INSIGNIA ENVIRONMENTAL

AU ENERGY, LLC

HESPERIA PHELAN CUP24-00012

INITIAL STUDY/MITIGATED NEGATIVE DECLARATION

JANUARY 2026

PREPARED FOR:

Au Energy

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Attachment B: Biological Resources Assessment
Attachment C: Archaeological Survey Report
Attachment D: Geotechnical Study
Attachment E: Infiltration Feasibility Study
Attachment F: Scoping Agreement Memorandum

1 – BACKGROUND

1.1 PROJECT TITLE

Au Energy, LLC (Au Energy) Hesperia Phelan CUP24-00012 (Project)

1.2 LEAD AGENCY NAME AND ADDRESS

City of Hesperia Planning Department
9700 Seventh Avenue
Hesperia, CA 92345

1.3 CONTACT PERSON AND PHONE NUMBER

Leilani Henry, Associate Planner
(760) 947-1231

1.4 PROJECT LOCATION

As shown in Figure 1: Regional Location and Figure 2: Project Site, the Project is located on the northwest corner of United States (U.S.) Highway 395 and Phelan Road in the City of Hesperia (City) in San Bernardino County, California (Assessor's Parcel Numbers [APN] 3064-401-10).

1.5 PROJECT SPONSOR'S NAME AND ADDRESS

Au Energy, LLC
41805 Albrae Street
Fremont, CA 94538

1.6 GENERAL PLAN DESIGNATION AND ZONING

The Project site is located on parcels zoned as Neighborhood Commercial (NC) in the City's Main Street and Freeway Corridor Specific Plan. Consistent with the City's Main Street and Freeway Corridor Specific Plan and the NC zone provisions, which encourage the development of businesses that provide convenience goods and services to local residents, this Project will provide fuel, car wash services, and convenience store sales, including the retail sale of beer and wine for off-site consumption.

1.7 DESCRIPTION OF PROJECT

An Initial Study/Mitigated Negative Declaration (IS/MND) for the Project was previously submitted to the City as Conditional Use Permit (CUP) 18-00003 on August 9, 2018. Since that time, the IS/MND and CUP authorization have expired. The currently proposed Project is in roughly the same location and of the same nature as the Project proposed in the original IS/MND, with design changes that have led to a reduced Project scope. As a result, the Project is now primarily limited to one parcel (APN 3064-401-10), with utilities and services extending onto Phelan Road and adjacent parcels. While the size of the proposed convenience store and car wash have increased, the size of the fueling station has decreased, and the fast-food restaurant

and food truck commissary have been removed from the Project scope. Findings and technical reports from the original IS/MND were referenced during preparation of this IS/MND; however, all findings have been verified through additional desktop and/or field review. The updated description of the Project is provided in the following subsections.

1.7.1 Project Structures

The Project includes the construction and operation of a 5,915-square-foot convenience store, five fuel islands (10 pumps total) beneath a 4,080-square-foot canopy, and a 1,968-square-foot automated car wash tunnel on an approximately 115,870-square-foot (2.66-acre) site, as depicted in Figure 3: Site Development Plan. The Project is located on APN 3064-401-10, as depicted in Figure 2: Project Site, with grading and landscaping extending onto APNs 3064-401-06 and 3064-401-09, and the proposed sewer line extending onto APN 3064-401-09, as depicted in Figure 3: Site Development Plan.

The convenience store is proposed to be located at the center of the Project site, approximately 60 feet west of the proposed fueling station and approximately 73 feet south of the proposed car wash. A total of 40 parking spaces are proposed, including 21 standard spaces, 10 standard spaces that are electrical vehicle capable[1], two spaces served by electrical vehicle charging stations, two handicap-accessible spaces, four spaces for use of a vacuum, and one space for use of pressurized air/water. The vacuum and air/water spaces are associated with the proposed car wash and provide users with the ability to manually clean the interior or exterior of their vehicles. Underground storage tanks (USTs) will be located in the southeastern corner of the Project site.

1.7.2 Landscaping and Paving

The entire approximately 2.66-acre site will be developed for the Project, with approximately 1.88 acres (81,893 square feet) of paved surface area and approximately 0.78 acre (33,977 square feet) of landscaped surface area. Because the Project site slopes gradually from northeast to southwest with an approximate slope of 3 percent, the entire Project site will be graded to create a flat surface. The Project will include approximately 0.35 acre (15,246 square feet) of flat landscaped area and approximately 0.43 acre (18,731 square feet) of sloped landscaped area, as depicted in Figure 3: Site Development Plan.

1.7.3 Project Access

Two driveways are proposed for the Project: one on the northeastern corner of the Project site off U.S. Highway 395, and the second on the southwestern corner of the Project site off Phelan Road. As a result, access to the site is proposed from a right-in and right-out-only approach on both U.S. Highway 395 and Phelan Road. During construction, the Project will either be accessed from the proposed driveway off Phelan Road, as shown in Figure 3: Site Development Plan, or a temporary access road in the same location as the sewer line, as shown in Figure 2: Project Site.

[1] A vehicle space with electrical panel space and load capacity to support a branch circuit and necessary raceways, both underground and/or surface mounted, to support electric vehicle charging.

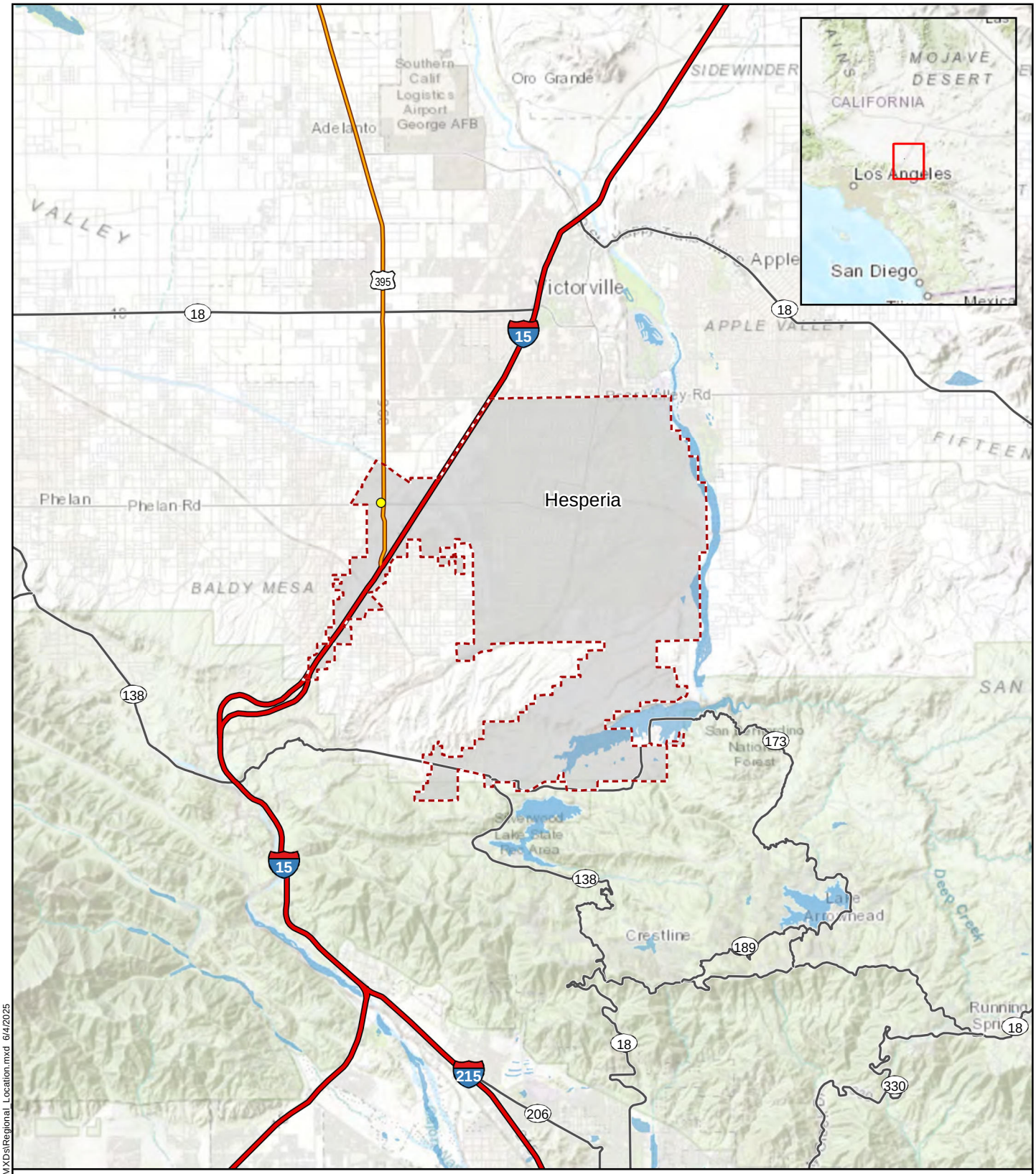


Figure 1: Regional Location **Hesperia Phelan**

- Project Location
- Interstate
- U.S. Highway
- Major Road/State Highway
- City Boundary

1 inch = 4 miles

0 2 4 Miles

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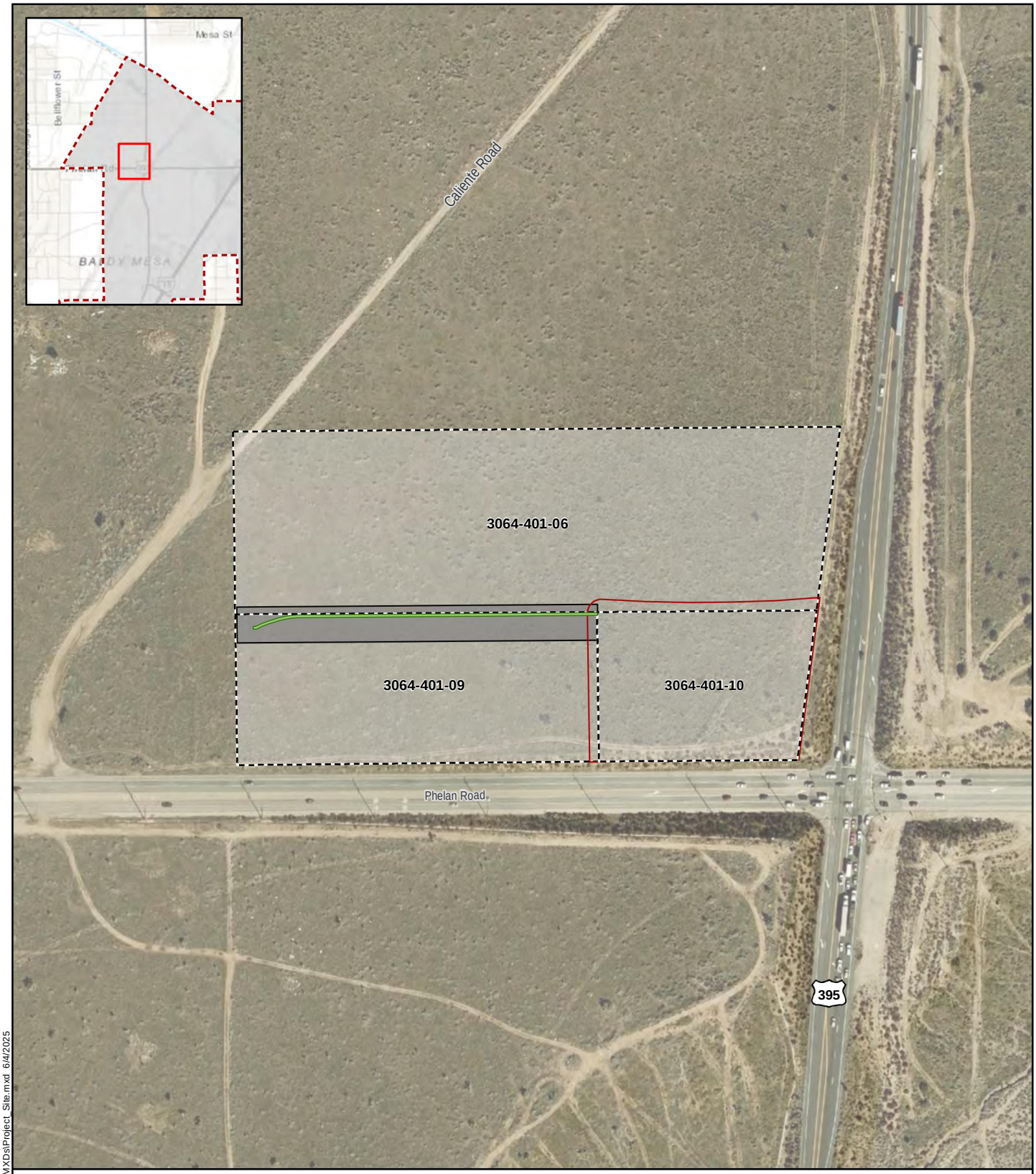


Figure 2: Project Site **Hesperia Phelan**

- Potential Temporary Access Road
- Proposed Sewer Line
- Project Site
- Parcel Boundary
- City Boundary

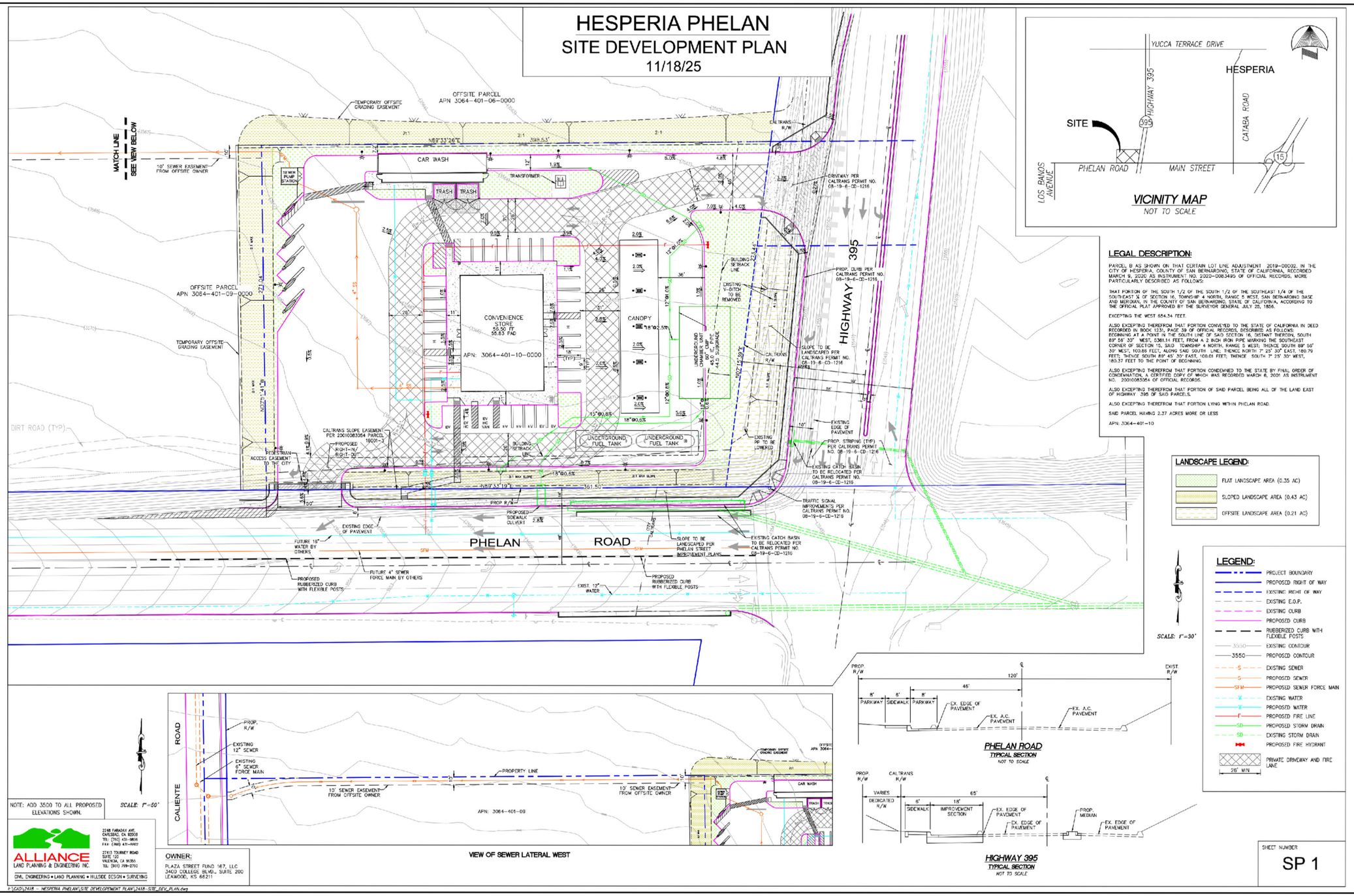
1:3,000

0 200 400 Feet

Au Energy INSIGNIA ENVIRONMENTAL

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HESPERIA PHELAN
SITE DEVELOPMENT PLAN
11/18/25



VICINITY MAP
NOT TO SCALE

LEGAL DESCRIPTION:

PARCEL B AS SHOWN ON THAT CERTAIN LOT LINE ADJUSTMENT 2019-00002, IN THE CITY OF HESPERIA, COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA, RECORDED MARCH 9, 2020 AS INSTRUMENT NO. 2020-0083495 OF OFFICIAL RECORDS, MORE PARTICULARLY DESCRIBED AS FOLLOWS:

THAT PORTION OF THE SOUTH 1/2 OF THE SOUTH 1/2 OF THE SOUTHEAST 1/4 OF THE SOUTHEAST ¼ OF SECTION 16, TOWNSHIP 4 NORTH, RANGE 5 WEST, SAN BERNARDINO BASE AND MERIDIAN, IN THE COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA, ACCORDING TO THE OFFICIAL PLAT APPROVED BY THE SURVEYOR GENERAL JULY 25, 1856.

EXCEPTING THE WEST 654.34 FEET.

ALSO EXCEPTING THEREFROM THAT PORTION CONVEYED TO THE STATE OF CALIFORNIA IN DEED RECORDED IN BOOK 1231, PAGE 39 OF OFFICIAL RECORDS, DESCRIBED AS FOLLOWS: BEGINNING AT A POINT IN THE SOUTH LINE OF SAID SECTION 16, DISTANT THEREON, SOUTH 89° 56' 30" WEST, 5361.14 FEET, FROM A 2 INCH IRON PIPE MARKING THE SOUTHEAST CORNER OF SECTION 15, SAID TOWNSHIP 4 NORTH, RANGE 5 WEST; THENCE SOUTH 89° 56' 30" WEST, 1103.86 FEET, ALONG SAID SOUTH LINE; THENCE NORTH 7° 25' 30" EAST, 180.79 FEET; THENCE SOUTH 89° 45' 30" EAST, 1001.01 FEET; THENCE SOUTH 7° 25' 30" WEST, 180.37 FEET TO THE POINT OF BEGINNING.

ALSO EXCEPTING THEREFROM THAT PORTION CONDEMNED TO THE STATE BY FINAL ORDER OF CONDEMNATION, A CERTIFIED COPY OF WHICH WAS RECORDED MARCH 6, 2001 AS INSTRUMENT NO. 2001083054 OF OFFICIAL RECORDS.

ALSO EXCEPTING THEREFROM THAT PORTION OF SAID PARCEL BEING ALL OF THE LAND EAST OF HIGHWAY 395 OF SAID PARCELS.

ALSO EXCEPTING THEREFROM THAT PORTION LYING WITHIN PHELAN ROAD.

SAID PARCEL HAVING 2.37 ACRES MORE OR LESS

APN: 3064-401-10

LANDSCAPE LEGEND:

- FLAT LANDSCAPE AREA (0.35 AC)
- SLOPED LANDSCAPE AREA (0.43 AC)
- OFFSITE LANDSCAPE AREA (0.21 AC)

LEGEND:

- PROJECT BOUNDARY
- PROPOSED RIGHT OF WAY
- EXISTING RIGHT OF WAY
- EXISTING E.O.P.
- EXISTING CURB
- PROPOSED CURB
- RUBBERIZED CURB WITH FLEXIBLE POSTS
- EXISTING CONTOUR
- PROPOSED CONTOUR
- EXISTING SEWER
- PROPOSED SEWER
- PROPOSED SEWER FORCE MAIN
- EXISTING WATER
- PROPOSED WATER
- PROPOSED FIRE LINE
- PROPOSED STORM DRAIN
- EXISTING STORM DRAIN
- PROPOSED FIRE HYDRANT
- PRIVATE DRIVEWAY AND FIRE LANE (26' MIN)

SCALE: 1"=30'

VIEW OF SEWER LATERAL WEST

PHELAN ROAD
TYPICAL SECTION
NOT TO SCALE

HIGHWAY 395
TYPICAL SECTION
NOT TO SCALE

NOTE: ADD 3500 TO ALL PROPOSED ELEVATIONS SHOWN.

SCALE: 1"=50'

ALLIANCE
LAND PLANNING & ENGINEERING INC.
CIVIL ENGINEERING • LAND PLANNING • HILLSIDE DESIGN • SURVEYING
2248 FARADAY AVE.
CARLSBAD, CA 92008
TEL: (760) 431-9696
FAX: (760) 431-9697
27411 TOURNEY ROAD
SUITE 120
VALENCIA, CA 91355
TEL: (661) 799-0760

OWNER:
PLAZA STREET FUND 167, LLC
3400 COLLEGE BLVD., SUITE 200
LEAWOOD, KS 66211

SHEET NUMBER
SP 1

P:\CAD\2418 - HESPERIA PHELAN\SITE DEVELOPMENT PLAN\2418-SITE_DEV_PLAN.dwg

Figure 3: Site Development Plan

1.7.4 Road Improvements

The Project includes improvements to U.S. Highway 395, Phelan Road, and the traffic signal on the northwestern corner of the Phelan Road and U.S. Highway 395 intersection, as depicted in Figure 3: Site Development Plan. The southbound side of U.S. Highway 395 will be widened to 58 feet from the centerline to allow for the following:

- installation of a 3-foot-wide median at the centerline,
- a dedicated bike lane along the southbound side,
- a dedicated right-turn lane to access the Project and to turn right onto Phelan Road,
- two southbound lanes, and
- one left-turn lane to travel east.

Rubberized curbs with flexible posts are proposed along the Phelan Road median.

1.7.5 Utilities

Utilities and services (e.g., a sewer line, water line, fire line, and storm drain) will extend off the Project site. The proposed water line will be located beneath Phelan Road and will extend north to connect to the proposed convenience store and car wash. The proposed fire line will extend north from Phelan Road to the proposed convenience store. The proposed storm drain will be located east of the proposed fueling station and will extend from the proposed car wash to Phelan Road. As discussed previously, the proposed sewer line will extend west from the proposed convenience store and cross APN 3064-401-09 before connecting to an existing sewer force main.

1.7.6 Project Schedule

Construction of the Project is anticipated to start in the first quarter of 2026 following approval from the City and will be completed in two phases. The first phase will consist of site grading and utility installation, and the second phase will include UST and structure installation, as well as landscaping. Project construction is anticipated to last between 200 and 250 days and is expected to be completed in the third quarter of 2026.

1.8 SURROUNDING LAND USES AND SETTING

APNs 3064-401-06, 3064-401-09, and 3064-401-10 are vacant. The parcel abutting APN 3064-401-09 to the west (i.e., APN 3064-391-01) is under construction for the Hesperia Commerce Center II Project, which includes the construction of three industrial/warehouse buildings. Parcels to the north, east, and south are vacant.

1.9 OTHER PUBLIC AGENCIES WHOSE APPROVAL IS REQUIRED

To implement the Project, Au Energy will need to obtain, at a minimum, the following discretionary permits/approvals:

- a City-issued CUP to permit the construction and operation of the convenience store with alcoholic beverage sales for off-site consumption, vehicle fuel stations, and car wash facilities in the NC zone;

- a California Department of Transportation-issued encroachment permit to permit the modifications to U.S. Highway 395, as well as the U.S. Highway 395 and Phelan Road intersection;

- a California Department of Fish and Wildlife-issued Western Joshua Tree Conservation Act Incidental Take Permit (ITP) or Section 2081 ITP to authorize relocation and removal of western Joshua tree (*Yucca brevifolia*);

- a Mojave Desert Air Quality Management District-issued Authority to Construct to permit the construction and operation of the vehicle fuel stations and associated USTs;

- City-issued encroachment, grading, and building permits; and

- a State Water Resources Control Board-issued National Pollutant Discharge Elimination System General Permit (Order WQ 2022-0057-DWQ NPDES No. CAS000002) for disturbing more than 1 acre of land.

1.10 CALIFORNIA NATIVE AMERICAN TRIBES

The City distributed a letter for the Project pursuant to PRC Section 21080.3.1 on August 1, 2025. On August 12, 2025, the Yuhaaviatam of San Manuel Nation (YSMN, also known as the San Manuel Band of Mission Indians) requested that the Project cultural report, geotechnical report, and plans detailing the proposed depth of ground disturbance be provided. The requested materials were provided to the City for distribution to the YSMN on August 15, 2025. After review of the requested materials, the YSMN provided mitigation measures that were incorporated into this IS/MND in September 2025.

2 – ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED

The environmental factors checked below would be potentially affected by Hesperia Phelan CUP24-00012, as indicated by the following checklist.

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

3 – DETERMINATION

On the basis of this initial evaluation:

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

☒ I find that although the 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 Project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT (EIR) is required.

☐ I find that the 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 EIR is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the 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 Project, nothing further is required.

Leilani Henry- Associate Planner	
Name	Signature
City of Hesperia	January 13, 2026
Agency	Date

4 – ENVIRONMENTAL ANALYSIS

4.1 AESTHETICS

Except as provided in Public Resources Code Section 21099, would the project:	Potentially Significant Impact	Less-than-Significant Impact with Mitigation Incorporated	Less-than-Significant Impact	No Impact
a) Have a substantial adverse effect on a scenic vista?			✓	
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?				✓
c) In nonurbanized 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?			✓	
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?			✓	

4.1.1 Discussion

a) Would the project have a substantial adverse effect on a scenic vista?

Less-than-Significant Impact. The scenic resources listed in the City of Hesperia (City) General Plan 2010 Open Space Element (General Plan) include the Mojave River and its associated tributary washes, including the Oro Grande Wash, as well as the San Bernardino and San Gabriel mountain ranges (City of Hesperia 2010). However, no scenic vistas are designated or described in the General Plan. The Hesperia Phelan CUP24-00012 (Project) site is located on undeveloped land, bordered by undeveloped land to the north and west, Phelan Road to the south, and Highway 395 to the east. The Oro Grande Wash is located approximately 680 feet southeast of the Project area; however, public viewpoints of Oro Grande Wash from Highway 395 and Phelan Road will not be obstructed by the construction of the Project. In addition, the Project will comply with the City's Municipal Code Title 15 (Building and Construction) and Title 16 (Development) concerning building height, which will reduce the potential for the structures to obstruct the public view of Oro Grande Wash (City of Hesperia 2025a and City of Hesperia 2025b). As a result, the impact will be less than significant.

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

No Impact. No designated state scenic highways are located within five miles of the Project area; thus, no scenic resources will be substantially damaged within a state scenic highway. As a result, no impact will occur.

c) In nonurbanized areas, would the project 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 located within an undeveloped area, approximately 0.3 mile west of an existing residential subdivision and approximately 1 mile west of an existing commercial area. Given nearby land uses and the Project's proximity to existing developed areas, the Project will not substantially degrade the existing visual character or quality of the site and its surroundings. Further, as described in Section 4.11 Land Use, the Project will be located on a parcel designated as Neighborhood Commercial (NC) in the City's Main Street and Freeway Corridor Specific Plan (City of Hesperia 2008). The Project will be consistent with the NC zone, which encourages the development of businesses that provide convenience goods and services to local residents, such as the services that will be provided by the Project when completed. The Project will also comply with Titles 15 and 16 of the City's Municipal Code, which include building height limitations, signage requirements, and other aesthetic regulations to which the Project will adhere (City of Hesperia 2025a and City of Hesperia 2025b). As a result, the impact will be less than significant.

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

Less-than-Significant Impact. Construction of the Project will be conducted in accordance with City of Hesperia Municipal Code Section 16.20.125, which stipulates construction hours and noise thresholds. Construction activities will be conducted during both daytime and nighttime hours. Nighttime construction activities will be conducted in accordance with the Project's traffic control plan approved by the City and California Department of Transportation as part of the permitting process prior to construction. Additionally, light plants used for nighttime construction will be directed away from traffic and any nearby residents to reduce glare. Once completed, the commercial buildings associated with the Project will produce additional light and glare in the area due to lighting on the vehicle fueling station overhang and convenience store; however, all exterior light fixtures will be constructed in accordance with Section 16.16.365 of the City's Municipal Code Section to be shielded and directed away from vehicular traffic and/or adjacent properties to reduce glare (City of Hesperia 2025b). As a result, the impact will be less than significant.

4.2 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:	Potentially Significant Impact	Less-than-Significant Impact with Mitigation Incorporated	Less-than-Significant Impact	No Impact
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?				✓
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?				✓
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))?				✓
d) Result in the loss of forest land or conversion of forest land to non-forest use?				✓
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?				✓

4.2.1 Discussion

a) Would the project 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. The Hesperia Phelan CUP24-00012 (Project) site is located on undeveloped land designated as Grazing Land by the California Department of Conservation's (DOC's) Farmland Mapping and Monitoring Program (California DOC 2022). The immediately adjacent parcels on all sides of the Project are also designated as Grazing Land. The Project will not be located on lands designated as Prime Farmland, Unique Farmland, or Farmland of Statewide Importance; therefore, the Project will not convert any Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to non-agricultural use. The Project is not located on land with any known agricultural activities or any known unique agricultural soils. As a result, no impact will occur.

b) Would the project conflict with existing zoning for agricultural use, or a Williamson Act contract?

No Impact. The Project is located on a parcel zoned as Neighborhood Commercial (NC) in the City of Hesperia's Main Street and Freeway Corridor Specific Plan (City of Hesperia 2008). Agricultural uses are prohibited in the NC zone. In addition, the Project is not located on or adjacent to parcels under an existing Williamson Act contract (California DOC 2025). As previously discussed, the Project is located on undeveloped land that does not contain any known agricultural activities. Therefore, the Project will not conflict with existing zoning for agricultural use or an existing Williamson Act contract. As a result, no impact will occur.

c) Would the project 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))?

No Impact. As discussed previously, the Project is on a parcel zoned as NC. No areas of forest land, timberland, or timberland zoned as Timberland Production are located in the vicinity of the Project. Therefore, the Project will not conflict with the zoning or cause the rezoning of forest lands or result in the conversion of timberland as none are present in the vicinity of the Project. As a result, no impact will occur.

d) Would the project result in the loss of forest land or conversion of forest land to non-forest use?

No Impact. The Project is located within the Mojave bioregion, which does not contain sufficient forest land for viable timber production and, as a result, does not have a high timber management emphasis (California Department of Forestry and Fire Protection 2017). The Project is not located on forest land or in the vicinity of forest land. Therefore, the Project will not result in the loss of forest land or conversion of forest land to non-forest use as none is present in the vicinity of the Project. As a result, no impact will occur.

e) Would the project 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?

No Impact. As discussed previously, the Project will not result in the temporary or permanent loss of forest land and no Prime Farmland, Unique Farmland, or Farmland of Statewide Importance will be converted to non-agricultural use. Therefore, the Project will not involve changes to the existing environment that will potentially result in the conversion of Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to non-agricultural use or conversion of forest land to non-forest use. As a result, no impact will occur.

4.3 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:	Potentially Significant Impact	Less-than-Significant Impact with Mitigation Incorporated	Less-than-Significant Impact	No Impact
a) Conflict with or obstruct implementation of the applicable air quality plan?				✓
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?			✓	
c) Expose sensitive receptors to substantial pollutant concentrations?			✓	
d) Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?			✓	

4.3.1 Discussion

a) Would the project conflict with or obstruct implementation of the applicable air quality plan?

No Impact. The United States (U.S.) Environmental Protection Agency (EPA) and California Air Resources Board (CARB) established the National Ambient Air Quality Standards (NAAQS) and California Air Quality Standards (CAAQS), respectively, for the following criteria air pollutants (CAPs): ozone (O_3), carbon monoxide (CO), nitrogen dioxide, particulate matter with a mean diameter of less than 10 microns (PM_{10}), particulate matter with a mean diameter of less than 2.5 microns ($PM_{2.5}$), sulfur dioxide, and lead (Pb). Furthermore, California has set additional standards for sulfates, hydrogen sulfide (H_2S), vinyl chloride, and visibility-reducing particles. Attainment of the CAAQS and NAAQS protects sensitive receptors and the public from CAPs that are known to have adverse human health effects. A region is designated as nonattainment if the NAAQS or CAAQS is exceeded for a pollutant. Hesperia Phelan CUP24-00012 (Project) is located in a portion of the Mojave Desert Air Basin that is classified by the U.S. EPA and CARB as nonattainment for O_3 and PM_{10} (CARB 2025). Within the Mojave Desert Air Basin, the Project is under the jurisdiction of the Mojave Desert Air Quality Management District (MDAQMD).

The MDAQMD is the agency responsible for managing the local air quality, administering California and federal air pollution control programs, and ensuring attainment and maintenance of the ambient air quality standards. The MDAQMD has established the Federal 70 ppb Ozone Attainment Plan (MDAQMD 2023) and Federal Particulate Matter (PM_{10}) Attainment Plan (MDAQMD 1995) to address nonattainment areas for O_3 and PM_{10}. A project is considered inconsistent with an air quality plan or applicable attainment plan if it could cause population and/or employment growth or growth in vehicle miles traveled in excess of the growth forecasts

included in an applicable air quality plan or attainment plan. As discussed in Section 4.14 Population and Housing, the Project will not result in significant population growth during construction or operation of the Project. Because construction of the Project will not result in significant population growth, it will not conflict with the growth projections used in the development of the applicable air quality plans.

Emissions associated with Project construction will be temporary and will represent a small fraction of the regional emission inventories included in the applicable air quality plans. Construction and operation of the Project will be performed in compliance with MDAQMD rules and regulations, ensuring that activities are consistent with air district efforts to achieve attainment and maintenance of the standards. In addition, the MDAQMD has established that a project does not conflict with an air attainment or maintenance plan if it is consistent with the existing land use plan (MDAQMD 2020). As discussed in Section 4.11 Land Use and Planning, the Project is consistent with the City of Hesperia-designated Neighborhood Commercial zone in which it is proposed. As a result, the Project will conform with applicable air quality plans.

Because the Project is not expected to substantially contribute to regional emissions and will not conflict with the growth projections in the applicable air quality plans, and because construction and operation of the Project will be performed in compliance with applicable air district rules and regulations, the Project will not conflict with or obstruct implementation of the applicable air quality plans. As a result, no impact will occur.

b) 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 federal or state ambient air quality standard?

Less-than-Significant Impact. Project emissions were calculated using the California Emissions Estimator Model (CalEEMod). Attachment A: CalEEMod: Hesperia Phelan Detailed Report details the inputs and results of the CalEEMod completed for the Project.

Active Project construction is expected to last between 200 and 250 days and will generate temporary air pollutant emissions associated with fugitive dust (particulate matter) and exhaust emissions from heavy construction equipment and construction vehicles. As discussed previously, the Project is in a region classified as nonattainment for O_3 and PM_{10}. The MDAQMD has established emissions thresholds for the following air pollutants:

- carbon dioxide equivalent (CO_2e),[2]
- CO,
- nitrogen oxides (NO_x),
- volatile organic compounds (VOCs),
- sulfur oxides (SO_x)
- PM_{10},
- $PM_{2.5}$,

[2] CO_2e is a measure used to compare the effect of emissions of various greenhouse gases based on their global warming potential projected over a specified time period (generally 100 years).

- H_2S, and
- Pb.

Emissions will vary day to day depending on the level of activity and the specific type of construction activity occurring. Table 1: MDAQMD Average Daily Construction Emissions presents the estimated uncontrolled construction emissions in the MDAQMD and compares emissions to the applicable thresholds for air pollutants. As shown in Table 1: MDAQMD Average Daily Construction Emissions, daily uncontrolled emissions will be below all applicable thresholds within the MDAQMD during construction. Therefore, the Project will not result in a considerable net increase of O_3 or PM_{10} during construction.

Table 1: MDAQMD Average Daily Construction Emissions

Construction Year	Average Daily Emissions (pounds per day)						
	CO_2e	CO	NO_x	Reactive Organic Gas (ROG)	SO_x	PM_{10}	$PM_{2.5}$
Uncontrolled Emissions							
2026	2,066	7	7	0.8	<0.1	6	0.9
Threshold	548,000	548	137	137	137	82	65
Exceeded?	No	No	No	No	No	No	No

Source: MDAQMD 2020
Note: O_3 forms as a result of chemical reactions between NO_x, VOCs, heat, and sunlight. As a result, if emissions do not exceed thresholds for NO_x or VOCs, then emissions will not exceed thresholds for O_3.

Operation of the Project is anticipated to generate 1,594 total daily trips. Table 2: MDAQMD Average Annual Operational Emissions presents the estimated annual uncontrolled emissions in the MDAQMD that will result from the total daily trips generated by operation of the Project. As shown in Table 2: MDAQMD Average Annual Operational Emissions, annual uncontrolled emissions will be below all applicable thresholds within the MDAQMD during operation. Therefore, the Project will not result in a considerable net increase of O_3 or PM_{10} during operation.

Table 2: MDAQMD Average Annual Operational Emissions

	Annual Emissions (tons per year)						
	CO_2e	CO	NO_x	ROG	SO_x	PM_{10}	$PM_{2.5}$
Uncontrolled Emissions							
Operations	4,070	32	4	10	<0.1	3	0.8
Threshold	100,000	100	25	25	25	15	12
Exceeded?	No	No	No	No	No	No	No

Source: MDAQMD 2020
Note: O_3 forms as a result of chemical reactions between NO_x, VOCs, heat, and sunlight. As a result, if emissions do not exceed thresholds for NO_x or VOCs, then emissions will not exceed thresholds for O_3.

Because the Project will not exceed applicable MDAQMD thresholds for O_3 or PM_{10} during construction or operation, the Project will not result in a cumulatively considerable net increase of any CAPs for which the Project region is classified as nonattainment for under NAAQS or CAAQS. As a result, impacts will be less than significant.

c) Would the project expose sensitive receptors to substantial pollutant concentrations?

Less-than-Significant Impact. As defined by MDAQMD, residences, schools, daycare centers, playgrounds, and medical facilities are considered sensitive receptor land uses. The MDAQMD has established that a gasoline-dispensing facility within 300 feet of sensitive receptors exposes sensitive receptors to substantial pollutant concentrations (MDAQMD 2020). The nearest sensitive receptors to the Project are the residences approximately 0.3 mile (1,700 feet) east of the Project on Mesa Linda Street. Therefore, the Project will not expose sensitive receptors to substantial pollutant concentrations. In addition, as detailed in Table 1: MDAQMD Average Daily Construction Emissions and Table 2: MDAQMD Average Annual Operational Emissions, all construction and operation emissions will be below applicable MDAQMD significance thresholds. As a result, the Project will not expose sensitive receptors to substantial pollutant concentrations, and impacts will be less than significant.

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

Less-than-Significant Impact. The occurrence and severity of odor impacts depend on numerous factors, including the nature, frequency, and intensity of the source; wind speed and direction; and the presence of sensitive receptors. While offensive odors rarely cause any physical harm, they still can be very unpleasant, leading to considerable distress and often generating citizen complaints to local governments and regulatory agencies. During construction, odor emissions could be generated by diesel-powered construction equipment and vehicles. Such odors will be short-term and limited to the immediate vicinity of the activity. These emissions will be temporary in nature and disperse quickly. Operation of the Project may result in gasoline odors from the long-term handling and storage of gasoline, vehicle tail pipe odors, food odors from the convenience store, and cleaning product odors from the car wash. As discussed previously, the nearest sensitive receptors to the Project are the residences approximately 0.3 mile (1,700 feet) east of the Project on Mesa Linda Street. Because the Project is located more than 1,500 feet from people residing near the Project, temporary Project construction activities and permanent operational activities are not expected to result in odors or emissions that will adversely affect a substantial number of people. Therefore, the Project will not result in other emissions (such as those leading to odors) that will adversely affect a substantial number of people. As a result, impacts will be less than significant

4.4 BIOLOGICAL RESOURCES

Would the project:	Potentially Significant Impact	Less-than-Significant Impact with Mitigation Incorporated	Less-than-Significant Impact	No Impact
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 Wildlife or U.S. Fish and Wildlife Service?		✓		
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 Wildlife or U.S. Fish and Wildlife Service?				✓
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?				✓
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?			✓	
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?		✓		
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?				✓

4.4.1 Discussion

a) Would the project 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 Wildlife or U.S. Fish and Wildlife Service?

Less-than-Significant Impact with Mitigation Incorporated. Caskey Biological Consulting, LLC (Caskey) prepared a Biological Resources Assessment (BRA) for Hesperia Phelan CUP24-00012 (Project), which is provided in Attachment B: Biological Resources Assessment. As part of the BRA, Caskey performed a field survey on December 19, 2024 and a subsequent field survey of the proposed sewer line location and potential access road location on April 22, 2025. The vegetation communities observed within the Study Area[3] were cheatgrass – medusahead grassland, which covers approximately 71 percent of the Study Area, and California buckwheat scrub, which covers approximately 13 percent of the Study Area. Dominant species in the cheatgrass – medusahead grassland vegetation community included cheatgrass (*Bromus tectorum*) and sparse native plants, such as western Joshua tree (*Yucca brevifolia*), rabbitbrush (*Ericameria nauseosa*), and bladderpod (*Cleomella arborea*). Dominant species in the California buckwheat scrub vegetation community included California buckwheat (*Eriogonum fasciculatum*) and deerweed (*Acmispon glaber*), as well as sparse non-natives, such as cheatgrass and star thistle (*Centaurea solstitalis*). The remaining approximately 16 percent of land cover within the Study Area was developed or disturbed land.

Special-Status Plant Species

Based on results of the field survey and a review of the California Department of Fish and Wildlife (CDFW) California Natural Diversity Database (CNDDB) and California Native Plant Society Online Inventory of Rare and Endangered Plants, western Joshua tree is the only special-status plant species that is present and has the potential to occur at the Project. Western Joshua tree, which is protected under the Western Joshua Tree Conservation Act, is a 5- to 20-meter-tall, evergreen, tree-like plant that occurs in desert grasslands and shrublands in hot, dry sites on flats, mesas, bajadas, and gentle slopes in the Mojave Desert on soils that are typically silts, loams, and/or sands that are fine, loose, or well-drained. As summarized in the BRA, 55 western Joshua trees were assessed within the BRA's Study Area. Of the 55 western Joshua trees assessed, 30 are within the footprint of the Project site. The remaining 25 trees are outside of the Project site and proposed sewer line location and are not anticipated to be impacted. Of the 30 western Joshua trees within the Project site, 28 are in good to excellent health, while two are in poor health or dead. Of the 30 western Joshua trees within the Project site, eight are in Size Class A, 21 are in Size Class B, and one is in Size Class C.[4] The Project will require the entire 2.66-acre Project site to be graded, which will result in impacts to all of the western Joshua trees present on the Project site.

Because impacts to western Joshua tree are anticipated, Au Energy, LLC (Au Energy) will consult with the CDFW prior to Project construction. In accordance with the Western Joshua Tree Conservation Act and mitigation measure (MM) BIO-1, Au Energy will apply for an

[3] The Study Area measures approximately 6.83 acres and includes the Project site, the proposed sewer line location, the potential access road location, and a 50-foot buffer.

[4] Size classes influence the number of western Joshua trees that will need to be relocated. Size classes are as follows:

- Class A – Less than 1 meter in height;
- Class B – 1 meter or greater but less than 5 meters in height; and
- Class C – 5 meters or greater in height.

incidental take permit (ITP) and submit it to the CDFW for review and approval prior to Project construction. As part of the western Joshua tree ITP, Au Energy will propose relocating select western Joshua trees that will be impacted by Project activities in accordance with CDFW's Western Joshua Tree Relocation Guidelines and Protocols (CDFW 2024a). Western Joshua trees may be relocated within the Project site to perimeter landscaping areas or to an off-site location identified during consultation with the CDFW. Given the number of western Joshua trees located on the Project site, relocating all of the western Joshua trees that will be impacted during construction may be infeasible. Therefore, some western Joshua trees may be destroyed. The final number of western Joshua trees to be relocated or destroyed and any additional (MMs will be determined during the ITP process in consultation with the CDFW. Therefore, impacts to western Joshua trees will be reduced through MM BIO-1 and the implementation of MMs, such as western Joshua tree relocation, included in the western Joshua tree ITP.

Special-Status Wildlife Species

Based on results of the field survey and a review of the CNDDB and the United States (U.S.) Fish and Wildlife Service (USFWS) Information for Planning and Consultation system, the following five special-status wildlife species have the potential to occur at the Project site:

- burrowing owl (*Athene cunicularia*) – California Endangered Species Act (CESA) candidate endangered;
- desert tortoise (*Gopherus agassizii*) – Federal Endangered Species Act (FESA) threatened, CESA threatened;
- loggerhead shrike (*Lanius ludovicianus*) – CDFW Species of Special Concern;
- Mohave ground squirrel (*Xerospermophilus mohavensis*) – CESA threatened; and
- monarch butterfly (*Danaus plexippus*) – FESA proposed threatened.

Burrowing Owl

Burrowing owls utilize existing burrows from small mammals, such as ground squirrels, for their nesting and cover sites. Two observations of burrowing owl as recent as 2006 were recorded in the CNDDB approximately 2.9 miles east of the Project site; however, no suitable burrows or signs of burrowing owl (e.g., pellets or whitewash) were observed within the Project site. Given the lack of burrowing owl observations and suitable burrows, this species is unlikely to occur at the Project site and no impact to this species is anticipated to occur. Although suitable burrows for burrowing owl were not observed at the Project site, two pre-construction burrow surveys will be completed prior to ground-disturbing activities to confirm the absence of burrowing owl from the Project work area in accordance with MM BIO-2. MM BIO-2 will require one pre-construction burrow survey to be completed no more than 14 days prior to ground-disturbing activities, and a second pre-construction burrow survey to be completed within 24 hours of ground-disturbing activities. A qualified biologist will identify, flag, and map all burrows and dens potentially occupied by burrowing owl and then confirm occupation of all potential burrows for buffers and avoidance. In accordance with MM BIO-3, if occupied burrows are identified, a qualified biologist will establish adequate buffers around the burrows based on field conditions and the CDFW Staff Report on Burrowing Owl Mitigation (2012). If occupied burrows cannot be avoided, the CDFW will be consulted, and a burrowing owl-specific mortality reduction or avoidance plan will be developed in accordance with MM BIO-3.

Desert Tortoise

Desert tortoises inhabit a variety of habitats, including desert washes, desert flats, bajadas, alluvial fans, rolling hills, rocky hills, and valleys. Throughout most of the Mojave and Colorado deserts, desert tortoises are found most often on gentle slopes with sandy gravel soils. Soils must be soft enough for digging burrows, but firm enough so that they do not collapse. The soils on the Project site were very compact and are likely too firm for burrow construction. One desert tortoise observation from 2000 was recorded in the CNDDB approximately 2 miles south of the Project site. No desert tortoise or signs of desert tortoise (e.g., burrows, scats, or carcasses) were observed during the field surveys; however, the December field survey was conducted outside of the desert tortoise active months (i.e., March to June and September to October). Given the lack of suitable burrowing habitat and observations of desert tortoise sign, this species is unlikely to occur at the Project site and no impact to this species will occur.

Loggerhead Shrike

Loggerhead shrike inhabits savannah; pinyon-juniper; Joshua tree and riparian woodlands; and desert oases, scrub, and washes. One loggerhead shrike observation as recent as 2007 was recorded in the CNDDB approximately 1.9 miles north of the Project site; however, loggerhead shrike was not observed during the field survey. This species is likely to occur given suitable nesting and foraging habitat within the Project site. The Project will cause the permanent loss of approximately 2.66 acres of suitable nesting and foraging habitat for this species; however, MM BIO-4 will be implemented during construction to reduce impacts to nesting loggerhead shrike. MM BIO-4 will require a pre-construction nesting bird survey prior to vegetation removal or relocation activities between the nesting bird season (i.e., February 15 through August 31). If an active bird nest that may be impacted by Project-related activities is observed, avoidance and minimization measures (AMMs), including delaying construction within the immediate vicinity of the active nest or establishing a nest buffer determined by a qualified biologist until the young have fledged or the nest has failed, will be implemented. Therefore, the incorporation of MM BIO-4 will avoid or minimize potential impacts to loggerhead shrike.

Mohave Ground Squirrel

Mohave ground squirrels prefer habitats in open desert scrub, alkali desert scrub, western Joshua tree woodlands, and annual grasslands. The species prefers sandy to gravelly soils and utilizes burrows at the base of shrubs. The Project site lacked suitable burrows for Mohave ground squirrel and this species was not observed during the field surveys; however, the December survey was conducted outside of the active season for the species (i.e., March to June). One Mohave ground squirrel observation as recent as 2005 was recorded in the CNDDB approximately 1.5 miles north of the Project site. Given the lack of species observations and suitable burrows documented at the Project site, Mohave ground squirrel is unlikely to occur at the Project site and no impact to this species will occur.

Monarch Butterfly

Monarch butterflies have a wide range of habitat types, including prairies, meadows, and grasslands, as well as populated areas such as parks, neighborhoods, and back yards. The field survey was conducted outside of the typical growing and blooming season for milkweed (*Asclepias* spp.) (i.e., May to August), which is the host plant for monarchs. As a result, no

milkweed plants were observed within the Project site. However, other shrubs that could provide nectar to monarchs were observed. The Project is not within the overwintering range for monarch butterflies and, as a result, monarch butterfly roosting is unlikely at the Project site. No CNDDB records of monarch butterfly occur within 3 miles of the Project site and no species observations were made during the field survey. Given the lack of species observations and the low potential for monarch butterflies to roost at the Project site, this species is unlikely to occur at the Project site and no impact to this species will occur.

With the implementation of MM BIO-1, MM BIO-2, MM BIO-3, and MM BIO-4, the Project will not 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 CDFW or USFWS. As a result, the impact will be less than significant with mitigation incorporated.

b) Would the project 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 Wildlife or U.S. Fish and Wildlife Service?

No Impact. According to the CNDDB search, which had a 3-mile radius, no riparian habitat or sensitive natural communities are documented within the vicinity of the Project. Likewise, no riparian habitat or sensitive natural communities were observed within the Project site during the field survey. As a result, no impact will occur.

c) Would the project 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?

No Impact. No federally or state-protected wetlands were observed on the Project site during the field survey. As a result, no impact will occur.

d) Would the project 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. Significant impacts on wildlife movement could occur if a wildlife movement corridor were to be interrupted by a feature that physically blocks wildlife movement (e.g., a roadway) or if suitable habitat that supports wildlife in the movement corridor were to be directly removed during construction or indirectly affected by construction noise or dust. The Project is located adjacent to the intersection of U.S. Highway 395 and Phelan Road, which are existing barriers to potential wildlife movement. The presence of U.S. Highway 395 and Phelan Road make it unlikely that the Project site is functioning as a migratory wildlife corridor. In addition, the Project is not located in a CDFW- or Bureau of Land Management-(BLM-) identified wildlife corridor (CDFW 2014 and BLM 2015). Because the Project site is not located in a CDFW- or BLM-identified wildfire corridor and it is unlikely that the Project site is functioning as a migratory corridor due to adjacent roads, the addition of Project structures is likely to have a minimal impact on wildlife movement, if at all. As a result, the impact will be less than significant.

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

Less-than-Significant Impact with Mitigation Incorporated. Chapter 16.24 of the City of Hesperia's (City's) Municipal Code outlines the provisions for protected plants in the City (City of Hesperia 2025). Pursuant to Chapter 16.24, a removal permit is required for the removal of a western Joshua tree. As discussed previously, Au Energy will apply for an ITP in accordance with the MM BIO-1 and submit it to the CDFW for review and approval prior to Project construction. As part of the ITP, Au Energy will propose relocating select western Joshua trees that will be impacted by Project activities in accordance with the CDFW's Western Joshua Tree Relocation Guidelines and Protocols (CDFW 2024a). All additional MMs included in the western Joshua tree ITP will be implemented during construction of the Project. Insignia Environmental corresponded with the City on February 19, 2025, and confirmed that receipt of the western Joshua tree ITP will satisfy Chapter 16.24 requirements of the City's Municipal Code (Henry 2025). As a result, the Project will not conflict with the City's protected plant ordinance with implementation of MM BIO-1, and impacts will be less than significant with mitigation incorporated.

f) Would the project 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 will be located within the focus area of the Draft Western Joshua Tree Conservation Plan (WJTCP); however, this plan has not been adopted by the California Fish and Game Commission (Commission) (CDFW 2024b). The Draft WJTCP includes western Joshua tree impact AMMs that can be voluntarily adopted by project proponents. As discussed previously, Au Energy will consult with the CDFW and apply for a western Joshua tree ITP. The Western Joshua Tree Conservation Act requires avoidance and minimization of impacts on western Joshua trees to the maximum extent practicable as a condition of obtaining a western Joshua tree ITP (CDFW 2024b). Because the Draft WJTCP may be adopted by the Commission prior to Project construction, AMMs included in the Draft WJTCP will be reviewed and may be included in the western Joshua tree ITP. Through the implementation of MMs included in the western Joshua tree ITP, the Project will minimize impacts to western Joshua tree. Therefore, the Project will be consistent with the Draft WJTCP.

The Project will not be located within, or conflict with, any adopted Habitat Conservation Plan; Natural Community Conservation Plan; or other approved local, regional, or state Habitat Conservation Plan. As a result, no impact will occur.

4.4.2 Mitigation Measures

The following MM will be implemented for the Project to reduce impacts to less-than-significant levels:

- **MM BIO-1: Western Joshua Tree ITP.** Au Energy will apply for a western Joshua tree ITP in accordance with the Western Joshua Tree Conservation Act and submit it to the CDFW for review and approval prior to Project construction.

- **MM BIO-2: Pre-Construction Burrow Surveys.** A qualified biologist will perform one pre-construction burrow survey of the Project work area no more than 14 days prior to ground-disturbing activities, and a second pre-construction burrow survey within 24 hours of ground-disturbing activities. The qualified biologist will identify, flag, and map all burrows potentially occupied by burrowing owl and then confirm occupation of all potential burrows for buffers and avoidance. Methods of determining burrow occupancy may include, but will not be limited to, visual observations of scat or tracks outside burrow entrances, dusting burrow entrances with a tracking medium for a period of 3 days, installing trail cameras for nocturnal observations, small mammal trapping, or a combination of these methods as appropriate. If burrows occupied by burrowing owl are identified, they will be avoided in accordance with MM BIO-3.

- **MM BIO-3: Burrow Avoidance.** If burrows occupied by burrowing owl are found during pre-construction burrow surveys, adequate buffers will be established around burrows. Adequate buffers will be determined by a qualified biologist based on field conditions and the CDFW Staff Report on Burrowing Owl Mitigation (2012). If occupied burrows cannot be avoided, the CDFW will be consulted, and a burrowing owl-specific mortality reduction or avoidance plan will be developed. This plan may include, but will not be limited to the following:

  - Detailed description of trapping methodology,
  - Detailed burrow excavation methods,
  - Release location(s),
  - Detailed release methods,
  - Artificial burrow design and installation methods,
  - Description of exclusion fencing type and implementation, and
  - Identification of a wildlife rehabilitation center or veterinary facility capable of and willing to treat injured burrowing owl.

  Any other construction activities that may impact burrows occupied by burrowing owl (including movement of construction equipment and other activities outside of the fenced/paved areas within wildlife habitat) will be monitored by a qualified biologist. The monitor/inspector will have the authority to stop work activities upon the discovery of burrowing owl sign and allow construction to proceed after the identification and implementation of steps required to avoid or minimize impacts to burrowing owl.

- **MM BIO-4: Nesting Bird Survey.** A pre-construction nesting bird survey will be conducted prior to vegetation removal or relocation activities between the nesting bird season (i.e., February 15 through August 31). If an active bird nest that may be impacted by Project-related activities is observed, AMMs, including delaying construction within the immediate vicinity of the active nest or establishing a nest buffer determined by a qualified biologist until the young have fledged or the nest has failed, will be implemented.

4.5 CULTURAL RESOURCES

Would the project:	Potentially Significant Impact	Less-than-Significant Impact with Mitigation Incorporated	Less-than-Significant Impact	No Impact
a) Cause a substantial adverse change in the significance of a historical resource pursuant to § 15064.5?		✓		
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to § 15064.5?		✓		
c) Disturb any human remains, including those interred outside of dedicated cemeteries?		✓		

4.5.1 Discussion

a) Would the project cause a substantial adverse change in the significance of a historical resource pursuant to § 15064.5?

Less-than-Significant Impact with Mitigation Incorporated. As part of the Initial Study/Mitigated Negative Declaration (IS/MND) previously prepared for Hesperia Phelan CUP24-00012 (Project), an Archaeological Survey Report was completed in November 2017 and is included as Attachment C: Archaeological Survey Report. The Archaeological Survey Report covered an Area of Potential Impacts (API), which was defined as the approximately 6.5-acre site originally included as part of the IS/MND previously prepared for the Project in 2018. Because the Project is in the same location as the previously proposed Project, the scope of the Project has been reduced, and the Project site has remained undeveloped/unmodified since the Archaeological Survey Report, the API and findings from the report are applicable to the current Project.

The Archaeological Survey Report included a records search of all previously recorded cultural resources within the Project site and a 0.5-mile radius around it, as well as previously conducted cultural resource studies. In addition, the report included a field survey in which the archaeologist examined exposed ground surface for artifacts (e.g., flaked stone tools, toolmaking debris, milling tools, and ceramics), ecofacts (e.g., marine shell and bone), soil discoloration that might indicate the presence of a cultural midden, and features indicative of the former presence of structures or buildings (e.g., standing exterior walls, postholes, and foundations) or historic debris (e.g., metal, glass, and ceramics).

Based on the results of the cultural resources record search and intensive pedestrian survey, three isolated historical resources were found within the API. The isolated historical resources are not eligible to be listed with the California Register of Historical Resources (CRHR) and are not deemed historically significant resources. Furthermore, no prehistoric resources were found

during the field survey. The Archaeological Survey Report concluded that no impacts to cultural resources are expected to occur and no further work for cultural resources is needed.

Although not anticipated, unknown historical resources could be destroyed by construction activities involving ground disturbance should they be present. As a result, Mitigation Measure (MM) CUL-1 will be implemented during Project construction. In the event that a cultural resource is discovered during Project construction, all work within a 60-foot buffer of the find will cease, and a qualified archaeologist meeting United States (U.S.) Secretary of Interior (SOI) standards will assess the find. Work on the other portions of the Project outside of the buffered area may continue during this assessment period. Additionally, the Yuhaaviatam of San Manuel Nation Cultural Resources Department (YSMN) will be contacted regarding any pre-contact finds and be provided information after the archaeologist makes his/her initial assessment of the nature of the find, so as to provide Tribal input with regards to significance and treatment. In accordance with MM CUL-2, if significant pre-contact cultural resources, as defined by the California Environmental Quality Act (CEQA) (as amended, 2015), are discovered and avoidance cannot be ensured, the archaeologist will develop a Monitoring and Treatment Plan, the drafts of which shall be provided to YSMN for review and comment. The archaeologist will monitor the remainder of the Project and implement the Monitoring and Treatment Plan accordingly.

With the implementation of MM CUL-1 and MM CUL-2, no substantial adverse changes related to a historical resource are anticipated and the impact to historical resources (as defined in Public Resource Code [PRC] Section 15064.5) will be less than significant with mitigation incorporated.

b) Would the project cause a substantial adverse change in the significance of an archaeological resource pursuant to § 15064.5?

Less-than-Significant Impact with Mitigation Incorporated. As discussed previously, the Archaeological Survey Report concluded that no impacts to cultural resources are expected to occur and no further work for cultural resources is needed. In addition, MM CUL-1 will be implemented during Project construction. With implementation of MM CUL-1, no substantial adverse changes related to an archaeological resource are anticipated and the impact to archaeological resources (as defined in PRC Section 15064.5) will be less than significant with mitigation incorporated.

c) Would the project disturb any human remains, including those interred outside of dedicated cemeteries?

Less-than-Significant Impact with Mitigation Incorporated. The Archaeological Survey Report did not identify human remains within the API. It is not always possible to predict where Native American human remains might occur outside of formal cemeteries. Therefore, it is possible that human remains could be uncovered during ground-disturbing activities. In accordance with MM CUL-3, and if human remains are inadvertently discovered during construction activities, all work within a 100-foot buffer of the find will cease and the San Bernardino County coroner will then be contacted in accordance with California Health and Safety Code (HSC) Section 7050.5. This procedure will ensure that the remains are treated in

accordance with California HSC Section 7050.5; and the impact to human remains during construction will be reduced to less than significant with mitigation incorporated.

4.5.2 Mitigation Measures

The following MMs will be implemented for the Project to reduce impacts to less-than-significant levels:

- **MM CUL-1: Inadvertent Cultural Resource Discoveries.** In the event that cultural resources are discovered during Project activities, all work in the immediate vicinity of the find (within a 60-foot buffer) will cease and a qualified archaeologist meeting SOI standards will be hired to assess the find. Work on the other portions of the Project outside of the buffered area may continue during this assessment period. Additionally, the YSMN will be contacted, as detailed within MM TCR-1, regarding any pre-contact finds and be provided information after the archaeologist makes his/her initial assessment of the nature of the find, so as to provide Tribal input with regards to significance and treatment.

- **MM CUL-2: Monitoring and Treatment Plan.** If significant pre-contact cultural resources, as defined by CEQA (as amended, 2015), are discovered and avoidance cannot be ensured, the archaeologist will develop a Monitoring and Treatment Plan, the drafts of which will be provided to YSMN for review and comment, as detailed within MM TCR-1. The archaeologist will monitor the remainder of the Project and implement the Monitoring and Treatment Plan accordingly.

- **MM CUL-3: 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) will cease and the San Bernardino County Coroner will be contacted pursuant to California HSC Section 7050.5 and that code enforced for the duration of the Project.

4.6 ENERGY

Would the project:	Potentially Significant Impact	Less-than-Significant Impact with Mitigation Incorporated	Less-than-Significant Impact	No Impact
a) Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?			✓	
b) Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?				✓

4.6.1 Discussion

a) Would the project 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 activities associated with Hesperia Phelan CUP24-00012 (Project) will require the short-term consumption of fossil fuel resources (e.g., diesel fuel and gasoline) to power construction equipment and motor vehicles. During construction, power will be provided by a temporary power meter installed by Southern California Edison. Construction will be short term and temporary; and the use of fuel will be necessary, efficient, and conservative in nature.

Based on the California Emissions Estimator Model (CalEEMod) calculations for the Project's land use type, included as Attachment 4.2 A: CalEEMod: Hesperia Phelan Detailed Report in Section 4.3 Air Quality, the estimated electricity consumption will be 254,438 kilowatt-hours per year (kWh/year), and the estimated natural gas consumption will be 133,065 thousand British Thermal Units per year (MBtu/year). However, because the Project will comply with California Building Code (CBC) Title 24 efficiency standards, the Project's estimated energy use is reduced to 89,305 kWh/year of electricity consumption and 26,540 MBtu/year of natural gas consumption. Further, through the permitting process with the City of Hesperia (City), the Project will be designed and operated in accordance with all appropriate state and local regulations governing energy efficiency, including the City's Municipal Code, Part 11 of the CBC, and Commercial Design Standards and Guidelines found in the City's Main Street and Freeway Corridor Specific Plan. Because the Project will comply with all local and state regulations concerning energy efficiency during construction and operations, energy consumption will not be wasteful, inefficient, or unnecessary. As a result, the impact will be less than significant.

b) Would the project conflict with or obstruct a state or local plan for renewable energy or energy efficiency?

No Impact. The Project will not obstruct a state or local plan for renewable energy or energy efficiency. As stated previously, the Project will adhere to the City's Municipal Code, Part 11 of the CBC, and Commercial Design Standards and Guidelines found in the City's Main Street and Freeway Corridor Specific Plan. These standards and guidelines include design measures aimed at promoting energy efficiency, including mandatory requirements for lighting controls, electric vehicle charging stations, and space-conditioning equipment. Because the Project will be constructed consistently with the CBC and City's design standards, the Project will not conflict with or obstruct a state or local plan for renewable energy or energy efficiency. As a result, no impact will occur.

4.7 GEOLOGY AND SOILS

Would the project:	Potentially Significant Impact	Less-than-Significant Impact with Mitigation Incorporated	Less-than-Significant Impact	No Impact
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?			✓	
iii) Seismic-related ground failure, including liquefaction?			✓	
iv) Landslides?			✓	
b) Result in substantial soil erosion or the 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?				✓
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?				✓
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?				✓
f) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?		✓		

4.7.1 Discussion

a) Would the project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving 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; strong seismic ground shaking; seismic-related ground failure, including liquefaction; or landslides?

Less-than-Significant Impact. As summarized in Table 3: Faults Located within 10 Miles of the Project, two faults are located within 10 miles of Hesperia Phelan CUP24-00012 (Project). The boundary of an earthquake fault zone is generally 500 feet from major active faults, and 200 to 300 feet from well-defined minor faults (City of Hesperia [City] 2010). The Project will not be located on or within 500 feet of any fault. In addition, the Project will not be located in any liquefaction or landslide zones identified by the California Department of Conservation (California DOC 2024). As a result, liquefaction and landslides have a low potential to occur at the Project site.

Table 3: Faults Located within 10 Miles of the Project

Fault Name	Fault Section	Fault Type	Age of Last Known Slip	Slip Rate (millimeter/year)	Approximate Distance and Direction from the Project (miles, direction)
Cleghorn Fault	Southern Cleghorn	Left lateral, strike-slip	Late Quaternary (less than 130,000 years ago)	Between 1.0 and 5.0	7.35, south
Cleghorn Fault	Northern Cleghorn	Left lateral, strike-slip	Late Quaternary (less than 130,000 years ago)	Between 0.2 and 1.0	9.18, south

Source: United States (U.S.) Geological Survey (USGS) 2022

Although the Project will introduce structures occupied by employees and customers, all Project structures will be constructed in compliance with Title 24, Part 2 of the California Building Code (CBC) and Chapter 16 of the International Building Code (IBC), which provide requirements for general structural design and includes means for determining earthquake loads based on the American Society of Civil Engineers/Structural Engineering Institute Standards. In addition, Hilltop Geotechnical, Inc. (HGI) prepared a geotechnical study and infiltration feasibility study for the Project. Recommendations from both studies will be incorporated into the Project design to ensure that all structures will adequately resist the forces of an earthquake. The geotechnical study and infiltration feasibility study are provided in Attachment D: Geotechnical Study and Attachment E: Infiltration Feasibility Study. As a result, Project structures will be able to withstand reasonably foreseeable seismic events. Incorporation of these standard engineering practices will ensure that people or structures will not be exposed to hazards associated with strong seismic ground shaking, and the impact will be less than significant.

b) Would the project result in substantial soil erosion or the loss of topsoil?

Less-than-Significant Impact. The Project site is undeveloped and slopes gradually upwards from northeast to southwest with an approximate slope of 3 percent. The Project will be located on soil classified as Cajon Sand, which is in hydrologic soil group A (U.S. Department of Agriculture [USDA] 2025). Hydrologic soil group A has the lowest runoff potential and typically consists of deep, well-drained to excessively drained sands or gravels (USDA 2002). In addition, the Project will be in a location with a soil erodibility factor of 0.08 (Esri 2023). Soils with low soil erodibility factors (between 0.05 and 0.15) are not considered susceptible to soil erosion (State Water Resources Control Board [SWRCB] 2025). As a result, the Project will not be located on soils that are susceptible to soil erosion.

Project construction will include grading the entire approximately 2.66-acre Project site. Ground-disturbing activities will expose soil to erosion by removing the vegetative cover and potentially compromising the soil structure. Rain and wind can further detach soil particles and transport them off site. However, the Project will receive coverage for disturbing more than 1 acre of soil under an SWRCB General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities, 2022-0057-DWQ (Construction General Permit). This Construction General Permit will require preparation of a Project-specific Storm Water Pollution Prevention Plan (SWPPP) to be authorized by the SWRCB, which will include erosion-reducing measures and site stabilization procedures. In accordance with Section 8.30.210 of the City's Municipal Code, the Project-specific SWPPP will be provided to the City for review and approval prior to the issuance of grading and building permits. Therefore, with implementation of the Project-specific SWPPP, construction of the Project will result in a less-than-significant impact to soil erosion.

Since the Project will require approximately 2.66 acres of grading, approximately 2.66 acres of topsoil will be lost. As discussed in Section 4.2 Agriculture, the Project is located on land designated as Grazing Land and is not located on land designated as Prime Farmland, Unique Farmland, or Farmland of Statewide Importance. Since the Project is not located on land productive for agriculture, the loss of topsoil is negligible. Although the Project will result in 2.66 acres of permanent topsoil loss, approximately 31 percent of the Project site will consist of landscaping, which exceeds the 10-percent minimum designated for the Neighborhood Commercial zone where the Project will be located (City of Hesperia 2008). Because the Project will not cause the loss of topsoil productive for agriculture, the Project's impact on topsoil loss will be less than significant.

To mitigate the addition of approximately 1.88 acres of impervious surface proposed by the Project, which can inhibit the infiltration of storm water, the proposed on-site storm drain system will connect to an underground retention facility located east of the proposed fueling station to retain any additional storm water runoff and discharge through a new proposed storm drain to Phelan Road. The underground retention facility will be capable of retaining storm water flows from a 100-year storm event. Consequently, this Project will not increase the amount of drainage impacting downstream properties; therefore, post-construction storm water drainage will be consistent with pre-construction conditions. In addition and in accordance with Section 8.30.230 of the City's Municipal Code, a Water Quality Management Plan (WQMP) will be provided to the City for review and approval prior to the issuance of grading and building permits. The

WQMP will include all required and proposed measures for site design, source control, runoff reduction, storm water treatment, baseline hydromodification management, and low-impact development techniques as applicable. Therefore, with implementation of the proposed storm drain system and WQMP, the Project will reduce the impact associated with runoff to less than significant.

c) Would the project 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?

No Impact. The Project will be located on the Quaternary older alluvium (Qoa) geologic unit (Dibblee 1965). As discussed previously, the Project will not be located in an area susceptible to liquefaction or landslides (California DOC 2024) or on soil susceptible to erosion (U.S. Department of Agriculture [USDA] 2023). In addition, the Project will not be located on soil susceptible to subsidence (USDA 2024), and all Project structures will be constructed in compliance with Title 24, Part 2 of the CBC, the IBC, and the City's Municipal Code. As discussed previously, recommendations from HGI's geotechnical study and infiltration feasibility study will be incorporated into the Project design to ensure all Project structures will be stable.

Because the Project will not be located in an area susceptible to landslides, liquefaction, erosion, or subsidence and Project structures will be compliant with the CBC, IBC, and City's Municipal Code, the Project will not cause on- or off-site landslides, lateral spreading, subsidence, liquefaction, or collapse. As a result, the Project will not be located on a geologic unit or soil that is unstable or will become unstable, and the no impact will occur.

d) Would the project 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?

No Impact. As discussed previously, the Project will be located on soil classified as Cajon Sand, which is in hydrologic soil group A. Hydrologic soil group A has the lowest runoff potential and typically consists of deep, well-drained to excessively drained sands or gravels (USDA 2002). Sand and gravel units typically have a low expansion potential (City of Hesperia 2010). As a result, the Project will not be located on expansive soils.

As discussed previously, all Project structures will be constructed in compliance with Title 24, Part 2 of the CBC, IBC, and City's Municipal Code. In addition, As discussed previously, recommendations from HGI's geotechnical study and infiltration feasibility study will be incorporated to ensure all Project structures will be stable.

Because the Project will not be located on expansive soil and Project structures will be compliant with the CBC, IBC, and City's Municipal Code, the Project will not create a substantial risk to life or property. As a result, no impact will occur.

e) Would the project 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 Project does not include the use or installation of a septic tank or alternative wastewater disposal system. The Project will connect to an existing sewer system. As a result, no impact will occur.

f) Would the project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

Less-than-Significant Impact with Mitigation Incorporated. Central and eastern San Bernardino County has rich paleontological resources, particularly near the eastern side of the county. The Project will be located in the southwestern quadrant of San Bernardino County, north of the Peninsular Ranges Geomorphic Province and at the southern cusp of the Mojave Desert (Norris and Webb 1990). This location is a broad basin characterized by widespread alluvial deposits from the mountains to the south and west, primarily of late Pleistocene age. The Project will be located on the Quaternary older alluvium (Qoa) geologic unit (Dibblee 1965). The surrounding area is composed of Younger alluvium (Q) underlain by Quaternary older alluvium (Qoa) and Pleistocene-Pliocene Nonmarine Sediments (QPc) (San Bernardino County 2018).

Intact paleontological resources are not expected to be present in the younger alluvial units across the southwestern valley floor in the upper layers, but could potentially be encountered in the older Pleistocene alluvium at depths of 50 feet. Because the excavation activities associated with the Project will not exceed 15 feet below ground surface, there is a low to moderate potential to encounter intact paleontological resources during construction. To reduce potential impacts to paleontological resources, Mitigation Measure (MM) PALEO-1 will be implemented. In accordance with MM PALEO-1, if a fossil discovery is made during excavation, all work within a 60-foot buffer of the find will be halted, and a qualified paleontologist will assess the find. If the fossils are determined to be potentially significant, the paleontologist will recover them by following standard field procedures for collecting paleontological resources. All significant fossils collected will be prepared in a properly equipped laboratory and delivered to an accredited museum or repository no later than 30 days after all laboratory work is completed. With the implementation of MM PALEO-1, the impact on paleontological resources will be less than significant with mitigation incorporated.

4.7.2 Mitigation Measures

The following MM will be implemented for the Project to reduce impacts to less-than-significant levels:

- **MM PALEO-1: Inadvertent Paleontological Resource Discoveries.** If a fossil discovery is made during excavation, all work within a 60-foot buffer of the find will be halted, and a qualified paleontologist will assess the find. If the fossils are determined to be potentially significant, the paleontologist will recover them by following standard field procedures for collecting paleontological resources. Typically, fossils can be safely salvaged quickly by a single paleontologist and not disrupt construction activity. In some cases, larger fossils (e.g., skeletons or large mammal fossils) require more extensive

excavation and longer salvage periods. In this case, the paleontologist will have the authority to temporarily direct, divert, or halt construction activity to ensure that the fossils can be removed in a safe and timely manner. All significant fossils collected will be prepared in a properly equipped laboratory to a point ready for curation. During preparation and inventory, the fossil specimens will be identified to the lowest taxonomic level practical prior to curation at an accredited repository (usually a museum). The fossil specimens will be delivered to an accredited museum or repository no later than 30 days after all laboratory work is completed. The cost of curation will be assessed by the repository and will be the responsibility of Au Energy, LLC.

4.8 GREENHOUSE GAS EMISSIONS

Would the project:	Potentially Significant Impact	Less-than-Significant Impact with Mitigation Incorporated	Less-than-Significant Impact	No Impact
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?			✓	
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?			✓	

4.8.1 Discussion

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

Less-than-Significant Impact. Hesperia Phelan CUP24-00012 (Project) emissions were calculated using the California Emissions Estimator Model (CalEEMod). Attachment 4.2-A: CalEEMod: Hesperia Phelan Detailed Report in Section 4.3 Air Quality details the inputs and results of the CalEEMod completed for the Project.

Construction of the Project will generate temporary greenhouse gas (GHG) emissions primarily as a result of the operation of construction equipment on site, as well as from vehicles transporting construction workers to and from the work areas, water trucks, and heavy trucks to transport materials to and from the work areas. Calculations of carbon dioxide (CO_2) emissions are provided to identify the magnitude of potential Project effects. As summarized in Table 4: Average Daily Construction GHG Emissions, Project construction activities, including the use of on-site construction equipment (e.g., excavators, bulldozers, graders, and other construction equipment) and off-site vehicle trips (e.g., worker commute trips, haul trips, and other on-road vehicles), will generate approximately 2,066 pounds of CO_2 equivalent (CO_2e)[5] per day in 2026, which will not exceed the Mojave Desert Air Quality Management District- (MDAQMD-) wide threshold of 548,000 pounds per day. Therefore, construction will not generate a quantity of GHG emissions that will potentially have a significant impact on the environment.

The Project will also include long-term energy consumption on site to support the car wash, gas station, and convenience store operations. In addition, the Project is anticipated to generate 1,594 total daily trips. Operation of the Project and the increased vehicular trips associated with customers will cause an increase in GHG emissions in the Project area. However, as summarized in Table 5: Average Annual Operational GHG Emissions, annual GHG emissions associated

[5] CO_2e is a measure used to compare the effect of emissions of various GHGs based on their global warming potential projected over a specified time period (generally 100 years).

with operation of the Project will not exceed the MDAQMD-wide threshold of 100,000 tons per year.

Table 4: Average Daily Construction GHG Emissions

Construction Year	Estimated CO_2e Emissions (pounds/day)
2026	2,066
MDAQMD Threshold	548,000
Exceeded?	No

Source: MDAQMD 2020

Table 5: Average Annual Operational GHG Emissions

	Annual Emissions (tons per year)
Operations	4,070
MDAQMD Threshold	100,000
Exceeded?	No

Source: MDAQMD 2020

Because the Project will not exceed applicable MDAQMD thresholds for CO_2e during construction or operation, the Project will not result in the generation of GHG emissions that may have a significant impact on the environment. As a result, impacts will be less than significant.

