3
s, saturation flow rate [veh/h]	479	1683	1679	1448
c, Capacity [veh/h]	249	1257	1255	173
X, volume / capacity	0.28	0.27	0.84	0.83
d, Delay for Lane Group [s/veh]	21.45	2.93	12.30	35.35

Lane Group LOS	C	A	B	D
Critical Lane Group	No	No	Yes	Yes
50th-Percentile Queue Length [veh/ln]	0.90	0.55	4.95	2.33
50th-Percentile Queue Length [ft/ln]	22.53	13.82	123.86	58.29
95th-Percentile Queue Length [veh/ln]	1.62	0.99	8.60	4.20
95th-Percentile Queue Length [ft/ln]	40.56	24.87	215.12	104.92

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	21.45	2.93	12.30	12.30	35.35	35.35
Movement LOS	C	A	B	B	D	D
Critical Movement	No	No	No	No	No	Yes
d_A, Approach Delay [s/veh]	6.06		12.30		35.35	
Approach LOS	A		B		D	
d_I, Intersection Delay [s/veh]	12.76					
Intersection LOS	B					
Intersection V/C	0.730					

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Unmitigated

Number	1					
Intersection	Green Valley Lake Rd/SR 18					
Control Type	Two-way stop					
Analysis Method	HCM 7th Edition					
Name	SR 18		SR 18		Green Valley Lake Rd	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Base Volume Input [veh/h]	58	439	265	6	5	52
Total Analysis Volume [veh/h]	91	514	310	10	12	118

Intersection Settings

Priority Scheme	Free		Free		Stop	
Flared Lane					No	
Storage Area [veh]	0		0		100	
Two-Stage Gap Acceptance					No	
Number of Storage Spaces in Median	0		0		0	

Capacity Analysis

Calculated Rank	2	1	1	1	3	2
v_c, Conflicting Flow Rate	320	0	0	0	1011	315
v_c, Stage 1	320	0	0	0	315	315
v_c, Stage 2	0	0	0	0	696	0
c_p,x, Potential Capacity [veh/h]	1240	0	0	0	265	725
c_p,x, Stage 1 [veh/h]	1785	0	0	0	740	1248
c_p,x, Stage 2 [veh/h]	1623	0	0	0	495	1085
c_m,x, Movement Capacity [veh/h]	1240	100000	100000	100000	246	725
c_m,x, Stage 1 [veh/h]	0	0	0	0	0	0
c_m,x, Stage 2 [veh/h]	0	0	0	0	0	0
c_T, Total Capacity [veh/h]	1240	100000	100000	100000	246	725

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.07	0.01	0.00	0.00	0.05	0.16
d_M, Delay for Movement [s/veh]	8.13	0.00	0.00	0.00	21.20	11.53
Movement LOS	A	A	A	A	C	B
Critical Movement	No	No	No	No	Yes	No
95th-Percentile Queue Length [veh/ln]	0.24	0.00	0.00	0.00	0.79	0.79
95th-Percentile Queue Length [ft/ln]	5.93	0.00	0.00	0.00	19.85	19.85
d_A, Approach Delay [s/veh]	1.22		0.00		12.42	
Approach LOS	A		A		B	
V/C_I, Worst Movement V/C Ratio	0.05					
d_I, Worst Movement Control Delay [s/veh]	21.20					
d_I, Intersection Delay [s/veh]	2.23					
Intersection LOS	C					

Option 1: Instal TS

Number	1					
Intersection	Green Valley Lake Rd/SR 18					
Control Type	Signalized					
Analysis Method	HCM 7th Edition					
Name	SR 18		SR 18		Green Valley Lake Rd	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Base Volume Input [veh/h]	42	309	951	10	9	64
Total Analysis Volume [veh/h]	72	362	1113	15	17	132

Intersection Settings

Cycle Length [s]	60					
Active Pattern	Pattern 1					
Coordination Type	Time of Day Pattern Coordinated					
Actuation Type	Semi-actuated					
Lost time [s]	0.00					
Control Type	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive
Signal Group	0	6	2	0	3	0
Auxiliary Signal Groups						
Lead / Lag	-	-	-	-	Lead	-
Minimum Green [s]	0	10	10	0	5	0
Maximum Green [s]	0	78	78	0	14	0
Amber [s]	0.0	3.0	3.0	0.0	3.0	0.0
All red [s]	0.0	1.0	1.0	0.0	1.0	0.0
Split [s]	0	49	49	0	11	0
Walk [s]	0	5	5	0	5	0
Pedestrian Clearance [s]	0	10	7	0	10	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0
l1, Start-Up Lost Time [s]	0.0	2.0	2.0	0.0	2.0	0.0
Minimum Recall		No	No		No	
Maximum Recall		No	No		No	
Pedestrian Recall		No	No		No	
Pedestrian Signal Group	0					
Pedestrian Walk [s]	0					
Pedestrian Clearance [s]	0					

Lane Group Calculations

g / C, Green / Cycle	0.75	0.75	0.75	0.12
(v / s)_i Volume / Saturation Flow Rate	0.16	0.22	0.67	0.10
so, Base Saturation Flow per Lane [pc/h/ln]	1900	1900	1900	1900
Arrival type	3		3	3
s, saturation flow rate [veh/h]	449	1683	1679	1448
c, Capacity [veh/h]	213	1262	1259	169
X, volume / capacity	0.34	0.29	0.90	0.88
d, Delay for Lane Group [s/veh]	26.66	2.96	15.82	39.76

Lane Group LOS	C	A	B	D
Critical Lane Group	No	No	Yes	Yes
50th-Percentile Queue Length [veh/ln]	1.10	0.58	6.38	2.61
50th-Percentile Queue Length [ft/ln]	27.42	14.58	159.60	65.19
95th-Percentile Queue Length [veh/ln]	1.97	1.05	10.53	4.69
95th-Percentile Queue Length [ft/ln]	49.36	26.24	263.19	117.34

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	26.66	2.96	15.82	15.82	39.76	39.76
Movement LOS	C	A	B	B	D	D
Critical Movement	No	No	No	No	No	Yes
d_A, Approach Delay [s/veh]	6.89		15.82		39.76	
Approach LOS	A		B		D	
d_I, Intersection Delay [s/veh]	15.64					
Intersection LOS	B					
Intersection V/C	0.775					

