Evans Park Project (17-01)

Draft Initial Study/Mitigated Negative Declaration

January 2022 | 02121.00002.001

Prepared for:

City of Menifee
Community Development Department
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TABLE OF CONTENTS

Section **Page**

CEQA Environmental Checklist Form 1

Environmental Factors Potentially Affected 6

Determination 7

Evaluation of Environmental Impacts 8

I. Aesthetics 10
II. Agriculture and Forestry Resources 13
III. Air Quality 15
IV. Biological Resources 21
V. Cultural Resources 37
VI. Energy 40
VII. Geology and Soils 41
VIII. Greenhouse Gas Emissions 46
IX. Hazards and Hazardous Materials 50
X. Hydrology and Water Quality 54
XI. Land Use and Planning 58
XII. Mineral Resources 59
XIII. Noise 60
XIV. Population and Housing 64
XV. Public Services 65
XVI. Recreation 67
XVII. Transportation 68
XVIII. Tribal Cultural Resources 72
XIX. Utilities and Service Systems 73
XX. Wildfire 77
XXI. Mandatory Findings of Significance 79

References 82

TABLE OF CONTENTS (cont.)

LIST OF APPENDICES

A Air Quality and Greenhouse Gas Emissions Technical
B General Biological Resources Assessment
C Cultural Resources Survey
D Geotechnical Investigation
E Paleontological Resource Assessment
F Hydrology and Water Quality Reports
G Noise and Vibration Technical Report
H Traffic Analysis

LIST OF FIGURES

No.	Title	Follows Page
1	Regional Location	2
2	Project Location	2
3	Southern Phase Site Plan	2

LIST OF TABLES

No.	Title	Page
1	Surrounding Land Uses	5
2	Unmitigated Daily Construction Emissions	17
3	Daily Operational Emissions	18
4	Maximum Localized Daily Construction Emissions	19
5	Impacts to Southern Phase Vegetation and Land Uses	25
6	Impacts to Northern Phase Vegetation and Land Uses	26
7	Construction Greenhouse Gas Emissions	47
8	Operational Greenhouse Gas Emissions	48
9	Total Amortized Construction and Operational Greenhouse Gas Emissions	48
10	Project Trip Generation Summary	69
11	Cumulative Projects List	80

ACRONYMS AND ABBREVIATIONS

AAQS	Ambient Air Quality Standards
AB	Assembly Bill
ADT	average daily trips
ALUCP	Airport Land Use compatibility Plan
amsl	above mean sea level
APN	Assessor's Parcel Number
AQMP	Air Quality Management Plan
ASTM	ASTM International
BMP	best management practice
CAAQS	California Ambient Air Quality Standards
CAL FIRE	California Department of Forestry and Fire Protection
CalEEMod	California Emissions Estimator Model
Caltrans	California Department of Transportation
CAP	Climate Action Plan
CAPCOA	California Air Pollution Control Officers Association
CBC	California Building Code
CCR	California Code of Regulations
CEQA	California Environmental Quality Act
CFG Code	California Fish and Game Code
cfs	cubic feet per second
City	City of Menifee
CNEL	Community Noise Equivalent Level
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
CREC	controlled recognized environmental condition
dB	decibel
dBA	A-weighted decibel
DEH	Department of Environmental Health
DOC	California Department of Conservation
DPM	diesel particulate matter
DTSC	Department of Toxic Substances Control
EIC	Eastern Information Center
EIR	Environmental Impact Report
EOP	Emergency Operations Plan
FEMA	Federal Emergency Management Agency
FHSZ	Fire Hazard Severity Zone

ACRONYMS AND ABBREVIATIONS (cont.)

gpm	gallons per minute
HELIX	HELIX Environmental Planning, Inc.
hp	horsepower
HREC	historical recognized environmental condition
Hz	hertz
I-	Interstate
IS/MND	Initial Study/Mitigated Negative Declaration
kBtu	kilo-British thermal unit
KVA	kilovolt-ampere
LCFS	Low Carbon Fuel Standard
LED	light-emitting diode
L_{MAX}	maximum reference noise level
LOS	Level of Service
LST	localized significance threshold
MAFB	March Air Force Base
MBTA	Migratory Bird Treaty Act
mgd	million gallons per day
MHCP	Multiple Habitat Conservation Program
MPD	Menifee Police Department
MSCP	Multiple Species Conservation Program
MT	metric ton
MTBE	methyl tertiary-butyl ether
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NAHC	Native American Heritage Commission
NESHAP	National Emission Standards for Hazardous Air Pollutants
NFPA	National Fire Prevention Association
NO_2	nitrogen dioxide
NO_X	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
NSLU	noise-sensitive land use
NSPS	New Source Performance Standards
Pechanga	Pechanga Band of Luiseño Indians
PM_{10}	particulate matter less than 10 microns in diameter
$PM_{2.5}$	particulate matter less than 2.5 microns in diameter
PPV	peak particle velocity

ACRONYMS AND ABBREVIATIONS (cont.)

PRC	Public Resources Code
PRMMP	Paleontological Resources Monitoring and Mitigation Plan
RAQS	Regional Air Quality Strategy
RCA	Regional Conservation Authority
RCALUC	Riverside County Airport Land Use Commission
RCSD	Riverside County Sheriff's Department
REC	recognized environmental condition
RO	reverse osmosis
ROG	reactive organic gas
RTP	Regional Transportation Plan
RWQCB	Regional Water Quality Control Board
SB	Senate Bill
SCAB	South Coast Air Basin
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
SCS	Sustainable Communities Strategy
SDAB	San Diego Air Basin
SDAPCD	San Diego Air Pollution Control District
SDCAPCD	San Diego County Air Pollution Control District
SDG&E	San Diego Gas & Electric
SIP	State Implementation Plan
SO_2	sulfur dioxide
SR	State Route
SRA	source receptor area
SWPPP	Stormwater Pollution Prevention Plan
SWQMP	storm water quality management plan
SWRCB	State Water Resources Control Board
TAC	toxic air contaminant
USDOT	U.S. Department of Transportation
V	volt
VdB	vibration decibel
VMT	vehicle miles traveled

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CITY OF MENIFEE

CEQA Environmental Checklist Form

1. **Project Title:** Evans Park

2. **Lead Agency Name and Address:** City of Menifee, Community Development Department, 29714 Haun Road, Menifee, CA 92586

3. **Contact Person and Phone Number:** Bryce Howell, Community Services Department, 951.723.3752

4. **Project Location:** Northeast and southeast of the intersection of Craig Avenue and Evans Road in the City of Menifee, County of Riverside, California (See Figure 1, *Regional Location*, and Figure 2, *Project Location*).

   A. Total Project Area: 22.73 acres

   B. Assessor's Parcel Numbers: 360-170-002, 360-170-003, 360-170-004, 360-170-005, 360-170-006, 360-190-001, 360-190,002

   C. Section 9 of Township 6 South, Range 3 West, on the U.S. Geological Survey (USGS) 7.5-minute Romoland quadrangle

   D. Latitude: 33.6632° Longitude: -117.1960°

5. **Project Applicant:** Not Applicable

   Project Representative: Not Applicable

   Property Owner: City of Menifee

6. **General Plan Designation:** Recreation (OS-R)

7. **Zoning:** Open Space-Recreation (OS-R)

8. **Description of Project:** The Menifee General Plan, Menifee Vision 2030 (General Plan) identifies a standard of 5 acres of parkland per 1,000 residents (City 2013a). Currently, the City of Menifee (City) maintains 35 parks that total 199 acres. Based on the City's Recreation Facility Needs Assessment, the City is forecast to have a population of about 116,453 by 2025 (United States Department of Commerce, Bureau of Census [U.S. Census Bureau] 2020). As such, an additional 381 acres of parkland is required to meet the 5 acres per 1,000 residents standard.

   As part of an extensive City-wide park planning process, the City solicited community involvement and identified City-wide facility usage patterns and park's needs. Recognized recreation standards and population projections provided the City a foundation for understanding the facilities required to meet City's needs. Facility recommendations were ultimately derived based on a prioritization of these needs. This process resulted in the adoption and implementation of the City's Park, Trails, and Open Space Master Plan (Parks Master Plan) (RJM 2016). The Parks Master Plan included Evans Park, as a conceptual 20-acre site that is intended for use by residents of the City of Menifee.

In accordance with the intent of the City's Parks Master Plan, the Evans Park Project (herein referred to as project or proposed project) involves the construction of a new community park in the City. The details of the proposed project are provided below.

The park, located east of Evans Road and north and south of Craig Avenue, (see Figure 1, *Regional Location*, and Figure 2, *Project Location*) would be constructed in two separate phases. The first phase, which would encompass the southern six acres of the 9.17-acre site and is currently funded and designed. The second phase, which would encompass the northern 13.56 acres of the site is in the conceptual phase. Once complete, Evans Park would occupy 22.73 acres and provide approximately 20 acres of recreational and open space facilities.

The Parks Master Plan describes a community park as a park that meets the recreational needs of several neighborhoods and may also preserve unique landscapes and open spaces. These parks serve multiple uses and provide recreational facilities and accommodate group activities not provided in neighborhood parks. Primary access to community park sites is expected to be by arterial and/ or collector streets. Geographic range of users is up to miles or City-wide if the park contains a recreation complex (City 2015). In addition, the City's Parks Development Design Guidelines state that community parks typically serve 18,000 to 25,000 residents within approximately a one-and-a-half-mile radius (City 2015).

Southern Phase

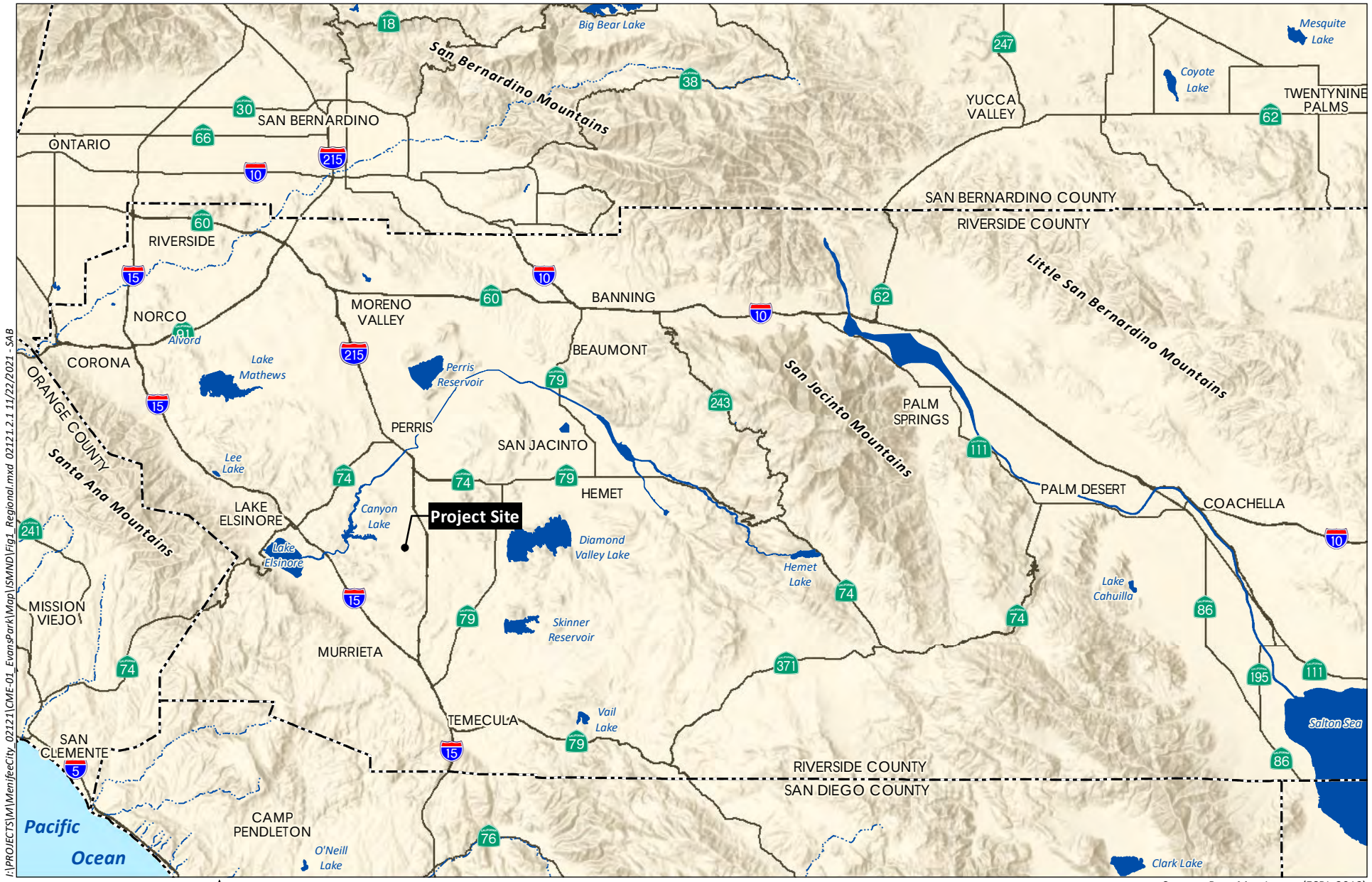
For the first (southern) phase, the City proposes to build an approximately six-acre bicycle trails park on the 9.17-acre site near the southeast corner of Evans Road and Craig Avenue (see Figure 3, *Southern Phase Site Plan*). The bicycle trails park would include a parking lot at the northeast corner with an entrance off Craig Avenue and a prefabricated restroom. The park would be divided into two separate sections a smaller paved tight circuit area called a "Pump Track" and the larger dirt trail portion of the track, which would have some wooden slat sections to add challenging elements to the track. Overall, approximately 90 percent of the southern phase would remain in a natural condition with minimal pervious surfaces incorporated.

Parking would be provided via a 12,000 square foot gravel parking lot in the northeast portion of the site, accessible from Craig Avenue and would accommodate approximately 45 vehicles. While the parking lot would be gravel at the opening of the southern phase, it would transition to a paved lot approximately one year after the southern phase becomes operational. Lighting would be provided via solar powered low emitting diode (LED) light standards. The park would operate from dawn until dusk until the installation of the light standards (to occur approximately one-year after the opening of the southern phase), at which point the park would operate until 9 p.m. Special events would be held at the park approximately four to five times a year and would include the use of a public address system.

It is anticipated that construction on the southern phase would commence in early 2022 with an opening date of late spring to early summer 2022. Once the southern phase becomes operational, regular maintenance would occur such as trash clean up and restroom servicing. The tracks themselves would be subject to maintenance after heavy rains and one to two times a year, however, no regular reshaping of the dirt trails is expected to occur.

This southern phase of the project is in the design stage and is analyzed at a project-level of detail.

Evans Park



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Source: Base Map Layers (ESRI, 2013)

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Regional Location

Figure 1



Source: Aerial (County of Riverside, 2020)

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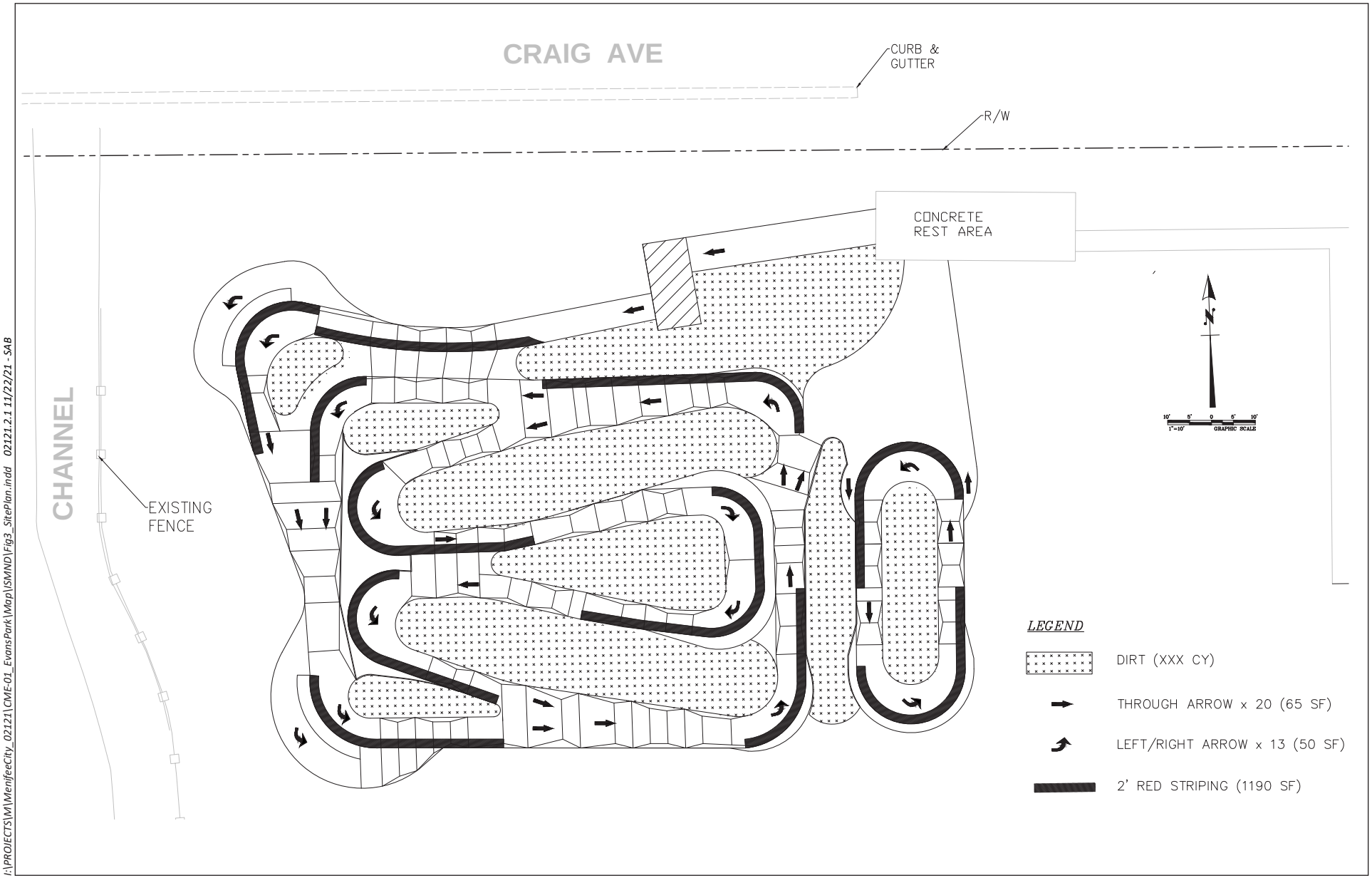
Project Location

Figure 2



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Source: KOA 2021

HELIX Environmental Planning

Southern Phase Site Plan

Figure 3

Northern Phase

The second (northern) phase, which encompasses the 12.88 acres north of Craig Avenue would include a mixture of active and passive spaces. It is the intent to develop the northern phase with a multi-use ball field, splash pad, picnic areas, and trails. Access would be via Evans Road with an internal drive to access the facilities. Ornamental landscaping would be provided throughout, however the existing wetland habitat in the southeastern portion would be retained in its natural state (refer to Figure 2). Overall, the northern phase would remain in a natural state to the maximum extent practicable with minimal impervious surfaces incorporated. It is anticipated that construction of the northern phase would commence in the year 2025.

The framework established in the City of Menifee Park Development and Design Guidelines (2015) provides a foundation for understanding the standards that would be expected for development of the northern phase. The City's Park Development Guidelines states that in general community parks should, "Provide a wide range of facilities that supplement those of the neighborhood parks, and which are determined by the needs and preferences of the community. Recreation centers, athletic fields, multipurpose courts, picnic facilities, play areas, parking areas, and comfort stations, landscaping and turf areas are standard amenities. When possible and desirable, swimming pools and tennis courts may be provided (City 2015)."

Because the northern phase is conceptual in nature and not expected to be developed in the immediate future, the technical studies and CEQA document address the northern phase at a program-level of analysis.

Circulation System Improvements

In addition, the project includes the following project design features as they relate to circulation:

- During the southern phase, the project would construct Evans Road at its ultimate half-section width as a Secondary (104-foot right-of-way) from Craig Avenue to the southern boundary of the southern phase consistent with the City's standards.

- During the southern phase, the project would construct Craig Avenue at its ultimate half-section-width as a Collector (74-foot right-of-way) from Evans Road to the eastern project boundary of the southern phase consistent with the City's standards.

- During the southern phase, the project would construct access to the site via Craig Avenue.

- During the northern phase, the project would construct Evans Road at its ultimate width as a Secondary (104-foot right-of-way) from Corson Avenue to Craig Avenue consistent with the

- City's standards.

- During the northern phase, the project would construct two driveways along Evans Road for site access.

Construction Best Management Practices

The project would also incorporate best management practices (BMPs) during construction to reduce emissions of fugitive dust. The San Diego Air Pollution Control District (SDAPCD) Rule 55 – Fugitive Dust Control states that no dust and/or dirt shall leave the property line. SDAPCD Rule 55 requires the following (SDAPCD 2009):

(1) **Airborne Dust Beyond the Property Line:** No person shall engage in construction or demolition activity subject to this rule in a manner that discharges visible dust emissions into the atmosphere beyond the property line for a period or periods aggregating more than three minutes in any 60-minute period.

(2) **Track-Out/Carry-Out:** Visible roadway dust as a result of active operations, spillage from transport trucks, erosion, or track-out/carry-out shall:

(i) be minimized by the use of any of the following or equally effective track-out/carry-out and erosion control measures that apply to the project or operation:

(a) track-out grates or gravel beds at each egress point,

(b) wheel-washing at each egress during muddy conditions, soil binders, chemical soil stabilizers, geotextiles, mulching, or seeding; and for outbound transport trucks;

(c) using secured tarps or cargo covering, watering, or treating of transported material; and

(ii) be removed at the conclusion of each workday when active operations cease, or every 24 hours for continuous operations. If a street sweeper is used to remove any track-out/carry-out, only PM_{10}-efficient (particulate matter less than 10 microns) street sweepers certified to meet the most current South Coast Air Quality Management District (SCAQMD) Rule 1186 requirements shall be used. The use of blowers for removal of track-out/carry-out is prohibited under any circumstances.

The control measures listed below are the BMPs that the project would incorporate for dust control and are included in the air emissions modeling:

- A minimum of two applications of water shall be applied during grading between dozer/grader passes;
- Paving, chip sealing, or chemical stabilization of internal roadways shall be applied after completion of grading;
- Grading shall be terminated if winds exceed 25 miles per hour (mph);
- All exposed surfaces shall maintain a minimum soil moisture of 12 percent;
- Dirt storage piles shall be stabilized by chemical binders, tarps, fencing, or other erosion control; and
- Vehicle speeds shall be limited to 15 mph on unpaved roads.

9. **Environmental Setting and Surrounding Land Uses:** The project site is located in a newly developing area in the southwestern portion of the City. The project site is relatively flat with elevations ranging from 1475 above mean sea level (amsl) in the northeastern corner to 1489 amsl in the southwestern corner of the northern phase and from 1482 amsl in the northeastern corner to 1486 amsl in the southwestern corner of the southern phase. The site is currently undeveloped and includes small amounts of vegetation. There is a drainage that runs through the northern phase and an earthen Riverside County Flood Control District (RCFCD) flood channel runs through the southern phase. There is also a basin that is dominated by salt cedar in the southern phase that was constructed as part of the surrounding residential development.

   The area surrounding the project site is primarily residential and rural in nature. Residential neighborhoods consisting of detached single-family homes are located to the south and west of the project site. Vacant land is located to the north. The east side of the project site is bordered by Paloma Valley High School and rural residential land uses. The General Plan land use designations, zoning, and existing land uses for the project area and immediate surroundings are provided in Table 1, *Surrounding Land Uses*.

Table 1
SURROUNDING LAND USES

Direction	General Plan Designation	Zoning District	Existing Land Use
Project Site	Recreation (OS-R), 2.1-5 du/ac Residential (2.1-5R)	Open Space-Recreation (OS-R), Low Density Residential-2 (LDR-2) [7,200 SF]	Vacant (undeveloped)
North	2.1-5 du/ac Residential (2.1-5R)	Low Density Residential-2 (LDR-2) [7,200 SF]	Vacant (undeveloped)
South	2.1-5 du/ac Residential (2.1-5R), Conservation (OS-C)	Low Density Residential-2 (LDR-2) [7,200 SF], Open Space-Conservation (OS-C)	Single-family Residential, Open Space
East	Public/Quasi Public Facilities (PF), 2.1-5 du/ac Residential (2.1-5R)	Public/Quasi-Public Facilities (PF), Low Density Residential-2 (LDR-2) [7,200 SF]	Paloma Valley High School, Vacant (undeveloped)
West	2.1-5 du/ac Residential (2.1-5R), Conservation (OS-C)	Low Density Residential-2 (LDR-2) [7,200 SF], Open Space-Conservation (OS-C)	Single-family Residential, Open Space

10. **Other public agencies whose approval is required (e.g., permits, financing approval, or participation agreement):** Implementation of the proposed project may require that approval, permits, licenses, certification, or other entitlements be obtained from various state and local agencies, including:

    - Western Riverside County Regional Conservation Authority (RCA) and California Department of Fish and Wildlife (CDFW) (Burrowing Owl Protection and Relocation Plan)

    - Santa Ana Regional Water Quality (National Pollution Discharge Elimination System [NPDES] Construction General Permit)

Environmental Factors Potentially Affected

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

☐ 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

Determination

On the basis of this initial evaluation:

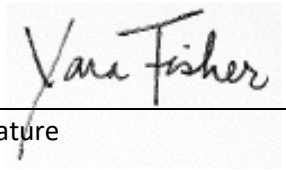
☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

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

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

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

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



Signature — January 24, 2022 (Date)

Yara Fisher (Printed Name) — Bryce Howell, City of Menifee (For)

Evaluation of Environmental Impacts

1) A brief explanation is required for all answers except "No Impact" answers that are adequately supported by the information sources a lead agency cites in the parentheses following each question. A "No Impact" answer is adequately supported if the referenced information sources show that the impact simply does not apply to projects like the one involved (e.g., the project falls outside a fault rupture zone). A "No Impact" answer should be explained where it is based on project-specific factors as well as general standards (e.g., the project will not expose sensitive receptors to pollutants, based on a project-specific screening analysis).

2) All answers must take account of the whole action involved, including off-site as well as on-site, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts.

3) Once the lead agency has determined that a particular physical impact may occur, then the checklist answers must indicate whether the impact is potentially significant, less than significant with mitigation, or less than significant. "Potentially Significant Impact" is appropriate if there is substantial evidence that an effect may be significant. If there are one or more "Potentially Significant Impact" entries when the determination is made, an EIR is required.

4) "Negative Declaration: Less Than Significant With Mitigation Incorporated" applies where the incorporation of mitigation measures has reduced an effect from "Potentially Significant Impact" to a "Less Than Significant Impact." The lead agency must describe the mitigation measures, and briefly explain how they reduce the effect to a less than significant level (mitigation measures from "Earlier Analyses," as described in (5) below, may be cross-referenced).

5) Earlier analyses may be used where, pursuant to the tiering, program EIR, or other CEQA process, an effect has been adequately analyzed in an earlier EIR or negative declaration. Section 15063(c)(3)(D). In this case, a brief discussion should identify the following:

    a. Earlier Analysis Used. Identify and state where they are available for review.

    b. Impacts Adequately Addressed. Identify which effects from the above checklist were within the scope of and adequately analyzed in an earlier document pursuant to applicable legal standards, and state whether such effects were addressed by mitigation measures based on the earlier analysis.

    c. Mitigation Measures. For effects that are "Less than Significant with Mitigation Measures Incorporated," describe the mitigation measures which were incorporated or refined from the earlier document and the extent to which they address site-specific conditions for the project.

6) Lead agencies are encouraged to incorporate into the checklist references to information sources for potential impacts (e.g., general plans, zoning ordinances). Reference to a previously prepared or outside document should, where appropriate, include a reference to the page or pages where the statement is substantiated.

7) Supporting Information Sources: A source list should be attached, and other sources used or individuals contacted should be cited in the discussion.

8) This is only a suggested form, and lead agencies are free to use different formats; however, lead agencies should normally address the questions from this checklist that are relevant to a project's environmental effects in whatever format is selected.

9) The explanation of each issue should identify:

    a. the significance criteria or threshold, if any, used to evaluate each question; and

    b. the mitigation measure identified, if any, to reduce the impact to less than significance.

I. Aesthetics

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Except as provided in Public Resources Code Section 21099, would the project:				
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) 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?	☐	☐	■	☐

Sources: City 2013a; 2013b, California Department of Transportation 2019, U.S. Census Bureau 2020

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

Less than Significant Impact. A scenic vista is generally defined as a public viewpoint that provides expansive or notable views of a highly valued landscape and are typically identified in planning documents, such as a community plan, but can also include locally known areas or locations where high-quality public views are available. As discussed in the City's General Plan EIR:

> The natural mountainous setting of the Menifee area is critical to its overall visual character and provides scenic vistas for the community. Topography and a lack of dense vegetation or urban development offer scenic views throughout the City, including to and from hillside areas. Scenic features include gently sloping alluvial fans, rugged mountains and steep slopes, mountain peaks and ridges, rounded hills with boulder outcrops, farmland and open space. Scenic vistas provide views of these features from public spaces. Many of the scenic resources are outside the City limits and beyond the planning area boundary. Scenic views from Menifee include the San Jacinto Mountains to the northeast and east; the San Bernardino Mountains to the north; the San Gabriel Mountains to the northwest; and the Santa Ana Mountains to the west and southwest (City 2013b).

While the project site itself does not contain any protected scenic resources, the flat topography and undeveloped nature of the project site area afford distant views across the site towards the surrounding mountain ranges and more prominent views toward the sloping hills and boulder outcrops southeast of the project site. The project would introduce new recreational land uses to the project site; however, the pump track and bike trails in the southern phase and the multi-use ball field, splash pad, picnic areas, and trail conceptually proposed in the northern phase, as well as associated infrastructure

(parking lots, restrooms, lighting, signage, etc.) are low profile and would not include the development of features that would obstruct views across the site. The minimal footprint of such features coupled with the topographical changes from the low-lying project site in relation to the height of the mountains, hillsides, and outcroppings , views would be maintained and therefore would not have a substantial adverse effect on a scenic vista. Impacts would be less than significant in relation to this issue.

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

No Impact. California's Scenic Highway Program was created by the legislature in 1963 to protect and enhance the natural scenic beauty of California highways and adjacent corridors. The State Scenic Highway System includes a list of highways maintained by the California Department of Transportation (Caltrans) that are either currently designated or eligible for designation as scenic highways. According to the Caltrans List of Officially Designated and Eligible State Scenic Highways, there are no officially designated state scenic highways in the vicinity of the project site (Caltrans 2019). The nearest eligible state scenic highway is a nearly three-mile section of Interstate (I-) 215 at its juncture with State Route (SR) 74, which is approximately six miles northeast of the project site. It is noted that entirety of I-215 as it traverses through Menifee is a designated scenic corridor within the General Plan (Exhibit CD-2, *Enhanced Landscape Corridors and Scenic Corridors*), indicating that locally this transportation route is considered to allow commuters valuable scenic views. As discussed above, the project would be low-profile, vertical development limited to restrooms and light standards. Other features such as the pump track mounds and trails, picnic tables, multi-use ball field, splash pad, parking lots, and any other associated infrastructures would be visible as you approach the site on the surrounding local circulation network, but not from further distances, such as I-215, which is approximately 1.5 miles to the east and at the same elevation as the project site. Nevertheless, there are no officially designated state scenic highways that have views into the project site and, therefore, the proposed project would not damage scenic resources within a state scenic highway. No impact would occur in relation to this issue.

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

No Impact. Public Resources Code (PRC) 21071 defines the term "urbanized area" for the purpose of CEQA to mean an incorporated city that has a population of at least 100,000 persons or has a population of less than 100,000 persons if the population of that city and not more than two contiguous incorporated cities combined equals at least 100,000 persons. As of 2020, the most recent available data, City has a population of 102,527 (U.S. Census Bureau 2020). Thus, the project site is within an urbanized area and therefore, is evaluated relative to applicable zoning and other regulations governing scenic quality.

The project site has a zoning and land use designation of Recreation (OS-R). In addition to the project's consistency with the zoning and land use designation, the project is consistent with the General Plan and its goals policies as they relate to scenic quality. Particularly, the General Plan policies consider the preservation of scenic vistas, including those that protect undisturbed slopes, hillsides, and other natural landforms that enhance the City's environmental setting. Further, the Open Space and Conservation Background Documents and Definitions document prepared to support the General Plan identifies that,

"As the City grows it is important to establish guidance for the protection and thoughtful development of Menifee's hillsides and natural rock outcroppings. The intent is to ensure that proposed development is carefully designed to respect the views and character that residents have identified as one of the City's most valuable assets (City 2013a)." As shown in Exhibit OSC-1, *Significant Slopes*, the project site is located in an area with minimal slope (0-5 percent) containing no slopes or hillsides and the drainage in the northern phase, a natural landform would remain in its present state. The project site would introduce new elements; however, the design concept is to retain the natural features of the site outside of the trails, multi-use ball field, splash pad, and parking lots.

In addition, the General Plan Community Design Element tasks the City with preserving positive characteristics and unique features of a site during the design and development of a new project; the relationship to scale and character of adjacent uses should be considered (Policy CD-3.1), maintaining and incorporating the city's natural amenities, including its hillsides, indigenous vegetation, and rock outcroppings, within proposed project (Policy CD-3.2), avoiding the blocking of public views by solid walls (policy CD-3.20), and use open space, greenways, recreational lands, and water courses as community separators (Policy CD-3.21). The project would create a pump track that would blend manufactured elements along the circuit and dirt trails with the existing vegetation and topography in the southern phase and similarly introducing a multi-use ball field, splash pad and picnic areas with a trail that it is integrated into the existing landscape of the northern phase. The project would not erect any walls that would obstruct views and would create a transition area between the residential land uses to the south and west and the high school to the north and east.

The project is consistent with the applicable land use designation and zoning and does not interfere with the City implementing goals and policies of the General Plan as they relate to the preservation of scenic resources. No impact would occur in relation to this issue.

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

Less than Significant Impact. There are two primary sources of light: light emanating from building interiors that passes through windows and light from exterior sources (e.g., street lighting, parking lot lighting, building illumination, security lighting, and landscape lighting). The introduction of light can be a nuisance by affecting adjacent areas and diminishing the view of the clear sky depending on the location of the light sources and its proximity to nearby light-sensitive areas.

The project site is located in an area that is developing, there are residential land uses to the south and west and Paloma Valley High School to the east. There are streetlights that align the west side of Evans Road and the north side of Craig Avenue. Other nearby sources of light are light emanating from the residences (exterior and interior) and security, multi-use ball field, and sidewalk/navigational lighting at the high school. Additionally, vehicles traveling along the surrounding roadways are also an existing light source.

The project would include the installation of solar light standards for the southern phase, which will allow the pump track to operate until 9 p.m., at which point the only lighting would be for security. The lighting plan for the northern phase is unknown, however, typical of City parks, lighting would be installed for security and for the operation of the multi-use ball field.

The Menifee Municipal Code (MMC) Title 13 sets forth the regulations for parks and recreation facilities, which includes that all lighted sports fields hall close by 10 p.m. (MMC Section 13.01.250). Further, the

City has adopted the County of Riverside Dark Sky Light Pollution Ordinance, which regulates the allowable lumens per acre and directs that lighting must be fully shielded if feasible and partially shielded in all other cases and must be focused to minimize spill light into the night sky and onto adjacent properties (MMC Section 6.01.040).

Site lighting would consist of pole-mounted and potentially building-mounted lights, which would conform to the California Building Code (CBC), California Code of Regulations (CCR) Title 24, as well as the City's standards that regulate outdoor lighting. All pole-mounted lights would be similar to the existing lighting surrounding the project and would blend into that existing lighting. Therefore, impacts related to lighting would be less than significant.

Glare is generally associated with architectural features such as windows or mirrored glass and solar paneling. The Project does not include any structures that would have such features. The restroom building, which is the only permanent structure proposed at the park, would be constructed of standard building materials, which would not create substantial daytime glare.

Thus, with the required compliance to the MMC and site design features, the project would not create a new source of substantial light or glare that would adversely affect day or nighttime views in the area. Impacts are less than significant in relation to this issue.

II. Agriculture and Forestry Resources

		Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:					
a)	Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	■
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?	☐	☐	☐	■

Sources: California Department of Conservation (DOC) 2019; 2017

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

No Impact. The project site is not classified as Prime Farmland, Unique Farmland, or Farmland of Statewide Importance and the project site is not used for agricultural purposes (Department of Conservation [DOC] 2019). Therefore, the project would not convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance No impact would occur in relation to this issue.

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

No Impact. The Williamson Act is applicable to parcels within an established agricultural preserve consisting of at least 20 acres of Prime Farmland, or at least 40 acres of land not designated as Prime Farmland. The Williamson Act is designed to prevent the premature and unnecessary conversion of open space lands and agricultural areas to urban uses. The Williamson Act enables local governments to enter into contracts with private landowners for the purpose of restricting specific parcels of land for use as agricultural or related open space. The project site is not zoned for agricultural use, is not Prime Farmland, and does not meet the acreage requirements. Additionally, according to the General Plan EIR, all Williamson Act contracts within the City expired in 2017 (City 2013b). Thus, the project would not conflict with an existing agricultural zoning or Williamson Act contract. No impact would occur in relation to this issue.

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))?

No Impact. PRC Section 12220(g) defines “forest land” as land that can support ten percent native cover of any species, including hardwoods, under natural conditions, and that allows for management of one or more forest resources, including timber, aesthetics, fish and wildlife, biodiversity, water quality, recreation, and other public benefits. There are trees that are clustered along the drainage in the northern phase and there are scattered ornamental trees in the southern phase; however, based on the definition provided in the PRC, no forest land occurs within or adjacent to the project site. Moreover, there is no land zoned as forest land or timberland that exists within the project site or within its vicinity. Therefore, the proposed project would not conflict with existing zoning for forest land or timberland. No impact would occur in relation to this issue.

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

No Impact. As stated in item II c), there is no land zoned as forest land or timberland that exists within the project site or its vicinity. As such, implementation of the proposed project would not result in the loss of forest land or conversion of forest land to non-forest use. No impact would occur in relation to this issue.

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?

No Impact. As stated in item II a), the project site is located in an area classified as Farmland of Local Importance. However, the project site is not currently used for agricultural purposes and is not intended

to be used for agricultural uses in the future. Additionally, the project site is not zoned for agricultural purposes, nor does the site have an agricultural land use designation. The project site is currently vacant and does not include forest land. Surrounding land uses include residential and land zoned and designated for residential as well as a high school. Thus, through the existing and planned land uses, the City has not identified this area for agricultural uses or preservation of forest land and the operation of a park would not indirectly convert any land to other uses through the need for offsite infrastructure support. Therefore, the project would not involve changes in the existing environment that could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use. No impact would occur in relation to this issue.

III. Air Quality

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Where available, the significance criteria established by the applicable air quality management district or air pollution control district may be relied upon to make the following determinations. Would the project:				
a) Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	■	☐
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?	☐	☐	■	☐

Sources: HELIX 2021a, Caltrans 1998, Urban Crossroads 2021a

The discussion below is based on the Air Quality and Greenhouse Gas Emission Technical Report prepared by HELIX Environmental Planning, Inc. (HELIX) (HELIX; 2021a), attached to this IS/MND as Appendix A.

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

Less than Significant Impact. The project site is located within the South Coast Air Basin (SCAB), which is governed by the South Coast Air Quality Management District (SCAQMD). The SCAQMD develops and administers local regulations for stationary air pollutant sources within the SCAB, and also develops plans and programs to meet attainment requirements for both federal and state ambient air quality standards (National Ambient Air Quality Standards [NAAQS] and California Ambient Air Quality Standards [CAAQS], respectively). The SCAQMD and the Southern California Association of Governments (SCAG) are responsible for developing and implementing the clean air plan for attainment and maintenance of the Ambient Air Quality Standards (AAQS) in the SCAB. The SCAQMD has developed a sequence of Air Quality Management Plans (AQMP) to reduce emissions. On March 3, 2017, the

SCAQMD adopted the 2016 AQMP, which represents a comprehensive analysis of emissions, meteorology, atmospheric chemistry, regional growth projections, and the impact of existing control measures. The AQMP, in combination with those from all other California nonattainment areas with serious (or worse) air quality problems, is submitted to CARB, which develops the California State Implementation Plan (SIP). The SIP relies on the same information from SCAG to develop emission inventories and emission reduction strategies that are included in the attainment demonstration for the air basin.

In addition, SCAG has prepared the Regional Transportation Plan (RTP)/Sustainable Communities Strategy (SCS), a long-range transportation plan that uses growth forecasts to project trends out over a 20-year period to identify regional transportation strategies to address mobility needs. These growth forecasts form the basis for the land use and transportation control portions of the AQMP. These documents are utilized in the preparation of the air quality forecasts and consistency analysis included in the AQMP. Both the RTP/SCS and AQMP are based, in part, on projections originating with County and City General Plans (SCAG serves as the federally designated metropolitan planning organization for the southern California region).

The project site is zoned and designated as OS-R and would be developed in accordance with those land uses. Additionally, the project site is identified as a desired location for a community park in the City's Parks Master Plan. Because the project is consistent with the local general plan and zoning, pursuant to SCAQMD guidelines, the proposed project is considered consistent with the region's AQMP. As such, proposed project-related emissions are accounted for in the AQMP, which is crafted to bring the basin into attainment for all criteria pollutants. Accordingly, the proposed project would be consistent with the projections in the AQMP. Impacts would be less than significant in relation to this issue.

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

Less than Significant Impact. The project would generate criteria pollutants in the short-term during construction and the long-term during operation. To determine whether a project would result in emissions that would violate an air quality standard or contribute substantially to an existing or projected air quality violation, a project's emissions are evaluated based on the quantitative emission thresholds established by the SCAQMD.

The project's criteria pollutant emissions were calculated using the California Emissions Estimator Model (CalEEMod) Version 2020.4.0. CalEEMod is a statewide land use emissions computer model designed to provide a uniform platform for government agencies, land use planners, and environmental professionals to quantify potential criteria pollutant and GHG emissions associated with both construction and operations from a variety of land use projects. The model was developed for the California Air Pollution Control Officers Association (CAPCOA) in collaboration with the California air districts. CalEEMod allows for the use of default data (e.g., emission factors, trip lengths, meteorology, source inventory) provided by the various California air districts to account for local requirements and conditions, and/or user-defined inputs.

Construction Emissions

Construction of the project would result in temporary increases in air pollutant emissions. These emissions would be generated in the form of fugitive dust emissions (particulate matter less than 10 microns [PM_{10}] and particulate matter less than 2.5 microns [$PM_{2.5}$]) and ozone precursor emissions

(nitrogen oxides [NO_X] and reactive organic gas [ROG]). Construction is expected to occur in 2022 for the southern phase and in 2025 and 2026 for the northern phase.

Construction emissions calculated using CalEEMod Version 2020.4.0 are provided in Appendices A and B of the Air Quality and Greenhouse Gas Emissions Technical Report prepared for the project, included as Appendix A to this IS/MND (HELIX 2021a). The results of the calculations for project construction are shown in Table 2, *Unmitigated Daily Construction Emissions*. The analysis assessed total daily emissions from both project phases broken down by phase of construction. The modeling assumes the application of water on all exposed areas during construction in compliance with SDAPCD Rule 55, *Fugitive Dust Control*. Based on CalEEMod version 2020.4.0, the control efficiency for watering two times per day is 55 percent.

Table 2
UNMITIGATED DAILY CONSTRUCTION EMISSIONS

Phase	ROG lbs/day	NO_X lbs/day	CO lbs/day	SO_X lbs/day	PM_{10} lbs/day	$PM_{2.5}$ lbs/day
Southern Phase (On and Off-site Emissions)						
Site Preparation	3.2	33.1	20.3	<0.1	10.7	6.1
Grading	2.0	20.9	15.8	<0.1	4.3	2.5
Building Construction	2.2	18.0	20.9	<0.1	2.3	1.2
2022 Maximum Daily Emissions[1]	**3.2**	**33.1**	**20.3**	**<0.1**	**10.7**	**6.1**
Northern Phase (On and Off-site Emissions)						
Site Preparation (2025)	2.5	25.3	18.4	<0.1	10.1	5.6
Grading (2025)	3.0	28.0	26.9	0.1	5.5	2.7
Building Construction (2025)	2.2	16.4	23.9	0.1	3.8	1.4
2025 Maximum Daily Emissions[1]	**3.0**	**28.0**	**26.9**	**0.1**	**10.1**	**5.6**
Building Construction (2026)	2.1	16.4	23.5	0.1	3.8	1.4
Paving (2026)	1.0	8.6	0.4	<0.1	0.6	0.4
Architectural Coating (2026)	0.3	1.2	3.0	<0.1	0.6	0.2
2026 Maximum Daily Emissions[1]	**2.1**	**16.4**	**23.5**	**0.1**	**3.8**	**1.4**
SCAQMD Thresholds	*75*	*100*	*550*	*150*	*150*	*55*
2022 - Significant Impact?	***No***	***No***	***No***	***No***	***No***	***No***
2025 - Significant Impact?	***No***	***No***	***No***	***No***	***No***	***No***
2026 - Significant Impact?	***No***	***No***	***No***	***No***	***No***	***No***

Source: HELIX 2021a

[1] Totals may not sum due to rounding, and offsite emissions are included in the totals.

ROG = reactive organic gas; NO_X = nitrogen oxides; CO = carbon monoxide; SO_X = sulfur oxides; PM_{10} = particulate matter 10 microns or less in diameter; $PM_{2.5}$ = particulate matter 2.5 microns or less in diameter; lbs/day = pounds per day

As shown in Table 2, emissions of criteria pollutants and precursors related to project construction would not exceed the SCAQMD significance threshold, and the impact would be less than significant.

Operational Emissions

Long-term operational sources of pollutant emissions include area, energy, mobile (transportation), water use, and solid waste. Area source emissions are generated from on-site activities such as use of consumer products, landscaping maintenance activities, and the reapplication of architectural coatings for maintenance. Energy source emissions would result from on-site electricity. Mobile source emissions are generated from project-related vehicle trips based on the trip generation rates from the Traffic

Study prepared for the project. Table 3, *Daily Operational Emissions*, presents a summary of maximum daily operational emissions for the proposed project.

Table 3
DAILY OPERATIONAL EMISSIONS

Phase	ROG lbs/day	NO_X lbs/day	CO lbs/day	SO_X lbs/day	PM_{10} lbs/day	$PM_{2.5}$ lbs/day
Phase 1						
Area	<0.1	<0.1	<0.1	0	0	0
Energy	0	0	0	0	0	0
Mobile	0.9	1.1	8.3	<0.1	1.8	0.5
Total Phase 1 Daily Emissions[1]	**0.9**	**1.1**	**8.3**	**<0.1**	**1.8**	**0.5**
Phase 2						
Area	<0.1	<0.1	<0.1	0	0	0
Energy	0	0	0	0	0	0
Mobile	1.6	1.7	15.1	<0.1	3.9	1.1
Total Phase 2 Daily Emissions[1]	**1.6**	**1.7**	**15.1**	**<0.1**	**3.9**	**1.1**
Total Operational Emissions	**2.5**	**2.8**	**23.4**	**<0.1**	**5.7**	**1.6**
SCAQMD Thresholds	*55*	*55*	*550*	*150*	*150*	*55*
Significant Impact?	***No***	***No***	***No***	***No***	***No***	***No***

Source: HELIX 2021a

[1] Totals may not sum due to rounding.

ROG = reactive organic gas; NO_X = nitrogen oxides; CO = carbon monoxide; SO_2 = sulfur dioxide; PM_{10} = particulate matter 10 microns or less in diameter; $PM_{2.5}$ = particulate matter 2.5 microns or less in diameter; lbs/day = pounds per day

As shown in Table 3, project operational emissions of criteria pollutants and precursors during long-term operation of the project would not exceed the daily thresholds set by the SCAQMD. Impacts would be less than significant in relation to this issue.

c) Expose sensitive receptors to substantial pollutant concentrations?

Less than Significant Impact. Sensitive populations (i.e., children, senior citizens, and acutely or chronically ill people) are more susceptible to the effects of air pollution than are the general population. Land uses that are considered sensitive receptors typically include residences, schools, playgrounds, childcare centers, hospitals, convalescent homes, and retirement homes. The closest existing sensitive receptors to the project site are the single-family residences located approximately 100 feet west of the project boundary. In addition, the Paloma Valley High School, with recreational fields located approximately 50 feet from the project's northeast corner, was also evaluated. An analysis of the project's potential to expose sensitive receptors to pollutants during construction and operation is provided below.

Construction Activities

Criteria Pollutants

The localized effects from the on-site portion of daily construction emissions were evaluated at sensitive receptor locations potentially impacted by the project according to the SCAQMD's localized significance threshold (LST) method, described above. The proposed project is within source receptor area (SRA) 24, Perris Valley. Consistent with the LST guidelines, when quantifying mass emissions for localized analysis,

only emissions that occur on site are considered. Emissions related to off-site delivery/haul truck activity and construction worker trips are not considered in the evaluation of construction-related localized impacts, as these do not contribute to emissions generated on a project site. Given the distance to the nearest sensitive receptors, the LSTs in SRA 24 for receptors located less than 82 feet (25 meters) are used for project sites greater than 5 acres. Table 4, *Maximum Localized Daily Construction Emissions*, shows the localized construction emissions .

Table 4
MAXIMUM LOCALIZED DAILY CONSTRUCTION EMISSIONS

Phase	NO_X lbs/day	CO lbs/day	PM_{10} lbs/day	$PM_{2.5}$ lbs/day
Phase 1 - 2022 Maximum Daily Onsite Emissions[1]				
Site Preparation	33.1	19.7	10.4	6.0
Grading	20.9	15.3	4.1	2.4
Building Construction	15.6	16.4	0.8	0.8
Highest Phase 1 - Emissions	**33.1**	**19.7**	**10.4**	**6.0**
SCAQMD LST Thresholds (25 meters)	*270*	*1577*	*13*	*8*
Mitigated 2022 Exceed LST @ 25 meters?	***No***	***No***	***No***	***No***
Phase 2 - 2025 Maximum Daily Onsite Emissions[1]				
Site Preparation	25.2	17.9	9.9	5.5
Grading	27.9	26.3	5.3	2.7
Building Construction	12.5	16.1	0.5	0.5
Highest Phase 2 - 2025 Emissions	**25.2**	**17.9**	**9.9**	**5.5**
SCAQMD LST Thresholds (25 meters)	270	1577	13	8
Mitigated 2025 Emissions Exceed LST @ 25 meters?	**No**	**No**	**No**	**No**
Phase 2 - 2026 Maximum Daily Onsite Emissions[1]				
Building Construction	12.5	16.0	0.5	0.5
Paving	8.6	14.6	0.4	0.4
Architectural Coatings	1.1	1.8	0.1	0.1
Highest Phase 2 – 2026 Emissions	12.5	16.0	0.5	0.5
SCAQMD LST Thresholds (25 meters)	*270*	*1577*	*13*	*8*
Mitigated 2026 Emissions Exceed LST @ 25 meters?	***No***	***No***	***No***	***No***

Source: HELIX 2021a

[1] Totals may not sum due to rounding.

NO_X = nitrogen oxides; CO = carbon monoxide; PM_{10} = particulate matter 10 microns or less in diameter; $PM_{2.5}$ = particulate matter 2.5 microns or less in diameter; lbs/day = pounds per day

As shown in Table 4, localized emissions for all criteria pollutants would remain below their respective SCAQMD LSTs at 82 feet (25 meters) during each phase of construction. Construction emissions during phase one and phase two would not result in exposure of sensitive receptors to substantial localized concentrations of criteria pollutants and precursors. Impacts would be less than significant in relation to this issue.

Toxic Air Contaminants

Diesel particulate matter (DPM) is the primary toxic air contaminant (TAC) that would be emitted during construction, and would be generated from the use of heavy-duty construction equipment, haul trucks, on-site generators, and construction worker vehicles. Health-related risks associated with diesel-exhaust emissions are primarily linked to long-term exposure and the associated risk of contracting cancer. The

amount to which the receptors could be exposed, which is a function of concentration and duration of exposure, is the primary factor used to determine health risk. The generation of TAC emissions during construction would be variable and sporadic due to the nature of construction activity. During some equipment-intensive phases such as grading, construction-related emissions would be higher than other less equipment-intensive phases such as building construction. Overall, construction is anticipated to last a total of approximately 490 working days, consisting of 380 working days for the northern phase and 110 working days for the southern phase. The closest sensitive receptors to the project site are the single-family residences located approximately 100 feet west of the project boundary, in addition to Paloma Valley High School, with recreational fields located approximately 50 feet from the project's northeast corner. Due to the short duration and intermittent nature of construction activities, and due to the highly dispersive properties of DPM, project-related TAC emission impacts during construction would not expose sensitive receptors to substantial pollutant concentrations and the impact would be less than significant.

Operational Activities

Carbon Monoxide Hotspots

A CO hotspot is an area of localized CO pollution caused by severe vehicle congestion on major roadways, typically near intersections. In accordance with the Transportation Project-Level Carbon Monoxide Protocol, CO hot spots are typically evaluated when: (a) the level of service (LOS) of an intersection decreases to a LOS E or worse because of the project; (b) signalization and/or channelization is added to an intersection; and (c) sensitive receptors such as residences, schools, hospitals, etc., are located in the vicinity of the affected intersection or roadway segment (Caltrans 1998). According to the Traffic Study prepared for the project, the Evans Road & Craig Avenue intersection is currently LOS F during the morning rush. Without mitigation, the intersection will remain LOS F with the project. With roadway improvements, the study area intersections are anticipated to operate at an acceptable LOS during the peak hours under the opening year cumulative condition (2025). Implementation of the project would not result in the LOS of any of the analyzed intersections degrading (Urban Crossroads 2021a). Therefore, consistent with the CO Protocol, operation of the project would not result in exposure of sensitive receptors to substantial localized CO concentrations. Impacts would be less than significant in relation to this issue.

Toxic Air Contaminants

Long-term operation of the project would result in some emissions of DPM from vehicles traveling to and from the project site. However, the project would not require the regular use of heavy or medium diesel-powered trucks (other than for occasional deliveries and waste collection) and the mix of vehicles traveling to and from the project site would primarily be light duty autos and trucks typical of the region. Therefore, the project would not result in significant localized concentrations of DPM. As a recreational park, the proposed project in not anticipated to generate other long-term operational TACs. Therefore, long-term operation of the project would not result in the exposure of sensitive receptors to substantial pollutant concentrations and the impact would be less than significant.

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

Less than Significant Impact. Minor amounts of odor compounds associated with diesel heavy equipment exhaust and VOCs would be emitted during construction of the project. The odors of these

emissions may be considered objectionable; however, construction emissions would be minor and temporary. Additionally, construction equipment associated with the project would be operating at various locations throughout the project site and would not take place all at once. Odorous hydrocarbons emissions would dissipate beyond the emissions sources and would only affect receptors in the immediate vicinity of the construction site. Construction-related operations would also be temporary in nature and would cease at the completion of construction. Therefore, construction activities would not result in nuisance odors. Odor impacts associated with construction would be less than significant. Operation of the project includes the operation of a park and does not include land uses commonly associated with odor complains, such as agricultural uses, wastewater treatment plants, food processing plants, chemical plants, and landfills. Therefore, long-term operation of the project would not be a substantial source of objectionable odors. Therefore, the project would not create objectionable odors affecting a substantial number of people, and the impact would be less than significant.

IV. Biological Resources

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and 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 US 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?	☐	■	☐	☐

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
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?	☐	■	☐	☐

Sources: HELIX 2021b, CDFW 2009, CDFW 2000, USFWS 2000, County 2006, CDFW 2021, CDFW 2012, USFWS 2015, Dudek 2003, South Coast Wildlands 2008, Riverside County Habitat Conservation Authority 1996.
HELIX conducted a General Biological Resources Assessment for the Evans Park Project (HELIX 2021b).

The discussion below is based on the General Biological Resources Assessment prepared by HELIX for the proposed project in November 2021 (HELIX 2021b). the General Biological Resources Assessment is attached to this IS/MND as Appendix B.

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?

Less than Significant with Mitigation Incorporated. Potential impacts resulting from the southern and northern phases are analyzed below.

Rare Plant Species

Southern Phase

Rare plant species include those species listed by the California Native Plant Society (CNPS) with a California Rare Plant Rank (CRPR) of 1, 2, or 3, federally and state listed endangered and threatened species, or those species that require additional surveys by the MSHCP.

Rare plant surveys were not required since the southern phase is not located within a Criteria Area Species Survey Area (CASSA) or Narrow Endemic Plant Species Survey Area (NEPSSA) [see item IV f), below]. According to a database search conducted on the California Natural Diversity Database (CNDDB) by the General Biological Resources Assessment, one species, smooth tarplant (*Centromadia pungens* ssp. *laevis*) was determined to have a high potential to occur on the southern phase based on suitable habitat and recent observations within the immediate vicinity of the site. The nearest record of smooth tarplant was recorded in 2015, 0.30 mile to the north, north of Paloma Valley High School. Smooth tarplant is conditionally covered under the MSHCP and is a CRPR 1B.1 species. Smooth tarplant and burrowing owl occur within the same habitat on-site, and two of the burrowing owl focused surveys overlapped within the species blooming period. Both of the surveys were negative for smooth tarplant. Therefore, impacts to rare plant species resulting from the southern phase of the proposed project would be less than significant.

Northern Phase

Rare plant surveys were not required since the southern phase is not located within a CASSA or NEPSSA [see item IV f), below]. According to a database search conducted on CNDDB by the General Biological

Resources Assessment, three rare plant species were considered to have a potential to occur within the northern phase based on the presence of potentially suitable habitat and observations within the vicinity of the northern phase: smooth tarplant, Parry's spineflower (*Chorizanthe parryi* var. *parryi*), and long-spined spineflower (*Chorizanthe polygonoides* var. *longispina*). Therefore, a significant impact may occur. Per mitigation measure BIO-1, rare plant surveys would be conducted within this suitable habitat to determine the presence of species. The focused surveys would be conducted in accordance with published agency guidelines (CDFW 2009, CDFW 2000, and USFWS 2000) and during the appropriate time of year as outlined in mitigation measure BIO-1. If rare plants are identified and cannot be avoided, the project-level biological survey report would justify why species-specific mitigation is necessary and propose mitigation to reduce project impacts to a less than significant level. With implementation of mitigation measure BIO-1, impacts to rare plant species in the northern phase would be less than significant.

Sensitive Animal Species

Southern Phase

Sensitive animal species include federally and state listed endangered and threatened, candidate species for listing by the CDFW, and/or are species of special concern (SSC) pursuant to CDFW. According to the General Biological Resources Assessment, seven sensitive animal species were determined to have potential to occur on the southern phase: Crotch bumblebee (*Bombus crotchii*), coastal whiptail (*Aspidoscelis tigris stejnegeri*), loggerhead shrike (*Lanius ludovicianus*), San Diego black-tailed jackrabbit (*Lepus californicus bennettii*), Stephens' kangaroo rat (*Dipodomys stephensi*), Burrowing Owl (*Athene cunicularia*; BUOW), and western mastiff bat (*Eumops perotis californicus*).

Crotch bumblebee has a low potential to occur within the disturbed California buckwheat scrub in the southeastern portion of the southern phase. This species is currently listed on CNDDB as a State Candidate Endangered Species. However, the Sacramento Superior Court recently ruled that insects are not subject to protection under the California Endangered Species Act (Almond Alliance et al. v. California Fish and Game Commission). Therefore, this species is not evaluated further because of this and its low potential to occur onsite.

Coastal whiptail, loggerhead shrike, San Diego black-tailed jackrabbit, and Stephens' kangaroo rat are fully Covered Species under the MSHCP. With payment of the Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP) Local Development Mitigation Fee (LDMF), no additional mitigation is required for potential impacts to these species. In addition, the southern phase is located within the Stephens' kangaroo rat Habitat Conservation Plan (HCP), and the project is required to pay a Stephens' kangaroo rat mitigation fee for incidental take authorization under the Stephens' kangaroo rat HCP prior to issuance of a grading permit, a certificate of occupancy, or upon final inspection, whichever occurs first.

BUOW is a conditionally Covered Species under the MSHCP. Focused BUOW surveys were conducted in the southern phase during the 2021 breeding season in accordance with the County's survey protocol (2006). No BUOWs or BUOW sign were observed on the southern phase during the focused survey; therefore, BUOW is currently presumed absent from the surveyed portion of the southern phase. However, a 30-day pre-construction survey is required to be conducted on the entire southern phase. To avoid significant impacts, the project would implement mitigation measure BIO-2. If BUOWs are observed during the 30-day pre-construction survey, additional measures would be required as outlined in BIO-2.

Although western mastiff bat is not an MSHCP Covered Species, it is listed as SSC by CDFW and does not carry a federal or state listing as threatened or endangered. The southern phase does not support suitable roosting habitat for western mastiff bat. Some potential foraging habitat exists on the southern phase, although the habitat is considered low quality based on the high level of existing disturbance. Western mastiff bat was recorded on CNDDB in 2001, approximately two miles northwest of the southern phase. Based on the presence of small extant of suitable habitat, lack of recent observations, and absence of suitable roosting habitat for western mastiff bat, no significant impacts to this bat species is anticipated by the southern phase.

Therefore, with implementation of mitigation measure BIO-2, impacts to sensitive animal species resulting from the southern phase would be less than significant.

Northern Phase

According to the General Biological Resources Assessment, nine sensitive animal species were determined to have potential to occur on the southern phase: western spadefoot (*Spea hammondii*), coastal whiptail, loggerhead shrike, Stephens' kangaroo rat, San Diego black-tailed jackrabbit, BUOW, Riverside fairy shrimp (*Streptocephalus woottoni*), western mastiff bat, and western yellow bat (*Lasiurus xanthinus*).

Western spadefoot, coastal whiptail, loggerhead shrike, Stephens' kangaroo rat, and San Diego black-tailed jackrabbit are fully Covered Species under the MSHCP. With the payment of the MSHCP LDMF, no additional mitigation is required for potential impacts to these species. The northern phase is located within the Stephens' kangaroo rat HCP and is required to pay a Stephens' kangaroo rat mitigation fee for incidental take authorization under the Stephens' kangaroo rat HCP prior to issuance of a grading permit, a certificate of occupancy, or upon final inspection, whichever occurs first.

BUOW and Riverside fairy shrimp are conditionally Covered Species under the MSHCP. The northern phase is located within the BUOW Survey Area, and suitable habitat is present within the northern phase. To avoid potential impacts to BUOW, the project would implement mitigation measure BIO-3 to conduct focused surveys in the northern phase prior to ground-disturbing activities. Measure BIO-1 also requires a 30-day pre-construction survey to be conducted on the entire northern phase. If BUOWs are observed during focused surveys and/or during the 30-day pre-construction survey, additional measures would be required as outlined in BIO-2 and BIO-3.

The northern phase supports suitable fairy shrimp habitat within the mapped herbaceous wetland and disturbed wetland communities. Therefore, focused surveys for the fairy shrimp species should be completed, and if fairy shrimp surveys are positive, additional measures would be required as outlined in mitigation measure BIO-4.

Although western mastiff bat and western yellow bat are not MSHCP Covered Species, these species are listed as SSC by CDFW and do not carry a federal or state listing as threatened or endangered. The northern phase does not support suitable roosting habitat for either bat species. Some potential foraging habitat exists on the northern phase, although the habitat is considered low quality based on the high level of existing disturbance. Western mastiff bat was recorded on CNDDB in 2001, approximately two miles northwest of the northern phase. Western yellow bat was only recorded on CNDDB in 1982, approximately three miles to the north of the northern. Based on the presence of small extant of suitable habitat, lack of recent observations, and absence of suitable roosting habitat for

western yellow bat and western mastiff bat, no significant impacts to either of these sensitive bat species are anticipated by the northern phase.

Therefore, with implementation of mitigation measures BIO-1 through BIO-4, impacts to sensitive animal species resulting from the northern phase would be less than significant.

Sensitive Vegetation Communities

Southern Phase

Approximately 1.92 acres of the 9.17-acre southern phase are proposed for development, which is dominated by non-native vegetation (Table 5, Impacts to Southern Phase Vegetation and Land Uses). Temporary impacts to sensitive natural communities are those associated with the 30-foot construction buffer surrounding the pump track, parking, and restroom facility. There are no temporary impacts to sensitive natural communities associated with the bike track as the soil will be scraped using a skip loader with a scraper attachment. Additionally, 1,500 feet of silt fencing would be placed around the construction basin to avoid any impacts to potentially jurisdictional habitat. None of the vegetation communities mapped on the southern phase are considered sensitive pursuant to CDFW (2021). Therefore, no impacts to sensitive vegetation communities would occur during the southern phase, and mitigation is not warranted.

Table 5
IMPACTS TO SOUTHERN PHASE VEGETATION AND LAND USES

MSHCP Vegetation Community Classification Collapsed	MSHCP Vegetation Community Classification Uncollapsed	Holland/Oberbauer	Temporary Impacts (Acres)	Permanent Impacts (Acres)
Coastal Sage Scrub	Riversidean Sage Scrub	Riversidean sage Scrub (disturbed form)	--	--
Riparian Scrub, Woodland, Forest	Tamarisk Scrub	Tamarisk Scrub (including disturbed)	--	--
Developed/Disturbed Land	Residential/Urban	Urban/Developed	--	--
	Exotic	Disturbed	0.81	1.11
Water	Open Water	Open Water	--	--
		TOTAL	**0.81**	**1.92**

Source: HELIX 2021b

Northern Phase

Because no specific site plan is available for the northern phase, the General Biological Resources Assessment conservatively assumes the entire 13.56-acre northern phase may be proposed for development (Table 6, *Impacts to Northern Phase Vegetation and Land Uses*). The majority of the northern phase is dominated by disturbed habitat. None of the vegetation communities mapped on the northern phase are considered sensitive pursuant to CDFW (2021). Therefore, no impacts to sensitive vegetation communities would occur, and mitigation is not warranted.

Table 6
IMPACTS TO NORTHERN PHASE VEGETATION AND LAND USES

MSHCP Vegetation Community Classification Collapsed	MSHCP Vegetation Community Classification Uncollapsed	Holland/Oberbauer	Temporary Impacts (Acres)	Permanent Impacts (Acres)
Riparian Scrub, Woodland, Forest	Southern Willow Scrub	Southern Willow Scrub	--	0.61
	Tamarisk Scrub	Tamarisk Scrub	--	0.12
N/A[4]	N/A	Disturbed Wetland	--	0.48
N/A[6]	N/A	Herbaceous Wetland	--	0.08
Grassland	Non-native Grassland	Non-native grassland	--	4.68
Developed/Disturbed Land	Residential/Urban	Urban/Developed	--	0.43
	Exotic	Disturbed	--	7.16
		TOTAL	**--**	**13.56**

Source: HELIX 2021b

Mitigation

BIO-1 **Rare Plants:** Due to the presence of suitable habitat for smooth tarplant, Parry's spineflower, and long-spined spineflower in the northern phase, a qualified biologist shall survey the northern phase during the appropriate time of year (i.e., when the species is readily identifiable, such as during its blooming period) prior to initiating construction activities. The focused surveys shall be conducted in accordance with published agency guidelines (CDFW 2009, CDFW 2000, USFWS 2000). If individuals are found, one or more of the following shall be completed:

- Seed collection of the rare plant species at the end of the growing season and prior to ground disturbance, or obtain special-status plant species seeds from a native plant nursery if available, and plant collected seeds within an appropriate on-site or off-site mitigation area, which will be conserved as open space in perpetuity;

- Payment into a mitigation bank and/or in-lieu fee program that has mitigation available for the rare plant species; and/or

- Preservation of land that contains the rare plant species.

Mitigation for significant impacts to special-status plant species will be implemented in consultation with CDFW.

BIO-2 **Burrowing Owl Pre-construction Survey:** In compliance with the MSHCP, a pre-construction survey shall be conducted on the southern phase within 30 days prior to ground disturbance to determine the presence of burrowing owls. If the pre-construction survey is negative and burrowing owl is confirmed absent, then ground-disturbing activities (i.e., earthwork, clearing, and grubbing) shall be allowed to commence and no further mitigation would be required.

If BUOW is observed during the pre-construction survey, active burrows shall be avoided by the project in accordance with the CDFW's *Staff Report on Burrowing Owl Mitigation* (2012) or CDFW's most recent guidelines. The Project Proponent shall immediately inform the Western Riverside County RCA of BUOW observations. A BUOW Protection and Relocation Plan (plan) shall be prepared by a qualified biologist, which must be sent for approval by RCA prior to

initiating ground disturbance. The RCA will coordinate directly with CDFW as needed to ensure that the plan is consistent with the MSHCP and CDFW guidelines. The plan shall detail avoidance measures that shall be implemented during construction and passive or active relocation methodology. Relocation shall only occur outside of the nesting season (September 1 through January 31). The RCA may require the creation of translocation sites within the MSHCP Conservation Area for the establishment of new colonies. If required, the translocation sites must take into consideration unoccupied habitat areas, the presence of burrowing mammals, existing colonies, and the effects to other MSHCP Covered Species in order to successfully create suitable habitat for BUOW. The translocation sites must be developed in consultation with RCA. If required, translocation sites would also be described in the agency-approved plan.

BIO-3 **Burrowing Owl Protocol Survey:** Prior to the commencement of ground-disturbing activities (i.e., earthwork, clearing, and/or grubbing) in the northern phase, Step II surveys shall be conducted to determine the presence or absence of BUOW on the project site. The surveys shall be conducted in accordance with the County's survey protocol (2006). If BUOW is not detected during the Step II surveys, a pre-construction survey shall be conducted on the southern phase within 30 days prior to ground disturbance to determine the presence of BUOW. If the pre-construction survey is negative and BUOW is confirmed absent, ground-disturbing activities shall be allowed to commence, and no further mitigation is required.

If BUOW is observed on the southern phase during the Step II surveys, a Determination of Biologically Equivalent or Superior Preservation assessment shall be completed to ensure that the proposed alternative provides for the replacement of any lost functions and values of habitat. At least 90 percent of the area with long-term conservation value and BUOW pairs shall be conserved on-site if the southern phase (including adjacent areas) supports three or more pairs BUOWs; supports greater than 35 acres of suitable habitat, and is non-contiguous with MSHCP Conservation Area lands.

If BUOW is observed during the Step II surveys or the pre-construction survey, active burrows shall be avoided by the project in accordance with the CDFW's *Staff Report on BUOW Mitigation* (2012) or CDFW's most recent guidelines. The project proponent shall inform the Western Riverside County Regional Conservation Authority (RCA) of BUOW observations. A BUOW Protection and Relocation Plan (plan) shall be prepared by a qualified biologist, which must be sent for approval by RCA prior to initiating ground disturbance. The RCA will coordinate directly with CDFW as needed to ensure that the plan is consistent with the MSHCP and CDFW guidelines. The plan shall detail avoidance measures that shall be implemented during construction and passive or active relocation methodology. Relocation shall only occur outside of the nesting season (September 1 through January 31).

BIO-4 **Fairy Shrimp:** Prior to commencement of ground-disturbing activities (i.e., earthwork, clearing, and/or grubbing) within the northern phase, dry and wet season focused surveys for federally listed fairy shrimp species shall be completed. The surveys shall be conducted by a permitted biologist and follow the current USFWS survey protocol for large brachiopods (USFWS 2015). Survey results shall be submitted to USFWS following completion of the surveys. If listed fairy shrimp species are not detected during the wet season surveys, then ground-disturbing activities shall be allowed to commence within the Phase III portion of the southern phase, and no further mitigation is required.

If federally listed fairy shrimp are identified during the wet and/or dry season surveys, and the project cannot avoid occupied habitat, a DBESP assessment shall be completed to ensure that the proposed alternative provides for the replacement of any lost functions and values of habitat. Project impacts to occupied listed fairy shrimp habitat shall be accomplished through the purchase of off-site mitigation credits at an agency-approved mitigation bank or in-lieu fee program, or through the purchase of off-site land that supports occupied habitat at a ratio of no less than 2:1. If off-site land is purchased, the mitigation site shall be preserved in perpetuity through a conservation easement, deed restriction, or similar legal protection mechanism.

b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified 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 with Mitigation Incorporated. Potential impacts to riparian habitat or other sensitive natural communities for the southern and northern phases are analyzed below.

Southern Phase

According to the General Biological Resources Assessment, the southern phase supports a total of 3.20 acres of potential jurisdictional habitat pursuant to Section 1602 of the CFG Code as regulated by CDFW, consisting of 1.37 acres of basin with riparian vegetation and 1.83 acres of vegetated flood control channel. Potential CDFW jurisdiction in the southern phase will be entirely avoided by the project, and mitigation is not warranted (refer to Table 5, above). Additionally, 1,500 feet of silt fencing will be placed around the construction basin to avoid any impacts to potentially jurisdictional habitat. Therefore, impacts to riparian habitat in the southern phase would not occur.

Northern Phase

According to the General Biological Resources Assessment, the northern phase supports a total of 1.35 acres of potential jurisdictional streambed and habitat pursuant to Section 1602 of the CFG Code as regulated by CDFW. Potential CDFW jurisdiction in the northern phase includes 0.55 acre of wetland habitat, 0.61 acre of southern willow scrub, and 0.19 acre of streambed habitat. A formal delineation of jurisdictional resources was not conducted, as the evaluation of the northern phase was conducted at a programmatic level. Therefore, a formal delineation of jurisdictional limits would be required in the northern phase prior to development to determine the limits, per mitigation measure BIO-5. Where avoidance is not feasible, project-specific impacts to jurisdictional resources would be applied by federal and state regulators via the applicable consulting and permitting process. The types of mitigation required may include on-site or off-site preservation, enhancement, creation, and/or restoration. With implementation of mitigation measure BIO-5, impacts to riparian habitat in the northern phase would be less than significant.

Mitigation

BIO-5 **Jurisdictional Resources:** A jurisdictional assessment shall be conducted for the northern phase. Jurisdictional resources shall be avoided when feasible. Where avoidance is not feasible, project-specific impacts to jurisdictional resources will be applied by federal and state regulators via the applicable consulting and permitting process. The types of mitigation required may include on-site or off-site preservation, enhancement, creation, and/or restoration at a ratio of no less than 2:1 or higher, and are to be accomplished in close proximity to the impacts or at

least in the same watershed. Final requirements and locations are, however, subject to change during applicable consultation/permit processes required by the USACE, RWQCB, and CDFW.

If Riparian/Riverine Areas in the northern phase (which are consistent with CDFW jurisdictional resources) cannot be avoided, a DBESP assessment shall be completed to ensure that the proposed alternative provides for the replacement of any lost functions and values of habitat. Project impacts to Riparian/Riverine Areas shall be accomplished through on-site mitigation, the purchase of off-site mitigation credits at an agency-approved mitigation bank or in-lieu fee program, or through the purchase of off-site land. If off-site land is purchased, the mitigation site shall be preserved in perpetuity through a conservation easement, deed restriction, or similar legal protection mechanism.

BMPs to minimize and avoid impacts to jurisdictional resources during and after construction may include, but are not limited to, the following:

- Construction-related equipment will be stored in developed areas, outside of the drainage. No equipment maintenance will be done within or adjacent to the drainage.
- Source control and treatment control BMPs will be implemented to minimize the potential contaminants that are generated during and after construction. Water quality BMPs will be implemented throughout the project to capture and treat potential contaminants.
- Substances harmful to aquatic life will not be discharged into the drainage. All hazardous substances will be properly handled and stored.
- A Storm Water Pollution Prevention Plan will be prepared to prevent sediment from entering the drainage during construction.
- To avoid attracting predators during construction, the project will be kept clean of debris to the extent possible. All food-related trash items will be enclosed in sealed containers and regularly removed from the site.
- Construction personnel will strictly limit their activities, vehicles, equipment, and construction material to the proposed project footprint, staging areas, and designated routes of travel.
- Exclusion fencing will be installed to demarcate the limits of disturbance. The exclusion fencing should be maintained until the completion of construction activities.

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?

Less than Significant with Mitigation Incorporated. Potential impacts related to wetlands for the southern and northern phases are analyzed below.

Southern Phase

According to the General Biological Resources Assessment, the southern phase supports a total of 3.20 acres of potential jurisdictional resources pursuant to Sections 404/401 of the Clean Water Act (CWA) as regulated by USACE and the Regional Water Quality Control Board (RWQCB). The potential

jurisdictional resources in the southern phase would be entirely avoided by the project, so impacts in in the southern phase would be less than significant.

Northern Phase

The northern phase supports potential jurisdictional waters and wetlands pursuant to Sections 404/401 of the CWA as regulated by USACE and RWQCB. A formal delineation of jurisdictional resources was not conducted as part of the General Biological Resources Assessment, as the evaluation was conducted at a programmatic level. Therefore, a formal delineation of jurisdictional limits would be required in the northern phase prior to development to determine the jurisdictional limits, per mitigation measure BIO-5 above. If resources under USACE and/or RWQCB jurisdiction are identified, impacts should be avoided where feasible. Where avoidance is not feasible, project-specific impacts to jurisdictional resources will be applied by federal and state regulators via the applicable consulting and permitting process. The types of mitigation required may include on-site or off-site preservation, enhancement, creation, and/or restoration. With implementation of mitigation measure BIO-5, impacts would be less than significant.

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

Less than Significant with Mitigation Incorporated. Potential impacts related to wildlife movement and migratory species for the southern and northern phases are analyzed below.

Southern Phase

The southern phase is not part of a regional corridor and does not serve as a nursery site. The southern phase is not identified by the MSHCP (Dudek 2003) or South Coast Missing Linkages (South Coast Wildlands 2008) as being part of a local or regional corridor or linkage. The southern phase currently does not directly connect two or more large blocks of habitat. The southern phase is bounded by residential development to the north and west. The southern phase does not support native communities, with the exception of a small, isolated patch of disturbed Riversidean sage scrub, and is dominated by non-native species that may be used by birds and smaller mammals and reptiles that have adapted to human disturbance. Some wildlife moving may use the southern phase for foraging and/or nesting, but the use of the southern phase would be restricted due to limited vegetative cover and adjacent disturbance from existing human development. Therefore, impacts to wildlife movement in the southern phase would be less than significant, and mitigation is not warranted.

Regarding migratory species, the development of the proposed southern phase could disturb or destroy active migratory bird nests, including eggs and young. Disturbance to or destruction of migratory bird eggs, young, or adults is in violation of the MBTA and is considered a potentially significant impact. Although suitable habitat for nesting birds on the southern phase is limited, herbaceous ground cover and shrubs located throughout the southern phase could provide habitat for protected nesting bird species. Mitigation measure BIO-6 would help ensure the southern phase follows MBTA regulations, and would reduce impacts to a less than significant level.

Northern Phase

The northern phase is not part of a regional corridor and does not serve as a nursery site. The northern phase is not identified by the MSHCP (Dudek 2003) or South Coast Missing Linkages (South Coast Wildlands 2008) as being part of a local or regional corridor or linkage. The northern phase currently does not directly connect two or more large blocks of habitat. The northern phase is bounded by development to the east and west. The northern phase is dominated by non-native habitat. There is a drainage on-site which may be used by smaller mammals and reptiles, but it is restricted due to the surrounding development. Therefore, impacts to wildlife movement and migratory species would be less than significant, and mitigation is not warranted.

Regarding migratory species, the development of the northern phase could disturb or destroy active migratory bird nests, including eggs and young. Disturbance to or destruction of migratory bird eggs, young, or adults is in violation of the MBTA and is considered a potentially significant impact. Within the northern phase, the trees along the drainage could provide habitat for protected nesting birds. Mitigation measure BIO-6 would help ensure the northern phase follows MBTA regulations, and would reduce impacts to a less than significant level.

Mitigation

BIO-6 **Nesting Birds:** To the extent feasible, construction activities (i.e., earthwork, clearing, and grubbing) within the southern phase or northern phase shall occur outside of the general bird nesting season for migratory birds. The general nesting season is March 15 through August 31 for songbirds and January 15 through August 31 for raptors.

If construction activities (i.e., earthwork, clearing, and grubbing) must occur during the general bird nesting season for migratory songbirds (March 15 through August 31) and raptors (January 15 through August 31) within the southern phase or northern phase, a qualified biologist shall perform a pre-construction survey of potential nesting habitat to confirm the absence of active nests belonging to migratory birds and raptors afforded protection under the MBTA and CFG Code. The pre-construction survey shall be performed no more than seven days prior to the commencement of construction activities. If construction is inactive for more than seven days, an additional survey shall be conducted. The results of the pre-construction survey shall be documented by the qualified biologist.

If the qualified biologist determines that no active migratory bird or raptor nests occur, the activities shall be allowed to proceed without any further requirements. If the qualified biologist determines that an active migratory bird or raptor nest is present, no impacts within 300 feet (500 feet for raptors) of the active nest shall occur until the young have fledged the nest and the nest is confirmed to no longer be active, or as determined by the qualified biologist. The biological monitor may modify the buffer or propose other recommendations in order to minimize disturbance to nesting birds.

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

Less than Significant with Mitigation Incorporated. According to the General Biological Resources Assessment, the southern phase of the proposed project supports trees. However, none of the trees within the southern phase would be impacted. Therefore, the project would not conflict with

Section 9.86.130 of the City's Ordinance. However, the northern phase supports trees that may be subject to tree protection measures and may be impacted. With implementation of mitigation measure BIO-7, the City would ensure consistency with the City's tree ordinance, which would reduce any direct impacts to City-protected trees to a less than significant level.

Mitigation

BIO-7 **Protected Trees:** Prior to impacting any trees within the northern phase, the City will confirm compliance with the City of Menifee's Park Design, Landscaping and Tree Preservation (Section 9.86.130 of the City's Ordinance No. 2015-167).

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?

Less than Significant with Mitigation Incorporated. According to the General Biological Resources Assessment, the southern phase is within the City/Menifee Area Plan of the MSHCP. The project site is not located within or adjacent to an MSHCP Criteria Area; therefore, the project site is not subject to special conservation requirements that apply to cells and is not required to undergo the Habitat Acquisition and Negotiation Strategy (HANS) process. The following analysis demonstrates the project's compliance with MSHCP requirements.

Riparian/Riverine Areas and Vernal Pools (MSHCP Section 6.1.2)

The identification of MSHCP Riparian/Riverine resources is based on the potential for the habitat to support, or be a tributary to habitat that supports Riparian/Riverine Covered Species. The MSHCP defines Riparian/Riverine habitat as "lands which contain Habitat dominated by trees, shrubs, or emergent mosses and lichens, which occur close to, or which depend upon, soil moisture from a nearby fresh water source; or areas with freshwater flow during all or a portion of the year" (Dudek 2003). The MSHCP defines Vernal Pools as "seasonal wetlands that occur in depression areas that have wetlands indicators of all three parameters (soils, vegetation, and hydrology) during the wetter portion of the growing season but normally lack wetlands indicators of hydrology and/or vegetation during the drier portion of the growing season" (Dudek 2003). Artificially created wetlands, except for those created intentionally to provide habitat or resulting from the creation of open waters or alteration of natural stream courses, are not considered MSHCP Vernal Pools.

Southern Phase

The southern phase does not support Riparian/Riverine or Vernal Pool habitat as defined by MSHCP. Therefore, the southern phase would not result in significant impacts to MSHCP Riparian/Riverine Areas. Additionally, the southern phase does not support suitable habitat for Riparian/Riverine or Vernal Pool plant species and, therefore, no impacts are anticipated by the project. The southern phase does not support suitable habitat for 11 of the 12 Riparian/Riverine or Vernal Pool animal species. The basin in the southern phase supports an area that may be potentially suitable habitat for Riverside fairy shrimp. However, the basin, including the potentially suitable fairy shrimp habitat, is completely avoided by the project. Therefore, the southern phase is consistent with MSHCP Section 6.1.2.

Northern Phase

The northern phase has habitat identified as potential Riparian/Riverine Resources and Vernal Pool Resources. The potential Riparian/Riverine Areas and Vernal Pool include the drainage feature; the streambed in the northern half of the northern phase; herbaceous wetlands; and the tamarisk scrub in the northwestern corner associated with an off-site riparian feature. Additionally, there is a potential for vernal pool habitat within the mapped herbaceous wetland and disturbed wetland communities. The MSHCP Riparian/Riverine Areas and Vernal Pool evaluation was conducted at a programmatic level, and project-level evaluations would be required to determine the limits, as outlined in mitigation measure BIO-5. MSHCP Riverine/Riverine Areas are equivalent to CDFW jurisdiction.

Since the northern phase proposes impacts to Riparian/Riverine Areas, the project is required to prepare a Determination of Biologically Equivalent or Superior Preservation (DBESP), which provides a detailed account of the impacts and proposed mitigation to compensate for impacts. Mitigation for permanent impacts to the Riparian/Riverine Areas would be met by implementing required mitigation for impacts to CDFW jurisdiction. Mitigation would include off-site enhancement, restoration, and/or creation at a ratio of no less than 2:1, as required by Measure BIO-5. With the implementation of Measure BIO-5, the project would not result in significant impacts to MSHCP Riparian/Riverine Areas.

The northern phase supports potentially suitable habitat for Riparian/Riverine or Vernal Pool plant species. The southern phase does not support suitable habitat for 10 of the 12 Riparian/Riverine or Vernal Pool animal species. The northern portion of the northern phase supports depressional areas that may potentially be suitable habitat for Riverside fairy shrimp. Prior to the commencement of ground-disturbing activities (i.e., earthwork, clearing, and/or grubbing) in the northern phase, dry season and wet season surveys will be completed by a permitted biologist following the current USFWS survey protocol for large brachiopods (USFWS 2015). If listed fairy shrimp are detected during the wet season surveys, a DBESP must be prepared to ensure that the proposed alternative provides for the replacement of any lost functions and values of habitat. Compensatory mitigation for impacts to occupied habitat would be required, as outlined in mitigation measure BIO-4.

The drainage in the northern phase also supports suitable habitat for least Bell's vireo. Based on conceptual plans for the northern phase, the project would not permanently or temporarily impact suitable least Bell's vireo habitat (southern willow scrub). However, project construction could have indirect impacts to least Bell's vireo if present within the drainage. Indirect impacts to this species during the nesting season (March 1 through August 31) would be a significant impact. Prior to the construction of the northern phase, a least Bell's vireo protocol survey is required pursuant to mitigation measure BIO-8. Mitigation measure BIO-8 also includes additional measures that would be required if least Bell's vireo surveys are positive. Therefore, impacts would be reduced to a less than significant level with mitigation.

Narrow Endemic Plant Species (MSHCP Section 6.1.3)

The project site is not located within a NEPSSA; therefore, no focused surveys were required, and the proposed project is consistent with Section 6.1.3 of the MSHCP. No mitigation is required.

Urban/Wildland Interface Guidelines (MSHCP Section 6.1.4)

Proposed developments adjacent to MSHCP Conservation Areas may create edge effects that can impact conserved biological resources. The MSHCP provides several guidelines that address potential

indirect effects from proposed developments that are in proximity to MSHCP Conservation Areas. These guidelines include measures addressing the quantity and quality of runoff generated by the development (i.e., drainage and toxics), night lighting, noise, non-native invasive plant species, barriers to humans and animal predators, and grading/land development encroachment.

The project site does not occur adjacent to land targeted for conservation or existing MSHCP Conservation Areas. The nearest MSHCP Conservation Area is Proposed Linkage 8, which is approximately 2.5 miles to the south of the project site. Since the project site is not within or adjacent to MSHCP Conservation areas, many of the MSHCP Urban/Wildland Interface Guidelines are not required. As discussed below, the project would comply with applicable guidelines to ensure consistency with MSHCP Section 6.1.4.

Drainage. The southern phase does not support any drainages; however, the northern phase supports one drainage feature. Therefore, the project would incorporate measures to avoid the discharge of untreated surface runoff into downstream waters. Measures would include those required for construction pursuant to the State Water Resources Control Board General Construction Stormwater Permit and those required post-construction pursuant to the National Pollutant Discharge Elimination System and Municipal Storm Drain requirements. The project shall be designed to prevent the release of toxins, chemicals, petroleum products, exotic plant materials, or other elements that might degrade or harm biological resources or ecosystem processes downstream from the project site.

Toxics. Land uses that use chemicals or generate bio-products that are potentially toxic or may adversely affect wildlife species, habitat, or water quality shall incorporate measures to ensure that the application of such chemicals does not result in a discharge into downstream waters. Measures such as those employed to address drainage issues would be implemented by the proposed project to avoid the potential impacts of toxics.

Lighting. The project site does not occur directly adjacent to MSHCP Conservation Areas, which are separated by existing development. Therefore, lighting standards are not applicable.

Noise. The project site does not occur directly adjacent to MSHCP Conservation Areas, which are separated by existing development. Therefore, noise standards are not applicable.

Invasives. The project site does not occur directly adjacent to MSHCP Conservation Areas. Therefore, the project is not required to avoid the use of invasive, non-native plants in accordance with MSHCP Table 6.2.

Barriers. Since the project site is not directly adjacent to the MSHCP Conservation Area, barriers or signage are not necessary.

Grading/Land Development. The project site is not adjacent to an existing or proposed MSHCP Conservation Areas. Therefore, manufactured slopes associated with proposed site development would not extend into an MSHCP Conservation Area.

Additional Surveys (MSHCP Section 6.3.2)

The project site is not within a CASSA or an amphibian or mammal survey area. No impacts to CASSA species or sensitive amphibian or mammal species are proposed.

Southern Phase

Focused BUOW surveys were required and completed for the southern phase in accordance with the County's survey protocol during the 2021 breeding season (County 2006). As discussed under item IV f), no BUOWs or BUOW sign were observed during the focused surveys. As required by BIO-2, a pre-construction survey must be conducted within 30 days of ground-disturbing activities (i.e., earthwork, clearing, and/or grubbing).

Northern Phase

Based on the results of the Step I Habitat Assessment, the northern phase supports suitable BUOW habitat. Prior to the commencement of ground-disturbing activities, Step II Focused Burrow and BUOW surveys will be conducted in accordance with the County's survey protocol (County 2006; mitigation measure BIO-3). If BUOW is not detected during the Step II surveys, a pre-construction survey must be conducted within 30 days of ground-disturbing activities (i.e., earthwork, clearing, and/or grubbing). If BUOW is detected during the Step II surveys, a DBESP must be prepared to ensure that the proposed alternative provides for the replacement of any lost functions and values of habitat. If BUOW is detected during the pre-construction survey or Step II surveys, avoidance of active nests and/or relocation of BUOW would be required, as outlined in mitigation measure BIO-3. As discussed above, the proposed project is consistent with MSHCP Section 6.3.2.

Fuels Management (MSHCP Section 6.4)

The property is not adjacent to an MSHCP Conservation Area. Therefore, fuel modification impacts would not extend into a conservation area. The project is consistent with MSHCP Section 6.4.

Multiple Species Habitat Conservation Plan and Stephens' Kangaroo Rat Fees

In order for the project to participate in the MSHCP, the project proponent is required to pay an MSHCP LDMF in order to finance the acquisitions of conservation areas to provide habitat for MSHCP covered species. The LDMF must be paid prior to the issuance of a building permit. The applicant shall pay the LDMF as determined by the City. Final fee credits shall be determined through coordination with the City.

The project site is also within the Stephens' kangaroo rat HCP but is not located within any of the core reserves (Riverside County Habitat Conservation Authority 1996). Therefore, the project is required to pay a Stephens' kangaroo rat mitigation fee for incidental take authorization under the Stephens' kangaroo rat HCP. Mitigation measure BIO-9 requires the project proponent to pay the MSHCP LDMF and Stephens' kangaroo rat HCP fees. Implementation of mitigation measure BIO-9 would reduce impacts to a less than significant level.

Mitigation

BIO-8 Least Bell's Vireo: Due to the presence of suitable habitat for least Bell's vireo within the northern phase, the following avoidance and minimization measures shall be implemented to avoid potential impacts to the species:

(1) Construction activities (i.e., earthwork, clearing, and grubbing) shall occur outside of the breeding season for least Bell's vireo (March 15 through August 31).

(2) If construction activities (i.e., earthwork, clearing, grubbing, etc.) are proposed within the least Bell's vireo's breeding season, focused protocol surveys for least Bell's vireo shall be conducted prior to commencement of construction activities, within all suitable habitat located on the northern phase, along with a 500-foot buffer where suitable habitat occurs, to determine whether the habitat is occupied. Focused surveys for least Bell's vireo shall be conducted by a qualified biologist and during the breeding season in accordance with the most recent USFWS guidelines. The results of the focused surveys shall be documented by the qualified biologist and submitted to USFWS and/or CDFW.

If the qualified biologist determines that least Bell's vireo do not occur within 500 feet of the proposed construction, the activities shall be allowed to proceed without any further requirements. If the qualified biologist determines that the habitat is occupied by least Bell's vireo, the following avoidance and minimization measures shall be implemented:

(a) No construction activities may occur within 500 feet of an active nest of a least Bell's vireo. A qualified biologist shall clearly delineate the required avoidance buffer around the active least Bell's vireo nest. The buffer shall be clearly marked with flags and/or fencing prior to the initiation of construction activities.