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

Less-than-Significant Impact. California's key initiative for reducing GHG emissions is Assembly Bill (AB) 32, passed by the state legislature on August 31, 2006. This effort set a target to reduce GHG emissions to 1990 levels by 2020. AB 32 requires the California Air Resources Board (CARB) to prepare a Scoping Plan that outlines the main state strategies for meeting the 2020 deadline and to reduce GHGs that contribute to global climate change. CARB's 2022 Scoping Plan was approved in December 2022 and lays out a path to achieve targets for carbon neutrality and reduce GHG emissions by 85 percent below 1990 levels no later than 2045 (CARB 2022).

In response to AB 32, the City of Hesperia (City) prepared a Climate Action Plan (CAP) (City 2010) and the San Bernardino Council of Governments (SBCOG) developed the San Bernardino County Regional Greenhouse Gas Reduction Plan (Reduction Plan) (SBCOG 2021). Since the CAP and Reduction Plan were developed in support of AB 32, a project that is consistent with the CAP and Reduction Plan will be consistent with AB 32. As stated in the Reduction Plan, the City has adopted a goal to reduce its community GHG emissions to 40 percent below its 2020 level of GHG emissions by 2030 (SBCOG 2021). To achieve this, the City's CAP includes numerous climate action strategies, such as energy efficiency, water conservation and reuse, and

waste reduction standards, with corresponding implementation policies from the City's General Plan. As part of the City's implementation of the CAP, the City enforces the California Building Code (CBC), which contains energy efficiency standards for new developments in Part 11 of the California Green Building Standards Code. The Project will be constructed and designed consistent with the CBC, City's Municipal Code, and Commercial Design Standards and Guidelines found in the City's Main Street and Freeway Corridor Specific Plan. These standards and guidelines include design measures aimed at reducing GHG emissions, including mandatory requirements for lighting controls, electric vehicle charging stations, and space-conditioning equipment. Since the Project will be constructed consistent with the CBC and the City's design standards, the Project will include features that reduce GHG emissions.

The MDAQMD has established that a project does not conflict with an air attainment or maintenance plan if it is consistent with the existing land use plan (MDAQMD 2020). As discussed in Section 4.11 Land Use and Planning, the Project is consistent with the City-designated Neighborhood Commercial zone in which it is proposed. In addition, as shown in Table 4: Average Daily Construction GHG Emissions and Table 5: Average Annual Operational GHG Emissions, the Project will not exceed MDAQMD GHG emission thresholds. Therefore, the Project will not conflict with the MDAQMD conformity guidelines for GHG emissions.

Since the Project will be constructed in accordance with the CBC and City's design standards, which include measures that reduce GHG emissions, and will be consistent with MDAQMD conformity guidelines, the Project will not conflict with California's AB 32, the City's CAP, or the SBCOG's Reduction Plan. As a result, impacts will be less than significant.

4.9 HAZARDS AND HAZARDOUS MATERIALS

Would the project:	Potentially Significant Impact	Less-than-Significant Impact with Mitigation Incorporated	Less-than-Significant Impact	No Impact
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?			✓	
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?			✓	
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within 0.25 mile of an existing or proposed school?				✓
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code § 65962.5 and, as a result, would it create a significant hazard to the public or the environment?				✓
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within 2 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?				✓
f) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?			✓	
g) Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires?			✓	

4.9.1 Discussion

a) Would the project 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 of Hesperia Phelan CUP24-00012 (Project) will require the temporary use of diesel fuel, gasoline, lubrication oil, hydraulic fluid, and chemicals

associated with vehicles and construction activities. In addition, the Project includes the operation of a vehicle fueling station and one 20,000-gallon underground storage tank (UST) and two 10,000-gallon USTs, which have the long-term potential to expose the public and environment to hazardous materials in the event of a release or through the routine use, storage, and transport of gasoline and diesel fuel. If improperly used, transported, stored, or disposed of, such materials have the potential to create a significant hazard to the public or environment.

The California Environmental Protection Agency (CalEPA) has implementation authority for the Unified Hazardous Waste and Hazardous Materials Management Regulatory Program (Unified Program) per California Code of Regulations (CCR) Title 27, Division 1, Subdivision 4, Chapter 1. The Unified Program requires CalEPA to certify local government agencies (i.e., Certified Unified Program Agencies [CUPAs]) to implement Hazardous Materials Business Plans (HMBPs), which aim to prevent or minimize harm to public health and safety and the environment from a release or threatened release of a hazardous material, at the local level. An HMBP includes details on hazardous material inventory, emergency response plans and procedures, and a training program that includes training in safety procedures in the event of a release of threatened release of hazardous material (CalEPA 2025).

The San Bernardino County Fire Protection Department (FPD) is the CUPA for the City of Hesperia (City). In accordance with California Health and Safety Code Division 20, Chapter 6.95 and CCR Title 19, Division 5, Chapter 1, Au Energy, LLC (Au Energy) will prepare and submit an HMBP to the San Bernardino County FPD through the California Environmental Reporting System (CERS) for review and approval prior to Project construction (San Bernardino County FPD 2025). All potentially hazardous materials will be stored, transported, and disposed of in accordance with the HMBP. In addition, since the Project includes the installation and operation of USTs, the Project will be subject to the UST element of the CERS. As a result, the Project's USTs will be annually inspected to verify the UST system is compliant with design and construction standards (San Bernardino County FPD 2025). Further, the USTs will be designed and constructed in accordance with California Health and Safety Code (HSC) Chapter 6.7 and CCR Title 23, Division 3, Chapter 16, which detail the design and construction requirements for new USTs. Therefore, all Project construction and operation activities will be conducted in compliance with the applicable HMBP and UST requirements.

Although the Project includes the routine transport or use of hazardous materials, implementation of the HMBP and UST requirements will reduce the Project's potential to create a significant hazard to the public or the environment to a less-than-significant level.

b) Would the project 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. Exposure and release of existing hazardous materials during construction and operation of the Project has the potential to impact on-site workers, the public, or the environment through direct contact, off-site transport, or improper disposal. However, the Project's vehicle fueling station will be designed and operated in accordance with the California Fire Code and California Mechanical Code (24 CCR 4). These codes contain the dispensing and operational requirements for motor fuel-dispensing facilities that safeguard the public health, safety, and general welfare from the hazards of fire, explosion, or dangerous conditions in new or

existing buildings, structures, and premises (CCR 2022). As mentioned previously, the USTs will be designed and constructed in accordance with California HSC Chapter 6.7 and CCR Title 23, Division 3, Chapter 16, which detail the design and construction requirements for new USTs.

As discussed previously, hazardous materials used for Project construction and operation will be handled in accordance with an HMBP. The HMBP will include best management practices such as maintaining spill kits, avoiding the storage of hazardous materials on or near work areas, and storing hazardous materials within secondary containment. Spill kits will be maintained on site during construction and operation of the Project to minimize the risk of releasing hazardous materials.

Therefore, the Project is not anticipated to 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. As a result, the impact will be less than significant.

c) Would the project emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within 0.25 mile of an existing or proposed school?

No Impact. The Project will not be located within 0.25 mile of an existing or proposed school. The nearest school is Canyon Ridge High School, which is approximately 1.45 miles southeast of the Project. Therefore, the Project will not emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within 0.25 mile of an existing or proposed school. As a result, no impact will occur.

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

No Impact. The Project is not located on or within 1 mile of any United States (U.S.) Environmental Protection Agency (EPA) National Priorities List sites (U.S. EPA 2024), California State Water Resources Control Board (SWRCB) Geotracker sites (SWRCB 2025), California Department of Toxic Substances Control (DTSC) EnviroStor sites (DTSC 2025a), or DTSC Hazardous Waste Tracking System sites (DTSC 2025b). Therefore, no existing hazardous materials have been reported at the Project site and no impact will occur.

e) For a project located within an airport land use plan or, where such a plan has not been adopted, within 2 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?

No Impact. The Project is not located within an airport land use plan or within 2 miles of a public airport or public use airport. The closest airport is the Hesperia Airport, which is located approximately 5.95 miles southeast of the Project. As a result, no impact will occur.

f) Would the project impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?

Less-than-Significant Impact. The City's General Plan Safety Element identifies U.S. Highway 395, which is adjacent to the Project, as a potential evacuation route. As part of the

Project, Au Energy will be applying for a California Department of Transportation (Caltrans) encroachment permit for modifications to U.S. Highway 395 and the intersection of U.S. Highway 395 and Phelan Road. Au Energy is required to prepare a traffic control plan for the encroachment permit, which will be approved by the City and Caltrans prior to Project construction. This plan will reduce the potential for emergency evacuation hazards by notifying landowners, emergency responders, and local agencies of the planned construction activities; requiring construction activities to be coordinated with emergency service providers; and implementing applicable traffic control measures. While short-duration delays could result from construction traffic and temporary lane closures on U.S. Highway 395 and Phelan Road, the Project will not require the full closure of any roads. Emergency vehicles will be allowed access in the event of an emergency. Likewise, temporary lane closures will be opened in the event of an evacuation. Therefore, the Project will not conflict with any adopted emergency response or evacuation plans. As a result, the impact will be less than significant.

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

Less-than-Significant Impact. As detailed further in Section 4.20 Wildfire, the Project will be located approximately 0.37 mile east of a state responsibility area and lands classified as a high fire hazard severity zone (California Board of Forestry and Fire Protection 2024, California Department of Forestry and Fire Protection [CAL FIRE] 2023). However, all Project structures will be constructed in compliance with the California Fire Code (24 CCR 9), which is based on the International Fire Code from the International Code Council and contains consensus standards related to establishing good practices to safeguard the public health, safety, and general welfare from the hazards of fire, explosion, or dangerous conditions in new or existing buildings, structures, and premises (CCR 2022). In addition, the Project's convenience store, car wash, and vehicle fueling station will be constructed and designed to be consistent with the City's Municipal Code Chapter 16.16 Section 365 (City of Hesperia 2025) and the Commercial Design Standards and Guidelines found in the City's Main Street and Freeway Corridor Specific Plan (City of Hesperia 2008). Consistent with the City's Main Street and Freeway Corridor Specific Plan, Project landscaping will not interfere with or restrict access to emergency apparatuses such as fire hydrants or fire alarm boxes. The Project's convenience store will include an automatic fire extinguishing system, consistent with the City's Municipal Code Chapter 15.04 Section 030 (City of Hesperia 2025). As discussed previously, the Project's vehicle fueling station will be designed and operated in accordance with the California Fire Code and California Mechanical Code (24 CCR 4). Therefore, by complying with the regulations and design standards intended to reduce the likelihood of fire hazards, the Project will not expose people or structures to a significant risk of loss, injury, or death involving wildland fires. As a result, the impact will be less than significant

4.10 HYDROLOGY AND WATER QUALITY

Would the project:	Potentially Significant Impact	Less-than-Significant Impact with Mitigation Incorporated	Less-than-Significant Impact	No Impact
a) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?			✓	
b) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?			✓	
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; or			✓	
iv) impede or redirect flood flows?				✓
d) In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?				✓
e) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?				✓

4.10.1 Discussion

a) Would the project violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?

Less-than-Significant Impact. Hesperia Phelan CUP24-00012 (Project) is not expected to violate water quality standards or waste discharge requirements, or significantly degrade surface or ground water quality. Construction will require ground-disturbing activities that could increase soil erosion rates which, if not properly managed, could potentially result in a violation of water quality standards and impacts to beneficial uses in adjacent or downstream waterbodies. All construction projects greater than 1 acre in size in the State of California are required to obtain coverage under the State Water Resources Control Board (SWRCB) Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities, 2022-057-DWQ (Construction General Permit) to prevent the discharge of pollutants to surface waters during construction. Since the Project will disturb more than 1 acre of land, a Notice of Intent will be filed with the SWRCB to obtain coverage under the Construction General Permit, and a Project-specific Stormwater Pollution Prevention Plan (SWPPP) will be prepared to comply with the permit. The SWPPP will include best management practices (BMPs) designed to address materials management, non-storm water discharges, sediment discharges, and erosion controls to meet water quality standards. Further, as discussed in Section 4.7 Geology and Soils, the Project will comply with the City of Hesperia (City) Municipal Code 8.30.230, which includes the submittal of a Water Quality Management Plan (WQMP) for City review. The WQMP will include all required and proposed measures for site design, source control, runoff reduction, stormwater treatment, baseline hydromodification management, and low-impact development techniques as applicable (City of Hesperia 2025).

Materials used during construction of the Project (e.g., diesel fuel, hydraulic fluid, oils, grease, and concrete) have the potential to be transported by storm water runoff and threaten groundwater quality in the event of spills or leaching. Specific measures to manage hazardous materials will be addressed in the SWPPP. Additionally, as described in Section 4.9 Hazards and Hazardous Materials, the Project will develop and implement a Hazardous Materials Business Plan, which includes BMPs such as maintaining spill kits, avoiding the storage of hazardous materials on or near work areas, and storing hazardous materials within secondary containment. As a result, the impact to water quality standards, waste discharge requirements, and surface or ground water quality will be less than significant.

b) Would the project 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 Project will not substantially decrease groundwater supplies or interfere substantially with groundwater recharge. The Project area lies entirely within the Upper Mojave River Valley Basin, Alto Subarea (Upper Basin). The Upper Mojave River Valley Groundwater Basin underlies an elongated north-south valley, with the Mojave River flowing through the valley from the San Bernardino Mountains on the south, northward into the Middle Mojave River Valley Groundwater Basin at the town of Helendale, approximately 21 miles north of the City of Hesperia (Department of Water Resources [DWR] 2004). The Upper Basin is managed by the Mojave Water Agency (MWA), which oversees the allocation of groundwater in

accordance with the adjudication ruling of 1993 (with subsequent rulings in 1996 and 2000, followed by finalization in 2002), which ensures the equitable allocation of groundwater from the Mojave River Basin based on water use needs of stakeholders in the region (MWA 2025). The Upper Basin has a total average water supply of 57,349 acre-feet per year, and MWA predicts ample water supply for all users through the year 2065 (MWA 2020). Water for Project construction activities and post-construction operations will be supplied by the Hesperia Water District, which receives its water from the Upper Basin. Water use during construction of the Project is anticipated to be approximately 3,000 gallons per day, and approximately 164 gallons per day (0.001 AFY) during operation. Thus, the amount of water used for the Project will be negligible compared to the total supply within the Upper Basin. As a result, the impact will be less than significant.

c) Would the project 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 result in substantial erosion or siltation on-site or off-site; substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site; 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; or impede or redirect flood flows?

Less-than-Significant Impact. The Project is located on undeveloped land composed of bare ground and sparse vegetation. As discussed previously, a SWPPP will be prepared for the Project that will include BMPs to reduce the risk of erosion during construction activities.

The Project will not cross or alter the course of any jurisdictional aquatic features; however, the amount of impervious surface will increase within the Project site. To mitigate the addition of 1.88 acres of impervious surface, which can inhibit the infiltration of stormwater and cause an increase in surface runoff, the proposed on-site storm drain system will connect to an underground retention facility located east of the proposed fueling station to retain any additional stormwater runoff and discharge through a new proposed storm drain to Phelan Road. The underground retention facility will be capable of retaining stormwater flows from a 100-year storm event. In addition, as previously discussed, a WQMP will be prepared that includes measures to reduce runoff. Consequently, this Project will not increase the amount of surface runoff impacting downstream properties beyond pre-construction conditions. These design elements will reduce the risk for flooding on- and off-site. As a result, the impact will be less than significant.

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

No Impact. The Project is not located within a designated flood hazard zone, per the Federal Emergency Management Agency (FEMA) Flood Risk Maps (FEMA 2024). Additionally, the Project is not located in the coastal zone and thus is not subject to inundation from a tsunami, or within a seiche zone. As a result, no impact will occur.

e) Would the project conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?

No Impact. The Project lies within the Upper Mojave Hydrologic Unit and is managed by the Regional Water Quality Control Board (RWQCB) Region 6 (Lahontan). The Project will not conflict with or obstruct implementation of the Lahontan RWQCB Basin Plan or any groundwater management plans. The Lahontan Basin Plan includes water quality objectives, identifies beneficial uses of its waterbodies, and addresses actions that may be necessary to remediate waters within the Upper Mojave that are designated as impaired for water quality. The Project does not cross any jurisdictional aquatic features, and is located approximately 680 feet northwest from the Oro Grande Wash. The Oro Grande Wash is currently not listed on the Clean Water Act (CWA) Section 303(d) List as an impaired waterbody (SWRCB 2025); thus, no formal water quality improvement plan is required for the Oro Grande Wash. Further, as stated previously, a SWPPP will be prepared for the Project to prevent discharges of pollutants to surface waters. As a result, no impact will occur.

Groundwater basin prioritization is a technical process that utilizes the best available data and information to classify California's 515 groundwater basins into one of four categories: high-, medium-, low-, or very low-priority (DWR 2025). Each basin's priority determines which provisions of the California Statewide Groundwater Elevation Monitoring and the Sustainable Groundwater Management Act (SGMA) apply. The SGMA requires local groundwater management authorities and/or water districts of medium- and high-priority groundwater basins to develop groundwater sustainability agencies (GSAs), develop groundwater sustainability plans (GSPs), and manage groundwater for long-term sustainability. Currently, no GSA or GSP exists for the Upper Basin due to its Very Low Priority classification. Water used during construction will be provided by the Hesperia Water District via an existing fire hydrant on Phelan Road, and will not conflict with groundwater management of the Upper Basin. As a result, no impact will occur.

4.11 LAND USE AND PLANNING

Would the project:	Potentially Significant Impact	Less-than-Significant Impact with Mitigation Incorporated	Less-than-Significant Impact	No Impact
a) Physically divide an established community?				✓
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?				✓

4.11.1 Discussion

a) Would the project physically divide an established community?

No Impact. No established communities are located at the Hesperia Phelan CUP24-00012 (Project) site or on the surrounding parcels. The Project is located in an undeveloped area of the City of Hesperia (City). The closest residential community is approximately 0.3 mile east of the Project. Therefore, the Project will not divide an established community, and no impact will occur.

b) Would the project 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 will be located on a parcel designated as Neighborhood Commercial (NC) in the City's Main Street and Freeway Corridor Specific Plan (City of Hesperia 2008). The Project will be consistent with the NC zone, which encourages the development of businesses that provide convenience goods and services to local residents, such as the services that will be provided by the Project when complete. As discussed previously, a residential community is located approximately 0.3 mile east of the Project. Additional residential communities and homes are located within 2 miles of the Project in all directions. Therefore, the Project will provide services accessible to local residents.

The NC zone requires a City-issued conditional use permit (CUP) to authorize construction and operation of the convenience store with alcoholic beverage sales for off-site consumption, vehicle fuel stations, and vehicle wash facilities. Au Energy, LLC (Au Energy) will obtain a CUP from the City prior to Project construction. Therefore, the Project will be consistent with the NC zone's permitted uses following receipt of the CUP.

As discussed in Section 4.4 Biological Resources, Chapter 16.24 of the City's Municipal Code outlines the provisions for protected plants in the City (City of Hesperia 2025). Pursuant to Chapter 16.24, a removal permit is required for the removal of a western Joshua tree (*Yucca brevifolia*). Au Energy will apply for an incidental take permit (ITP) in accordance with the

Western Joshua Tree Conservation Act and submit it to California Department of Fish and Wildlife (CDFW) for review and approval prior to Project construction. Insignia Environmental corresponded with the City on February 19, 2025 and confirmed that receipt of the western Joshua tree ITP will satisfy Chapter 16.24 requirements of the City's Municipal Code. As a result, the Project will not conflict with the City's protected plant ordinance.

In addition, the Project will be located within the focus area of the Draft Western Joshua Tree Conservation Plan (WJTCP); however, this plan has not been adopted by the California Fish and Game Commission (Commission) (CDFW 2024). The Draft WJTCP includes western Joshua tree impact avoidance and minimization measures that can be voluntarily adopted by project proponents. The Western Joshua Tree Conservation Act requires avoidance and minimization of impacts on western Joshua trees to the maximum extent practicable as a condition of obtaining a western Joshua tree ITP (CDFW 2024). Since the Draft WJTCP may be adopted by the Commission prior to Project construction, avoidance and minimization measures included in the Draft WJTCP will be reviewed and may be included in the western Joshua tree ITP. Through the implementation of mitigation measures included in the western Joshua tree ITP, the Project will minimize impacts to western Joshua tree. Therefore, the Project will be consistent with the Draft WJTCP.

The Project will not be located within any adopted Habitat Conservation Plan; Natural Community Conservation Plan; or other approved local, regional, or state habitat conservation plan, and it will not conflict with any land use plan, policy, or regulation. As a result, no impact will occur.

4.12 MINERAL RESOURCES

Would the project:	Potentially Significant Impact	Less-than-Significant Impact with Mitigation Incorporated	Less-than-Significant Impact	No Impact
a) Result in the loss of availability of a known mineral resource that would be a value to the region and the residents of the state?				✓
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?				✓

4.12.1 Discussion

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

No Impact. There is no mining operation located within 5 miles of Hesperia Phelan CUP24-00012 (Project). The closest operation is the Scheerer Quarry, which mines sand and gravel and is located approximately 13.5 miles northeast of the Project (California Department of Conservation 2025). The Project will not cross mining sites or interfere with mining operations. Consequently, the construction of the Project will not lead to the depletion of any known mineral resources. As a result, no impact will occur.

b) Would the project 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. The Project is located more than 5 miles from any known or potential mineral resource recovery site. The City of Hesperia General Plan Conservation Element (Conservation Element) describes the presence of non-significant mineral resources (i.e., sand used for construction) in the Summit Valley region and within the Mojave River washes (City of Hesperia 2019). The Conservation Element further describes these minerals as not significant due to their relatively high abundance in the surrounding areas. In addition to the non-significant classification, the areas of mineral deposits are more than 5 miles from the Project. As a result, no impact will occur.

4.13 NOISE

Would the project result in:	Potentially Significant Impact	Less-than-Significant Impact with Mitigation Incorporated	Less-than-Significant Impact	No Impact
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?			✓	
b) Generation of excessive groundborne vibration or groundborne noise levels?			✓	
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 2 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?				✓

4.13.1 Discussion

a) Would the project result in 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. The nearest sensitive receptors to Hesperia Phelan CUP24-00012 (Project) are within a residential community located approximately 0.3 mile (1,700 feet) east of the Project on Mesa Linda Street. As outlined in the City of Hesperia's (City's) Noise Ordinance, the maximum allowable noise level at a residential parcel line is 60 A-weighted decibels (dBA) [6] between 7:00 a.m. and 10:00 p.m. (City of Hesperia 2025).

The Project will be located on the corner of United States (U.S.) Highway 395 and Phelan Road, which has an approximate existing roadway noise level of 71 dBA Community Noise Equivalent Level (CNEL)[7] at 50 feet (City of Hesperia 2010). Construction associated with Project will generate noise that will temporarily increase ambient noise levels in the Project vicinity due to construction equipment use (e.g., excavators, bulldozers, graders, and trucks); however, given

[6] Because the human ear is not equally sensitive to all sound frequencies within the entire spectrum, noise levels at maximum human sensitivity are factored more heavily into sound descriptions in a process called "A weighting," written as dBA (City 2010).

[7] Because community receptors are more sensitive to unwanted noise intrusion during the evening and at night, state law requires that, for planning purposes, an artificial decibel increment penalty be added to quiet-time noise levels in a 24-hour noise descriptor called CNEL (City 2010).

the Project site's high existing ambient noise level, noise generated by on-site construction equipment is not anticipated to significantly increase ambient noise levels. In addition to noise generated by on-site construction equipment, construction-related vehicle trips (e.g., worker commute trips, haul trucks, and other on-road vehicles) will temporarily increase noise levels along roadways leading to the Project site. This temporary vehicle traffic will increase ambient traffic noise levels along roadways; however, any increase will be minimal, as these trips will occur throughout the day.

According to the U.S. Department of Transportation (DOT), a dozer has a maximum sound level (L_{max})[8] of 82 dBA at 50 feet (U.S. DOT 2025a) and will generate some of the highest noise levels during Project construction. The A-weighted, equivalent sound level at the nearest sensitive receptor resulting from operation of the dozer with a Usage Factor (U.F.) of 40 percent over a 1-hour period will be approximately 47 dBA, using the calculation below:[9]

$$L_{eq(h)} = L_{max} - 20 \log (D/D_0) + 10 \log (U.F.) + 10 \log (\text{number of units operating concurrently})$$

At 47 dBA, the sound of the dozer at the nearest sensitive receptor will be between the sound levels of a soft whisper (40 dBA) and urban residence (50 dBA) (U.S. Department of Labor 2022). Therefore, Project construction will not cause noise levels to exceed 60 dBA at the nearest noise-sensitive receptors within the residential community. In addition, construction activities occurring between 7:00 a.m. and 7:00 p.m. will be exempt from noise standards unless construction activities occur on Sundays or federal holidays (City of Hesperia 2025). Construction of the convenience store, vehicle fueling station, and car wash is anticipated to occur 6 days per week (Monday through Saturday) between 7:00 a.m. and 7:00 p.m., and will last 200 to 250 days. Road improvement work on U.S. Highway 395 and Phelan Road is anticipated to require night work. Nighttime construction activities will be conducted in accordance with the Project's traffic control plan approved by the City and California Department of Transportation (Caltrans) as part of the permitting process prior to construction. All noise control measures included in the traffic control plan will be implemented to reduce construction noise. Work on Sundays and federal holidays is not anticipated. As a result, the Project will not conflict with the local noise ordinance.

Long-term operations associated with the Project may slightly increase ambient noise levels in the Project vicinity as a result of the permanent operation of facilities, including roof-top mechanical equipment associated with the convenience store building, mechanical equipment within the car wash, and the self-service vacuum stalls. As discussed previously, the Project will be located on the corner of U.S. Highway 395 and Phelan Road. Given the Project site's high existing ambient noise level of approximately 71 dBA CNEL resulting from traffic along U.S. Highway 395 and Phelan Road, any increase in ambient noise levels resulting from Project

[8] L_{max} is the maximum noise level recorded during a noise event (City of Hesperia 2010).

[9] $L_{eq(h)}$ = A-weighted, equivalent sound level at a receptor resulting from operation of a piece of equipment over a 1-hour time period.
L_{max} = Maximum noise emission level of equipment based on its work cycle at distance D_0.
U.F. = Usage Factor, which accounts for the percent time that equipment is in use over the time period of interest (1 hour).
D = Distance from the equipment to the receptor of interest.
D_0 = Reference distance at which the L_{max} was measured for the piece of equipment.

operations will be negligible and indistinguishable, as traffic will mask any noise from Project operations.

As discussed in Section 4.17 Transportation, Project operations are anticipated to generate approximately 1,594 new daily trips. The City's General Plan projected that noise levels along Phelan Road will increase to 74 dBA CNEL following build-out in accordance with the General Plan (City 2010). Although the Project will increase vehicular traffic, U.S. Highway 395 and Phelan Road are major roadways where increased traffic and noise levels are anticipated as the City's development increases. Therefore, the City's General Plan has already considered the increase in noise levels that will result from increased development in the City. The Project is not anticipated to cause noise levels along Phelan Road to exceed 74 dBA CNEL, and the Project will remain consistent with the City's General Plan.

Project operations will require a maximum of six employees daily. It is estimated that three employees will be needed for operations during the day and two employees will be needed for operations at night. No employees will be needed for the car wash because it will be self-operated. As outlined in the City's Noise Ordinance, the maximum allowable noise level for commercial land uses is 65 dBA (City 2025). The existing ambient noise level 50 feet from U.S. Highway 395 and Phelan Road is approximately 71 dBA CNEL and may increase to 74 dBA during operations. Between 70 and 75 dBA, noise levels are expected to be similar to a loud classroom (U.S. Department of Labor 2022). Although Project employees may be exposed to elevated noise levels while outside of their personal vehicles or the proposed convenience store, the Project employees will predominately work within the convenience store, which is approximately 200 feet west of U.S. Highway 395 and 90 feet north of Phelan Road. While inside the convenience store, noise from surrounding vehicle use will be attenuated from the building and sloped landscaped areas (U.S. DOT 2025b). Therefore, given the distance of the convenience store from roadways and the barriers to noise created by the convenience store walls and sloped landscaped areas, the Project is not anticipated to expose employees to noise levels that exceed 65 dBA.

Similarly, customers may be exposed to elevated noise levels resulting from adjacent roadways, vehicles idling, and car wash operations while outside of their personal vehicles or the convenience store. Although customers outside may be exposed to elevated noise levels, the exposure will be temporary, similar to a loud classroom, and consistent with typical noise levels at other existing vehicle fueling stations in the vicinity. Therefore, individuals outside of personal vehicles and the convenience store are not anticipated to be exposed to noise levels that exceed thresholds of significance. As a result, the noise impact associated with Project construction and operation will be less than significant.

b) Would the project result in generation of excessive groundborne vibration or groundborne noise levels?

Less-than-Significant Impact. Groundborne vibration will be generated by heavy equipment use during Project construction. As discussed previously, the nearest sensitive receptors are located approximately 0.3 mile (1,700 feet) east of the Project on Mesa Linda Street. The Caltrans vibration threshold for building damage to new residential structures is a peak particle velocity (PPV) of 0.5 peak inch per second. At 25 feet, a large bulldozer has a PPV of 0.089 inch

per second. During the operation of a large bulldozer, the PPV at the nearest sensitive receptor will be approximately 0.0009 inch per second using the following calculation (Caltrans 2020):[10]

$$PPV_{Equipment} = PPV_{Ref} (25/D)^{n} \text{ (inch/second)}$$

Therefore, vibration from construction will not damage structures at the nearest sensitive receptor. In addition, a PPV of 0.01 inch per second is barely perceptible to humans (Caltrans 2020). Because a large bulldozer generates a PPV well below 0.01 inch per second, the nearest sensitive receptors to the Project are not likely to perceive a vibration caused by construction. Project operations will not involve the use of any large rotating equipment or heavy machinery that will introduce any new sources of perceivable groundborne vibration. As a result, the construction and operation of the Project will not result in the generation of excessive groundborne vibration or noise levels, and the impact will be less than significant.

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 2 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 Project is not located within an airport land use plan or within 2 miles of a public airport or public use airport. The closest airport is the Hesperia Airport, which is located approximately 5.95 miles southeast of the Project. As a result, no impact will occur.

[10] PPV_{Ref} = reference PPV at 25 feet.
D = distance from equipment to the receiver in feet.
n = 1.1 (the value related to the attenuation rate through ground).

4.14 POPULATION AND HOUSING

Would the project:	Potentially Significant Impact	Less-than-Significant Impact with Mitigation Incorporated	Less-than-Significant Impact	No Impact
a) Induce substantial unplanned population growth in an area, either directly (e.g., by proposing new homes and businesses) or indirectly (e.g., through extension of roads or other infrastructure)?				✓
b) Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?				✓

4.14.1 Discussion

a) Would the project induce substantial unplanned population growth in an area, either directly (e.g., by proposing new homes and businesses) or indirectly (e.g., through extension of roads or other infrastructure)?

No Impact. Construction of Hesperia Phelan CUP24-00012 (Project) will not create a direct increase in the demand for housing. No more than eight construction workers are anticipated to be on site at any given time during construction. Operation of the Project will only require a daily maximum of seven employees, who will likely be sourced from the City of Hesperia or San Bernardino County. Because employees will be sourced from the local area, operation of the Project will not result in population growth. Rather than encourage population growth, such services support the existing population, with the closest residential community located approximately 0.3 mile east of the Project and additional residential communities and homes located within 2 miles of the Project in all directions. Further, the Project is approximately 0.5 mile west of an existing sewer main near the intersection of Main Street and Mesa Linda Street and across from an existing water main on the south side of Phelan Road (City of Hesperia 2025). As a result, development of the Project will not require significant extension of utility infrastructure, and no impact will occur.

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

No Impact. The Project is located on undeveloped land that is zoned to allow for development of commercial uses. No housing exists within the Project site. The nearest residential community is approximately 0.3 mile east of the Project, and construction of the Project will not cause the displacement of this community. As a result, no impact will occur.

4.15 PUBLIC SERVICES

Would the project:	Potentially Significant Impact	Less-than-Significant Impact with Mitigation Incorporated	Less-than-Significant Impact	No Impact
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:				
Fire Protection?			✓	
Police Protection?			✓	
Schools?				✓
Parks?				✓
Other Public Facilities?				✓

4.15.1 Discussion

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?

Fire Protection

Less-than-Significant Impact. Construction and operation of Hesperia Phelan CUP24-00012 (Project) will not have a significantly adverse effect on fire protection services in the Project area. Fire protection services are provided to the City of Hesperia (City) by the San Bernardino County Fire Protection District. The closest fire station to the Project is Fire Station 305, which is located at 8331 Caliente Road, approximately 2.5 miles south of the Project. Fire Station 305 is fully staffed and maintains a daily crew of eight personnel (City of Hesperia 2025). Construction of the Project may require the temporary closure of lanes on Phelan Road and United States Highway 395; however, as discussed in Section 4.9 Hazards and Hazardous Materials, any lane closure will be included in the required traffic control plan to minimize the effect on response times, service rations, or other public service objectives for fire protection in

the area. Additionally, a new fire line is proposed as part of the Project; this line will connect to the existing 12-inch water main that runs along the south side of Phelan Road and will extend north from Phelan Road to the proposed convenience store. Further, as discussed in Section 4.20 Wildfire, the Project will be designed to adhere to all California Fire Code (24 California Code of Regulations 9) standards regarding fire prevention. As a result, the impact will be less than significant.

Police Protection

Less-than-Significant Impact. Construction and operation of the Project will not significantly affect police protection services in the Project area. The Hesperia Police Department contracts with the San Bernardino County Sheriff's Department to provide police services in the City's jurisdiction. The Hesperia Police Department is comprised of 58 sworn law enforcement personnel, including a captain, a lieutenant, seven sergeants, five detectives, and 44 deputy sheriffs (San Bernardino County 2025). The Hesperia Patrol Station is located at 15840 Smoketree Street, which is located approximately 5.3 miles east of the Project. Perimeter security fencing will be installed around the outer limits of the Project work area during construction. Lighting will also be installed for security purposes during construction. Construction crews will lock and secure the Project site to prevent theft or vandalism associated with work equipment or supplies at the completion of each workday. Although the need for police services may arise during and after construction, such a need will not exceed the capacity of the existing providers in the vicinity of the Project and will not require the provision of service beyond existing capacities. As a result, the impact will be less than significant.

Schools

No Impact. It is not anticipated that construction and operation of the Project will adversely affect the provision of, or access to, school services. The Project lies within the Snowline Joint Unified School District, at the far eastern boundary of the district; however, the closest school to the Project is Canyon Ridge High (1.4 miles to the southeast) within the Hesperia Unified School District (HUSD). Although the HUSD boundary is just outside of the Project area, its schools are located nearest to the Project and it serves the City and adjacent areas in the high desert of San Bernardino County, covering 140 square miles. The HUSD provides public education services for kindergarten through senior high school students, including three comprehensive high schools, two continuation high schools, three middle schools, 12 elementary schools, three choice schools, two alternative schools, one adult education school, and five charter schools (HUSD 2025). Construction and operation of the Project is not likely to disrupt access to schools, as the nearest residential community is located east of the Project and its residents would be traveling eastbound on Phelan Road to access schools within the HUSD. Although the schools within the HUSD are closest to the Project area, the traffic to and from those schools will not be impeded by the Project; due to the Project's relative location, no impact will occur.

Parks

No Impact. It is not anticipated that construction and operation of the Project will adversely affect the provision of services by, or access to, public parks. The closest public park to the Project is Malibu Park, which is located approximately 1.7 miles to the southeast. The Mojave Narrows Regional Park and the Mojave River Forks Regional Park are located approximately 9.4 miles northeast and 9.7 miles southeast of the Project, respectively. Lane closures during

construction of the Project are unlikely to affect access to any of the surrounding public parks. As a result, no impact will occur.

Other Public Facilities

No Impact. It is not anticipated that construction and operation of the Project will adversely affect the provision of services by other public facilities as none are located near the Project area. The nearest library to the Project is the San Bernardino County Hesperia Branch Library, which is located approximately 4.9 miles east of the Project. The High Desert Medical Center and Hesperia Post Office are located approximately 6.3 miles east and 6.5 miles east of the Project, respectively. As a result, there will be no impact on other public facilities.

4.16 RECREATION

	Potentially Significant Impact	Less-than-Significant Impact with Mitigation Incorporated	Less-than-Significant Impact	No Impact
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?				✓
b) Would the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?				✓

4.16.1 Discussion

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. No City of Hesperia (City) neighborhood parks or San Bernardino County regional parks are located within 1 mile of Hesperia Phelan CUP24-00012 (Project). Malibu Park, located approximately 1.7 miles southeast of the Project, is the closest City park (City of Hesperia 2025).

The use of parks and recreational facilities is closely tied to population; as population increases, the use of existing parks and recreational facilities can be expected to increase proportionally. As presented in Section 4.14 Population and Housing, the Project will not directly or indirectly induce substantial population growth. During construction of the Project, regional and local parks may be used by workers during their lunch or break periods. However, construction will be temporary and will last 200 to 250 days. Given the duration of construction activities and lack of population growth resulting from the Project, the Project will not increase the use of existing neighborhood and regional parks such that substantial physical deterioration of the facilities will occur. As a result, no impact will occur.

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

No Impact. The Project does not include any recreational facilities. In addition, the Project will not result in a permanent population increase; therefore, it will not require the construction or expansion of any recreational facilities. The Project will not have an adverse physical effect on the environment from the construction of new recreational facilities or expansion of existing recreational facilities. As a result, no impact will occur.

4.17 TRANSPORTATION

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

4.17.1 Discussion

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

No Impact. Hesperia Phelan CUP24-00012 (Project) will not conflict with any program, plan, or ordinance that addresses the City of Hesperia's (City's) circulation system. The City's public transit service is provided by the Victor Valley Transit Authority (VVTA) (City of Hesperia 2010). Phelan Road at the Project site is located along VVTA Route 21: Super Target – Wrightwood (VVTA 2025). The nearest bus stop along Route 21 is located approximately 1.15 miles west of the Project. VVTA Route 64: Hesperia Post Office – Super Target is located approximately 0.8 mile east of the Project, at the intersection of Main Street and Cataba Road. There are no additional bus stops proposed as part of the Project, and the Project will not conflict with the public transit policies outlined in the Circulation Element of the City's General Plan or interfere with the established VVTA public transit routes. As a result, no impact will occur.

The Circulation Element of the City's General Plan classifies Phelan Road as a Major Arterial, with a total right-of-way (ROW) of 120 feet, including 60 feet on either side of the street centerline (City of Hesperia 2010). The Project proposes ROW improvements to the north side of Phelan Road in accordance with the Major Arterial standards, providing 60 feet of ROW from the street centerline to the back of the sidewalk.

United States (U.S.) Highway 395 is classified as a Special Street in the Circulation Element, with a total ROW of 130 feet. The Project proposes ROW improvements to U.S. Highway 395 in accordance with the Special Street standard, providing between approximately 92 and 100 feet of ROW from the highway centerline to the new proposed California Department of Transportation

ROW line along the east boundary of the Project. The Project complies with all street standards shown in the Circulation Element of the City's General Plan, and no impact will occur.

According to the City's Main Street and Freeway Corridor Specific Plan, the nearest bicycle/pedestrian path is located approximately 1 mile north of the Project and is designated as a Class I Bike Lane that runs along either side of the California Aqueduct (City of Hesperia 2021). The Project does not cross an existing bicycle or pedestrian facility and will not conflict with the Main Street and Freeway Corridor Specific Plan. As a result, no impact will occur.

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

Less-than-Significant Impact. Section 150964.3, Determining the Significance of Transportation Impacts, of the California Environmental Quality Act (CEQA) Guidelines was introduced to provide guidance for determining the significance of transportation impacts. This section provides criteria for determining a project's transportation impacts, including for land use projects (Section 15064.3[b][1]) and transportation projects (Section 15064.3[b][2]). Criteria 3 and Criteria 4 of CEQA Guidelines Section 15064.3 include stipulations to conduct a Vehicle Miles Traveled (VMT) assessment to determine potential impacts.

The City's traffic impact analysis guidelines provide a process for projects to be screened from full VMT assessment under the assumption that the projects will result in a less-than-significant transportation impact related to VMT. As discussed in Attachment F: Scoping Agreement Memorandum, the City has VMT screening options based on land use types, including local-serving gas stations and local-serving retail less than 50,000 square feet. The Project includes a 5,915-square-foot convenience store and 1,968-square-foot automated car wash tunnel, totaling 7,883 square feet. Therefore, the Project is a local-serving gas station and a local-serving retail measuring less than 50,000 square feet. As a result, the Project can be screened from VMT assessment under the presumption that it will result in a less-than-significant impact related to VMT.

As a result, the Project will not result in transportation impacts related to increased VMT and will not conflict or be inconsistent with CEQA Guidelines Section 15064.3(b). Therefore, the impacts will be less than significant.

c) Would the project 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 includes improvements to U.S. Highway 395, Phelan Road, and the traffic signal on the northwestern corner of the Phelan Road and U.S. Highway 395 intersection to reduce the potential for traffic-related incidents involving vehicles entering and exiting the Project's proposed driveways along Phelan Road and U.S. Highway 395. The southbound side of U.S. Highway 395 will be widened to 58 feet from the centerline to allow for the following:

- installation of a 3-foot-wide median at the centerline,
- a dedicated bike lane along the southbound side,

- a dedicated right-turn lane to access the Project and to turn right onto Phelan Road,
- two southbound lanes, and
- one left-turn lane to travel east.

In addition, the Project will include the following:

- rubberized curbs with flexible posts along the Phelan Road median to discourage left-turns and U-turns to reduce the crash risk from improper or unexpected movements;
- an increased driveway setback from the intersection to reduce conflict points between turning vehicles and cross-traffic;
- driveways on both U.S. Highway 395 and Phelan Road that can only be accessed by a right-in and right-out-only approach to limit left-turn movements and reduce crash risks;
- lighting that covers the driveway entrance to reduce the potential for vehicle and pedestrian collisions;
- rumble strips near the driveway to enhance driver awareness;
- high friction surface treatment at the driveways to reduce skidding;
- retroreflective lane strips to improve lane visibility; and
- clear zones along the driveway access to provide a recovery area for vehicles that veer off the road.

With implementation of the Project's proposed driveway design, lighting and clear zones, as well improvements to U.S. Highway 395, Phelan Road, and the traffic signal, the Project is not anticipated to increase hazards along the roadways. As a result, the impact will be less than significant.

d) Would the project result in inadequate emergency access?

Less-than-Significant Impact. The Project will not impair implementation of or physically interfere with an adopted emergency response or evacuation plan. Temporary lane closures along Phelan Road and U.S. Highway 395 will be required during construction; however, these impacts will be temporary, short-term, and localized; and access for emergency vehicles will be maintained in all instances. Any temporary closures will be coordinated with local jurisdictions and emergency service providers in accordance with the encroachment permit process, as further described in Section 4.9 Hazards and Hazardous Materials. As a result, the impact will be less than significant.

4.18 TRIBAL CULTURAL RESOURCES

	Potentially Significant Impact	Less-than-Significant Impact with Mitigation Incorporated	Less-than-Significant Impact	No Impact
a) Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code § 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 Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k), or		✓		
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 § 5024.1. In applying the criteria set forth in subdivision (c) of Public Resource Code § 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.		✓		

4.18.1 Discussion

a) Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code § 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 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), or 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 § 5024.1?

Less-Significant-Impact with Mitigation Incorporated. As discussed in Section 4.5 Cultural Resources, as part of the Initial Study/Mitigated Negative Declaration (IS/MND) previously prepared for Hesperia Phelan CUP24-00012 (Project) in 2018, an Archaeological Survey Report was completed in November 2017 and is included as Attachment C: Archaeological Survey Report. Because the Project is in the same location as the previously proposed Project, the scope of the Project has been reduced, and the Project site has remained undeveloped/unmodified since the Archaeological Survey Report, the Area of Potential Impacts (API) and findings from the report are applicable to the current Project.

Based on the results of the cultural resources record search and intensive pedestrian survey, three isolated historical resources were found within the API. The isolated historical resources are not eligible to be listed with the California Register of Historical Resources (CRHR) and are not deemed historically significant resources. No tribal cultural resources were encountered during the field survey.

Although not anticipated, a tribal cultural resource could be damaged or destroyed by ground-disturbing activities in the event an unknown tribal cultural resource is located within an area subject to disturbance. To address this potential impact, Mitigation Measures (MMs) TCR-1 and TCR-2 will be implemented during Project construction. In accordance with MM TCR-1, and in the event previously unidentified tribal cultural resources are uncovered during Project construction, the Yuhaaviatam of San Manuel Nation Cultural Resources Management Department (YSMN) will be contacted and provided information regarding the nature of the find, so as to provide Tribal input with regards to significance and treatment. Should the find be deemed significant, as defined by the California Environmental Quality Act (CEQA) (as amended, 2015), a Cultural Resources Monitoring and Treatment Plan will be created by the archaeologist, in coordination with YSMN, and all subsequent finds will be subject to this plan. The Monitoring and Treatment Plan will allow for a monitor to be present that represents YSMN for the remainder of the project, should YSMN elect to place a monitor on-site.

In accordance with MM TCR-2, any and all archaeological/cultural documents created as a part of the Project (isolate records, site records, survey reports, testing reports, etc.) will be supplied to the applicant and Lead Agency for dissemination to YSMN. The Lead Agency and/or applicant shall, in good faith, consult with YSMN throughout the life of the Project.

With the implementation of MMs TCR-1 and TCR-2, no substantial adverse changes related to a tribal cultural resource are anticipated, and the impact to tribal cultural resources as defined in PRC Section 21074 will be less than significant with mitigation incorporated.

4.18.2 Mitigation Measures

The following MMs will be implemented for the Project to reduce impacts to less-than-significant levels:

- **MM TCR-1: Inadvertent Cultural Resource Discoveries.** The YSMN will be contacted, as detailed in MM CUL-1, of any pre-contact cultural resources discovered

during Project implementation, and be provided information regarding the nature of the find, so as to provide Tribal input with regards to significance and treatment. Should the find be deemed significant, as defined by CEQA (as amended, 2015), a Cultural Resources Monitoring and Treatment Plan will be created by the archaeologist, in coordination with YSMN, and all subsequent finds will be subject to this plan. The Monitoring and Treatment Plan will allow for a monitor to be present that represents YSMN for the remainder of the Project, should YSMN elect to place a monitor on-site.

- **MM TCR-2: Consultation.** Any and all archaeological/cultural documents created as a part of the Project (isolate records, site records, survey reports, testing reports, etc.) will be supplied to the applicant and Lead Agency for dissemination to YSMN. The Lead Agency and/or applicant will, in good faith, consult with YSMN throughout the life of the Project.

4.19 UTILITIES AND SERVICE SYSTEMS

Would the project:	Potentially Significant Impact	Less-than-Significant Impact with Mitigation Incorporated	Less-than-Significant Impact	No Impact
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?			✓	
b) Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?			✓	
c) Result in a determination by the waste water 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?			✓	
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?			✓	
e) Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?				✓

4.19.1 Discussion

a) Would the project 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?

Water

Less-than-Significant Impact. Construction of Hesperia Phelan CUP24-00012 (Project) will require the temporary use of water and wastewater facilities by construction workers. Water used for construction activities, such as for dust suppression and compaction requirements, will be trucked to the Project using local fire hydrants and construction water meters as provided by the local Hesperia Water District (HWD). The HWD has sufficient water supply to accommodate the Project through its Mojave Basin Area Adjudication, which is the primary governing structure

that allocates water supplies among the regional water purveyors and individual water users to meet regional water needs (HWD 2020). Following construction, the proposed new water line for the convenience store and car wash will be connected to the existing 12-inch water line beneath the south side of Phelan Road, which is part of the City of Hesperia's (City's) water system. As a result, the impact will be less than significant.

Wastewater and Stormwater

Less-than-Significant Impact. The HWD operates the City's wastewater services in conjunction with the Victor Valley Wastewater Reclamation Authority (VVWRA) (City 2010). The Project will include construction of a new sewer force main that will connect to an existing 12-inch sewer main along Caliente Road to the west of the Project, through a proposed 5-foot sewer easement granted by the adjacent property owner with Assessor's Parcel Number 3064-401-09. The VVWRA has a current treatment capacity of 2 million gallons per day (mgd) for wastewater effluent from the service area in which the Project lies. The Project will result in a marginal increase of approximately 164 gallons per day in wastewater effluent to the VVWRA; however, the VVWRA has sufficient treatment capacity to accommodate this increase. As a result, the impact will be less than significant.

The Project will require one storm water catch basin at the southeast end of the Project to be relocated a few feet to the north, along Phelan Road, to match the new location of the curb and gutter. Additionally, the Project involves the removal of one v-ditch swale along the east side of the Project within California Department of Transportation right-of-way; however, these changes to the storm drain system would be minimal and would not significantly affect the downstream hydrology. The Project location is currently undeveloped and composed of a pervious surface and sparse vegetation. To mitigate the addition of 1.88 acres of impervious surfaces proposed by the Project, which can inhibit the infiltration of stormwater, the proposed on-site storm drain system will connect to an underground retention facility located east of the proposed fueling station to retain any additional stormwater runoff and discharge through a new proposed storm drain to Phelan Road. The underground retention facility will be capable of retaining stormwater flows from a 100-year storm event. Consequently, this Project will not increase the amount of stormwater runoff impacting downstream properties beyond pre-construction conditions. In addition, as discussed in Section 4.7 Geology and Soils, the Project will comply with the City's Municipal Code Section 8.30.230, which includes the submittal of a Water Quality Management Plan (WQMP) for City review. The WQMP will include all required and proposed measures for site design, source control, runoff reduction, stormwater treatment, baseline hydromodification management, and low-impact development techniques as applicable. As a result, the impact will be less than significant.

Electrical Power and Natural Gas

Less-than-Significant Impact. Construction of the Project will not require the creation or relocation of electrical and natural gas facilities. During construction, power will be provided by a temporary power meter installed by Southern California Edison. Following construction, the Project will connect to an existing electrical distribution line that runs along the south side of Phelan Road across from the Project. When the Project becomes operational, electrical service will be provided by Southern California Edison and natural gas service will be provided by Southwest Gas Corporation. As a result, the impact will be less than significant.

Telecommunications

No Impact. No new telecommunication facilities are proposed as part of the Project. Further, construction of the Project will not require the relocation of any existing telecommunication facilities. As a result, there will be no impact.

b) Would the project 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 City, through the HWD, has reliable water supplies to meet its retail customer demands in a single dry year, as well as for 5 consecutive years of dry-year conditions through 2045 (HWD 2020). HWD obtains its water from groundwater sources in the Alto Subarea of the Mojave Basin Area. The City was allocated 11,871 acre-feet per year (AFY), or approximately 10.6 mgd, of water use from the Alto Subarea in the 2020-2021 Water Year (HWD 2020). Water use during construction of the Project is anticipated to be approximately 3,000 gallons per day, and approximately 164 gallons per day (0.001 AFY) following the completion of the development. Thus, the amount of water use for the Project is negligible compared to this annual allocation. As a result, the impact will be less than significant.

c) Would the project result in a determination by the waste water 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. As discussed previously, the wastewater provider for the Project will be the VVWRA in conjunction with the HWD. The City owns, operates, and maintains a wastewater collection system that connects to the VVWRA's 3-mile interceptor that runs along the northeast boundary of the City and ultimately flows to the Regional Waste Water Treatment Plant (RWWTP) that is owned and operated by the VVWRA (HWD 2020). The VVWRA was originally formed to meet the requirements of the federal Clean Water Act and provide wastewater treatment for the growing area. According to the City's 2015 Wastewater Master Plan (WWMP), approximately 11 percent of the geographic area studied in the WWMP is currently served by the City's sewers, which ultimately flow to the VVWRA RWWTP. The remaining area is either undeveloped or served by on-site systems (i.e., septic tanks). Based on the WWMP, the wastewater flow volume from the service area is 2.0 mgd or 2,240 AFY (HWD 2020). As discussed previously, the VVWRA has sufficient treatment capacity to accommodate a marginal increase of approximately 164 gallons per day in wastewater effluent from the Project. As a result, the impact will be less than significant.

d) Would the project 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. Solid wastes generated during construction will primarily be non-hazardous wastes, including wood, metal, paper, and plastic packaging. Construction waste will be disposed of properly by the City's waste hauler, Advance Disposal Company, Inc. (Advance Disposal), and in accordance with all applicable federal, state, and local laws. The nearest Advance Disposal waste collection facility is located approximately 6.5 miles east of the

Project and has a maximum daily capacity of 1,500 tons (California Department of Resources Recycling and Recovery [CalRecycle] 2025). The Project will not generate solid waste that is greater than state or local standards, that exceeds the capacity of local infrastructure, or that otherwise impairs the attainment of the City solid waste reduction goals. As a result, the impact will be less than significant.

e) Would the project comply with federal, state, and local management and reduction statutes and regulations related to solid waste?

No Impact. All construction waste associated with the Project will be disposed of properly and in accordance with all applicable federal, state, and local laws regarding solid and hazardous waste. Therefore, no impact will occur.

4.20 WILDFIRE

If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project:	Potentially Significant Impact	Less-than-Significant Impact with Mitigation Incorporated	Less-than-Significant Impact	No Impact
a) Substantially impair an adopted emergency response plan or emergency 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?		✓		
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?			✓	
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?				✓

4.20.1 Discussion

a) If located in or near state responsibility areas (SRAs) or lands classified as very high fire hazard severity zones (FHSZs), would the project substantially impair an adopted emergency response plan or emergency evacuation plan?

Less-than-Significant Impact. Hesperia Phelan CUP24-00012 (Project) will be located approximately 0.37 mile east of an SRA and lands classified as a high FHSZ (California Board of Forestry and Fire Protection 2024, California Department of Forestry and Fire Protection [CAL FIRE] 2023). The Project will also be located approximately 1.25 miles northwest of lands classified as a very high FHSZ.

As detailed in the City of Hesperia's (City's) General Plan Safety Element, fires typically start in the mountains or foothills approximately 3.45 miles south of the Project (City of Hesperia 2010). If winds fan a fire north toward the City, evacuees would take roads leading north toward the more developed areas of the City or out of the City entirely. The City's General Plan Safety Element identifies United States (U.S.) Highway 395, which is adjacent to the Project, as a potential evacuation route. As discussed in Section 4.9 Hazards and Hazardous Materials, any lane closure will be included in the required traffic control plan to minimize the effects on

evacuation routes. Therefore, the Project will not conflict with any adopted emergency response or evacuation plans. As a result, the impact will be less than significant.

b) If located in or near SRAs or lands classified as very high FHSZs, would the project 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 Impact with Mitigation Incorporated. As discussed previously, the Project will be located approximately 0.37 mile east of an SRA and lands classified as a high FHSZ. Elevations at the Project site slope upward from northeast to southwest with an approximate slope of 3 percent. Given the gradual slope of the Project site, the site topography is not anticipated to exacerbate wildfire risks. Prevailing winds at the Project site originate from the west and southwest (Mojave Desert Air Quality Management District 2020). Therefore, a potential fire would be anticipated to travel eastward from the Project site. The Project site consists of cheatgrass-medusahead grasslands and California buckwheat scrub, which could potentially act as surface fuel loads. The surrounding parcels are vacant, with sparse vegetation that could also potentially act as surface fuel loads. The Project is in an area with a history of fires, including a 1945 unnamed fire that occurred approximately 2.15 miles west of the Project site, the 1958 Santa Fe #13 fire that occurred approximately 2.05 miles east of the Project site, and the 2021 Farmington fire that occurred approximately 2.10 miles south of the Project site (CAL FIRE 2025). Given the potential fuel loads on and surrounding the Project site, prevailing wind direction, the Project's proximity to the SRA, and the history of fires in the region, the Project is located in an area with potential wildfire risk.

Construction activities have the potential to start a fire due to the increased presence of vehicles, equipment, and human activity in areas of elevated fire hazard severity. Because construction typically occurs during the driest time of the year, heat or sparks from construction vehicles or equipment have the potential to ignite dry vegetation. However, construction of the Project will not exacerbate wildfire risks with implementation of Mitigation Measure (MM) FIRE-1, which details the fire management procedures that will be followed during construction. Fire management procedures include training construction crews on fire prevention and response, directing Project personnel to park away from dry vegetation, equipping all off-road vehicles with fire management tools, creating a buffer around "hot work" (e.g., welding, grinding, or any other activity that creates hot sparks), using fire-resistant mats and/or windscreens when welding, and coordinating procedures with local fire officials. In addition, U.S. Highway 395 and Phelan Road may act as firebreaks to slow the progress of a fire. With implementation of MM FIRE-1, construction of the Project will neither exacerbate wildfire risks nor expose construction crews to pollutant concentrations from a wildfire.

Operation of the Project will require a daily maximum of six employees. Employees will be limited to the convenience store, as the car wash will be self-operated and require no employees. As discussed in Section 4.9 Hazards and Hazardous Materials, all Project structures will be constructed in compliance with the California Fire Code (24 California Code of Regulations [CCR] 9). In addition, the Project's convenience store, car wash, and vehicle fueling station will be constructed and designed consistent with the City's Municipal Code Chapter 16.16 Section 365 (City of Hesperia 2025) and the Commercial Design Standards and Guidelines found in the

City's Main Street and Freeway Corridor Specific Plan (City of Hesperia 2008). Therefore, by complying with the California Fire Code and local development standards intended to reduce the likelihood of fire hazards, the Project will not exacerbate wildfire risks during operation. As a result, long-term Project employees will not be exposed to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire.

With incorporation of MM FIRE-1, the California Fire Code, and local development standards, the Project will have a less-than-significant impact with mitigation incorporated.

c) If located in or near SRAs or lands classified as very high FHSZs, would the project 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. The Project will include the construction and operation of a vehicle fueling station and associated underground storage tanks. The vehicle fueling station and associated underground storage tanks may exacerbate fire risk because the fuel stored and dispensed at the vehicle fueling station will be flammable and combustible. As discussed in Section 4.9 Hazards and Hazardous Materials, the vehicle fueling station will be designed and operated in accordance with the California Fire Code and California Mechanical Code (24 CCR 4), and the underground storage tanks will be designed and constructed in accordance with California Health and Safety Code Chapter 6.7 and CCR Title 23, Division 3, Chapter 16. Therefore, the vehicle fueling station and associated underground storage tanks will be operated in compliance with state standards to reduce the Project's potential to exacerbate fire risks. In addition, the Project will require approximately 1.88 acres of the Project site to be paved, which will remove vegetation that could potentially act as surface fuel loads and reduce the Project's potential to exacerbate fire risks. As a result, the impact will be less than significant.

d) If located in or near SRAs or lands classified as very high FHSZs, would the project 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?

No Impact. The Project is not located in a flood zone (City of Hesperia 2010) or area prone to landslides (California Department of Conservation 2024). In addition, the Project will receive coverage for disturbing more than 1 acre of soil under the General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities, 2022-0057-DWQ (Construction General Permit). This Construction General Permit will require preparation of a Project-specific Storm Water Pollution Prevention Plan to be authorized by the State Water Resources Control Board; it will include erosion control measures and site stabilization procedures (e.g., the use of gravels bags or soil binders).

The Project includes a storm drainage system that will connect to an underground retention facility located east of the proposed fueling station to retain any additional stormwater runoff and discharge through a new proposed storm drain to Phelan Road. The underground retention facility will be capable of retaining stormwater flows from a 100-year storm event. Consequently, this Project will not increase the amount of runoff impacting downstream

properties. In addition, in accordance with the City's Municipal Code Section 8.30.220 and Section 8.30.230, a Water Quality Management Plan (WQMP) will be provided to the City for review and approval prior to the issuance of grading and building permits. The WQMP will include all required and proposed measures for site design, source control, runoff reduction, stormwater treatment, baseline hydromodification management, and low-impact development techniques as applicable. Therefore, the Project will not 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. Therefore, no impact will occur.

4.20.2 Mitigation Measures

The following MM will be implemented for the Project to reduce impacts to less than significant levels:

- **MM FIRE-1: Fire Risk Management:** The Project will follow standard fire risk management procedures during construction, including the following:
  - Safe work practices, training, and fire response will be conducted.
  - Project personnel will be directed to park away from dry vegetation.
  - All off-road vehicles will be equipped with a 5-gallon backpack pump (filled with water), one Pulaski, and one shovel.
  - Construction activities that are considered "hot work" (e.g., welding, grinding, or any other activity that creates hot sparks) will have a 10-foot buffer around that activity, and vegetation will be cleared to ensure sparks do not create a fire hazard.
  - Fire-resistant mats and/or windscreens will be used when welding. In addition, during fire "red flag" conditions (as determined by the California Department of Forestry and Fire Protection), welding will be curtailed.
  - Every fuel truck will carry a large fire extinguisher with a minimum rating of 40 B:C,[11] and all flammable materials will be removed from equipment parking and storage areas.
  - Procedures will be coordinated with local fire officials.
  - Daily site-specific risk conditions will be identified.

[11] Class B fire extinguishers are classified for flammable liquid/gas fires. Class C fire extinguishers are classified for energized electrical equipment. A fire extinguisher with a minimum rating of 40 B:C is capable of covering and extinguishing 40 square feet of a Class B fire and is also safe to use for a Class C fire (Koorsen Fire & Security 2019).

4.21 MANDATORY FINDINGS OF SIGNIFICANCE

	Potentially Significant Impact	Less-than-Significant Impact with Mitigation Incorporated	Less-than-Significant Impact	No Impact
a) Does the project 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?		✓		
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.)			✓	
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?			✓	

4.21.1 Discussion

a) Does the project 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. As discussed in Section 4.4 Biological Resources, Hesperia Phelan CUP24-00012 (Project) will result in impacts to western Joshua tree (*Yucca brevifolia*)─a candidate for listing as a threatened species under the California Endangered Species Act─during construction. Therefore, Au Energy, LLC (Au Energy) will apply for an incidental take permit (ITP) in accordance with MM BIO-1 and submit it to the California Department of Fish and Wildlife (CDFW) for review and approval prior to Project construction. As part of the western Joshua tree ITP, Au Energy will propose relocating select western Joshua trees that will be impacted by Project activities in accordance with the CDFW's

Western Joshua Tree Relocation Guidelines and Protocols. The final number of western Joshua trees to be relocated or destroyed and any additional mitigation measures (MMs) will be determined during the ITP process in consultation with the CDFW. Therefore, impacts to western Joshua trees will be reduced through MM BIO-1 and the implementation of MMs (e.g., western Joshua tree relocation) included in the western Joshua tree ITP.

Although burrowing owl (*Athene cunicularia*) is unlikely to occur at the Project site, MM BIO-2 and MM BIO-3 will be implemented to further reduce the potential for impacts to occur to burrowing owl. MM BIO-2 will require one pre-construction burrow survey to be completed no more than 14 days prior to ground-disturbing activities, and a second pre-construction burrow survey to be completed within 24 hours of ground-disturbing activities. A qualified biologist will identify, flag, and map all burrows and dens potentially occupied by burrowing owl and then confirm occupation of all potential burrows for buffers and avoidance. In accordance with MM BIO-3, if occupied burrows are identified, a qualified biologist will establish adequate buffers around the burrows based on field conditions and the CDFW Staff Report on Burrowing Owl Mitigation (2012). If occupied burrows cannot be avoided, the CDFW will be consulted, and a burrowing owl-specific mortality reduction or avoidance plan will be developed in accordance with MM BIO-3.

In addition, loggerhead shrike (*Lanius ludovicianus*), a CDFW species of special concern, is likely to occur at the Project site given the suitable nesting and foraging habitat within the site. Therefore, MM BIO-4 will be implemented during Project construction to reduce potential impacts to loggerhead shrike. MM BIO-4 will require a pre-construction nesting bird survey prior to vegetation removal or relocation activities during the nesting bird season (i.e., February 15 through August 31). If an active bird nest that may be impacted by Project-related activities is observed, avoidance and minimization measures will be implemented, including delaying construction within the immediate vicinity of the active nest or establishing a nest buffer determined by a qualified biologist until the young have fledged or the nest has failed.

No additional special-status plant species were documented at the Project site, and no additional special-status wildlife species are likely to occur at the Project site. Further, no sensitive natural communities were observed within the Project site.

As discussed in Section 4.5 Cultural Resources and Section 4.18 Tribal Cultural Resources, no impacts to cultural resources are expected to occur as a result of the Project. Given the potential for unanticipated cultural discoveries, MMs CUL-1, CUL-2, and CUL-3 and MMs TCR-1 and TCR-2 will be implemented. MMs CUL-1, CUL-2, and CUL-3 and MMs TCR-1 and TCR-2 detail the procedures that will be followed in the event that an inadvertent cultural resource or human remain is discovered during Project construction.

Overall, the Project will not 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, reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major period of California history or prehistory. As a result, the impact will be less than significant with mitigation incorporated.

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. As discussed in this Initial Study/Mitigated Negative Declaration (IS/MND), the Project will result in no impact or less-than-significant impacts to the following resources:

- aesthetics;
- agriculture and forestry resources;
- air quality;
- energy;
- greenhouse gas emissions;
- hazards and hazardous materials;
- hydrology and water quality;
- land use and planning;
- mineral resources;
- noise;
- population and housing;
- public services;
- recreation;
- transportation; and
- utilities and service systems.

The Project will result in less-than-significant impacts with mitigation incorporated for the following resources:

- biological resources;
- cultural resources;
- geology and soils;
- tribal cultural resources; and
- wildfire.

Given the size of the Project, lack of impacts associated with the Project, and absence of existing development within the surrounding parcels, the effects of past projects were not considered in this analysis. In addition, only resources where mitigation is incorporated to reduce impacts to less-than-significant levels for the Project were considered in this analysis.

Review of the City of Hesperia's (City's) California Environmental Quality Act (CEQA) Portal identified proposed and approved projects within 0.5 mile of the Project, as summarized in Table 6: Proposed and Approved Projects within 0.5 Mile. The Project's contribution to cumulative biological, cultural, geology and soils, tribal cultural, and wildfire impacts will be less than significant, as discussed in the subsections that follow.

Biological Resources

A significant cumulative impact on biological resources could result if the Project contributes to cumulative impacts related to sensitive habitat or species, sensitive habitat/natural communities, or wildlife movement corridors. At the Project level, no impacts related to local policies, ordinances, and plans protecting biological resources were identified; therefore, the Project will not contribute to cumulative impacts on local policies, ordinances, and plans protecting biological resources. As discussed in Section 4.4 Biological Resources, Project-level impacts on migratory corridors were found to be less than significant due to the Project being located adjacent to United States (U.S.) Highway 395 and Phelan Road, as well as the absence of CDFW- or Bureau of Land Management-identified wildlife corridors. As discussed previously, impacts to western Joshua trees will be reduced through MM BIO-1, potential impacts to burrowing owl will be reduced through MM BIO-2 and MM BIO-3, and impacts to loggerhead shrike will be reduced through implementation of MM BIO-4.

It is anticipated that the projects included in Table 6: Proposed and Approved Projects within 0.5 Mile will mitigate impacts to biological resources and comply with applicable federal, state, and local laws and regulations that protect biological resources. For instance, the Dara Industrial Project includes MMs to avoid or reduce impacts to western Joshua tree, burrowing owl, and special-status species. Likewise, the Hesperia Commerce Center II, I-15 Industrial Park, KISS Logistics Center, and U.S. Cold Storage Hesperia projects include MMs for western Joshua trees, burrowing owl, and pre-construction nesting bird surveys. The Phelan 20 Project may have potentially significant impacts on biological resources; however, final impacts and MMs will be determined in the Environmental Impacts Report (EIR) that is currently being prepared. Therefore, nearby proposed and approved projects are implementing measures to reduce impacts to western Joshua trees and nesting birds or are in the process of determining appropriate MMs for impacts to biological resources. In addition, the Project's size is significantly smaller in comparison to the other nearby projects. As a result, the Project's contribution to cumulative biological resources impacts will be less than significant.

Cultural Resources

A significant cumulative impact on cultural resources could result if the Project contributes to cumulative direct or indirect impacts on significant historical or archaeological resources, and/or inadvertently discovered human remains. As discussed in Section 4.5 Cultural Resources, no impacts to cultural resources are expected to occur as a result of the Project. However, the Project will implement MMs CUL-1, CUL-2, and CUL-3 to minimize impacts to inadvertent cultural resource or human remain discoveries that, although unanticipated, may occur during Project construction.

While proposed and approved projects could also encounter subsurface resources or remains, the existing regulations and plans, as well as standard MMs, will reduce potentially significant impacts to less-than-significant levels. In addition, impacts to cultural resources are site-specific, and as such are not expected to combine with the development of other projects to cumulatively increase the risk of impacting subsurface resources or remains. Potential impacts will be evaluated on a case-by-case basis. Therefore, the Project's incremental contribution to cumulative cultural resources impacts will be less than significant.

Table 6: Proposed and Approved Projects within 0.5 Mile

Project Name	Project Description	Approximate Distance to the Project	Project Status	Anticipated Construction Schedule
CUP23-00008	CUP23-00008 includes the construction of an approximately 469,979-square-foot warehouse distribution building on approximately 26.94 gross acres located approximately 1,000 feet east of U.S. Highway 395 and Yucca Terrace Drive.	0.3 mile north	Under Review	Information Not Available (INA)[12]
Dara Industrial Project (CUP22-00003)	CUP22-00003 includes the construction of an approximately 750,000-square-foot warehouse distribution building on approximately 47 acres located on the west side of U.S. Highway 395 and approximately 600 feet north of Aspen Street.	0.5 mile south	Approved	INA
Hesperia Commerce Center II Project (CUP19-00010)	CUP19-00010 includes the construction of three industrial warehouse buildings totaling approximately 3.75 million square feet on 195 acres of land located north of Phelan Road, west of U.S. Highway 395, south of Yucca Terrace Drive, and east of the Los Angeles Department of Water and Power line corridor.	0.15 mile west	In Construction	2025
I-15 Industrial Park Project (CUP21-00005 & CUP21-00004)	CUP21-00005 includes the construction of an approximately 742,000-square-foot distribution building on approximately 36 gross acres located at the northeast corner of U.S. Highway 395 and Poplar Street. CUP21-00004 includes the construction of an approximately 1,108,000-square-foot warehouse distribution building on approximately 69 gross acres located on the east side of Mesa Linda Avenue at the intersection of Mesa Linda Avenue and Poplar Street.	0.5 mile southeast	Approved	INA

[12] At the time that this IS/MND was prepared, construction schedules were either not publicly available or were in the planning process with a construction schedule yet to be determined.

Project Name	Project Description	Approximate Distance to the Project	Project Status	Anticipated Construction Schedule
Phelan 20 Project (CUP23-00005)	CUP23-00005 includes the construction of an approximately 419,700-square-foot warehouse distribution building on approximately 22.61 gross acres located approximately 1,000 feet east of the U.S. Highway 395 and Phelan Road intersection.	0.1 mile southwest	Under Review	INA
KISS Logistics Center (CUP22-00017)	CUP22-00017 includes construction of an approximately 655,468-square-foot warehouse distribution building on approximately 29.6 gross acres located west of U.S. Highway 395 and approximately 600 feet north of Phelan Road.	0.05 mile north	Pending Approval of City Council	INA
U.S. Cold Storage Hesperia (CUP21-00003)	CUP21-00003 includes the construction of an approximately 491,000-square-foot refrigerated distribution warehouse located on approximately 39.05 gross acres located on the east side of U.S. Highway 395.	0.45 mile northeast	Under Review	INA

Sources: Applied Planning, Inc. 2022; City of Hesperia 2025; Dudek 2020, 2022, 2024; EPD Solutions, Inc. 2023; Lilburn Corporation 2021

Geology and Soils

A significant cumulative impact on paleontological resources could result if the Project contributes to cumulative impacts on significant resources, sites, or unique geologic features. The Project will be located on the Quaternary older alluvium (Qoa) geologic unit. Because the excavation activities associated with the Project will not exceed 15 feet below ground surface, there is a low to moderate potential to encounter intact paleontological resources during construction. MM PALEO-1, which details the procedure to follow in the event that a fossil discovery is made during Project excavation activities, will be implemented to reduce potential impacts to paleontological resources.

It is anticipated that proposed and approved projects will follow similar best practices and abide by existing regulations if there is the potential to impact paleontological resources. For instance, the Dara Industrial, Hesperia Commerce Center II, I-15 Industrial Park, KISS Logistics Center, and U.S. Cold Storage Hesperia projects include MMs to reduce or minimize impacts to paleontological resources. The Phelan 20 Project may have potentially significant impacts on paleontological resources; however, final impacts and MMs will be determined in the EIR that is currently being prepared. Impacts to paleontological resources are site-specific, and as such are not expected to combine with the development of other projects to cumulatively increase the risk of impacting subsurface resources. Therefore, the Project's incremental contribution to cumulative paleontological resources impacts will be less than significant.

Tribal Cultural Resources

A cumulatively considerable impact on tribal cultural resources could result if the Project contributes to a substantial adverse change in the significance of a tribal cultural resource. As discussed in Section 4.18 Tribal Cultural Resources, no tribal cultural resources have been identified on the Project site. Impacts to previously unidentified tribal cultural resources encountered during construction will be reduced to the greatest extent possible through implementation of MMs TCR-1 and TCR-2. These MMs will reduce impacts to less-than-significant levels if previously unidentified tribal cultural resources are encountered during construction by establishing procedures for avoiding impacts in the event of an inadvertent discovery.

The nearby proposed and approved projects have the potential to uncover tribal cultural resources during ground-disturbing activities. However, all projects are required to comply with state regulations that protect tribal cultural resources. In addition, impacts to tribal cultural resources are site-specific, and are not expected to combine with the development of other projects to increase the risk of impacting tribal cultural resources. Therefore, the Project's incremental contribution to cumulative tribal cultural resources impacts will be less than significant.

Wildfire

Cumulative impacts on wildfires have the potential to occur if multiple projects have a combined impact on emergency response or evacuation plans, exposure of project occupants to wildfire or wildfire-caused pollutants, exacerbation of fire risk, or post-fire flooding risks. As discussed in Section 4.20 Wildfire, the Project is located in an area with potential wildfire risk. Therefore, MM FIRE-1, which details the fire management procedures to follow during construction, will

be implemented to reduce the Project's potential to exacerbate wildfire risks. All Project structures will be constructed in compliance with the California Fire Code (24 California Code of Regulations [CCR] 9). The vehicle fueling station will be designed and operated in accordance with the California Fire Code and California Mechanical Code (24 CCR 4), and the underground storage tanks will be designed and constructed in accordance with California Health and Safety Code (HSC) Chapter 6.7 and Title 23, Division 3, Chapter 16 of the CCR. In addition, the Project's convenience store, car wash, and vehicle fueling station will be constructed and designed consistent with Chapter 16.16, Section 365 of the City's Municipal Code and the Commercial Design Standards and Guidelines found in the City's Main Street and Freeway Corridor Specific Plan.

The Dara Industrial Project is not located within or near a state responsibility area or within an area classified as a very high fire hazard severity zone (FHSZ) (Applied Planning, Inc. 2022). The Hesperia Commerce Center II and I-15 Industrial Park projects are near lands classified as moderate and high FHSZs. As a result, the projects will adhere to the City's Municipal Code, use low ignitable building materials, and implement fire-resistant irrigated landscaping (Dudek 2020, 2022). The Phelan 20 Project may have potentially significant impacts on wildfire; however, final impacts and MMs will be determined in the EIR that is currently being prepared. The KISS Logistics Center and U.S. Cold Storage Hesperia projects will adhere to the development standards in the City's Municipal Code, which are intended to address wildfire risks (EPD Solutions Inc. 2023, Lilburn Corporation 2021). Therefore, nearby proposed and approved projects are implementing design standards to address wildfire risks or are in the process of determining appropriate measures for impacts to wildfire. As a result, the Project's contribution to cumulative wildfire risks will be less than significant.

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

Less-than-Significant Impact. In general, impacts to human beings are associated with air quality, geologic hazards, hazards and hazardous materials, noise, and traffic safety impacts. As discussed in Section 4.3 Air Quality, all emissions will be below applicable Mojave Desert Air Quality Management District significance thresholds.

As discussed previously, the Project will not result in environmental impacts that will have substantial direct or indirect effects on human beings with respect to geologic hazards, as all Project structures will be constructed in compliance with Title 24, Part 2 of the California Building Code and Chapter 16 of the International Building Code. In addition, Hilltop Geotechnical, Inc. prepared a geotechnical study and infiltration feasibility study for the Project. Recommendations from both studies will be incorporated into the Project design to ensure that all structures will adequately resist the forces of an earthquake. The geotechnical study and infiltration feasibility study are provided in Attachment 4.6-A: Geotechnical Study and Attachment 4.6-B: Infiltration Feasibility Study in Section 4.7 Geology and Soils.

As discussed in Section 4.9 Hazards and Hazardous Materials, the Project's potential for hazards from hazardous materials or accidents will be less than significant as the Project's vehicle fueling station will be designed and operated in accordance with the California Fire Code and California Mechanical Code (24 CCR 4), and underground storage tanks will be designed and constructed in accordance with Chapter 6.7 of the California HSC and Title 23, Division 3, Chapter 16 of the

CCR. In addition, all potentially hazardous materials will be stored, transported, and disposed of in accordance with the Project-specific Hazardous Materials Business Plan.

The nearest sensitive receptors to the Project are within a residential community located approximately 0.3 mile (1,700 feet) east of the Project on Mesa Linda Street. As discussed in Section 4.13 Noise, construction will not have the potential to generate significant short-term groundborne vibration or groundborne noise at the nearest sensitive receptors. The Project will not exceed the noise level limit at any property boundary during operation.