APPENDIX D

TRIP GENERATION

DATA WORKSHEETS

APPENDIX D
SUMMARY OF PROJECT TRIP GENERATION
HUME SOCAL PROJECT

Summer

	Quantity	Trips	Assumption	Mon	Tue	Wed	Thu	Fri	Sat	Sun	7-day Average
Employees	250	50	90% live on site, 10% commute	50	50	50	50	50	50	50	50
Student Campers	2500	50	Buses (50 students per bus)	0	0	0	0	0	100	100	29
Adults	150	75	Vehicle Occupancy -2	0	0	0	0	75	0	75	21
Total				50	50	50	50	125	150	225	100

Soulder (Non-Summer)

	Quantity	Trips	Assumption	Mon	Tue	Wed	Thu	Fri	Sat	Sun	7-day Average
Employees	40	8	90% live on site, 10% commute	8	8	8	8	8	8	8	8
Student Campers	800	16	Buses (50 students per bus)	0	0	0	0	32	0	32	9
Adults	150	75	Vehicle Occupancy -2	0	0	0	0	75	0	75	21
Total				8	8	8	8	115	8	115	39

APPENDIX E

TRAFFIC SIGNAL WARRANY ANALYSIS WORKSHEETS

TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS (2000 MUTCD)

MAJOR STREET: **SR-18** NB SB # OF APPROACH LANES: **1**

MINOR STREET: **Green Valley Lake Road** EB WB # OF APPROACH LANES: **1**

CITY, STATE: **County of San Bernardino**

COMMENTS: Existing
0

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): **Y**
85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N) **N**

			MAJOR ST TWO-WAY TRAFFIC	MINOR ST TRAFFIC HEAVY LEG	WARRANT 1 - Condition A, Part 1			WARRANT 1 - Condition B, Part 1			WARRANT 1 - Condition A, Part 2			WARRANT 1 - Condition B, Part 2			WARRANT 2 Four-Hour	WARRANT 3 Peak Hour
					MAIN LINE	SIDE STREET	BOTH MET	MAIN LINE	SIDE STREET	BOTH MET	MAIN LINE	SIDE STREET	BOTH MET	MAIN LINE	SIDE STREET	BOTH MET		
THRESHOLD VALUES					**350**	**105**		**525**	**53**		**280**	**84**		**420**	**42**			
06:00 AM	TO	07:00 AM	0	0														
07:00 AM	TO	08:00 AM	0	0														
08:00 AM	TO	09:00 AM	1,312	73	Y			Y	Y	**Y**	Y			Y	Y	**Y**	**Y**	
09:00 AM	TO	10:00 AM	0	0														
10:00 AM	TO	11:00 AM	0	0														
11:00 AM	TO	12:00 PM	0	0														
12:00 PM	TO	01:00 PM	0	0														
01:00 PM	TO	02:00 PM	0	0														
02:00 PM	TO	03:00 PM	0	0														
03:00 PM	TO	04:00 PM	0	0														
04:00 PM	TO	05:00 PM	0	0														
05:00 PM	TO	06:00 PM	768	57	Y			Y	Y	**Y**	Y			Y	Y	**Y**		
06:00 PM	TO	07:00 PM	0	0														
07:00 PM	TO	08:00 PM	0	0														
08:00 PM	TO	09:00 PM	0	0														
09:00 PM	TO	10:00 PM	0	0														
			2,080	130	2	0	**0**	2	2	**2**	2	0	**0**	2	2	**2**	**1**	**0**
					8 HOURS NEEDED			8 HOURS NEEDED			8 HOURS NEEDED for both Condition A & B						4 HRS NEEDED	1 HR NEEDED
					NOT SATISFIED			**NOT SATISFIED**			**NOT SATISFIED**						**NOT SATISFIED**	**NOT SATISFIED**

04/26/24
Kimley-Horn and Associates

TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS (2000 MUTCD)

MAJOR STREET: **SR-18** NB SB # OF APPROACH LANES: **1**

MINOR STREET: **Green Valley Lake Road** EB WB # OF APPROACH LANES: **1**

CITY, STATE: **County of San Bernardino**

COMMENTS: Opening Year 2027
0

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): **Y**
85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N) **N**

			MAJOR ST TWO-WAY TRAFFIC	MINOR ST TRAFFIC HEAVY LEG	WARRANT 1 - Condition A, Part 1			WARRANT 1 - Condition B, Part 1			WARRANT 1 - Condition A, Part 2			WARRANT 1 - Condition B, Part 2			WARRANT 2 Four-Hour	WARRANT 3 Peak Hour
					MAIN LINE	SIDE STREET	BOTH MET	MAIN LINE	SIDE STREET	BOTH MET	MAIN LINE	SIDE STREET	BOTH MET	MAIN LINE	SIDE STREET	BOTH MET		
THRESHOLD VALUES					**350**	**105**		**525**	**53**		**280**	**84**		**420**	**42**			
06:00 AM	TO	07:00 AM	0	0														
07:00 AM	TO	08:00 AM	0	0														
08:00 AM	TO	09:00 AM	1,443	80	Y			Y	Y	**Y**	Y			Y	Y	**Y**	**Y**	**Y**
09:00 AM	TO	10:00 AM	0	0														
10:00 AM	TO	11:00 AM	0	0														
11:00 AM	TO	12:00 PM	0	0														
12:00 PM	TO	01:00 PM	0	0														
01:00 PM	TO	02:00 PM	0	0														
02:00 PM	TO	03:00 PM	0	0														
03:00 PM	TO	04:00 PM	0	0														
04:00 PM	TO	05:00 PM	0	0														
05:00 PM	TO	06:00 PM	846	63	Y			Y	Y	**Y**	Y			Y	Y	**Y**	**Y**	
06:00 PM	TO	07:00 PM	0	0														
07:00 PM	TO	08:00 PM	0	0														
08:00 PM	TO	09:00 PM	0	0														
09:00 PM	TO	10:00 PM	0	0														
			2,289	143	2	0	**0**	2	2	**2**	2	0	**0**	2	2	**2**	**2**	**1**
					8 HOURS NEEDED			8 HOURS NEEDED			8 HOURS NEEDED for both Condition A & B						4 HRS NEEDED	1 HR NEEDED
					NOT SATISFIED			**NOT SATISFIED**			**NOT SATISFIED**						**NOT SATISFIED**	**SATISFIED**