(b) If construction activities are proposed within 500 feet of an occupied nest, a biological monitor shall be required to observe the behavior of any breeding least Bell's vireo. The construction supervisor shall be notified if the construction activities appear to be altering the birds' normal breeding behavior. No construction activities will be allowed within 500 feet of an occupied nest until additional minimization measures have been performed. Such measures may include retaining a qualified acoustician to determine ambient noise levels and project-related noise levels at the edge of the occupied habitat. Noise levels at the edge of the occupied habitat shall not exceed an hourly average of 60 decibels (dB[A]), or a 3 dB(A) increase in noise levels if ambient noise levels exceed 60 dB(A). If project-related noise levels at the edge of the occupied habitat are above 60 dB(A) or the 3 dB(A) increase in noise occurs, additional minimization measures shall be taken to reduce project-related noise levels to an acceptable level as determined by the biological monitor. Measures may include, but are not limited to, limitation on the use of certain equipment, placement of equipment, restrictions on the simultaneous use of equipment, use of noise barriers, or other noise attenuation methods as deemed appropriate by the biologist and acoustician. The USFWS and/or CDFW shall be notified of additional minimization measures taken to reduce noise during construction activities. If the biological monitor determines the construction activities are posing a potential risk to the nest after implementing the additional minimization measures, the noise generating construction activities shall cease until USFWS and/or CDFW are contacted to discuss alternative methods. The biological monitor shall prepare written documentation of all monitoring activities at the completion of construction activities, which shall be submitted to CDFW/or USFWS.

(c) All project personnel shall attend a training program presented by a qualified biologist prior to construction activities. The training program will inform project

personnel about the life history of least Bell's vireo and all avoidance and minimization measures.

(d) The construction contractor shall only allow construction activities to occur during daylight hours, and high noise levels shall generally be limited according to these hours.

(e) The construction contractor shall require functional mufflers on all construction equipment (stationary or mobile) used within or immediately adjacent to any 500-foot avoidance buffers to reduce construction equipment noise. Stationing equipment is situated so that noise generated from the equipment is not directed towards any habitat occupied by least Bell's vireo.

The construction contractor will place staging areas as far as feasible from any occupied nest by least Bell's vireo.

BIO-9 **Habitat Conservation Plan Fees:** The City is subject to the MSHCP LDMF and the Stephens' kangaroo rat HCP Fee for the southern phase and northern phase, which shall be paid prior to the issuance of any grading permit.

V. Cultural Resources

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
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?	☐	☐	■	☐

Sources: HELIX 2021c, City 2013a

HELIX Environmental Planning, Inc. prepared a Cultural Resources Survey Report for the project (HELIX 2021c). The study included a cultural resources study including a records search conducted by the staff at the Eastern Information Center (EIC), a Native American Heritage Commission (NAHC) Sacred Lands File (SLF) search, a review of historic aerial photographs and maps, and a pedestrian survey was conducted for the project area. The discussion below is based on this cultural report and is attached to this IS/MND as Appendix C.

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

No Impact. The records search for the project site and a one-mile radius identified that there have been 75 cultural resources studies conducted within one mile of the project area, three of which overlap the project area, one of which is adjacent. Of these three, two of the studies that overlap the project area

are archaeological assessments, and the third is listed as a cultural resources investigation. The report on the adjacent parcel is an archaeological monitoring report addressing a portion of the project area. None of these reports identified any cultural resources. The records search indicated five recorded historic resources, consisting of the remains of several structures and two refuse deposits. In addition, a single multicomponent site is documented, consisting of bedrock milling and a trash scatter, and abandoned farm equipment. None of these resources are within or adjacent to the project site.

In addition, historic topographic maps and aerial photographs were reviewed to assess the potential for historic structural resources and historic archaeological resources. The review indicates that the area surrounding the project site remained relatively undeveloped until at least the 1990s, and it does not appear to have been utilized for agricultural uses. In particular, the aerial photographs from 1938, 1967, and 1978 show a creek or stream running northeast-southwest through the project area; no development is shown in any of these photographs within the project area; by 1996, it appears that structures had been built south of Craig Avenue and northwest of the intersection of Craig Avenue and Evans Road; the Palomar Valley High School had also been constructed.

Lastly, a pedestrian survey of the project site was conducted on October 22, 2020, by a HELIX staff archaeologist and a representative from the Pechanga Band of Mission Indians. The project area was walked in transects spaced approximately 10 to 15 feet apart. Visibility in most of the northern phase was poor (10 to 15 percent) due to the existence of dense, chest-high grasses and other vegetation. During the survey it was noted that two newly constructed, raised dirt pathways are located at the southern end of the northern phase, and a graded road and drainage bisect the area. As noted in the aerial photographs, a creek runs northeast-southwest through the eastern portion of the northern phase. A constructed platform is located in the center of the northern phase provided some greater visibility, with visibility ranging from 20 to 40 percent. Bioturbation was observed within the northern section of the project area.

The southern phase also had poor visibility due to chest- and head-high vegetation, with visibility ranging from approximately zero to 10 percent. A large pond with several boulder outcrops was located in the southeastern corner of the section; these outcrops were examined for grinding activity, though none was observed.

Visible soils within the project area consisted of grey/brown sandy silt and decomposed granite. Modern trash was scattered throughout both sections of the project area, and construction debris was found in the northern section. No cultural or historic resources were observed.

Therefore, based on the lack of recorded resources within the project site, no identifiable historical use or development of the site, and the results of the pedestrian survey, the project would not cause a substantial adverse change in the significance if a historical resource pursuant to CEQA Guidelines §15064.5. No impacts would occur in relation to this issue.

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

Less than Significant with Mitigation Incorporated. As stated above, the records search conducted by the EIC indicated that 75 cultural resources studies have been performed within a one-mile radius of the project site, three of which overlap the site and one that was adjacent. While no historic resources were identified, the EIC has a record of 33 prehistoric resources recorded within the one-mile search radius. No resources have been previously mapped within or adjacent to the project area. In general, the

prehistoric resources within the one-mile records search boundary consist of prehistoric village/ habitation sites and milling stations, as well as two isolates. These sites include features such as a house pit, petroglyphs, cupules, rock walls, and other rock features. In addition, as note in item V a), a single multicomponent site is documented, consisting of bedrock milling and a trash scatter, and abandoned farm equipment.

As discussed above in item V a), at the time of the pedestrian survey the project site was covered by dense vegetation, and much of the ground surface could not be observed, thus, difficult to determine if there are visible archaeological resources. Moreover, the project site is located within alluvial soils, where there is a potential for buried cultural resources. In addition, as part of the Native American Contact Program, the Pechanga Band of Luiseño Indians (Pechanga) identified the project vicinity as culturally sensitive, although the NAHC stated that the search of the SLF returned negative results. Thus, it is concluded that there is the potential for unknown archeological resources at the project site.

Therefore, due to the potential for subsurface cultural resources and the cultural sensitivity identified by Pechanga, it is recommended that an archaeological and Native American monitoring program be implemented for any grading or other ground-disturbing activities, including but not limited to brushing/grubbing, excavation and trenching for utilities. The City's General Plan Implementation Action OSC-32 states development should include mandatory mitigation measures, in coordination with the Pechanga Band of Luiseno Indians and/or Soboba Band of Luiseno Indians, for any project within previously undisturbed soils in an area determined to be in a culturally or archeologically sensitive area, based on consultation with the project archeologist and the Tribe (City 2013a). Thus, the project would implement mitigation measure CUL-1 below to reduce impacts.

Mitigation Measure

CUL-1 Prior to the issuance of grading permits, the City shall contract with a qualified archaeologist and Native American monitors from a traditionally culturally affiliated tribe to develop and implement an archaeological and Native American monitoring program. The monitoring program shall be implemented for any grading or other ground-disturbing activities, including but not limited to brushing/grubbing, excavation and trenching for utilities. The monitoring program shall include attendance by the archaeologist and Native American monitor at a pre-construction meeting with the grading contractor and the presence of archaeological and Native American monitors during initial ground-disturbing activities for the project. Both archaeological and Native American monitors shall have the authority to temporarily halt or redirect grading and other ground-disturbing activity in the event that cultural resources are encountered. If significant cultural material is encountered, the project archaeologist shall coordinate with the Native American representative and City staff to develop and implement appropriate avoidance, preservation, or mitigation measures.

With implementation of CUL-1, the project would not cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5. Impacts are less than significant with mitigation in relation to this issue.

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

Less than Significant Impact. The project site is not located within or near a formal cemetery and is not known to be located on a burial ground. In the event that human remains are discovered, the County Coroner shall be contacted. If the remains are determined to be of Native American origin, the Most

Likely Descendant, as identified by the NAHC, shall be contacted in order to determine proper treatment and disposition of the remains. All requirements of Health & Safety Code §7050.5 and PRC §5097.98 shall be followed. Impacts are less than significant in relation to this issue.

VI. Energy

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

Source: HELIX 2021a

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

Less Than Significant Impact. Energy used during construction would primarily consist of fuels in the form of diesel and gasoline for the operation of construction equipment and construction worker vehicles. While construction activities would consume petroleum-based fuels, consumption of such resources would be temporary and would cease upon the completion of construction. There are no unusual project characteristics or construction processes that would require the use of equipment that would be more energy intensive than is used for comparable activities, or equipment that would not conform to current emissions standards (and related fuel efficiencies). Equipment employed in construction of the project would therefore not result in wasteful, inefficient, or unnecessary consumption of fuel.

Energy used during project operations would primarily consist of fuel in the form of gasoline for maintenance vehicles traveling to and from the project site. Based on these considerations, the project would not result in a substantial increase in demand of local or regional energy supplies, and would not result in wasteful, inefficient, or unnecessary consumption of energy. Impacts would be less than significant.

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

No Impact. Often local energy conservation plans and goals are devised based upon the anticipated land uses within a planning area as outlined in planning documents including a City's General Plan or Zoning Ordinance. The project is consistent with the OS-R land use designation and zoning. Additionally, the project would retain portions of the site in its natural state and any additional landscaping would be drought tolerant. As is typical of other public water play areas, water usage at the splash pad would be activated by the users and only be active during the time of use. All lighting would be energy efficient as required by CCR. Energy would largely be confined to the nighttime hours from security lighting. Regular

maintenance may require energy; however, this would not be a daily occurrence. The project would be built and operated in accordance with existing, applicable regulations, which include, but are not limited to, the California Green Building Standards Code and CARB regulations. Additionally, as discussed in the project's Air Quality and Greenhouse Gas Emissions Technical Report, the project would not conflict with statewide plans and regulations requiring an increasing fraction of electricity to be generated from renewable sources (HELIX 2021a). Construction equipment and operation equipment would be maintained to allow for continuous energy-efficient operations. No impact would occur in relation to this issue.

VII. Geology and Soils

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i. Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	☐	☐	☐	■
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 wastewater disposal systems where sewers are not available for the disposal of wastewater?	☐	☐	☐	■
f) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	■	☐	☐

Sources: MTGL, Inc. 2021; City 2015; 2013a; 2013b; PaleoWest 2021

MTGL prepared a Geotechnical Investigation in September 2021 for the restroom proposed in the southern phase, the results of which are referenced as appropriate herein (MTGL 2021). The Geotechnical Investigation also contains recommendations that are designed to meet the criteria set forth in the CBC, which is adopted into the MMC as Chapter 8.04. Accordingly, these recommendations are required by the CBC and are incorporated as project design features that would be included as conditions of approval. The Geotechnical Investigation is attached to this IS/MND as Appendix D. Please refer to Appendix D for the recommendations. Additionally, PaleoWest prepared a Paleontological Resources Assessment for the project that is attached to this IS/MND as Appendix E (PaleoWest 2021)

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?

No Impact. Seismically induced surface or ground rupture occurs when movement on a fault deep within the earth breaks through to the surface as a result of seismic activity. Fault rupture almost always follows preexisting faults, which are zones of weakness. Under the Alquist-Priolo Earthquake Fault Zoning Act, which was passed in 1972, the California State Geologist identifies areas in the State that are at risk from surface fault rupture. The Alquist-Priolo Act's main purpose is to prevent the construction of buildings used for human occupancy on the surface trace of active faults and requires the State Geologist to establish and map regulatory zones, known as Alquist-Priolo Earthquake Fault Zones, around the surface traces of active faults.

According to the Geotechnical Investigation, the project site is not located in an Alquist-Priolo Earthquake Fault Zone. Additionally, no active faults are known to underlie or project toward the site (MTGL, Inc. 2021). Therefore, project implementation would not expose people or structures to potential substantial adverse effects involving rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map. No impacts would occur.

    ii. Strong seismic ground shaking?

Less than Significant Impact. The project site is in a seismically active region and is likely to be subjected to moderate to severe seismic ground shaking in response to a major earthquake. As noted in response VII ai), there are no known active faults that cross the project site; however, there are several active faults that run throughout Riverside County and the closest active fault, the Elsinore fault is approximately five miles southwest of the project site. The Geotechnical Investigation notes that it is likely that the site would experience strong ground shaking as a result of movement along an active fault in the vicinity of the site (MTGL 2021). The project does not involve habitable structures. The Geotechnical Investigation includes recommendations that are designed to meet the CBC standards and have been incorporated into the project as design features. Project components not evaluated in the Geotechnical Investigation would also be required to comply with the seismic design parameters outlined in the CBC. Mandatory compliance with applicable seismic-safety development requirements would minimize seismic ground shaking effects in the event of a major earthquake. Therefore, the project would not directly or indirectly cause potential substantial adverse effects, including the risk of

loss, injury, or death involving strong seismic ground shaking. Impacts would be less than significant in relation to this issue.

iii. Seismic-related ground failure, including liquefaction?

Less than Significant Impact. Liquefaction is a soil phenomenon in which water-saturated soils lose strength when subject to the forces of intense and prolonged ground shaking. Liquefaction generally occurs in areas where four criteria are met: (1) the site is subject to seismic activity; (2) on-site soil consists of cohesionless soil or silt and clay with low plasticity; (3) groundwater is encountered within 50 feet of the surface; and (4) soil relative densities are less than 70 percent.

Exhibit S-3, *Liquefaction and Landslides*, of the General Plan does not identify the site as being within an area subject to liquefaction. However, according to the Geotechnical Investigation, historically groundwater has been encountered at eight feet below ground surface (bgs), thus MTGL conducted field studies to further investigate. MTGL test boring encountered groundwater at ten feet bgs, yet the soil types identified at the site have a low potential to liquefy. Thus, MTGL concluded the site has a low liquefaction potential. Thus, the project would not directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving ground failure or liquefaction, Impacts are less than significant in relation to this issue.

iv. Landslides?

No Impact. The project site has little topographic variation with an elevation ranging from 1,475 to 1,489 feet amsl. Exhibit -3, *Liquefaction and Landslides*, of the General Plan does not identify the site as being within an area subject to landslides. Additionally, according to the Geotechnical Investigation, the project site is not located in a hillside area of the County where earthquake-induced landslides would cause permanent ground displacements (MTGL, Inc. 2021). No reported occurrences of landslides or mudflows are currently known to have recently affected the site. Thus, the project would not directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving landslides, No impacts would occur in relation to this issue.

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

Less than Significant Impact. Soil exposed by construction activities could be subject to erosion if exposed to heavy rain, winds, or other storm events. The project would require a NPDES Construction General Permit and be required to submit a Notice of Intent to the RWQCB for the preparation a Stormwater Pollution Prevention Plan (SWPPP). Generally, a SWPPP demonstrates how water quality during, and post construction would be maintained in accordance with mandated objectives. Often this is achieved by employing Best Management Practices (BMPs) (see Section X, *Hydrology and Water Quality*). Many BMPs serve a dual purpose or protecting water quality and reducing soil erosion and loss of topsoil. Prior to the issuance of an encroachment permit, the City requires that an applicant demonstrates proof of coverage under the NPDES Construction General Permit and a complete SWPPP.

Grading activities within the site would also be required to comply with the City's Grading Ordinance, which requires the preparation of an Erosion Control Plan (MMC Section 8.26.060) as well as the Storm Water/Urban Runoff standards (MMC 15.01.015), which would further ensure soil erosion and topsoil loss is minimized.

Operationally, the southern phase, with the exception of the asphalt pump track and manufactured dirt trails, the site would be maintained in a natural state. Routine maintenance would include minor dust control and reshaping of track contours. While there is no site plan for the northern phase, the conceptual land uses would be a combination of pervious and impervious and portions of the site are proposed to be retained in the natural state. As stated in the City's Park Development Guidelines, all park projects shall be designed to meet requirements of the MMC and the Stormwater Standards including permits issued through the Santa Ana Regional Water Quality Control Board (SARWQCB) for the area wide NPDES, and Municipal Separate Storm Sewer System Permit (MS4 Permit). Bioretention basins and swales, permeable paving, and other natural means of filtration of stormwater runoff are preferred (City 2015). Thus, while there is no specific design for the northern phase, it is required to be designed to adhere to the various regulations governing water quality that also serve to reduce erosion and loss of topsoil.

Therefore, with the required regulatory compliance the project would not result in substantial soils erosion or loss of topsoil. Impacts would be less than significant.

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

Less than Significant Impact. As identified in response VII a) the site is not in an area subject to landslides or liquefaction.

Lateral spreading refers to landslides that commonly form on gentle slopes and that have rapid fluid-like flow movement, like water. The project site has minimal topographic variation and ranges from an elevation ranging from 1475 to 1489 feet amsl. As shown in Exhibit S-2, *Slope Distribution,* of the General Plan the project site and surrounding area have slopes ranging from 0 to 19 percent (City 2013a). As stated in the Geotechnical Investigation, due to the low gradient at the site, the potential for lateral spreading is considered low (MTGL 2021).

Ground subsidence is the gradual settling or sinking of the ground surface with little or no horizontal movement. Most ground subsidence is induced by humans. In the areas of California where ground subsidence has been reported (such as the San Joaquin Valley, Coachella Valley, and Wilmington), this phenomenon is most commonly associated with the extraction of fluids (water and/or petroleum) from subsurface sediments. Subsidence can also occur when dry collapsible soils become saturated. Less commonly, ground subsidence can occur as a response to natural forces such as earthquake movements.

Settlement typically occurs in loose granular, cohesionless soils, and can occur in either wet or dry conditions. Unconsolidated young alluvial deposits are especially susceptible to this hazard. According to Exhibit S-4, *Geologic Map*, of the General Plan, the project site is underlain by old alluvial fan deposits and therefore, settlement potential is low.

The project does not contain any habitable structures. Any buildings constructed onsite would be designed in accordance with the CBC and the recommendations of the Geotechnical Investigation. Collectively, the implementation of the recommendations of the Geotechnical Investigation and adherence to the CBC would reduce any impacts in relation to any unstable geologic units or other geologic conditions. Therefore, the project and surrounding area would not become unstable as a result

of on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse. Impacts would be less than significant in relation to this issue.

d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994),

Less than Significant Impact. According to Exhibit S-4, *Geologic Map*, of the General Plan, the project site is underlain by old alluvial fan deposits. According to the General Plan EIR, soils on weathered old alluvial fan deposits are commonly clay-rich and are probably moderately expansive. Expansive soils are generally considered a concern for foundation design. The Geotechnical Investigation prepared for the restroom facility on the southern phase contains recommendations, that are incorporated as project design features and would be adopted as conditions of approval to reduce impacts related to expansive soils (see recommendations 4.08, 4.16, and 4.19). Any future structures on the northern phase, such as restrooms would be required to adhere to the CBC, which as noted has been adopted into the MMC as Chapter 8.04. Therefore, while the project may be located on expansive soils, project design features required as conditions of approval reduce potential impacts to less than significant in relation to this issue.

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

No Impact. Septic tanks and alternative wastewater disposal systems are not proposed as part of the project. No impact would occur in relation to this issue.

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

Less than Significant with Mitigation Incorporated. PaleoWest, LLC (PaleoWest) conducted a paleontological resource assessment for the project. The goal of the assessment is to identify the geologic units that may be impacted by development of the project, determine the paleontological sensitivity of geologic units within the project area, assess potential for impacts to paleontological resources from development of the project, and recommend mitigation measures to avoid or mitigate impacts to scientifically significant paleontological resources, as necessary.

This paleontological resource assessment included a fossil locality records search conducted by the Western Science Center (WSC) in Hemet, California. The records search was supplemented by a review of existing geologic maps and primary literature regarding fossiliferous geologic units within the proposed project vicinity and region.

According to published geologic maps, the project area is underlain by middle to early Pleistocene age very old alluvial channel deposits. Pleistocene age alluvial, fluvial and lacustrine deposits have proven to yield scientifically significant paleontological resources throughout southern California from the coastal areas to the inland valleys. Middle to late Pleistocene alluvial sediments in the vicinity of the project area are potentially highly fossiliferous, and many nearby localities within these deposits have preserved a diverse fossil assemblage of Ice Age fauna.

The WSC has no records of fossil localities from within the project site; however, they note that Pleistocene age deposits underlying the project site have a well-documented record of yielding abundant fossil resources in southern California. Consequently, any project related grading, trenching, or excavations in areas previously undisturbed would have the potential to disturb paleontological

resources, resulting in significant impacts in relation to this issue. Thus, the project would implement mitigation measure GEO-1 below to reduce impacts.

Mitigation Measure

GEO-1 Prior to the commencement of ground-disturbing activities, a professional paleontologist shall be retained to prepare and implement a Paleontological Resources Monitoring and Mitigation Plan (PRMMP) for the project. Prior to the start of ground-disturbing activities, field personnel shall receive a worker's environmental awareness training on paleontological resources, developed by the project paleontologist. The project paleontologist shall complete paleontological monitoring as described in the PRMMP. In the event that a paleontological resource is discovered, the monitor shall temporarily divert the construction equipment around the find until it is assessed for scientific significance and, if appropriate, collected. If the resource is determined to be of scientific significance, the project paleontologist shall salvage the fossil or prepare for curation as appropriate. Upon completion of ground disturbing activity (and curation of fossils if necessary) the project paleontologist shall prepare a final mitigation and monitoring report outlining the results of the mitigation and monitoring program.

With implementation of GEO-1, the project would not directly or indirectly destroy a unique paleontological resource or site or unique geologic feature. Impacts are less than significant with mitigation in relation to this issue.

VIII. Greenhouse Gas Emissions

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
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?	☐	☐	■	☐

Sources: HELIX 2021a, Urban Crossroads 2021b

The discussion below is based on the Air Quality and Greenhouse Gas Emissions Technical Report prepared by HELIX Environmental Planning, Inc. (HELIX 2021a), attached to this IS/MND as Appendix A.

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

Less than Significant Impact. GHGs are emitted by natural processes and human activities primarily associated with: (1) the burning of fossil fuels during motorized transport, electricity generation, natural gas consumption, industrial activity, manufacturing, and other activities; (2) deforestation; (3) agricultural activity; and (4) solid waste decomposition. Emissions of GHGs in excess of natural

ambient concentrations are thought to be responsible for the enhancement of the greenhouse effect and contributing to what is termed "global warming," the trend of warming of the Earth's climate from anthropogenic activities. Global climate change impacts are by nature cumulative; direct impacts cannot be evaluated because the impacts themselves are global rather than localized impacts.

The GHGs defined under California's AB 32 include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). As individual GHGs have varying heat-trapping properties and atmospheric lifetimes, GHG emissions are converted to carbon dioxide equivalent (CO_2e) units for comparison. The CO_2e is a consistent methodology for comparing GHG emissions because it normalizes various GHG emissions to a consistent measure.

The SCAQMD has established that projects that do not generate more than 3,000 metric tons (MT) CO_2e per year would have GHG emissions that would not be considered significant. The City of Menifee does not currently have an applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions. Applicable plans adopted for the purpose of reducing GHG emissions include the CARB's Scoping Plan and SCAG's Connect SoCal 2020–2045. GHG emissions will be reduced to meet the State rules, but the City has not gone further to require other emission reductions. Therefore, a threshold of 3,000 MT CO_2e per year is used in this analysis for the determination of significance.

The project would result in emissions of GHGs during both construction and operation. GHG emissions resulting from project construction and operation are analyzed below.

Construction Emissions

Construction sources of GHG emissions include heavy construction equipment, worker vehicle miles traveled, and water use. The project's construction GHG emissions were estimated using CalEEMod Version 2020.4.0 and are shown in Table 7, *Construction Greenhouse Gas Emissions*. Emissions of GHGs related to the construction of the project would be temporary, and the total estimated GHG emissions associated with construction of the project would be 1,212.5 MT CO_2e. To be conservative in accounting for all project sources of GHG emissions, the construction period GHG emissions were amortized (i.e., averaged) over 30 years to be added to operational emissions. Averaged over 30 years, the proposed construction activities would contribute approximately 40.5 MT CO_2e emissions per year.

Table 7
CONSTRUCTION GREENHOUSE GAS EMISSIONS

Emissions Year	Emissions (MT CO_2e)	Total After Amortizing Construction Emissions[2] (MT CO_2e)
2022 (Southern Phase)	191.1	6.4
2025 (Northern Phase)	761.2	25.4
2026 (Northern Phase)	260.2	8.7
TOTAL[1]	**1,212.5**	**40.5**

Source: HELIX 2021a

[1] Totals may not sum due to rounding.

[2] Construction emissions are amortized over 30 years in accordance with SCAQMD guidance.

MT = metric tons; CO_2e = carbon dioxide equivalent

Operational Emissions

Operational sources of emissions include area, energy, transportation, water use, and solid waste. The project's operational GHG emissions were estimated using CalEEMod Version 2020.4.0 and are shown in Table 8, *Operational Greenhouse Gas Emissions*.

Table 8
OPERATIONAL GREENHOUSE GAS EMISSIONS

Year	Annual Emissions (MT CO_2e)
Southern Phase	
Area	<0.1
Energy	0
Mobile	306.6
Waste	0.2
Water	11.3
Southern Phase Total	**318.1**
Northern Phase	
Area	<0.1
Energy	0
Mobile	596.6
Waste	0.4
Water	24.3
Northern Phase Total	**621.4**
TOTAL[1]	**939.5**

Source: HELIX 2021a
[1] Totals may not sum due to rounding.
MT = metric tons; CO_2e = carbon dioxide equivalent

Table 9, *Total Amortized Construction and Operational Greenhouse Gas Emissions*, shows construction and operational GHG emissions.

Table 9
TOTAL AMORTIZED CONSTRUCTION AND OPERATIONAL GREENHOUSE GAS EMISSIONS

Year	Amortized Construction Emissions[2] (MT CO_2e)	Operational Emissions (MT CO_2e)	Total Amortized Construction Emissions + Operational Emissions
Phase 1 South Area (Amortized Construction + Operations)	6.4	318.1	324.5
Phase 2 North Area (Amortized Construction + Operations)	34.1	621.4	655.5
TOTAL[1]	**40.5**	**939.5**	**980.0**
Threshold	**NA**	**3000**	**3000**
Exceed Threshold?	**NA**	**No**	**No**

Source: HELIX 2021a
[1] Totals may not sum due to rounding.
[2] Construction emissions are amortized over 30 years in accordance with SCAQMD guidance.
MT = metric tons; CO_2e = carbon dioxide equivalent

As shown in Table 9, the project would result in annual GHG emissions of 980 MT CO_2e, which is less than the SCAQMD's 3,000 MT CO_2e per year interim threshold. Therefore, impacts would be less than significant in relation to this issue.

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

Less than Significant Impact. There are numerous State plans, policies, and regulations adopted for the purpose of reducing GHG emissions. The principal overall State plan and policy is AB 32 and Senate Bill (SB) 32, the California Global Warming Solutions Act of 2006. The quantitative goal of AB 32 is to reduce GHG emissions to 1990 levels by 2020. SB 32 would require further reductions of 40 percent below 1990 levels by 2030. Statewide plans and regulations such as GHG emissions standards for vehicles (AB 1493), the Low Carbon Fuel Standard (LCFS), and regulations requiring an increasing proportion of electricity to be generated from renewable sources are being implemented at the statewide level; as such, compliance at the project level is not addressed. Therefore, the proposed project does not conflict with those plans and regulations.

Transportation-related emissions consistently contribute the most GHG emissions in California. According to the Vehicle Miles Travelled (VMT) analysis prepared for the project, the project would result in a less than significant impact related to VMT (Urban Crossroads 2021b). The project would be consistent with the General Plan and zoning designations for the site. The project would also be constructed in accordance with the energy-efficiency standards, water reduction goals, and other standards contained in the 2019 Title 24 Part 6 Building Energy Efficiency Standards and Part 11 (CALGreen) Building Standards. Because the project would be consistent with the local general plan, residential growth in the City as a result of the project, and the related changes in regional VMT, would be accounted for in the SCAG's RTP/SCS.

Additionally, there are numerous State plans, policies, and regulations adopted for the purpose of reducing GHG emissions. The principal overall State plan and policy is AB 32, the California Global Warming Solutions Act of 2006. The quantitative goal of AB 32 is to reduce GHG emissions to 1990 levels by 2020. SB 32 requires further reductions of 40 percent below 1990 levels by 2030. Because the project's operational year is post-2020, the project aims to reach the quantitative goals set by SB 32. Statewide plans and regulations such as GHG emissions standards for vehicles (AB 1493), the LCFS, and regulations requiring an increasing fraction of electricity to be generated from renewable sources are being implemented at the statewide level; as such, compliance at the project level is not addressed. Therefore, the proposed project would not conflict with those plans and regulations. Impacts would be less than significant in relation to this issue.

IX. Hazards and Hazardous Materials

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
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 one-quarter 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 Section 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 two miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area?	☐	☐	☐	■
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?	☐	☐	■	☐

Sources: HELIX 2021c, EnviroStor 2021, GeoTracker 2021, Riverside County Airport Land Use Commission [RCALUC] 2011, City 2021b.

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

Less than Significant Impact. Materials and waste are generally considered hazardous if they are poisonous (toxicity); can be ignited by open flame (ignitability); corrode other materials (corrosivity); or react violently, explode, or generate vapors when mixed with water (reactivity). The term "hazardous material" is defined in the State Health and Safety Code (Chapter 6.95, Section 25501[o]) as any material that, because of quantity, concentration, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment. Hazardous waste is defined as any hazardous material that is abandoned, discarded, or recycled, as defined in the State Health and Safety Code (Chapter 6.95, Section 25125). The transportation, use, and disposal of

hazardous materials, as well as the potential releases of hazardous materials to the environment, are closely regulated through many state and federal laws.

Construction activities associated with the proposed project would require transportation and use of limited quantities of fuel, oil, sealants, and other hazardous materials related to construction. The use of hazardous materials and substances during construction would be subject to federal, state, and local health and safety requirements for handling, storage, and disposal. As a result, hazardous material impacts related to construction activities would be less than significant. Typically, day-to-day activities within the project site would not involve the routine transport, use, or disposal of hazardous materials. Potentially, regular maintenance could use solvents or other agents. No special permits would be required for such limited transport, use and/or disposal of these common products. Therefore, the project would not create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials. Impacts would be less than significant in relation to this issue.

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

Less than Significant Impact. Potential release of hazardous materials and/or wastes during project construction is discussed above in item IX a). As noted therein, potential impacts associated with construction-related hazardous materials would be less than significant based on compliance with regulatory requirements and standard construction measures.

Archival research indicates that the site has remained vacant with no structures or ground disturbing activities occurring onsite (HELIX 2021c) from at least 1860 to present. Therefore, there is no indication of past land uses that would create a hazardous materials or waste threat through upset or accidental disturbance. The potential to encounter contaminated soils and/or groundwater during construction activities is further discussed in item IX d).

Long-term operation of the proposed project would not involve the use or transport of hazardous materials. Infrequent operation of maintenance vehicles may involve the use of cleaning agents or other chemicals typically used for maintenance, but the types of such agents transported in maintenance vehicles would not be considered acutely hazardous substances. Thus, project construction and operation would not 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. Impacts would be less than significant in relation to this issue.

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

No Impact. Paloma Valley High School is located less than a quarter mile northeast of the project site. As discussed above in Items IX a) and IX b), the project is a community park, which does not involve the routine use of hazardous materials that could adversely affect humans at nearby schools. Therefore, the proposed project would not emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one quarter mile of an existing or proposed school. No impact would occur.

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

No Impact. Government Code 65962.5 stipulates that the Department of Toxic Substances Control (DTSC), the Department of Health Services (DHS), the State Water Resources Control Board (SWRCB), and any local enforcement agency, as designated by Section 18051, Title 14 of the CCR, identify and update annually a list of sites that have been reported to have certain types of contamination. To determine if the project site is listed on any such site, the DTSC EnviroStor and the SWRCB GeoTracker online databases were consulted.

The EnviroStor and the GeoTracker databases did not identify any listings for the project site or properties within 1,000 feet (EnviroStor 2021; GeoTracker 2021). In addition, a request was submitted to the Riverside County DEH for records pertaining to the site; DEH had no records for the project site **[PENDING RESPONSE]**. Therefore, the project is not located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5. No impact would occur in relation to this issue.

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

No Impact. There are three airports in the vicinity of Menifee that have the potential to influence development: March Air Force Base (MAFB); French Valley Airport; and Perris Valley Airport. MAFB is located approximately 18 miles north of the project site; parts of Menifee are within the compatibility review zones for MAFB. However, the project is outside of any review zone. The French Valley Airport is approximately 6.8 miles southeast of the project site and the Perris Valley Airport is approximately 6.6 miles northwest of the project site. The Riverside County Airport Land Use Compatibility Plan (ALUCP) is the guiding ALUCP both airports. According to Map FV-1 , *Compatibility Plan French Valley Airport*, the project site is not within the airport influence area for the (Riverside County Airport Land Use Commission [RCALUC] 2011). According to Map PV-1, *Compatibility Plan Perris Valley Airport* of the ALUCP, the project site is within Zone E of the Perris Valley Airport (RCALUC 2011). Regulations of land uses in airport compatibility zones for Perris Valley Airport are implemented by the RCALUC. Development plans for projects in the part of Airport Compatibility Zone E for Perris Valley Airport are reviewed by the RCALUC before being considered for approval by the City if development would include structures greater than 150 feet in height. However, the project is a community park. The tallest features would be the light standards, which would extend to a height of no greater than 26 feet **[CITY TO CONFIRM]**. Additionally, Map PV-5, *Ultimate Noise Impacts*, of the ALUCP identifies that the project site lies outside of the boundaries of noise impacts foe Perris Valley Airport. (RCALUC 2011). Therefore, the project would not result in a safety hazard or excessive noise for people residing or working in the project area. No Impact would occur in relation to this issue.

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

Less than Significant Impact. The project could impact emergency access during both construction and operation. During construction of the project, heavy construction vehicles could interfere with emergency response to the site or emergency evacuation procedures in the event of an emergency

(e.g., vehicles traveling behind the slow-moving truck). However, such trips would be brief and infrequent. Additionally, although traffic may temporarily need to be directed around the construction, the project construction would not require road closures. Public roadways would remain open for standard traffic and emergency response vehicles for the duration of construction. The City's Engineering Department reviews project plans and identifies the procedures to reduce construction-related impacts and maintain traffic flow on City streets and the project conditions of approval would require that emergency access be maintained during construction. Post construction, access to the project area would be from Craig Avenue for the southern phase and from the existing drive that extends into the site from Evans Road for the northern phase.

In relation to an emergency response plan, the City has prepared the Emergency Operations Plan (EOP). The EOP integrates relevant information from the City and County and addresses the planned response to situations associated with natural disasters and/or human caused incidents. The plan focuses on coordinating mutual aid and provides an overview of the operational concepts relating to various emergencies, identifies components of the emergency response, and describes the overall responsibilities of the County and the participating local jurisdictions. The EOP is programmatic and administered at a regional and City level, there are no components of the proposed project that would disrupt the effective implementation of the EOP.

In addition, the EOP directs that emergency evacuation responsibilities are delegated to local law enforcement agencies that coordinate with the Riverside County Sheriff's Department (RCSD). The Menifee Police Department (MPD) has the authority to activate the Emergency Alert System, providing warning information, evacuation procedures, traffic control, and public security and order. The RCSD would submit mutual aid requests and oversee multi-jurisdictional efforts. The City does not have any established evacuation routes, as they are determined by the type and location of emergency. On a project level, the project would adhere to the required codes of the MMC, including those that have been adopted to enact the CBC and the California Fire Code to maintain adequate emergency access and response. The project would not impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan. Impacts would be less than significant.

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

Less than Significant Impact. A wildfire is an uncontrolled fire in an area of combustible vegetation that occurs in the countryside or a wilderness area; according to the City's Local Hazards Mitigation Plan (LHMP), due to the natural topography, terrain, volatile fuel types and climate conditions, the City is located in one of the most active wildfire areas in the State (City 2021b). The California Department of Forestry and Fire Protection (CAL FIRE) classifies lands in accordance with whether a very high fire hazard is present so that public officials are able to identify measures that will retard the rate of fire spread and reduce the intensity of uncontrolled fire through vegetation management and building standards. The designation of being within a very high or high fire severity hazard zone is based upon a combination of fuels, terrain, weather, and other relevant factors. The project site is located in an area that is designated as a Very High Fire Hazard Severity Zone (VHFHSZ) (City 2021b).

Currently both the northern and southern phase support a combination of non-native herbaceous species and grasses that during project-related site visits were dense and chest-high (HELIX 2021b; HELIX 2021c). The project would convert the undeveloped project site to park land uses. While both phases would maintain natural vegetation, as part of the City's park system, regular maintenance and brush

control would occur to reduce wildfire risks. Access would be provided via Craig Avenue and Evans Road to the southern and northern phases respectively. These project related activities are considered beneficial in relation to reducing wildfire risks.

As required, the project would adhere to the regulations set forth in the California Fire Code, which has been adopted by the City as MMC Section 08.20.010. The California Fire Code sets forth specific stipulations for development within a VHFHSZ, for which the project is subject. Through project improvements and the required regulatory compliance, the project would not expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires. Impacts would be less than significant in relation to this issue.

X. Hydrology and Water Quality

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
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 off- site?	☐	☐	■	☐
iii. Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional resources of polluted runoff?	☐	☐	■	☐
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?	☐	☐	☐	■

Sources: CValdo Corporation 2021a, 2021b, 2021c, 2021d, FEMA 2017.

The following is based on the Evans Community Park Preliminary Drainage Study, Evans Park Pump Track Site Preliminary Drainage Study, Project Specific Water Quality Management Plan, Evans Community Park, and Project Specific Water Quality Management Plan, Evans Park Pump Track Site prepared by CValdo (CValdo 2201a; 2201b; 2021c; 2021d). The reports are included attached to this IS/MND as Appendix F.

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

Less than Significant Impact. The project would not violate any water quality standards or waste discharge requirements. The project includes the construction of a park, so much of the site would remain in its present natural state (approximately 90 percent of the southern phase, and to the maximum extent practicable for the northern phase). However, the project would involve some clearing and grading during construction, and once operational would add some impervious surfaces. There is the potential for water pollutants to be generated in the short-term during construction activities, with construction related pollutants potentially including loose soils, liquid and solid construction materials and wastes, and accidental spills of concrete, fuels, and other materials. Several measures to protect water quality and limit discharges are directed and implemented, through both the preparation of various plans and adherence to established programs. As discussed below, the project will be required to demonstrate compliance with such plans and programs.

The NPDES program regulates point source and non-point source pollutant discharges to surface waters. Municipalities are required to obtain permits for the water pollution generated by stormwater in their jurisdictions. As discussed in Section VII, these permits are known as MS4 permits. The 2010 Santa Ana MS4 Permit, which is applicable to the project, requires that low-impact development (LID) retention BMPs are implemented where feasible. The project would adhere to such BMPs. Additionally, the project would adhere to the NPDES Construction General Permit during construction, which includes BMPs that serve to protect groundwater quality. A SWPPP would also be prepared in compliance with the Construction General Permit, which would identify erosion control and sediment control BMPs that would be implemented to minimize the occurrence of soil erosion or loss of topsoil (CValdo Corporation 2021c, 2021d).

Once operational, the proposed project would not significantly alter drainage at the site. According to the Drainage Studies prepared for the project, the major flow paths are assumed to remain the same with project implementation. The Drainage Study prepared for the southern phase determined that the 100-year peak flow rate would increase by approximately 3 cubic feet per second (cfs), which would not cause adverse impacts (CValdo Corporation 2021b). The Drainage Study prepared for the northern phase included a program-level analysis, which determined that the northern phase should be designed to convey the 100-year peak flow rate to avoid adverse impacts (CValdo Corporation 2021a). The northern phase would incorporate such recommendations through project design features and/or conditions of approval.

The proposed project would comply with the requirements identified above to protect water quality during construction and operation. Therefore, the project would not violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality . Impacts would be less than significant in relation to this issue.

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

Less than Significant Impact. The project site is located in the Santa Ana Watershed and San Jacinto River Sub-Watershed. The proposed project would not substantially deplete groundwater supplies or interfere substantially with groundwater recharge. The proposed project includes the construction of a park, and much of the site would remain in its present natural state (approximately 90 percent of the southern phase, and to the maximum extent practicable for the northern phase). A portion of these features would require irrigation; however, this be achieved through the use of reclaimed water, thereby not depleting groundwater resources. Additionally, the project does not involve the installation of groundwater wells or other infrastructure that would deplete groundwater supplies and it would not impede recharge. Thus, the project would not substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin. Impacts would be less than significant in relation to this issue.

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?

Less than Significant Impact. As stated above in item X a), a SWPPP would be prepared in compliance with the Construction General Permit, which would identify erosion control and sediment control BMPs that would be implemented to minimize the occurrence of soil erosion or siltation. Additionally, as discussed in the Drainage Studies prepared for the project, the major flow paths are assumed to remain the same with project implementation. In the southern phase, flows enter the site at the southeast corner and travel northwest within the site before exiting the site along the northern boundary. The major flow paths would not change in the southern phase with project implementation. In the northern phase, flows enter the site along the western and southwestern boundaries, and travel northeast within the project site before exiting along the northern and eastern boundaries. Since there is no drainage pattern indicated on the current preliminary site plan, it is assumed that the general flow paths would remain unchanged in the northern phase with project implementation. Further, the Drainage Studies prepared for the project determined that project implementation would not significantly increase peak flow rates. For the southern phase, the 10-year peak flow rate would remain 5.2 cubic feet per second (cfs) and the 100-year peak flow rate would remain 8.1 cfs along the southeast boundary with and without the project. The 10-year peak flow rate would increase from 13.3 to 15.4 cfs and the 100-year peak flow rate would increase from 21.2 to 24.2 cfs along the northwest boundary with the project, resulting in a maximum increase of 3 cfs for the southern phase of the project. For the northern phase, the increase of 10-year peak flow rates and 100-year peak flow rates would be minimal at the site, with the largest increase occurring at the northeast boundary where the 100-year peak flow rate would increase from 57.2 to 58.7 cfs. Along the eastern boundary, on-site runoff would result in lower 10-year peak flow rates (7.1 to 6.9 cfs) and 100-year peak flow rates (11.2 to 11.1 cfs) with project implementation. Additionally, runoff enters the site of the northern phase via a reinforced concrete box culvert within Craig Avenue and flows northeast through the site within the Evans Road Channel. With project implementation, the 100-year peak flows entering through the reinforced concrete box culvert would remain at 2,093.6 cfs, and upon exiting at the eastern boundary would decrease from 2,104.8 cfs to 2,104.7 cfs. The proposed project would not significantly alter drainage at the site, and would not

result in substantial erosion or siltation on- or off-site. Impacts would be less than significant in relation to this issue.

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

Less than Significant Impact. The project site would transition from undeveloped land to park uses that would support a combination of impervious surfaces and natural conditions, which would alter the rate and amount of runoff. As stated above in item X a), a SWPPP would be implemented for the proposed project that would establish BMPs that would minimize impacts to existing drainage patterns of the area in a manner which would substantially increase the rate or amount of surface runoff, which would result in flooding on- or off-site. Additionally, the proposed project would not significantly alter drainage at the site. Further, the Drainage Studies prepared for the project determined that project implementation would not significantly increase peak flow rates. As discussed above in item X c i), project implementation would result in a maximum increase of 3 cfs for the southern phase of the project and 1.5 cfs for the northern phase. Along the eastern boundary of the northern phase, on-site 10-year and 100-year peak flows would be lessened with project implementation. Flows exiting the site that would include discharge form the Evans Road Channel would slightly decrease with project implementation. Impacts would be less than significant in relation to this issue.

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

Less than Significant Impact. As stated above in item X a), a SWPPP would be implemented for the proposed project that would establish BMPs that would minimize impacts to existing drainage patterns of the area in a manner which would substantially increase the rate or amount of surface runoff, which would result in flooding on- or off-site. Additionally, the proposed project would not significantly alter drainage at the site. Further, the Drainage Studies prepared for the project determined that project implementation would not significantly increase peak flow rates. Impacts would be less than significant in relation to this issue.

iv. Impede or redirect flood flows?

Less than Significant Impact. According to the flood map prepared by the Federal Emergency Management Agency (FEMA) for the project region, the project site is located in an area of minimal flood hazard (FEMA 2017). Additionally, as stated above in item X a), the Drainage Studies prepared for the project determined that project implementation would not significantly increase peak flow rates or significantly alter drainage at the site. The project would not impede or redirect flood flows. Impacts would be less than significant in relation to this issue.

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

Less than Significant Impact. According to the flood map prepared by FEMA for the project region, the project site is located in an area of minimal flood hazard (FEMA 2017). Therefore, the project would not experience significant impacts related to floods. Tsunamis are usually caused by displacement of the ocean flood causing large waves and are typically generated by seismic activity. The proposed project is located approximately 35 miles from the Pacific Ocean; therefore, a tsunami hazard is not present for the project site. A seiche is a standing wave in an enclosed or partly enclosed body of water. Seiches are normally caused by earthquake activity, and can affect harbors, bays, lakes, rivers, and canals. The

nearest bodies of water include the private lakes approximately 2.1 miles to the northeast, Canyon Lake approximately 2.2 miles to the northwest, Lake Elsinore approximately 7.2 miles to the west, and Diamond Valley Lake approximately 7.9 miles to the east. Therefore, the project is located too far to be impacted by a seiche event. Impacts would be less than significant in relation to this issue.

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

No Impact. As stated above in item X a), a SWPPP would be implemented for the proposed project. Additionally, the project would comply with all storm water quality standards during construction and operation. Adhering to the BMPs and all storm water quality standards would minimize any potential negative impacts associated with hydrology and water quality. Implementation of the proposed project would not conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan. There would be no impact.

XI. Land Use and Planning

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a) Physically divide an established community?	☐	☐	☐	■
b) Cause 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?	☐	■	☐	☐

Sources: City 2013, HELIX 2021b

a) Physically divide an established community?

No Impact. The physical division of an established community typically refers to the construction of a linear feature, such as an interstate highway or railroad tracks, or removal of a means of access, such as a local road or bridge that would impact mobility within an existing community or between a community and outlying area. Conversely, this project, a public park, would serve to connect the community. The undeveloped project site would provide a logical connection between the existing residential land uses to the south, west, and northwest and the high school to the north and east in an area of the City that is developing. No impact would occur in relation to this issue.

b) Cause 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?

Less than Significant with Mitigation Incorporated. The project site is zoned and designated as OS-R and would be developed in accordance with those land uses. Additionally, the project site is identified as a desired location for a community park in the City's Parks Master Plan. As discussed in item IV f), with mitigation measures BIO-2 through BIO-9, the project would not conflict with, MSHCP, the City's Tree Preservation Ordinance, or other approved local, regional, or state habitat conservation plans. Thus,

with the implementation of BIO-2 through BIO-9, land-use related impacts would be less than significant in relation to this issue.

Mitigation

Please see mitigation measures BIO-1 through BIO-9 of this IS/MND. No additional mitigation measures are required.

XII. Mineral Resources

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

Sources: DOC 2021; City 2013b

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

Less than Significant Impact. The DOC classifies the availability of mineral resources in a region into four mineral resource zone (MRZ) categories: MRZ 1 for no mineral resources, MRZ 2 for significant resources areas with the quality and quantity known, MRZ 3 for significant resource areas with the quality and quantity unknown, and MRZ 4 for areas with no information (DOC 2021). The project site is designated as MRZ 3; however, no mineral extraction has been documented to occur on site and no known significant mineral resources have been designated in the City (City 2013b). The project site has a land use designation and zoning of OS-R and is not planned for mineral extraction use. Further, given the location of the site in relation to residential development to the south and west and Paloma Valley High School to the northwest, it is highly unlikely that surface mining or mineral recovery operations could occur on site. Therefore, implementation of the proposed project would not result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state. Impacts would be less than significant in relation to this issue.

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

No Impact. As stated above in item XII a), the project area is not used for mineral extraction and is not delineated as a locally important mineral resource recovery site in the General Plan or any other land use plan. As such, no impacts would occur in relation to this issue.

XIII. Noise

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project result in:				
a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☐	■	☐
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 two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	■

Sources: HELIX 2021d, U.S. Department of Transportation (USDOT) 2008, USDOT 2021, Urban Crossroads 2021a, Caltrans 2020.

HELIX prepared a Noise and Vibration Technical Report for the proposed project, which is the foundation for the information presented below (HELIX 2021d). The report is attached to this IS/MND as Appendix G.

Noise is generally defined as unwanted sound. Sound, traveling in the form of waves from a source, exerts a sound pressure level (referred to as sound level) that is measured in decibels (dB), which is the standard unit of sound amplitude measurement. The dB scale is a logarithmic scale that describes the physical intensity of the pressure vibrations that make up any sound, with 0 dB corresponding roughly to the threshold of human hearing and 120 to 140 dB corresponding to the threshold of pain. Pressure waves traveling through air exert a force registered by the human ear as sound.

Sound pressure fluctuations can be measured in units of hertz (Hz), which correspond to the frequency of a particular sound. Typically, sound does not consist of a single frequency, but rather a broad band of frequencies varying in levels of magnitude. When all the audible frequencies of a sound are measured, a sound spectrum is plotted consisting of a range of frequency spanning 20 to 20,000 Hz. The sound pressure level, therefore, constitutes the additive force exerted by a sound corresponding to the sound frequency/sound power level spectrum. The typical human ear is not equally sensitive to all frequencies of the audible sound spectrum.

As a consequence, when assessing potential noise impacts, sound is measured using an electronic filter that deemphasizes the frequencies below 1,000 Hz and above 5,000 Hz in a manner corresponding to the human ear's decreased sensitivity to extremely low and extremely high frequencies. This method of frequency weighting is referred to as A-weighting and is expressed in units of A-weighted decibels (dBA). A-weighting follows an international standard methodology of frequency deemphasis and is typically applied to community noise measurements.

An individual's noise exposure is a measure of noise over a period of time. While a noise level is a measure of noise at a given instant in time, community noise varies continuously over a period of time with respect to the contributing sound sources of the community noise environment. Community noise is primarily the product of many distant noise sources, which constitute a relatively stable background noise exposure, with the individual contributors unidentifiable. The background noise level changes throughout a typical day, but does so gradually, corresponding with the addition and subtraction of distant noise sources such as traffic. What makes community noise variable throughout a day, besides the slowly changing background noise, is the addition of short-duration, single-event noise sources (e.g., aircraft flyovers, motor vehicles, sirens), which re readily identifiable to the individual.

These successive additions of sound to the community noise environment change the community noise level from instant to instant, requiring the measurement of noise exposure over a period of time to legitimately characterize a community noise environment and evaluate cumulative noise impacts. This time-varying characteristic of environmental noise is described using statistical noise descriptors. The most frequently used noise descriptors are summarized below:

L_{EQ}: The L_{EQ}, or equivalent sound level, is used to describe noise over a specified period of time in terms of a single numerical value; the L_{EQ} of a time-varying signal and that of a steady signal are the same if they deliver the same acoustic energy over a given time. The L_{EQ} may also be referred to as the average sound level.

L_{MAX}: The maximum, instantaneous noise level experienced during a given period of time.

L_{MIN}: The minimum, instantaneous noise level experienced during a given period of time.

L_{DN}: Also termed the DNL, the L_{DN} is the average A-weighted noise level during a 24-hour day, obtained after an addition of 10 dBA to measured noise levels between the hours of 10:00 p.m. to 7:00 a.m. to account nighttime noise sensitivity.

CNEL: CNEL, or Community Noise Equivalent Level, is the average A-weighted noise level during a 24-hour day that is obtained after an addition of 5 dBA to measured noise levels between the hours of 7:00 p.m. to 10:00 p.m. and after an addition of 10 dBA to noise levels between the hours of 10:00 p.m. to 7:00 a.m. to account for noise sensitivity in the evening and nighttime, respectively.

An important way of predicting a human reaction to a new noise environment is the way it compares to the existing environment to which one has adapted (i.e., comparison to the ambient noise environment). In general, the more a new noise level exceeds the previously existing ambient noise level, the less acceptable the new noise level will be judged by those hearing it. Outside of the laboratory, a 3 dBA change in noise levels is considered to be a barely perceivable difference. A change in noise levels of 5 dBA is considered to be readily perceivable, and a change of 10 dBA is subjectively heard as doubling of the perceived loudness.

These relationships occur in part because of the logarithmic nature of sound and the decibel system. The human ear perceives sound in a non-linear fashion; hence the decibel scale was developed. Because the decibel scale is based on logarithms, two noise sources do not combine in a simple additive fashion, but rather logarithmically. For example, if two identical noise sources produce noise levels of 50 dBA, the combined sound level would be 53 dBA, not 100 dBA.

Noise levels from a particular source generally decline as distance to the receptor increases. Other factors, such as the weather and reflecting or barriers, also help intensify or reduce the noise level at any given location. A commonly used rule of thumb for roadway noise is that for every doubling of distance from the source, the noise level is reduced by about 3 dBA at acoustically "hard" locations (i.e., the area between the noise source and the receptor is nearly complete asphalt, concrete, hard-packed soil, or other solid materials) and 4.5 dBA at acoustically "soft" locations (i.e., the area between the source and receptor is normal earth or has vegetation, including grass). Noise from stationary or point sources is reduced by about 6 to 7.5 dBA for every doubling of distance at acoustically hard and soft locations, respectively. Noise levels may also be reduced by intervening structures – generally, a single row of buildings between the receptor and the noise source reduces the noise level by about 5 dBA, while a solid wall or berm reduces noise levels by 5 to 10 dBA.

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

Less than Significant Impact. The proposed project would generate noise levels during project construction and operations as discussed below, based on the analysis completed in the Noise and Vibration Technical Report prepared for the project (HELIX 2021d).

Construction

Construction of the southern phase would require the use of equipment, such as excavators, front-end loaders, backhoes, scrapers, dozers, rollers, and pavers. Blasting or the use of pile drivers is not anticipated to be required. The loudest construction equipment anticipated to be use would be a scraper which generates typical noise levels of 79.6 dBA L_{EQ} at a distance of 50 feet (USDOT 2008). The nearest noise-sensitive land use (NSLU) to the southern phase are the single-family residences, approximately 300 feet west of where the scraper would be used for construction of the southern phase. At this distance, the resulting noise would be 64.0 dBA L_{EQ}. At the nearest NSLU to anticipated northern phase facility construction areas (single-family residences approximately 130 feet west), the resulting noise would be 71.3 dBA L_{EQ}. These modeled noise estimates do not consider intervening terrain or structures. The residential neighborhoods along the west side of Evans Road are separated from the roadway by an approximately 8-foot-high sound wall. According to the Federal Highway Administration's Noise Barrier Design Handbook, a properly designed noise barrier should attain a 10 dBA reduction in traffic noise for the first row of houses behind the barrier (USDOT 2021).

In accordance with the MMC 8.01.010, construction projects located within 0.25 mile (1,320 feet) of an inhabited dwelling are permitted to complete construction activities Monday through Saturday from 6:30 a.m. to 7:00 p.m., except on nationally recognized holidays. Furthermore, in accordance with the City General Plan Policy N-1.7, the daytime exterior noise standard for residential uses is 65 dBA L_{EQ} (City 2013a). Accounting for a reduction in noise from the existing sound walls, the highest anticipated project construction noise would be 61.3 dBA L_{EQ} and would not exceed the City's General Plan residential exterior noise standard at the nearest NSLUs. Thus, the project would not result in a temporary increase in ambient noise levels above established standards. Impacts would be less than significant in relation to this issue.

Operational On-site Noise

Operational on-site noise from normal use of the project (vehicles entering and existing parking lots, people engaged in conversation, music from personal devices, children and pets playing, bicycles on the pump track and trails, operation of landscape equipment) would be similar to typical daytime noise from existing suburban residential neighborhoods and the high school in the project vicinity. These noise sources would occur during the park operating hours and are not anticipated to result in a substantial permanent increase in ambient noise levels.

Organized special events, such as those anticipated approximately four to five times a year for the southern phase, may use a portable PA speaker system. This analysis anticipates that special events would only occur within the pump track portion of the site. The PA system would most likely be set up in the northeastern portion of the pump track near the start and finish lines (see Figure 3). Therefore, the noise generated by the PA system was conservatively calculated at a distance of 400 feet, whereas the nearest NSLU to the west are the residential lots across Evans Road to the west located 380 feet from the closest portion of the pump track and the nearest NSLU to the south are the residences 480 feet from the closest portion of the pump track. A typical portable PA system can produce noise levels as high as 85 dBA L_{EQ} at a distance of 5 feet. Accounting for a standard 6 dBA reduction in noise level for every doubling of distance, the resulting noise at the closest NSLUs (400 feet to the west) would be approximately 47 dBA, not accounting for intervening terrain or structure such as the existing 8-foot-high sound wall, and would not exceed the City's General Plan residential daytime exterior noise standard of 65 dBA L_{EQ} at the nearest NSLUs. In addition, organized events which include amplified sound would require a permit or approval from the City.

Section 13.01.250 of the MMC defines the standard closure hours for City-owned parks as from 30 minutes after sunset of one day to 30 minutes before sunrise of the following day, and all lighted sports fields shall be closed from 10:00 p.m. of one day and 30 minutes before sunrise of the next day. In addition, Section 13.01.150 for the MMC prohibits loud and unreasonable noise, including, playing music, using amplification equipment or playing a musical instrument, which disturbs, injures or endangers the health or peace of others after the designated park hours of operation, with exceptions for permitted events.

Operational Traffic Noise

A 3 dBA increase in ambient noise level represents a doubling of noise energy and the detectable increase threshold for noise in typical outdoor environments. Therefore, a 3 dBA increase in traffic noise levels would require an approximate doubling of traffic volumes. According to the Traffic Study prepared for the project, the existing traffic volumes along Craig Avenue fronting the project site (east of Evans Road) is 3,900 average daily trips (ADT), and 2,000 ADT on Evans Road north of Craig Avenue (Urban Crossroads 2021a). According to the project trip distribution analysis, full buildout of the project would add 350 ADT to Craig Avenue and 550 ADT to Evans Road. Therefore, the project would not double traffic volumes on area roads and the increase in ambient traffic noise as a result of full project buildout would be less than 3 dBA.

Therefore, considering the types of noise typical of a community park, the MMC regulations of park operating hours, special event permitting requirements, and the existing sound wall between the project site and houses west of Evans Road, and the projected traffic levels, long-term operation would not result in a permanent increase in ambient noise levels above established standards. Impacts would be less than significant in relation to this issue.

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

Less than Significant Impact. The primary potential for generation of groundborne vibration would occur during project construction, specifically the use of a vibratory roller for compaction of aggregate and asphalt for the project driveways and parking lots. According to Caltrans' Transportation and Construction Vibration Guidance Manual, the threshold of "strongly perceptible" vibration annoyance potential for human receptors is 0.1 inch per second peak particle velocity (PPV), and the threshold for potential damage to relatively old residential structures is 0.5 inch per second PPV for continuous/ frequent intermittent construction sources (Caltrans 2020). Construction may require the use of a vibratory roller for the paving work for the entrance driveways, which may extend partially into Evans Road and may occur as close as 75 feet from the nearest single-family residences located to the west of the project site. According to the Noise and Vibration Technical Report prepared for the project, the use of a vibratory roller would generate approximately 0.063 inch per second PPV at a distance of 75 feet, which is substantially lower than the structural damage impact to older structures threshold of 0.5 inch per second PPV and the "strongly perceptible" threshold for humans of 0.1 inch per second. Additionally, off-site exposure to such ground-borne vibration would be temporary as it would be limited to the short-term construction period. Temporary vibration impacts associated with project southern phase or northern phase construction would be less than significant. Once operational, the types of activities associated with a community park development would not generate excessive ground-borne vibration. The project would not result in the generation of excessive groundbourne vibration or groundbourne noise levels. Impacts are less than significant in relation to this issue.

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

No Impact. The proposed project is not located within an airport land use plan or within two miles of a public airport or public use airport. The closest private airstrip to the project site is the Skylark airstrip, approximately 6.3 miles to the west. The closest public airports to the project siter are the Perris Valley Airport, approximately 6.6 miles north, and the French Valley Airport, approximately 6.8 miles to the southeast. Therefore, the project is not locating in the vicinity of a public airport or private airstrip and would not expose persons living or working in the project vicinity to excessive noise from airports. Airstrip-related noise impacts would not occur.

XIV. Population and Housing

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a) Induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☐	■

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
b) Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	■

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

No Impact. The project does not include housing or other development that would directly or indirectly affect the number of residents in the area and would not contribute to the creation of additional housing in the City. The project includes minimal roadway/infrastructure improvements that are part of previously identified and planned roadway improvements and/or intended to solely serve the site and would not be of a magnitude to support additional population growth in the area. As discussed in this IS/MND, the City is deficient in park land (in relation to their stated Parks Master Plan goals) and the proposed park is intended to serve the existing population. The proposed project concept would provide approximately 20 acres of a variety of recreational activities for the existing neighborhoods. Therefore, since the project is intended to serve the existing population and has no other features that would directly or indirectly induce growth, no impacts would occur in relation to this issue.

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

No Impact. The proposed project includes the development of a park on undeveloped land that is not designated or zoned for housing. The proposed project would not remove housing and would not displace substantial numbers of people or housing, necessitating the construction of replacement housing elsewhere. No impact would occur in relation to this issue.

XV. Public Services

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:				
a) Fire protection?	☐	☐	■	☐
b) Police protection?	☐	☐	■	☐

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
c) Schools?	☐	☐	☐	■
d) Parks?	☐	■	☐	☐
e) Other public facilities?	☐	☐	☐	■

Source: City 2013a

a) Fire protection?

Less than Significant Impact. The proposed project does not include the construction and operation of any new fire protection facilities, nor would it create a demand for additional facilities. The project would not directly or indirectly introduce any new residents or employees to the project site or the City that would increase the demand for services. The Riverside County Fire Department currently provides fire protection services within the City. Station No. 68 located at 26020 Wickerd Road is approximately one mile southwest of the project site and would likely be the station to serve the project and no new facilities, equipment, or staff would be required to continue to provide fire protection to the area. There may be occurrences or events where paramedics or other fire protection personnel would be needed to provide services at the site; however, this could be handled with the existing resources. Impacts would be less than significant in relation to this issue.

b) Police protection?

Less than Significant Impact. The project does not include the construction and operation of any new police protection facilities, nor would it create a demand for additional facilities. The project would introduce security lighting to an area that currently is unlit and provide a safe gathering place for the community. The City of Menifee Police Department provides law enforcement services in the project area; the nearest station to the site is at 29714 Haun Road, approximately three miles northeast of the project site. The project would not increase population, cause increased traffic congestion on streets in the project area, or otherwise interfere with the ability of police services to maintain acceptable service ratios, meet target response times, or other performance objectives for police protection. The park does not pose any unique design or location criteria that would introduce a substantial new demand for services. As such, the project would not require new or altered police facilities and would not result in substantial adverse physical impacts related to police protection. Impacts would be less than significant in relation to this issue.

c) Schools?

No Impact. The proposed project involves the construction and operation of a new community park and would not introduce inhabitants to the project area that would require additional schools. No impacts would occur in relation to this issue.

d) Parks?

Less than Significant with Mitigation Incorporated. The project is the construction and operation of an approximately 22-acre community park that would be constructed in two phases and once complete the park would support a pump track and bike track, multi-use ball field, splash pad, walking trails, and picnic tables. Implementation of the project would introduce a park in an area of the City that has identified in the City's Parks Master Plan to serve the existing population and planned growth in the area. The project would improve the City's ratio of the number of acres of parkland per population, assisting the City in achieving its General Plan goal of providing an additional 381 acres of parkland within the City to meet its desired ratio of 5 acres of parkland per 1,000 residents (City 2013a). The environmental impacts of the project are discussed within items I-XX of this IS/MND, and with mitigation proposed within this document, potential environmental impacts would be reduced to a less than significant level.

Mitigation

Please see mitigation measures BIO-1 through BIO-9, CUL-1, and GEO-1 of this IS/MND. No additional mitigation measures are required.

e) Other public facilities?

No Impact. Other public facilities may include libraries, senior centers, community centers, and pools, all of which are intended to serve the general public. The project involves the construction of a park to primarily serve the existing and forecasted population within the City and would not directly or indirectly introduce any new residents that would require additional public facilities. Therefore, no impacts would occur in relation to this issue.

XVI. Recreation

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a) 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) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	☐	■	☐	☐

Source: City 2013a

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

No Impact. The proposed project consists of construction of a park intended to serve an area that is currently park deficient as determined by the standard in the General Plan (City 2013a). The project would not introduce residents or create the need for new facilities. Conversely, the project would add approximately 20 acres of recreational space to the existing neighborhood and would likely alleviate some of the demand that these residents may be placing on other recreational facilities in the surrounding area. The proposed project would not result in physical deterioration of an existing open space or any recreation facilities. Therefore, no impacts would occur in relation to this issue.

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

Less than Significant with Mitigation Incorporated. The project is the construction of a park, which as identified in this IS/MND could lead to potentially significant impacts if left unmitigated. However, mitigation as set forth in this document would serve to reduce any potential impacts to less than significant.

Mitigation

Please see mitigation measures BIO-1 through BIO-9, CUL-1, and GEO-1 of this IS/MND. No additional mitigation measures are required.

XVII. Transportation

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a) Conflict with a program plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?	☐	☐	■	☐
b) Would the project conflict or be inconsistent with CEQA Guidelines section 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?	☐	☐	■	☐

Sources: Urban Crossroads 2021a, Urban Crossroads 2021b, City 2020

Urban Crossroads prepared a Traffic Study and a VMT Screening Evaluation for the project, the results of which are referenced as appropriate herein (Urban Crossroads 2021a; 2021b). The Traffic Study also contains recommendations that have been incorporated into the project as project design features as

discussed in the project description. The Traffic Study and VMT Screening Evaluation is attached to this IS/MND as Appendix H.

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

Less than Significant Impact. An analysis of the project's potential impacts to the circulation system is provided below.

Roadways

The policies of the City's General Plan Circulation Element identify that LOS D is the acceptable operating condition for intersections, expect at constrained intersections at close proximity to Interstate 215 where LOS E may be permitted (Policy C-1.2). LOS is the term used to denote the different operating conditions that occur under various traffic volume loads. LOS designations range from A to F, with LOS A representing the best operating conditions and LOS F representing the worst operating conditions. The policies of the City's General Plan Circulation Element also require roadways to comply with applicable safety standards, be compatible with surrounding uses, and be maintained in accordance with best practices (Policy C-1.1).

The proposed project involves the construction of a park that would include a pump track and bicycle trails park in the southern phase and a multi-use ball field, splash pad, picnic areas, and walking trail in the northern phase. Estimated trip generation for each phase of the project is shown in Table 10, *Project Trip Generation Summary*.

Table 10
PROJECT TRIP GENERATION SUMMARY

Land Use	Quantity (acres)	AM Peak Hour Total	PM Peak Hour Total	Daily
Southern Phase: Pump Track	6.00	12	24	300
Northern Phase: Sports Park	12.88	26	52	644
Total	**-**	**38**	**76**	**944**

Source: Urban Crossroads 2021a

As shown in Table 10, the project is anticipated to generate approximately 944 daily trips, including 38 AM peak hour trips and 76 PM peak hour trips. As noted in the project description, the project includes the following project design features as they relate to circulation:

- During the southern phase, the project would construct Evans Road at its ultimate half-section width as a Secondary (104-foot right-of-way) from Craig Avenue to the southern boundary of the southern phase consistent with the City's standards.

- During the southern phase, the project would construct Craig Avenue at its ultimate half-section-width as a Collector (74-foot right-of-way) from Evans Road to the eastern project boundary of the southern phase consistent with the City's standards.

- During the southern phase, the project would construct access to the site via Craig Avenue.

- During the northern phase, the project would construct Evans Road at its ultimate width as a Secondary (104-foot right-of-way) from Corson Avenue to Craig Avenue consistent with the City's standards.

- During the northern phase, the project would construct two driveways along Evans Road for site access.

The Traffic Study analyzed the potential impacts associated with project implementation under existing conditions (2021) and opening year cumulative conditions (2025) (Urban Crossroads 2021a). The Traffic Study found that with implementation of the project design features, the project would not cause significant adverse impacts to intersections or roadways. The Traffic Study also found that installation of traffic lights would not be required and no off-site improvements are recommended, although the project Applicant would be required to pay requisite fees and/or fair share fees consistent with the City's requirements. Therefore, the project would not result in significant impacts related to roadways. Impacts would be less than significant.

Bicycle and Pedestrian Facilities

The policies of the City's General Plan Circulation Element identify that on- and off-street pathways must comply with applicable safety standards, be compatible with surrounding uses, and be maintained in accordance with best practices (Policy C-2.1). The policies of the City's General Plan Circulation Element also encourages off-street multi-purpose trails as paths of citywide travel (Policy C-2.2), and promotes opportunities to expand pedestrian and bicycle networks (Policy C-2.4).

There are proposed Class III bicycle facilities along Craig Avenue and a proposed Class II bicycle facility along Evans Road. Additionally, there is a sidewalk along the west side of Evans Road and along portions of Craig Avenue. The proposed project would not interfere with the existing or proposed bicycle and pedestrian facilities in the area. The project includes a bicycle trails park in the southern phase and pedestrian trails in the northern phase, which would not conflict with the policies in the City's General Plan. Rather, the construction of new, safe pathways would support Policies C-2.1, C-2.2, and C-2.4 of the City's General Plan Circulation Element. Therefore, the project's impact on bicycle and pedestrian facilities would be less than significant.

Transit

The policies of the City's General Plan Circulation Element identify that community-wide facilities shall be sited in transit-ready areas that can be made accessible by public transit. The project area is not currently served by transit services, although there is potential for future on-road transit service along Craig Avenue. Transit service is reviewed and updated by the Riverside Transit Agency periodically to address ridership, budget, and community demand needs. According to the project's Traffic Study, changes in land use can affect these periodic adjustments which may lead to either enhanced or reduced service where appropriate. Implementation of the project does not involve the construction of housing that would introduce new residents to the area that would require transit services. The project is intended to serve the surrounding communities, and would not interfere with transit services. Additionally, the project site is located in an area with the potential for future transit services to be incorporated. Therefore, impacts would not occur.

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

Less than Significant Impact. A VMT Screening Evaluation was prepared for the project (Urban Crossroads 2021b). The assessment utilized methodologies from the Governor's Office of Planning and Research Technical Advisory developed to assist with implementation of SB 743, which resulted in a shift in the measure of effectiveness for determining transportation impacts from LOS and vehicular delay to VMT. Accordingly, the City Council adopted analytical procedures, screening tools, and impact thresholds for VMT, which are documented in the City of Menifee Traffic Impact Analysis Guidelines for Vehicle Miles Traveled (City 2020). The City's Traffic Impact Analysis Guidelines for Vehicle Miles Traveled includes three types of screenings that lead agencies can apply to effectively screen projects from project-level assessment. If a project meets the criteria of at least one of the screening criteria types, the project is assumed to result in less than significant VMT impacts. The three screening categories are broadly classified as Transit Priority Area (TPA) screening, Low VMT Area screening, and Project Type screening. According to the VMT Screening Evaluation prepared for the project, the project does not meet the criteria of the TPA screening or Low VMT Area screening. However, the proposed project meets the requirements of the Project Type screening because the project was determined to be local serving in nature and would have a net effect of reducing Citywide VMT. Therefore, by meeting the requirements of the Project Type screening, the project is assumed to result in less than significant VMT impacts per the City's Traffic Impact Analysis Guidelines for Vehicle Miles Traveled. As such, impacts related to VMT would be considered less than significant.

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

Less than Significant Impact. There would be no hazardous design features or incompatible uses introduced as a result of the project. The project involves the construction of a park that would include a bicycle trails park in the southern phase a multi-use ball field, splash pad, picnic areas, and trails in the northern phase. The project would have three access points: one to the southern phase via Craig Avenue and two to the northern phase via Evans Road. Per the recommendations of the Traffic Study, the project would also include improvements to Craig Avenue and Evans Road, which would minimize traffic hazards in the area surrounding the project site. As discussed in the project description and in item XVII, these recommendations are included as project design features. Additionally, the project would incorporate on-site traffic signing and striping in accordance with the Traffic Study. As such, the proposed project would not substantially increase hazards due to a geometric design feature or incompatible uses. Impacts would be less than significant.

d) Result in inadequate emergency access?

Less than Significant Impact. Refer to the discussion in item IX f). The project could impact emergency access during both construction and operation. During construction of the project, heavy construction vehicles could interfere with emergency response to the site or emergency evacuation procedures in the event of an emergency (e.g., vehicles traveling behind the slow-moving truck). However, such trips would be brief and infrequent. Additionally, although traffic may temporarily need to be directed around the construction, the project construction would not require road closures. The project would also improve access to the site by constructed a driveway via Craig Avenue during the southern phase and two driveways via Evans Road during the northern phase. Therefore, the project would not result in inadequate emergency access. Impacts would be less than significant.

XVIII. Tribal Cultural Resources

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a) Cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code Section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:				
i. Listed or eligible for listing in the California 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 Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resources Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.	☐	■	☐	☐

Sources: HELIX 2021c

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

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

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

Less than Significant with Mitigation Incorporated. As detailed in item V a) based on the lack of recorded resources onsite, no identifiable historical use or development of the site, and the results of the pedestrian survey, the project would not cause a substantial adverse change in the significance if a historical resource.

However, as discussed in item V b), based on the findings of the record search, the types of soils, and the Native American Contact Program there is an indication that there is a potential for the presence of archaeological resources. A field survey was also performed, and no resources were observed; yet due to dense chest-high vegetation ground visibility was obscured.

In particular, the records search conducted by the EIC indicated that while there are no prehistoric resources within or adjacent to the project site there were 33 prehistoric resources recorded within the one-mile search radius. Additionally, the project site is located within alluvial soils, where there is a potential for buried cultural resources. Further, as part of the Native American Contact Program, the Pechanga Band of Luiseño Indians (Pechanga) identified the project vicinity as culturally sensitive, although the NAHC stated that the search of the SLF returned negative results.

Due to the potential for subsurface cultural resources and the cultural sensitivity identified by Pechanga, it is recommended that an archaeological and Native American monitoring program be implemented for any grading or other ground-disturbing activities, including but not limited to brushing/grubbing, excavation, and trenching for utilities. The City's General Plan Implementation Action OSC-32 states development should include mandatory mitigation measures, in coordination with the Pechanga Band of Luiseno Indians and/or Soboba Band of Luiseno Indians, for any project within previously undisturbed soils in an area determined to be in a culturally or archeologically sensitive area, based on consultation with the project archeologist and the Tribe (City 2013a). Thus, the project would implement mitigation measure CUL-1 as identified in Section V to reduce impacts.

In accordance with the requirements of AB 52, the City sent notification to Native American Tribes traditionally and culturally affiliated with the project area on December 22, 2021. Consultation with interested tribes has been initiated and is ongoing.

Mitigation Measure

Please see mitigation measure CUL-1 in Section V.

With implementation of CUL-1, the project would not cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code Section 21074. Impacts are less than significant with mitigation in relation to this issue.

XIX. Utilities and Service Systems

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a) Require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?	☐	☐	☐	■

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
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 wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	■	☐
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?	☐	☐	☐	■

Sources: CValdo Corporation 2021b, 2021a, WSC 2021, City 2013b, City 2019, CalRecycle 2021

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

Less than Significant Impact. The project involves the construction of a park, which as noted previously is not anticipated to result in the addition of any new residents to the area. The project would require minimal amounts of water and wastewater treatment to support the proposed pump track, bike trails, and restroom in the southern phase and the multi-use ball field, splash pad, and bathroom facilities in the northern phase.

The dirt and gravel tracks in the southern phase may require water for dust control in association with periodic track reshaping and maintenance. With the exception of the identified park features (asphalt pump track, dirt trails, restroom facility, and parking lot), the remainder of the project site would be retained in a natural state. Restroom fixtures would be Title 24 compliant, which would require that all faucets and toilets be low flow. Lighting would be provided via a combination of solar and LED powered light standards.

While the northern phase is conceptual, the City has identified the intent to include a multi-use ball field, splash pad, picnic tables, trail, and a restroom facility. Like other City parks, the splash pad would use reclaimed water and the water play features would not be constantly flowing. Splash pad users would activate water use on demand. Similar to the splash pad, the multi-use field would use reclaimed water for irrigation. Ornamental landscaping would be provided throughout the northern phase, however the existing wetland habitat in the southeastern portion would be retained in its natural state.

As discussed in item X a) above, the proposed project would not significantly alter drainage at the site. According to the Drainage Studies prepared for the project, the major flow paths are assumed to remain the same with project implementation. The Drainage Study prepared for the southern phase

determined that the 100-year peak flow rate would increase by approximately 3 cfs, which would not cause adverse impacts (CValdo Corporation 2021b). The Drainage Study prepared for the northern phase included a program-level analysis, which determined that the northern phase should be designed to convey the 100-year peak flow rate to avoid adverse impacts (CValdo Corporation 2021a).

The project would require local connections to connect to the surrounding water and wastewater infrastructure that serves the greater project area. Thus, with the project-related design features coupled with the required compliance with regulations for energy efficiency, the project would not substantially increase the demand for water or wastewater treatment services and would not require the need for new or expanded water or wastewater treatment facilities. Adequate services and utilities infrastructure are available to serve the project. Implementation of the project would not require the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities. Impacts associated with these utilities would be less than significant.

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

Less than Significant Impact. The Urban Water Management Planning Act (Act), adopted in 1983, requires water suppliers in California to conduct long-term water resources planning and specifically, Section 10620 (a) of the Act, identifies that urban water suppliers shall prepare and adopt an urban water management plan (UWMP) and that these plans are to be updated every five years.

Accordingly, Eastern Municipal Water District (EMWD), the water purveyor for the City has prepared the 2020 UWMP, an update to the 2015 UWMP, which has been submitted to the California Department of Water Resources for review in July 2021. The UWMP outlines that EMWD has four sources of water supply: imported water from the Metropolitan Water District of Southern California (MWD), local groundwater, desalinated groundwater, and recycled water. Further, through a combination of these resources EMWD indicates that the agency has the ability to meet current and projected water demands through 2045 during normal, historic single-dry and historic multiple-dry year periods. While planned local supplies will complement imported MWD supplies and improve reliability for EMWD and the region, MWD has shown the ability to continue to meet demands through 2045, even during an extended drought (WSC 2021).

The proposed Project would result in a slight increase in water demand to accommodate the bathroom facility needs for park visitors. Water demands for landscaping purposes would be minimal as a portion of the project site would remain in its current natural state and any ornamental landscaping would be drought tolerant. Reclaimed water would be used to irrigate the multi-use ball field and for the splash pad. Additionally, any irrigation for landscaping would be from reclaimed water that would not place a demand on potable water. Thus, the primary uses of potable water would be the restroom facilities and any water fountains that may be installed at the site These facilities, as required by CALGreen, would include low flow faucets and toilets. Moreover, according to the General Plan EIR, there is sufficient supply to meet demand of General Plan buildout and impacts were determined to be less than significant. The proposed project is consistent with the General Plan and impacts related to water supply are consistent with those contemplated and analyzed in the General Plan EIR.

As stated in the UWMP, EMWD can meet its water demands through 2045 under all scenarios, coupled with the low demand and the required compliance to State efficiency standards, the project would have

sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years. The project would have less than significant impacts in relation to this issue.

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

Less than Significant Impact. The project would generate wastewater (sewage) from visitors to the park using the restroom facilities. Onsite wastewater infrastructure would require local connections to the surrounding infrastructure. According to the General Plan EIR, buildout of the planned land uses would result in an increase of 5.6 million gallons per day (mgd) of wastewater, which could be adequately handled by the two regional water reclamation facilities (RWRFs), Perris Valley and Temecula (City 2013b). The project is consistent with the designated General Plan land use (OS-R) and therefore has been accounted; impacts would be less than significant in relation to this issue.

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

Less than Significant Impact. California Department of Resources and Recycling and Recovery (CalRecycle) monitors the progress of local jurisdictions in meeting the various solid waste reduction recycling goals, which are expressed in per capita disposal rates for residents and employees. The most current information for the City (2019) is that the City is disposing fewer pounds per day (ppd) of waste than the target rates; thereby exceeding their goal. Specifically, the City of has a goal of disposing of no more than 4.6 ppd/resident and 29.8 ppd/employee; as of 2019, on the whole residents were disposing of 3.6 ppd and employees 22.7 ppd (CalRecycle 2021).

The project would generate waste during construction; however due to the nature of the project, it is not subject to the City's construction waste diversion regulations. Regardless, the project would be required to comply with applicable State and local regulations, including Section 40050 et seq. of the California Public Resources Code, to reduce the volume of solid waste entering landfills.

During the operation of the park, waste typical of a parkland use would be generated, including food packaging, paper, pet waste, etc. Trash and separate recycling receptacles would be placed throughout the park and collected in accordance with the provisions set forth in MMC, Chapter 6.30, Collection of Solid Waste and Recycling. The amount of waste produced by park users would differ depending on the level of use and day of the week. For example, larger amounts of waste would likely be generated during weekends or if sporting events are held at the pump track or multi-use ball field. Given that the project would be required to adhere to solid waste regulations and the only solid waste generated from the park would be from visitors and the project would not include any residential uses or include permanent employees on the site, it is not anticipated that the project would impede goals that the City has established for residents and employees. The project would have a less than significant impact in relation to this issue.

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

No Impact. The project would comply as required with the City's recycling programs, which are designed to comply with federal, state, and local statutes and regulations related to solid waste. These statutes

and regulations include the California Integrated Solid Waste Management Act, the California Beverage Container Recycling and Litter Reduction Act, and the City's solid waste disposal policies and practices. The Integrated Solid Waste Management Act requires that jurisdictions maintain a 50 percent or better diversion rate for solid waste, including construction and demolition waste. Therefore, the Project would have a less than significant impact in relation to this issue.

XX. Wildfire

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

Sources: City 2013b, CValdo Corporation 2021a, 2021b

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

Less than Significant Impact. Please see item IX f). Impacts would be less than significant in relation to this issue.

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

Less than Significant Impact. The project site is level and void of slopes. However, as discussed in item IX g), the project site does support some characteristics, such as dense and unmaintained vegetation that are favorable to the spread of wildfires and is located in a VHFHSZ. However, while the project would retain the natural vegetation, as a City park vegetation would be maintained for brush fire control, which would reduce the risk of the spread of wildfire and thereby any associated pollutants. The surrounding area, which is developed with a combination of residential and institutional land uses does

not support the common characteristics identified as a wildfire risk, such as difficult terrain, inadequate access, and unmaintained vegetation. Therefore, the proposed project would not exacerbate wildfire risks due to slope, prevailing winds, and other factors, and any impacts related to exposing project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire. Impacts would be less than significant in relation to this issue.

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?

No Impact. The project does not include the installation of infrastructure that would exacerbate fire risks. The Project would be required to comply with the California Fire Code (MMC Section 08.20.010), which stipulates the standards for access, fire hydrants, water pressure, fire lanes, etc. The project would remove fire hazards such as overgrown brush and vegetation. No impact would occur in relation to this issue.

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

Less than Significant Impact. The project area is relatively flat, with an elevation ranging from 1,477 to 1,489 feet amsl. Additionally, as identified in item VII a iv), the project site and surrounding area are not identified as being within an area subject to landslides (City 2013b). As stated in Section X, the on-site drainage patterns would not be significantly changed from current conditions. In the southern phase, flows enter the site at the southeast corner and travel northwest within the site before exiting the site along the northern boundary. The major flow paths would not change in the southern phase with project implementation. In the northern phase, flows enter the site along the western and southwestern boundaries, and travel northeast within the project site before exiting along the northern and eastern boundaries. Since there is no drainage pattern indicated on the current preliminary site plan, it is assumed that the general flow paths would remain unchanged in the northern phase with project implementation. In addition, project implementation would result in a maximum increase of 3 cfs for the southern phase of the project and 1.5 cfs for the northern phase. Along the eastern boundary of the northern phase, on-site 10-year and 100-year peak flows would be lessened with project implementation (CValdo Corporation 2021a, 2021b). Flows exiting the site that would include discharge form the Evans Road Channel would slightly decrease with project implementation. Further, the project would not introduce any habitable structures. Therefore, project would not expose people or structures to significant risks related to runoff, post-fire slope instability, or drainage changes. Impacts would be less than significant in relation to this issue.

XXI. Mandatory Findings of Significance

	Potentially Significant Impact	Less Than Significant 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 significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of past, present and probable future projects)?	☐	☐	■	☐
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☐	■	☐	☐

Sources: City 2021b, HELIX 2021a; 2021b; 2021 c, PaleoWest 2021

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. Potentially significant impacts to the environment resulting from the proposed project have been identified for the areas of biological resources, cultural resources (including tribal cultural resources), and geology (paleontological resources). The project would have the potential to result in significant impacts to sensitive or protected plant and animal species, riparian or sensitive communities, wetlands, migratory species, a tree ordinance, and adopted plans designed to protect biological resources. However, by implementing mitigation measures BIO-1 through BIO-9, impacts would be reduced to below a level of significance.

The project is not expected to impact resources related to major periods of California history or prehistory. Based on the cultural sensitivity of the project region and undeveloped nature of the site, however, the project would have the potential to impact unknown subsurface cultural, paleontological and tribal cultural resources. With implementation of mitigation measures CUL-1 and GEO-1, however, impacts to unknown subsurface cultural, paleontological and tribal cultural resources would be reduced to below a level of significance.

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

Less than Significant Impact. Cumulative impacts are defined as two or more individual project effects that, when considered together or in concert with other projects, combine to result in a significant impact (CEQA Guidelines Section 15355). As shown in Table 11, *Cumulative Projects List*, there are multiple past, present, and reasonably foreseeable projects occurring in Menifee. The projects are characterized as residential or industrial in nature and occur in various parts of the city.

Table 11
CUMULATIVE PROJECTS LIST

Project	Location/Distance from Project Site	Project Description
Northern Gateway Commerce Center's I & II	Two sites north of McLaughlin Road, near Geary Street (site 1) and Evans Road (site 2)/ 4.5 miles north of proposed project	Construction of two concrete tilt-up buildings and associated facilities and improvements. The buildings would each include office and warehouse space.
City of Menifee Housing Element Update	City of Menifee, citywide	Updates to the City of Menifee Housing Element.
Menifee Crossroads Project	Intersection of Newport Road and Bradley Road/1.2 mile north of proposed project	Development of approximately 103,274 square feet of retail and office space, in addition to on-site improvements. Proposed retail uses include a market, restaurants, and shops.
Boulders Project	Intersection of Normandy Road and Berea Road/1.4 mile northwest of proposed project	Development of a mixed-use commercial and multiple family residential use consisting of a three-story office building with an area of 21,310 square feet, an 8,250-square foot daycare building with an outdoor play area, and a 234-unit apartment complex consisting of nine three-story apartment buildings and one 3,455-square foot clubhouse.

Source: City 2021a

The closest project is the Menifee Crossroads Project, occurring approximately 1.2 mile of the proposed project. The Menifee Crossroads Project involves the construction of approximately 103,274 square feet of various retail uses and office space, in addition to on-site improvements, located on an approximately nine-acre site. The Menifee Crossroads Project would not be located adjacent to or in the immediate vicinity of the proposed project.

There is potential for the construction schedules of the listed projects to overlap with the proposed project. However, the remaining projects are over one mile away from the proposed project and are therefore at such a distance that cumulative impacts would be minimal. Additionally, the proposed project is almost exclusively limited to construction-related effects that would occur at the site. Potential impacts to biological resources, cultural resources, tribal cultural resources, and paleontological resources that may be present on the project site would be lowered to a less than significant level through mitigation. Potential impacts associated with simultaneous construction of the

projects would be short-term and limited by minimal construction workers traveling to the site. The minimal noise impacts generated during construction would be less than cumulative considerable due to the distance between the proposed project and the other projects. The projects would address potential impacts related to biological and cultural impacts at their respective sites so that potential impacts would not be cumulatively considerable. Therefore, the project would not result in impacts that are individually limited but cumulatively considerable.

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

Less than Significant with Mitigation Incorporated. The proposed project would adhere to regulatory codes, ordinances, regulations, standards, and guidelines applicable to each of the environmental issue areas analyzed herein. As described above, potentially significant impacts resulting from the proposed project with the potential to cause adverse effects on human beings have been identified for the areas of land use, public services (parks), and recreation. The proposed project includes the construction of a park which may result in adverse physical effects on the environment. However, such impacts are evaluated in the entirety of this IS/MND. Therefore, impacts would be reduced to a less than significant level through implementation of the mitigation measures included in this IS/MND (namely mitigation measure BIO-1 through BIO-9, CUL-1, and GEO-1). Additionally, the project has the potential to result in land use impacts by conflicting with an MSHCP, the City's Tree Preservation Ordinance, or other approved local, regional, or state habitat conservation plans. However, such impacts would be reduced to a less than significant level with mitigation measures BIO-2 through BIO-9. Impacts would be less than significant with mitigation incorporated.

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CValdo Corporation

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IS/MND Appendix A

Air Quality and Greenhouse Gas Emissions Technical Report

HELIX Environmental Planning

Evans Park Project

Air Quality and Greenhouse Gas Emissions Technical Report

December 2021 | 02121.00002.001

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TABLE OF CONTENTS

Section **Page**

EXECUTIVE SUMMARY ES-1

1.0 INTRODUCTION 1

1.1 Project Location 1
1.2 Project Description 1
1.2.1 Southern Phase 1
1.2.2 Northern Phase 2
1.3 Construction Activities and Phasing 2

2.0 REGULATORY SETTING 3

2.1 Air Quality 3
2.1.1 Air Pollutants of Concern 3
2.1.2 Federal Air Quality Regulations 5
2.1.3 California Air Quality Regulations 7
2.1.4 Local Regulations 8
2.2 Greenhouse Gases 9
2.2.1 Climate Change Overview 9
2.2.2 Types of Greenhouse Gases 10
2.2.3 Federal Greenhouse Gas Regulations 11
2.2.4 California Greenhouse Gas Regulations 12
2.2.5 Regional GHG Policies and Plans 16

3.0 EXISTING CONDITIONS 16

3.1 Climate and Meteorology 17
3.2 Existing Air Quality 18
3.2.1 Criteria Pollutants 18
3.2.2 Greenhouse Gases 19
3.3 Methodology 20
3.3.1 Construction Emissions 20
3.3.2 Operation Emissions 23
3.3.3 Localized Significance Threshold Methodology 23
3.4 Significance Criteria 24
3.4.1 Air Quality 24
3.4.2 Greenhouse Gases 25

4.0 AIR QUALITY IMPACT ANALYSIS 26

4.1 Issue 1: Consistency with Air Quality Plans 26
4.1.1 Impacts 26
4.1.2 Significance of Impacts 27
4.1.3 Mitigation Framework 27
4.1.4 Significance After Mitigation 27

TABLE OF CONTENTS (cont.)

Section **Page**

4.2 Issue2: Cumulatively Considerable Net Increase of Nonattainment Criteria Pollutants 27
4.2.1 Impacts 27
4.2.2 Significance of Impacts 29
4.2.3 Mitigation Framework 29
4.2.4 Significance After Mitigation 29
4.3 Issue 3: Impacts to Sensitive Receptors 30
4.3.1 Impacts 30
4.3.2 Significance of Impacts 32
4.3.3 Mitigation Framework 33
4.3.4 Significance After Mitigation 33
4.4 Issue 4: Other Emissions (Such as Those Leading to Odors) 33
4.4.1 Impacts 33
4.4.2 Significance of Impacts 33
4.4.3 Mitigation Framework 33
4.4.4 Significance After Mitigation 33

5.0 GREENHOUSE GAS IMPACT ANALYSIS 34

5.1 Issue 1: Greenhouse Gas Emissions 34
5.1.1 Construction and Operational Emissions 34
5.1.2 Significance of Impacts 35
5.1.3 Mitigation Framework 36
5.1.4 Significance After Mitigation 36
5.2 Issue 2: Conflict With Applicable Plans Adopted for the Purpose of Reducing Greenhouse Gas Emissions 36
5.2.1 Impacts 36
5.2.2 Significance of Impacts 37
5.2.3 Mitigation Framework 37
5.2.4 Significance After Mitigation 37

6.0 LIST OF PREPARERS 37

7.0 REFERENCES 38

TABLE OF CONTENTS (cont.)