As discussed in Section 4.17 Transportation, the Project will not result in transportation impacts related to increased vehicle miles traveled and will not conflict or be inconsistent with CEQA Guidelines Section 15064.3, subdivision (b). In addition, the Project includes improvements to U.S. Highway 395, Phelan Road, and the traffic signal on the northwestern corner of the Phelan Road and U.S. Highway 395 intersection to reduce the potential for traffic-related incidents involving vehicles entering and exiting the Project's proposed driveways along Phelan Road and U.S. Highway 395. Neither the construction phase nor the operation phase of the Project will generate any permanent traffic hazards.

Overall, the Project will not cause substantial adverse effects on human beings, either directly or indirectly, and the impact will be less than significant.

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ATTACHMENT A: CALEEMOD: HESPERIA PHELAN DETAILED REPORT

Hesperia Phelan Detailed Report

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1.1. Basic Project Information

Data Field	Value
Project Name	Hesperia Phelan
Construction Start Date	1/6/2026
Operational Year	2026
Lead Agency	—
Land Use Scale	Project/site
Analysis Level for Defaults	County
Windspeed (m/s)	2.80
Precipitation (days)	1.40
Location	34.427183248214334, -117.40060217043182
County	San Bernardino-Mojave Desert
City	Hesperia
Air District	Mojave Desert AQMD
Air Basin	Mojave Desert
TAZ	5106
EDFZ	10
Electric Utility	Southern California Edison
Gas Utility	Southwest Gas Corp.
App Version	2022.1.1.29

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

Convenience Market with Gas Pumps	10.0	Pump	2.37	7,883	26,572	0.00	—	—

1.3. User-Selected Emission Reduction Measures by Emissions Sector

Sector	#	Measure Title
Construction	C-2*	Limit Heavy-Duty Diesel Vehicle Idling
Construction	C-11	Limit Vehicle Speeds on Unpaved Roads
Construction	C-12	Sweep Paved Roads

* Qualitative or supporting measure. Emission reductions not included in the mitigated emissions results.

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.	ROG	NOx	CO	SO2	PM10T	PM2.5T	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—
Unmit.	3.78	10.2	12.0	0.02	4.53	0.72	2,286	0.09	0.03	2,296
Mit.	3.78	10.2	12.0	0.02	4.53	0.68	2,286	0.09	0.03	2,296
% Reduced	—	—	—	—	—	6%	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—
Unmit.	1.71	23.6	17.3	0.09	51.0	7.18	11,774	0.13	1.40	12,197
Mit.	1.71	23.6	17.3	0.09	49.7	7.05	11,774	0.13	1.40	12,197
% Reduced	—	—	—	—	3%	2%	—	—	—	—
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—
Unmit.	0.83	6.88	7.37	0.02	5.89	0.87	2,029	0.05	0.12	2,066
Mit.	0.83	6.88	7.37	0.02	5.16	0.80	2,029	0.05	0.12	2,066

% Reduced	—	—	—	—	12%	8%	—	—	—	—
Annual (Max)	—	—	—	—	—	—	—	—	—	—
Unmit.	0.15	1.26	1.34	< 0.005	1.07	0.16	336	0.01	0.02	342
Mit.	0.15	1.26	1.34	< 0.005	0.94	0.15	336	0.01	0.02	342
% Reduced	—	—	—	—	12%	8%	—	—	—	—
Exceeds (Daily Max)	—	—	—	—	—	—	—	—	—	—
Threshold	137	137	548	137	82.0	65.0	—	—	—	548,000
Unmit.	No	No	No	No	No	No	—	—	—	No
Mit.	No	No	No	No	No	No	—	—	—	No
Exceeds (Average Daily)	—	—	—	—	—	—	—	—	—	—
Threshold	137	137	548	137	82.0	65.0	—	—	—	548,000
Unmit.	No	No	No	No	No	No	—	—	—	No
Mit.	No	No	No	No	No	No	—	—	—	No
Exceeds (Annual)	—	—	—	—	—	—	—	—	—	—
Threshold	25.0	25.0	100	25.0	15.0	12.0	—	—	—	—
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	ROG	NOx	CO	SO2	PM10T	PM2.5T	CO2T	CH4	N2O	CO2e
Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—
2026	3.78	10.2	12.0	0.02	4.53	0.72	2,286	0.09	0.03	2,296
Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—
2026	1.71	23.6	17.3	0.09	51.0	7.18	11,774	0.13	1.40	12,197

Average Daily	—	—	—	—	—	—	—	—	—	—
2026	0.83	6.88	7.37	0.02	5.89	0.87	2,029	0.05	0.12	2,066
Annual	—	—	—	—	—	—	—	—	—	—
2026	0.15	1.26	1.34	< 0.005	1.07	0.16	336	0.01	0.02	342

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	ROG	NOx	CO	SO2	PM10T	PM2.5T	CO2T	CH4	N2O	CO2e
Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—
2026	3.78	10.2	12.0	0.02	4.53	0.68	2,286	0.09	0.03	2,296
Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—
2026	1.71	23.6	17.3	0.09	49.7	7.05	11,774	0.13	1.40	12,197
Average Daily	—	—	—	—	—	—	—	—	—	—
2026	0.83	6.88	7.37	0.02	5.16	0.80	2,029	0.05	0.12	2,066
Annual	—	—	—	—	—	—	—	—	—	—
2026	0.15	1.26	1.34	< 0.005	0.94	0.15	336	0.01	0.02	342

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.	ROG	NOx	CO	SO2	PM10T	PM2.5T	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—
Unmit.	64.1	22.4	172	0.23	17.2	4.51	23,670	2.84	1.90	26,013
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—
Unmit.	54.8	23.9	165	0.21	17.2	4.51	21,917	3.18	1.96	24,217

Average Daily (Max)	—	—	—	—	—	—	—	—	—	—
Unmit.	55.3	24.1	175	0.21	17.1	4.48	22,247	3.25	1.98	24,583
Annual (Max)	—	—	—	—	—	—	—	—	—	—
Unmit.	10.1	4.40	31.9	0.04	3.12	0.82	3,683	0.54	0.33	4,070
Exceeds (Daily Max)	—	—	—	—	—	—	—	—	—	—
Threshold	—	—	—	—	—	—	—	—	—	548,000
Unmit.	—	—	—	—	—	—	—	—	—	No
Exceeds (Average Daily)	—	—	—	—	—	—	—	—	—	—
Threshold	—	—	—	—	—	—	—	—	—	548,000
Unmit.	—	—	—	—	—	—	—	—	—	No
Exceeds (Annual)	—	—	—	—	—	—	—	—	—	—
Threshold	25.0	25.0	100	25.0	15.0	12.0	—	—	—	100,000
Unmit.	No	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	ROG	NOx	CO	SO2	PM10T	PM2.5T	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—
Mobile	63.8	22.4	172	0.23	17.2	4.50	23,248	2.57	1.90	23,948
Area	0.23	< 0.005	0.34	< 0.005	< 0.005	< 0.005	1.41	< 0.005	< 0.005	1.41
Energy	< 0.005	0.04	0.03	< 0.005	< 0.005	< 0.005	413	0.03	< 0.005	415
Water	—	—	—	—	—	—	4.71	0.02	< 0.005	5.39
Waste	—	—	—	—	—	—	2.28	0.23	0.00	7.99
Refrig.	—	—	—	—	—	—	—	—	—	1,634
Total	64.1	22.4	172	0.23	17.2	4.51	23,670	2.84	1.90	26,013

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—
Mobile	54.6	23.9	165	0.21	17.2	4.50	21,497	2.91	1.96	22,155
Area	0.18	—	—	—	—	—	—	—	—	—
Energy	< 0.005	0.04	0.03	< 0.005	< 0.005	< 0.005	413	0.03	< 0.005	415
Water	—	—	—	—	—	—	4.71	0.02	< 0.005	5.39
Waste	—	—	—	—	—	—	2.28	0.23	0.00	7.99
Refrig.	—	—	—	—	—	—	—	—	—	1,634
Total	54.8	23.9	165	0.21	17.2	4.51	21,917	3.18	1.96	24,217
Average Daily	—	—	—	—	—	—	—	—	—	—
Mobile	55.1	24.1	175	0.21	17.1	4.48	21,826	2.97	1.98	22,519
Area	0.21	< 0.005	0.17	< 0.005	< 0.005	< 0.005	0.70	< 0.005	< 0.005	0.70
Energy	< 0.005	0.04	0.03	< 0.005	< 0.005	< 0.005	413	0.03	< 0.005	415
Water	—	—	—	—	—	—	4.71	0.02	< 0.005	5.39
Waste	—	—	—	—	—	—	2.28	0.23	0.00	7.99
Refrig.	—	—	—	—	—	—	—	—	—	1,634
Total	55.3	24.1	175	0.21	17.1	4.48	22,247	3.25	1.98	24,583
Annual	—	—	—	—	—	—	—	—	—	—
Mobile	10.0	4.40	31.9	0.04	3.12	0.82	3,614	0.49	0.33	3,728
Area	0.04	< 0.005	0.03	< 0.005	< 0.005	< 0.005	0.12	< 0.005	< 0.005	0.12
Energy	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	68.5	< 0.005	< 0.005	68.7
Water	—	—	—	—	—	—	0.78	< 0.005	< 0.005	0.89
Waste	—	—	—	—	—	—	0.38	0.04	0.00	1.32
Refrig.	—	—	—	—	—	—	—	—	—	271
Total	10.1	4.40	31.9	0.04	3.12	0.82	3,683	0.54	0.33	4,070

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	ROG	NOx	CO	SO2	PM10T	PM2.5T	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—
Mobile	63.8	22.4	172	0.23	17.2	4.50	23,248	2.57	1.90	23,948
Area	0.23	< 0.005	0.34	< 0.005	< 0.005	< 0.005	1.41	< 0.005	< 0.005	1.41
Energy	< 0.005	0.04	0.03	< 0.005	< 0.005	< 0.005	413	0.03	< 0.005	415
Water	—	—	—	—	—	—	4.71	0.02	< 0.005	5.39
Waste	—	—	—	—	—	—	2.28	0.23	0.00	7.99
Refrig.	—	—	—	—	—	—	—	—	—	1,634
Total	64.1	22.4	172	0.23	17.2	4.51	23,670	2.84	1.90	26,013
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—
Mobile	54.6	23.9	165	0.21	17.2	4.50	21,497	2.91	1.96	22,155
Area	0.18	—	—	—	—	—	—	—	—	—
Energy	< 0.005	0.04	0.03	< 0.005	< 0.005	< 0.005	413	0.03	< 0.005	415
Water	—	—	—	—	—	—	4.71	0.02	< 0.005	5.39
Waste	—	—	—	—	—	—	2.28	0.23	0.00	7.99
Refrig.	—	—	—	—	—	—	—	—	—	1,634
Total	54.8	23.9	165	0.21	17.2	4.51	21,917	3.18	1.96	24,217
Average Daily	—	—	—	—	—	—	—	—	—	—
Mobile	55.1	24.1	175	0.21	17.1	4.48	21,826	2.97	1.98	22,519
Area	0.21	< 0.005	0.17	< 0.005	< 0.005	< 0.005	0.70	< 0.005	< 0.005	0.70
Energy	< 0.005	0.04	0.03	< 0.005	< 0.005	< 0.005	413	0.03	< 0.005	415
Water	—	—	—	—	—	—	4.71	0.02	< 0.005	5.39
Waste	—	—	—	—	—	—	2.28	0.23	0.00	7.99
Refrig.	—	—	—	—	—	—	—	—	—	1,634
Total	55.3	24.1	175	0.21	17.1	4.48	22,247	3.25	1.98	24,583
Annual	—	—	—	—	—	—	—	—	—	—
Mobile	10.0	4.40	31.9	0.04	3.12	0.82	3,614	0.49	0.33	3,728

Area	0.04	< 0.005	0.03	< 0.005	< 0.005	< 0.005	0.12	< 0.005	< 0.005	0.12
Energy	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	68.5	< 0.005	< 0.005	68.7
Water	—	—	—	—	—	—	0.78	< 0.005	< 0.005	0.89
Waste	—	—	—	—	—	—	0.38	0.04	0.00	1.32
Refrig.	—	—	—	—	—	—	—	—	—	271
Total	10.1	4.40	31.9	0.04	3.12	0.82	3,683	0.54	0.33	4,070

3. Construction Emissions Details

3.1. Site Preparation (2026) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10T	PM2.5T	CO2T	CH4	N2O	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.18	10.2	11.2	0.03	0.44	0.40	2,883	0.12	0.02	2,893
Dust From Material Movement	—	—	—	—	0.66	0.07	—	—	—	—
Onsite truck	< 0.005	0.02	0.02	< 0.005	2.94	0.29	8.71	< 0.005	< 0.005	9.12
Average Daily	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.03	0.25	0.28	< 0.005	0.01	0.01	71.1	< 0.005	< 0.005	71.3
Dust From Material Movement	—	—	—	—	0.02	< 0.005	—	—	—	—
Onsite truck	< 0.005	< 0.005	< 0.005	< 0.005	0.07	0.01	0.21	< 0.005	< 0.005	0.22
Annual	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	0.01	0.05	0.05	< 0.005	< 0.005	< 0.005	11.8	< 0.005	< 0.005	11.8
Dust From Material Movement	—	—	—	—	< 0.005	< 0.005	—	—	—	—
Onsite truck	< 0.005	< 0.005	< 0.005	< 0.005	0.01	< 0.005	0.04	< 0.005	< 0.005	0.04
Offsite	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—
Worker	0.04	0.05	0.51	0.00	2.85	0.30	127	< 0.005	< 0.005	128
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.18	10.3	2.25	0.06	41.1	4.62	8,756	0.01	1.37	9,167
Average Daily	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.01	0.00	0.07	0.01	3.21	< 0.005	< 0.005	3.26
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	0.26	0.05	< 0.005	1.01	0.11	216	< 0.005	0.03	226
Annual	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.00	0.01	< 0.005	0.53	< 0.005	< 0.005	0.54
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	0.05	0.01	< 0.005	0.18	0.02	35.7	< 0.005	0.01	37.4

3.2. Site Preparation (2026) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10T	PM2.5T	CO2T	CH4	N2O	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	1.18	10.2	11.2	0.03	0.44	0.40	2,883	0.12	0.02	2,893
Dust From Material Movement	—	—	—	—	0.66	0.07	—	—	—	—
Onsite truck	< 0.005	0.02	0.02	< 0.005	1.65	0.16	8.71	< 0.005	< 0.005	9.12
Average Daily	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.03	0.25	0.28	< 0.005	0.01	0.01	71.1	< 0.005	< 0.005	71.3
Dust From Material Movement	—	—	—	—	0.02	< 0.005	—	—	—	—
Onsite truck	< 0.005	< 0.005	< 0.005	< 0.005	0.04	< 0.005	0.21	< 0.005	< 0.005	0.22
Annual	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.05	0.05	< 0.005	< 0.005	< 0.005	11.8	< 0.005	< 0.005	11.8
Dust From Material Movement	—	—	—	—	< 0.005	< 0.005	—	—	—	—
Onsite truck	< 0.005	< 0.005	< 0.005	< 0.005	0.01	< 0.005	0.04	< 0.005	< 0.005	0.04
Offsite	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—
Worker	0.04	0.05	0.51	0.00	2.85	0.30	127	< 0.005	< 0.005	128
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.18	10.3	2.25	0.06	41.1	4.62	8,756	0.01	1.37	9,167
Average Daily	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.01	0.00	0.07	0.01	3.21	< 0.005	< 0.005	3.26
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	0.26	0.05	< 0.005	1.01	0.11	216	< 0.005	0.03	226

Annual	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.00	0.01	< 0.005	0.53	< 0.005	< 0.005	0.54
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	0.05	0.01	< 0.005	0.18	0.02	35.7	< 0.005	0.01	37.4

3.3. Grading (2026) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10T	PM2.5T	CO2T	CH4	N2O	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.48	13.2	14.4	0.02	0.59	0.54	2,622	0.11	0.02	2,631
Dust From Material Movement	—	—	—	—	2.80	1.34	—	—	—	—
Onsite truck	< 0.005	0.02	0.02	< 0.005	2.94	0.29	8.71	< 0.005	< 0.005	9.12
Average Daily	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.07	0.65	0.71	< 0.005	0.03	0.03	129	0.01	< 0.005	130
Dust From Material Movement	—	—	—	—	0.14	0.07	—	—	—	—
Onsite truck	< 0.005	< 0.005	< 0.005	< 0.005	0.14	0.01	0.43	< 0.005	< 0.005	0.45
Annual	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.12	0.13	< 0.005	0.01	< 0.005	21.4	< 0.005	< 0.005	21.5
Dust From Material Movement	—	—	—	—	0.03	0.01	—	—	—	—

Onsite truck	< 0.005	< 0.005	< 0.005	< 0.005	0.03	< 0.005	0.07	< 0.005	< 0.005	0.07
Offsite	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—
Worker	0.05	0.06	0.64	0.00	3.57	0.38	158	< 0.005	0.01	160
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.18	10.3	2.25	0.06	41.1	4.62	8,756	0.01	1.37	9,167
Average Daily	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.04	0.00	0.18	0.02	8.03	< 0.005	< 0.005	8.14
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.01	0.51	0.11	< 0.005	2.02	0.23	432	< 0.005	0.07	452
Annual	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.01	0.00	0.03	< 0.005	1.33	< 0.005	< 0.005	1.35
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	0.09	0.02	< 0.005	0.37	0.04	71.5	< 0.005	0.01	74.9

3.4. Grading (2026) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10T	PM2.5T	CO2T	CH4	N2O	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.48	13.2	14.4	0.02	0.59	0.54	2,622	0.11	0.02	2,631
Dust From Material Movement	—	—	—	—	2.80	1.34	—	—	—	—

Onsite truck	< 0.005	0.02	0.02	< 0.005	1.65	0.16	8.71	< 0.005	< 0.005	9.12
Average Daily	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.07	0.65	0.71	< 0.005	0.03	0.03	129	0.01	< 0.005	130
Dust From Material Movement	—	—	—	—	0.14	0.07	—	—	—	—
Onsite truck	< 0.005	< 0.005	< 0.005	< 0.005	0.08	0.01	0.43	< 0.005	< 0.005	0.45
Annual	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.12	0.13	< 0.005	0.01	< 0.005	21.4	< 0.005	< 0.005	21.5
Dust From Material Movement	—	—	—	—	0.03	0.01	—	—	—	—
Onsite truck	< 0.005	< 0.005	< 0.005	< 0.005	0.01	< 0.005	0.07	< 0.005	< 0.005	0.07
Offsite	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—
Worker	0.05	0.06	0.64	0.00	3.57	0.38	158	< 0.005	0.01	160
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.18	10.3	2.25	0.06	41.1	4.62	8,756	0.01	1.37	9,167
Average Daily	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.04	0.00	0.18	0.02	8.03	< 0.005	< 0.005	8.14
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.01	0.51	0.11	< 0.005	2.02	0.23	432	< 0.005	0.07	452
Annual	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.01	0.00	0.03	< 0.005	1.33	< 0.005	< 0.005	1.35
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	0.09	0.02	< 0.005	0.37	0.04	71.5	< 0.005	0.01	74.9

3.5. 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	ROG	NOx	CO	SO2	PM10T	PM2.5T	CO2T	CH4	N2O	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.18	10.1	11.8	0.02	0.36	0.33	2,201	0.09	0.02	2,208
Onsite truck	< 0.005	0.02	0.01	< 0.005	2.94	0.29	8.65	< 0.005	< 0.005	9.07
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.18	10.1	11.8	0.02	0.36	0.33	2,201	0.09	0.02	2,208
Onsite truck	< 0.005	0.02	0.02	< 0.005	2.94	0.29	8.71	< 0.005	< 0.005	9.12
Average Daily	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.58	4.98	5.80	0.01	0.18	0.16	1,085	0.04	0.01	1,089
Onsite truck	< 0.005	0.01	0.01	< 0.005	1.45	0.14	4.28	< 0.005	< 0.005	4.48
Annual	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.11	0.91	1.06	< 0.005	0.03	0.03	180	0.01	< 0.005	180
Onsite truck	< 0.005	< 0.005	< 0.005	< 0.005	0.26	0.03	0.71	< 0.005	< 0.005	0.74
Offsite	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.19	0.00	0.72	0.08	36.1	< 0.005	< 0.005	36.6
Vendor	< 0.005	0.04	0.02	< 0.005	0.21	0.02	40.4	< 0.005	0.01	42.1
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.13	0.00	0.72	0.08	31.9	< 0.005	< 0.005	32.3

Vendor	< 0.005	0.04	0.02	< 0.005	0.21	0.02	40.4	< 0.005	0.01	42.0
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.07	0.00	0.35	0.04	16.2	< 0.005	< 0.005	16.4
Vendor	< 0.005	0.02	0.01	< 0.005	0.10	0.01	19.9	< 0.005	< 0.005	20.7
Hauling	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	0.01	0.00	0.06	0.01	2.68	< 0.005	< 0.005	2.72
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	0.02	< 0.005	3.30	< 0.005	< 0.005	3.43
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.6. 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	ROG	NOx	CO	SO2	PM10T	PM2.5T	CO2T	CH4	N2O	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.18	10.1	11.8	0.02	0.36	0.33	2,201	0.09	0.02	2,208
Onsite truck	< 0.005	0.02	0.01	< 0.005	1.65	0.16	8.65	< 0.005	< 0.005	9.07
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.18	10.1	11.8	0.02	0.36	0.33	2,201	0.09	0.02	2,208
Onsite truck	< 0.005	0.02	0.02	< 0.005	1.65	0.16	8.71	< 0.005	< 0.005	9.12
Average Daily	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.58	4.98	5.80	0.01	0.18	0.16	1,085	0.04	0.01	1,089
Onsite truck	< 0.005	0.01	0.01	< 0.005	0.81	0.08	4.28	< 0.005	< 0.005	4.48
Annual	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	0.11	0.91	1.06	< 0.005	0.03	0.03	180	0.01	< 0.005	180
Onsite truck	< 0.005	< 0.005	< 0.005	< 0.005	0.15	0.01	0.71	< 0.005	< 0.005	0.74
Offsite	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.19	0.00	0.72	0.08	36.1	< 0.005	< 0.005	36.6
Vendor	< 0.005	0.04	0.02	< 0.005	0.21	0.02	40.4	< 0.005	0.01	42.1
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.13	0.00	0.72	0.08	31.9	< 0.005	< 0.005	32.3
Vendor	< 0.005	0.04	0.02	< 0.005	0.21	0.02	40.4	< 0.005	0.01	42.0
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.07	0.00	0.35	0.04	16.2	< 0.005	< 0.005	16.4
Vendor	< 0.005	0.02	0.01	< 0.005	0.10	0.01	19.9	< 0.005	< 0.005	20.7
Hauling	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	0.01	0.00	0.06	0.01	2.68	< 0.005	< 0.005	2.72
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	0.02	< 0.005	3.30	< 0.005	< 0.005	3.43
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.7. Paving (2026) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10T	PM2.5T	CO2T	CH4	N2O	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	0.67	5.88	8.19	0.01	0.25	0.23	1,244	0.05	0.01	1,248
Paving	0.00	—	—	—	—	—	—	—	—	—
Onsite truck	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	0.02	0.16	0.22	< 0.005	0.01	0.01	34.1	< 0.005	< 0.005	34.2
Paving	0.00	—	—	—	—	—	—	—	—	—
Onsite truck	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	0.03	0.04	< 0.005	< 0.005	< 0.005	5.64	< 0.005	< 0.005	5.66
Paving	0.00	—	—	—	—	—	—	—	—	—
Onsite truck	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	0.07	1.16	0.00	4.28	0.45	214	0.01	0.01	218
Vendor	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
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.02	0.00	0.12	0.01	5.36	< 0.005	< 0.005	5.43
Vendor	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
Annual	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.00	0.02	< 0.005	0.89	< 0.005	< 0.005	0.90
Vendor	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

3.8. Paving (2026) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10T	PM2.5T	CO2T	CH4	N2O	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.67	5.88	8.19	0.01	0.25	0.23	1,244	0.05	0.01	1,248
Paving	0.00	—	—	—	—	—	—	—	—	—
Onsite truck	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	0.02	0.16	0.22	< 0.005	0.01	0.01	34.1	< 0.005	< 0.005	34.2
Paving	0.00	—	—	—	—	—	—	—	—	—
Onsite truck	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	0.03	0.04	< 0.005	< 0.005	< 0.005	5.64	< 0.005	< 0.005	5.66
Paving	0.00	—	—	—	—	—	—	—	—	—
Onsite truck	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	0.07	1.16	0.00	4.28	0.45	214	0.01	0.01	218
Vendor	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

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.02	0.00	0.12	0.01	5.36	< 0.005	< 0.005	5.43
Vendor	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
Annual	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.00	0.02	< 0.005	0.89	< 0.005	< 0.005	0.90
Vendor	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

3.9. 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	ROG	NOx	CO	SO2	PM10T	PM2.5T	CO2T	CH4	N2O	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.12	0.86	1.13	< 0.005	0.02	0.02	134	0.01	< 0.005	134
Architectural Coatings	3.65	—	—	—	—	—	—	—	—	—
Onsite truck	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	< 0.005	0.02	0.03	< 0.005	< 0.005	< 0.005	3.66	< 0.005	< 0.005	3.67
Architectural Coatings	0.10	—	—	—	—	—	—	—	—	—
Onsite truck	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	0.01	< 0.005	< 0.005	< 0.005	0.61	< 0.005	< 0.005	0.61
Architectural Coatings	0.02	—	—	—	—	—	—	—	—	—
Onsite truck	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	< 0.005	< 0.005	0.04	0.00	0.01	< 0.005	7.21	< 0.005	< 0.005	7.32
Vendor	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
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.18	< 0.005	< 0.005	0.18
Vendor	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
Annual	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.03	< 0.005	< 0.005	0.03
Vendor	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

3.10. 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	ROG	NOx	CO	SO2	PM10T	PM2.5T	CO2T	CH4	N2O	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.12	0.86	1.13	< 0.005	0.02	0.02	134	0.01	< 0.005	134

Architectural Coatings	3.65	—	—	—	—	—	—	—	—	—
Onsite truck	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	< 0.005	0.02	0.03	< 0.005	< 0.005	< 0.005	3.66	< 0.005	< 0.005	3.67
Architectural Coatings	0.10	—	—	—	—	—	—	—	—	—
Onsite truck	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	0.01	< 0.005	< 0.005	< 0.005	0.61	< 0.005	< 0.005	0.61
Architectural Coatings	0.02	—	—	—	—	—	—	—	—	—
Onsite truck	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	< 0.005	< 0.005	0.04	0.00	0.01	< 0.005	7.21	< 0.005	< 0.005	7.32
Vendor	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
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.18	< 0.005	< 0.005	0.18
Vendor	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
Annual	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.03	< 0.005	< 0.005	0.03

Vendor	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

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	ROG	NOx	CO	SO2	PM10T	PM2.5T	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—
Convenience Market with Gas Pumps	63.8	22.4	172	0.23	17.2	4.50	23,248	2.57	1.90	23,948
Total	63.8	22.4	172	0.23	17.2	4.50	23,248	2.57	1.90	23,948
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—
Convenience Market with Gas Pumps	54.6	23.9	165	0.21	17.2	4.50	21,497	2.91	1.96	22,155
Total	54.6	23.9	165	0.21	17.2	4.50	21,497	2.91	1.96	22,155
Annual	—	—	—	—	—	—	—	—	—	—
Convenience Market with Gas Pumps	10.0	4.40	31.9	0.04	3.12	0.82	3,614	0.49	0.33	3,728
Total	10.0	4.40	31.9	0.04	3.12	0.82	3,614	0.49	0.33	3,728

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	ROG	NOx	CO	SO2	PM10T	PM2.5T	CO2T	CH4	N2O	CO2e

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—
Convenience Market with Gas Pumps	63.8	22.4	172	0.23	17.2	4.50	23,248	2.57	1.90	23,948
Total	63.8	22.4	172	0.23	17.2	4.50	23,248	2.57	1.90	23,948
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—
Convenience Market with Gas Pumps	54.6	23.9	165	0.21	17.2	4.50	21,497	2.91	1.96	22,155
Total	54.6	23.9	165	0.21	17.2	4.50	21,497	2.91	1.96	22,155
Annual	—	—	—	—	—	—	—	—	—	—
Convenience Market with Gas Pumps	10.0	4.40	31.9	0.04	3.12	0.82	3,614	0.49	0.33	3,728
Total	10.0	4.40	31.9	0.04	3.12	0.82	3,614	0.49	0.33	3,728

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	ROG	NOx	CO	SO2	PM10T	PM2.5T	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—
Convenience Market with Gas Pumps	—	—	—	—	—	—	371	0.02	< 0.005	372
Total	—	—	—	—	—	—	371	0.02	< 0.005	372
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—
Convenience Market with Gas Pumps	—	—	—	—	—	—	371	0.02	< 0.005	372

Total	—	—	—	—	—	—	371	0.02	< 0.005	372
Annual	—	—	—	—	—	—	—	—	—	—
Convenience Market with Gas Pumps	—	—	—	—	—	—	61.4	< 0.005	< 0.005	61.6
Total	—	—	—	—	—	—	61.4	< 0.005	< 0.005	61.6

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	ROG	NOx	CO	SO2	PM10T	PM2.5T	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—
Convenience Market with Gas Pumps	—	—	—	—	—	—	371	0.02	< 0.005	372
Total	—	—	—	—	—	—	371	0.02	< 0.005	372
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—
Convenience Market with Gas Pumps	—	—	—	—	—	—	371	0.02	< 0.005	372
Total	—	—	—	—	—	—	371	0.02	< 0.005	372
Annual	—	—	—	—	—	—	—	—	—	—
Convenience Market with Gas Pumps	—	—	—	—	—	—	61.4	< 0.005	< 0.005	61.6
Total	—	—	—	—	—	—	61.4	< 0.005	< 0.005	61.6

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	ROG	NOx	CO	SO2	PM10T	PM2.5T	CO2T	CH4	N2O	CO2e

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—
Convenience Market with Gas Pumps	< 0.005	0.04	0.03	< 0.005	< 0.005	< 0.005	42.6	< 0.005	< 0.005	42.8
Total	< 0.005	0.04	0.03	< 0.005	< 0.005	< 0.005	42.6	< 0.005	< 0.005	42.8
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—
Convenience Market with Gas Pumps	< 0.005	0.04	0.03	< 0.005	< 0.005	< 0.005	42.6	< 0.005	< 0.005	42.8
Total	< 0.005	0.04	0.03	< 0.005	< 0.005	< 0.005	42.6	< 0.005	< 0.005	42.8
Annual	—	—	—	—	—	—	—	—	—	—
Convenience Market with Gas Pumps	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	7.06	< 0.005	< 0.005	7.08
Total	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	7.06	< 0.005	< 0.005	7.08

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	ROG	NOx	CO	SO2	PM10T	PM2.5T	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—
Convenience Market with Gas Pumps	< 0.005	0.04	0.03	< 0.005	< 0.005	< 0.005	42.6	< 0.005	< 0.005	42.8
Total	< 0.005	0.04	0.03	< 0.005	< 0.005	< 0.005	42.6	< 0.005	< 0.005	42.8
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—
Convenience Market with Gas Pumps	< 0.005	0.04	0.03	< 0.005	< 0.005	< 0.005	42.6	< 0.005	< 0.005	42.8
Total	< 0.005	0.04	0.03	< 0.005	< 0.005	< 0.005	42.6	< 0.005	< 0.005	42.8

Annual	—	—	—	—	—	—	—	—	—	—
Convenience Market with Gas Pumps	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	7.06	< 0.005	< 0.005	7.08
Total	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	7.06	< 0.005	< 0.005	7.08

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	ROG	NOx	CO	SO2	PM10T	PM2.5T	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—
Consumer Products	0.17	—	—	—	—	—	—	—	—	—
Architectural Coatings	0.01	—	—	—	—	—	—	—	—	—
Landscape Equipment	0.06	< 0.005	0.34	< 0.005	< 0.005	< 0.005	1.41	< 0.005	< 0.005	1.41
Total	0.23	< 0.005	0.34	< 0.005	< 0.005	< 0.005	1.41	< 0.005	< 0.005	1.41
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—
Consumer Products	0.17	—	—	—	—	—	—	—	—	—
Architectural Coatings	0.01	—	—	—	—	—	—	—	—	—
Total	0.18	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—
Consumer Products	0.03	—	—	—	—	—	—	—	—	—
Architectural Coatings	< 0.005	—	—	—	—	—	—	—	—	—

Landscape Equipment	0.01	< 0.005	0.03	< 0.005	< 0.005	< 0.005	0.12	< 0.005	< 0.005	0.12
Total	0.04	< 0.005	0.03	< 0.005	< 0.005	< 0.005	0.12	< 0.005	< 0.005	0.12

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	ROG	NOx	CO	SO2	PM10T	PM2.5T	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—
Consumer Products	0.17	—	—	—	—	—	—	—	—	—
Architectural Coatings	0.01	—	—	—	—	—	—	—	—	—
Landscape Equipment	0.06	< 0.005	0.34	< 0.005	< 0.005	< 0.005	1.41	< 0.005	< 0.005	1.41
Total	0.23	< 0.005	0.34	< 0.005	< 0.005	< 0.005	1.41	< 0.005	< 0.005	1.41
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—
Consumer Products	0.17	—	—	—	—	—	—	—	—	—
Architectural Coatings	0.01	—	—	—	—	—	—	—	—	—
Total	0.18	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—
Consumer Products	0.03	—	—	—	—	—	—	—	—	—
Architectural Coatings	< 0.005	—	—	—	—	—	—	—	—	—
Landscape Equipment	0.01	< 0.005	0.03	< 0.005	< 0.005	< 0.005	0.12	< 0.005	< 0.005	0.12
Total	0.04	< 0.005	0.03	< 0.005	< 0.005	< 0.005	0.12	< 0.005	< 0.005	0.12

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	ROG	NOx	CO	SO2	PM10T	PM2.5T	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—
Convenience Market with Gas Pumps	—	—	—	—	—	—	4.71	0.02	< 0.005	5.39
Total	—	—	—	—	—	—	4.71	0.02	< 0.005	5.39
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—
Convenience Market with Gas Pumps	—	—	—	—	—	—	4.71	0.02	< 0.005	5.39
Total	—	—	—	—	—	—	4.71	0.02	< 0.005	5.39
Annual	—	—	—	—	—	—	—	—	—	—
Convenience Market with Gas Pumps	—	—	—	—	—	—	0.78	< 0.005	< 0.005	0.89
Total	—	—	—	—	—	—	0.78	< 0.005	< 0.005	0.89

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	ROG	NOx	CO	SO2	PM10T	PM2.5T	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—
Convenience Market with Gas Pumps	—	—	—	—	—	—	4.71	0.02	< 0.005	5.39
Total	—	—	—	—	—	—	4.71	0.02	< 0.005	5.39

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—
Convenience Market with Gas Pumps	—	—	—	—	—	—	4.71	0.02	< 0.005	5.39
Total	—	—	—	—	—	—	4.71	0.02	< 0.005	5.39
Annual	—	—	—	—	—	—	—	—	—	—
Convenience Market with Gas Pumps	—	—	—	—	—	—	0.78	< 0.005	< 0.005	0.89
Total	—	—	—	—	—	—	0.78	< 0.005	< 0.005	0.89

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	ROG	NOx	CO	SO2	PM10T	PM2.5T	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—
Convenience Market with Gas Pumps	—	—	—	—	—	—	2.28	0.23	0.00	7.99
Total	—	—	—	—	—	—	2.28	0.23	0.00	7.99
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—
Convenience Market with Gas Pumps	—	—	—	—	—	—	2.28	0.23	0.00	7.99
Total	—	—	—	—	—	—	2.28	0.23	0.00	7.99
Annual	—	—	—	—	—	—	—	—	—	—
Convenience Market with Gas Pumps	—	—	—	—	—	—	0.38	0.04	0.00	1.32

Total	—	—	—	—	—	—	0.38	0.04	0.00	1.32

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	ROG	NOx	CO	SO2	PM10T	PM2.5T	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—
Convenience Market with Gas Pumps	—	—	—	—	—	—	2.28	0.23	0.00	7.99
Total	—	—	—	—	—	—	2.28	0.23	0.00	7.99
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—
Convenience Market with Gas Pumps	—	—	—	—	—	—	2.28	0.23	0.00	7.99
Total	—	—	—	—	—	—	2.28	0.23	0.00	7.99
Annual	—	—	—	—	—	—	—	—	—	—
Convenience Market with Gas Pumps	—	—	—	—	—	—	0.38	0.04	0.00	1.32
Total	—	—	—	—	—	—	0.38	0.04	0.00	1.32

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	ROG	NOx	CO	SO2	PM10T	PM2.5T	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—

Convenience Market with Gas Pumps	—	—	—	—	—	—	—	—	—	1,634
Total	—	—	—	—	—	—	—	—	—	1,634
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—
Convenience Market with Gas Pumps	—	—	—	—	—	—	—	—	—	1,634
Total	—	—	—	—	—	—	—	—	—	1,634
Annual	—	—	—	—	—	—	—	—	—	—
Convenience Market with Gas Pumps	—	—	—	—	—	—	—	—	—	271
Total	—	—	—	—	—	—	—	—	—	271

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	ROG	NOx	CO	SO2	PM10T	PM2.5T	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—
Convenience Market with Gas Pumps	—	—	—	—	—	—	—	—	—	1,634
Total	—	—	—	—	—	—	—	—	—	1,634
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—
Convenience Market with Gas Pumps	—	—	—	—	—	—	—	—	—	1,634
Total	—	—	—	—	—	—	—	—	—	1,634
Annual	—	—	—	—	—	—	—	—	—	—

Convenience Market with Gas Pumps	—	—	—	—	—	—	—	—	—	271
Total	—	—	—	—	—	—	—	—	—	271

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	ROG	NOx	CO	SO2	PM10T	PM2.5T	CO2T	CH4	N2O	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	ROG	NOx	CO	SO2	PM10T	PM2.5T	CO2T	CH4	N2O	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	ROG	NOx	CO	SO2	PM10T	PM2.5T	CO2T	CH4	N2O	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	ROG	NOx	CO	SO2	PM10T	PM2.5T	CO2T	CH4	N2O	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	ROG	NOx	CO	SO2	PM10T	PM2.5T	CO2T	CH4	N2O	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	ROG	NOx	CO	SO2	PM10T	PM2.5T	CO2T	CH4	N2O	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	ROG	NOx	CO	SO2	PM10T	PM2.5T	CO2T	CH4	N2O	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	ROG	NOx	CO	SO2	PM10T	PM2.5T	CO2T	CH4	N2O	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	ROG	NOx	CO	SO2	PM10T	PM2.5T	CO2T	CH4	N2O	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	ROG	NOx	CO	SO2	PM10T	PM2.5T	CO2T	CH4	N2O	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	ROG	NOx	CO	SO2	PM10T	PM2.5T	CO2T	CH4	N2O	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	ROG	NOx	CO	SO2	PM10T	PM2.5T	CO2T	CH4	N2O	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	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—

5. Activity Data

5.1. Construction Schedule

Phase Name	Phase Type	Start Date	End Date	Days Per Week	Work Days per Phase	Phase Description
Site Preparation	Site Preparation	1/6/2026	1/15/2026	6.00	9.00	—
Grading	Grading	1/16/2026	2/5/2026	6.00	18.0	—
Building Construction	Building Construction	2/6/2026	9/3/2026	6.00	180	—
Paving	Paving	9/4/2026	9/15/2026	6.00	10.0	—
Architectural Coating	Architectural Coating	9/16/2026	9/26/2026	6.00	10.0	—

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
Site Preparation	Graders	Diesel	Average	1.00	8.00	148	0.41
Site Preparation	Scrapers	Diesel	Average	1.00	8.00	423	0.48
Site Preparation	Tractors/Loaders/Backhoes	Diesel	Average	1.00	7.00	84.0	0.37
Site Preparation	Off-Highway Trucks	Diesel	Average	1.00	1.00	376	0.38
Grading	Graders	Diesel	Average	1.00	8.00	148	0.41
Grading	Rubber Tired Dozers	Diesel	Average	1.00	8.00	367	0.40
Grading	Tractors/Loaders/Backhoes	Diesel	Average	2.00	7.00	84.0	0.37
Grading	Off-Highway Trucks	Diesel	Average	1.00	1.00	376	0.38
Building Construction	Cranes	Diesel	Average	1.00	8.00	367	0.29
Building Construction	Forklifts	Diesel	Average	2.00	7.00	82.0	0.20
Building Construction	Generator Sets	Diesel	Average	1.00	8.00	14.0	0.74
Building Construction	Tractors/Loaders/Backhoes	Diesel	Average	1.00	6.00	84.0	0.37
Building Construction	Welders	Diesel	Average	3.00	8.00	46.0	0.45
Paving	Cement and Mortar Mixers	Diesel	Average	1.00	8.00	10.0	0.56
Paving	Pavers	Diesel	Average	1.00	8.00	81.0	0.42
Paving	Paving Equipment	Diesel	Average	1.00	8.00	89.0	0.36
Paving	Rollers	Diesel	Average	2.00	8.00	36.0	0.38
Paving	Tractors/Loaders/Backhoes	Diesel	Average	1.00	8.00	84.0	0.37
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

Site Preparation	Graders	Diesel	Average	1.00	8.00	148	0.41
Site Preparation	Scrapers	Diesel	Average	1.00	8.00	423	0.48
Site Preparation	Tractors/Loaders/Backhoes	Diesel	Average	1.00	7.00	84.0	0.37
Site Preparation	Off-Highway Trucks	Diesel	Average	1.00	1.00	376	0.38
Grading	Graders	Diesel	Average	1.00	8.00	148	0.41
Grading	Rubber Tired Dozers	Diesel	Average	1.00	8.00	367	0.40
Grading	Tractors/Loaders/Backhoes	Diesel	Average	2.00	7.00	84.0	0.37
Grading	Off-Highway Trucks	Diesel	Average	1.00	1.00	376	0.38
Building Construction	Cranes	Diesel	Average	1.00	8.00	367	0.29
Building Construction	Forklifts	Diesel	Average	2.00	7.00	82.0	0.20
Building Construction	Generator Sets	Diesel	Average	1.00	8.00	14.0	0.74
Building Construction	Tractors/Loaders/Backhoes	Diesel	Average	1.00	6.00	84.0	0.37
Building Construction	Welders	Diesel	Average	3.00	8.00	46.0	0.45
Paving	Cement and Mortar Mixers	Diesel	Average	1.00	8.00	10.0	0.56
Paving	Pavers	Diesel	Average	1.00	8.00	81.0	0.42
Paving	Paving Equipment	Diesel	Average	1.00	8.00	89.0	0.36
Paving	Rollers	Diesel	Average	2.00	8.00	36.0	0.38
Paving	Tractors/Loaders/Backhoes	Diesel	Average	1.00	8.00	84.0	0.37
Architectural Coating	Air Compressors	Diesel	Average	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
Site Preparation	—	—	—	—

Site Preparation	Worker	10.0	18.5	LDA,LDT1,LDT2
Site Preparation	Vendor	—	10.2	HHDT,MHDT
Site Preparation	Hauling	131	20.0	HHDT
Site Preparation	Onsite truck	1.00	2.00	HHDT
Grading	—	—	—	—
Grading	Worker	12.5	18.5	LDA,LDT1,LDT2
Grading	Vendor	—	10.2	HHDT,MHDT
Grading	Hauling	131	20.0	HHDT
Grading	Onsite truck	1.00	2.00	HHDT
Building Construction	—	—	—	—
Building Construction	Worker	2.52	18.5	LDA,LDT1,LDT2
Building Construction	Vendor	1.29	10.2	HHDT,MHDT
Building Construction	Hauling	0.00	20.0	HHDT
Building Construction	Onsite truck	1.00	2.00	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	0.50	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
Site Preparation	—	—	—	—

Site Preparation	Worker	10.0	18.5	LDA,LDT1,LDT2
Site Preparation	Vendor	—	10.2	HHDT,MHDT
Site Preparation	Hauling	131	20.0	HHDT
Site Preparation	Onsite truck	1.00	2.00	HHDT
Grading	—	—	—	—
Grading	Worker	12.5	18.5	LDA,LDT1,LDT2
Grading	Vendor	—	10.2	HHDT,MHDT
Grading	Hauling	131	20.0	HHDT
Grading	Onsite truck	1.00	2.00	HHDT
Building Construction	—	—	—	—
Building Construction	Worker	2.52	18.5	LDA,LDT1,LDT2
Building Construction	Vendor	1.29	10.2	HHDT,MHDT
Building Construction	Hauling	0.00	20.0	HHDT
Building Construction	Onsite truck	1.00	2.00	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	0.50	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	11,825	3,942	—

5.6. Dust Mitigation

5.6.1. Construction Earthmoving Activities

Phase Name	Material Imported (Cubic Yards)	Material Exported (Cubic Yards)	Acres Graded (acres)	Material Demolished (sq. ft.)	Acres Paved (acres)
Site Preparation	0.00	14,150	4.50	0.00	—
Grading	0.00	28,330	6.00	0.00	—
Paving	0.00	0.00	0.00	0.00	1.83

5.6.2. Construction Earthmoving Control Strategies

Control Strategies Applied	Frequency (per day)	PM10 Reduction	PM2.5 Reduction
Water Exposed Area	2	61%	61%

5.7. Construction Paving

Land Use	Area Paved (acres)	% Asphalt
Convenience Market with Gas Pumps	1.83	0%

5.8. Construction Electricity Consumption and Emissions Factors

kWh per Year and Emission Factor (lb/MWh)

Year	kWh per Year	CO2	CH4	N2O
2026	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
Convenience Market with Gas Pumps	15,940	15,940	15,940	5,818,100	24,029	23,681	23,681	8,734,418

5.9.2. Mitigated

Land Use Type	Trips/Weekday	Trips/Saturday	Trips/Sunday	Trips/Year	VMT/Weekday	VMT/Saturday	VMT/Sunday	VMT/Year
Convenience Market with Gas Pumps	15,940	15,940	15,940	5,818,100	24,029	23,681	23,681	8,734,418

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	11,825	3,942	—

5.10.3. Landscape Equipment

Season	Unit	Value
Snow Days	day/yr	0.00

Summer Days	day/yr	180

5.10.4. Landscape Equipment - Mitigated

Season	Unit	Value
Snow Days	day/yr	0.00
Summer Days	day/yr	180

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)
Convenience Market with Gas Pumps	254,438	532	0.0330	0.0040	133,065

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)
Convenience Market with Gas Pumps	254,438	532	0.0330	0.0040	133,065

5.12. Operational Water and Wastewater Consumption

5.12.1. Unmitigated

Land Use	Indoor Water (gal/year)	Outdoor Water (gal/year)
Convenience Market with Gas Pumps	104,572	588,265

5.12.2. Mitigated

Land Use	Indoor Water (gal/year)	Outdoor Water (gal/year)
Convenience Market with Gas Pumps	104,572	588,265

5.13. Operational Waste Generation

5.13.1. Unmitigated

Land Use	Waste (ton/year)	Cogeneration (kWh/year)
Convenience Market with Gas Pumps	4.24	—

5.13.2. Mitigated

Land Use	Waste (ton/year)	Cogeneration (kWh/year)
Convenience Market with Gas Pumps	4.24	—

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
Convenience Market with Gas Pumps	Other commercial A/C and heat pumps	R-410A	2,088	< 0.005	4.00	4.00	18.0
Convenience Market with Gas Pumps	Supermarket refrigeration and condensing units	R-404A	3,922	26.5	16.5	16.5	18.0

5.14.2. Mitigated

Land Use Type	Equipment Type	Refrigerant	GWP	Quantity (kg)	Operations Leak Rate	Service Leak Rate	Times Serviced
Convenience Market with Gas Pumps	Other commercial A/C and heat pumps	R-410A	2,088	< 0.005	4.00	4.00	18.0

Convenience Market with Gas Pumps	Supermarket refrigeration and condensing units	R-404A	3,922	26.5	16.5	16.5	18.0

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	33.6	annual days of extreme heat
Extreme Precipitation	4.95	annual days with precipitation above 20 mm
Sea Level Rise	—	meters of inundation depth
Wildfire	22.7	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	N/A	N/A	N/A	N/A
Wildfire	N/A	N/A	N/A	N/A
Flooding	N/A	N/A	N/A	N/A
Drought	0	0	0	N/A
Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	N/A	N/A	N/A	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	N/A	N/A	N/A	N/A
Wildfire	N/A	N/A	N/A	N/A
Flooding	N/A	N/A	N/A	N/A
Drought	1	1	1	2
Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	N/A	N/A	N/A	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 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	91.1
AQ-PM	32.2
AQ-DPM	57.9
Drinking Water	29.7
Lead Risk Housing	13.8
Pesticides	0.00
Toxic Releases	25.0

Traffic	83.1
Effect Indicators	—
CleanUp Sites	73.4
Groundwater	0.00
Haz Waste Facilities/Generators	65.9
Impaired Water Bodies	0.00
Solid Waste	0.00
Sensitive Population	—
Asthma	84.6
Cardio-vascular	99.5
Low Birth Weights	5.81
Socioeconomic Factor Indicators	—
Education	67.1
Housing	11.2
Linguistic	19.9
Poverty	67.2
Unemployment	82.7

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	66.22610035
Employed	25.70255357
Median HI	56.85871936
Education	—
Bachelor's or higher	31.64378288
High school enrollment	2.258437059

Preschool enrollment	41.10098807
Transportation	—
Auto Access	89.83703323
Active commuting	14.92364943
Social	—
2-parent households	97.98537149
Voting	43.48774541
Neighborhood	—
Alcohol availability	89.68304889
Park access	26.5622995
Retail density	22.41755422
Supermarket access	25.03528808
Tree canopy	7.25009624
Housing	—
Homeownership	84.70422174
Housing habitability	80.57230848
Low-inc homeowner severe housing cost burden	56.2941101
Low-inc renter severe housing cost burden	70.48633389
Uncrowded housing	64.30129603
Health Outcomes	—
Insured adults	59.70742974
Arthritis	0.6
Asthma ER Admissions	14.5
High Blood Pressure	1.1
Cancer (excluding skin)	0.9
Asthma	37.3
Coronary Heart Disease	1.0
Chronic Obstructive Pulmonary Disease	1.6

Diagnosed Diabetes	6.3
Life Expectancy at Birth	28.4
Cognitively Disabled	58.3
Physically Disabled	16.0
Heart Attack ER Admissions	1.2
Mental Health Not Good	58.7
Chronic Kidney Disease	1.3
Obesity	41.7
Pedestrian Injuries	90.6
Physical Health Not Good	24.5
Stroke	2.9
Health Risk Behaviors	—
Binge Drinking	95.3
Current Smoker	59.6
No Leisure Time for Physical Activity	48.5
Climate Change Exposures	—
Wildfire Risk	0.0
SLR Inundation Area	0.0
Children	33.8
Elderly	53.1
English Speaking	52.3
Foreign-born	39.5
Outdoor Workers	27.8
Climate Change Adaptive Capacity	—
Impervious Surface Cover	86.5
Traffic Density	80.1
Traffic Access	23.0
Other Indices	—

Hardship	53.1
Other Decision Support	—
2016 Voting	53.1

7.3. Overall Health & Equity Scores

Metric	Result for Project Census Tract
CalEnviroScreen 4.0 Score for Project Location (a)	52.0
Healthy Places Index Score for Project Location (b)	42.0
Project Located in a Designated Disadvantaged Community (Senate Bill 535)	No
Project Located in a Low-Income Community (Assembly Bill 1550)	No
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	Start of construction and operational year updated to match project schedule.
Land Use	Lot acreage, building square feet, and landscape areas updated to match project design
Construction: Construction Phases	Defaults changed to represent a 6-day work week. Building construction reduced to 180 working days to match project schedule. Site Prep and Grading duration extended to match anticipated project schedule.

Construction: Dust From Material Movement	Grading values updated to match project description
Construction: Trips and VMT	Haul trucks for grading and site development assumed to have 12 cy capacity. One water truck added during site development and grading. All other values left at default.
Construction: Paving	Updated paved area using project description data.
Construction: On-Road Fugitive Dust	Construction will utilize a dirt access road to access the Project site.
Construction: Off-Road Equipment	Off-Highway Trucks, which represent water trucks, were added to site preparation and grading phases for dust suppression.
Operations: Vehicle Data	Weekday trip value received from the project traffic study. Saturday and Sunday trip values are anticipated to be the same as weekday. Non Res H-W trip lengths were reduced given the low-level retail use and proximity of the project to existing convenience markets with gas pumps. Saturday and Sunday trip purposes and percentages were adjusted to be consistent with weekday purposes and percentages.

ATTACHMENT B: BIOLOGICAL RESOURCES ASSESSMENT

Hesperia Phelan

Biological Resource Assessment

prepared for

AU Energy, LLC
41805 Albrae Street
Fremont, CA 94538
Contact: Sunny Goyal

prepared by

Caskey Biological Consulting, LLC
2604 B El Camino Real #341
Carlsbad, California 92008

June 2025

Caskey
biological consulting

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Appendix A Special-Status Species Evaluation Tables

Appendix B Site Photographs

Appendix C Plant and Wildlife Observations

Appendix D Western Joshua Tree Report

1 Introduction

Caskey Biological Consulting, LLC (Caskey) prepared this biological resource assessment report to document the existing conditions for the Au Energy, LLC Hesperia Phelan (Project) and to evaluate the potential for Project-related impacts to sensitive biological resources.

The purpose of this document is to provide technical information on the Project and survey buffers (Study Area), and to determine to what extent the Project may impact special-status species and sensitive natural communities.

1.1 Project Locations

The Project is located in Hesperia, California. Regionally, the Project is in the western portion of San Bernardino County (Figure 1). The approximate center of the Project is latitude 34.427242°N and longitude -117.400904°W (WGS84) (Figure 2) and is depicted within the *Baldy Mesa, California* United States Geological Survey (USGS) 7.5-minute topographic quadrangle (Figure 3). The Project's elevation ranges between approximately 3,560 and 3,575 feet (ft.) above mean sea level (msl).

1.2 Project Description

The Project includes the construction and operation of a 5,915-square-foot convenience store, five fuel islands (10 pumps total) beneath a 4,080-square-foot canopy, and a 1,968-square-foot automated car wash tunnel on an approximately 115,870-square-foot (2.66-acre) site (Project site).

The convenience store is proposed to be located at the center of the Project site, approximately 60 feet west of the proposed fueling station and approximately 73 feet south of the proposed car wash. A total of 45 parking spaces are proposed, including 25 standard spaces, four standard spaces that are electrical vehicle capable, four spaces served by electrical vehicle charging stations, four recreational vehicle spaces, two handicap-accessible spaces, five spaces for use of a vacuum, and one space for use of pressurized air/water. The vacuum and air/water spaces are associated with the proposed car wash and provide users with the ability to manually clean the interior or exterior of their vehicles. Underground storage tanks will be located in the southeastern corner of the Project site.

Two driveways are proposed for the Project—one on the northeastern corner of the Project site off United States (U.S.) Highway 395 and the second on the southwestern corner of the Project site off Phelan Road. As a result, access to the site is proposed from a right-in and right-out only approach on both U.S. Highway 395 and Phelan Road. The Project includes improvements to U.S. Highway 395 and the traffic signal on the northwestern corner of the Phelan Road and U.S. Highway 395 intersection. U.S. Highway 395's southbound side will be widened to 55 feet from the centerline to allow for installation of a 3-foot-wide median at the centerline, a dedicated bike lane along the southbound side, a dedicated right-turn lane

to access the Project and to turn right onto Phelan Road, two southbound lanes, and one left-turn lane to travel east.

Construction of the Project is anticipated to start in the first quarter of 2026 following approval from the City of Hesperia and will be completed in two phases. The first phase will consist of site grading and utility installation, and the second phase will include underground tank and structure installation, as well as landscaping. Project construction is anticipated to last between 200 and 250 days and is expected to be completed in the third quarter of 2026.

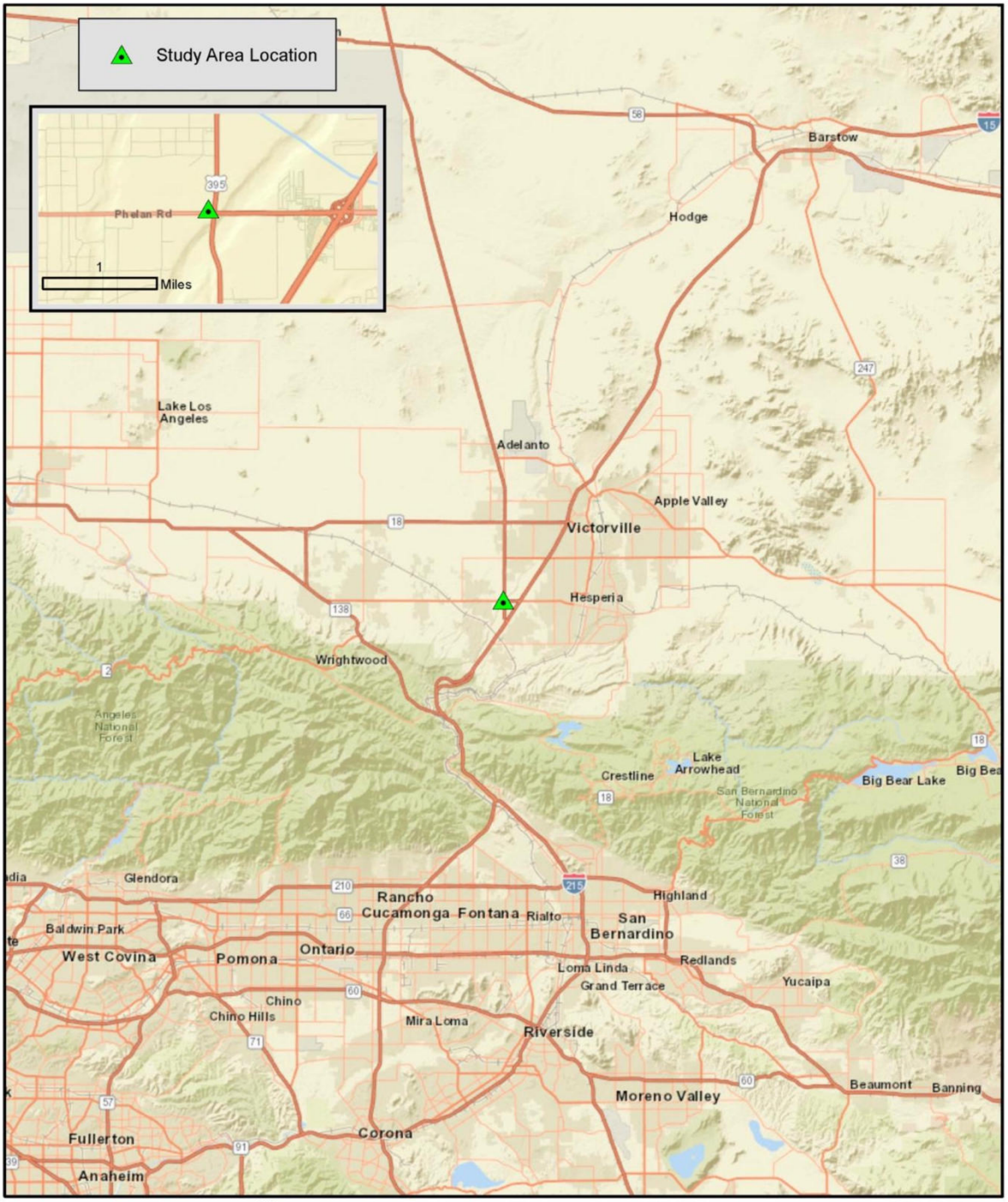


Figure 1 - Regional Location

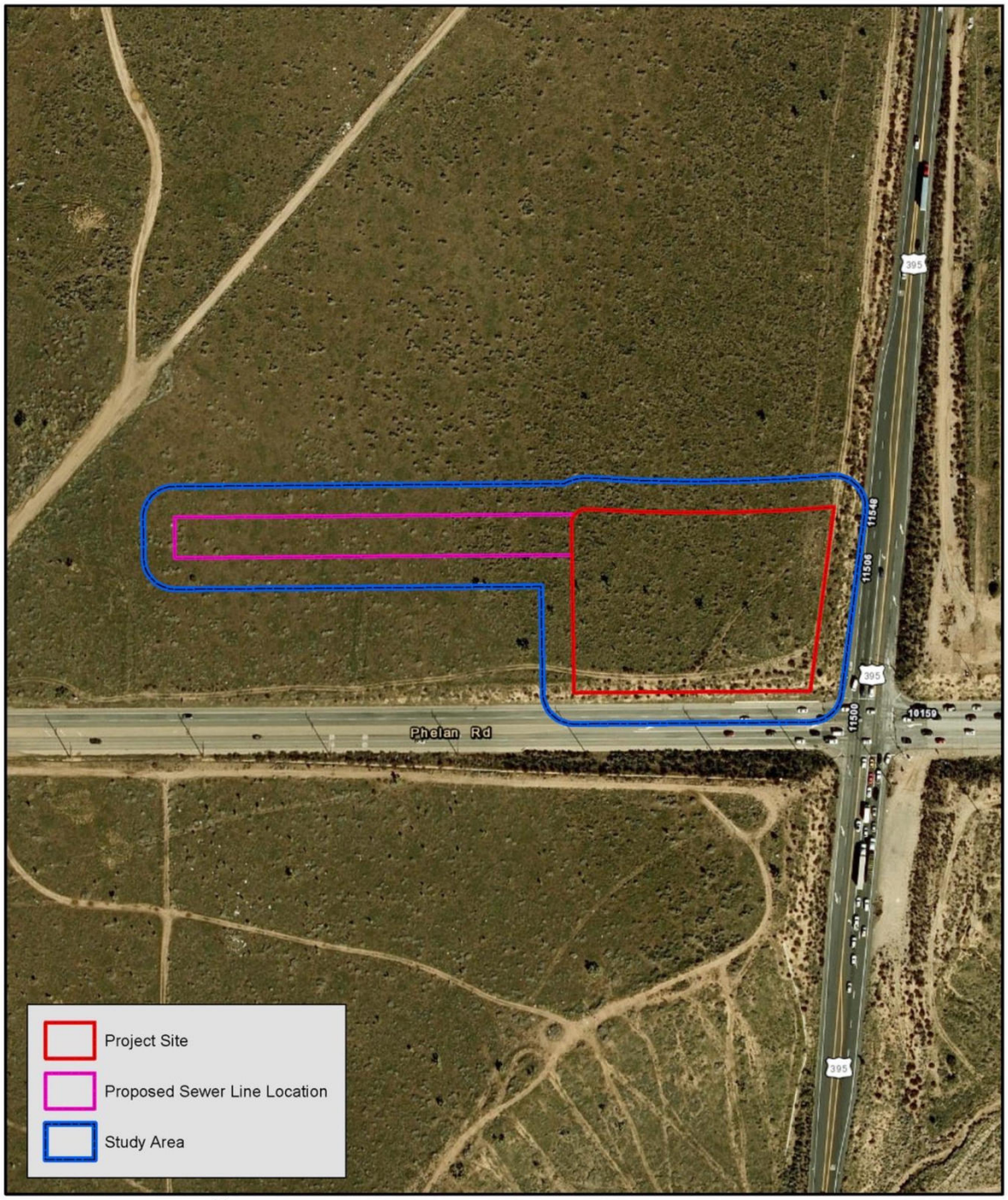


Figure 2 - Study Area Map

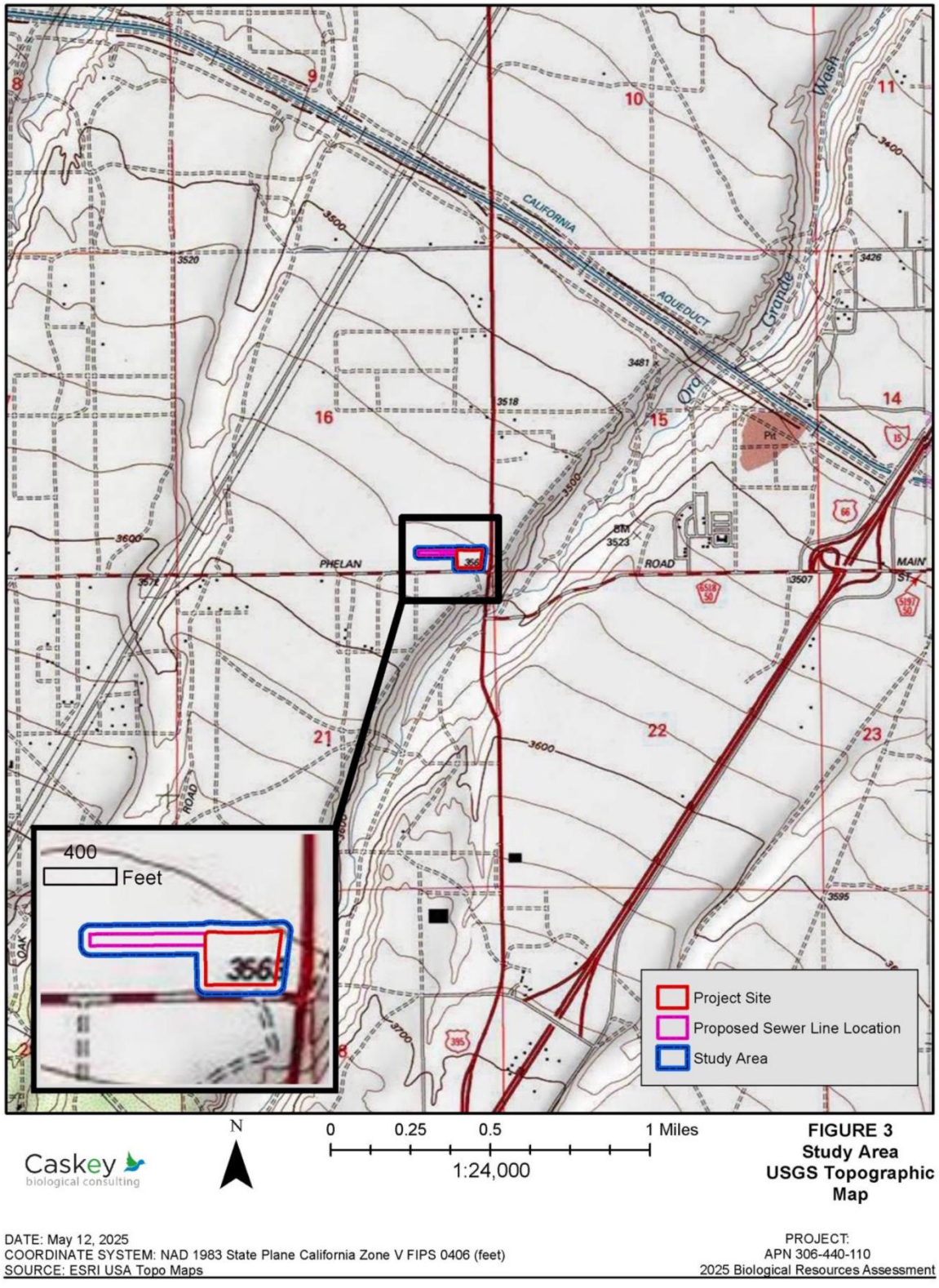


Figure 3 - Study Area USGS Topographic Map

2 Methodology

2.1 Database and Literature Review

Prior to conducting the field surveys, thorough literature review and records searches were conducted to determine which special-status biological resources may potentially occur on or within the vicinity of the survey area. Previous special-status plant and wildlife species occurrence records within the USGS *Baldy Mesa* quadrangles were determined through queries of the U.S. Fish and Wildlife Service (USFWS) Information for Planning and Consultation system (IPaC) (USFWS 2024), California Department of Fish and Wildlife (CDFW) California Natural Diversity Database (CNDDB) (CDFW 2024a), and the California Native Plant Society (CNPS) Online Inventory of Rare and Endangered Plants (CNPS 2024). All federally- and state-listed, fully protected species (FP), Species of Special Concern (SSC), Watch List (WL), and plants with a California Rare Plant Ranking (CRPR) of 1-4 that could be present based on the record search were evaluated. Species were not discussed if there is no record of occurrence, or the species has been extirpated within one mile of the Project. The results from these scientific database queries were compiled into a table provided in Appendix A. In addition to the above sources, Caskey reviewed aerial imagery depicting the Project (Google Earth 2024), the *Baldy Mesa*, California USGS 7.5-minute topographic quadrangles (USGS 2024), the Web Soil Survey (United States Department of Agriculture, Natural Resources Conservation Service [USDA NRCS] 2024), and other available background information.

2.2 Regulatory Overview

Regulated or sensitive biological resources and potentially jurisdictional waterbodies studied and analyzed herein include special-status plant and animal species, nesting birds and raptors, and sensitive plant communities. Regulatory authority over biological resources and jurisdictional waterbodies may be shared by federal, state, and local authorities.

2.2.1 Special-Status Plant Species and Communities

For the purposes of this report, special-status plant species include:

- Species listed, proposed for listing, or candidate for listing as threatened or endangered under the federal Endangered Species Act (FESA);
- Species listed or candidates for listing as rare, threatened, or endangered under the California Endangered Species Act (CESA) or Native Plant Protection Act (NPPA);
- Plant species with a California Rare Plant Rank (CRPR) of 1-4;
- Sensitive Natural Communities under CDFW (2024) and California Native Plant Society's (CNPS) Manual of California Vegetation;
- Western Joshua Tree Conservation Act (WJTCA),

2.2.2 Special-Status Wildlife Species

For the purposes of this report, special-status wildlife species include:

- Species listed or candidates for listing as threatened or endangered under the federal Endangered Species Act (FESA);
- Species listed or candidates for listing as rare, threatened, or endangered under the California Endangered Species Act (CESA);
- Species designated as Fully Protected (FP) by Fish and Game Code Sections 3511, 4700, 5050, and 5515;
- Species identified as Species of Special Concern (SSC) by the California Department of Fish and Wildlife (CDFW);
- Species designated as Watch List (WL) by the CDFW;
    - WL defined as taxa that were previously designated as SSC, but no longer merit that status, or which do not yet meet SSC criteria, but for which there is a need for additional information to clarify status (CNDDB, 2024); and
- Avian species protected by the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act.

2.3 Field Survey

Caskey principal biologist, Jason Caskey, conducted a site visit and field survey on December 19, 2024, beginning at 1000 and ending at 1400. A subsequent field survey of the proposed sewer line location and potential access road location was conducted by Mr. Caskey on April 22 2025, beginning at 0900 and ending at 1200. The Study Area, measuring approximately 6.83 acres, included the Project site, the proposed sewer line location and potential access road location, and a 50-foot buffer. Temperatures ranged from 70 to 73 degrees Fahrenheit, and wind ranged from 0 to 3 miles per hour. The survey included walking meandering transects throughout the entirety of the Study Area to document the existing site conditions. During the survey, observation points were mapped using FieldMaps for ArcGIS connected to a Geode + GNSS submeter unit and antenna global positioning system.

The potential for presence of sensitive biological resources, including sensitive plant and animal species, sensitive plant communities, and habitat for nesting birds protected by federal and state laws were evaluated. Assessments for the potential occurrence of special-status species are based upon known ranges, habitat preferences for the species, species listed in the USFWS IPaC report, species occurrence records within one-mile radius of the Study Area from the CNDDB, and the survey results of the Study Area. The potential for each special-status species to occur in the Study Area was evaluated according to the following criteria:

- **Absent.** Few or none of the habitat components meeting the species requirements are present (foraging, breeding, cover, substrate, elevation, hydrology, plant community, site history, disturbance regime), and/or the majority of habitat on and adjacent to the site is unsuitable or of very poor quality, no documented CNDDB species occurrences within

three miles of the Project, documented occurrence is extirpated, or species would have been identified on-site during biological surveys (focused-level, protocol-level, or otherwise), if present. The species is not on the site.

- **Unlikely to Occur**. Some of the habitat components meeting the species requirements are present, and/or only some of the habitat on or adjacent to the site is unsuitable. The species has a low probability of being found on the site.
- **Likely to Occur.** All of the habitat components meeting the species requirements are present and/or most of the habitat on or adjacent to the site is highly suitable. The species has a moderate to high probability of being found on the site.
- **Present.** Species is observed on the site or has been recorded (e.g., CNDDB, other reports) on the site recently (within the last five years).

3 Existing Site Conditions

This section summarizes the results of the literature review and biological resource assessment. Discussions regarding the general environmental setting, vegetation communities present, plants and animals observed, potential special-status species issues, soil types, and other possible constraints regarding the biological resources within the Study Area are presented below. Representative photographs of the Study Area are provided in Appendix B and a complete list of all plant and animal species observed on site during the field survey is provided in Appendix C.

The Study Area is located on the northwest corner of U.S. Highway 395 and Phelan Road in Hesperia, California. Land uses in and around the Study Area consist of undeveloped lands and residential and commercial properties.

3.1 Vegetation Communities and Land Cover Types

Vegetation communities and land cover types in the Study Area include cheatgrass-medusahead grasslands, California buckwheat scrub, and developed/disturbed, which contain areas of sparse to no vegetation (Table 1) (Figure 4). For a full list of vegetation observed during the field survey, please refer to Appendix C.

- **Cheatgrass-medusahead grassland:** This community was the most abundant throughout the Study Area. Cheatgrass (*Bromus tectorum*) was the dominant species along with sparse native shrubs including rabbitbrush (*Ericameria* nauseosa) and bladderpod (*Cleomella* arborea). Additionally, a total of 55 Joshua trees with an approximate 7% cover, ranging in various sizes and health were observed throughout the community.
- **California buckwheat scrub**: This community was observed primarily between the existing dirt access road and the adjacent U.S. Highway 395 and Phelan Road. The dominant species in this community is California buckwheat (*Eriogonum fasciculatum*), and deerweed (*Acmispon glaber*) with some sparse non-natives such as cheatgrass and star thistle (*Centaurea solstitalis*).
- **Developed/Disturbed:** This land cover type consists of developed and disturbed areas including the dirt access road and the adjacent U.S. Highway 395 and Phelan Road. The western third of the Study Area contained an active residential development project that previously graded out the area.

Table 1 - Vegetation Communities and Land Cover Types within the Study Area

Vegetation Community/ Cover Types	Acreage	Global/State Sensitivity[1]
Cheatgrass – medusahead grassland	4.88	-/-
California buckwheat scrub	0.87	G5/S5
Developed/Disturbed	1.08	-/-
Total	**6.83**	

[1]G5 = demonstrably secure within and outside of California; G4 = apparently secure within and outside California; S5 = demonstrably secure within California; S4 = apparently secure within California (CDFW 2025b)

3.2 Soils

The USDA NRCS Web Soil Survey depicts one soil unit within the Study Area. A detailed description of the soil units within the Study Area is below.

Cajon Sand, 0 to 2 percent slope, which occurs within the Study Area, is a somewhat excessively drained soil that occurs within alluvial fans. The soil type is an alluvium derived from granite sources and has a typical soil profile of sand from 0 to 25-inches in depth and gravelly sand from 25 to 45-inches in depth. The soil is not considered hydric (USDA NRCS 2024).

3.3 Observed Wildlife

No special-status species were observed within the Study Area during the biological resources assessment. Observed avian species included common raven (*Corvus corax*), California thrasher (*Toxostoma redivivum*), and red-tailed hawk (*Buteo jamaicensis*). Additional wildlife species observed during the site visit include brush rabbit (*Sylvilagus bachmani*) and a western side-blotched lizard (*Uta stansburiana elegans*). See Appendix C for a full list of species observed.

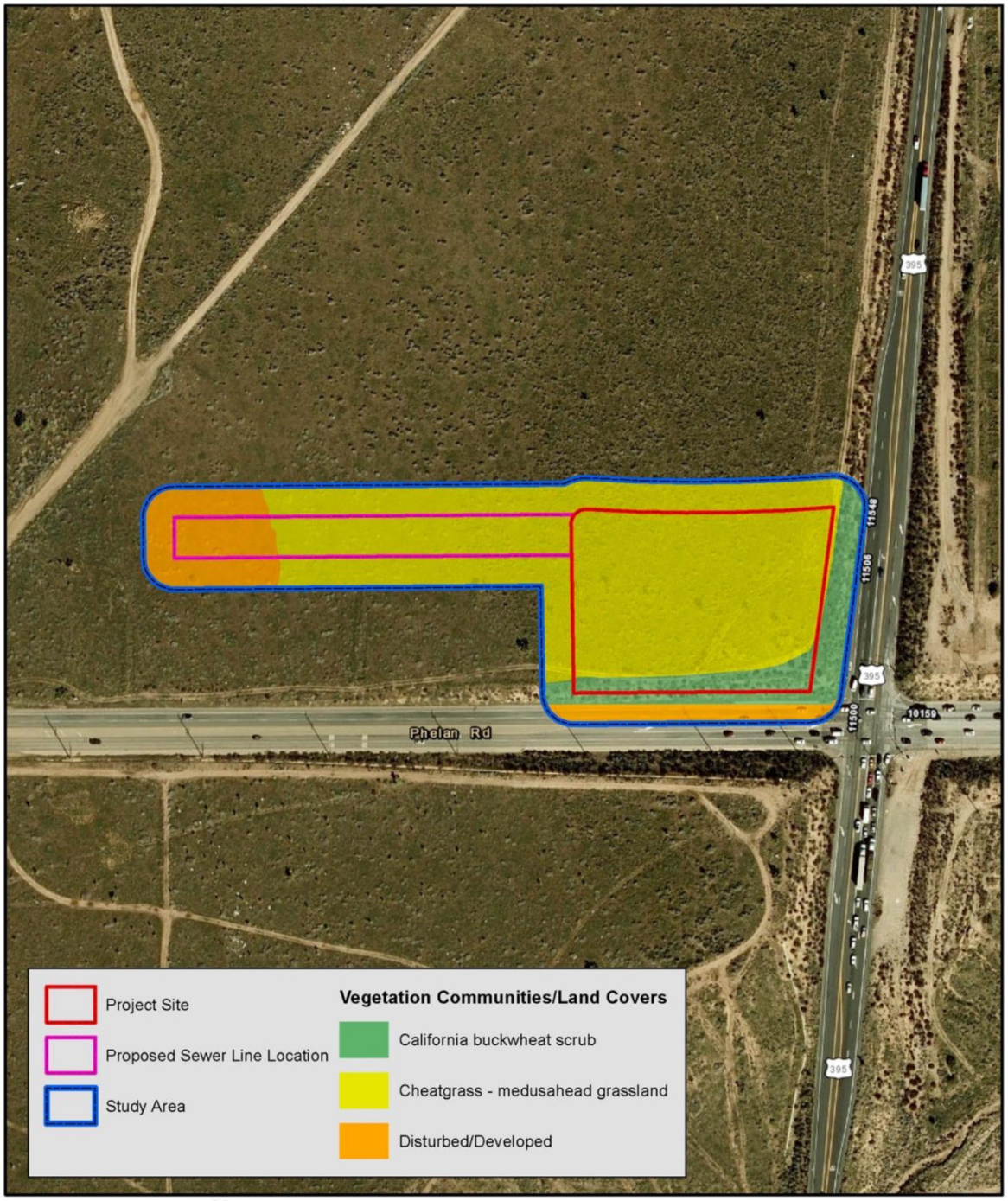


Figure 4 - Vegetation Communities/Land Covers

4 Results

This section discusses the findings of the habitat assessment conducted within the Study Area. The criteria used to evaluate potential Project-related impacts to biological resources are presented in Section 2.3. For a complete evaluation of all species with a potential to occur, please refer to Appendix A.