04/27/24
Kimley-Horn and Associates

TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS (2000 MUTCD)

MAJOR STREET: **SR-18** NB SB # OF APPROACH LANES: **1**

MINOR STREET: **Green Valley Lake Road** EB WB # OF APPROACH LANES: **1**

CITY, STATE: **County of San Bernardino**

COMMENTS: Opening Year 2027 Plus Project
0

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): **Y**
85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N) **N**

			MAJOR ST TWO-WAY TRAFFIC	MINOR ST TRAFFIC HEAVY LEG	WARRANT 1 - Condition A, Part 1			WARRANT 1 - Condition B, Part 1			WARRANT 1 - Condition A, Part 2			WARRANT 1 - Condition B, Part 2			WARRANT 2 Four-Hour	WARRANT 3 Peak Hour
					MAIN LINE	SIDE STREET	BOTH MET	MAIN LINE	SIDE STREET	BOTH MET	MAIN LINE	SIDE STREET	BOTH MET	MAIN LINE	SIDE STREET	BOTH MET		
THRESHOLD VALUES					**350**	**105**		**525**	**53**		**280**	**84**		**420**	**42**			
06:00 AM	TO	07:00 AM	0	0														
07:00 AM	TO	08:00 AM	0	0														
08:00 AM	TO	09:00 AM	1,469	143	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	**Y**
09:00 AM	TO	10:00 AM	0	0														
10:00 AM	TO	11:00 AM	0	0														
11:00 AM	TO	12:00 PM	0	0														
12:00 PM	TO	01:00 PM	0	0														
01:00 PM	TO	02:00 PM	0	0														
02:00 PM	TO	03:00 PM	0	0														
03:00 PM	TO	04:00 PM	0	0														
04:00 PM	TO	05:00 PM	0	0														
05:00 PM	TO	06:00 PM	872	126	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	**Y**
06:00 PM	TO	07:00 PM	0	0														
07:00 PM	TO	08:00 PM	0	0														
08:00 PM	TO	09:00 PM	0	0														
09:00 PM	TO	10:00 PM	0	0														
			2,341	269	2	2	**2**	2	2	**2**	2	2	**2**	2	2	**2**	**2**	**2**
					8 HOURS NEEDED			8 HOURS NEEDED			8 HOURS NEEDED for both Condition A & B						4 HRS NEEDED	1 HR NEEDED
					NOT SATISFIED			**NOT SATISFIED**			**NOT SATISFIED**						**NOT SATISFIED**	**SATISFIED**

04/27/24
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TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS (2000 MUTCD)

MAJOR STREET: **SR-18** NB SB # OF APPROACH LANES: **1**

MINOR STREET: **Green Valley Lake Road** EB WB # OF APPROACH LANES: **1**

CITY, STATE: **County of San Bernardino**

COMMENTS: Horzon Year 2040
0

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): **Y**
85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N) **N**

			MAJOR ST TWO-WAY TRAFFIC	MINOR ST TRAFFIC HEAVY LEG	WARRANT 1 - Condition A, Part 1			WARRANT 1 - Condition B, Part 1			WARRANT 1 - Condition A, Part 2			WARRANT 1 - Condition B, Part 2			WARRANT 2 Four-Hour	WARRANT 3 Peak Hour
					MAIN LINE	SIDE STREET	BOTH MET	MAIN LINE	SIDE STREET	BOTH MET	MAIN LINE	SIDE STREET	BOTH MET	MAIN LINE	SIDE STREET	BOTH MET		
THRESHOLD VALUES					**350**	**105**		**525**	**53**		**280**	**84**		**420**	**42**			
06:00 AM	TO	07:00 AM	0	0														
07:00 AM	TO	08:00 AM	0	0														
08:00 AM	TO	09:00 AM	1,536	86	Y			Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	**Y**
09:00 AM	TO	10:00 AM	0	0														
10:00 AM	TO	11:00 AM	0	0														
11:00 AM	TO	12:00 PM	0	0														
12:00 PM	TO	01:00 PM	0	0														
01:00 PM	TO	02:00 PM	0	0														
02:00 PM	TO	03:00 PM	0	0														
03:00 PM	TO	04:00 PM	0	0														
04:00 PM	TO	05:00 PM	0	0														
05:00 PM	TO	06:00 PM	899	67	Y			Y	Y	**Y**	Y			Y	Y	**Y**	**Y**	
06:00 PM	TO	07:00 PM	0	0														
07:00 PM	TO	08:00 PM	0	0														
08:00 PM	TO	09:00 PM	0	0														
09:00 PM	TO	10:00 PM	0	0														
			2,435	153	2	0	**0**	2	2	**2**	2	1	**1**	2	2	**2**	**2**	**1**
					8 HOURS NEEDED			8 HOURS NEEDED			8 HOURS NEEDED for both Condition A & B						4 HRS NEEDED	1 HR NEEDED
					NOT SATISFIED			**NOT SATISFIED**			**NOT SATISFIED**						**NOT SATISFIED**	**SATISFIED**

04/27/24
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TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS (2000 MUTCD)

MAJOR STREET: **SR-18** NB SB # OF APPROACH LANES: **1**

MINOR STREET: **Green Valley Lake Road** EB WB # OF APPROACH LANES: **1**

CITY, STATE: **County of San Bernardino**

COMMENTS: Horzon Year 2040 Plus Project
0

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): **Y**
85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N) **N**