LIST OF APPENDICES

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LIST OF FIGURES

No.	Title	Follows Page
1	Regional Location	2
2	Aerial Photograph	2
3	Southern Phase Site Plan	2

LIST OF TABLES

No.	Title	Page
1	Summary of Common Sources and Human Health Effects of Criteria Air Pollutants	4
2	Ambient Air Quality Standards	6
3	South Coast Air Basin Attainment Status (Riverside County Portion)	7
4	Global Warming Potentials and Atmospheric Lifetimes	11
5	Project Site and Surrounding Land Uses	17
6	Air Quality Monitoring Data	18
7	California Greenhouse Gas Emissions by Sector	19
8	Anticipated Construction Schedule	21
9	Construction Equipment Assumptions	22
10	SCAQMD Thresholds of Significance	25
11	Unmitigated Daily Construction Emissions	28
12	Daily Operational Emissions	29
13	Maximum Localized Daily Construction Emissions	30
14	Phase 1 and Phase 2 - Estimated Construction Greenhouse Gas Emissions	34
15	Phase 1 and Phase 2 - Estimated Operational Greenhouse Gas Emissions	35
16	Phase 1 and Phase 2 - Total Amortized Construction and Operational Greenhouse Gas Emissions	35

ACRONYMS AND ABBREVIATIONS

AB	Assembly Bill
ADT	average daily trips
APN	Assessor's Parcel Number
APS	alternative planning strategy
AQMP	Air Quality Management Plan
C_2F_6	hexafluoroethane
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
CAFE	Corporate Average Fuel Economy
CalEEMod	California Emissions Estimator Model
CalEPA	California Environmental Protection Agency
CALGreen	California Green Building Standards Code
Caltrans	California Department of Transportation
CAP	Climate Action Plan
CAPCOA	California Air Pollution Control Officers Association
CARB	California Air Resources Board
CCR	California Code of Regulations
CEQA	California Environmental Quality Act
CF_4	tetraflouromethane
CFC	chlorofluorocarbon
CFR	Code of Federal Regulations
CH_4	methane
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
DPM	diesel particulate matter
EO	Executive Order
GHG	greenhouse gas
GWP	global warming potential
HFC	hydrofluorocarbon
I-	Interstate
IPCC	Intergovernmental Panel on Climate Change
kW	kilowatts
kWhr	kilowatts-hours
LCFS	Low Carbon Fuel Standard
LLG	Linscott, Law & Greenspan, Engineers

ACRONYMS AND ABBREVIATIONS (cont.)

LOS	Level of Service
LST	localized significance threshold
mg/m^3	milligrams per cubic meter
MMT	million metric tons
mpg	miles per gallon
mph	miles per hour
MPOs	metropolitan planning organizations
MT	metric tons
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NASA	National Aeronautics and Space Administration
NHTSA	National Highway Traffic Safety Administration
NO	nitrogen monoxide
NO_2	nitrogen dioxide
NO_X	nitrogen oxides
O_3	ozone
OEHHA	Office of Environmental Health Hazard Assessment
Pb	lead
PFC	perfluorocarbon
PM_{10}	particulate matter less than 10 microns
$PM_{2.5}$	particulate matter less than 2.5 microns
ppm	parts per million
ROG	reactive organic gas
RTP	Regional Transportation Plan
SB	Senate Bill
SCAB	South Coast Air Basin
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
SCS	Sustainable Communities Strategy
SF	square feet/foot
SF_6	hexafluoride
SIP	State Implementation Plan
SO_2	sulfur dioxide
SO_X	sulfur oxides
SRA	source receptor area
TACs	toxic air contaminants
TIA	Traffic Impact Analysis

ACRONYMS AND ABBREVIATIONS (cont.)

USEPA	U.S. Environmental Protection Agency
VMT	vehicle miles traveled
VOC	volatile organic compound
WRCOG	Western Riverside Council of Governments

EXECUTIVE SUMMARY

This report presents an assessment of potential air quality and greenhouse gas (GHG) emissions impacts during construction and operation of the proposed Evans Park (project), located in the City of Menifee (City). The Project is planned for two stages, with the southern portion completed first. This report includes the construction and operation of both portions of the proposed park. The southern portion of the park includes a pump track, parking, restrooms, and other associated improvements. The northern portion is still being planned.

The proposed project is designed to be consistent with the City of Menifee General Plan and the Menifee Zoning Code. The existing General Plan land use designation is Open Space-Recreation (OS-R), Low Density Residential-2 (LDR-2). As such, the project's growth is accounted for in the South Coast Air Quality Management District's (SCAQMD's) Air Quality Management Plan (AQMP).

The project would result in emissions of criteria air pollutants during construction and operation. In accordance with SCAQMD Rule 403, fugitive dust control measures are incorporated into the project design including: the use of an on-site water truck to wet down active grading areas and roads at least twice daily, maintaining a minimum moisture content of 12 percent on unpaved roads, and enforcing a 10-mile per hour (mph) speed limit on unpaved roads.

Impacts related to cumulatively considerable net increases of criteria pollutant in the region would be less than significant.

Project-generated traffic would not result in a carbon monoxide hot spot. Construction and operation of the project would not result in exposure of sensitive receptors to significant quantities of toxic air contaminants or substantial localized criteria pollutant and precursor concentrations. Impacts related to exposure of sensitive receptors to substantial pollutant concentrations, or other emissions such as odors, would be less than significant.

Phase 1 and Phase 2 project-related construction activities are estimated to generate a total of 1,212.5 metric tons (MT) of carbon dioxide equivalent (CO_2e), or 40.5 MT CO_2e per year when amortized over 30 years. Phase 1 and Phase 2 total operational and amortized construction emissions are estimated to generate 980.0 MT of CO_2e. This value is less than the SCAQMD's 3,000 MT CO_2e per year interim threshold. Therefore, GHG emissions would be less than significant.

The impacts related to GHG emissions and conflicts with GHG reduction plans and policies would be less than significant.

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1.0 INTRODUCTION

This report presents an assessment of potential air quality and greenhouse gas (GHG) emissions impacts during construction and operation of the proposed Evans Park Project (project).

1.1 PROJECT LOCATION

The project proposes the construction of a community park on the Evans Park site in the City of Menifee (City). The Park, located east of Evans Road and north and south of Craig Avenue, (see Figures 1 and 2, *Regional Location* and *Aerial Photograph of Project Location*, respectively) would be constructed in two separate phases. The first phase encompasses the southern six acres of the 9.17-acre site and is currently funded and designed.[1] The second phase encompasses the northern 13.56 acres of the site and is in the conceptual phase. Once complete, Evans Park would occupy 22.73 acres and provide approximately 20 acres of recreational and open space facilities.

1.2 PROJECT DESCRIPTION

The City's Parks Master Plan describes a community park as a park that meets the recreational needs of several neighborhoods and may also preserve unique landscapes and open spaces. These parks serve multiple uses and provide recreational facilities and accommodate group activities not provided in neighborhood parks. Primary access to community park sites is expected to be by arterial and/or collector streets. Community parks typically serve 18,000 to 25,000 residents within approximately a one- and one-half mile radius (City of Menifee 2015).

1.2.1 Southern Phase

For the first (southern) phase, the City proposes to build a bicycle trails park on the site near the southeast corner of Evans Road and Craig Avenue (see Figure 3, *Southern Phase Site Plan*). The bicycle trails park would include a parking lot at the northeast corner with an entrance off Craig Avenue and a prefabricated restroom. The park would be divided into two separate sections, a smaller paved tight circuit area called a "Pump Track" and the larger dirt trail portion of the track, which would have some wooden slat sections to add challenging elements to the track.

Parking would be provided via a 12,000-square foot gravel parking lot in the northeast portion of the site, accessible from Craig Avenue and accommodate approximately 45 vehicles. While the parking lot would be gravel at the opening of the southern phase, it would transition to a paved lot approximately one year after the southern phase becomes operational. Lighting would be provided via a combination of solar and LED powered light standards. The park would operate from dawn until dusk until the installation of the light standards (to occur approximately one year after the opening of the southern phase), at which point the park would operate until 9 p.m. Special events would be held at the park approximately four to five times a year and would include the use of a public address system.

Construction on the southern phase would commence in winter to spring 2022 with an opening date of late spring to early summer 2022. Once the southern phase becomes operational, regular maintenance would occur such as trash clean up and restroom servicing. The tracks themselves would be subject to

[1] An additional three acres in the western portion of the site is dedicated to a canal and is not included in the overall park acreage.

maintenance after heavy rains and one to two times a year; however, no regular reshaping of the dirt trails is expected to occur.

1.2.2 Northern Phase

The second (northern) phase, which encompasses the 13.56 acres north of Craig Avenue, would include a mixture of active and passive spaces. It is the intent to develop the northern phase with a multi-use ball field, splash pad, picnic areas, and trails. Access would be via Evans Road with an internal drive to access the facilities. Ornamental landscaping would be provided throughout, however the existing wetland habitat in the southeastern portion would be retained in its natural state. It is anticipated that construction of the northern phase will commence in the year 2025.

The framework established in the City of Menifee Park Development and Design Guidelines (City of Menifee 2015) provides a foundation for understanding the standards that would be expected for development of the northern phase. The City's Park Development Guidelines states that in general community parks should, "Provide a wide range of facilities that supplement those of the neighborhood parks, and which are determined by the needs and preferences of the community. Recreation centers, athletic fields, multipurpose courts, picnic facilities, play areas, parking areas, and comfort stations, landscaping and turf areas are standard amenities. When possible and desirable, swimming pools and tennis courts may be provided." (City of Menifee 2015)

Circulation System Improvements

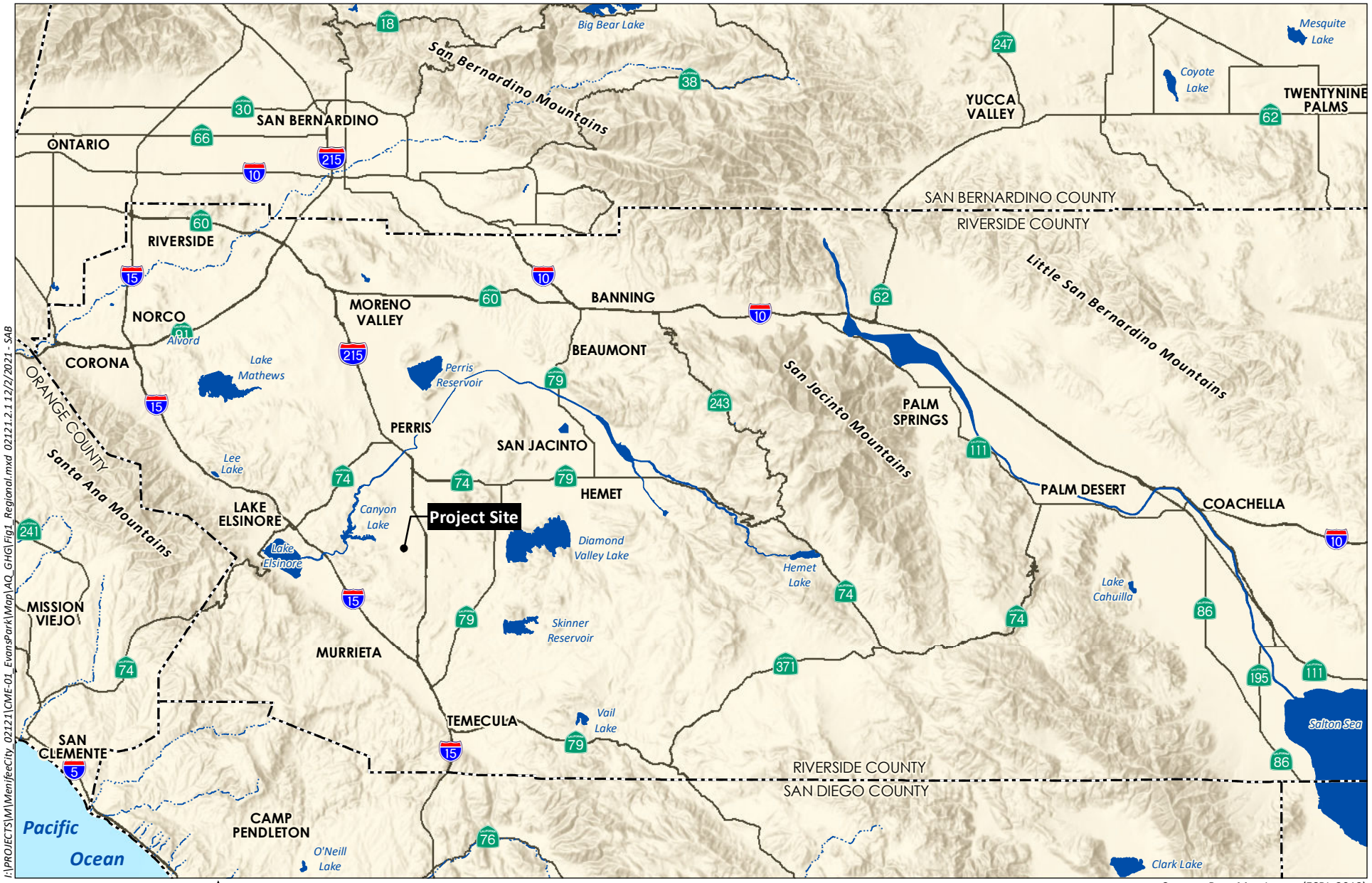
The project includes the following project design features as they relate to circulation:

- During the southern phase, the project would construct Evans Road at its ultimate half-section width as a Secondary (104-foot right-of-way) from Craig Avenue to the southern boundary of the southern phase consistent with the City's standards.
- During the southern phase, the project would construct Craig Avenue at its ultimate half-section-width as a Collector (74-foot right-of-way) from Evans Road to the eastern project boundary of the southern phase consistent with the City's standards.
- During the southern phase, the project would construct access to the site via Craig Avenue.
- During the northern phase, the project would construct Evans Road at its ultimate width as a Secondary (104-foot right-of-way) from Corson Avenue to Craig Avenue consistent with the City's standards.
- During the northern phase, the project would construct two driveways along Evans Road for site access.

1.3 CONSTRUCTION ACTIVITIES AND PHASING

Phase 1 project construction is estimated start in February 2022 and be completed in July 2022. Construction activities include site preparation, grading, and construction of the pump track and restrooms. The pump track will take 12 weeks to build, followed by 6 weeks of restroom construction. The project would not require demolition as the site is currently vacant and undeveloped. Site

Evans Park



I:\PROJECTS\M\MenifeeCity_02121\CME-01_EvansPark\Map\AQ_GHG\Fig1_Regional.mxd 02121.2.1 12/2/2021 - SAB

0 10 Miles

Source: Base Map Layers (ESRI, 2013)

HELIX Environmental Planning

Regional Location

Figure 1

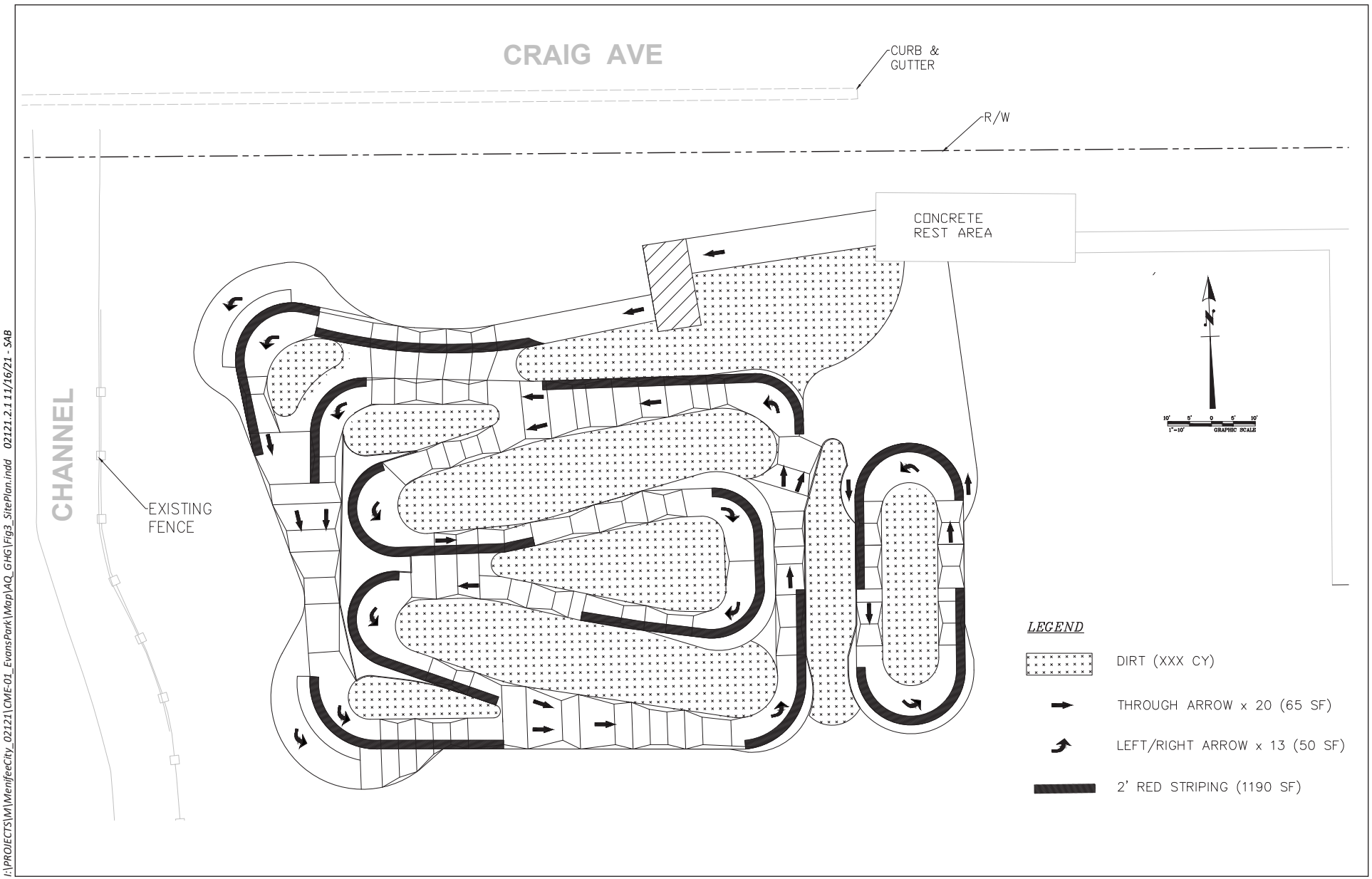


Source: Aerial (County of Riverside, 2020)

HELIX Environmental Planning

Aerial Photograph of Project Location

Figure 2



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Source: KOA 2021

HELIX Environmental Planning

Southern Phase Site Plan

Figure 3

preparation (e.g., grubbing) would be included in the grading. During grading, no soil will be imported or exported. Imported soil will be needed for the pump track. Phase 2 project construction is expected to occur starting in January 2025. For modeling purposes, Phase 2 was assumed to be completed in June 2026. Detailed construction phasing and equipment assumptions are summarized in Section 4.1, *Methodology*, and provided in Appendix A.

Project construction would be required to implement all applicable fugitive dust best available control measures specified in Table 1 of the South Coast Air Quality Management District (SCAQMD) Rule 403, *Fugitive Dust* (SCAQMD 2005), including, but not limited to: the use of an on-site water truck to wet down exposed areas at least twice daily, maintaining a 12 percent moisture content to unpaved roads, and limiting vehicle speeds to 10 miles per hour (mph).

2.0 REGULATORY SETTING

2.1 AIR QUALITY

The project site is located within the South Coast Air Basin (SCAB). Air quality in the SCAB is regulated by the U.S. Environmental Protection Agency (USEPA) at the federal level, by the California Air Resources Board (CARB) at the state level, and by the SCAQMD at the regional level.

2.1.1 Air Pollutants of Concern

2.1.1.1 Criteria Pollutants

Criteria pollutants are defined by state and federal law as a risk to the health and welfare of the general public. In general, criteria air pollutants include the following compounds:

- Ozone (O_3)
- Carbon monoxide (CO)
- Nitrogen dioxide (NO_2)
- Particulate matter (PM), which is further subdivided:
    - Coarse PM, 10 microns or less in diameter (PM_{10})
    - Fine PM, 2.5 microns or less in diameter ($PM_{2.5}$)
- Sulfur dioxide (SO_2)
- Lead (Pb)

Criteria pollutants can be emitted directly from sources (primary pollutants, e.g., CO, SO_2, PM_{10}, $PM_{2.5}$, and lead), or they may be formed through chemical and photochemical reactions of precursor pollutants in the atmosphere (secondary pollutants; e.g., ozone, NO_2, PM_{10}, and $PM_{2.5}$). PM_{10} and $PM_{2.5}$ can be both

primary and secondary pollutants. The principal precursor pollutants of concern are reactive organic gases ([ROGs] also known as volatile organic compounds [VOCs])[2] and nitrogen oxides (NO_X).

The descriptions of sources and general health effects for each of the criteria air pollutants are shown in Table 1, *Summary of Common Sources and Human Health Effects of Criteria Air Pollutants*, based on information provided by the California Air Pollution Control Officers Association ([CAPCOA] 2021a). Specific adverse health effects on individuals or population groups induced by criteria pollutant emissions are highly dependent on a multitude of interconnected variables such as cumulative concentrations, local meteorology and atmospheric conditions, and the number and characteristics of exposed individuals (e.g., age, gender). Criteria pollutant precursors (ROG and NO_X) affect air quality on a regional scale, typically after significant delay and distance from the pollutant source emissions. Health effects related to ozone and NO_2 are, therefore, the product of emissions generated by numerous sources throughout a region. Emissions of criteria pollutants from vehicles traveling to or from the project site (mobile emissions) are distributed nonuniformly in location and time throughout the region, wherever the vehicles may travel. As such, specific health effects from these criteria pollutant emissions cannot be meaningfully correlated to the incremental contribution from the project.

Table 1
SUMMARY OF COMMON SOURCES AND HUMAN HEALTH EFFECTS OF CRITERIA AIR POLLUTANTS

Pollutant	Major Man-Made Sources	Human Health Effects
Carbon Monoxide (CO)	An odorless, colorless gas formed when carbon in fuel is not burned completely; a component of motor vehicle exhaust.	Reduces the ability of blood to deliver oxygen to vital tissues, affecting the cardiovascular and nervous system. Impairs vision, causes dizziness, and can lead to unconsciousness or death.
Nitrogen Dioxide (NO_2)	A reddish-brown gas formed during fuel combustion for motor vehicles and industrial sources. Sources include motor vehicles, electric utilities, and other sources that burn fuel.	Respiratory irritant; aggravates lung and heart problems. Precursor to ozone and acid rain. Contributes to climate change and nutrient overloading, which deteriorates water quality. Causes brown discoloration of the atmosphere.
Ozone (O_3)	Formed by a chemical reaction between reactive organic gases (ROGs) and nitrogen oxides (NO_X) in the presence of sunlight. Common sources of these precursor pollutants include motor vehicle exhaust, industrial emissions, gasoline storage and transport, solvents, paints, and landfills.	Irritates and causes inflammation of the mucous membranes and lung airways; causes wheezing, coughing, and pain when inhaling deeply; decreases lung capacity; aggravates lung and heart problems. Damages plants; reduces crop yield. Damages rubber, some textiles and dyes.
Particulate Matter (PM_{10} and $PM_{2.5}$)	Produced by power plants, steel mills, chemical plants, unpaved roads and parking lots, wood-burning stoves and fireplaces, automobiles, and other sources.	Increased respiratory symptoms, such as irritation of the airways, coughing, or difficulty breathing; aggravated asthma; development of chronic bronchitis; irregular heartbeat; nonfatal heart attacks; and premature death in people with heart or lung disease. Impairs visibility (haze).

[2] CARB defines and uses the term ROGs while the USEPA defines and uses the term VOCs. The compounds included in the lists of ROGs and VOCs and the methods of calculation are slightly different. However, for the purposes of estimating criteria pollutant precursor emissions, the two terms are often used interchangeably.

Pollutant	Major Man-Made Sources	Human Health Effects
Sulfur Dioxide (SO_2)	A colorless, nonflammable gas formed when fuel containing sulfur is burned, when gasoline is extracted from oil, or when metal is extracted from ore. Examples are petroleum refineries, cement manufacturing, metal processing facilities, locomotives, and ships.	Respiratory irritant. Aggravates lung and heart problems. In the presence of moisture and oxygen, sulfur dioxide converts to sulfuric acid, which can damage marble, iron, and steel. Damages crops and natural vegetation. Impairs visibility. Precursor to acid rain.
Lead	Metallic element emitted from metal refineries, smelters, battery manufacturers, iron and steel producers, use of leaded fuels by racing and aircraft industries.	Anemia, high blood pressure, brain and kidney damage, neurological disorders, cancer, lowered IQ. Affects animals, plants, and aquatic ecosystems.

Source: CAPCOA 2021a

2.1.1.2 Toxic Air Contaminants

The Health and Safety Code (§39655, subd. (a).) defines a toxic air contaminant (TAC) as "an air pollutant which may cause or contribute to an increase in mortality or in serious illness, or which may pose a present or potential hazard to human health." A substance that is listed as a hazardous air pollutant pursuant to subsection (b) of Section 112 of the Federal Clean Air Act (CAA) (42 United States Code Section 7412[b]) is a TAC. Under State law, the California Environmental Protection Agency (CalEPA), acting through CARB, is authorized to identify a substance as a TAC if it determines the substance is an air pollutant that may cause or contribute to an increase in mortality or an increase in serious illness, or that may pose a present or potential hazard to human health.

Diesel engines emit a complex mixture of air pollutants, including both gaseous and solid material. The solid material in diesel exhaust is referred to as diesel particulate matter (DPM). Almost all DPM is 10 microns or less in diameter, and 90 percent of DPM is less than 2.5 microns in diameter (CARB 2021a). Because of their extremely small size, these particles can be inhaled and eventually trapped in the bronchial and alveolar regions of the lung. In 1998, CARB identified DPM as a TAC based on published evidence of a relationship between diesel exhaust exposure and lung cancer and other adverse health effects. DPM has a notable effect on California's population—it is estimated that about 70 percent of total known cancer risk related to air toxics in California is attributable to DPM (CARB 2021a).

2.1.2 Federal Air Quality Regulations

2.1.2.1 Federal Clean Air Act

Air quality is defined by ambient air concentrations of specific pollutants identified by the USEPA to be of concern with respect to health and welfare of the general public. The USEPA is responsible for enforcing the CAA of 1970 and its 1977 and 1990 Amendments. The CAA required the USEPA to establish National Ambient Air Quality Standards (NAAQS), which identify concentrations of pollutants in the ambient air below which no adverse effects on the public health and welfare are anticipated. In response, the USEPA established both primary and secondary standards for several criteria pollutants. Table 2, *Ambient Air Quality Standards*, shows the federal and state ambient air quality standards for these pollutants.

Table 2
AMBIENT AIR QUALITY STANDARDS

Pollutant	Averaging Time	California Standards	Federal Standards Primary[1]	Federal Standards Secondary[2]
O_3	1 Hour	0.09 ppm (180 µg/m^3)	–	–
	8 Hour	0.070 ppm (137 µg/m^3)	0.070 ppm (137 µg/m^3)	Same as Primary
PM_{10}	24 Hour	50 µg/m^3	150 µg/m^3	Same as Primary
	AAM	20 µg/m^3	–	Same as Primary
$PM_{2.5}$	24 Hour	–	35 µg/m^3	Same as Primary
	AAM	12 µg/m^3	12.0 µg/m^3	15.0 µg/m^3
CO	1 Hour	20 ppm (23 mg/m^3)	35 ppm (40 mg/m^3)	–
	8 Hour	9.0 ppm (10 mg/m^3)	9 ppm (10 mg/m^3)	–
	8 Hour (Lake Tahoe)	6 ppm (7 mg/m^3)	–	–
NO_2	1 Hour	0.18 ppm (339 µg/m^3)	0.100 ppm (188 µg/m^3)	–
	AAM	0.030 ppm (57 µg/m^3)	0.053 ppm (100 µg/m^3)	Same as Primary
SO_2	1 Hour	0.25 ppm (655 µg/m^3)	0.075 ppm (196 µg/m^3)	–
	3 Hour	–	–	0.5 ppm (1,300 µg/m^3)
	24 Hour	0.04 ppm (105 µg/m^3)	–	–
Lead	30-day Avg.	1.5 µg/m^3	–	–
	Calendar Quarter	–	1.5 µg/m^3	Same as Primary
	Rolling 3-month Avg.	–	0.15 µg/m^3	Same as Primary
Visibility Reducing Particles	8 Hour	Extinction coefficient of 0.23 per km – visibility ≥ 10 miles (0.07 per km – ≥30 miles for Lake Tahoe)	No Federal Standards	No Federal Standards
Sulfates	24 Hour	25 µg/m^3	No Federal Standards	No Federal Standards
Hydrogen Sulfide	1 Hour	0.03 ppm (42 µg/m^3)	No Federal Standards	No Federal Standards
Vinyl Chloride	24 Hour	0.01 ppm (26 µg/m^3)	No Federal Standards	No Federal Standards

Source: CARB 2016

[1] National Primary Standards: The levels of air quality necessary, within an adequate margin of safety, to protect public health.

[2] National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

O_3 = ozone; ppm: parts per million; µg/m^3 = micrograms per cubic meter; PM_{10} = particulate matter with an aerodynamic diameter of 10 microns or less; AAM = Annual Arithmetic Mean; $PM_{2.5}$ = fine particulate matter; CO = carbon monoxide; mg/m^3; = milligrams per cubic meter; NO_2 = nitrogen dioxide; SO_2 = sulfur dioxide; km = kilometer; – = No Standard

The USEPA has classified air basins (or portions thereof) as being in "attainment," "nonattainment," "maintenance," or "unclassified" for each criteria air pollutant, based on whether or not the NAAQS have been achieved. Upon attainment of a standard for which an area was previously designated nonattainment, the area will be classified as a maintenance area. If an area is designated unclassified, it is because inadequate air quality data were available as a basis for a nonattainment or attainment

designation. The project site is located within the Riverside County portion of the SCAB and, as such, is in an area designated as a nonattainment area for certain pollutants that are regulated under the CAA. Table 3, *South Coast Air Basin Attainment Status (Riverside County Portion)*, lists the federal and state attainment status of the SCAB for the criteria pollutants. With respect to federal air quality standards, the USEPA classifies the SCAB as in attainment for PM_{10}, CO, NO_2, SO_2, and lead, and in nonattainment for 8-hour ozone and $PM_{2.5}$.

Table 3
SOUTH COAST AIR BASIN ATTAINMENT STATUS (RIVERSIDE COUNTY PORTION)

Criteria Pollutant	Federal Designation	State Designation
O_3 (1-hour)	(No federal standard)	Nonattainment
O_3 (8-hour)	Extreme Nonattainment	Nonattainment
CO	Attainment (Maintenance)	Attainment
PM_{10}	Attainment (Maintenance)	Nonattainment
$PM_{2.5}$	Serious Nonattainment	Nonattainment
NO_2	Attainment (Maintenance)	Attainment
SO_2	Unclassifiable/Attainment	Unclassifiable/Attainment
Lead	Attainment	Attainment
Sulfates	(No federal standard)	Attainment
Hydrogen Sulfide	(No federal standard)	Attainment
Visibility	(No federal standard)	Attainment

Source: SCAQMD 2016a

2.1.3 California Air Quality Regulations

2.1.3.1 California Clean Air Act

The federal CAA allows states to adopt ambient air quality standards and other regulations provided that they are at least as stringent as federal standards. CARB, a part of the CalEPA, is responsible for the coordination and administration of both federal and state air pollution control programs within California, including setting the California Ambient Air Quality Standards (CAAQS). CARB also conducts research, compiles emission inventories, develops suggested control measures, and provides oversight of local programs. CARB establishes emissions standards for motor vehicles sold in California, consumer products (such as hairspray, aerosol paints, and barbecue lighter fluid), and various types of commercial equipment. It also sets fuel specifications to further reduce vehicular emissions.

In addition to primary and secondary AAQS, the state has established a set of episode criteria for ozone, CO, NO_2, SO_2, and PM. These criteria refer to episode levels representing periods of short-term exposure to air pollutants that actually threaten public health. Table 3, above, lists the state attainment status of the SCAB for the criteria pollutants. Under state designation, the SCAB is currently in attainment for CO, NO_2, SO_2, and lead; and in nonattainment for ozone, PM_{10}, and $PM_{2.5}$.

2.1.3.2 State Implementation Plan

The CAA requires areas with unhealthy levels of criteria pollutants to develop plans, known as State Implementation Plans (SIPs). SIPs are comprehensive plans that describe how an area will attain the NAAQS. The 1990 amendments to the CAA set deadlines for attainment based on the severity of an area's air pollution problem.

SIPs are not single documents—they are a compilation of new and previously submitted plans, programs (e.g., monitoring, modeling, permitting), district rules, state regulations and federal controls. Many of California's SIPs rely on a core set of control strategies, including emission standards for cars and heavy trucks, fuel regulations and limits on emissions from consumer products. State law makes CARB the lead agency for all purposes related to the SIP. Local air districts and other agencies prepare SIP elements and submit them to CARB for review and approval. CARB forwards the SIP revisions to the USEPA for approval and publication in the Federal Register. The Code of Federal Regulations (CFR) Title 40, Chapter I, Part 52, Subpart F, Section 52.220 lists all of the items that are included in the California SIP (CARB 2009). At any one time, several California submittals are pending USEPA approval.

2.1.3.3 California Energy Code

California Code of Regulations (CCR) Title 24 Part 6, California's Energy Efficiency Standards for Residential and Nonresidential Buildings, were first established in 1978 in response to a legislative mandate to reduce California's energy consumption. Energy-efficient buildings require less electricity, natural gas, and other fuels. Electricity production from fossil fuels and on-site fuel combustion (typically for space and water heating) results primarily in GHG emissions. The California Energy Code is discussed in further detail in Section 2.2.4, below.

2.1.4 Local Regulations

2.1.4.1 South Coast Air Quality Management District

Air quality in Riverside County is regulated by the SCAQMD. As a regional agency, the SCAQMD works directly with the Southern California Association of Governments (SCAG), County transportation commissions, and local governments, and cooperates actively with all federal and state government agencies. The SCAQMD develops rules and regulations; establishes permitting requirements for stationary sources; inspects emissions sources; and enforces such measures through educational programs or fines, when necessary.

Air Quality Management Plan

The SCAQMD is directly responsible for reducing emissions from stationary (area and point), mobile, and indirect sources. It has responded to this requirement by preparing a sequence of Air Quality Management Plans (AQMP).

On March 3, 2017, the SCAQMD adopted the 2016 AQMP, which is a regional and multi-agency effort (SCAQMD, CARB, SCAG, and USEPA). The 2016 AQMP represents a comprehensive analysis of emissions, meteorology, atmospheric chemistry, regional growth projections, and the impact of existing control measures. The plan seeks to achieve multiple goals in partnership with other entities promoting reductions in criteria pollutant, GHGs, and toxic risk, as well as efficiencies in energy use, transportation, and goods movement (SCAQMD 2017).

The AQMP, in combination with those from all other California nonattainment areas with serious (or worse) air quality problems, is submitted to CARB, which develops the California SIP. The SIP relies on the same information from SCAG to develop emission inventories and emission reduction strategies that are included in the attainment demonstration for the air basin. The current federal and state attainment status for the SCAB is presented above, in Table 3.

Rules and Regulations

The following rules promulgated by the SCAQMD would be applicable to construction and/or operation of the project.

Rule 401 – Visible Emissions: Limits the allowable opacity of air contaminant emissions from any single source (SCAQMD 2001).

Rule 402 – Nuisance: Prohibits the discharge of air contaminants, including odors, which cause injury, detriment, nuisance, or annoyance to any considerable number of persons (SCAQMD 1976).

Rule 403 – Fugitive Dust: Requires actions to prevent, reduce or mitigate anthropogenic fugitive dust emissions, including emissions from construction activities. Project construction would be required to implement all applicable fugitive dust best available control measures specified in Table 1 in the rule (SCAQMD 2005).

Rule 113 – Architectural Coating: Establishes VOC limits for architectural coatings (e.g., paints, stains, preservatives). Effective January 1, 2019, building interior and exterior paint is limited to a maximum VOC content of 50 grams per liter (SCAQMD 2016b).

2.2 GREENHOUSE GASES

2.2.1 Climate Change Overview

Global climate change refers to changes in average climatic conditions on Earth including temperature, wind patterns, precipitation, and storms. Global temperatures are moderated by atmospheric gases. These gases are commonly referred to as GHGs because they function like a greenhouse by letting sunlight in but preventing heat from escaping, thus warming the Earth's atmosphere.

GHGs are emitted by natural processes and human (anthropogenic) activities. Anthropogenic GHG emissions are primarily associated with: (1) the burning of fossil fuels during motorized transport, electricity generation, natural gas consumption, industrial activity, manufacturing, and other activities; (2) deforestation; (3) agricultural activity; and (4) solid waste decomposition.

The temperature record shows a decades-long trend of warming, with 2016 global surface temperatures ranking as the warmest year on record since 1880. The newest release in long-term warming trends announced 2020 ranked as tied with 2016 for the warmest year on record with an increase of 1.84 degrees Fahrenheit compared to the 1951-1980 average (National Aeronautics and Space Administration [NASA] 2021). GHG emissions from human activities are the most significant driver of observed climate change since the mid-20th century (United Nations Intergovernmental Panel on Climate Change [IPCC] 2013). The IPCC constructed several emission trajectories of GHGs needed to stabilize global temperatures and climate change impacts. The statistical models show a "high confidence" that temperature increase caused by anthropogenic GHG emissions could be kept to less than two degrees Celsius relative to pre-industrial levels if atmospheric concentrations are stabilized at about 450 parts per million (ppm) carbon dioxide equivalent (CO_2e) by the year 2100 (IPCC 2014).

2.2.2 Types of Greenhouse Gases

The GHGs defined under California's AB 32 include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6).

Carbon Dioxide. CO_2 is the most important and common anthropogenic GHG. CO_2 is an odorless, colorless GHG. Natural sources include the decomposition of dead organic matter; respiration of bacteria, plants, animals, and fungi; evaporation from oceans; and volcanic outgassing. Anthropogenic sources of CO_2 include burning fuels, such as coal, oil, natural gas, and wood. Data from ice cores indicate that CO_2 concentrations remained steady prior to the current period for approximately 10,000 years. The atmospheric CO_2 concentration in 2010 was 390 ppm, 39 percent above the concentration at the start of the Industrial Revolution (approximately 280 ppm in 1750). In September 2021, the CO_2 concentration was 413 ppm, a 48 percent increase since 1750 (National Oceanic and Atmospheric Administration [NOAA] 2021).

Methane. CH_4 is the main component of natural gas used in homes. A natural source of methane is from the decay of organic matter. Geological deposits known as natural gas fields contain methane, which is extracted for fuel. Other sources are decay of organic material in landfills, fermentation of manure, and cattle digestion.

Nitrous Oxide. N_2O is produced by both natural and human-related sources. N_2O is emitted during agricultural and industrial activities, as well as during the combustion of fossil fuels and solid waste. Primary human-related sources of N_2O are agricultural soil management, animal manure management, sewage treatment, mobile and stationary combustion of fossil fuel, adipic (fatty) acid production, and nitric acid production.

Hydrofluorocarbons. Fluorocarbons are gases formed synthetically by replacing all hydrogen atoms in methane or ethane with chlorine and/or fluorine atoms. Chlorofluorocarbons (CFCs) are nontoxic, nonflammable, insoluble, and chemically nonreactive in the troposphere (the level of air at Earth's surface). CFCs were first synthesized in 1928 for use as refrigerants, aerosol propellants, and cleaning solvents. They destroy stratospheric ozone; therefore, their production was stopped as required by the 1989 Montreal Protocol.

Sulfur Hexafluoride. SF_6 is an inorganic, odorless, colorless, nontoxic, nonflammable gas. SF_6 is used for insulation in electric power transmission and distribution equipment, in the magnesium industry, in semi-conductor manufacturing, and as a tracer gas for leak detection.

GHGs have long atmospheric lifetimes that range from one year to several thousand years. Long atmospheric lifetimes allow for GHG emissions to disperse around the globe. Because GHG emissions vary widely in the power of their climatic effects, climate scientists have established a unit called global warming potential (GWP). The GWP of a gas is a measure of both potency and lifespan in the atmosphere as compared to CO_2. For example, a gas with a GWP of 10 is 10 times more potent than CO_2 over 100 years. CO_2e is a quantity that enables all GHG emissions to be considered as a group despite their varying GWP. The GWP of each GHG is multiplied by the prevalence of that gas to produce CO_2e.

Historically, GHG emission inventories have been calculated using the GWPs from the IPCC's Second Assessment Report (SAR). In 2007, IPCC updated the GWP values based on the latest science at the time in its Fourth Assessment Report (AR4). The updated GWPs in the IPCC AR4 have begun to be used in recent GHG emissions inventories. In 2013, IPCC again updated the GWP values based on the latest

science in its Fifth Assessment Report (AR5) (IPCC 2013). However, United Nations Framework Convention on Climate Change (UNFCCC) reporting guidelines for national inventories require the use of GWP values from the AR4. To comply with international reporting standards under the UNFCCC, official emission estimates for California and the U.S. are reported using AR4 GWP values, and statewide and national GHG inventories have not yet updated their GWP values to the AR5 values. Project GHG emissions in this analysis are reported using the AR4 GWP values.

By applying the GWP ratios, project related CO_2e emissions can be tabulated in metric tons per year. Typically, the GWP ratio corresponding to the warming potential of CO_2 over a 100-year period is used as a baseline. The atmospheric lifetime and GWP of selected GHGs are summarized in Table 4, *Global Warming Potentials and Atmospheric Lifetimes*.

Table 4
GLOBAL WARMING POTENTIALS AND ATMOSPHERIC LIFETIMES

Greenhouse Gas	Atmospheric Lifetime (years)	IPCC SAR GWP	IPCC AR4 GWP	IPCC AR5 GWP
Carbon Dioxide (CO_2)	50-200	1	1	1
Methane (CH_4)	12	21	25	28
Nitrous Oxide (N_2O)	114	310	298	265
HFC-134a	14	1,300	1,430	1,300
PFC: Tetraflouromethane (CF_4)	50,000	6,500	7,390	6,630
PFC: Hexafluoroethane (C_2F_6)	10,000	9,200	12,200	11,100
Sulfur Hexafluoride (SF_6)	3,200	23,900	22,800	23,500

Source: IPCC 2007
IPCC = Intergovernmental Panel on Climate Change; GWP = global warming potential; HFC = hydrofluorocarbon; PFC = perfluorocarbon

2.2.3 Federal Greenhouse Gas Regulations

2.2.3.1 Federal Clean Air Act

The U.S. Supreme Court ruled on April 2, 2007, in *Massachusetts v. U.S. Environmental Protection Agency* that CO_2 is an air pollutant, as defined under the CAA, and that the USEPA has the authority to regulate emissions of GHGs. The USEPA announced that GHGs (including CO_2, CH_4, N_2O, HFC, PFC, and SF_6) threaten the public health and welfare of the American people (USEPA 2021). This action was a prerequisite to finalizing the USEPA's GHG emissions standards for light-duty vehicles, which were jointly proposed by the USEPA and the United States Department of Transportation's National Highway Traffic Safety Administration (NHTSA).

2.2.3.2 Light-Duty Vehicle Greenhouse Gas Emissions Standards and Corporate Average Fuel Economy Standards

The USEPA and the NHTSA worked together on developing a national program of regulations to reduce GHG emissions and to improve fuel economy of light-duty vehicles. The USEPA established the first-ever national GHG emissions standards under the CAA, and the NHTSA established CAFE standards under the Energy Policy and Conservation Act. On April 1, 2010, the USEPA and NHTSA announced a joint Final Rulemaking that established standards for 2012 through 2016 model year vehicles. This was followed up on October 15, 2012, when the agencies issued a Final Rulemaking with standards for model years 2017

through 2025. On March 3, 2020, the agencies released the final Safer Affordable Fuel-Efficient Vehicles Rule for Model Years 2021-2026 Passenger Cars and Light Trucks (SAFE Vehicles Rule). The purpose of the SAFE Vehicles Rule is "to correct the national automobile fuel economy and GHG emissions standards to give the American people greater access to safer, more affordable vehicles that are cleaner for the environment." The direct effect of the rule is to eliminate the standards that were put in place to gradually raise average fuel economy for passenger cars and light trucks under test conditions from 37 miles per gallon (mpg) in 2020 to 50 mpg in 2025. The new SAFE Vehicles Rule freezes the average fuel economy level standards indefinitely at the 2020 levels. The new SAFE Vehicles Rule also results in the withdraw of the waiver previously provided to California for that State's GHG and zero emissions vehicle (ZEV) programs under Section 209 of the CAA (USEPA and NHTSA 2020). The combined USEPA GHG standards and NHTSA CAFE standards resolve previously conflicting requirements under both federal programs and the standards of the State of California and other states that have adopted the California standards. The SAFE Vehicles Rule Part I (SAFE-1), which withdraws the waiver, was published in September 2019 and Part II (SAFE-2), which finalizes the regulation, was published in April 2020. On April 26, 2021, the USEPA published the Notice of Reconsideration of Previous Withdrawal of a Waiver for California's Advanced Clean Car Program. The purpose of this Notice of Reconsideration is to seek comment on a number of issues in the SAFE-1 action including:

- Whether it was proper for the USEPA to reconsider a previously issued CAA waiver;
- Whether USEPA's actions to withdraw California's waiver was appropriate;
- Whether the SAFE-1 interpretation of the CAA that enabled USEPA to withdraw California's waiver was appropriate; and
- Whether the SAFE-1 interpretation of CAA Section 177 that could disallow other states' ability to adopt California GHG emission standards was appropriate.

2.2.4 California Greenhouse Gas Regulations

2.2.4.1 California Code of Regulations, Title 24, Part 6

CCR Title 24 Part 6: California's Energy Efficiency Standards for Residential and Nonresidential Buildings were first established in 1978 in response to a legislative mandate to reduce California's energy consumption. Energy-efficient buildings require less electricity, natural gas, and other fuels. Electricity production from fossil fuels and on-site fuel combustion (typically for space or water heating) results in GHG emissions.

The Title 24 standards are updated approximately every three years to allow consideration and possible incorporation of new energy efficiency technologies and methods. The 2019 Title 24 standards went into effect on January 1, 2020. The 2019 update to the Building Energy Efficiency Standards focuses on several key areas to improve the energy efficiency of newly constructed buildings and additions and alterations to existing buildings. The most significant efficiency improvement to the residential standards is a requirement for onsite photovoltaic electricity generation (e.g., solar panels) for most new or modified residential building up to three stories high (California Energy Commission [CEC] 2019a).

The standards are divided into three basic sets. First, there is a basic set of mandatory requirements that apply to all buildings. Second, there is a set of performance standards—the energy budgets—that vary by climate zone (of which there are 16 in California) and building type; thus, the standards are tailored to local conditions. Finally, the third set constitutes an alternative to the performance standards, which is a set of prescriptive packages that are basically a recipe or a checklist compliance approach.

2.2.4.2 California Green Building Standards Code

The California Green Building Standards Code (CALGreen; CCR Title 24, Part 11) is a code with mandatory requirements for all nonresidential buildings (including industrial buildings) and residential buildings for which no other state agency has authority to adopt green building standards. The current 2019 Standards for new construction of, and additions and alterations to, residential and nonresidential buildings went into effect on January 1, 2020 (California Building Standards Commission [CBSC] 2019). The development of CALGreen is intended to (1) cause a reduction in GHG emissions from buildings; (2) promote environmentally responsible, cost-effective, healthier places to live and work; (3) reduce energy and water consumption; and (4) respond to the directives by the Governor. In short, the code is established to reduce construction waste; make buildings more efficient in the use of materials and energy; and reduce environmental impact during and after construction.

CALGreen contains requirements for storm water control during construction; construction waste reduction; indoor water use reduction; material selection; natural resource conservation; site irrigation conservation; and more. The code provides for design options allowing the designer to determine how best to achieve compliance for a given site or building condition. The code also requires building commissioning, which is a process for the verification that all building systems, like heating and cooling equipment and lighting systems, are functioning at their maximum efficiency.

2.2.4.3 Executive Order S-3-05

On June 1, 2005, Executive Order (EO) S-3-05 proclaimed that California is vulnerable to climate change impacts. It declared that increased temperatures could reduce snowpack in the Sierra Nevada, further exacerbate California's air quality problems, and potentially cause a rise in sea levels. To avoid or reduce climate change impacts, EO S-3-05 calls for a reduction in GHG emissions to the year 2000 level by 2010, to year 1990 levels by 2020, and to 80 percent below 1990 levels by 2050.

2.2.4.4 Assembly Bill 32 – Global Warming Solution Act of 2006

The California Global Warming Solutions Act of 2006, widely known as AB 32, requires that CARB develop and enforce regulations for the reporting and verification of statewide GHG emissions. CARB is directed by AB 32 to set a GHG emission limit, based on 1990 levels, to be achieved by 2020. The bill requires CARB to adopt rules and regulations in an open public process to achieve the maximum technologically feasible and cost-effective GHG emission reductions.

2.2.4.5 Executive Order B-30-15

On April 29, 2015, EO B-30-15 established a California GHG emission reduction target of 40 percent below 1990 levels by 2030. The EO aligns California's GHG emission reduction targets with those of leading international governments, including the 28 nation European Union. California is on track to meet or exceed the target of reducing GHGs emissions to 1990 levels by 2020, as established in AB 32.

California's new emission reduction target of 40 percent below 1990 levels by 2030 will make it possible to reach the goal established by EO S-3-05 of reducing emissions 80 percent under 1990 levels by 2050.

2.2.4.6 Senate Bill 32

Senate Bill (SB) 32 (Amendments to the California Global Warming Solutions Action of 2006) extends California's GHG reduction programs beyond 2020. SB 32 amended the Health and Safety Code to include Section 38566, which contains language to authorize CARB to achieve a statewide GHG emission reduction of at least 40 percent below 1990 levels by no later than December 31, 2030. SB 32 codified the targets established by EO B-30-15 for 2030, which set the next interim step in the State's continuing efforts to pursue the long-term target expressed in EO B-30-15 of 80 percent below 1990 emissions levels by 2050.

2.2.4.7 Assembly Bill 197

A condition of approval for SB 32 was the passage of AB 197. AB 197 requires that CARB consider the social costs of GHG emissions and prioritize direct reductions in GHG emissions at mobile sources and large stationary sources. AB 197 also gives the California legislature more oversight over CARB through the addition of two legislatively appointed members to the CARB Board and the establishment a legislative committee to make recommendations about CARB programs to the legislature.

2.2.4.8 Assembly Bill 1493 – Vehicular Emissions of Greenhouse Gases

AB 1493 (Pavley) requires that CARB develop and adopt regulations that achieve "the maximum feasible reduction of GHGs emitted by passenger vehicles and light-duty truck and other vehicles determined by CARB to be vehicles whose primary use is noncommercial personal transportation in the State." On September 24, 2009, CARB adopted amendments to the Pavley regulations that intend to reduce GHG emissions in new passenger vehicles from 2009 through 2016. The amendments bind California's enforcement of AB 1493 (starting in 2009), while providing vehicle manufacturers with new compliance flexibility. In January 2012, CARB approved a new emissions-control program for model years 2017 through 2025. The program combines the control of smog, soot, and global warming gases and requirements for greater numbers of zero-emission vehicles into a single packet of standards called Advanced Clean Cars (CARB 2021b).

2.2.4.9 Assembly Bill 341

The state legislature enacted AB 341 (California Public Resource Code Section 42649.2), increasing the diversion target to 75 percent statewide. AB 341 requires all businesses and public entities that generate four cubic yards or more of waste per week to have a recycling program in place. The final regulation was approved by the Office of Administrative Law on May 7, 2012 and went into effect on July 1, 2012.

2.2.4.10 Executive Order S-01-07

This EO, signed by Governor Schwarzenegger on January 18, 2007, directs that a statewide goal be established to reduce the carbon intensity of California's transportation fuels by at least 10 percent by the year 2020. It orders that a Low Carbon Fuel Standard (LCFS) for transportation fuels be established for California and directs CARB to determine whether a LCFS can be adopted as a discrete early action measure pursuant to AB 32. CARB approved the LCFS as a discrete early action item with a regulation adopted and implemented in April 2010. Although challenged in 2011, the Ninth Circuit reversed the

District Court's opinion and rejected arguments that implementing LCFS violates the interstate commerce clause in September 2013. CARB is therefore continuing to implement the LCFS statewide.

2.2.4.11 Senate Bill 350

Approved by Governor Brown on October 7, 2015, SB 350 increases California's renewable electricity procurement goal from 33 percent by 2020 to 50 percent by 2030. This will increase the use of Renewables Portfolio Standard eligible resources, including solar, wind, biomass, and geothermal. In addition, large utilities are required to develop and submit Integrated Resource Plans to detail how each entity will meet their customers' resource needs, reduce GHG emissions, and increase the use of clean energy.

2.2.4.12 Senate Bill 375

SB 375, the Sustainable Communities and Climate Protection Act of 2008, supports the State's climate action goals to reduce GHG emissions through coordinated transportation and land use planning with the goal of more sustainable communities.

Under the Sustainable Communities Act, CARB sets regional targets for GHG emissions reductions from passenger vehicle use. In 2010, CARB established these targets for 2020 and 2035 for each region covered by one of the State's metropolitan planning organizations (MPOs). CARB periodically reviews and updates the targets, as needed.

Each of California's MPOs must prepare a Sustainable Communities Strategy (SCS) as an integral part of its regional transportation plan (RTP). The SCS contains land use, housing, and transportation strategies that, if implemented, would allow the region to meet its GHG emission reduction targets. Once adopted by the MPO, the RTP/SCS guides the transportation policies and investments for the region. CARB must review the adopted SCS to confirm and accept the MPO's determination that the SCS, if implemented, would meet the regional GHG targets. If the combination of measures in the SCS would not meet the regional targets, the MPO must prepare a separate alternative planning strategy (APS) to meet the targets. The APS is not a part of the RTP. Qualified projects consistent with an approved SCS or Alternative Planning Strategy categorized as "transit priority projects" would receive incentives to streamline CEQA processing.

2.2.4.13 Senate Bill 100

Approved by Governor Brown on September 10, 2018, SB 100 extends the renewable electricity procurement goals and requirements of SB 350. SB 100 requires that all retail sale of electricity to California end-use customers be procured from 100 percent eligible renewable energy resources and zero-carbon resources by the end of 2045.

2.2.4.14 California Air Resources Board: Scoping Plan

On December 11, 2008, the CARB adopted the Scoping Plan (CARB 2008) as directed by AB 32. The Scoping Plan proposes a set of actions designed to reduce overall GHG emissions in California to the levels required by AB 32. Measures applicable to development projects include those related to energy-efficiency building and appliance standards, the use of renewable sources for electricity generation, regional transportation targets, and green building strategy. Relative to transportation, the Scoping Plan includes nine measures or recommended actions related to reducing VMT and vehicle GHGs through

fuel and efficiency measures. These measures would be implemented statewide rather than on a project-by-project basis.

In response to EO B-30-15 and SB 32, all state agencies with jurisdiction over sources of GHG emissions were directed to implement measures to achieve reductions of GHG emissions to meet the 2030 and 2050 targets. CARB was directed to update the Scoping Plan to reflect the 2030 target and, therefore, is moving forward with the update process (CARB 2014). The mid-term target is critical to help frame the suite of policy measures, regulations, planning efforts, and investments in clean technologies and infrastructure needed to continue driving down emissions. CARB is moving forward with a second update to the Scoping Plan to reflect the 2030 target set by EO B-30-15 and codified by SB 32. The 2017 Climate Change Scoping Plan Update, Proposed Strategy for Achieving California's 2030 Greenhouse Gas Target, was adopted in December 2017. The Scoping Plan Update establishes a proposed framework for California to meet a 40 percent reduction in GHGs by 2030 compared to 1990 levels (CARB 2017).

2.2.5 Regional GHG Policies and Plans

2.2.5.1 Connect SoCal 2020–2045 RTP/SCS

Menifee is a member city of SCAG. SCAG's Connect SoCal 2020–2045 RTP/SCS, adopted September 3, 2020, is a long-range visioning plan that balances future mobility and housing needs with economic, environmental, and public health goals. The RTP/SCS embodies a collective vision for the region's future and is developed with input from local governments, county transportation commissions, tribal governments, nonprofit organizations, businesses, and local stakeholders in Imperial, Los Angeles, Orange, Riverside, San Bernardino, and Ventura Counties.

The RTP/SCS establishes GHG emissions goals for automobiles and light-duty trucks for 2020 and 2035 and establishes an overall GHG target for the region consistent with both the statewide GHG-reduction targets for 2020 and the post-2020 statewide GHG reduction goals.

2.2.5.2 Western Riverside Council of Governments

In September 2014, the Western Riverside Council of Governments (WRCOG) completed the Subregional Climate Action Plan (Subregional CAP). The Subregional CAP is a joint effort by twelve cities in the subregion which establishes emissions reduction targets, emissions reduction measures, and action steps to assist each community to demonstrate consistency AB 32 (WRCOG 2014). The City of Menifee was not a participating agency in developing (and has not adopted) the Subregional CAP.

3.0 EXISTING CONDITIONS

The site is located at the southeast corner of Craig Avenue and Evans Road. The project site is designated Open Space-Recreation (OS-R) and Low Density Residential-2 (LDR-2). Topographically, the site is flat. Vegetation on the project site consists primarily of disturbed areas, non-native species, and California sagebrush scrub and several trees. The project site will be surrounded by housing developments to the west, south and east, see Figure 2. The property north of Craig Avenue is vacant but will become additional park area.

Table 5, *Project Site and Surrounding Land Uses* summarizes the existing project site and surrounding land uses, and the corresponding General Plan land use and zoning designations.

Table 5
PROJECT SITE AND SURROUNDING LAND USES

Direction	General Plan Designation	Zoning District	Existing Land Use
Project Site	Recreation (OS-R), 2.1-5 du/ac Residential (2.1-5R)	Open Space-Recreation (OS-R), Low Density Residential-2 (LDR-2) [7,200 SF]	Vacant (undeveloped)
North	2.1-5 du/ac Residential (2.1-5R)	Low Density Residential-2 (LDR-2) [7,200 SF]	Vacant (undeveloped)
South	2.1-5 du/ac Residential (2.1-5R), Conservation (OS-C)	Low Density Residential-2 (LDR-2) [7,200 SF], Open Space-Conservation (OS-C)	Single-family Residential, Open Space
East	Public/Quasi Public Facilities (PF), 2.1-5 du/ac Residential (2.1-5R)	Public/Quasi-Public Facilities (PF), Low Density Residential-2 (LDR-2) [7,200 SF]	Paloma Valley High School, Vacant (undeveloped)
West	2.1-5 du/ac Residential (2.1-5R), Conservation (OS-C)	Low Density Residential-2 (LDR-2) [7,200 SF], Open Space-Conservation (OS-C)	Single-family Residential, Open Space

Source: City of Menifee (2019).

3.1 CLIMATE AND METEOROLOGY

The project site is in the SCAB, which consists of all or part of four counties: Los Angeles, San Bernardino, Riverside, and Orange. The distinctive climate of the SCAB is determined by its terrain and geographic location. The SCAB is a coastal plain with connecting broad valleys and low hills. It is bound by the Pacific Ocean to the southwest and high mountains around the rest of its perimeter. The general region lies in the semi-permanent high-pressure zone of the eastern Pacific, resulting in a mild climate tempered by cool sea breezes with light, average wind speeds.

The usually mild climatological pattern is interrupted occasionally by periods of extremely hot weather, winter storms, or Santa Ana winds. Winds in the project area are usually driven by the dominant land/ sea breeze circulation system. Regional wind patterns are dominated by daytime onshore sea breezes. At night, the wind generally slows and reverses direction traveling toward the sea. Local canyons can also alter wind direction, with wind tending to flow parallel to the canyons. The vertical dispersion of air pollutants in the SCAB is hampered by the presence of persistent temperature inversions. High pressure systems, such as the semi-permanent high-pressure zone in which the SCAB is located, are characterized by an upper layer of dry air that warms as it descends, restricting the mobility of cooler marine-influenced air near the ground surface, and resulting in the formation of subsidence inversions. Such inversions restrict the vertical dispersion of air pollutants released into the marine layer and, together with strong sunlight, can produce worst-case conditions for the formation of photochemical smog. The basin-wide occurrence of inversions at 3,500 feet above mean sea level or less averages 191 days per year (SCAQMD 1993).

In Menifee, the summers are hot, arid, and mostly clear; and the winters are long, cold, and partly cloudy (Weatherspark 2021). Over the course of the year, the temperature typically varies from 41°F to 92°F and is rarely below 33°F or above 99°F.

The predominant wind direction in the vicinity of the project site is from the west. Menifee experiences mild seasonal variation over the course of the year. The windier part of the year occurs in the winter and spring with average wind speeds of more than 5.6 mph. The windiest month of the year in Menifee is April, with an average hourly wind speed of 6.4 mph. Summer and fall wind conditions tend to be lower. The calmest month of the year in Menifee is September, with an average hourly wind speed of 4.8 mph.

Summers may have average daily high temperature above 86°F. The hottest month of the year in Menifee is August, with an average high of 92°F and low of 64°F. Winters may have an average daily high temperature below 70°F. The coldest month of the year in Menifee is December, with an average low of 42°F and high of 65°F.

The rainy period of the year occurs from October to April, The month with the most rain in Menifee is February, with an average rainfall of 2.5 inches. The rainless period of the year occurs from April to October. The month with the least rain in Menifee is June, with an average rainfall of 0.1 inch.

3.2 EXISTING AIR QUALITY

3.2.1 Criteria Pollutants

3.2.1.1 Attainment Designations

Attainment designations are discussed in Section 2.1 and Table 2. The SCAB is a federal and state nonattainment area for 8-hour ozone and $PM_{2.5}$. The SCAB is also a state nonattainment area for 1-hour ozone and PM_{10}.

3.2.1.2 Monitored Air Quality

The SCAQMD maintains monitoring stations to measure ambient concentrations of pollutants in the SCAB. The nearest monitoring station, approximately 7.6 miles west of the project site, is the "Lake Elsinore" air monitoring station. Table 6, *Air Quality Monitoring Data*, presents a summary of the ambient pollutant concentrations during the most recent three years (2018 through 2020) for which the SCAQMD has reported data.

Table 6
AIR QUALITY MONITORING DATA

Pollutant Standard	2018	2019	2020
Ozone (O_3) – Lake Elsinore			
Maximum concentration 1-hour period (ppm)	0.116	0.108	0.130
Maximum concentration 8-hour period (ppm)	0.095	0.089	0.100
Days above 1-hour state standard (>0.09 ppm)	16	4	18
Days above 8-hour state/federal standard (>0.070 ppm)	31	31	55
Coarse Particulate Matter (PM_{10}) – Lake Elsinore			
Maximum 24-hour concentration (µg/m^3)	105.3	93.8	192.4
Measured Days above 24-hr state standard (>50 µg/m^3)	*	*	*
Measured Days above 24-hr federal standard (>150 µg/m^3)	0	0	1
Annual average (µg/m^3)	23.3	19.7	23.7
Exceed state annual standard (20 µg/m^3)	Yes	No	Yes

Pollutant Standard	2018	2019	2020
Fine Particulate Matter ($PM_{2.5}$) – Lake Elsinore			
Maximum 24-hour concentration (µg/m^3)	31.3	17.6	41.6
Measured Days above 24-hour federal standard (>35 µg/m^3)	*	*	*
Annual average (µg/m^3)	6.7	*	7.2
Exceed state and federal annual standard (12 µg/m^3)	Yes	No	Yes
Nitrogen Dioxide (NO_2) – Lake Elsinore			
Maximum 1-hour concentration (ppm)	0.0413	0.0380	0.0436
Days above state 1-hour standard (0.18 ppm)	0	0	0
Days above federal 1-hour standard (0.100 ppm)	0	0	0
Annual average (ppm)	0.008	0.006	0.007
Exceed annual federal standard (0.053 ppm)	No	No	No
Exceed annual state standard (0.030 ppm)	No	No	No

Source: CARB 2021c

ppb = parts per billion; ppm = parts per million; µg/m^3 = micrograms per cubic meter, * = insufficient data available.

As shown in Table 6, the 1-hour and 8-hour ozone standards, and the PM_{10} and $PM_{2.5}$ standards were exceeded numerous times in each of the sample years. Data for NO_2 showed no exceedances.

3.2.2 Greenhouse Gases

In 2018, total GHG emissions worldwide were estimated at 48,900 million metric tons (MMT) of CO_2e emissions (Climate Watch 2021). The U.S. contributed the second largest portion (12 percent) of global GHG emissions in 2018 with 5,790 MMT CO_2e, of which 82 percent was CO2 emission (Climate Watch 2021). On a national level, 91 percent of GHG emissions were associated with transportation and electricity generation (Climate Watch 2021).

CARB performed statewide inventories for the years 1990 to 2019, as shown in Table 7, *California Greenhouse Gas Emissions by Sector*. The inventory is divided into five broad sectors of economic activity: agriculture, commercial and residential, electricity generation, industrial, and transportation. Emissions are quantified in MMT CO_2e.

Table 7
CALIFORNIA GREENHOUSE GAS EMISSIONS BY SECTOR

Sector	1990 Emissions (MMT CO_2e)	2000 Emissions (MMT CO_2e)	2010 Emissions (MMT CO_2e)	2019 Emissions (MMT CO_2e)
Agriculture and Forestry	18.9 (4%)	31.0 (7%)	33.7 (8%)	31.8 (8%)
Commercial and Residential	44.1 (10%)	45.8 (10%)	52.2 (12%)	43.8 (43.8%)
Electricity Generation	110.5 (26%)	105.4 (22%)	90.6 (20%)	58.8 (14%)
Industrial	105.3 (24%)	105.8 (22%)	101.8 (23%)	88.2 (21%)
Transportation	150.6 (35%)	183.2 (39%)	170.2 (38%)	166.1 (40%)
Unspecified Remaining	1.3 (<1%)	0.0 (0%)	0.0 (0%)	0.0 (0%)
TOTAL	**430.7**	**471.1**	**448.5**	**418.2**

Source: CARB 2007 and CARB 2021d

MMT = million metric tons; CO_2e = carbon dioxide equivalent

As shown in Table 7, statewide GHG source emissions totaled 431 MMT CO_2e in 1990, 471 MMT CO_2e in 2000, 449 MMT CO_2e in 2010, and 418 MMT CO_2e in 2019. Transportation-related emissions

consistently contribute the most GHG emissions, followed by electricity generation and industrial emissions (CARB 2007 and CARB 2021d).

3.3 METHODOLOGY

Criteria pollutant and GHG emissions were calculated using the California Emissions Estimator Model (CalEEMod), Version 2020.4.0 CalEEMod is a computer model used to estimate air emissions resulting from land development projects throughout the state of California. CalEEMod was developed by CAPCOA in collaboration with the California air quality management and pollution control districts, primarily the SCAQMD. The calculation methodology, source of emission factors used, and default data is described in the CalEEMod User's Guide, and Appendices A, D, and E (CAPCOA 2021b).

In brief, CalEEMod is a computer model that estimates criteria air pollutant and greenhouse gas emissions from mobile (i.e., vehicular) sources, area sources (fireplaces, woodstoves, and landscape maintenance equipment), energy use (electricity and natural gas used in space heating, ventilation, and cooling; lighting; and plug-in appliances), water use and wastewater generation, and solid waste disposal. Emissions are estimated based on land use information input to the model by the user.

In the first module, the user defines the specific land uses that will occur at the project site. The user also selects the appropriate land use setting (urban or rural), operational year, location, climate zone, and utility provider. The input land uses, size features, and population are used throughout CalEEMod in determining default parameters and calculations in each of the subsequent modules. The input land use information consists of land use subtypes (such as the residential subtypes of single-family residential and multi-family medium-rise residential) and their unit or square footage quantities.

Subsequent modules include construction (including off-road vehicle emissions), mobile (on-road vehicle emissions), area sources (architectural coatings [painting], consumer products [cleansers, aerosols, solvents]), water and wastewater, and solid waste. Each module comprises multiple components including an associated mitigation module to account for further reductions in the reported baseline calculations. Other inputs include trip generation rates, trip lengths, vehicle fleet mix (percentage autos, trucks, etc.), trip distribution (percent work to home, etc.), duration of construction phases, construction equipment usage, grading areas, season, and ambient temperature, as well as other parameters.

In various places the user can input additional information and/or override the default assumptions to account for project- or location-specific parameters. For this assessment, the default parameters were not changed unless otherwise noted. The CalEEMod output files are included in Appendix A to this report.

3.3.1 Construction Emissions

CalEEMod has the capability to calculate reductions in construction emissions from the effects of dust control, diesel-engine classifications, and other selected emissions reduction measures. In compliance with SCAQMD Rule 403, fugitive dust emissions calculations assume application of water on exposed surface a minimum of two times per day, enforcing a 10-mph speed limit on unpaved surfaces, and maintaining a minimum 12 percent moisture content in unpaved roads and parking areas within the project sate. Based on CalEEMod, Version 2020.4.0 defaults, the control efficiency for watering two times per day is 55 percent.

CalEEMod estimates construction emissions for each year of construction activity based on the annual construction equipment profile and other factors determined as needed to complete all phases of construction by the target completion year. As such, each year of construction activity has varying quantities of GHG emissions. Per SCAQMD guidance, total construction GHG emissions resulting from the project are amortized over 30 years and added to operational GHG emissions.

3.3.1.1 Construction Activities

Construction emissions were estimated based on the timeline provided by the project applicant, which assumes Phase 1 construction would commence with grading in the winter 2022 and be completed in the summer of 2022. Phase 2 construction activities would begin as early as 2025. The quantity, duration, and intensity of construction activity influence the amount of construction emissions and related pollutant concentrations that occur at any one time. As such, the emission forecasts provided herein reflect a specific set of conservative assumptions based on the expected construction scenario wherein a relatively large amount of construction activity is occurring in a relatively intensive manner. Because of this conservative assumption, actual emissions could be less than those forecasted. If construction is delayed or occurs over a longer time period, emissions could be reduced because of: (1) a more modern and cleaner-burning construction equipment fleet mix than assumed in CalEEMod; and/or (2) a less intensive buildout schedule (i.e., fewer daily emissions occurring over a longer time interval).

Construction activities would include site preparation, grading, and building construction. Construction will occur five days per week with equipment operating up to eight hours per day on weekdays.

The proposed grading will not require disposal of soil. Some importing of soil will be needed to construct, then maintain, the dirt track.

Architectural coatings would be applied to the restrooms. The construction schedule assumed in the modeling is shown in Table 8, *Anticipated Construction Schedule*.

Table 8
ANTICIPATED CONSTRUCTION SCHEDULE

Construction Activity	Construction Period Start	Construction Period End	Number of Working Days
Phase 1			
Site Preparation	02/01/2022	02/28/2022	20
Grading	03/01/2022	05/02/2022	45
Building Construction	05/03/2022	07/04/2022	45
Phase 2			
Site Preparation	1/1/2025	1/14/2025	10
Grading	1/15/2025	2/25/2025	30
Building Construction	2/26/2025	4/21/2025	300
Paving	4/22/2026	5/19/2026	20
Architectural Coatings	5/20/2026	6/16/2026	20

Source: Applicant; CalEEMod

3.3.1.2 Construction Off-Road Equipment

Construction would require the use of heavy off-road equipment. Grading construction equipment estimates are based on project-specific information. Table 9, *Construction Equipment Assumptions*, shows a summary of the assumed equipment that would be involved in each phase of construction.

Table 9
CONSTRUCTION EQUIPMENT ASSUMPTIONS

Phase Name	Off-road Equipment Type	Amount	Usage Hours	Horsepower	Load Factor
Phase 1					
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Site Preparation	Tractors/Loaders/ Backhoes	4	8.00	97	0.37
Grading	Excavators	1	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Tractors/Loaders/ Backhoes	3	8.00	97	0.37
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/ Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Phase 2					
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Site Preparation	Tractors/Loaders/ Backhoes	4	8.00	97	0.37
Grading	Excavators	2	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Scrapers	2	8.00	367	0.48
Grading	Tractors/Loaders/ Backhoes	2	8.00	97	0.37
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/ Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Paving	Pavers	2	8.00	130	0.42
Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Architectural Coatings	Air Compressors	1	6.00	78	0.48

3.3.1.3 Construction On-Road Trips

Worker commute trips and vendor delivery trips were modeled using CalEEMod defaults.

3.3.2 Operation Emissions

Operational impacts were estimated using CalEEMod. Operational sources of emissions include area, energy, transportation, water use, and solid waste.

3.3.2.1 Area Source Emissions

Area sources include emissions from landscaping equipment, the use of consumer products, and the reapplication of architectural coatings for maintenance. Emissions associated with area sources were estimated using the CalEEMod default values.

3.3.2.2 Energy Emissions

Energy source emissions were estimated assuming implementation of energy-reducing project design features to comply with the 2019 Title 24 standards. Development within the project would use solar electricity for outdoor lighting and restroom lighting. Electricity will be provided to the outdoor lights with solar panel/battery lights. Emissions associated with energy sources were estimated using the CalEEMod default values.

3.3.2.3 Vehicular (Mobile) Sources

Operational emissions from mobile source emissions are associated with project-related vehicle trip generation and trip length. Based on the trip generation rate from the Traffic Impact Analysis (TIA) prepared for the project, the southern portion (phase 1) would generate 300 average daily trips (ADT) and the northern portion (phase 2) would generate 644 ADT for a total of 944 ADT. Trip distance and trip type were based on CALEEMOD defaults.

3.3.2.4 Solid Waste Sources

The disposal of solid waste produces GHG emissions from anaerobic decomposition in landfills, incineration, and transportation of waste. CalEEMod determines the GHG emissions associated with disposal of solid waste into landfills. Portions of these emissions are biogenic. CalEEMod methods for quantifying GHG emissions from solid waste are based on the IPCC method using the degradable organic content of waste. A conservative 25 percent solid waste diversion rate was applied in CalEEMod to account for mandatory compliance with AB 341 which is not included in the model defaults.

3.3.2.5 Water Sources

Water-related GHG emissions are from the conveyance and treatment of water. CalEEMod uses the CEC's 2006 *Refining Estimates of Water-Related Energy Use in California* to establish default water related emission factors. Modeling was conducted using these defaults and a 20 percent reduction in potable water use and wastewater generation in accordance with 2019 CALGreen requirements not accounted for in the model defaults.

3.3.3 Localized Significance Threshold Methodology

As part of the SCAQMD's environmental justice program, more attention has been focused on localized air quality effects. Also, while regional impact analysis is based on attaining or maintaining regional

emissions standards, localized impact analysis compares the concentration of a pollutant at a receptor site to a health-based standard.

SCAQMD has developed a localized significance threshold (LST) methodology and mass rate look-up tables by source receptor area (SRA) that can be used by public agencies to determine whether a project may generate significant adverse localized air quality impacts. LSTs represent the maximum emissions from a project that will not cause or contribute to an exceedance of the most stringent applicable federal or state ambient air quality standard; they are developed based on the ambient concentrations of that pollutant for each SRA (SCAQMD 2009). The LST methodology translates the concentration standards into emissions thresholds that are a function of project site area, source to receptor distance, and the location within the SCAB. The LST methodology is recommended to be limited to projects of five acres or less and to avoid the need for complex dispersion modeling. For projects that exceed five acres, such as the proposed project, the five-acre LST look-up values can be used as a screening tool to determine which pollutants require detailed analysis (Sun 2017). This approach is conservative as it assumes that all on-site emissions would occur within a five-acre area and over-predicts potential localized impacts (i.e., more pollutant emissions occurring within a smaller area and within closer proximity to potential sensitive receptors). If a project exceeds the LST look up values, then the SCAQMD recommends that project-specific localized air quality modeling be performed.

The closest receptors are the multiple single-family residences located approximately 100 feet west of the project boundary. In addition, the Paloma Valley High School, with recreational fields located approximately 50 feet from the project's northeast corner, was also evaluated.

Therefore, the LSTs in SRA 24 for receptors located with 82 feet (25 meters) are used for project sites less than or equal to 5 acres.

3.4 SIGNIFICANCE CRITERIA

3.4.1 Air Quality

Thresholds used to evaluate potential air quality and odor impacts are based on applicable criteria in the State's California Environmental Quality Act (CEQA) Guidelines Appendix G. A significant air quality and/or odor impact could occur if the implementation of the proposed project would:

1. Conflict with or obstruct implementation of the SCAQMD Air Quality Management Plan, or applicable portions of the SIP; or

2. Result in a cumulatively considerable net increase of any criteria pollutant for which the SCAB is non-attainment under an applicable NAAQS or CAAQS; or

3. Expose sensitive receptors to substantial pollutant concentrations; or

4. Results in other emissions (such as those leading to odors) adversely affecting a substantial number of people.

Appendix G of the State CEQA Guidelines states that the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the above determinations. The SCAQMD has established significance thresholds to assess the regional and localized impacts of project-related air pollutant emissions. The significance thresholds are updated, as

needed, to appropriately represent the most current technical information and attainment status in the SCAB. Table 10, *SCAQMD Thresholds of Significance*, presents the most current significance thresholds, including regional daily thresholds for short-term construction and long-term operational emissions; maximum incremental cancer risk and hazard indices for TACs; and maximum ambient concentrations for exposure of sensitive receptors to localized pollutants. A project with daily emission rates, risk values, or concentrations below these thresholds is generally considered to have a less than significant effect on air quality.

Table 10
SCAQMD THRESHOLDS OF SIGNIFICANCE

Pollutant	Construction	Operation
Mass Daily Thresholds (pounds per day)		
VOC	75	55
NO_X	100	55
CO	550	550
PM_{10}	150	150
$PM_{2.5}$	55	55
SO_X	150	150
Lead	3	3
Toxic Air Contaminants		
TACs	Maximum Incremental Cancer Risk ≥ 10 in 1 million Cancer Burden > 0.5 excess cancer cases (in areas ≥ 1 in 1 million) Chronic & Acute Hazard Index ≥ 1.0 (project increment)	
Ambient Air Quality for Criteria Pollutants		
NO_2	1-hour average ≥ 0.18 ppm Annual average ≥ 0.03 ppm	
CO	1-hour average ≥ 20.0 ppm (state) 8-hour average ≥ 9.0 ppm (state/federal)	
PM_{10}	24-hour average ≥ 10.4 µg/m^3 (construction) 24-hour average ≥ 2.5 µg/m^3 (operation) Annual average ≥ 1.0 µg/m^3	
$PM_{2.5}$	24-hour average ≥ 10.4 µg/m^3 (construction) 24-hour average ≥ 2.5 µg/m^3 (operation)	
SO_2	1-hour average ≥ 0.075 ppm 24-hour average ≥ 0.04 ppm	

Source: SCAQMD 2015
lbs/day = pounds per day; VOC = volatile organic compound; NOX = nitrogen oxides; CO = carbon monoxide; PM_{10} = respirable particulate matter with a diameter of 10 microns or less; $PM_{2.5}$ = fine particulate matter with a diameter of 2.5 microns or less; SO_X = sulfur oxides; TACs = toxic air contaminants; GHG = greenhouse gas emissions; MT/yr = metric tons per year; CO_2e = carbon dioxide equivalent; NO_2 = nitrogen dioxide; ppm = parts per million; µg/m^3 = micrograms per cubic meter

3.4.2 Greenhouse Gases

Given the relatively small levels of emissions generated by a typical development in relationship to the total amount of GHG emissions generated on a national or global basis, individual development projects are not expected to result in significant, direct impacts with respect to climate change. However, given the magnitude of the impact of GHG emissions on the global climate, GHG emissions from new

development could result in significant, cumulative impacts with respect to climate change. Therefore, the potential for a significant GHG impact is limited to cumulative impacts.

According to Appendix G of the CEQA Guidelines, a project would have a significant environmental impact if it would:

(1) Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment; or

(2) Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs.

There are no established federal, state, or local quantitative thresholds applicable to the project to determine the quantity of GHG emissions that may have a significant effect on the environment. CARB, the SCAQMD, and various cities and agencies have proposed, or adopted on an interim basis, thresholds of significance that require the implementation of GHG emission reduction measures. Because the proposed project is located within the SCAQMD jurisdiction, the most appropriate screening threshold for determining GHG emissions is the SCAQMD proposed Tier 3 screening threshold (SCAQMD 2010); therefore, a significant impact would occur if the proposed project would exceed the SCAQMD proposed Tier 3 screening threshold of 3,000 MT CO_2e per year.

The City of Menifee does not currently have an applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions. Applicable plans adopted for the purpose of reducing GHG emissions include the CARB's Scoping Plan and SCAG's Connect SoCal 2020–2045. GHG emissions will be reduced to meet the State rules, but the City has not gone further to require other emission reductions.

4.0 AIR QUALITY IMPACT ANALYSIS

This section evaluates potential direct impacts of the proposed project related to air pollutant emissions. Project-level air quality modeling was completed as part of this analysis. Complete modeling results are included as Appendix A of this report.

4.1 ISSUE 1: CONSISTENCY WITH AIR QUALITY PLANS

4.1.1 Impacts

SCAG is the regional planning agency for Los Angeles, Orange, Ventura, Riverside, San Bernardino, and Imperial Counties, and addresses regional issues relating to transportation, economy, community development, and environment. SCAG has prepared the RTP/SCS, a long-range transportation plan that uses growth forecasts to project trends out over a 20-year period to identify regional transportation strategies to address mobility needs. These growth forecasts form the basis for the land use and transportation control portions of the AQMP. These documents are utilized in the preparation of the air quality forecasts and consistency analysis included in the AQMP. Both the RTP/SCS and AQMP are based, in part, on projections originating with County and City General Plans.[3]

[3] SCAG serves as the federally designated metropolitan planning organization for the southern California region.

The project site is zoned and designated as OS-R and would be developed in accordance with those land uses. Additionally, the project site is identified as a desired location for a community park in the City's Parks Master Plan. Because the project is consistent with the local general plan and zoning, pursuant to SCAQMD guidelines, the proposed project is considered consistent with the region's AQMP. As such, proposed project-related emissions are accounted for in the AQMP, which is crafted to bring the basin into attainment for all criteria pollutants. Accordingly, the proposed project would be consistent with the projections in the AQMP, thus resulting in a less than significant impact.

4.1.2 Significance of Impacts

Implementation of the project would not conflict with or obstruct implementation of the AQMP. The impact would be less than significant.

4.1.3 Mitigation Framework

Impacts would be less than significant; therefore, no mitigation measures are required.

4.1.4 Significance After Mitigation

Impacts related to conflicts with the applicable air quality plan would be less than significant.

4.2 ISSUE 2: CUMULATIVELY CONSIDERABLE NET INCREASE OF NONATTAINMENT CRITERIA POLLUTANTS

By its very nature, air pollution is largely a cumulative impact. The nonattainment status of regional pollutants is a result of past and present development within the SCAB. The region is a federal and/or state nonattainment area for ozone, PM_{10}, and $PM_{2.5}$. In accordance with CEQA Guidelines Section 15064(h)(3), the SCAQMD's approach for assessing cumulative impacts is based on the AQMP forecasts of attainment of ambient air quality standards in accordance with the requirements of the federal and State Clean Air Acts. If a project conflicts with the AQMP, which is intended to bring the SCAB into attainment for all criteria pollutants, that project can be considered cumulatively considerable. Additionally, if the mass regional emissions calculated for a project exceed the applicable SCAQMD daily significance thresholds that are designed to assist the region in attaining the applicable state and national ambient air quality standards, that project can be considered cumulatively considerable. As discussed in Issue 1, above, the project would not conflict with or obstruct implementation of the AQMP. A comparison of the project mass regional emissions with the applicable SCAQMD daily significance thresholds is provided below.

4.2.1 Impacts

The project would generate criteria pollutants and precursors in the short-term during construction and the long-term during operation. To determine whether a project would result in cumulatively considerable emissions that would violate an air quality standard or contribute substantially to an existing or projected air quality violation, a project's emissions are evaluated based on the quantitative emission thresholds established by the SCAQMD (as shown in Table 10).

4.2.1.1 Construction

The project's construction emissions were estimated using CalEEMod as described in Section 3.4.1. Additional details of phasing, selection of construction equipment, and other input parameters, including CalEEMod data, are included in Appendix A. Table 11, *Unmitigated Daily Construction Emissions*, presents the summary of construction emissions for each project phase. Winter unmitigated daily maximum emissions were applied to Table 11, as they are slightly higher than summer emissions. The data are presented as the maximum anticipated daily emissions for comparison with the SCAQMD thresholds.

Table 11
UNMITIGATED DAILY CONSTRUCTION EMISSIONS

Phase	lbs/day					
	ROG	**NO_X**	**CO**	**SO_X**	**PM_{10}**	**$PM_{2.5}$**
Phase 1 (On and Offsite Emissions)						
Site Preparation	3.2	33.1	20.3	<0.1	10.7	6.1
Grading	2.0	20.9	15.8	<0.1	4.3	2.5
Building Construction	2.2	18.0	20.9	<0.1	2.3	1.2
2022 Maximum Daily Emissions[1]	**3.2**	**33.1**	**20.3**	**<0.1**	**10.7**	**6.1**
Phase 2 (On and Offsite Emissions)						
Site Preparation (2025)	2.5	25.3	18.4	<0.1	10.1	5.6
Grading (2025)	3.0	28.0	26.9	0.1	5.5	2.7
Building Construction (2025)	2.2	16.4	23.9	0.1	3.8	1.4
2025 Maximum Daily Emissions[1]	**3.0**	**28.0**	**26.9**	**0.1**	**10.1**	**5.6**
Building Construction (2026)	2.1	16.4	23.5	0.1	3.8	1.4
Paving (2026)	1.0	8.6	0.4	<0.1	0.6	0.4
Architectural Coating (2026)	0.3	1.2	3.0	<0.1	0.6	0.2
2026 Maximum Daily Emissions[1]	**2.1**	**16.4**	**23.5**	**0.1**	**3.8**	**1.4**
SCAQMD Thresholds	*75*	*100*	*550*	*150*	*150*	*55*
2022 - Significant Impact?	***No***	***No***	***No***	***No***	***No***	***No***
2025 - Significant Impact?	***No***	***No***	***No***	***No***	***No***	***No***
2026 - Significant Impact?	***No***	***No***	***No***	***No***	***No***	***No***

Source: CalEEMod; USEPA AP-42 (output data is provided in Appendices A and B)

[1] Totals may not sum due to rounding, and offsite emissions are included in the totals.

lbs/day = pounds per day; ROG = reactive organic gas; NO_X = nitrogen oxides; CO = carbon monoxide; SO_X = sulfur oxides; PM_{10} = particulate matter 10 microns or less in diameter; $PM_{2.5}$ = particulate matter 2.5 microns or less in diameter

As shown in Table 11, emissions will not exceed the SCAQMD significance threshold, and the impact would be less than significant.

4.2.1.2 Operation

The project's operational emissions were estimated using CalEEMod as described in Section 3.4.2. Model outputs are provided in Appendix A. Table 12, *Daily Operational Emissions*, presents the summary of operational emissions for the proposed project. The data are presented as the maximum anticipated daily emissions for comparison with the SCAQMD thresholds.

Table 12
DAILY OPERATIONAL EMISSIONS

Phase	lbs/day					
	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
Phase 1						
Area	<0.1	<0.1	<0.1	0	0	0
Energy	0	0	0	0	0	0
Mobile	0.9	1.1	8.3	<0.1	1.8	0.5
Total Phase 1 Daily Emissions[1]	**0.9**	**1.1**	**8.3**	**<0.1**	**1.8**	**0.5**
Phase 2						
Area	<0.1	<0.1	<0.1	0	0	0
Energy	0	0	0	0	0	0
Mobile	1.6	1.7	15.1	<0.1	3.9	1.1
Total Phase 2 Daily Emissions[1]	**1.6**	**1.7**	**15.1**	**<0.1**	**3.9**	**1.1**
Total Operational Emissions	**2.5**	**2.8**	**23.4**	**<0.1**	**5.7**	**1.6**
SCAQMD Thresholds	*55*	*55*	*550*	*150*	*150*	*55*
Significant Impact?	***No***	***No***	***No***	***No***	***No***	***No***

Source: CalEEMod (output data is provided in Appendix A)

[1] Totals may not sum due to rounding.

lbs/day = pounds per day; ROG = reactive organic gas; NO_X = nitrogen oxides; CO = carbon monoxide; SO_2 = sulfur dioxide; PM_{10} = particulate matter 10 microns or less in diameter; $PM_{2.5}$ = particulate matter 2.5 microns or less in diameter

As shown in Table 12, project operational emissions would not exceed the daily thresholds set by the SCAQMD.

4.2.2 Significance of Impacts

Long-term operational emissions and short-term construction emissions would result in criteria pollutant and precursor pollutant emissions that would not exceed the SCAQMD thresholds, and the impact would be less than significant.

4.2.3 Mitigation Framework

No mitigation is required.

4.2.4 Significance After Mitigation

The project would not result in a cumulatively considerable net increase of any criteria pollutant for which the SCAB is non-attainment, and the impact would be less than significant.

4.3 ISSUE 3: IMPACTS TO SENSITIVE RECEPTORS

4.3.1 Impacts

4.3.1.1 Construction Activities

Criteria Pollutants

The localized effects from the on-site portion of daily construction emissions were evaluated at sensitive receptor locations potentially impacted by the project according to the SCAQMD's LST method, described above. The proposed project is within SRA 24, Perris Valley. Consistent with the LST guidelines, when quantifying mass emissions for localized analysis, only emissions that occur on site are considered. Emissions related to off-site delivery/haul truck activity and construction worker trips are not considered in the evaluation of construction-related localized impacts, as these do not contribute to emissions generated on a project site. The closest receptors are the multiple single-family residences located approximately 100 feet west of the project boundary. In addition, the Paloma Valley High School, with recreational fields located approximately 50 feet from the project's northeast corner, was also evaluated. Therefore, the LSTs in SRA 24 for receptors located less than 82 feet (25 meters) are used for project sites greater than 5 acres. Table 13, *Maximum Localized Daily Construction Emissions*, shows the localized construction emissions.

Table 13
MAXIMUM LOCALIZED DAILY CONSTRUCTION EMISSIONS

Phase	lbs/day			
	NO_X	CO	PM_{10}	$PM_{2.5}$
Phase 1 - 2022 Maximum Daily Onsite Emissions[1]				
Site Preparation	33.1	19.7	10.4	6.0
Grading	20.9	15.3	4.1	2.4
Building Construction	15.6	16.4	0.8	0.8
Highest Phase 1 - Emissions	**33.1**	**19.7**	**10.4**	**6.0**
SCAQMD LST Thresholds (25 meters)	*270*	*1577*	*13*	*8*
Mitigated 2022 Exceed LST at 25 meters?	***No***	***No***	***No***	***No***
Phase 2 - 2025 Maximum Daily Onsite Emissions[1]				
Site Preparation	25.2	17.9	9.9	5.5
Grading	27.9	26.3	5.3	2.7
Building Construction	12.5	16.1	0.5	0.5
Highest Phase 2 - 2025 Emissions	**25.2**	**17.9**	**9.9**	**5.5**
SCAQMD LST Thresholds (25 meters)	270	1577	13	8
Mitigated 2025 Emissions Exceed LST at 25 meters?	**No**	**No**	**No**	**No**

Phase	lbs/day			
	NO_X	CO	PM_{10}	$PM_{2.5}$
Phase 2 - 2026 Maximum Daily Onsite Emissions[1]				
Building Construction	12.5	16.0	0.5	0.5
Paving	8.6	14.6	0.4	0.4
Architectural Coatings	1.1	1.8	0.1	0.1
Highest Phase 2 – 2026 Emissions	12.5	16.0	0.5	0.5
SCAQMD LST Thresholds (25 meters)	*270*	*1577*	*13*	*8*
Mitigated 2026 Emissions Exceed LST at 25 meters?	***No***	***No***	***No***	***No***

Source: CalEEMod (output data is provided in Appendix A)

[1] Totals may not sum due to rounding.

lbs/day = pounds per day; NO_X = nitrogen oxides; CO = carbon monoxide; PM_{10} = particulate matter 10 microns or less in diameter; $PM_{2.5}$ = particulate matter 2.5 microns or less in diameter

As shown in Table 13, localized emissions for all criteria pollutants would remain below their respective SCAQMD LSTs at 82 feet (25 meters) during each phase of construction. Construction emissions during phase one and phase two would not result in exposure of sensitive receptors to substantial localized concentrations of criteria pollutants and precursors. Mitigation measures would not be required to reduce the severity of this impact.