4.1 Special-Status Species

4.1.1 Special-Status Plant Species

According to the CNDDB and CNPS three-mile radius search, two (2) special-status plant species have been recorded within the vicinity of the Study Area (Appendix A) and therefore were included in the assessment. The following special-status plant species with records within three-mile of the Study Area that were reviewed are shown below:

- short-joint beavertail (*Opuntia basilaris* var*. brachyclada*), CRPR 1B.2
- western Joshua tree (*Yucca brevifolia*) State Candidate

Of the two (2) species reviewed, one plant species has the potential to occur based on recent species records and the presence of suitable habitat and are discussed in further detail below.

Western Joshua Tree

Western Joshua tree, a state candidate for listing (SC), is a 5 to 20 meter tall, evergreen, tree-like plant that flowers episodically during wet years (Gucker 2006). It occurs in desert grasslands and shrublands in hot, dry sites on flats, mesas, bajadas, and gentle slopes in the Mojave Desert on soils that are typically silts, loams, and /or sands that are fine, loose, or well-drained (Gucker 2006).

This species was observed during the biological resource assessment, therefore; this species is present on the Project site. For more information regarding the Joshua trees onsite, please refer to Appendix D.

4.1.2 Special-Status Wildlife Species

According to the CNDDB three-mile buffer search, four (4) special-status wildlife species are known to or have the potential to occur within the vicinity of the Study Area (Appendix A) while an additional three (3) special-status species were identified by the USFWS IPaC report as having the potential to occur within the Study Area. The following special-status wildlife species with records within three-mile of the Study Area that were reviewed are shown below.

- monarch butterfly (*Danaus plexippus*), Federally proposed threatened
- western spadefoot (*Spea hammondii*), Federally proposed threatened, CDFW SSC
- southwestern pond turtle (*Actinemys pallida*), Federally proposed threatened, CDFW SSC

- desert tortoise (*Gopherus agassizii*), Federally threatened, State threatened
- Mohave ground squirrel (*Xerospermophilus mohavensis*), State threatened
- burrowing owl (*Athene cunicularia*) State candidate endangered
- loggerhead shrike (*Lanius ludovicianus*), CDFW SSC

Of the seven species reviewed, five special-status species have the potential to occur within the Study Area based on the presence of suitable habitat and documented observations and are discussed in further detail below.

Monarch Butterfly

The monarch butterfly is a large butterfly that is currently proposed for listing under FESA as a threatened species. This species has a wide range of habitat types including prairies, meadows, grasslands, and even populated areas such as parks, neighborhoods, and back yards. Milkweed is the host plant for this species and is a requirement for suitable habitat. Large, mature trees for roosting are required for overwintering habitat requirements. During the habitat assessment, no milkweed was observed, although the survey was conducted outside of the blooming period for milkweed. Likewise, there were no large trees that would be suitable for roosting. Likewise, the species was not observed during the habitat assessment and is considered unlikely to occur.

Desert Tortoise

The desert tortoise is a federally threatened and state-endangered species with a range that includes most of the Mojave and Colorado deserts in California as well as portions of Nevada and Utah. Desert tortoises inhabit a variety of habitats including desert washes, desert flats, bajadas, alluvial fans, rolling hills, rocky hills and valleys. Vegetation communities that are known to provide suitable habitat include creosote scrub, saltbush scrub, Joshua tree woodlands, Mojave mixed-woody scrub, juniper woodland and blackbush scrub within elevations of 300 to 5,000 feet (USFWS 2024a). The average home range of adult tortoises can vary from 25-35 acres for females and 40-120 acres for males (USFWS 2024a). Throughout most of the Mojave and Colorado Deserts, tortoises are found most often on gentle slopes with sandy-gravel soils. Soils must be soft enough for digging burrows, but firm enough so that they do not collapse. The soils on site were very compact and would likely be too firm for burrow construction. No desert tortoise or desert tortoise sign (burrows, scat, carcasses, etc.) were observed during the habitat assessment. Considering all factors above, desert tortoise is considered unlikely to occur

Mohave Ground Squirrel

Mohave ground squirrel (MGS) is a small rodent endemic to the western Mojave Desert and is listed as a State threatened species. The species prefers habitats in open desert scrub, alkali desert scrub, Joshua tree woodlands, and annual grasslands. The MGS feeds on a variety of seeds and fruits, particularly from the Joshua tree. This species prefers sandy to gravelly soils and utilizes burrows at the base of shrubs (CDFW 2019). While there are habitat components preferred by the species present within the Study Area, there has only been one documented observation in the CNDDB dating back to 2005. The species was not observed

during the habitat assessments, however, the December survey was conducted outside of the active season for the species (March to June). Considering the lack of observations and suitable burrows documented within the vicinity and the absence of direct observation during the habitat assessment, the species has a low probability of being found on the site and is unlikely to occur within the access road, work area, and staging area.

Burrowing Owl

Burrowing owl, a State candidate for threatened or endangered listing status under CESA, is a small owl that frequently inhabits open, dry grasslands, deserts, and urban environments with sparse vegetation. These small owls utilize existing burrows from small mammals such as ground squirrels for their nesting and cover sites. Burrowing owls tend to feed on small mammals, lizards, and insects. There have been two observations recorded in the CNDDB within three miles of the Study Area as recently as 2006, however, no occupied burrows or burrowing owl sign, including pellets or whitewash, were observed within the Study Area. Considering all factors above, there is a low probability of this species being observed onsite and is unlikely to occur.

Loggerhead Shrike

Loggerhead shrike is a CDFW SSC that inhabits savannah; pinyon-juniper; Joshua tree and riparian woodlands; desert oases, scrub, and washes. It prefers open country for hunting, with perches for scanning, and fairly dense shrubs and brush for nesting. There is potentially suitable nesting and foraging habitat within the Study Area for this species although it was not observed during the habitat assessment. According to CNDDB records, the loggerhead shrike was last observed within three miles of the Study Area in 2007. While some of the habitat components were observed within the Study Area, this species has a moderate probability of being found onsite and is likely to occur.

4.1.3 Migratory Birds

Nesting birds are protected under California Fish and Game Code (CFGC) and Migratory Bird Treaty Act (MBTA). The habitat observed within the Study Area could be used by numerous species of nesting birds protected under CFGC and MBTA. The survey was conducted outside of the nesting bird season (February 15 – August 31) and suitable nesting habitat was observed to be present within the Study Area.

4.2 Sensitive Natural Communities

According to the CNDDB three-mile radius search, no sensitive natural communities have been documented to occur within the vicinity of the Study Area. Likewise, no sensitive natural communities were observed within the Study Area.

4.3 Critical Habitats

The Study Area is not located within USFWS-designated critical habitat (USFWS 2024).

5 Discussion and Conclusion

This section discusses the results of the literature and database review and the biological resource assessment. Based on the literature and data review and the results of the biological resources assessment, it is reasonable to conclude that there is potential for special-status plant and wildlife species. The criteria used to evaluate potential Project-related impacts to biological resources are presented in Section 2.3.

The findings and conclusions presented in this report represent the professional opinion of the consulting biologists.

5.1 Special-Status Species

5.1.1 Special-Status Plant Species

The Study Area contains many of the habitat requirements, including soils compositions and elevation ranges, for one special-status species: Western Joshua tree. During the biological resource assessment and focused Joshua tree survey, a total of 55 Joshua trees ranging in various sizes and health were observed. Impacts to Joshua trees are anticipated for this Project. For more information, please refer to the focused Western Joshua Tree Report in Appendix D.

5.1.2 Special-Status Wildlife Species

As discussed in Section 4.1.2, seven special-status animal species have the potential to occur in the Study Area based upon known ranges, habitat preferences for the species, and species occurrence records in the vicinity of the Study Area, as documented in the CNDDB, IPaC, and other records. However, of the seven special-status species, only five of these species have potential to be present within the Study Area: monarch butterfly, desert tortoise, Mohave ground squirrel, burrowing owl, and loggerhead shrike.

All five species were documented in IPaC and CNDDB as having the potential to occur in the area. Milkweed, the sole food source for the monarch butterfly larvae, was not observed within the Study Area, although the survey was conducted outside of the blooming period. Any observation of the species would likely be from flyovers. Moderate to poor habitat for the burrowing owl, desert tortoise, and Mohave ground squirrel was observed throughout the Study Area. While the December survey was conducted outside of their actives season, there were no direct observations of the burrowing owl, desert tortoise, or Mohave ground squirrel. Based solely on the habitat assessed during the survey, it is our professional opinion that monarch butterfly, burrowing owl, desert tortoise, and the Mohave ground squirrel are unlikely to occur. Impacts to these special-status species are not anticipated. However, loggerhead shrike is likely to occur given suitable nesting and foraging habitat within the Study Area. Potential impacts to loggerhead shrike may occur during Project construction and, as a result,

pre-construction nesting bird surveys are recommended prior to vegetation removal to minimize potential impacts to loggerhead shrike.

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Appendix A: Special-Status Species Evaluation Tables

Special-Status Plant Species in the Regional Vicinity of the Study Area

Scientific Name Common Name	Status FESA/CESA CRPR Rank	Habitat Requirements	Potential to Occur	Rationale
Plants				
Opuntia basilaris var. *brachyclada* Short-joint beavertail	None/None 1B.2	A perennial stem succulent found in chaparral, Joshua tree woodlands, Mojavean desert scrub, and pinyon and juniper woodlands. Blooming from April to June, this species is found at elevations of 1,390 to 5,905 fee (Baldwin 2012).	Absent	According to the CNDDB, there are known occurrences within a 1-mile radius of the Study Area. Suitable habitat does exist; however, this species was not observed during the site assessment. If present, this perennial succulent would have been observed.
Yucca brevifolia Western Joshua tree	None/ Candidate/ None	5 to 20 meter tall, evergreen, tree-like plant occurs in desert grasslands and shrublands in hot, dry sites on flats, mesas, bajadas, and gentle slopes in the Mojave Desert on soils that are typically silts, loams, and /or sands that are fine, loose, or well-drained. Blooming between March and May, the species is found at elevations of 1300 to 7545 feet (Baldwin 2012).	Present	The Study Area contains a total of 55 Joshua trees.

CRPR (CNPS California Rare Plant Rank)

1B=Rare, Threatened, or Endangered in California and elsewhere

CRPR Threat Code Extension

.2=Moderately threatened in California (20-80% occurrences threatened)

Reference – Calflora, 2024

Special-Status Animal Species in the Regional Vicinity of the Project

Scientific Name Common Name	Status Fed/State ESA/ CDFW	Habitat Requirements	Potential to Occur	Rationale
Invertebrates				
Danaus plexippus Monarch Butterfly	Proposed Threatened/ None/None	Monarchs are observed across North America where host plants and nectar plants occur. Host plant genera include *Asclepias.*	Unlikely to occur	There were no preferred host plant species observed within the Study Area, however, the survey was conducted outside of the blooming period. There were no large trees suitable for roosting.
Amphibians				
Spea hammondii western spadefoot	Proposed Threatened/ None SSC	Inhabits open areas with sandy or gravelly soils in forests, grasslands, coastal sage scrub, chapparal, river floodplains and mountains. Breeding occurs after heavy rains in shallow pools.	Absent	The Study Area is not within the range for the species nor does it include the habitat components required by the species.
Birds				
Athene cunicularia burrowing owl	None/None SSC	Located in open areas with sparse vegetation including deserts, grasslands and urban environments. Nesting occurs in areas with high burrow densities associated with high mammal populations.	Unlikely to occur	There was a lack of quality mammal burrows the species would require. There have been two observations documented in CNDDB within three miles as recently as 2006. No occupied burrows or species sign (whitewash, pellets, etc) were observed during the habitat assessment.
Lanius ludovicianus loggerhead shrike	None/None SSC	Broken woodlands, savannah, pinyon-juniper, Joshua tree, and riparian woodlands, desert oases, scrub & washes. Prefers open country for hunting, with perches for scanning, and fairly dense shrubs and brush for nesting.	Likely to occur	Suitable habitat for this species occurs within the Study Area. However, the species was not observed during the site assessment.

Scientific Name Common Name	Status Fed/State ESA/ CDFW	Habitat Requirements	Potential to Occur	Rationale
Mammals				
Xerospermophilus mohavensis Mohave ground squirrel	None/ Threatened None	Open desert scrub, alkali scrub & Joshua tree woodland. Also feeds in annual grasslands. Restricted to Mojave Desert. Prefers sandy to gravelly soils, avoids rocky areas. Uses burrows at base of shrubs for cover. Nests are in burrows.	Unlikely to occur	Suitable habitat in the form of Joshua tree woodland occurs in the Study Area, however, there were a lack of small mammal burrows. Likewise, the annual grasses were lacking on the site.
Reptiles				
Gopherus agassizii Desert tortoise	Threatened/ Threatened None	Observed in a variety of desert scrub habitats such as desert washes, alluvial fans and saltbush plains. Most are associated with creosote bush scrub. Wildflowers, cactus and grasses make up the bulk of the desert tortoise diet.	Unlikely to occur	The Study Area is within the known range and habitat type of the desert tortoise, however, no observations of the species or their sign was observed during the habitat assessment.
Actinemys pallida southwestern pond turtle	Proposed Threatened/ None SSC	Located in ponds, lakes, rivers, streams and marshes with dense vegetation. Require exposed banks for basking and nesting.	Absent	There are no aquatic habitats in the Study Area that would be considered suitable habitat for the species.

Regional Vicinity refers to within the topographic quadrant and immediately surrounding quadrants.

SSC = CDFW Species of Special Concern

Appendix B: Site Photographs



View W - Study Area



View E - Study Area



View SW - Study Area



View N - Study Area



View S - Study Area



View N - Study Area



View NE- Study Area

Appendix C: Plant and Wildlife Observations

Plant Species Observed Within the Study Area

Scientific Name	Common Name
ANGIOSPERMS (EUDICOTS)	
ASTERACEAE	**SUNFLOWER FAMILY**
Ericameria nauseosa	rubber rabbitbrush
*Salsola tragus**	tumbleweed
*Centauerea solstitialis**	yellow star thistle
CHENOPODIACEAE	**GOOSEFOOT FAMILY**
Grayia spinosa	hop sage
CLEOMACEAE	**SPIDERFLOWER FAMILY**
Cleomella arborea	bladderpod
FABACEAE	**LEGUME FAMILY**
Acmispon glaber	deerweed
GERANIACEAE	**GERANIUM FAMILY**
*Erodium cicutarium**	redstem filaree
POLYGONACEAE	**BUCKWHEAT FAMILY**
Eriogonum fasciculatum	California buckwheat
ANGIOSPERMS (MONOCOTS)	
POACEAE	**GRASS FAMILY**
*Bromus rubens**	red brome
*Bromus tectorum**	cheatgrass
AGAVACEAE	**CENTURY PLANT FAMILY**
Yucca brevifolia	Western Joshua tree

*Non-Native Species, +Ornamental, Unlikely to be Invasive

Wildlife Species Observed Within the Study Area

Scientific Name	Common Name	Status	Native or Introduced
Birds			
Haemorhous mexicanus	house finch	None	Native
Corvus corax	common raven	None	Native
Zenaida macroura	mourning dove	None	Native
Buteo lineatus	red-shouldered Hawk	None	Native
Campylorhynchus brunneicapillus	cactus wren	None	Native
Toxostoma redivivum	California thrasher	None	Native
Streptopelia decaocto	Eurasian collared-dove	None	Introduced
Buteo jamaicensis	red-tailed hawk	None	Native
Cathartes aura	turkey vulture	None	Native
Reptiles			
Uta stansburiana elegans	western side-blotched lizard	None	Native
Mammals			
Sylvilagus bachmani	brush rabbit	None	Native

Appendix D: Western Joshua Tree Report

June 2, 2025

Sunny Goyal
Au Energy, LLC
41805 Albrae Street
Fremont, CA 94538

Subject: Western Joshua Tree Technical Memo
Hesperia Phelan (Project), City of Hesperia, California

Dear Mr. Goyal:

This report documents the findings of a Western Joshua Tree (*Yucca brevifolia*) census survey conducted on behalf of Au Energy, LLC (Au Energy) for the Project. The Project is in the City of Hesperia, San Bernardino County, California. This report summarizes the Project, outlines the potential for impacts to Western Joshua Tree within the Project area, and provides recommendations for impact avoidance or minimization.

Project Location and Description

The Project is located in the City of Hesperia, in San Bernardino County, California and is situated at the northwest corner of the intersection of Phelan Road and United States Highway 395 (34.427242, -117.400904). Regionally, the Study Area is in the western portion of San Bernardino County (Figure 1). The Project is depicted on *Baldy Mesa, California* United States Geological Survey (USGS) 7.5-minute topographic quadrangle.

Au Energy is proposing the construction and operation of a 5,915-square-foot convenience store, five fuel islands (10 pumps total) beneath a 4,080-square-foot canopy, and a 1,968-square-foot automated car wash tunnel on an approximately 115,870-square-foot (2.66-acre) site (Project site). The convenience store is proposed to be located at the center of the Project site, approximately 60 feet west of the proposed fueling station and approximately 73 feet south of the proposed car wash. A total of 45 parking spaces are proposed, including 25 standard spaces, four standard spaces that are electrical vehicle capable, four spaces served by electrical vehicle charging stations, four recreational vehicle spaces, two handicap-accessible spaces, five spaces for use of a vacuum, and one space for use of pressurized air/water. The vacuum and air/water spaces are associated with the proposed car wash and provide users with the ability to manually clean the interior or exterior of their vehicles. Underground storage tanks will be located in the southeastern corner of the Project site. Currently, the property is vacant.

The Study Area is dominated by non-native grasses and weeds including cheatgrass (*Bromus tectorum*) and tumbleweed (*Salsola tragus*) with a few sparse native shrubs including California buckwheat (*Eriogonum fasciculatum*) and rabbitbrush (*Ericameria nauseosa*). Au Energy will be preparing the site beginning with grading out the area and removing the onsite vegetation. Once the area has been graded, construction of the new fueling station and market will begin.

Western Joshua Tree

Western Joshua Tree, a state candidate for listing (SC), is a 5 to 20 meter tall, evergreen, tree-like plant, that flowers episodically during wet years (Gucker 2006). It occurs in desert grasslands and shrublands in

hot, dry sites on flats, mesas, bajadas, and gentle slopes in the Mojave Desert on soils that are typically silts, loams, and /or sands that are fine, loose, or well-drained (Gucker 2006[1]).

Methodology

Prior to conducting the census survey, Caskey Biological Consulting (Caskey) conducted a review of relevant databases and literature for biological resources information. The purpose of the desk top review is to remain diligent on Joshua tree biology and regulatory measures. The review included information on occurring sensitive biological resources from the following sources:

- California Native Plant Society Inventory of Rare and Endangered Plants (CNPS, 2025)[2];
- Western Joshua Tree Conservation Act (CDFW, 2025)[3]

Caskey principal biologist, Jason Caskey, conducted a site visit and field survey on December 19, 2024, beginning at 1000 and ending at 1400. A subsequent field survey of the proposed sewer line location and potential access road location was conducted by Mr. Caskey on April 22 2025, beginning at 0900 and ending at 1200. The Study Area, measuring approximately 6.83 acres, included the Project site, the proposed sewer line location and potential access road location, and a 50-foot buffer (Figure 2). Mr. Caskey surveyed the Study Area on foot to document general site conditions and assess the Project as it pertains to potential impacts from the Project.

Conditions were sunny with temperatures at approximately 73 degrees Fahrenheit and wind speeds ranging from 0-3 miles per hour. The purpose of the site visit was to determine the location, size, and health status of all Joshua trees within 50 feet of the Project. Each protected plant's location was marked using a handheld global positioning system (GPS) unit and photographed.

During field surveys, for each Joshua tree encountered, the following data was recorded:

1. tree height (meters),
2. canopy width (feet),
3. diameter at breast heigh (dbh) and;
4. overall health.
    a. *Excellent:* Trees showing vigor, no dieback or discoloration of foliage, and no signs of insects, disease, decay, or structural defects.
    b. *Good:* Trees showing vigor, no major dieback or discoloration of foliage, and no signs of insects, disease, decay, or significant structural defects.
    c. *Fair*: Trees with 10-30% foliar dieback, poor foliage coloration, dead wood, or showing some signs of disease and decay and minor structural defects.
    d. *Poor*: Trees with more than 30% foliar dieback, dead wood, severe decay or insect activity or structural problems

[1] Gucker, C.L. 2006. *Yucca brevifolia*. In: Fire Effects Information System, U.S. Dept. of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: https://www.fs.fed.us/databas/feis/plants/tree/yucbre/all.html

[2] California Native Plant Society (CNPS). 2025a. Inventory of Rare and Endangered Plants. V.7-08c-Interim 8-22-02. Updated online and accessed via: www.rareplants.cnps.org

[3] California Department of Fish and Wildlife (CDFW). 2025. Western Joshua Tree Conservation Act. Accessed via: https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=213498&inline

e. *Dead*: Trees that have fallen and are completely detached from its roots or fallen and its roots are no longer in contact with the soil

Tree heights were measured using an application on Mr. Caskey's phone while the dbh was measured using a dbh tape measurer.

Summary of Results

Fifty-five (55) Joshua trees were assessed within the Study Area (Figure 2). Of the 55 Joshua trees assessed, 30 Joshua trees are within the footprint of the Project site. The remaining 25 trees are outside of the Project site and proposed sewer line location and would not be impacted. All Joshua tree assessed were in good to excellent health with the exception of seven Joshua trees that were in poor health or dead. Survey results are detailed in Table 1.

Table 1: Joshua Tree Location, Size, and Health Conditions

ID	Location (decimal degree)	Size Class	Tree Height (m)	Canopy Width (feet)	Diameter at Breast Height (inches)	Health Class	Additional Comments
1	34.427203, -117.400505	B	3.6	8	29	Good	Slight foliage discoloration
2	34.427202, -117.400528	B	1.8	2	19	Excellent	New growth observed
3	34.427204, -117.400524	A	0.6	1	10	Excellent	Sapling
4	34.427219, -117.400526	B	1.2	2	24	Poor	Tree has fallen, decay observed
5	34.427726, -117.400413	A	0.3	1	6	Excellent	Sapling
6	34.427718, -117.400676	B	3.0	3	33	Excellent	New growth observed, inactive bird nest in tree
7	34.427245, -117.400658	B	4.5	14	40	Good	Minor trunk decay at base.
8	34.427235, -117.400863	A	0.3	1	4	Excellent	Sapling
9	34.427252, -117.400887	B	4.8	12	41	Excellent	No dead foliage, inactive bird nest in tree
10	34.427333, -117.400782	B	2.1	2	19	Excellent	New growth observed
11	34.427498, -117.400782	B	1.8	1	20	Excellent	No discoloration or dead foliage
12	34.427648, -117.400758	A	0.3	1	6	Excellent	Sapling

Table 1: Joshua Tree Location, Size, and Health Conditions

ID	Location (decimal degree)	Size Class	Tree Height (m)	Canopy Width (feet)	Diameter at Breast Height (inches)	Health Class	Additional Comments
13	34.427690, -117.400864	B	2.1	2	21	Excellent	New growth observed
14	34.427119, -117.401016	B	2.4	3	19	Excellent	New growth observed
15	34.427049, -117.401127	B	2.1	2	18	Excellent	New growth observed. Tree is marked with pink flagging.
16	34.427220, -117.401124	A	0.9	1	9	Excellent	Sapling, new growth
17	34.427208, -117.401213	B	1.5	1	20	Excellent	Young tree, new growth
18	34.427323, -117.401130	B	1.9	4	21	Excellent	Tree has a double trunk
19	34.427314, -117.401184	B	4.8	12	31	Excellent	Solid trunk, no decay observed, no discoloration
20	34.427337, -117.401169	A	0.9	1	10	Excellent	Sapling with a double trunk
21	34.427590, -117.401151	B	2.4	2	19	Good	Slight foliage discoloration
22	34.427642, -117.401248	B	1.8	2	18	Excellent	Young tree with double trunk
23	34.427690, -117.401277	A	0.3	1	6	Excellent	Sapling
24	34.427782, -117.401377	B	1.8	2	17	Excellent	New growth observed
25	34.427663, -117.401408	A	0.9	1	10	Excellent	Sapling
26	34.427446, -117.401369	B	2.4	3	19	Good	Dead foliage observed, although also signs of new growth
27	34.427375, -117.401397	C	5.2	15	38	Excellent	Double trunk, large, mature tree
28	34.427335, -117.401398	B	3.9	2	31	Dead	Fallen, dead tree
29	34.427071, -117.401341	B	1.2	1	13	Excellent	New growth, marked with pink flagging
30	34.427071, -117.401362	B	2.4	4	13	Excellent	New growth, marked with pink flagging

Table 1: Joshua Tree Location, Size, and Health Conditions

ID	Location (decimal degree)	Size Class	Tree Height (m)	Canopy Width (feet)	Diameter at Breast Height (inches)	Health Class	Additional Comments
31	34.427192, -117.401548	B	2.1	2	12	Excellent	New growth observed
32	34.427340, -117.401555	B	4.8	11	29	Excellent	Double trunk
33	34.427411, -117.401553	A	0.9	1	11	Excellent	Sapling
34	34.427242, -117.401694	B	4.8	10	30	Good	Minor foliage discoloration
35	34.427359, -117.402087	B	3.7	7	31	Good	Slight foliage discoloration
36	34.427366, -117.402080	B	3.9	6	37	Good	Slight foliage discoloration
37	34.427358, -117.402076	B	3.4	4	28	Excellent	New growth observed
38	34.427350 -117.402082	B	2.1	3	16	Good	Heavy lean caused by another Joshua Tree (43) that has fallen over
39	34.427342 -117.402076	B	3.9	6	32	Excellent	No foliage discoloration
40	34.427343, -117.402067	B	1.5	2	19	Good	Dead foliage observed on one limb.
41	34.427351, -117.402063	B	3.6	5	27	Excellent	No foliage discoloration, new growth observed
42	34.427352, -117.402058	B	1.2	1	16	Excellent	Young tree, new growth
43	34.427354, -117.402072	B	1.8	2	9	Poor	Fallen tree. Currently being supported by Joshua Tree 38.
44	34.427362, -117.402054	B	2.4	3	32	Excellent	New growth, no discoloration
45	34.427366, -117.402052	B	2.1	3	28	Excellent	New growth, no discoloration
46	34.427373, -117.402066	B	1.9	N/A	24	Dead	Fallen, broken into multiple fragments. Trunk deterioration
47	34.427376, -117.402061	B	1.9	N/A	26	Dead	Fallen, broken into multiple fragments. Trunk deterioration
48	34.427339, -117.402049	B	1.2	3	18	Excellent	Young tree with new growth observed.

Table 1: Joshua Tree Location, Size, and Health Conditions

ID	Location (decimal degree)	Size Class	Tree Height (m)	Canopy Width (feet)	Diameter at Breast Height (inches)	Health Class	Additional Comments
49	34.427333, -117.402045	A	0.6	2	12	Excellent	Sapling
50	34.427480, -117.401846	B	3.4	4	26	Excellent	No foliage discoloration
51	34.427480, -117.401838	B	3	4	22	Poor	Trunk is rotting at the base and is falling over
52	34.427475, -117.401844	B	3	6	22	Good	Tree is falling over, but shows signs of new growth
53	34.427412, -117.401682	B	2.4	N/A	24	Dead	Fallen, broken into multiple fragments. Trunk deterioration
54	34.427701, -117.401559	A	0.3	1	6	Excellent	Sapling
55	34.427374, -117.402051	B	3.4	6	32	Excellent	New growth, no discoloration

Class A – Less than one meter in height;

Class B – One meter or greater but less than five meters in height

Class C – Five meters or greater in height

Conclusion and Recommendations

Fifty-five (55) Joshua trees were assessed within the Study Area for potential impacts. Of the 55 Joshua trees, 25 were located outside of the Project site and proposed sewer line location; therefore, no impacts to these trees are anticipated. Thirty (30) Joshua trees of various heights and health were observed to be within the Project site and are likely to be impacted by Project activities. Areas temporarily impacted will be allowed to recover naturally from the existing seedbank. For any Joshua trees that may be avoided, the following avoidance and minimization measures would be recommended:

- Install tree protection zones (TPZ), where feasible. This would consist of a barricade or fencing at the canopy edge of the Joshua tree;
- Avoid parking or staging equipment within the driplines of Joshua trees to avoid additional root compaction;
- Avoid grade changes within the dripline of the Joshua tree;
- Minimize the addition of fill dirt or compaction of fill dirt in trenches in order to avoid compaction of soil within the root zone of protected trees;
- Trenches shall be hand dug when possible to avoid unnecessary root damage;
- If feasible, relocation of Joshua trees shall be conducted by a certified arborist with California desert vegetation relocation and restoration experience;
    - A consultation with CDFW is recommended prior to relocation efforts.

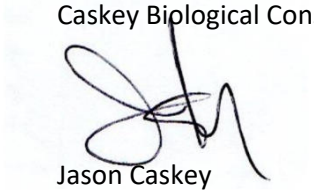
If it is deemed that Joshua tree avoidance is not possible, the Western Joshua Tree Conservation Act (WJTCA) authorizes California Department of Fish and Wildlife (CDFW) to issue individual take permits (ITP). For any Joshua trees that require an ITP, the permittee must mitigate all impacts to, and taking of, the western Joshua tree. These measures shall be proportional in extent to the impacts of the taking of the species. The permittee must ensure that appropriate funding is in place to implement the required mitigation measures. However, in lieu of completing the mitigation obligation, the permittee may elect to satisfy the mitigation obligation by paying fees pursuant to the fee schedule determined within the WJTCA. Initiating a consultation with CDFW and applying for an ITP is recommended.

Closing

Thank you for the opportunity to be of service on this Project. Please contact Caskey principal biologist, Jason Caskey at 918-671-7681 if you have any questions regarding this report.

Respectfully submitted,

Caskey Biological Consulting, LLC



Jason Caskey
Principal Biologist

Attachments:

Figure 1 – Regional Location
Figure 2 – Joshua Tree Assessment Results
Appendix A – Joshua Tree Photographs

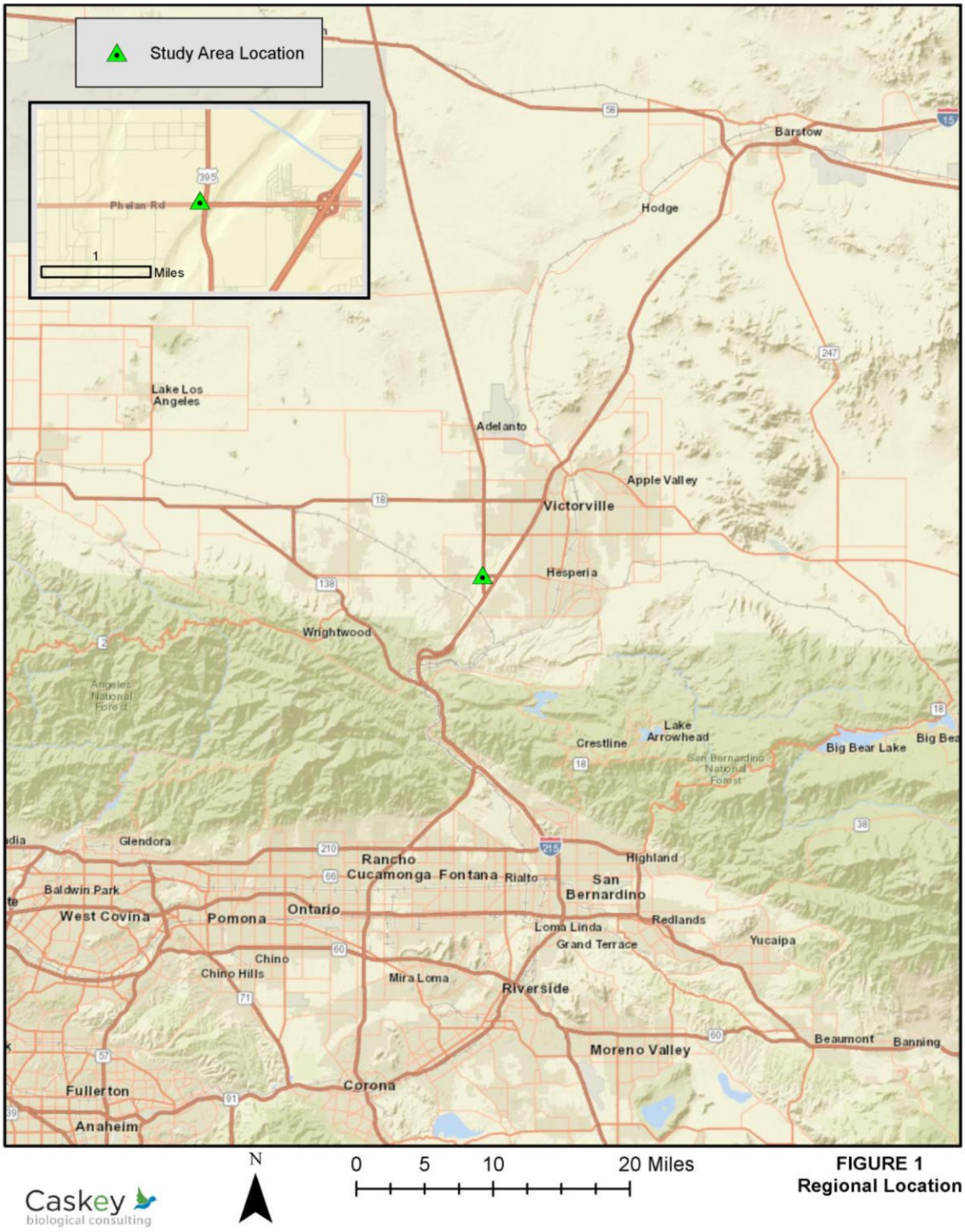


Figure 1: Regional Location

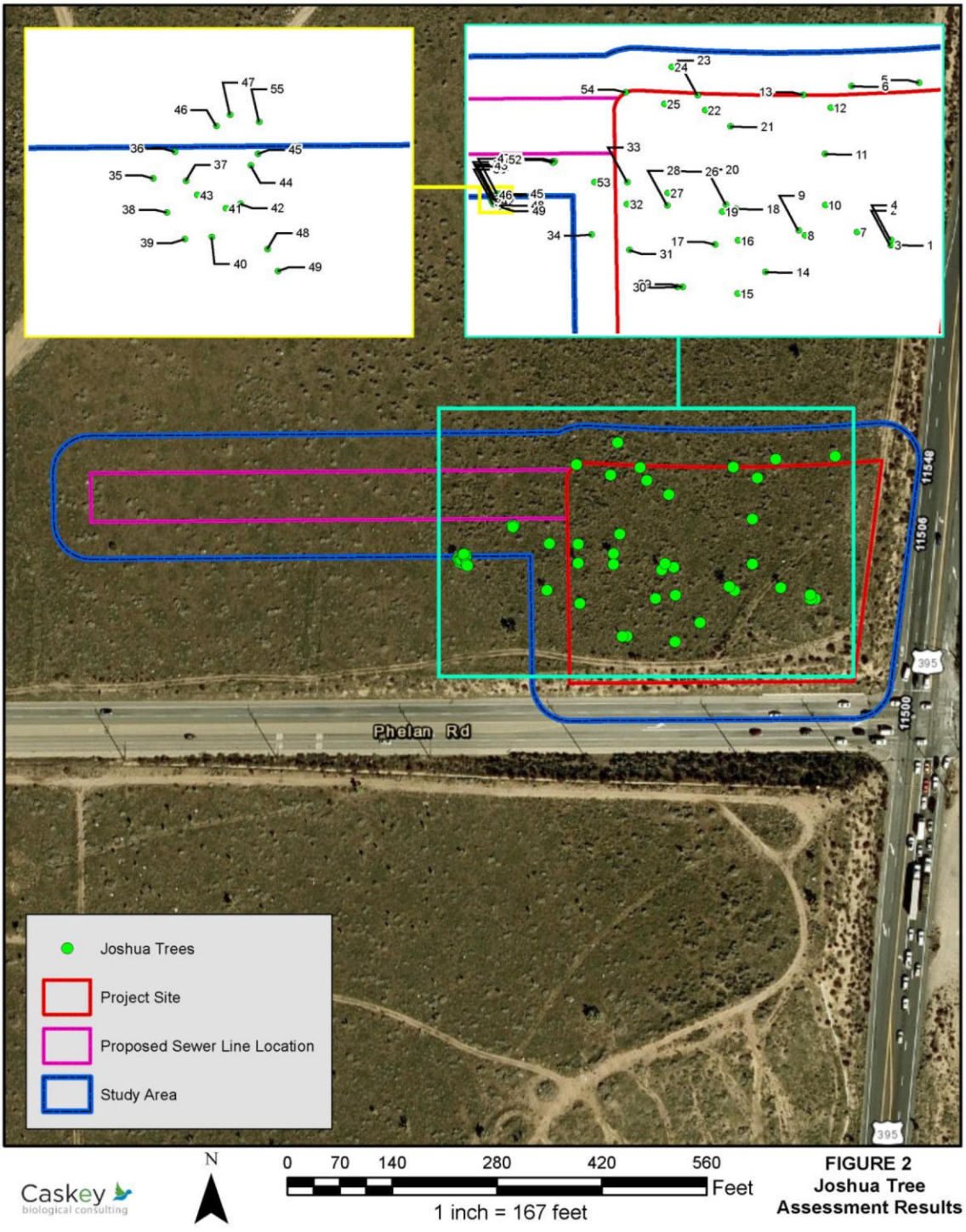


Figure 2: Joshua Tree Assessment Results

APPENDIX A
Joshua Tree Photographs



Joshua Tree #1-4



Joshua Tree #5



Joshua Tree #6



Joshua Tree #7



Joshua Tree #8



Joshua Tree #9



Joshua Tree #10



Joshua Tree #11



Joshua Tree #12



Joshua Tree #13



Joshua Tree #14



Joshua Tree #15



Joshua Tree #16



Joshua Tree #17



Joshua Tree #18



Joshua Tree #19



Joshua Tree #20



Joshua Tree #21

made with Wildnote



Joshua Tree #22



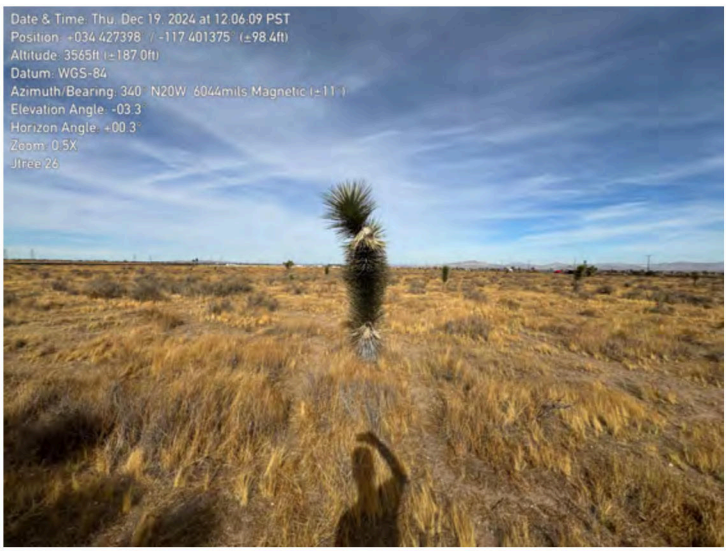
Joshua Tree #23



Joshua Tree #24



Joshua Tree #25



Joshua Tree #26



Joshua Tree #27

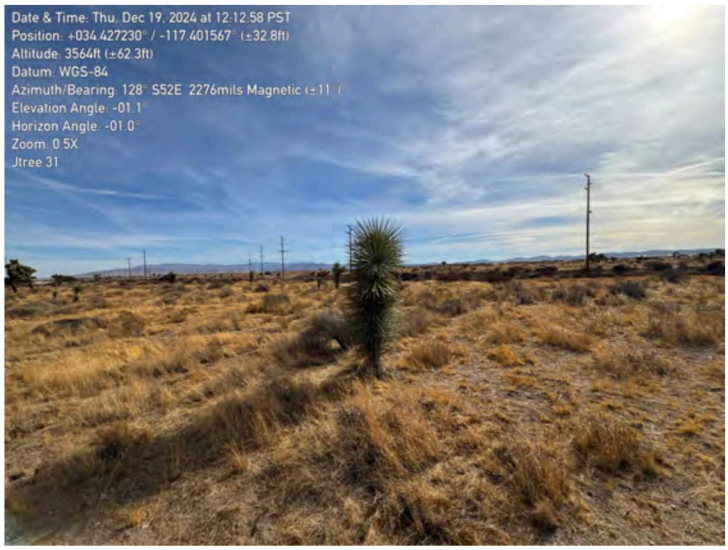
made with Wildnote



Joshua Tree #28



Joshua Tree #29-30



Joshua Tree #31



Joshua Tree #32



Joshua Tree #33



Joshua Tree #34

made with Wildnote



Joshua Tree 35-37



Joshua Tree 38-41



Joshua Tree 42-44



Joshua Tree 45



Joshua Tree 46, 47, & 55



Joshua Tree 48-49

made with Wildnote



Joshua Tree 50-52



Joshua Tree 53



Joshua Tree 54

ATTACHMENT C: ARCHAEOLOGICAL SURVEY REPORT

ARCHAEOLOGICAL SURVEY REPORT FOR A VACANT UNDEVELOPED LOT, LOCATED ON PRIVATE PROPERTY IN THE CITY OF HESPERIA, SAN BERNARDINO COUNTY, CALIFORNIA

Prepared For:	Thomas Serna Heady Design, INC 7365 Carnelian St. Suite 239 Rancho Cucamonga, CA 91730
Prepared By:	Lauren DeOliveira Archaeologist 761 Channel Islands Dr. Camarillo, CA 93012
Reviewed By:	Robert Wlodarski H.E.A.R.T. Archaeology 8701 Lava Place West Hills, CA 91304
Date:	November 1, 2017 Updated September 23, 2025

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EXECUTIVE SUMMARY

Lauren DeOliveira conducted a Phase I cultural resources investigation on behalf of Heady Design INC., for the proposed construction of a gas station including a convenience store, drive thru car wash, metal canopy with fueling dispensers and a food truck commissary located on a vacant undeveloped lot to the north west of US Highway 395 and Phelan Road, Hesperia, San Bernardino County, California. Victorville lies to the cities north boarder, Apple Valley on the east, Phelan to the west, and Silverwood Lake in the San Bernardino National Forest to its south. The project site is located near the western boarder of the city. The project site is an undeveloped flat lot, approx. 6.5 acres. The area is dominated by desert flora including Joshua trees, sagebrush, and juniper brush.

This cultural resources study includes a records search, intensive pedestrian survey, and report of the survey findings.

This investigation yielded three (3) historic isolates located within the project boundary. No prehistoric resources were discovered within the project site. No further work is recommended for cultural resources.

Should unanticipated discoveries occur during construction, the following is recommended:

CUL Recommendations:

If cultural resources are discovered during project activities, all work in the immediate vicinity of the find (within a 60-foot buffer) shall cease and a qualified archaeologist meeting Secretary of Interior standards shall be hired to assess the find. Work on the other portions of the project outside of the buffered area may continue during this assessment period. Additionally, the Yuhaaviatam of San Manuel Nation Cultural Resources Department (YSMN) shall be contacted, as detailed within TCR-1, regarding any pre-contact finds and be provided information after the archaeologist makes his/her initial assessment of the nature of the find, so as to provide Tribal input with regards to significance and treatment.

If significant pre-contact cultural resources, as defined by CEQA (as amended, 2015), are discovered and avoidance cannot be ensured, the archaeologist shall develop a Monitoring and Treatment Plan, the drafts of which shall be provided to YSMN for review and comment, as detailed within TCR-1. The archaeologist shall monitor the remainder of the project and implement the Plan accordingly.

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.

Tribal Cultural Resources Recommendation:

The Yuhaaviatam of San Manuel Nation Cultural Resources Management Department (YSMN) shall be contacted, as detailed in CUL-1, of any pre-contact cultural resources discovered during project implementation, and be provided information regarding the nature of the find, so as to provide Tribal input with regards to significance and treatment. Should the find be deemed significant, as defined by CEQA (as amended, 2015), a Cultural Resources Monitoring and Treatment Plan shall be created by the archaeologist, in coordination with YSMN, and all subsequent finds shall be subject to this Plan. This Plan shall allow for a monitor to be present that represents YSMN for the remainder of the project, should YSMN elect to place a monitor on-site.

Any and all archaeological/cultural documents created as a part of the project (isolate records, site records, survey reports, testing reports, etc.) shall be supplied to the applicant and Lead Agency for dissemination to YSMN. The Lead Agency and/or applicant shall, in good faith, consult with YSMN throughout the life of the project.

1.0 INTRODUCTION

Lauren DeOliveira conducted a Phase I cultural resources investigation on behalf of Heady Design, INC for the proposed construction on a vacant undeveloped lot located on the north west corner of US Highway 395 and Phelan Road within the city of Hesperia, San Bernardino County. This report documents the results of the records search and field survey.

1.1 Project Description and Location

Heady Design, INC. has proposed the construction of a gas station including a convenience store, drive thru car wash, metal canopy with fueling dispensers and a food truck commissary located on an undeveloped lot.

The project site is located within the city of Hesperia, San Bernardino County, California. Specifically, the project site is located within the Baldy Mesa 7.5' USGS topographic quadrangle in Section 16 of Township 4 North, Range 5 West (Exhibits 1 and 2).

1.2 Area of Potential Impacts

The Area of Potential Impacts (API) is defined as the approx. 6.5-acre parcel located at the north west corner of US Highway 395 and Phelan Road within the city of Hesperia, California. The parcel is an undeveloped lot and is privately owned. The project site is bordered by vacant undeveloped lots to the north and west, Phelan Road to the south, and US Highway 395 to the east.

1.3.1 STATE

1.3.1.1 California Environmental Quality Act (CEQA)

The proposed gas station and drive thru car wash constitutes a "project" as defined by CEQA (California Public Resources Code §21000 *et seq*.). CEQA requires a lead agency to determine whether a project may have a significant effect on historical resources (Section 21084.1). If it can be demonstrated that a project will cause damage to a unique archaeological resource, the lead agency may require reasonable efforts be made to permit any or all of these resources to be preserved in place or left in an undisturbed state. To the extent that resources cannot be left undisturbed, mitigation measures are required (Section 21083.2[a], [b], and [c]).

EXHIBIT 1: PROJECT LOCATION

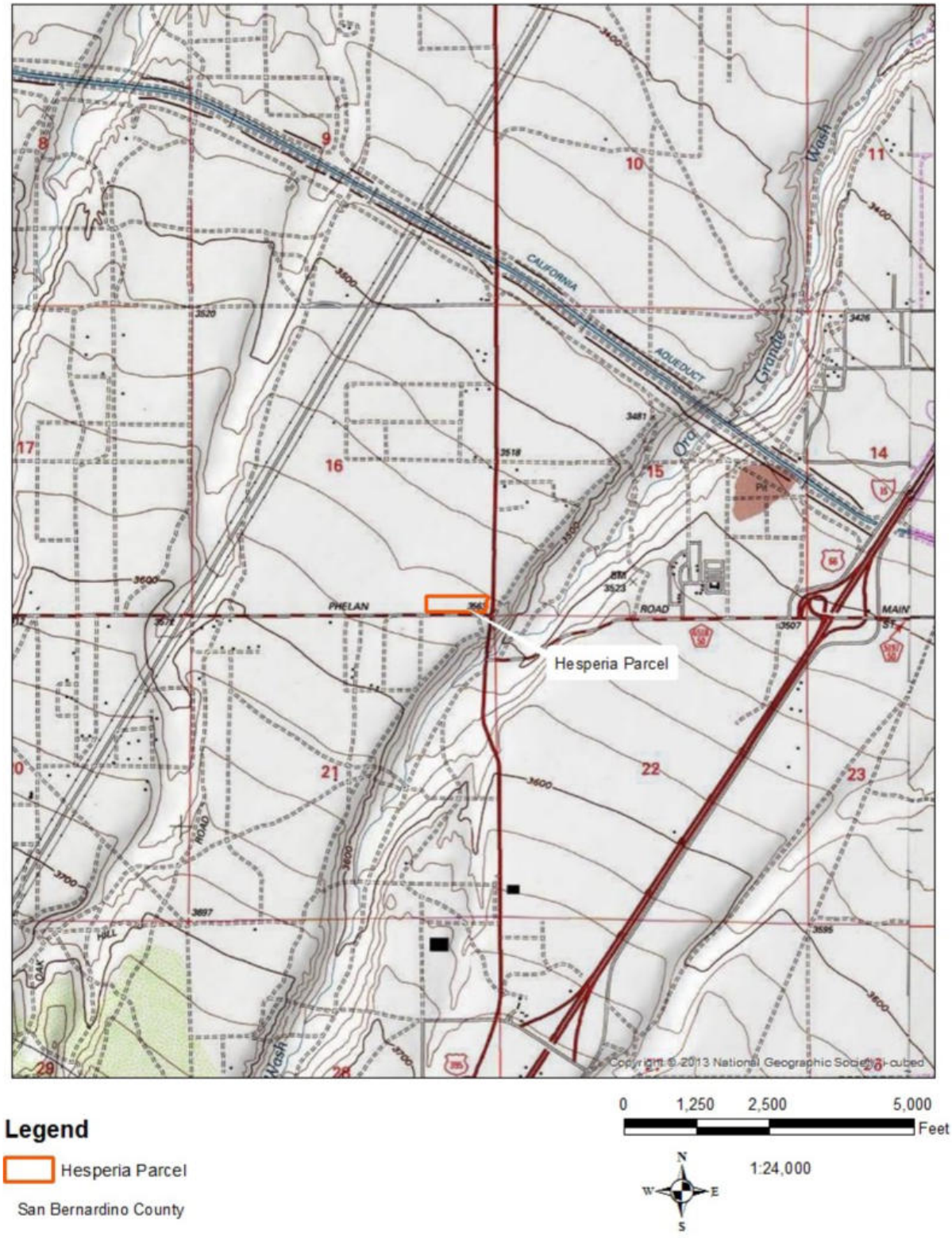


EXHIBIT 2: AREA OF POTENTIAL IMPACTS



Section 21083.2(g) defines a unique archaeological resource as 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:

1) Contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information;

2) Has a special and particular quality such as being the oldest of its type or the best available example of its type; or

3) Is directly associated with a scientifically recognized important prehistoric or historic event or person.

A historical resource is a resource listed in, or determined to be eligible for listing, in the California Register of Historical Resources (CRHR) (Section 21084.1), a resource included in a local register of historical resources (Section 15064.5[a][2]), or any object, building, structure, site, area, place, record, or manuscript that a lead agency determines to be historically significant (Section 15064.5[a][3]).

2.0 BACKGROUND INFORMATION

2.1 Environmental Setting

The project is located in the city of Hesperia, San Bernardino County, California. Elevation is approximately 3500 feet above mean sea level (United States Geological Survey 2017). This area of the Mojave Desert is referred to as the High Desert due to its unique weather patterns. The area is dominated by desert flora such as sagebrush, Joshua trees, and juniper bushes. The city of Hesperia encompasses approximately 73.21 square miles in total which includes 73.10 square miles of land and .11 square miles of water (United States Census 2016). Victorville lies at its north boarder, Apple Valley on the east, Phelan to the west, and Silverwood Lake in the San Bernardino National Forest to its south. The project site is located near the western boarder of the city.

2.2 Prehistoric Overview

California prehistory is generally divided into three broad time periods: Paleoindian Period (ca. 11,550-8,550 B.C.), Archaic Period (8,550 B.C.-A.D. 1100), and Emergent Occupation (A.D. 1000- European Contact). These periods are briefly described below.

2.2.1 PALEO-INDIAN PERIOD (CA. 11,500- 8,550 B.C.)

Little is known about Paleo-Indian people from inland Southern California. One of the earliest finds of human remains in North America came from the Arlington Springs Women from Santa Rosa Island. Radiocarbon dates from human bones and rodent bones have yielded dates of approximately 11,000 B.C. (Glassow et al. 2007). Opposite Santa Rosa Island, on the mainland, site CA-SBA-1951 yielded a basal corner of a Clovis point that may indicate occupation of comparable age (Glassow et al. 2007). Unfortunately, sites of this age are too few and are subject to environmental destruction and little can be concluded about these early cultures.

2.2.2 ARCHAIC PERIOD (8,550 B.C.-A.D. 1,100)

The Archaic period has three known sub periods: Lower, Middle, and Upper Archaic. These periods are briefly described below.

The Lower Archaic period ranges from 8,550-5,550 B.C. and focuses on a warmer climate shift. The Lower Archaic is generally characterized by nomadic hunter-gatherers. A shift to relying on a wider range of plant species is prevalent during this time (Chartkoff and Chartkoff 1984). From the archaeological record, chipped stone tools and Clovis points are present along with introduction of milling stones (Heizer and Elsasser 1980, Moratto 1984).

The Middle Archaic ranges from 5,550-550 B.C. and represents a period of growing diversification. A significant climate shift occurred at the beginning of this time period. Drier, warmer conditions caused a shift to more gathering practices with a focused importance on seed and acorn processing to supplement hunting. Milling stone artifacts, such as manos and metates, were more prominent during this time period. Stone flaked and core tools also began to emerge (Heizer and Elsasser 1980).

The Upper Archaic ranges from 550 B.C. – A.D. 1,100 and begins with a shift to a wetter, cooler climate. Lakes and small rivers returned after their disappearance during Middle Archaic period. The archaeological record shows a shift in artifact assemblage. People began to enrich their diets be refining their system of seasonal migration and adding more and more plant species to their resource list (Chartkoff and Chartkoff 1984). More specialized tool production is seen including blades and projectile points, as well as manufactured goods such as shell beads and ornaments. Population increase and settlement expansion yielded more cultural diversity. Also, the archaeological record shows regional specific practices (Chartkoff and Chartkoff 1984, Heizer and Elsasser 1980).

2.2.3 EMERGENT OCCUPATION PERIOD (A.D. 1,100- EUROPEAN CONTACT)

The Emergent Occupation is characterized by a relatively stable climate although drought and flood periods may have been seen at the local level. Population sizes peaked after A.D. 1,000 and settlements were integrated into regional sociopolitical organizations based on specialization and exchange (Glassow et al. 2007).

The Emergent Occupation period is particularly recognized in northern and central California. From the archaeological record, the Emergent Occupation is characterized by the bow and arrow replacing the atlatl. During this period, regionally variable economies emerged, although fishing and plant harvesting appear to increase in importance in the Central Valley. Mortar and pestles are the main tool of choice during this period. Shell bead production sites increase with bead blanks and manufacturing debris being seen in the archaeological record. This increase in bead production may be linked to the adoption of a monetized exchange system (Rosenthal et al. 2007).

2.3 Ethnographic Overview

The project site is located within the territories of two branches of Shoshonean Uto-Aztencan speakers, the Serrano and the Vanyume. It should be noted that the Yuhaaviatam of San Manuel Nation recognize the Vanyume as belonging to the same population as the Serrano, the Maara'yam.

2.3.1 VANYUME

Very little is known about the Vanyume culture because they were a very sparse population living near and around the Mojave River. It is possible that the Vanyume spoke a dialect of Serrano however, the language of the Vanyume cannot be determined from the brief word list available (Bean and Smith 1978).

Politically, they differed from the Serrano proper, for example, in enjoying friendly relationships with the Mojave, who were enemies of the Serrano.

The population of the Vanyume was never large and between 1820-1834, the Vanyume fell subject to the mission relocation project and other European encroachment into their territory (Stickle and Weinman-Roberts 1980). Before the 1900's the Vanyume were extinct.

2.3.2 SERRANO

It is nearly impossible to assign boundaries of the Serrano territory due to their sociopolitical organization and lack of reliable data. The Serrano were organized into local lineages occupying favored territories but rarely claiming any territory far from the lineage's home base (Bean and Smith 1978). The estimated population of the Serrano before European contact was 1,500-2,500. It is difficult to estimate the number of Serranos living in each village however, it is likely that the villages held only as many Serranos as could be accommodated by water sources (Stickle and Weinman-Roberts 1980).

The Serrano lived in dwellings which were circular, domed structures built over an excavated area. These structures were built with fire pits and primarily served as sleeping areas. Ceremonial houses were the only other buildings in the villages and were normally occupied by the village priest (Stickle and Weinman-Roberts 1980).

In the Serrano artifact assemblage, it is noted to be similar to that of the neighboring Cahuilla and includes musical instruments such as rattles and flutes; utensils and ornaments such as fire drills, mortars, metates, pipes, beads, awls, and projectile points from wood, shell, bone, and stone. The Serrano were talented pottery and basket makers. Their pots were made of coiled clay smoothed out with a paddle and set in the sun to dry before being fired in a pit. The brownware was sometimes decorated with designs of circles and lines of either red or black (Stickle and Weinman-Roberts 1980).

The Serrano were also known for their petroglyphs. Abstract and geometric designs are often see with representational figures of sheep, lizards and human beings. Some state that their petroglyphs were records of important events, rough maps, and artistic representations of native life (Stickle and Weinman-Roberts 1980).

2.4 Historic Overview

The post-contact history of California is generally divided into three periods: Spanish Period (1769–1822), Mexican period (1822–1848), and the American Period (1848–present). Each of these periods are briefly described below.

2.4.1 THE SPANISH PERIOD (1769-1822)

The earliest historic exploration of California was conducted by Juan Rodriguez Cabrillo in 1542. Voyages by Cabrillo and Hernando de Alarcon were part of the Spanish expansion. Exploration of California would continue through the 1700's by many European nations. By the 1760's Britain, France, and Russia were claiming more and more territory in North America. Spain made the decision to colonize Atla (upper) California to prevent foreign invasion.

In 1769, an expedition set out with military commander Gaspar de Portola and Father Junipero Serra. Portola was instructed to find the Bay of Monterey and Father Serra was to begin establishing missions for the Native Americans of Alta California. Father Serra established the first mission, San Diego de Alcala in 1769. This mission would be the first of 21 missions established from San Diego to San Francisco. Many missions became extensive operations containing churches, quarters for Native American laborers and solders, and a padre's residence.

Two other types of Spanish settlements began to emerge: the presidio and the pueblo. The presidios were characterized as fortified places and pueblos were small towns created to bring settlers into the province. Two major pueblos flourished to become major California cities: Los Angeles and San Jose (Hoover et al. 2002).

2.4.2 THE MEXICAN PERIOD (1822-1848)

New Spain became the Republic of Mexico in 1822. Mexican rule brought significant changes from that of Spain. The government often changed from one administration to another between Monterey and Los Angeles (Hoover et al. 2002).

By Mexican revolutionary standards, the missions were hopelessly reactionary. They were seen as major economic forces by the poor Mexican country because of their ownership of land. In 1834, the secularization of missions would begin and the mission properties would be taken over by the state and sold to the highest bidders. Land grants and deeds, known as ranchos, were sold to citizens. These ranchos mark the first attempts to make specific identifications of land. About 500 land grants were made during Mexican rule (Hoover et al. 2002).

2.4.3 THE AMERICAN PERIOD (1848-PRESENT)

The end of the Mexican War with the signing of the Treaty of Guadalupe Hidalgo in 1848 marked the official start to the American Period. With the initial discovery of gold made in Northern California, by 1849 the gold rush was in full swing. A large number of Americans ventured west to seek their fortune. Many others traveled to California by sea from Australia, China, Europe, and Chile. Given the large influx of people to California, the movement toward statehood began in 1849. By 1850, California was admitted as the 31st state. The population of California continued to increase particularly because of the completion of the transcontinental railway in 1869 (Hoover et al. 2002).

2.5 Historic Context of the Study Area

2.5.1 SAN BERNARDINO COUNTY

San Bernardino County was created in 1853 from territory that was first part of Los Angeles and San Diego Counties. The county encompasses 20,094 square miles which makes it the largest county in the United States. The Mojave region covers 90 percent of the county's area and contains only one-fifth of its population (Hoover et al. 2002).

Until the coming of the railroads, the main route across this part of California was the Mojave Road. Heading west from Fort Piute, the Mojave Road crossed several dynamic sources of water. Rock Springs and "Government Hole" are close to one another with the latter being bug in 1859. Marl Springs lay to the west and further on, was Soda Springs where a small Army post was set up in 1867 (Hoover et al. 2002).

One of the main historical spots in the Mojave Desert is Chimey Rock (SRL 737), which is the site of the last Native American fight in Southern California. Native Americans from the area raided lumber in the San Bernardino Mountains, burning and looting cabins and a sawmill. A retaliatory posse ventured to the Native American camp at Chimey Rock, killing and wounding many of them. Another main historic spot within the Mojave is Joshua Tree National Park established in 1936. Although most of the park lies within Riverside County, the visitor center and headquarters are located in San Bernardino County (Hoover et al. 2002).

2.5.2 HESPERIA AREA HISTORY

Hesperia began as a Spanish land grant known as Rancho San Felipe, Las Flores y el Paso del Cajon, which founded in 1781. The land was sparsely inhabited during the Spanish-Mexican rule in the 1800's due to its rough climate. After the Mexican-American War of 1848, the US annexed the region along with Southern California (City of Hesperia 2017).

Railroad land developers laid out the town and completed the construction of the US and Santa Fe Railroad in 1891. The railroad developers marketed the town across the country calling Hesperia the "Omaha of the West," with projections of 100,000 people to migrate to the town by the year 1900, but only 1,000 had moved in by that time (City of Hesperia 2017).

Hesperia grew relatively slowly until the completion of US Routes 66, 91 and 395 in the 1940s followed by Interstate 15 in the late 1960s. A total of 30 square miles of land was laid out for possible residential development. In the early 1950s, land developer M. Penn Phillips and his silent financial partner, the famous boxer Jack Dempsey, financed the building of roads and land subdivisions, promoting lots sales on television. They built the Hesperia Inn and golf course which attracted a variety of Hollywood celebrities. The Hesperia Inn also housed the Jack Dempsey Museum. But the main wave of newcomers arrived in Hesperia in the 1980s. Hesperia was officially incorporated on July 1, 1988. Suburban growth transformed the small town of 5,000 people in 1970 to a moderate-sized community of over 60,000 by the year 2000 (City of Hesperia 2017).

3.0 Methods

3.1 Records Search

A records search was conducted by Lauren DeOliveira at the California Historical Resources Information Center (CHRIS) South Central Coastal Information Center (SCCIC) located at California State University, Fullerton on October 31, 2017. The search included all previously recorded cultural resources within the project area and a ½ -mile radius around it, as well as previously conducted cultural resource studies. The CHRIS search included a review of the NRHP, the CRHR, the California Points of Historical Interest list, the California Historical Landmarks list, the Archaeological Determinations of Eligibility list, and the California State Historic Resources Inventory list. The records search also included a review of all historic USGS 7.5- and 15-minute quadrangle maps.

3.2 Field Survey

Archaeologist Lauren DeOliveira conducted an intensive pedestrian survey of the project site on October 27, 2017. The project site was surveyed using transects spaced no greater than 15 meters apart and oriented in an east-west direction.

The archaeologist examined exposed ground surface for artifacts (e.g., flaked stone tools, tool-making debris, milling tools, ceramics, ecofacts (e.g., marine shell and bone), soil discoloration that might indicate the presence of a cultural midden, and features indicative of the former presence of structures or buildings (e.g., standing exterior walls, postholes, foundations) or historic debris (e.g., metal, glass, ceramics). Ground disturbances such as burrows were visually inspected.

4.0 RESULTS

4.1 Records Search Results

The SCCIC records search identified seven (7) previous cultural resource studies with a ½ -mile radius of the project area (Table 1). Of those, two (2) intersects the project area. Eleven (11) previously recorded cultural resources are located within the record search area but non overlap the current project area (Table 2).

TABLE 1: SUMMARY OF PREVIOUS STUDIES WITH A 1/2-MILE RADIUS OF THE PROJECT AREA. ITEMS IN ITALICS REPRESENT A CULTURAL STUDY WITHIN THE PROJECT ALIGNMENT

Report No.	Author	Title	Year
SB-00191	*Smith, Gerald*	*Archaeological, Historical and Paleontological Site Survey for County Service Area NO. 70 Improvement Zone "J", Assessment of Impact and Recommendations*	*1973*
SB-01474	Smith, Gerald and E. Gary Stickle	A Cultural Resources Assessment of the Phelan Road Improvement Project, HO9155, Baldy Mesa Area, San Bernardino County, California	1984
SB-02476	McKenna, Jeanette	A Phase I Linear Survey: Cultural Resources Investigations for the Hesperia Improvement District, Hesperia, San Bernardino, California	1991
SB-03110	*Brock, James and Christine D'iorio*	*Historic Property Survey and Historic Architectural Evaluation Report for the Widening of Phelan Road from Baldy Mesa Road to State HWY 395, San Bernardino County, CA*	*1996*
SB-04289	White, Robert and Laura White	A Cultural Resources Assessment of the San Bernardino County Special Districts CSA 70 Zone J Casita Ave Water Pipeline Project Near Hesperia, San Bernardino Co	2003
SB-06333	Horne, Melinda	Cultural Resources Survey for the Mojave Water Agency Water Banking Project	2005
SB-07493	Dahdul, Miriam, Daniel Ballester, John Goodman II, and Nina Gallardo	Historical/Archaeological Resources Survey Report: Westside Terraces Project, Assessor's Parcel No's 3064-441-01 to 03, City of Hesperia, San Bernardino County, California	2013

TABLE 2: PREVIOUSLY RECORDED RESOURCES WITHIN A 1/2-MILE RADIUS OF THE PROJECT AREA

Site Number	Type	Recorder and Year
P-36-004267	Historic Road: Oro Grande Was Oak-Hill Cutoff Road	R. Reynolds (1980)
P-36-004268	Historic Road: Oro Grande Was Oak-Hill Cutoff Road	J. Brock (1995)
P-36-007545	Historic Road: HWY 395	D. Martinez and C. Connolly (Updated 2013)
P-36-007755	Historic Refuse Scatter	K. Becker, J. Phillips and B. Schmitz (1993)
P-36-007756	Historic Refuse Deposit	K. Becker, J. Phillips and B. Schmitz (1993)
P-36-007757	Historic Refuse Scatter	K. Becker, J. Phillips and B. Schmitz (1993)
P-36-008077	Historic Refuse Scatter	J. Brock (1995)
P-36-008082	Historic Road: Phelan Road	J. Brock (1995)
P-36-012342	Historic Refuse Deposit	S. Norris, T. Diaz, and M. Knypstra (2005)
P-36-012345	Historic Two Lane Road	V. Austerman and L. Lee (2005)
P-36-012347	Prehistoric quartzite cobble core	K. Becker, J. Phillips and B. Schmitz (2005)

4.2 Field Survey Results

The project site is a flat undeveloped lot, approx. 6.5 acres consisting of local high desert flora such as Joshua trees and sagebrush along with some dormant desert grasses. Ground visibility within the API was good (80 percent). Within the project area, the soil is a light brown, fine grain, sandy silt with angular pebbles.



Exhibit 3: Overview of Project Area Facing Northeast



Exhibit 4: Overview of Project Area Facing Northwest



Exhibit 5: Overview of Project Area Facing West

No pre-historic resources were identified as a result of the field survey.

Three (3) historic isolated church key cans were observed within the API (Exhibits 6-8).

ISO_001 was located at GPS coordinate 34.426971, -117.402985 and measures 3.5 inches in diameters. ISO_002 was located at GPS coordinate 34.427174, -117.401299 and measures 2.5 inches in diameter by 6 inches long. ISO_003 was located at GPS coordinate 34.427750, - 117.401855 and measures 2.5 inches in diameter by 6 inches long. These types of historic cans are common and were often used as beer cans.



EXHIBIT 6: ISO_001. CHURCH KEY CAN.



Exhibit 7: ISO_002. Church Key Can.



EXHIBIT 8: ISO_003. CHURCH KEY CAN.

5.0 SUMMARY AND RECOMMENDATIONS

Based on the results of the cultural resources record search and intensive pedestrian survey, three (3) isolated historic resources was found within the API. The isolated historic resources are not eligible to be listed with the California Register of Historical Resources (CRHR) and are not deemed as historically significant resources. Furthermore, no prehistoric resources were found as a result of the field survey. No impacts are expected to occur and no further work for cultural resources is needed.

Should unanticipated discoveries occur during construction, the following is recommended:

CUL Recommendations:

If cultural resources are discovered during project activities, all work in the immediate vicinity of the find (within a 60-foot buffer) shall cease and a qualified archaeologist meeting Secretary of Interior standards shall be hired to assess the find. Work on the other portions of the project outside of the buffered area may continue during this assessment period. Additionally, the Yuhaaviatam of San Manuel Nation Cultural Resources Department (YSMN) shall be contacted, as detailed within TCR-1, regarding any pre-contact finds and be provided information after the archaeologist makes his/her initial assessment of the nature of the find, so as to provide Tribal input with regards to significance and treatment.

If significant pre-contact cultural resources, as defined by CEQA (as amended, 2015), are discovered and avoidance cannot be ensured, the archaeologist shall develop a Monitoring and Treatment Plan, the drafts of which shall be provided to YSMN for review and comment, as detailed within TCR-1. The archaeologist shall monitor the remainder of the project and implement the Plan accordingly.

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.

Tribal Cultural Resources Recommendation:

The Yuhaaviatam of San Manuel Nation Cultural Resources Management Department (YSMN) shall be contacted, as detailed in CUL-1, of any pre-contact cultural resources discovered during project implementation, and be provided information regarding the nature of the find, so as to provide Tribal input with regards to significance and treatment. Should the find be deemed significant, as defined by CEQA (as amended, 2015), a Cultural Resources Monitoring and Treatment Plan shall be created by the archaeologist, in coordination with YSMN, and all subsequent finds shall be subject to this Plan. This Plan shall allow for a monitor to be present that represents YSMN for the remainder of the project, should YSMN elect to place a monitor on-site.

Any and all archaeological/cultural documents created as a part of the project (isolate records, site records, survey reports, testing reports, etc.) shall be supplied to the applicant and Lead Agency for dissemination to YSMN. The Lead Agency and/or applicant shall, in good faith, consult with YSMN throughout the life of the project.

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ATTACHMENT D: GEOTECHNICAL STUDY

HILLTOP GEOTECHNICAL
INCORPORATED

786 S. GIFFORD AVENUE • SAN BERNARDINO • CA 92408
Phone **909-890-9079** • FAX 909-890-9055
hilltopg@hgeotech.com

February 25, 2025

Plaza Street Partners
3400 College Boulevard, Suite 200
Leewood, KS 66211
Attn: Mylena Oliveira, Senior Project Coordinator

Project No.: 1699-01
Report No.: 1

Subject: **Update Report of Geotechnical/Geologic Study, Proposed Service Station and Convenience Store, 12050 Phelan Road, Hesperia, CA 92344.**

References: 1. **Hilltop Geotechnical, Inc.** January 29, 2018, *Report of Preliminary Geotechnical/Geologic Study, Proposed Service Station, Convenience Store and Food Truck Commissary, Northwest Corner of Phelan Road and Highway 395, City of Hesperia, San Bernardino County, California, Project No.: 1123-B17, Report No.: 1.*

2. **Alliance Land Planning & Engineering Inc.**, January 15, 25, *Hesperia Phelan Site Development Plan (Preliminary Grading/Drainage Plan), Sheet Number: SP-1.*

Gentleman,

Pursuant to your request, Hilltop Geotechnical, Inc. (HGI) have reviewed the preliminary geotechnical investigation report (Reference No. 1) and update site plan (Reference No. 2).

Based on our site visit conducted on February 21, 2025, the site conditions have no significant changes within the proposed project area compared to the site conditions at the time the preliminary geotechnical study report was prepared by HGI. Per update site plan provided by the property owner (Reference No. 2), the proposed development has slightly been changed from the original site plan

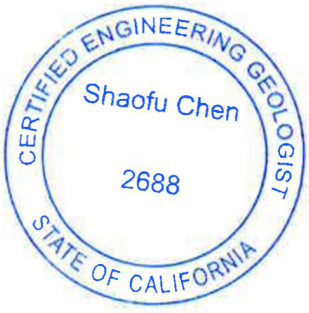
prepared at the time HGI conducted a geotechnical investigation in 2018. The recommendations presented in the geotechnical report (Reference No. 1) are still applicable to the presently proposed development with some modifications presented in this update report. The updated recommendations are presented in the report below and supersede the recommendations presented in the geotechnical report (Reference No. 1).

The findings of this study indicate that the proposed development at the subject site is feasible provided the recommendations presented in the update report are incorporated into the project design and implemented during the project construction.

If you have any questions after reviewing the findings and recommendations contained in the attached report, please do not hesitate to contact this office. This opportunity to be of professional service is sincerely appreciated.

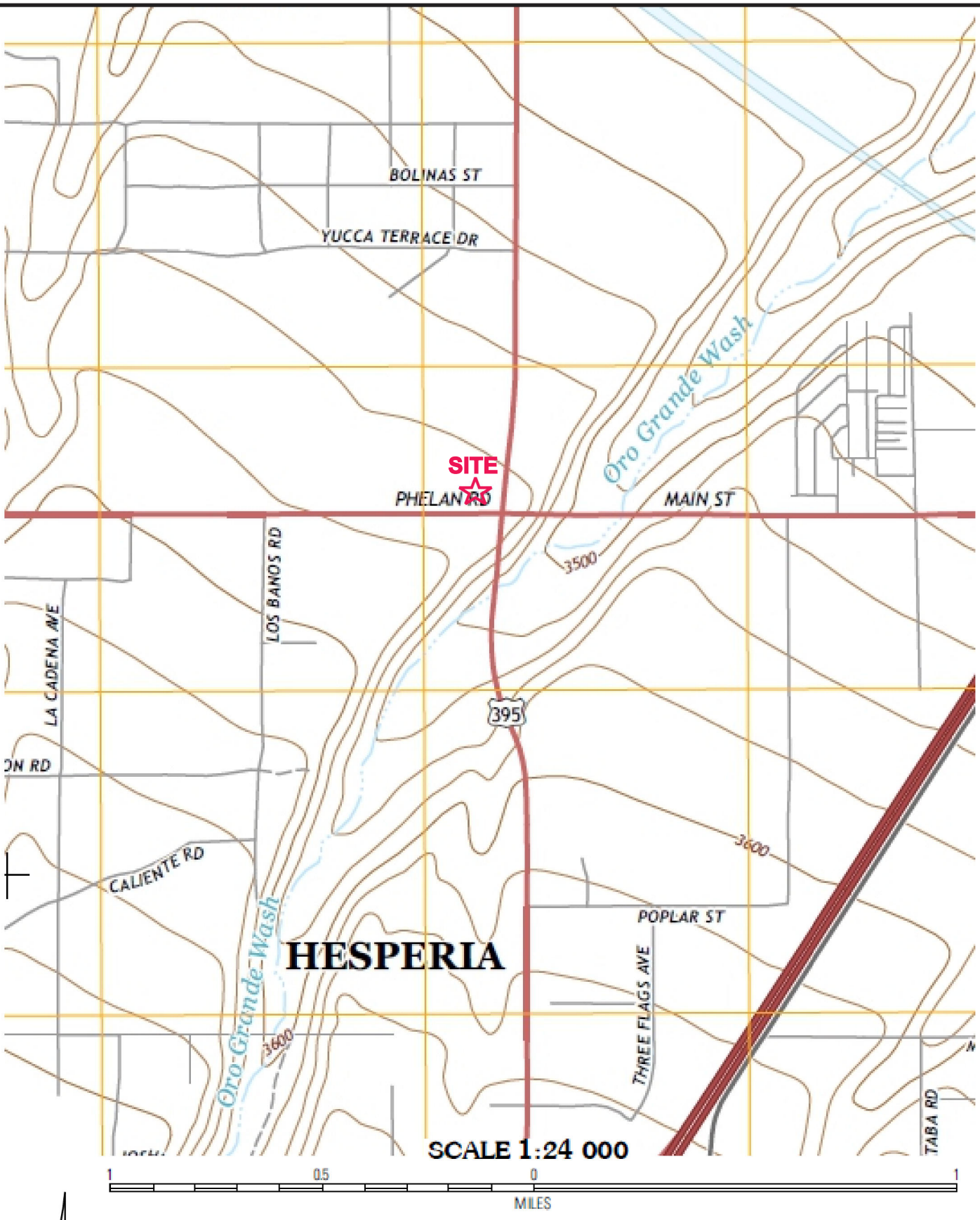
Respectfully Submitted,
HILLTOP GEOTECHNICAL, INC.