			MAJOR ST TWO-WAY TRAFFIC	MINOR ST TRAFFIC HEAVY LEG	WARRANT 1 - Condition A, Part 1			WARRANT 1 - Condition B, Part 1			WARRANT 1 - Condition A, Part 2			WARRANT 1 - Condition B, Part 2			WARRANT 2 Four-Hour	WARRANT 3 Peak Hour
					MAIN LINE	SIDE STREET	BOTH MET	MAIN LINE	SIDE STREET	BOTH MET	MAIN LINE	SIDE STREET	BOTH MET	MAIN LINE	SIDE STREET	BOTH MET		
THRESHOLD VALUES					**350**	**105**		**525**	**53**		**280**	**84**		**420**	**42**			
06:00 AM	TO	07:00 AM	0	0														
07:00 AM	TO	08:00 AM	0	0														
08:00 AM	TO	09:00 AM	1,562	149	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	**Y**
09:00 AM	TO	10:00 AM	0	0														
10:00 AM	TO	11:00 AM	0	0														
11:00 AM	TO	12:00 PM	0	0														
12:00 PM	TO	01:00 PM	0	0														
01:00 PM	TO	02:00 PM	0	0														
02:00 PM	TO	03:00 PM	0	0														
03:00 PM	TO	04:00 PM	0	0														
04:00 PM	TO	05:00 PM	0	0														
05:00 PM	TO	06:00 PM	925	130	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	**Y**
06:00 PM	TO	07:00 PM	0	0														
07:00 PM	TO	08:00 PM	0	0														
08:00 PM	TO	09:00 PM	0	0														
09:00 PM	TO	10:00 PM	0	0														
			2,487	279	2	2	**2**	2	2	**2**	2	2	**2**	2	2	**2**	**2**	**2**
					8 HOURS NEEDED			8 HOURS NEEDED			8 HOURS NEEDED for both Condition A & B						4 HRS NEEDED	1 HR NEEDED
					NOT SATISFIED			**NOT SATISFIED**			**NOT SATISFIED**						**NOT SATISFIED**	**SATISFIED**

04/27/24
Kimley-Horn and Associates

APPENDIX F
ESTIMATES COST ESTIMATES

APPENDIX F
TRAFFIC IMPROVEMENT FAIR-SHARE COST

#1 - Green Valley Lake Road at SR-18	Unit Cost	Quantity	Total
Install Traffic Signal	$ 400,000	1	$ 400,000
Project Fair Share percentage[1]			8.9%
Project Cost			$ 35,671
		Total Project Cost	**$** 35,671

[1] Higher of MD or PM project fair share percentage

Appendix K

Emergency Plan and Procedures

Hume SoCal Camp

Emergency Plan & Procedures

Updated 04/26/2024

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Emergency Contact Numbers

Emergency Medical Services
Emergency Dispatch – 911

Mountain Community Hospital – (909) 336-3651
29101 Hospital Rd, Lake Arrowhead, CA 92352 (24 Hour ER)

Redlands Community Hospital – (909) 335-5500
350 Terracina Blvd, Redlands, CA 92373

San Bernardino County Sheriff
Dispatch – (909) 336-0600
26010 Highway 189, Twin Peaks, CA 92391

San Bernardino County Emergency Information Line
Recorded info ony (909) 355-8800

California Highway Patrol
Dispatch – (909) 867-2791
31230 Highway 18, Running Springs, CA 92382

Road Conditions (Recording) (800) 427-7623

California Poison Control
(800) 222-1222

Transportation

First Student – (909) 885-0993

Turnpike Charter – (909) 883-8030

Shalimar – (909) 923-1100

Roesh Lines – (909) 885-4465

Hume SoCal Camp
Administrative Personnel

Main Office - (909) 867-4444

Site Director – **Chad Castor** - (559) 246-7733

Program Director – **Kyle O'Neill** - ()

Facilities Manager – **Tyler Reed** – ()

Office Manager – **Lisa McRaven** – (909) 264-6305

All Emergencies must be reported to the Hume SoCal Business Office. An "Incident Report" must be filled out for all major injuries sustained by campers.

San Bernardino County Evacuation Classifications

Evacuation Warning

Alerting of community members in a defined area of the potential threat to life and property from an emergency incident. An evacuation warning may be issued when the potential or actual threat to civilian life is more than 2 hours away.

Evacuation Order

Mobilization of the community to vacate a defined area due to an immediate threat to life and property from an emergency incident. An evacuation order should be used when there is a potential or actual threat to civilian life within 1 to 2 hours or the Incident Commander deems it necessary to protect civilians. There are three evacuation categories: Immediate, Delayed (4 or more hours), and Shelter in Place.

Evacuation Location – To be designated by San Bernardino County Sherriffs

HSC Phase Plan

Hume Christian Camps has developed a four-phase plan when responding to an evacuation notification by government authority:

Phase I - Evacuation Warning - Activate Evacuation Plan

Phase II - Evacuation Order - Alarm Sounds

Phase III - Evacuation

Phase IV - Evacuation Location

Business Office

Radio Channel: 1, 3 for Talking

Phase I: Evacuation Warning

- Close Welcome Center and secure the entry control points.
- Incident Management Team - Identify Incident Response Team.
- Review Evacuation Plan
- Identify Incident Commander (IC).
    - Contact Hume Executive Office to appraise them of our situation.
    - Assess transportation needs early.
    - Verify escape route and transportation availability with local authorities.
- Identify Public Information Officer (PIO).
    - Implement Communication Plan
    - Establish Media Briefing Area
- Identify Staff Evacuation Coordinator (SEC)
    - Prepare lists of all staff, family members, and current housing.
    - Prepare to “check-out” and account for all staff.
- Identify Evacuation Location Coordinator (ELC).
- Place Incident Status Board (A-frame) - In front of Welcome Center.
    - Current information and Status.
    - Post alarm signals and expectations.
    - Post maps and evacuation routes.
- Establish Media briefing area.
- Post HSC contact information.
- Publish Ten (10) Camp Rosters and distribute.
    - Three (3) to Program Director.
    - Three (2 Camper, 1 Staff) to Welcome Center.
    - Two (2 “all camp”) to Evacuation Bin for Evacuation Location.
    - Two (2 staff/families) to Staff Evacuation Coordinator.
- Transmit an “all camp” (includes campers, staff, and families) roster to the Hume Executive Office.
- Conduct daily briefings: 7:00am and 4:00pm with Camp Leadership at the Welcome Center.

Phase II: Evacuation Order - Alarm Sounds

- Welcome Center will be utilized as the Incident Command Post (ICP).
- Office staff to assist the IC as needed.
- PIO to maintain status board and regular media updates.
- Maintain communications with Hume Executive Office personnel.
- SEC to report to the Recreation Hall to brief Staff on evacuation plan.
- ELC to evacuate to the Evacuation Location and prepare to receive camp.
- Reassign personnel to Recreation Hall as they become available.

Phase III: Evacuation

- Coordinate Evacuation Operations with direction from the IC.
- All personnel not designated by the IC will immediately evacuate campus through the Recreation Hall check-out process.
- Follow Campus check-out process for all camps in session.
- Provide regular media and status board updates.
- Monitor Evacuation Status.
- Consider sending registrars to the evacuation location to assist the ELC as needed.