Toxic Air Contaminants

Implementation of the project would result in the use of heavy-duty construction equipment, haul trucks, on-site generators, and construction worker vehicles. These vehicles and equipment could generate the TAC DPM. Generation of DPM from construction projects typically occurs in a localized area (e.g., at the project site) for a short period of time. Because construction activities and subsequent emissions vary depending on the phase of construction (e.g., grading, building construction), the construction-related emissions to which nearby receptors are exposed to would also vary throughout the construction period. During some equipment-intensive phases such as grading, construction-related emissions would be higher than other less equipment-intensive phases such as building construction. Concentrations of mobile-source DPM emissions are typically reduced by 70 percent at approximately 500 feet (CARB 2005).

The dose (of TAC) to which receptors are exposed is the primary factor used to determine health risk. Dose is a function of the concentration of a substance in the environment and the extent of exposure a person has with the substance; a longer exposure period to a fixed quantity of emissions would result in higher health risks. Current models and methodologies for conducting cancer health risk assessments are associated with longer-term exposure periods (typically 30 years for individual residents based on guidance from OEHHA) and are best suited for evaluation of long duration TAC emissions with predictable schedules and locations. These assessment models and methodologies do not correlate well with the temporary and highly variable nature of construction activities. Cancer potency factors are based on animal lifetime studies or worker studies where there is long-term exposure to the carcinogenic agent. There is considerable uncertainty in trying to evaluate the cancer risk from projects that will only last a small fraction of a lifetime (Office of Environmental Health Hazard Assessment [OEHHA] 2015). Considering this information, the highly dispersive nature of DPM, and the fact that construction activities would occur at various locations throughout the project site, it is not anticipated that construction of the project would expose sensitive receptors to substantial DPM concentrations.

4.3.1.2 Operational Activities

CO Hotspots

Vehicle exhaust is the primary source of CO. In an urban setting, the highest CO concentrations are generally found within close proximity to congested intersections. Under typical meteorological conditions, CO concentrations tend to decrease as distance from the emissions source (i.e., congested intersection) increase. Project-generated traffic has the potential of contributing to localized "hot spots" of CO off-site. Because CO is a byproduct of incomplete combustion, exhaust emissions are worse when fossil-fueled vehicles are operated inefficiently, such as in stop-and-go traffic or through heavily congested intersections, where the level of service (LOS) is severely degraded.

CARB recommends evaluation of the potential for the formation of locally high concentrations of CO, known as CO hot spots. A CO hot spot is a localized concentration of CO that is above the state or national 1-hour or 8-hour CO ambient air standards. To verify that the project would not cause or contribute to a violation of the 1-hour and 8-hour CO standards, an evaluation of the potential for CO hot spots at nearby intersections was conducted.

The TIA (Urbanxroads 2021) evaluated whether there would be a change in the LOS at the intersections affected by the proposed project. In accordance with the Transportation Project-Level Carbon Monoxide Protocol, CO hot spots are typically evaluated when: (a) the LOS of an intersection decreases to a LOS E or worse because of the project; (b) signalization and/or channelization is added to an intersection; and (c) sensitive receptors such as residences, schools, hospitals, etc., are located in the vicinity of the affected intersection or roadway segment (California Department of Transportation [Caltrans] 1998).

The Evans Road & Craig Avenue intersection is currently LOS F during the morning rush. Without mitigation, the intersection will remain LOS F with the project. With roadway improvements, the study area intersections are anticipated to operate at an acceptable LOS during the peak hours under Opening Year Cumulative (2025).

Implementation of the project would not result in the LOS of any of the analyzed intersections degrading (Urbanxroads 2021). Therefore, consistent with the CO Protocol, operation of the project would not result in exposure of sensitive receptors to substantial localized CO concentrations.

Toxic Air Contaminants

Long-term operation of the Project would result in some emissions of DPM from vehicles traveling to and from the Project site. However, the Project would not require the regular use of heavy or medium diesel-powered trucks (other than for occasional deliveries and waste collection) and the mix of vehicles traveling to and from the Project site would primarily be light duty autos and trucks typical of the region. Therefore, the Project would not result in significant localized concentrations of DPM. As a recreational park, the proposed Project in not anticipated to generate other long-term operational TACs. Therefore, long-term operation of the Project would not result in the exposure of sensitive receptors to substantial pollutant concentrations and the impact would be less than significant.

4.3.2 Significance of Impacts

Implementation of the project would not expose sensitive receptors to substantial pollutant concentrations, and the impact would be less than significant.

4.3.3 Mitigation Framework

Impacts would be less than significant; therefore, no mitigation measures are required.

4.3.4 Significance After Mitigation

Mitigation measures would not be required to reduce the severity of this impact. Implementation of the project would not expose sensitive receptors to substantial pollutant concentrations, and the impact would be less than significant.

4.4 ISSUE 4: OTHER EMISSIONS (SUCH AS THOSE LEADING TO ODORS)

4.4.1 Impacts

According to the SCAQMD *CEQA Air Quality Handbook*, land uses associated with odor complaints include agricultural uses, wastewater treatment plants, food processing plants, chemical plants, composting activities, refineries, landfills, dairies, and fiberglass molding operations (SCAQMD 1993). The project would not include any of these uses nor are there any of these land uses in the project vicinity.

Emissions from construction equipment, such as diesel exhaust, and VOCs from architectural coatings and paving activities may generate odors; however, these odors would be temporary, intermittent, and not expected to affect a substantial number of people. Additionally, noxious odors would be confined to the immediate vicinity of construction equipment. By the time such emissions reach any sensitive receptor sites, they would be diluted to well below any level of air quality concern. Furthermore, short-term construction-related odors are expected to cease upon the drying or hardening of the odor-producing materials. Long-term operation of the project would not be a substantial source of objectionable odors. Therefore, the project would not create objectionable odors affecting a substantial number of people, and the impact would be less than significant.

4.4.2 Significance of Impacts

Implementation of the project would not result in other emissions (such as those leading to odors) adversely affecting a substantial number of people, and the impact would be less than significant.

4.4.3 Mitigation Framework

Impacts would be less than significant; therefore, no mitigation measures are required.

4.4.4 Significance After Mitigation

Implementation of the project would not result in other emissions (such as those leading to odors) adversely affecting a substantial number of people, and the impact would be less than significant.

5.0 GREENHOUSE GAS IMPACT ANALYSIS

This section evaluates potential impacts of the proposed project related to the generation of GHG emissions. Complete modeling results are included as Appendix A of this report.

5.1 ISSUE 1: GREENHOUSE GAS EMISSIONS

5.1.1 Construction and Operational Emissions

Project construction GHG emissions were estimated using the CalEEMod model as described in Section 3.4.1. Project-specific input was based on general information provided in Section 1.0 and default model settings to estimate reasonably conservative conditions. Additional details of phasing, selection of construction equipment, and other input parameters, including CalEEMod data, are included in Appendix A.

For construction emissions, SCAQMD guidance recommends that the emissions be amortized (i.e., averaged) over 30 years and added to operational emissions. Table 14, *Phase 1 and Phase 2 - Estimated Construction Greenhouse Gas Emissions*, shows construction GHG emissions.

Table 14
PHASE 1 AND PHASE 2 - ESTIMATED CONSTRUCTION GREENHOUSE GAS EMISSIONS

Emissions Year	Emissions (MT CO_2e)	Total After Amortizing Construction Emissions[2] (MT CO_2e)
2022 (Phase 1 South Area)	191.1	6.4
2025 (Phase 2 North Area)	761.2	25.4
2026 (Phase 2 North Area)	260.2	8.7
Total[1]	**1212.5**	**40.5**

Source: CalEEMod (output data is provided in Appendices A and B)
[1] Totals may not sum due to rounding.
[2] Construction emissions are amortized over 30 years in accordance with SCAQMD guidance.
GHG = greenhouse gas; MT = metric tons; CO_2e = carbon dioxide equivalent

Emissions of GHGs related to the construction of the project would be temporary. As shown in Table 14, total GHG emissions associated with construction of the south area projects are estimated at 191.1 MT CO_2e. Total GHG emissions associated with construction of the north area projects are estimated at 1,021.4 MT CO_2e.

Table 15, *Phase 1 and Phase 2 - Estimated Operational GHG Emissions*, shows operational GHG emissions.

Table 15
PHASE 1 AND PHASE 2 - ESTIMATED OPERATIONAL GREENHOUSE GAS EMISSIONS

Year	Annual Emissions (MT CO_2e)
Phase 1	
Area	<0.1
Energy	0
Mobile	306.6
Waste	0.2
Water	11.3
Phase 1 Total	**318.1**
Phase 2	
Area	<0.1
Energy	0
Mobile	596.6
Waste	0.4
Water	24.3
Phase 2 Total	**621.4**
TOTAL[1]	**939.5**

Source: CalEEMod (output data is provided in Appendices A and B)
[1] Totals may not sum due to rounding.
GHG = greenhouse gas; MT = metric tons; CO_2e = carbon dioxide equivalent

Table 16, *Phase 1 and Phase 2 - Total Amortized Construction and Operational GHG Emissions*, shows construction and operational GHG emissions.

Table 16
PHASE 1 AND PHASE 2 - TOTAL AMORTIZED CONSTRUCTION AND OPERATIONAL GREENHOUSE GAS EMISSIONS

Year	Amortized Construction Emissions[2] (MT CO_2e)	Operational Emissions (MT CO_2e)	Total Amortized Construction Emissions + Operational Emissions
Phase 1 South Area (Amortized Construction + Operations)	6.4	318.1	324.5
Phase 2 North Area (Amortized Construction + Operations)	34.1	621.4	655.5
TOTAL[1]	40.5	939.5	980.0
Threshold	NA	3000	3000
Exceed Threshold?	NA	No	No

Source: CalEEMod (output data is provided in Appendices A and B)
[1] Totals may not sum due to rounding.
[2] Construction emissions are amortized over 30 years in accordance with SCAQMD guidance.
GHG = greenhouse gas; MT = metric tons; CO_2e = carbon dioxide equivalent

5.1.2 Significance of Impacts

As shown in Table 16, the project would result in annual GHG emissions of 980 MT CO_2e. This value is less than the SCAQMD's 3,000 MT CO_2e per year interim threshold. Therefore, GHG emissions would be less than significant.

5.1.3 Mitigation Framework

No mitigation measures would be needed.

5.1.4 Significance After Mitigation

As shown in Table 16, the total project amortized GHG emissions would be 980 MT CO_2e per year. This is less than the SCAQMD's 3,000 MT CO_2e threshold for land use projects. Therefore, the project would not generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment, and the impact would be less than significant with mitigation implemented.

5.2 ISSUE 2: CONFLICT WITH APPLICABLE PLANS ADOPTED FOR THE PURPOSE OF REDUCING GREENHOUSE GAS EMISSIONS

5.2.1 Impacts

There are numerous State plans, policies, and regulations adopted for the purpose of reducing GHG emissions. The principal overall State plan and policy is AB 32, the California Global Warming Solutions Act of 2006. The quantitative goal of AB 32 is to reduce GHG emissions to 1990 levels by 2020. SB 32 would require further reductions of 40 percent below 1990 levels by 2030. Because the project's operational year is post-2020, the project aims to reach the quantitative goals set by SB 32. Statewide plans and regulations such as GHG emissions standards for vehicles (AB 1493), the LCFS, and regulations requiring an increasing fraction of electricity to be generated from renewable sources are being implemented at the statewide level; as such, compliance at the project level is not addressed. Therefore, the proposed project would not conflict with those plans and regulations.

As shown in Section 3.2, transportation-related emissions consistently contribute the most GHG emissions in California (41 percent in 2017). According to the TIA VMT analysis, using the WRCOG VMT Screening Tool, the project is located in a low VMT area and would have a less than significant impact related to VMT. The project would be consistent with the General Plan and zoning designations for the site. Because the project would be consistent with the local general plan, residential growth in the City as a result of the project, and the related changes in regional VMT, would be accounted for in the SCAG's RTP/SCS.

The project must also be constructed in accordance with the energy-efficiency standards, water reduction goals, and other standards contained in the 2019 Title 24 Part 6 Building Energy Efficiency Standards and Part 11 (CALGreen) Building Standards. Thus, the project would be consistent with the Regional Plan.

5.2.1.1 Greenhouse Gas Reduction Plan

There are numerous State plans, policies, and regulations adopted for the purpose of reducing GHG emissions. The principal overall State plan and policy is AB 32, the California Global Warming Solutions Act of 2006. The quantitative goal of AB 32 is to reduce GHG emissions to 1990 levels by 2020. SB 32 requires further reductions of 40 percent below 1990 levels by 2030. Because the project's operational year is post-2020, the project aims to reach the quantitative goals set by SB 32. Statewide plans and regulations such as GHG emissions standards for vehicles (AB 1493), the LCFS, and regulations requiring an increasing fraction of electricity to be generated from renewable sources are being implemented at

the statewide level; as such, compliance at the project level is not addressed. Therefore, the proposed project would not conflict with those plans and regulations.

The project would be consistent with the General Plan and zoning designations for the site (City of Menifee 2019). Because the project would be consistent with the local general plan, growth in the City as a result of the project, and the related changes in regional VMT, would be accounted for in SCAG's RTP/SCS.

The project must also be constructed in accordance with the energy-efficiency standards, water reduction goals, and other standards contained in the 2019 Title 24 Part 6 Building Energy Efficiency Standards and Part 11 (CALGreen) Building Standards.

5.2.2 Significance of Impacts

The Project will meet the State and local emission reduction goals, resulting in a less than significant impact.

5.2.3 Mitigation Framework

No mitigation measures would be needed.

5.2.4 Significance After Mitigation

The project would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs, and the impact would be less than significant.

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Appendix A

CalEEMod Output

Menifee Park - South Section - South Coast AQMD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Menifee Park - South Section

South Coast AQMD Air District, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
City Park	6.00	Acre	6.00	261,360.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	31
Climate Zone	10			**Operational Year**	2022
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	390.98	**CH4 Intensity (lb/MWhr)**	0.033	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Per project description. The southern portion of Evans Park is 6 acres.

Construction Phase - Total Days are based on a six month construction period.

Off-road Equipment -

Off-road Equipment -

Off-road Equipment -

Off-road Equipment -

Trips and VMT -

Demolition -

Grading -

Vehicle Trips - [300 Trips/day] / [6 acres] = 50 Trips/acre

Road Dust -

Menifee Park - South Section - South Coast AQMD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Woodstoves -

Energy Use - Solar Street Lamps will be installed.

Construction Off-road Equipment Mitigation -

Mobile Land Use Mitigation -

Area Mitigation -

Energy Mitigation -

Waste Mitigation - New solid waste requirements.

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadMoistureContent	0	12
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	10
tblConstructionPhase	NumDays	230.00	45.00
tblConstructionPhase	NumDays	20.00	45.00
tblConstructionPhase	NumDays	10.00	20.00
tblVehicleTrips	ST_TR	1.96	50.00
tblVehicleTrips	SU_TR	2.19	50.00
tblVehicleTrips	WD_TR	0.78	50.00

2.0 Emissions Summary

Menifee Park - South Section - South Coast AQMD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2022	3.2354	33.1312	20.8697	0.0456	19.8582	1.6138	21.4720	10.1558	1.4847	11.6405	0.0000	4,505.3905	4,505.3905	1.1970	0.1569	4,568.9387
Maximum	**3.2354**	**33.1312**	**20.8697**	**0.0456**	**19.8582**	**1.6138**	**21.4720**	**10.1558**	**1.4847**	**11.6405**	**0.0000**	**4,505.3905**	**4,505.3905**	**1.1970**	**0.1569**	**4,568.9387**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2022	3.2354	33.1312	20.8697	0.0456	9.0469	1.6138	10.6606	4.5995	1.4847	6.0841	0.0000	4,505.3905	4,505.3905	1.1970	0.1569	4,568.9387
Maximum	**3.2354**	**33.1312**	**20.8697**	**0.0456**	**9.0469**	**1.6138**	**10.6606**	**4.5995**	**1.4847**	**6.0841**	**0.0000**	**4,505.3905**	**4,505.3905**	**1.1970**	**0.1569**	**4,568.9387**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**54.44**	**0.00**	**50.35**	**54.71**	**0.00**	**47.73**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Menifee Park - South Section - South Coast AQMD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.0135	1.0000e-005	6.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		1.3100e-003	1.3100e-003	0.0000		1.4000e-003
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.8510	1.0787	8.3095	0.0177	1.8190	0.0156	1.8346	0.4848	0.0146	0.4993		1,808.5011	1,808.5011	0.1243	0.0848	1,836.8778
Total	**0.8645**	**1.0787**	**8.3101**	**0.0177**	**1.8190**	**0.0156**	**1.8346**	**0.4848**	**0.0146**	**0.4993**		**1,808.5024**	**1,808.5024**	**0.1243**	**0.0848**	**1,836.8792**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.0135	1.0000e-005	6.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		1.3100e-003	1.3100e-003	0.0000		1.4000e-003
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.8510	1.0787	8.3095	0.0177	1.8190	0.0156	1.8346	0.4848	0.0146	0.4993		1,808.5011	1,808.5011	0.1243	0.0848	1,836.8778
Total	**0.8645**	**1.0787**	**8.3101**	**0.0177**	**1.8190**	**0.0156**	**1.8346**	**0.4848**	**0.0146**	**0.4993**		**1,808.5024**	**1,808.5024**	**0.1243**	**0.0848**	**1,836.8792**

Menifee Park - South Section - South Coast AQMD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	2/1/2022	2/28/2022	5	20	
2	Grading	Grading	3/1/2022	5/2/2022	5	45	
3	Building Construction	Building Construction	5/3/2022	7/4/2022	5	45	

Acres of Grading (Site Preparation Phase): 30

Acres of Grading (Grading Phase): 45

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	1	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	7	18.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	110.00	43.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Water Unpaved Roads

Reduce Vehicle Speed on Unpaved Roads

3.2 Site Preparation - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					19.6570	0.0000	19.6570	10.1025	0.0000	10.1025			0.0000			0.0000
Off-Road	3.1701	33.0835	19.6978	0.0380		1.6126	1.6126		1.4836	1.4836		3,686.0619	3,686.0619	1.1922		3,715.8655
Total	**3.1701**	**33.0835**	**19.6978**	**0.0380**	**19.6570**	**1.6126**	**21.2696**	**10.1025**	**1.4836**	**11.5860**		**3,686.0619**	**3,686.0619**	**1.1922**		**3,715.8655**

Menifee Park - South Section - South Coast AQMD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.2 Site Preparation - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0652	0.0477	0.6211	1.7200e-003	0.2012	1.2000e-003	0.2024	0.0534	1.1100e-003	0.0545		174.4750	174.4750	4.8700e-003	4.6700e-003	175.9891
Total	**0.0652**	**0.0477**	**0.6211**	**1.7200e-003**	**0.2012**	**1.2000e-003**	**0.2024**	**0.0534**	**1.1100e-003**	**0.0545**		**174.4750**	**174.4750**	**4.8700e-003**	**4.6700e-003**	**175.9891**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.8457	0.0000	8.8457	4.5461	0.0000	4.5461			0.0000			0.0000
Off-Road	3.1701	33.0835	19.6978	0.0380		1.6126	1.6126		1.4836	1.4836	0.0000	3,686.0619	3,686.0619	1.1922		3,715.8655
Total	**3.1701**	**33.0835**	**19.6978**	**0.0380**	**8.8457**	**1.6126**	**10.4582**	**4.5461**	**1.4836**	**6.0297**	**0.0000**	**3,686.0619**	**3,686.0619**	**1.1922**		**3,715.8655**

Menifee Park - South Section - South Coast AQMD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.2 Site Preparation - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0652	0.0477	0.6211	1.7200e-003	0.2012	1.2000e-003	0.2024	0.0534	1.1100e-003	0.0545		174.4750	174.4750	4.8700e-003	4.6700e-003	175.9891
Total	**0.0652**	**0.0477**	**0.6211**	**1.7200e-003**	**0.2012**	**1.2000e-003**	**0.2024**	**0.0534**	**1.1100e-003**	**0.0545**		**174.4750**	**174.4750**	**4.8700e-003**	**4.6700e-003**	**175.9891**

3.3 Grading - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					7.0826	0.0000	7.0826	3.4247	0.0000	3.4247			0.0000			0.0000
Off-Road	1.9486	20.8551	15.2727	0.0297		0.9409	0.9409		0.8656	0.8656		2,872.0464	2,872.0464	0.9289		2,895.2684
Total	**1.9486**	**20.8551**	**15.2727**	**0.0297**	**7.0826**	**0.9409**	**8.0234**	**3.4247**	**0.8656**	**4.2903**		**2,872.0464**	**2,872.0464**	**0.9289**		**2,895.2684**

Menifee Park - South Section - South Coast AQMD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.3 Grading - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0544	0.0398	0.5176	1.4300e-003	0.1677	1.0000e-003	0.1687	0.0445	9.2000e-004	0.0454		145.3958	145.3958	4.0600e-003	3.8900e-003	146.6576
Total	**0.0544**	**0.0398**	**0.5176**	**1.4300e-003**	**0.1677**	**1.0000e-003**	**0.1687**	**0.0445**	**9.2000e-004**	**0.0454**		**145.3958**	**145.3958**	**4.0600e-003**	**3.8900e-003**	**146.6576**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					3.1872	0.0000	3.1872	1.5411	0.0000	1.5411			0.0000			0.0000
Off-Road	1.9486	20.8551	15.2727	0.0297		0.9409	0.9409		0.8656	0.8656	0.0000	2,872.0464	2,872.0464	0.9289		2,895.2684
Total	**1.9486**	**20.8551**	**15.2727**	**0.0297**	**3.1872**	**0.9409**	**4.1280**	**1.5411**	**0.8656**	**2.4067**	**0.0000**	**2,872.0464**	**2,872.0464**	**0.9289**		**2,895.2684**

Menifee Park - South Section - South Coast AQMD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.3 Grading - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0544	0.0398	0.5176	1.4300e-003	0.1677	1.0000e-003	0.1687	0.0445	9.2000e-004	0.0454		145.3958	145.3958	4.0600e-003	3.8900e-003	146.6576
Total	**0.0544**	**0.0398**	**0.5176**	**1.4300e-003**	**0.1677**	**1.0000e-003**	**0.1687**	**0.0445**	**9.2000e-004**	**0.0454**		**145.3958**	**145.3958**	**4.0600e-003**	**3.8900e-003**	**146.6576**

3.4 Building Construction - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.7062	15.6156	16.3634	0.0269		0.8090	0.8090		0.7612	0.7612		2,554.3336	2,554.3336	0.6120		2,569.6322
Total	**1.7062**	**15.6156**	**16.3634**	**0.0269**		**0.8090**	**0.8090**		**0.7612**	**0.7612**		**2,554.3336**	**2,554.3336**	**0.6120**		**2,569.6322**

Menifee Park - South Section - South Coast AQMD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.4 Building Construction - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0770	2.0882	0.7107	8.2300e-003	0.2753	0.0210	0.2963	0.0793	0.0201	0.0994		884.8210	884.8210	0.0295	0.1284	923.8174
Worker	0.3986	0.2916	3.7956	0.0105	1.2295	7.3500e-003	1.2369	0.3261	6.7600e-003	0.3328		1,066.2359	1,066.2359	0.0298	0.0286	1,075.4891
Total	**0.4756**	**2.3797**	**4.5063**	**0.0187**	**1.5049**	**0.0283**	**1.5332**	**0.4054**	**0.0268**	**0.4322**		**1,951.0569**	**1,951.0569**	**0.0593**	**0.1569**	**1,999.3065**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.7062	15.6156	16.3634	0.0269		0.8090	0.8090		0.7612	0.7612	0.0000	2,554.3336	2,554.3336	0.6120		2,569.6322
Total	**1.7062**	**15.6156**	**16.3634**	**0.0269**		**0.8090**	**0.8090**		**0.7612**	**0.7612**	**0.0000**	**2,554.3336**	**2,554.3336**	**0.6120**		**2,569.6322**

Menifee Park - South Section - South Coast AQMD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.4 Building Construction - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0770	2.0882	0.7107	8.2300e-003	0.2753	0.0210	0.2963	0.0793	0.0201	0.0994		884.8210	884.8210	0.0295	0.1284	923.8174
Worker	0.3986	0.2916	3.7956	0.0105	1.2295	7.3500e-003	1.2369	0.3261	6.7600e-003	0.3328		1,066.2359	1,066.2359	0.0298	0.0286	1,075.4891
Total	**0.4756**	**2.3797**	**4.5063**	**0.0187**	**1.5049**	**0.0283**	**1.5332**	**0.4054**	**0.0268**	**0.4322**		**1,951.0569**	**1,951.0569**	**0.0593**	**0.1569**	**1,999.3065**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.8510	1.0787	8.3095	0.0177	1.8190	0.0156	1.8346	0.4848	0.0146	0.4993		1,808.5011	1,808.5011	0.1243	0.0848	1,836.8778
Unmitigated	0.8510	1.0787	8.3095	0.0177	1.8190	0.0156	1.8346	0.4848	0.0146	0.4993		1,808.5011	1,808.5011	0.1243	0.0848	1,836.8778

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
City Park	300.00	300.00	300.00	863,262	863,262
Total	300.00	300.00	300.00	863,262	863,262

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
City Park	16.60	8.40	6.90	33.00	48.00	19.00	66	28	6

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
City Park	0.543376	0.059966	0.184357	0.131187	0.023843	0.006245	0.012012	0.009162	0.000826	0.000515	0.023898	0.000748	0.003864

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0135	1.0000e-005	6.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		1.3100e-003	1.3100e-003	0.0000		1.4000e-003
Unmitigated	0.0135	1.0000e-005	6.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		1.3100e-003	1.3100e-003	0.0000		1.4000e-003

Menifee Park - South Section - South Coast AQMD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0135					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	6.0000e-005	1.0000e-005	6.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		1.3100e-003	1.3100e-003	0.0000		1.4000e-003
Total	**0.0135**	**1.0000e-005**	**6.1000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**1.3100e-003**	**1.3100e-003**	**0.0000**		**1.4000e-003**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0135					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	6.0000e-005	1.0000e-005	6.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		1.3100e-003	1.3100e-003	0.0000		1.4000e-003
Total	**0.0135**	**1.0000e-005**	**6.1000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**1.3100e-003**	**1.3100e-003**	**0.0000**		**1.4000e-003**

7.0 Water Detail

7.1 Mitigation Measures Water

Apply Water Conservation Strategy

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

8.0 Waste Detail

8.1 Mitigation Measures Waste

Institute Recycling and Composting Services

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Menifee Park - North Section - South Coast AQMD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Menifee Park - North Section

South Coast AQMD Air District, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
City Park	12.88	Acre	12.88	561,052.80	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	31
Climate Zone	10			**Operational Year**	2026
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	390.98	**CH4 Intensity (lb/MWhr)**	0.033	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Per project description. The northern portion of Evans Park is 12.88 acres.

Construction Phase - No demolition required.

Off-road Equipment -

Off-road Equipment -

Off-road Equipment -

Off-road Equipment -

Off-road Equipment -

Trips and VMT -

Demolition -

Grading -

Menifee Park - North Section - South Coast AQMD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Vehicle Trips - 644 trips/12.88 acres = 50 trips/acre

Road Dust -

Woodstoves -

Energy Use - Solar Street Lamps will be installed.

Construction Off-road Equipment Mitigation - Required by SCAQMD Rule 403.

Mobile Land Use Mitigation -

Area Mitigation -

Energy Mitigation -

Waste Mitigation - New solid waste requirements.

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadMoistureContent	0	12
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	10
tblVehicleTrips	ST_TR	1.96	50.00
tblVehicleTrips	SU_TR	2.19	50.00
tblVehicleTrips	WD_TR	0.78	50.00

2.0 Emissions Summary

Menifee Park - North Section - South Coast AQMD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2025	2.9606	27.9806	26.8861	0.0638	19.8582	1.1320	20.9460	10.1558	1.0415	11.1566	0.0000	6,431.3204	6,431.3204	1.9472	0.3032	6,539.3851
2026	2.1197	16.3537	23.5471	0.0626	3.2270	0.5601	3.7871	0.8692	0.5269	1.3961	0.0000	6,350.2766	6,350.2766	0.7164	0.2959	6,456.0541
Maximum	**2.9606**	**27.9806**	**26.8861**	**0.0638**	**19.8582**	**1.1320**	**20.9460**	**10.1558**	**1.0415**	**11.1566**	**0.0000**	**6,431.3204**	**6,431.3204**	**1.9472**	**0.3032**	**6,539.3851**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2025	2.9606	27.9806	26.8861	0.0638	9.0469	1.1320	10.1347	4.5995	1.0415	5.6003	0.0000	6,431.3204	6,431.3204	1.9472	0.3032	6,539.3851
2026	2.1197	16.3537	23.5471	0.0626	3.2270	0.5601	3.7871	0.8692	0.5269	1.3961	0.0000	6,350.2766	6,350.2766	0.7164	0.2959	6,456.0541
Maximum	**2.9606**	**27.9806**	**26.8861**	**0.0638**	**9.0469**	**1.1320**	**10.1347**	**4.5995**	**1.0415**	**5.6003**	**0.0000**	**6,431.3204**	**6,431.3204**	**1.9472**	**0.3032**	**6,539.3851**

Menifee Park - North Section - South Coast AQMD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	46.83	0.00	43.71	50.40	0.00	44.26	0.00	0.00	0.00	0.00	0.00	0.00

Menifee Park - North Section - South Coast AQMD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.0290	1.0000e-005	1.3100e-003	0.0000		0.0000	0.0000		0.0000	0.0000		2.8200e-003	2.8200e-003	1.0000e-005		3.0000e-003
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	1.5754	1.7294	15.1221	0.0335	3.9049	0.0248	3.9297	1.0406	0.0231	1.0637		3,523.5872	3,523.5872	0.2317	0.1560	3,575.8788
Total	**1.6044**	**1.7294**	**15.1234**	**0.0335**	**3.9049**	**0.0248**	**3.9297**	**1.0406**	**0.0231**	**1.0637**		**3,523.5900**	**3,523.5900**	**0.2317**	**0.1560**	**3,575.8818**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.0290	1.0000e-005	1.3100e-003	0.0000		0.0000	0.0000		0.0000	0.0000		2.8200e-003	2.8200e-003	1.0000e-005		3.0000e-003
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	1.5754	1.7294	15.1221	0.0335	3.9049	0.0248	3.9297	1.0406	0.0231	1.0637		3,523.5872	3,523.5872	0.2317	0.1560	3,575.8788
Total	**1.6044**	**1.7294**	**15.1234**	**0.0335**	**3.9049**	**0.0248**	**3.9297**	**1.0406**	**0.0231**	**1.0637**		**3,523.5900**	**3,523.5900**	**0.2317**	**0.1560**	**3,575.8818**

Menifee Park - North Section - South Coast AQMD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	1/1/2025	1/14/2025	5	10	
2	Grading	Grading	1/15/2025	2/25/2025	5	30	
3	Building Construction	Building Construction	2/26/2025	4/21/2026	5	300	
4	Paving	Paving	4/22/2026	5/19/2026	5	20	
5	Architectural Coatings	Architectural Coating	5/20/2026	6/16/2026	5	20	

Acres of Grading (Site Preparation Phase): 15

Acres of Grading (Grading Phase): 90

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	2	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Scrapers	2	8.00	367	0.48

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Paving	Pavers	2	8.00	130	0.42
Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Architectural Coatings	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	7	18.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	236.00	92.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coatings	1	47.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Water Unpaved Roads

Reduce Vehicle Speed on Unpaved Roads

Menifee Park - North Section - South Coast AQMD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.2 Site Preparation - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					19.6570	0.0000	19.6570	10.1025	0.0000	10.1025			0.0000			0.0000
Off-Road	2.4727	25.2339	17.9118	0.0381		1.0868	1.0868		0.9999	0.9999		3,689.1037	3,689.1037	1.1931		3,718.9320
Total	**2.4727**	**25.2339**	**17.9118**	**0.0381**	**19.6570**	**1.0868**	**20.7438**	**10.1025**	**0.9999**	**11.1023**		**3,689.1037**	**3,689.1037**	**1.1931**		**3,718.9320**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0534	0.0339	0.4995	1.5600e-003	0.2012	1.0400e-003	0.2022	0.0534	9.5000e-004	0.0543		162.1868	162.1868	3.5900e-003	3.7500e-003	163.3953
Total	**0.0534**	**0.0339**	**0.4995**	**1.5600e-003**	**0.2012**	**1.0400e-003**	**0.2022**	**0.0534**	**9.5000e-004**	**0.0543**		**162.1868**	**162.1868**	**3.5900e-003**	**3.7500e-003**	**163.3953**

Menifee Park - North Section - South Coast AQMD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.2 Site Preparation - 2025

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.8457	0.0000	8.8457	4.5461	0.0000	4.5461			0.0000			0.0000
Off-Road	2.4727	25.2339	17.9118	0.0381		1.0868	1.0868		0.9999	0.9999	0.0000	3,689.1037	3,689.1037	1.1931		3,718.9320
Total	**2.4727**	**25.2339**	**17.9118**	**0.0381**	**8.8457**	**1.0868**	**9.9324**	**4.5461**	**0.9999**	**5.5460**	**0.0000**	**3,689.1037**	**3,689.1037**	**1.1931**		**3,718.9320**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0534	0.0339	0.4995	1.5600e-003	0.2012	1.0400e-003	0.2022	0.0534	9.5000e-004	0.0543		162.1868	162.1868	3.5900e-003	3.7500e-003	163.3953
Total	**0.0534**	**0.0339**	**0.4995**	**1.5600e-003**	**0.2012**	**1.0400e-003**	**0.2022**	**0.0534**	**9.5000e-004**	**0.0543**		**162.1868**	**162.1868**	**3.5900e-003**	**3.7500e-003**	**163.3953**

Menifee Park - North Section - South Coast AQMD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.3 Grading - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					9.2036	0.0000	9.2036	3.6538	0.0000	3.6538			0.0000			0.0000
Off-Road	2.9012	27.9429	26.3311	0.0621		1.1309	1.1309		1.0404	1.0404		6,008.2814	6,008.2814	1.9432		6,056.8614
Total	**2.9012**	**27.9429**	**26.3311**	**0.0621**	**9.2036**	**1.1309**	**10.3345**	**3.6538**	**1.0404**	**4.6942**		**6,008.2814**	**6,008.2814**	**1.9432**		**6,056.8614**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0594	0.0377	0.5550	1.7300e-003	0.2236	1.1500e-003	0.2247	0.0593	1.0600e-003	0.0604		180.2076	180.2076	3.9900e-003	4.1700e-003	181.5504
Total	**0.0594**	**0.0377**	**0.5550**	**1.7300e-003**	**0.2236**	**1.1500e-003**	**0.2247**	**0.0593**	**1.0600e-003**	**0.0604**		**180.2076**	**180.2076**	**3.9900e-003**	**4.1700e-003**	**181.5504**

Menifee Park - North Section - South Coast AQMD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.3 Grading - 2025

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					4.1416	0.0000	4.1416	1.6442	0.0000	1.6442			0.0000			0.0000
Off-Road	2.9012	27.9429	26.3311	0.0621		1.1309	1.1309		1.0404	1.0404	0.0000	6,008.2814	6,008.2814	1.9432		6,056.8614
Total	**2.9012**	**27.9429**	**26.3311**	**0.0621**	**4.1416**	**1.1309**	**5.2725**	**1.6442**	**1.0404**	**2.6846**	**0.0000**	**6,008.2814**	**6,008.2814**	**1.9432**		**6,056.8614**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0594	0.0377	0.5550	1.7300e-003	0.2236	1.1500e-003	0.2247	0.0593	1.0600e-003	0.0604		180.2076	180.2076	3.9900e-003	4.1700e-003	181.5504
Total	**0.0594**	**0.0377**	**0.5550**	**1.7300e-003**	**0.2236**	**1.1500e-003**	**0.2247**	**0.0593**	**1.0600e-003**	**0.0604**		**180.2076**	**180.2076**	**3.9900e-003**	**4.1700e-003**	**181.5504**

Menifee Park - North Section - South Coast AQMD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.4 Building Construction - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3674	12.4697	16.0847	0.0270		0.5276	0.5276		0.4963	0.4963		2,556.4744	2,556.4744	0.6010		2,571.4981
Total	**1.3674**	**12.4697**	**16.0847**	**0.0270**		**0.5276**	**0.5276**		**0.4963**	**0.4963**		**2,556.4744**	**2,556.4744**	**0.6010**		**2,571.4981**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0926	3.5048	1.3150	0.0162	0.5891	0.0197	0.6087	0.1696	0.0188	0.1884		1,748.3966	1,748.3966	0.0605	0.2540	1,825.5929
Worker	0.7004	0.4445	6.5493	0.0204	2.6379	0.0136	2.6515	0.6996	0.0125	0.7121		2,126.4494	2,126.4494	0.0471	0.0492	2,142.2941
Total	**0.7930**	**3.9493**	**7.8643**	**0.0366**	**3.2270**	**0.0332**	**3.2603**	**0.8692**	**0.0313**	**0.9005**		**3,874.8460**	**3,874.8460**	**0.1076**	**0.3032**	**3,967.8870**

Menifee Park - North Section - South Coast AQMD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.4 Building Construction - 2025

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3674	12.4697	16.0847	0.0270		0.5276	0.5276		0.4963	0.4963	0.0000	2,556.4744	2,556.4744	0.6010		2,571.4981
Total	**1.3674**	**12.4697**	**16.0847**	**0.0270**		**0.5276**	**0.5276**		**0.4963**	**0.4963**	**0.0000**	**2,556.4744**	**2,556.4744**	**0.6010**		**2,571.4981**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0926	3.5048	1.3150	0.0162	0.5891	0.0197	0.6087	0.1696	0.0188	0.1884		1,748.3966	1,748.3966	0.0605	0.2540	1,825.5929
Worker	0.7004	0.4445	6.5493	0.0204	2.6379	0.0136	2.6515	0.6996	0.0125	0.7121		2,126.4494	2,126.4494	0.0471	0.0492	2,142.2941
Total	**0.7930**	**3.9493**	**7.8643**	**0.0366**	**3.2270**	**0.0332**	**3.2603**	**0.8692**	**0.0313**	**0.9005**		**3,874.8460**	**3,874.8460**	**0.1076**	**0.3032**	**3,967.8870**

Menifee Park - North Section - South Coast AQMD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.4 Building Construction - 2026

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3674	12.4697	16.0847	0.0270		0.5276	0.5276		0.4963	0.4963		2,556.4744	2,556.4744	0.6010		2,571.4981
Total	**1.3674**	**12.4697**	**16.0847**	**0.0270**		**0.5276**	**0.5276**		**0.4963**	**0.4963**		**2,556.4744**	**2,556.4744**	**0.6010**		**2,571.4981**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0906	3.4802	1.2991	0.0159	0.5891	0.0196	0.6087	0.1696	0.0187	0.1884		1,715.6487	1,715.6487	0.0606	0.2495	1,791.5006
Worker	0.6618	0.4038	6.1634	0.0198	2.6379	0.0129	2.6508	0.6996	0.0119	0.7115		2,078.1535	2,078.1535	0.0428	0.0464	2,093.0555
Total	**0.7523**	**3.8840**	**7.4624**	**0.0357**	**3.2270**	**0.0325**	**3.2595**	**0.8692**	**0.0306**	**0.8998**		**3,793.8022**	**3,793.8022**	**0.1034**	**0.2959**	**3,884.5561**

Menifee Park - North Section - South Coast AQMD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.4 Building Construction - 2026

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3674	12.4697	16.0847	0.0270		0.5276	0.5276		0.4963	0.4963	0.0000	2,556.4744	2,556.4744	0.6010		2,571.4981
Total	**1.3674**	**12.4697**	**16.0847**	**0.0270**		**0.5276**	**0.5276**		**0.4963**	**0.4963**	**0.0000**	**2,556.4744**	**2,556.4744**	**0.6010**		**2,571.4981**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0906	3.4802	1.2991	0.0159	0.5891	0.0196	0.6087	0.1696	0.0187	0.1884		1,715.6487	1,715.6487	0.0606	0.2495	1,791.5006
Worker	0.6618	0.4038	6.1634	0.0198	2.6379	0.0129	2.6508	0.6996	0.0119	0.7115		2,078.1535	2,078.1535	0.0428	0.0464	2,093.0555
Total	**0.7523**	**3.8840**	**7.4624**	**0.0357**	**3.2270**	**0.0325**	**3.2595**	**0.8692**	**0.0306**	**0.8998**		**3,793.8022**	**3,793.8022**	**0.1034**	**0.2959**	**3,884.5561**

Menifee Park - North Section - South Coast AQMD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.5 Paving - 2026

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.9152	8.5816	14.5780	0.0228		0.4185	0.4185		0.3850	0.3850		2,206.7452	2,206.7452	0.7137		2,224.5878
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.9152**	**8.5816**	**14.5780**	**0.0228**		**0.4185**	**0.4185**		**0.3850**	**0.3850**		**2,206.7452**	**2,206.7452**	**0.7137**		**2,224.5878**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0421	0.0257	0.3917	1.2600e-003	0.1677	8.2000e-004	0.1685	0.0445	7.5000e-004	0.0452		132.0860	132.0860	2.7200e-003	2.9500e-003	133.0332
Total	**0.0421**	**0.0257**	**0.3917**	**1.2600e-003**	**0.1677**	**8.2000e-004**	**0.1685**	**0.0445**	**7.5000e-004**	**0.0452**		**132.0860**	**132.0860**	**2.7200e-003**	**2.9500e-003**	**133.0332**

Menifee Park - North Section - South Coast AQMD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.5 Paving - 2026

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.9152	8.5816	14.5780	0.0228		0.4185	0.4185		0.3850	0.3850	0.0000	2,206.7452	2,206.7452	0.7137		2,224.5878
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.9152**	**8.5816**	**14.5780**	**0.0228**		**0.4185**	**0.4185**		**0.3850**	**0.3850**	**0.0000**	**2,206.7452**	**2,206.7452**	**0.7137**		**2,224.5878**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0421	0.0257	0.3917	1.2600e-003	0.1677	8.2000e-004	0.1685	0.0445	7.5000e-004	0.0452		132.0860	132.0860	2.7200e-003	2.9500e-003	133.0332
Total	**0.0421**	**0.0257**	**0.3917**	**1.2600e-003**	**0.1677**	**8.2000e-004**	**0.1685**	**0.0445**	**7.5000e-004**	**0.0452**		**132.0860**	**132.0860**	**2.7200e-003**	**2.9500e-003**	**133.0332**

Menifee Park - North Section - South Coast AQMD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.6 Architectural Coatings - 2026

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1709	1.1455	1.8091	2.9700e-003		0.0515	0.0515		0.0515	0.0515		281.4481	281.4481	0.0154		281.8319
Total	**0.1709**	**1.1455**	**1.8091**	**2.9700e-003**		**0.0515**	**0.0515**		**0.0515**	**0.0515**		**281.4481**	**281.4481**	**0.0154**		**281.8319**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.1318	0.0804	1.2275	3.9400e-003	0.5254	2.5700e-003	0.5279	0.1393	2.3600e-003	0.1417		413.8696	413.8696	8.5200e-003	9.2400e-003	416.8373
Total	**0.1318**	**0.0804**	**1.2275**	**3.9400e-003**	**0.5254**	**2.5700e-003**	**0.5279**	**0.1393**	**2.3600e-003**	**0.1417**		**413.8696**	**413.8696**	**8.5200e-003**	**9.2400e-003**	**416.8373**

Menifee Park - North Section - South Coast AQMD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.6 Architectural Coatings - 2026

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1709	1.1455	1.8091	2.9700e-003		0.0515	0.0515		0.0515	0.0515	0.0000	281.4481	281.4481	0.0154		281.8319
Total	**0.1709**	**1.1455**	**1.8091**	**2.9700e-003**		**0.0515**	**0.0515**		**0.0515**	**0.0515**	**0.0000**	**281.4481**	**281.4481**	**0.0154**		**281.8319**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.1318	0.0804	1.2275	3.9400e-003	0.5254	2.5700e-003	0.5279	0.1393	2.3600e-003	0.1417		413.8696	413.8696	8.5200e-003	9.2400e-003	416.8373
Total	**0.1318**	**0.0804**	**1.2275**	**3.9400e-003**	**0.5254**	**2.5700e-003**	**0.5279**	**0.1393**	**2.3600e-003**	**0.1417**		**413.8696**	**413.8696**	**8.5200e-003**	**9.2400e-003**	**416.8373**

Menifee Park - North Section - South Coast AQMD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	1.5754	1.7294	15.1221	0.0335	3.9049	0.0248	3.9297	1.0406	0.0231	1.0637		3,523.5872	3,523.5872	0.2317	0.1560	3,575.8788
Unmitigated	1.5754	1.7294	15.1221	0.0335	3.9049	0.0248	3.9297	1.0406	0.0231	1.0637		3,523.5872	3,523.5872	0.2317	0.1560	3,575.8788

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
City Park	644.00	644.00	644.00	1,853,136	1,853,136
Total	644.00	644.00	644.00	1,853,136	1,853,136

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
City Park	16.60	8.40	6.90	33.00	48.00	19.00	66	28	6

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
City Park	0.540893	0.062748	0.186142	0.127785	0.023768	0.006610	0.012333	0.009205	0.000817	0.000491	0.024860	0.000754	0.003594

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0290	1.0000e-005	1.3100e-003	0.0000		0.0000	0.0000		0.0000	0.0000		2.8200e-003	2.8200e-003	1.0000e-005		3.0000e-003
Unmitigated	0.0290	1.0000e-005	1.3100e-003	0.0000		0.0000	0.0000		0.0000	0.0000		2.8200e-003	2.8200e-003	1.0000e-005		3.0000e-003

Menifee Park - North Section - South Coast AQMD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0289					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.2000e-004	1.0000e-005	1.3100e-003	0.0000		0.0000	0.0000		0.0000	0.0000		2.8200e-003	2.8200e-003	1.0000e-005		3.0000e-003
Total	**0.0290**	**1.0000e-005**	**1.3100e-003**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**2.8200e-003**	**2.8200e-003**	**1.0000e-005**		**3.0000e-003**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0289					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.2000e-004	1.0000e-005	1.3100e-003	0.0000		0.0000	0.0000		0.0000	0.0000		2.8200e-003	2.8200e-003	1.0000e-005		3.0000e-003
Total	**0.0290**	**1.0000e-005**	**1.3100e-003**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**2.8200e-003**	**2.8200e-003**	**1.0000e-005**		**3.0000e-003**

7.0 Water Detail

7.1 Mitigation Measures Water

Apply Water Conservation Strategy

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

8.0 Waste Detail

8.1 Mitigation Measures Waste

Institute Recycling and Composting Services

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Menifee Park - South Section - South Coast AQMD Air District, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Menifee Park - South Section

South Coast AQMD Air District, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
City Park	6.00	Acre	6.00	261,360.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	31
Climate Zone	10			**Operational Year**	2022
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	390.98	**CH4 Intensity (lb/MWhr)**	0.033	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Per project description. The southern portion of Evans Park is 6 acres.

Construction Phase - Total Days are based on a six month construction period.

Off-road Equipment -

Off-road Equipment -

Off-road Equipment -

Off-road Equipment -

Trips and VMT -

Demolition -

Grading -

Vehicle Trips - [300 Trips/day] / [6 acres] = 50 Trips/acre

Road Dust -

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Woodstoves -

Energy Use - Solar Street Lamps will be installed.

Construction Off-road Equipment Mitigation -

Mobile Land Use Mitigation -

Area Mitigation -

Energy Mitigation -

Waste Mitigation - New solid waste requirements.

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadMoistureContent	0	12
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	10
tblConstructionPhase	NumDays	230.00	45.00
tblConstructionPhase	NumDays	20.00	45.00
tblConstructionPhase	NumDays	10.00	20.00
tblVehicleTrips	ST_TR	1.96	50.00
tblVehicleTrips	SU_TR	2.19	50.00
tblVehicleTrips	WD_TR	0.78	50.00

2.0 Emissions Summary

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2022	0.1257	1.2068	1.0306	2.1300e-003	0.3949	0.0562	0.4510	0.1886	0.0521	0.2406	0.0000	188.9743	188.9743	0.0436	3.3400e-003	191.0585
Maximum	**0.1257**	**1.2068**	**1.0306**	**2.1300e-003**	**0.3949**	**0.0562**	**0.4510**	**0.1886**	**0.0521**	**0.2406**	**0.0000**	**188.9743**	**188.9743**	**0.0436**	**3.3400e-003**	**191.0585**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2022	0.1257	1.2068	1.0306	2.1300e-003	0.1991	0.0562	0.2553	0.0906	0.0521	0.1427	0.0000	188.9741	188.9741	0.0436	3.3400e-003	191.0583
Maximum	**0.1257**	**1.2068**	**1.0306**	**2.1300e-003**	**0.1991**	**0.0562**	**0.2553**	**0.0906**	**0.0521**	**0.1427**	**0.0000**	**188.9741**	**188.9741**	**0.0436**	**3.3400e-003**	**191.0583**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**49.58**	**0.00**	**43.40**	**51.94**	**0.00**	**40.70**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Menifee Park - South Section - South Coast AQMD Air District, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	12-1-2021	2-28-2022	0.3637	0.3637
2	3-1-2022	5-31-2022	0.7228	0.7228
3	6-1-2022	8-31-2022	0.2434	0.2434
		Highest	0.7228	0.7228

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	2.4600e-003	0.0000	8.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.5000e-004	1.5000e-004	0.0000	0.0000	1.6000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.1524	0.1989	1.5296	3.2500e-003	0.3250	2.8300e-003	0.3278	0.0867	2.6400e-003	0.0894	0.0000	301.8496	301.8496	0.0204	0.0141	306.5562
Waste						0.0000	0.0000		0.0000	0.0000	0.1056	0.0000	0.1056	6.2400e-003	0.0000	0.2615
Water						0.0000	0.0000		0.0000	0.0000	0.0000	14.0855	14.0855	1.1900e-003	1.4000e-004	14.1582
Total	**0.1548**	**0.1989**	**1.5297**	**3.2500e-003**	**0.3250**	**2.8300e-003**	**0.3278**	**0.0867**	**2.6400e-003**	**0.0894**	**0.1056**	**315.9353**	**316.0408**	**0.0278**	**0.0142**	**320.9760**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	2.4600e-003	0.0000	8.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.5000e-004	1.5000e-004	0.0000	0.0000	1.6000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.1524	0.1989	1.5296	3.2500e-003	0.3250	2.8300e-003	0.3278	0.0867	2.6400e-003	0.0894	0.0000	301.8496	301.8496	0.0204	0.0141	306.5562
Waste						0.0000	0.0000		0.0000	0.0000	0.0792	0.0000	0.0792	4.6800e-003	0.0000	0.1961
Water						0.0000	0.0000		0.0000	0.0000	0.0000	11.2684	11.2684	9.5000e-004	1.2000e-004	11.3266
Total	**0.1548**	**0.1989**	**1.5297**	**3.2500e-003**	**0.3250**	**2.8300e-003**	**0.3278**	**0.0867**	**2.6400e-003**	**0.0894**	**0.0792**	**313.1182**	**313.1973**	**0.0260**	**0.0142**	**318.0790**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**25.00**	**0.89**	**0.90**	**6.47**	**0.14**	**0.90**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	2/1/2022	2/28/2022	5	20	
2	Grading	Grading	3/1/2022	5/2/2022	5	45	
3	Building Construction	Building Construction	5/3/2022	7/4/2022	5	45	

Menifee Park - South Section - South Coast AQMD Air District, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Acres of Grading (Site Preparation Phase): 30

Acres of Grading (Grading Phase): 45

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	1	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	7	18.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	110.00	43.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Water Exposed Area

Water Unpaved Roads

Reduce Vehicle Speed on Unpaved Roads

3.2 Site Preparation - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1966	0.0000	0.1966	0.1010	0.0000	0.1010	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0317	0.3308	0.1970	3.8000e-004		0.0161	0.0161		0.0148	0.0148	0.0000	33.4394	33.4394	0.0108	0.0000	33.7098
Total	**0.0317**	**0.3308**	**0.1970**	**3.8000e-004**	**0.1966**	**0.0161**	**0.2127**	**0.1010**	**0.0148**	**0.1159**	**0.0000**	**33.4394**	**33.4394**	**0.0108**	**0.0000**	**33.7098**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.2 Site Preparation - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	6.0000e-004	4.9000e-004	6.3900e-003	2.0000e-005	1.9700e-003	1.0000e-005	1.9900e-003	5.2000e-004	1.0000e-005	5.4000e-004	0.0000	1.6071	1.6071	4.0000e-005	4.0000e-005	1.6210
Total	**6.0000e-004**	**4.9000e-004**	**6.3900e-003**	**2.0000e-005**	**1.9700e-003**	**1.0000e-005**	**1.9900e-003**	**5.2000e-004**	**1.0000e-005**	**5.4000e-004**	**0.0000**	**1.6071**	**1.6071**	**4.0000e-005**	**4.0000e-005**	**1.6210**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0885	0.0000	0.0885	0.0455	0.0000	0.0455	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0317	0.3308	0.1970	3.8000e-004		0.0161	0.0161		0.0148	0.0148	0.0000	33.4394	33.4394	0.0108	0.0000	33.7097
Total	**0.0317**	**0.3308**	**0.1970**	**3.8000e-004**	**0.0885**	**0.0161**	**0.1046**	**0.0455**	**0.0148**	**0.0603**	**0.0000**	**33.4394**	**33.4394**	**0.0108**	**0.0000**	**33.7097**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.2 Site Preparation - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	6.0000e-004	4.9000e-004	6.3900e-003	2.0000e-005	1.9700e-003	1.0000e-005	1.9900e-003	5.2000e-004	1.0000e-005	5.4000e-004	0.0000	1.6071	1.6071	4.0000e-005	4.0000e-005	1.6210
Total	**6.0000e-004**	**4.9000e-004**	**6.3900e-003**	**2.0000e-005**	**1.9700e-003**	**1.0000e-005**	**1.9900e-003**	**5.2000e-004**	**1.0000e-005**	**5.4000e-004**	**0.0000**	**1.6071**	**1.6071**	**4.0000e-005**	**4.0000e-005**	**1.6210**

3.3 Grading - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1594	0.0000	0.1594	0.0771	0.0000	0.0771	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0438	0.4692	0.3436	6.7000e-004		0.0212	0.0212		0.0195	0.0195	0.0000	58.6232	58.6232	0.0190	0.0000	59.0972
Total	**0.0438**	**0.4692**	**0.3436**	**6.7000e-004**	**0.1594**	**0.0212**	**0.1805**	**0.0771**	**0.0195**	**0.0965**	**0.0000**	**58.6232**	**58.6232**	**0.0190**	**0.0000**	**59.0972**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.3 Grading - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.1300e-003	9.2000e-004	0.0120	3.0000e-005	3.7000e-003	2.0000e-005	3.7300e-003	9.8000e-004	2.0000e-005	1.0000e-003	0.0000	3.0133	3.0133	8.0000e-005	8.0000e-005	3.0394
Total	**1.1300e-003**	**9.2000e-004**	**0.0120**	**3.0000e-005**	**3.7000e-003**	**2.0000e-005**	**3.7300e-003**	**9.8000e-004**	**2.0000e-005**	**1.0000e-003**	**0.0000**	**3.0133**	**3.0133**	**8.0000e-005**	**8.0000e-005**	**3.0394**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0717	0.0000	0.0717	0.0347	0.0000	0.0347	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0438	0.4692	0.3436	6.7000e-004		0.0212	0.0212		0.0195	0.0195	0.0000	58.6232	58.6232	0.0190	0.0000	59.0972
Total	**0.0438**	**0.4692**	**0.3436**	**6.7000e-004**	**0.0717**	**0.0212**	**0.0929**	**0.0347**	**0.0195**	**0.0542**	**0.0000**	**58.6232**	**58.6232**	**0.0190**	**0.0000**	**59.0972**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.3 Grading - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.1300e-003	9.2000e-004	0.0120	3.0000e-005	3.7000e-003	2.0000e-005	3.7300e-003	9.8000e-004	2.0000e-005	1.0000e-003	0.0000	3.0133	3.0133	8.0000e-005	8.0000e-005	3.0394
Total	**1.1300e-003**	**9.2000e-004**	**0.0120**	**3.0000e-005**	**3.7000e-003**	**2.0000e-005**	**3.7300e-003**	**9.8000e-004**	**2.0000e-005**	**1.0000e-003**	**0.0000**	**3.0133**	**3.0133**	**8.0000e-005**	**8.0000e-005**	**3.0394**

3.4 Building Construction - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0384	0.3514	0.3682	6.1000e-004		0.0182	0.0182		0.0171	0.0171	0.0000	52.1382	52.1382	0.0125	0.0000	52.4505
Total	**0.0384**	**0.3514**	**0.3682**	**6.1000e-004**		**0.0182**	**0.0182**		**0.0171**	**0.0171**	**0.0000**	**52.1382**	**52.1382**	**0.0125**	**0.0000**	**52.4505**

Menifee Park - South Section - South Coast AQMD Air District, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.4 Building Construction - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.7500e-003	0.0473	0.0157	1.9000e-004	6.1000e-003	4.7000e-004	6.5700e-003	1.7600e-003	4.5000e-004	2.2100e-003	0.0000	18.0555	18.0555	6.0000e-004	2.6200e-003	18.8513
Worker	8.3100e-003	6.7100e-003	0.0878	2.4000e-004	0.0272	1.7000e-004	0.0273	7.2100e-003	1.5000e-004	7.3600e-003	0.0000	22.0976	22.0976	6.1000e-004	5.9000e-004	22.2893
Total	**0.0101**	**0.0540**	**0.1035**	**4.3000e-004**	**0.0333**	**6.4000e-004**	**0.0339**	**8.9700e-003**	**6.0000e-004**	**9.5700e-003**	**0.0000**	**40.1531**	**40.1531**	**1.2100e-003**	**3.2100e-003**	**41.1405**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0384	0.3514	0.3682	6.1000e-004		0.0182	0.0182		0.0171	0.0171	0.0000	52.1381	52.1381	0.0125	0.0000	52.4504
Total	**0.0384**	**0.3514**	**0.3682**	**6.1000e-004**		**0.0182**	**0.0182**		**0.0171**	**0.0171**	**0.0000**	**52.1381**	**52.1381**	**0.0125**	**0.0000**	**52.4504**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.4 Building Construction - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.7500e-003	0.0473	0.0157	1.9000e-004	6.1000e-003	4.7000e-004	6.5700e-003	1.7600e-003	4.5000e-004	2.2100e-003	0.0000	18.0555	18.0555	6.0000e-004	2.6200e-003	18.8513
Worker	8.3100e-003	6.7100e-003	0.0878	2.4000e-004	0.0272	1.7000e-004	0.0273	7.2100e-003	1.5000e-004	7.3600e-003	0.0000	22.0976	22.0976	6.1000e-004	5.9000e-004	22.2893
Total	**0.0101**	**0.0540**	**0.1035**	**4.3000e-004**	**0.0333**	**6.4000e-004**	**0.0339**	**8.9700e-003**	**6.0000e-004**	**9.5700e-003**	**0.0000**	**40.1531**	**40.1531**	**1.2100e-003**	**3.2100e-003**	**41.1405**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.1524	0.1989	1.5296	3.2500e-003	0.3250	2.8300e-003	0.3278	0.0867	2.6400e-003	0.0894	0.0000	301.8496	301.8496	0.0204	0.0141	306.5562
Unmitigated	0.1524	0.1989	1.5296	3.2500e-003	0.3250	2.8300e-003	0.3278	0.0867	2.6400e-003	0.0894	0.0000	301.8496	301.8496	0.0204	0.0141	306.5562

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
City Park	300.00	300.00	300.00	863,262	863,262
Total	300.00	300.00	300.00	863,262	863,262

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
City Park	16.60	8.40	6.90	33.00	48.00	19.00	66	28	6

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
City Park	0.543376	0.059966	0.184357	0.131187	0.023843	0.006245	0.012012	0.009162	0.000826	0.000515	0.023898	0.000748	0.003864

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
City Park	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
City Park	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

Menifee Park - South Section - South Coast AQMD Air District, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	2.4600e-003	0.0000	8.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.5000e-004	1.5000e-004	0.0000	0.0000	1.6000e-004
Unmitigated	2.4600e-003	0.0000	8.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.5000e-004	1.5000e-004	0.0000	0.0000	1.6000e-004

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	2.4600e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	1.0000e-005	0.0000	8.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.5000e-004	1.5000e-004	0.0000	0.0000	1.6000e-004
Total	**2.4700e-003**	**0.0000**	**8.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**1.5000e-004**	**1.5000e-004**	**0.0000**	**0.0000**	**1.6000e-004**

Menifee Park - South Section - South Coast AQMD Air District, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	2.4600e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	1.0000e-005	0.0000	8.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.5000e-004	1.5000e-004	0.0000	0.0000	1.6000e-004
Total	**2.4700e-003**	**0.0000**	**8.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**1.5000e-004**	**1.5000e-004**	**0.0000**	**0.0000**	**1.6000e-004**

7.0 Water Detail

7.1 Mitigation Measures Water

Apply Water Conservation Strategy

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	11.2684	9.5000e-004	1.2000e-004	11.3266
Unmitigated	14.0855	1.1900e-003	1.4000e-004	14.1582

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
City Park	0 / 7.14889	14.0855	1.1900e-003	1.4000e-004	14.1582
Total		**14.0855**	**1.1900e-003**	**1.4000e-004**	**14.1582**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
City Park	0 / 5.71911	11.2684	9.5000e-004	1.2000e-004	11.3266
Total		**11.2684**	**9.5000e-004**	**1.2000e-004**	**11.3266**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Institute Recycling and Composting Services

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	0.0792	4.6800e-003	0.0000	0.1961
Unmitigated	0.1056	6.2400e-003	0.0000	0.2615

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
City Park	0.52	0.1056	6.2400e-003	0.0000	0.2615
Total		**0.1056**	**6.2400e-003**	**0.0000**	**0.2615**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
City Park	0.39	0.0792	4.6800e-003	0.0000	0.1961
Total		**0.0792**	**4.6800e-003**	**0.0000**	**0.1961**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Menifee Park - North Section

South Coast AQMD Air District, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
City Park	12.88	Acre	12.88	561,052.80	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	31
Climate Zone	10			**Operational Year**	2026
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	390.98	**CH4 Intensity (lb/MWhr)**	0.033	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Per project description. The northern portion of Evans Park is 12.88 acres.

Construction Phase - No demolition required.

Off-road Equipment -

Off-road Equipment -

Off-road Equipment -

Off-road Equipment -

Off-road Equipment -

Trips and VMT -

Demolition -

Grading -

Menifee Park - North Section - South Coast AQMD Air District, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Vehicle Trips - 644 trips/12.88 acres = 50 trips/acre

Road Dust -

Woodstoves -

Energy Use - Solar Street Lamps will be installed.

Construction Off-road Equipment Mitigation - Required by SCAQMD Rule 403.

Mobile Land Use Mitigation -

Area Mitigation -

Energy Mitigation -

Waste Mitigation - New solid waste requirements.

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadMoistureContent	0	12
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	10
tblVehicleTrips	ST_TR	1.96	50.00
tblVehicleTrips	SU_TR	2.19	50.00
tblVehicleTrips	WD_TR	0.78	50.00

2.0 Emissions Summary

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2025	0.2898	2.3614	3.1596	8.2100e-003	0.5908	0.0844	0.6752	0.2009	0.0789	0.2799	0.0000	749.4940	749.4940	0.1030	0.0305	761.1619
2026	0.0942	0.7446	1.1165	2.8000e-003	0.1320	0.0269	0.1589	0.0356	0.0252	0.0608	0.0000	256.2229	256.2229	0.0320	0.0107	260.2195
Maximum	**0.2898**	**2.3614**	**3.1596**	**8.2100e-003**	**0.5908**	**0.0844**	**0.6752**	**0.2009**	**0.0789**	**0.2799**	**0.0000**	**749.4940**	**749.4940**	**0.1030**	**0.0305**	**761.1619**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2025	0.2898	2.3614	3.1596	8.2100e-003	0.4609	0.0844	0.5452	0.1430	0.0789	0.2219	0.0000	749.4935	749.4935	0.1030	0.0305	761.1615
2026	0.0942	0.7446	1.1165	2.8000e-003	0.1320	0.0269	0.1589	0.0356	0.0252	0.0608	0.0000	256.2228	256.2228	0.0320	0.0107	260.2193
Maximum	**0.2898**	**2.3614**	**3.1596**	**8.2100e-003**	**0.4609**	**0.0844**	**0.5452**	**0.1430**	**0.0789**	**0.2219**	**0.0000**	**749.4935**	**749.4935**	**0.1030**	**0.0305**	**761.1615**

Menifee Park - North Section - South Coast AQMD Air District, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**17.98**	**0.00**	**15.59**	**24.49**	**0.00**	**17.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	**1-1-2025**	**3-31-2025**	0.8287	0.8287
2	**4-1-2025**	**6-30-2025**	0.5960	0.5960
3	**7-1-2025**	**9-30-2025**	0.6026	0.6026
4	**10-1-2025**	**12-31-2025**	0.6105	0.6105
5	**1-1-2026**	**3-31-2026**	0.5938	0.5938
6	**4-1-2026**	**6-30-2026**	0.2475	0.2475
		Highest	0.8287	0.8287

Menifee Park - North Section - South Coast AQMD Air District, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	5.2900e-003	0.0000	1.6000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	3.2000e-004	3.2000e-004	0.0000	0.0000	3.4000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.2824	0.3183	2.7786	6.1600e-003	0.6977	4.5100e-003	0.7022	0.1862	4.2000e-003	0.1904	0.0000	587.9767	587.9767	0.0381	0.0259	596.6437
Waste						0.0000	0.0000		0.0000	0.0000	0.2253	0.0000	0.2253	0.0133	0.0000	0.5582
Water						0.0000	0.0000		0.0000	0.0000	0.0000	30.2369	30.2369	2.5500e-003	3.1000e-004	30.3929
Total	**0.2877**	**0.3183**	**2.7788**	**6.1600e-003**	**0.6977**	**4.5100e-003**	**0.7022**	**0.1862**	**4.2000e-003**	**0.1904**	**0.2253**	**618.2140**	**618.4393**	**0.0539**	**0.0262**	**627.5951**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	5.2900e-003	0.0000	1.6000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	3.2000e-004	3.2000e-004	0.0000	0.0000	3.4000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.2824	0.3183	2.7786	6.1600e-003	0.6977	4.5100e-003	0.7022	0.1862	4.2000e-003	0.1904	0.0000	587.9767	587.9767	0.0381	0.0259	596.6437
Waste						0.0000	0.0000		0.0000	0.0000	0.1690	0.0000	0.1690	9.9900e-003	0.0000	0.4187
Water						0.0000	0.0000		0.0000	0.0000	0.0000	24.1895	24.1895	2.0400e-003	2.5000e-004	24.3143
Total	**0.2877**	**0.3183**	**2.7788**	**6.1600e-003**	**0.6977**	**4.5100e-003**	**0.7022**	**0.1862**	**4.2000e-003**	**0.1904**	**0.1690**	**612.1666**	**612.3356**	**0.0501**	**0.0261**	**621.3770**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**25.00**	**0.98**	**0.99**	**7.12**	**0.23**	**0.99**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	1/1/2025	1/14/2025	5	10	
2	Grading	Grading	1/15/2025	2/25/2025	5	30	
3	Building Construction	Building Construction	2/26/2025	4/21/2026	5	300	

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

4	Paving	Paving	4/22/2026	5/19/2026	5	20	
5	Architectural Coatings	Architectural Coating	5/20/2026	6/16/2026	5	20	

Acres of Grading (Site Preparation Phase): 15

Acres of Grading (Grading Phase): 90

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	2	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Scrapers	2	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Paving	Pavers	2	8.00	130	0.42
Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Architectural Coatings	Air Compressors	1	6.00	78	0.48

Trips and VMT

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	7	18.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	236.00	92.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coatings	1	47.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Water Unpaved Roads

Reduce Vehicle Speed on Unpaved Roads

3.2 Site Preparation - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0983	0.0000	0.0983	0.0505	0.0000	0.0505	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0124	0.1262	0.0896	1.9000e-004		5.4300e-003	5.4300e-003		5.0000e-003	5.0000e-003	0.0000	16.7335	16.7335	5.4100e-003	0.0000	16.8688
Total	**0.0124**	**0.1262**	**0.0896**	**1.9000e-004**	**0.0983**	**5.4300e-003**	**0.1037**	**0.0505**	**5.0000e-003**	**0.0555**	**0.0000**	**16.7335**	**16.7335**	**5.4100e-003**	**0.0000**	**16.8688**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.2 Site Preparation - 2025

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.5000e-004	1.7000e-004	2.5700e-003	1.0000e-005	9.9000e-004	1.0000e-005	9.9000e-004	2.6000e-004	0.0000	2.7000e-004	0.0000	0.7469	0.7469	2.0000e-005	2.0000e-005	0.7525
Total	**2.5000e-004**	**1.7000e-004**	**2.5700e-003**	**1.0000e-005**	**9.9000e-004**	**1.0000e-005**	**9.9000e-004**	**2.6000e-004**	**0.0000**	**2.7000e-004**	**0.0000**	**0.7469**	**0.7469**	**2.0000e-005**	**2.0000e-005**	**0.7525**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0442	0.0000	0.0442	0.0227	0.0000	0.0227	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0124	0.1262	0.0896	1.9000e-004		5.4300e-003	5.4300e-003		5.0000e-003	5.0000e-003	0.0000	16.7335	16.7335	5.4100e-003	0.0000	16.8688
Total	**0.0124**	**0.1262**	**0.0896**	**1.9000e-004**	**0.0442**	**5.4300e-003**	**0.0497**	**0.0227**	**5.0000e-003**	**0.0277**	**0.0000**	**16.7335**	**16.7335**	**5.4100e-003**	**0.0000**	**16.8688**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.2 Site Preparation - 2025

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.5000e-004	1.7000e-004	2.5700e-003	1.0000e-005	9.9000e-004	1.0000e-005	9.9000e-004	2.6000e-004	0.0000	2.7000e-004	0.0000	0.7469	0.7469	2.0000e-005	2.0000e-005	0.7525
Total	**2.5000e-004**	**1.7000e-004**	**2.5700e-003**	**1.0000e-005**	**9.9000e-004**	**1.0000e-005**	**9.9000e-004**	**2.6000e-004**	**0.0000**	**2.7000e-004**	**0.0000**	**0.7469**	**0.7469**	**2.0000e-005**	**2.0000e-005**	**0.7525**

3.3 Grading - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1381	0.0000	0.1381	0.0548	0.0000	0.0548	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0435	0.4191	0.3950	9.3000e-004		0.0170	0.0170		0.0156	0.0156	0.0000	81.7593	81.7593	0.0264	0.0000	82.4204
Total	**0.0435**	**0.4191**	**0.3950**	**9.3000e-004**	**0.1381**	**0.0170**	**0.1550**	**0.0548**	**0.0156**	**0.0704**	**0.0000**	**81.7593**	**81.7593**	**0.0264**	**0.0000**	**82.4204**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.3 Grading - 2025

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	8.2000e-004	5.8000e-004	8.5600e-003	3.0000e-005	3.2900e-003	2.0000e-005	3.3100e-003	8.7000e-004	2.0000e-005	8.9000e-004	0.0000	2.4896	2.4896	5.0000e-005	6.0000e-005	2.5082
Total	**8.2000e-004**	**5.8000e-004**	**8.5600e-003**	**3.0000e-005**	**3.2900e-003**	**2.0000e-005**	**3.3100e-003**	**8.7000e-004**	**2.0000e-005**	**8.9000e-004**	**0.0000**	**2.4896**	**2.4896**	**5.0000e-005**	**6.0000e-005**	**2.5082**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0621	0.0000	0.0621	0.0247	0.0000	0.0247	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0435	0.4191	0.3950	9.3000e-004		0.0170	0.0170		0.0156	0.0156	0.0000	81.7592	81.7592	0.0264	0.0000	82.4203
Total	**0.0435**	**0.4191**	**0.3950**	**9.3000e-004**	**0.0621**	**0.0170**	**0.0791**	**0.0247**	**0.0156**	**0.0403**	**0.0000**	**81.7592**	**81.7592**	**0.0264**	**0.0000**	**82.4203**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.3 Grading - 2025

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	8.2000e-004	5.8000e-004	8.5600e-003	3.0000e-005	3.2900e-003	2.0000e-005	3.3100e-003	8.7000e-004	2.0000e-005	8.9000e-004	0.0000	2.4896	2.4896	5.0000e-005	6.0000e-005	2.5082
Total	**8.2000e-004**	**5.8000e-004**	**8.5600e-003**	**3.0000e-005**	**3.2900e-003**	**2.0000e-005**	**3.3100e-003**	**8.7000e-004**	**2.0000e-005**	**8.9000e-004**	**0.0000**	**2.4896**	**2.4896**	**5.0000e-005**	**6.0000e-005**	**2.5082**

3.4 Building Construction - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1511	1.3779	1.7774	2.9800e-003		0.0583	0.0583		0.0548	0.0548	0.0000	256.2710	256.2710	0.0602	0.0000	257.7770
Total	**0.1511**	**1.3779**	**1.7774**	**2.9800e-003**		**0.0583**	**0.0583**		**0.0548**	**0.0548**	**0.0000**	**256.2710**	**256.2710**	**0.0602**	**0.0000**	**257.7770**

Menifee Park - North Section - South Coast AQMD Air District, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.4 Building Construction - 2025

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0105	0.3872	0.1429	1.7900e-003	0.0641	2.1700e-003	0.0663	0.0185	2.0700e-003	0.0206	0.0000	175.0772	175.0772	6.0800e-003	0.0254	182.8076
Worker	0.0713	0.0502	0.7437	2.2900e-003	0.2861	1.5000e-003	0.2876	0.0760	1.3800e-003	0.0774	0.0000	216.4165	216.4165	4.7200e-003	5.0100e-003	218.0275
Total	**0.0818**	**0.4374**	**0.8866**	**4.0800e-003**	**0.3502**	**3.6700e-003**	**0.3539**	**0.0945**	**3.4500e-003**	**0.0979**	**0.0000**	**391.4936**	**391.4936**	**0.0108**	**0.0304**	**400.8351**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1511	1.3779	1.7774	2.9800e-003		0.0583	0.0583		0.0548	0.0548	0.0000	256.2707	256.2707	0.0602	0.0000	257.7767
Total	**0.1511**	**1.3779**	**1.7774**	**2.9800e-003**		**0.0583**	**0.0583**		**0.0548**	**0.0548**	**0.0000**	**256.2707**	**256.2707**	**0.0602**	**0.0000**	**257.7767**

Menifee Park - North Section - South Coast AQMD Air District, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.4 Building Construction - 2025

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0105	0.3872	0.1429	1.7900e-003	0.0641	2.1700e-003	0.0663	0.0185	2.0700e-003	0.0206	0.0000	175.0772	175.0772	6.0800e-003	0.0254	182.8076
Worker	0.0713	0.0502	0.7437	2.2900e-003	0.2861	1.5000e-003	0.2876	0.0760	1.3800e-003	0.0774	0.0000	216.4165	216.4165	4.7200e-003	5.0100e-003	218.0275
Total	**0.0818**	**0.4374**	**0.8866**	**4.0800e-003**	**0.3502**	**3.6700e-003**	**0.3539**	**0.0945**	**3.4500e-003**	**0.0979**	**0.0000**	**391.4936**	**391.4936**	**0.0108**	**0.0304**	**400.8351**

3.4 Building Construction - 2026

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0540	0.4926	0.6353	1.0600e-003		0.0208	0.0208		0.0196	0.0196	0.0000	91.6082	91.6082	0.0215	0.0000	92.1465
Total	**0.0540**	**0.4926**	**0.6353**	**1.0600e-003**		**0.0208**	**0.0208**		**0.0196**	**0.0196**	**0.0000**	**91.6082**	**91.6082**	**0.0215**	**0.0000**	**92.1465**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.4 Building Construction - 2026

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.6700e-003	0.1374	0.0505	6.3000e-004	0.0229	7.7000e-004	0.0237	6.6100e-003	7.4000e-004	7.3500e-003	0.0000	61.4111	61.4111	2.1800e-003	8.9300e-003	64.1262
Worker	0.0240	0.0163	0.2502	7.9000e-004	0.1023	5.1000e-004	0.1028	0.0272	4.7000e-004	0.0276	0.0000	75.6029	75.6029	1.5300e-003	1.6900e-003	76.1445
Total	**0.0277**	**0.1537**	**0.3006**	**1.4200e-003**	**0.1252**	**1.2800e-003**	**0.1265**	**0.0338**	**1.2100e-003**	**0.0350**	**0.0000**	**137.0140**	**137.0140**	**3.7100e-003**	**0.0106**	**140.2707**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0540	0.4926	0.6353	1.0600e-003		0.0208	0.0208		0.0196	0.0196	0.0000	91.6081	91.6081	0.0215	0.0000	92.1464
Total	**0.0540**	**0.4926**	**0.6353**	**1.0600e-003**		**0.0208**	**0.0208**		**0.0196**	**0.0196**	**0.0000**	**91.6081**	**91.6081**	**0.0215**	**0.0000**	**92.1464**

Menifee Park - North Section - South Coast AQMD Air District, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.4 Building Construction - 2026

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.6700e-003	0.1374	0.0505	6.3000e-004	0.0229	7.7000e-004	0.0237	6.6100e-003	7.4000e-004	7.3500e-003	0.0000	61.4111	61.4111	2.1800e-003	8.9300e-003	64.1262
Worker	0.0240	0.0163	0.2502	7.9000e-004	0.1023	5.1000e-004	0.1028	0.0272	4.7000e-004	0.0276	0.0000	75.6029	75.6029	1.5300e-003	1.6900e-003	76.1445
Total	**0.0277**	**0.1537**	**0.3006**	**1.4200e-003**	**0.1252**	**1.2800e-003**	**0.1265**	**0.0338**	**1.2100e-003**	**0.0350**	**0.0000**	**137.0140**	**137.0140**	**3.7100e-003**	**0.0106**	**140.2707**

3.5 Paving - 2026

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	9.1500e-003	0.0858	0.1458	2.3000e-004		4.1900e-003	4.1900e-003		3.8500e-003	3.8500e-003	0.0000	20.0193	20.0193	6.4700e-003	0.0000	20.1811
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**9.1500e-003**	**0.0858**	**0.1458**	**2.3000e-004**		**4.1900e-003**	**4.1900e-003**		**3.8500e-003**	**3.8500e-003**	**0.0000**	**20.0193**	**20.0193**	**6.4700e-003**	**0.0000**	**20.1811**

Menifee Park - North Section - South Coast AQMD Air District, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.5 Paving - 2026

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.9000e-004	2.6000e-004	4.0300e-003	1.0000e-005	1.6500e-003	1.0000e-005	1.6500e-003	4.4000e-004	1.0000e-005	4.4000e-004	0.0000	1.2165	1.2165	2.0000e-005	3.0000e-005	1.2252
Total	**3.9000e-004**	**2.6000e-004**	**4.0300e-003**	**1.0000e-005**	**1.6500e-003**	**1.0000e-005**	**1.6500e-003**	**4.4000e-004**	**1.0000e-005**	**4.4000e-004**	**0.0000**	**1.2165**	**1.2165**	**2.0000e-005**	**3.0000e-005**	**1.2252**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	9.1500e-003	0.0858	0.1458	2.3000e-004		4.1900e-003	4.1900e-003		3.8500e-003	3.8500e-003	0.0000	20.0192	20.0192	6.4700e-003	0.0000	20.1811
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**9.1500e-003**	**0.0858**	**0.1458**	**2.3000e-004**		**4.1900e-003**	**4.1900e-003**		**3.8500e-003**	**3.8500e-003**	**0.0000**	**20.0192**	**20.0192**	**6.4700e-003**	**0.0000**	**20.1811**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.5 Paving - 2026

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.9000e-004	2.6000e-004	4.0300e-003	1.0000e-005	1.6500e-003	1.0000e-005	1.6500e-003	4.4000e-004	1.0000e-005	4.4000e-004	0.0000	1.2165	1.2165	2.0000e-005	3.0000e-005	1.2252
Total	**3.9000e-004**	**2.6000e-004**	**4.0300e-003**	**1.0000e-005**	**1.6500e-003**	**1.0000e-005**	**1.6500e-003**	**4.4000e-004**	**1.0000e-005**	**4.4000e-004**	**0.0000**	**1.2165**	**1.2165**	**2.0000e-005**	**3.0000e-005**	**1.2252**

3.6 Architectural Coatings - 2026

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.7100e-003	0.0115	0.0181	3.0000e-005		5.2000e-004	5.2000e-004		5.2000e-004	5.2000e-004	0.0000	2.5533	2.5533	1.4000e-004	0.0000	2.5567
Total	**1.7100e-003**	**0.0115**	**0.0181**	**3.0000e-005**		**5.2000e-004**	**5.2000e-004**		**5.2000e-004**	**5.2000e-004**	**0.0000**	**2.5533**	**2.5533**	**1.4000e-004**	**0.0000**	**2.5567**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.6 Architectural Coatings - 2026

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.2100e-003	8.2000e-004	0.0126	4.0000e-005	5.1600e-003	3.0000e-005	5.1800e-003	1.3700e-003	2.0000e-005	1.3900e-003	0.0000	3.8118	3.8118	8.0000e-005	9.0000e-005	3.8391
Total	**1.2100e-003**	**8.2000e-004**	**0.0126**	**4.0000e-005**	**5.1600e-003**	**3.0000e-005**	**5.1800e-003**	**1.3700e-003**	**2.0000e-005**	**1.3900e-003**	**0.0000**	**3.8118**	**3.8118**	**8.0000e-005**	**9.0000e-005**	**3.8391**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.7100e-003	0.0115	0.0181	3.0000e-005		5.2000e-004	5.2000e-004		5.2000e-004	5.2000e-004	0.0000	2.5533	2.5533	1.4000e-004	0.0000	2.5567
Total	**1.7100e-003**	**0.0115**	**0.0181**	**3.0000e-005**		**5.2000e-004**	**5.2000e-004**		**5.2000e-004**	**5.2000e-004**	**0.0000**	**2.5533**	**2.5533**	**1.4000e-004**	**0.0000**	**2.5567**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.6 Architectural Coatings - 2026

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.2100e-003	8.2000e-004	0.0126	4.0000e-005	5.1600e-003	3.0000e-005	5.1800e-003	1.3700e-003	2.0000e-005	1.3900e-003	0.0000	3.8118	3.8118	8.0000e-005	9.0000e-005	3.8391
Total	**1.2100e-003**	**8.2000e-004**	**0.0126**	**4.0000e-005**	**5.1600e-003**	**3.0000e-005**	**5.1800e-003**	**1.3700e-003**	**2.0000e-005**	**1.3900e-003**	**0.0000**	**3.8118**	**3.8118**	**8.0000e-005**	**9.0000e-005**	**3.8391**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.2824	0.3183	2.7786	6.1600e-003	0.6977	4.5100e-003	0.7022	0.1862	4.2000e-003	0.1904	0.0000	587.9767	587.9767	0.0381	0.0259	596.6437
Unmitigated	0.2824	0.3183	2.7786	6.1600e-003	0.6977	4.5100e-003	0.7022	0.1862	4.2000e-003	0.1904	0.0000	587.9767	587.9767	0.0381	0.0259	596.6437

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
City Park	644.00	644.00	644.00	1,853,136	1,853,136
Total	644.00	644.00	644.00	1,853,136	1,853,136

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
City Park	16.60	8.40	6.90	33.00	48.00	19.00	66	28	6

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
City Park	0.540893	0.062748	0.186142	0.127785	0.023768	0.006610	0.012333	0.009205	0.000817	0.000491	0.024860	0.000754	0.003594

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
City Park	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
City Park	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

Menifee Park - North Section - South Coast AQMD Air District, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	5.2900e-003	0.0000	1.6000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	3.2000e-004	3.2000e-004	0.0000	0.0000	3.4000e-004
Unmitigated	5.2900e-003	0.0000	1.6000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	3.2000e-004	3.2000e-004	0.0000	0.0000	3.4000e-004

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	5.2800e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	2.0000e-005	0.0000	1.6000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	3.2000e-004	3.2000e-004	0.0000	0.0000	3.4000e-004
Total	**5.3000e-003**	**0.0000**	**1.6000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**3.2000e-004**	**3.2000e-004**	**0.0000**	**0.0000**	**3.4000e-004**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	5.2800e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	2.0000e-005	0.0000	1.6000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	3.2000e-004	3.2000e-004	0.0000	0.0000	3.4000e-004
Total	**5.3000e-003**	**0.0000**	**1.6000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**3.2000e-004**	**3.2000e-004**	**0.0000**	**0.0000**	**3.4000e-004**

7.0 Water Detail

7.1 Mitigation Measures Water

Apply Water Conservation Strategy

Menifee Park - North Section - South Coast AQMD Air District, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	24.1895	2.0400e-003	2.5000e-004	24.3143
Unmitigated	30.2369	2.5500e-003	3.1000e-004	30.3929

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
City Park	0 / 15.3463	30.2369	2.5500e-003	3.1000e-004	30.3929
Total		**30.2369**	**2.5500e-003**	**3.1000e-004**	**30.3929**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
City Park	0 / 12.277	24.1895	2.0400e-003	2.5000e-004	24.3143
Total		**24.1895**	**2.0400e-003**	**2.5000e-004**	**24.3143**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Institute Recycling and Composting Services

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	0.1690	9.9900e-003	0.0000	0.4187
Unmitigated	0.2253	0.0133	0.0000	0.5582

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
City Park	1.11	0.2253	0.0133	0.0000	0.5582
Total		**0.2253**	**0.0133**	**0.0000**	**0.5582**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
City Park	0.8325	0.1690	9.9900e-003	0.0000	0.4187
Total		**0.1690**	**9.9900e-003**	**0.0000**	**0.4187**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

IS/MND Appendix B

General Biological Resources Assessment

Evans Park Project

General Biological Resources Assessment

November 2021 | 02121.00002.001

Prepared for:

City of Menifee
29995 Evans Road
Menifee, CA 92586

Prepared by:

HELIX Environmental Planning, Inc.
7578 El Cajon Boulevard
La Mesa, CA 91942

TABLE OF CONTENTS

Section **Page**

SUMMARY S-1

1.0 INTRODUCTION 1

1.1 Purpose of the Report 1
1.2 Project Location 1
1.3 Project Description 1

2.0 METHODS 2

2.1 Nomenclature 3
2.2 Literature Review 3
2.3 Field Surveys 3
2.3.1 General Biological Survey 3
2.3.2 Focused Species Surveys 4
2.3.3 Jurisdictional Assessment 4
2.3.4 Riparian/Riverine and Vernal Pool Habitat Assessment 5

3.0 RESULTS 5

3.1 Environmental Setting 5
3.2 Vegetation Communities 6
3.2.1 Disturbed Riversidean Sage Scrub 6
3.2.2 Southern Willow Scrub 7
3.2.3 Tamarisk Scrub (including Disturbed) 7
3.2.4 Herbaceous Wetland (including Disturbed) 7
3.2.5 Non-native Grassland 7
3.2.6 Developed 8
3.2.7 Disturbed 8
3.2.8 Open Water 8
3.3 Plants 8
3.4 Animals 9
3.5 Sensitive Biological Resources 9
3.5.1 Rare Plant Species 9
3.5.2 Sensitive Animal Species 10
3.5.3 Sensitive Vegetation Communities/Habitats 11
3.5.4 Habitat and Wildlife Corridor Evaluation 12
3.5.5 Jurisdictional Waters 13
3.6 Western Riverside County MSHCP Consistency Analysis 14
3.6.1 Project Location within the MSHCP 14
3.6.2 Riparian/Riverine and Vernal Pool Habitat Assessment (MSHCP Section 6.1.2) 14
3.6.3 Narrow Endemic Plant Species Survey Area (MSHCP Section 6.1.3) 20
3.6.4 Additional Survey Needs and Procedures (MSHCP Section 6.3.2) 20

TABLE OF CONTENTS (cont.)

Section **Page**

4.0 REGIONAL AND REGULATORY CONTEXT 22

4.1 Federal Regulations 22
4.1.1 Federal Endangered Species Act 22
4.1.2 Federal Clean Water Act, Section 404 22
4.1.3 Migratory Bird Treaty Act 22
4.1.4 Critical Habitat 23
4.2 State Regulations 23
4.2.1 California Environmental Quality Act 23
4.2.2 California Endangered Species Act 23
4.2.3 Protection of Raptor Species 23
4.2.4 California Fish and Game Code, Section 1602 24
4.3 Local Regulations 24
4.3.1 Multiple Species Habitat Conservation Plan Consistency 24
4.3.2 Stephens' Kangaroo Rat Habitat Conservation Plan 24
4.3.3 City Tree Preservation 24

5.0 PROJECT EFFECTS 25

5.1 Sensitive Species 26
5.1.1 Rare Plant Species 26
5.1.2 Sensitive Animal Species 26
5.1.3 Sensitive Vegetation Communities 28
5.2 U.S. Army Corps of Engineers/Regional Water Quality Control Board Jurisdiction 30
5.3 Wildlife Movement and Migratory Species 30
5.3.1 Wildlife Movement 30
5.3.2 Migratory Species 31
5.4 Local Policies and Ordinances 31
5.5 Adopted Habitat Conservation Plans 32
5.5.1 Riparian/Riverine Areas and Vernal Pools (MSHCP Section 6.1.2) 32
5.5.2 Narrow Endemic Plant Species (MSHCP Section 6.1.3) 33
5.5.3 Urban/Wildland Interface Guidelines (MSHCP Section 6.1.4) 33
5.5.4 Additional Surveys (MSHCP Section 6.3.2) 35
5.5.5 Fuels Management (MSHCP Section 6.4) 35
5.5.6 Multiple Species Habitat Conservation Plan and Stephens' Kangaroo Rat Fees 35

6.0 MITIGATION MEASURES 36

7.0 CERTIFICATION/QUALIFICATION 41

8.0 REFERENCES 42

TABLE OF CONTENTS (cont.)

LIST OF APPENDICES

A Plant Species Observed
B Animal Species Observed or Detected
C Representative Site Photographs
D Rare Plant Species Potential to Occur
E Sensitive Animal Species Potential to Occur
F Burrowing Owl Focused Survey Report

LIST OF FIGURES

No.	Title	Follows Page
1	Regional Location	2
2	USGS Topography	2
3	Aerial Photograph	2
4	Site Plan	2
5	Vegetation	6
6	Potential Jurisdictional Features and MSHCP Riparian Areas	14
7	MSHCP Context	14
8	Impacts to Vegetation	30
9	Impacts to Potential Jurisdictional Features and MSHCP Riparian/Riverine Areas	30

LIST OF TABLES

No.	Title	Page
1	Vegetation and Land Uses	6
2	Potential Jursidictional Features in Southern Phase	13
3	Potential Jurisdictional Features in Northern Phase	14
4	MSHCP Riparian/Riverine and Vernal Pool Plant Species	16
5	MSHCP Riparian/Riverine and Vernal Pool Animal Species	18
6	Impacts to Southern Phase Vegetation and Land Uses	29
7	Impacts to Northern Phase Vegetation and Land Uses	29

ACRONYMS AND ABBREVIATIONS

AMSL	above mean sea level
BUOW	Burrowing Owl
CESA	California Endangered Species Act
CASSA	Criteria Area Species Survey Area
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CFG	California Fish and Game
City	City of Menifee
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
County	County of Riverside
CRPR	California Rare Plant Rank
CWA	Clean Water Act
DBESP	Determination of Biological Equivalent or Superior Preservation
Dudek	Dudek & Associates
FESA	Federal Endangered Species Act
HANS	Habitat Acquisition and Negotiation Strategy
HCP	Habitat Conservation Plan
HELIX	HELIX Environmental Planning, Inc.
LDMF	Local Development Mitigation Fee
MBTA	Migratory Bird Treaty Act
MSHCP	Multiple Species Habitat Conservation Plan
NEPSSA	Narrow Endemic Plant Species Survey Area
NPPA	Native Plant Protection Act
NRCS	Natural Resources Conservation Service
OHWM	Ordinary High-Water Mark
Project	Evans Park
RCA	Riverside County Regional Conservation Authority
RCHCA	Riverside County Habitat Conservation Authority
RWQCB	Regional Water Quality Control Board

ACRONYMS AND ABBREVIATIONS (cont.)

SKR	Stephens' kangaroo rat
SSC	Species of Special Concern
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geologic Survey

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SUMMARY

The Evans Park Project is located in the City of Menifee in western Riverside County, California. The proposed project consists of the construction of a community park, located east of Evans Road and north and south of Craig Avenue and would be constructed in two separate phases. The first phase, which would encompass the southern 9.17 acres of the site, is currently funded and designed. The second phase, which would encompass the northern 13.56 acres of the site, is in the conceptual phase. Once complete, Evans Park would provide approximately 23 acres of recreational and open space facilities.

This report describes the biological resources and potential impacts to those resources related to the proposed development of the first phase, the southern phase, at a project-specific level. This report also addresses potential biological resources and impacts to those resources related to the future development of the second phase, the northern phase, at a programmatic level.