S. Mac Chen, P.E. C76834, C.E.G. 2688
Principal Engineer/Geologist

Distribution: (1) Addressee
Mylena Oliveira (moliveira@plazastreetpartners.com)



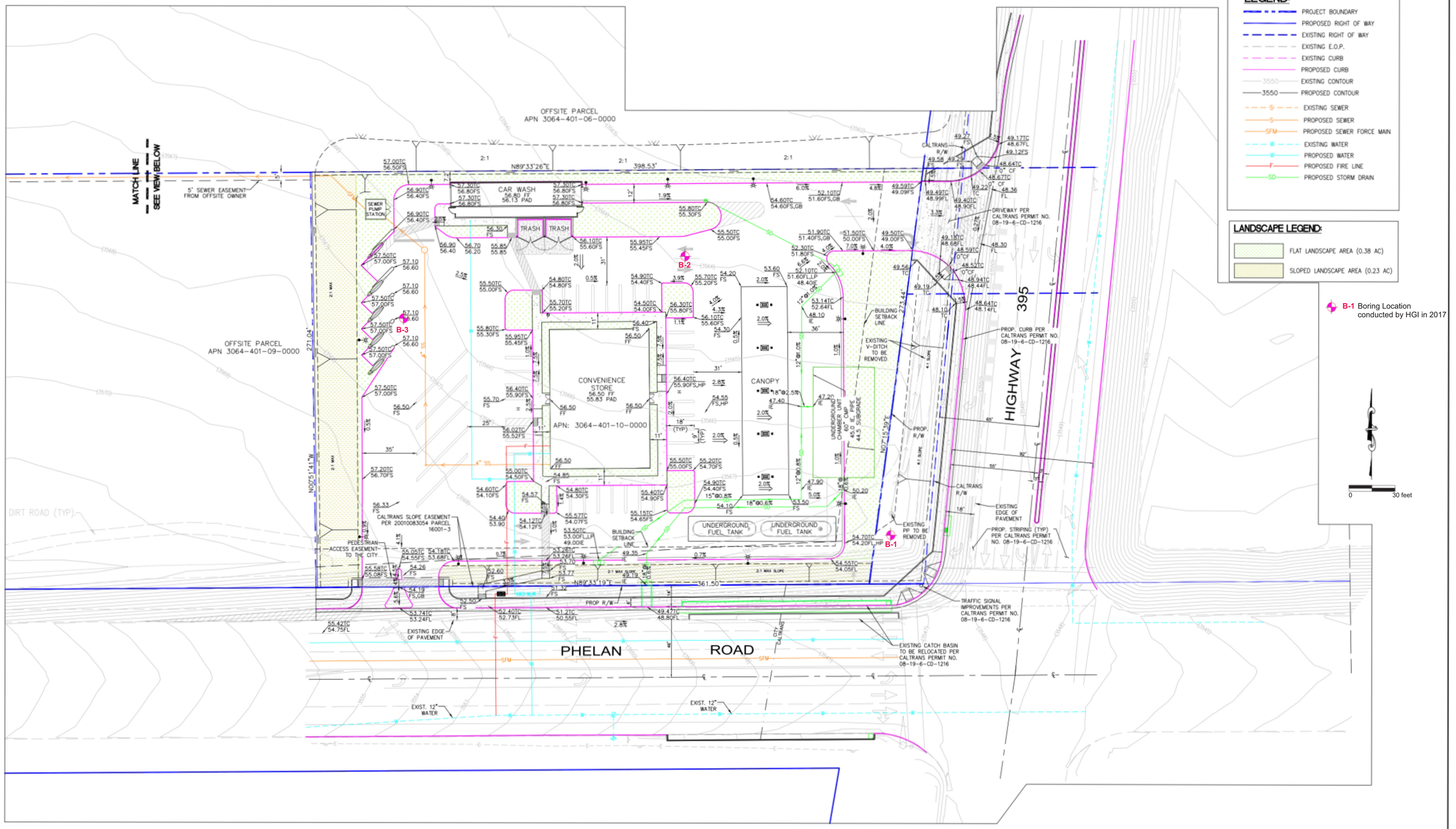
Source: Copied from USGS Topo Map-
Baldy Mesa Quadrangle 2015

HILLTOP GEOTECHNICAL
INCORPORATED

SITE LOCATION MAP

12050 Phelan Road, Hesperia, CA 92344

By: MC	Date: 2/2025
Project No.: 1699-01	**Figure No. 1**



HILLTOP GEOTECHNICAL INCORPORATED	**Update Site Plan and Boring Locations**
	12050 Phelan Road, Hesperia, CA 92344
By: MC	Date: 2/2025
Project No.: 1699-01	**Plate No. 1**

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Attachment A

Preliminary Geotechnical Investigation Report

by Hilltop Geotechnical, Inc.

1. UPDATED GEOTECHNICAL CONCLUSIONS AND RECOMMENDATIONS

GENERAL

In our opinion, the proposed service station and convenience store are feasible from a geotechnical engineering viewpoint provided the geotechnical recommendations presented in this report are followed.

Preliminary recommendations for site grading, foundation design, slab support, pavement design, slope maintenance, etc., are presented in the subsequent paragraphs.

SITE PREPARATION RECOMMENDATIONS

General

The grading recommendations presented in this report are intended for: 1) the rework of unsuitable, near-surface and alluvial earth materials to create a uniformly thick engineered building pad and satisfactory support for exterior hardscape (i.e., sidewalks, patios, etc.) and pavement; and 2) the use of a conventional shallow foundation system and concrete slabs cast on-grade for the proposed structures.

If hardscape and pavement subgrade earth materials are prepared at the time of grading of the building site, and the improvements are not constructed immediately, additional observations and testing of the subgrade earth material will have to be performed to locate areas which may have been damaged by construction traffic, construction activities, and/or seasonal wetting and drying. The additional observations and testing should be performed before placing aggregate base material, Hot Mix Asphalt (HMA) concrete, and/or Portland Cement concrete (PCC) in those areas.

The grading should be conducted in accordance with the recommendations presented in this report. We recommend that **HGI**, as the Geotechnical Engineer

/ Geologist of Record, be retained by the owner of the proposed project to observe the excavation and grading operations, foundation preparation, and test the compacted fill and utility trench backfill. If **HGI** were not selected to perform the required observation and testing of earthwork construction, **HGI** would cease to be the Geotechnical Consultant of Record for the project. A pre-grading conference should be held at the site with representatives of the owner, the grading contractor, the City of Hesperia, the Civil Engineer, and a representative of **HGI** in attendance. Special grading procedures and/or concerns can be addressed at that time.

Earthwork observation services allow the testing of only a small percentage of the fill placed at the site. Contractual arrangements with the grading contractor by the project owner should contain the provision that he is responsible for excavating, placing, and compacting fill in accordance with the recommendations presented in this report and the approved project grading plans and specifications. Observation by the project Geotechnical / Geologic Consultant and/or his representatives during grading should not relieve the grading contractor of his responsibility to perform the work in accordance with the recommendations presented in this report and the approved project plans and specifications.

The following recommendations may need to be modified and/or supplemented during grading as field conditions require.

Clearing and Grubbing

Debris, grass, weeds, brush, trees, and other deleterious materials should be removed from the proposed buildings, exterior hardscape and pavement areas and areas to receive structural fill before grading is performed. Any organic material and miscellaneous / demolition debris should be legally disposed of offsite. Any topsoil or highly organic surface soil encountered should be stripped

and stockpiled for use on finished grades in landscape areas or exported from the site. Disking or mixing organic material into the soils proposed to be used as structural fill should not be permitted.

Man-made objects encountered (i.e., septic tanks, leach lines, irrigation systems, underground utilities, old foundations, etc.) should be overexcavated, exported from the site, and legally disposed of offsite. Cesspools or seepage pits, if encountered (none were encountered during this study), should be abandoned, and capped according to directions and supervision of San Bernardino County Department of Health, the State of California, and/or the appropriate governmental agency procedures which has jurisdiction over them before fill and/or pavement is placed over the area. If no procedures are required by the Health Department or if the following recommendations are more stringent, the cesspool or seepage pit should be pumped free of any liquid and filled with a low strength sand cement slurry to an elevation 5.0 feet below the final site grade in the area. The upper 5.0 feet of the cesspool or seepage pit should be excavated; and the area should be backfilled with a properly compacted filling material. The location of the cesspool or seepage pit should be surveyed and plotted on the final 'As-Graded' plan prepared by the project Civil Engineer. Wells, if encountered, should be abandoned, and capped according to directions and supervision of San Bernardino County Department of Health, the State of California, and/or the appropriate governmental agency procedures which has jurisdiction over the well before fill and/or pavement is placed over the area.

Excavation Characteristics

Excavation and trenching within the subject property to the depths anticipated for the proposed development are anticipated to be relatively easy in the near-surface alluvial on the subject site and should be accomplished with conventional earth-moving equipment since the drill rig equipped with flight augers was able to penetrate to the indicated depths. It is not anticipated that a significant

amount of oversized rock material (i.e., three inches in greatest dimension) will be generated during the removal and replacement process within the alluvial materials which will require special handling during the development of the site.

Suitability of on-Site Materials as Fill

In general, the on-site earth materials present below any topsoil and/or highly organic materials are considered satisfactory for reuse as fill. Fill materials should be free of significant amounts of organic materials and/or debris and should not contain rocks or clumps greater than three inches in maximum dimension. It is noted that the in-situ moisture content of the near-surface fill and alluvial soils on the subject site at the time this field study was performed was below the optimum moisture content for the on-site materials and that moisture will have to be added to the on-site soils if the soils are to be used as compacted fill material soon.

Removal and Recompaction

Uncontrolled or undocumented fills and/or unsuitable, loose, or disturbed near-surface incompetent, porous, collapsible alluvium in proposed areas which will support structural fills, structures (i.e., buildings, decorative block walls, retaining walls, trash enclosure walls, etc.), fill slopes, exterior hardscape (i.e., sidewalks, patios, curb / gutters, etc.), fill slopes, and pavement should be prepared in accordance with the following recommendations for grading in such areas. If overexcavation of undocumented fill or moisture sensitive, collapsible earth materials is elected not to be performed in hardscape, curb / gutter, pavement, and decorative block wall or fence areas, penetration of irrigation water with time may cause some settlement and distress to the improvements in those areas. The cost of the additional grading verses the risk of distress and the cost of repairs to the structures needs to be evaluated by the project owner.

- The near-surface loose, collapsible, near-surface alluvial materials on the site are recommended to be overexcavated and recompacted. The overexcavation should extend to at least 4.0 feet below existing ground surface and to a uniform elevation within the horizontal limits of the overexcavation in the areas which will receive structural fill, building structures, retaining walls, trash enclosure walls, and decorative concrete block walls or a minimum of 2 feet below the proposed footing bottom. A relative compaction of 85 percent or greater should be obtained in the exposed earth material at the overexcavation depth prior to performing any scarification, moisture conditioning, and recompaction. If 85 percent relative compaction is not present, the overexcavation should be deepened until a minimum of 85 percent relative compaction is present. Moreover, the depth of the overexcavation within the perimeter of the proposed structures should be to a uniform elevation throughout the limits of the structures. It is noted that fill placed to construct slopes and/or support sidewalks, patios, retaining walls, block walls, driveways, and pavement are considered to be engineered fill.

- Where a cut / fill transition zone extends through a proposed building pad area, a compacted mat of fill will have to be constructed under the building area to prevent differential settlement between the two (2) dissimilar materials. This mat should be constructed by over excavating the materials in the cut portion of the pad to a distance outside the proposed building limits of 5.0 feet or to the depth of the over excavation below the finish pad grade, whichever is greater. The over excavation should extend to a depth of 5.0 feet below the pad elevation or to a minimum depth of 0.5 times the depth of the deepest fill within the building pad, whichever is greater.

- In total cut building pads for proposed structures, over excavation and recompaction are recommended to be performed to a depth of 4.0 feet below

the proposed cut pad elevation and to a lateral distance of 4.0 feet outside the perimeter of the structure. This will provide a uniformly compacted building pad for support of the structure and remove oversize materials within the anticipated depths of foundations and underground utilities.

- In the proposed exterior hardscape (i.e., sidewalks, patio slabs, etc.), and pavement areas where engineered fill will not be placed or cuts are proposed, the existing near-surface soils need only be processed to a depth of 6.0 to 12 inches below existing site grades or proposed subgrade elevation, whichever is deeper unless old, undocumented fill materials are encountered at exposed grades. If undocumented fills are encountered, they will need to be over excavated and properly compacted fill replaced to achieve proposed grades.

  Due to the collapsible nature of the near-surface alluvial earth materials on the subject site, if overexcavation and replacement is not performed under the exterior concrete slabs, hardscape, pavement, curb / gutters, etc., there is a risk of settlement and vertical differential movement if the subgrade earth materials are allowed to become saturated. Therefore, proper drainage should be established away from such improvements and minimal precipitation or irrigation water allowed to percolate into the earth materials adjacent to the exterior concrete hardscape, pavement, curbs / gutters, etc.

- Additional over excavation will need to be performed in areas where the exposed subgrade cannot be properly processed and recompacted per the following recommendations presented in this section of this report.

- In landscape or non-structural fill areas where non-structural fill will be placed, overexcavation will not need to be performed prior to placing non-structural fill materials. Proposed fill slopes are structural fills and do not

fall under this provision. Any non-structural filling areas should be clearly designated on the project grading and/or site plan by the Civil Engineer or Architect.

- The limits of over excavation for the building pads should extend to at least 4.0 feet or to the depth of the over excavation beneath the finish pad grade for the structure, whichever is greater, beyond the structure perimeter or footing edges. The limits of over excavation for fill slopes should extend to 4.0 feet beyond the toe of the slope or to the depth of the over excavation beneath the toe of the slope, whichever is greater. The limits of over excavation for the decorative concrete block perimeter wall footings and/or retaining wall footings should extend to 4.0 feet beyond the footing edges or to the depth of the over excavation beneath the footing grade, whichever is greater. The limits of processing or over excavation for exterior hardscape, curb / gutter, and pavement areas should extend to 2.0 feet beyond the edge of the exterior hardscape, curb / gutter, or pavement, or to the depth of the over excavation beneath the finish subgrade elevation, whichever is greater.

  In areas where over excavation cannot be performed to the required distance beyond the foundations, (i.e., perimeter project block walls, retaining walls, etc.) along property lines, the foundations should be deepened to extend through the loose fill and near-surface, porous alluvial soils and be embedded to a minimum depth of 2.0 feet into the firm underlying material.

- It is noted that localized areas, once exposed, may warrant additional over excavation for the removal of existing undocumented fills, porous, moisture sensitive alluvial soils, and subsurface obstructions and/or debris which may be associated with the past usage of the site. Actual depths of

removals and the competency of the exposed over excavation bottoms should be determined by the project Geotechnical / Geologic Consultant and/or his representative during grading operations at the time they are exposed and before scarification and recompaction or the placement of fill.

- The exposed over excavation bottom surfaces should be scarified to a depth of 6.0 to 12 inches, brought to optimum moisture content to 3.0 percent within optimum moisture content, and compacted to 90 percent or greater relative compaction before placement of fill. Maximum dry density and optimum moisture content for compacted materials should be determined according to current ASTM D1557 procedures. The scarification and recompaction of the exposed over excavation bottoms in bedrock materials may be deleted upon approval by the project Geotechnical / Geologic Consultant, and/or his representative. The scarification and recompaction of the exposed over excavation bottoms in alluvial materials may be deleted upon approval by the project Geotechnical / Geologic Consultant, and/or his representative when in-place density test results in the undisturbed alluvial materials indicate a relative compaction of 90 percent or greater.

Import Material

Import fill should be 'Non-Expansive' as defined in Section 1803.5.3, 'Expansive Soil,' in the 2022 CBC (i.e., Expansion Index ≤ 20) as determined by current ASTM D4829 procedures and have strength parameters equivalent to or greater than the on-site earth materials. Import filling material should be approved by the project Geotechnical / Geologic Consultant prior to it being brought on-site.

Fill Placement Requirements

Fill material, whether on-site material or import, should be approved by the project Geotechnical / Geologic Consultant and/or his representative before placement. Fill material should be free from vegetation, organic material, debris,

and oversized material (i.e., three inches in maximum dimension). Approved fill material should be placed in horizontal lifts not exceeding 6.0 to 12 inches in compacted thickness or in thicknesses the grading contractor can demonstrate that he can achieve adequate compaction and watered or aerated to obtain optimum moisture content to 3.0 percent within optimum moisture content. Each lift should be spread evenly and should be thoroughly mixed to ensure uniformity of soil moisture. Fill soils should be compacted to 90 percent or greater relative compaction. Maximum dry density and optimum moisture content for compacted materials should be determined in accordance with current ASTM D1557 procedures.

Compaction Equipment

It is anticipated that the compaction equipment to be used for the project will include a combination of rubber-tired, track-mounted, sheepsfoot, and/or vibratory rollers to achieve compaction. Compaction by rubber-tired or track-mounted equipment, by itself, may not be sufficient. Adequate water trucks, water pulls, and/or other appropriate equipment should be available to provide sufficient moisture and dust control. The actual selection of equipment and compaction procedures are the responsibility of the contractor performing the work and should be such that uniform compaction of the fill is achieved.

Shrinkage, Bulking, and Subsidence

There will be a material loss due to the clearing and grubbing operations. The following values are exclusive of losses due to clearing, grubbing, or the removal of other subsurface features and may vary due to differing conditions within the project boundaries and the limitations of this study.

Volumetric shrinkage of the near-surface alluvium on the subject site that is excavated and replaced as controlled, compacted fill should be anticipated. It is estimated that the average shrinkage of the near-surface soils within the upper 5.0 feet of the site which will be removed and replaced will be approximately 13

to 20 percent, based on fill volumes when compacted to 90 to 95 percent of maximum dry density for the soil type based on current ASTM D1557 procedures. For example, a 13.0 percent shrinkage factor would mean that it would take 1.13 cubic yards of excavated material to make 1.0 cubic yard of compacted fill at 90 percent relative compaction. A higher relative compaction would mean a larger shrinkage value.

A subsidence factor (loss of elevation due to compaction of existing fill and/or alluvial soils in-place) of 0.12 to 0.16 foot per foot of compacted soil should be used in areas where the existing soils are compacted in-place to 90 to 95 percent relative compaction and to a depth of twelve inches.

Subsidence of the site due to settlement from the placement of less than 3.0 feet of fill (not including the depth of over excavation and replacement) during the planned grading operation is expected to be minimal.

Although the above values are only approximate, they represent the recommended estimate of some of the respective factors to be used to calculate lost volume that will occur during grading.

Abandonment of Existing Underground Lines

The abandonment of existing underground irrigation, utility, or pipelines, if present within the zone of construction, should be performed by either excavating the lines and filling in the excavations with documented, properly compacted fill or by filling the lines with a low strength sand / aggregate / cement slurry mixture. Filled lines should not be permitted closer than 3.0 feet below the bottom of proposed footings and/or concrete slabs on-grade. The lines should be cut off at a distance of 5.0 feet or greater from the area of construction. The ends of the lines should be plugged with 5.0 feet or more of exhibiting minimal shrinkage characteristics to prevent water or fluid migration into or from the lines. Capping of the lines may also be needed if the lines are subject to line pressures. The slurry

should consist of a fluid, workable mixture of sand, aggregate, cement, and water. Plugs should be placed at the ends of the line prior to filling with the slurry mixture. Cement should be Portland cement conforming to current ASTM C150 specifications. Water used for the slurry mixture should be free of oil, salt, and other impurities which would have an adverse effect on the quality of the slurry. Aggregate, if used in the slurry, mixture should meet the following gradation or a suitable equivalent:

SIEVE SIZE	PERCENT PASSING
1.5"	100
1.0"	80-100
3/4"	60-100
3/8"	50-100
No. 4	40-80
No. 100	10-40

The sand, aggregate, cement, and water should be proportioned either by weight or by volume. Each cubic yard of slurry should not contain less than 188 pounds (2.0 sacks) of cement. Water content should be sufficient to produce a fluid, workable mix that will flow and can be pumped without segregation of the aggregate while being placed. The slurry should be placed within 1.0 hour of mixing. The contractor should take precautions so that voids within the line to be abandoned are completely filled with slurry.

Local ordinances relative to abandonment of underground irrigation, utility, or pipelines, if more restrictive, supersede the above recommendations.

Slope Setbacks

Cut and fill slope setbacks from the permit boundary lines should be in accordance with Appendix 'J,' Section J108, 'Setbacks,' of the 2022 CBC or current City of Hesperia, California Grading Ordinances, whichever is more stringent.

Benching

Compacted fill deeper than 5.0 feet and placed on natural slope surfaces inclined at 5H:1V (Horizontal to Vertical) or steeper should be placed on a series of level benches excavated into competent native materials per Appendix J, 'Grading,' Section J107.3, 'Benching,' in the 2022 CBC. The benches should have a 2.0 foot or higher backcut in competent material.

Fill Slopes

Finish fill slopes should not be inclined steeper than 2H:1V (Horizontal to Vertical). Fill slope surfaces should be compacted to 90 percent relative compaction to the face of the finished slope. Overexcavation beneath proposed fill slopes should be performed in accordance with the recommendations presented in previous sections of this report. Fill slopes should be constructed in a skillful manner so that they are positioned at the design orientations and slope ratio. Achieving a uniform slope surface by subsequent thin wedge filling should be avoided. Add-on correction to a fill slope should be conducted under the observation and recommendations of the project Geotechnical / Geologic Consultant. The proposed add-on correction procedures should be submitted in writing by the contractor before commencement of corrective grading and reviewed by the project Geotechnical / Geologic Consultant. Compacted fill slopes should be back rolled with appropriate equipment for the type of soil being used during fill placement at intervals not exceeding 4.0 feet in vertical height. As an alternative to the bankrolling of the fill slopes, over-filling of the slopes will be considered acceptable and preferred. The fill slope should be constructed by over-filling with compacted fill to 3.0 feet or greater horizontally and then

trimmed back to expose the dense inner core of the slope surface. Fill slopes steeper than 3H:1V are moderately susceptible to erosion due to the low cohesion parameters of the soil.

Cut Slopes

Finish cut slopes in alluvium should not be inclined steeper than 2H:1V (Horizontal to Vertical). The cut slopes should be observed by the project Geotechnical / Geologic Consultant and/or his representative during grading to provide supplemental recommendations for stability of slopes, if needed. Cut slopes that face in the same direction as the prevailing natural slope will require top of cut paved interceptor swales. Cut slopes steeper than 3H:1V are moderately susceptible to erosion due to the low cohesion parameters of the soil.

Loose Material on Slope Face

The grading contractor should be made aware to take care to avoid spillage of loose material down the face of slopes during grading and during drainage terrace and down drain construction. Fine grading operations for benches and down drains should not deposit loose trimmed soils on the finished slope surfaces.

Slope Creep

Proposed slopes are planned to be stable under normal conditions and moderate earthquakes. However, movement due to creep effects of improvements located near the tops of existing slopes and/or proposed fill and cut slopes must be considered. Due to moisture variations and natural gravity forces, the soil on the face of a slope tends to move downward and outward with time. Past experience has indicated that there is a zone which ranges back from the top of the slope edge that may experience movement. This zone varies from approximately 5.0 feet to 15 to 20 feet depending on the type of soil the slope is composed of, the height of the slope, the inclination of the slope, moisture conditions, etc. The movement tends to be greatest at the top of the slope near the slope edge.

Improvements within the creep zone should be designed and constructed to accommodate the anticipated movements. The movements may vary from a fraction of an inch to several inches and are dependent on the height, soil type, distance from the slope edge, and other factors.

Slope Protection

Permanent slope maintenance and protection measures as presented in the subsequent 'Slope Maintenance and Protection Recommendations' section of this report should be initiated as soon as practicable after completion of cut and/or fill slope construction. Fill slopes and cut slopes in alluvium materials steeper than 3H:1V (Horizontal to Vertical) are moderately susceptible to erosion due to the low cohesion parameters of the soils. The plant mix, method of application, and maintenance requirements are subject to the approval of a registered Landscape Architect or other qualified landscape professional. Construction delays, climate or weather conditions, and plant growth rates may be such that additional short-term non-plant erosion management measures may be needed. Examples would include matting, netting, plastic sheets, deep staking (5.0 feet or deeper), etc.

Temporary Roads

Temporary roads created during grading should be removed in their entirety or replaced as documented compacted fill as part of the rough grading of the tract.

Protection of Work

During the grading process and prior to the completion of construction of permanent drainage controls, it is the responsibility of the grading contractor to provide good drainage and prevent ponding of water and damage to the in progress or finished work on the site and/or to adjoining properties.

Observation and Testing

During grading, observation and testing should be conducted by the project Geotechnical / Geologic Consultant and/or his representatives to verify that the grading is being performed according to the recommendations presented in this report. The project Geotechnical / Geologic Consultant and/or his representative should observe the over excavation bottoms and the placement of fill and should take tests to verify the moisture content, density, uniformity, and degree of compaction obtained. The contractor should notify the project Geotechnical / Geologic Consultant when cleanout and/or over excavation bottoms are ready for observation and prior to scarification and recompaction. Typically, one (1) in-place density test should be performed for every 2.0 vertical feet of fill material, or one (1) test for every 500 cubic yards of fill, which ever requires the greater number of tests. Where testing demonstrates insufficient density, additional compaction effort, with the adjustment of the moisture content when needed, should be applied until retesting shows that satisfactory relative compaction has been obtained. The results of observations and testing services should be presented in a formal 'Grading Report' following completion of the grading operations. Grading operations undertaken at the site without the project Geotechnical / Geologic Consultant and/or his representative present may result in exclusions of the affected areas from the grading report for the project. The presence of the project Geotechnical / Geologic Consultant and/or his representative will be for the purpose of providing observations and field testing and will not include supervision or directing of the actual work of the contractor or the contractor's employees or agents. Neither the presence and/or the non-presence of the project Geotechnical / Geologic Consultant and/or his field representative nor the field observations and testing will excuse the contractor for defects discovered in the contractor's work. If **HGI** does not perform the observation and testing of the earthwork for the project and is replaced as Geotechnical / Geologic Consultant of record for the project, the work on the project should be stopped until the replacement Geotechnical / Geologic

Consultant has reviewed the previous reports and work performed for the project, agreed in writing to accept the recommendations and prior work performed by **HGI** for the subject project, or has performed their own studies and submitted their revised recommendations.

Earth Material Expansion Potential

The preliminary expansion potential of the on-site soils is discussed in the subsequent foundation and floor slab recommendation sections of this report. Upon completion of grading for the building pad areas, near-surface samples should be obtained for expansion potential testing to verify the preliminary expansion test results and the foundation and slab-on-grade recommendations presented in this report.

Earth Material Corrosion Potential

The preliminary corrosion potential of the on-site soil is discussed in the subsequent corrosion recommendation sections of this report. Upon completion of grading for the building pad areas, near-surface samples should be obtained for corrosion potential testing to verify the preliminary chemical test results and the recommendations presented in this report for protection of concrete which come in direct contact with the on-site soils and to present recommendations for protection of bare metal, if desired, which come in direct contact with the on-site soils.

SEISMIC DESIGN PARAMETERS

Based on our field investigation, the 2022 California Building Code (CBC), and ASCE/SEI 7-16 Minimum Design Loads and Associated Criteria for Buildings and Other Structures (ASCE/SEI 7-16), the site could be designated as **Site Class D** per Table 20.3-1 of ASCE 7-16. The occupancy risk category can be designated as II. Other required seismic design parameters can be obtained from Section 1613 of the 2022 CBC or could be obtained from the California Structural

Engineers Association website: ***https://seismicmaps.org/*** below by entering the address of the project site (34.4267801, -117.4011969), the computer outputs incorporated with Supplement 3 are summarized in the following table:

Spectral Response Accelerations S_{MS} and S_{M1}	
Ss = 1.5g, S_{MS} = Fa x Ss	S_1 = 0.6g, S_{M1} = Fv x S_1
Site Class D: Fa = 1, Fv = 1.7*1.5	
Period (Sec.)	Sa (g)
0.2	1.5 (S_{MS}, Site Class D)
1.0	1.53 (S_{M1}, Site Class D)

Design Spectral Response Accelerations S_{DS} and S_{D1}	
S_{DS} = 2/3 x S_{MS}	S_{D1} = 2/3 x S_{M1}
PGA=0.5g, F_{PGA}=1.1, PGA_M=0.55g	
Period (Sec.)	Sa(g)
0.2	1 (S_{DS}, Site Class D)
1.0	1.2 (S_{D1}, Site Class D)
Seismic Design Category: D	

PRELIMINARY FOUNDATION DESIGN RECOMMENDATIONS

General

The recommendations presented in the subsequent paragraphs for foundation design and construction are based on geotechnical characteristics and 'non-expansive' conditions for the supporting earth materials as defined in Section 1803.5.3, 'Expansive Soil,' in the 2022 CBC and should not preclude more restrictive structural requirements. Foundations for the proposed structures may consist of conventional column and continuous wall footings founded upon undisturbed, documented, properly, compacted fill.

The Structural Engineer for the project should determine the actual footing width, depth, and reinforcing to resist design vertical, horizontal, and uplift forces under static and seismic conditions. Reinforcement recommendations presented in this report are considered the minimum for the earth material conditions present on the site and are not intended to supersede the design of the project

Structural Engineer or the criteria of the governing agencies for the project. The project Structural Engineer may design a 'Slab-on-Ground Foundation' system based on the current **Wire Reinforcement Institute, Inc.** procedures or a 'Post-Tension Slab-on-Ground' system based on the current **Post Tensioning Institute** as an alternative to conventional reinforced concrete foundations and cast-on-grade concrete floor slabs. Geotechnical parameters for the design of a 'Slab-on-Ground Foundation' system or a 'Post-Tension Slab-on-Ground' system can be submitted upon request, if needed.

Conventional Foundations

Foundation Size

Continuous footings should have a minimum width of twelve inches for 1-story structure and a minimum width of fifteen inches for 2-story structures. Footings supporting a roof only should be as required for supporting one (1) floor. Continuous footings should be continuously reinforced with a minimum of two (2) No. 4 steel reinforcing bars located near the top and two (2) No. 4 steel reinforcing bars located near the bottom of the footings to minimize the effects of slight differential movements which may occur due to minor variations in the engineering characteristics or seasonal moisture change in the supporting soils. Column footings should have a width of eighteen inches by eighteen inches or greater and be suitably reinforced, based on structural requirements. The continuous footings should extend across doorway and garage entrances and should be founded at the same depths and reinforced the same as the adjacent footings.

Depth of Embedment

Exterior and interior footings supported in undisturbed, documented, properly compacted fill or undisturbed, firm, alluvial earth material should extend to a depth of twelve inches or greater below lowest adjacent finish grade. Footings should extend to a depth of 12 inches or greater into the bedrock material

underlying the unsuitable on-site earth materials due to the expansion potential of the supporting earth materials. Frost is not considered a design factor for foundations in the City of Hesperia, California, since there will not be any significant frost penetration in the winter months.

Footings should be founded in undisturbed, documented, properly compacted fill or undisturbed, natural earth material, but not a combination of the different earth materials within the structure. Where building, decorative wall, or retaining wall footings will be constructed directly on the property line or where the limits of overexcavation do not extend sufficiently beyond the footing edges per the 'Earthwork Recommendations' section of this report, the footings should be deepened to extend through the unsuitable, earth material and be founded to a depth of 12 inches or greater into firm, competent, undisturbed, natural earth material.

Footing Setback

Embedment of footings on or near existing or planned slopes should be determined by a setback distance measured from the bottom outside edge of the footing to the slope face in accordance with the 2022 CBC or the current City of Hesperia, California Codes and Ordinances, whichever is greater.

Foundations for the proposed structure and/or retaining walls on slopes that are steeper than 10H:1V (Horizontal to Vertical) (10 percent slope) should be designed in accordance with the 2022 CBC. The top surface of the footings should be level or should be stepped so that both the top and bottom of such foundations are in accordance with the provisions in the 2022 CBC. The stepped foundation should be suitably reinforced and designed by a qualified Civil or Structural Engineer.

The fine-grained soils overlying the natural slopes on the subject site are prone to downslope creep. The rate of creep is a function of the length and steepness of

the slope, the moisture content of the soils, the depth of creep prone soils, and the degree and care and maintenance of the slope. Slope creep is activated by wetting of the soil mantle. In addition, the presence of burrowing animals can reduce the integrity of the soil and increase the downslope creep.

Bearing Capacity

Provided the recommendations for site earthwork and for footing width and depth of embedment are incorporated into the project design and construction, the allowable bearing value for design of continuous and column footings for the total dead plus frequently-applied live loads is 2,000 pounds per square foot (psf) for footings that are 12 inches in width and a depth of embedment of 12 inches or greater below lowest adjacent finish grade for footings founded in undisturbed, documented, properly, compacted fill material. For eccentrically loaded footings and/or overturning moments, the resultant force should be in the middle one-third of the footing and the average bearing value across the footing should not exceed the recommended allowable bearing value. The allowable bearing values have a factor of safety of 3.0 or greater and may be increased by 33.3 percent for short durations of live and/or dynamic loading such as wind or seismic forces.

Settlement

Footings designed according to the recommended bearing value for continuous and column footings, the assumed maximum wall and column loads, and founded in undisturbed, properly compacted fill material are not expected to exceed a total settlement of 1.0 inch or a differential settlement of 0.25 inch between similarly sized and loaded footings.

Lateral Capacity

Resistance to lateral loads can be provided by a combination of friction acting at the base of the foundation and passive earth pressure on the sides of the footings and stem walls. Foundation design parameters, based on undisturbed,

documented, properly compacted fill or undisturbed, in-situ alluvium for resistance to static lateral dead forces are as follows:

Allowable Lateral Bearing Pressure
(Equivalent Fluid Pressure), Passive Case:
Documented and Compacted Fill - 200 pcf
Undisturbed Alluvial Soil - 150 pcf
* Pounds per Square foot per Foot of Depth (pcf).

Allowable Lateral Sliding Coefficient of Friction Between Soil and Concrete:
Documented and Compacted Fill - 0.3
Undisturbed Alluvial Soil - 0.25

The above values are allowable design values and have safety factors of 2.0 or greater incorporated into them and may be used in combination without reduction in evaluating the resistance to lateral loads. The recommended lateral resistance assumes a horizontal surface for the soil mass extending to ten feet or greater from the face of the footing, or three (3) times the height of the surface generating passive pressure, whichever is greater. The allowable values may be increased by 33.3 percent for short durations of live and/or dynamic loading, such as wind or seismic forces. For the calculation of the allowable lateral bearing pressure (passive earth resistance), the upper 1.0 foot of material should be neglected unless confined by a concrete slab or pavement. The largest recommended allowable lateral bearing pressure (passive earth resistance) is fifteen times the recommended design value for the appropriate class of material.

Final Foundation Design Recommendations

Final foundation recommendations should be made upon completion of grading and be included in the 'Report of Grading' prepared by the Geotechnical / Geologic Consultant for the project.

Foundation Excavations

Foundation excavations should be observed by the project Geotechnical / Geologic Consultant and/or his representative prior to placement of forms, reinforcing steel, or placement of concrete for the purpose of verification of the recommendations presented in this report and for compliance with the project plans and specifications. The foundation excavations should be trimmed neat, level, and square. Any loose or sloughed material and debris should be removed from the foundation excavations prior to placement of reinforcing steel and removed again prior to the placement of concrete. Soils removed from the foundation excavations should not be placed in slab-on-grade areas unless compacted to 90 percent or greater relative compaction. The maximum dry density and optimum moisture content for the soil should be determined in accordance with current ASTM D1557 procedures.

SLAB-ON-GRADE FLOOR RECOMMENDATIONS

The recommendations for concrete slabs on-grade, both interior and exterior, excluding Portland Cement Concrete (PCC) pavement, based on geotechnical characteristics and expansive conditions for the supporting soils. The expansion potential of the slab subgrade areas should be verified at the completion of grading of the building pad areas. Concrete slabs should be designed to minimize cracking as a result of shrinkage. Joints (isolation, contraction, and construction) should be placed in accordance with the American Concrete Institute (ACI) or Portland Cement Association (PCA) guidelines. Special precautions should be taken during placement and curing of concrete slabs. Excessive slump (high water / cement ratio) of the concrete and/or improper curing procedures used

during either hot or cold weather conditions could result in excessive shrinkage, cracking, or curling in the slabs. It is recommended that concrete proportioning, placement, and curing be performed in accordance with ACI recommendations and procedures.

Commercial and/or industrial slabs should be designed by the project Structural Engineer in accordance with Portland Cement Association (PCA) or other approved design procedures for the actual loads and uses proposed.

Interior floor Slabs

Interior concrete floor slabs-on-grade should be 4.0 inches or greater in thickness and be placed on properly prepared subgrade per the 'Earthwork Recommendations' section of this report. The concrete for the floor slab should have a compressive strength of 2,500 pounds per square inch (psi) or greater at 28 days. Slab reinforcement should consist of a minimum of No. 3 reinforcing bars placed thirty inches on center in both directions, or an equivalent substitute. The amount of reinforcing in the floor slab should be increased as necessary based on the structural loads placed on the floors. The reinforcing should be placed at mid-depth to 1.5 inches below the top surface of the slab to minimize cracking. The concrete section, reinforcing steel, and/or design concrete compressive strength should be increased appropriately for anticipated excessive or concentrated floor loads. A Modulus of Subgrade Reaction (k_s) of 150 pounds per square inch per inch of deflection is recommended for the design of structural slabs cast on grade for excessive floor loads. A compacted sand or gravel bedding layer beneath lightly loaded floor slabs is not needed but may be desirable to enhance the design section for heavy floor loads. If gravel bedding is used, it should consist of a well graded, crushed aggregate. The sand or gravel layer should be compacted to 90 percent or greater of maximum dry density, as determined by current ASTM D1557 procedures.

If a vapor barrier / moisture retarder is used under the floor slab and it is placed on well graded crushed gravel material, the gravel should be 4.0 inches or greater in thickness. If open graded gravel is used, a separation fabric such as Mirafi 140N series or an equivalent substitute should be used to protect the vapor barrier / moisture retarder from punctures.

If the floor slabs in the shop area will be supporting live loads, such as moving forklift trucks or vehicles, it is recommended that construction joints in the floor be provided with a key or dowels to permit the transfer of loads. Keys should not be used unless the slab is 6.0 inches or greater in thickness. If tracked equipment will be using the facility, consideration should be given to the use of a surface hardener for the concrete slabs such Master Builders “Master Plate 200" or “Anviltop.”

Subgrade soils should be moisture conditioned to optimum moisture content to 3.0 percent above optimum moisture content to a depth of twelve inches and proof compacted to 90 percent or greater relative compaction based on current ASTM D1557 procedures immediately before placing the gravel material, the moisture barrier, or pouring concrete.

Vapor Barrier / Moisture Retarder Recommendations

In areas where moisture sensitive floor coverings are anticipated over the floor slab, the use of a vapor barrier / moisture retarder beneath the slab should be considered. The use or non-use of a vapor barrier / moisture retarder, the thickness of the vapor barrier / moisture retarder, the use of a granular layer over the vapor barrier / moisture retarder, the thickness of the granular materials, the type of granular material, etc. should be determined by the Structural Engineer who is designing the floor slab in conjunction with the Architect who is specifying the use and the type of floor coverings to be placed over the floor slab. The vapor

barrier / moisture retarder recommendations provided by the supplier of the flooring materials should also be incorporated into the project plans.

EXTERIOR CONCRETE FLATWORK

Exterior concrete slabs cast on finish subgrade (i.e., pedestrian walkways, patios, sidewalks, etc., with the exception of PCC pavement) should be 4.0 inches or greater in thickness and be underlain by 12 inches or greater of earth material that has been prepared in accordance with the 'Earthwork Recommendation' section of this report. Reinforcing in the slab, the design compressive strength of the concrete, and the use of a compacted sand or gravel base beneath the slabs should be according to the current codes and ordinances of the City of Hesperia, California. Subgrade earth materials should be moisture conditioned to optimum moisture content to 3.0 percent within optimum moisture content to a depth of 12 inches or greater and proof compacted to 90 percent or greater relative compaction based on current ASTM D1557 procedures immediately before placing aggregate base material, placing reinforcing steel, or placing the concrete.

Due to the collapsible nature of the near-surface alluvial soils on the subject site, if overexcavation and replacement is not performed under the exterior concrete slabs and hardscape, there is a risk of settlement and vertical differential movement of the exterior concrete hardscape, sidewalks, curbs / gutters, etc. if the subgrade earth materials are allowed to become saturated. Therefore, proper drainage should be established away from such improvements and minimal precipitation or irrigation water allowed to percolate into the earth materials adjacent to the exterior concrete hardscape, curbs / gutters, etc.

RETAINING WALL RECOMMENDATIONS

Retaining walls may be needed to achieve finish grades. Retaining walls should be designed in accordance with the recommendations in the following sections. If earth reinforced walls, crib walls, keystone walls, etc. are used for the

development of the subject site, the design requirement of the proprietary retaining wall system should supersede the following recommendations if there are any conflicts.

Static Lateral Earth Pressures

Retaining walls backfilled with non-expansive granular soil (i.e., Expansion Index (EI) ≤20 or Unified Soil Classifications of SP, SW, SM, GP, GW, and GM) within a zone extending upward and away from the heel of the footing at a slope of 0.5H:1V (Horizontal to Vertical) or flatter for level backfill behind the wall can be designed to resist static lateral earth pressures equivalent to those recommended in the following table:

LATERAL EARTH PRESSURE						
	Level Backfill and Soil Classification*			2H:1V Sloped Backfill and Soil Classification***		
Condition	SP, SW, GP, GW	GM	SM	SP, SW, GP, GW	GM	SM
Active	30 pcf**	40 pcf	45 pcf	40 pcf	62 pcf	81 pcf
At-Rest	60 pcf	60 pcf	60 pcf	87 pcf	110 pcf	120 pcf

* Per Table 1610.1, 'Lateral Soil Load,' in the 2022 CBC.
** Equivalent fluid Pressure, pounds per square foot per foot of depth (pcf).
*** Based on a moist unit weight of 125 pcf and an Angle of Internal Friction of 38 degrees for SP, SW, GP, and GW backfill soils, 31 degrees an for GM backfill soils, and 28 for an Angle of Internal Friction of 28 for SM backfill soils.

The designer of the retaining wall should specify the type of backfill material to be used in the active / at-rest zone behind the retaining wall. Any expansive soils which may be encountered on the subject site should not be used as backfill for retaining walls. Retaining walls that are free to deflect 0.001 radian at the top should be designed for the above-recommended active condition. Retaining walls that are not capable of this movement should be assumed rigid and designed for

the at-rest condition. The above values assume well-drained backfill and that a buildup of hydrostatic pressure will not occur. Surcharge loads, dead and/or live (i.e., construction loads, etc.), acting on the backfill within a horizontal distance behind the retaining wall, equivalent to or less than the vertical height of the retaining wall, should also be considered in the design. Uniform surcharge pressures should be applied as an additional uniform (rectangular) pressure distribution. The lateral earth pressure coefficient for a uniform vertical surcharge load behind the retaining wall is 0.50. Seismic and wind loads should also be added to the design loads on the retaining walls, if applicable.

DYNAMIC (SEISMIC) EARTH PRESSURE

The increase in lateral earth pressure on any retaining wall higher than six feet from earthquake loading may be estimated using the Mononobe-Okabe method as described by Seed and Whitman (1970). Based on the theory, the total active pressure can be divided into static and dynamic components. The total earth active pressure could be divided into static and dynamic components. For the proposed project, lateral earth seismic increment as equivalent fluid pressure can be taken as:

$$\gamma_{seismic} = 3/4 * K_h * \gamma_s = 3/4 * 0.183 * 125 = 17.2 \text{ pcf (level backfill)}$$

$$= 22.6 \text{ pcf (3:1 backfill)}$$

$$= 24.9 \text{ pcf (2:1 backfill)}$$

Where $K_h = 1/2x2/3xPGAm$, $PGAm = 0.55g$,

$\gamma_s = 125$ pcf

Seismic loading shall be distributed as an inverted triangle from top to bottom of retained earth. The centroid of the dynamic lateral force increase shall be applied at a distance of 2/3H above the base of the wall, where H represents retained earth height. To estimate the total (static and dynamic) lateral forces, the dynamic lateral force increase may be added to the active pressure. For dynamic conditions, the safety factor for sliding and overturning may be reduced to 1.1.

Foundation Design

Retaining wall footings should be founded to the same depths below lowest adjacent finished grade and offsets from the face of slopes, and into undisturbed, observed and tested, compacted fill, or firm, competent, undisturbed, alluvial soil as recommended in the previous sections of this report for a deepened foundation system. The foundations may be designed for the same average allowable bearing value across the footing (as long as the resultant force is located in the middle one-third of the footing), and with the same allowable static and seismic allowable lateral bearing pressure, allowable passive earth pressure, and allowable sliding resistance as recommended in the 'Foundation Design Recommendations' section of this report.

Subdrain

A subdrain system should be constructed behind, and at the base of retaining walls to allow drainage and to prevent the buildup of excessive hydrostatic pressures. The subdrain system should be designed by the project Civil Engineer. The use of water-stops, impermeable barriers, or other damp proofing or waterproofing methods should be considered for any walls where moisture migration through the wall is considered critical to the performance and/or appearance of the walls. A waterproofing consultant should be retained to provide specific waterproofing recommendations for the project.

Typical subdrains may include weep holes with a continuous free draining gravel gallery, perforated pipe surrounded by free draining filter rock, or another approved system. The option of providing an ungrouted, open coarse of block at the bottom of a retaining wall is not a recommended drainage option since the openings are so often covered by landscape soil, hardscape, and or pavement. Gravel galleries and/or filter rock, if not designed and graded for the on-site and/or import materials, should be enclosed in a geotextile fabric such as Mirafi 140N series or an equivalent substitute, to prevent infiltration of fine soil

particles into the subdrain and clogging of the system. Before the placement of the fabric, the top of the footing should be cleared of loose soil materials, large stones, and/or other debris. Any large depressions or holes should be filled with a concrete slurry or a suitable equivalent to permit close contact of the fabric with the surrounding surface. The fabric should be placed smoothly without folds or excessive wrinkles. Successive sheets of the fabric should be placed with an overlap of 24 inches or more in the direction of the flow of the water in the pipe with the upstream layer overlapping the downstream layer. The fabric should be folded over the top of the free draining granular material producing an overlap of twelve inches or more. The perforated pipes should be Schedule 40 or stronger and 4.0 inches or greater in diameter. Perforations may be either bored 0.25-inch diameter holes or 0.1875-inch (3/16-inch) wide slots placed on the bottom one-third of the pipe perimeter. If the pipe is bored, a minimum of ten holes per linear foot should be uniformly placed along the pipe. If slots are used, they should not exceed 2.0 inches in length and should not be closer than 2.0 inches on center along the length of the pipe. The total length of the slots should not be less than 50 percent of the pipe length and should be uniformly spaced along the length of the pipe. Pipe perforations should be placed downward. Gravel filters should have a volume of 3.0 cubic feet or greater per linear foot of pipe. Subdrains should maintain a positive flow gradient and have outlets that drain in a non-erosive manner.

Prefabricated drainage products such as 'Miradrain' or a suitable equivalent may also be used for the purpose of providing drainage behind retaining walls when installed in accordance with the manufacturer's recommendations.

Backfill

Backfill directly behind retaining walls (if backfill width is less than 3.0 feet) may consist of 0.5- to 1.5-inch diameter, rounded to subrounded gravel with less than 5.0 percent passing the 0.5-inch sieve enclosed in a geotextile fabric such as Mirafi

140N series, or an equivalent substitute, or a clean sand (Sand Equivalent Value greater than 50) water jetted into place to obtain compaction. If water jetting is used, the subdrain system should be in place. Even if water jetting is used, the sand should be densified to 90 percent or greater relative compaction. If the specified density is not obtained by water jetting, mechanical methods will have to be used. If other types of soil or gravel are used for backfilling, mechanical compaction methods will have to be used to obtain a relative compaction of 90 percent or greater of maximum dry density. Backfill directly behind retaining walls should not be compacted by wheel, track, or other rolling by heavy construction equipment unless the wall is designed for the surcharge loading. If gravel, clean sand, or other imported backfill is used behind retaining walls in unpaved areas, the upper 12 to 18 inches of backfill should consist of typical on-site material compacted to 90 percent or greater relative compaction to prevent the influx of surface run-off into the granular backfill and into the subdrain system. Maximum dry density and optimum moisture content for backfill materials should be determined according to current ASTM D1557 procedures.

V-Drain Design

A V-drain should be constructed directly behind retaining walls which have a sloping backfill to intercept surface water and drain it from the back of the retaining wall. The V-drain should be designed and constructed in accordance with the current typical standards of the City of Hesperia, California. The V-drain should direct water from the back of the retaining wall to an adequate down drain and discharge it in a non-erosive manner.

Observation and Testing

During retaining wall construction, observation and testing should be conducted by the project Geotechnical / Geologic Consultant and/or his representatives to verify that the work is being performed according to the recommendations presented in this report.

The foundation excavations should be observed by the project Geotechnical / Geologic Consultant and/or his representative prior to placement of forms, reinforcing steel, or placement of concrete for the purpose of verification of the recommendations presented in this report and for compliance with the project plans and specifications. The foundation excavations should be trimmed neat, level, and square. Any loose or sloughed material and debris should be removed from the foundation excavations prior to placement of reinforcing steel and removed again prior to the placement of concrete.

The placement and construction of the subdrain system behind the retaining walls should be observed by the project Geotechnical / Geologic Consultant and/or his representatives to verify that the work is being performed according to the recommendations presented in this report.

During backfill of the retaining walls, observation and testing should be conducted by the project Geotechnical / Geologic Consultant and/or his representatives to verify that the backfilling is being performed according to the recommendations presented in this report. The project Geotechnical / Geologic Consultant and/or his representative should observe the placement of fill and should take tests to verify the moisture content, density, uniformity, and degree of compaction obtained. Where testing demonstrates insufficient density, additional compaction effort, with the adjustment of the moisture content when needed, should be applied until retesting shows that satisfactory relative compaction has been obtained. The results of observations and testing services should be presented in a formal report following completion of the construction operations. Retaining wall backfill operations undertaken at the site without the project Geotechnical / Geologic Consultant and/or his representative present may result in exclusions of the affected areas from the final report for the project.

The presence of the project Geotechnical / Geologic Consultant and/or his representative will be for the purpose of providing observations and field testing and will not include supervision or directing of the actual work of the contractor or the contractor's employees or agents. Neither the presence and/or the non-presence of the project Geotechnical / Geologic Consultant and/or his field representative nor the field observations and testing will excuse the contractor for defects discovered in the contractor's work.

CORROSION POTENTIAL EVALUATION

The recommendations for corrosion protection should be verified at the completion of grading of the building pads on the subject site. Bulk samples of the near surface on-site soils were obtained during the field study which was performed for this report to evaluate the potential for soil corrosivity.

Concrete Corrosion

A preliminary test on a sample of near-surface, on-site earth material suggests a soluble sulfate concentration of 0.0011 percent. Earth materials with a water-soluble sulfate (SO_4) concentration of less than 0.10 percent are considered to be Category S, Class S0 in accordance with Table 19.3.1.1, 'Exposure Categories and Classes,' in **American Concrete Institute (ACI)** 318-19. Therefore, the requirements in Table 19.3.2.1, 'Requirements for Concrete by Exposure Class,' in **ACI** 318-19 are applicable. The referenced **ACI** Table 19.3.2.1 should be used to determine the type cement, the maximum water cement ratio, and the minimum compressive strength to be used for normal weight concrete which comes in direct contact with the on-site earth materials (i.e., foundations, floor slabs, driveway slabs, sidewalks, patios, curbs / gutters, etc.). A lower water / cement ratio or higher compressive strength may be required for design of concrete for water tightness or for protection against freezing and thawing, or for corrosion protection of concrete reinforcement per Section 1904, 'Durability Requirements,' in the 2022 CBC, if applicable.

Experience in the southern California area has shown that even though the earth materials do not contain levels of soluble sulfate which would require the use of sulfate resistant cement, maximum water cement ratios, or minimum compressive strength for concrete, concrete corrosion and erosion problems still occur. These problems are the result of concentrations of soluble sulfate, chloride, and other salts and/or acids present in groundwater, irrigation water, rain water, and potable water sources, and in fertilizers or amendments used to promote plant growth (i.e., some domestic water sources contain levels of dissolved sulfate which would be a Class S1 exposure to concrete which comes in contact with it). Therefore, it may be wise to use a concrete designed for a Category S, Class S1 criteria that comes into contact with surface run-off or other sources of water. Higher strength, lower water / cement ratio, and denser concrete may also be effective in reducing the potential for corrosion to occur and preventing damage due to salt or acid exposure. The use of sulfate resistant concrete for non-structural elements (i.e., driveway slabs, sidewalks, patios, curbs / gutters, etc.), is considered to be a value / risk assessment and decision to be made by the client.

Metallic Corrosion Potential

The life of buried metals depends on the type of material, thickness, and construction details. Since **HGI** does not practice metallic corrosion engineering, if corrosion protection is considered to be a design issue, an engineer specializing in corrosion should be consulted regarding the potential damage due to corrosion. The corrosion engineer should recommend appropriate types of piping and/or protective measures where needed.

A preliminary minimum resistivity test on a sample of the near-surface, on-site, earth material of 18,747 ohm-cm suggests a mild to moderate corrosive environment for buried ferrous metal in direct contact with the on-site earth materials when the earth materials are wet. Soils with a minimum resistivity of less than 1,000 ohm-cm indicate a severe corrosive environment and a minimum

resistivity of 2,000 ohm-cm or greater indicates a mild to moderate corrosive environment for buried ferrous metal in direct contact with the soils when the soils are wet.

A preliminary test on a sample of near surface, on-site, earth material suggests a soluble chloride concentration of less than 10 parts per million (ppm). Earth materials with greater than 300 and 500 ppm of soluble chloride are considered to be aggressive to buried ferrous and copper material respectively, in direct contact with the earth materials.

Earth material pH is a general indicator of the corrosivity of earth materials. The measured pH of a sample of near-surface, on-site, earth material of 6.9 indicates a non-corrosive environment to copper and ferrous metals when in direct contact with the on-site earth materials.

Sulfide in soils is a general indicator of the corrosivity of earth materials. The measured sulfide of the samples of near surface, on-site, earth material tested as part as part of this report from the finish building pads was 'Negative' which indicates a non-corrosive environment to copper and ferrous metals when in direct contact with the on-site earth materials.

Salt Crystallization Exposure

Damage of concrete, concrete masonry units, slump stone block, etc. can occur when evaporation of moisture takes place at the surface of the materials. As evaporation takes place, salts (i.e., carbonates, chloride, sulfur, sodium, potassium, etc.) are deposited in or form on the surfaces. As the salts crystallize, they can exert extreme pressures in the pore spaces of the materials they are deposited in and/or on. The formation of the crystals within the pore spaces of the material can result in what is generally called 'salt crystallization damage.' This results in the scaling and/or etching of the surface of the material on which they are deposited. The damaging effects of this phenomenon can be greatly reduced

and/or even eliminated by the following or other such methods: 1) either using a higher strength concrete or a denser, low porosity product; 2) seal the surface of the material with a water proofing substance which will prevent the evaporation of the moisture from within the cementitious product. If 'salt crystallization damage' is considered to be an issue, an engineer or chemist specializing in this area should be consulted regarding the potential damage due evaporation and the deposition of salts. The engineer or chemist should recommend appropriate types of materials or protective measures where needed.

PRELIMINARY PAVEMENT RECOMMENDATIONS

The following are preliminary recommendations for the structural pavement section for the proposed parking areas, and driveway areas for the subject development. The Hot Mix Asphalt (HMA) concrete pavement sections have been determined in general accordance with current **California Department of Transportation (CALTRANS)** design procedures using the CalFP Ver. 1.1 'Hot Mix Asphalt Empirical Design' computer program developed by the **CALTRANS, Office of Pavement Design** and are based on a an assumed Traffic Index (TI) of 5.5 for a 20 year design life and an assumed R-Value of at least 40 based on past experience in the vicinity of the site and visual textural classification of the on-site earth material and/or import materials which are anticipated to be at subgrade elevation.

Portland Cement Concrete (PCC) pavement sections are based on an equivalent structural number as the recommended HMA concrete pavement section and a compressive strength of 2,500 psi or greater at 28 days for the concrete.

The preliminary recommendations for the pavement sections should consist of the following:

RECOMMENDED PAVEMENT SECTIONS			
Site Area	**Traffic Index**	**Subgrade R-Value****	**Pavement Section**
Driveway and Parking Areas for Autos and Light Weight Vehicles Only.	≤5.0	≥40	3.5" Hot Mix Asphaltic (HMA) Concrete over 5" Aggregate Base (AB) or 5.5" PCC @ 2,500 psi over properly prepared subgrade.
Driveway and Parking Areas for Heavy Weight Trucks, RV's, etc.	≤7.0	≥40	5.0" Hot Mix Asphaltic (HMA) Concrete over 7.0" Aggregate Base (AB) or 7.0" PCC @ 2,500 psi over properly prepared subgrade.
* Traffic Index was assumed for the project. ** R-Value was assumed for the project.			

It is noted that the City of Hesperia minimum pavement sections may override the above pavement recommendations without prior City review and approval.

HMA concrete pavement materials should be as specified in the current **CALTRANS** Standard Specifications or an equivalent substitute. Aggregate base should conform to Class 2 Material, 1-1/2" Maximum or 3/4" Maximum, as specified in Section 26-1.02B, 'Class 2 Aggregate Base,' in the current **CALTRANS** Standard Specifications or an equivalent substitute.

Portland Cement Concrete sections are based on a compressive strength of 2,500 psi or greater at 28 days for the concrete. Higher strength design for concrete can permit thinner pavement sections. Lower strength design for the concrete will

require thicker pavement sections. Joints (longitudinal, transverse, construction, and expansion), jointing arrangement, joint type, pavement, and/or joint reinforcing, as well as drainage, crowning, finishing, and curing of PCC pavement should be in accordance with current Portland Cement Association (PCA) recommendations.

The subgrade soil, including utility trench backfill, should be compacted to 90 percent or greater relative compaction to a depth of 1.0 foot or greater below finish subgrade elevation. The aggregate base material should be compacted to 95 percent or greater relative compaction. If asphaltic concrete and/or PCC pavement is placed directly on subgrade, the upper 6.0 inches of the subgrade should be compacted to 95 percent or greater relative compaction. Maximum dry density and optimum moisture content for subgrade and aggregate base materials should be determined according to current ASTM D1557 procedures. The asphalt concrete pavement should be densified to 95 percent or greater of the density obtained by current California Test 304 and 308 procedures (Hveem compacted laboratory samples).

If semi-trailers are to be parked on the asphalt concrete pavement, such that a considerable load is transferred from small, steel wheels, it is recommended that a strip of rigid Portland Cement concrete pavement with a thickness of 6.0 inches or greater be provided in these areas. This will provide for the distribution of loads to the subgrade without causing deformation of the pavement surface. Special consideration should also be given to areas where truck traffic will negotiate small radius turns and/or in areas utilized by solid tired forklifts or other material handling equipment. HMA concrete pavement in these areas should utilize stiffer emulsions or the areas should be paved with Portland Cement concrete. Where HMA concrete pavement abuts concrete aprons, drives, walks, or curb and gutter sections, a thickened edge transition zone is recommended for the HMA concrete section to minimize the effects of impact

loading as vehicles transition from PCC paving to HMA concrete paving. This thickened edge should consist of an increased thickness of 2.0 inches for parking areas and 4.0 inches for areas of heavy truck usage. This thickened edge should extend to a distance of 3.0 feet or greater from the edge of pavement and then gradually taper back to the design pavement thickness. If pavement subgrade earth materials are prepared at the time of grading of the building site and the areas are not paved immediately, additional observations and testing will have to be performed before placing aggregate base material, asphaltic concrete, or PCC pavement to locate areas that may have been damaged by construction traffic, construction activities, and/or seasonal wetting and drying. In the proposed pavement areas, earth material samples should be obtained at the time the subgrade is graded for Resistance (R-Value) testing according to current California Test 301 procedures to verify the pavement design recommendations.

Because the full design thickness of the HMA concrete is frequently not placed prior to construction traffic being allowed to use the parking lots, rutting and pavement failures can occur prior to project completion. To reduce this occurrence, it is recommended that either the full-design pavement section be placed prior to use by the construction traffic, or a higher Traffic Index (TI) be specified where construction traffic will use the pavement.

Surface water infiltration beneath pavements could significantly reduce the pavement design life. To limit the need for additional long-term maintenance of the pavement or pre-mature failure, it would be beneficial to protect at-grade pavements from landscape water infiltration by means of a concrete cutoff wall, deepened curbs, or equivalent. Pavement cut-off barriers should be considered where pavement areas are located downslope of any landscape areas that are to be irrigated. The cut-off barrier should extend to a depth of at least 4.0 inches below the pavement section aggregate base material.

Gradation is not the only quality guidelines for aggregate base material. The longevity and performance of pavements utilizing aggregate base material for support is dependent upon the quality of the material which composes the aggregate base. CALTRANS specifications do not specifically exclude the use of material other than a natural, crushed rock and rock dust for Class 2 Aggregate Base material as the 'Standard Specifications for Public Works Construction' (2024 Edition of the 'Greenbook'), Section 200-2.2, does for Crushed Aggregate Base material. Often times, reclaimed Portland Cement concrete, Hot Mix Asphalt concrete, lean concrete base, and cement treated base are crushed, combined with broken stone, crushed gravel, natural rough surfaced gravel, and sand per the current Section 26-1.02B, 'Class 2 Aggregate Base,' of the current CALTRANS 'Standard Specifications,' and graded to produce a Class 2 Aggregate Base material per CALTRANS gradation specifications. Bricks, concrete masonry units, tile, glass, ceramics, porcelain, wood, plastic, metal, etc. **are not** an acceptable reclaimed material for use in a Class 2 Aggregate Base material per the current CALTRANS 'Standard Specifications'. If a reclaimed material is proposed for use on the project as a Class 2 Aggregate Base, the reclaimed materials should not exceed 50 percent of the total volume of the aggregate used. The aggregate base material should be tested prior to delivery to the subject project site for the following quality requirements per the current, appropriate CALTRANS test procedures:

TEST	TEST METHOD NO.	QUALITY REQUIREMENT	
		OPERATING RANGE	CONTRACT COMPLIANCE
Resistance (R-Value)	Calif. Test 301	--	78 Min.
Sand Equivalent	Calif. Test 217	25 Min.	22 Min.
Durability Index	Calif. Test 229	--	35 Min.

If a reclaimed material or a pit run aggregate is proposed for use on the project as a 'Greenbook' Crushed Miscellaneous Base, the materials should be tested for the following quality requirements, per the current 'Greenbook,' 2024 Edition, and appropriate procedures as well as the required gradation and other requirements:

TEST	TEST METHOD NO.	QUALITY REQUIREMENT
Resistance (R-Value)	Calif. Test 301	78 Minimum[1]
Sand Equivalent	Calif. Test 217	35 Minimum
Percent Wear[2] 100 Revolutions 500 Revolutions	ASTM C131	 15 Maximum 52 Maximum
Gravel Particles[3], (%)	Calif. Test 202	15 Maximum

1. R-Value requirement may be waived if Sand Equivalent is 40 or more.
2. The percentage wear requirements may be waived if the material has a minimum Durability Index of 40 in accordance with CALTRANS Test Method 229.
3. Gravel is defined as particles with no more than one (1) fractured face.

A 'Greenbook' Crushed Miscellaneous Base may contain broken or crushed asphalt concrete or Portland Cement concrete and may contain crushed aggregate base or other rock materials. The Crushed Miscellaneous Base may contain no more than 3.0 percent brick retained on # 4 sieve by dry weight of the total sample.

Samples of the proposed aggregate base using reclaimed material should be sampled from the manufacturer's stockpiles prior to delivery to the project. The samples should be obtained at a time as near the delivery to the project as possible but would allow enough time to complete the testing and report the results before delivery to the site. Samples should again be obtained and tested

for quality compliance from the materials delivered to the project. In addition, per the current **CALTRANS** Standard Specifications, "No single aggregate grading or Sand Equivalent test shall represent more than 500 cubic yards or one (1) day production, whichever is less."

Concrete gutters should be provided at flow lines in paved areas. Pavements should be sloped to permit rapid and unimpaired flow of runoff water. In addition, paved areas should be protected from moisture migration and ponding from adjacent water sources. Saturation of aggregate base and/or subgrade materials could result in pavement failure and/or premature maintenance. The gutter material and construction methods should conform to the current standards of San Bernardino County, California.

POST-GRADING CRITERIA

Soils generated from the excavation of foundations, utility trenches, etc., to be used on-site, should be moisture conditioned to optimum moisture content to 3.0 percent within optimum moisture content and compacted to 90 percent or greater of the maximum dry density for the material type as determined by current ASTM D1557 procedures when it is to be placed under floor slabs, under hardscape areas, and/or in paved areas. The placement of the excess material should not alter positive drainage away from structures and/or off the lot and should not change the distance from the weep screed on the structure to the finished adjacent soil grade per the 'Finish Surface Drainage Recommendations' presented in a subsequent section of this report, the project plans, and/or the 2022 CBC.

SLOPE MAINTENANCE AND PROTECTION RECOMMENDATIONS

Although the design and construction of slopes are planned to create slopes that possess stability against mass rotational failure, surficial slumping, creep, and

pop-outs, certain factors are beyond the influence of the project Geotechnical / Geologic Consultant. Soil slopes are subject to some erosion when subjected to sustained water application. To reduce long term erosion, the following recommendations for slope protection and maintenance should be considered when planning, designing, and implementing slope erosion methods:

- Surface water should not be allowed to flow over the on-site natural or proposed man-made slopes other than incidental rainfall and irrigation. Alterations of manufactured or natural slopes, terraces, top of slope berms, and/or pad gradients should not be allowed that will prevent pad and roof run-off from the structures from being expediently directed to approved disposal areas and away from the tops of slopes.

- Surface drainage should be positively maintained and directed to the street or storm drain system in a non-erosive manner.

- Top of slope berms should be constructed and compacted as part of finish grading of the property and should be maintained by the property owner. The recommended drainage patterns should be established at the time of finish grading and maintained throughout the life of the proposed development. Concentrated surface waters entering the property from off-site sources should be collected and directed to a permanent drainage system.

- The property owner is responsible for the maintenance and cleaning of the interceptor ditches, drainage terraces, down drains and other drainage devices that have been installed to promote slope stability.

- It is recommended that slopes be planted with light-weight ground cover, shrubs and trees that possess deep (5.0 feet or greater), dense root structures that require minimal irrigation (drought resistance). It should

be the responsibility of the Landscape Architect or other suitably qualified individual to provide such plants initially and of the [property] [individual lot] owner[s] to maintain such planting. Alteration of the planting scheme is at the property owner's risk.

- If automatic sprinkler systems are installed their use should be adjusted to account for natural rainfall.

- The property owner should establish a program for the elimination of burrowing animals. This should be an on-going program to protect slope stability.

- The property owner should observe the lot drainage during heavy precipitation periods as this is often when trouble occurs. Problems such as gullying or ponding should be corrected as soon as practicable.

- High moisture content in slope soils is a major factor in slope erosion and slope failures. Therefore, precautions should be taken to minimize soil saturation. Leakage from waterlines, irrigation systems, etc. or bypassing of clogged drains should be promptly repaired.

The above guidelines are provided to mitigate slope maintenance and protection problems. The above guidelines are general maintenance and design procedures but may be superseded under the specific direction of a Licensed Landscape Architect or other suitably qualified individual.

UTILITY TRENCH RECOMMENDATIONS

Utility trenches within the zone of influence of foundations or under building floor slabs, exterior hardscape, and/or pavement areas should be backfilled with documented, compacted soil. Utility trenches within the building pad and extending to 5.0 feet beyond the building exterior footings should be backfilled

with on-site or similar soil. Where interior or exterior utility trenches are proposed to pass beneath or parallel to building, retaining wall, and/or decorative concrete block perimeter wall footings, the bottom of the trench should not be located below a 1H:1V (Horizontal to Vertical) plane projected downward from the outside bottom edge of the adjacent footing unless the utility lines are designed for the footing surcharge loads.

It is recommended that utility trench excavations be designed and constructed in accordance with current OSHA regulations. These regulations provide trench sloping and shoring design parameters for trenches up to twenty feet in vertical depth based on a description and field verification of the soil types encountered. Trenches over twenty feet in vertical depth should be designed by the Contractor's Engineer based on site specific geotechnical analyses. For planning purposes, we recommend that the following OSHA soil type designations and temporary slope inclinations be used:

EARTH MATERIAL	OSHA SOIL TYPE*	TEMPORARY SLOPE INCLINATION (H:V)**
Undocumented Fill	C	1.5:1
Compacted Fill	C	1.5:1
Alluvium	C	1.5:1

Type 'C': Cohesive soils with an unconfined compressive strength of 0.5 tsf or less: or Granular soils including sands, gravels, loamy, clayey, or silty sands, etc.

** Steepest allowable slopes for excavations less than 20 feet in vertical height. Slopes for excavations greater than 20 feet in vertical height should be designed by a Registered Professional Engineer with experience in Geotechnical Consulting and Soil Mechanics.

Excavations of less than 5.0 feet in depth may also be subject to collapse due to water, vibrations, previously disturbed earth materials, or other factors and may require protection for workers such as temporary slopes, shoring, or a shielding protective system. The excavations should be observed by a qualified, competent person (as defined in the current OSHA regulations) looking for signs of potential

cave-ins on a daily basis before starting work, as needed throughout the work shifts, and after every rainstorm or other hazard-increasing occurrence.

Surcharge loads (i.e., spoil piles, earthmoving equipment, trucks, etc.,) should not be allowed within 1.5 times the vertical depth of the excavation. Excavations should be initially observed by the project Geotechnical / Geologic Consultant and/or his representative to verify the recommendations presented or to make additional recommendations to maintain stability and safety. Moisture variations, differences in the cohesive or cementation characteristics, or changes in the coarseness of the deposits may require slope flattening or, conversely, permit steepening upon review and appropriate testing by the project Geotechnical / Geologic Consultant and/or his representative. The excavations should be observed by a qualified, competent person (as defined in the current OSHA regulations) looking for signs of potential problems on a daily basis before the start of work, as needed throughout the work shifts, and after every rainstorm or other hazard-increasing occurrence. Deep utility trenches may experience caving which will require special considerations to stabilize the walls and expedite trenching operations. Surface drainage should be controlled along the top of the construction slopes to preclude erosion of the slope face. If excavations are to be left open for long periods, the slopes should be sprayed with a protective compound and/or covered to minimize drying out, raveling, and/or erosion of the slopes.

Utility Line Foundation Preparation

If the utility trench excavation bottom is in material that is not suitable for support of the utility pipe, the material should be removed to a minimum depth of 1.0 foot below the bottom of the pipe and replaced with concrete slurry, sand, or crushed gravel meeting the following appropriate gradation limits or some other suitable equivalent as specified by the utility designer.

SIEVE SIZE	CRUSHED ROCK OR GRAVEL (PERCENT PASSING)
1"	100
3/4“	90-100
½“	30-60
3/8“	0-20
No. 4	0-5

SIEVE SIZE	SAND (PERCENT PASSING)
3/8"	100
No. 4	75-100
No. 30	12-50
No. 100	5-20
No. 200	0-15

Most of the granular native earth materials encountered on the subject site **are not** expected to meet the above granular earth material criteria.

We recommend that where the bottom of the pipe foundation excavation is loose or soft, the foundation earth materials be removed to firm materials as determined by the Engineer. This condition would likely only apply where fill underlies the pipe in localized areas along a utility alignment. If firm material is not encountered within 24 inches of the bottom of the pipe zone, the contractor may then elect to stabilize the trench bottom with 24 inches of crushed rock as

described above. Alternately, soft, or loose material may be excavated to firm earth material and the overexcavation replaced with select earth material.

The bottom of the utility trench excavation should be proof compacted to 90 percent or greater relative compaction prior to placement of compacted fill. Maximum dry density and optimum moisture content for compacted materials should be determined according to current ASTM D1557 procedures.

Prior to placement of trench slurry or crushed rock, the bottom needs only be cleaned of loose materials created by the excavation process. Where the bottom of the trench contains rocks or hard objects protruding above a depth of 6.0 inches below the pipe bottom, such objects should be removed or broken and any resulting cavities filled to produce a smooth surface.

Bedding Requirements

It is recommended that the pipe be bedded on either clean sand, gravel, crushed rock, or any approved suitable material in order to provide a smooth, firm, and uniform foundation for the pipe. The pipe bedding material, thickness, shaping, and placement should satisfy the design requirements as determined by the design Civil Engineer and/or in accordance with Section 306-1.2.1 of the 2024 Edition of the 'Greenbook'. The majority of the man-made fills and alluvial soils on the subject site may not be suitable to be used as bedding and pipe zone backfill materials depending upon the bedding and pipe zone backfill specifications required by the project designer and/or the agency having jurisdiction over the utility line.

Trench Zone Backfill

The excavated earth materials from the trench may be used as backfill in the trench zone unless more restrictive specifications are required by the design engineer or the permitting agency. The trench backfill material should consist of

approved earth materials free of trash debris, vegetation or other deleterious matter, and oversized particles (i.e., three inches in maximum dimension). Trench zone backfill should be compacted to 90 percent or greater relative compaction. Maximum density and optimum moisture content for compacted materials should be determined according to current ASTM D1557 procedures.

Trench backfill material should be placed in a lift thickness appropriate for the type of backfill material and compaction equipment used. Backfill material should be brought to optimum moisture content to 3.0 percent within optimum moisture content and compacted to 90 percent or greater relative compaction by mechanical means. Jetting or flooding of the backfill material will **not** be considered a satisfactory method for compaction. Maximum dry density and optimum moisture content for backfill material should be determined according to current ASTM D1557 procedures.

FINISH SURFACE DRAINAGE RECOMMENDATIONS

Positive drainage should be established away from the tops of slopes, the exterior walls of structures, the back of retaining walls, trash enclosure walls, decorative concrete block walls, etc. Finish surface gradients in unpaved areas should be provided next to tops of slopes and buildings to guide surface water away from foundations, hardscape, pavement, and from flowing over the tops of slopes. The surface water should be directed toward adequate drainage facilities. Ponding of surface water should not be allowed next to structures or on pavements. Design criteria for finish lot drainage away from structures and off the property should be determined by the project Structural Engineer designing the foundations and slabs in conjunction with the project Civil Engineer designing the precise grading for lot drainage, respectively, in accordance with the 2022 CBC and/or the current San Bernardino County, California building codes and the soil types and expansion characteristics for the soils contained in this report. Finished landscaped and hardscape or pavement grades adjacent to the proposed

structures should maintain a vertical distance below the bottom elevation of the weep screed per the 2022 CBC and/or the current San Bernardino County building codes. Landscape plants with high water needs and trees should be planted at a distance away from the structure equivalent to or greater than the width of the canopy of the mature tree or 6.0 feet, whichever is greater. Downspouts from roof drains should discharge to a permanent all-weather surface which slopes away from the structure. Downspouts from roof drains should not discharge into planter areas immediately adjacent to the building unless there is positive drainage out of the planter and away from the structure in accordance with the recommendations of the project foundation and slab designer and/or the project Civil Engineer designing the precise grades for the lot drainage.

PLANTER RECOMMENDATIONS

Planters around the perimeter of the structures should be designed so that adequate drainage is maintained, and minimal irrigation water is allowed to percolate into the soils underlying the buildings. This should include enclosed or trapped planter areas that are created as a result of sidewalks. Planters with solid bottoms, independent of the underlying soil, are recommended within 6.0 feet from the buildings. The planters should drain directly into surrounding paved areas or into a designed subdrain system. If planters are raised above the surrounding finished grades or are placed against the building structure, the interior walls of the planter should be waterproofed.

2. LIMITATIONS

REVIEW, OBSERVATION, AND TESTING

The recommendations presented in this report are contingent upon review of final plans and specifications for the project by **HGI**. The project Geotechnical / Geologic Consultant should review and verify in writing the compliance of the

final grading plan and the final foundation plans with the recommendations presented in this report.

It is recommended that **HGI** be retained to provide continuous Geotechnical / Geologic Consulting services during the earthwork operations (i.e., rough grading, utility trench backfill, subgrade preparation for slabs-on-grade and pavement areas, finish grading, etc.) and foundation installation process. This is to observe compliance with the design concepts, specifications, and recommendations and to allow for design changes if subsurface conditions differ from those anticipated prior to start of construction. If **HGI** is replaced as Geotechnical / Geologic Consultant of record for the project, the work on the project should be stopped until the replacement Geotechnical / Geologic Consultant has reviewed the previous reports and work performed for the project, agreed in writing to accept the recommendations and prior work performed by **HGI** for the subject project, or has submitted their revised recommendations.

UNIFORMITY OF CONDITIONS

The recommendations and opinions expressed in this report reflect our understanding of the project requirements based on an evaluation of subsurface earth material conditions encountered at the subsurface exploration locations and the assumption that earth material conditions do not deviate appreciably from those encountered. It should be recognized that the performance of the foundations may be influenced by undisclosed or unforeseen variations in earth material conditions that may occur in intermediate and unexplored areas. Any unusual conditions not covered in this report that may be encountered during site development should be brought to the attention of **HGI** so that we may make modifications, if necessary.