Phase IV: Evacuation Location

- Evacuation location is designated by local authorities.
- Convey location to Hume Executive Office.
- Maintain communications with the ELC as transportation departs to Evacuation Location.
- ELC will reunite each student with appropriate parent or guardian. If in doubt, do not release students until appropriate verifications can be made.
- Students will arrive with staff. Utilize incoming staff as needed.

Staff Evacuation Coordinator (SEC)

Radio Channel: 1, 3 & 4 for talking

Phase I: Evacuation Warning

- Review Evacuation Plan
- Notification to **All** staff members via email, social media, teams, and phone of a potential evacuation.
- Distribute evacuation letter (Appendix "A")
- Gather all necessary personnel files, computers and Red Dot items - stage for pick up
- Print 4 copies of all current housing lists, including family members
- Print 4 copies each of all current staff - alphabetically and by department

Phase II: Evacuation Order - Alarm Sounds

- Check-in with the Incident Commander (IC) at the Incident Command Post (ICP).
- SEC and designated Personnel move to the Recreation Hall and set up Staff Evacuation Center.
- Begin Check-out process for all Hume Staff.
- Utilize excess staff from other departments as needed.

Phase III: Evacuation

- SEC must document staff and families and their transportation off the hill. Lists of riders per vehicle must be created, checked, and turned into the IC in the Welcome Center.
- Staff lists should include:
    - Staff Person's or Family's Name(s)
    - What vehicle they left in
    - Their destination
    - Cell Phone number of each individual staff member

Phase IV: Evacuation Location

- Check-in with the Evacuation Location Coordinator (ELC)
- Aid the ELC with checking-in/out students and staff as needed.

Health Center

Radio Channel: 1, 3 for talking

Phase I: Evacuation Warning

- Report to the Health Center and staff as appropriate.
- Review Evacuation Plan.
- Nurse Manager to notify Camp Director via Teams or radio of any sick or injured campers staying in the health center.
- Prepare to return all medications if time allows. If not, prepare to transport medications to the evacuation location.
- Prepare to secure all files, equipment and computers as necessary - Stage for transport.
- Gather all Camper Release forms from the week out of the Health Center.

Phase II: Evacuation Order – Alarm Sounds

- Nurse Manager respond on channel 1 on radio with "This is (Name) responding."
- Registered Nurses to remain at the Health Center assisting the Nurse Manager.
- Nurse Interns report to the Medication Station and assist with medication return.
- All sick or injured campers who can return to their groups will be directed to the appropriate staging area. The campers who need continued medical monitoring or care will transport with Health Center staff to the Evacuation Location.

Phase III: Evacuation

- Nurse Manager to keep records of the status of all students, counselors that are in their care.
- Designated Nurses will be dismissed to transport their charge to the Evacuation Location.
- All remaining nursing staff will report to the Recreation Hall.
- Completed check out forms to be given to the Nurse Manager as soon as possible.
- **Accountability is not an option: please keep detailed check out records!**

Phase IV: Evacuation Location

- Evacuation location is directed by local authorities.
- Arriving staff, counselors and students will be checked in at the Evacuation Location.
- All sick or injured campers to remain with nursing staff separated from other campers.
- Check out per Evacuation Location procedures.

Departments

Radio Channel: 1, 3 for Talking

Phase I: Evacuation Warning

- All staff meet at the Recreation Hall and take roll call.
- Review evacuation plan.
- Introduce identified Incident Command Post (ICP), Incident Commander (IC), Staff Evacuation Coordinator (SEC), Public Information Officer (PIO), and Evacuation Location Coordinator (ELC).
- Identify staff member(s) to remain and establish roles.
- Follow the following departmental procedures when Evacuation Order is in place.

MARCOM

Phase II: Evacuation Order - Alarm Sounds

- Pack one (1) individual shooting bag to be used by the remaining staff for documenting the incident as necessary.
- Pack the rest of the camera gear and stage equipment for transport at the Recreation Hall Parking area.
- Be prepared to update web and social media with relevant information and updates.
- Staff & families of staff, report to the Recreation Hall.

Phase III & IV: Evacuation & Evacuation Location

- Continue video/ photo documentation as appropriate.
- Non-assigned staff to report to the Recreation Hall for assignments/evacuation.

FOOD SERVICE

Phase II: Evacuation Order - Alarm Sounds

- All staff report to the kitchen.
- Food Service Manager move to channel 1 on radio and respond with "This is (Name) responding." Let your staff know you'll be on channel 1. Your second in charge that you appointed will be on your normal department channel.
- Kitchen Lead will account for their staff and report to the SEC that all staff are accounted for and/or report any missing staff.
- Create a Food Plan - Focus attention on the next two (2) meals - one likely being a sack lunch.
- Implement records and equipment gathering and stage/ load for transport at the Recreation Hall Parking area.
- Provide bottled water at Dining Hall if available.

Phase III: Evacuation

- Food Service Manager will contact the SEC with list of accounted staff staying in place.
- Continue food plan as prepared.
- Non-assigned staff to report to the Recreation Hall for assignments/evacuation.

Maintenance/Facilities/Grounds

Phase II: Evacuation Order - Alarm Sounds

- It is expected that all maintenance personnel will remain on campus until specifically ordered to evacuate. Family members will evacuate per Phase (2) instructions.
- Maintenance Supervisor move to channel 1 on radio and respond with "This is (Name) responding." Let your staff know you'll be on channel 1. Your second in charge that you appointed will be on your normal department channel.
- Personnel to stage in the Recreation Hall and await assignments.
- All important records and equipment to the Recreation Hall Parking area for transport.
- Provide a road legal truck for transport of proprietary records and equipment. Pick up at Recreation Hall Parking area.

Phase III: Evacuation

- Stage any transport vehicles available on Basketball Court as directed ***DO NOT INTERFERE WITH BUS EVACUATION WITH CAMPERS***
- Please leave keys in vehicles.
- Non-assigned staff to report to the Recreation Hall for assignments/evacuations.