The project site is located within the Sun City/Menifee Area Plan of the Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP). The southern phase is not located within or adjacent to an MSHCP Criteria Area or an MSHCP Conservation Area. The southern phase is located within the MSHCP Burrowing Owl (*Athene cunicularia*; BUOW) Survey Area. HELIX Environmental Planning, Inc. (HELIX) conducted a general biological survey, including vegetation mapping and a general habitat assessment; a habitat assessment and focused survey for burrowing owl (*Athene cunicularia*; BUOW); a rare plant survey, an assessment of potential jurisdictional features; and an MSHCP Riparian/Riverine and Vernal Pool resource assessment.

The project site contains twelve vegetation communities, including disturbed Riversidean sage scrub, southern willow scrub, tamarisk scrub (including disturbed), herbaceous wetland (including disturbed), non-native grassland, developed areas, disturbed areas, and open water. Suitable BUOW habitat was identified on the project site during the Step I Habitat Assessment; Step II Focused Burrow and BUOW surveys were conducted on the southern phase during the 2021 breeding season. The southern phase also supports suitable habitat for nesting migratory bird species and potential jurisdictional resources. The southern phase does not support sensitive plant communities or MSHCP Riparian/Riverine or Vernal Pool habitat. The northern phase supports suitable habitat for nesting migratory bird species and potential jurisdictional resources, and MSHCP Riparian/Riverine or Vernal Pool habitat. The northern phase does not support sensitive plant communities. Depressional areas were noted during the habitat assessment in the northern phase, which could potentially support suitable habitat for the federally listed Riverside fairy shrimp (*Streptocephalus woottoni*). In accordance with Section 6.1.2 of the MSHCP, dry season and wet season surveys should be completed prior to the construction of the northern phase of the project.

Approximately 15 acres of the 23-acre project site would be developed. An additional 0.81 acre of temporary impacts are included in the southern phase. Potential significant impacts were identified for rare plants (if present during protocol surveys), BUOW (if present during the Step II surveys or 30-day pre-construction survey), nesting bird species, federally listed fairy shrimp species (if observed during dry or wet season surveys), federally listed least Bell's vireo (*Vireo bellii pusillus*; if observed during protocol surveys), jurisdictional resources (if impacts cannot be avoided), and protected trees (if impacts cannot be avoided). The project is required to comply with regulations of the MSHCP and Habitat Conservation Plan for Stephens' kangaroo rat (*Dipodomys stephensi*; SKR).

Measures related to the following topics are proposed herein to fully mitigate potential impacts of the project: rare plant, BUOW, migratory nesting bird species, federally listed fairy shrimp species, federally listed least Bell's vireo, jurisdictional resources, compliance with the City's protected tree ordinance, and payment of MSHCP and SKR fees. Successful implementation of these measures would mitigate potential impacts to below a level of significance.

1.0 INTRODUCTION

1.1 PURPOSE OF THE REPORT

This report provides the City of Menifee (City; California Environmental Quality Act [CEQA] lead agency), resource agencies, and the public with current biological data to satisfy the review of the proposed Evans Park (project) located in the City of Menifee, Riverside County (County), California. The purpose of this report is to document the existing biological conditions on and in the immediate vicinity of the project site and provide an analysis of potential impacts to sensitive biological resources with respect to local, state, and federal policy. This report provides the biological resources technical documentation necessary for project review under CEQA by the City and demonstrates project consistency with the Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP; Dudek and Associates [Dudek] 2003).

1.2 PROJECT LOCATION

The approximately 23-acre project site is located in the City of Menifee in western Riverside County, California, and is generally located south of State Route 74, west of Interstate 215, and east of Interstate 15 (Figure 1, *Regional Location*). The project site is located within Township 6 South, Range 3 West, Section 9 on the U.S. Geological Survey (USGS) 7.5-minute Romoland quadrangle map (Figure 2, *USGS Topography*). Specifically, the project site is located east of Evans Road and north and south of Craig Avenue (Figure 3, *Aerial Photograph*).

1.3 PROJECT DESCRIPTION

The proposed project consists of the construction of a community park on the Evans Park site in the City of Menifee. The park, located east of Evans Road and north and south of Craig Avenue, would be constructed in two separate phases. The first phase, which would encompass the southern 9.17 acres of the site, is currently funded and designed.[1] The second phase, which would encompass the northern 13.56 acres of the site, is in the conceptual phase. Once complete, Evans Park would provide approximately 23 acres of recreational and open space facilities (Figure 4, *Site Plan*).

Southern Phase

For the first (southern) phase, the City proposes to build an approximate nine-acre bicycle trails park on the nine-acre site near the southeast corner of Evans Road and Craig Avenue (Figure 4). The bicycle trails park would include a parking lot at the northeast corner with an entrance off Craig Avenue and a prefabricated restroom. The park would be divided into two separate sections to include a smaller paved tight circuit area called a “Pump Track”, and the larger dirt trail portion of the track, which would have some wooden slat sections to add challenging elements to the track.

Parking would be provided via a 12,000 square foot gravel parking lot in the northeast portion of the site, accessible from Craig Avenue, and be able to accommodate approximately 45 vehicles. While the parking lot would be gravel at the opening of the southern phase, it would transition to a paved lot approximately one year after the southern phase becomes operational. Lighting would be provided via a

[1] The 9.17 acres in the southern phase includes a 2.32-acre flood control channel along the western portion of the site.

combination of solar and LED-powered light standards. The park would operate from dawn until dusk, until the installation of the light standards (to occur approximately one year after the opening of the southern phase), at which point the park would operate until 9 p.m. Special events would be held at the park approximately four to five times a year and would include the use of a public address system.

It is anticipated that construction on the southern phase would commence in winter 2021 and continue to spring 2022, with an opening date of late spring to early summer 2022. Once the southern phase becomes operational, regular maintenance would occur, such as trash clean-up and restroom servicing. The tracks themselves would be subject to maintenance one to two times a year and after heavy rains; however, no regular reshaping of the dirt trails is expected to occur.

This southern phase of the project is in the design stage and is analyzed at a project-level of detail.

Northern Phase

The second (northern) phase, which encompasses the 13.56 acres north of Craig Avenue, would include a mixture of active and passive spaces. It is the intent to develop the northern phase with a multi-use ball field, splash pad, picnic areas, and trails. Access would be via Evans Road with an internal drive to access the facilities. Ornamental landscaping would be provided throughout; however, the existing wetland habitat in the southeastern portion would be retained in its natural state. It is anticipated that construction of the northern phase would commence in the year 2025.

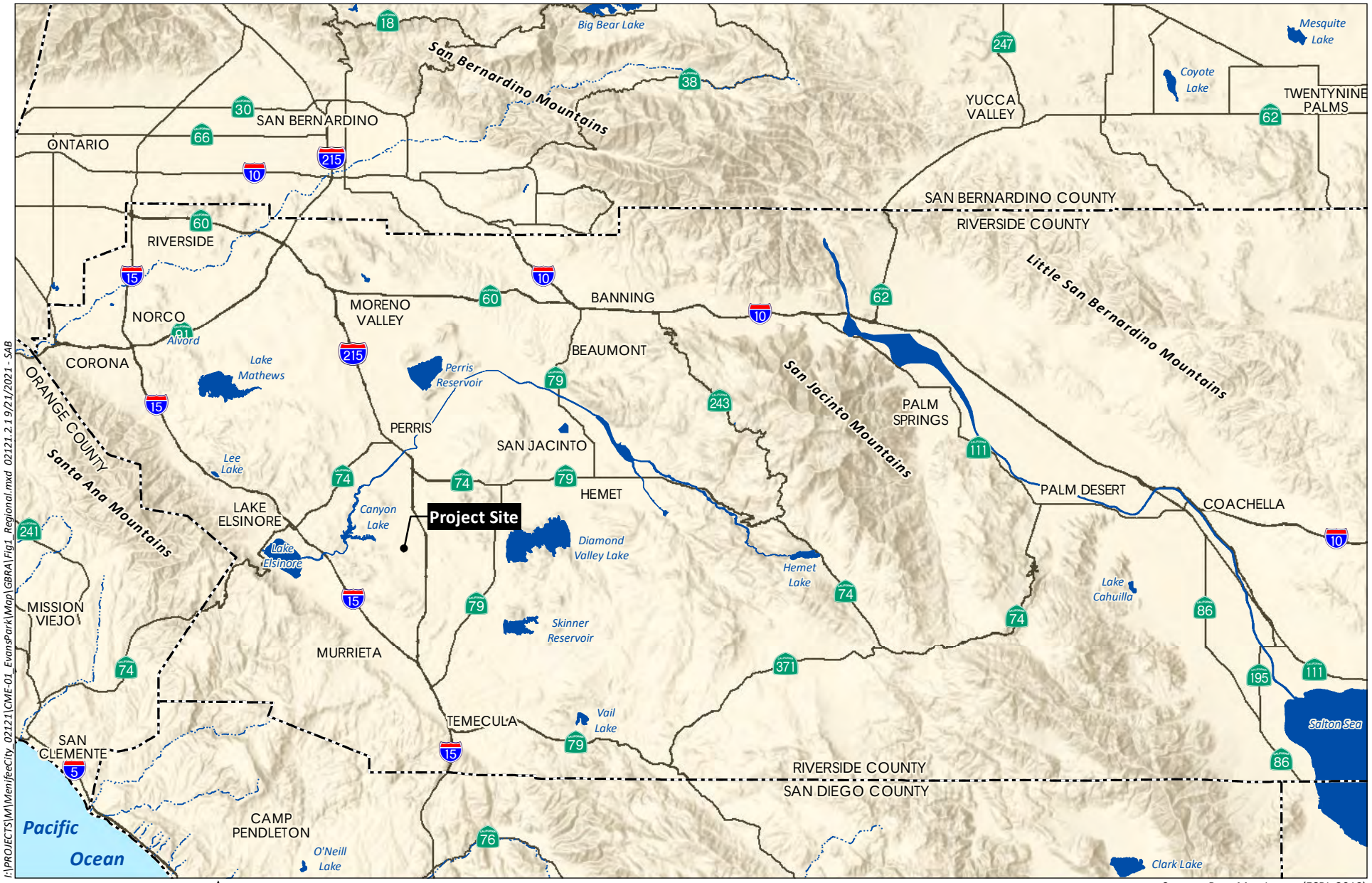
The framework established in the City of Menifee Park Development and Design Guidelines (2016) provides a foundation for understanding the standards expected for the development of the northern phase. The City's Park Development Guidelines (City 2016) state that, in general, community parks should, "Provide a wide range of facilities that supplement those of the neighborhood parks, and which are determined by the needs and preferences of the community. Recreation centers, athletic fields, multipurpose courts, picnic facilities, play areas, parking areas, and comfort stations, landscaping and turf areas are standard amenities. When possible and desirable, swimming pools and tennis courts may be provided."

Because the northern phase is conceptual in nature and not expected to be developed in the immediate future, this general biological resources assessment addresses the northern phase at a program-level of analysis. This assessment assumes permanent impacts to all 13.56 acres of the northern phase.

2.0 METHODS

Evaluation of the southern phase included a review of project plans; a literature review of biological resources occurring on the southern phase and surrounding vicinity; a habitat assessment and focused survey for burrowing owl (*Athene cunicularia*; BUOW); and a rare plant survey. A general biological survey, including vegetation mapping and a general habitat assessment; an assessment of potential jurisdictional features; and an MSHCP Riparian/Riverine and Vernal Pool resource assessment were completed as part of the biological due diligence assessment in 2020 and included the entire project site (northern and southern phases; HELIX 2020). The methods used to evaluate the biological resources present on the project site are discussed in this section.

Evans Park



I:\PROJECTS\M\MenifeeCity_02121\CME-01_EvansPark\Map\GBRA\Fig1_Regional.mxd 02121.2.1 9/21/2021 - SAB

0 10 Miles

Source: Base Map Layers (ESRI, 2013)

HELIX Environmental Planning

Regional Location

Figure 1



I:\PROJECTS\M\MenifeeCity_02121\CME-01_EvansPark\Map\GBRA\Fig2_USGS.mxd 02121.2.1 10/29/2021 - SAB

0 2,000 Feet

Source: ROMOLAND 7.5' Quad (USGS)

HELIX Environmental Planning

USGS Topography

Figure 2



I:\PROJECTS\M\MenifeeCity_02121\CME-01_EvansPark\Map\GBRA\Fig3_Aerial.mxd 02121.2.1 10/29/2021 - SAB

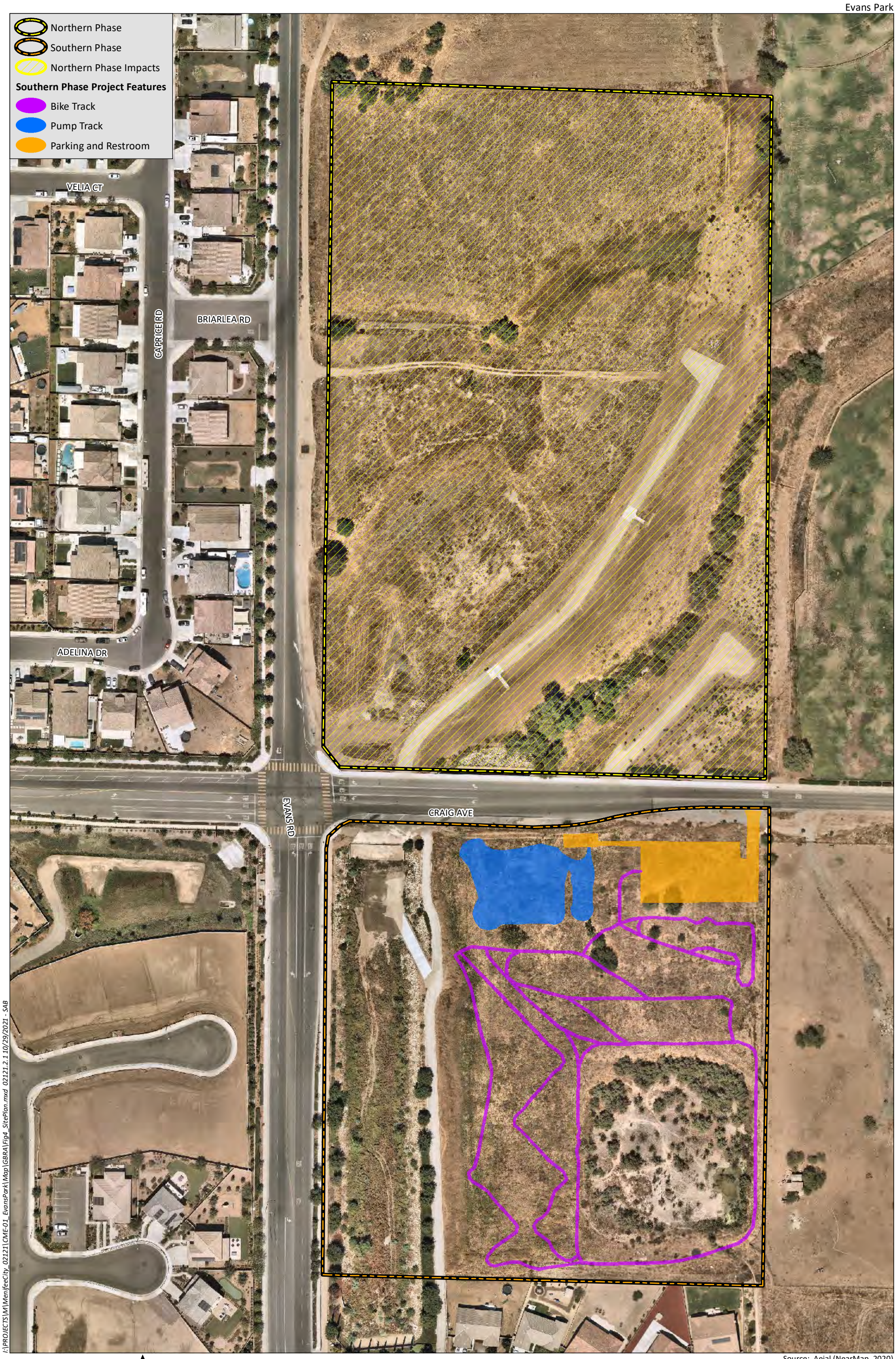
0 400 Feet

Source: Aerial (SanGIS, 2017)

HELIX Environmental Planning

Aerial Photograph

Figure 3



I:\PROJECTS\M\MenifeeCity_02121\CME-01_EvansPark\Map\GBRA\Fig4_SitePlan.mxd 02121.2.1 10/29/2021 - SAB

0 125 Feet

Source: Aeial (NearMap, 2020)

HELIX Environmental Planning

Site Plan

Figure 4

2.1 NOMENCLATURE

Nomenclature for this report follows Baldwin et al. (2012) for plants and the MSHCP (Dudek 2003) for vegetation community classifications, with additional vegetation community information taken from Holland (1986) and Oberbauer (2008). Animal nomenclature follows Emmel and Emmel (1973) for butterflies, California Herps (2021) for reptiles and amphibians, American Ornithologists' Union (2020 for birds, and Baker et al. (2003) for mammals. Rare plant and sensitive animal statuses are from the California Native Plant Society's (CNPS) Inventory of Rare and Endangered Plants of California (2021) and the California Department of Fish and Wildlife's (CDFW) California Natural Diversity Database (CNDDB; California Department of Fish and Wildlife [CDFW] 2021a). Rare plant species' habitats and flowering periods are from the Jepson Manual (Baldwin et al. 2012), MSHCP (Dudek 2003), CNPS (2021), and CNDDB (CDFW 2021a). Soil classifications were obtained from the Natural Resources Conservation Service's (NRCS) Web Soil Survey (2021).

2.2 LITERATURE REVIEW

Prior to conducting the site visit, HELIX Environmental Planning, Inc. (HELIX) reviewed regional planning documents, Google Earth aerials (2021), Web Soil Survey (NRCS 2021), and sensitive species database records, including the Inventory of Rare and Endangered Plants of California (CNPS 2021), CNDDB (CDFW 2021a), U.S. Fish and Wildlife Service's (USFWS) critical habitat maps (2021a). A one-quadrangle database search was conducted on CNDDB and CNPS, which included the Romoland quadrangle. In addition, the MSHCP (Dudek 2003) and the Regional Conservation Authority's MSHCP Information Tool (Western Riverside County Regional Conservation Authority 2021) were consulted to determine project compliance with the MSHCP.

2.3 FIELD SURVEYS

Field surveys were conducted to document the existing condition of the project site and surrounding lands. The general biological survey included vegetation mapping, during which dominant plant species were noted. A habitat assessment was also conducted on the project site to determine habitat suitability for rare plant and animal species in addition to MSHCP Riparian/Riverine Species. Focused surveys were conducted for BUOW in the southern phase. A formal jurisdictional assessment was not conducted; however, an assessment to map the potential jurisdictional limits regulated by the U.S. Army Corps of Engineers (USACE), Regional Water Quality Control Board (RWQCB), and CDFW in addition to MSHCP Riparian/Riverine Areas, was completed.

A list of plant and animal species observed and/or detected during the field surveys are provided as Appendix A, *Plant Species Observed*, and Appendix B, *Animal Species Observed or Detected*. Noted animal species were identified by direct observation, vocalizations, or the observance of scat, tracks, or other signs. However, the list of animal species identified is not necessarily a comprehensive account of all species that use the southern phase, as species that are nocturnal, secretive, or seasonally restricted may not have been observed.

2.3.1 General Biological Survey

A general biological survey of the project site was conducted by HELIX Biologist Amy Lee on October 23, 2020 (HELIX 2020). Vegetation communities were mapped in accordance with the classification described in Section 2.1.3 of the MSHCP (Dudek 2003), with additional information from Holland (1986)

and Oberbauer (2008). Vegetation was mapped on a 70-foot scale (1 inch = 70 feet) aerial photograph of the project site. Vegetation communities and land uses were mapped by HELIX to one-tenth of an acre (0.10 acre). The entire project site was surveyed on foot with the aid of binoculars. Representative photographs of the site were taken, with select photographs included in this report as Appendix C, *Representative Site Photographs*. Plant and animal species observed or otherwise detected were recorded in field notebooks. Animal identifications were made in the field by direct, visual observation or indirectly by detection of calls, burrows, tracks, or scat. Plant identifications were made in the field or in the lab through comparison with voucher specimens or photographs.

2.3.2 Focused Species Surveys

2.3.2.1 Burrowing Owl

The southern phase is located within an MSHCP BUOW Survey Area. In accordance with the County's survey protocol, a Step I Habitat Assessment was conducted on the southern phase and within a 150-meter (approximately 500-foot) buffer zone around the periphery of the southern phase (survey area; County 2006) by HELIX biologist Matthew Dimson on July 26, 2021. Suitable BUOW habitat was identified on the southern phase. Focused surveys were conducted on the southern phase, which are described in detail below.

After completing the habitat assessment, Step II surveys were conducted within the survey area. Step II surveys, which consisted of a focused burrow survey (Part A) and four focused BUOW surveys (Part B), were conducted to determine whether the survey area supports suitable burrows and/or BUOWs. The focused burrow survey was conducted concurrently with the first focused BUOW survey. Since suitable burrows were observed within the survey area, three additional focused BUOW surveys were conducted. The biologist walked transects spaced no greater than 30 meters apart (approximately 100 feet) to allow for 100 percent visual coverage of all suitable habitat within the survey area. The biologist walked slowly and methodically, closely checking habitat for suitable burrows, BUOW diagnostic sign (e.g., molted feathers, pellets/castings, or whitewash at or near a burrow entrance), and individual BUOWs. Inaccessible areas of the survey area were visually assessed using binoculars. The focused burrow survey and four BUOW surveys were conducted by Mr. Dimson between July 26 and August 25, 2021.

The focused BUOW surveys did not include the northern phase. Project-level focused BUOW surveys will be required in the northern phase prior to development.

2.3.3 Jurisdictional Assessment

A formal delineation of jurisdictional features was not conducted; however, potential jurisdictional drainages and wetlands were identified on the project site. Prior to beginning fieldwork, 70-foot scale (1 inch = 70 feet) aerial photographs, USGS quadrangle maps, and National Wetlands Inventory maps (USFWS 2021b) were reviewed to assist in determining the location of potential jurisdictional waters within the project site. Ms. Lee conducted the assessment of potential jurisdictional features on October 23, 2020. The assessment was conducted to identify jurisdictional waters potentially subject to USACE jurisdiction pursuant to Section 404 of the Clean Water Act (CWA); jurisdictional waters potentially subject to RWQCB jurisdiction pursuant to Section 401 of the CWA and/or State Porter-Cologne Water Quality Control Act; and streambed habitats potentially subject to CDFW jurisdiction pursuant to Sections 1600 *et seq.* of the California Fish and Game (CFG) Code. Data collection was

targeted in areas that were deemed to have the potential to support jurisdictional resources, such as the presence of an ordinary high-water mark (OHWM), the presence of a bed/bank and streambed associated vegetation, and/or other surface indications of streambed hydrology.

2.3.4 Riparian/Riverine and Vernal Pool Habitat Assessment

In accordance with the MSHCP, a Riparian/Riverine and Vernal Pool habitat assessment was conducted by Ms. Lee on October 23, 2020. This habitat assessment was conducted concurrently with the assessment of potential jurisdictional features. The identification of Riparian/Riverine Areas is based on the potential for the habitat to support, or be tributary to habitat that support, Riparian/Riverine Covered Species identified in MSHCP Section 6.1.2.

3.0 RESULTS

3.1 ENVIRONMENTAL SETTING

Southern Phase

The southern phase consists mainly of land dominated by non-native herbaceous species, in addition to a maintained flood control channel on the western portion along Evans Road, and a basin dominated by Salt cedar (*Tamarisk ramosissima*) constructed in 2009 as part of the surrounding residential development. The flood control channel and basin are potential jurisdictional features but are not considered MSHCP Riparian/Riverine resources as they are manmade features, which are excluded as MSHCP Riparian/Riverine Areas under the MSHCP. Surrounding land uses consist of residential development to the south and west and undeveloped land to the north and east. The topography in the southern phase is primarily flat with elevations ranging from approximately 1482 feet (451 meters) above mean sea level (AMSL) at the northeastern boundary to approximately 1486 feet (453 meters) AMSL along the southwestern boundary. The main soil type mapped within the southern phase is Wyman loam (2 to 8 percent, eroded), in addition to Yokohl loam (2 to 8 percent slopes) and Las Posas loam (2 to 8 percent slopes; NRCS 2021).

Northern Phase

The northern phase consists of undeveloped land dominated by non-native herbaceous species and non-native grasses. There is a drainage feature that runs from the eastern boundary to the southern boundary of the northern phase. The northern phase supports potential jurisdictional features and MSHCP Riparian/Riverine and Vernal Pool resources. Surrounding land uses consist of undeveloped land to the north and south, residential development to the west, and Paloma Valley High School to the east. Topography in the northern phase is primarily flat, with elevations ranging from approximately 1475 feet (449 meters) AMSL in the northeastern corner to 1489 feet (454 meters) AMSL at the southwestern corner. The main soil type mapped within the northern phase is Monserate sandy loam (0 to 5 percent, eroded; NRCS 2021), in addition to Yokohl loam (2 to 8 percent slopes) and a pocket of Ramona sandy loam (0 to 5 percent; NRCS 2021).

3.2 VEGETATION COMMUNITIES

Twelve vegetation communities and land uses were mapped within the project site (Table 1, *Vegetation and Land Uses*; Figure 5, *Vegetation*). The Holland (1986)/Oberbauer (2008) Element Codes are provided in parentheses next to each community name in Table 1. A brief description of each vegetation community and land use mapped on the project site is provided below.

Table 1
VEGETATION AND LAND USES

MSHCP Vegetation Community Classification[1]		Holland/Oberbauer	Southern Phase (Acres)	Northern Phase (Acres)	Total Acres[2]
Collapsed	**Uncollapsed**				
Coastal Sage Scrub	Riversidean Sage Scrub	Riversidean sage Scrub (disturbed form) (H[3] 32700)	0.16	--	0.16
Riparian Scrub, Woodland, Forest	Southern Willow Scrub	Southern Willow Scrub (H 63320)	--	0.61	0.61
	Tamarisk Scrub	Tamarisk Scrub (including disturbed; H 63810)	1.28	0.12	1.40
N/A[4]	N/A	Disturbed Wetland (O[5] 11200)	--	0.48	0.48
N/A[6]	N/A	Herbaceous Wetland (O 52510)	--	0.08	0.08
Grassland	Non-native Grassland	Non-native grassland (H 42200)	--	4.68	4.68
Developed/Disturbed Land	Residential/Urban	Urban/Developed (O[4] 11300l)	2.32	0.43	2.75
	Exotic	Disturbed (O 11300)	5.31	7.16	12.47
Water	Open Water	Open Water (O 64100)	0.10	--	0.10
		TOTAL	**9.17**	**13.56**	**22.73**

Source: Dudek (2003) and HELIX (2020).

1 Collapsed and uncollapsed community classifications are terms from MSHCP Table 2-1.

2 Acreages are rounded to the nearest hundredths.

3 Holland Element Code.

4 The MSHCP does not have a classification for disturbed wetland.

5 Oberbauer Element Code.

6 The MSHCP does not have a classification for herbaceous wetland.

3.2.1 Disturbed Riversidean Sage Scrub

Riversidean sage scrub is the most xeric expression of coastal sage scrub and is typically dominated by California sagebrush (*Artemisia californica*), California buckwheat (*Eriogonum fasciculatum*), and foxtail chess (*Bromus madritensis*). Disturbed Riversidean sage scrub is dominated by species associated with disturbed communities, but also includes a sparse number of species associated with Riversidean sage scrub.

Disturbed Riversidean sage scrub was observed in only one location in the southern phase along the southern boundary, totaling 0.16 acre. This community was dominated by foxtail chess. In addition to California buckwheat, native species observed included fasciculated tarplant (*Deinandra fasciculata*), California aster (*Corethrogyne filaginifolia*), and horseweed (*Erigeron canadensis*).

Northern Phase
Southern Phase

Vegetation and Land Cover Types

- Disturbed Riversidean Sage Scrub
- Disturbed Tamarisk Scrub
- Open Water
- Herbaceous Wetland
- Disturbed Wetland
- Southern Willow Scrub
- Tamarisk Scrub
- Non-native Grassland
- Disturbed
- Developed

CAPRICE RD
BRIARLEA RD
ADELINA DR
EVANS RD
CRAIG AVE

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0 125 Feet

Source: Aeial (NearMap, 2020)

HELIX Environmental Planning

Vegetation

Figure 5

3.2.2 Southern Willow Scrub

Southern willow scrub consists of dense, broad-leaved, winter-deciduous stands of trees dominated by shrubby willows in association with mule fat (*Baccharis salicifolia*) with scattered Fremont cottonwoods (*Populus fremontii*) and western sycamores (*Platanus racemosa*). This vegetation community occurs on loose, sandy, or fine gravelly alluvium deposited near stream channels during flood flows. Frequent flooding maintains this early seral community, preventing succession to a riparian woodland or forest.

Southern willow scrub was observed along the drainage within the northern phase, totaling 0.61 acre. This plant community was dominated by willow species (*Salix* ssp.). Native species observed in the understory included mule fat, jimson weed (*Datura wrightii*), and alkali mallow (*Malvella leprosa*), with non-native species observed including Russian thistle (*Salsola tragus*), tamarisk (*Tamarix ramosissima*), and curly dock (*Rumex crispus*).

3.2.3 Tamarisk Scrub (including Disturbed)

Tamarisk scrub is a weedy monoculture of tamarisk (*Tamarix* ssp.) species generally found in sandy or gravelly braided washes or intermittent streams. In addition to Tamarisk species, other vegetation species associated with this community include fourwing saltbush (*Atriplex lentiformis*), saltgrass (*Distichlis spicata*), narrow-leaved willow (*Salix exigua*), and arrow weed (*Pluchea sericea*).

Tamarisk scrub was observed in the northern and southern phases, totaling 0.61 acre. Salt cedar was the dominant species observed. In addition, the southern phase includes disturbed tamarisk scrub totaling 0.79 acre, which is characterized by a dominance of non-native grasses and fewer salt cedar species within the community.

3.2.4 Herbaceous Wetland (including Disturbed)

Herbaceous wetland is a seasonal wetland mainly with annual species. Vegetation species characteristic of this community include annuals such as common monkeyflower (*Mimulus guttatus*) and annual beardgrass (*Polypogon monspeliensis*).

Herbaceous wetland was observed in the northern phase, adjacent to the northeastern corner of the site, totaling 0.08 acre. Species observed include annual beardgrass, alkali mallow, and saltgrass. Additionally, the northern phase also includes disturbed herbaceous wetland in the northern half of the site and a pocket within the drainage, totaling 0.48 acre. Disturbed herbaceous wetland was dominated by non-native species such as curly dock and short-pod mustard (*Hirschfeldia incana)*, with native species associated with herbaceous wetlands in addition to upland native species such as doveweed (*Croton setigerus*), jimson weed, and western sunflower (*Helianthus annuus*).

3.2.5 Non-native Grassland

Non-native grassland is a dense to sparse cover of annual grasses, often associated with numerous species of showy-flowered native annual forbs. Characteristic species include oats (*Avena* spp.), brome grasses (*Bromus* spp.), and mustards (*Brassica* spp., short-pod mustard). Most of the annual introduced species within the non-native grassland originated from the Mediterranean region, an area with a long history of agriculture and a climate similar to California. Intensive grazing and agricultural practices combined with severe droughts in California contributed to the successful invasion and establishment of

these species and the replacement of native grasslands with annual-dominated non-native grasslands (Jackson 1985).

Non-native grassland was observed in the northern phase totaling approximately 4.68 acres. This vegetation community was dominated by soft brome (*Bromus hordeaceus*) and common ripgut grass (*Bromus diandrus*). Other non-native species observed included wild lettuce (*Lactuca serriola),* shortpod mustard, tocalote (*Centaurea melitensis*), and white tumbleweed (*Amaranthus albus*). Scattered amounts of native species were also observed, including fasciculated tarplant, California aster, and annual fireweed (*Epilobium brachycarpum*), and vinegar weed (*Trichostema lanceolatum*).

3.2.6 Developed

Developed land is where permanent structures and/or pavement have been placed, which prevents the growth of vegetation, or where landscaping is clearly tended and maintained.

Developed land was observed in the northern and southern phases, totaling 2.75 acres. Within the southern phase, the developed land included the maintained flood control channel along Evans Road and associated trail and within the northern phase, a decomposed granite path parallel to the drainage course located in the west and east side.

3.2.7 Disturbed

Disturbed land use includes land cleared of vegetation (e.g., dirt roads), land containing a preponderance of non-native plant species, such as ornamentals or ruderal exotic species that take advantage of disturbance (previously cleared or abandoned landscaping), or land showing signs of past or present animal usage that removes any capability of providing viable habitat.

Disturbed land was observed in the northern and southern phases, totaling 12.47 acres. These areas were dominated by ruderal exotic vegetation. Non-native species observed within the disturbed areas included red brome, short-pod mustard, rip-gut brome, tocalote, and wire lettuce. Ornamental trees were also observed in the disturbed habitat and included eucalyptus (*Eucalyptus* sp.), palo verde (*Paspalum dilatatum*), tree-of-heaven (*Ailanthus altissima*), and one native Fremont cottonwood.

3.2.8 Open Water

Open water is an unvegetated community covered by water. Open water was observed in the southern phase in the southeastern corner of the basin, totaling 0.10 acre. A few mule fat shrubs were observed along the margins of the open water.

3.3 PLANTS

HELIX identified a total of 26 plant species during surveys to date, of which 13 (50 percent) are non-native species (Appendix A). The majority of the plant species observed occur in the southern phase, as a comprehensive plant list for the northern phase was not prepared since an in-depth field survey was not conducted, and this programmatic level assessment does not require that level of detail. A subsequent review would likely be required that would include greater detail regarding plant species occurring or expected to occur on the site in the northern phase.

3.4 ANIMALS

A total of 19 animal species were identified on the southern phase during biological surveys, all of which are bird species (Appendix B). A comprehensive animal list for the northern phase was not prepared since an in-depth field survey was not conducted, and this programmatic level assessment does not require that level of detail. A subsequent review would likely be required that would include greater detail regarding general animal species occurring or expected to occur in the northern phase.

3.5 SENSITIVE BIOLOGICAL RESOURCES

3.5.1 Rare Plant Species

Rare plant species are uncommon or limited in that they: (1) are only found in the western Riverside County region; (2) are a local representative of a species or association of species not otherwise found in the region; or (3) are severely depleted within their ranges or within the region. Rare plant species include those species listed by CNPS with a California Rare Plant Rank (CRPR) of 1, 2, or 3 (2021), federally and state listed endangered and threatened species, or those species that require additional surveys by the MSHCP (Dudek 2003). The MSHCP survey requirements for rare plant species are discussed below in Section 3.6. Since the southern phase does not occur within any MSHCP rare plant survey overlays, no focused surveys were warranted.

Eight rare plant species were recorded within the Romoland quadrangle based on a database search conducted on CNDDB (CDFW 2021a) and CNPS (2021). An evaluation of each rare species' potential to occur on the Southern Phase is provided in Appendix D, *Rare Plant Species Potential to Occur*. The potential for rare plant species to occur in the northern phase was based on information obtained from the literature review and observations made during the general biological survey. However, this evaluation was conducted at a programmatic level, and project-level evaluations would further refine the potential to occur determinations. Potential additional species and precise locations and numbers of sensitive plant species (if any) would be identified through project-level surveys for proposed future development.

Southern Phase

Of the eight rare plant species recorded within the vicinity of the southern phase, only one species was considered to have potential to occur on the site, whereas the other seven species were considered to have no potential to occur, based on geographic range, elevation range, and/or lack of suitable habitat on the southern phase. Smooth tarplant (*Centromadia pungens* ssp. *laevis*) was determined to have a high potential to occur on the southern phase. Smooth tarplant is a CRPR 1B.1 species and is conditionally covered under the MSHCP. Within the MSHCP, smooth tarplant surveys are only required on sites located in Criteria Area Species Surveys Area, of which the southern phase is not a part.

Northern Phase

Of the eight rare plant species recorded within the vicinity of the northern phase, five rare plant species are not expected to occur based on information obtained from the literature review and observations made during the general biological survey. Three rare plant species, smooth tarplant, Parry's spineflower (*Chorizanthe parryi* var. *parryi*), and long-spined spineflower (*Chorizanthe polygonoides* var. *longispina*), were considered to have a potential to occur on the northern phase based on the presence

of potentially suitable habitat and observations within the vicinity of the northern phase. However, this evaluation was conducted at a programmatic level, and project-level evaluations would further refine the potential to occur determinations. Potential additional species and precise locations and numbers of rare plant species (if any) would be identified through project-level surveys for the proposed future development.

3.5.2 Sensitive Animal Species

Sensitive animal species include federally and state listed endangered and threatened, candidate species for listing by CDFW, and/or are species of special concern (SSC) pursuant to CDFW.

Twenty-one sensitive animal species were recorded within the Romoland quadrangle based on a database search conducted on CNDDB (CDFW 2021). An evaluation of each sensitive animal species' potential to occur on the Southern Phase is provided in Appendix E, *Sensitive Animal Species Potential to Occur*. The potential for sensitive animal species to occur in the northern phase was based on information obtained from the literature review and observations made during the general biological survey. However, this evaluation was conducted at a programmatic level, and project-level evaluations would further refine the potential to occur determinations. Potential additional species and precise locations and numbers of sensitive animal species (if any) would be identified through project-level surveys for proposed future development.

Southern Phase

Of the 21 sensitive animal species recorded within the vicinity of the southern phase, 14 species were considered to have no potential to occur on the southern phase due to the lack of suitable habitat. The remaining seven species are discussed in detail below.

Three species were determined to have a low potential to occur on the southern phase based on the presence of low-quality habitat, limited acreage of habitat, and the lack of recent observations within the immediate vicinity of the southern phase. These species include Crotch bumblebee (*Bombus crotchii*), coastal whiptail (*Aspidoscelis tigris stejnegeri*), and western mastiff bat (*Eumops perotis californicus*). Crotch bumblebee has a low potential to occur within the disturbed California buckwheat scrub in the southeastern portion of the southern phase. This species is currently listed on CNDDB as a State Candidate Endangered Species. However, the Sacramento Superior Court recently ruled that insects are not subject to protection under the California Endangered Species Act (Almond Alliance et al. v. California Fish and Game Commission). Therefore, this species is not evaluated further in this report because of this and its low potential to occur. Coastal whiptail and western mastiff bat are state SSC and Crotch bumblebee is a state CE species. The southern phase only provides a foraging habitat and not roosting habitat for the western mastiff bat. Coastal whiptail is a covered species under the MSHCP.

Three species were determined to have a moderate potential to occur on the southern phase based on the presence of some moderate quality habitat and/or small extent of habitat. These species include loggerhead shrike (*Lanius ludovicianus*), Stephens' kangaroo rat (*Dipodomys stephensi*; SKR) and San Diego black-tailed jackrabbit (*Lepus californicus bennettii*). Loggerhead shrike and San Diego black-tailed jackrabbit are State SSC species, while SKR is a federally endangered and State threatened species. All three species are covered species under the MSHCP. An evaluation of each sensitive animal species' potential to occur on the southern phase is provided in Appendix E.

One species, BUOW, was determined to have a high potential to occur based on the presence of suitable habitat and recent observations within the vicinity of the southern phase. Focused surveys for BUOW were conducted in accordance with the County's survey protocol (2006), as previously described in Section 2.3.2.2 above. No BUOWs or BUOW sign were observed within the survey area. Therefore, the southern phase does not currently support BUOWs. The survey methods and results are discussed in detail in a separate letter report, which is provided as Appendix F, *Burrowing Owl Focused Survey Repor*t.

Northern Phase

Of the 21 sensitive animal species recorded within the vicinity of the southern phase, 12 species were considered to have no potential to occur on the northern phase due to the lack of suitable habitat. The remaining nine species are discussed in detail below. In addition, the northeast portion of the northern phase supports depressional areas that may be potentially suitable habitat for federally listed fairy shrimp species. Fairy shrimp species are discussed further in Section 3.6.2.1.

Two species, western mastiff bat and western yellow bat (*Lasiurus xanthinus*), were determined to have a low potential to occur on the northern phase. The northern phase only provides a foraging habitat and not roosting habitat for the bat species.

Five species were determined to have a moderate potential to occur due to the presence of moderate quality habitat; those species include western spadefoot (*Spea hammondii*), coastal whiptail, loggerhead shrike, SKR, and San Diego black-tailed jackrabbit. All five species are covered species under the MSHCP.

Two species were determined to have a high potential due to the presence of suitable habitat and recent observations in the vicinity of the northern phase. These species include Riverside fairy shrimp (*Streptocephalus woottoni*) and BUOW.

3.5.3 Sensitive Vegetation Communities/Habitats

Sensitive vegetation communities/habitats are considered either rare within the region or sensitive by CDFW (CDFW 2021b). Communities are given a Global and State (S) ranking on a scale of 1 to 5. Communities afforded a rank of 5 are most common, while communities with a rank of 1 are considered highly periled. CDFW considers sensitive communities as those with a rank between S1 and S3.

Southern Phase

The majority of the vegetation community present in the southern phase consists of disturbed habitat. The southern phase does not support any sensitive vegetation communities or habitats pursuant to CDFW (2020).

Northern Phase

The majority of the vegetation community present in the northern phase consists of disturbed and non-native habitat. No sensitive vegetation communities/habitats pursuant to CDFW were mapped in the northern phase (2020).

3.5.4 Habitat and Wildlife Corridor Evaluation

Wildlife corridors connect otherwise isolated pieces of habitat and allow movement or dispersal of plants and animals. Corridors can be local or regional in scale; their functions may vary temporally and spatially based on conditions and species presence. Local wildlife corridors allow access to resources such as food, water, and shelter within the framework of their daily routine. Animals use these corridors, which are often hillsides or tributary drainages, to move between different habitats. Regional corridors provide these functions over a larger scale and link two or more large habitat areas, allowing the dispersal of organisms and the consequent mixing of genes between populations.

Southern Phase

The southern phase is not located within any MSHCP Linkages, which are areas within the Plan Area that are identified as having the potential to facilitate wildlife movement. The nearest linkage to the southern phase is Proposed Linkage 8, which is approximately 2.5 miles to the south of the southern phase and consists of upland habitat in the Pigeon Pass Valley and connects two existing noncontiguous habitat blocks in the Box Springs Mountain area (Dudek 2003). The southern phase is not located within any linkages recognized by the South Coast Missing Linkages report (South Coast Wildlands 2008). The nearest linkage described by the South Coast Missing Linkages report is the San Bernardino–San Jacinto Connection, located approximately 18 miles to the east of the southern phase.

The southern phase does not directly connect to large blocks of habitat. The southern phase is bounded by the future northern phase to the north, residential development to the south and west, and undeveloped land to the east. The southern phase does not support any native communities, with the exception of a small, isolated patch of disturbed Riversidean sage scrub, and is dominated by non-native species, including red brome, tocalote, and short-pod mustard. The southern phase does not connect two or more large habitat areas, and the southern phase is not considered a wildlife corridor.

The southern phase is disturbed from historical and surrounding human activities and supports minimal vegetative cover dominated by non-native species. Although the southern phase does not function as a wildlife corridor, it does support some shrubs and herbaceous ground cover that may provide limited opportunities for local wildlife movement or wildlife movement. Smaller mammals and reptiles that are adapted to human disturbance (e.g., California ground squirrel [*Otospermophilus beecheyi*], cottontail rabbits [*Sylvilagus* sp.], western fence lizard [*Sceloporus occidentalis*]) may use the southern phase for foraging and/or cover, while bird species may fly over existing development to access the southern phase for foraging and/or nesting. Some wildlife may use the southern phase for cover and/or foraging. Therefore, the southern phase may support some low-quality habitat for wildlife, but the southern phase does not function as a wildlife corridor since it does not connect two or more large blocks of habitat.

Northern Phase

The northern phase is not located within any MSHCP Linkages. The nearest linkage to the northern phase is Proposed Linkage 8, which is approximately 2.5 miles to the south of the northern phase and consists of upland habitat in the Pigeon Pass Valley and connects two existing noncontiguous habitat blocks in the Box Springs Mountain area (Dudek 2003). Similar to the southern phase, the northern phase is not located within any linkages recognized by the South Coast Missing Linkages report (South Coast Wildlands 2008). The nearest linkage described by the South Coast Missing Linkages report is the

San Bernardino–San Jacinto Connection, located approximately 18 miles to the east of the northern phase.

The northern phase does not directly connect to large blocks of habitat. The northern phase is bounded by undeveloped land to the north, future Evans Park development to the south, residential development to the west, and Paloma Valley High School to the east. The northern phase supports one isolated patch of southern willow scrub, but is dominated mainly by non-native species, similar to the southern phase. The northern phase does not connect two or more large habitat areas, and the southern phase is not considered a wildlife corridor.

As with the southern phase, the northern phase is disturbed from historical and surrounding human activities and supports minimal vegetative cover dominated by non-native species. Although the northern phase does not function as a wildlife corridor, it does support a drainage feature with some trees, shrubs, and herbaceous ground cover that may provide limited opportunities for local wildlife movement or wildlife movement. Smaller mammals and reptiles that are adapted to human disturbance may use the northern phase for foraging and/or cover, while bird species may fly over existing development to access the northern phase for foraging and/or nesting. Some wildlife may use the drainage feature in the northern phase for cover and/or foraging. Therefore, the northern phase may support some low-quality habitat for wildlife, but the northern phase does not function as a wildlife corridor since it does not connect two or more large blocks of habitat.

3.5.5 Jurisdictional Waters

Southern Phase

Based on the results of the assessment of potential jurisdictional features, two potentially jurisdictional features were identified in the southern phase, including a flood control channel and a basin located in the southern portion of the southern phase (Figure 6, *Potential Jurisdictional Features and MSHCP Riparian Areas*; Table 2, *Potential Jurisdictional Features in Southern Phase*). Based on the establishment of riparian vegetation, the basin contains potential CDFW and/or RWQCB jurisdiction, while the flood control channel contains potential CDFW and USACE jurisdiction.

Table 2
POTENTIAL JURISDICTIONAL FEATURES IN SOUTHERN PHASE

Feature	Acres
Basin	1.37
Flood Control Channel	1.83
TOTAL	**3.20**

Source: HELIX (2020)

Northern Phase

Based on the results of the assessment of potential jurisdictional features, four potentially jurisdictional resources were identified in the northern portion of the project site, including streambed, a swale dominated by hydrophytic vegetation (identified as wetland [including disturbed]), and southern willow scrub (Figure 6; Table 3, Potential Jurisdictional Features in Northern Phase).

Table 3
POTENTIAL JURISDICTIONAL FEATURES IN NORTHERN PHASE

Feature	Acres
Streambed	0.19
Wetland	0.07
Disturbed Wetland	0.48
Southern Willow Scrub	0.61
TOTAL	**1.35**

Source: HELIX (2020)

This evaluation of potential jurisdictional features was conducted at a programmatic level and project-level evaluations would be required to determine jurisdictional limits of the potential features identified.

3.6 WESTERN RIVERSIDE COUNTY MSHCP CONSISTENCY ANALYSIS

3.6.1 Project Location within the MSHCP

The MSHCP Plan Area is divided into 16 Area Plans, within which 153,000 acres were identified as potential areas for conservation that would contribute to the overall existing MSHCP Conservation Area. The areas identified for conservation within the MSHCP Plan Area are called Criteria Areas, and include Core Areas that support habitat for covered species and Linkages that provide a connection between Core Areas. The Criteria Areas are divided into 160-acre cells, which each have its own conservation goal. All projects within a cell or cell group are required to be accessed through the Habitat Acquisition and Negotiation Strategy (HANS) process to determine the amount of MSHCP conservation required. The HANS process aids in the acquisition of lands that will contribute to the assembly of the MSHCP Reserve.

As described in Section 2.1.2 of the MSHCP, the project site is located in the Riverside Lowlands bioregion, an area lying generally below 2,000 AMSL and characterized by Riversidean sage scrub and annual grasslands. The relatively arid climate is partly the result of the rain shadow cast by the Santa Ana Mountains. A high level of disturbance and urbanization are noted within this bioregion (Dudek 2003).

The project site is located within the Sun City/Menifee Area Plan and is not located within or adjacent to an MSHCP Criteria Area; therefore, the project site is not subject to special conservation requirements that apply to cells and is not required to undergo the HANS process. The nearest criteria cells to the southern phase are Cells 5252 and 5253, which are located approximately 2.5 miles to the south (Figure 7, *MSHCP Context*). The project site is not located within or directly adjacent to any MSHCP Conservation Areas. The project site is located approximately 7.5 miles to the east of Core E and five miles to the north of Core 2. Existing development separates the project site from MSHCP Conservation Areas.

3.6.2 Riparian/Riverine and Vernal Pool Habitat Assessment (MSHCP Section 6.1.2)

The identification of MSHCP Riparian/Riverine areas is based on the potential for the habitat to support, or be a tributary to habitat that supports Riparian/Riverine Covered Species. Riparian/Riverine Covered Species are identified in MSHCP Section 6.1.2. The MSHCP defines Riparian/Riverine habitat as “lands



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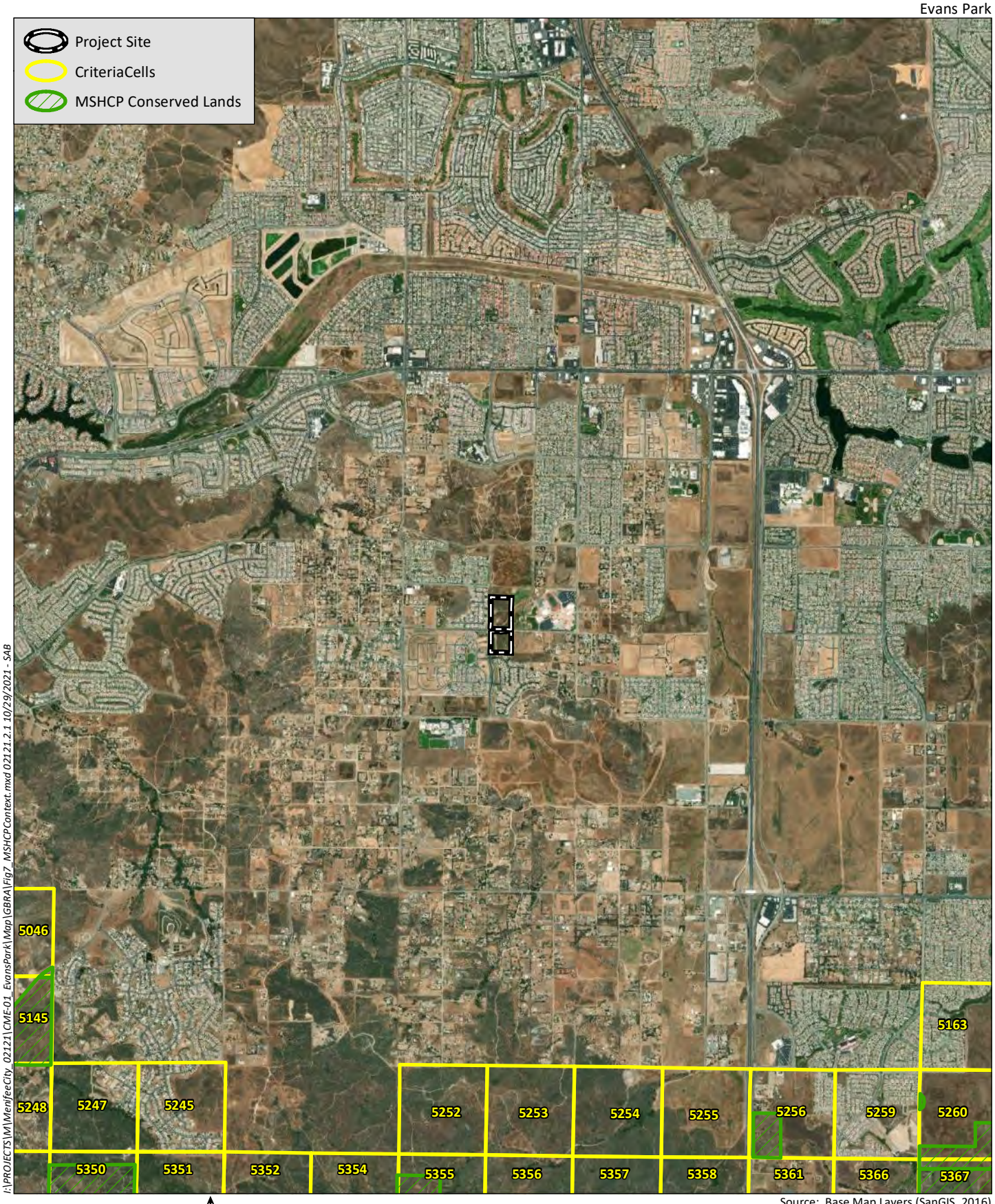
Source: Aeial (NearMap, 2020)

HELIX Environmental Planning

Potential Jurisdictional Features and MSHCP Riparian Areas

Figure 6



Source: Base Map Layers (SanGIS, 2016)

HELIX Environmental Planning

MSHCP Context

Figure 7

which contain Habitat dominated by trees, shrubs, or emergent mosses and lichens, which occur close to or which depend upon soil moisture from a nearby fresh water source; or areas with freshwater flow during all or a portion of the year" (Dudek 2003). The MSHCP defines Vernal Pools as "seasonal wetlands that occur in depression areas that have wetlands indicators of all three parameters (soils, vegetation and hydrology) during the wetter portion of the growing season but normally lack wetlands indicators of hydrology and/or vegetation during the drier portion of the growing season" (Dudek 2003). Artificially created features, except for those created intentionally to provide wetland habitat or resulting from the creation of open waters or the alteration of natural stream courses, are not considered MSHCP Riparian/Riverine Areas or Vernal Pools. In accordance with the MSHCP, a Riparian/Riverine habitat assessment was conducted by Amy Lee on October 23, 2020.

Southern Phase

No MSHCP Riparian/Riverine Areas or Vernal Pools were identified in the southern phase. Areas that are artificially created by human activity, except for those created intentionally to provide wetland habitat; created open waters such as Lake Perris; or wetlands resulting from the alteration of natural stream courses, are not considered MSHCP Riparian/Riverine subject to MSHCP analysis. The flood control channel and basin are not considered Riparian/Riverine resources as they are artificially created constructed features that are not protected under the MSHCP (Figure 6).

Northern Phase

The northern phase includes habitat that was identified as potential Riparian/Riverine Areas and Vernal Pool Resources (Figure 6). The potential Riparian/Riverine Areas and Vernal Pool include the drainage feature; the streambed in the northern half of the northern phase; herbaceous wetlands; and the tamarisk scrub in the northwestern corner associated with an off-site riparian feature. Additionally, there is a potential for vernal pool (fairy shrimp) habitat within the mapped herbaceous wetland and disturbed wetland communities. The MSHCP Riparian/Riverine Areas and Vernal Pool evaluation was conducted at a programmatic level, and project-level evaluations would be required to determine the limits. Project-level evaluations should be conducted to confirm vernal pool habitat in the northern phase. MSHCP Riverine/Riverine Areas are equivalent to CDFW jurisdiction.

3.6.2.1 Riparian/Riverine and Vernal Pool Species

Through the protection of Riparian/Riverine and Vernal Pool habitats, the MSHCP aims to conserve several plant and animal species within the Plan Area. During the Riparian/Riverine habitat assessment discussed above, each plant and animal species listed in Section 6.1.2 of the MSHCP was evaluated to determine the potential to occur on the southern phase. Riparian/Riverine and Vernal Pool species are discussed in detail below.

Plant Species

The MSHCP lists 23 rare plant species that have a potential to occur in Riparian/Riverine and/or Vernal Pool habitats within the MSHCP Plan Area, which are listed below in Table 4, *MSHCP Riparian/Riverine and Vernal Pool Plant Species*.

Southern Phase: No MSHCP Riparian/Riverine or Vernal Pool plant species are expected to occur on the southern phase based on the absence of drainage features and vernal pools.

Northern Phase: Of the 23 rare plant species, four have the potential to occur on the northern phase. Two species (smooth tarplant and California black walnut [*Juglans californica*]) have a moderate potential to occur based on suitable habitat, and two species (prostrate navarretia [*Navarretia prostrata*] and vernal barley [*Hordeum intercedens*]) have a low potential to occur based on the presence of some wetland habitat. However, if the project-level evaluations confirm vernal pool habitat in the northern phase, an additional four species have a low potential to occur (California Orcutt grass [*Orcuttia californica*], Orcutt's brodiaea [*Brodiaea orcuttii*], San Diego button celery [*Eryngium aristulatum* var. *parishii*], and spreading navarretia [*Navarretia fossalis*]).

Table 4
MSHCP RIPARIAN/RIVERINE AND VERNAL POOL PLANT SPECIES

Common Name	Scientific Name	Habitat	Potential to Occur	
			Southern Phase	Northern Phase
Brand's phacelia	*Phacelia stellaris*	Sandy washes and/or benches in alluvial flood plains.	**None.** Suitable habitat is not present in the southern phase.	**None.** Suitable habitat is not present in the northern phase.
California black walnut	*Juglans californica* var. *californica*	Open savannahs, creek beds, alluvial terraces, and north-facing slopes.	**None.** Suitable habitat is not present in the southern phase.	**Moderate.** Suitable habitat is present within the drainage.
California Orcutt grass	*Orcuttia californica*	Vernal pools.	**None.** Suitable habitat is not present in the southern phase.	**Low**[1]. Potential suitable habitat, but small extant if present.
Coulter's matilija poppy	*Romneya coulteri*	Dry washes and canyons in chaparral and coastal sage scrub communities and disturbed areas.	**None.** Suitable habitat is not present in the southern phase.	**None**. Suitable habitat is not present in the northern phase.
Engelmann oak	*Quercus engelmannii*	Woodlands, mixed chaparral, and savannah grasslands.	**None.** Suitable habitat is not present in the southern phase.	**None**. Suitable habitat is not present in the northern phase.
Fish's milkwort	*Polygala cornuta* var. *fishiae*	Shaded, rocky places in canyons associated with woodlands and chaparral.	**None.** Suitable habitat is not present in the southern phase.	**None**. Suitable habitat is not present in the northern phase.
graceful tarplant	*Holocarpha virgata* ssp. *elongata*	Coastal mesas and foothills with grassland habitats.	**None.** Suitable habitat is not present in the southern phase.	**None**. Suitable habitat is not present in the northern phase.
lemon lily	*Lilium parryi*	Moist montane meadows.	**None.** Suitable habitat is not present in the southern phase.	**None**. Suitable habitat is not present in the northern phase.
Mojave tarplant	*Deinandra mohavensis*	Drainages within arid montane chaparral.	**None.** Suitable habitat is not present in the southern phase.	**None**. Suitable habitat is not present in the northern phase.
mud nama	*Nama stenocarpum*	Marshes, swamps, lake margins, and riverbanks along muddy embankments.	**None.** Suitable habitat is not present in the southern phase.	**None**. Suitable habitat is not present in the northern phase.
ocellated Humboldt lily	*Lilium humboldtii* ssp. *ocellatum*	Shaded montane canyons.	**None.** Suitable habitat is not present in the southern phase.	**None**. Suitable habitat is not present in the northern phase.

Common Name	Scientific Name	Habitat	Potential to Occur	
			Southern Phase	Northern Phase
Orcutt's brodiaea	*Brodiaea orcuttii*	Vernally moist grasslands and vernal pools; occasionally occurs along stream embankments within clay soils.	**None.** Suitable habitat is not present in the southern phase.	**Low**[1]. Potential suitable habitat, but small extant if present.
Parish's meadowfoam	*Limnanthes gracilis* var. *parishii*	Montane meadows with abundant annual and herbaceous perennials and lack of shrubs.	**None.** Suitable habitat is not present in the southern phase.	**None**. Suitable habitat is not present in the northern phase.
prostrate navarretia	*Navarretia prostrata*	Coastal sage scrub, valley and foothill grassland, and vernal pools.	**None.** Suitable habitat is not present in the southern phase.	**Low**. Suitable habitat is present within the wetland habitat.
San Diego button-celery	*Eryngium aristulatum* var. *parishii*	Vernal pools.	**None.** Suitable habitat is not present in the southern phase.	**Low**[1]. Potential suitable habitat, but small extant if present.
San Jacinto Valley crownscale	*Atriplex coronata* var. *notatior*	Highly alkaline and silty-clay soils associated with alkali sink scrub, alkali playa, vernal pool, and annual alkali grassland habitats.	**None.** Suitable habitat is not present in the southern phase.	**None**. Suitable habitat or soils are not present in the northern phase.
San Miguel savory	*Clinopodium chandleri*	Coastal sage scrub, chaparral, cismontane woodland, riparian woodland, and valley and foothill grasslands.	**None.** Suitable habitat is not present in the southern phase.	**None**. Suitable substrate for this species is not present on the northern phase.
Santa Ana River woolly-star	*Eriastrum densifolium* spp. *sanctorum*	Sandy soils on flood plains and terraces within coastal scrub and chaparral communities.	**None.** Suitable habitat is not present in the southern phase.	**None**. Suitable habitat is not present in the northern phase.
slender-horned spineflower	*Dodecahema leptoceras*	Sandy soil associated with alluvial scrub; is often found on stream terraces and banks.	**None.** Suitable habitat is not present in the southern phase.	**None**. Suitable habitat is not present in the northern phase.
smooth tarplant	*Centromadia pungens* ssp. *laevis*	Alkali scrubs, playas, and grasslands; riparian woodland and streams.	**None.** Suitable habitat is not present in the southern phase.	**Moderate**. Suitable habitat is present within the wetland habitat.
spreading navarretia	*Navarretia fossalis*	Vernal pools, depressions, and ditches.	**None.** Suitable habitat is not present in the southern phase.	**Low**[1]. Potential suitable habitat, but small extant if present.
thread-leaved brodiaea	*Brodiaea filifolia*	Clay soils in vernally moist grasslands and vernal pool periphery are typical locales.	**None.** Suitable habitat is not present in the southern phase.	**None.** Suitable substrate is not present in the northern phase.

Common Name	Scientific Name	Habitat	Potential to Occur	
			Southern Phase	Northern Phase
vernal barley	*Hordeum intercedens*	Saline flats and depressions in grasslands or vernal pools.	**None.** Suitable habitat is not present in the southern phase.	**Low**. Suitable habitat within the wetland habitat.

Source: Dudek (2003).

[1] Low potential for species to occur only if project-level evaluations confirm vernal pool habitat in the northern phase. Otherwise, there is no potential for the species to occur.

Animal Species

The MSHCP lists 12 sensitive animal species that have a potential to occur in Riparian/Riverine and/or Vernal Pool habitats within the MSHCP Plan Area, which are provided in Table 5, *MSHCP Riparian/Riverine and Vernal Pool Animal Species*. The MSHCP requires focused surveys to be conducted for projects that propose impacts to three invertebrate and three bird species, as described in detail below. The southern phase does not support suitable habitat for any of the sensitive bird species listed below in Table 5.

Table 5
MSHCP RIPARIAN/RIVERINE AND VERNAL POOL ANIMAL SPECIES

Common Name	Scientific Name	Habitat	Potential to Occur	
			Southern Phase	Northern Phase
Riverside fairy shrimp	*Streptocephalus woottoni*	Deep vernal pools and other ephemeral basins that hold water for typically 30 or more days.	**Low**. Potential habitat is present within the basin, however, impacts to the basin will be avoided.	**Low**[1]. Potential suitable habitat, but small extant if present.
Santa Rosa Plateau fairy shrimp	*Linderiella santarosae*	Limited to vernal pools within the Santa Rosa Plateau.	**None**. Southern phase is outside of this species distribution.	**None**. Northern phase is outside of this species distribution.
vernal pool fairy shrimp	*Branchinecta lynchi*	Vernal pools and other ephemeral basins within patches of grassland and agriculture interspersed in coastal sage scrub and chaparral.	**None**. Southern phase is outside of this species distribution.	**None.** Northern phase is outside of this species distribution.
arroyo toad	*Anaxyrus californicus*	Washes and intermittent streams with open-canopy riparian forest.	**None.** Suitable habitat is not present in the southern phase.	**None.** Suitable habitat is not present in the northern phase.
California red-legged frog	*Rana aurora draytonii*	Perennial streams with dense, shrubby riparian vegetation.	**None.** Suitable habitat is not present in the southern phase.	**None.** Suitable habitat is not present in the northern phase.
mountain yellow-legged frog	*Rana muscosa*	Perennial waterways, often within open riparian vegetation.	**None.** Suitable habitat is not present in the southern phase.	**None.** Suitable habitat is not present in the northern phase.

Common Name	Scientific Name	Habitat	Potential to Occur	
			Southern Phase	Northern Phase
Santa Ana sucker	*Catostomus santaanae*	Clear, cool perennial streams with loose sand, gravel, cobble, and boulders with algae, aquatic emergent vegetation, macroinvertebrates, and riparian vegetation.	**None.** Suitable habitat is not present in the southern phase.	**None.** Suitable habitat is not present in the northern phase.
bald eagle	*Haliaeetus leucocephalus*	Within close proximity to lakes or other water bodies.	**None.** Suitable habitat is not present in the southern phase.	**None.** Suitable habitat is not present in the northern phase.
least Bell's vireo	*Vireo bellii pusillus*	Well-developed riparian scrub, woodland, or forest.	**None.** Suitable habitat is not present in the southern phase.	**Moderate**. Suitable habitat is present within the drainage.
peregrine falcon	*Falco peregrinus*	Generally, areas with cliffs or tall buildings near water where prey (shorebirds and ducks) is concentrated.	**None.** Suitable habitat is not present in the southern phase.	**None.** Suitable habitat is not present in the northern phase.
southwestern willow flycatcher	*Empidonax traillii extimus*	Breeds within thickets of willows or other riparian understory usually along streams, ponds, lakes, or canyons.	**None.** Suitable habitat is not present in the southern phase.	**None.** Suitable habitat is not present in the northern phase.
western yellow-billed cuckoo	*Coccyzus americanus occidentalis*	Extensive stands of mature riparian woodland.	**None.** Suitable habitat is not present in the southern phase.	**None.** Suitable habitat is not present in the northern phase.

Source: Dudek (2003).

[1] Low potential for species to occur only if project-level evaluations confirm vernal pool habitat in the northern phase. Otherwise, there is no potential for the species to occur.

Invertebrates

Three sensitive fairy shrimp species occur in the MSHCP Plan Area, including Riverside fairy shrimp (*Streptocephalus woottoni*), Santa Rosa Plateau fairy shrimp (*Linderiella santarosae*), and vernal pool fairy shrimp (*Branchinecta lynchi*). Vernal pool fairy shrimp occurs throughout the Central Valley and in several disjunct populations in Riverside County. This species exists in vernal pools and other ephemeral basins, often located in patches of grassland and agriculture interspersed in coastal sage scrub and chaparral. Riverside fairy shrimp occurs in Riverside, Orange, and San Diego Counties, as well as in northern Baja California, Mexico. This species is typically found in deeper vernal pools and other ephemeral basins that hold water for long periods of time (30 or more days). Santa Rosa Plateau fairy shrimp is limited to the Santa Rosa Plateau in Riverside County.

Southern Phase: The southern phase supports a constructed basin in the southeast portion of the site that holds water for a period of time that may potentially be suitable habitat for Riverside fairy shrimp (Figure 5). Based on known populations within the Plan Area, Santa Rosa Plateau fairy shrimp and vernal pool fairy shrimp are not expected to occur on the southern phase. The basin will be avoided and not impacted; therefore, there are no impacts to Riverside fairy shrimp.

Northern Phase: The northern phase supports depressional areas that may potentially be suitable habitat for Riverside fairy shrimp (Figure 5). Based on known populations within the Plan Area, Santa Rosa Plateau fairy shrimp and vernal pool fairy shrimp are not expected to occur on the northern phase. Project-level evaluations should be conducted to confirm suitable habitat, and if suitable habitat is present, a presence/absence survey of Riverside fairy shrimp in the northern phase should be completed.

Birds

Riparian/Riverine Areas within the MSHCP Plan Area provide suitable habitat for sensitive bird species, such as least Bell's vireo (*Vireo bellii pusillus*), southwestern willow flycatcher (*Empidonax traillii extimus*), western yellow-billed cuckoo (*Coccyzus americanus occidentalis*), bald eagle (*Haliaeetus leucocephalus*), and peregrine falcon (*Falco peregrinus*). Typical habitat for least Bell's vireo consists of well-developed riparian scrub, woodland, or forest dominated by willows, mule fat, and Fremont cottonwood. Least Bell's vireo will also use small patches of trees adjacent to dense, riparian habitat. Southwestern willow flycatcher and western yellow-billed cuckoo require mature riparian forest with a stratified canopy and nearby water. Both the bald eagle and peregrine falcon occur primarily in and adjacent to open water habitats, with peregrine falcon occurring in riparian areas.

The MSHCP requires focused surveys to be conducted for projects that propose impacts to suitable habitat for least Bell's vireo, southwestern willow flycatcher, and western yellow-billed cuckoo.

Southern Phase: The southern phase does not support suitable habitat for any sensitive bird species.

Northern Phase: The northern phase supports potentially suitable habitat for least Bell's vireo. Therefore, Project-level evaluations should be conducted to determine suitability, and if suitable habitat is present, a focused survey for least Bell's vireo should be conducted.

3.6.3 Narrow Endemic Plant Species Survey Area (MSHCP Section 6.1.3)

The MSHCP requires focused plant surveys to be conducted for projects located within a Narrow Endemic Plant Species Survey Area (NEPSSA). There are 14 narrow endemic plant species associated with 10 different NEPSSAs located throughout the MSHCP Plan Area (see Table 6-1 in the MSHCP). Prior to conducting focused surveys, a habitat assessment should be conducted to determine whether the project supports suitable habitat for plant species listed for the NEPSSA species. Focused surveys for species listed for the NEPSSA should be conducted if suitable habitat is present. If focused surveys are positive, 90 percent of the property that supports habitat suitable for long-term conservation of the species must be avoided until conservation goals for the species are satisfied.

The project site is not within a NEPSSA. Therefore, focused NEPSSA surveys were not required.

3.6.4 Additional Survey Needs and Procedures (MSHCP Section 6.3.2)

The MSHCP requires additional surveys for projects that support suitable habitat for certain conditionally-covered species. The survey results provide species-specific information in order for the MSHCP to satisfy the Federal Endangered Species Act (FESA) issuance criteria. If focused surveys are positive for conditionally-covered species, 90 percent of the property that supports habitat suitable for long-term conservation of the species must be avoided until conservation goals for the species are satisfied. Additional survey requirements are discussed in detail below.

3.6.4.1 Criteria Area Species

Focused surveys for rare plant species must be conducted for projects located within a Criteria Area Species Survey Area (CASSA). There are 13 criteria area species associated with eight CASSAs located throughout the MSHCP Plan Area (see Table 6-1 in the MSHCP). Prior to conducting focused surveys, a habitat assessment should be conducted to determine whether the project site supports suitable habitat for plant species listed for the CASSA. If suitable habitat is present, focused surveys for species listed for the CASSA should be conducted.

The project site is not within a CASSA; therefore, focused CASSA surveys were not required.

3.6.4.2 Amphibian Species

Focused surveys for arroyo toad (*Bufo californicus*), California red-legged frog (*Rana draytonii*), and mountain yellow-legged frog (*Rana muscosa*), must be conducted for projects located within an Amphibian Species Survey Area.

The project site is not within the Amphibian Species Survey Area; therefore, focused surveys were not required.

3.6.4.3 Bird Species

A focused survey for BUOW must be conducted for projects located within a BUOW Survey Area.

The project site is located within the BUOW Survey Area. Therefore, a Step I Habitat Assessment was conducted in accordance with the County's protocol, as described above in Section 2.3.2.1 of this report.

Southern Phase: Suitable habitat was identified on the southern phase; therefore, Step II Focused Burrow and BUOW surveys were required and completed for the southern phase in accordance with the County's survey protocol (County 2006). As discussed in Section 3.5.2, no BUOWs or BUOW sign were observed during the focused surveys (Appendix F).

Northern Phase: Suitable habitat has been identified on the northern phase; therefore, Step II Focused Burrow and BUOW surveys are required in accordance with the County's survey protocol to determine the presence/absence of BUOW on the northern phase.

3.6.4.4 Mammal Species

Focused surveys for Aguanga kangaroo rat (*Dipodomys merriami collinus*), San Bernardino kangaroo rat (*Dipodomys merriami parvus*), and Los Angeles pocket mouse (*Perognathus longimembris brevinasus*), must be conducted for projects located within a Mammal Species Survey Area.

The project site is not within the Mammal Species Survey Area; therefore, focused surveys were not required.

4.0 REGIONAL AND REGULATORY CONTEXT

Biological resources located within the project site are subject to regulatory review by federal, state, and local agencies. Biological resources-related laws and regulations that apply to the project include the FESA, Migratory Bird Treaty Act (MBTA), CWA, California Endangered Species Act (CESA), and CFG Code.

4.1 FEDERAL REGULATIONS

4.1.1 Federal Endangered Species Act

Administered by the USFWS, the FESA provides the legal framework for the listing and protection of species (and their habitats) identified as being endangered or threatened with extinction. Actions that jeopardize endangered or threatened species and the habitats upon which they rely are considered a "take" under the ESA. Section 9(a) of the ESA defines take as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct." "Harm" and "harass" are further defined in federal regulations and case law to include actions that adversely impair or disrupt a listed species' behavioral patterns.

Sections 4(d), 7, and 10(a) of the FESA regulate actions that could jeopardize endangered or threatened species. Section 7 describes a process of federal interagency consultation for use when federal actions may adversely affect listed species. A biological assessment is required for any major construction activity if it may affect a listed species. In this case, take can be authorized via a letter of biological opinion issued by the USFWS for non-marine related listed species issues. A Section 7 consultation is required when there is a nexus between federally listed species' use of the site and impacts to USACE jurisdictional areas. Section 10(a) allows the issuance of permits for "incidental" take of endangered or threatened species. The term "incidental" applies if the taking of a listed species is incidental to, and not the purpose of, an otherwise lawful activity. The MSHCP is the Section 10(a) permit for western Riverside County, including the project site.

4.1.2 Federal Clean Water Act, Section 404

Federal wetland regulation (non-marine issues) is guided by the Rivers and Harbors Act of 1899 and the CWA. The Rivers and Harbors Act deals primarily with discharges into navigable waters, while the purpose of the CWA is to restore and maintain the chemical, physical, and biological integrity of all waters of the U.S. Permitting for projects filling waters of the U.S., including wetlands and vernal pools, is overseen by USACE under Section 404 of the CWA. Projects may be permitted on an individual basis or may be covered under one of several approved Nationwide Permits. Individual Permits are assessed individually based on the type of action, amount of fill, etc. Individual Permits typically require substantial time (often longer than six months) to review and approve, while Nationwide Permits are pre-approved if a project meets the appropriate conditions. A CWA Section 401 Water Quality Certification, which is administered by the State Water Resources Control Board, must be issued prior to any 404 Permit.

4.1.3 Migratory Bird Treaty Act

All migratory bird species that are native to the United States or its territories are protected under the Federal MBTA, as amended under the Migratory Bird Treaty Reform Act of 2004 (FR Doc. 05-5127). The

MBTA is generally protective of migratory birds but does not actually stipulate the type of protection required. In common practice, the MBTA is used to place restrictions on the disturbance of active bird nests during the nesting season, which is generally defined as March 15 through August 31 for songbirds. In addition, the USFWS commonly places restrictions on disturbances allowed near active raptor nests. The raptor nesting season is generally defined as January 15 through August 31.

4.1.4 Critical Habitat

As described by the FESA, critical habitat is the geographic area occupied by a threatened or endangered species essential to species conservation that may require special management considerations or protection. Critical habitat also may include specific areas not occupied by the species, but that have been determined to be essential for species conservation.

Critical habitat does not occur on the project site. The nearest critical habitat to the project site is spreading navarretia (*Navarretia fossalis*) critical habitat, which is approximately 2.5 miles to the southeast of the project site (USFWS 2021a).

4.2 STATE REGULATIONS

4.2.1 California Environmental Quality Act

Primary environmental legislation in California is found in CEQA and its implementing guidelines (State CEQA Guidelines), which require that projects with potential adverse effects (i.e., impacts) on the environment undergo environmental review. Adverse environmental impacts are typically mitigated as a result of the environmental review process in accordance with existing laws and regulations.

4.2.2 California Endangered Species Act

The CESA is similar to the FESA in that it contains a process for the listing of species and regulating potential impacts to listed species. Section 2081 of the CESA authorizes the CDFW to enter into a memorandum of agreement for take of listed species for scientific, educational, or management purposes. The MSHCP is the regional 2081 for this portion of the County, which includes the project site. The golden eagle (*Aquila chrysaetos*) and white-tailed kite (*Elanus leucurus*) are considered state fully protected species. Fully protected species may not be taken or possessed at any time, and no state licenses or permits may be issued for their take except for collecting the species necessary for scientific research, and relocation of the bird species for the protection of livestock (Fish and Game Code Sections 3511, 4700, 5050, and 5515).

The Native Plant Protection Act (NPPA) enacted a process in which plants are listed as rare or endangered. The NPPA regulates the collection, transport, and commerce of plants that are listed. The CESA followed the NPPA and covers both plants and animals that are determined to be endangered or threatened with extinction. Plants listed as rare under NPPA were designated threatened under CESA.

4.2.3 Protection of Raptor Species

Raptors (birds of prey) and owls and their active nests are protected by California Fish and Game Code Section 3503.5, which states that it is unlawful to take, possess, or destroy any birds of prey or to take, possess, or destroy the nest or eggs of any such bird unless authorized by the CDFW.

4.2.4 California Fish and Game Code, Section 1602

The California Fish and Game Code (Section 1600 et seq.) requires an agreement with the CDFW for projects affecting riparian and wetland habitats through the issuance of a Streambed Alteration Agreement.

4.3 LOCAL REGULATIONS

4.3.1 Multiple Species Habitat Conservation Plan Consistency

The MSHCP is a comprehensive multi-jurisdictional effort that includes Riverside County and multiple cities in western Riverside County. Rather than addressing sensitive species on an individual basis, the MSHCP focuses on the conservation of 146 species, proposing a reserve system of approximately 500,000 acres and a mechanism to fund and implement the reserve system (Dudek 2003). Most importantly, the MSHCP allows participating entities to issue take permits for listed species so that individual applicants need not seek their own permits from the USFWS and/or CDFW. The MSHCP was adopted on June 17, 2003, by the Riverside County Board of Supervisors. The Incidental Take Permit was issued by both the USFWS and CDFW on June 22, 2004. Section 3.6 above and Section 5.5 below demonstrate the project's consistency with the MSHCP.

4.3.2 Stephens' Kangaroo Rat Habitat Conservation Plan

The Habitat Conservation Plan (HCP) for SKR describes the conservation, mitigation, and monitoring measures that are implemented within core reserves (Riverside County Habitat Conservation Authority [RCHCA 1996]). Within the HCP, there are seven core reserves totaling 41,221 acres for conservation of SKR and associated habitat. The HCP provides a 30-year incidental take authorization for SKR on lands within its boundaries, which includes 533,954 acres within the County of Riverside and Cities of Corona, Hemet, Lake Elsinore, Moreno Valley, Murrieta, Perris, Riverside, and Temecula.

The project site is within the SKR HCP but is not located within any of the core reserves. Therefore, the southern phase and northern phase are required to pay an SKR mitigation fee for incidental take authorization under the SKR HCP.

4.3.3 City Tree Preservation

Section 9.86.130 of the City's Ordinance No. 2015-167 details the protection of existing trees. The following measures are to be implemented for existing trees:

(a) All trees to be saved shall be enclosed by an appropriate construction barrier, such as a chain-link fence or other means, prior to the issuance of a Grading Permit, Building Permit, or before the commencement of work, whichever occurs first. Fences are to remain in place during all phases of construction and may not be removed until construction is complete.

(b) No substantial disruption or removal of the structural or absorptive roots of any tree shall be performed.

(c) No fill material shall be placed within six feet from the outer trunk circumference of any tree.

(d) No fill materials shall be placed, and no excavation shall occur within the drip line of any tree. This is a guideline and is subject to modification to meet the needs of individual tree species as determined by an ISA-certified arborist or landscape architect.

(e) No substantial compaction of the soil within the drip line of any tree shall be undertaken.

(f) No construction, including structures and walls, that disrupts the root system shall be permitted. As a guideline, no cutting of roots should occur within a distance equal to three and one-half times the trunk diameter, as measured at four feet from the surrounding grade. The actual setback may vary to meet the needs of individual tree species as determined by an ISA-certified arborist or landscape architect. Where some root removal is necessary, the tree crown may require thinning to prevent wind damage.

5.0 PROJECT EFFECTS

This section describes potential direct and indirect impacts associated with the proposed project. Direct impacts immediately alter the affected biological resources such that those resources are eliminated temporarily or permanently. Indirect impacts consist of secondary effects of a project, including noise, decreased water quality (e.g., through sedimentation, urban contaminants, or fuel release), fugitive dust, colonization of non-native plant species, animal behavioral changes, and night lighting. The magnitude of an indirect impact can be the same as a direct impact; however, the effect usually takes a longer time to become apparent.

The significance of impacts to biological resources present, or those with potential to occur, was determined based upon the sensitivity of the resource and the extent of the anticipated impacts. For certain highly sensitive resources (e.g., a federally listed species), any impact would be significant. Conversely, other resources that are of low sensitivity (e.g., species with a large, locally stable population in the County but declining elsewhere) could sustain some impact with a less than significant effect.

According to Appendix G of the CEQA Guidelines, project impacts to biological resources would be considered significant if they would:

(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 CDFW or USFWS.

(b) Have a substantial adverse effect on any riparian habitat or sensitive natural community identified by local or regional plans, policies, regulations, or by CDFW or USFWS.

(c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the CWA (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 within an established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.

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

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

5.1 SENSITIVE SPECIES

5.1.1 Rare Plant Species

Southern Phase

Seven of the eight rare plant species recorded within the Romoland quadrangle were not considered to have a potential to occur based on geographic range, elevation range, and/or lack of suitable habitat (see Appendix D). Rare plant surveys were not required since the southern phase is not located within a CASSA (see Section 5.5.4 below) or NEPSSA (see Section 5.5.2 below).

One species (smooth tarplant) was determined to have a high potential to occur on the southern phase based on suitable habitat and recent observations within the immediate vicinity of the site. The nearest record of smooth tarplant was recorded in 2015, 0.30 mile to the north, north of Paloma Valley High School. Smooth tarplant is conditionally covered under the MSHCP and is a CRPR 1B.1 species. Smooth tarplant and burrowing owl occur within the same habitat on-site, and two of the burrowing owl focused surveys overlapped within the species blooming period. Both of the surveys were negative for smooth tarplant.

Northern Phase

Five of the eight rare plant species recorded within the Romoland quadrangle were not considered to have a potential to occur based on geographic range, elevation range, and/or lack of suitable habitat (see Appendix D). Rare plant surveys were not required since the southern phase is not located within a CASSA (see Section 5.5.4 below) or NEPSSA (see Section 5.5.2 below).

Three rare plant species, smooth tarplant, Parry's spineflower, and long-spined spineflower, were considered to have a potential to occur within the northern phase based on the presence of potentially suitable habitat and observations within the vicinity of the northern phase. Therefore, rare plant surveys should be conducted within this suitable habitat to determine the presence of species. The focused surveys should be conducted in accordance with published agency guidelines (CDFW 2009, CDFW 2000, and USFWS 2000) and during the appropriate time of year as outlined in BIO-1 in Section 6 below. If rare plants are identified and cannot be avoided, the project-level biological survey report would justify why species-specific mitigation is necessary and propose mitigation to reduce project impacts to a less than significant level.

5.1.2 Sensitive Animal Species

Southern Phase

Of the 21 sensitive animal species recorded within the vicinity of the southern phase, 14 species were considered to have no potential to occur on the southern phase due to the lack of suitable habitat (see Appendix E). Crotch bumblebee has a low potential to occur within the disturbed California buckwheat

scrub in the southeastern portion of the southern phase. This species is currently listed on CNDDB as a State Candidate Endangered Species. However, the Sacramento Superior Court recently ruled that insects are not subject to protection under the California Endangered Species Act (Almond Alliance et al. v. California Fish and Game Commission). Therefore, this species is not evaluated further in this report because of this and its low potential to occur.

MSHCP Covered Species

Coastal whiptail, loggerhead shrike, San Diego black-tailed jackrabbit, and Stephens' kangaroo rat are fully Covered Species under the MSHCP. With payment of the MSHCP LDMF, no additional mitigation is required for potential impacts to these species. In addition, the southern phase is located within the Stephens' kangaroo rat HCP, and the project is required to pay a Stephens' kangaroo rat mitigation fee for incidental take authorization under the Stephens' kangaroo rat HCP prior to issuance of a grading permit, a certificate of occupancy, or upon final inspection, whichever occurs first. See Section 5.5.6 below for a more detailed discussion.

MSHCP Conditionally Covered Species

BUOW is a conditionally Covered Species under the MSHCP. Focused BUOW surveys were conducted in the southern phase during the 2021 breeding season in accordance with the County's survey protocol (2006). No BUOWs or BUOW sign were observed on the southern phase during the focused survey; therefore, BUOW is currently presumed absent from the surveyed portion of the southern phase. Measure BIO-2 requires a 30-day pre-construction survey to be conducted on the entire southern phase. If BUOWs are observed during the 30-day pre-construction survey, additional measures would be required as outlined in BIO-2.

Species not Covered Under the MSHCP

Although western mastiff bat is not an MSHCP Covered Species, it is listed as SSC by CDFW and does not carry a federal or state listing as threatened or endangered. The southern phase does not support suitable roosting habitat for western mastiff bat. Some potential foraging habitat exists on the southern phase, although the habitat is considered low quality based on the high level of existing disturbance. Western mastiff bat was recorded on CNDDB in 2001, approximately two miles northwest of the southern phase (CDFW 2021). Based on the presence of small extant of suitable habitat, lack of recent observations, and absence of suitable roosting habitat for western mastiff bat, no significant impacts to this bat species is anticipated by the southern phase.

Northern Phase

Of the 21 sensitive animal species recorded within the vicinity of the southern phase, 12 species were considered to have no potential to occur on the northern phase due to the lack of suitable habitat (Appendix E).

MSHCP Covered Species

Western spadefoot, coastal whiptail, loggerhead shrike, SKR, and San Diego black-tailed jackrabbit are fully Covered Species under the MSHCP. With the payment of the MSHCP LDMF, no additional mitigation is required for potential impacts to these species. The northern phase is located within the Stephens' kangaroo rat HCP and is required to pay a Stephens' kangaroo rat mitigation fee for incidental

take authorization under the Stephens' kangaroo rat HCP prior to issuance of a grading permit, a certificate of occupancy, or upon final inspection, whichever occurs first. See Section 5.5.6 below for a more detailed discussion.

MSHCP Conditionally Covered Species

BUOW and Riverside fairy shrimp are conditionally Covered Species under the MSHCP.

The northern phase is located within the BUOW Survey Area, and suitable habitat is present within the northern phase. To avoid potential impacts to BUOW, a mitigation measure is included as BIO-3 in Section 6.0 below to conduct focused surveys in the northern phase prior to ground-disturbing activities. Measure BIO-1 also requires a 30-day pre-construction survey to be conducted on the entire northern phase. If BUOWs are observed during focused surveys and/or during the 30-day pre-construction survey, additional measures would be required as outlined in BIO-2 and BIO-3.

The northern phase supports suitable fairy shrimp habitat within the mapped herbaceous wetland and disturbed wetland communities. Therefore, focused surveys for the fairy shrimp species should be completed, and if fairy shrimp surveys are positive, additional measures would be required as outlined in BIO-4.

Species not Covered Under the MSHCP

Although western mastiff bat and western yellow bat are not MSHCP Covered Species, these species are listed as SSC by CDFW and do not carry a federal or state listing as threatened or endangered. The northern phase does not support suitable roosting habitat for either bat species. Some potential foraging habitat exists on the northern phase, although the habitat is considered low quality based on the high level of existing disturbance. Western mastiff bat was recorded on CNDDB in 2001, approximately two miles northwest of the northern phase (CDFW 2021). Western yellow bat was only recorded on CNDDB in 1982, approximately three miles to the north of the northern phase (CDFW 2021). Based on the presence of small extant of suitable habitat, lack of recent observations, and absence of suitable roosting habitat for western yellow bat and western mastiff bat, no significant impacts to either of these sensitive bat species are anticipated by the northern phase.

5.1.3 Sensitive Vegetation Communities

5.1.3.1 California Department of Fish and Wildlife Sensitive Vegetation Communities/Habitats

Southern Phase

Approximately 1.92 acres of the 9.17-acre southern phase are proposed for development, which is dominated by non-native vegetation (Figure 8, Impacts to Vegetation; Table 6, Impacts to Southern Phase Vegetation and Land Uses). Temporary impacts are those associated with the 30-foot construction buffer surrounding the pump track, parking, and restroom facility. There are no temporary impacts associated with the bike track as the soil will be scraped using a skip loader with a scraper attachment. Additionally, 1,500 feet of silt fencing will be placed around the construction basin to avoid any impacts to potentially jurisdictional habitat. None of the vegetation communities mapped on the southern phase are considered sensitive pursuant to CDFW (2021b). Therefore, no impacts to sensitive vegetation communities would occur, and mitigation is not warranted.

Table 6
IMPACTS TO SOUTHERN PHASE VEGETATION AND LAND USES

MSHCP Vegetation Community Classification		Holland/Oberbauer	Temporary Impacts (Acres)	Permanent Impacts (Acres)
Collapsed	Uncollapsed			
Coastal Sage Scrub	Riversidean Sage Scrub	Riversidean sage Scrub (disturbed form)	--	--
Riparian Scrub, Woodland, Forest	Tamarisk Scrub	Tamarisk Scrub (including disturbed)	--	--
Developed/Disturbed Land	Residential/Urban	Urban/Developed	--	--
	Exotic	Disturbed	0.81	1.11
Water	Open Water	Open Water	--	--
		TOTAL	**0.81**	**1.92**

Source: HELIX (2020)

Northern Phase

Because no specific site plan is available for the northern phase, this study assumes the entire 13.56-acre northern phase may be proposed for development (Figure 8*;* Table 7, *Impacts to Northern Phase Vegetation and Land Uses*). The majority of the northern phase is dominated by disturbed habitat. None of the vegetation communities mapped on the northern phase are considered sensitive pursuant to CDFW (2021b). Therefore, no impacts to sensitive vegetation communities would occur, and mitigation is not warranted.

Table 7
IMPACTS TO NORTHERN PHASE VEGETATION AND LAND USES

MSHCP Vegetation Community Classification		Holland/Oberbauer	Temporary Impacts (Acres)	Permanent Impacts (Acres)
Collapsed	Uncollapsed			
Riparian Scrub, Woodland, Forest	Southern Willow Scrub	Southern Willow Scrub	--	0.61
	Tamarisk Scrub	Tamarisk Scrub	--	0.12
N/A[4]	N/A	Disturbed Wetland	--	0.48
N/A[6]	N/A	Herbaceous Wetland	--	0.08
Grassland	Non-native Grassland	Non-native grassland	--	4.68
Developed/Disturbed Land	Residential/Urban	Urban/Developed	--	0.43
	Exotic	Disturbed	--	7.16
		TOTAL	**--**	**13.56**

Source: HELIX (2020)

5.1.3.2 California Department of Fish and Wildlife Riparian Habitat and Streambed

Southern Phase

The southern phase supports a total of 3.20 acres of potential jurisdictional habitat pursuant to Section 1602 of the CFG Code as regulated by CDFW, consisting of 1.37 acres of basin with riparian vegetation and 1.83 acres of vegetated flood control channel. Potential CDFW jurisdiction in the southern phase will be entirely avoided by the project, and mitigation is not warranted (Table 7; Figure 9, *Impacts to*

Potential Jurisdictional Features and MSHCP Riparian/Riverine Areas). Additionally, 1,500 feet of silt fencing will be placed around the construction basin to avoid any impacts to potentially jurisdictional habitat.

Northern Phase

The northern phase supports a total of 1.35 acres of potential jurisdictional streambed and habitat pursuant to Section 1602 of the CFG Code as regulated by CDFW (Table 3; Figure 9). Potential CDFW jurisdiction in the northern phase includes 0.55 acre of wetland habitat, 0.61 acre of southern willow scrub, and 0.19 acre of streambed habitat. A formal delineation of jurisdictional resources was not conducted, as the evaluation was conducted at a programmatic level. Therefore, a formal delineation of jurisdictional limits should be conducted in the northern phase prior to development to determine the limits. Where avoidance is not feasible, project-specific impacts to jurisdictional resources will be applied by federal and state regulators via the applicable consulting and permitting process. The types of mitigation required may include on-site or off-site preservation, enhancement, creation, and/or restoration (BIO-5).

5.2 U.S. ARMY CORPS OF ENGINEERS/REGIONAL WATER QUALITY CONTROL BOARD JURISDICTION

Southern Phase

The southern phase supports a total of 3.20 acres of potential jurisdictional resources pursuant to Sections 404/401 of the CWA as regulated by USACE and RWQCB. The potential jurisdictional resources in the southern phase will be entirely avoided by the project, and mitigation is not warranted (Figure 9).