CHANGE IN SCOPE

HGI should be advised of any changes in the project scope of proposed site grading so that it may be determined if recommendations contained herein are valid. This should be verified in writing or modified by a written addendum.

TIME LIMITATIONS

The findings of this report are valid as of this date. Changes in the condition of a property can, however, occur with the passage of time, whether they be due to natural processes or the work of man on this or adjacent properties. In addition, changes in the State-of-the-Art and/or government codes may occur. Due to such changes, the findings of this report may be invalidated wholly or in part by changes beyond our control. Therefore, this report should not be relied upon after a period of two (2) years without a review by **HGI** verifying the validity of the conclusions and recommendations.

PROFESSIONAL STANDARD

In the performance of our professional services, we comply with the standard of care and skill ordinarily exercised under similar circumstances by members of the geological / geotechnical professions currently practicing under similar conditions and in the same locality. The client recognizes that subsurface conditions may vary from those encountered at the locations where our surveys and exploratory excavations were made, and that our data, interpretations, and recommendations are based solely on information obtained by us. We will be responsible for those data, interpretations, and recommendations, but should not be responsible for interpretations by others of the information presented and/or developed. Our services consist of professional consultation and observation only, and other warranties, expressed or implied, are not made or intended in connection with work performed by **HGI** or by the proposal for consulting or other services or by the furnishing of oral or written reports or findings.

CLIENT'S RESPONSIBILITY

It is the responsibility of the client and/or the client's representatives to ensure that information and recommendations contained herein are brought to the attention of the Engineers and Architect for the project and incorporated into project plans and specifications. It is further their responsibility to take measures so that the contractor and his subcontractors carry out such recommendations during construction.

ATTACHMENT A

Preliminary Geotechnical Investigation Report

by Hilltop Geotechnical, Inc. Dated January 29, 2018

REPORT OF PRELIMINARY GEOTECHNICAL / GEOLOGIC STUDY PROPOSED SERVICE STATION CONVENIENCE STORE AND FOOD TRUCK COMMISSARY NORTHWEST CORNER OF PHELAN ROAD AND HIGHWAY 395 CITY OF HESPERIA SAN BERNARDINO COUNTY, CALIFORNIA

PROJECT NO.: 1123-B17
REPORT NO.: 1

JANUARY 29, 2018

SUBMITTED TO:

HEADY DESIGN, INC.
7365 CARNELIAN STREET, SUITE 239
RANCHO CUCAMONGA, CA 91730

PREPARED BY:

HILLTOP GEOTECHNICAL, INC.
786 SOUTH GIFFORD AVENUE
SAN BERNARDINO, CA 92408

HILLTOP GEOTECHNICAL
INCORPORATED

786 S. GIFFORD AVENUE • SAN BERNARDINO • CALIFORNIA 92408
hilltopg@hgeotech.com • FAX 909-890-9055 • **909-890-9079**

January 29, 2018

Heady Design, Inc.
7365 Carnelian Street, Suite 239
Rancho Cucamonga, CA 91730

Project No.: 1123-B17
Report No.: 1

Attention: Mr. Thomas Serna - Project Manager

Subject: **Report of Preliminary Geotechnical / Geologic Study, Proposed Service Station, Convenience Store and Food Truck Commissary, Northwest Corner of Phelan Road and Highway 395, City of Hesperia, San Bernardino County, California.**

References:

1. **Heady Design, Inc.**, January 23, 2018, *Conceptual Site Plan, Service Station, NWC. Phelan Road & Highway 395, Hesperia, CA 92344*, Job No.: PPB-001, Drawing SP1, Scale 1"=30'.
2. **A&A Surveying ans Mapping**, December 20, 2016, *Alta/Nsps Land Title Survey*, Sheet 1 of 1, Scale 1"=80'.
3. Technical References - See Appendix 'B.'

Mr. Serna:

According to your request, we have completed a preliminary geotechnical / geologic study for the design and construction of the proposed service station, convenience store and food truck commissary. We are presenting, herein, our findings and recommendations.

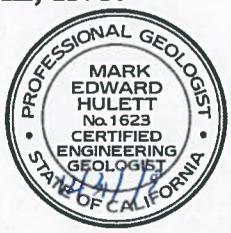
The recommendations presented in this report are considered preliminary since the proposed grading, the floor level elevations, the type of structures construction, the structural loads, etc. were not known at the time of this report. The findings of this study indicate that the project site is suitable for the proposed development

provided the recommendations presented in the attached report are complied with and incorporated into the design and construction of the project.

Copies of this report should be forwarded to your other consultants for the project (i.e., Civil Engineer, Architect, Structural Engineer, etc.) as needed to implement the recommendations presented. The required number of the original, wet ink signed reports should be saved for submittal, and the other required documentation to the appropriate agency having jurisdiction over the project for review and permitting purposes.

If you have any questions after reviewing the findings and recommendations contained in the attached report, please do not hesitate to contact this office. This opportunity to be of professional service is sincerely appreciated.

Respectfully Submitted,
HILLTOP GEOTECHNICAL, INC.





Mark Hulett, CEG No. 1623
President

Sundaramoorthy Srirajan, PE No. 68601
Senior Engineer
Date Signed: 1-29-18

Ashley Hulett, GIT No. 574
Staff Geologist

SS/AH/MH/ah

Distribution: (4) Addressee
Via U.S. Postal Service
(1) Addressee
pdf Copy Via E-Mail (tserna@headydesign.com)
(hheady@headydesign.com)

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REPORT OF PRELIMINARY GEOTECHNICAL / GEOLOGIC STUDY PROPOSED SERVICE STATION CONVENIENCE STORE AND FOOD TRUCK COMMISSARY NORTHWEST CORNER OF PHELAN ROAD AND HIGHWAY 395 CITY OF HESPERIA SAN BERNARDINO COUNTY, CALIFORNIA

PROJECT NO.: 1123-B17
REPORT NO.: 1

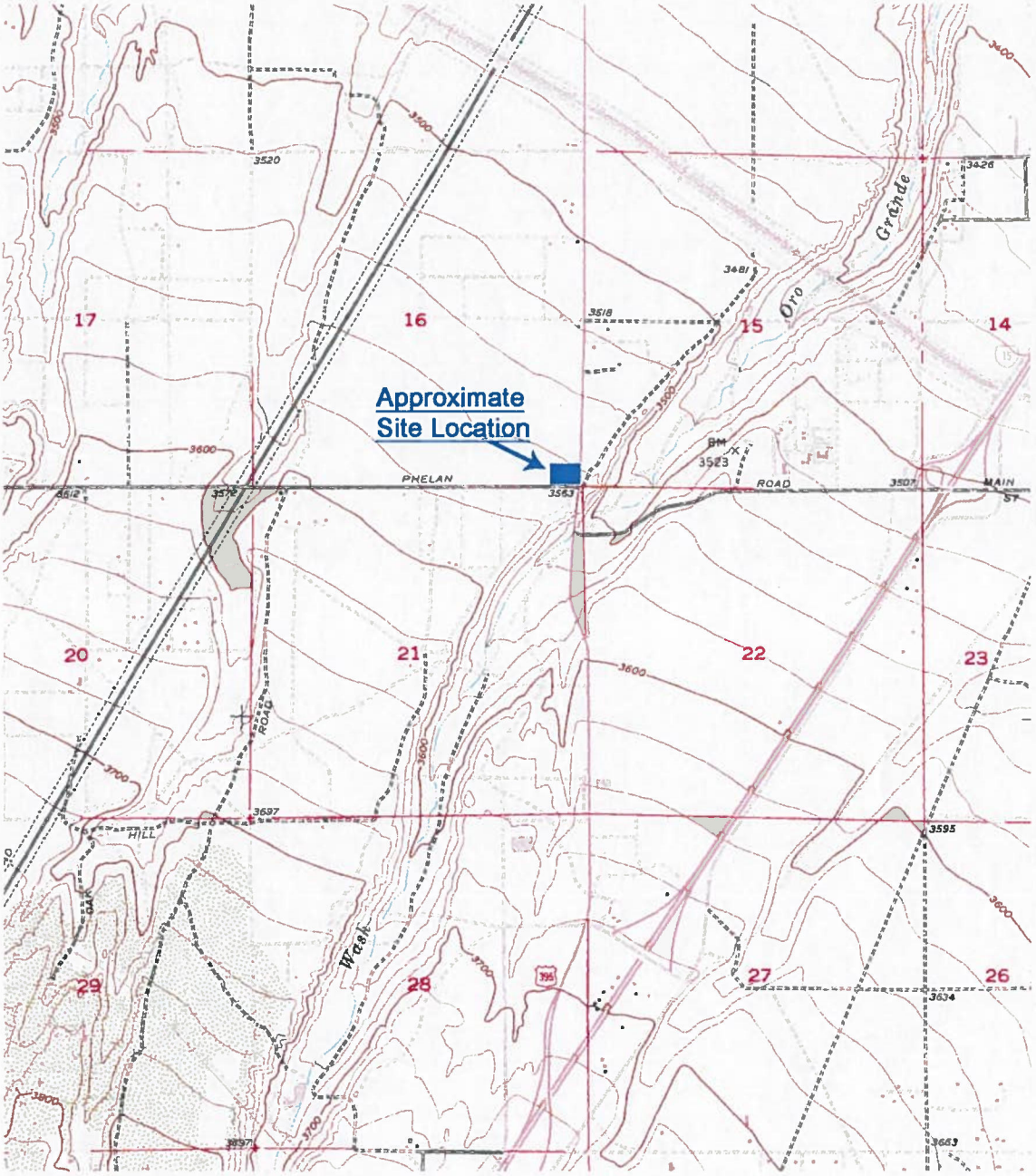
JANUARY 29, 2018

INTRODUCTION

AUTHORIZATION

This report presents results of the preliminary geotechnical / geologic study conducted on the subject site for the proposed to be located on the northwest corner of Phelan road and Highway 395 in the City of Hesperia, San Bernardino County, California. The general location of the subject site is indicated on the 'Site Location Map,' Figure No. 1.

Authorization to perform this study was in the form of a signed proposal from **Hilltop Geotechnical, Inc. (HGI)** (Geotechnical / Geologic Consultant) to **Heady Design, Inc.** (Client), dated October 19, 2017, Proposal Number: P17160 and signed by Mr. Thomas Serna.



0 2,750 5,500

Approximate Scale in Feet

N

Reference: **United States Department of the Interior, Geologic Survey**, 1956, Photorevised 1988, *Baldy Mesa Quadrangle, California, San Bernardino Co.,* 7.5 Minute Series (Topographic), Scale 1:24,000.

HILLTOP GEOTECHNICAL
INCORPORATED

SITE LOCATION MAP	
By: AH	Date: 11/2017
Project No.: 1123-B17.1	Figure No.: 1

PURPOSE AND SCOPE OF STUDY

The scope of work performed for this study was designed to determine and evaluate the surface and subsurface conditions in the vicinity of the proposed structures on the subject site with respect to geotechnical characteristics, including potential geologic hazards that may effect the development of the site, and to provide geotechnical recommendations and criteria for use in the design and construction of the proposed development. The scope of work included the following:

- Review of locally and easily available published and unpublished soil, geologic, and seismologic reports and data for the area (see References in Appendix 'B'), available historic photographs, flood hazard maps, well data, etc. to ascertain earth material, geologic, and hydrologic conditions of the area.
- Telephone conversations with the client and/or representatives of the client.
- Site reconnaissance.
- Subsurface exploration by means of borings to characterize earth materials, geologic, and groundwater conditions that could influence the proposed development.
- Sampling of on-site earth materials from the exploratory excavations.
- Laboratory testing of selected earth material samples considered representative of the subsurface conditions to determine the engineering properties and characteristics.
- Define the general geology of the subject site and evaluate potential geologic hazards which would have an effect on the proposed site development.
- Determine seismic classification of the site to meet the requirements of the 2016 California Building Code (CBC), effective on January 1, 2017.
- Engineering analysis of field and laboratory data to provide a basis for geotechnical conclusions and recommendations regarding site grading and foundation, floor slab, retaining wall, pavement, etc. design parameters.

- Preparation of this report to present the geotechnical and geologic conclusions and recommendations for the proposed site development.

This report presents our conclusions and/or recommendations regarding:

- The geologic setting of the site.
- Potential geologic hazards (including landslides, seismicity, faulting, liquefaction potential, etc.)
- General subsurface earth conditions.
- Presence and effect of expansive, collapsible, and compressible earth materials.
- Groundwater conditions within the depth of our subsurface study.
- Excavation characteristics of the on-site earth materials.
- Characteristics and compaction requirements of proposed fill and backfill materials.
- Recommendations and guide specifications for earthwork.
- Seismic design coefficients for structural design purposes.
- Types and depths of foundations.
- Allowable bearing pressure and lateral resistance for foundations.
- Estimated total and differential settlements.
- Preliminary corrosion potential evaluation for concrete in direct contact with the on-site earth materials.
- Temporary and permanent cut and fill slope recommendations.
- Utility trench excavation and backfill recommendations.

- Slope maintenance and protection recommendations.
- Preliminary pavement recommendations.

The scope of work performed for this report did not include any testing of earth materials or groundwater for environmental purposes, an environmental assessment of the property, or opinions relating to the possibility of surface or subsurface contamination by hazardous or toxic substances. In addition, evaluation of on-site private sewage disposal systems for the proposed development was not part of this study.

This study was prepared for the exclusive use of **Heady Design Inc.** and their consultants for specific application to the development of the proposed project in accordance with generally accepted standards of the geotechnical and geologic professions and generally accepted geotechnical (soil and foundation) engineering and geologic principles and practices at the time this report was prepared. Other warranties, implied or expressed, are not made. Although reasonable effort has been made to obtain information regarding geotechnical / geologic and subsurface conditions of the site, limitations exist with respect to knowledge of unknown regional or localized off-site conditions which may have an impact at the site. The conclusions and recommendations presented in this report are valid as of the date of this report. However, changes in conditions of a property can occur with passage of time, whether they are due to natural processes or to works of man on this and/or adjacent properties.

If conditions are observed or information becomes available during the design and construction process which are not reflected in this report, **HGI**, as Geotechnical / Geologic Consultant of record for the project, should be notified so that

supplemental evaluations can be performed and conclusions and recommendations presented in this report can be verified or modified in writing, as necessary. Changes in applicable or appropriate standards of care in the geologic / geotechnical professions occur, whether they result from legislation or the broadening of knowledge and experience. Accordingly, the conclusions and recommendations presented in this report may be invalidated, wholly or in part, by changes outside the influence of the project Geotechnical / Geologic Consultant which occur in the future.

PREVIOUS SITE STUDIES

No previous geotechnical and/or geological studies for the subject site are known to have been performed or were made available for review at the time of this study, if any had been performed.

PROJECT DESCRIPTION / PROPOSED DEVELOPMENT

As part of our study, we have discussed the project with Mr. Thomas Serna of **Heady Design**, the client, and Mr. Bill Raymond of **Marshall Engineering Group, Inc.** the Civil Engineer for the project. We also have been provided with the Reference No. 1 'Site Plan' noted on the first page of the cover letter for this report.

Based on information presented to this firm, it is our understanding that the proposed project will consist of a new gasoline service station, convenience store, a food truck commissary, and a fuel canopy. The site will also be developed with accompanying Hot Mix Asphaltic (HMA) concrete and/or Portland Cement concrete (PCC) driveway and parking areas, (PCC) curbs and gutters, a decorative concrete block perimeter wall, and a trash enclosure.

The proposed buildings are expected to be a single-story structure consisting of wood trusses on wood beams and steel columns, wood studs, and veneered walls. It is assumed that light to moderate loads will be imposed on the foundations. The foundation loads are not anticipated to exceed 3,500 pounds per lineal foot (plf) for continuous footings and 60 kips for column footings. The proposed structure ground level floor will consist of a concrete slab cast on compacted subgrade. Finish floor elevation for the structure had not been furnished at the time of our study, but it is anticipated to be within 1.0 to 2.0 feet of existing site grades. Therefore, no cut or fill slopes are anticipated to be required for the development of the site. Minor, low height, retaining walls may be required to establish landscape, parking, or driveway areas for the proposed development.

The above project description and assumptions were used as the basis for the field exploration, laboratory testing program, the engineering analysis, and the conclusions and recommendations presented in this report. HGI should be notified if structures, foundation loads, grading, and/or details other than those represented herein are proposed for final development of the site so a review can be performed, a supplemental evaluation made, and revised recommendations submitted, if required.

FIELD EXPLORATION AND LABORATORY TESTING

The field study performed for this report included a visual reconnaissance of existing surface conditions of the subject site and surrounding area. A study of the property's subsurface condition was performed to evaluate underlying earth strata and the presence of groundwater. Surface and subsurface conditions were explored on November 10, 2017.

The subsurface exploration consisted of excavating three (3) exploratory borings in the area of the proposed structures on the subject property. The approximate locations of the exploratory excavations are shown on the 'Exploratory Excavation Location Plan,' Plate No. 1, presented in Appendix 'A' of this report. The exploratory excavations were observed and logged by a representative of **HGI**. Earth materials encountered in the exploratory excavations were visually described in the field in general accordance with the current Unified Soils Classification System (USCS), ASTM D2488, visual-manual procedures, as illustrated on the attached, simplified 'Subsurface Exploration Legend,' Plate No. 2, presented in Appendix 'A' of this report. The results are presented on the 'Subsurface Exploration Log,' Plate Nos. 3 through 5, presented in Appendix 'A' of this report.

A more detailed explanation of the field study which was performed for this report is presented in Appendix 'A' of this report.

Relatively undisturbed ring samples, and representative bulk samples of on-site natural earth materials were collected during the field exploration and returned to the laboratory for testing. Laboratory tests were conducted to evaluate the index and engineering properties of on-site earth materials and included in-situ dry density and moisture content tests, an expansion index test, a soluble sulfate chemical tests, a sieve analysis test, a maximum dry density / optimum moisture content relationship test, and consolidation tests. A more detailed explanation of laboratory tests performed for this study and test results are presented in Appendix 'A' of this report, Plate Nos. 6 through 9.

FINDINGS

SITE DESCRIPTION

The subject property comprises approximately 15.2 acres was irregular in shape and approximately 600 feet by 1,100 feet in plan dimension as shown on the Reference No. 2 'Land Title Survey' noted on the first page of the cover letter for this report. The subject property is located at the northwest corner of Phelan Road and Highway 395 in the City of Hesperia, San Bernardino County, California. The subject property is located in the southwest one-quarter of Section 16, T4N, R5W of the San Bernardino Principle Meridian at Latitude: 34.4276° North, Longitude: 117.4015° West.

The subject property is bounded by the existing descending slopes and streets to the east and south. To the north and west of the property was vacant land as shown on the Reference No. 1 'Site Plan' noted on the first page of the cover letter for this report. The southeast corner of the site was approximately 10 to 12 feet higher than that of the two surrounding streets. The descending slopes decreased in height towards the west and north from the southeast corner. The northeast corner of the site was approximately 4 feet higher than Highway 395 and the southwest corner was approximately 2 feet higher than that of Phelan Road. The site is located along the uppermost western edge of the Oro Grande Wash approximately 85 feet higher and 0.2 miles west of the active drainage path of the wash.

Per the referenced 'Site Plan,' the immediate area of the subject site, excluding the slopes in the right-of-way, was almost flat with a shallow, downward inclination toward the north northeast at an average gradient of approximately 2.0 percent. Total on-site relief in the area of the proposed development was approximately 14

feet. The minimum and maximum elevations within the immediate area of the proposed development on the subject site was approximately 7143 and 7157 Mean Sea Level (MSL), respectively. On-site drainage was accomplished by sheetflow toward the north, northeast.

At the time the field exploration was made, the surface of the site was soft and the drilling equipment experienced minor difficulty moving around on the site. The on site desert land was slightly undulating with pockets of loose unconsolidated materials on the surface. A trail leading to the southeast portion of the site made accessing the site easier. Minor amounts of trash and debris was scattered throughout the property. The debris consisted of plastic's, styrofoam, metal, mattresses, and other man made debris. Vegetation across the site was light to heavy and consisted of seasonal native grasses, weeds, forbs, brush, and joshua trees.

Buildings or other type structures were not present on the site. Utilities consisting of electric, telephone, gas, sewer, water, as well as other unknown underground and overhead lines, were observed to be present adjacent to the site. One power line was located on the southeast corner of the site.

ENGINEERING GEOLOGIC ANALYSIS

Regional Geologic Setting

The project site is situated near the southern margin of the Mojave Desert Geomorphic Province, one (1) of 11 provinces recognized in California. The Mojave Desert Geomorphic Province is a distinctive geologic and physiographic region encompassing much of southeastern California, extending from the Tehachapi Mountains on the west to an arbitrary boundary at the Colorado River on the east. The southern edge of the province abuts the east-west trending Transverse Ranges

(combined San Gabriel, San Bernardino, Little San Bernardino and Eagle Mountains), while the northern boundary is generally recognized to be the Garlock fault zone. Characteristic landforms of the province include relatively narrow, elongated ranges separated by wider, intervening valleys.

The arid climate of the Mojave Desert province demonstrates precipitation patterns commonly associated with such climates. That is, years to decades of little or no precipitation that are separated by brief periods of locally torrential rain. The brief, heavy precipitation over relatively small areas causes deep erosion at higher elevations, followed by rapid deposition of eroded sediments after runoff leaves steep terrain. Alluvial fans extending from isolated mountain ranges often coalesce to form bajadas. The bajadas, which form the margins of many relatively flat-floored valleys in this province, stand in topographic contrast to the deeply eroded and incised, often jagged mountain ranges.

Most of the province is internally draining; thus, many valleys typically include at least one (1) flat playa surface, many of which become shallow, ephemeral lakes in very wet years. The playa lakes and surrounding, alluvial fans and bajadas usually conceal the much deeper, fault-controlled sedimentary basin that may contain thousands of feet of alluvium and soft rock. Topographic relief is subdued in the western Mojave, but becomes increasingly greater to the east and north as the ranges and valleys exhibit general northwesterly trends.

The province contains a diverse array of rock types. Mesozoic-age igneous intrusive granitic rocks are predominant in the western and southern portions of the province and are widely observed in the remainder. Quaternary and Holocene extrusive igneous rocks and volcanic formations may be observed throughout this province, though they are most common in the southern and western portions.

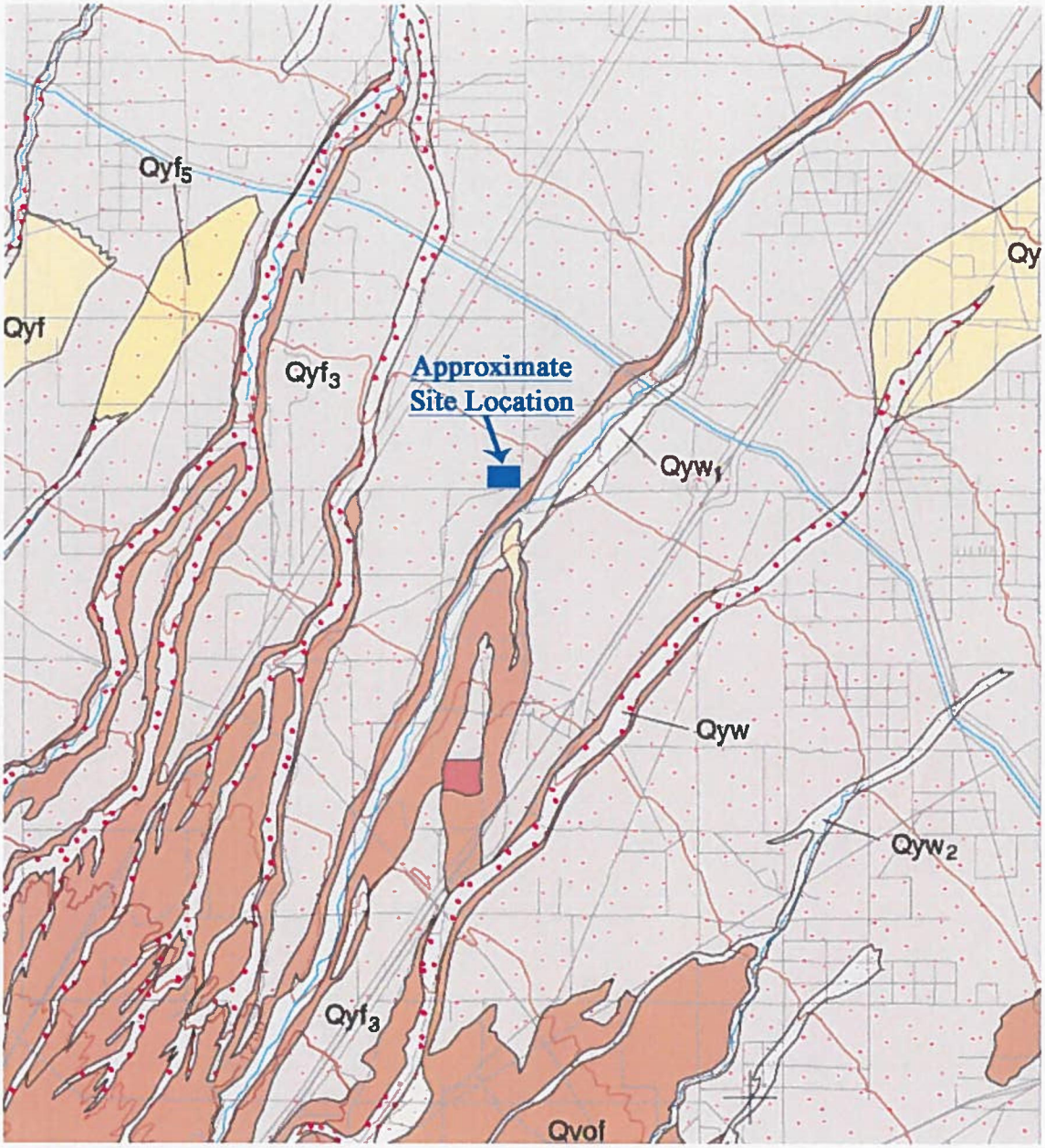
Parts of the central and northern portions of the province include thick sequences of metavolcanic rocks, as well as a number of Paleozoic-age, sedimentary formations that can be correlated to similar rocks in Arizona and Nevada. Tertiary and Quaternary-age alluvial and lacustrine sediments fill basins and occasionally form low hills. The sediments often host economically significant deposits of clay and evaporites including salts and borates. Locally the site consists of younger alluvial deposits over older alluvial deposits. The general geology in the area surrounding the subject site is shown on the 'Regional Geology Map,' and 'Regional Geologic Map Legend,' Figure Nos. 2a and 2b.

Local Subsurface Conditions

Earth Materials Description: Presented as follows are brief descriptions of the earth materials encountered in the exploratory excavations. More detailed descriptions of encountered earth materials are presented on the 'Subsurface Exploration Log,' Plate Nos. 3 through 5, presented in Appendix 'A' of this report. The earth material strata, as shown on the logs, represent conditions at the actual exploratory excavation locations. Other variations may occur beyond and/or between the excavations. Lines of demarcation between earth materials on the logs represented the approximate boundary between the material types; however, the transition may be gradual.

The earth materials encountered on the subject site during the field exploration were identified as young alluvium (Qyf3) and old alluvium (Qvof).

The young alluvium was generally encountered in the upper portions of the subject site and generally consisted of silty fine to coarse sands with varying amounts of gravel (SM) to slightly silty fine to coarse sand (SP/SM) and fine to coarse sand with traces of silt (SP). The young alluvium was light brown, and orangish brown



0 5,500 11,000

Approximate Scale In Feet

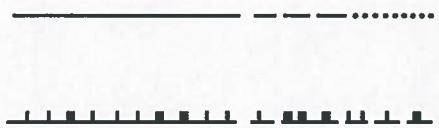
N

Reference: **California Department of Conservation, Division of Mines and Geology**, 2003, Morton, D.M., Miller, F.K., (Digitally Prepared by Cossette, P.M. and Bovard, K.R.); *Preliminary Geologic Map of the San Bernardino 30' x 60' Quadrangle, California*, Version 1.0, Scale: 1:100,000.

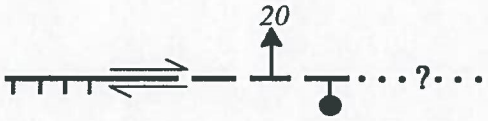
HILLTOP GEOTECHNICAL INCORPORATED

REGIONAL GEOLOGY MAP	
By: AH	Date: 11/2017
Project No.: 1123-B17.1	Figure No.: 2a

Legend for Geologic Symbols and Units



Separates geologic-map units. Solid where meets map-accuracy standard; dashed where may not meet map-accuracy standard; dotted where concealed



Contact—Separates terraced alluvial units where younger alluvial unit is incised into older alluvial unit; hachures at base of slope, point toward topographically lower surface. Solid where meets map-accuracy standard; dashed where may not meet map-accuracy standard

Fault—Solid where meets map-accuracy standard; dashed where may not meet map accuracy standard. Dotted where concealed by mapped covering unit; queried where existence uncertain. Hachures indicate scarp, with hachures on downdropped block. Paired arrows indicate relative movement; single arrow indicates direction and amount of fault-plane dip. Bar and ball on down-thrown block.

Qyw - Young wash deposits (Holocene).

Qyw_1 - Young wash deposits, unit 1 (early Holocene).

Qyf -Young alluvial fan deposit (Holocene and late Pleistocene).

Qyf_3 - Young alluvial fan deposit, unit 3 (middle Holocene)(Site).

Qvof - Very old alluvial fan deposit (middle to early Pleistocene).

Reference: **California Department of Conservation, Division of Mines and Geology**, 2003, Morton, D.M., Miller, F.K., (Digitally Prepared by Cossette, P.M. and Bovard, K.R.); *Preliminary Geologic Map of the San Bernardino 30' x 60' Quadrangle, California*, Version 1.0, Scale: 1:100,000.

HILLTOP GEOTECHNICAL INCORPORATED	REGIONAL GEOLOGY MAP LEGEND	
	By: AH	Date: 11/2017
	Project No.: 1123-B17.1	Figure No.: 2b

in color and dry near the surface to moist with depth. Locally, the young alluvium extended to depths in excess of 12.0 feet below the existing ground surfaces at the excavation locations on the subject site. The upper several feet of the alluvium was visually porous and had a density of approximately 78 to 80 percent.

The older alluvium was characterized by a clayey fine to coarse sand with traces of caliche. The older alluvium was red brown in color and contained a desert varnish at the approximate interface with the younger alluvium. A distinct but very gradual coarsening of the materials with depth was noted. The borings were terminated in the alluvial deposit.

Groundwater: Groundwater was not encountered in the exploratory excavations to the maximum depth explored of approximately 50.5 feet below existing ground surface at the boring locations at the time the field study was performed for this report.

Depth to groundwater data for the site area was available through the **California Department of Water Resources** internet web site. The depth to groundwater in State Well No. 04N05W21H001S, located approximately 2,514 feet south southwest of the site was at 656.14 feet on February 14, 2017. The surface elevation of this well is approximately 35 feet lower (topographically) than that of the site. Based on this information, the current depth to static groundwater beneath the site is estimated to be greater than 50 feet. Based on proposed site grading and the inferred groundwater depths, groundwater should not be a factor for project design or long-term performance.

Surface Water: Surface water was not observed on the subject site at the time the field study was performed for this report.

Site Variations: Based on results of our subsurface exploration and experience, variations in the continuity and nature of surface and subsurface conditions should be anticipated. Due to uncertainty involved in the nature and depositional characteristics of earth materials at the site, care should be exercised in extrapolating or interpolating subsurface conditions between and beyond the exploratory excavation locations.

Groundwater observations were made in the exploratory excavations at times and under conditions stated on the boring logs. These data have been reviewed and interpretations made in the text in other sections of this report. However, it should be noted that fluctuations in levels of groundwater, springs, and/or perched water may occur due to variations in precipitation, temperature, and other factors.

Faulting and Regional Seismicity

The site is situated in an area of active and potentially active faults, as is most of metropolitan southern California. Active faults present a variety of potential risks to structures, the most common of which are strong ground shaking, dynamic densification, liquefaction, mass wasting, and surface rupture at the fault plane. Generally speaking, the following four (4) factors are the principal determinants of seismic risk at a given location:

- Distance to seismogenically capable faults.
- The maximum or "characteristic" magnitude earthquake for a capable fault.
- Seismic recurrence interval, in turn related to tectonic slip rates.
- Nature of earth materials underlying the site.

Surface rupture represents the primary potential hazard to structures built in an active fault zone. A review of official maps delineating State of California earthquake fault zones found that the subject site lies in the southeast portion of the Baldy Mesa Quadrangle. No Zones of Required Investigation are located within this quadrangle. In addition, the site is not located within a zone of mandatory study for active faulting per the **San Bernardino County Planning Department**, *San Bernardino County Land Use Plan, GENERAL PLAN, Geologic Hazard Overlays*, Sheet EHFH C Victorville/San Bernardino, Plot Date: 03/09/2010, Scale: 1:14,400 (http://www.co.san-bernardino.ca.us/landuseservices/general). Reviews of other geology maps of the Hesperia region revealed no known faults that cross the subject site.

The most recent, large earthquake that occurred in close proximity to the subject property was the June 28, 1992 Big Bear earthquake. The epicenter of this quake was located approximately 58.5 kilometers southwest of the subject property at Latitude: 34.2030° North, Longitude: 116.8270° West. The Big Bear quake had a measured magnitude of 6.7, had no surface rupture, and is believed to have occurred on a blind thrust fault, the exact location and geometry of which currently are unknown. Several aftershocks also were centered very near the epicenter, including a magnitude 5.6 aftershock.

Ground shaking is judged to be the primary hazard most likely to affect the site, based upon proximity to ten (10) regionally significant active faults as listed in the following table. Other significant fault zones, including the Chino Central Avenue fault, the Raymond fault, and several zones in the high desert area are located at distances exceeding 50 kilometers from the site. Greater distances, lower slip rates, and lesser maximum magnitudes indicate much lower risk to the site from the latter fault zones than the ten (10) closest faults including the regionally

significant San Andreas fault. Characteristics of the major active fault zones selected for inclusion in analysis of strong ground shaking are listed in the following table:

Fault Zone[1]	Distance (km)[2] / Direction from Site	Fault Length (km)[1]	Slip Rate (mm/yr)[1]	Reference Earthquake $M_{(Max)}$[1]	Fault Type[1]
Cleghorn (ll-ss)	14.2 / South	25±3	3.0±2.0	6.5	B
Cucamonga (r,45 N)	15.4 / South Southwest	28±3	5.0±2.0	6.9	B
North Frontal (Western Segment) (r, 45 S)	16.9 / Southwest	51±5	1.0±0.5	7.2	B
San Andreas (San Bernardino Segment) (rl-ss)	17.4 / South Southwest	103±10	24.0±6.0	7.5	A
San Andreas (Mojave Segment) (rl-ss)	17.5 / Southwest	103±10	30.0±7.0	7.4	A
San Jacinto (San Bernardino Segment) (rl-ss)	22.5 / South Southwest	36±4	12.0±6.0	6.7	A
Helendale - S. Lockhardt (rl-ss)	32.9 / Northeast	97±10	0.6±0.4	7.3	B
Sierra Madre (r, 45 N)	34.6 / Southwest	57±6	2.0±1.0	7.2	B
San Jose (ll-r-o, 75 NW)	43.2 / Southwest	20±2	0.5±0.5	6.4	B
Clamshell - Sawpit (r, 45 NW)	45.8 / Southwest	16±2	0.5±0.5	6.5	B
San Jacinto (San Jacinto Valley Segment) (rl-ss)	48.1 / South	43±4	12.0±6.0	6.9	A

Fault Zone[1]	Distance (km)[2] / Direction from Site	Fault Length (km)[1]	Slip Rate (mm/yr)[1]	Reference Earthquake $M_{(Max)}$[1]	Fault Type[1]

1. **Tianqing, C.W., Bryant, W.A., Rowshandel, B., Branum, D., and Wills, C.J.**, June 2003, *The Revised 2002 California Probabilistic Seismic Hazards Maps (Appendix A - 2002 California Fault Parameters).*
   California Department of Conservation, Division of Mines and Geology, 1996, *Probabilistic Seismic Hazard Assessment for the State of California*, DMG Open-File Report 96-08.
2. **Blake, Thomas F.**, 2000, *Preliminary Fault-Data for EQFault, EQSearch and FriskSP* and **Blake, Thomas, F.**, *Computer Services and Software, Users Manuals, FriskSP v. 4.00, EQSearch v. 3.00, and EQFault v. 3.00.*
3. Fault Geometry: (ss) strike slip; (r) reverse; (n) normal; (rl) right lateral; (ll) left lateral; (O) oblique; (45 N) direction.

Probabilistic seismic hazard maps and data files prepared by the **California Geological Survey (CGS)** determine ground motions with a 10-percent probability of being exceeded in the next 50 years (475 years mean return time) as a fraction of the acceleration due to gravity for peak ground acceleration (PGA) and spectral accelerations (Sa) for short and moderately long periods, 0.2 seconds and 1.0 second, respectively. This data was available at the **CGS** 'PSHA Ground Motion Interpolator (2008)' web site (http://www.quake.ca.gov/gmaps/PSHA/psha_interpolator.html). The values are presented in the following table for reference:

GROUND MOTION*	SITE ACCELERATION Site Class D**
PGA	0.477g
Sa @ 0.2 Sec.	1.047g
Sa @ 1.0 Sec.	0.631g

* 10-percent probability of being exceeded in the next 50 years (475 years mean return time).
** Shear Wave Velocity of 274 m/sec was assumed for the on-site materials.

California Geological Survey (CGS) assign a 2-percent likelihood that a Peak Horizontal Ground Acceleration (PGA) of approximately 0.741g will occur at this site within the next 50 years (2,475 years mean return time). This data was available at the **CGS** 'PSHA Ground Motion Interpolator (2008)' web site (http://www.quake.ca.gov/gmaps/PSHA/psha_interpolator.html).

Actual shaking intensities at the site from any seismic source may be substantially higher or lower than estimated for a given earthquake magnitude, due to complex and unpredictable effects from variables such as:

- Near-source directivity effects.
- Direction, length, and mechanism of fault rupture (strike-slip, normal, reverse).
- Depth and consistency of unconsolidated sediments.
- Topography.
- Geologic structure underlying the site.
- Seismic wave reflection, refraction, and interference.

Secondary Seismic Hazards

Secondary hazards include induced landsliding or mass wasting, liquefaction, flooding (from ruptured tanks and reservoirs, surface oscillations in larger lakes, or seismic sea waves), and subsidence as a result of soil densification. Landsliding and liquefaction susceptibility maps have been prepared for much of coastal Los Angeles and Orange County, California by the **CGS**. As of the date of this report, the site has not been identified or excluded from a State-delineated zone of mandatory study for either landsliding or liquefaction.

Landslide: The subject site is not located in an area designated for landslide susceptibility per **San Bernardino County Planning Department**, *San Bernardino County Land Use Plan, GENERAL PLAN, Geologic Hazard Overlays*, Sheet EHFH C Victorville/San Bernardino Plot Date: 03/09/2010, Scale: 1:14,400 (http://www.co.san-bernardino.ca.us/landuseservices/general).

Due to the flat-lying nature of the site, on-site landsliding or debris flows sourced from higher elevations should not be considered to be a geologic constraint at this site.

Liquefaction: Liquefaction is a phenomenon in which cohesionless, saturated, fine-grained sand and sandy silt soils lose shear strength due to ground shaking. The subject site is not located within a designated area as having a liquefaction potential per **San Bernardino County Planning Department**, *San Bernardino County Land Use Plan, GENERAL PLAN, Geologic Hazard Overlays*, Sheet EHFH C Victorville/San Bernardino Plot Date: 03/09/2010, Scale: 1:14,400 (http://www.co.san-bernardino.ca.us/landuseservices/general).

It is our opinion that liquefaction potential at the subject site is very low due to an estimated depth of groundwater of 50 feet or greater beneath the existing ground surface on the site.

Seismically Induced Subsidence: Loose sandy soils subjected to moderate to strong ground shaking can experience settlement. Experience from the Northridge Earthquake indicates that structural distress can result from such seismic settlement. Based upon the results of this study, the subject site is underlain at depth by dense to very dense or hard, consolidated deposits that should not be prone to a significant degree of seismic settlement. Where applicable, loose, near-

surface, alluvial soils and undocumented fills should be removed and recompacted to uniform high densities to mitigate both settlement and consolidation potentials.

Lateral Spreading: Lateral spread is the most pervasive type of liquefaction-induced ground failure. Lateral spreads can occur on gently sloping ground or where nearby drainage or stream channels can lead to static shear stress biases on essentially horizontal ground. During lateral spread, blocks of mostly intact, surficial earth material displace downslope or towards a free face along a shear zone that has formed within the liquefied sediment. The resulting ground deformation typically has extensional fissures or a graben at the head of the failure, shear deformations along the side margins, and compression or buckling of the earth material at the toe. The amount of lateral displacement typically ranges from a few centimeters to several meters and can cause considerable damage to engineered structures and lifelines.

A formal lateral spread analysis was not performed as part of this study. The lateral spread potential of the subject site is not considered to be a geologic hazard for the proposed structure on the subject property.

Seiching: Seiching involves an enclosed body of water oscillating due to ground shaking, usually following an earthquake. Lakes and water towers are typical bodies of water affected by seiching. However, the site does not appear to be within the influence of large bodies of water and, as such, seiching should not be considered a geologic hazard for the development of the subject site.

Tsunamis: Because of the inland geographic location of the site, tsunamis are not considered a geologic hazard for the development of the subject site.

Lurching: Lurching is a phenomena in which ground cracking and/or secondary faulting occurs as a result of ground shaking. Generally, lurching primarily occurs in the immediate vicinity of faulting or within typical building setback zones or "No Human Occupancy" zones. No evidence of faulting was encountered on the site and although the potential for lurching cannot be entirely ruled out, the likelihood for lurching to impact the site is considered to be low.

OTHER GEOLOGIC HAZARDS

Flooding

The subject site is not located within a designated area as having a flooding potential per **San Bernardino County Planning Department**, *San Bernardino County Land Use Plan, GENERAL PLAN, Hazard Overlays*, Sheet FH05 B Baldy Mesa, Plot Date: 05/29/2007, Scale: 1:14,400 (http://www.co.san-bernardino.ca.us/landuseservices/general).

In addition, the subject site is located atop a hill, at least 80 feet above the nearest significant drainage channel. Therefore, flooding is not considered to be a constraint for the development of the subject project at this location.

CONCLUSIONS AND RECOMMENDATIONS

GENERAL

The conclusions and recommendations presented in this report are preliminary since a grading plan, the type of structure construction, structural loads, finish floor elevations, etc. were not available and are, in part, based on, information provided to this firm, the results of the field and laboratory data obtained from three (3) exploratory excavations located on the subject property, experience gained

from work conducted by this firm on projects within the general vicinity of the subject site, the project description and assumptions presented in the 'Project Description / Proposed Development' section of this report, engineering analyses, and professional judgement. Based on a review of the field and laboratory data and the engineering analysis, the proposed development is feasible from a geotechnical / geologic standpoint. The subject property can be developed without adverse impact onto or from adjoining properties providing the recommendations contained within this report are adhered to during project design and construction.

The average in-situ moisture contents and in-situ dry densities of the upper 5.0 feet of the near-surface alluvial materials on the subject site suggests that the soils have an average relative compaction of less than 80 percent.

The laboratory tests suggest that the alluvial materials on the site are subject have a moderate collapse potential if they should become saturated while under a load (hydroconsolidation). Laboratory consolidation tests indicate collapses of 5.0 percent under a load of 1,600 psf when water was added during the testing procedure. Theoretically, a 5.0 percent collapse of 3.0 feet of soil beneath a footing and/or structural fills would result in an additional settlement of approximately 1.8 inches, beyond what would normally be anticipated. Greater collapse potentials and/or a deeper zone of saturation would result in a larger settlement. Depending on the uniformity of the depth and the area of saturation, the settlement may not be uniform throughout the structure and/or fill area.

Some remedial grading consisting of removals and replacement will have to be performed within near-surface alluvium in the area of proposed structural fills, structures, exterior hardscapes, and/or pavement.

The actual conditions of the near-surface supporting material across the site may vary. The nature and extent of variations of the surface and subsurface conditions between the exploratory excavations may not become evident until construction. If variations of the material become evident during construction of the proposed development, **HGI** should be notified so that the project Geotechnical / Geologic Consultant can reevaluate the characteristics of the material and the conclusions and recommendations of this report, and, if needed, make revisions to the conclusions and recommendations presented herein.

Preliminary recommendations for site grading, foundations, slab support, pavement design, slope maintenance, etc., are presented in the subsequent paragraphs.

SITE PREPARATION RECOMMENDATIONS

General

The grading recommendations presented in this report are intended for: 1) the rework of unsuitable, near-surface and alluvial earth materials to create uniformly thick engineered building pads and satisfactory support for exterior hardscape (i.e., sidewalks, patios, etc.) and pavement; and 2) the use of a conventional shallow foundation system and concrete slabs cast on-grade for the proposed structures.

If hardscape and pavement subgrade earth materials are prepared at the time of grading of the building site, and the improvements are not constructed immediately, additional observations and testing of the subgrade earth material will have to be performed to locate areas which may have been damaged by construction traffic, construction activities, and/or seasonal wetting and drying. The additional observations and testing should be performed before placing

aggregate base material, Hot Mix Asphalt (HMA) concrete, and/or Portland Cement concrete (PCC) in those areas.

The grading should be performed in accordance with the recommendations presented in this report. We recommend that **HGI**, as the Geotechnical Engineer / Geologist of Record, be retained by the owner of the proposed project to observe the excavation and grading operations, foundation preparation, and test the compacted fill and utility trench backfill. If **HGI** were not selected to perform the required observation and testing of earthwork construction, **HGI** would cease to be the Geotechnical Consultant of Record for the project. A pregrading conference should be held at the site with representatives of the owner, the grading contractor, the City of Hesperia, the Civil Engineer, and a representative of **HGI** in attendance. Special grading procedures and/or concerns can be addressed at that time.

Earthwork observation services allow the testing of only a small percentage of the fill placed at the site. Contractual arrangements with the grading contractor by the project owner should contain the provision that he is responsible for excavating, placing, and compacting fill in accordance with the recommendations presented in this report and the approved project grading plans and specifications. Observation by the project Geotechnical / Geologic Consultant and/or his representatives during grading should not relieve the grading contractor of his responsibility to perform the work in accordance with the recommendations presented in this report and the approved project plans and specifications.

The following recommendations may need to be modified and/or supplemented during grading as field conditions require.

Final Grading Plan Review

The project Civil Engineer should review this report, incorporate critical information on to the grading plan and/or reference this geotechnical / geologic study, by Company Name, Project No., Report No., and report date, on the grading plan. Final grading plans should be reviewed by **HGI** when they become available to address the suitability of our grading recommendations with respect to the proposed improvements.

Clearing and Grubbing

Debris, grasses, weeds, brush, trees, and other deleterious materials should be removed from the proposed building, exterior hardscape and pavement areas and areas to receive structural fill before grading is performed. Any organic material and miscellaneous / demolition debris should be legally disposed of off site. Any topsoil or highly organic soils encountered should be stripped and stockpiled for use on finished grades in landscape areas or exported from the site. Disking or mixing of organic material into the earth materials proposed to be used as structural fill should not be permitted.

Man-made objects encountered (i.e., septic tanks, leach lines, irrigation systems, underground utilities, old foundations, construction debris, etc.) should be overexcavated, exported from the site, and legally disposed of off site. Cesspools or seepage pits, if encountered (none were encountered during this study), should be abandoned and capped according to directions and supervision of San Bernardino County Department of Health, the State of California, and/or the appropriate governmental agency procedures which has jurisdiction over them before fill and/or pavement is placed over the area. If no procedures are required by the Health Department or if the following recommendations are more stringent, the cesspool or seepage pit should be pumped free of any liquid and filled with a

low strength sand cement slurry to an elevation 5.0 feet below the final site grade in the area. The upper 5.0 feet of the cesspool or seepage pit should be excavated and the area backfilled with a properly compacted fill material. The location of the cesspool or seepage pit should be surveyed and plotted on the final 'As-Graded' plan prepared by the project Civil Engineer.

Wells, if encountered, should be abandoned and capped according to directions and supervision of San Bernardino County Department of Health, the State of California, and/or the appropriate governmental agency procedures which has jurisdiction over the well before fill and/or pavement is placed over the area.

Excavation Characteristics

Excavation and trenching within the subject property to the depths anticipated for the proposed development is anticipated to be relatively easy in the near-surface alluvial, and highly weathered bedrock materials on the subject site and should be accomplished with conventional earth-moving equipment since the drill rig equipped with flight augers was able to penetrate to the indicated depths. It is not anticipated that a significant amount of oversized rock material (i.e., 12 inches in greatest dimension) will be generated during the removal and replacement process within the alluvial materials which will require special handling during the development of the site.

Suitability of On-Site Materials as Fill

In general, the on-site earth materials present below any topsoil and/or highly organic materials are considered satisfactory for reuse as fill. Fill materials should be free of significant amounts of organic materials and/or debris and should not contain rocks or clumps greater than 12 inches in maximum dimension. It is noted that the average in-situ moisture content of the near-surface fill and alluvial earth

materials on the subject site at the time this field study was performed was below the optimum moisture content for the on-site materials and that moisture will have to be added to the on-site earth materials if the earth materials are to be used as compacted fill material in the near future. No significant amount of oversized rock materials are anticipated to be generated from the cuts performed in the local materials.

Removal and Recompaction

Uncontrolled or undocumented fills and/or unsuitable, loose, or disturbed near-surface incompetent, porous, collapsible alluvium in proposed areas which will support structural fills, structures (i.e., buildings, decorative block walls, retaining walls, trash enclosure walls, etc.), fill slopes, exterior hardscape (i.e., sidewalks, patios, curb / gutters, etc.), fill slopes, and pavement should be prepared in accordance with the following recommendations for grading in such areas. If overexcavation of undocumented fill or moisture sensitive, collapsible earth materials is elected not to be performed in hardscape, curb / gutter, pavement, and decorative block wall or fence areas, penetration of irrigation water with time may cause some settlement and distress to the improvements in those areas. The cost of the additional grading verses the risk of distress and cost of repairs to the structures needs to be evaluated by the project owner.

- The near-surface loose, collapsible, near-surface alluvial materials on the site are recommended to be overexcavated and recompacted. Based upon our exploratory excavations borings and laboratory test results, we anticipate that the overexcavation will extend to a depth of approximately 5.0 feet below existing ground surface and to a uniform elevation within the horizontal limits of the overexcavation in the areas which will receive structural fill, building structures, retaining walls, trash enclosure walls, and decorative concrete block walls. A relative compaction of 85 percent or greater should be obtained in the exposed earth material at the overexcavation depth prior to performing any scarification, moisture

conditioning, and recompaction. If 85 percent relative compaction is not present, the overexcavation should be deepened until a minimum of 85 percent relative compaction is present. Moreover, the depth of the overexcavation within the perimeter of the proposed structures should be to a uniform elevation throughout the limits of the structures. It is noted that fill placed to construct slopes and/or support sidewalks, patios, retaining walls, block walls, driveways, and pavement are considered to be structural fill.

- In the proposed exterior hardscape (i.e., sidewalks, patio slabs, etc.), and pavement areas where structural fill will not be placed or cuts are proposed, the existing near-surface earth materials need only be processed to a depth of 6.0 to12 inches below existing site grades or proposed subgrade elevation, whichever is deeper unless old, undocumented fill materials are encountered at exposed grades. If undocumented fills are encountered, they will need to be overexcavated and properly compacted fill replaced to achieve proposed grades.

  Due to the collapsible nature of the near-surface alluvial earth materials on the subject site, if overexcavation and replacement is not performed under the exterior concrete slabs, hardscape, pavement, curb / gutters, etc,, there is a risk of settlement and vertical differential movement if the subgrade earth materials are allowed to become saturated. Therefore, proper drainage should be established away from such improvements and minimal precipitation or irrigation water allowed to percolate into the earth materials adjacent to the exterior concrete hardscape, pavement, curbs / gutters, etc.

- Additional overexcavation will need to be performed in areas where the exposed subgrade can not be properly processed and recompacted per the following recommendations presented in this section of this report.

- In landscape or non-structural fill areas where non-structural fill will be placed, overexcavation will not need to be performed prior to placing non-structural fill materials. Proposed fill slopes are structural fills and do not fall under this provision. Any non-structural fill areas should be clearly designated on the project grading and/or site plan by the Civil Engineer or Architect.

- The limits of overexcavation for the building pads should extend to a distance of 5.0 feet or to the depth of the overexcavation beneath the finish

pad grade for the structure, whichever is greater, beyond the structure perimeter or footing edges. The limits of overexcavation for fill slopes should extend to a distance of 4.0 feet beyond the toe of the slope or to the depth of the overexcavation beneath the toe of the slope, whichever is greater. The limits of overexcavation for the decorative concrete block perimeter wall footings and/or retaining wall footings should extend to a distance of 4.0 feet beyond the footing edges or to the depth of the overexcavation beneath the footing grade, whichever is greater. The limits of processing or overexcavation for exterior hardscape, curb / gutter, and pavement areas should extend to a distance of 2.0 feet beyond the edge of the exterior hardscape, curb / gutter, or pavement, or to the depth of the overexcavation beneath the finish subgrade elevation, whichever is greater.

- It is noted that localized areas, once exposed, may warrant additional overexcavation for the removal of existing undocumented fills, loose, near-surface earth material, porous, moisture sensitive alluvial earth materials, and subsurface obstructions and/or debris which may not have been located during the field study performed for this report. Actual depths of removals and the competency of the exposed overexcavation bottoms should be determined by the project Geotechnical / Geologic Consultant and/or his representative during grading operations at the time they are exposed and before scarification and recompaction or the placement of fill.

- The exposed overexcavation bottom surfaces should be scarified to a depth of 6.0 to 12 inches, brought to optimum moisture content to 3.0 percent above optimum moisture content, and compacted to 90 percent or greater relative compaction before placement of fill. Maximum dry density and optimum moisture content for compacted materials should be determined according to current ASTM D1557 procedures. The scarification and recompaction of the exposed overexcavation bottoms in alluvial materials may be deleted upon approval by the project Geotechnical / Geologic Consultant, and/or his representative when in-place density test results in the undisturbed alluvial materials indicate a relative compaction of 90 percent or greater.

Import Material

Import fill should be 'Non-Expansive' as defined in Section 1803.5.3, 'Expansive Soil,' in the 2016 CBC (i.e., Expansion Index ≤ 20) as determined by current ASTM D4829 procedures and have strength parameters equivalent to or greater than the

on-site earth materials. Import fill material should be approved by the project Geotechnical / Geologic Consultant prior to it being brought on-site.

Fill Placement Requirements

Fill material, whether on-site material or import, should be approved by the project Geotechnical / Geologic Consultant and/or his representative before placement. Fill material should be free from vegetation, organic material, debris, and oversize material (i.e., 3 inches in maximum dimension). Approved fill material should be placed in horizontal lifts not exceeding 6.0 to 12 inches in compacted thickness or in thicknesses the grading contractor can demonstrate that he can achieve adequate compaction and watered or aerated to obtain optimum moisture content to 3.0 percent above optimum moisture content. Each lift should be spread evenly and should be thoroughly mixed to ensure uniformity of earth material moisture. Fill soils should be compacted to 90 percent or greater relative compaction. Maximum dry density and optimum moisture content for compacted materials should be determined in accordance with current ASTM D1557 procedures.

Compaction Equipment

It is anticipated that the compaction equipment to be used for the project will include a combination of rubber-tired, track-mounted, sheepsfoot, and/or vibratory rollers to achieve compaction. Compaction by rubber-tired or track-mounted equipment, by itself, may not be sufficient. Adequate water trucks, water pulls, and/or other appropriate equipment should be available to provide sufficient moisture and dust control. The actual selection of equipment and compaction procedures are the responsibility of the contractor performing the work and should be such that uniform compaction of the fill is achieved.

Shrinkage, Bulking, and Subsidence

There will be a material loss due to the clearing and grubbing operations. The following values are exclusive of losses due to clearing, grubbing, or the removal of other subsurface features and may vary due to differing conditions within the project boundaries and the limitations of this study.

Volumetric shrinkage of the near-surface earth materials on the subject site that is excavated and replaced as controlled, compacted fill should be anticipated. It is estimated that the average shrinkage of the near-surface earth materials within the upper 5.0 feet of the site which will be removed and replaced will be approximately 13 to 20 percent, based on fill volumes when compacted to 90 to 95 percent of maximum dry density for the earth material type based on current ASTM D1557 procedures. For example, a 13 percent shrinkage factor would mean that it would take 1.13 cubic yards of excavated material to make 1.0 cubic yard of compacted fill at 90 percent relative compaction. A higher relative compaction would mean a larger shrinkage value.

A subsidence factor (loss of elevation due to compaction of the near-surface alluvial earth materials in-place) of 0.12 to 0.16 foot per foot of compacted earth material should be used in areas where the existing earth materials are compacted in-place to 90 to 95 percent relative compaction and to a depth of 12 inches.

Subsidence of the site due to settlement from the placement of less than 3.0 feet of fill (not including the depth of overexcavation and replacement) during the planned grading operation is expected to be minimal.

Although the above values are only approximate, they represent the recommended estimate of some of the respective factors to be used to calculate lost volume that will occur during grading.

Abandonment of Existing Underground Lines

Abandonment of existing underground irrigation, utility, or pipelines, if present within the zone of construction, should be performed by either excavating the lines and filling in the excavations with documented, properly compacted fill or by filling the lines with a low strength sand / aggregate / cement slurry mixture. Filled lines should not be permitted closer than 3.0 feet below the bottom of proposed footings and/or concrete slabs on-grade. The lines should be cut off at a distance of 5.0 feet or greater from the area of construction. The ends of the lines should be plugged with 5.0 feet or more of concrete exhibiting minimal shrinkage characteristics to prevent water or fluid migration into or from the lines. Capping of the lines may also be needed if the lines are subject to line pressures. The slurry should consist of a fluid, workable mixture of sand, aggregate, cement, and water. Plugs should be placed at the ends of the line prior to filling with the slurry mixture. Cement should be Portland cement conforming to current ASTM C150 specifications. Water used for the slurry mixture should be free of oil, salts, and other impurities which would have an adverse effect on the quality of the slurry. Aggregate, if used in the slurry, mixture should meet the following gradation or a suitable equivalent:

SIEVE SIZE	PERCENT PASSING
1.5"	100
1.0"	80-100
3/4"	60-100
3/8"	50-100
No. 4	40-80
No. 100	10-40

The sand, aggregate, cement, and water should be proportioned either by weight or by volume. Each cubic yard of slurry should not contain less than 188 pounds

(2.0 sacks) of cement. Water content should be sufficient to produce a fluid, workable mix that will flow and can be pumped without segregation of the aggregate while being placed. The slurry should be placed within 1.0 hour of mixing. The contractor should take precautions so that voids within the line to be abandoned are completely filled with slurry.

Local ordinances relative to abandonment of underground irrigation, utility, or pipelines, if more restrictive, supersede the above recommendations.

Slope Setbacks

Cut and fill slope setbacks from the permit boundary lines should be in accordance with Appendix J, 'Grading,' Section J108, 'Setbacks,' of the 2016 CBC or current City of Hesperia, California Grading Ordinances, whichever is more stringent.

Benching

Compacted fill deeper than 5.0 feet and placed on natural slope surfaces inclined at 5H:1V (Horizontal to Vertical) or steeper should be placed on a series of level benches excavated into competent native materials per Appendix J, 'Grading,' Section J107.3, 'Benching,' in the 2016 CBC. The benches should have a 2.0 foot or higher backcut in competent material.

Fill Slopes

Finish fill slopes should not be inclined steeper than 2H:1V (Horizontal to Vertical). Fill slope surfaces should be compacted to 90 percent relative compaction to the face of the finished slope. Overexcavation beneath proposed fill slopes, the construction of fill slope keys, and benching of fills should be performed in accordance with the recommendations presented in previous sections of this report. Fill slopes should be constructed in a skillful manner so that they are positioned at the design orientations and slope ratio. Achieving a uniform slope

surface by subsequent thin wedge filling should be avoided. Add-on correction to a fill slope should be conducted under the observation and recommendations of the project Geotechnical / Geologic Consultant. The proposed add-on correction procedures should be submitted in writing by the contractor before commencement of corrective grading and reviewed by the project Geotechnical / Geologic Consultant. Compacted fill slopes should be backrolled with appropriate equipment for the type of earth material being used during fill placement at intervals not exceeding 4.0 feet in vertical height. As an alternative to the backrolling of the fill slopes, over-filling of the slopes will be considered acceptable and preferred. The fill slope should be constructed by over-filling with compacted fill to a distance of 3.0 feet or greater horizontally, and then trimmed back to expose the dense inner core of the slope surface. Fill slopes steeper than 3H:1V are moderately susceptible to erosion due to the low cohesion parameters of the earth materials.

Cut Slopes

Finish cut slopes in alluvium should not be inclined steeper than 2H:1V (Horizontal to Vertical). The cut slopes should be observed by the project Geotechnical / Geologic Consultant and/or his representative during grading to provide supplemental recommendations for stability of slopes, if needed. Cut slopes that face in the same direction as the prevailing natural slope will require top of cut paved interceptor swales. Cut slopes steeper than 3H:1V are moderately susceptible to erosion due to the low cohesion parameters of the earth materials.

Loose Material on Slope Face

The grading contractor should be made aware to take care to avoid spillage of loose material down the face of slopes during grading and during drainage terrace and downdrain construction. Fine grading operations for benches and downdrains should not deposit loose trimmed earth materials on the finished slope surfaces.

Slope Creep

Proposed slopes are planned to be stable under normal conditions and moderate earthquakes. However, movement due to creep effects of improvements located near the tops of fill and cut slopes must be considered. Due to moisture variations and natural gravity forces, the earth materials on the face of a slope tend to move downward and outward with time. Past experience has indicated that there is a zone which ranges back from the top of the slope edge that may experience movement. This zone varies from approximately 5.0 feet to 15 to 20 feet depending on the type of earth material the slope is composed of, the height of the slope, the inclination of the slope, moisture conditions, etc. The movement tends to be greatest at the top of the slope near the slope edge. Improvements within the creep zone should be designed and constructed to accommodate the anticipated movements. The movements may very from a fraction of an inch to several inches and is dependent on the slope height, earth material type, distance from the slope edge, and other factors.

Slope Protection

Permanent slope maintenance and protection measures as presented in the subsequent 'Slope Maintenance and Protection Recommendations' section of this report should be initiated as soon as practicable after completion of cut and/or fill slope construction. Fill slopes and cut slopes in alluvium materials steeper than 3H:1V (Horizontal to Vertical) are moderately susceptible to erosion due to the low cohesion parameters of the earth materials. The plant mix, method of application, and maintenance requirements are subject to the approval of a registered Landscape Architect or other qualified landscape professional. Construction delays, climate or weather conditions, and plant growth rates may be such that additional short-term non-plant erosion management measures may be needed. Examples would include matting, netting, plastic sheets, deep staking (5.0 feet or deeper), etc.

Temporary Roads

Temporary roads created during grading should be removed in their entirety or replaced as documented compacted fill as part of the rough grading of the tract.

Protection of Work

During the grading process and prior to the completion of construction of permanent drainage controls, it is the responsibility of the grading contractor to provide good drainage and prevent ponding of water and damage to the in progress or finished work on the site and/or to adjoining properties.

Observation and Testing

During grading, observation and testing should be conducted by the project Geotechnical / Geologic Consultant and/or his representatives to verify that the grading is being performed according to the recommendations presented in this report. The project Geotechnical / Geologic Consultant and/or his representative should observe and test the overexcavation bottoms and the placement of fill and should take tests to verify the moisture content, density, uniformity and degree of compaction obtained. The contractor should notify the project Geotechnical / Geologic Consultant when cleanout and/or overexcavation bottoms are ready for observation and prior to scarification and recompaction. Typically, one (1) in-place density test should be performed for every 2.0 vertical feet of fill material, or one (1) test for every 500 cubic yards of fill, which ever requires the greater number of tests. In-place density and moisture content tests should be performed during the placement of the fill materials during the grading operations in general accordance with the following current ASTM test procedures:

> Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth) - ASTM D6938.

Test Method for Density and Unit Weight of Soil in Place by Sand Cone Method - ASTM D1556.

Method for Laboratory Determination of Water (Moisture) Content of Soil and Rock - ASTM D2216.

Method for Determination of Water (Moisture) Content of Soil by Direct Heating Method - ASTM D4959.

Method for Determination of Water (Moisture) Content of Soil by the Microwave Oven Method - ASTM D4643.

Where testing demonstrates insufficient density, additional compaction effort, with the adjustment of the moisture content when needed, should be applied until retesting shows that satisfactory relative compaction has been obtained. The results of observations and testing services should be presented in a formal 'Grading Report' following completion of the grading operations. Grading operations undertaken at the site without the project Geotechnical / Geologic Consultant and/or his representative present may result in exclusions of the affected areas from the grading report for the project. The presence of the project Geotechnical / Geologic Consultant and/or his representative will be for the purpose of providing observations and field testing and will not include supervision or directing of the actual work of the contractor or the contractor's employees or agents. Neither the presence and/or the non-presence of the project Geotechnical / Geologic Consultant and/or his field representative nor the field observations and testing will excuse the contractor for defects discovered in the contractor's work. If **HGI** does not perform the observation and testing of the earthwork for the project and is replaced as Geotechnical / Geologic Consultant of record for the project, the work on the project should be stopped until the replacement Geotechnical / Geologic Consultant has reviewed the previous reports and work performed for the project, agreed in writing to accept the recommendations and prior work performed by **HGI** for the subject project, or has performed their own

studies and submitted their revised recommendations. If **HGI** were not selected to perform the required observation and testing of earthwork construction, **HGI** would cease to be the Geotechnical Consultant of Record for the project.

Earth Material Expansion Potential

The preliminary expansion potential of the on-site earth materials is discussed in the subsequent foundation and floor slab recommendation sections of this report. Upon completion of grading for the building pad areas, near-surface samples should be obtained for expansion potential testing to verify the preliminary expansion test results and the foundation / slab-on-grade recommendations presented in this report.

Earth Material Corrosion Potential

The preliminary corrosion potential of the on-site earth material is discussed in the subsequent corrosion recommendation sections of this report. Upon completion of grading for the building pad areas, near-surface samples should be obtained for corrosion potential testing to verify the preliminary chemical test results and the recommendations presented in this report for protection of concrete which will be in direct contact with the on-site earth materials.

2016 CBC SEISMIC DESIGN CRITERIA

Per the **California Building Standards Commission**, *2016 California Building Code* (CBC), California Code of Regulations, Title 24, Part 2, Volume 2 of 2, Section 1613, 'Earthquake Loads,' the followings coefficients and factors relevant to seismic mitigation and design for new construction include:

- **Site Class**

  Categorizing the upper 30 meters (±100 ft.) of earth materials into one (1) of the Site Classes 'A,' 'B,' 'C,' 'D,' 'E,' and 'F' that are based on

average shear wave velocities, Standard Penetration Test blow counts, or undrained shear strength.

- **Occupancy Category**
  Relationship between the number of lives placed at risk by a failure of the structure as determined from Figure C1-1, 'Approximate Relationship between Number of Lives Placed at Risk by a Failure and Occupancy Category,' in Chapter C1 of ASCE 7-10.

- **Mapped, Maximum Considered Earthquake (MSC), 5.0 Percent Damped, Spectral Response Acceleration Parameters at Short Period and at 1-Second Period**
  Mapped, Maximum Considered Earthquake (MSC), 5.0 percent damped, spectral response acceleration parameters at short period (0.2 second) and at long period (1-second), S_s and S_1, respectively, for Site Class 'B' are determined from Java Ground Motion Parameter Calculator - Version 5.0.9a available at the USGS web site (http://earthquake.usgs.gov/research/hazmaps/design/).

- **Site Coefficients**
  Short period site coefficient (at 0.2 second period), F_a, and long-period site coefficient (at 1.0 second period), F_v, are based on 'Site Class' and the 'Mapped Spectral Response Acceleration at Short Period and at 1-Second Period,' S_a and S_1, respectively.

- **Seismic Design Category**
  A classification assigned to a structure based on its 'Risk Category' and the severity of the design earthquake ground motion at the site (i.e., Short Period Response Acceleration (S_{DS}) and Long Period Response Acceleration (S_{D1}) Parameters).

Based on our understanding of local geologic conditions and limited in-situ penetration tests performed for this study, the 'Site Class' judged applicable to this site is 'D', with a soil profile name of 'Stiff Soil (D)' per Table 20.3-1, 'Site Classification,' in Chapter 20 of ASCE 7-10 with an average Shear Wave Velocity of 600 to 1,200 feet/second (ft./s) or an average Standard Penetration Test value of 15 to 50 blows per foot of penetration in the upper 100 feet (30.48 m) of the site.

The following table presents supplemental coefficients and factors relevant to seismic mitigation and design for new construction built according to the 2016 CBC based on a 2-percent probability of being exceeded in the next 50 years (2,475 years mean return time).

Site Location	Latitude: 34.4276° N Longitude: 117.4015° W
Occupancy Category[1]	I, II, or III
Site Class[2]	D
Mapped, Maximum Considered Earthquake (MCE), 5.0 Percent Damped, Spectral Response Acceleration Parameter at Short Period (S_s)[3] (0.2 Second) for Site Class 'B.'	1.500
Mapped, Maximum Considered Earthquake (MCE), 5.0 Percent Damped, Spectral Response Acceleration Parameter at 1-Second (S_1)[3] for Site Class 'B.'	0.600
Site Coefficients (F_a)[3] for Site Class 'D.'	1.0
Site Coefficients (F_v)[3] for Site Class 'D.'	1.5
The MSC, 5.0 Percent Damped, Spectral Response Acceleration Parameter at Short Periods Adjusted for Site Class 'D' Effects (S_{MS})[3].	1.500
The MSC, 5.0 Percent Damped, Spectral Response Acceleration Parameter at 1-Second Adjusted for Site Class 'D' Effects (S_{M1})[3]	0.900
Design, 5.0 Percent Damped, Spectral Response Acceleration Parameter at Short Periods (S_{DS})[3] for Site Class 'D.'	1.000
Design, 5.0 Percent Damped, Spectral Response Acceleration Parameter at 1-Second (S_{D1})[3] for Site Class 'D.'	0.600
Seismic Design Catagory[4]	D
Model Magnitude Earthquake (M)[5]	7.5
Average Shear Wave Velocity in the Top 30m of the Site for Site Class 'D.'[5]	274 m/s
Peak Ground Acceleration (PGA)[3]	0.5
Site Coefficient (F_{PGA})[4]	1.0
$PGA_M = F_{PGA} * PGA$[5]	0.5g

1.	Determined from Figure C1-1, 'Approximate Relationship between Number of Lives Placed at Risk by a Failure and Occupancy Category,' in Chapter C1 of **ASCE 7-10**, 2010 Edition.
2.	Per Table 20.3-1, 'Site Classification,' in Chapter 20 of **ASCE 7-10**, 2010 Edition.
3.	Java Ground Motion Parameter Calculator - Version 5.1.0 (2-10-2011) available at **USGS** web site (http://earthquake.usgs.gov/research/hazmaps/design/). Data based on **ASCE 7-10**, 2010 Edition, 'Standard, Minimum Design Loads for Buildings and Other Structures.'
4.	Per Table 11.6-1, 'Seismic Design Category Based on Short Period Response Acceleration Parameters' and Table 11.6-2, 'Seismic Design Category Based on 1-S Period Response Acceleration Parameters' in Chapter 11 of **ASCE 7-10**, 2010 Edition.
5.	Per Table 11.8-1, 'Mapped Maximum Considered Geometric Mean (MCE_G) Peak Ground Acceleration, PGA,' in Chapter 11 of **ASCE 7-10**, 2010 Edition.
6.	Per Section 11.8.3 in Chapter 11 of **ASCE 7-10**, 2010 Edition.

Actual shaking intensities at the site from any seismic source may be substantially higher or lower than estimated for a given earthquake magnitude, due to complex and unpredictable effects from variables such as:

- Near-source directivity effects.
- Direction, length, and mechanism of fault rupture (strike-slip, normal, reverse).
- Depth and consistency of unconsolidated sediments.
- Topography.
- Geologic structure underlying the site.
- Seismic wave reflection, refraction, and interference.

FOUNDATION DESIGN RECOMMENDATIONS

General

The recommendations presented in the subsequent paragraphs for foundation design and construction are based on geotechnical characteristics and 'Non-Expansive' conditions for the supporting earth materials as defined in Section 1803.5.3, 'Expansive Soil,' in the 2016 CBC and should not preclude more restrictive structural requirements. Foundations for the proposed structures may consist of conventional column and continuous wall footings founded upon undisturbed, documented, properly, compacted fill.

The Structural Engineer for the project should determine the actual footing width, depth, and reinforcing to resist design vertical, horizontal, and uplift forces under static and seismic conditions. Reinforcement recommendations presented in this report are considered the minimum for the earth material conditions present on the site and are not intended to supersede the design of the project Structural Engineer or the criteria of the governing agencies for the project. The project Structural Engineer may design a 'Slab-on-Ground Foundation' system based on the current **Wire Reinforcement Institute, Inc.** procedures or a 'Post-Tension Slab-on-Ground' system based on the current **Post Tensioning Institute** as an alternative to conventional reinforced concrete foundations and cast-on-grade concrete floor slabs. Geotechnical parameters for the design of a 'Slab-on-Ground Foundation' system or a 'Post-Tension Slab-on-Ground' system can be submitted upon request, if needed.

Foundation Size

Continuous footings should have a width of 12 and 15 inches or greater for one-story and 2-story building structures, respectively supported by the foundations, respectively, in accordance with Table 1809.7, 'Prescriptive Footings Supporting Walls of Light-Frame Construction,' in the 2016 CBC. Footings supporting a roof only shall be as required for supporting one (1) floor. Continuous footings should be continuously reinforced with a minimum of one (1) No. 4 steel reinforcing bar located near the top and one (1) No. 4 steel reinforcing bar located near the bottom of the footings to minimize the effects of slight differential movements which may occur due to minor variations in the engineering characteristics or seasonal moisture change in the supporting soils. Column footings should have a width of 18 inches by 18 inches or greater and be suitably reinforced, based on structural requirements. The continuous footings should extend across doorway and garage

entrances and should be founded at the same depths and reinforced the same as the adjacent footings.

Depth of Embedment

Exterior and interior footings supported in undisturbed, documented, properly compacted fill or undisturbed, firm, alluvial earth material should extend to a depth of 12 inches or greater below lowest adjacent finish grade. Footings should extend to a depth of 12 inches or greater into the bedrock material underlying the unsuitable on-site earth materials due to the expansion potential of the supporting earth materials. Frost is not considered a design factor for foundations in the City of Hesperia, California, since there will not be any significant frost penetration in the winter months.

Footings should be founded in undisturbed, documented, properly compacted fill or undisturbed, natural earth material, but not a combination of the different earth materials within the structure. Where building, decorative wall, or retaining wall footings will be constructed directly on the property line or where the limits of overexcavation do not extend sufficiently beyond the footing edges per the 'Earthwork Recommendations' section of this report, the footings should be deepened to extend through the unsuitable, earth material and be founded to a depth of 12 inches or greater into firm, competent, undisturbed, natural earth material.

Footing Setback

Embedment of footings on or near existing or planned slopes should be determined by a setback distance measured from the bottom outside edge of the footing to the slope face in accordance with Section 1808.7, 'Foundations on or Adjacent to Slopes,' in the 2016 CBC or the current City of Hesperia, California codes and ordinances, whichever is greater.

Foundations for the proposed structure and/or retaining walls on slopes that are steeper than 10H:1V (Horizontal to Vertical) (10 percent slope) should be designed in accordance with the provisions of Section 1809.3, 'Stepped Footings,' in the 2016 CBC. The top surface of the footings should be level or should be stepped so that both the top and bottom of such foundations are in accordance with the provisions in Section 1809.3 in the 2016 CBC. The stepped foundation should be suitably reinforced and designed by a qualified Civil or Structural Engineer.

The fine grained earth materials overlying the natural slopes on the subject site are prone to downslope creep. The rate of creep is a function of the length and steepness of the slope, the moisture content of the earth materials, the depth of creep prone earth materials, and the degree and care and maintenance of the slope. Slope creep is activated by wetting of the earth material mantle. In addition, the presence of burrowing animals can reduce the integrity of the earth materials and increase the downslope creep.

Bearing Capacity

Provided the recommendations for site earthwork and for footing width and depth of embedment are incorporated into the project design and construction, the allowable bearing value for design of continuous and column footings for the total dead plus frequently-applied live loads is 2,000 pounds per square foot (psf) for footings that are 12 inches in width and a depth of embedment of 12 inches or greater below lowest adjacent finished grade in accordance with Table 1806.2, 'Presumptive Load-Bearing Values,' in the 2016 CBC for footings founded in undisturbed, documented, properly, compacted fill material (Class 4 Material). For eccentrically loaded footings and/or overturning moments, the resultant force should be in the middle one-third of the footing and the average bearing value across the footing should not exceed the recommended allowable bearing value. The allowable bearing value has a factor of safety of 3.0 or greater and may be

increased by 33.3 percent for short durations of live and/or dynamic loading such as wind or seismic forces.