Accommodations

Phase II: Evacuation Order - Alarm Sounds

- Accommodations Manager moves to channel 1. Let your staff know you'll be on channel 1. Your second in charge that you appointed will be on your normal department channel.
- Accommodations Manager acquire and secure documentation to the Recreation Hall Parking area for transport:
    - Key code books & MSDS books.
    - Managers laptop
    - Files relating to personnel matters.
- Provide personnel and keys to ensure a complete inspection of occupancies have been conducted.
- Assign personnel to specific areas of camp to ensure compliance.
- Non-assigned personnel report to the Recreation Hall for assignments/evacuations.

Phase III: Evacuation

- Continue with Phase II Assignments

Activities

Phase II: Evacuation Order – Alarm Sounds

- Activities Supervisor, in conjunction with the Activity Teams, will oversee the shutdown of all activities.
- Direct campers & Counselors to head to Oak Dining.
- Identify and send two (2) responsible staff to the Welcome Center to direct responding equipment and evacuation vehicles.
- Snack Shop, Coffee Co, & Supply Co.
    - Close Stores & Concessions - Secure money and records & take to Welcome Center.
    - Secure money from vending machines and other responsible venues.

Phase III: Evacuation

- Non-assigned personnel report to the Recreation Hall for assignments/evacuation.

Program Camps & Guest Groups

(including, but not limited to, summer camp, winter camp, guest groups)

Phase I: Evacuation Warning

- Camp Director & Staff Leads meet at the Recreation Hall.
- Review specific camp evacuation plan.
- Camp Director will obtain three (3) camp rosters for the camp from registration and place in their evacuation bin.
- Meet with Leads to pass on information and plan evacuation assignments.
- Head Lead Counselor will create a seating chart in Oak Dining for churches.
- Leads prepare activities, movies, or videos to keep students occupied in the Dining Hall during the evacuation process.
- Camp Director to update counselors at the next Counselor meeting of the current situation.
    - They will explain what to do if the evacuation/ fire alarm sounds.
    - They will meet with church leaders and determine transportation needs.
    - They will convey that only student's medications & cell phones will be transported on Hume transportation.
    - They will convey to Pastors & Counselors that luggage will **not** be permitted on Hume provided transportation. Cell phones, medications and small backpacks that will fit on the students lap will be the only materials allowed on Hume provided transportation.

Phase II: Evacuation Order - Alarm Sounds

- Staging area – Oak Dining
- Secondary Staging Area – Oak Chapel
- Camp Director move to channel 1 on radio and respond with "This is (Name) responding." Let your staff know you'll be on channel 1. Your second in charge that you appointed will be on your normal department channel.
- Camp Director obtain three (3) registration rosters for Camp from the Welcome Center or Evacuation Bin.
    - One (1) Roster to the Camp Director
    - One (1) for Chapel check -in
    - One (1) for Chapel check out/ transportation roster
- Lead Counselor - Immediately help to shut down all activities and send students to Oak Dining.
- Church Counselors to account for all assigned students, within Oak Dining. Give the Lead Counselor of your cabin an accounting of your present and missing students.
- Head Lead Counselor - Collect any camper release forms from Health Center and/or Welcome Center of students who have already left for the week.
- Lead counselors to perform sweeps of the camp, report to Camp Director of any missing students.
- Maintain entry control points for Dining Hall management. Do not allow students/ counselors to leave the Dining Hall without permission.
- Communicate the Oak Dining seating chart and have all churches/ students move to and

remain in their designated area.
- Split the Dining Hall in half and have a designated Lead Counselor available for questions for each side of the room.
- Camp Director should maintain an up-front stage presence.
- Production team will report to the chapel, shut down critical systems and gather any physical backups/critical equipment.
- SCS counselors with students will remain with their students until safely transported to a safe location, potentially to the Evacuation Location.
- SCS counselors without students will report to the Recreation Hall.

Phase III: Evacuation

- Camp Director to keep records of the status of all churches, counselors and students.
- Students to remain with their respective counselor, by cabin for the duration of the evacuation.
- Counselors and students will be dismissed to their transportation in an orderly manner with emphasis on safety and accountability. Check "out" of the chapel and check "In" to the transportation vehicle will be recorded.
- All Churches with their own transportation will be processed first and free to evacuate.
- Buses and/or cars will be staged in the bus staging area in front of Oak Chapel, then loaded and occupants recorded. The vehicle will be free to proceed to the evacuation location.
- Completed check out forms to be given to the Camp Director as soon as possible.
- **Accountability is not an option: please keep detailed check out records!**

Phase IV: Evacuation Location

- Evacuation location will be designated by local authorities.
- In the case of a planned evacuation, churches with their own transportation will be allowed to return home, but must stay in phone contact to ensure safe arrival for final check-out process.
- Arriving Staff, Counselors and Students will be checked in at Evacuation Location.
- Churches, counselors and students to remain together.
- Check - out per Evacuation Location procedures.

Note: A plan will have to be developed to catalog and store luggage until such time as it can be claimed.

NATURAL DISASTER EMERGENCY PLAN

This plan is developed for the response of Hume Christian Camp personnel to a natural disaster which may impact camp operations. Natural disasters in the San Bernardino Mountains may include fire, flooding, earthquake, landslide and severe weather. This plan outlines the response to each of these emergencies.

FIRE OR MEDICAL EMERGENCY

Fires include both structure and wildland fire.

1. Dial 911 – Speak slowly, concisely, with a monotone voice.
2. Give name, address, and location (on property) of the incident.
3. State the nature of the request (Police, Fire, or Ambulance), current status and number of patients.
4. **DO NOT** hang up – answer all dispatcher questions and remain on the phone until dispatch tells you otherwise.

SEVERE WEATHER

Severe weather includes lightning storms, heavy rain, high winds and heavy snowfall.

When there is the reported potential for lightning activity:

1. The activities staff will monitor the electronic lightning meter which is kept at the activities office.
2. When lightning strikes are occurring within 3 to 8 miles of the camp facilities, the waterfront staff will close all swimming pools and notify all campers to return to the shore and exit the pond.
3. Additionally, all high adventure ropes course activity will cease.

When heavy rain storms occur:

1. Facilities staff will monitor the Creeks and the Pond for potential flooding.
2. If flooding is imminent, facilities staff will take appropriate measures to sandbag or otherwise protect vulnerable areas.
3. Program staff will cease all camper/guest activities in the pond and prevent campers/guests from entering areas where there is potential for flooding.
4. If housing units are in the potential flood impact areas, residents will be moved to other housing for their safety.
5. Other activities will be evaluated to determine if a hazard exists due to the rain, and if so the activity will be terminated.