Northern Phase

The northern phase supports potential jurisdictional waters and wetlands pursuant to Sections 404/401 of the CWA as regulated by USACE and RWQCB. A formal delineation of jurisdictional resources was not conducted, as the evaluation was conducted at a programmatic level. Therefore, a formal delineation of jurisdictional limits should be conducted in the northern phase prior to development to determine the jurisdictional limits. If resources under USACE and/or RWQCB jurisdiction are identified, impacts should be avoided where feasible. Where avoidance is not feasible, project-specific impacts to jurisdictional resources will be applied by federal and state regulators via the applicable consulting and permitting process. The types of mitigation required may include on-site or off-site preservation, enhancement, creation, and/or restoration (BIO-5).

5.3 WILDLIFE MOVEMENT AND MIGRATORY SPECIES

5.3.1 Wildlife Movement

Southern Phase

The southern phase is not part of a regional corridor and does not serve as a nursery site. The southern phase is not identified by the MSHCP (Dudek 2003) or South Coast Missing Linkages (South Coast Wildlands 2008) as being part of a local or regional corridor or linkage. The southern phase currently does not directly connect two or more large blocks of habitat. The southern phase is bounded by

Evans Park

Northern Phase
Southern Phase
Permanent Impacts
Temporary Impact Buffer

Vegetation and Land Cover Types

Disturbed Riversidean Sage Scrub
Disturbed Tamarisk Scrub
Open Water
Herbaceous Wetland
Disturbed Wetland
Southern Willow Scrub
Tamarisk Scrub
Non-native Grassland
Disturbed
Developed

CAPRICE RD
BRIARLEA RD
ADELINA DR
EVANS RD
CRAIG AVE

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0 125 Feet

Source: Aeial (NearMap, 2020)

HELIX Environmental Planning

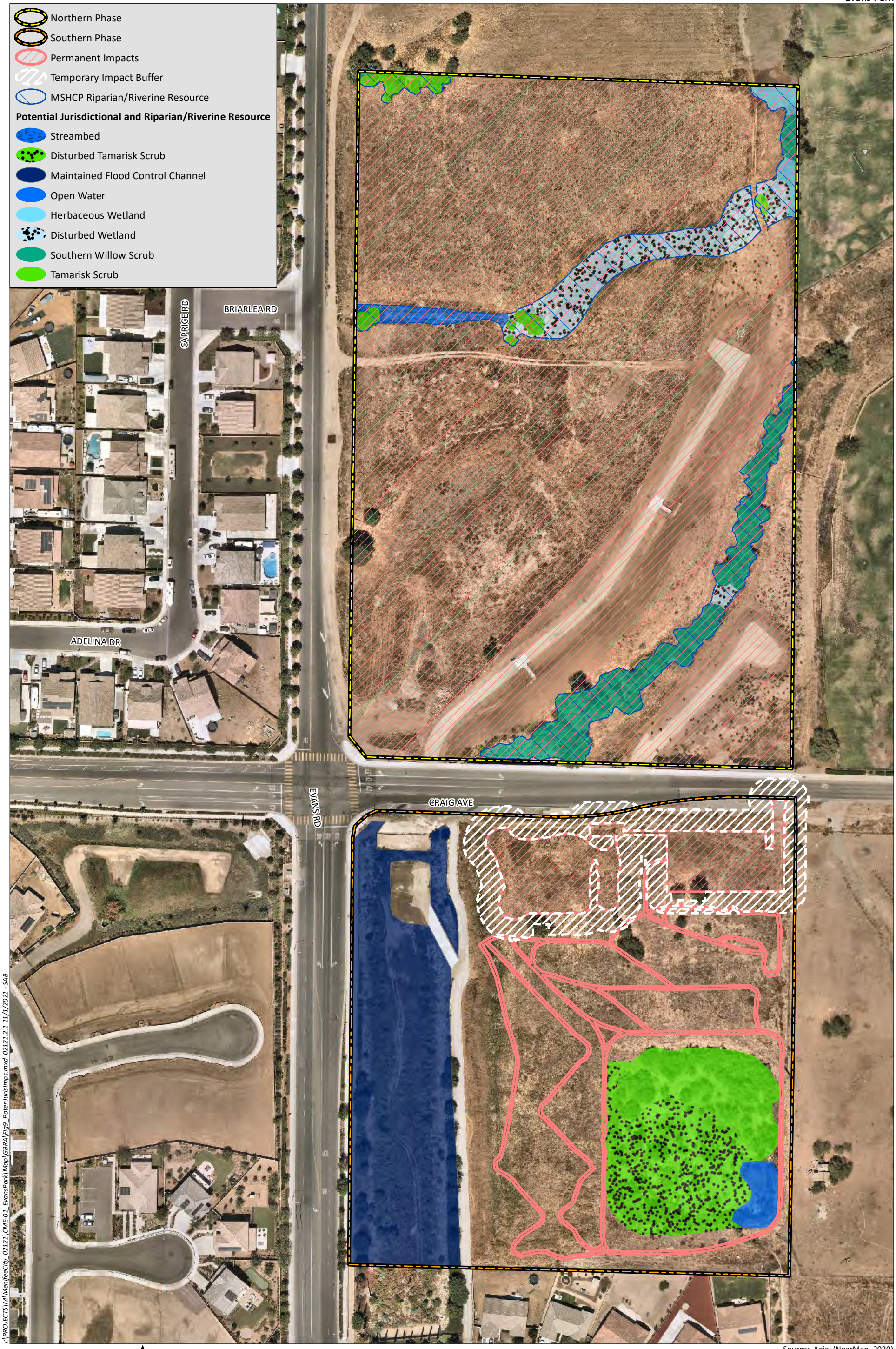
Impacts to Vegetation

Figure 8

- Northern Phase
- Southern Phase
- Permanent Impacts
- Temporary Impact Buffer
- MSHCP Riparian/Riverine Resource

Potential Jurisdictional and Riparian/Riverine Resource

- Streambed
- Disturbed Tamarisk Scrub
- Maintained Flood Control Channel
- Open Water
- Herbaceous Wetland
- Disturbed Wetland
- Southern Willow Scrub
- Tamarisk Scrub



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Source: Aeial (NearMap, 2020)

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HELIX Environmental Planning

Impacts to Potential Jurisdictional Features and MSHCP Riparian/Riverine Areas

Figure 9

residential development to the north and west. The southern phase does not support native communities, with the exception of a small, isolated patch of disturbed Riversidean sage scrub, and is dominated by non-native species that may be used by birds and smaller mammals and reptiles that have adapted to human disturbance. Some wildlife moving may use the southern phase for foraging and/or nesting, but the use of the southern phase would be restricted due to limited vegetative cover and adjacent disturbance from existing human development. Therefore, impacts to wildlife movement and migratory species would be less than significant, and mitigation is not warranted.

Northern Phase

The northern phase is not part of a regional corridor and does not serve as a nursery site. The northern phase is not identified by the MSHCP (Dudek 2003) or South Coast Missing Linkages (South Coast Wildlands 2008) as being part of a local or regional corridor or linkage. The northern phase currently does not directly connect two or more large blocks of habitat. The northern phase is bounded by development to the east and west. The northern phase is dominated by non-native habitat. There is a drainage on-site which may be used by smaller mammals and reptiles, but it is restricted due to the surrounding development. Therefore, impacts to wildlife movement and migratory species would be less than significant, and mitigation is not warranted.

5.3.2 Migratory Species

Southern Phase

The development of the proposed southern phase could disturb or destroy active migratory bird nests, including eggs and young. Disturbance to or destruction of migratory bird eggs, young, or adults is in violation of the MBTA and is considered a potentially significant impact. Although suitable habitat for nesting birds on the southern phase is limited, herbaceous ground cover and shrubs located throughout the southern phase could provide habitat for protected nesting bird species. A mitigation measure is provided as BIO-6 in Section 6.0 below, which would help ensure the southern phase is in compliance with MBTA regulations.

The development of the northern phase could disturb or destroy active migratory bird nests, including eggs and young. Disturbance to or destruction of migratory bird eggs, young, or adults is in violation of the MBTA and is considered a potentially significant impact. Within the northern phase, the trees along the drainage could provide habitat for protected nesting birds. A mitigation measure is provided as BIO-6 in Section 6.0 below, which would help ensure the northern phase is in compliance with MBTA regulations.

5.4 LOCAL POLICIES AND ORDINANCES

Southern Phase: The southern phase supports trees. However, none of the trees within the southern phase will be impacted. Therefore, the project would not conflict with Section 9.86.130 of the City's Ordinance.

Northern Phase: The northern phase supports trees that may be subject to tree protection measures. In accordance with Measure BIO-7, the City will ensure consistency with the City's tree ordinance, which would reduce any direct impacts to City-protected trees to less than significant.

5.5 ADOPTED HABITAT CONSERVATION PLANS

As discussed in Section 3.6.1 above, the southern phase is within the City/Menifee Area Plan of the MSHCP. The project site is not located within or adjacent to an MSHCP Criteria Area; therefore, the project site is not subject to special conservation requirements that apply to cells and is not required to undergo the HANS process. The following sections demonstrate the project's compliance with MSHCP requirements.

5.5.1 Riparian/Riverine Areas and Vernal Pools (MSHCP Section 6.1.2)

The identification of MSHCP Riparian/Riverine resources is based on the potential for the habitat to support, or be a tributary to habitat that supports Riparian/Riverine Covered Species. Riparian/Riverine Covered Species are identified in MSHCP Section 6.1.2. The MSHCP defines Riparian/Riverine habitat as "lands which contain Habitat dominated by trees, shrubs, or emergent mosses and lichens, which occur close to or which depend upon soil moisture from a nearby fresh water source; or areas with freshwater flow during all or a portion of the year" (Dudek 2003). The MSHCP defines Vernal Pools as "seasonal wetlands that occur in depression areas that have wetlands indicators of all three parameters (soils, vegetation, and hydrology) during the wetter portion of the growing season but normally lack wetlands indicators of hydrology and/or vegetation during the drier portion of the growing season" (Dudek 2003). Artificially created wetlands, except for those created intentionally to provide habitat or resulting from the creation of open waters or alteration of natural stream courses, are not considered MSHCP Vernal Pools.

Riparian/Riverine Habitat

Southern Phase: The southern phase does not support Riparian/Riverine or Vernal Pool habitat as defined by MSHCP. Therefore, the southern phase would not result in significant impacts to MSHCP Riparian/Riverine Areas.

Northern Phase: The northern phase has habitat identified as potential Riparian/Riverine Resources and Vernal Pool Resources (Figure 6). The potential Riparian/Riverine Areas and Vernal Pool include the drainage feature; the streambed in the northern half of the northern phase; herbaceous wetlands; and the tamarisk scrub in the northwestern corner associated with an off-site riparian feature. Additionally, there is a potential for vernal pool habitat within the mapped herbaceous wetland and disturbed wetland communities. The MSHCP Riparian/Riverine Areas and Vernal Pool evaluation was conducted at a programmatic level, and project-level evaluations would be required to determine the limits, as outlined in BIO-5. MSHCP Riverine/Riverine Areas are equivalent to CDFW jurisdiction.

Since the northern phase proposes impacts to Riparian/Riverine Areas, the project is required to prepare a Determination of Biologically Equivalent or Superior Preservation (DBESP), which provides a detailed account of the impacts and proposed mitigation to compensate for impacts. Mitigation for permanent impacts to the Riparian/Riverine Areas would be met by implementing required mitigation for impacts to CDFW jurisdiction. Mitigation would include off-site enhancement, restoration, and/or creation at a ratio of no less than 2:1, as required by Measure BIO-5 included in Section 6.0 below. With the implementation of Measure BIO-5, the project would not result in significant impacts to MSHCP Riparian/Riverine Areas.

Riparian/Riverine Species

Southern Phase: The southern phase does not support suitable habitat for Riparian/Riverine or Vernal Pool plant species and, therefore, no impacts are anticipated by the project. The southern phase does not support suitable habitat for 11 of the 12 Riparian/Riverine or Vernal Pool animal species (Table 5). The basin in the southern phase supports an area that may be potentially suitable habitat for Riverside fairy shrimp. However, the basin, including the potentially suitable fairy shrimp habitat, is completely avoided by the project. Therefore, the southern phase is consistent with MSHCP Section 6.1.2.

Northern Phase: The northern phase supports potentially suitable habitat for Riparian/Riverine or Vernal Pool plant species. The southern phase does not support suitable habitat for 10 of the 12 Riparian/Riverine or Vernal Pool animal species. The northern portion of the northern phase supports depressional areas that may potentially be suitable habitat for Riverside fairy shrimp. Prior to the commencement of ground-disturbing activities (i.e., earthwork, clearing, and/or grubbing) in the northern phase, dry season and wet season surveys will be completed by a permitted biologist following the current USFWS survey protocol for large brachiopods (USFWS 2015). If listed fairy shrimp are detected during the wet season surveys, a DBESP must be prepared to ensure that the proposed alternative provides for the replacement of any lost functions and values of habitat. Compensatory mitigation for impacts to occupied habitat would be required, as outlined in Measure BIO-4 in Section 6.0 below.

The drainage in the northern phase also supports suitable habitat for least Bell's vireo. Based on conceptual plans for the northern phase, the project would not permanently or temporarily impact suitable least Bell's vireo habitat (southern willow scrub). However, project construction could have indirect impacts to least Bell's vireo if present within the drainage. Indirect impacts to this species during the nesting season (March 1 through August 31) would be a significant impact. Prior to the construction of the northern phase, a least Bell's vireo protocol survey is required pursuant to BIO-8 included in Section 6.0 below. BIO-8 also includes additional measures that would be required if least Bell's vireo surveys are positive.

5.5.2 Narrow Endemic Plant Species (MSHCP Section 6.1.3)

The project site is not located within a NEPSSA; therefore, no focused surveys were required, and the proposed project is consistent with Section 6.1.3 of the MSHCP.

5.5.3 Urban/Wildland Interface Guidelines (MSHCP Section 6.1.4)

Proposed developments adjacent to MSHCP Conservation Areas may create edge effects that can impact conserved biological resources. The MSHCP provides several guidelines that address potential indirect effects from proposed developments that are in proximity to MSHCP Conservation Areas. These guidelines include measures addressing the quantity and quality of runoff generated by the development (i.e., drainage and toxics), night lighting, noise, non-native invasive plant species, barriers to humans and animal predators, and grading/land development encroachment.

The project site does not occur adjacent to land targeted for conservation or existing MSHCP Conservation Areas. The nearest MSHCP Conservation Area is Proposed Linkage 8, which is approximately 2.5 miles to the south of the project site. Since the project site is not within or adjacent to MSHCP Conservation areas, many of the MSHCP Urban/Wildland Interface Guidelines are not required.

As discussed below, the project will comply with applicable guidelines to ensure consistency with MSHCP Section 6.1.4.

Drainage

The southern phase does not support any drainages; however, the northern phase supports one drainage feature. Therefore, the project will incorporate measures to avoid the discharge of untreated surface runoff into downstream waters. Measures will include those required for construction pursuant to the State Water Resources Control Board General Construction Stormwater Permit and those required post-construction pursuant to the National Pollutant Discharge Elimination System and Municipal Storm Drain requirements. The project shall be designed to prevent the release of toxins, chemicals, petroleum products, exotic plant materials, or other elements that might degrade or harm biological resources or ecosystem processes downstream from the project site.

Toxics

Land uses that use chemicals or generate bio-products that are potentially toxic or may adversely affect wildlife species, habitat, or water quality shall incorporate measures to ensure that the application of such chemicals does not result in a discharge into downstream waters. Measures such as those employed to address drainage issues would be implemented by the proposed project to avoid the potential impacts of toxics.

Lighting

The project site does not occur directly adjacent to MSHCP Conservation Areas, which are separated by existing development. Therefore, lighting standards are not applicable.

Noise

The project site does not occur directly adjacent to MSHCP Conservation Areas, which are separated by existing development. Therefore, noise standards are not applicable.

Invasives

The project site does not occur directly adjacent to MSHCP Conservation Areas. Therefore, the project is not required to avoid the use of invasive, non-native plants in accordance with MSHCP Table 6.2.

Barriers

Since the project site is not directly adjacent to the MSHCP Conservation Area, barriers or signage are not necessary.

Grading/Land Development

The project site is not adjacent to an existing or proposed MSHCP Conservation Areas. Therefore, manufactured slopes associated with proposed site development will not extend into an MSHCP Conservation Area.

5.5.4 Additional Surveys (MSHCP Section 6.3.2)

The project site is not within a CASSA or an amphibian or mammal survey area. No impacts to CASSA species or sensitive amphibian or mammal species are proposed.

Southern Phase: Focused BUOW surveys were required and completed for the southern phase in accordance with the County's survey protocol during the 2021 breeding season (County 2006). As discussed in Section 3.5.2, no BUOWs or BUOW sign were observed during the focused surveys. As required by BIO-2, a pre-construction survey must be conducted within 30 days of ground-disturbing activities (i.e., earthwork, clearing, and/or grubbing).

Northern Phase: Based on the results of the Step I Habitat Assessment, the northern phase supports suitable BUOW habitat. Prior to the commencement of ground-disturbing activities, Step II Focused Burrow and BUOW surveys will be conducted in accordance with the County's survey protocol (County 2006; Measure BIO-3). If BUOW is not detected during the Step II surveys, a pre-construction survey must be conducted within 30 days of ground-disturbing activities (i.e., earthwork, clearing, and/or grubbing). If BUOW is detected during the Step II surveys, a DBESP must be prepared to ensure that the proposed alternative provides for the replacement of any lost functions and values of habitat. If BUOW is detected during the pre-construction survey or Step II surveys, avoidance of active nests and/or relocation of BUOW would be required, as outlined in Measure BIO-3 in Section 6.0 below. As discussed above, the proposed project is consistent with MSHCP Section 6.3.2.

As discussed above, the proposed project is consistent with MSHCP Section 6.3.2.

5.5.5 Fuels Management (MSHCP Section 6.4)

The property is not adjacent to an MSHCP Conservation Area. Therefore, fuel modification impacts would not extend into a conservation area. The project is consistent with MSHCP Section 6.4.

5.5.6 Multiple Species Habitat Conservation Plan and Stephens' Kangaroo Rat Fees

In order for the project to participate in the MSHCP, the project proponent is required to pay an MSHCP LDMF in order to finance the acquisitions of conservation areas to provide habitat for MSHCP covered species (City 2007). The LDMF must be paid prior to the issuance of a building permit. The applicant shall pay the LDMF as determined by the City. Final fee credits shall be determined through coordination with the City.

The project site is also within the SKR HCP but is not located within any of the core reserves (RCHCA 1996). Therefore, the project is required to pay an SKR mitigation fee for incidental take authorization under the SKR HCP (City 1996).

A mitigation measure (BIO-9) is provided in Section 6.0, which requires the project proponent to pay the MSHCP LDMF and SKR HCP fees.

6.0 MITIGATION MEASURES

The following provides recommended measures intended to minimize or avoid impacts to biological resources:

BIO-1 **Rare Plants:** Due to the presence of suitable habitat for smooth tarplant, Parry's spineflower, and long-spined spineflower in the northern phase, a qualified biologist shall survey the northern phase during the appropriate time of year (i.e., when the species is readily identifiable, such as during its blooming period) prior to initiating construction activities. The focused surveys shall be conducted in accordance with published agency guidelines (CDFW 2009, CDFW 2000, USFWS 2000). If individuals are found, one or more of the following shall be completed:

- Seed collection of the rare plant species at the end of the growing season and prior to ground disturbance, or obtain special-status plant species seeds from a native plant nursery if available, and plant collected seeds within an appropriate on-site or off-site mitigation area, which will be conserved as open space in perpetuity;

- Payment into a mitigation bank and/or in-lieu fee program that has mitigation available for the rare plant species; and/or

- Preservation of land that contains the rare plant species.

Mitigation for significant impacts to special-status plant species will be implemented in consultation with CDFW.

BIO-2 **Burrowing Owl Pre-construction Survey:** In compliance with the MSHCP, a pre-construction survey shall be conducted on the southern phase within 30 days prior to ground disturbance to determine the presence of burrowing owls. If the pre-construction survey is negative and burrowing owl is confirmed absent, then ground-disturbing activities (i.e., earthwork, clearing, and grubbing) shall be allowed to commence and no further mitigation would be required.

If BUOW is observed during the pre-construction survey, active burrows shall be avoided by the project in accordance with the CDFW's *Staff Report on Burrowing Owl Mitigation* (2012) or CDFW's most recent guidelines. The Project Proponent shall immediately inform the Western Riverside County RCA of BUOW observations. A BUOW Protection and Relocation Plan (plan) shall be prepared by a qualified biologist, which must be sent for approval by RCA prior to initiating ground disturbance. The RCA will coordinate directly with CDFW as needed to ensure that the plan is consistent with the MSHCP and CDFW guidelines. The plan shall detail avoidance measures that shall be implemented during construction and passive or active relocation methodology. Relocation shall only occur outside of the nesting season (September 1 through January 31). The RCA may require the creation of translocation sites within the MSHCP Conservation Area for the establishment of new colonies. If required, the translocation sites must take into consideration unoccupied habitat areas, the presence of burrowing mammals, existing colonies, and the effects to other MSHCP Covered Species in order to successfully create suitable habitat for BUOW. The translocation sites must be developed in consultation with RCA. If required, translocation sites would also be described in the agency-approved plan.

BIO-3 **Burrowing Owl Protocol Survey:** Prior to the commencement of ground-disturbing activities (i.e., earthwork, clearing, and/or grubbing) in the northern phase, Step II surveys shall be conducted to determine the presence or absence of BUOW on the project site. The surveys shall be conducted in accordance with the County's survey protocol (2006). If BUOW is not detected during the Step II surveys, a pre-construction survey shall be conducted on the southern phase within 30 days prior to ground disturbance to determine the presence of BUOW. If the pre-construction survey is negative and BUOW is confirmed absent, ground-disturbing activities shall be allowed to commence, and no further mitigation is required.

If BUOW is observed on the southern phase during the Step II surveys, a Determination of Biologically Equivalent or Superior Preservation assessment shall be completed to ensure that the proposed alternative provides for the replacement of any lost functions and values of habitat. At least 90 percent of the area with long-term conservation value and BUOW pairs shall be conserved on-site if the southern phase (including adjacent areas) supports three or more pairs BUOWs; supports greater than 35 acres of suitable habitat, and is non-contiguous with MSHCP Conservation Area lands.

If BUOW is observed during the Step II surveys or the pre-construction survey, active burrows shall be avoided by the project in accordance with the CDFW's *Staff Report on BUOW Mitigation* (2012) or CDFW's most recent guidelines. The project proponent shall inform the Western Riverside County Regional Conservation Authority (RCA) of BUOW observations. A BUOW Protection and Relocation Plan (plan) shall be prepared by a qualified biologist, which must be sent for approval by RCA prior to initiating ground disturbance. The RCA will coordinate directly with CDFW as needed to ensure that the plan is consistent with the MSHCP and CDFW guidelines. The plan shall detail avoidance measures that shall be implemented during construction and passive or active relocation methodology. Relocation shall only occur outside of the nesting season (September 1 through January 31).

BIO-4 **Fairy Shrimp:** Prior to commencement of ground-disturbing activities (i.e., earthwork, clearing, and/or grubbing) within the northern phase, dry and wet season focused surveys for federally listed fairy shrimp species shall be completed. The surveys shall be conducted by a permitted biologist and follow the current USFWS survey protocol for large brachiopods (USFWS 2015). Survey results shall be submitted to USFWS following completion of the surveys. If listed fairy shrimp species are not detected during the wet season surveys, then ground-disturbing activities shall be allowed to commence within the Phase III portion of the southern phase, and no further mitigation is required.

If federally listed fairy shrimp are identified during the wet and/or dry season surveys, and the project cannot avoid occupied habitat, a DBESP assessment shall be completed to ensure that the proposed alternative provides for the replacement of any lost functions and values of habitat. Project impacts to occupied listed fairy shrimp habitat shall be accomplished through the purchase of off-site mitigation credits at an agency-approved mitigation bank or in-lieu fee program, or through the purchase of off-site land that supports occupied habitat at a ratio of no less than 2:1. If off-site land is purchased, the mitigation site shall be preserved in perpetuity through a conservation easement, deed restriction, or similar legal protection mechanism.

BIO-5 **Jurisdictional Resources:** A jurisdictional assessment shall be conducted for the northern phase. Jurisdictional resources shall be avoided when feasible. Where avoidance is not feasible,

project-specific impacts to jurisdictional resources will be applied by federal and state regulators via the applicable consulting and permitting process. The types of mitigation required may include on-site or off-site preservation, enhancement, creation, and/or restoration at a ratio of no less than 2:1 or higher, and are to be accomplished in close proximity to the impacts or at least in the same watershed. Final requirements and locations are, however, subject to change during applicable consultation/permit processes required by the USACE, RWQCB, and CDFW.

If Riparian/Riverine Areas in the northern phase (which are consistent with CDFW jurisdictional resources) cannot be avoided, a DBESP assessment shall be completed to ensure that the proposed alternative provides for the replacement of any lost functions and values of habitat. Project impacts to Riparian/Riverine Areas shall be accomplished through on-site mitigation, the purchase of off-site mitigation credits at an agency-approved mitigation bank or in-lieu fee program, or through the purchase of off-site land. If off-site land is purchased, the mitigation site shall be preserved in perpetuity through a conservation easement, deed restriction, or similar legal protection mechanism.

Best Management Practices (BMPs) to minimize and avoid impacts to jurisdictional resources during and after construction may include, but are not limited to, the following:

- Construction-related equipment will be stored in developed areas, outside of the drainage. No equipment maintenance will be done within or adjacent to the drainage.
- Source control and treatment control BMPs will be implemented to minimize the potential contaminants that are generated during and after construction. Water quality BMPs will be implemented throughout the project to capture and treat potential contaminants.
- Substances harmful to aquatic life will not be discharged into the drainage. All hazardous substances will be properly handled and stored.
- A Storm Water Pollution Prevention Plan will be prepared to prevent sediment from entering the drainage during construction.
- To avoid attracting predators during construction, the project will be kept clean of debris to the extent possible. All food-related trash items will be enclosed in sealed containers and regularly removed from the site.
- Construction personnel will strictly limit their activities, vehicles, equipment, and construction material to the proposed project footprint, staging areas, and designated routes of travel.
- Exclusion fencing will be installed to demarcate the limits of disturbance. The exclusion fencing should be maintained until the completion of construction activities.

BIO-6 **Nesting Birds:** To the extent feasible, construction activities (i.e., earthwork, clearing, and grubbing) within the southern phase or northern phase shall occur outside of the general bird nesting season for migratory birds. The general nesting season is March 15 through August 31 for songbirds and January 15 through August 31 for raptors.

If construction activities (i.e., earthwork, clearing, and grubbing) must occur during the general bird nesting season for migratory songbirds (March 15 through August 31) and raptors (January

15 through August 31) within the southern phase or northern phase, a qualified biologist shall perform a pre-construction survey of potential nesting habitat to confirm the absence of active nests belonging to migratory birds and raptors afforded protection under the MBTA and CFG Code. The pre-construction survey shall be performed no more than seven days prior to the commencement of construction activities. If construction is inactive for more than seven days, an additional survey shall be conducted. The results of the pre-construction survey shall be documented by the qualified biologist.

If the qualified biologist determines that no active migratory bird or raptor nests occur, the activities shall be allowed to proceed without any further requirements. If the qualified biologist determines that an active migratory bird or raptor nest is present, no impacts within 300 feet (500 feet for raptors) of the active nest shall occur until the young have fledged the nest and the nest is confirmed to no longer be active, or as determined by the qualified biologist. The biological monitor may modify the buffer or propose other recommendations in order to minimize disturbance to nesting birds.

BIO-7 **Protected Trees:** Prior to impacting any trees within the northern phase, the City will confirm compliance with the City of Menifee's Park Design, Landscaping and Tree Preservation (Section 9.86.130 of the City's Ordinance No. 2015-167).

BIO-8 **Least Bell's Vireo:** Due to the presence of suitable habitat for least Bell's vireo within the northern phase, the following avoidance and minimization measures shall be implemented to avoid potential impacts to the species:

(1) Construction activities (i.e., earthwork, clearing, and grubbing) shall occur outside of the breeding season for least Bell's vireo (March 15 through August 31).

(2) If construction activities (i.e., earthwork, clearing, grubbing, etc.) are proposed within the least Bell's vireo's breeding season, focused protocol surveys for least Bell's vireo shall be conducted prior to commencement of construction activities, within all suitable habitat located on the northern phase, along with a 500-foot buffer where suitable habitat occurs, to determine whether the habitat is occupied. Focused surveys for least Bell's vireo shall be conducted by a qualified biologist and during the breeding season in accordance with the most recent USFWS guidelines. The results of the focused surveys shall be documented by the qualified biologist and submitted to USFWS and/or CDFW.

If the qualified biologist determines that least Bell's vireo do not occur within 500 feet of the proposed construction, the activities shall be allowed to proceed without any further requirements. If the qualified biologist determines that the habitat is occupied by least Bell's vireo, the following avoidance and minimization measures shall be implemented:

(a) No construction activities may occur within 500 feet of an active nest of a least Bell's vireo. A qualified biologist shall clearly delineate the required avoidance buffer around the active least Bell's vireo nest. The buffer shall be clearly marked with flags and/or fencing prior to the initiation of construction activities.

(b) If construction activities are proposed within 500 feet of an occupied nest, a biological monitor shall be required to observe the behavior of any breeding least

Bell's vireo. The construction supervisor shall be notified if the construction activities appear to be altering the birds' normal breeding behavior. No construction activities will be allowed within 500 feet of an occupied nest until additional minimization measures have been performed. Such measures may include retaining a qualified acoustician to determine ambient noise levels and project-related noise levels at the edge of the occupied habitat. Noise levels at the edge of the occupied habitat shall not exceed an hourly average of 60 decibels (dB[A]), or a 3 dB(A) increase in noise levels if ambient noise levels exceed 60 dB(A). If project-related noise levels at the edge of the occupied habitat are above 60 dB(A) or the 3 dB(A) increase in noise occurs, additional minimization measures shall be taken to reduce project-related noise levels to an acceptable level as determined by the biological monitor. Measures may include, but are not limited to, limitation on the use of certain equipment, placement of equipment, restrictions on the simultaneous use of equipment, use of noise barriers, or other noise attenuation methods as deemed appropriate by the biologist and acoustician. The USFWS and/or CDFW shall be notified of additional minimization measures taken to reduce noise during construction activities. If the biological monitor determines the construction activities are posing a potential risk to the nest after implementing the additional minimization measures, the noise generating construction activities shall cease until USFWS and/or CDFW are contacted to discuss alternative methods. The biological monitor shall prepare written documentation of all monitoring activities at the completion of construction activities, which shall be submitted to CDFW/or USFWS.

(c) All project personnel shall attend a training program presented by a qualified biologist prior to construction activities. The training program will inform project personnel about the life history of least Bell's vireo and all avoidance and minimization measures.

(d) The construction contractor shall only allow construction activities to occur during daylight hours, and high noise levels shall generally be limited according to these hours.

(e) The construction contractor shall require functional mufflers on all construction equipment (stationary or mobile) used within or immediately adjacent to any 500-foot avoidance buffers to reduce construction equipment noise. Stationing equipment is situated so that noise generated from the equipment is not directed towards any habitat occupied by least Bell's vireo.

The construction contractor will place staging areas as far as feasible from any occupied nest by least Bell's vireo.

BIO-9 **Habitat Conservation Plan Fees:** The City is subject to the MSHCP LDMF and the SKR HCP Fee for the southern phase and northern phase, which shall be paid prior to the issuance of any grading permit.

7.0 CERTIFICATION/QUALIFICATION

The following individuals contributed to the fieldwork and/or preparation of this report:

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Appendix A

Plant Species Observed

Appendix A
Plant Species Observed

Family	Scientific Name*	Common Name
Dicotyledones		
Asteraceae	*Baccharis salicifolia*	mule fat
	*Centaurea melitensis**	tocalote
	Corethrogyne filaginifolia var. *incana*	San Diego sand aster
	Deinandra fasciculata	fascicled tarplant
	Heterotheca grandiflora	telegraph weed
	*Lactuca serriola**	wild lettuce
Boraginaceae	*Heliotropium curassavicum* var. *oculatum*	salt heliotrope
Brassicaceae	*Hirschfeldia incana**	short-pod mustard
Chenopodiaceae	*Amaranthus albus**	white tumbleweed
	*Salsola tragus**	Russian thistle
Euphorbiaceae	*Croton setigerus*	dove weed
Lamiaceae	*Trichostema lanceolatum*	vinegar weed
Malvaceae	*Malvella leprosa*	alkali-mallow
Moraceae	*Morus alba**	white mulberry
Myrtaceae	*Eucalyptus* sp.*	eucalyptus
Onagraceae	*Epilobium brachycarpum*	annual fireweed
	Epilobium ciliatum ssp. *ciliatum*	willow herb
Polygonaceae	*Eriogonum fasciculatum*	California buckwheat
	*Rumex crispus**	curly dock
Salicaceae	*Populus fremontii*	Fremont cottonwood
Simaroubaceae	*Ailanthus altissima**	tree-of-heaven
Solanaceae	*Datura wrightii*	jimson weed
Monocotyledones		
Poaceae	*Bromus hordeaceus**	soft brome
	*Bromus madritensis**	foxtail chess
	*Paspalum dilatatum **	palo verde
	*Polypogon monspeliensis**	annual beardgrass

* Non-native species

Appendix B

Animal Species Observed or Detected

Appendix B
Animal Species Observed or Detected

Taxon		Scientific Name	Common Name
Order	**Family**		
VERTEBRATES			
Birds			
Accipitriformes	Accipitridae	*Accipiter cooperii*	Cooper's hawk
		Buteo jamaicensis	red-tailed hawk
	Cathartidae	*Cathartes aura*	turkey vulture
Apodiformes	Trochilidae	*Calypte anna*	Anna's hummingbird
		Selasphorus sasin	Anna’s hummingbird
Charadriiformes	Charadriidae	*Charadrius vociferus*	Killdeer
Columbiformes	Columbidae	*Columbia livia*	rock dove
		Zenaida macroura	mourning dove
Passeriformes	Corvidae	*Corvus corax*	common raven
	Fringillidae	*Haemorhous mexicanus*	house finch
		Spinus psaltria	lesser goldfinch
	Icteridae	*Sturnella neglecta*	western meadowlark
	Passerellidae	*Melospiza melodia*	song sparrow
	Sylviidae	*Chamaea fasciata*	wrentit
	Turdidae	*Sialia mexicana*†	western bluebird
	Tyrannidae	*Sayornis nigricans*	black phoebe
		Sayornis saya	Say's phoebe
Pelecaniformes	Ardeidae	*Egretta thula*	snowy egret
Strigiformes	Tytonidae	*Tyto alba*	barn owl

Appendix C

Representative Site Photographs



Photo 1. View of disturbed Riversidean sage scrub habitat in southern phase with disturbed tamarisk scrub in background, facing east.



Photo 2. View of southern willow scrub and disturbed habitat in the northern phase, facing north.

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Photo 3. View of tamarisk scrub in the southern phase, facing south.



Photo 4. View of disturbed tamarisk scrub in the southern phase, facing south.

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Photo 5. View of herbaceous wetland in the northern phase, facing north.



Photo 6. View of disturbed wetland in the northern phase, facing west.

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Photo 7. View of non-native grassland habitat in the northern phase, facing north.



Photo 8. View of the maintained flood control channel (developed land) in the southern phase, facing west.

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Photo 9. View of developed land use in the northern phase, facing south.



Photo 10. View of disturbed habitat in the southern phase, facing east.

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Photo 11. View of disturbed habitat in the northern phase, facing north.



Photo 12. View of the open water habitat in the southern phase, facing northwest.

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Appendix D

Rare Plant Species Potential to Occur

Attachment D
Rare Plant Species Potential to Occur[1]

Species Name	Common Name	Status[2]	Habitat, Ecology, and Life History	Potential to Occur[3]	
				Southern Phase	Northern Phase
Allium munzii	Munz's onion	FE/ST CRPR 1B.1 MSHCP Covered Species (b)	Medium perennial herb. Occurs on clay soils in chaparral, cismontane woodland, coastal sage scrub, pine-juniper woodland, and valley and foothill grasslands. Elevation range 300-900 m. Flowering period Apr-May.	**None.** The southern phase does not support clay soils.	**None.** The northern phase does not support clay soils.
Brodiaea filifolia	thread-leaved brodiaea	FT/SE CRPR 1B.1 MSHCP Covered Species (d)	Medium perennial herb. Occurs in clay soils within vernally-moist grasslands and vernal pool periphery are typical locales. Elevation range 25-860 m. Flowering period Mar-Jun.	**None.** The southern phase does not support clay soils.	**None.** The northern phase does not support clay soils.
Centromadia pungens ssp. *laevis*	smooth tarplant	CRPR 1B.1 MSHCP Covered Species (d)	Medium annual herb. Occurs within valley and foothill grasslands, chenopod scrub, meadows and seeps, playas, and riparian woodlands. Often occurs in disturbed areas, particularly near alkaline locales. Elevation range 90-500 m. Flowering period Apr-Sep.	**High**. The southern phase supports suitable habitat.	**High.** The northern phase contains suitable habitat.
Chorizanthe parryi var. *parryi*	Parry's spineflower	CRPR 1B.1 MSHCP Covered Species (e)	Small annual herb. Occurs in sandy soil on flats and foothills in mixed grassland, coastal sage scrub, and chaparral communities. Elevation range 90-800 m. Flowering period May-Jun.	**None.** The southern phase does not support suitable habitat.	**Low.** The southern phase supports marginally suitable habitat. An observation was recorded on CNDDB in 2014 less than 2 miles southwest of the northern phase.

Appendix D (cont.)
Rare Plant Species Potential to Occur[1]

Species Name	Common Name	Status[2]	Habitat, Ecology, and Life History	Potential to Occur[3]	
				Southern Phase	Northern Phase
Chorizanthe polygonoides var. *longispina*	long-spined spineflower	CRPR 1B.2 MSHCP Covered Species	Small annual herb. Occurs within clay lenses largely devoid of shrubs. Can be occasionally seen on vernal pool and even montane meadows peripheries near vernal seeps. Elevation range 30-1500 m. Flowering period Apr-Jun.	**None.** The southern phase does not support clay lenses or vernally-moist areas.	**Moderate.** The northern phase supports suitable habitat. The species was recorded on CNDDB in 2017 less than a miles southeast of the northern phase.
Lasthenia glabrata ssp. *coulteri*	Coulter's goldfields	CRPR 1B.1 MSHCP Covered Species (d)	Medium annual herb. Occurs in coastal salt marsh, upper end of tidal inundation areas, and vernal pools. Elevation range 0-1000 m. Flowering period Apr-May.	**None.** The southern phase does not support coastal habitats or vernal pools.	**None.** The northern phase does not support coastal habitats or vernal pools.
Navarretia fossalis	spreading navarretia	FT CRPR 1B.1 MSHCP Covered Species (b)	Small annual herb. Occurs in vernal pools, vernal swales, or roadside depressions. Population size is strongly correlated with rainfall. Depth of pool appears to be a significant factor as this species is rarely found in shallow pools. Elevation range 30-1300 m. Flowering period Apr-Jun.	**None.** The southern phase does not support vernally-moist areas or roadside depressions.	**None.** The northern phase does not support vernally-moist areas or roadside depressions.

Appendix D (cont.)
Rare Plant Species Potential to Occur[1]

Species Name	Common Name	Status[2]	Habitat, Ecology, and Life History	Potential to Occur[3]	
				Southern Phase	Northern Phase
Orcuttia californica	California Orcutt grass	FE/SE CRPR 1B.1 MSHCP Covered Species (b)	Small annual herb. Occurs in or near vernal pools. This species tends to grow in wetter portions of the vernal pool basin but does not show much growth until the basins become somewhat desiccated. Elevation range 0-700 m. Flowering period Apr-Aug.	**None.** The southern phase does not support vernal pools.	**None.** The northern phase does not support suitable vernal pool habitat.

Source: HELIX (2021)

[1] Sensitive species reported within the Romoland quadrangle on CNDDB and CNPS databases.

[2] Listing is as follows: F = Federal; S = State of California; E = Endangered; T = Threatened.
CRPR = California Rare Plant Rank: 1A – presumed extinct; 1B – rare, threatened, or endangered in California and elsewhere; 2A – rare, threatened, or endangered in California and elsewhere; 2B – rare, threatened, or endangered in California but more common elsewhere; 3 – more information on distribution, endangerment, ecology, and/or taxonomic validity is needed. Extension codes: .1 – seriously endangered; .2 – moderately endangered; .3 – not very endangered. MSHCP Conditionally Covered Species (a) through (f): (a) surveys may be required for species as part of wetland mapping (MSHCP Section 6.1.2); (b) surveys may be required for species within Narrow Endemic Plant Species Survey Area (MSHCP Section 6.1.3); (c) surveys may be required for species within locations shown on survey maps (MSHCP Section 6.3.2); (d) surveys may be required for species within Criteria Area Species Survey Area (MSHCP Section 6.3.2); (e) covered species will be considered to be covered species adequately conserved when conservation requirements identified in species-specific conservation objectives have been met (MSHCP Table 9-3); and (f) covered species will be conserved covered species adequately conserved when a Memorandum of Understanding is executed with the Forest Service that addresses management for these species on Forest Service Land (MSHCP Table 9-3).

[3] Potential to Occur is assessed as follows: **None**: Habitat suitable for species survival does not occur on the project site, the project site is not within geographic range of the species, and/or the project site is not within the elevation range of the species; **Low**: Suitable habitat is present on the project site but of low quality and/or small extent. The species has not been recorded recently on or near the project site. Although the species was not observed during surveys for the current project, the species cannot be excluded with certainty; **Moderate**: Suitable habitat is present on the project site and the species was recorded recently near the project site; however, the habitat is of moderate quality and/or small extent. Although the species was not observed during surveys for the current project, the species cannot be excluded with certainty; **High**: Suitable habitat of sufficient extent is present on the project site and the species has been recorded recently on or near the project site but was not observed during surveys for the current project. However, focused/protocol surveys are not required or have not been completed; **Presumed Present**: The species was observed during focused surveys for the current project and is assumed to occupy the project site; **Presumed Absent**: Suitable habitat is present on the project site but focused surveys for the species were negative.

Appendix E

Sensitive Animal Species Potential to Occur

Attachment E
Sensitive Animal Species Potential to Occur[1]

Species Name	Common Name	Status[2]	Habitat, Ecology, and Life History	Potential to Occur[3]	
				Southern Phase	Northern Phase
Invertebrates					
Bombus crotchii	Crotch bumble bee	SCE	Coastal California east to the Sierra-Cascade crest and south into Mexico. Occurs within open grassland and scrub habitats. Species' food genera include *Antirrhinum* sp., *Phacelia* sp., *Clarkia* sp., *Dendromecon* sp., *Eschscholzia* sp., and *Eriogonum* sp.	**Low.** The majority of the southern phase supports suitable grassland habitat, with a small area of scrub habitat, mapped as disturbed Riversidean Sage Scrub in the southeastern portion of the site. Potential food source, California buckwheat (*Eriogonum fasciculatum*) was located in this area. This species was recorded in 2001 in the vicinity of Cottonwood Canyon, approximately 4 miles west of the site.	**None.** The northern phase supports grassland habitat, but lacks scrub habitat and potential food source.
Euphydryas editha quino	quino checkerspot butterfly	FE/-- MSHCP Covered Species	Open, sunny areas within chaparral and coastal sage scrub. Host plants are *Plantago* spp., *Antirrhinum coulterianum*, and *Cordylanthus rigidus*.	**None.** The southern phase does not support chaparral or coastal sage scrub habitat.	**None.** The northern phase does not support chaparral or coastal sage scrub habitat.
Streptocephalus woottoni	Riverside fairy shrimp	FE MSHCP Covered Species (a)	Typically requires deep vernal pools and seasonal wetlands at least 30 centimeters deep.	**None.** The southern phase does not support suitable vernal pool habitat.	**High.** The northern phase supports suitable seasonal wetland habitat within the southeastern portion. The closest known occurrence is 3 miles to the southeast of the site from 2002.

Appendix E (cont.)
Sensitive Animal Species Potential to Occur[1]

Species Name	Common Name	Status[2]	Habitat, Ecology, and Life History	Potential to Occur[3]	
				Southern Phase	Northern Phase
Amphibians					
Spea hammondii	western spadefoot	SSC MSHCP Covered Species	Occurs in open coastal sage scrub, chaparral, and grassland, along sandy or gravelly washes, floodplains, alluvial fans, or playas; requires vernal pools for breeding and friable soils for burrowing; generally excluded from areas with bullfrogs (*Rana catesbiana*) or crayfish (*Procambarus* spp.)	**None.** The southern phase does not support suitable vernal pool habitat.	**Moderate.** The northern phase supports limited areas of potential vernal pool habitat and grassland habitat. There are several occurrences of the species recorded on CNDDB within 5 miles of the site.
Reptiles					
Arizona elegans occidentalis	California glossy snake	SSC	Most common in desert habitats but also occur in chaparral, sagebrush, valley-foothill hardwood woodland, pine-juniper woodland, and annual grass. Prefers open sandy areas with scattered brush, but also found in rocky areas.	**None.** The southern phase does support annual grassland habitat. However, the non-native grass habitat is dense and not open with scattered brush as preferred by the species.	**None.** The northern phase does support annual grassland habitat. However, the non-native grass habitat is dense and not open with scattered brush as preferred by the species.

Appendix E (cont.)
Sensitive Animal Species Potential to Occur[1]

Species Name	Common Name	Status[2]	Habitat, Ecology, and Life History	Potential to Occur[3]	
				Southern Phase	Northern Phase
Aspidoscelis tigris stejnegeri	coastal whiptail	SSC MSHCP Covered Species	Open coastal sage scrub, chaparral, and woodlands. Frequently found along the edges of dirt roads traversing its habitats. Important habitat components include open, sunny areas, shrub cover with accumulated leaf litter, and an abundance of insects, spiders, or scorpions.	**Low.** The southern phase includes marginally suitable habitat within the small area of disturbed Riversidean sage scrub.	**Moderate.** The northern phase supports suitable riparian habitat.
Crotalus ruber	red-diamond rattlesnake	SSC MSHCP Covered Species	Occurs in chaparral, coastal sage scrub, along creek banks, particularly among rock outcrops or piles of debris with a supply of burrowing rodents for prey.	**None**. The southern phase does not support suitable habitat with rock outcrops or dense vegetation as preferred by this species.	**None**. The northern phase does not support suitable habitat with rock outcrops or dense vegetation as preferred by this species.
Phrynosoma blainvillii	coast horned lizard	SSC MSHCP Covered Species	Coastal sage scrub and open areas in chaparral, oak (*Quercus* sp.) woodlands, and coniferous forests with sufficient basking sites, adequate scrub cover, and areas of loose soil; require native ants, especially harvester ants (*Pogonomyrmex* spp.), and are generally excluded from areas invaded by Argentine ants (*Linepithema humile*).	**None.** The majority of the site within the southern phase does not support coastal sage scrub, oak woodlands, or coniferous forests. There is a small area mapped as disturbed California buckwheat scrub at the southeastern portion of the site. However, this area is small (0.16 acre) and would not be expected to support this species due to the small size and no contiguous habitat adjacent.	**None.** The northern phase does not support chaparral, oak woodlands, or forest habitats.

Appendix E (cont.)
Sensitive Animal Species Potential to Occur[1]

Species Name	Common Name	Status[2]	Habitat, Ecology, and Life History	Potential to Occur[3]	
				Southern Phase	Northern Phase
Birds					
Aquila chrysaetos	Golden eagle	SFP MSHCP Covered Species	Typical foraging habitat includes grassy and open, shrubby habitats. Generally nests on remote cliffs; requires areas of solitude at a distance from human habitation.	**None.** The southern phase does not support suitable open space away from human habitation for this species or remote cliffs for nesting.	**None.** The northern phase does not support suitable open space away from human habitation for this species or remote cliffs for nesting.
Athene cunicularia	burrowing owl	SSC MSHCP Covered Species (c)	Typical habitat is grasslands, open scrublands, agricultural fields, and other areas where there are ground squirrel burrows or other areas in which to burrow.	**Presumed Absent.** Focused surveys were conducted for burrowing owl and were negative.	**High.** The northern phase has suitable burrowing owl habitat. Burrowing owls have been observed within the vicinity of the northern phase.
Lanius ludovicianus	loggerhead shrike	SSC MSHCP Covered Species	Prefers open habitats with scattered shrubs, trees, posts, fences, utility lines, or other perches. Highest density occurs in open-canopied valley foothill hardwood, valley foothill hardwood-conifer, valley foothill riparian, pinyon-juniper, juniper, desert riparian, and Joshua tree habitats. Frequents open habitats with sparse shrubs and trees, other suitable perches, bare ground, and low or sparse herbaceous cover	**Moderate.** The southern phase supports suitable habitat. The nearest observation of this species was recorded in CNDDB in 2007, approximately 4.5 miles to the northeast of the southern phase.	**Moderate.** The northern phase supports suitable habitat. The nearest observation of this species was recorded in CNDDB in 2007, approximately 4.5 miles to the northeast of the northern phase.

Appendix E (cont.)
Sensitive Animal Species Potential to Occur[1]

Species Name	Common Name	Status[2]	Habitat, Ecology, and Life History	Potential to Occur[3]	
				Southern Phase	Northern Phase
Polioptila californica californica	coastal California gnatcatcher	FT/SSC MSHCP Covered Species	Occurs in coastal sage scrub and very open chaparral.	**None.** The majority of the site within the southern phase does not support coastal sage scrub or chaparral habitat. There is a small area mapped as disturbed California buckwheat scrub at the southeastern portion of the site. However, this area is small (0.16 acre) and would not be expected to support this species due to the small size and no contiguous habitat adjacent.	**None.** The northern phase does not support coastal sage scrub or chaparral habitats.
Mammals					
Chaetodipus californicus femoralis	Dulzura pocket mouse	SSC	Primarily associated with mature chaparral. It has, however, been trapped in mule fat scrub and is known to occur in coastal sage scrub.	**None.** The southern phase does not support chaparral, mule fat scrub, or coastal sage scrub.	**None.** The northern phase does not support chaparral, mule fat scrub, or coastal sage scrub.
Chaetodipus fallax fallax	northwestern San Diego pocket mouse	SSC MSHCP Covered Species	Herbaceous openings within coastal sage scrub, chaparral, grasslands, and desert scrub. Often associated with sandy, rocky, or gravelly substrates.	**None.** The majority of the southern phase does not support chaparral or desert scrub. There is a small area mapped as disturbed Riversidean sage scrub at the southeastern portion of the site. However, this area is small (0.16 acre) and would not be expected to support this species due to the small size. Additionally, the species is generally associated with rocks or course gravel which is not found on site.	**None.** The majority of the northern phase does not support coastal scrub, chaparral or desert scrub. There is grassland habitat on the northern half of the site. Additionally, the species is generally associated with rocks or course gravel which is not found on site.

Appendix E (cont.)
Sensitive Animal Species Potential to Occur[1]

Species Name	Common Name	Status[2]	Habitat, Ecology, and Life History	Potential to Occur[3]	
				Southern Phase	Northern Phase
Dipodomys merriami parvus	San Bernardino kangaroo rat	FE/SSC MSHCP Covered Species (c)	Generally associated with alluvial fan sage scrub, but also occurs in sage scrub, chaparral, and grassland in proximity to alluvial fan sage scrub habitats.	**None.** The southern phase does not support suitable support alluvial fan sage scrub and is not in proximity to this habitat type.	**None.** The northern phase does not support suitable support alluvial fan sage scrub and is not in proximity to this habitat type
Dipodomys stephensi	Stephens' kangaroo rat	FE/ST MSHCP Covered Species	Primarily occurs in sparsely vegetated areas within grassland habitats, but also found in open coastal scrub habitat. Feeds on filaree (*Erodium* sp.) and brome (*Bromus* sp.) seeds. Dig burrows in firm soil or use abandoned pocket gopher burrows.	**Moderate.** The southern phase supports suitable grassland habitat, but it is not sparsely vegetated. The nearest observation of this species was recorded in CNDDB in 1989, less than 1 mile to the north of the southern phase.	**Moderate.** The northern phase supports suitable grassland habitat, but it is not sparsely vegetated. The nearest observation of this species was recorded in CNDDB in 1989, less than 1 mile to the north of the northern phase.
Eumops perotis californicus	western mastiff bat	SSC	Roosts under exfoliating rock slabs on cliff faces and occasionally in large boulder crevices and building cracks. Forages in a variety of open areas, including washes, floodplains, chaparral, coastal sage scrub, woodlands, ponderosa pine forests, grassland, and agricultural areas.	**Low.** No suitable roosting habitat as there are no cliff crevices or buildings on the site. However, there is suitable foraging habitat. have foraging habitat. The nearest observation of this species was recorded in CNDDB in 2001, approximately 2 miles to the northwest of the southern phase.	**Low.** No suitable roosting habitat as there are no cliff crevices or buildings on-site. However, there is suitable foraging habitat. have foraging habitat. The nearest observation of this species was recorded in CNDDB in 2001, approximately 2 miles to the northwest of the northern phase.

Appendix E (cont.)
Sensitive Animal Species Potential to Occur[1]

Species Name	Common Name	Status[2]	Habitat, Ecology, and Life History	Potential to Occur[3]	
				Southern Phase	Northern Phase
Lasiurus xanthinus	western yellow bat	SSC	Roosts in trees and are commonly found in palms and cottonwoods. Typically forages over water and among trees within riparian, desert riparian, desert wash, and palm oasis habitats.	**None.** The southern phase does not support suitable habitat.	**Low.** No suitable roosting habitat on-site. However, there is suitable foraging habitat. The nearest observation of this species was recorded in CNDDB in 1982, approximately 3 miles to the north of the northern phase.
Lepus californicus bennettii	San Diego black-tailed jackrabbit	SSC MSHCP Covered Species	Occurs primarily in open habitats including coastal sage scrub, chaparral, grasslands, croplands, and open, disturbed areas if there is at least some shrub cover present.	**Moderate.** The southern phase supports suitable grassland habitat. The nearest observation of this species was recorded in CNDDB in 2015, approximately 5 miles to the northeast of the southern phase.	**Moderate.** The southern phase supports suitable grassland habitat. The nearest observation of this species was recorded in CNDDB in 2015, approximately 5 miles to the northeast of the northern phase.
Onychomys torridus ramona	southern grasshopper mouse	SSC	Occurs in desert areas, especially scrub habitats with friable soils for digging. Prefers low to moderate shrub cover.	**None.** The southern phase does not support suitable desert habitat or friable soils required for the species.	**None.** The northern phase does not support suitable desert habitat or friable soils required for the species.

Appendix E (cont.)
Sensitive Animal Species Potential to Occur[1]

Species Name	Common Name	Status[2]	Habitat, Ecology, and Life History	Potential to Occur[3]	
				Southern Phase	Northern Phase
Perognathus longimembris brevinasus	Los Angeles pocket mouse	SSC MSHCP Covered Species (c)	Sandy, gravelly, or stony soils within coastal scrub, alluvial sage scrub, and grassland habitats.	**None.** The southern phase does not support soils required for the species.	**None.** The northern phase does not support soils required for the species.

[1] Sensitive species reported within the Romoland quadrangle on CNDDB.

[2] Listing is as follows: F = Federal; S = State of California; E = Endangered; T = Threatened; CE = Candidate Endangered; CT = Candidate Threated; FP = Fully Protected; SSC = State Species of Special Concern. MSHCP Conditionally Covered Species (a) through (f): (a) surveys may be required for species as part of wetland mapping (MSHCP Section 6.1.2); (b) surveys may be required for species within Narrow Endemic Plant Species Survey Area (MSHCP Section 6.1.3); (c) surveys may be required for species within locations shown on survey maps (MSHCP Section 6.3.2); (d) surveys may be required for species within Criteria Area Species Survey Area (MSHCP Section 6.3.2); (e) covered species will be considered to be covered species adequately conserved when conservation requirements identified in species-specific conservation objectives have been met (MSHCP Table 9-3); and (f) covered species will be conserved covered species adequately conserved when a Memorandum of Understanding is executed with the Forest Service that addresses management for these species on Forest Service Land (MSHCP Table 9-3).

[3] Potential to Occur is assessed as follows. **None**: Species is so limited to a particular habitat that it cannot disperse across unsuitable habitat (*e.g.* aquatic organisms), and habitat suitable for its survival does not occur on the Southern phase (Project Sites 1-4, Off-site Areas, and other areas within the Specific Plan Area); **Not Expected**: Species moves freely and might disperse through or across the Southern phase, but suitable habitat for residence or breeding does not occur on the Southern phase (includes species recorded during surveys but only as transients); **Low**: Suitable habitat is present on the Southern phase but of low quality and/or small extent. The species has not been recorded recently on or near the Southern phase. Although the species was not observed during surveys for the current project, the species cannot be excluded with certainty; **Moderate**: Suitable habitat is present on the Southern phase and the species was recorded recently near the Southern phase; however, the habitat is of moderate quality and/or small extent. Although the species was not observed during surveys for the current project, the species cannot be excluded with certainty; **High**: Suitable habitat of sufficient extent for residence or breeding is present on the site and the species has been recorded recently on or near the Southern phase but was not observed during surveys for the current project. However, focused/protocol surveys are not required or have not been completed; **Presumed Present**: The species was observed during biological surveys for the current project and is assumed to occupy the Southern phase; **Presumed Absent**: Suitable habitat is present on the Southern phase but focused/protocol surveys for the species were negative.

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Appendix F

Burrowing Owl Focused Survey Report

HELIX Environmental Planning, Inc.
7578 El Cajon Boulevard
La Mesa, CA 91942
619.462.1515 tel
619.462.0552 fax
www.**helixepi**.com

September 2, 2021 02121.00002.001

Mr. Bryce Howell
City of Murrieta
29995 Evans Road
Menifee, CA 92586

Subject: 2021 Burrowing Owl (*Athene cunicularia*) Survey Report for the Evans Park Project Southern Phase

Dear Mr. Howell:

This letter report presents the results of the 2021 focused burrowing owl (*Athene cunicularia;* BUOW) survey conducted by HELIX Environmental Planning, Inc. (HELIX) for the first (southern) phase of the Evans Park (project) located in the City of Menifee (City), Riverside County (County), California. The survey was conducted in accordance with the County's Burrowing Owl Survey Instructions for the Western Riverside Multiple Species Habitat Conservation Plan (MSHCP; County of Riverside [County] 2006). This survey was conducted to meet applicable conditions under the MSHCP, which was approved in 2003 (Dudek and Associates [Dudek] 2003). The MSHCP is a comprehensive planning effort that includes multiple cities throughout Riverside County, including the City of Menifee. As part of the MSHCP implementation, enrolled jurisdictions are required to impose terms of the MSHCP, including appropriate surveys in accordance with Volume 1, Section 6. The project site is located within the MSHCP BUOW Survey Area; therefore, surveys are required if suitable habitat is present (County 2006). This letter report describes the methods used to perform the survey and the survey results.

PROJECT LOCATION

The approximately six-acre project site is generally located west of Interstate(I)-15, east of I-215, and south of State Route 72 in the City of Menifee in Riverside County, California (Figure 1, *Regional Location*). [1] The project site is located in Section 9 of Township 6 South, Range 3 West on the U.S. Geological Survey (USGS) 7.5-minute Romoland quadrangle map (Figure 2, *USGS Topography*). Specifically, the project site is located immediately southeast of the Craig Avenue and Evans Road intersection (Figure 3, *Aerial Photograph*).

[1] An additional three acres in the western portion of the site is dedicated to a flood control channel and is not included in the overall park acreage.

PROJECT DESCRIPTION

The proposed project is the construction of a community park on the Evans Park site in the City of Menifee. The park, located east of Evans Road and north and south of Craig Avenue, will be constructed in two separate phases. The first phase, which will encompass the southern six acres of the site, is currently funded and designed. The second phase, which will encompass the northern 12.88 acres of the site, is in the conceptual phase. Once complete, Evans Park will provide approximately 19 acres of recreational and open space facilities.

For the first (southern) phase, the City proposes to build an approximate six-acre bicycle trails park on the six-acre site (Figure 3). The bicycle trails park would include a parking lot at the northeast corner with an entrance off Craig Avenue and a prefabricated restroom. The park will be divided into two separate sections, including a smaller paved tight circuit area called a "Pump Track" and the larger dirt trail portion of the track, which will have some wooden slat sections to add challenging elements to the track.

Parking will be provided via a 12,000 square foot gravel lot in the northeast portion of the site, accessible from Craig Avenue, and will be able to accommodate approximately 45 vehicles. While the parking lot will be gravel at the opening of the southern phase, it will transition to a paved lot approximately one year after the southern phase becomes operational.

PROJECT SITE DESCRIPTION

The project site is dominated by non-native vegetation, consisting of mostly short-pod mustard (*Hirschfeldia incana*). Tree of heaven (*Ailanthus altissima*) and black locust (*Robinia pseudoacacia*) are located in the northern part of the project site. The western portion includes a maintained flood control channel along Evans Road, in addition to a basin that was constructed in 2009 as part of the surrounding residential development, which is dominated by tamarisk (*Tamarix* sp.). The project site topography is mostly flat, with elevations ranging from approximately 1,482 feet above mean sea level (AMSL) near the southeastern portion of the project site to approximately 1,492 feet above AMSL near the northern boundary. The northern portion of the project site is bounded by Craig Avenue and the western portion by Evans Road. Representative photographs of the project site are included as Attachment A, *Representative Site Photographs*.

The immediate surrounding land uses include residential development west and south, undeveloped land to the north and east, and Paloma Valley High School to the northeast (Figure 3). The project site is located approximately 7.5 miles west of Diamond Valley Lake.

METHODS

A Step I Habitat Assessment and Step II Locating Burrows and Burrowing Owls were conducted on the project site by HELIX biologist Matthew Dimson between July 26, 2021 and August 25, 2021, in accordance with the County's survey protocol (County 2006). The specific survey information is provided in Table 1, *Survey Information.* The habitat assessment and focused burrow and BUOW surveys are described in detail below.

Table 1
SURVEY INFORMATION

Site Visit	Survey Date	Biologists	Start/Stop Time	Start/Stop Weather Conditions	Survey Results
1[1]	07/26/21	Matthew Dimson	0600-0745	69°F, wind 0-1 mph, 100% clouds 70°F, wind 0-1 mph, 90% clouds	Suitable habitat and burrows detected.
2	08/03/21	Matthew Dimson	0610-0750	58°F, wind 0-1 mph, 0% clouds 70°F, wind 0-1 mph, 0% clouds	No BUOW detected.
3	08/17/21	Matthew Dimson	0615-0800	63°F, wind 1-2 mph, 70% clouds 66°F, wind 1-2 mph, 70% clouds	No BUOW detected.
4	08/25/21	Matthew Dimson	0610-0730	61°F, wind 0-1 mph, 0% clouds 68°F, wind 0-1 mph, 0% clouds	No BUOW detected.

[1] This visit included the habitat assessment, focused burrow survey, and first focused burrowing owl survey

Step I – Habitat Assessment

The project site is located within an MSHCP BUOW survey area; therefore, a Step I Habitat Assessment was conducted to determine whether the project site supports suitable BUOW habitat. The habitat assessment was conducted concurrently with the Step II Part A, as described below. The assessment was conducted on the project site and within a 150-meter (approximately 500-foot) buffer zone around the periphery project site (collectively, the survey area). The survey area was slowly walked and assessed for suitable BUOW habitat, including:

- disturbed low-growing vegetation within grassland and shrublands (less than 30 percent canopy cover);
- gently rolling or level terrain;
- areas with abundant small mammal burrows, especially California ground squirrel burrows (*Otospermophilus beecheyi*);
- fence posts, rocks, or other low perching locations; and
- man-made structures, such as earthen berms, debris piles, and cement culverts.

Inaccessible areas of the survey area were visually assessed using binoculars.

Step II – Locating Burrows and Burrowing Owls

Since suitable habitat was observed during the habitat assessment, Step II surveys were conducted within the survey area. Step II surveys, which consist of a focused burrow survey (Part A) and four focused BUOW surveys (Part B), were conducted to determine whether the survey area supports suitable burrows and/or BUOW. The focused burrow survey was conducted concurrently with the first BUOW survey.

All potential burrows were checked for signs of recent owl occupation. Signs of occupation include:

- pellets/casting (regurgitated fur, bones, and/or insect parts);
- whitewash (excrement); and/or
- feathers.

Since suitable burrows were observed within the survey area, three additional BUOW surveys were conducted. Mr. Dimson walked transects spaced no greater than 30 meters apart (approximately 100 feet) to allow for 100 percent visual coverage of all suitable habitat within the survey area. Mr. Dimson walked slowly and methodically, closely checking suitable habitat within the survey area for suitable burrows, BUOW diagnostic sign (e.g., molted feathers, pellets/castings, or whitewash at or near a burrow entrance), and individual BUOW. Inaccessible areas of the survey area were visually assessed using binoculars. All suitable burrows, burrow surrogates, BUOW sign, and/or BUOW observations were recorded using a handheld Global Positioning System unit (Figure 4, *Transect Locations*).

RESULTS

Suitable BUOW habitat was observed within the survey area, including non-native vegetation and disturbed habitat (Attachment A). Suitable burrows that could potentially be used by BUOW were observed within the study area. No BUOW or sign of BUOW occupation (e.g., pellets, whitewash, feathers) were observed during the four focused surveys. Therefore, BUOW does not currently occupy the project site. Transects walked are shown on Figure 4.

CONCLUSION

No BUOWs were observed or detected within the survey area during the focused surveys. Burrows with potential to support BUOW were noted in the survey area, but no sign of BUOW occupation was observed. A pre-construction survey is required 30 days prior to ground disturbance pursuant to the County's survey protocol (County 2006). If ground-disturbing activities are delayed more than 30 days after the pre-construction survey has been completed, the study area must be resurveyed.

Please note, only the southern phase of the Evans Park Project was surveyed. Protocol surveys will be required for the northern phase prior to construction to determine the status of BUOW on the northern phase.

If you have any questions regarding the information presented in this letter report, please contact Matthew Dimson (MattD@helixepi.com) or Amy Lee (AmyL@helixepi.com) at 619-462-1515.

Sincerely,



Matthew Dimson
Biologist



Amy Lee
Biology Project Manager

Attachments:

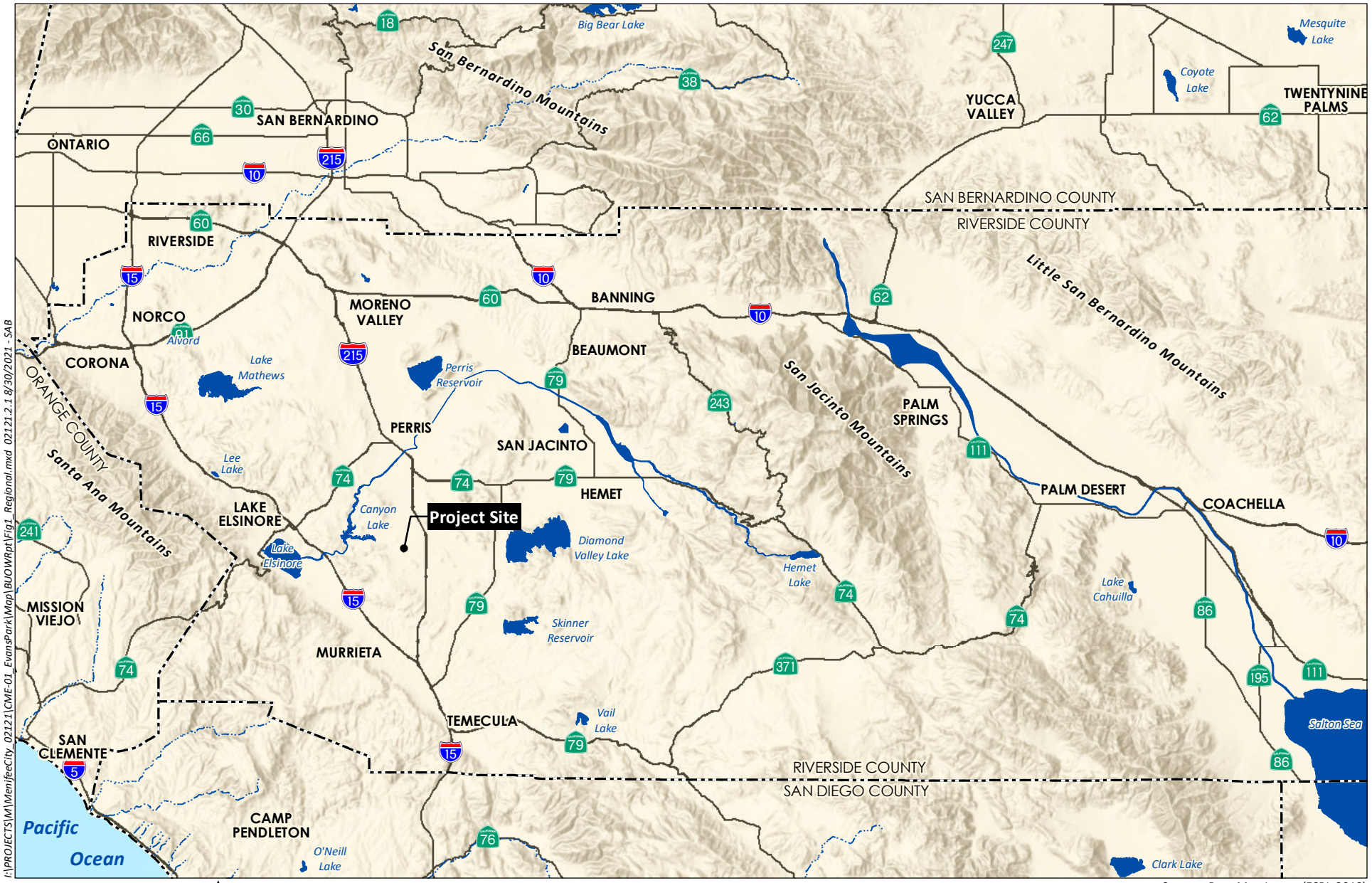
Figure 1: Regional Location
Figure 2: USGS Topography
Figure 3: Aerial Photograph
Figure 4: Transect Locations
Attachment A: Representative Site Photographs

REFERENCES

Dudek and Associates. 2003. Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP) Final MSHCP Volume I. Prep. for County of Riverside, Transportation and Land Management Agency.

Riverside, County of. 2006. Environmental Programs Department. Burrowing Owl Survey Instructions for the Western Riverside Multiple Species Habitat Conservation Plan Area. Retrieved from: https://www.rctlma.org/Portals/3/EPD/consultant/burrowing_owl_survey_instructions.pdf. March 29. Accessed August 25, 2021.

Evans Park



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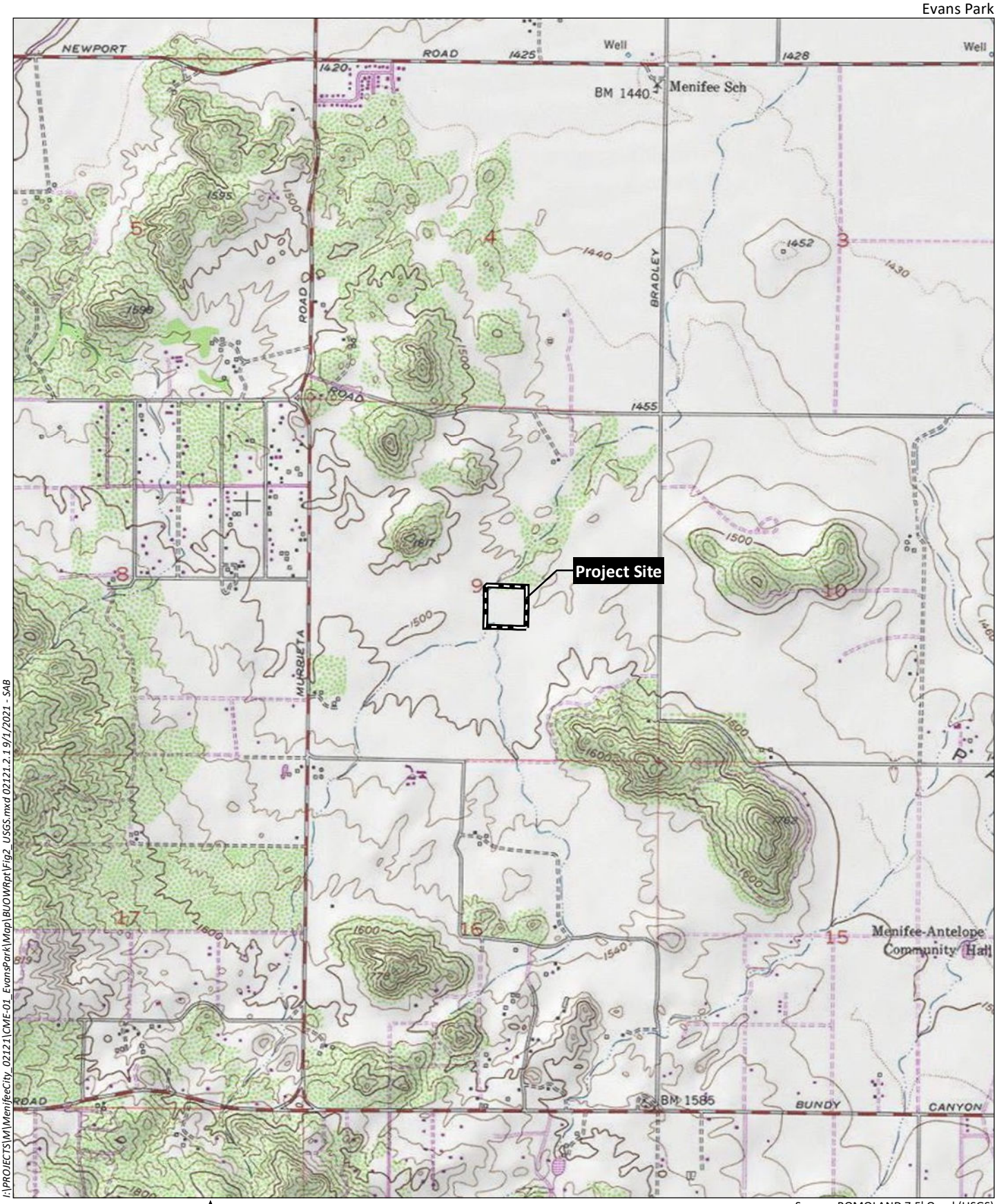
Source: Base Map Layers (ESRI, 2013)

HELIX Environmental Planning

Regional Location

Figure 1



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0 2,000 Feet

Source: ROMOLAND 7.5' Quad (USGS)

HELIX Environmental Planning

USGS Topography

Figure 2



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0 400 Feet

Source: Aerial (Maxar, 2019)

HELIX Environmental Planning

Aerial Photograph

Figure 3



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0 250 Feet

Source: Aerial (Maxar, 2019)

HELIX Environmental Planning

Transect Locations

Figure 4



Photograph 1: Photograph of a representative burrow in the southern portion of the project site.



Photograph 2: Photograph of suitable burrowing owl habitat taken in the northwest corner of the project site, facing southeast.



Photograph 3: Photograph of suitable burrowing owl habitat taken in southern portion of the project site, facing north.



Photograph 4: Photograph of a representative burrow in the eastern portion of the project site.

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IS/MND Appendix C

Cultural Resources Survey

Evans Park Project

Cultural Resources Survey

September 2021 | 02121.00001.001

Prepared for:

The City of Menifee
29995 Evans Road
Menifee, CA 92586

Prepared by:

HELIX Environmental Planning, Inc.
7578 El Cajon Boulevard
La Mesa, CA 91942



Mary Robbins-Wade
Cultural Resources Group Manager

National Archaeological Database Information

Authors:	Mary Robbins-Wade, M.A., RPA and James Turner M.A., RPA
Firm:	HELIX Environmental Planning, Inc.
Client/Project:	City of Menifee / Evans Park Project
Report Date:	September 2021
Report Title:	Cultural Resources Survey for the Evans Park Project, Menifee, Riverside County, California
Submitted to:	City of Menifee
Type of Study:	Cultural Resources Survey
New Sites:	None
Updated Sites:	None
USGS Quad:	Romoland 7.5' Quadrangle
Acreage:	Approximately 16 acres
Key Words:	Riverside County; Township 6 South, Range 3 West; Menifee; Craig Avenue; Evans Road; cultural resources survey; no resources found

TABLE OF CONTENTS

Section **Page**

EXECUTIVE SUMMARY ES-1

1.0 INTRODUCTION 1

1.1 Project Location and Description 1
1.2 Regulatory Framework 2
1.2.1 California Environmental Quality Act 2
1.2.2 City of Menifee 3
1.2.3 Native American Heritage Values 4

2.0 PROJECT SETTING 4

2.1 Natural Setting 4
2.2 Cultural Setting 5
2.2.1 Prehistoric Period 5
2.2.2 Ethnohistory 7
2.2.3 Historical Background 7

3.0 METHODS 9

4.0 RESULTS 10

4.1 Records Search 10
4.2 Archival Research 17
4.3 Native American Contact Program 18
4.4 Field Survey 18

5.0 SUMMARY AND MANAGEMENT RECOMMENDATIONS 21

6.0 REFERENCES 23

LIST OF APPENDICES

A Resumes
B Records Search (confidential, bound separately)
C Native American Correspondence (confidential, bound separately)

TABLE OF CONTENTS (cont.)

LIST OF FIGURES

No.	Title	Follows Page
1	Regional Location	2
2	USGS Topography	2
3	Aerial Photograph	2

LIST OF TABLES

No.	Title	Page
1	Previous Studies within One Mile of the Project Area	10
2	Previously Recorded Resources within One Mile of the Project Area	15

ACRONYMS AND ABBREVIATIONS

AB	Assembly Bill
AMSL	above mean sea level
APN	Assessor's Parcel Number
BLM	Bureau of Land Management
BP	Before Present
CCR	California Code of Regulations
CEQA	California Environmental Quality Act
CHRIS	California Historical Resources Information System
CRHR	California Register of Historical Resources
DEIR	Draft Environmental Impact Report
EIC	Eastern Information Center
ft	feet
GLO	General Land Office
HELIX	HELIX Environmental Planning, Inc.
NAHC	Native American Heritage Commission
NOAA	National Oceanic and Atmospheric Administration
NRHP	National Register of Historic Places
OHP	Office of Historic Preservation
OSC	Open Space and Conservation
PRC	Public Resources Code
SHPO	State Historic Preservation Officer
SLF	Sacred Lands File
SLR	San Luis Rey
TCP	Traditional Cultural Properties
TCR	Tribal Cultural Resources
USGS	U.S. Geological Survey

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EXECUTIVE SUMMARY

HELIX Environmental Planning, Inc. (HELIX) was contracted by the City of Menifee (City) to provide cultural resources services for the Evans Park Project (project) located in the City, in Riverside County, California. The project is a proposed approximately 19-acre park on both sides of Craig Avenue. A cultural resources study including a records search, Sacred Lands File search, a review of historic aerial photographs and maps, and a pedestrian survey was conducted for the project area. This report details the methods and results of the cultural resources study and has been prepared to comply with the California Environmental Quality Act (CEQA).

A records search was requested from the Eastern Information Center (EIC) on October 15, 2020; however, due to COVID-19, the University of California, Riverside campus was closed, causing a delay in processing records searches by EIC staff. The records search was received on January 15, 2021. The records search indicated that 75 previous cultural resources studies have been conducted within one mile of the project area, three of which overlap portions of the project area. The records search results also indicated that a total of 33 cultural resources have been previously recorded within one mile of the project area; however, no sites have been recorded within the project site.

The field investigations included an intensive pedestrian survey of the study area by a HELIX archaeologist and two Luiseño Native American monitors from the Pechanga Band of Luiseño Indians (Pechanga) on October 22, 2020. The survey did not result in the identification of any cultural material within the project area. In discussion with the Pechanga Cultural Resources Department, the project vicinity was identified as an area of cultural sensitivity, with two Traditional Cultural Properties located in relative proximity.

Based on the results of the current study, no historic properties as defined under CEQA will be affected by the Evans Park Project. However, the project site was covered by dense vegetation, and much of the ground surface could not be observed. Due to the alluvial setting of the project area, there is a potential for subsurface cultural resources. Given this potential and the cultural sensitivity identified by Pechanga, it is recommended that an archaeological and Native American monitoring program be implemented for ground-disturbing activities. The monitoring program would include attendance by the archaeologist and Native American monitor at a pre-construction meeting with the grading contractor and the presence of archaeological and Native American monitors during initial ground-disturbing activities associated with the project. Both archaeological and Native American monitors would have the authority to temporarily halt or redirect grading and other ground-disturbing activity in the event that cultural resources are encountered. If significant cultural material is encountered, the project archaeologist will coordinate with the Native American representative and City of Menifee staff to develop and implement appropriate mitigation measures.

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1.0 INTRODUCTION

1.1 PROJECT LOCATION AND DESCRIPTION

The proposed Evans Park Project (project) is the construction of a community park on the Evans Park site, located in the City of Menifee (City) in southwestern Riverside County (Figure 1, *Regional Location*). The project is located northeast of Interstate 15 and west of Interstate 215 within Section 9 of Township 6 South, Range 3 West, on the U.S. Geological Survey (USGS) 7.5-minute Romoland quadrangle (Figure 2, *USGS Topography*). The approximately 19-acre project site is located within Assessor's Parcel Numbers (APNs) 360-170-002 to -006, 360-190-001, and -002, and is bordered by Evans Road to the west and is bisected by Craig Avenue (Figure 3, *Aerial Photograph*).

The park would be constructed in two separate phases. The first phase, which would encompass the southern six acres of the project site, is currently funded and designed. (An additional three acres in the western portion of the site is dedicated to a canal and is not included in the overall park acreage.) The second phase, which would encompass the northern 12.88 acres of the site, is in the conceptual phase. Once complete, Evans Park would provide approximately 19 acres of recreational and open space facilities.

The City's Parks Master Plan describes a community park as a park that meets the recreational needs of several neighborhoods and may also preserve unique landscapes and open spaces. These parks serve multiple uses and provide recreational facilities and accommodate group activities not provided in neighborhood parks. Primary access to community park sites is expected to be by arterial and/ or collector streets. The geographic range of users is up to miles, or City-wide if the park contains a recreation complex (City of Menifee 2015). In addition, the City's Parks Development Design Guidelines state that community parks typically serve 18,000 to 25,000 residents within approximately a one-and-a-half-mile radius (City of Menifee 2015).

For the first (southern) phase, the City proposes to build an approximately six-acre bicycle trail that would include a parking lot at the northeast corner with an entrance off Craig Avenue, and a prefabricated restroom. The park would be divided into two separate sections: a smaller paved tight circuit area called a "Pump Track" and the larger dirt trail portion of the track, which would have some wooden slat sections to add challenging elements to the track.

Parking would be provided via a 12,000 square foot gravel parking lot in the northeast portion of the site, accessible from Craig Avenue, and accommodate approximately 45 vehicles. While the parking lot would be gravel at the opening of the southern phase, it would transition to a paved lot approximately one year after the southern phase becomes operational. Lighting would be provided via a combination of solar and LED-powered light standards. Once the southern phase becomes operational, regular maintenance would occur, such as trash clean-up and restroom servicing. The tracks themselves would be subject to maintenance after heavy rains and one to two times a year; however, no regular reshaping of the dirt trails is expected to occur.

The second (northern) phase, which encompasses the 12.88 acres north of Craig Avenue, would include a mixture of active and passive spaces. It is the intent to develop the northern phase with a multi-use ball field, splash pad, picnic areas, and trails. Access would be via Evans Road with an internal drive to access the facilities. Ornamental landscaping would be provided throughout; however, the existing

wetland habitat in the southeastern portion would be retained in its natural state. It is anticipated that construction of the northern phase would commence in the year 2025.

A cultural resources survey was conducted by HELIX Environmental Planning, Inc. (HELIX) to assess whether the project would have any effects on cultural resources. Mary Robbins-Wade, M.A., RPA, served as principal investigator and is the primary author of this technical report. James Turner, M.A., RPA, and Theodore G. Cooley, M.A., RPA, served as report contributors, and Mary Villalobos, B.A., conducted the field survey. Ms. Robbins-Wade, Mr. Turner, and Mr. Cooley meet the qualifications of the Secretary of Interior's Standards and Guidelines for archaeology. Luiseño Native American tribal cultural monitors from the Pechanga Band of Luiseño Indians (Pechanga) participated in the field survey. Resumes of key HELIX personnel are included as Appendix A.

This report addresses the methods and results of the cultural resources survey, which included a records search, Sacred Lands File search, historic archival research, and an intensive pedestrian field survey.

1.2 REGULATORY FRAMEWORK

1.2.1 California Environmental Quality Act

The California Environmental Quality Act (CEQA) Guidelines (§15064.5) address determining the significance of impacts to archaeological and historic resources. Cultural resources are defined as buildings, sites, structures, or objects, each of which may have historical, architectural, archaeological, cultural, and/or scientific importance (Office of Historic Preservation [OHP] 1995). Significant resources are designated as "historical resources," and are defined per Public Resources Code 21084.1 and CEQA Guidelines, California Code of Regulations (CCR) Title 14 Section 15064.5 as follows:

- resource(s) listed or determined eligible by the State Historical Resources Commission for listing in the CRHR [California Register of Historical Resources] (14 CCR Section 15064.5[a][1])

- resource(s) either listed in the National Register of Historic Places (NRHP) or in a "local register of historical resources" or identified as significant in a historical resource survey meeting the requirements of Section 5024.1(g) of the Public Resources Code, unless "the preponderance of evidence demonstrates that it is not historically or culturally significant" (14 CCR Section 15064.5[a][2])

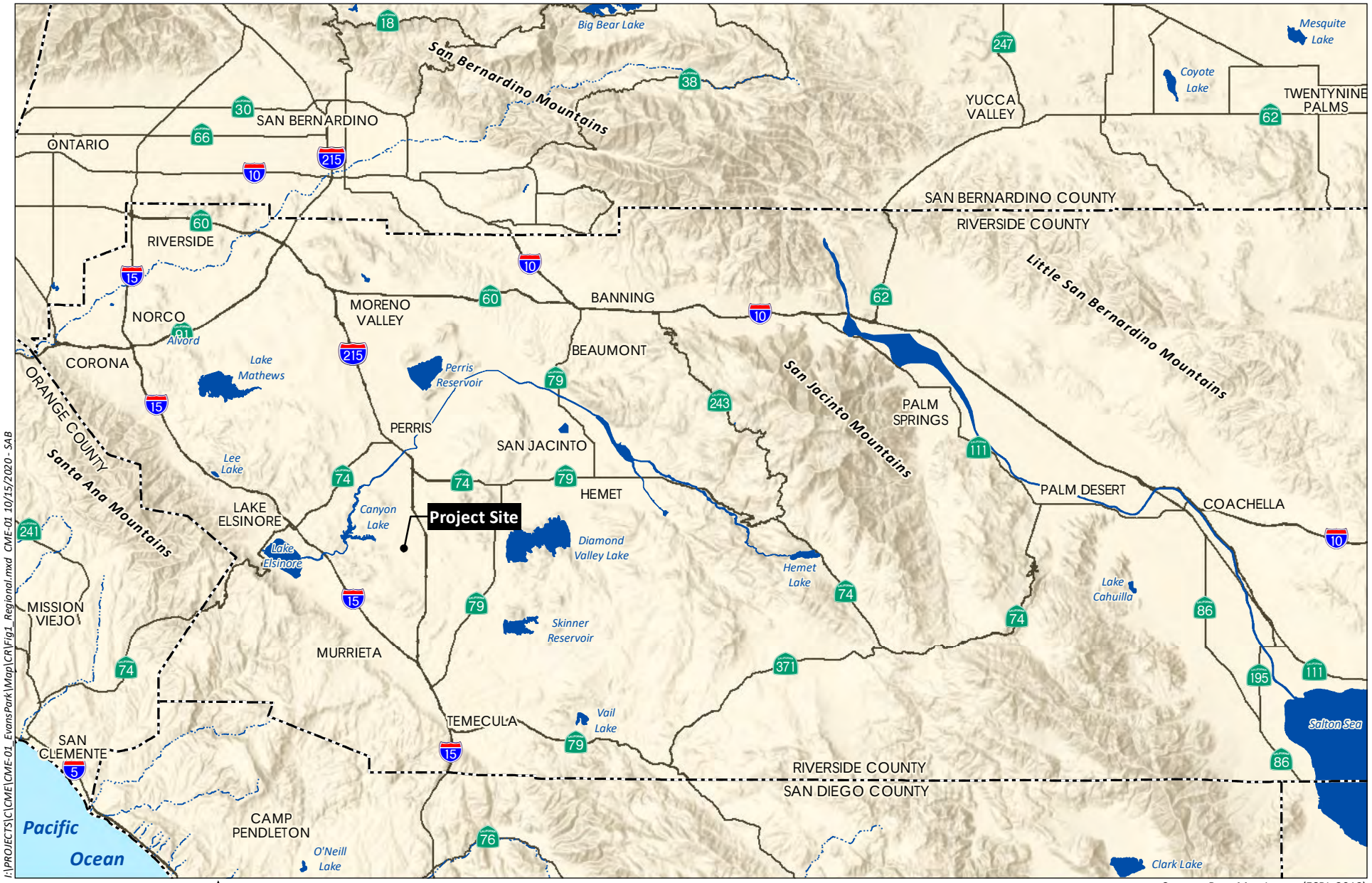
- resources determined by the Lead Agency to meet the criteria for listing on the CRHR (14 CCR Section 15064.5[a][3])

For listing in the CRHR, a historical resource must be significant at the local, state, or national level under one or more of the following four criteria:

1. It is associated with events that have made a significant contribution to the broad patterns of local or regional history, or the cultural heritage of California or the United States;

2. It is associated with the lives of persons important to local, California, or national history;

3. It embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of a master or possesses high artistic values;



I:\PROJECTS\C\CME\CME-01_EvansPark\Map\CR\Fig1_Regional.mxd CME-01 10/15/2020 - SAB

Source: Base Map Layers (ESRI, 2013)

HELIX Environmental Planning

Regional Location

Figure 1



I:\PROJECTS\C\CME\CME-01_EvansPark\Map\CRI\Fig2_USGS.mxd CME-01 10/15/2020 - SAB

0 2,000 Feet

Source: ROMOLAND 7.5' Quad (USGS)

HELIX Environmental Planning

USGS Topography

Figure 2



I:\PROJECTS\C\CME\CME-01_EvansPark\Map\CR\Fig3_Aerial.mxd CME-01 10/15/2020 - SAB

0 400 Feet

Source: Aerial (SanGIS, 2017)

HELIX Environmental Planning

Aerial Photograph

Figure 3

4. It has yielded or has the potential to yield information important to the prehistory or history of the local area, California, or the nation.

Under 14 CCR Section 15064.5(a)(4), a resource may also be considered a "historical resource" for the purposes of CEQA at the discretion of the lead agency.

All resources that are eligible for listing in the CRHR must have integrity, which is the authenticity of a historical resource's physical identity evidenced by the survival of characteristics that existed during the resource's period of significance. Resources, therefore, must retain enough of their historic character or appearance to be recognizable as historical resources and to convey the reasons for their significance. Integrity is evaluated with regard to the retention of location, design, setting, materials, workmanship, feeling, and association. In an archaeological deposit, integrity is assessed with reference to the preservation of material constituents and their culturally and historically meaningful spatial relationships. A resource must also be judged with reference to the particular criteria under which it is proposed for nomination.

1.2.2 City of Menifee

The Open Space & Conservation (OSC) Element of the Menifee General Plan 2030 includes the following goals and policies related to cultural resources:

- Goal OSC-5: Archaeological, historical, and cultural resources are protected and integrated into the city's built environment.
    - Policy OCS-5.1: Preserve and protect archaeological and historic resources and cultural sites, places, districts, structures, landforms, objects and native burial sites, traditional cultural landscapes and other features, consistent with state law and any laws, regulations or policies which may be adopted by the City to implement this goal and associated policies.
    - Policy OCS-5.2: Work with local schools, organizations, appropriate Native American tribes with ancestral territories located within the city and other agencies to educate the public about the rich archaeological, historic, and cultural resources found in the City.
    - Policy OCS-5.3: Preserve sacred sites identified in consultation with the appropriate Native American tribes whose ancestral territories are within the City, such as Native American burial locations, by avoiding activities that would negatively impact the sites, while maintaining the confidentiality of the location and nature of the sacred site.
    - Policy OCS-5.4: Establish clear and responsible policies and best practices to identify, evaluate, and protect previously unknown archaeological, historic, and cultural resources, following applicable CEQA and National Environmental Policy Act (NEPA) procedures and in consultation with the appropriate Native American tribes who have ancestral lands within the City.
    - Policy OCS-5.5: Develop clear policies regarding the preservation and avoidance of cultural resources located within the City, in consultation with the appropriate Native American tribes who have ancestral lands within the City.