Settlement

Footings designed according to the recommended bearing value, the assumed maximum wall and column loads, and founded in undisturbed, documented, properly, compacted fill material are not expected to exceed a total settlement of 1.0 inch or a differential settlement of 0.25 inch between similarly sized and loaded footings

Lateral Capacity

Resistance to lateral loads can be provided by a combination of friction acting at the base of the foundation and passive earth pressure on the sides of the footings and stem walls. Foundation design parameters, based on undisturbed, documented, properly compacted fill (Class 4 Material) for resistance to static lateral dead forces are as follows:

ALLOWABLE LATERAL BEARING PRESSURE (Equivalent Fluid Pressure), Passive Case

Material Type	Bearing Pressure
Undisturbed, Documented, Compacted, 'Non-Expansive' Fill**	150 pcf*
Undisturbed, Existing, On-Site Soil	***

* Pounds per square foot per foot of depth (pcf).
** Per Table 1806.2, 'Presumptive Load-Bearing Values,' for a Class 4 Material (SW, SP, SM, SC, GM, and GC) in the 2016 CBC with a relative compaction of 85% or greater.
*** Materials are to be removed and replaced as properly compacted fill to support foundations.

ALLOWABLE LATERAL SLIDING RESISTANCE BETWEEN SOIL AND CONCRETE	
Material Type	**Coefficient of Friction**
Undisturbed, Documented, Compacted, 'Non-Expansive' Fill*	0.25
Undisturbed, Existing, On-Site Soil	**

* Per Table 1806.2, 'Presumptive Load-Bearing Values,' for a Class 4 Material (SW, SP, SM, SC, GM, and GC) in the 2016 CBC with a relative compaction of 85% or greater.

** Materials are to be removed and replaced as properly compacted fill to support foundations.

The above values are allowable design values and have safety factors of 2.0 or greater incorporated into them and may be used in combination without reduction in evaluating the resistance to lateral loads. The recommended lateral resistance assumes a horizontal surface for the earth material mass extending to a distance of 10 feet or greater from the face of the footing, or three (3) times the height of the surface generating passive pressure, whichever is greater. The allowable values may be increased by 33.3 percent for short durations of live and/or dynamic loading, such as wind or seismic forces. For the calculation of the allowable lateral bearing pressure (passive earth resistance), the upper 1.0 foot of material should be neglected unless confined by a concrete slab or pavement. The largest recommended allowable lateral bearing pressure (passive earth resistance) is 15 times the recommended design value for the appropriate CBC class of material.

Interim Foundation Plan Review

It is recommended that **HGI** review the foundation plans for the structures as they become available. The purpose of this review is to determine if these plans have been prepared in accordance with the recommendations contained in this report. This review will also provide **HGI** an opportunity to submit additional recommendations as conditions warrant.

Final Foundation Design Recommendations

Final foundation recommendations should be made upon completion of grading and be included in the 'Report of Grading' prepared by the Geotechnical / Geologic Consultant for the project.

Foundation Excavations

Foundation excavations should be observed by the project Geotechnical / Geologic Consultant and/or his representative prior to placement of forms, reinforcing steel, or placement of concrete for the purpose of verification of the recommendations presented in this report and for compliance with the project plans and specifications. The foundation excavations should be trimmed neat, level, and square. Any loose or sloughed material and debris should be removed from the foundation excavations prior to placement of reinforcing steel and removed again prior to the placement of concrete. Earth materials removed from the foundation excavations should not be placed in slab-on-grade, hardscape, and/or pavement areas unless compacted to 90 percent or greater relative compaction. The maximum dry density and optimum moisture content for the earth material should be determined in accordance with current ASTM D1557 procedures.

SLAB-ON-GRADE FLOOR RECOMMENDATIONS

The recommendations for concrete slabs on-grade, both interior and exterior, excluding Portland Cement Concrete (PCC) pavement, are based on geotechnical characteristics and 'Non-Expansive' conditions for the supporting earth material as defined in Section 1803.5.3, 'Expansive Soil,' in the 2016 CBC. The expansion potential of the slab subgrade areas should be verified at the completion of grading of the building pad areas. Concrete slabs should be designed to minimize cracking as a result of shrinkage. Joints (isolation, contraction, and construction) should be placed in accordance with the current **American Concrete Institute (ACI)** or **Portland Cement Association (PCA)** guidelines. Special precautions should be

taken during placement and curing of concrete slabs. Excessive slump (high water / cement ratio) of the concrete and/or improper curing procedures used during either hot or cold weather conditions could result in excessive shrinkage, cracking, or curling in the slabs. It is recommended that concrete proportioning, placement, and curing be performed in accordance with ACI recommendations and procedures.

Interior Floor Slabs

Interior concrete floor slabs-on-grade should be 4.0 inches or greater in thickness and be placed on properly prepared subgrade per the 'Earthwork Recommendations' section of this report. The concrete for the floor slab should have a compressive strength of 2,500 pounds per square inch (psi) or greater at 28 days. Slab reinforcement should consist of a minimum of No. 3 reinforcing bars placed 30 inches on center in both directions, or an equivalent substitute. The amount of reinforcing in the floor slab should be increased as necessary based on the structural loads placed on the floors. The reinforcing should be placed at mid-depth to 1.5 inches below the top surface of the slab to minimize cracking. The concrete section, reinforcing steel, and/or design concrete compressive strength should be increased appropriately for anticipated excessive or concentrated floor loads. A Modulus of Subgrade Reaction (k_s) of 150 pounds per square inch per inch of deflection is recommended for the design of structural slabs cast on grade for excessive floor loads. A compacted sand or gravel bedding layer beneath lightly loaded floor slabs is not needed but may be desirable to enhance the design section for heavy floor loads. If gravel bedding is used, it should consist of a well graded, crushed aggregate. The sand or gravel layer should be compacted to 90 percent or greater of maximum dry density, as determined by current ASTM D1557 procedures.

If a vapor barrier / moisture retarder is used under the floor slab and it is placed on well graded, crushed, gravel material, it is recommended that a 1.0 inch thick

layer of sand or other approved granular material be placed beneath the vapor barrier / moisture retarder to prevent punctures from angular gravel fragments and projections. If open graded gravel (capillary break) is placed beneath the vapor barrier or retarder, the gravel layer should be 6.0 inches or greater in thickness. If open graded gravel is used, a separation fabric such as Mirafi 140N series, or an equivalent substitute, should be used in-leu of a sand cushion to protect the vapor barrier / moisture retarder from punctures.

If the floor slabs in shop area will be supporting live loads, such as moving forklift trucks or vehicles, it is recommended that construction joints in the floor be provided with a key or dowels to permit the transfer of loads. Keys should not be used unless the slab is 6.0 inches or greater in thickness. If tracked equipment will be using the facility, consideration should be given to the use of a surface hardener for the concrete slabs such Master Builders "Master Plate 200" or "Anviltop."

Subgrade soils should be moisture conditioned to optimum moisture content to 3.0 percent above optimum moisture content to a depth of 12 inches and proof compacted to 90 percent or greater relative compaction based on current ASTM D1557 procedures immediately before placing the gravel material, the moisture barrier, or pouring concrete.

Vapor Barrier / Moisture Retarder Recommendations

HGI does not practice in the field of moisture vapor transmission evaluation / mitigation. Therefore, it is recommended that a qualified person or firm be engaged or consulted with to evaluate the general and specific moisture vapor transmission paths and any impact on the proposed construction. This person or firm should provide recommendations for mitigation of potential adverse impact of moisture vapor transmission on various components of the structure as deemed

appropriate in accordance with ACI, PCA, ASTM, PTI, the California Building Code, and/or the International Residential Code.

In heated / air conditioned areas in a structure where moisture sensitive floor coverings are anticipated over the floor slab, the use of a vapor barrier / moisture retarder beneath the slab should be considered. Typically, a vapor retarder is not utilized under the floor slabs in garages, utility buildings, and other unheated accessory structures, driveways, walks, patios, and/or other flatwork not likely to be enclosed and heated at a later date. The use or non-use of a vapor barrier / moisture retarder, the thickness of the vapor barrier / moisture retarder, the use of a granular layer over the vapor barrier / moisture retarder, the thickness of the granular materials, the type of granular material, etc. should be determined by the Structural Engineer who is designing the floor slab in conjunction with the Architect who is specifying the use and the type of floor coverings to be placed over the floor slab, and/or a person or firm that practices in the field of moisture vapor transmission evaluation / mitigation. The vapor barrier / moisture retarder recommendations provided by the supplier of the flooring materials should also be incorporated into the project plans.

EXTERIOR CONCRETE FLATWORK

Exterior concrete slabs cast on finish subgrade (i.e., pedestrian walkways, patios, sidewalks, etc., with the exception of PCC pavement) should be 4.0 inches or greater in thickness and be underlain by 12 inches or greater of earth material that has been prepared in accordance with the 'Earthwork Recommendation' section of this report. Reinforcing in the slab, the design compressive strength of the concrete, and the use of a compacted sand or gravel base beneath the slabs should be according to the current codes and ordinances of the City of Hesperia, California. Subgrade earth materials should be moisture conditioned to optimum moisture content to 3.0 percent above optimum moisture content to a depth of 12

inches or greater and proof compacted to 90 percent or greater relative compaction based on current ASTM D1557 procedures immediately before placing aggregate base material, placing reinforcing steel, or placing the concrete.

Due to the collapsible nature of the near-surface alluvial soils on the subject site, if overexcavation and replacement is not performed under the exterior concrete slabs and hardscape, there is a risk of settlement and vertical differential movement of the exterior concrete hardscape, sidewalks, curbs / gutters, etc. if the subgrade earth materials are allowed to become saturated. Therefore, proper drainage should be established away from such improvements and minimal precipitation or irrigation water allowed to percolate into the earth materials adjacent to the exterior concrete hardscape, curbs / gutters, etc.

RETAINING WALL RECOMMENDATIONS

Retaining walls may be needed to achieve finish grades. Retaining walls should be designed in accordance with the recommendations in the following sections. If earth reinforced walls, crib wall, keystone walls, etc. are used for the development of the subject site, the design requirement of the proprietary retaining wall system should supercede the following recommendations if there are any conflicts.

Static Lateral Earth Pressures

Retaining walls backfilled with 'Non-Expansive' granular soil (i.e., Expansion Index (EI) ≤ 20 and Unified Soil Classifications of SP, SW, SM, GP, GW, and GM) within a zone extending upward and away from the heel of the footing at a slope of 0.5H:1V (Horizontal to Vertical) or flatter for level backfill behind the retaining wall can be designed to resist static lateral earth pressures equivalent to those recommended in the following table:

LATERAL EARTH PRESSURE						
Condition	Level Backfill and Soil Classification*			2H:1V Sloped Backfill and Soil Classification***		
	SP, SW, GP, GW	GM	SM	SP, SW, GP, GW	GM	SM
Active	30 pcf**	40 pcf	45 pcf	40 pcf	62 pcf	81 pcf
At-Rest	60 pcf	60 pcf	60 pcf	87 pcf	110 pcf	120 pcf

* Per Table 1610.1, 'Lateral Soil Load,' in the 2016 CBC.
** Equivalent fluid Pressure, pounds per square foot per foot of depth (pcf).
*** Based on a moist unit weight of 125 pcf and an Angle of Internal Friction of 38 degrees for SP, SW, GP, and GW backfill soils, 31 degrees an for GM backfill soils, and 28 for an Angle of Internal Friction of 28 for SM backfill soils.

The designer of the retaining wall should specify the type of backfill material to be used in the active / at-rest zone behind the retaining wall. Any expansive soils which may be encountered on the subject site should not be used as backfill for retaining walls. Retaining walls that are free to deflect 0.001 radian at the top should be designed for the above-recommended active condition. Retaining walls that are not capable of this movement should be assumed rigid and designed for the at-rest condition. The above values assume well-drained backfill and that a buildup of hydrostatic pressure will not occur. Surcharge loads, dead and/or live (i.e., construction loads, etc.), acting on the backfill within a horizontal distance behind the retaining wall, equivalent to or less than the vertical height of the retaining wall, should also be considered in the design. Uniform surcharge pressures should be applied as an additional uniform (rectangular) pressure distribution. The lateral earth pressure coefficient for a uniform vertical surcharge load behind the retaining wall is 0.50. Seismic and wind loads should also be added to the design loads on the retaining walls, if applicable.

Seismic Lateral Earth Pressure

In accordance with Section 1803.5.12, 'Seismic Design Categories D through F,' in the 2016 CBC for the structures, seismic loads should also be added to the design loads on the retaining walls retaining more than 6.0 feet in height. Recommended seismic lateral earth pressures can be provided upon request.

Foundation Design

Retaining wall footings should be founded to the same depths below lowest adjacent finished grade and offsets from the face of slopes, and into, undisturbed, observed and tested, compacted fill, or firm, competent, undisturbed, alluvial earth material as standard foundations. The foundations may be designed for the same average allowable bearing value across the footing (as long as the resultant force is located in the middle one-third of the footing), and with the same allowable static and seismic allowable lateral bearing pressure, allowable passive earth pressure, and allowable sliding resistance as recommended in the 'Foundation Design Recommendations' section of this report. Retaining walls should be designed for a factor of safety of 1.5 against lateral sliding and overturning per Section 1807.2.3, 'Safety Factor,' in the 2016 CBC.

Foundation Size: Continuous footings should have a width of 12 inches or greater. Continuous footings should be continuously reinforced with a minimum of one (1) No. 4 steel reinforcing bar located near the top and one (1) No. 4 steel reinforcing bar located near the bottom of the footings to minimize the effects of slight differential movements which may occur due to minor variations in the engineering characteristics or seasonal moisture change in the supporting expansive earth materials.

Depth of Embedment: Footings should extend to a depth of 12 inches or greater below lowest adjacent finish grade. Frost is not considered a design factor for

foundations in the City of Hesperia, California since there will not be any significant frost penetration in the winter months.

Bearing Capacity: Provided the recommendations for site earthwork and for footing width and depth of embedment are incorporated into the project design and construction, the allowable bearing value for design of retaining wall footings for the total dead plus frequently-applied live loads is 2,000 pounds per square foot (psf) for footings that are 12 inches in width and a depth of embedment of 12 inches below lowest adjacent finish grade in accordance with Table 1806.2, 'Presumptive Load-Bearing Values,' in the 2016 CBC for footings founded in undisturbed, documented, properly, compacted fill material (Class 4 Material). For eccentrically loaded footings and/or overturning moments, the resultant force should be in the middle one-third of the footing and the average bearing value across the footing should not exceed the recommended allowable bearing value. The allowable bearing values have a factor of safety of 3.0 or greater and may be increased by 33.3 percent for short durations of live and/or dynamic loading such as wind or seismic forces.

Settlement: Footings designed according to the recommended bearing values are not expected to exceed a total settlement of 1.0 inch or a differential settlement of 0.5 inch between similarly sized and loaded footings.

Lateral Capacity

Resistance to lateral loads can be provided by a combination of friction acting at the base of the foundation and passive earth pressure on the sides of the footings and stem walls. Foundation design parameters, based on undisturbed, documented, properly compacted fill (Class 4 Material) for resistance to static lateral dead forces per Table 1806.2, 'Presumptive Load-Bearing Values,' in the 2016 CBC are as follows:

Allowable Lateral Bearing Pressure
(Equivalent Fluid Pressure), Passive Case:

Undisturbed, Documented, Compacted, 'Non-Expansive' Fill** - 150 pcf*
Undisturbed, Existing, On-Site Soil - ***

* Pounds per square foot per foot of depth (pcf).
** Per Table 1806.2, 'Presumptive Load-Bearing Values,' for a Class 4 Material (SW, SP, SM, SC, GM, and GC) in the 2016 CBC.
*** Materials are to be removed and replaced as properly compacted fill to support foundations.

Allowable Lateral Sliding Coefficient of Friction Between Soil and Concrete:

Undisturbed, Documented, Compacted, 'Non-Expansive' Fill* - 0.25
Undisturbed, Existing, On-Site Soil - **

* Per Table 1806.2, 'Presumptive Load-Bearing Values,' for a Class 4 Material (SW, SP, SM, SC, GM, and GC) in the 2016 CBC.
** Materials are to be removed and replaced as properly compacted fill to support foundations.

The above values are allowable design values and have safety factors of 2.0 or greater incorporated into them and may be used in combination without reduction in evaluating the resistance to lateral loads. The recommended lateral resistance assumes a horizontal surface for the earth material mass extending to a distance of 10 feet or greater from the face of the footing, or three (3) times the height of the surface generating passive pressure, whichever is greater. The allowable values may be increased by 33.3 percent for short durations of live and/or dynamic loading, such as wind or seismic forces. For the calculation of the allowable lateral bearing pressure (passive earth resistance), the upper 1.0 foot of material should be neglected unless confined by a concrete slab or pavement. The largest recommended allowable lateral bearing pressure (passive earth resistance) is 15 times the recommended design value for the appropriate class of material.

Subdrain

A subdrain system should be constructed behind, and at the base of retaining walls to allow drainage and to prevent the buildup of excessive hydrostatic pressures. The subdrain system should be designed by the project Civil Engineer. The use of

water-stops, impermeable barriers, or other dampproofing or waterproofing methods should be considered for any retaining walls where moisture migration through the retaining wall is considered critical to the performance and/or appearance of the retaining walls. A waterproofing consultant should be retained to provide specific waterproofing recommendations for the project, if required.

Typical subdrains may include weep holes with a continuous free draining gravel gallery, perforated pipe surrounded by free draining filter rock, or another approved system. The option of providing an ungrouted, open coarse of block at the bottom of a retaining wall is not a recommended drainage option since the openings in this coarse are so often covered by landscape soil, hardscape, and or pavement. Gravel galleries and/or filter rock, if not designed and graded for the on-site and/or import materials, should be enclosed in a geotextile fabric such as Mirafi 140N series, or an equivalent substitute, to prevent infiltration of fine soil particles into the subdrain and clogging of the system. Before placement of the fabric, the top of the footing should be cleared of loose soil materials, large stones, and/or other debris. Any large depressions or holes should be filled with a concrete slurry or a suitable equivalent to permit close contact of the fabric with the surrounding surface. The fabric should be placed smoothly without folds or excessive wrinkles. Successive sheets of the fabric should be placed with an overlap of 24 inches or more in the direction of the flow of the water in the pipe with the upstream layer overlapping the downstream layer. The fabric should be folded over the top of the free draining granular material producing an overlap of 12 inches or more. The perforated pipes should be Schedule 40 or stronger and 4.0 inches or greater in diameter. Perforations may be either bored 0.25-inch diameter holes or 0.1875-inch (3/16-inch) wide slots placed on the bottom one-third of the pipe perimeter. If the pipe is bored, a minimum of 10 holes per linear foot should be uniformly placed along the pipe. If slots are used, they should not exceed 2.0 inches in length and should not be closer than 2.0 inches on center along the length

of the pipe. The total length of the slots should not be less than 50 percent of the pipe length and should be uniformly spaced along the length of the pipe. Pipe perforations should be placed downward. Gravel filters should have a volume of 3.0 cubic feet or greater per linear foot of pipe. Subdrains should maintain a positive flow gradient and have outlets that drain in a non-erosive manner.

Prefabricated drainage products such as 'Miradrain,' or a suitable equivalent, may also be used for the purpose of providing drainage behind retaining walls when installed in accordance with the manufacturers recommendations.

Backfill

Backfill directly behind retaining walls (if backfill width is less than 3.0 feet) may consist of 0.5- to 1.5-inch diameter, rounded to subrounded gravel with less than 5.0 percent passing the 0.5 inch sieve enclosed in a geotextile fabric such as Mirafi 140N series, or an equivalent substitute, or a clean sand (Sand Equivalent Value greater than 50) water jetted into place to obtain compaction. If water jetting is used, the subdrain system should be in place. Even if water jetting is used, the sand should be densified to 90 percent or greater relative compaction. If the specified density is not obtained by water jetting, mechanical methods will have to be used. If other types of soil or gravel are used for backfill, mechanical compaction methods will have to be used to obtain a relative compaction of 90 percent or greater of maximum dry density. Backfill directly behind retaining walls should not be compacted by wheel, track or other rolling by heavy construction equipment unless the retaining wall is designed for the surcharge loading. If gravel, clean sand, or other imported backfill is used behind retaining walls in unpaved areas, the upper 12 to 18 inches of backfill should consist of typical on-site material compacted to 90 percent or greater relative compaction to prevent the influx of surface run-off into the granular backfill and into the

subdrain system. Maximum dry density and optimum moisture content for backfill materials should be determined according to current ASTM D1557 procedures.

V-Drain Design

A V-drain should be constructed directly behind retaining walls which have a sloping backfill to intercept surface water and drain it from the back of the retaining wall. The V-drain should be designed and constructed in accordance with the current typical standards of City of Hesperia, California. The V-drain should direct water from the back of the retaining wall to an adequate down drain and discharge it in a non-erosive manner.

Observation and Testing

During retaining wall construction, observation and testing should be conducted by the project Geotechnical / Geologic Consultant and/or his representatives to verify that the work is being performed according to the recommendations presented in this report.

The foundation excavations should be observed by the project Geotechnical / Geologic Consultant and/or his representative prior to placement of forms, reinforcing steel, or placement of concrete for the purpose of verification of the recommendations presented in this report and for compliance with the project plans and specifications. The foundation excavations should be trimmed neat, level, and square. Any loose or sloughed material and debris should be removed from the foundation excavations prior to placement of reinforcing steel and removed again prior to the placement of concrete.

The placement and construction of the subdrain system behind the retaining walls

should be observed by the project Geotechnical / Geologic Consultant and/or his representatives to verify that the work is being performed according to the recommendations presented in this report.

During backfill of the retaining walls, observation and testing should be conducted by the project Geotechnical / Geologic Consultant and/or his representatives to verify that the backfilling is being performed according to the recommendations presented in this report. The project Geotechnical / Geologic Consultant and/or his representative should observe the placement of fill and should take tests to verify the moisture content, density, uniformity and degree of compaction obtained. Where testing demonstrates insufficient density, additional compaction effort, with the adjustment of the moisture content when needed, should be applied until retesting shows that satisfactory relative compaction has been obtained. The results of observations and testing services should be presented in a formal report following completion of the construction operations. Retaining wall backfill operations undertaken at the site without the project Geotechnical / Geologic Consultant and/or his representative present may result in exclusions of the affected areas from the final report for the project.

The presence of the project Geotechnical / Geologic Consultant and/or his representative will be for the purpose of providing observations and field testing and will not include supervision or directing of the actual work of the contractor or the contractor's employees or agents. Neither the presence and/or the non-presence of the project Geotechnical / Geologic Consultant and/or his field representative nor the field observations and testing will excuse the contractor for defects discovered in the contractor's work.

CORROSION POTENTIAL EVALUATION

The recommendations for corrosion protection should be verified at the completion of grading of the building pads on the subject site. Bulk samples of the near surface, on-site earth materials were obtained during the field study to evaluate the potential for corrosivity. Results from the tests are included in the 'Summary of Laboratory Test Results' presented in Appendix 'A.'

Concrete Corrosion Potential

A preliminary test on a sample of near-surface, on-site earth material suggest a soluble sulfate concentration of 0.0011 percent. Earth materials with a water soluble sulfate (SO_4) concentration of less than 0.10 percent are considered to be Category S, Class S0 in accordance with Table 19.3.1.1, 'Exposure Categories and Classes,' in **American Concrete Institute (ACI)** 318-14. Therefore the requirements in Table 19.3.2.1, 'Requirements for Concrete by Exposure Class,' in **ACI** 318-14 are applicable. The referenced **ACI** Table 19.3.2.1 should be used to determine the type cement, the maximum water cement ratio, and the minium compressive strength to be used for normal weight concrete which comes in direct contact with the on-site earth materials (i.e., foundations, floor slabs, driveway slabs, sidewalks, patios, curbs / gutters, etc.). A lower water / cement ratio or higher compressive strength may be required for design of concrete for water tightness or for protection against freezing and thawing, or for corrosion protection of concrete reinforcement per Section 1904, 'Durability Requirements,' in the 2016 CBC, if applicable.

Experience in the southern California area has shown that even though the earth materials do not contain levels of soluble sulfate which would require the use of sulfate resistant cement, maximum water cement ratios, or minimum compressive strength for concrete, concrete corrosion and erosion problems still occur. These problems are the result of concentrations of soluble sulfate, chloride, and other

salts and/or acids present in groundwater, irrigation water, rain water, and potable water sources, and in fertilizers or amendments used to promote plant growth (i.e., some domestic water sources contain levels of dissolved sulfate which would be a Class S1 exposure to concrete which comes in contact with it). Therefore, it may be wise to use a concrete designed for a Category S, Class S1 criteria that comes into contact with surface run-off or other sources of water. Higher strength, lower water / cement ratio, and denser concrete may also be effective in reducing the potential for corrosion to occur and preventing damage due to salt or acid exposure. The use of sulfate resistant concrete for non-structural elements (i.e., driveway slabs, sidewalks, patios, curbs / gutters, etc.), is considered to be a value / risk assessment and decision to be made by the client.

Metallic Corrosion Potential

The life of buried metals depends on type of material, thickness, and construction details. Since **HGI** does not practice metallic corrosion engineering, if corrosion protection is considered to be a design issue, an engineer specializing in corrosion should be consulted regarding the potential damage due to corrosion. The corrosion engineer should recommend appropriate types of piping and/or protective measures where needed.

A preliminary minimum resistivity test on a sample of the near-surface, on-site, earth material of 18,747 ohm-cm suggest a mild to moderate corrosive environment for buried ferrous metal in direct contact with the on-site earth materials when the earth materials are wet. Soils with a minimum resistivity of less than 1,000 ohm-cm indicates a severe corrosive environment and a minimum resistivity of 2,000 ohm-cm or greater indicates a mild to moderate corrosive environment for buried ferrous metal in direct contact with the soils when the soils are wet.

A preliminary test on a sample of near-surface, on-site, earth material suggests a soluble chloride concentration of less than10 parts per million (ppm). Earth materials with greater than 300 and 500 ppm of soluble chloride are considered to be aggressive to buried ferrous and copper material respectively, in direct contact with the earth materials.

Earth material pH is a general indicator of the corrosivity of earth materials. The measured pH of a sample of near-surface, on-site, earth material of 6.9 indicates a non-corrosive environment to copper and ferrous metals when in direct contact with the on-site earth materials.

Sulfide in soils is a general indicator of the corrosivity of earth materials. The measured sulfide of the samples of near-surface, on-site, earth material tested as part as part of this report from the finish building pads was 'Negative' which indicates a non-corrosive environment to copper and ferrous metals when in direct contact with the on-site earth materials.

Salt Crystallization Exposure

Damage of concrete, concrete masonry units, slump stone block, etc. surface can occur when evaporation of moisture takes place at the surface of the materials. As evaporation takes place, salts (i.e,. carbonates, chloride, sulfur, sodium, potassium, etc.) are deposited in or form on the surfaces. As the salts crystalize, they can exert extreme pressures in the pore spaces of the materials they are deposited in and/or on. The formation of the crystals within the pore spaces of the material can result in what is generally called 'salt crystallization damage.' This results in the scaling and/or etching of the surface of the material on which they are deposited. The damaging effects of this phenomenon can be greatly reduced and/or even eliminated by the following or other such methods: 1) either using a higher strength concrete or a denser, low porosity product; 2) seal the surface of the

material with a water proofing substance which will prevent the evaporation of the moisture from within the cementitious product. If 'salt crystallization damage' is considered to be an issue, an engineer or chemist specializing in this area should be consulted regarding the potential damage due evaporation and the deposition of salts. The engineer or chemist should recommend appropriate types of materials or protective measures where needed.

PRELIMINARY PAVEMENT RECOMMENDATIONS

The following are preliminary recommendations for the structural pavement section for the proposed parking areas, and driveway areas for the subject development. The Hot Mix Asphalt (HMA) concrete pavement sections have been determined in general accordance with current **California Department of Transportation (CALTRANS)** design procedures using the CalFP Ver. 1.1 'Hot Mix Asphalt Empirical Design' computer program developed by the **CALTRANS, Office of Pavement Design** and are based on a an assumed Traffic Index (TI) of 5.5 for a 20 year design life and an assumed R-Value of at least 40 based on past experience in the vicinity of the site and visual textural classification of the on-site earth material and/or import materials which are anticipated to be at subgrade elevation.

Portland Cement Concrete (PCC) pavement sections are based on an equivalent structural numbers as the recommended HMA concrete pavement section and a compressive strength of 2,500 psi or greater at 28 days for the concrete.

The preliminary recommendations for the pavement sections should consist of the following:

RECOMMENDED PAVEMENT SECTIONS			
Site Area	**Traffic Index***	**Subgrade R-Value****	**Pavement Section**
Driveway and Parking Areas for Autos and Light Weight Vehicles Only.	≤5.5	≥40	3.5" Hot Mix Asphaltic (HMA) Concrete over 5.0" Aggregate Base (AB) or 5.5" PCC @ 2,500 psi over properly prepared subgrade.
Driveway and Parking Areas for Delivery Trucks	≤7.0	≥40	5.0" Hot Mix Asphaltic (HMA) Concrete over 7.0" Aggregate Base (AB) or 7.0" PCC @ 2,500 psi over properly prepared subgrade.
* Traffic Index was assumed for the project. ** R-Value was assumed for the project.			

It is noted that the City of Hesperia minimum pavement sections may override the above pavement recommendations without prior City review and approval.

HMA concrete pavement materials should be as specified in Section 39, 'Hot Mix Asphalt,' in the current CALTRANS 2010 'Standard Specifications' with the 7-18-2014 Revisions, or an equivalent substitute. Aggregate base should conform to Class 2 Material, 1-1/2" Maximum or 3/4" Maximum, as specified in Section 26-1.02B, 'Class 2 Aggregate Base,' in the current, CALTRANS 2010 'Standard Specifications' with the 7-18-2014 Revisions, or an equivalent substitute.

Portland Cement Concrete sections are based on a compressive strength of 2,500 psi or greater at 28 days for the concrete. Higher strength design for the concrete can permit thinner pavement sections. Lower strength design for the concrete will

require thicker pavement sections. Joints (longitudinal, transverse, construction, and expansion), jointing arrangement, joint type, pavement and/or joint reinforcing, as well as drainage, crowning, finishing and curing of PCC pavement should be in accordance with current Portland Cement Association (PCA) recommendations.

The subgrade earth material, including utility trench backfill, should be compacted to 90 percent or greater relative compaction to a depth of 1 foot or greater below the finish pavement subgrade elevation. The aggregate base material should be compacted to 95 percent or greater relative compaction. If asphaltic concrete and/or PCC pavement is placed directly on subgrade, the upper 1.0 foot of the subgrade should be compacted to 95 percent or greater relative compaction. Maximum dry density and optimum moisture content for subgrade and aggregate base materials should be determined according to current ASTM D1557 procedures. The asphalt concrete pavement should be densified to 95 percent or greater of the density obtained by current California Test 304 and 308 procedures (Hveem compacted laboratory samples).

If semi-trailers are to be parked on the asphalt concrete pavement, such that a considerable load is transferred from small, steel wheels, it is recommended that a strip of rigid Portland Cement concrete pavement with a thickness of 6.0 inches or greater be provided in these areas. This will provide for the distribution of loads to the subgrade without causing deformation of the pavement surface. Special consideration should also be given to areas where truck traffic will negotiate small radius turns and/or in areas utilized by solid tired forklifts or other material handling equipment. HMA concrete pavement in these areas should utilize stiffer emulsions or the areas should be paved with Portland Cement concrete. Where HMA concrete pavement abuts concrete aprons, drives, walks, or curb and gutter sections, a thickened edge transition zone is recommended for the HMA concrete

section to minimize the effects of impact loading as vehicles transition from PCC paving to HMA concrete paving. This thickened edge should consist of an increased thickness of 2.0 inches for parking areas and 4.0 inches for areas of heavy truck usage. This thickened edge should extend to a distance of 3.0 feet or greater from the edge of pavement and then gradually taper back to the design pavement thickness. If pavement subgrade earth materials are prepared at the time of grading of the building site and the areas are not paved immediately, additional observations and testing will have to be performed before placing aggregate base material, asphaltic concrete, or PCC pavement to locate areas that may have been damaged by construction traffic, construction activities, and/or seasonal wetting and drying. In the proposed pavement areas, earth material samples should be obtained at the time the subgrade is graded for Resistance (R-Value) testing according to current California Test 301 procedures to verify the pavement design recommendations.

Because the full design thickness of the HMA concrete is frequently not placed prior to construction traffic being allowed to use the parking lots, rutting and pavement failures can occur prior to project completion. To reduce this occurrence, it is recommended that either the full-design pavement section be placed prior to use by the construction traffic, or a higher Traffic Index (TI) be specified where construction traffic will use the pavement.

Surface water infiltration beneath pavements could significantly reduce the pavement design life. To limit the need for additional long-term maintenance of the pavement or pre-mature failure, it would be beneficial to protect at-grade pavements from landscape water infiltration by means of a concrete cutoff wall, deepened curbs, or equivalent. Pavement cut-off barriers should be considered where pavement areas are located downslope of any landscape areas that are to be

irrigated. The cut-off barrier should extend to a depth of at least 4.0 inches below the pavement section aggregate base material.

Gradation is not the only quality guidelines for aggregate base material. The longevity and performance of pavements utilizing aggregate base material for support is dependent upon the quality of the material which composes the aggregate base. CALTRANS specifications do not specifically exclude the use of material other than a natural, crushed rock and rock dust for Class 2 Aggregate Base material as the 'Standard Specifications for Public Works Construction' (2012 Edition of the 'Greenbook' with the 2014 Cumulative Supplement), Section 200-2.2, does for Crushed Aggregate Base material. Often times, reclaimed Portland Cement concrete, Hot Mix Asphalt concrete, lean concrete base, and cement treated base are crushed, combined with broken stone, crushed gravel, natural rough surfaced gravel, and sand per the current Section 26-1.02B, 'Class 2 Aggregate Base,' of the current CALTRANS 2010 'Standard Specifications,' with the 7-18-2014 Revisions, and graded to produce a Class 2 Aggregate Base material per CALTRANS gradation specifications. Bricks, concrete masonry units, tile, glass, ceramics, porcelain, wood, plastic, metal, etc. **are not** an acceptable reclaimed material for use in a Class 2 Aggregate Base material per the current CALTRANS 2010 'Standard Specifications' with the 7-18-2014 Revision. If a reclaimed material is proposed for use on the project as a Class 2 Aggregate Base, the reclaimed materials should not exceed 50 percent of the total volume of the aggregate used. The aggregate base material should be tested prior to delivery to the subject project site for the following quality requirements per the current, appropriate CALTRANS test procedures:

TEST	TEST METHOD NO.	QUALITY REQUIREMENT	
		OPERATING RANGE	CONTRACT COMPLIANCE
Resistance (R-Value)	Calif. Test 301	--	78 Minimum
Sand Equivalent	Calif. Test 217	25 Minimum	22 Minimum
Durability Index	Calif. Test 229	--	35 Minimum

If a reclaimed material or a pit run aggregate is proposed for use on the project as a 'Greenbook' Crushed Miscellaneous Base (CMB), the materials should be tested for the following quality requirements prior to delivery to the subject project, per the current 'Greenbook,' 2012 Edition with the 2014 Cumulative Supplement, Section 200-2.4.3, and appropriate procedures as well as the required gradation and other requirements:

TEST	TEST METHOD NO.	QUALITY REQUIREMENT
Resistance (R-Value)	Calif. Test 301	78 Minimum[1]
Sand Equivalent	Calif. Test 217	35 Minimum
Percent Wear[2] 100 Revolutions 500 Revolutions	ASTM C131	 15 Maximum 52 Maximum

1. R-Value requirement may be waived if Sand Equivalent is 40 or more.
2. The percentage wear requirements may be waived if the material has a minimum Durability Index of 40 in accordance with CALTRANS Test Method 229.

A 'Greenbook' CMB may contain broken or crushed asphalt concrete or Portland Cement concrete and may contain crushed aggregate base or other rock materials. The CMB may contain no more than 3.0 percent brick retained on the # 4 sieve by dry weight of the total sample.

Samples of the proposed aggregate base using reclaimed material should be sampled from the manufacturer's stockpiles and tested prior to delivery to the project. The samples should be obtained at a time as near the delivery to the project as possible but would allow enough time to complete the testing and report the results before delivery to the site. Samples should again be obtained and tested for quality compliance from the materials delivered to the project. In addition, per the current CALTRANS 2010 'Standard Specifications' with the 7-18-2014 Revisions, an aggregate grading and Sand Equivalent test shall not represent more than 500 cubic yards or one (1) days production if less than 500 cubic yards.

Concrete gutters should be provided at flow lines in paved areas. Pavements should be sloped to permit rapid and unimpaired flow of runoff water. In addition, paved areas should be protected from moisture migration and ponding from adjacent water sources. Saturation of aggregate base and/or subgrade materials could result in pavement failure and/or premature maintenance. The gutter material and construction methods should conform to the current standards of the City of Hesperia, California.

POST-GRADING CRITERIA

Earth materials generated from the excavation of foundations, utility trenches, etc., to be used on-site, should be moisture conditioned to optimum moisture content to 3.0 percent above optimum moisture content and compacted to 90 percent or greater of the maximum dry density for the material type as determined by current ASTM D1557 procedures when it is to be placed under floor slabs, under hardscape areas, and/or in paved areas. The placement of the excess material should not alter positive drainage away from structures and/or off the lot and should not change the distance from the weep screed on the structure to the finished adjacent earth material grade per the 'Finish Surface Drainage Recommendations' presented in a subsequent section of this report.

SLOPE MAINTENANCE AND PROTECTION RECOMMENDATIONS

Although the design and construction of slopes are planned to create slopes that possess stability against mass rotational failure, surficial slumping, creep, and pop-outs, certain factors are beyond the influence of the project Geotechnical / Geologic Consultant. Earth material slopes are subject to some erosion when subjected to sustained water application. To reduce long term erosion, the following recommendations for slope protection and maintenance should be considered when planning, designing, and implementing slope erosion methods: Surface water should not be allowed to flow over the slopes other than incidental rainfall and irrigation. Alterations of manufactured or natural slopes, terraces, top of slope berms, and/or pad gradients should not be allowed that will prevent pad and roof run-off from the structure from being expediently directed to approved disposal areas and away from the tops of slopes.

- Surface drainage should be positively maintained from the rear yard, through the side yards, and to the street or storm drain in a non-erosive manner.

- Top of slope berms should be constructed and compacted as part of finish grading of the property and should be maintained by the property owner. The recommended drainage patterns should be established at the time of finish grading and maintained throughout the life of the proposed development.

- Concentrated surface waters entering the property from off-site sources should be collected and directed to a permanent drainage system.

- The property owner is responsible for the maintenance and cleaning of the interceptor ditches, drainage terraces, downdrains and other drainage devices that have been installed to promote slope stability.

- It is recommended that slopes be planted with light-weight ground cover, shrubs and trees that possess deep (5.0 feet or greater), dense root structures that require minimal of irrigation (drought resistance). It should

be the responsibility of the Landscape Architect or other suitably qualified individual to provide such plants initially and of the property owner to maintain such planting. Alteration of the planting scheme is at the property owner's risk.

- If automatic sprinkler systems are installed their use should be adjusted to account for natural rainfall.

- The property should establish a program for the elimination of burrowing animals. This should be an on-going program to protect slope stability.

- The property owner should observe the lot drainage during heavy precipitation periods as this is often when trouble occurs. Problems such as gullying or ponding should be corrected as soon as practicable.

- High moisture content in slope earth materials is a major factor in slope erosion and slope failures. Therefore, precautions should be taken to minimize earth material saturation. Leakage from pools, waterlines, irrigation systems, etc. or bypassing of clogged drains should be promptly repaired.

The above guidelines are provided to mitigate slope maintenance and protection problems, when applicable, by the project developer. The above guidelines are general maintenance and design procedures but may be superseded under specific direction of a licensed Landscape Architect or other suitably qualified individual.

UTILITY TRENCH RECOMMENDATIONS

Utility trenches within the zone of influence of foundations or under building floor slabs, exterior hardscape, and/or pavement areas should be backfilled with documented, compacted earth material. Utility trenches within the building pad and extending to a distance of 5.0 feet beyond the building exterior footings should be backfilled with on-site or similar earth material. Where interior or exterior utility trenches are proposed to pass beneath or parallel to building, retaining wall, and/or decorative concrete block perimeter wall footings, the bottom of the trench should not be located below a 1H:1V (Horizontal to Vertical) plane projected

downward from the outside bottom edge of the adjacent footing unless the utility lines are designed for the footing surcharge loads.

Trench Excavation

It is recommended that utility trench excavations be designed and constructed in accordance with current OSHA regulations. These regulations provide trench sloping and shoring design parameters for trenches up to 20 feet in vertical depth based on a description and field verification of the earth material types encountered. Trenches over 20 feet in vertical depth should be designed by the Contractor's Engineer based on site specific geotechnical analyses. For planning purposes, we recommend that the following OSHA earth material type designations and temporary slope inclinations be used:

EARTH MATERIAL	OSHA SOIL TYPE*	TEMPORARY SLOPE INCLINATION (H:V)**
Undocumented Fill	C	1.5:1
Compacted Fill	C	1.5:1
Alluvium	C	1.5:1
Type 'C': Cohesive soils with an unconfined compressive strength of 0.5 tsf or less: or Granular soils including sands, gravels, loamy, clayey or silty sands, etc.		
** Steepest allowable slopes for excavations less than 20 feet in vertical height. Slopes for excavations greater than 20 feet in vertical height should be designed by a Registered Professional Engineer with experience in Geotechnical Consulting and Soil Mechanics.		

Excavations of less than 5.0 feet in depth may also be subject to collapse due to water, vibrations, previously disturbed earth materials, or other factors and may require protection for workers such as temporary slopes, shoring, or a shielding protective system. The excavations should be observed by a qualified, competent person (as defined in the current OSHA regulations) looking for signs of potential

cave-ins on a daily basis before start of work, as needed throughout the work shifts, and after every rainstorm or other hazard-increasing occurrence.

Surcharge loads (i.e., spoil piles, earthmoving equipment, trucks, etc,) should not be allowed within a horizontal distance measured from the top of the excavation slope equivalent to the vertical depth of the excavation 1.5 times the vertical depth of the excavation. Excavations should be initially observed by the project Geotechnical / Geologic Consultant and/or his representative to verify the recommendations presented or to make additional recommendations to maintain stability and safety. Moisture variations, differences in the cohesive or cementation characteristics, or changes in the coarseness of the deposits may require slope flattening or, conversely, permit steepening upon review and appropriate testing by the project Geotechnical / Geologic Consultant and/or his representative. The excavations should be observed by a qualified, competent person (as defined in the current OSHA regulations) looking for signs of potential problems on a daily basis before start of work, as needed throughout the work shifts, and after every rainstorm or other hazard-increasing occurrence. Deep utility trenches may experience caving which will require special considerations to stabilize the walls and expedite trenching operations. Surface drainage should be controlled along the top of the construction slopes to preclude erosion of the slope face. If excavations are to be left open for long periods, the slopes should be sprayed with a protective compound and/or covered to minimize drying out, raveling, and/or erosion of the slopes.

Utility Line Foundation Preparation

If the utility trench excavation bottom is in material that is not suitable for support of the utility pipe, the material should be removed to a minimum depth of 1.0 foot below the bottom of the pipe and replaced with concrete slurry, sand, or

crushed gravel meeting the following appropriate gradation limits or some other suitable equivalent as specified by the utility designer.

SIEVE SIZE	CRUSHED ROCK OR GRAVEL (PERCENT PASSING)
1"	100
3/4"	90-100
½"	30-60
3/8"	0-20
No. 4	0-5

SIEVE SIZE	SAND (PERCENT PASSING)
3/8"	100
No. 4	75-100
No. 30	12-50
No. 100	5-20
No. 200	0-15

Most of the granular native earth materials encountered on the subject site **are not** expected to meet the above granular earth material criteria.

We recommend, that where the bottom of the pipe foundation excavation is loose or soft, the foundation earth materials be removed to firm materials as determined by the Engineer. This condition would likely only apply where fill underlies the pipe in localized areas along a utility alignment. If firm material is not encountered within 24 inches of the bottom of the pipe zone, the contractor may then elect to stabilize the trench bottom with 24 inches of crushed rock as

described above. Alternately, soft or loose material may be excavated to firm earth material and the overexcavation replaced with select earth material.

The bottom of the utility trench excavation should be proof compacted to 90 percent or greater relative compaction prior to placement of compacted fill. Maximum dry density and optimum moisture content for compacted materials should be determined according to current ASTM D1557 procedures.

Prior to placement of trench slurry or crushed rock, the bottom need only be cleaned of loose materials created by the excavation process. Where the bottom of the trench contains rocks or hard objects protruding above a depth of 6.0 inches below the pipe bottom, such objects should be removed or broken and any resulting cavities filled to produce a smooth surface.

Bedding Requirements

It is recommended that the pipe be bedded on either clean sand, gravel, crushed rock or any approved suitable material in order to provide a smooth, firm, and uniform foundation for the pipe. The pipe bedding material, thickness, shaping, and placement should satisfy the design requirements as determined by the design Civil Engineer and/or in accordance with Section 306-1.2.1 of the 2012 Edition of the 'Greenbook' with the 2014 Cumulative Supplement. The majority of the man-made fills and alluvial soils on the subject site may not be suitable to be used as bedding and pipe zone backfill materials depending upon the bedding and pipe zone backfill specifications required by the project designer and/or the agency having jurisdiction over the utility line.

Trench Zone Backfill

The excavated earth materials from the trench may be used as backfill in the trench zone unless more restrictive specifications are required by the design

engineer or the permitting agency. The trench backfill material should consist of approved earth materials free of trash debris, vegetation or other deleterious matter, and oversize particles (i.e., 12 inch in maximum dimension). Trench zone backfill should be compacted to 90 percent or greater relative compaction. Maximum density and optimum moisture content for compacted materials should be determined according to current ASTM D1557 procedures.

Trench backfill material should be placed in a lift thickness appropriate for the type of backfill material and compaction equipment used. Backfill material should be brought to optimum moisture content to 3.0 percent above optimum moisture content and compacted to 90 percent or greater relative compaction by mechanical means. Jetting or flooding of the backfill material will **not** be considered a satisfactory method for compaction. Maximum dry density and optimum moisture content for backfill material should be determined according to current ASTM D1557 procedures.

FINISH SURFACE DRAINAGE RECOMMENDATIONS

Positive drainage should be established away from the tops of slopes, the exterior walls of structures, the back of retaining walls, trash enclosure walls, decorative concrete block walls, etc. Finish surface gradients in unpaved areas should be provided next to tops of slopes and buildings to guide surface water away from foundations, hardscape, pavement, and from flowing over the tops of slopes. The surface water should be directed toward adequate drainage facilities. Ponding of surface water should not be allowed next to structures or on pavements. Design criteria for finish lot drainage away from structures and off the lot should be determined by the project Structural Engineer designing the foundations and slabs in conjunction with the project Civil Engineer designing the precise grading for lot drainage, respectively, in accordance with the 2016 CBC and/or the current City of Hesperia, California codes and ordinances and the earth material types and

expansion characteristics for the earth materials contained in this report. Finished landscaped and hardscape or pavement grades adjacent to the proposed structures should maintain a vertical distance below the bottom elevation of the weep screed per the 2016 CBC and/or the current City of Hesperia codes and ordinances. Landscape plants with high water needs and trees should be planted at a distance away from the structure equivalent to or greater than the width of the canopy of the mature tree or 6.0 feet, whichever is greater. Downspouts from roof drains should discharge to a permanent all-weather surface which slopes away from the structure. Downspouts from roof drains should not discharge into planter areas immediately adjacent to the building unless there is positive drainage out of the planter and away from the structure in accordance with the recommendations of the project foundation and slab designer and/or the project Civil Engineer designing the precise grades for the lot drainage.

PLANTER RECOMMENDATIONS

Planters around the perimeter of the structures should be designed so that adequate drainage is maintained and minimal irrigation water is allowed to percolate into the earth materials underling the buildings. This should include enclosed or trapped planter areas that are created as a result of sidewalks. Planters with solid bottoms, independent of the underlying earth material, are recommended within a distance of 6.0 feet from the buildings. The planters should drain directly onto surrounding paved areas or into a designed subdrain system. If planters are raised above the surrounding finished grades or are placed against the building structure, the interior walls of the planter should be waterproofed.

LIMITATIONS

REVIEW, OBSERVATION, AND TESTING

The recommendations presented in this report are contingent upon review of final plans and specifications for the project by **HGI**. The project Geotechnical / Geologic Consultant should review and verify in writing the compliance of the final grading plan and the final foundation plans with the recommendations presented in this report.

It is recommended that **HGI** be retained to provide continuous Geotechnical / Geologic Consulting services during the earthwork operations (i.e., rough grading, utility trench backfill, subgrade preparation for slabs-on-grade and pavement areas, finish grading, etc.) and foundation installation process. This is to observe compliance with the design concepts, specifications and recommendations and to allow for design changes in the event that subsurface conditions differ from those anticipated prior to start of construction. If **HGI** is replaced as Geotechnical / Geologic Consultant of record for the project, the work on the project should be stopped until the replacement Geotechnical / Geologic Consultant has reviewed the previous reports and work performed for the project, agreed in writing to accept the recommendations and prior work performed by **HGI** for the subject project, or has submitted their revised recommendations.

UNIFORMITY OF CONDITIONS

The recommendations and opinions expressed in this report reflect our understanding of the project requirements based on an evaluation of subsurface earth material conditions encountered at the subsurface exploration locations and the assumption that earth material conditions do not deviate appreciably from those encountered. It should be recognized that the performance of the foundations may be influenced by undisclosed or unforeseen variations in earth material

conditions that may occur in intermediate and unexplored areas. Any unusual conditions not covered in this report that may be encountered during site development should be brought to the attention of the **HGI** so that we may make modifications, if necessary.

CHANGE IN SCOPE

HGI should be advised of any changes in the project scope of proposed site grading so that it may be determined if recommendations contained herein are valid. This should be verified in writing or modified by a written addendum.

TIME LIMITATIONS

The findings of this report are valid as of this date. Changes in the condition of a property can, however, occur with the passage of time, whether they be due to natural processes or the work of man on this or adjacent properties. In addition, changes in the State-of-the-Art and/or government codes may occur. Due to such changes, the findings of this report may be invalidated wholly or in part by changes beyond our control. Therefore, this report should not be relied upon after a period of two (2) years without a review by **HGI** verifying the validity of the conclusions and recommendations.

PROFESSIONAL STANDARD

In the performance of our professional services, we comply with the standard of care and skill ordinarily exercised under similar circumstances by members of the geologic / geotechnical professions currently practicing under similar conditions and in the same locality. The client recognizes that subsurface conditions may vary from those encountered at the locations where our surveys and exploratory excavations were made, and that our data, interpretations, and recommendations are based solely on information obtained by us. We will be responsible for those data, interpretations, and recommendations, but should not be responsible for

interpretations by others of the information presented and/or developed. Our services consist of professional consultation and observation only, and other warranties, expressed or implied, are not made or intended in connection with work performed by HGI or by the proposal for consulting or other services or by the furnishing of oral or written reports or findings.

CLIENT'S RESPONSIBILITY

It is the responsibility of the client and/or the client's representatives to ensure that information and recommendations contained herein are brought to the attention of the Engineers and Architect for the project and incorporated into project plans and specifications. It is further their responsibility to take measures so that the contractor and his subcontractors carry out such recommendations during construction.

APPENDIX A

FIELD EXPLORATION

The field study performed for this report included a visual reconnaissance of existing surface conditions of the subject site and surrounding area. Site observations were conducted on November 10, 2017 by a representative of **HGI**.

A study of the property's subsurface condition was performed to evaluate underlying earth strata and the presence of groundwater. Three (3) exploratory borings were performed on the subject site on November 10, 2017. Locations of the exploratory excavations were determined in the field by pacing, tape measuring, and sighting from the adjacent existing streets, Joshua Trees, and topographic features as shown on the Reference No. 2, 'Land Title Survey,' noted on the first page of the cover letter for this report. Approximate locations of the exploratory excavations are denoted on the 'Exploratory Excavation Location Plan,' Plate No. 1, presented in this Appendix. Approximate elevations at the locations of the exploratory excavations were determined by interpolation to the closest foot from a two foot contour interval topographic plot of the site (Reference No. 2 noted on the first page of the cover letter for this report). Locations and elevations of the exploratory excavations should be considered accurate only to the degree implied by the method used in determining them.

The exploratory borings were performed by using a truck-mounted drill rig equipped with 8-inch outside-diameter, hollow-stem augers. The exploratory excavations were explored to depths ranging from approximately 21.5 to 20.5 feet below existing ground surface at the excavation locations. Bulk and relatively undisturbed samples of encountered earth materials were obtained at various depths in the exploratory excavations and returned to our laboratory for testing and verification of field classifications. Bulk samples were obtained from cuttings developed during the excavation process and represent a mixture of earth

materials within the depth indicated on the logs. Relatively undisturbed samples of encountered earth materials were obtained by driving a thin-walled, steel sampler lined with 1-inch high, 2.416-inch inside diameter brass rings. The sampler was driven with successive drops of a 140-pound weight having a free fall of approximately 30 inches. Blow counts for each successive 6.0 inches of penetration, or fraction thereof, are shown on the 'Subsurface Exploration Log,' Plate Nos. 3 through 5, presented in this Appendix. Ring samples were retained in close-fitting moisture-proof containers and returned to our laboratory for testing. Standard Penetration Tests were also performed at various depths in the borings. The test was performed in general accordance with current American Society of Testing Materials (ASTM) D1586 procedures using a standard penetration sampler (2.0-inch outside diameter, 1.375-inch inside diameter) driven with a 140 weight dropping 30 inches. The blow counts to drive the sampler for three (3) successive 6.0 inch intervals are recorded on the 'Subsurface Exploration Log,' Plate Nos. 3 through 5, presented in this Appendix. The standard penetration resistance ('N' value) is the sum of the blow counts for the last two (2) 6.0 inch intervals.

Groundwater observations were made during, and at the completion of the excavation process and are noted on the 'Subsurface Exploration Log' presented in this Appendix, if encountered.

The exploratory excavations were logged by a representative of **HGI** for earth materials and subsurface conditions encountered. Earth materials encountered in the exploratory excavations were visually described in the field in general accordance with the current Unified Soils Classification System (USCS), ASTM D2488, visual-manual procedures, as illustrated on the attached, simplified 'Subsurface Exploration Legend,' Plate No. 2, presented in this Appendix. The visual textural description, color of the earth material at natural moisture content, apparent moisture condition of the earth materials, and apparent relative density

or consistency of the earth materials, etc., were recorded on the field logs. The 'Relative Density' of granular soils (SP, SW, SM, SC, GP, GW, GM, GC) is given as very loose, loose, medium dense, dense, or very dense and is based on the number of blows to drive the sampler 1.0 foot or fraction thereof. The 'Consistency' of silts or clays (ML, CL, MH, CH) is given as very soft, soft, medium stiff, stiff, very stiff, or hard and is also based on the number of blows to drive the sampler 1.0 foot or fraction thereof. The field log for each excavation contains factual information and interpretation of earth material conditions between samples. The 'Subsurface Exploration Log' presented in this Appendix represent our interpretation of the field log contents and results of laboratory observations and tests performed on samples obtained in the field from the exploratory excavations.

LABORATORY TESTING PROGRAM

Laboratory tests were performed on selected, relatively undisturbed ring and bulk samples obtained from exploratory excavations during the field study. Tests were performed in general accordance with generally accepted American Society for Testing and Materials (ASTM), State of California - Department of Transportation (CALTRANS), Environmental Protection Agency (EPA) or other suitable test methods or procedures. The remaining samples obtained during the field study will be discarded 30 days after the date of this report. This office should be notified immediately if retention of samples will be needed beyond 30 days. A brief description of the tests performed is presented below:

CLASSIFICATION

The field classification of earth material materials encountered in the exploratory excavations was verified in the laboratory in general accordance with the current Unified Soils Classification System, ASTM D2488, 'Standard Practice for Determination and Identification of Soils (Visual-Manual Procedures).' The final classification is shown on the 'Subsurface Exploration Log,' Plate Nos. 3 through 5, presented in this Appendix.

IN-SITU MOISTURE CONTENT AND DRY DENSITY

The in-situ moisture content and dry density were determined in general accordance with current ASTM D2216 (Moisture Content) and procedures, respectively, for selected undisturbed samples obtained. This information was an aid to classification and permitted recognition of variations in material consistency with depth. The dry density is determined in pounds per cubic foot and the moisture content is determined as a percentage of the oven dry weight of the earth material. Test results are shown on the 'Subsurface Exploration Log,' Plate Nos. 3 through 5, presented in this Appendix.

EXPANSION TEST

A laboratory expansion test was performed on a selected sample of near-surface earth material in general accordance with the current ASTM D4829 procedures. In this testing procedure, a remolded sample is compacted in two (2) layers in a 4-inch inside diameter mold to a total compacted thickness of approximately 1.0 inch by using a 5.5-pound weight dropping 12 inches and with 15 blows per layer. The sample should be compacted at a saturation between 48 and 52 percent. After remolding, the sample is confined under a pressure of 144 pounds per square foot (psf) and allowed to soak for 24 hours. The resulting volume change due to the increase in moisture content within the sample is recorded and the Expansion Index (EI) calculated. The test results are summarized in the 'Summary of Laboratory Test Results,' Plate No. 6, presented in this Appendix.

SOLUBLE SULFATE TEST

The concentration of soluble sulfate was determined on a selected sample of near-surface earth material in general accordance with current EPA 300.0 procedures. The test results are summarized in the 'Summary of Laboratory Test Results,' Plate No. 6, presented in this Appendix.

SIEVE ANALYSIS

The percent by weight finer than a No. 200 sieve (silt and clay content) was determined for a selected sample of earth material in general accordance with current ASTM D1140 procedures. The test is performed by taking a known weight of an oven dry sample of earth material, washing it over a No. 200 sieve, and oven drying the earth material retained on the No. 200 sieve. The dry weight of earth material retained on the No. 200 sieve is measured and the resulting percentage retained is calculated based on the original total dry earth material sample weight. The percent passing the No. 200 sieve is determined by subtracting the percent

retained from 100. The test results are summarized in the 'Summary of Laboratory Test Results,' Plate No. 7, presented in this Appendix.

CHEMICAL AND MINIMUM ELECTRICAL RESISTIVITY

The concentration of soluble chloride, pH, as well as other chemical constituents and the minimum electrical resistivity were determined for a selected sample of near-surface earth material. The pH test was performed in general accordance with current ASTM D4972 procedures. The test results are summarized in the 'Summary of Laboratory Test Results,' Plate No. 7, presented in this Appendix.

CONSOLIDATION TESTS

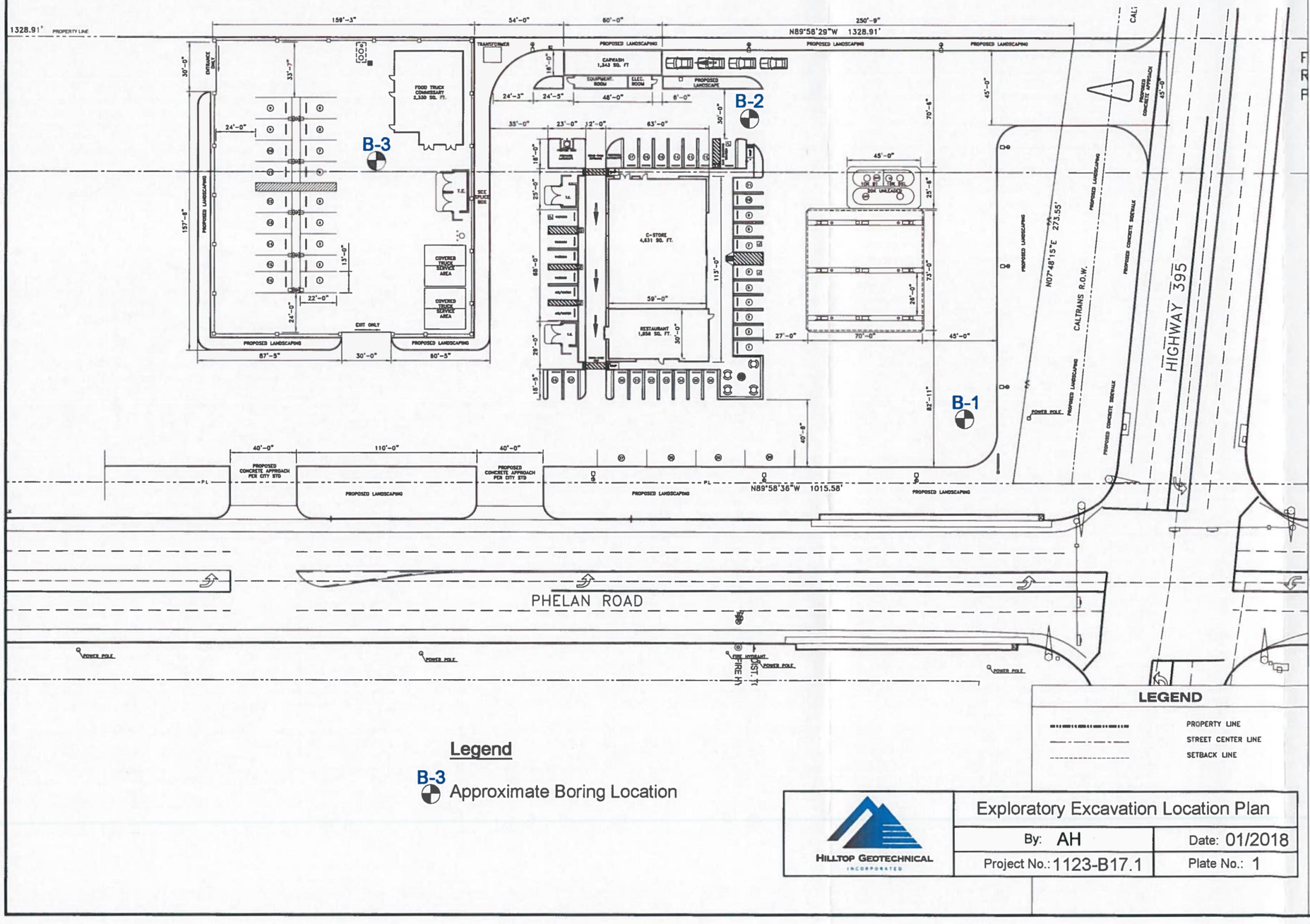
Hydroconsolidation or the Collapse Potential, I_C, of the on-site earth material behavior under load were made on the basis of consolidation tests that were performed on selected relatively undisturbed ring samples of the alluvial soils in general accordance with current ASTM D5333 procedures. The consolidation apparatus is designed to receive a 1-inch high, 2.416-inch diameter ring sample. Porous stones are placed in contact with the top and bottom of each specimen to permit addition and release of pore water. A load of 1,600 pounds per square foot (psf) was applied normal to the face of the specimen at field moisture condition and the sample was allowed to consolidate. Upon completion of the consolidation process, water was added to the test apparatus to create a submerged condition and to measure the collapse (hydroconsolidation) or expansion potential of the sample. The resulting change in sample thickness was recorded. The test results are summarized in the 'Summary of Laboratory Test Results,' Plate No. 8, presented in this Appendix.

MAXIMUM DRY DENSITY / OPTIMUM MOISTURE CONTENT RELATIONSHIP TEST

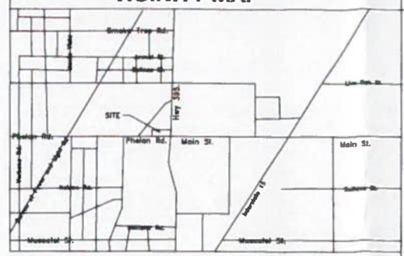
A maximum dry density / optimum moisture content relationship determination was performed on a sample of near-surface earth material in general accordance with current ASTM D1557 procedures using a 4-inch diameter mold. Samples were prepared at various moisture contents and compacted in five (5) layers using a 10-pound weight dropping 18 inches and with 25 blows per layer. A plot of the compacted dry density versus the moisture content of the specimens was constructed and the maximum dry density and optimum moisture content determined from the plot. The test results are summarized in the 'Maximum Dry Density / Optimum Moisture Content Relationship Test Results,' Plate No. 9, presented in this Appendix.

NORTH

SCALE: 1"=30'



VICINITY MAP



SITE PLAN NOTES

1. EXISTING CATCH BASIN TO BE DEMOLISHED (TYP. OF 2)
2. CONCRETE SIDEWALK TO BE DEMOLISHED
3. EXISTING AC BERM TO BE DEMOLISHED
4. POWER POLE TO BE REMOVED
5. STREET LIGHT TO BE RELOCATED
6. NEW CATCH BASIN (TYP. OF 2)
7. PROPOSED SIDEWALK WITH 8" CURB AND 18" GUTTER
8. PROPOSED ADA ACCESSIBLE RAMPS WITH TRUNCATED DOMES.
9. INSTALL NEW RETAINING WALLS
10. PROPOSED 45'-0" CONCRETE DRIVE APPROACH PER CALTRANS STANDARDS
11. PROPOSED 40'-0" CONCRETE DRIVE APPROACH (TYP. OF 2) PER CITY STANDARDS.
12. INSTALL 6" HIGH CONCRETE LANDSCAPE CURB
13. INSTALL 6" HIGH CONCRETE LANDSCAPE CURB WITH 18" GUTTER
14. LANDSCAPE AND IRRIGATION AREA.
15. 12" WIDE CONC. STRIP (TYP).
16. 20'-0" HIGH MOUNTED YARD LIGHTS, ON 2' HIGH CONCRETE BASE. (TYP. OF X)
17. MONUMENT SIGN WITH CORPORATE LOGO AND FUEL PRICING. (SEE SHEET SN1)
18. INSTALL A.C. PAVING
19. INSTALL CONCRETE SLABS
20. 25'-6" X 42'-0" REINFORCED CONCRETE TANK SLAB.
21. 154'-6" X 45'-0" REINFORCED CONCRETE DRIVE SLAB.
22. 152'-6" X 43'-0" METAL CANOPY WITH 4 METAL CANOPY COLUMNS.
23. (1) 20,000 GALLON UNDERGROUND STORAGE TANKS AND (1) 20,000 GALLON SPLIT TANK, 10,000/10,000 WITH ALL ASSOCIATED PIPING AND FUEL SYSTEM COMPONENTS.
24. INSTALL EMERGENCY SHUT OFF SWITCH WITH AUDIO/VISUAL ALARM
25. PROPOSED 6" HIGH CONCRETE FUEL ISLANDS (TYP. OF 8)
26. INSTALL MULTI-PRODUCT FUEL DISPENSERS WITH REQUIRED UNDER GROUND CONTAINMENT, ASSOCIATED PIPING AND FUEL SYSTEM MONITORING EQUIPMENT (TYP. OF 8) (FUEL SYSTEM IS UNDER SEPARATE PERMIT)
27. INSTALL WINDOW/TRASH AMENITY UNIT (TYP. OF 8)
28. PROPOSED 6" DIAMETER, CONCRETE FILLED METAL BOLLARD TYPICAL
29. STRIPED 9'-0" x 18'-0" PARKING STALLS (TYP OF XX).
30. STRIPED 10'-0" X 18'-0" CAR CHARGING STATION ACCESSIBLE PARKING STALL WITH 5'-0" X 18'-0" LOADING ZONE
31. STRIPED 9'-0" X 18'-0" VAN ACCESSIBLE PARKING STALL WITH A 8'-0" X 18'-0" LOADING ZONE. (TYP. OF)
32. INSTALL ADA COMPLIANT PARKING SIGNAGE TO BE POLE MOUNTED OR WALL MOUNTED BASED ON CONDITIONS. (TYP. OF) SEE SHEET DETAIL
33. CAR CHARGING UNIT ON A CONCRETE SLAB
34. VEHICLE VACUUM UNITS MOUNTED ON A CONCRETE SLAB
35. AIR AND WATER UNIT MOUNTED ON CONCRETE SLAB
36. (N) 500 GALLON PROPANE TANK (TYP. OF)
37. 200 SF. CMU BLOCK TRASH ENCLOSURE WITH MTL ROOF AND A 10'-0" X 10'-0" CONCRETE APRON. SEE SHEET FOR ELEVATIONS
38. XXX SF. CMU BLOCK TRASH ENCLOSURE WITH MTL ROOF AND A 10'-0" X 10'-0" CONCRETE APRON. SEE SHEET FOR ELEVATIONS
39. STRIPED 10'-0" X 30'-0" RV PARKING STALL (TYP. OF 3)
40. STRIPED 10'-0" X 20'-0" FOOD TRUCK STALL (TYP).
41. 4,755 SF CONVENIENCE STORE WITH 1,304 SF RESTAURANT.
42. MENU BOARD, SEE SHEET FOR ELEVATIONS
43. 1,343 SF. CMU BLOCK CAR WASH, WITH SEPARATE EQUIPMENT AND ELECTRICAL ROOMS. SEE SHEET FOR ELEVATIONS
44. CAR WASH ELECTRONIC PAY POINT/KEY PAD ON 3-1/2" THICK 24" X 24" CONCRETE SLAB
45. CAR WASH DIGITAL TIMER DISPLAY FOR DRYER EQUIPMENT ON 3-1/2" THICK 36" X 36" CONCRETE SLAB
46. CONCRETE PICNIC AREA WITH WATER FEATURE AND WRAP AROUND WIND PROTECTIVE GLASS.
47. – FT. HIGH BLOCK FENCE WALL
48. 2,330 SF. FOOD TRUCK COMMISSARY
49. METAL SERVICE CANOPY AREA ON SLOPED CONCRETE SLAB WITH TRENCH DRAIN. SERVICES INCLUDE: HOT WATER FOR WASH DOWNS AND COLD POTABLE WATER
50. GREASE INTERCEPTOR
51. 2'-0" WIDE CONCRETE SWALE WITH CATCH BASIN
52. 8'-0" HIGH WROUGHT IRON FENCE WITH (2) TWO AUTOMATIC GATES
53. PROPOSED LOCATION FOR SCE TRANSFORMER

LEGEND

- PROPERTY LINE
- STREET CENTER LINE
- SETBACK LINE

Legend

B-3 Approximate Boring Location

Exploratory Excavation Location Plan	
By: AH	Date: 01/2018
Project No.: 1123-B17.1	Plate No.: 1

HILLTOP GEOTECHNICAL INCORPORATED

HEADY DESIGN INC.
7365 Carnelian St. Suite 239
Rancho Cucamonga, CA 91730
Phone: (909) 581-1202
Email: hheady@headydesign.com

SERVICE STATION
NW C. PHELAN RD & HIGHWAY 395
HESPERIA, CA 92344

CONCEPTUAL SITE PLAN

Rev. #	Date	Revision Description

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JOB NO:	PPB-001
DRAWN BY:	TS
DATE:	1/23/18
SCALE:	1"=30'

DRAWING: SP1

Drawing: L:\Job-DATA\PPB Files\PPB Projects 2018\PPB-001 - Hesperia\Drawings\1-Preliminary\PPB-001 SP1-SITE PLAN.dwg PPB-001-SP1 SITE PLAN
Last Modified: Jan. 23, 18 - 10:51

SUBSURFACE EXPLORATION LEGEND

UNIFIED SOIL CLASSIFICATION SYSTEM Visual-Manual Procedure (ASTM D2488-09a)					CONSISTENCY / RELATIVE DENSITY
MAJOR DIVISIONS			GROUP SYMBOLS	TYPICAL NAMES	CRITERIA
Coarse-Grained Soils* More than 50 % Retained on No. 200 Sieve	Gravels 50 % or more of Coarse Fraction Retained on No. 4 Sieve	Clean Gravels	GW	Well Graded Gravels and Gravel-Sand Mixtures, Little or no Fines	Reference: 'Foundation Engineering', Peck, Hansen, Thornburn, 2nd Edition.
			GP	Poorly Graded Gravels and Gravel-Sand Mixtures, Little or no Fines	Standard Penetration Test, Granular Soils
		Gravels with Fines	GM	Silty Gravels, Gravel-Sand-Silt Mixtures**	Penetration Resistance, N, (Blows / Foot) / Relative Density
			GC	Clayey Gravel, Gravel-Sand-Clay Mixtures**	0 - 4 Very Loose
	Sands More than 50 % of Coarse Fraction Passes No. 4 Sieve	Clean Sands	SW	Well Graded Sands and Gravely Sands, Little or no Fines	5 - 10 Loose
			SP	Poorly Graded Sands and Gravelly Sands, Little or no Fines	11 - 30 Medium Dense
		Sands with Fines	SM	Silty Sands, Sand-Silt Mixtures**	31 - 50 Dense
			SC	Clayey Sands, Sand-Clay Mixtures**	> 50 Very Dense
Fine Grained Soils* 50 % or more Passes No. 200 Sieve	Silts and Clays Liquid Limits 50 % or less		ML	Inorganic Silts, Sandy Silts, Rock Flour	Standard Penetration Test, Cohesive Soils
			CL	Inorganic Clays of Low to Medium Plasticity, Gravelly Clays, Sandy Clays, Silty Clays, Lean Clays	Penetration Resistance, N, (Blows / Foot) / Consistency / Unconfined Compressive Strength, (Tons / Sq. Ft.)
			OL	Organic Silts and Organic silty Clays of Low Plasticity	< 2 Very Soft < 0.25
	Silts and Clays Liquid Limits Greater than 50 %		MH	Inorganic Silts, Micaceous or Diatomaceous silts, Plastic Silts	2 - 4 Soft 0.25 - 0.5
			CH	Inorganic Clays of High Plasticity, Fat Clays	5 - 8 Firm (Medium Stiff) 0.5 - 1.0
			OH	Organic Clays of Medium to High Plasticity	9 - 15 Stiff 1.0 - 2.0
					16 - 30 Very Stiff 2.0 - 4.0
Highly Organic Soils			PT	Peat, Muck, or Other Highly Organic Soils	> 31 Hard > 4.0

* Based on material passing the 3-inch sieve.

** More than 12% passing the No. 200 sieve; 5% to 12% passing No. 200 sieve requires use of duel symbols (i.e., SP-SM., GP-GM, SP-SC, GP-GC, etc.); Border line classifications are designated as CH/Cl, GM/SM, SP/SW, etc.

U.S. Standard Sieve Size 12" 3" 3/4" #4 #10 #40 #200

Unified Soil Classification Designation	Boulders	Cobbles	Gravel		Sand			Silt and Clay
			Coarse	Fine	Coarse	Medium	Fine	

Moisture Condition

Dry	Absence of moisture, dusty, dry to the touch.
Moist	Damp but no visible moisture.
Wet	Visible free water, usually below the water table.

Material Quantity

Trace	< 5 %
Few	5 - 10%
Little	15 - 25%
Some	30 - 45 %

Other Symbols

C - Core Sample
S - SPT Sample
B - Bulk Sample
CK - Chunk Sample
R - Ring Sample
N - Nuclear Gauge Test
∇ - Water Table

HILLTOP GEOTECHNICAL INCORPORATED

(Revised 11-23-2015)

Plate No. 2

HILLTOP GEOTECHNICAL INCORPORATED

SUBSURFACE EXPLORATION LOG
BORING NO. B-1

Project Name:	Proposed Convenience Store and Food Truck Commissary, Hesperia				
Project No.	1123-B17.1	Date:	10/10/2017	Logged By:	AH
Type of Rig:	Hollow-Stem Auger	Drive Wt.:	140 lb	Elevation:	± 3572
Drill Hole Dia.:	8 in.	Drop:	30 in.	Depth of Boring (ft.):	21.5

Depth (ft.)	Sample Type	Penetration Resistance	Soil Classification	Dry Density (lb/ft3)	Moisture Content (%)	Lithology	Groundwater	Description
0	R/B	6	SM			Qyf3		YOUNG ALLUVIAL FAN DEPOSIT:
1		3						Silty fine sand, trace medium sand; Light brown; Moist; Very loose.
		3		104.2	0.7			
2								
3	S	3						Sample slightly porous.
		2						
4		3						
5			SM					Silty fine to coarse sand; Orange brown; Moist; Medium dense to Loose.
	R	6						
6		7						
		9		112.1	4.0			
7								
8	S	3						Trace gravel.
		4						
9		8						
10			SP					Fine to coarse sand, trace gravel, trace silt; Red brown; Moist; Medium dense.
	R	8						
11		11						
		14		112.2	3.0			
12								
			SC			Qvof		VERY OLD ALLUVIAL FAN DEPOSIT:
13	S	22						Clayey fine to coarse sand, trace caliche; Red brown; Moist; Very dense.
		42						
14		15						
15								
	R	27						
16		28						
		50/5"						
17								
18								
19			SC/SM					Slighlty silty clayey fine to coarse sand, trace caliche; Red brown; Moist; Dense.
20								
	S	17						
21		13						
		18						
22								Bottom of boring at 21.5 feet.
								No groundwater encountered.
23								Boring backfilled with excavated material.
24								
25								

S - SPT Sample R - Ring Sample B - Bulk Sample N - Nuclear Gauge Test D - Disturbed Sample

N.R. - No Recovery

Plate No. 3

HILLTOP GEOTECHNICAL INCORPORATED

SUBSURFACE EXPLORATION LOG
BORING NO. B-2

Project Name:	Proposed Convenience Store and Food Truck Commissary, Hesperia				
Project No.	1123-B17.1	Date:	10/10/2017	Logged By:	AH
Type of Rig:	Hollow-Stem Auger	Drive Wt.:	140 lb	Elevation:	± 3571
Drill Hole Dia.:	8 in.	Drop:	30 in.	Depth of Boring (ft.):	50.5

Depth (ft.)	Sample Type	Penetration Resistance	Soil Classification	Dry Density (lb/ft3)	Moisture Content (%)	Lithology	Groundwater	Description
1	S	1 2 2	SM			Qyf3		YOUNG ALLUVIAL FAN DEPOSIT: Silty fine to medium sand trace coarse sand; Light brown; Moist; Very loose to medium dense.
3	R	7 7 12		106.2	2.9			sample slightly porous, trace gravel.
5	S	6 7 7	SM					Silty fine to coarse sand; Orange brown; Moist; Medium dense to Dense.
8	R	16 24 28		121.6	3.4			Trace gravel, cemened.
10	S	9 14 20	SP/SM					Slightly silty fine to coarse sand, trace gravel; Red brown; Moist; Medium dense.
13	R	24 19 23	SC			Qvof		VERY OLD ALLUVIAL FAN DEPOSIT: Clayey fine to coarse sand; Red brown; Moist; Medium dense to very Dense. Sample had appearance of old desert varnish.
15	S	44 27 32						Trace silt.
19			SP/SM					Slightly silty fine to coarse sand; Red brown; Moist; Dense.
20	R	15 24 30						

S - SPT Sample R - Ring Sample B - Bulk Sample N - Nuclear Gauge Test D - Disturbed Sample

N.R. - No Recovery

Plate No. 4a

HILLTOP GEOTECHNICAL INCORPORATED

SUBSURFACE EXPLORATION LOG
BORING NO. B-2

Project Name:	Proposed Convenience Store and Food Truck Commissary, Hesperia				
Project No.	1123-B17.1	Date:	10/10/2017	Logged By:	AH
Type of Rig:	Hollow-Stem Auger	Drive Wt.:	140 lb	Elevation:	± 3571
Drill Hole Dia.:	8 in.	Drop:	30 in.	Depth of Boring (ft.):	50.5

Depth (ft.)	Sample Type	Penetration Resistance	Soil Classification	Dry Density (lb/ft3)	Moisture Content (%)	Lithology	Groundwater	Description
26	S	10 13 14	SP/SM			Qvof		VERY OLD ALLUVIAL FAN DEPOSIT: Slightly silty fine to coarse sand; Red brown to light brown; Moist; Medium dense to dense.
30	R	22 24 28						Slightly cemented.
35	S	17 17 21						
40	R	15 26 32						Trace thin lenses of silt and silty fine sand, thickness of thickest layer 2".
45	S	15 16 18						
48			SC					Clayey fine to coarse sand; Red brown; Moist; Very dense.