When high winds occur:

1. Facility staff will determine if there are any potential safety hazards as a result of the high winds, such as falling trees and limbs and flying debris. They will take appropriate steps to mitigate the hazard.

2. Program and activity staff will take measures to ensure that campers/guests are protected from actions that could place them in danger of falling trees or flying debris.
3. Housing units will be monitored and evaluated for potential failure due to the high winds, i.e. canvas coverings and tents.

When heavy snowfall occurs:

1. Facility staff will maintain clear roads and walkways.
2. Roads to/from camp property will be monitored.
3. If roadway blockage occurs, the Transportation Emergency Plan will be put into operation.

EARTHQUAKE

1. Depending on the severity of the earthquake, all staff will assist campers/guests in taking the appropriate action, which may include "duck and cover" and moving away from windows or other items that could potentially fall.
2. After the shaking has stopped, staff will assist campers/guests in leaving a building and going to a safe place outside away from potential falling objects.
3. Facility staff will make an immediate check of all buildings for potential damage and/or collapse and report structural integrity to the senior administrator in charge.
4. Damaged or collapsed buildings will be reported to 911 for response.
5. All Staff & campers will assemble at designated safety area – **Oak Dining.**
6. Once the status of the campgrounds and facilities is determined, a decision will be made by the site director if it is safe to continue normal operations or if activities should be modified or canceled.
7. Any fires or injuries will be handled per the plans for those situations.

LANDSLIDE

1. If the landslide is on the camp property, Facility staff will respond to determine the potential danger or obstruction to normal operations.
2. If the landslide is off camp property, 911 shall be notified and may be reported in association with the U.S. Forest Service or other outside agency.
3. If the landslide affects one of the roads entering the camp property, a determination will be made as to how it will impact our campers/guests. It may be necessary to implement the Transportation Emergency Plan.
4. In an extreme case, where access to/from camp property will be disrupted for more than a few hours, it may be necessary to modify or cancel camp operations and notification will need to be made to affected campers, churches and groups.

Lost Camper Procedure

We must take this seriously. On a number of occasions, campers have been reported missing. Nine out of ten times, they just got lost in the crowd and they really are around. But there always is that other 10% of the time. Use the following guidelines to determine if a camper is missing:

1. Where were they last seen, and at what time?
    a. The longer they've been gone, the harder to find.
2. Could they simply be lost in the crowd?
    a. Send people out to scan the crowd.
    b. Make an announcement
3. Are they sick?
    a. Did they go to their cabin to rest?
    b. Could they have gone to the Health Center?
4. What is their temperament?
    a. Are they likely to wander off?
    b. Did they have a tough day?
    c. Would they have a motivation to sneak off?
    d. Do they NOT want to be found?
5. Who do they normally hang out with?

Once you've determined they're missing, it's time to act.

1. Have counselors and program staff check obvious places where they might be. Ex. Dining Hall, Chapel, Cabin, Health Center, Snack Shop.
2. If a staff person knows they are missing, and it's been more than 15 minutes, notify the Camp Director.
3. Use church counselors and available program staff to initiate a wider search.
4. After 30 minutes of a camper missing, notify the Site Director.
5. Use the radio to get all available staff, and coordinate a camp-wide search.
6. After a camper has been missing for an hour and a thorough search of camp has been conducted, call 911 to report a missing camper.
7. Once the proper officials have been contacted and searches are in effect, parents need to be contacted.

Fires and Medical Emergencies

CONDITIONS
Hume SoCal's location is remote. Hume has the following system for reporting and responding to emergencies and fires.

FIRE DISCIPLINES
Hume SoCal is part of an extremely hazardous fire area. Therefore, we must enforce some stringent rules to prevent forest fires and burning of buildings.

- Smoking is prohibited.
- No fireworks or firecrackers are allowed on the campus grounds at any time, nor in the surrounding National Forest.
- All staff are required to sign off for their understanding of fire reporting and procedures during initial orientation and safety training.

Throughout the year, there will be scheduled fire drills for staff.

REPORTING
Report first, get help, and then respond to the condition if you are trained and able. Do not try to fight the fire, revive a victim, or deal with the emergency before reporting.

When fire or smoke is spotted in Hume SoCal or surrounding area, it should always be reported. Report it to your supervisor, the Welcome Center, or any Executive Staff member. In the event that a fire is confirmed, report it immediately by dialing **911**.

EMERGENCIES
If at any time an emergency arises, such as a life threatening accident or fire, please respond to the problem in the manner described below.

HIGH ALTITUDE
Hume SoCal is approximately at 6,800 feet elevation. There is generally 40-45% less oxygen here than there is at sea level. The humidity level is 50-90% less here than there is at sea level. Signs of Oxygen deficiency due to the high altitude usually occurs 24 to 36 hours after arrival.

Less Severe Symptoms Include:
- Weakness
- Loss of appetite
- Insomnia
- Drowsiness and yawning
- Restlessness
- Shortness of breath
- Nasal congestion
- Sore throat
- Headache

More Severe Symptoms Include:

- Increased Heart Rate
- Palpitations
- Nausea and/or vomiting
- Nose Bleeds
- Cought
- Fatigue
- Diarrhea
- Dizziness

There are ways to avoid Oxygen Deficiency. Plenty of rest, drinking lots of water, and eating light meals is a helpful way to keep Oxygen Deficiency at bay.

DEHYDRATION

Dehydration occurs more rapidly in high altitude due to low humidity. You should drink more water than you would on a normal basis at higher elevations. Carry water when you go hiking or at any activity that encourages physical exertion.

Transportation Emergency Plan

This plan is developed for the response to potential camper/guest transportation emergencies that might arise on mountainous roadways which are subject to traffic accidents, rain storms, heavy snow, ice, landslides, wildfires or other roadway issues.