- Policy OCS-5.6: Develop strong government-to-government relationships and consultation protocols with the appropriate Native American tribes with ancestral territories within the City in order to ensure better identification, protection and preservation of cultural resources, while also developing appropriate educational programs, with tribal participation, for Menifee residents.

1.2.3 Native American Heritage Values

Federal and state laws mandate that consideration be given to the concerns of contemporary Native Americans with regard to potentially ancestral human remains, associated funerary objects, and items of cultural patrimony. Consequently, an important element in assessing the significance of the study site has been to evaluate the likelihood that these classes of items are present in areas that would be affected by the proposed project.

Potentially relevant to prehistoric archaeological sites is the category termed Traditional Cultural Properties (TCP) in discussions of cultural resource management performed under federal auspices. According to Patricia L. Parker and Thomas F. King (1998), "Traditional" in this context refers to those beliefs, customs, and practices of a living community of people that have been passed down through the generations, usually orally or through practice. The traditional cultural significance of a historic property, then, is significance derived from the role the property plays in a community's historically rooted beliefs, customs, and practices. Cultural resources can include TCPs, such as gathering areas, landmarks, and ethnographic locations, in addition to archaeological districts. Generally, a TCP may consist of a single site, or group of associated archaeological sites (district or traditional cultural landscape), or an area of cultural/ethnographic importance.

In California, the Traditional Tribal Cultural Places Bill of 2004 requires local governments to consult with Native American Tribes during the project planning process, specifically before adopting or amending a General Plan or a Specific Plan, or when designating land as open space for the purpose of protecting Native American cultural places. The intent of this legislation is to encourage consultation and assist in the preservation of Native American places of prehistoric, archaeological, cultural, spiritual, and ceremonial importance. Per Section 21084.2 of the Public Resources Code, California State Assembly Bill (AB) 52 revised PRC Section 21074 to include Tribal Cultural Resources (TCRs) as an area of CEQA environmental impact analysis. As a general concept, a TCR is similar to the federally defined TCP; however, it incorporates consideration of local and state significance and required mitigation under CEQA. Per PRC Section 21080.3, a CEQA lead agency must consult with any California Native American tribe that requests consultation and that is traditionally and culturally affiliated with the geographic area of a proposed project to identify resources of cultural or spiritual value to the tribe, even if such resources are already eligible as historical resources as a result of cultural resources studies.

2.0 PROJECT SETTING

2.1 NATURAL SETTING

The project site is situated in Menifee Valley northeast of Cottonwood Canyon, south of Perris Valley, and north of Paloma Valley. The climate of western Riverside County is characterized as a semi-arid environment with low humidity and rainfall. Almost all rainfall occurs in the winter, but the region can also experience rare, intense summer thunderstorms. Wind is also a strong feature of this climatic

regime, with dry winds in excess of 25 miles per hour in the late winter and early spring (National Oceanic and Atmospheric Administration [NOAA] 2014).

The project area is relatively flat, with an elevation ranging from 1477 to 1489 feet above mean sea level (AMSL). Geologically, the project area is underlain by alluvium of intermediate age, dating to between the Holocene and Pleistocene (Bovard and Morton 1996). Five soil types are mapped within the project area; two within the northern portion of the project area, two within the southern portion, and one that is present in both (Natural Resource Conservation Service n.d.). Soils within the northern portion of the project area consist of Ramona sandy loam (0 to 5 percent slopes) and Monserate sandy loam (0 to 5 percent slopes); Wyman loam (2 to 8 percent slopes) and Las Posas loam (2 to 8 percent slopes) are mapped for the southern portion of the project area; and Yokohl loam (2 to 8 percent slopes) is present in both sections of the project area (Natural Resource Conservation Service n.d.). The Ramona series consists of the "fine-loamy, mixed, thermic family of Typic Haploxeralfs" (Bowman 1973: 51). The Monserate series is a member of the "fine-loamy, mixed, thermic family of Typic Durixeralfs" which supports a vegetation of "mainly annual grasses and forbs, widely spaced native canyon oak, and shrubs on eroded slopes" (National Cooperative Soil Survey 2003). The Wyman series consists of "well-drained, very deep loams that formed in alluvium derived from basic igneous rock" and supports a vegetation of "chiefly flattop buckwheat, wild oats, and annual grasses and forbs" (Bowman 1973:83-84). The Los Posas series consists of "moderately deep, well drained soils that formed in material weathered from basic igneous rocks" (Natural Resources Conservation Service 1997a). Finally, the Yokohl Series consists of the "fine, montmorillonitic, thermic family of Typic Durixeralfs" that developed in alluvium from basic igneous rocks (Natural Resources Conservation Service 1997).

Prehistorically, the natural vegetation in the project vicinity would have provided several plant species known to have been used by the Luiseño people for food, medicine, tools, shelter, ceremonial, and other uses (Bean and Shipek 1978; Sparkman 1908). Many of the animal species found in these communities would have been used by native populations as well.

2.2 CULTURAL SETTING

2.2.1 Prehistoric Period

Proposed dates for the earliest human occupation in California vary from around 20,000 years ago to 10,000 years ago. Several researchers have argued for the presence of Pleistocene humans in California (Carter 1957, 1978, 1980; Minshall 1976); however, these sites identified as "early man" are all controversial. The material from the sites is generally considered non-artifactual, and the investigative methodology is often questioned (Moratto 1984). The most widely recognized timeline for the prehistory of Southern California was proposed by Wallace (1955) and divides the region's prehistory into four main periods, or "horizons": Early, Milling Stone (Archaic Period), Intermediate, and Late horizons.

The best example of Early Prehistoric Period archaeological evidence in Southern California is in the San Dieguito complex of San Diego County, dating to over 9,000 years ago (Warren 1967; Warren et al. 1998). The San Dieguito Tradition is thought by most researchers to have an emphasis on big game hunting and coastal resources (Warren 1967). The material culture of the San Dieguito complex consists primarily of scrapers, scraper planes, choppers, large blades, and large projectile points. In some areas of California, the Early Prehistoric Period is often referred to as the Paleo-Indian period and is associated

with the last Ice Age occurring during the Terminal Pleistocene (pre-10,000 years ago) and the Early Holocene, beginning circa 10,000 years ago (Erlandson 1994, 1997).

The Millingstone Horizon, or Archaic Period, dates from 7,000-8,600 to 1,300-3,000 years ago and is generally consistent with the Oak Grove complex of Santa Barbara, the Topanga complex of Los Angeles, and the La Jolla complex of San Diego (Warren et al. 1998). The Millingstone Horizon is also referred to as the Encinitas Tradition (Warren 1968). The Encinitas tradition is generally "recognized by millingstone assemblages in shell middens, often near sloughs and lagoons" (Moratto 1984:147). According to Wallace, "a changeover from hunting to the collection of seed foods is clearly reflected in the archaeological record for the period between 6000 and 3000 B.C. The importance of seeds in the diet of the prehistoric peoples can be seen in the numbers of food-grinding implements present at their settlements" (Wallace 1978:28). Basin metates, manos, discoidals, a small number of Pinto series and Elko series points, and flexed burials are also characteristic. Most of the archaeological evidence for Archaic Period occupation in southern California is derived from sites located in near-coastal valleys, and around estuaries that are present along the San Diego coast (Warren et al. 1998). In Riverside County, the Archaic Period occupation is represented by diagnostic artifacts and radiocarbon dates identified at sites situated within the Perris, Domenigoni, and Diamond valleys (Bettinger 1974; Goldberg 2001; Robinson 2001). Archaeological excavations conducted for the Perris Reservoir Project in Perris Valley yielded radiocarbon dates of circa 2,200 before present (BP) (Bettinger 1974), and several sites identified during archaeological studies conducted for the Eastside Reservoir (Diamond Valley Lake) Project dated to what the researchers termed the Middle Archaic (7,000 to 4,000 years ago) and Late Archaic (4,000 to 1,500 years ago) periods (Goldberg 2001).

Dates for the Intermediate Horizon vary by locale but can generally be dated to between 4,000 and 1,500 years ago (Elsasser 1978). The Intermediate Horizon is consistent with the Hunting Culture of Santa Barbara County and is characterized by the presence of Pinto style points, named after the Pinto Basin in Riverside County, an increased use of the mortar and pestle, and the consumption of fleshier foods such as acorns as opposed to small, hard seeds (Stickel 1978). This change resulted in the adoption of a more sedentary lifestyle, as seen in the presence of seasonal campsites (Van Horn 1980).

The Late Prehistoric period in southern California is characterized by the arrival of Uto-Aztecan-speaking people who occupied large portions of the Great Basin and an area stretching from southern Arizona and northwest and central Mexico into Nevada, Oregon, and Idaho (Miller 1986). The expansion of the Takic group into southern California is unrefined, but several scholars have hypothesized as to when and how the so-called "Uto Aztecan wedge" occurred. Sutton (2009) argues that the Takic group expanded into southern California from the San Joaquin Valley about 3,500 years ago. Moratto (1984) also proposes that Takic expansion into the Southern Coast region correlates to the end of the Early Period (Late Archaic) circa 3,200 to 3,500 years ago, while Golla (2007) suggests an expansion of Uto-Aztecan speakers into southern California at approximately 2,000 years ago. While the exact chronology of Takic-speaking groups' immigration to southern California remains uncertain, the beginning of the Late Prehistoric Period is marked by evidence of a number of new tool technologies and subsistence shifts in the archaeological record and is characterized by higher population densities and intensification of social, political, and technological systems (Gallegos 2002; McDonald and Eighmey 2004).

The Late Prehistoric period is represented by the San Luis Rey (SLR) complex in the northern portion of San Diego County and portions of Riverside County. The SLR complex is divided into two phases: SLR I and SLR II. Elements of the SLR complex include small, triangular, pressure-flaked projectile points (generally Cottonwood series, but Desert Side-notched series also occurs); milling implements: mortars

and pestles, manos and metates, and bedrock milling features; bone awls; Olivella shell beads; other stone and shell ornaments; and cremations (Meighan 1954; Moratto 1984; True et al. 1974). The later SLR II complex also includes several elements not found in the SLR I complex: "pottery vessels, cremation urns, red and black pictographs, and such nonaboriginal items as metal knives and glass beads" (Meighan 1954:223).

Native American population figures in the region substantially increased toward the end of the Late Prehistoric Period. After about 400 years ago, a change occurred in settlement and subsistence patterns, and land use intensified region, which was reflected into the ethnohistoric period (Wilke 1974, 1978; Bean et al. 1991; Goldberg 2001).

2.2.2 Ethnohistory

Based on ethnographic data, including the areas defined for the Takic-speaking peoples at the time of contact, it is generally accepted that the San Luis Rey complex is associated with the Luiseño people. The term Luiseño is derived from the Mission San Luis Rey, and since Spanish-Mexican colonial times, has been used in reference to those Takic-speaking people associated with the mission. Although researchers use slightly different ethnographic territory boundaries, the territory of the Luiseño people is generally described as extending along the coast from Agua Hedionda Creek on the southwest to Aliso Creek on the northwest. On the north, this boundary extended east beyond Santiago Peak to the eastern side of the Elsinore Fault Valley, continuing southeast to Palomar Mountain, then around the southern slope above the valley of San Jose. The southern boundary follows westerly to Agua Hedionda Creek (Bean and Shipek 1978; White 1963). Traditional stories and songs of the Native people also describe the extent of traditional use areas.

It must be noted that interpretations by archaeologists and linguistic anthropologists may differ from the traditional knowledge of the Luiseño people. The Luiseño creation story indicates that the Luiseño people have always been here, not migrating from elsewhere. The creation story of the Pechanga Band of the Luiseño tells that the world was created at Temecula. "The Káamalam [first people] moved to a place called Nachíivo Pomíisavo, but it was too small, so they moved to a place called 'exva Teméeku,' this place you now know as Temeku. Here they settled while everything was still in darkness (DuBois 1908)" (Masiel-Zamora 2013:2). A traditional Luiseño story tells of a great flood, and the people went to higher ground, where they were saved. The San Luis Rey Band say that this higher ground where the people were saved is Morro Hill in northern San Diego County. Some Luiseño informants indicated the place in this story is a hill just east of Highway 395 in the San Luis Rey River Valley (Cupples and Hedges 1977).

2.2.3 Historical Background

2.2.3.1 Spanish Period

The first documented Spanish contact in what is now Riverside County was by Spanish military captain Juan Bautista de Anza, who led expeditions in 1774 and 1775 from Sonora to Monterey (Bolton 1930). Anza embarked on the initial expedition to explore a land route northward through California from Sonora, with the second expedition bringing settlers across the land route to strengthen the colonization of San Francisco (Rolle 1963). Anza's route led from the San Jacinto Mountains northwest through the San Jacinto Valley, which was named "San José" by Anza. Little documentation exists of Anza's route being used after the two expeditions, although it was likely used to bring Spanish supplies

into the newly colonized Alta California (Lech 2004). In 1781, the Spanish government closed the route due to uprisings by the Yuman Indians. However, by that time, the missions were established and self-sufficient; thus, the need for Spanish supplies from Sonora had begun to diminish.

Although Riverside County proved to be too far inland to include any missions within its limits, Missions San Juan Capistrano and San Luis Rey de Francia, established in 1776 and 1798 respectively, claimed a large part of southwestern Riverside County. Throughout the Spanish Period, the influence of the Spanish progressively spread further from the coast and into the inland areas of southern California as Missions San Luis Rey and San Gabriel extended their influence into the surrounding regions and used the lands for grazing cattle and other animals.

In the 1810s, ranchos and mission outposts, called asistencias, were established near the project vicinity, increasing the amount of Spanish contact in the region. An asistencia was established in Pala in 1818 and in San Bernardino in 1819. Additionally, Rancho San Jacinto was established for cattle grazing in the San Jacinto Valley (Bean and Vane 1980; Brigandi 1999). In 1820, Father Payeras, a senior mission official, promoted the idea that the San Bernardino and Pala asistencias be developed into full missions in order to establish an inland mission system (Lech 2004). However, Mexico won its independence from Spain in 1821, bringing an end to the Spanish Period in California.

2.2.3.2 Mexican Period

Although Mexico gained its independence from Spain in 1821, Spanish patterns of culture and influence remained for a time. The missions continued to operate as they had in the past, and laws governing the distribution of land were also retained in the 1820s. Following the secularization of the missions in 1834, large ranchos were granted to prominent and well-connected individuals, ushering in the Rancho Era, with the society making a transition from one dominated by the church and the military to a more civilian population, with people living on ranchos or in pueblos. With the numerous new ranchos in private hands, cattle ranching expanded and prevailed over agricultural activities. Although the project site and immediate vicinity are not within any former rancho land grants, there are a number of ranchos in what is now southwestern Riverside County.

2.2.3.3 American Period

American governance began in 1848, when Mexico signed the Treaty of Guadalupe Hidalgo, ceding California to the United States at the conclusion of the Mexican–American War. A great influx of settlers to California occurred during the American Period, resulting from several factors, including the discovery of gold in the state in 1848, the end of the Civil War, and the availability of free land through the passage of the Homestead Act. The increase in American and European populations quickly overwhelmed many of the Spanish and Mexican cultural traditions and greatly increased the rate of population decline among Native American communities.

Initially, southern California was divided into only two counties: Los Angeles and San Diego. In 1853, San Bernardino County was added, placing what is now Riverside County primarily within San Diego County and partially within San Bernardino County. Southern California was developed by Americans and other immigrants who migrated to the western frontier in pursuit of gold and other mining, agriculture, trade, and land speculation (Lech 2004). Menifee Valley was not on a widely traveled route and developed later than surrounding areas. The area is named after a mining business owned by Kentucky native Luther Menifee Wilson, born in 1845 (City of Menifee n.d.; Padon 2010). Wilson came to the northern

part of then-San Diego County in 1880 and began prospecting for minerals, finding gold quartz, and securing mining claims around the "Menifee Quartz Lode," which today is Murrieta Road just north of Holland Road. The area soon saw an influx of miners and became known as Menifee Valley.

Grain farms were also established around the same time in the region. In 1880, the Kirkpatricks owned and farmed a total of 640 acres northeast of Antelope Road and Holland Road. The Kirkpatricks continued large-scale farming into the twentieth century. William Newport came to the valley in 1885 and purchased 2,000 acres to farm (Padon 2010). His homestead was located on the north side of Newport Road between Murrieta and Bradley Roads. By 1906, Newport was "farming 15,000 acres, with 13,000 acres in wheat and barley and 2,000 acres in alfalfa and pasture" (Padon 2010:10). Emil Leon Plath homesteaded 160 acres at the southwest corner of Scott and Briggs Roads, for which he received his patent on July 20, 1892. Two mines in the immediate area were given the name Leon and are on the 1893 Riverside County Map (Lech 2004). Leon Road was named in honor of Emil Leon Plath and his family.

Though many other families came to this region for farming and mining, no town site was established. However, a general store was established at the intersection of Newport and Bradley roads, and a post office was established within the store. The Menifee School District was formed, and a school was constructed in the same neighborhood as the post office (Menifee Valley Historical Association 2006).

3.0 METHODS

HELIX submitted a request for a records search of the project site and a one-mile radius to the Eastern Information Center (EIC) at the University of California, Riverside on October 15, 2020. The records search request covered a one-mile radius around the project area and included the identification of previously recorded cultural resources and locations and citations for previous cultural resources studies. A review of the California Historical Resources and the state Office of Historic Preservation (OHP) historic properties directories were also requested. Due to COVID-19, the University of California, Riverside campus was closed, causing a delay in processing records searches by EIC staff; the records search was not received until January 15, 2021. However, a previous cultural resource study covering an adjacent area, and historic maps and aerial photographs were reviewed prior to the receipt of the records search, which is included as Confidential Appendix B. Ms. Robbins-Wade also spoke with a Pechanga representative regarding the known cultural resources and cultural sensitivity of the project area and vicinity, as discussed in Section 4.3, Native American Contact Program.

The Native American Heritage Commission (NAHC) was contacted on October 15, 2020, for a Sacred Lands File search and list of Native American contacts, which were received on October 19, 2020. Native American Heritage Commission correspondence is included as Confidential Appendix C to this report (bound separately).

A pedestrian field survey of the project site was conducted by HELIX archaeologist Mary Villalobos and Native American monitors Tony Foussat and Julio Marquez of Pechanga on October 22, 2020. The project area was surveyed in parallel transects spaced approximately 10 to 15 feet (ft) apart.

4.0 RESULTS

4.1 RECORDS SEARCH

The records search for the project site and a one-mile radius was received from the EIC on January 15, 2021; the records search summary and map are included as Appendix B (Confidential Appendices, bound separately). The EIC has a record of 75 cultural resources studies conducted within one mile of the project area, three of which overlap the project area, and one of which is adjacent to it (Table 1, *Previous Studies within One Mile of the Project Area*). Two of the studies that overlap the project area are archaeological assessments of separate land parcels (RI-00770 and RI 00771; Bowles and Salpas 1980a, 1980b), and one is listed as a cultural resources investigation (RI-06923; McKenna et al. 2006a). The report on the adjacent parcel is an archaeological monitoring report addressing a portion of the project area, addressed in the 2006 cultural resources investigation report by McKenna (RI-06924; McKenna et al. 2006b). None of these reports identified any cultural resources.

Table 1
PREVIOUS STUDIES WITHIN ONE MILE OF THE PROJECT AREA

Report Number (RI-)	Year	Author	Report Title
000228	1977	Daly, Ken	Archaeological Assessment of the NW 1/4 of Section 10, T6S, R3W, Romoland Quadrangle, Riverside County, California
000344	1978	Chace, Paul	An Archaeological Survey of Tract 11072, Near Sun City, In Riverside County
000399	1978	Giansanti, Renee and Donna Belligio	Environmental Impact Evaluation: An Archaeological Assessment of Tentative Parcel Map 12010, Antelope Valley Area of Riverside County, California
000529	1979	Barker, James and Matthew C. Hall	Environmental Impact Evaluation: An Archaeological Assessment of Tentative Parcel 11137, Sedco Hills Area of Riverside County, California
000542	1979	Bowles, Larry L. and Jean A. Salpas	An Archaeological Assessment for a Proposed Zone Change
000557	1979	Bowles, Larry L. and Jean A. Salpas	Archaeological Assessment of Tentative Parcel 12,802
000569	1979	Bowles, Larry L. and Jean A. Salpas	An Archaeological Assessment of Parcel 14411 Near Riverside County
000625	1979	Giansanti, Rene	Environmental Impact Evaluation: An Archaeological Assessment of Tentative Parcel 13834 Amended #1, South of Sun City, Riverside County, California
000637	1979	Hall, Matthew C.	Environmental Impact Evaluation: An Archaeological Assessment of Tentative Parcel 13570, Sedco Hills Area of Riverside County, California
000648	1979	Jesperson, Michele M.	Environmental Impact Evaluation: Archaeological Assessment of Tentative Tract 13297, Murrieta Area of Riverside County, California

Report Number (RI-)	Year	Author	Report Title
000671	1979	Oxendine, Joan	Report of An Archaeology Survey of CZ 2900, S 10, T 6S, R 3W, Romoland Quadrangle
000683	1979	Pinto, Diana and Susan Frommer	An Archaeological Survey of a Portion of Menifee and Paloma Valleys
000684	1979	Susan Frommer	An Archaeological Survey of a 14-Acre Parcel in Menifee and the Paloma Valleys Region
000770*	1980	Bowles, Larry L. and Jean A. Salpas	An Archaeological Assessment of Parcel 15811
000771*	1980	Bowles, Larry L. and Jean A. Salpas	An Archaeological Assessment of Parcel 15837
000784	1980	Bowles, Larry L. and Jean A. Salpas	An Archaeological Assessment of Parcel 15715 Near Sun City, Riverside County
000788	1980	Bowles, Larry L.	An Archaeological Assessment of Parcel 15906 Near Sun City, Riverside County
000791	1980	Bowles, Larry L.	An Archaeological Assessment of Parcel 16119
000794	1980	Bowles, Larry L.	An Archaeological Assessment of Parcel 16334
000800	1980	Bowles, Larry L. and Jean A. Salpas	An Archaeological Assessment of Parcel 16181
000807	1980	Bowles, Larry L. and Jean A. Salpas	An Archaeological Assessment of Parcel 16333
000852	1980	Giansanti, Rene	Environmental Evaluation: An Archaeological Assessment of Tentative Parcel 14659, Menifee Valley Area of Riverside County, California
000894	1980	Moore, Deborah	Environmental Impact Evaluation: An Archaeological Assessment of Tentative Tract 15133, South of Sun City in Riverside County, California
000895	2001	McKenna, Jeanette A.	A Phase I Cultural Resource Investigation of The Millennium Project Area in the Murrieta Area of Riverside County, California
000903	1980	Salpas, Jean A.	An Archaeological Assessment of Parcel 16120
000916	1980	Desautels, Roger J.	Archaeological Survey Report on a 288-Acre Parcel Located in the Vicinity of Sun City, County of Riverside, California
000976	1980	Oxendine, Joan	Archaeological Assessment of PM 9221
001127	1998	Love, Bruce	Letter Report: Tract Map No. 28990, Archaeological Site CA-RIV-2074
001503	1982	Del Chario, Kathleen and Marie Cottrell	Archaeological Assessment of Tentative Parcel 17674, Near Sun City, Riverside County, California

Report Number (RI-)	Year	Author	Report Title
001569	1979	Bowles, Larry L. and Jean Salpas	An Archaeological Assessment of Parcel 13839
001570	1978	Bowles, Larry L. and Jean Salpas	An Archaeological Assessment of Parcel 13840
001571	1979	Bowles, Larry L. and Jean Salpas	An Archaeological Assessment of Parcel 13873
001572	1979	Bowles, Larry L. and Jean Salpas	An Archaeological Assessment of Parcel 14613
002150	1987	McCarthy, Daniel F.	An Archaeological Assessment Of 19.56 Acres of Land Along Haun Road, South of Sun City, Riverside County, California
002151	1987	Pinto, Diana G.	Archaeological Test Excavations at CA-RIV-333, -339, and -340, Located South of Sun City in Riverside County, California
002152	1993	Love, Bruce	The Results of the Reexamination of the Archaeological Materials and Consultation with the Pechanga Band of Luiseno Indians
003823	1994	White, Robert S.	An Archaeological Assessment of a 10-Acre Parcel as Shown on TPM 27932, Located at 31755 Bradley Road, Menifee, Riverside County
004224	1999	Love, Bruce and Bai "Tom" Tang	Historical/Archaeological Resources Survey Report: La Piedra Waterline Project, Eastern Municipal Water District, Riverside County, California
004376	1999	Keller, Jean A.	A Phase I Cultural Resources Assessment of APN 358-230-001, 76.0 Acres of Land Near Menifee, Riverside County, California
004404	2000	Jones and Stokes Associates, Inc.	Final Cultural Resources Inventory Report for the Williams Communications, Inc., Fiber Optic Cable System Installation Project, Riverside to San Diego, California
004603	2001	Demack, Carol R.	Phase I Archaeological Assessment of 60-Acre Parcel in the Menifee Valley, Riverside County, California
004699	2003	Tetra Tech, Inc.	A Phase I Archaeological Survey of Approx. 67.3 Acres for The Proposed Country Glen II Housing Development Project (Tentative Tract 30064), Riverside County Near Menifee, California
004735	2003	Keller, Jean A.	A Phase I Cultural Resources Assessment of APN 360-260-001 Thru 004, 40.00 Acres of Land Near Sun City, Riverside County, California
004804	2005	Tetra Tech, Inc.	Archaeological and Paleontological Resources Monitoring Report Regarding Ground-Disturbing Activities in the 67.3-Acre County Glen II Project Site, Menifee, Riverside County, California

Report Number (RI-)	Year	Author	Report Title
004881	2001	Dice, Michael and Leslie Nay Irish	A Phase I Archaeological Survey of Tract #29862, a 16.59-Acre Residential Project Located Near Newport and Bradley Roads, Menifee, County of Riverside, California
004882	2001	Dice, Michael	A Phase I Archaeological Resource Survey of Tract #29861, an 18.64-Acre Residential Project Located Near Newport and Bradley Roads, Menifee, County of Riverside, California
004883	2002	Hall, Barbara Ann	A Phase I Archaeological Resource Survey of Tract #28990, a 59.67-Acre Residential Project Located Near Holland and Bradley Roads, Menifee, County of Riverside, California
004904	2003	Irish, Leslie Nay, Anna M. Hoover, and Kristie R. Blevins	An Archaeological Records Search and Survey Report for Tract 30902, APNs 360-210-034 To -038, 360-220-036, and 360-220-037, Menifee, County of Riverside, California
004905	2003	Irish, Leslie Nay, Kristie R. Blevins, Anna M. Hoover, and Hugh M. Wagner	A Phase I Archaeological and Paleontological Survey Report for Menifee Assemblages, TT# 31194, APNs 360-300-002 To -006, -009, and 360-350-001, Menifee, County of Riverside, California
004906	2003	Irish, Leslie Nay	Letter Report: A Historical Assessment Amendment to an Archaeological and Paleontological Assessment Report Entitled "Phase I Archaeological and Paleontological Survey Report for Menifee Assemblages, Tr31194, APNs 360-300-002 To -006, ETC"
004941	2003	McKenna, Jeanette A.	A Phase I Cultural Resource Investigation of the Cimarron Valley Estates Project Area in the Murrieta Area of Riverside County, California.
005270	2004	Dice, Michael and Peter Messick	An Archaeological Resource Evaluation and Paleontological Records Search on John Laing Homes; Burns Ranch Project (APN # 360-240-034 and 360-260-005) County of Riverside, California
005405	2004	Keller, Jean	A Phase I Cultural Resource Assessment of Tentative Tract Map 31831, +/-30 Acres Near Sun City, Riverside County, California
005407	2005	Keller, Jean	A Phase I Cultural Resource Assessment of Tentative Tract Map 33060, +/-9.2 Acres of Land Near Menifee, Riverside County, California
005643	2004	White, Robert S. and Laura S. White	A Cultural Resources Assessment of an 18.62-Acre Parcel as Shown on TTM 30812 Located Adjacent to Murrieta Road at La Piedra Road, Menifee, Riverside County, California
005875	2002	Love, Bruce and Bai Tang	Historical/Archaeological Resources Survey Report, Tentative Tract Map No. 30422, Menifee East Specific Plan, Menifee Valley, Riverside County, California

Report Number (RI-)	Year	Author	Report Title
005876	2000	Love, Bruce, Bai Tang, Michael Hogan, and Mariam Dahdul	Historical/Archaeological Resources Survey Report, Murrieta Road, Improvement Project at the Intersection of Holland Road, Menifee Valley, Riverside County, California
006050	2004	Brown, Joan C.	Cultural Resources Reconnaissance for the Menifee School Project, Riverside County, California
006158	2004	Aislin-Kay, Marnie	Letter Report: Cultural Resource Records Search and Site Visit Results for Cingular Telecommunications Facility Candidate SC-232-03 (Rockland Garbani Ranch), 26675 Garbani Road, Menifee, Riverside County, California
006740	2005	Brunzell, David	Cultural Resource Assessment: Tentative Tract Map No. 33883, Riverside County, California
006923*	2006	McKenna, Jeanette A.	A Phase I Cultural Resource Investigation of the Hidden Hills Addendum Parcels, (Formerly Cimarron Valley Estates) in the Murrieta Area of Riverside County, California
006924	2006	McKenna, Jeanette A.	Results of an Archaeological Monitoring Program at the Hidden Hills Project Area, a KB Home Development in the Menifee/Murrieta Area of Riverside County, California
007280	2006	White, Robert S. and Laura S. White	Phase I Cultural Resources Assessment of the 305-Acre Countryside Development Project (Specific Plan 194) Located North of Holland Road and West of Interstate 215, Menifee, Unincorporated Riverside County
007632	2006	Collins, Nora and Brian F. Smith	A Phase I Archaeological Assessment for the Galvez-Menifee Project, Riverside County, California
008185	2007	Mason, Roger D.	Cultural Resources Monitoring Report for Phase I of The Countryside Development Project, Menifee, Riverside County, California
009021	2013	Cunningham et al.	Cultural Resources Investigation Results of the Marshalling Yard Survey, Access Road Survey, and Supplemental 115kv Transmission Line Survey in Support of the Alberhill Substation, Riverside County, California
009127	2014	Irish, Leslie and Barbara Loren-Webb	Phase 1 Cultural Resources Assessment: APN 360-250-009, City of Menifee, Riverside County, California
009132	2013	Irish, Leslie and Barbara Loren-Webb	Phase 1 Cultural Resources Assessment Update: Golden Meadows, City of Menifee, California and Phase II Testing
009353	2003	Nay Irish et al.	A Phase I Archaeological and Paleontological Survey Report for Menifee Assemblages, Tt#31194, APNs 360-300-002 To -006, -009, and 360-350-001 Menifee County of Riverside, California

Report Number (RI-)	Year	Author	Report Title
009358	2013	Lamb, Meghan	Cultural Resource Monitoring Report for the SCE Plant Betterment & 2013 Deteriorated Pole Replacement Project (TD637743/TD732297), Sun City, Riverside County, California
009468	2016	Tang, Bai "Tom", Ben Kerridge, and Nina Gallardo	Historical/Archaeological Resources Survey Report: Rancho Bonito Project, City of Menifee, Riverside County, California
009608	2014	Puckett, Heather R.	Cultural Resources Summary for the Proposed Verizon Wireless, Inc. Property at the Red Fox Site, 31265 Murrieta Road, Menifee, Riverside County, California
009779	2016	McDougall, Dennis and Joan George	Cultural Resources Assessment of 35.3 Acres for Tentative Tract Map (TTM) 36303, City of Menifee, Riverside County, California
009927	2005	Bonner Wayne H., and Marnie Aislin-Kay	Cultural Resource Records Search and Site Visit for Cingular Telecommunications Facility Candidate Rs-0081-01 (Melvin Street), 30290 Melvin Street, Menifee, Riverside County, California
010380	2017	Sanka, Jennifer M., William R. Gillean, and Leslie Nay Irish	Phase IV Cultural Resources Monitoring Report for The Menifee Estates Project City of Menifee, Riverside County, California

* Overlaps Project Area

The EIC has a record of 33 resources recorded within the one-mile search radius (Table 2, *Previously Recorded Resources within One Mile of the Project Area*). No resources have been previously mapped within or adjacent to the project area. In general, the prehistoric resources within the records search boundary consist of prehistoric village/habitation sites and milling stations, as well as two isolates. These sites include features such as a house pit, petroglyphs, cupules, rock walls, and other rock features. Five historic resources are recorded, consisting of the remains of several structures and two refuse deposits. A single multicomponent site is documented, consisting of bedrock milling and a trash scatter, and abandoned farm equipment.

Table 2
PREVIOUSLY RECORDED RESOURCES WITHIN ONE MILE OF THE PROJECT AREA

Primary Number (P-33-##)	Trinomial (CA-RIV-#)	Age	Description	Recorder, Date
000332	332	Prehistoric	Possible village or camp site surrounded by a granite outcrop used for milling.	Smith, 1953; Chace, 1963; Boucher, 1979; Accardy, 2017
000337	337	Historic	A house pit.	M.K., 1964

Primary Number (P-33-##)	Trinomial (CA-RIV-#)	Age	Description	Recorder, Date
000339	339	Prehistoric	A single boulder with approximately 49 cupules. Also recorded as a campsite with a surface scatter of flakes.	Kowta, 1964; Hedges, 1981, McCarthy, 1987
000340	340	Prehistoric	A portion of a village site, consisting of petroglyphs, cupules, milling features, rock walls, and other rock features.	Kowta, 1964; Hedges, 1981; McCarthy, 1987; Hoover and Blevins, 2003;
000341	341	Prehistoric	Rock wall feature situated in a discontinuous circle.	Kowta, 1964
001028	1028	Unknown	No information given.	Eastvold, 1976
001415	1415	Prehistoric	Surface scatter of flakes, tools, and bedrock milling features.	Chace, 1978
001698	1698	Prehistoric	A grinding slick on a large granitic outcrop.	Giansanti, 1979
001724	1724	Prehistoric	Four bedrock mortars and a pair of quartz flakes.	Oxendine, 1979
001845	1845	Prehistoric	Four slicks on a large granitic outcrop.	Salpas and Bowles, 1980; Hogan, 2000
001987	1987	Prehistoric	Four slicks on two granitic outcrops and a lithic scatter.	Unknown, n.d.
002005	2005	Prehistoric	Two slicks on a large boulder and a small lithic scatter.	Oxendine, 1979
002009	2009	Prehistoric	Food processing site consisting of four metate fragments from two separate metates and a core.	Desautels, 1980
002074	2074	Prehistoric	A granitic boulder with a single milling slick.	Moore, 1981; Hall and Harris, 2002
007711	---	Historic	Two brick houses, two wood frame barns, a small cabin, and a mineshaft.	Borchard, 1982
008855	6285	Prehistoric	A boulder with a single milling slick.	Johnson, 1999
008856	6286	Prehistoric	Four boulders with milling stations. One boulder has two slicks, and the remaining three have one slick each.	Johnson, 1999
008857	6287	Prehistoric	A boulder with a milling station.	Johnson, 1999
008858	6288	Prehistoric	Two boulders with three slicks.	Johnson, 1999
010990	6640	Prehistoric	A bedrock milling station with a single slick.	White, 2001
010991	6641	Prehistoric	A bedrock milling station with a single slick.	White, 2001
011203	---	Prehistoric	Bedrock milling features on three boulders.	McKenna, 2003
014399	7830	Prehistoric	A single bedrock milling feature in a bedrock outcrop.	Eliseuson, 2003
014400	7831	Prehistoric	A single bedrock milling feature in a bedrock outcrop.	Eliseuson, 2003
023814	11706	Multi-Component	A historic trash scatter and abandoned farm equipment. A bedrock milling slick.	Loren-Webb, 2013
024208	11905	Prehistoric	Three bedrock milling features and three milling elements.	Morgan and Hall, 2015

Primary Number (P-33-##)	Trinomial (CA-RIV-#)	Age	Description	Recorder, Date
024209	11906	Historic	A foundation and driveway lined with a rock wall.	Morgan and Hall, 2015
026645	---	Prehistoric	Isolated mano fragment and crystal quartz lithic tool.	Gillean and Sanka, 2016
026646	---	Prehistoric	Isolated granitic mano.	Gillean and Sanka, 2016
026647	12548	Historic	Domestic refuse deposit comprised of glass and ceramics.	Gillean and Sanka, 2016
026648	12549	Historic	Refuse deposit consisting of domestic refuse.	Gillean and Sanka, 2016

4.2 ARCHIVAL RESEARCH

Historic topographic maps and aerial photographs were reviewed to assess the potential for historic structural resources and historic archaeological resources. Maps included the 1901 Elsinore (1:125,0000) topographic map; the 1942 and 1943 (1:62,500) Murrieta topographic maps; and the 1953, 1973, and 1979 (1:24,000) Romoland topographic maps. General Land Office (GLO) Survey Plat Maps were researched and downloaded from the Bureau of Land Management's (BLM) GLO Records website. These included the survey plats from 1860, 1880, 1885, 1896, and 1897 for Township 6 South, Range 3 West (T6S/R3W). A BLM GLO Records land patent search was also conducted to identify the historic ownership of the project area; however, only land patents issued to the Southern Pacific Railroad Company were identified for Section 9. Historic aerial photographs from 1938, 1967, 1978, and 1996 were reviewed at historicaerials.com (NETR Online 2020).

On the 1860 survey plat map, the region surrounding the project area is indicated as "Open Plain" and the land to the south is indicated as consisting of "Brushy Land." A trail is indicated in the southwest corner of Section 9 of T6S/R3W; this trail was recorded as running northwest-southeast, from Section 14 to Section 6.

No buildings or structures appear within the project site on the 1901 Elsinore map, but several roads and structures are situated throughout the Menifee Valley. By the 1940s, additional structures are shown throughout the valley on the 1942 and 1943 Murrieta topographic maps; however, nothing is shown recorded within the project area. The 1953, 1973, and 1979 Romoland topographic maps do not show any structures or roads near the project area.

The aerial photographs from 1938, 1967, and 1978 show a creek or stream running northeast-southwest through the project area; no development is shown in any of these photographs within the project area. By 1996, it appears that structures had been built south of Craig Avenue and northwest of the intersection of Craig Avenue and Evans Road; the Palomar Valley High School had also been constructed before the 1996 aerial photograph was taken and after the 1979 Romoland topographic map was created (NETR Online 2020).

A Draft Environmental Impact Report (DEIR) was prepared for the Cimarron Valley Estates, located immediately south and southwest of the project area (HDR 2003). The DEIR utilized a cultural resources investigation prepared by McKenna (2003) that consisted of a records search from the EIC that covered a half mile surrounding the project area, a review of the Sacred Lands File from the NAHC, and an

intensive pedestrian survey of the area. While the full results of the records search for the Cimarron Valley Estates were not disclosed in the DEIR, the report described two cultural resources within the Cimarron Valley Estates project area: P-33-11189 [P-33-011189] and P-33-11203 [P-33-011203].

P-33-011189 consisted of a small concentration of historic refuse scattered near structures depicted on the USGS quadrangle map just east of Murrieta Road. Artifacts within this scatter included amethyst glass, solder cans, and a stovepipe segment. This site was not included in the records search obtained from EIC for the current study, but a map with the site record for P-33-011203 shows it as being located approximately 2,500 feet from the Evans Park project site. Prehistoric resource P-33-011203 consists of bedrock grinding slicks on three isolated boulders located on the eastern boundary of the Cimarron Valley Estates property, approximately 1,000 feet from the Evans Park project area. While no artifacts or evidence of habitation were found in association with these slicks, the DEIR noted that the likelihood of subsurface cultural deposits is possible (HDR 2003).

The DEIR also stated that the results of the Sacred Lands File search indicated that "no sacred spaces were identified within one-half mile of the proposed project area" (HDR 2003). This half-mile search radius includes the Evans Park project area.

4.3 NATIVE AMERICAN CONTACT PROGRAM

HELIX contacted the Native American Heritage Commission (NAHC) on October 15, 2020, for a Sacred Lands File (SLF) search and a list of Native American contacts for the project area. The NAHC indicated in a response dated October 19, 2020, that no known sacred lands or Native American cultural resources are within the project area but stated that "the absence of specific site information in the SLF does not indicate the absence of cultural resources in any project area." Native American correspondence is included as Appendix C (Confidential Appendices, bound separately).

Principal Investigator Mary Robbins-Wade spoke to Ebru Ozdil of the Pechanga Cultural Resources Department about the project on October 23, 2020, prior to the receipt of the records search from EIC. Ms. Ozdil stated that Pechanga does not have record of any cultural resources within the project location, though there is record of numerous archaeological sites within several miles of the project. Ms. Ozdil noted that the project site is in proximity to two TCPs. Resources in the vicinity of the project area (at least some of which are included in the EIC records search) include rock art, cupules, and ceremonial places or items, including the Ringing Rock, as well as human remains. The density of cultural resources and archaeological sites in the general vicinity is high. Given these factors, the project site is in an area that is sensitive for cultural resources.

4.4 FIELD SURVEY

A pedestrian survey of the project site was conducted on October 22, 2020, by HELIX staff archaeologist Mary Villalobos, and Tony Foussat and Julio Marquez from the Pechanga Band of Mission Indians. The project area was walked in transects spaced approximately 10 to 15 feet apart.

Visibility in most of the northern section of the project area (north of Craig Avenue) was poor; due to the existence of dense, chest-high grasses and other vegetation, visibility ranged from five to 10 percent (Plate 1). Two newly constructed, raised dirt pathways are located at the southern end of this section, and a graded road and drainage bisect the area (Plate 2). A creek runs northeast-southwest through the eastern portion of the northern section; due to the dense vegetation and trees, visibility along the creek

was roughly 15 to 20 percent (Plate 3). A constructed platform is located in the center of the section, with visibility on the platform ranging from 20 to 40 percent. Bioturbation was observed within the northern section of the project area.

The southern section (south of Craig Avenue) also had poor visibility due to chest- and head-high vegetation, approximately zero to 10 percent (Plate 4). A large pond with several boulder outcrops was located in the southeastern corner of the section; these outcrops were examined for grinding activity, though none was observed (Plates 5 through 7).

Visible soils within the project area consisted of grey/brown sandy silt and decomposed granite. Modern trash was scattered throughout both sections of the project area, and construction debris was found in the northern section. No cultural or historic resources were observed.



Plate 1. Overview of the northern section of the project area, view to the north.



Plate 2. Overview of constructed roadway within the northern section, view to the northeast.



Plate 3. Overview of creek in the eastern side of the northern section, view to the east.



Plate 4. Overview of the southern section, view to the east.



Plate 5. Overview of the pond in the southern section, view to the east.



Plate 6. Overview of the boulder outcrop in the southern section, view to the north.



Plate 7. Overview of the boulder outcrop in the southern section, view to the south.

5.0 SUMMARY AND MANAGEMENT RECOMMENDATIONS

A study was undertaken to identify cultural resources that are present in the Evans Park project area and to determine the effects of the project on historical resources. The cultural resources survey did not identify any cultural resources within the project area; therefore, no impacts to cultural resources have been identified.

The area surrounding the project area remained relatively undeveloped until at least the 1990s, and it does not appear to have been utilized for agricultural uses. However, the project site was covered by dense vegetation, and much of the ground surface could not be observed. Additionally, the project site is located within alluvial soils, where there is a potential for buried cultural resources.

Based on the results of the current study, no historical resources as defined by CEQA would be affected by the Evans Park Project. However, Pechanga has identified the project vicinity as culturally sensitive, although the NAHC stated that the search of the Sacred Lands File returned negative results.

Due to the potential for subsurface cultural resources and the cultural sensitivity identified by Pechanga, it is recommended that an archaeological and Native American monitoring program be implemented for any grading or other ground-disturbing activities, including brushing/grubbing, excavation, trenching for utilities, etc. The monitoring program would include attendance by the archaeologist and Native American monitor at a pre-construction meeting with the grading contractor and the presence of archaeological and Native American monitors during initial ground-disturbing activities for the project. Both archaeological and Native American monitors would have the authority to temporarily halt or redirect grading and other ground-disturbing activity in the event that cultural resources are encountered. If significant cultural material is encountered, the project archaeologist will coordinate with the Native American representative and City staff to develop and implement appropriate avoidance, preservation, or mitigation measures.

In the event that human remains are discovered, the County Coroner shall be contacted. If the remains are determined to be of Native American origin, the Most Likely Descendant, as identified by the NAHC, shall be contacted in order to determine proper treatment and disposition of the remains. All requirements of Health & Safety Code §7050.5 and PRC §5097.98 shall be followed.

Should the project limits change to incorporate new areas of proposed disturbance, an archaeological survey of these areas will be required.

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Appendix A

Resumes

Mary Robbins-Wade, RPA

Cultural Resources Group Manager

Summary of Qualifications

Ms. Robbins-Wade has 41 years of extensive experience in both archaeological research and general environmental studies. She oversees the management of all archaeological, historic, and interpretive projects; prepares and administers budgets and contracts; designs research programs; supervises personnel; and writes reports. Ms. Robbins-Wade has managed or participated in hundreds of projects under the California Environmental Quality Act (CEQA), as well as numerous archaeological studies under various federal jurisdictions, addressing Section 106 compliance and National Environmental Policy Act (NEPA) issues. She has excellent relationships with local Native American communities and the Native American Heritage Commission (NAHC), as well as has supported a number of local agency clients with Native American consultation under State Bill 18 and assistance with notification and Native American outreach for Assembly Bill 52 consultation. Ms. Robbins-Wade is a Registered Professional Archaeologist (RPA) and meets the U.S. Secretary of the Interior's Professional Qualifications for prehistoric and historic archaeology.

Selected Project Experience

12 Oaks Winery Resort. Project Manager/ Principal Investigator for a cultural resources survey of approximately 650 acres for a proposed project in the County of Riverside. Oversaw background research, field survey, site record updates, Native American coordination, and report preparation. Met with Pechanga Cultural Resources staff to discuss Native American concerns. Worked with applicant and Pechanga to design the project to avoid impacts to cultural resources. Work performed for Standard Portfolio Temecula, LLC.

28th Street between Island Avenue and Clay Avenue Utilities Undergrounding Archaeological Monitoring. Project Manager/Principal Investigator for a utilities undergrounding project in a historic neighborhood of East San Diego. Responsible for project management; coordination of archaeological and Native American monitors; coordination with forensic anthropologist, Native American representative/Most Likely Descendent, and City staff regarding treatment of possible human remains; oversaw identification of artifacts and cultural features, report preparation, and resource documentation. Work performed for the City of San Diego.

Archaeological Testing F11 Project. Project Manager for a cultural resources study for a proposed mixed-use commercial and residential tower in downtown San Diego. Initial work included an archaeological records search and a historic study, including assessment of the potential for historic archaeological resources. Subsequent work included development and implementation of an archaeological testing plan, as well as construction monitoring and the assessment of historic archaeological resources encountered. Work performed for the Richman Group of Companies.

Education

Master of Arts, Anthropology, San Diego State University, California, 1990

Bachelor of Arts, Anthropology, University of California, Santa Barbara, 1981

Registrations/ Certifications

Caltrans, Professionally Qualified Staff-Equivalent Principal Investigator for prehistoric archaeology, , Bureau of Land Management Statewide Cultural Resource Use Permit (California), permit #CA-18-35, , Register of Professional Archaeologists #10294, 1991

County of San Diego, Approved CEQA Consultant for Archaeological Resources, 2007

, Orange County Approved Archaeologist, 2016

Blended Reverse Osmosis (RO) Line Project. Project Manager/ Principal Investigator for cultural resources monitoring during construction of a 24-inch recycled water pipeline in the City of Escondido. Oversaw monitoring program, including Worker Environmental Awareness Training; responsible for Native American outreach/coordination, coordination with City staff and construction crews, and general project management. Work performed for the City of Escondido.

Buena Sanitation District Green Oak Sewer Replacement Project. Project Manager/Principal Investigator for a cultural resources testing program in conjunction with a proposed sewer replacement project for the City of Vista. Oversaw background research, fieldwork, site record update, Native American coordination, and report preparation. Work performed for Harris & Associates, Inc., with the City of Vista as the lead agency.

Cactus II Feeder Transmission Pipeline IS/MND. Cultural Resources Task Lead for this project in the City of Moreno Valley. Eastern Municipal Water District proposed to construct approximately five miles of new 30-inch to 42 inch-diameter pipeline; the project would address existing system deficiencies within the City and provide supply for developing areas. Oversaw background research, field survey, and report preparation. Responsible for Native American outreach for cultural resources survey. Assisted District with Native American outreach and consultation under AB 52. Work performed under an as-needed contract for Eastern Municipal Water District.

Dale 2199C Pressure Zone Looping Pipeline Project. Cultural Resources Task Lead for this project in Moreno Valley. Eastern Municipal Water District proposed construction of a new pipeline to connect two existing pipelines in the District's 2199C Pressure Zone. The pipeline would consist of an 18-inch-diameter pipeline between Kitching Street and Alta Vista Drive that would connect to an existing 12-inch-diameter pipeline in the northern end of Kitching Street and to an existing 18-inch-diameter pipeline at the eastern end of Alta Vista Drive. The project will improve reliability and boost the Dale Pressure Zone's baseline pressure and fire flow availabilities. Four potential alignments were under consideration; three of these bisect undeveloped land to varying degrees, while the other is entirely situated within developed roadways. Oversaw background research and field survey. Responsible for Native American outreach for cultural resources survey and co-authored technical report. Work performed under an as-needed contract for Eastern Municipal Water District.

Downtown Riverside Metrolink Station Track & Platform Project. Cultural Resources Task Lead for this project involving changes to and expansion of the Downtown Riverside Metrolink Station. Overseeing records search and background information, archaeological survey, and report preparation. Responsible for coordination with Native American Heritage Commission, Riverside County Transportation Commission (RCTC), and Federal Transportation Authority (FTA) on Native American outreach. Work performed for Riverside County Transportation Commission as a subconsultant to HNTB Corporation.

Emergency Storage Pond Project. Project Manager/Principal Investigator for a cultural resources testing program in conjunction with the Escondido Recycled Water Distribution System - Phase 1. Two cultural resources sites that could not be avoided through project design were evaluated to assess site significance and significance of project impacts. Work included documentation of bedrock milling

features, mapping of features and surface artifacts, excavation of a series of shovel test pits at each site, cataloging and analysis of cultural material recovered, and report preparation. The project is located in an area that is sensitive to both the Kumeyaay and Luiseño people, requiring close coordination with Native American monitors from both groups. Work performed for the City of Escondido.

Escondido Brine Line Project. Project Manager/Principal Investigator for cultural resources monitoring during construction of approximately 2.3 miles of a 15-inch brine return pipeline in the City of Escondido. The project, which is part of the City's Agricultural Recycled Water and Potable Reuse Program, enables discharge of brine recovered from a reverse osmosis facility that is treating recycled water; it is one part of the larger proposed expansion of Escondido's recycled water distribution to serve eastern and northern agricultural land. The project is located in an area that is sensitive to both the Kumeyaay and Luiseño people, requiring close coordination with Native American monitors from both groups. Oversaw monitoring program, including Worker Environmental Awareness Training; responsible for Native American outreach/coordination, coordination with City staff and construction crews, and general project management. Work performed for the City of Escondido.

Hacienda del Mar EIR. Senior Archaeologist for a proposed commercial development project for a senior care facility in Del Mar. Assisted in the preparation of associated permit applications and an EIR. Oversaw background research, updated records search and Sacred Lands File search, monitoring of geotechnical testing, coordination with City staff on cultural resources issues, and preparation of updated report. Prior to coming to HELIX, served as Cultural Resources Task Lead for the cultural resources survey for the project, conducted as a subcontractor to HELIX. Work performed for Milan Capital Management, with the City of San Diego as the lead agency.

Lilac Hills Ranch. Project Manager/Principal Investigator of a cultural resources survey and testing program for an approximately 608-acre mixed-use development in the Valley Center area. Oversaw background research, field survey, testing, recording of archaeological sites and historic structures, and report preparation. Responsible for development of the research design and data recovery program, preparation of the preservation plan, and Native American outreach and coordination. The project also included recording historic structures, development of a research design and data recovery program for a significant archaeological site, and coordination with the Native American community and the client to develop a preservation plan for a significant cultural resource. The project changed over time, so additional survey areas were included, and a variety of off-site improvement alternatives were addressed. Work performed for Accretive Investments, Inc. with County of San Diego as the lead agency.

Moulton Niguel Water District Regional Lift Force Main Replacement. Cultural Resources Task Lead/Principal Investigator for the replacement of a regional lift station force main operated by Moulton Niguel Water District (MNWD). The project comprises an approximately 9,200 linear foot alignment within Laguna Niguel Regional Park in Orange County, in an area that is quite sensitive in terms of cultural resources. HELIX is supporting Tetra Tech throughout the preliminary design, environmental review (CEQA), and final design, including permitting with applicable state and federal regulatory agencies. The cultural resources survey will inform project design, in order to avoid or minimize potential impacts to cultural resources. Oversaw background research and constraints analysis, Native American

coordination, cultural resources survey, coordination with MNWD and Tetra Tech, and report preparation. Work performed for MNWD, as a subconsultant to Tetra Tech.

Murrieta Hot Springs Road Improvements Project. Principal Investigator/Cultural Resources Task Lead for cultural resources survey in support of an Initial Study/Mitigated Negative Declaration (IS/MND) for the widening of Murrieta Hot Springs Road in the City of Murrieta. The project would widen or restripe Murrieta Hot Springs Road between Winchester Road and Margarita Road from a 4-lane roadway to a six-lane roadway to improve traffic flow, as well as provide bike lanes in both directions along this segment. A new raised median, light poles, signage, stormwater catch basins, retaining walls, and sidewalks would also be provided on both sides of the roadway, where appropriate. The project area is in a location that is culturally sensitive to the Native American community. The cultural resources study included tribal outreach and coordination to address this cultural sensitivity.

Park Circle - Cultural Resources. Project Manager/Principal Investigator of a cultural resources survey and testing program for a proposed 65-acre residential development in the Valley Center area of San Diego County. The project is located along Moosa Creek, in an area that is culturally sensitive to the Luiseño people. Oversaw background research, historic study, field survey, testing, recording archaeological sites and historic structures, and report preparation. Responsible for Native American outreach and coordination. The cultural resources study included survey of the project area, testing of several archaeological sites, and outreach and coordination with the Native American community, as well as a historic study that addressed a mid-20th century dairy barn and a late 19th century vernacular farmhouse. Work performed for Touchstone Communities.

Peacock Hill Cultural Resources. Project Manager/Principal Investigator of a cultural resources study update for a residential development in Lakeside. Oversaw updated research, fieldwork, lab work, analysis by forensic anthropologists, report preparation, and Native American coordination. In the course of outreach and coordination with the Native American (Kumeyaay) community, possible human remains were identified, prompting additional fieldwork, as well as coordination with the Native American community and forensic anthropologists. Work performed for Peacock Hill, Inc.

Sky Canyon Sewer Environmental Consulting. Cultural Resources Task Lead for this project adjacent to the City of Murrieta in southwestern Riverside County. Eastern Municipal Water District (District) proposed to implement the Sky Canyon Sewer Main Extension Project to construct approximately 6,700 linear feet of new gravity-fed 36-inch-diameter sewer main to provide additional sewer capacity for planned development. The proposed 36-inch-diameter sewer main would extend the existing 36-inch-diameter French Valley Sewer at Winchester Road further downstream to Murrieta Hot Springs Road. Oversaw background research and field survey. Responsible for Native American outreach for cultural resources survey and co-authored technical report. Assisted District with Native American outreach and consultation under AB 52. Work performed under an as-needed contract for Eastern Municipal Water District.

James Turner, RPA

Staff Archaeologist

Summary of Qualifications

Mr. Turner is a Registered Professional Archaeologist (RPA) with a Master's degree in Anthropology and field and college-level teaching experience in archaeology. He is experienced in Section 106, the Native American Graves Protection and Repatriation Act (NAGPRA), and writing detailed reports. Mr. Turner has archaeological research and fieldwork expertise throughout southern California. He has also received training in identifying and analyzing animal remains in archaeological contexts, historic artifact identification, and technical writing. Mr. Turner's experience meets the Secretary of the Interior's Professional Qualification Standards for archaeology.

Selected Project Experience

eTS 43472 "Gold Mine" Monitoring (2020). Archaeologist for an erosion control and repair project in the community of Julian. Conducted cultural resource monitoring and report preparation. Work performed for San Diego Gas & Electric.

Aliso Creek Canyon Restoration Project (2020). Archaeologist for an erosion repair project in Lake Forest. Conducted a field survey of the project area, performed background research, and produced a cultural resources report. Work performed for the Orange County Department of Public Works.

Broadway Channel Improvements - Phase A (2020 -). Archaeologist for an earthen channel improvement project in the city of El Cajon. Performed background research and prepared cultural resource survey report. Work performed for City of El Cajon.

Clairemont Community Plan Update EIR Ph1 (2020). Archaeologist for the Clairemont Community Plan Update. Performed background research and assisted with preparing the Community Plan Update cultural resources section. Work performed for the City of San Diego.

Cordial Road Pipeline (2020). Archaeologist for a pipeline replacement project in the unincorporated portion of the City of El Cajon. Performed background research and field survey. Other responsibilities included the production of a letter report detailing the methods and results of the survey, as well as the completion of a site record update to submit to the South Coastal Information Center. Work performed for the Padre Dam Municipal Water District.

Carmel Mountain Road Life Sciences Project (2020). Archaeologist for a proposed commercial development project in the Torrey Hills Community Plan area.

Education

Master of Arts, Anthropology, San Diego State University, 2018

Bachelor of Arts, Biology and Anthropology, San Diego State University, 2015

Registrations/ Certifications

Registered Professional Archaeologist #17338

Professional Affiliations

Society for Historical Archaeology

Society for California Archaeology

Responsibilities included performing background and archival research and producing an archaeological resources report. Work performed for Allen Matkins Leck Gabme Mallory & Natsis, LLP.

Draft EIS/Overseas EIS - Disposal of Decommissioned, Defueled Ex-Enterprise (CVN 65) & Associated Naval Reactor Plants (2020 -). Archaeologist for the Draft EIS for the disposal of the Navy ex-Enterprise. Responsible for background research and citation management and assisted with document preparation. Work performed for the United States Navy as a subconsultant to ManTech.

Eastlake Village Park (2020). Archaeologist for a telecommunication project in the community of Eastlake in the City of Chula Vista. Conducted cultural resource monitoring for the drilling of a cassion hole. Work performed for Terracon.

General Coatings (2020). Archaeologist for a due diligence project for the possible future expansion of the General Coatings property. Conducted background research, which included analyzing a records search and viewing historic maps and aerial photographs of the project area. Additional responsibilities included performing a field survey of the project area and producing a cultural resources due diligence report. Work performed for General Coatings.

Lake Rancho Viejo Environmental Consulting (2020). Archaeologist for a cultural resources survey for a proposed housing development in the community of Fallbrook in northern San Diego County. Conducted background research and report preparation. Work performed for Q Technology Direct LLC with County of San Diego as the lead agency.

Mtn View Connector Pipeline - Cultural (2020). Archaeologist for a waterline replacement project in the community of Alpine. Conducted cultural resource monitoring and prepared the final monitoring report. Work performed for Padre Dam Municipal Water District.

Salt Bay Design District Specific Plan EIR (2020). Archaeologist for a mixed-use development project, which proposes to include wholesale/retail shopping and light industrial uses. Participated in an archaeological testing program and produced artifact tables for report. Work performed for M & A Gabaee.

Santa Ysabel Trail (2020 -). Staff Archaeologist for a proposed 3 mile hiking trail in the unincorporated community of Julian. Performed background research, participated in the cultural resource survey, and contributed to the cultural resources survey report. Work performed for the County of San Diego Parks and Recreation Department.

Mary Villalobos

Staff Archaeologist

HELIX Environmental Planning

Summary of Qualifications

Ms. Villalobos serves as a field archaeologist on a number of cultural resource projects in southern California, including surveys, testing programs, and monitoring. She has also served as a laboratory assistant for major universities, museums, and archaeological centers. She has expertise in cultural resource surveying, cataloging site excavation data, and monitoring. Ms. Villalobos' experience includes international work for a key archaeological project in Peru focused on a temple excavation.

Selected Project Experience

1125 S. Cleveland Street -Cultural & Native American Monitoring (2016). Archaeological monitor for a housing project in the City of Oceanside, CA. Responsible for field monitoring, coordination with construction crew and Native American monitors, identification of artifacts and cultural features, and daily field notes. Work performed for Hallmark Communities. Lead agency was City of Oceanside.

12 Oaks Winery Resort (2015 - 2018). Field Archaeologist for survey of an approximately 600-acre project near Temecula in Riverside County, CA. Responsibilities included identification of cultural material during field survey. Work performed for Standard Portfolio Temecula, LLC, with County of Riverside as the lead agency.

28th Street between Island Avenue and Clay Avenue Archaeological Monitoring (2016 - 2018). Archaeological Monitor for a utilities undergrounding project in a historic neighborhood of East San Diego, CA. Responsible for field monitoring, coordination with construction crew and Native American monitors, identification of artifacts and cultural features, and daily field notes. Work performed for the City of San Diego.

4th & J Project (2017). Archaeological monitor for a residential project in a historic neighborhood in the City of San Diego, CA. Responsible for field monitoring, coordination with construction crew and Native American monitors, identification of artifacts and cultural features, and daily field notes. Work performed for Legacy Partners, lead agency is City of San Diego.

Oceanside As-Needed Environmental Consulting Services (2015 - 2016). Archaeological Monitor for construction of a new facility at the Mission Basin Desalting Facility near the San Luis Rey River, in the City of Oceanside, CA. Responsible for field monitoring, coordination with construction crew and Native American monitors, identification of artifacts and cultural features, and daily field notes. Work performed for the City of Oceanside.

Education

Bachelor of Arts, Anthropology, concentration in Archaeology, University of California San Diego, CA, 2013

Registrations/ Certifications

Technical Safety Institute, HAZWOPER 40 Hour, Issue No. F183292: Hazardous Waste Operations and Emergency Response, 2018

City of San Diego As-Needed Permitting Assistance for O & M Activities and Emergencies (2016 - 2016). Archaeological monitor for the removal of sediment at culvert outlets at Hotel Circle, in the City of San Diego, CA, to help alleviate flooding in the area. Responsible for field monitoring, coordination with construction crew and Native American monitors, identification of artifacts and cultural features, and daily field notes. Work performed for the City of San Diego

Storage Buildings Construction Monitoring, San Marcos Campus (2017). Archaeological monitor for the construction of storage facilities on the campus of Palomar College in the City of San Marcos, California. Cultural resources are located near the project area. Responsible for field monitoring, coordination with construction crew and Native American monitors, identification of artifacts and cultural features, and daily field notes. Work performed for Palomar College.

Cemetery Area Water Pipeline Replacement (2015 - 2016). Archaeological Monitor for a water pipeline replacement project in eastern Escondido, CA. Responsible for field monitoring, coordination with construction crew and Native American monitors, identification of artifacts and cultural features, and daily field notes. Work performed for the City of Escondido.

Da Vinci (2018). Archaeological monitor during potholing to find existing utilities for the construction of a telecommunication tower. Responsible for field monitoring, coordination with construction crew, identification of artifacts and cultural features, and daily monitoring notes. Work performed for Terracon. Lead agency is Verizon.

DePratti, Inc. Telespan Lake Wohlford (2017). Field archaeologist for a testing program to determine the northern extent of an important archaeological site near Lake Wohlford in the community of Bear Valley in the County of San Diego, California. Responsibilities included excavation of test units, identification of cultural material, and preparation of field notes. Work performed for DePratti, Inc. Lead agency is County of San Diego.

El Camino Real Road Widening-Archaeological Monitoring (2016). Archaeological Monitor for a road widening project in an area with archaeological and cultural sensitivity in the City of Carlsbad, CA. Responsible for field monitoring, coordination with construction crew and Native American monitors, identification of artifacts and cultural features, and daily field notes. Work performed for the City of Carlsbad.

Magnolia Trails (2016). Archaeological Monitor for a residential development in the City of El Cajon, CA. Responsible for field monitoring, coordination with construction crew and Native American monitors, identification of artifacts and cultural features, and daily field notes. Work performed for KB Home. Lead agency was City of El Cajon.

Appendix B

Records Search
(Confidential, bound separately)

Appendix C

Native American Correspondence
(Confidential, bound separately)

IS/MND Appendix D

Geotechnical Investigation

GEOTECHNICAL ENGINEERING
CONSTRUCTION INSPECTION
MATERIALS TESTING
ENVIRONMENTAL

OFFICE LOCATIONS

ORANGE COUNTY
CORPORATE BRANCH

2992 E. La Palma Avenue
Suite A
Anaheim, CA 92806

Tel: 714.632.2999
Fax: 714.632.2974

SAN DIEGO
IMPERIAL COUNTY

6295 Ferris Square
Suite C
San Diego, CA 92121

Tel: 858.537.3999
Fax: 858.537.3990

INLAND EMPIRE

14467 Meridian Parkway
Building 2A
Riverside, CA 92518

Tel: 951.653.4999
Fax: 951.653.4666

INDIO

44917 Golf Center Pkwy
Suite 1
Indio, CA 92201

Tel: 760.342.4677
Fax: 760.342.4525

OC/LA/INLAND EMPIRE
DISPATCH

800.491.2990

SAN DIEGO DISPATCH

888.844.5060

www.mtglinc.com

GEOTECHNICAL INVESTIGATION

EVANS PARK PUMP TRACK RESTROOM
26533 CRAIG AVENUE
MENIFEE, CALIFORNIA

Prepared For:
City of Menifee
29995 Evans Road
Menifee, California

Prepared By:
MTGL, Inc.
2992 La Palma, Suite A
Anaheim, California 92806

September 20, 2021

MTGL Project No. 4406A13
MTGL Log No. 21-1661

GEOTECHNICAL ENGINEERING
CONSTRUCTION INSPECTION
MATERIALS TESTING
ENVIRONMENTAL

OFFICE LOCATIONS

ORANGE COUNTY
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IMPERIAL COUNTY
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Tel: 858.537.3999
Fax: 858.537.3990

INLAND EMPIRE
14467 Meridian Parkway
Building 2A
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Tel: 951.653.4999
Fax: 951.653.4666

INDIO
44917 Golf Center Pkwy
Suite 1
Indio, CA 92201
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Fax: 760.342.4525

OC/LA/INLAND EMPIRE
DISPATCH
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SAN DIEGO DISPATCH
888.844.5060

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September 20, 2021

MTGL Project No.: 4406A13
MTGL Log No.: 21-1661
MTGL Branch: Anaheim

Bryce Howell, Park/Landscape Maintenance Manager
City of Menifee Community Services Department
29995 Evans Road
Menifee, California 92586

Subject: **GEOTECHNICAL INVESTIGATION**
EVANS PARK PUMP TRACK RESTROOM
26533 CRAIG AVENUE
MENIFEE, CALIFORNIA 92586

Dear Mr. Howell,

In accordance with your request and authorization, we have completed a Soils Engineering Investigation for the subject site. We are pleased to present the following report which includes existing site conditions, results of our field exploration and laboratory testing, and our conclusions and recommendations for grading and foundations design.

The project is located at 26533 Craig Avenue in the city of Menifee, County of Riverside, California. It is our understanding that the project will consist of the design and construction of a new 170 square feet, pre-fabricated restroom building at the existing undeveloped property. The purpose of our work was to provide conclusions and recommendations regarding the geotechnical aspects of the project.

We explored the subsurface conditions beneath the site by drilling two (2) borings to depths of approximately 10 to 51½ feet below the existing ground surface using a truck-mounted drill rig equipped with a hollow-stem auger. Our field engineer logged the borings and collected samples of the materials encountered in the borings for laboratory testing. Our laboratory subsequently tested selected samples from the borings to evaluate pertinent soil classification and engineering properties to assist in developing geotechnical conclusions and recommendations.

The materials encountered in the borings consisted primarily of fill and Old Alluvial Fan Deposits. The fill extended to approximate depths of two (2) feet below the existing ground surface and consisted of loose silty sands. The Old Alluvial Fan Deposits underlying the fills consisted of dense layers of silty sand, gravelly sand, and sand. Groundwater was observed in the borings at a depth of 10 feet below existing ground surface.

Based on the results of our investigation, the site will be suitable for construction, provided the recommendations presented herein are incorporated into the plans and specifications for the proposed construction.

The main geotechnical considerations affecting the project are the presence of potentially compressible fills. To reduce the potential for settlement, the existing fills should be excavated in below planned structures, settlement sensitive improvements, and areas to receive new fills. The excavated materials, free of vegetation, debris, and rocks greater than six (6) inches may be used as compacted fill. Accordingly, we recommend that the structure can be supported on spread footings bearing entirely on compacted fills. To reduce the potential for expansive heave, concrete slabs-on-grade, hardscape, and site and retaining wall footings should be underlain by at least two (2) feet of material with an expansion index of 20 or less. The recommendations presented herein may need to be updated once final plans are developed.

We appreciate this opportunity to be of continued service and look forward to providing additional consulting services during the planning and construction of the project. Should you have any questions regarding this report, please do not hesitate to contact us at your convenience.

Respectfully submitted,
MTG$_L$, Inc.



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TABLE OF CONTENTS

1.00 INTRODUCTION 1
1.01 PLANNED CONSTRUCTION 1
1.02 SCOPE OF WORK 1
1.03 SITE DESCRIPTION 1
1.04 FIELD INVESTIGATION 1
1.05 LABORATORY TESTING 2
2.00 FINDINGS 3

2.01 GEOLOGIC AND SUBSURFACE CONDITIONS 3
2.02 FAULTING AND SURFACE RUPTURE 3
2.03 SURFACE AND GROUNDWATER CONDITIONS 4
2.04 FLOODING POTENTIAL 4
2.05 LIQUEFACTION POTENTIAL 4
2.06 LANDSLIDES 5
2.07 TSUNAMI AND SEICHE HAZARDS 5

3.00 CONCLUSIONS 6
3.01 GENERAL CONCLUSIONS 6
3.02 SEISMIC DESIGN PARAMETERS 6
3.03 BEARING FAILURE 7
3.04 LATERAL SPREADING (LATERAL DISPLACEMENT) 7
3.05 LIFELINE HAZARDS 7

4.00 RECOMMENDATIONS 8
4.01 EXCAVATION CHARACTERISTICS AND SHRINKAGE ESTMATES 8
4.02 SETTLEMENT CONSIDERATIONS 8
4.03 SITE CLEARING 9
4.04 SITE PREPARATION 9
4.05 REMOVALS AND OVEREXCAVATION 9
4.05.1 STRUCTURES SUPPORTED ON CONVENTIONAL FOUNDATIONS 10
4.05.2 NON-STRUCTURAL AREAS 10
4.06 FILL MATERIALS 10
4.07 EXPANSIVE SOILS 11
4.08 IMPORTED SOILS 11
4.09 OVERSIZED MATERIALS 11
4.10 TEMPORARY EXCAVATIONS 12
4.11 TEMPORARY SHORING 12
4.12 SLOPES 13
4.13 TEMPORARY DEWATERING 13
4.14 SHALLOW FOUNDATIONS 14

4.15 CONCRETE SLABS ON GRADE 14
4.16 MISCELLANEOUS FLATWORK AND HARDSCAPES 15
4.17 PREWETTING RECOMMENDATIONS 15
4.18 CORROSIVITY 16
4.19 RETAINING STRUCTURES 17
4.20 SEISMIC EARTH PRESSURES 18
4.21 UTILITY TRENCHES 18
4.21.1 THRUST BLOCKS 19
4.21.2 MODULUS OF SOIL REACTION 19
4.21.3 BEDDING 19
4.21.4 BACKFILL 19
4.21.5 CUTOFF WALLS 20
4.22 CONSTRUCTION CONSIDERATIONS 20
4.22.1 MOISTURE SENSITIVE SOILS AND WEATHER-RELATED CONCERNS 20
4.22.2 DRAINAGE AND GROUNDWATER CONSIDERATIONS 20
4.22.3 SITE DRAINAGE 21
4.23 PLAN REVIEW 21

5.00 GEOTECHNICAL OBSERVATION AND TESTING 22

6.00 LIMITATIONS 22

ATTACHMENTS:

Figure 1 – Site Location Map
Figure 2 – Boring Location Map
Figure 3 – Geologic Map
Figure 4 – Fault Map
Figure 5 – Liquefaction and Landslides Map
Figure 6 – Flood Zone Map
Figure 7 – Retaining Wall Drainage Detail

Appendix A – References
Appendix B – Field Investigation
Appendix C – Laboratory Testing
Appendix D – General Earthwork and Grading Specifications
Appendix E – Liquefaction and Dynamic Settlement Analysis

1.00 INTRODUCTION

In accordance with your request and authorization, MTGL, Inc. has completed a Soils Engineering Investigation for the subject site. The following report presents a summary of our findings, conclusions and recommendations based on our investigation, laboratory testing, and engineering analysis.

1.01 PLANNED CONSTRUCTION

The project consists of constructing a new pre-fabricated restroom building at the subject site. The total square footage of the proposed structure will be on the order of approximately 170 square feet.

1.02 SCOPE OF WORK

The scope of our Geotechnical services included the following:

- Review of geologic, seismic, ground water and geotechnical literature.
- Logging, sampling and backfilling of two (2) exploratory borings drilled with an 8" hollow stem auger drill rig to a maximum depth of 51½ feet below existing ground surface.
- Laboratory testing of representative samples (See Appendix C).
- Geotechnical engineering review of data and engineering recommendations.

Preliminary plans were not available for review at the time of our investigation. Preparation of this report summarizing our findings and presenting our conclusions and recommendations for the proposed construction.

1.03 SITE DESCRIPTION

The project is located at 26533 Craig Avenue in the city of Menifee, California. The park is bounded by a residential tract to the south, private property to the east, Evans Road to the west, and Craig Avenue to the north. The park is currently undeveloped land with a mixture of shrubbery and long grass occupying the surface of the land. The approximate site location is shown on the accompanying Site Location Map (Figure 1).

1.04 FIELD INVESTIGATION

Prior to the field investigation, a site reconnaissance was performed by a staff engineer from our office to mark the boring locations, as shown on the boring location plan, and to evaluate the locations with respect to obvious subsurface structures and access for the drilling rig. Underground Service Alert was then notified of the marked location for utility clearance.

Our subsurface investigation consisted of drilling exploratory borings utilizing a truck mounted drill rig equipped with an eight (8) inch diameter hollow stem auger. See Appendix B for further discussion of the field exploration including logs of test borings.

Borings were logged and sampled using Modified California Ring (Ring) and Standard Penetration Test (SPT) samplers at selected depth intervals. Samplers were driven into the bottom of the boring with successive drops of a 140-pound weight falling 30-inches. The number of blows required to drive the last 12-inches of the 18-inch Ring and SPT samplers are shown on the boring logs in the "blows/foot" column (Appendix B). SPT was performed in the borings in general accordance with the American Standard Testing Method (ASTM) D1586 Standard Test Method. Representative bulk soil samples were also obtained from our borings.

Each soil sample collected was inspected and described in general conformance with the Unified Soil Classification System (USCS). The soil descriptions were entered on the boring logs. All samples were sealed and packaged for transportation to our laboratory.

1.05 LABORATORY TESTING

Laboratory tests were performed on representative samples to verify the field classification of the recovered samples and to determine the geotechnical properties of the subsurface materials. All laboratory tests were performed in general conformance with ASTM or State of California Standard Methods. The results of our laboratory tests are presented in Appendix C of this report.

2.00 FINDINGS

2.01 GEOLOGIC AND SUBSURFACE CONDITIONS

Site geologic materials encountered during our investigation consisted of Fill and Old Alluvial Fan Deposits. Very Old Alluvial Fan Deposits and Granitic Bedrock is mapped within the vicinity of the site but was not encountered during our exploration (Figure 3).

A total of two (2) exploratory borings were advanced at the subject site, to a maximum depth of 51½ feet. The onsite soils consisted of loose Fills underlain by dense to very dense Old Alluvial Fan Deposits. Boring locations and pertinent data for each boring are presented in the table below.

SUMMARY OF SUBSURFACE SOIL CONDITIONS

Boring No.	Drilled Depth (ft)	Latitude (Deg)	Longitude (Deg)	Surface Conditions	Existing Ground Elevation (ft)	Approximate Thickness of Fill (ft)	Groundwater Depth Below Ground Surface (ft)
B-1	51½	33.6632	-117.1959	SM	1483	2	10
B-2	10	33.6632	-117.1961	SM	1483	2	10

- **Fill** - Fill was encountered in each of our borings. The fill encountered in the borings extended to depths up to about two (2) feet below the existing ground surface. The fill consisted of loose silty sands.

- **Old Alluvial Fan Deposits** - The Fill is underlain by Old Alluvial Fan Deposits consisting of dense interbedded layers of silty sands, gravelly sands, and sands.

The subsurface soils encountered were generally above their optimum moisture content. These materials are coarse-grained and non-plastic in nature. Expansion testing of representative materials indicates a very low expansion index when tested in accordance with ASTM D4829.

2.02 FAULTING AND SURFACE RUPTURE

The closest known potentially active fault is the Elsinore fault zone located about 5 miles southwest of the site. The site is not located in an Alquist-Priolo Earthquake Fault Zone. No active faults are known to underlie or project toward the site (Figure 2). Therefore, the probability of fault rupture is considered low.

2.03 SURFACE AND GROUNDWATER CONDITIONS

No areas of ponding or standing water were present at the time of our study. Further, no springs or areas of natural seepage were found.

According to the California Department of Water Resources (2021), historic high groundwater levels measured at a nearby well (06S03W09G001S) is on the order of eight (8) feet below grade. At the time of our field investigation, groundwater was encountered at 10 feet.

2.04 FLOODING POTENTIAL

The site is not located within a flood hazard area as identified by FEMA and the City of Menifee General Plan Safety Elements (Figure 6).

2.05 LIQUEFACTION POTENTIAL

Liquefaction is a phenomenon wherein earthquake induced ground vibrations increase the pore pressure in saturated, granular soils until it is equal to the confining, overburden pressure. When this occurs, the soil can completely lose its shear strength and enter a liquefied state. The possibility of liquefaction is dependent upon grain size, relative density, confining pressure, saturation of the soils, strength of the ground motion and duration of ground shaking. In order for liquefaction to occur three criteria must be met: underlying loose, coarse-grained (sandy) soils, a groundwater depth of less than about 50 feet and a nearby large magnitude earthquake.

The city of Menifee General Plan Safety Element (Figure 5) indicates that the site is not within an area of liquefaction potential. However, due to the high groundwater level encountered during our investigation, a liquefaction screening analysis was conducted in general accordance with the recommended procedures for implementation of DMG Special Publication 117A (CGS, 2008). Our analysis was based on a historic high groundwater table of eight (8) feet, an earthquake magnitude of 7.0, and an estimated Peak Ground Acceleration of 0.6g in accordance with the 2019 California Building Code.

Based on our analysis of the soil types encountered during the field investigation at the site, there is a very low potential for liquefaction. Consequently, the seismically induced settlement will be negligible. Our detailed analysis is presented in Appendix E.

2.06 LANDSLIDES

The site is not located in a hillside area of the county where earthquake induced landslides would cause permanent ground displacements (Figure 5). No reported occurrences of landslides or mudflows are known to have recently affected the site. Therefore, the potential for landslides and mudflows is considered to be very low at the site.

2.07 TSUNAMI AND SEICHE HAZARDS

The site is not located within an area mapped by the California Geological Survey as subject to inundation by tsunami. Given the inland location of the site at an elevation of approximately 1483 feet MSL, the inundation hazard posed by tsunami is considered to be very low. Seiches are not considered a hazard due to the absence of above-ground tanks or reservoirs located immediately up gradient from the site

3.00 CONCLUSIONS

3.01 GENERAL CONCLUSIONS

Based on our Geotechnical review of the planned construction, it is our opinion that the site is suitable for the proposed construction provided our conclusions are taken into consideration during design, and our recommendations are incorporated into the construction plans and specifications and implemented during grading and construction.

The main geotechnical considerations affecting the project are the presence of potentially compressible fills. To reduce the potential for settlement, the existing fills should be excavated in below planned structures, settlement sensitive improvements, and areas to receive new fills. The excavated materials, free of vegetation, debris, and rocks greater than six (6) inches may be used as compacted fill.

The recommendations presented herein may need to be updated once final plans are developed. The proposed structure should be supported on spread footings bearing entirely on compacted fill materials. To reduce the potential settlement, concrete slabs-on-grade, hardscape, and retaining wall footings should be underlain by at least two (2) feet of material with an expansion index of 20 or less. The recommendations presented herein may need to be updated once final plans are developed.

3.02 SEISMIC DESIGN PARAMETERS

A geologic hazard likely to affect the project is ground shaking as a result of movement along an active fault zone in the vicinity of the subject site (USGS, 2020). Based on the subsurface conditions encountered during our investigation, the site may be classified as site class C. The mapped site coefficients and maximum considered earthquake (MCER) spectral response acceleration parameters in accordance with the 2019 CBC are presented below:

2019 CALIFORNIA BUILDING CODE – MAPPED SITE COEFFICIENTS

Site Coordinates	
Latitude	**Longitude**
33.6632°	-117.1960°

Site Coefficients and Spectral Response Acceleration Parameters	Values
Site Class	C
Site Coefficients, F_a	1.2
Site Coefficients, F_v	1.479
Earthquake Fault Seismic Source	Elsinore
Earthquake Magnitude	7.0
Mapped Spectral Response Acceleration at Short Period, S_s	1.408g
Mapped Spectral Response Acceleration at 1-Second Period, S_1	0.521g
Mapped Design Spectral Acceleration at Short Period, S_{DS}	1.126g
Design Spectral Acceleration at 1-Second Period, S_{D1}	0.514g
Shear-Wave Velocity Vs_{30}	391 m/s

3.03 BEARING FAILURE

When liquefaction occurs, the soil can completely lose its shear strength and lose its capacity to support the structure resulting in a foundation bearing failure. Lightweight structures which are embedded in liquefiable soil and extend below the groundwater table contain large void spaces which may "float" or lift up and out of the ground surface during or after an earthquake. Based on our analysis, the potential for bearing capacity failure due to liquefaction is low.

3.04 LATERAL SPREADING (LATERAL DISPLACEMENT)

Lateral spreading is a condition where a relatively stiff block of soil moves laterally toward a free face or slope on a liquefied zone of subsurface soil. Lateral spreads generally develop along gentle slopes and move toward a free face such as an incised river channel. Lateral spreads can cause significant horizontal movement causing fissures, and scarps to develop at the surface. Lateral spreads have been observed to disrupt foundations located across a failure, to rupture sewers, pipelines and other utilities and compress or buckle structures at the toe of the spread. Due to the low gradient of the site, the potential for lateral spreading is considered negligible.

3.05 LIFELINE HAZARDS

Liquefaction, lateral spreading, and seismically induced settlement of structures may also pose problems for streets and lifelines. Specifically, natural gas pipelines may break and catch fire during an earthquake and water lines may break preventing firefighters from accessing water.

Therefore, consideration should be given to providing isolated and flexible connections for gas and water utility lines as a preventive measure.

4.00 RECOMMENDATIONS

Our recommendations are considered minimum and may be superseded by more conservative requirements of the architect, structural engineer, building code, or governing agencies. The foundation recommendations are based on the expansion index and shear strength of the onsite soils. Import soils, if necessary, should be a very low expansion potential and should be approved by the Geotechnical Engineer prior to importing to the site. In addition to the recommendations in this section, additional general earthwork and grading specifications are included in Appendix D.

4.01 EXCAVATION CHARACTERISTICS AND SHRINKAGE ESTMATES

Our exploratory borings were advanced with some difficulty, but no oversize materials were encountered in our subsurface investigation. Accordingly, we expect that all earth materials will be rippable with conventional heavy duty grading equipment and oversized materials are not expected.

Shrinkage is the decrease in volume of soil upon removal and recompaction expressed as a percentage of the original in-place volume, which will account for changes in earth volumes that will occur during grading. Our estimate for shrinkage of the onsite fill and native soils are expected to range from 15% to 20%.

4.02 SETTLEMENT CONSIDERATIONS

Foundations should be designed to resist the anticipated settlements. Static settlement of an individual foundation member will vary depending on the plan dimensions of the foundation and the actual load supported.

Total foundation settlements are estimated to be less than one (1) inch. Differential settlements between adjacent columns and across continuous footings are estimated to be less than ¾ inch over a distance of 40 feet. Settlements should be completed shortly after structural loads are applied.

4.03 SITE CLEARING

All surface vegetation, trash, debris, asphalt concrete, Portland cement concrete and underground pipes should be cleared and removed from the proposed construction site. Underground facilities such as utilities, pipes or underground storage tanks may exist at the site. Removal of underground tanks is subject to state law as regulated by the County, City and/or Fire Department. If storage tanks containing hazardous or unknown substances are encountered, the proper authorities must be notified prior to any attempts at removing such objects.

Any water wells, if encountered during construction, should be exposed and capped in accordance with the requirements of the regulating agencies.

Depressions resulting from the removal of foundations of existing buildings, underground tanks and pipes, buried obstructions and/or tree roots should be backfilled with properly compacted material.

4.04 SITE PREPARATION

All fill materials should be compacted to at least 90% of its maximum dry density as determined by ASTM Test Method D1557. Fill materials should be placed in loose lifts, no greater than eight (8) inches prior to applying compactive effort. All engineered fill materials should be moisture-conditioned and processed as necessary to achieve a uniform moisture content that is near optimum moisture content and within moisture limits required to achieve adequate bonding between lifts.

4.05 REMOVALS AND OVEREXCAVATION

Structural plans, grading plans and foundation elevations were not available at the time of our investigation. Therefore, once formal plans are prepared and available for review, this office should review these plans from a geotechnical viewpoint, comment on any changes, and revise the recommendations of this report as necessary.

All vegetation, asphalt paving, trash and debris should be cleared from the grading area and removed completely from the site. Any existing utilities or conduits that extend beyond the limits of the proposed construction area should be removed completely or abandoned in place and plugged with a non-shrink cement grout.

Prior to placement of compacted fills, all non-engineered fills and loose, porous, or compressible soils will need to be over-excavated down to competent ground.

4.05.1 STRUCTURES SUPPORTED ON CONVENTIONAL FOUNDATIONS

Existing fills and any underlying loose native materials should be excavated beneath the planned structures, settlement sensitive improvements and any areas to receive new fills. The overexcavation depth should be at least two (2) feet below the finish the planned finish pad elevation or at least three (3) feet below the deepest planned footing bottom, whichever is greater. Horizontally, the excavations should extend at least five (5) feet outside the planned perimeter foundations.

4.05.2 NON-STRUCTURAL AREAS

Non-structural areas such as sidewalks and other miscellaneous flatwork areas including all paved areas will require a minimum depth of two (2) feet of removal and recompaction below the lowest adjacent grade. Processing for hardscape areas should extend a minimum distance of two (2) feet outside the hardscape limits.

The exposed soils beneath all over-excavation and in cut areas not otherwise requiring over-excavation should be scarified to a minimum depth of 12-inches, moisture conditioned and compacted to a minimum of 90% relative compaction.

The above recommendations are based on the assumption that soils encountered during field exploration are representative of soils throughout the site. Removal and over-excavation depths must be verified, and adjusted if necessary, at the time of grading.

4.06 FILL MATERIALS

Removed and/or over-excavated soils, except for roots, debris and rocks greater than six (6) inches, may be used as compacted fill. Material with an expansion index of 20 or less, as determined by ASTM D4829, should be placed and compacted from two (2) feet below the deepest planned footing bottom to finished pad grade elevation. Concrete slabs should be underlain by at least two (2) feet of material with an expansion index of 20 or less. Based on our field investigation, we expect that most of the onsite materials will meet this expansion index criteria.

Prior to placing fill, exposed surfaces at the bottom of the excavations should be scarified to a depth of 12-inches, moisture conditioned to near optimum moisture content, and compacted to at least 90% relative compaction. Fill should be placed in horizontal lifts at a thickness appropriate for the equipment spreading, mixing, and compacting the material, but generally should not exceed eight (8) inches in loose thickness. Fill should be moisture conditioned to near optimum moisture content and compacted to at least 90% relative compaction. Fill should be benched into sloping ground inclined steeper than 5:1 (horizontal to vertical). The maximum dry density and optimum moisture content for evaluating relative compaction should be determined in accordance with ASTM D1557.

Utility trench backfill beneath structures, pavements and hardscape should be compacted to at least 90% relative compaction. The top 12-inches of subgrade beneath pavements should be compacted to at least 95% relative compaction

4.07 EXPANSIVE SOILS

To reduce the potential for expansive heave, soils with an expansion index greater than 20 should be excavated a minimum two (2) feet below the planned structure or exterior slab subgrade elevations. Horizontally, excavations should extend at least two (2) feet outside the perimeter of the slab or up to temporary shoring or existing improvements, whichever is less. Granular material with an expansion index of 20 or less should be used as replacement fill.

4.08 IMPORTED SOILS

Imported soil should consist of predominately granular soil, free of organic matter and rocks greater than 6 inches. Imported soil should have an expansion index of 20 or less and should be inspected and, if appropriate, tested prior to transport to the site

4.09 OVERSIZED MATERIALS

Excavations may generate oversized material. Oversized material is defined as rocks or cemented clasts greater than six (6) inches in largest dimension. Oversized material should be broken down to no greater than six (6) inches in largest dimension for use in fill, used as landscape material, or disposed of off-site.

4.10 TEMPORARY EXCAVATIONS

Temporary excavations three (3) feet deep or less can be made vertically. Deeper temporary excavations in fill should be laid back no steeper than 1:1 (horizontal:vertical). The faces of temporary slopes should be inspected daily by the Contractor's Competent Person before any personnel are allowed to enter the excavation. Zones of potential instability, sloughing, or raveling should be brought to the attention of the engineer and corrective action implemented before personnel begin working in the excavation. Excavated soils should not be stockpiled behind temporary excavations within a distance equal to the depth of the excavation. MTGL should be notified if other surcharge loads are anticipated so that lateral load criteria can be developed for the specific situation. If temporary slopes are to be maintained during the rainy season, berms are recommended along the tops of slopes to prevent runoff water from entering the excavation and eroding the slope faces.

Slopes steeper than those described above will require shoring. Additionally, temporary excavations that extend below a plane inclined at 1½:1 (horizontal:vertical) downward from the outside bottom edge of existing structures or improvements will require shoring. Soldier piles and lagging, internally braced shoring or trench boxes could be used. If trench boxes are used, the soil immediately adjacent to the trench box is not directly supported. Ground surface deformations immediately adjacent to the pit or trench could be greater where trench boxes are used compared to other methods of shoring.

4.11 TEMPORARY SHORING

For design of cantilevered shoring, an active soil pressure equal to a fluid weighing 35 pcf can be used for level retained ground or 55 pcf for 2:1 (horizontal:vertical) sloping ground. The surcharge loads on shoring from traffic and construction equipment adjacent to the excavation can be modeled by assuming an additional two (2) feet of soil behind the shoring.

For design of soldier piles, an allowable passive pressure of 300 psf per foot of embedment over 2.5 times the pile diameter or the spacing of the piles, whichever is less, up to a maximum of 4,500 psf can be used for soil above the groundwater level. An allowable passive pressure of 150 psf per foot of embedment over 2.5 times the pile diameter or the spacing of the piles, whichever is less, up to a maximum of 2,000 psf can be used for soil below the groundwater level. Hydrostatic pressure should be applied below the groundwater level.

Soldier piles should be spaced at least three pile diameters, center to center. Continuous lagging will be required throughout. The soldier piles should be designed for the full-anticipated lateral pressure; however, the pressure on the lagging will be less due to arching in the soils. For design of lagging, the earth pressure but can be limited to a maximum value of 400 psf.

Installation of soldier piles below groundwater (or dewatered soil) will require special construction techniques and equipment, such as temporary casing and/or drilling slurry to cope with groundwater and potential heavy caving. Other installation methods may be available. Contract documents should specify that the contractor mobilize equipment capable of installing piles below groundwater (or dewatered soil) to reduce the potential that claims for delays or extra work will arise.

Piles should be filled with concrete immediately after drilling. The concrete should be pumped to the bottom of the drilled holes using the tremie method. If casing is used, the casing should be removed as the concrete is placed, keeping the level of the concrete at least five (5) feet above the bottom of the casing at all times.

4.12 SLOPES

All permanent slopes should be constructed no steeper than 2:1 (horizontal:vertical). Faces of fill slopes should be compacted either by rolling with a sheepsfoot roller or other suitable equipment or by overfilling and cutting back to design grade. Fills should be benched into sloping ground inclined steeper than 5:1 (horizontal:vertical). It is our opinion that cut slopes constructed no steeper than 2:1 (horizontal:vertical) will possess an adequate factor of safety. An engineering geologist should observe all cut slopes during grading to ascertain that no unforeseen adverse geologic conditions are encountered that require revised recommendations. All slopes are susceptible to surficial slope failure and erosion. Water should not be allowed to flow over the top of slope. Additionally, slopes should be planted with vegetation that will reduce the potential for erosion.