S - SPT Sample R - Ring Sample B - Bulk Sample N - Nuclear Gauge Test D - Disturbed Sample

N.R. - No Recovery

Plate No. 4b

SUBSURFACE EXPLORATION LOG
BORING NO. B-2

HILLTOP GEOTECHNICAL INCORPORATED

Project Name:	Proposed Convenience Store and Food Truck Commissary, Hesperia				
Project No.	1123-B17.1	Date:	10/10/2017	Logged By:	AH
Type of Rig:	Hollow-Stem Auger	Drive Wt.:	140 lb	Elevation:	± 3571
Drill Hole Dia.:	8 in.	Drop:	30 in.	Depth of Boring (ft.):	50.5

Depth (ft.)	Sample Type	Penetration Resistance	Soil Classification	Dry Density (lb/ft3)	Moisture Content (%)	Lithology	Groundwater	Description
51	R	50/5"	SC			Qvof		VERY OLD ALLUVIAL FAN DEPOSIT: Clayey fine to coarse sand; Red brown; Moist; Very dense. Bottom of boring at 50.5 feet. No groundwater encountered. Boring backfilled with excavated material.
52								
53								
54								
55								
56								
57								
58								
59								
60								
61								
62								
63								
64								
65								
66								
67								
68								
69								
70								
71								
72								
73								
74								
75								

S - SPT Sample R - Ring Sample B - Bulk Sample N - Nuclear Gauge Test D - Disturbed Sample

N.R. - No Recovery

Plate No. 4c

HILLTOP GEOTECHNICAL INCORPORATED

SUBSURFACE EXPLORATION LOG
BORING NO. B-3

Project Name:	Proposed Convenience Store and Food Truck Commissary, Hesperia				
Project No.	1123-B17.1	Date:	10/10/2017	Logged By:	AH
Type of Rig:	Hollow-Stem Auger	Drive Wt.:	140 lb	Elevation:	± 3571
Drill Hole Dia.:	8 in.	Drop:	30 in.	Depth of Boring (ft.):	21.5

Depth (ft.)	Sample Type	Penetration Resistance	Soil Classification	Dry Density (lb/ft3)	Moisture Content (%)	Lithology	Groundwater	Description
1	R	3 4 4	SM	98.8	0.8	Qyf3		YOUNG ALLUVIAL FAN DEPOSIT: Silty fine to medium sand trace gravel, trace thin rootlets; Light brown; Moist; Loose.
2								
3	S	3 5 8						
4								
5			SP/SM					Slightly silty fine to coarse sand, trace gravel; Orange brown; Moist; Medium dense to loose.
6	R	10 10 10		104.3	3.5			
7								
8	S	2 3 5						
9								
10	R	6 8 9		103.5	2.1			
11								
12			SC			Qvof		VERY OLD ALLUVIAL FAN DEPOSIT: Clayey fine to coarse sand, trace caliche; Red brown; Moist; Dense.
13	S	13 19 24						
14								
15	R	16 16 27						
16								
17								
18								
19								
20	S	18 19 19						
21								
22								Bottom of boring at 21.5 feet. No groundwater encountered. Boring backfilled with excavated material.
23								
24								
25								

S - SPT Sample R - Ring Sample B - Bulk Sample N - Nuclear Gauge Test D - Disturbed Sample

N.R. - No Recovery

Plate No. 5

SUMMARY OF LABORATORY TEST RESULTS

EXPANSION INDEX TEST RESULTS (ASTM D4829 Test Method)						
SAMPLE NO.	MOISTURE CONTENT PRIOR TO TEST (to 0.1%)	DRY DENSITY PRIOR TO TEST (to 0.1 pcf)	SATURATION PRIOR TO TEST (to 0.1% between 48% & 52%)*	MOISTURE CONTENT AFTER TEST (to 0.1%)	EXPANSION INDEX	EXPANSION POTENTIAL**
B-1, 0.0'-4.0'	7.7	118.0	48.6	12.0	0	Non-Expansive

* Assumes a 2.70 Specific Gravity for the earth material.
** As defined in Section 1803.5.3, 'Expansive Soil,' in the 2016 California Building Code (CBC) (i.e., Non-Expansive: EI ≤20; Expansive: EI >20).

SOLUBLE SULFATE TEST RESULTS (EPA 300.0 Test Procedure)*		
SAMPLE	SOLUBLE SULFATE CONTENT (%)	CLASS**
B-1, 0.0'-4.0'	<0.0010	S0

* Test performed by **A & R Laboratories.**
** Per Table 19.3.1.1, 'Exposure Categories and Classes,' in **American Concrete Institute (ACI)** 318-14.
*** ND - Not Detected (Reportable Detection Limit (>10 ppm = 0.0010%)

PLATE NO. 6

HILLTOP GEOTECHNICAL, INC.

SUMMARY OF LABORATORY TEST RESULTS

PERCENT PASSING #200 SIEVE TEST RESULTS (ASTM D1140 Test Method)		
SAMPLE	EARTH MATERIAL DESCRIPTION	PERCENT PASSING #200 SIEVE
B-1, 0.0'-4.0'	Silty fine sand, trace medium sand; Light brown (SM)	27

CHEMICAL / MINIMUM ELECTRICAL RESISTIVITY TEST RESULTS				
SAMPLE	RESISTIVITY Minimum (ohm-cm)	pH*	SULFIDE	CHLORIDE (ppm)**
B-1, 0.0'-4.0'	18,747	6.89	Neg.***	<10

* Test performed in accordance with ASTM D4972 procedures.
** Test performed by **A & R Laboratories** in accordance with EPA 300.0 procedures.
*** Neg. - Negative.
**** ND - Not Detected (Reportable Detection Limit (>10ppm = 0.0010%).

PLATE NO. 7

HILLTOP GEOTECHNICAL, INC.

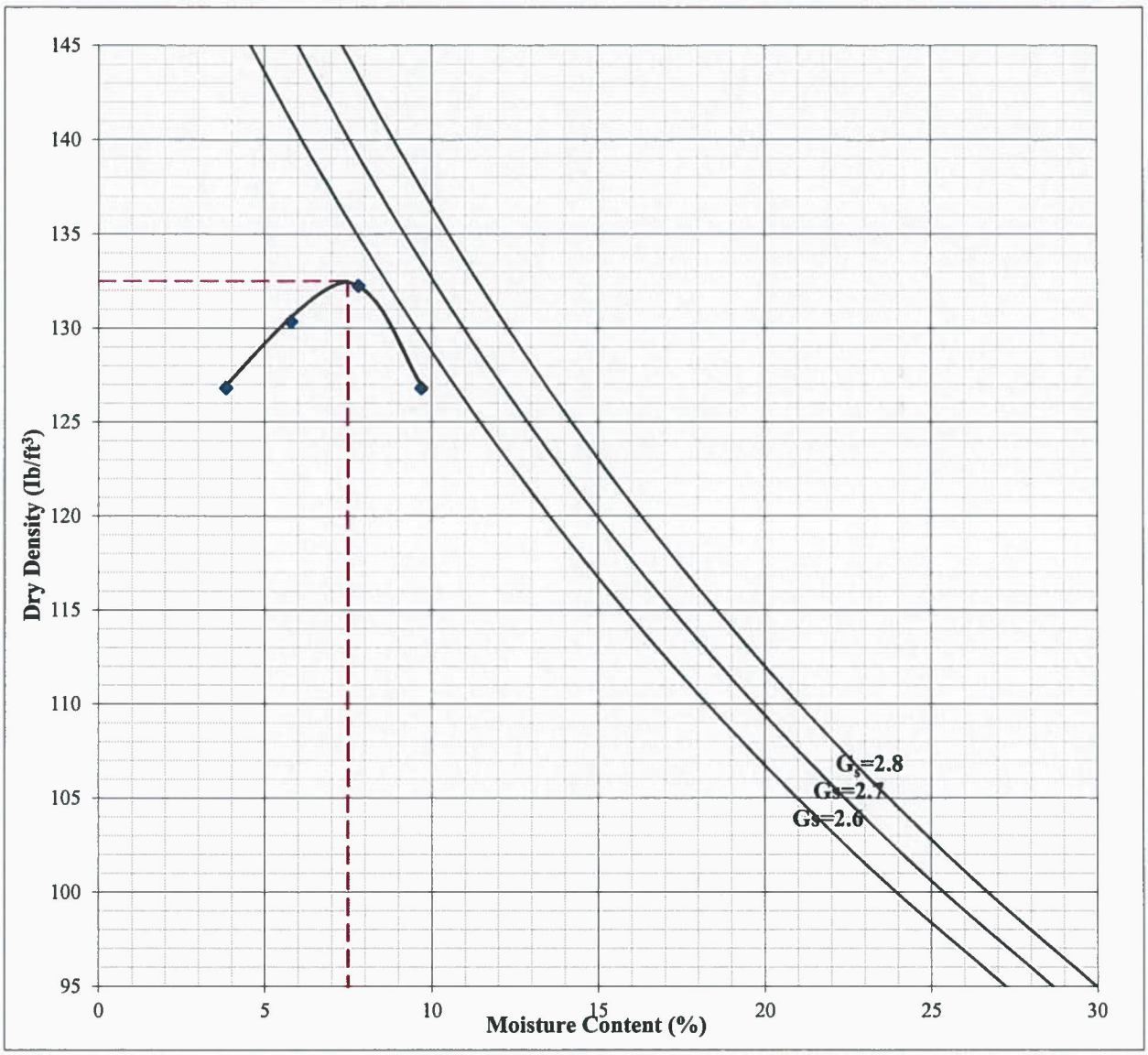
SUMMARY OF LABORATORY TEST RESULTS

COLLAPSE POTENTIAL TEST RESULTS (ASTM D5333 Test Method)				
SAMPLE	SETTLEMENT AT 1,600 PSF LOAD (%)	COLLAPSE / SWELL* (%)	COLLAPSE INDEX, (I_C), (%)	DEGREE OF COLLAPSE **
B-2, 2.5'	1.4	5.0	5.0	Moderate
B-3, 5.0'	2.1	5.0	5.0	Moderate

* Percent collapse (-) or swell (+) measured when water added at 1,600 psf load during test procedure.

** Per Table 1, 'Classification of Collapse Index, I_C,' in ASTM Standard Test Method D5333-03.

None - 0%
Slight - 0.1 - 2.0%
Moderate - 2.1 - 6.0%
Moderately Severe - 6.1 - 10.0%
Severe - >10.0%



Maximum Dry Density (lb/ft^3)	132.5
Optimum Moisture Content (%)	7.5
Procedure	A

HILLTOP GEOTECHNICAL
INCORPORATED

MAXIMUM DRY DENSITY / OPTIMUM MOISTURE CONTENT RELATIONSHIP TEST RESULTS (ASTM D1557 Test Method)

SAMPLE: B-1, 0.0'-4.0'			
SOIL DESCRIPTION:	Silty fine sand, trace medium sand; Light brown (SM)		
BY: SS		DATE:	11/2017
JOB NO.: 1123-B17.1		PLATE NO.:	9

APPENDIX B

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ATTACHMENT E: INFILTRATION FEASIBILITY STUDY

REPORT OF INFILTRATION FEASIBILITY STUDY
FOR A PROPOSED STORMWATER RETENTION CHAMBER
PROPOSED SERVICE STATION AND CONVENIENCE STORE
12050 PHELAN ROAD
HESPERIA, CA 92344

PROJECT NO.: 1699-01

REPORT NO.: 2

FEBRUARY 24, 2025

SUBMITTED TO:

PLAZA STREET PARTNER

3400 COLLEGE BOULEVARD, SUITE 200

LEEWOOD, KS 66211

PREPARED BY:

HILLTOP GEOTECHNICAL, INC.

786 SOUTH GIFFORD AVENUE

SAN BERNARDINO, CA 92408

HILLTOP GEOTECHNICAL
INCORPORATED

786 S. GIFFORD AVENUE • SAN BERNARDINO • CA 92408
Phone **909-890-9079** • FAX 909-890-9055
hilltopg@hgeotech.com

February 24, 2025
Project No.: 1699-01
Report No.: 2

Plaza Street Partners
3400 College Boulevard, Suite 200
Leewood, KS 66211
Attention: Mylena Oliveira, Senior Project Coordinator

Subject: **Report of Infiltration Feasibility Study for a Proposed Stormwater Retention Chamber, Proposed Service Station and Convenience Store, 12050 Phelan Road, Hesperia, CA 92344.**

References: 1. **Hilltop Geotechnical, Inc.** January 29, 2018, *Report of Preliminary Geotechnical/Geologic Study, Proposed Service Station, Convenience Store and Food Truck Commissary, Northwest Corner of Phelan Road and Highway 395, City of Hesperia, San Bernardino County, California, Project No.: 1123-B17, Report No.: 1.*

2. **Alliance Land Planning & Engineering Inc.**, January 15, 25, *Hesperia Phelan Site Development Plan (Preliminary Grading/Drainage Plan), Sheet Number: SP-1.*

Gentleman,

In accordance with your request, we have performed an infiltration feasibility study for a proposed stormwater retention chamber on the subject property. This infiltration testing was performed in general accordance with Appendix VII Infiltration Rate Evaluation Protocol and Factor of Safety Recommendations issued by the San Bernardino County Dated May 19, 2011.

The findings of this study indicate that the site is suitable for the design of the proposed stormwater retention tank provided the recommendations presented in the attached report are incorporated into the project design and implemented during the project construction.

We appreciate the opportunity of providing geotechnical services on this project. Should you have any questions regarding this submittal, please do not hesitate to contact us.

Respectfully submitted,
HILLTOP GEOTECHNICAL, INC.

S. Mack Chen, P.E. C76834/C.E.G. 2688
Principal Engineer/Geologist

REGISTERED PROFESSIONAL ENGINEER
SHAOFU CHEN
C76834
CIVIL
STATE OF CALIFORNIA

CERTIFIED ENGINEERING GEOLOGIST
Shaofu Chen
2688
STATE OF CALIFORNIA

Attachment:
Plate No. 1, Site Plan and Test Locations
Plate No. 2, Subsurface Exploration Legend
Plate Nos. 3a through 4b, Subsurface Exploration Log
Plate Nos. 5 and 6, Infiltration Data Sheet

Distribution:
(1) Via Email to
Mylena Oliveira <moliveira@plazastreetpartner.com>

LOCATION OF PROJECT SITE 1
SITE CONDITIONS 1
LOCATION OF INFILTRATION SITES 1
SOIL CHARACTERISTICS OF SUBJECT SITE 1
Soil Profile 2
Groundwater 2
INFILTRATION TEST PROCEDURES 2
TEST RESULTS 3
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RECOMMENDATIONS 4
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REPORT OF INFILTRATION FEASIBILITY STUDY
FOR A PROPOSED STORMWATER RETENTION CHAMBER
PROPOSED SERVICE STATION AND CONVENIENCE STORE
12050 PHELAN ROAD
HESPERIA, CA 92344

LOCATION OF THE PROJECT SITE

The subject site is located at 12050 Phelan Road in the City of Hesperia, CA 92344 (**Figure 1**) and is bounded by Phelan Road to the south, Highway 395 to the east, and by vacant lots in other directions. Per the conceptual grading plan provided by the project civil engineer, the proposed infiltration test location was designated on the east portion of the subject site.

SITE CONDITIONS

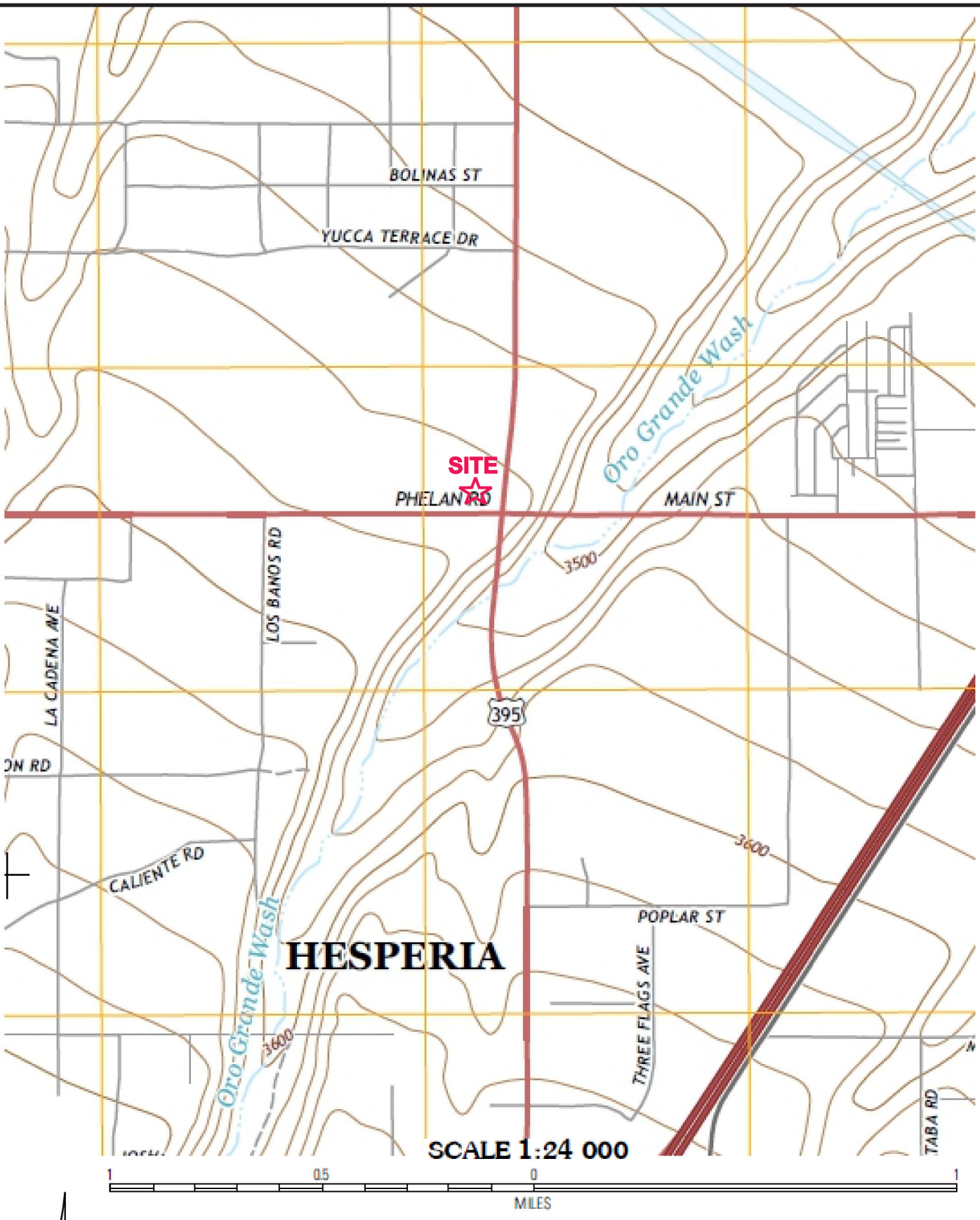
The site was vacant during our field exploration. The site was covered by seasonal grass and native bushes. The approximate infiltration test locations are shown on the 'Site Plan and Test Locations' Plate No. 1.

LOCATION OF INFILTRATION TESTS

Per the conceptual grading plan provided by the project civil engineer, the existing ground surface will be cut down to a maximum of approximately fifteen feet. The bottom of the proposed stormwater chamber will be approximately 21 to 23 feet below the existing ground surface (bgs). Two 8-inch-diameter soil borings were drilled to 25 feet bgs. During a geotechnical investigation conducted by Hilltop Geotechnical, Inc. dated October 10, 2017, one soil boring B-2 was extended to a depth of 50.5 feet bgs by a drill rig. The groundwater was not encountered up to 50.5 feet bgs during our field exploration. The two eight-inch-diameter borings were then converted to infiltration tests by inserting three-inch diameter perforated sleeved PVC pipe. Two inches of gravel were added to the bottom of the borings prior to the perforated pipe placement.

SOIL CHARACTERISTICS OF THE SUBJECT SITE

- The soil characteristics for the subject site are classified as hydrologic soil group A.



Source: Copied from USGS Topo Map-
Baldy Mesa Quadrangle 2015

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SITE LOCATION MAP

12050 Phelan Road, Hesperia, CA 92344

By: MC	Date: 2/2025
Project No.: 1699-01	**Figure No. 1**

- Silty sand was encountered at both test locations.
- The topography of the existing ground surface is planar at the designated test locations. In general, the site is sloping towards the northeast with an average gradient of 3 percent.
- Per the on-site soil conditions, the proposed stormwater retention chamber on the site is feasible.

Soil Profile

The earth materials encountered on the subject site during our field exploration were identified as alluvium.

Alluvium was encountered at both borings from the ground surface to 25 feet bgs mainly consisting of silty fine-medium grained sand, which was dark yellowish brown in color and was medium dense to dense in consistency.

Groundwater

During a geotechnical investigation conducted by Hilltop Geotechnical, Inc. dated October 10, 2017, one soil boring B-2 was extended to a depth of 50.5 feet bgs by a drill rig. The groundwater was not encountered up to 50.5 feet bgs during our field exploration.

INFILTRATION TEST PROCEDURES

a) Test Method: Infiltration testing was conducted in general accordance with deep percolation test method in Appendix VII Infiltration Rate Evaluation Protocol and Factor of Safety Recommendations issued by the San Bernardino County Dated May 19, 2011.

b) Drilling: Two boreholes were approximately eight inches in diameter, drilled by an 8-inch-diameter auger. The infiltration testing was performed in silty sand. After drilling, approximately two inches of gravel was placed at the bottom of the test hole and perforated, and a sleeved three-inch diameter PVC pipe was inserted into each bore hole.

c) Soaking Period: The test holes were pre-soaked by filling each borehole up to 14 to 15 feet bgs on February 21, 2025. Since silty sand exists at the project area, two consecutive measurements showed that six inches of water seeped away in less than 25 minutes, the infiltration testing was conducted on the same day. The test was run for 80 minutes with measurements taken every 10 minutes.

d) Measurement of the infiltration rate: Measurements were taken with a precision of 0.1 inches using a water indicator.

TEST RESULTS

The infiltration rates were converted to infiltration rates using the Porchet Method. The final infiltration rates obtained are presented below in **Table 1**:

Table 1: Final Infiltration Rates

Infiltration Test #	**Tested Infiltration Rate (in/hr)**
PB-1	5.21
PB-2	3.86

DISCUSSION

The rates presented above were generally as anticipated with respect to the on-site soil. The earth materials for the infiltration testing consist mainly of silty sand.

Field infiltration tests are subject to many factors that affect the infiltration rate, including soil texture, the condition of the soil surface, soil-moisture tension or the degree of saturation, the temperature of the water and soil, the percentage of entrapped air in the soil, and the head of the applied water. The infiltration rate in PB-2 was slightly less than that in PB-1. It may be caused by local differences from soil textures.

RECOMMENDATIONS

Based on the San Bernardino County Guidelines, a factor of safety should be applied to the infiltration rates. A factor of safety of two was applied to the rates below in Table 2.

Table 2 Recommended Design Infiltration Rates

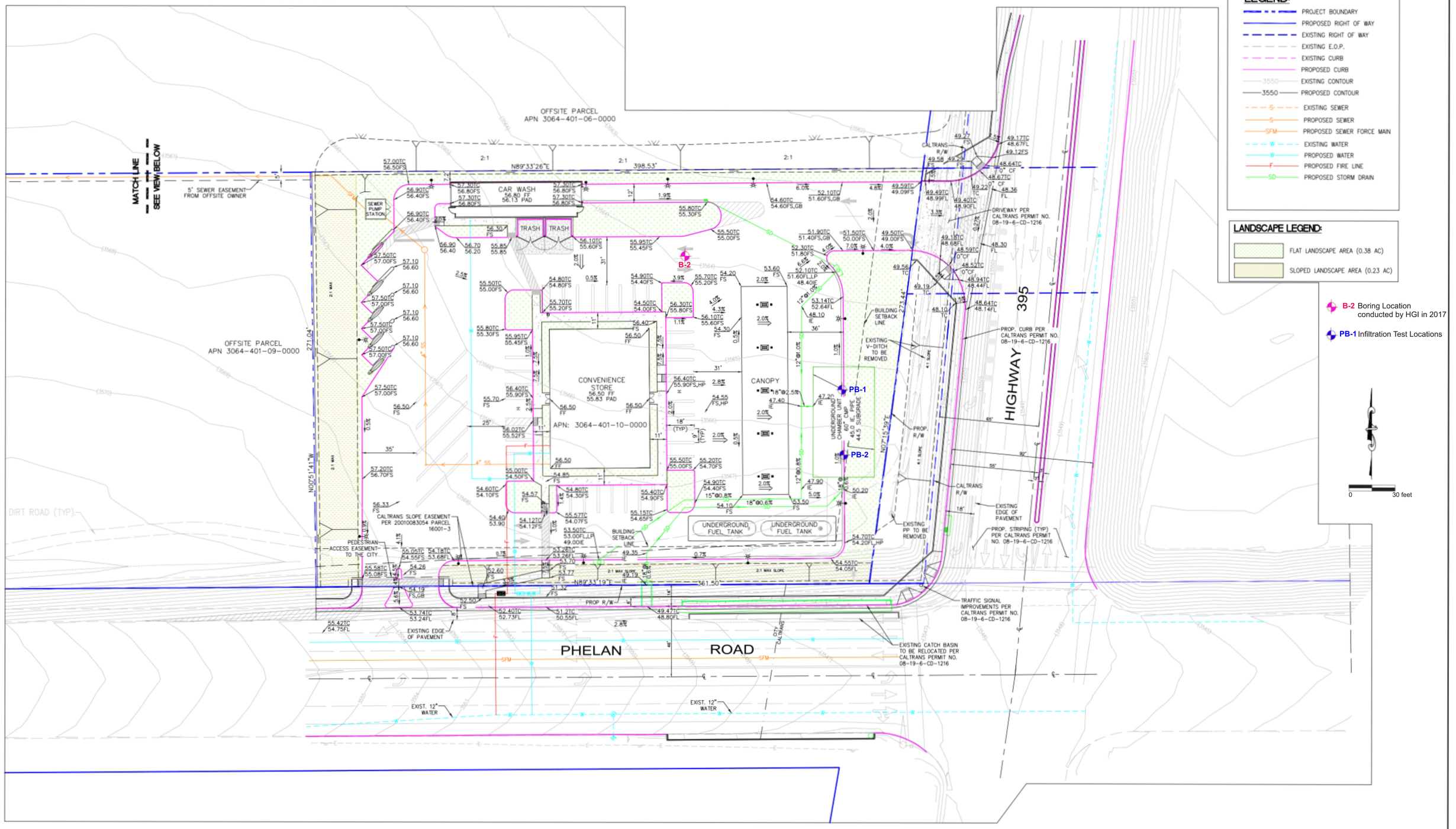
Infiltration Test #	Tested Infiltration Rate (in/hr)	Recommended Design Infiltration Rate w/ Factor of Safety (2) (in/hr)
PB-1	5.21	2.61
PB-2	3.86	1.93

Our field infiltration test results indicate that tested infiltration rates were 5.21 and 3.86 inches per hour at depth of 25 feet. Both tested infiltration rates were greater than the minimum 0.3 inches/hour required by the Infiltration Guidelines. Based on the tested results, the design infiltration rate of **1.93** inches per hour is recommended to be used for the proposed stormwater retention chamber.

Caution should be used in determining an infiltration rate for the proposed stormwater retention systems. Eventual siltation, from windblown silt, water-borne silt from irrigation and precipitation runoff, and the accumulation of organic material in surface soils due to landscape grass and plant growth, can drastically reduce infiltration rates over time. We recommend that suitable methods to prevent siltation be considered in project design.

CLOSURE

Findings of this report were prepared in accordance with generally accepted professional engineering principles and practice in the field of soil characteristics. The conclusions are based on results of field exploration and testing. If conditions are encountered during construction that appear to be different from those indicated by this report, this firm should be notified.



Grading Plan and Test Locations	
12050 Phelan Road, Hesperia, CA 92344	
By: MC	Date: 2/2025
Project No.: 1699-01.2	**Plate No. 1**

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SUBSURFACE EXPLORATION LEGEND

UNIFIED SOIL CLASSIFICATION SYSTEM Visual-Manual Procedure (ASTM D2488-09a)					CONSISTENCY / RELATIVE DENSITY		
MAJOR DIVISIONS			GROUP SYMBOLS	TYPICAL NAMES	CRITERIA		
Coarse-Grained Soils*	Gravels 50 % or more of Coarse Fraction Retained on No. 4 Sieve	Clean Gravels	GW	Well Graded Gravels and Gravel-Sand Mixtures, Little or no Fines	Reference: 'Foundation Engineering', Peck, Hansen, Thornburn, 2nd Edition.		
			GP	Poorly Graded Gravels and Gravel-Sand Mixtures, Little or no Fines	Standard Penetration Test Granular Soils		
		Gravels with Fines	GM	Silty Gravels, Gravel-Sand-Silt Mixtures**	Penetration Resistance, N, (Blows / Foot)	Relative Density	
			GC	Clayey Gravel, Gravel-Sand-Clay Mixtures**	0 - 4	Very Loose	
More than 50 % Retained on No. 200 Sieve	Sands More than 50 % of Coarse Fraction Passes No. 4 Sieve	Clean Sands	SW	Well Graded Sands and Gravely Sands, Little or no Fines	5 - 10	Loose	
			SP	Poorly Graded Sands and Gravelly Sands, Little or no Fines	11 - 30	Medium Dense	
		Sands with Fines	SM	Silty Sands, Sand-Silt Mixtures**	31 - 50	Dense	
			SC	Clayey Sands, Sand-Clay Mixtures**	> 50	Very Dense	
Fine Grained Soils*	Silts and Clays Liquid Limits 50 % or less		ML	Inorganic Silts, Sandy Silts, Rock Flour	Standard Penetration Test Cohesive Soils		
			CL	Inorganic Clays of Low to Medium Plasticity, Gravelly Clays, Sandy Clays, Silty Clays, Lean Clays	Penetration Resistance, N, (Blows / Foot)	Consistency	Unconfined Compressive Strength, (Tons / Sq. Ft.)
			OL	Organic Silts and Organic silty Clays of Low Plasticity	< 2	Very Soft	< 0.25
50 % or more Passes No. 200 Sieve	Silts and Clays Liquid Limits Greater than 50 %		MH	Inorganic Silts, Micaceous or Diatomaceous silts, Plastic Silts	2 - 4	Soft	0.25 - 0.5
			CH	Inorganic Clays of High Plasticity, Fat Clays	5 - 8	Firm (Medium Stiff)	0.5 - 1.0
			OH	Organic Clays of Medium to High Plasticity	9 - 15	Stiff	1.0 - 2.0
					16 - 30	Very Stiff	2.0 - 4.0
Highly Organic Soils			PT	Peat, Muck, or Other Highly Organic Soils	> 31	Hard	> 4.0

* Based on material passing the 3-inch sieve.

** More than 12% passing the No. 200 sieve; 5% to 12% passing No. 200 sieve requires use of duel symbols (i.e., SP-SM., GP-GM, SP-SC, GP-GC, etc.); Border line classifications are designated as CH/Cl, GM/SM, SP/SW, etc.

U.S. Standard Sieve Size 12" 3" 3/4" #4 #10 #40 #200

Unified Soil Classification Designation	Boulders	Cobbles	Gravel		Sand			Silt and Clay
			Coarse	Fine	Coarse	Medium	Fine	

Moisture Condition

Dry	Absence of moisture, dusty, dry to the touch.
Moist	Damp but no visible moisture.
Wet	Visible free water, usually below the water table.

Material Quantity

Trace	< 5 %
Few	5 - 10%
Little	15 - 25%
Some	30 - 45 %
Mostly	50-100%

Other Symbols

C - Core Sample
S - SPT Sample
B - Bulk Sample
CK - Chunk Sample
R - Ring Sample
N - Nuclear Gauge Test
∇ - Water Table

Hilltop Geotechnical
786 S. Gifford Avenue, San Bernardino, California, 92408
Phone: 909 890 9079

Boring No.: PB-1

Latitude	: 34.42702	Drill Supplier	: OneWay Drilling	Job Number	: 1699-01	Sheet	: 1 OF 2
Longitude	: -117.39921	Driller Company	: OneWay Drilling	Client	: Plaza Street Partners		
Elevation	: 3566(ft)	Logged By	: Albert Buffet	Project	: Phelan Rd. & HWY 395, Hesperia SI & Infiltration		
Total Depth	: 25 ft	Date	: 02/21/2025	Location	: Phelan Rd & US-395, Hesperia, CA 92344, USA		

Depth (ft)	Samples: Bulk	Blows per 6"	Soil Origin	Graphic Log	Classification Code	Material Description	Testing: % Fines	Dry Density (pcf)	Moisture %	Direct Shear
0.2			Non-Soil Fill		PAV	Grass over topsoil				
1					SM	SILTY SAND: silty fine to medium grained sand, medium dense, trace fine sized gravel, moist to slightly moist, dark yellowish brown, trace of rootlets .				
1.5										
2			Alluvium			SILTY SAND: silty fine to medium grained sand, medium dense, moist to slightly moist, trace fine to medium sized gravel, dark yellowish brown, slightly porous.				
3										
4										
5	5					SILTY SAND: silty fine to coarse grained sand, medium dense, moist to slightly moist, trace fine to medium sized gravel, dark yellowish brown.				
6										
7										
8										
9										
10	10					SILTY SAND: silty fine to medium grained sand, medium dense, moist to slightly moist, trace fine to medium sized gravel, dark yellowish brown, layers of clayey sand .				
11										
12	12		Old Alluvium		SC	CLAYEY SAND: clayey fine to coarse grained sand, dense to very dense, moist, trace fine sized gravel, dark yellowish brown, trace caliche.				
13										
14										
15	15					SILTY SAND: silty fine to medium grained sand, dense to very dense, moist, trace fine to medium sized gravel, dark yellowish brown, layers of clayey sand and silty fine to coarse sand.				
16										
17					SM					
18										
19										

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Khoury Engineering
Hilltop Geotechnical
7864 Clifford Avenue, San Bernardino, California, 92408
14280 Euclid Avenue, Chino, California, 91710
Phone: 909 606 6791

Boring No.: PB-1

Latitude	: 34.42702	Drill Supplier	: OneWay Drilling	Job Number	: 1699-01	Sheet	: 2 OF 2
Longitude	: -117.39921	Driller Company	: OneWay Drilling	Client	: Plaza Street Partners		
Elevation	: 3566(ft)	Logged By	: Albert Buffet	Project	: Phelan Rd. & HWY 395, Hesperia SI & Infiltration		
Total Depth	: 25 ft	Date	: 02/21/2025	Location	: Phelan Rd & US-395, Hesperia, CA 92344, USA		

Depth (ft)	Samples: Bulk	Blows per 6"	Soil Origin	Graphic Log	Classification Code	Material Description	Testing: % Fines	Dry Density (pcf)	Moisture %	Direct Shear
20										
21						SILTY SAND: silty fine grained sand, dense to very dense, moist, trace fine to medium sized gravel, dark yellowish brown, layers of sand with silt and clayey sand.				
22										
23										
24										
						PB-1 Terminate at 25 ft. No Groundwater Encountered.				

HILLTOP GEOTECHNICAL INCORPORATED

Khoury Engineering

Hilltop Geotechnical

7864 Clifford Avenue, San Bernardino, California, 92408

14280 Euclid Avenue, Chino, California, 91710

Phone: 909 606 6791

Boring No.: PB-2

Latitude	**: 34.42702**	**Drill Supplier**	**: OneWay Drilling**	**Job Number**	**: 1699-01**	**Sheet**	**: 1 OF 2**
Longitude	**: -117.39931**	**Driller Company**	**: OneWay Drilling**	**Client**	**: Plaza Street Partners**		
Elevation	**: 3566(ft)**	**Logged By**	**: Albert Buffet**	**Project**	**: Phelan Rd. & HWY 395, Hesperia SI & Infiltration**		
Total Depth	**: 25 ft**	**Date**	**: 02/21/2025**	**Location**	**: Phelan Rd & US-395, Hesperia, CA 92344, USA**		

Depth (ft)	Samples: Bulk	Blows per 6"	Soil Origin	Graphic Log	Classification Code	Material Description	Testing: % Fines	Dry Density (pcf)	Moisture %	Direct Shear
0.2			Non-Soil Fill		PAV	Grass over topsoil				
1					SM	SILTY SAND: silty fine to medium grained sand, loose to medium dense, trace fine to medium sized gravel, moist to slightly moist, dark yellowish brown, trace of rootlets, small pockets of clay .				
1.5										
2										
3			Alluvium			SILTY SAND: silty fine grained sand, medium dense, slightly moist, trace fine sized gravel, light yellowish brown, trace of rootlets .				
4										
5										
6						SILTY SAND: silty fine to medium grained sand, medium dense, moist to slightly moist, trace fine sized gravel, dark yellowish brown, layers of clayey sand.				
7										
8										
9										
10						SILTY SAND: silty fine to medium grained sand, medium dense, moist to slightly moist, trace fine to medium sized gravel, dark yellowish brown, layers of silty fine to coarse sand .				
11										
12						SILTY SAND: silty fine to medium grained sand, dense to very dense, moist, trace fine to medium sized gravel, dark yellowish brown, trace caliche.				
13			Old Alluvium							
14										
15						SILTY SAND: silty fine to medium grained sand, dense to very dense, moist, trace fine sized gravel, dark yellowish brown.				
16										
17										
18										
19										

HILLTOP GEOTECHNICAL
INCORPORATED

Khoury Engineering
Hilltop Geotechnical
7862 Clifford Avenue, San Bernardino, California, 92408
14280 Euclid Avenue, Chino, California, 91710
Phone: 909 606 6791

Boring No.: PB-2

Latitude	: 34.42702	Drill Supplier	: OneWay Drilling	Job Number	: 1699-01	Sheet	: 2 OF 2
Longitude	: -117.39931	Driller Company	: OneWay Drilling	Client	: Plaza Street Partners		
Elevation	: 3566(ft)	Logged By	: Albert Buffet	Project	: Phelan Rd. & HWY 395, Hesperia SI & Infiltration		
Total Depth	: 25 ft	Date	: 02/21/2025	Location	: Phelan Rd & US-395, Hesperia, CA 92344, USA		

Depth (ft)	Samples: Bulk	Blows per 6"	Soil Origin	Graphic Log	Classification Code	Material Description	Testing: % Fines	Dry Density (pcf)	Moisture %	Direct Shear
20										
21						SILTY SAND: silty fine to medium grained sand, dense to very dense, moist, trace fine sized gravel, dark yellowish brown, layers of fine to coarse sand with silt.				
22										
23										
24										
						PB-2 Terminate at 25 ft. **No Groundwater Encountered.**				

Plate No. 4b

HILLTOP GEOTECHNICAL INCORPORATED

INFILTRATION DATA SHEET

Project Name: Phelan Rd & CA 395

Project Number: 1699-01.2

Test Hole Number: PB-1

Date Tested: 2/21/25

Depth of Boring in feet: 25.0

Tested By: NL

Radius of boring feet: 0.33

Hours Presaturation

Presoak: Time Initial 9:45 AM on 2/21/25

Depth of Bottom (ft)	Time Initial	Time Final	Time Interval (minutes)	Depth of Water - Initial (ft)	Depth of Water - Final (ft)	Change in Water Level (ft)	$H_{average}$ (ft)	Rate, It (In/Hr)	Rate, It (Cm/Hr)
25.00	9:45	10:10	25.0	15.00	22.90	7.90	6.05	5.88	14.93
25.00	10:13	10:38	25.0	15.00	21.45	6.45	6.78	4.31	10.95
25.00	10:42	10:52	10.0	16.00	19.20	3.20	7.40	4.91	12.48
25.00	10:54	11:04	10.0	17.00	20.40	3.40	6.30	6.09	15.46
25.00	11:10	11:20	10.0	17.00	20.15	3.15	6.43	5.54	14.06
25.00	11:21	11:31	10.0	17.00	20.08	3.08	6.46	5.38	13.68
25.00	11:36	11:46	10.0	17.00	20.05	3.05	6.48	5.32	13.51
25.00	11:47	11:57	10.0	17.00	20.05	3.05	6.48	5.32	13.51
25.00	12:00	12:10	10.0	17.00	20.00	3.00	6.50	5.21	13.24
25.00	12:12	12:22	10.0	17.00	20.00	3.00	6.50	5.21	13.24

Plate No. 5

HILLTOP GEOTECHNICAL INCORPORATED

INFILTRATION DATA SHEET

Project Name: Phelan Rd & CA 395

Project Number: 1699-01.2

Test Hole Number: PB-2

Date Tested: 2/21/25

Depth of Boring in feet: 25.0

Tested By: NL

Radius of boring feet: 0.33

Hours Presaturation

Presoak: Time Initial 10:10 AM on 2/21/25

Depth of Bottom (ft)	Time Initial	Time Final	Time Interval (minutes)	Depth of Water - Initial (ft)	Depth of Water - Final (ft)	Change in Water Level (ft)	$H_{average}$ (ft)	Rate, It (In/Hr)	Rate, It (Cm/Hr)
25.00	10:10	10:35	25.0	14.00	20.65	6.65	7.68	3.95	10.02
25.00	10:37	11:02	25.0	14.00	20.60	6.60	7.70	3.90	9.91
25.00	11:10	11:20	10.0	17.00	19.45	2.45	6.78	4.09	10.40
25.00	11:28	11:38	10.0	17.00	19.42	2.42	6.79	4.04	10.25
25.00	11:41	11:51	10.0	17.00	19.40	2.40	6.80	4.00	10.15
25.00	11:53	12:03	10.0	17.00	19.45	2.45	6.78	4.09	10.40
25.00	12:05	12:15	10.0	17.00	19.42	2.42	6.79	4.04	10.25
25.00	12:17	12:27	10.0	17.00	19.40	2.40	6.80	4.00	10.15
25.00	12:29	12:39	10.0	17.00	19.36	2.36	6.82	3.92	9.95
25.00	12:42	12:52	10.0	17.00	19.33	2.33	6.84	3.86	9.81

Plate No. 6

ATTACHMENT F: SCOPING AGREEMENT MEMORANDUM

Fehr & Peers

Memo

Date: December 23, 2025

To: Matthew Winter

From: Paul Herrmann
Marsha Phillips

Subject: Hesperia Phelan Gas Station Project – Site Plan Update Review

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Fehr & Peers prepared a Transportation Impact Analysis (TIA) for the Project in accordance with the Transportation Study Scoping Agreement memorandum approved by the City of Hesperia on April 30, 2025. Since the execution of the scoping agreement and completion of the TIA, the Project site plan has been refined as part of ongoing design development and engineering coordination. The following summarizes the site plan updates relative to the assumptions evaluated in the TIA.

- Addition of designated electric vehicle (EV) charging spaces within the previously approved site layout.
- Minor design changes to internal circulation, drive aisles, and parking striping to improve site functionality.
- Minor adjustments to site geometry and internal layout to accommodate grading, drainage, and EV infrastructure.

These site plan changes do not increase trip generation, alter project access points, change driveway configurations, or modify off-site roadway conditions analyzed in the Transportation Impact Analysis. Accordingly, the site plan updates do not affect the assumptions, analysis methodology, or conclusions of the TIA.

Sincerely,

FEHR & PEERS



Paul Herrmann, PE

Senior Associate

Appendix A: Scoping Agreement Memorandum

Project Scoping Form

This scoping form shall be submitted to the City of Hesperia to assist in identifying infrastructure improvements that may be required to support traffic from the proposed project.

Project Identification:

Case Number:	SAGR24-00015
Related Cases:	
SP No.	
EIR No.	
GPA No.	
CZ No.	
Project Name:	Hesperia Phelan Project
Project Address:	12050 Phelan Road, Hesperia CA 92344
Project Opening Year:	2026
Project Description:	Gas Station with 10 vehicle fueling positions 5,900 SF convenience store and 2,000 SF car wash This service station will not offer diesel to commercial trucks/vehicles.

	Consultant:	**Developer:**
Name:	Fehr & Peers	AU Energy
Address:	101 Pacifica, Suite 300	41805 Albrae Street
	Irvine, CA 92618	Fremont, CA 94538
Telephone:	949-308-6300	
Fax/Email:		

Trip Generation Information:

Trip Generation Data Source: ITE Trip Generation, 11th Edition

Current General Plan Land Use: Neighborhood Commerical

Proposed General Plan Land Use: Neighborhood Commercial

Current Zoning: Neighborhood Commercial

Proposed Zoning: Neighborhood Commercial

	Existing Trip Generation			Proposed Trip Generation		
	In	Out	Total	In	Out	Total
AM Trips				64	64	128
PM Trips				63	63	126

Trip Internalization: ☑ Yes ☐ No (10 % Trip Discount)

Pass-By Allowance: ☑ Yes ☐ No (_____% Trip Discount) **Attachment C**

Potential Screening Checks

Is your project screened from specific analyses (see Page 11 of the guidelines related to LOS assessment and Pages 24-26).

Is the project screened from LOS assessment? ☐ Yes ☑ No

LOS screening justification (see Page 11 of the guidelines): _____

Is the project screened from VMT assessment? ☑ Yes ☐ No

VMT screening justification (see Pages 24-26 of the guidelines): Under the assumptions that the project will result in a less-than-significant transportation impact related to VMT, the project is screened from a full VMT analysis under SBCTA TIA guidelines. **Attachment D**

Level of Service Scoping

- Proposed Trip Distribution (Attach Graphic for Detailed Distribution):

North	South	East	West
35 %	35 %	25 %	5 %

- Attach list of Approved and Pending Projects that need to be considered (provided by the City Traffic Engineer and adjacent agencies) **Attachment E**
- Attach list of study intersections/roadway segments **Attachment B**
- Attach site plan **Attachment A**
- Note other specific items to be addressed:
  - Site access **Attachment C**
  - On-site circulation
  - Parking
  - Consistency with Plans supporting Bikes/Peds/Transit
  - Other _____
- Date of Traffic Counts **April 2025**
- Attach proposed analysis scenarios (years plus proposed forecasting approach) **Attachment C**
- Attach proposed phasing approach (if the project is phased)

VMT Scoping

For projects that are not screened, identify the following:

- Travel Demand Forecasting Model Used _____
- Attach SBCTA Screening VMT Assessment output or describe why it is not appropriate for use
- Attach proposed Model Land Use Inputs and Assumed Conversion Factors (attach)

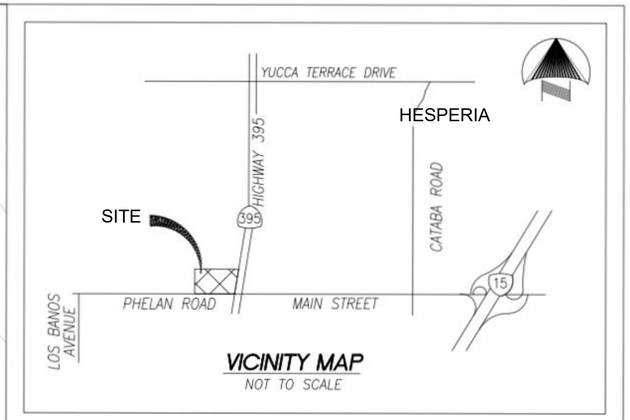
Attachment A: Project Site Plan

HESPERIA PHELAN

SITE DEVELOPMENT PLAN

(PRELIMINARY GRADING/DRAINAGE PLAN)

4/10/25



VICINITY MAP

NOT TO SCALE

LEGAL DESCRIPTION:

PARCEL B AS SHOWN ON THAT CERTAIN LOT LINE ADJUSTMENT 2019-00002, IN THE CITY OF HESPERIA, COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA, RECORDED MARCH 9, 2020 AS INSTRUMENT NO. 2020-0083495 OF OFFICIAL RECORDS, MORE PARTICULARLY DESCRIBED AS FOLLOWS:

THAT PORTION OF THE SOUTH 1/2 OF THE SOUTH 1/2 OF THE SOUTHEAST 1/4 OF THE SOUTHEAST ¼ OF SECTION 16, TOWNSHIP 4 NORTH, RANGE 5 WEST, SAN BERNARDINO BASE AND MERIDIAN, IN THE COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA, ACCORDING TO THE OFFICIAL PLAT APPROVED BY THE SURVEYOR GENERAL JULY 25, 1856.

EXCEPTING THE WEST 654.34 FEET.

ALSO EXCEPTING THEREFROM THAT PORTION CONVEYED TO THE STATE OF CALIFORNIA IN DEED RECORDED IN BOOK 1231, PAGE 39 OF OFFICIAL RECORDS, DESCRIBED AS FOLLOWS: BEGINNING AT A POINT IN THE SOUTH LINE OF SAID SECTION 16, DISTANT THEREON, SOUTH 89° 56' 30" WEST, 5361.14 FEET, FROM A 2 INCH IRON PIPE MARKING THE SOUTHEAST CORNER OF SECTION 15, SAID TOWNSHIP 4 NORTH, RANGE 5 WEST; THENCE SOUTH 89° 56' 30" WEST, 100.86 FEET, ALONG SAID SOUTH LINE; THENCE NORTH 7° 25' 30" EAST, 180.79 FEET; THENCE SOUTH 89° 45' 30" EAST, 100.01 FEET; THENCE SOUTH 7° 25' 30" WEST, 180.37 FEET TO THE POINT OF BEGINNING.

ALSO EXCEPTING THEREFROM THAT PORTION CONDEMNED TO THE STATE BY FINAL ORDER OF CONDEMNATION, A CERTIFIED COPY OF WHICH WAS RECORDED MARCH 6, 2001 AS INSTRUMENT NO. 20010083054 OF OFFICIAL RECORDS.

ALSO EXCEPTING THEREFROM THAT PORTION OF SAID PARCEL BEING ALL OF THE LAND EAST OF HIGHWAY 395 OF SAID PARCELS.

ALSO EXCEPTING THEREFROM THAT PORTION LYING WITHIN PHELAN ROAD.

SAID PARCEL HAVING 2.37 ACRES MORE OR LESS

APN: 3064-401-10

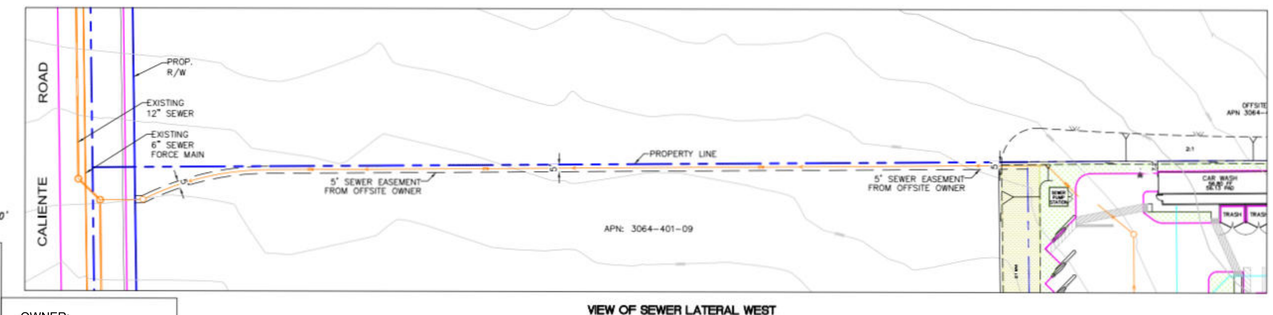
LANDSCAPE LEGEND:

- FLAT LANDSCAPE AREA (0.38 AC)
- SLOPED LANDSCAPE AREA (0.23 AC)

LEGEND:

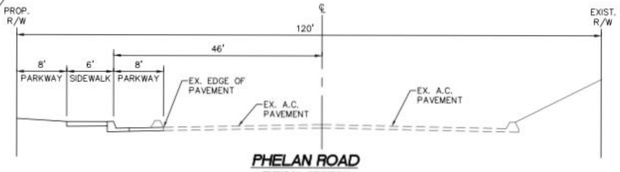
- PROJECT BOUNDARY
- PROPOSED RIGHT OF WAY
- EXISTING RIGHT OF WAY
- EXISTING E.O.P.
- EXISTING CURB
- PROPOSED CURB
- RUBBERIZED CURB WITH FLEXIBLE POSTS
- 3550 EXISTING CONTOUR
- 3550 PROPOSED CONTOUR
- -S- EXISTING SEWER
- S PROPOSED SEWER
- SFM PROPOSED SEWER FORCE MAIN
- -W- EXISTING WATER
- W PROPOSED WATER
- F PROPOSED FIRE LINE
- SD PROPOSED STORM DRAIN
- PROPOSED FIRE HYDRANT

SCALE: 1"=30'



VIEW OF SEWER LATERAL WEST

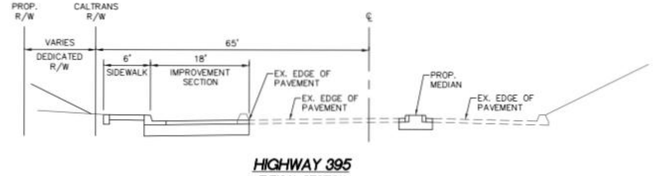
SCALE: 1"=50'



PHELAN ROAD

TYPICAL SECTION

NOT TO SCALE



HIGHWAY 395

TYPICAL SECTION

NOT TO SCALE

NOTE: ADD 3500 TO ALL PROPOSED ELEVATIONS SHOWN.

ALLIANCE
LAND PLANNING & ENGINEERING INC.
CIVIL ENGINEERING • LAND PLANNING • HILLSIDE DESIGN • SURVEYING
2248 FARADAY AVE, CARLSBAD, CA 92008
TEL: (760) 431-9896
FAX: (760) 431-8802
27413 TOURNEY ROAD SUITE 120 VALENCIA, CA 91355
TEL: (661) 799-2760

OWNER:
PLAZA STREET FUND 167, LLC
3400 COLLEGE BLVD., SUITE 200
LEAWOOD, KS 66211

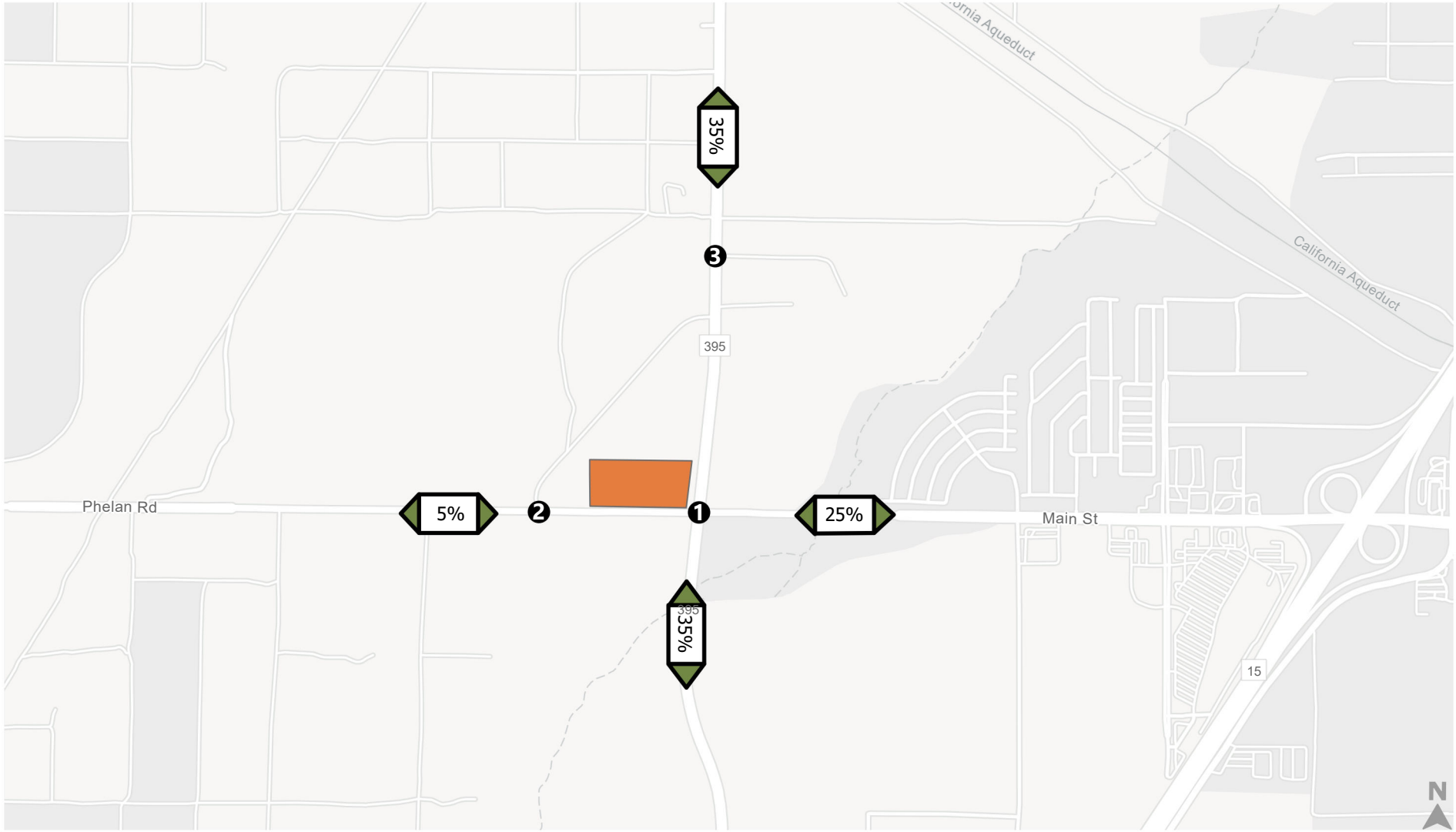
SHEET NUMBER
SP 1

I:\CAD\2418 - HESPERIA PHELAN\SITE DEVELOPEMENT PLAN\2418-SITE_DEV_PLAN.dwg

Attachment B: Trip Distribution and Study Area

Study Intersections

1. Phelan Road and U.S. 395
2. Caliente Road and Phelan Road
3. Yucca Terrace Drive and U.S. 395



Legend

- # Study Intersections
- Project Site
- Passenger Car Trip Distributions

Study Intersections

1. Phelan Road and U.S. 395
2. Caliente Road and Phelan Road
3. Yucca Terrace Drive and U.S. 395

Figure 2

Hesperia Loop and Gas Trip Distribution Map

Attachment C: Trip Generation and Analysis Scenarios

Table 1: Trip Generation

Land Use	Quantity/Units	Estimated Trip Generation						
		Daily	AM Peak Hour Trips			PM Peak Hour Trips		
			In	Out	Total	In	Out	Total
Convenience Store/Gas Station[1] (ITE Code 945)	10 Vehicle Fuel Pumps (4-5.5k)	2,571	135	135	270	114	114	228
Pass-by Reduction[2]		(1,286)	(84)	(84)	(168)	(64)	(64)	(128)
Net External Trips		1,285	51	51	102	50	50	100
Automated Car Wash[3] (ITE Code 948)	1 tunnel	775	39	39	78	39	39	78
Pass-by Reduction[4]		(388)	(22)	(22)	(44)	(22)	(22)	(44)
Internal Capture[5]		(78)	(4)	(4)	(8)	(4)	(4)	(8)
Net External Trips		309	13	13	26	13	13	26
Net External Project Trips		**1,594**	**64**	**64**	**128**	**63**	**63**	**126**

Notes:

1. Average trip rates for ITE Code 945: Daily = 257.13; AM Peak Hour = 27.04, PM Peak Hour = 22.76. The ITE Code for gas stations up to 5.5K was used instead of the code for those exceeding 5.5K due to the lack of sufficient studies in the ITE.
2. Pass-by rates for ITE Code 945: Daily= 50%; AM Peak Hour = 62%; PM Peak Hour 56%
3. ITE Trip Generation Handbook does not provide AM or weekday daily rates for the ITE Code 948; AM peak hour rate assumed to be 100% of the PM peak hour rate; daily rate assumed to be 10 times the PM peak hour rate. Daily = 775; AM Peak Hour 77.5, PM Peak Hour = 77.5.
4. Pass-by rates for ITE Code 948: Daily= 50%; AM Peak Hour = 56%; PM Peak Hour 56%
5. 10% Internalization reduction was assumed for compatible land use types

Sources:

1. *Trip Generation Manual, 11th Edition* (Institute of Transportation Engineers, 2021)
2. *Trip Generation Handbook, 3rd Edition* (Institute of Transportation Engineers, 2017)

Analysis Scenarios

- Existing (2025) Conditions – 2025 traffic full intersection turning movement counts collected at study intersections.
- Near-Term without Project Conditions (2026) – Annual growth of 2% projected traffic volumes and near-term roadway improvements expected to occur around the time the proposed Project will be operational, without the Project.
- Near-Term with Project Conditions (2026) – Annual growth of 2% projected traffic volumes and near-term roadway improvements expected to occur around the time the proposed Project will be operational, with the Project.
- Cumulative without Project Conditions (2035) – Projected traffic volumes and future roadway improvements using 2% annual growth under City of Hesperia's build-out conditions (**Attachment E**) within a 10-year horizon, without the Project.
- Cumulative with Project Conditions (2035) – Projected traffic volumes and future roadway improvements using 2% annual growth under City of Hesperia's build-out conditions (**Attachment E**) within a 10-year horizon, with the Project.

Special Issues:

- As part of the LOS analysis, we will evaluate the proposed changes to the signal at U.S. 395 and Phelan Road to confirm they do not result in any operational deficiencies.
- The Caliente Road new intersection will also be included in the analysis, including the analysis of the driveway 330' away from the new intersection.
- A collision analysis will also be preformed along Phelan Road near the Project to assess the safety at the right in/right out driveway along Phelan Road.
- "Fair-share" contributions for improvements within the City's DIF program and within in other jurisdictions will be included in the TIA.
- There will be coordination with Caltrans to obtain the necessary requirements for the review and approval process, including the following information needed for the study:
    - Traffic signal timing information at the intersection of U.S. 395 and Phelan Road.

Attachment D: VMT Memorandum

FEHR PEERS

Memorandum

Date: January 31, 2025

To: Sunny Goyal

From: Paul Herrmann, P.E.

Subject: Hesperia Phelan VMT Screening Assessment

OC24-1103

Fehr & Peers has completed a Vehicle Miles Traveled (VMT) screening assessment in support of the Hesperia Phelan Gas Station (Project) in Hesperia, California. This memorandum documents how the Project is presumed to result in a less-than-significant transportation impact related to VMT. This memorandum utilizes screening criteria from the *City of Hesperia's Traffic Impact Analysis Guidelines for Vehicle Miles Traveled (VMT) and Level of Service Assessment (LOS)*.

Project Description

The Project site is located on a vacant lot on the northwest corner of State Highway 395 and Phelan Road. The Project proposes the development of a gas station, convenience store and a drive-through car wash. The proposed development is 7,900 square feet in total. A 2,000 square feet car wash and a 5,900 square feet convenience store. The Project can be accessed directly through two driveways located on U.S. 395 and Phelan Road.

VMT Screening

The City's traffic impact analysis guidelines provide a process for projects to be screened from full VMT assessment under the assumption that the project will result in a less-than-significant transportation impact related to VMT. The City has VMT screening options based on land use types, including local-serving retail less than 50,000 square feet which the Project qualifies for.

Land Use Types

The following land use types are applicable for screening in Project Type Screening.

- 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

The Project is a gas station and retail land use and below 50,000 square feet in size. Therefore, the Project can be screened from VMT assessment under the presumption that it will result in a **less-than-significant impact** related to VMT.

Conclusion

The proposed project is eligible for VMT screening and will not require a VMT modeling assessment. The proposed project can be screened from analysis under the presumption it will result in a **less-than-significant impact.**

We hope this information is helpful. If you have any questions or concerns, please do not hesitate to contact Paul Herrmann (p.herrmann@fehrandpeers.com or 949-308-6318) with questions or comments.

Attachment E: Pending and Approved Projects List

Cumulative Projects List

ID[1]	Project Name[2]	Use	Size (square feet)	Project Description	Status
	I-15 Industrial Park Project (CUP21-00005) CUP21-00004	General Light Industrial	647,500	CUP21-00005 to construct a 742,000 square foot distribution building within the Commercial Industrial Business Park (CIBP) zone of the Main Street and Freeway Corridor Specific Plan on 36 gross acres located at the northeast corner of Highway 395 and Poplar Street in conjunction with adoption of an Environmental Impact Report pursuant to the provisions of CEQA (Applicant: Covington Capitol; APN: 3064-581-01) CUP21-00004 to construct a 1,108,000 square foot warehouse distribution building on approximately 69 gross acres within the Regional Commercial (RC) and Commercial Industrial Business Park (CIBP) zones of the Main Street and Freeway Corridor Specific Plan located on the east side of Mesa Linda Avenue, at the intersection of Mesa Linda Avenue and Popular Street, and Specific Plan Amendment SPLA 21-00001 to change approximately 45 acres of the project site from Regional Commercial (RC) to Commercial Industrial Business Park (CIBP), in conjunction with adoption of an Environmental Impact Report pursuant to the provisions of CEQA (Applicant: Covington Capitol; APNs: 3064-601-07 & 3064-621-01)	Approved (1/17/2023)
		High-Cube Fulfillment Center Warehouse	1,202,500		
	Pixior Warehouse (CUP20-00006) (See CUPR25-00001 below)	High-Cube Fulfillment Center Warehouse	440,000	CUP20-00006 to construct a 444,000 square foot distribution center within the Commercial/Industrial Business Park (CIBP) on 23.5 gross acres located on the west side of Amargosa Road, north of the California Aqueduct (Applicant: 55555 Amargosa LLC; APN: 0405-062-51)	Approved (9/9/2021)
	Hesperia Commerce Center II (CUP19-00010) (See CUPR24-00001 below)	General Light Industrial	1,383,781	CUP19-00010 to allow the construction of three industrial warehouse buildings totaling approximately 3.75 million square feet on 195 acres of land designated Commercial/Industrial Business Park (CIBP) zone within the Main Street and Freeway Corridor Specific Plan located north of Phelan Road (Main Street), west of Highway 395, south of Yucca Terrace Drive and east of the Los Angeles Department of Water and Power line corridor (Applicant: Covington Group; APN: 3064-351-03, 3064-361-01, 3064-391-01, 3064-401-02).	Approved (5/17/2022)
		High-Cube Fulfillment Center Warehouse	2,361,648		
	Hesperia Commerce Center (CUP11-10229)	High-Cube Fulfillment Center Warehouse	3,500,000	A conditional use permit and a development agreement to construct a 3.5 million square foot industrial park and a tentative parcel map to create 13 parcels and a remainder on 232 gross acres located on the east and west side of Caliente Road between the Union Pacific Railroad and Cedar Street (APNs: 3039-311-03 thru 06, 3039-341-01 thru 07, 3039-351-08, and 3039-431-02 & 04)	Constructed
	Poplar (CUP21-00010)	High-Cube Fulfillment Center Warehouse	145,145 269,555	Consideration of Conditional Use Permit CUP21-00010 to construct a 414,700 SF distribution building within the Commercial Industrial Business Park (CIBP) zone of the Main Street and Freeway Corridor Specific Plan on 18 gross acres located on the north side of Poplar St, between Lassen Rd and Mesa Linda St in conjunction with adoption of an Environmental Impact Report pursuant to the provisions of CEQA (Applicant: Covington Capitol; APNs: 3064-581-04 & 05)	Approved (3/9/2023)
	CUP22-00003	High-Cube Fulfillment Center Warehouse	750,000	Consideration of Conditional Use Permit CUP22-00003 to construct a 750,000 square foot warehouse distribution building on approximately 47 acres within the Commercial Industrial Business Park (CIBP) of the Main Street and Freeway Corridor Specific Plan located on the west side of Highway 395, east of the wash and approximately 600 feet north of Aspen Street, in conjunction with adoption of an Environmental Impact Report pursuant to the provisions of CEQA (Applicant: SRD Design Studio; APNs: 3064-551-03, -04, -06, -07, -08 & 3064-561-06)	Approved (1/26/2023)
	CUP22-00004	High-Cube Fulfillment Center Warehouse	400,000	Consideration of Conditional Use Permit CUP22-00004 to construct a 400,000 square foot warehouse distribution building on approximately 18 gross acres within the Commercial Industrial Business Park (CIBP) of the Main Street and Freeway Corridor Specific Plan located on the southwest corner of Sultana Street and Mesa Linda Street, in conjunction with adoption of an Environmental Impact Report pursuant to the provisions of CEQA (Applicant: Newcastle Partners; APNs: 3064-581-02 & -03)	Approved (9/14/2023)
	CUP22-00016	General Light Industrial	74,924	Consideration of Conditional Use Permit CUP22-00016 to construct a 74,924 square foot warehouse with onsite truck storage on 10.3 gross acres within the Commercial Industrial Business Park zone of the Main Street and Freeway Corridor Specific Plan located at the southeast corner of Poplar Street and Tree Flags Avenue (Applicant: Bobby Kang, CEO- Cargo solutions Express; APNs: 3064-591-13, -and 3064-631-01)	Under Review

ID[1]	Project Name[2]	Use	Size (square feet)	Project Description	Status
	CUP22-00017	High-Cube Fulfillment Center Warehouse	655,468	Consideration of Conditional Use Permit CUP22-00017 to construct a 655,468 square foot warehouse distribution building on 29.6 gross acres within the Commercial Industrial Business Park (CIBP) and the Neighborhood Commercial (NC) zone of the Main Street and Freeway Corridor Specific Plan located west of Highway 395, approximately 600 feet north of Phelan Road, in conjunction with an Specific Plan Amendment to change the zone for parcel 3064-401-05 from NC to CIBP and the adoption of an Environmental Impact Report pursuant to the provisions of CEQA (Applicant: KISS Logistics Center; APNs: 3064-401-03, -04, & -05)	Approved 5/7/24
	SPR22-00017	High-Cube Fulfillment Center Warehouse	142,634	Consideration of Site Plan Review SPR22-00017 to construct a 142,634 square feet industrial warehouse building on 8.1 acres within the Commercial Industrial Business Park (CIBP) zone of the Main Street and Freeway Corridor Specific Plan located at the southeast corner of Poplar Street and Highway 395 (Applicant: Covington Development Partners, LLC; APNs: 3064-591-01 & -03)	Under Review
	CUP23-00005 / Phelan 20	High-Cube Fulfillment Center Warehouse	419,700	Consideration of Conditional Use Permit CUP23-00005 to construct a 419,700 square foot warehouse distribution building within the Commercial Industrial Business Park (CIBP) zone of the Main Street and Freeway Corridor Specific Plan on 22.61 gross acres located approximately 1,000 feet east of the Highway 395 and Phelan Road intersection in conjunction with adoption of an Environmental Impact Report pursuant to the provisions of CEQA (Applicant: Covington Capitol; APN: 3064-531-06)	Under Review
	CUP23-00007	High-Cube Fulfillment Center Warehouse	11,250	Consideration of Conditional Use Permit CUP23-00007 to construct an outdoor truck parking and maintenance facility to include a 5,000 square foot maintenance building, 4,600 square foot warehouse building, a 1,650 square foot office building and 83 truck parking spaces on approximately 4.5 acres within the Commercial Industrial Business Park (CIBP) zone of the Main Street and Freeway Corridor Specific Plan located south of Poplar Court, approximately 630 feet west of Highway 395 in conjunction with the adoption of a mitigated negative declaration pursuant to the provisions of CEQA (APN: 3064-561-06; Applicant: SRD Design Studio, Inc.)	Under Review
	CUP23-00008	High-Cube Fulfillment Center Warehouse	469,979	Consideration of Conditional Use Permit CUP23-00008 to construct a 469,979 square foot warehouse distribution building within the Commercial Industrial Business Park (CIBP) zone of the Main Street and Freeway Corridor Specific Plan on 26.94 gross acres located approximately 1,000 feet east of the Highway 395 and Yucca Terrace Drive (Applicant: Covington Capitol; APN: 3064-401-01, 02)	Under Review
	SPR23-00024	High-Cube Fulfillment Center Warehouse	150,000	Consideration of Site Plan Review SPR23-00024 to construct a 150,000 square foot industrial warehouse within the Commercial Industrial Business Park (CIBP) zone of the Main Street and Freeway Corridor Specific Plan on 11.01 gross acres located at the southeast corner of Caliente Road and Cedar Street (Applicant: Caliente 395, LLC - Covington Group; APN: 3039-351-08)	Under Review
	SPR24-00006	High-Cube Fulfillment Center Warehouse/ Manufacturing	91,569	Consideration of Site Plan Review SPR24-00006 to construct a 91,569 square foot multi-tenant warehouse building within the Commercial Industrial Business Park (CIBP) zone of the Main Street and Freeway Corridor Specific Plan on 5 gross acres located at the northeast corner of Aspen Road and Caliente Road (Applicant: Moses Macias; APN: 3064-561-05)	Under Review
	CUP24-00003	High-Cube Fulfillment Center Warehouse/ Manufacturing	75,894	Consideration of Conditional Use Permit CUP24-00003 to construct a 75,894 square foot warehouse with onsite truck storage consisting of 104 truck and trailer stalls and 30 tractor stalls 10.5 gross acres within the Commercial Industrial Business Park zone of the Main Street and Freeway Corridor Specific Plan located at the southeast corner of Poplar Street and Tree Flags Avenue (Applicant: Bobby Kang, CEO- Cargo solutions Express; APNs: 3064-591-12, -17, and -18).	Under Review
	CUP24-00005	Large box retail building	167,664	Consideration of Conditional Use Permit CUP24-00005 to construct a 167,664 square foot large box retail building with a tire center along with the construction of a fuel station and carwash on 27.2 acres within the Regional Commercial (RC) zone of the Main Street and Freeway Corridor Specific Plan located along Amargosa Road, south of the California Aqueduct, east of Key Pointe Avenue and north of the I-15 Southbound Main Street off-ramp (Applicant: Kimley-horn, Ryan Alvarez; APNs: 0405-062-72, -73 and 3064-481-06, -07)	Under Review
	CUP24-00009	High-Cube Fulfillment Center Warehouse	499,580	Consideration of Conditional Use Permit CUP24-00009 to construct a 499,850 square foot industrial warehouse building in conjunction with Specific Plan Amendment No. SPLA24-00004 to change the zoning from Regional Commercial (RC) to Commercial Industrial Business Park (CIBP) within the Main Street and Freeway Corridor Specific Plan, on 30.5 acres located on the west side of Amargosa Road between Avenal Street and Palmetto Way (Applicant: SRD Design Studio, Inc; APNs: 0405-072-52, 53, and 55)	Under Review

ID[1]	Project Name[2]	Use	Size (square feet)	Project Description	Status
	CUPR24-00001	High-Cube Fulfillment Center Warehouse	2,517,413	Consideration of Revised Conditional Use Permit CUPR24-00001 to modify the previously approved site design layout for a portion of the Hesperia Commerce Center II project (CUP19-00010) for the construction of a 2,517,413 square foot industrial warehouse building on 177.8 acres within the Commercial Industrial Business Park (CIBP) zone of the Main Street and Freeway Corridor Specific Plan located on the north side of Phelan Road, west of Caliente Road, south of Yucca Terrace Drive and east of the power line utility corridor in conjunction with the adoption of an Addendum to the Final Environmental Impact Report for the Hesperia Commerce Center II project (SCH #2019110418) pursuant to the provisions of CEQA (Applicant: Covington Group; APNs: 3064-351-03, 3064-361-01 & 3064-391-01).	Under Construction
	CUPR25-00001	High-Cube Fulfillment Center Warehouse	444,000	Consideration of Revised Conditional Use Permit CUPR25-00001 to modify the previously approved site design layout (CUP20-00006) reducing the square footage of the building from 444,000 square foot to 428,850 square foot distribution center within the Commercial/Industrial Business Park (CIBP) on 23.5 gross acres located on the west side of Amargosa Road, north of the California Aqueduct (Applicant: Covington Group; APN: 0405-062-51)	Under Review