1. When a report is received of a roadway situation which has or may impact the vehicular travel to or from the Hume Christian Camp facilities, an immediate investigation will be conducted to determine the impact to our campers/guests.
2. If the investigation reveals that campers/guests have been, or will be, impacted by the roadway situation, appropriate resources will be mobilized to handle the needs of the emergency.
3. A staff member will be assigned to coordinate the response by HSC resources and to liaison with outside agencies and affected guests/churches.
4. Resources to be mobilized may include HSC vehicles and personnel and other local and State government agencies, as needed.
5. Actions to be taken may include delaying arrival or departure of guests until the roads are cleared; providing escort vehicles for convoys of guest vehicles; providing blankets and food for delayed or trapped guests.
6. In extreme cases, additional food and lodging at the camp facilities may need to be provided for those who are not able to leave the grounds.

While HSC will do everything we can to assist our campers and guests, it is understood that every group/church or individual is responsible to ensure that they have the appropriate means of travel, especially for winter conditions, in the San Bernardino Mountains. The road and weather conditions can change rapidly during mountain storms and HSC is only responsible for clearing the roads in and around the Hume SoCal facilities. All other roads and highways are the responsibility of the US Forest Service and/or CalTrans.

Staff & Camper Illness/Injury Procedures

STAFF PROTOCOL

All staff at HSC must have a Health Screen completed prior to starting employment. This will screen for illness or injury that may interfere with work or possibly be contagious.

If a staff member is found to have a contagious illness, they will be prohibited from working and/or food handling for 72 hours after symptoms cease, as per the health department. If a staff member comes to work ill and you think it may be contagious, please send them to the Health Center for assessment.

We will emphasize strict hand washing for at least 20 seconds with soap for all staff as part of normal personal hygiene.

Pursuant to Title 17, California Code of Regulations, we must report immediately by phone, 2 or more cases of suspected food borne disease from 2 separate households.

If a staff member is injured on the job, they shall be sent to the Health Center with their supervisor if possible, so Workmen's Comp paperwork can be started. If there is an injury that may interfere with their job, they must be sent to the Health Center for clearance prior to starting their assignment.

CAMPER PROTOCOL

Any camper who is ill and needs treatment should find their counselor and go to the Health Center to see the nurse. In the event that the camper is too ill to go to the Health Center, 911 can be notified to pick the camper up and transport them to the Hospital. The Health Center staff will determine if the camper needs to be monitored in the Health Center, or isolated in our sick bay. Parents, counselor, and youth pastor will be notified of the plan of care.

In the event that a camper needs to go home due to illness or injury, parents will be notified along with the appropriate camp staff, and a Camper Release form will be filled out and signed by the parent or guardian picking that camper up.

If the camper needs more advanced medical care due to the illness or injury, their church staff (counselor, youth pastor) will transport the camper to the most appropriate medical facility.

If the camper has an illness or injury that is life threatening, limb threatening, or unstable, contact EMS for transport via ambulance or helicopter as needed.

In the event of a food borne illness or viral outbreak, contact the nurse first, then the Medical Supervisor, and the Health Department if necessary.

San Bernardino County Health Department: Phone: (800) 782-4264

Stranger In Camp Procedure

Anyone visiting our camps are required to check in with the Welcome Center.

If an unidentified person is on property the staff is to report to camp Leadership. The designated staff is trained to approach and follow the below procedures:

- Inquire to find out if the individual or group is lost and needs help finding a specific place.
- Ask the individual or group to vacate the private property.
- If the individual or group refuses to stay off the HSC private property, the designated staff will contact 911 or the San Bernardino County Sheriff's Department, to have a Law Enforcement Officer dispatched.
- Take note of any vehicles involved, as well as personal descriptions.
- Be sure to monitor the movements of the stranger until Law Enforcement arrives.

Waterfront Emergency Plan

The following are waterfront Emergencies that need *IMMEDIATE ACTION*:

These emergencies will be on or in: the ponds / pools / streams

- Cold water rescues
  - Boat over turns – (Spring and Fall)
  - Fallen through ice (Winter)
- Drowning /near drowning
  - Non-swimmer falls out of boat
- Other Emergencies on or in the water
  - Heart attack
  - Stroke
  - Seizure
  - Severe allergic reaction
  - Potential loss of life or limb

Activate the emergency response system(EMS) by calling 9-1-1

Report the following information:

- **Location**: Pond? Last specific sighting of victim, time last seen, time down.
- **About the person**: Name, sex, age, height, weight
- **Hume camper**? Guest, Staff?
- **Mechanism of injury**: Non-swimmer? Trauma?
- **Check reliability of notifier**: get name, phone #.

Critical incident Debriefing

- Same Day – mandatory for all staff present at scene
- 24 hours later – Site Director follows-up with each individual 1 on 1.

Animal, Insect, and Plant Sightings & Exposure

During the course of normal day to day activities, many animal/insect sightings and brushes with poisonous plants will happen. If you see the following, or are attacked, bitten, or touched by any fo the below, please follow the procedures listed.

ANIMAL SIGHTING

Many large animals such as black bears, big horn sheep, mule deer, coyotes, bobcats, and mountain lions inhabit the San Bernardino Mountains. These animals are shy and are frightened of humans.

In the event that you do have a large animal sighting while on the trails or in the camp, you should do the following:

1. Stay quiet and observe the animal.
2. Keep calm and stay together in your group.
3. Insure that the animal has plenty of room and a way to retreat.
4. **DO NOT** get between an adult animal and its offspring.

If the animal acts aggressively:

1. Stay together in your group and keep campers calm.
2. **DO NOT** show fear.
3. Back group away slowly while continuing to face the animal, waving hands and shouting.
4. Report the incident to Camp Leadership.

RATTLESNAKES

1. Rattlesnakes are most often seen on hot, sunny days but they may be searching for food at any time, including after dark.
2. When provoked, a rattlesnake usually "rattles."
3. Observe the snake from a safe distance (at least twice its body length away).
4. Give it plenty of room to escape.
5. **LEAVE IT ALONE**, do not attempt to catch it and notify Camp Leadership.

INSECTS AND SPIDERS

1. Bees, Wasps, various Spiders, and Scorpions may be found around the camp area and hiking trails.
2. Ground nesting Wasps are common under rocks or along trails.
3. Learn to recognize the insects.
4. If you get stung or bitten, go to the Health Center for treatment.

STINGING NETTLE AND OTHER POISONOUS PLANTS

1. Stinging Nettles usually grow in moist areas.
2. Touching the leaves or stems cause a rash to break out immediately.
3. If exposed, DO NOT touch or rub the affected area. Pour fresh water over the area. Lightly use soap and water if available.