4.13 TEMPORARY DEWATERING

Groundwater seepage may occur locally due to local irrigation or following heavy rain. Temporary dewatering can be accomplished by sloping the excavation bottom to a sump and pumping from the sump. A layer of gravel about six (6) inches thick placed in the bottom of the excavation will facilitate groundwater flow and can be used as a working platform.

4.14 SHALLOW FOUNDATIONS

The planned structure may be supported on shallow conventional spread and/or continuous footings bearing entirely on compacted fill materials. An allowable bearing capacity of 2,000 psf may be used to design the foundations. The bearing capacity can be increased by 500 psf for each foot of depth below the minimum and 250 psf for each foot of width beyond the minimum up to a maximum of 4,000 psf. The bearing value can be increased by ⅓ when considering the total of all loads, including wind or seismic forces.

The recommended minimum footing width and embedment depth below the lowest adjacent grade are as follows. Foundations should be reinforced in accordance with the requirements of the structural engineer.

RECOMMENDED CONVENTIONAL FOUNDATIONS

Foundation Type	Minimum Width	Minimum Depth
Continuous (Interior)	12 inches	18 inches
Continuous (Perimeter)	12 inches	24 inches
Spread Footings	24 inches	24 inches

Lateral loads will be resisted by friction between the bottoms of footings and passive pressure on the faces of footings and other structural elements below grade. An allowable coefficient of friction of 0.35 can be used. Passive pressure can be computed using an allowable lateral pressure of 300 psf per foot of depth below the ground surface for level ground conditions. An allowable passive pressure of 150 psf per foot of depth for portions below the groundwater level. Reductions for sloping ground should be made. The passive pressure can be increased by ⅓ when considering the total of all loads, including wind or seismic forces. The upper one (1) foot of soil should not be relied on for passive support unless the ground is covered with pavements or slabs.

4.15 CONCRETE SLABS ON GRADE

Concrete slabs on grade may be designed with a minimum thickness of five (5) inches for normal loading conditions. However, if heavier loads are anticipated, a modulus of subgrade reaction of 120 pounds per cubic inch may be used when the slabs are supported by compacted fill.

All slabs should be reinforced with a minimum #4 bars, 18 inches on center, each direction at the mid-height of the slab. The structural engineer may require heavier reinforcement. Control joints

should be constructed to create squares or rectangles with a maximum spacing of 12 feet on large slab areas.

A vapor barrier should be placed beneath slabs-on-grade where moisture sensitive floor coverings or equipment are planned. If plastic is used, a minimum 15-mil is recommended. The plastic should comply with ASTM E1745. Installation should comply with ASTM E1643. The slab can be placed directly on the vapor retarder/barrier. The floor covering manufacturer should be contacted to determine the volume of moisture vapor allowable and treatment needed to reduce moisture vapor emissions to acceptable limits for the type of floor covering installed.

4.16 MISCELLANEOUS FLATWORK AND HARDSCAPES

Exterior slabs not subjected to vehicular loads should be at least four (4) inches thick underlain by at least two (2) feet non-expansive granular material and reinforced with at least No. 3 bars at 18 inches on center each way. Slabs should be provided with weakened plane joints. Joints should be placed in accordance with the American Concrete Institute (ACI) guidelines. The project architect should select the final joint patterns. A one (1) inch maximum size aggregate mix is recommended for concrete for exterior slabs. The corrosion potential of on-site soils with respect to reinforced concrete will need to be considered in concrete mix design. Coarse and fine aggregate in concrete should conform to the "Greenbook" Standard Specifications for Public Works Construction. Control joints should be spaced at intervals of no more than 12 feet.

4.17 PREWETTING RECOMMENDATIONS

Prior to placing concrete slabs and flatwork, the underlying soils should be brought to within 2% of its optimum moisture content for a depth of 12 inches prior to the placement of concrete. The geotechnical consultant should perform in-situ moisture tests to verify that the appropriate moisture content has been achieved a maximum of 24 hours prior to the placement of concrete or moisture barriers.

Once the slab subgrade soil has been pre-wetted and compacted, the soil should not be allowed to dry prior to concrete placement. If the subgrade soil is dry, the moisture content of the soil should be restored prior to placement of concrete and re-tested.

Proper moisture conditioning and compaction of subgrade soils prior to placement is very important prior to concrete placement. Even with proper site preparation, some soil moisture changes of the subgrade soils supporting the concrete flatwork due to edge effects (shrink/swell)

may occur. Drying and/or wetting of subgrade soils adjacent to landscaped areas or open fields may increase the potential of shrink/swell effects beneath concrete flatwork areas. To help reduce edge effects, lateral cutoffs, such as inverted curbs are recommended. Control joints should be used to reduce the potential for flatwork panel cracks because of minor soil shrink/swell.

4.18 CORROSIVITY

Soluble sulfate tests indicate that concrete at the subject site will have a moderate exposure to water soluble sulfate in the soil. We recommend that the concrete be designed to resist a severe exposure category. Our recommendations for concrete exposed to sulfate-containing soils are presented below.

RECOMMENDATIONS FOR CONCRETE EXPOSED TO SULFATE CONTAINING SOILS

Sulfate Exposure Severity	Class	Water soluble sulfate (SO_4) in soil (% by wgt)	Sulfate (SO_4) in water (ppm)	Max Water to Cement Ratio by Weight	Minimum Compressive Strength (psi)	Cement Type	Calcium Chloride Admixture
Negligible	S0	0.00 - 0.10	0-150	---	2,500	---	No Restriction
Moderate	S1	0.10 - 0.20	150-1,500	0.50	4,000	II/V	No Restriction
Severe	S2	0.20 - 2.00	1,500-10,000	0.45	4,500	V	Not Permitted
Very Severe	S3	Over 2.00	Over 10,000	0.45	4,500	V Plus Pozzolan	Not Permitted

Corrosivity testing consisting of soils reactivity (pH) and resistivity (ohms-cm) were also tested on representative soils. The test results indicate that the soils have a soil reactivity of 7.2 and a resistivity of less than 500 ohms-cm. A neutral or non-corrosive soil has a reactivity value ranging from 5.5 to 8.4. Generally, soils that could be considered corrosive to metal have resistivities less than 3,000 ohms. Those soils with resistivity values of less than 1000 ohms-cm can be considered extremely corrosive.

Based on our test results, it is our opinion that the underlying soils at the site have a high corrosion potential. Protection of buried pipes utilizing coatings on all underground pipes; clean backfills and a cathodic protection system can be effective in controlling corrosion. A qualified corrosion engineer should be consulted to further assess the corrosive properties of the soil.

4.19 RETAINING STRUCTURES

Embedded structural walls should be designed for lateral earth pressures exerted on the walls. The magnitude of these earth pressures will depend on the amount of deformation that the wall can yield under the load. If the wall can yield sufficiently to mobilize the full shear strength of the soils, it may be designed for the active condition. If the wall cannot yield under the applied load, then the shear strength of the soil cannot be mobilized, and the earth pressures will be higher. These walls such as basement walls and swimming pools should be designed for the at rest condition. If a structure moves towards the retained soils, the resulting resistance developed by the soil will be the passive resistance.

For design purposes, the recommended equivalent fluid pressure for each case for walls constructed above the static groundwater table and backfilled with non-expansive soils is provided below. Retaining wall backfill should be compacted to at least 90% relative compaction based on the maximum density defined by ASTM D1557. Retaining structures may be designed to resist the following lateral earth pressures.

- Allowable Bearing Pressure – 2,000 psf
- Coefficient of Friction (Soil to Footing) – 0.35
- Passive Earth Pressure - equivalent fluid weight of 300 pcf (Maximum of 3,000 psf)
- At rest lateral earth pressure - 60 pcf
- Active Earth Pressures (equivalent fluid weights):

Slope of Retained Material	Equivalent Fluid Weight (pcf)
Level	35
2:1 (H:V)	55

It is recommended that all retaining wall footings be embedded at least 24 inches below the lowest adjacent finish grade. In addition, the wall footings should be designed and reinforced as required for structural considerations. The wall areas should be over excavated to a minimum depth of two (2) feet below the bottom of the proposed footings. The required horizontal limits of the over excavated area shall be defined as the area extending from the edge of the footing for a minimum distance of two (2) feet.

Lateral resistance parameters provided above are ultimate values. Therefore, a suitable factor of safety should be applied to these values for design purposes. The appropriate factor of safety will depend on the design condition and should be determined by the project Structural Engineer. If any super-imposed loads are anticipated, this office should be notified so that appropriate recommendations for earth pressures may be provided.

Retaining structures should be drained to prevent the accumulation of subsurface water behind the walls. Back drains should be installed behind all retaining walls exceeding three (3) feet in height. Backdrains may consist of a two (2) feet wide zone of ¾-inch crushed rock. The backdrain should be separated from the adjacent soils using a non-woven filter fabric, such as Mirafi 140N or equivalent. Weep holes should be provided, or a perforated pipe should be installed at the base of the backdrain and sloped to discharge to a suitable storm drain facility. As an alternative, a geocomposite drainage system such as Miradrain 6000 or equivalent placed behind the wall and connected to a suitable storm drain facility can be used. The project architect should provide waterproofing specifications and details. A typical detail for retaining wall back drains is presented as Figure 7. All back drains should be outlet to suitable drainage devices.

4.20 SEISMIC EARTH PRESSURES

If required, the seismic earth pressure can be taken as equivalent to the pressure of a fluid weighing 22 pcf. This value is for level backfill and does not include a factor of safety. Appropriate factors of safety should be incorporated into the design. This pressure is in addition to the un-factored, static active earth pressure and can be applied as a rectangular distribution. The passive pressure and bearing capacity can be increased by ⅓ in determining the seismic stability of the wall.

4.21 UTILITY TRENCHES

All Cal/OSHA construction safety orders should be observed during all underground work. All utility trench backfill within street right of way, utility easements, under or adjacent to sidewalks, driveways, or building pads should be observed and tested by the geotechnical consultant to verify proper compaction. Trenches excavated adjacent to foundations should not extend within the footing influence zone defined as the area within a line projected at a 1:1 (horizontal to vertical) drawn from the bottom edge of the footing. Trenches crossing perpendicular to foundations should be excavated and backfilled prior to the construction of the foundations. The excavations

should be backfilled in the presence of the geotechnical engineer and tested to verify adequate compaction beneath the proposed footing.

4.21.1 THRUST BLOCKS

For level ground conditions, a passive earth pressure of 300 psf per foot of depth below the lowest adjacent final grade can be used to compute allowable thrust block resistance. A value of 150 psf per foot should be used below groundwater level, if encountered.

4.21.2 MODULUS OF SOIL REACTION

A modulus of soil reaction (E') of 2,000 psi can be used to evaluate the deflection of buried flexible pipelines. This value assumes that granular bedding material is placed adjacent to the pipe and is compacted to at least 90% relative compaction.

4.21.3 BEDDING

Pipe bedding as specified in the "Greenbook" Standard Specifications for Public Works Construction can be used. Bedding material should consist of clean sand having a sand equivalent not less than 30 and should extend to at least 12-inches above the top of pipe. Alternative materials meeting the intent of the bedding specifications are also acceptable. Samples of materials proposed for use as bedding should be provided to the engineer for inspection and testing before the material is imported for use on the project. The on-site materials are not expected to meet "Greenbook" bedding specifications. The pipe bedding material should be placed over the full width of the trench. After placement of the pipe, the bedding should be brought up uniformly on both sides of the pipe to reduce the potential for unbalanced loads. No voids or uncompacted areas should be left beneath the pipe haunches. Ponding or jetting the pipe bedding should not be allowed.

4.21.4 BACKFILL

Excavated material free of organic debris and rocks greater than six (6) inches in any dimension are generally expected to be suitable for use as backfill. Imported material should not contain rocks greater than four (4) inches in any dimension or organic debris. Imported material should have an expansion index of 20 or less. MTGL should observe and, if appropriate, test proposed imported materials before they are delivered to the site. Backfill should be placed in lifts eight (8) inches or less in loose thickness, moisture

conditioned to optimum moisture content or slightly above, and compacted to at least 90% relative compaction. The top 12-inches of soil beneath pavement subgrade should be compacted to at least 95% relative compaction.

4.21.5 CUTOFF WALLS

Where pipeline inclinations exceed 15%, cutoff walls may be necessary in trench excavations. Additionally, we do not recommend that open graded rock be used for pipe bedding or backfill because of the potential for piping erosion. The recommended bedding is clean sand having a sand equivalent not less than 30. Alternatively, two (2) sack sand-cement slurry can be used for the pipe bedding. If sand-cement slurry is used for pipe bedding the slurry should be placed to at least one (1) foot over the top of the pipe. The need for cutoff walls should be further evaluated by the project civil engineer designing the pipeline.

4.22 CONSTRUCTION CONSIDERATIONS

4.22.1 MOISTURE SENSITIVE SOILS AND WEATHER-RELATED CONCERNS

The upper soils encountered at this site may be sensitive to disturbances caused by construction traffic and to changes in moisture content. During wet weather periods, increases in the moisture content of the soil can cause significant reduction in the soil strength and its support capabilities. In addition, soils that become excessively wet may be slow to dry and thus significantly delay the progress of the grading operations. Therefore, it will be advantageous to perform earthwork and foundation construction activities during the dry season. Much of the on-site soils may be susceptible to erosion during periods of inclement weather. As a result, the project Civil Engineer/Architect and Grading Contractor should take appropriate precautions to reduce the potential for erosion during and after construction.

4.22.2 DRAINAGE AND GROUNDWATER CONSIDERATIONS

Based on our investigation, groundwater is expected to be below the anticipated depths of grading, the installation of subdrains is not expected to be necessary. However, variations in the ground water table may result from fluctuation in the ground surface topography, subsurface stratification, precipitation, irrigation, and other factors such as impermeable and/or cemented formational materials overlain by fill soils. In addition, during retaining wall excavations, seepage may be encountered. Therefore, we recommend that a

representative of MTGL, Inc. be present during grading operations to evaluate areas of seepage. Drainage devices for reduction of water accumulation can be recommended should these conditions occur.

Water should not be allowed to collect in the foundation excavation, on floor slab areas, or on prepared subgrades of the construction area either during or after construction. Undercut or excavated areas should be sloped to facilitate removal of any collected rainwater, groundwater, or surface runoff. Positive site drainage should be provided to reduce infiltration of surface water around the perimeter of the structure and beneath the floor slabs. The grades should be sloped away from the structure and surface drainage should be collected and discharged such that water is not permitted to infiltrate the backfill and floor slab areas.

4.22.3 SITE DRAINAGE

The site should be drained to provide for positive drainage away from structures in accordance with the building code and applicable local requirements. Unpaved areas should slope no less than 2% away from structure. Paved areas should slope no less than 1% away from structures. Concentrated roof and surface drainage from the site should be collected in engineered, non-erosive drainage devices and conducted to a safe point of discharge. The site drainage should be designed by a civil engineer.

4.23 PLAN REVIEW

MTGL should review the grading and foundation plans to verify that the intent of the recommendations presented in this report has been implemented and that revised recommendations are not necessary because of changes after this report was completed.

5.00 GEOTECHNICAL OBSERVATION AND TESTING

The recommendations provided in this report are based on preliminary design information and subsurface conditions as interpreted from the investigation. Our preliminary conclusion and recommendations should be reviewed and verified during site grading and revised accordingly if exposed Geotechnical conditions vary from our preliminary findings and interpretations. The Geotechnical consultant should perform Geotechnical observation and testing during the following phases of grading and construction:

- During site grading and over-excavation.
- During foundation excavations and placement.
- Upon completion of retaining wall footing excavation prior to placing concrete.
- During excavation and backfilling of all utility trenches
- During processing and compaction of the subgrade for the access and parking areas and prior to construction of pavement sections.
- When any unusual or unexpected Geotechnical conditions are encountered during any phase of construction.

6.00 LIMITATIONS

The findings, conclusions, and recommendations contained in this report are based on the site conditions as they existed at the time of our investigation, and further assume that the subsurface conditions encountered during our investigation are representative of conditions throughout the site. Should subsurface conditions be encountered during construction that are different from those described in this report, this office should be notified immediately so that our recommendations may be re-evaluated.

This report was prepared for the exclusive use and benefit of the owner, architect, and engineer for evaluating the design of the facilities as it relates to geotechnical aspects. It should be made available to prospective contractors for information on factual data only, and not as a warranty of subsurface conditions included in this report.

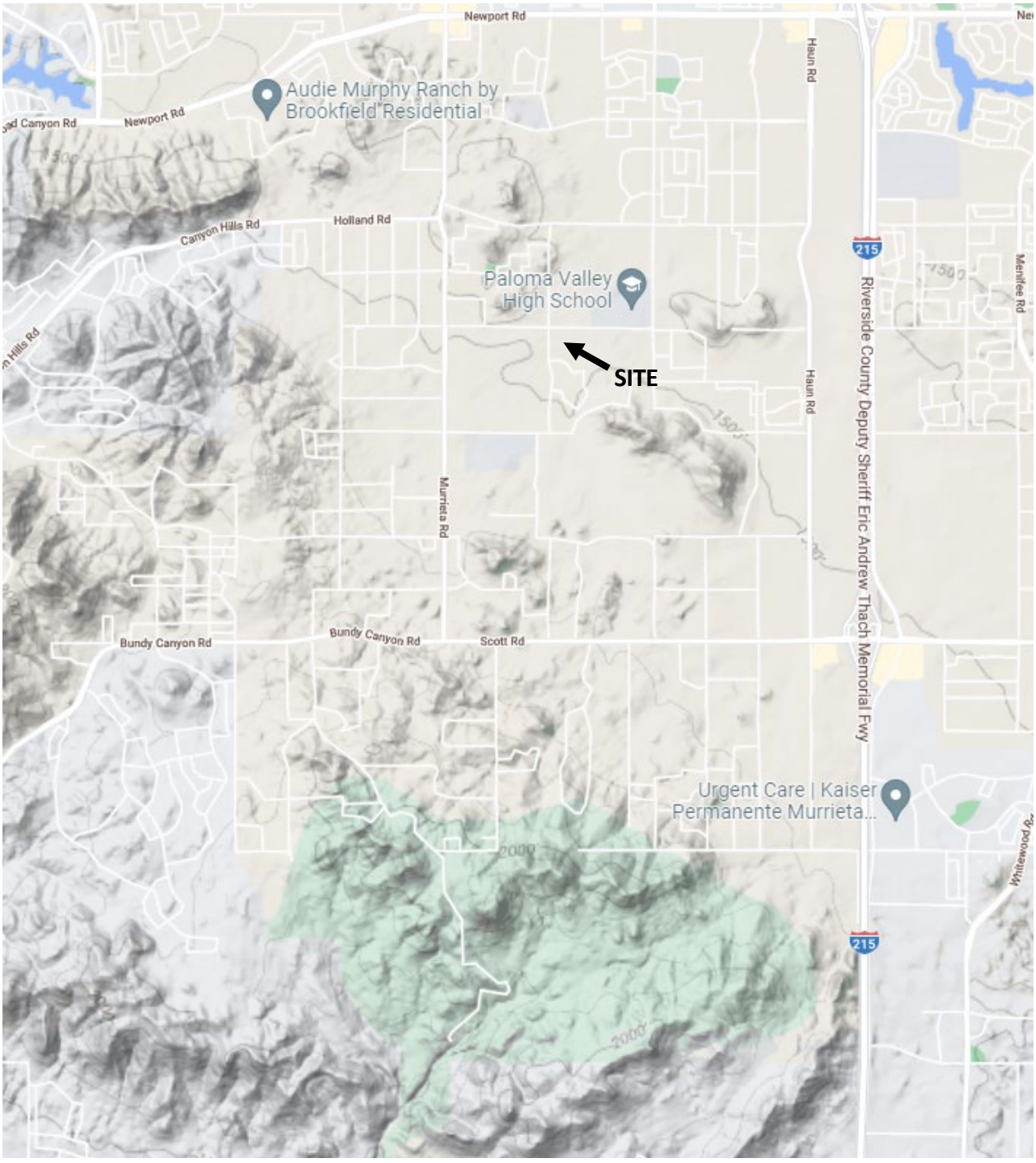
Our investigation was performed using the standard of care and level of skill ordinarily exercised under similar circumstances by reputable soil engineers and geologists currently practicing in this or similar localities. No warranty, express or implied, is made as to the conclusions and professional advice included in this report.

This firm does not practice or consult in the field of safety engineering. We do not direct the Contractor's operations, and we are not responsible for their actions. The contractor will be solely and completely responsible for working conditions on the job site, including the safety of all persons and property during performance of the work. This responsibility will apply continuously and will not be limited to our normal hours of operation.

The findings of this report are considered valid as of the present date. However, changes in the conditions of a site can occur with the passage of time, whether they are due to natural events or to human activities on this or adjacent sites. In addition, changes in applicable or appropriate codes and standards may occur, whether they result from legislation or the broadening of knowledge.

Accordingly, this report may become invalidated wholly or partially by changes outside our control. Therefore, this report is subject to review and revision as changed conditions are identified.

FIGURES



Base Map: Google Earth

SITE LOCATION MAP

Not to Scale

Figure 1



N

Base Map: Google Earth

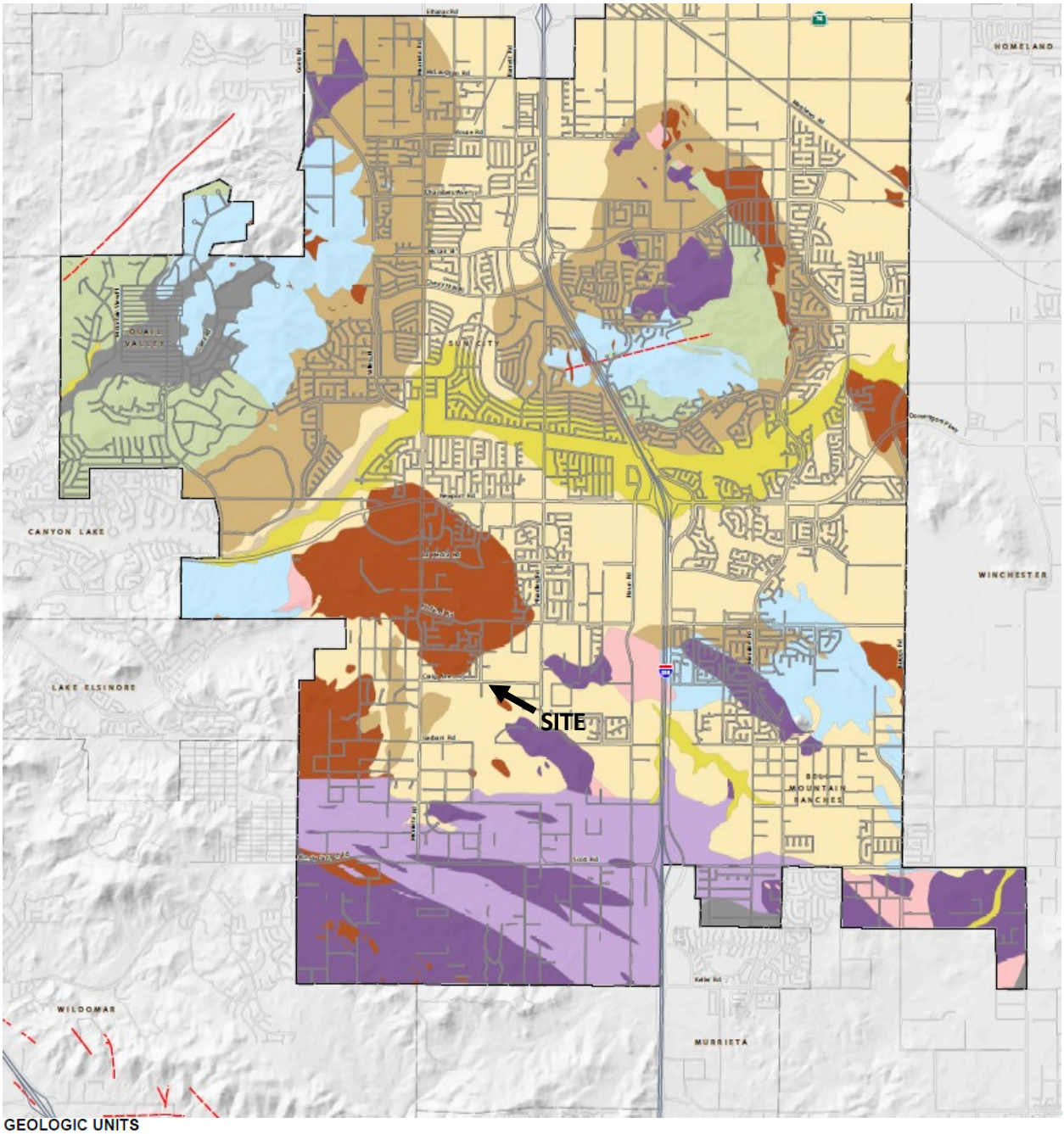
LEGEND:

B-2 Boring Location

BORING LOCATION MAP

Not to Scale

Figure 2

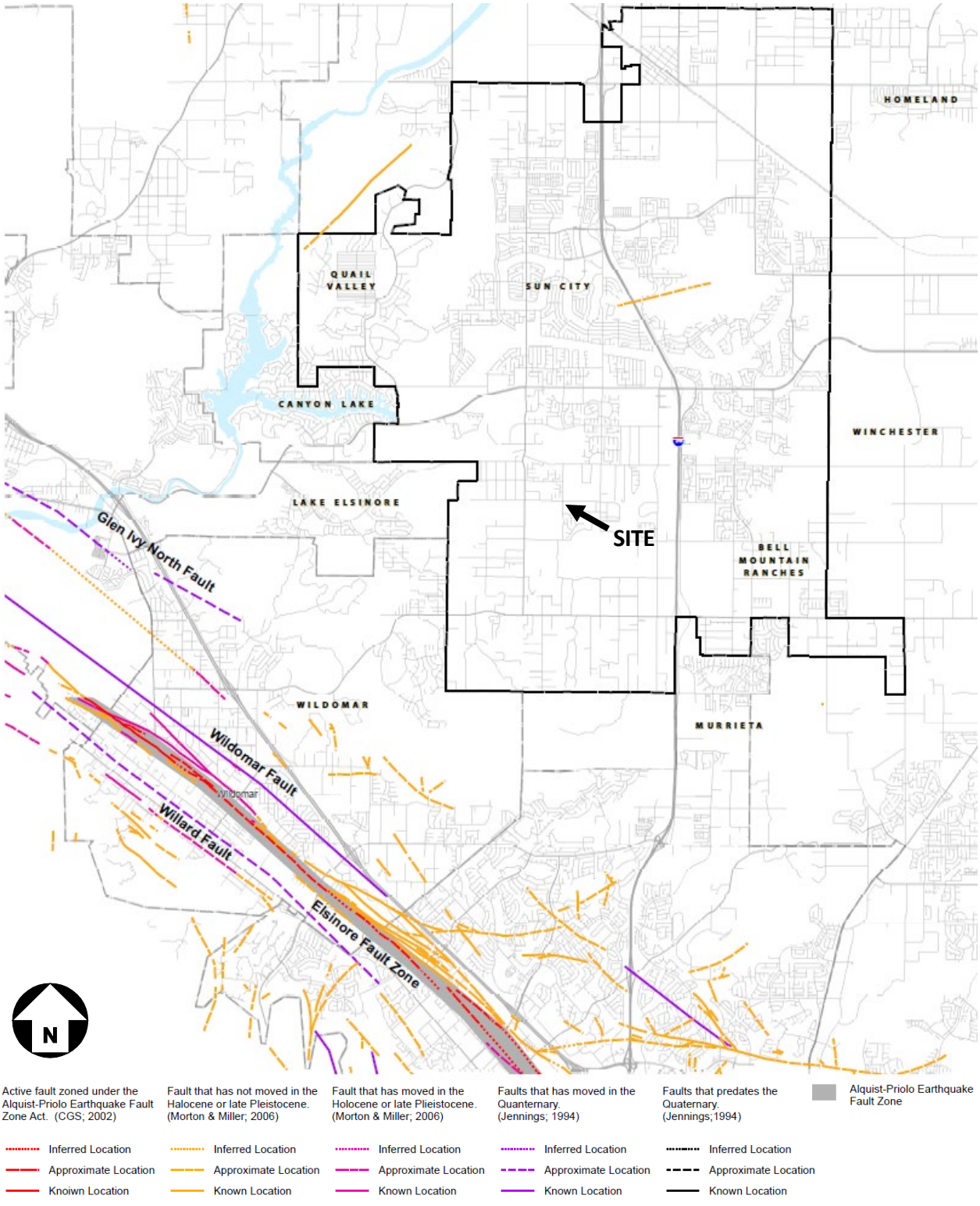


Base Map: City of Menifee General Plan

GEOLOGIC MAP

Not to Scale

Figure 3

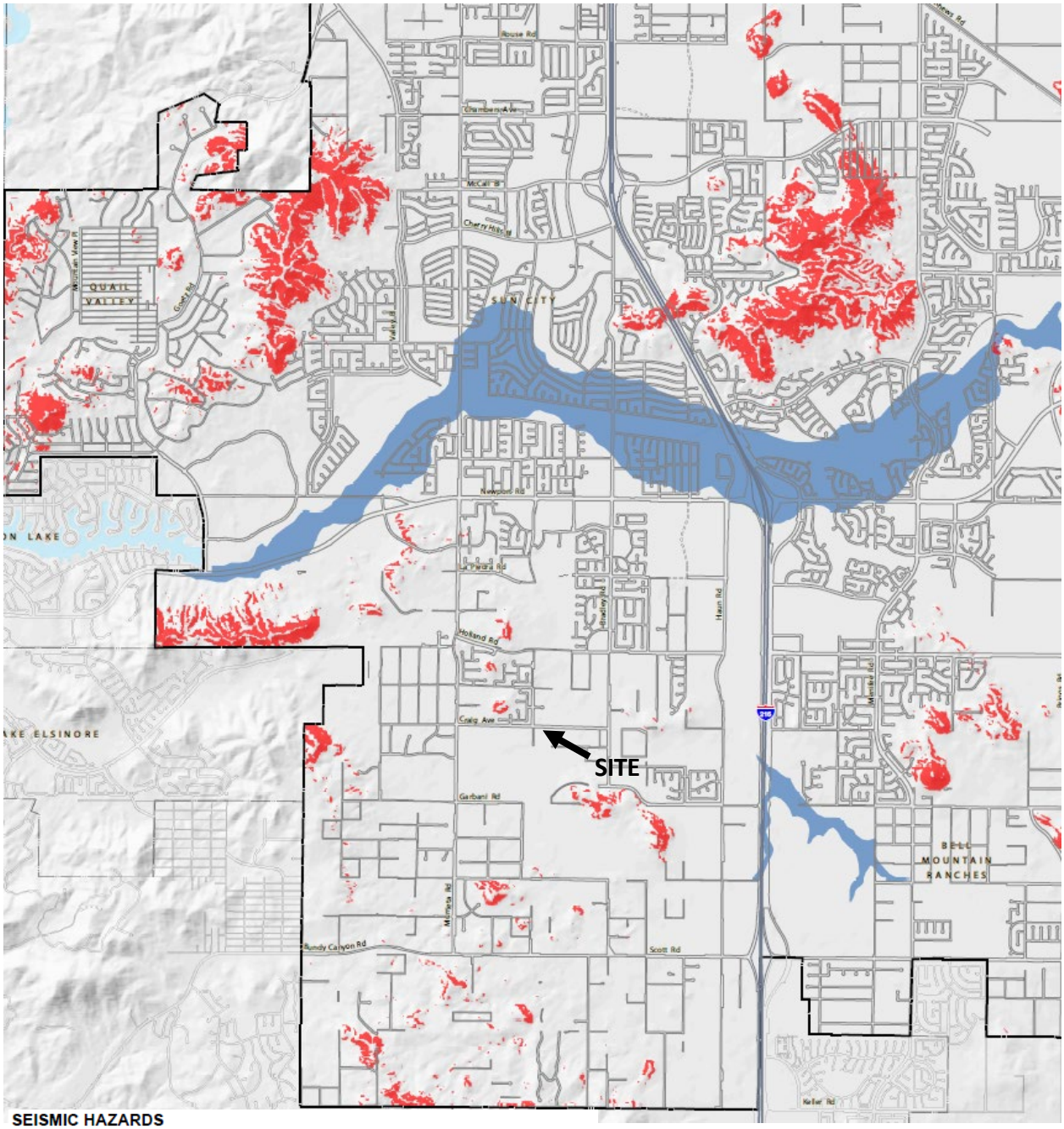


FAULT MAP

Not to Scale

Base Map: City of Menifee General Plan

Figure 4



SEISMIC HAZARDS

Liquefaction: Areas where local geological and groundwater conditions suggest a potential for liquefaction.

Landslide: Areas where local topographic and geological conditions suggest the potential for earthquake-induced landslides.

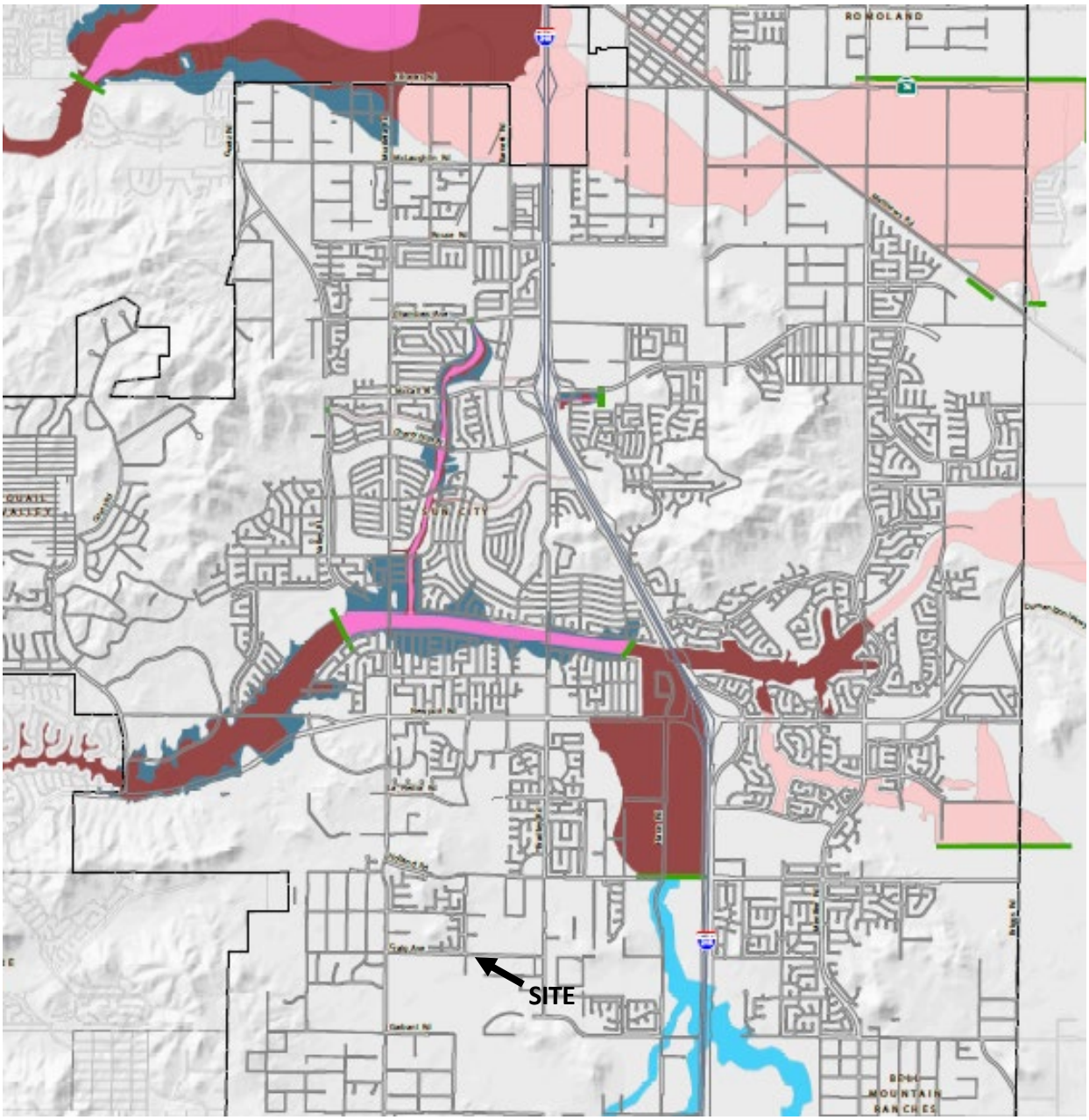
N

LIQUEFACTION MAP

Not to Scale

Base Map: City of Menifee General Plan

Figure 5



High Risk Areas/Special Flood Hazard Area

A - Zone that corresponds to the 100-year flood areas, as determined by approximate methods. Because detailed hydraulic analyses were not performed, no base flood elevations or depths have been determined. Flood insurance is required.

AE - Zone that corresponds to the 100-year flood areas, as determined by detailed hydraulic analyses*. In most cases, base flood elevations are shown at selected intervals. Flood insurance is required.

AE Flood - Floodway zone. Watercourse channel that generally must be kept free of encroachment. Development is subject to special regulations.

Moderate and Low Risk

X - Zone that corresponds to areas between to areas between the limit of the 100-year and 500-year floods. No base flood elevations or depths have been determined. Flood insurance is available but not required.

X - Zone that corresponds to areas outside of the 500-year flood or areas protected from the 100-year flood by levees. Flood insurance is available but not required.

Riverside County Flood Hazard Zone

Limit of FEMA Study

* See FEMA Flood Insurance Rate Maps and FEMA Flood Insurance Study for Riverside County for Base Flood Elevations.

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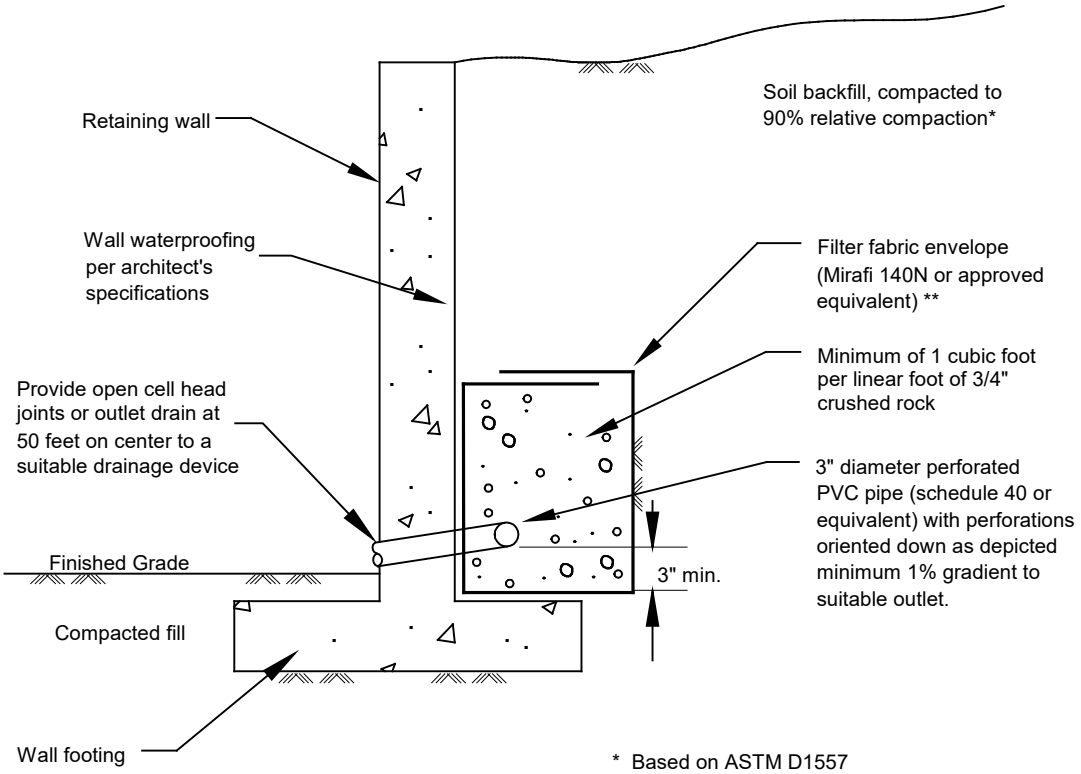
Base Map: City of Menifee General Plan

FLOOD HAZARDS MAP

Not to Scale

Figure 6



* Based on ASTM D1557

** If class 2 permeable material (See gradation to left) is used in place of 3/4" - 1 1/2" gravel. Filter fabric may be deleted. Class 2 permeable material compacted to 90% relative compaction. *

SPECIFICATIONS FOR CLASS 2 PERMEABLE MATERIAL (CAL TRANS SPECIFICATIONS)

Sieve Size	% Passing
1"	100
3/4"	90-100
3/8"	40-100
No.4	25-40
No.8	18-33
No.30	5-15
No.50	0-7
No.200	0-3

RETAINING WALL DRAINAGE DETAIL

APPENDIX A

REFERENCES

APPENDIX A
REFERENCES

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APPENDIX B

FIELD EXPLORATION PROGRAM

APPENDIX B

FIELD EXPLORATION PROGRAM

The subsurface conditions for this Geotechnical Investigation were explored by excavating exploratory borings with an eight (8) inch hollow-stem-auger. All drive samples were obtained by SPT or California Tube Sampler. The approximate locations of the borings are shown on the Boring Location Map (Figure 2). The field exploration was performed under the supervision of our Geologist who maintained a continuous log of the subsurface soils encountered and obtained samples for laboratory testing.

Subsurface conditions are summarized on the accompanying Logs of Borings. The logs contain factual information and interpretation of subsurface conditions between samples. The stratum indicated on these logs represents the approximate boundary between earth units and the transition may be gradual. The logs show subsurface conditions at the dates and locations indicated and may not be representative of subsurface conditions at other locations and times.

Identification of the soils encountered during the subsurface exploration was made using the field identification procedure of the Unified Soils Classification System (ASTM D2488). A legend indicating the symbols and definitions used in this classification system and a legend defining the terms used in describing the relative compaction, consistency or firmness of the soil are attached in this appendix. Bag samples of the major earth units were obtained for laboratory inspection and testing, and the in-place density of the various strata encountered in the exploration was determined

The exploratory borings were located in the field by using cultural features depicted on a preliminary site plan provided by the client. Each location should be considered accurate only to the scale and detail of the plan utilized.

Project: **Evans Park Pump Track Restroom GI**
Project Location: **26533 Craig Avenue, Menifee**
Project Number: **4406A13**

Key to Log of Boring
Sheet 1 of 1

Elevation (feet)	Depth (feet)	Sample Type	Sample Number	Sampling Resistance, blows/ft	Material Type	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
1	2	3	4	5	6	7	8	9	10	11

COLUMN DESCRIPTIONS

1 Elevation (feet): Elevation (MSL, feet).
2 Depth (feet): Depth in feet below the ground surface.
3 Sample Type: Type of soil sample collected at the depth interval shown.
4 Sample Number: Sample identification number.
5 Sampling Resistance, blows/ft: Number of blows to advance driven sampler one foot (or distance shown) beyond seating interval using the hammer identified on the boring log.
6 Material Type: Type of material encountered.
7 Graphic Log: Graphic depiction of the subsurface material encountered.
8 MATERIAL DESCRIPTION: Description of material encountered. May include consistency, moisture, color, and other descriptive text.
9 Water Content, %: Water content of the soil sample, expressed as percentage of dry weight of sample.
10 Dry Unit Weight, pcf: Dry weight per unit volume of soil sample measured in laboratory, in pounds per cubic foot.
11 REMARKS AND OTHER TESTS: Comments and observations regarding drilling or sampling made by driller or field personnel.

FIELD AND LABORATORY TEST ABBREVIATIONS

CHEM: Chemical tests to assess corrosivity
COMP: Compaction test
CONS: One-dimensional consolidation test
LL: Liquid Limit, percent
PI: Plasticity Index, percent
SA: Sieve analysis (percent passing No. 200 Sieve)
UC: Unconfined compressive strength test, Qu, in ksf
WA: Wash sieve (percent passing No. 200 Sieve)

MATERIAL GRAPHIC SYMBOLS

Silty GRAVEL to Clayey GRAVEL (GM-GC)
Silty SAND (SM)
Poorly graded SAND with Silt (SP-SM)
Well graded SAND (SW)

TYPICAL SAMPLER GRAPHIC SYMBOLS

Auger sampler
Bulk Sample
3-inch-OD California w/ brass rings
CME Sampler
Grab Sample
2.5-inch-OD Modified California w/ brass liners
Pitcher Sample
2-inch-OD unlined split spoon (SPT)
Shelby Tube (Thin-walled, fixed head)

OTHER GRAPHIC SYMBOLS

Water level (at time of drilling, ATD)
Water level (after waiting)
Minor change in material properties within a stratum
Inferred/gradational contact between strata
Queried contact between strata

GENERAL NOTES

1: Soil classifications are based on the Unified Soil Classification System. Descriptions and stratum lines are interpretive, and actual lithologic changes may be gradual. Field descriptions may have been modified to reflect results of lab tests.
2: Descriptions on these logs apply only at the specific boring locations and at the time the borings were advanced. They are not warranted to be representative of subsurface conditions at other locations or times.

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Figure B-2

Project: **Evans Park Pump Track Restroom GI**	Log of Boring B-1
Project Location: **26533 Craig Avenue, Menifee**	**Sheet 1 of 2**
Project Number: **4406A13**	

Date(s) Drilled **7/28/2021**	Logged By **J. Rowerdink**	Checked By **I. Chun**
Drilling Method **Hollow Stem Auger**	Drill Bit Size/Type **8" / HSA**	Total Depth of Borehole **51.5 ft**
Drill Rig Type **Truck Mounted CME-95**	Drilling Contractor **Baja Explorations**	Approximate Surface Elevation **1483 ft**
Groundwater Level and Date Measured **Encountered at 10 feet**	Sampling Method(s) **Bulk, Cal, SPT**	Hammer Data **140 lb / 30" Drop**
Borehole Backfill **Cement-Grout & Bentonite**	Location **33.663203, -117.195931**	

Elevation (feet)	Depth (feet)	Sample Type	Sample Number	Sampling Resistance, blows/ft	Material Type	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
1483	0				SM		FILL: Surface - Silty SAND w/ Gravel & Grass			
					SM		OLD ALLUVIAL FAN DEPOSITS: Silty SAND w/ Gravel & trace Clay, Brown, Moist			Max Density = 126.2 pcf @ 10.3%
1478	5			9/14	SM		Silty SAND w/ trace Clay, Brown, Moist, Medium Dense	12.0	119.9	Phi = 34.5 deg
1473	10			4/3	SM		Silty SAND, Dark Brown, Wet, Loose ▼	19.9		
					SP-SM					
1468	15			17/50-5"	SP-SM		SAND, Brown, Wet, Very Dense			No Recovery
					SW					
1463	20			15/50-3"	SW		SAND, Medium Brown, Some Gravel, Moist, Very Dense	7.9		
1458	25			25/50-6"	SW		SAND w/ Trace Silt & Gravel, Medium Brown, Moist, Very Dense			
					GM-GC					
1453	30									

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Project: **Evans Park Pump Track Restroom GI**
Project Location: **26533 Craig Avenue, Menifee**
Project Number: **4406A13**

Log of Boring B-1
Sheet 2 of 2

Elevation (feet)	Depth (feet)	Sample Type	Sample Number	Sampling Resistance, blows/ft	Material Type	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
1453	30			30/50-3"	GM-GC		Sandy Gravel w/ Trace Clay, Medium Brown, Wet, Very Dense	10.0		
1448	35			37/50-2"	GM-GC		Sandy Gravel w/ Trace Clay, Light Brown, Wet, Very Dense			
1443	40			24/50-6"	GM-GC		Sandy Gravel w/ Trace Clay, Light Brown, Moist, Very Dense	7.8		
1438	45			50-6"	GM-GC		Sandy Gravel w/ Trace Clay, Light Brown, Wet, Very Dense			
1433	50			27/50-4"	GM-GC		Sandy Gravel w/ Trace Clay, Brown, Wet, Very Dense	11.5		
							End of Boring as Planned at 51.5' Groundwater Encountered at 10.0 feet Boring Backfilled with Cement-Grout & Bentonite on 7/28/21			
1428	55									
1423	60									
1418	65									

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Project: **Evans Park Pump Track Restroom GI** Project Location: **26533 Craig Avenue, Menifee** Project Number: **4406A13**	Log of Boring B-2 **Sheet 1 of 1**

Date(s) Drilled **7/28/2021**	Logged By **J. Rowerdink**	Checked By **I. Chun**
Drilling Method **Hollow Stem Auger**	Drill Bit Size/Type **8" / HSA**	Total Depth of Borehole **11.0 ft**
Drill Rig Type **Truck Mounted CME-95**	Drilling Contractor **Baja Explorations**	Approximate Surface Elevation **1483 ft**
Groundwater Level and Date Measured **Encountered at 10 feet**	Sampling Method(s) **Cal, SPT**	Hammer Data **140 lb / 30" Drop**
Borehole Backfill **Cement-Grout & Bentonite**	Location **33.663177, -117.196092**	

Elevation (feet)	Depth (feet)	Sample Type	Sample Number	Sampling Resistance, blows/ft	Material Type	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
1483	0				SM		FILL: Surface - Silty SAND w/ Grass & Gravel			
					SM		OLD ALLUVIAL FAN DEPOSITS			
1478	5			8/13	SM		Silty SAND w/ Some Clay, Dark Brown, Moist, Medium Dense	12.8	119.8	Phi = 36 deg
1473	10			10/11	SM		Silty SAND w/ Some Clay, Dark Brown, Wet, Medium Dense	18.9		EI = 0 LL = NV PL = NP PI = NP
							End of Boring as Planned at 11.0' Groundwater Encountered at 10.0 feet Boring Backfilled with Cement-Grout & Bentonite on 7/28/21			
1468	15									
1463	20									
1458	25									
1453	30									

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APPENDIX C

LABORATORY TEST PROCEDURES

APPENDIX C
LABORATORY TESTING PROCEDURES

1. Particle Size Analysis

Particle size analysis on representative soil samples were determined using the standard test method of the ASTM D422.

2. Atterberg Limits

The liquid limit, plastic limit, and the plasticity index of the major soil types encountered were determined using the standard test methods of the ASTM D4318.

3. Maximum Density

Maximum density tests were performed on a representative bag sample of the near surface soils in accordance with ASTM D1557.

4. Direct Shear

Direct Shear Tests were performed on in-place samples of site soils in accordance with ASTM D3080.

5. Expansion Index

Expansion index testing was determined using the standard test method ASTM D4829.

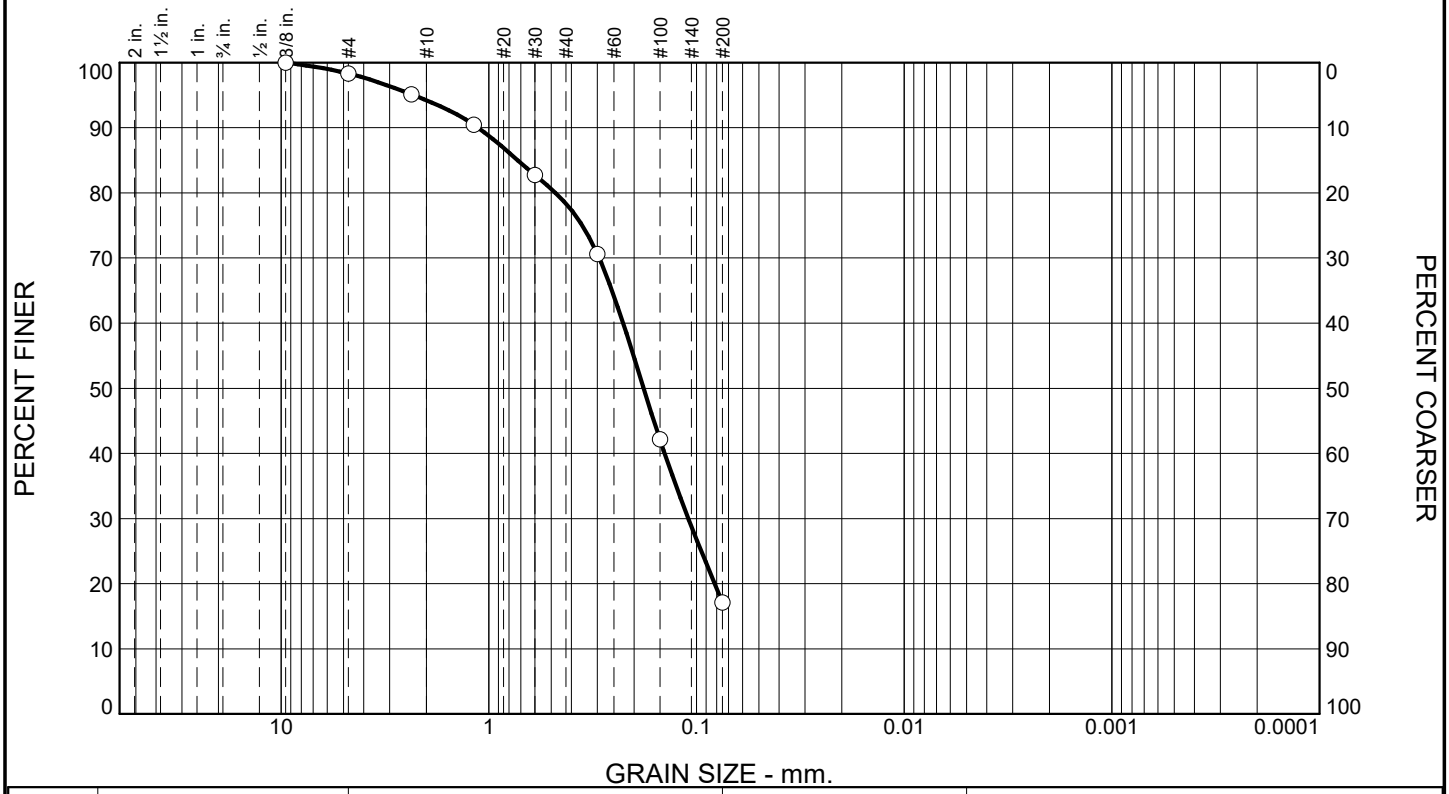
Sample Location	Expansion Index	Expansion Classification
B-2 @ 10’	0	Very Low

6. Corrosion

Chemical testing was performed on representative samples to determine the corrosion potential of the onsite soils. Testing consisted of pH, chlorides (CTM 422), soluble sulfates (CTM 417), and resistivity (CTM 643). Test results are as follows:

Sample Location	pH	Sulfates (ppm)	Chlorides (ppm)	Resistivity (ohm-cm)
B-1 @ 0’-5’	7.2	901	722	<500

Particle Size Distribution Report



% +3"	% Gravel	% Sand	% Silt	% Clay
0.0	1.7	81.2	17.1	

Test Results (ASTM C 136 & ASTM C 117)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3/8"	100.0		
#4	98.3		
#8	95.1		
#16	90.4		
#30	82.7		
#50	70.6		
#100	42.1		
#200	17.1		

* (no specification provided)

Material Description

DARK BROWN SILTY SAND

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= SM **AASHTO (M 145)=** A-2-4(0)

Coefficients

D_{90}= 1.1270 D_{85}= 0.7247 D_{60}= 0.2255
D_{50}= 0.1796 D_{30}= 0.1095 D_{15}=
D_{10}= C_u= C_c=

Remarks

SAMPLED BY JAY ROWERDINK
F.M.=1.21

Date Received: 08-08-2021 **Date Tested:** 08-16-2021

Tested By: RJS

Checked By: IC

Title: EM

Location: B2 @ 10'
Sample Number: 10388 **Depth:** 10'

Date Sampled: 07-28-2021

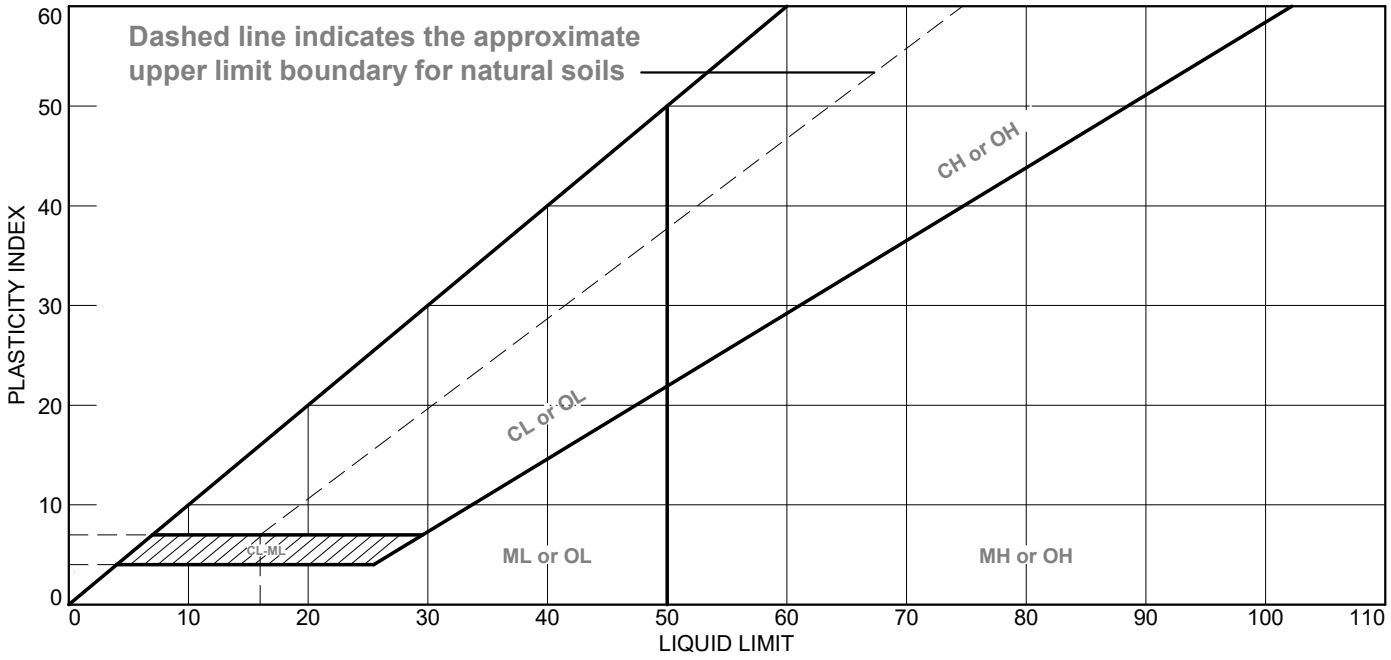
MTGL, Inc.

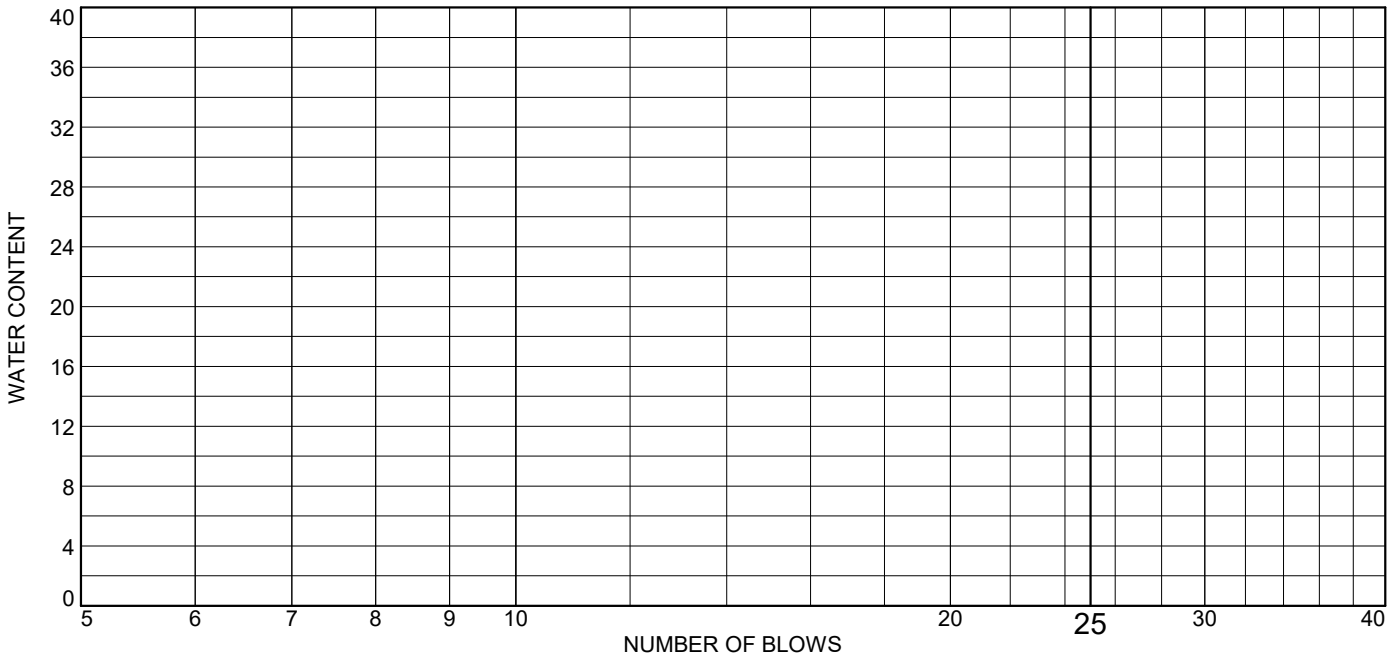
Anaheim, CA

Client: CITY OF MENIFEE
Project: EVANS PARK PUMP TRACK

Project No: 4406A13

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	DARK BROWN SILTY SAND w/ TRACE CLAY	NV	NP	NP	78.3	17.1	SM

Project No. 4406A13 **Client:** CITY OF MENIFEE

Project: EVANS PARK PUMP TRACK

Location: B2 @ 10'
Sample Number: 10388 **Depth:** 10'

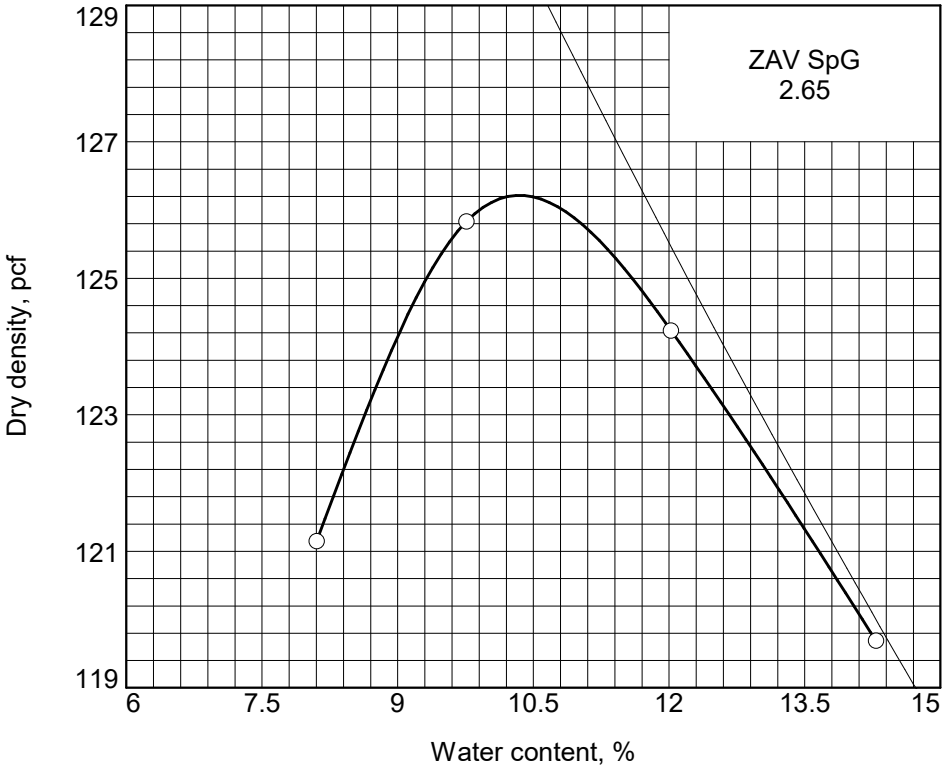
MTGL, Inc.

Anaheim, CA

Remarks:
● SAMPLED BY JAY ROWERDINK

Tested By: RJS **Checked By:** IC

COMPACTION TEST REPORT



Curve No.
10388

Test Specification:
ASTM D 1557-12 Method B Modified

Preparation Method MOIST
Hammer Wt. 10 lb.
Hammer Drop 18 in.
Number of Layers five
Blows per Layer 25
Mold Size 0.03333 cu. ft.

Test Performed on Material Passing 3/8 in. **Sieve**

NM **LL** **PI**
Sp.G. (ASTM D 854) 2.65
%>3/8 in. 1.4 **%<No.200**
USCS SC **AASHTO**
Date Sampled 07-28-2021
Date Tested 08-13-2021
Tested By RJS

TESTING DATA

	1	2	3	4	5	6
WM + WS	6090.0	6198.0	6214.0	6178.0		
WM	4110.0	4110.0	4110.0	4110.0		
WW + T #1	489.6	412.8	403.5	453.6		
WD + T #1	452.9	376.1	360.2	396.9		
TARE #1	0.0	0.0	0.0	0.0		
WW + T #2						
WD + T #2						
TARE #2						
MOISTURE	8.1	9.8	12.0	14.3		
DRY DENSITY	121.2	125.8	124.2	119.7		

TEST RESULTS

Maximum dry density = 126.2 pcf

Optimum moisture = 10.3 %

Material Description

DARK BROWN CLAYEY SAND

Remarks:
SAMPLED BY JAY ROWERDINK

Project No. 4406A13 **Client:** CITY OF MENIFEE
Project: EVANS PARK PUMP TRACK

○ **Location:** B1 @ 0'-5' **Depth:** 0'-5' **Sample Number:** 10388

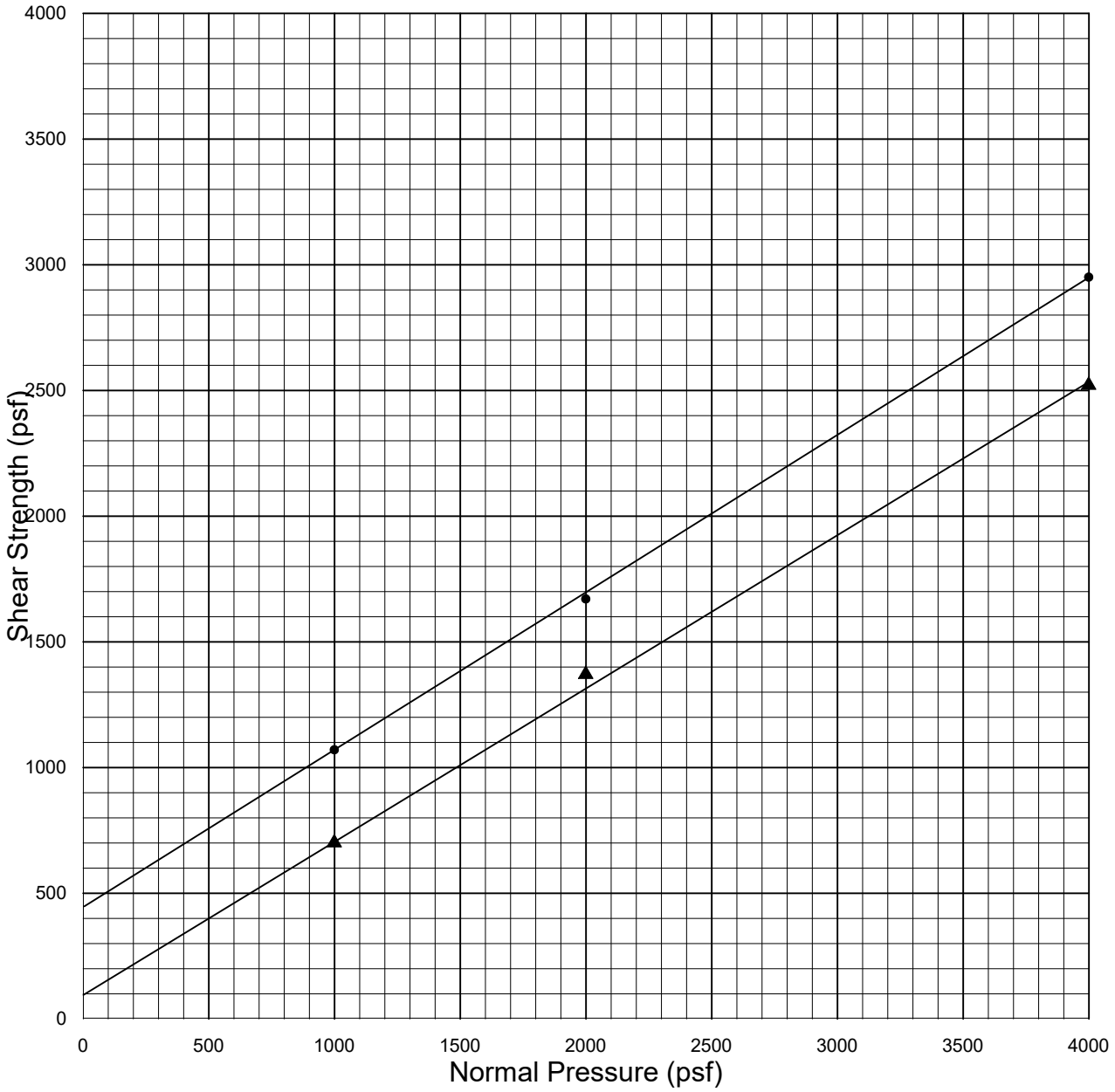
Checked by: IC
Title: EM

MTGL, Inc.

Anaheim, CA

MTGL # 4406A13

DIRECT SHEAR TEST - ASTM D-3080



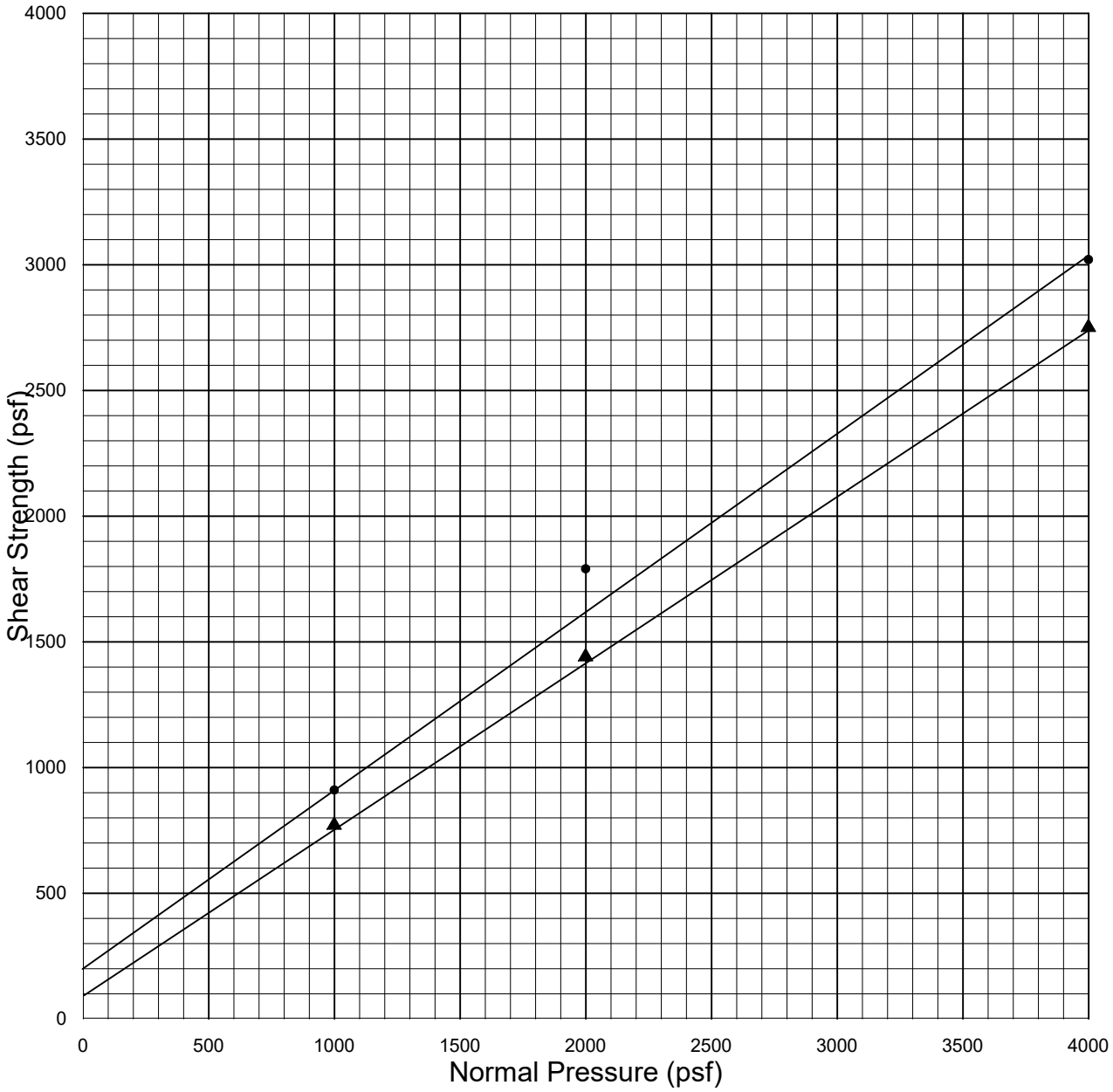
Strain Rate: 0.0042 in. / min.

Sample	Type	Description	Dry Density (pcf)	Initial W.C. (%)	Final W.C. (%)
B-1 @ 5'	Undisturbed & Saturated	Sandy Clay	114.1	16.6	19.3

Normal Pressure (psf)	Peak Shear Strength (psf)	Ultimate Shear Strength (psf)
1000	1070 @ 0.0700"	700
2000	1670 @ 0.0950"	1370
4000	2950 @ 0.0550"	2520
	C = 450 psf	C = 100 psf
	ϕ = 32 deg.	ϕ = 31 deg.

MTGL # 4406A13

DIRECT SHEAR TEST - ASTM D-3080



Strain Rate: 0.0042 in. / min.

Sample	Type	Description	Dry Density (pcf)	Initial W.C. (%)	Final W.C. (%)
B-2 @ 5'	Undisturbed	Sandy Clay	113.6	17.1	19.8

Normal Pressure (psf)	Peak Shear Strength (psf)	Ultimate Shear Strength (psf)
1000	910 @ 0.1000"	770
2000	1790 @ 0.1050"	1440
4000	3020 @ 0.1650"	2750
	C = 200 psf	C = 100 psf
	ϕ = 35.5 deg.	ϕ = 33 deg.

ANAHEIM TEST LAB, INC

196 Technology Drive, Unit D
Irvine, CA 92618
Phone (949)336-6544

MTGL, INC.
2992 LA PALMA AVE. #A
ANAHEIM, CA 92806

DATE: 08/19/2021

P.O. NO: Transmittal

LAB NO: C-5142

SPECIFICATION: CTM-643/417/422

MATERIAL: Soil

Project No.: 4406A13
MTGL Lab No: #10,388
Project: Evans Park Pump Track, Menifee, CA
Sample ID: B1 @ 0'-5'

ANALYTICAL REPORT

CORROSION SERIES
SUMMARY OF DATA

pH	MIN. RESISTIVITY per CT. 643 ohm-cm	SOLUBLE SULFATES per CT. 417 ppm	SOLUBLE CHLORIDES per CT. 422 ppm
7.2	<500	901	722

RESPECTFULLY SUBMITTED

WES BRIDGER LAB MANAGER

APPENDIX D

GENERAL EARTHWORK AND GRADING SPECIFICATIONS

APPENDIX D

GENERAL EARTHWORK AND GRADING SPECIFICATIONS

GENERAL

These specifications present general procedures and requirements for grading and earthwork as shown on the approved grading plans, including preparation of areas to be filled, placement of fill, installation of subdrains, and excavations. The recommendations contained in the attached geotechnical report are a part of the earthwork and grading specifications and shall supersede the provisions contained herein in the case of conflict. Evaluations performed by the Consultant during the course of grading may result in new recommendations, which could supersede these specifications, or the recommendations of the geotechnical report.

EARTHWORK OBSERVATION AND TESTING

Prior to the start of grading, a qualified Geotechnical Consultant (Geotechnical Engineer and Engineering Geologist) shall be employed for the purpose of observing earthwork procedures and testing the fills for conformance with the recommendations of the geotechnical report and these specifications. It will be necessary that the Consultant provide adequate testing and observation so that he may determine that the work was accomplished as specified. It shall be the responsibility of the Contractor to assist the Consultant and keep them apprised of work schedules and changes so that he may schedule his personnel accordingly.

It shall be the sole responsibility of the Contractor to provide adequate equipment and methods to accomplish the work in accordance with applicable grading codes or agency ordinances, these specifications and the approved grading plans.

Maximum dry density tests used to determine the degree of compaction will be performed in accordance with the American Society for Testing and Materials Test Method (ASTM) D1557.

PREPARATION OF AREAS TO BE FILLED

Clearing and Grubbing: All brush, vegetation and debris shall be removed or piled and otherwise disposed of.

Processing: The existing ground which is determined to be satisfactory for support of fill shall be scarified to a minimum depth of 6 inches. Existing ground, which is not satisfactory, shall be over-excavated as specified in the following section.

Over-excavation: Soft, dry, spongy, highly fractured or otherwise unsuitable ground, extending to such a depth that surface processing cannot adequately improve the condition, shall be over-excavated down to firm ground, approved by the Consultant.

Moisture conditioning: Over-excavated and processed soils shall be watered, dried-back, blended, and mixed as required to have a relatively uniform moisture content near the optimum moisture content as determined by ASTM D1557.

Re-compaction: Over-excavated and processed soils, which have been mixed, and moisture conditioned uniformly shall be recompacted to a minimum relative compaction of 90% of ASTM D1557.

Benching: Where soils are placed on ground with slopes steeper than 5:1 (horizontal to vertical), the ground shall be stepped or benched. Benches shall be excavated in firm material for a minimum width of 4 feet.

FILL MATERIAL

General: Material to be placed as fill shall be free of organic matter and other deleterious substances and shall be approved by the Consultant.

Oversize: Oversized material defined as rock, or other irreducible material with a maximum dimension greater than 12 inches, shall not be buried or placed in fill, unless the location, material, and disposal methods are specifically approved by the Consultant. Oversize disposal operations shall be such that nesting of oversized material does not occur, and such that the oversize material is completely surrounded by compacted or densified fill. Oversize material shall

not be placed within 10 feet vertically of finish grade or within the range of future utilities or underground construction, unless specifically approved by the Consultant.

Import: If importing of fill material is required for grading, the import material shall meet the general requirements.

FILL PLACEMENT AND COMPACTION

Fill Lifts: Approved fill material shall be placed in areas prepared to receive fill in near-horizontal layers not exceeding 6 inches in compacted thickness. The Consultant may approve thicker lifts if testing indicates the grading procedures are such that adequate compaction is being achieved with lifts of greater thickness. Each layer shall be spread evenly and shall be thoroughly mixed during spreading to attain uniformity of material and moisture in each layer.

Fill Moisture: Fill layers at a moisture content less than optimum shall be watered and mixed, and wet fill layers shall be aerated by scarification or shall be blended with drier material. Moisture conditioning and mixing of fill layers shall continue until the fill material is at uniform moisture content at or near optimum.

Compaction of Fill: After each layer has been evenly spread, moisture conditioned, and mixed, it shall be uniformly compacted to not less than 90% of maximum dry density in accordance with ASTM D1557. Compaction equipment shall be adequately sized and shall be either specifically designed for soil compaction or of proven reliability, to efficiently achieve the specified degree of compaction.

Fill Slopes: Compacting on slopes shall be accomplished, in addition to normal compacting procedures, by backrolling of slopes with sheepsfoot rollers at frequent increments of two (2) to three (3) feet as the fill is placed, or by other methods producing satisfactory results. At the completion of grading, the relative compaction of the slope out to the slope face shall be at least 90% in accordance with ASTM D1557.

Compaction Testing: Field tests to check the fill moisture and degree of compaction will be performed by the consultant. The location and frequency of tests shall be at the consultant's discretion. In general, these tests will be taken at an interval not exceeding two (2) feet in vertical

rise, and/or 1,000 cubic yards of fill placed. In addition, on slope faces, at least one test shall be taken for each 5,000 square feet of slope face and/or each 10 feet of vertical height of slope.

SUBDRAIN INSTALLATION

Subdrain systems, if required, shall be installed in approved ground to conform to the approximate alignment and details shown on the plans or herein. The subdrain location or materials shall not be changed or modified without the approval of the Consultant. The Consultant, however, may recommend and, upon approval, direct changes in subdrain line, grade or materials. All subdrains should be surveyed for line and grade after installation and sufficient time shall be allowed for the surveys, prior to commencement of fill over the subdrain.

EXCAVATION

Excavations and cut slopes will be examined during grading. If directed by the Consultant, further excavation or over-excavation and refilling of cut areas, and/or remedial grading of cut slopes shall be performed. Where fill over cut slopes are to be graded, unless otherwise approved, the cut portion of the slope shall be made and approved by the Consultant prior to placement of materials for construction of the fill portion of the slope.

APPENDIX E

LIQUEFACTION AND DYNAMIC SETTLEMENT ANALYSIS

Liquefaction SPT Analysis 3.3.2

Organization: **MTGL**
Project Name: **Evans Park Pump Track Restr**
Job #: **4406A13**
Analysis by: **JR**
Date: **9/20/2021**

Input Parameters

Units: **English**

Variable	Value	Variable	Value
Peak Ground Acceleration	0.600 g	Design GWT (Historical)	8.00 ft
Earthquake Magnitude	7.0 MW	Site GWT	10.0 ft
Bottom Depth	50.00 ft	Average Soil Unit Weight	
Bore Hole Diameter	8.0 in	above GWT	121.0 pcf
Rod Length Height Stick up	4.9 ft	below GWT	127.3 pcf
Correction for Sample Liners	Yes	Sloping Ground	No

Geotechnical Properties

#	Material Type	USCS	Bottom Depth, ft	Consistency	Flags	SPT field	Fines Content, %	Energy Ratio, %
1	Granular Soil	SM	2.00	Loose	Unsaturated	19	15	50
2	Granular Soil	SM	4.00	Loose	Unsaturated	19	15	50
3	Granular Soil	SM	6.00	Medium Dense	Unsaturated	19	15	50
4	Granular Soil	SM	8.00	Loose	Unsaturated	19	15	50
5	Granular Soil	SM	10.00	Loose	Unsaturated	9	15	50
6	Granular Soil	SP-SM	12.00	Very Dense		50	5	50
7	Granular Soil	SP-SM	14.00	Very Dense		50	5	50
8	Granular Soil	SW	16.00	Very Dense		50	5	50
9	Granular Soil	SW	18.00	Very Dense		50	5	50
10	Granular Soil	SW	20.00	Very Dense		50	5	50
11	Granular Soil	SW	22.00	Very Dense		50	5	50
12	Granular Soil	SW	24.00	Very Dense		50	5	50
13	Granular Soil	SW	26.00	Very Dense		50	5	50
14	Granular Soil	GC-GM	28.00	Very Dense		50	5	50
15	Granular Soil	GC-GM	30.00	Very Dense		50	5	50
16	Granular Soil	GC-GM	32.00	Very Dense		50	5	50
17	Granular Soil	GC-GM	34.00	Very Dense		50	5	50
18	Granular Soil	GC-GM	36.00	Very Dense		50	5	50
19	Granular Soil	GC-GM	38.00	Very Dense		50	5	50
20	Granular Soil	GC-GM	40.00	Very Dense		50	5	50
21	Granular Soil	GC-GM	42.00	Very Dense		50	5	50
22	Granular Soil	GC-GM	44.00	Very Dense		50	5	50
23	Granular Soil	GC-GM	46.00	Very Dense		50	5	50
24	Granular Soil	GC-GM	48.00	Very Dense		50	5	50
25	Granular Soil	GC-GM	50.00	Very Dense		50	5	50

Results

Settlement: 0.03 in
Lateral Displacement: 0.00 ft

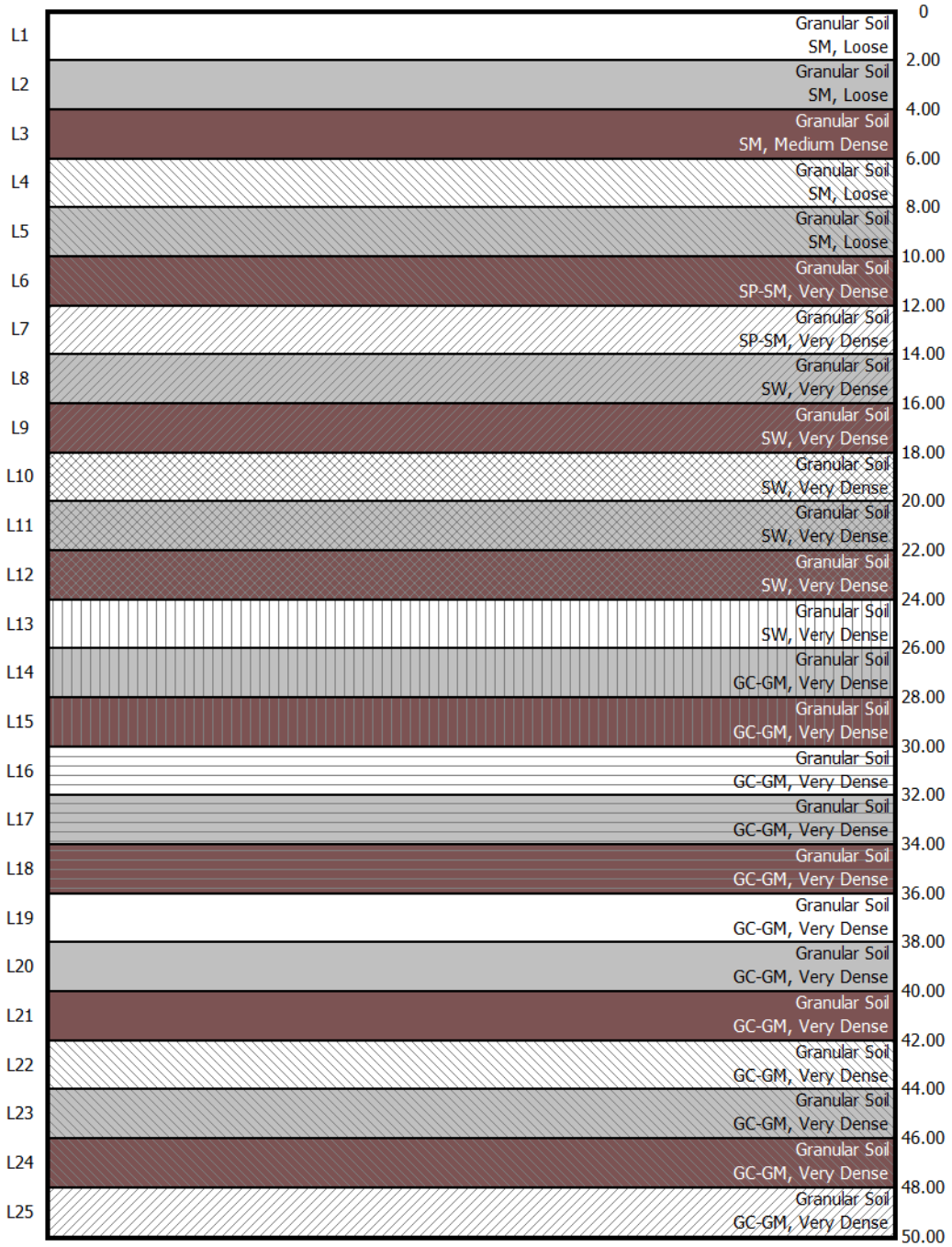


Fig. 1: Subsurface profile

Liquefaction Analysis - Set 1/4

Sample #	Depth, ft	C_E	C_B	C_R	C_S	N_{60}
1	2.00	0.83	1.15	0.75	1.30	17.75
2	4.00	0.83	1.15	0.75	1.29	17.67
3	6.00	0.83	1.15	0.80	1.27	18.53
4	8.00	0.83	1.15	0.80	1.24	18.12
5	10.00	0.83	1.15	0.85	1.11	8.16
6	12.00	0.83	1.15	0.85	1.30	52.95
7	14.00	0.83	1.15	0.85	1.30	52.95
8	16.00	0.83	1.15	0.95	1.30	59.18
9	18.00	0.83	1.15	0.95	1.30	59.18
10	20.00	0.83	1.15	0.95	1.30	59.18
11	22.00	0.83	1.15	0.95	1.30	59.18
12	24.00	0.83	1.15	0.95	1.30	59.18
13	26.00	0.83	1.15	0.95	1.30	59.18
14	28.00	0.83	1.15	1.00	1.30	62.29
15	30.00	0.83	1.15	1.00	1.30	62.29
16	32.00	0.83	1.15	1.00	1.30	62.29
17	34.00	0.83	1.15	1.00	1.30	62.29
18	36.00	0.83	1.15	1.00	1.30	62.29
19	38.00	0.83	1.15	1.00	1.30	62.29
20	40.00	0.83	1.15	1.00	1.30	62.29
21	42.00	0.83	1.15	1.00	1.30	62.29
22	44.00	0.83	1.15	1.00	1.30	62.29
23	46.00	0.83	1.15	1.00	1.30	62.29
24	48.00	0.83	1.15	1.00	1.30	62.29
25	50.00	0.83	1.15	1.00	1.30	62.29

Liquefaction Analysis - Set 2/4

Sample #	Depth, ft	σ V, psf	σ V', psf	C_N	$(N_1)_{60}$
1	2.00	242.0	242.0	1.70	30.18
2	4.00	484.0	484.0	1.66	29.37
3	6.00	726.0	726.0	1.47	27.20
4	8.00	968.0	968.0	1.34	24.36
5	10.00	1222.6	1097.8	1.38	11.24
6	12.00	1477.2	1227.6	1.15	61.05
7	14.00	1731.8	1357.4	1.12	59.46
8	16.00	1986.4	1487.2	1.10	64.87
9	18.00	2241.0	1617.0	1.07	63.46
10	20.00	2495.6	1746.8	1.05	62.18
11	22.00	2750.2	1876.6	1.03	61.02
12	24.00	3004.8	2006.4	1.01	59.96
13	26.00	3259.4	2136.2	1.00	58.98
14	28.00	3514.0	2266.0	0.98	61.13
15	30.00	3768.6	2395.8	0.97	60.24
16	32.00	4023.2	2525.6	0.95	59.41
17	34.00	4277.8	2655.4	0.94	58.63
18	36.00	4532.4	2785.2	0.93	57.90
19	38.00	4787.0	2915.0	0.92	57.21
20	40.00	5041.6	3044.8	0.91	56.55
21	42.00	5296.2	3174.6	0.90	55.94
22	44.00	5550.8	3304.4	0.89	55.35
23	46.00	5805.4	3434.2	0.88	54.79
24	48.00	6060.0	3564.0	0.87	54.26
25	50.00	6314.6	3693.8	0.86	53.75

Liquefaction Analysis - Set 3/4

Sample #	Depth, ft	ΔN-Fines	$(N_1)_{60}$-CS	Stress Reduc.	CSR	MSF-Sand
1	2.00	3.26	33.44	1.001	0.391	1.141
2	4.00	3.26	32.63	0.995	0.388	1.141
3	6.00	3.26	30.47	0.989	0.386	1.141
4	8.00	3.26	27.62	0.981	0.383	1.141
5	10.00	3.26	14.50	0.974	0.423	1.141
6	12.00	0.00	61.05	0.966	0.453	1.141
7	14.00	0.00	59.46	0.957	0.476	1.141
8	16.00	0.00	64.88	0.948	0.494	1.141
9	18.00	0.00	63.46	0.939	0.508	1.141
10	20.00	0.00	62.19	0.930	0.518	1.141
11	22.00	0.00	61.03	0.920	0.526	1.141
12	24.00	0.00	59.96	0.910	0.531	1.141
13	26.00	0.00	58.98	0.899	0.535	1.141
14	28.00	0.00	61.13	0.889	0.537	1.141
15	30.00	0.00	60.24	0.878	0.539	1.141
16	32.00	0.00	59.41	0.867	0.539	1.141
17	34.00	0.00	58.63	0.856	0.538	1.141
18	36.00	0.00	57.90	0.845	0.536	1.141
19	38.00	0.00	57.21	0.834	0.534	1.141
20	40.00	0.00	56.56	0.823	0.531	1.141
21	42.00	0.00	55.94	0.811	0.528	1.141
22	44.00	0.00	55.35	0.800	0.524	1.141
23	46.00	0.00	54.79	0.789	0.520	1.141
24	48.00	0.00	54.26	0.778	0.516	1.141
25	50.00	0.00	53.75	0.767	0.511	1.141

Liquefaction Analysis - Set 4/4

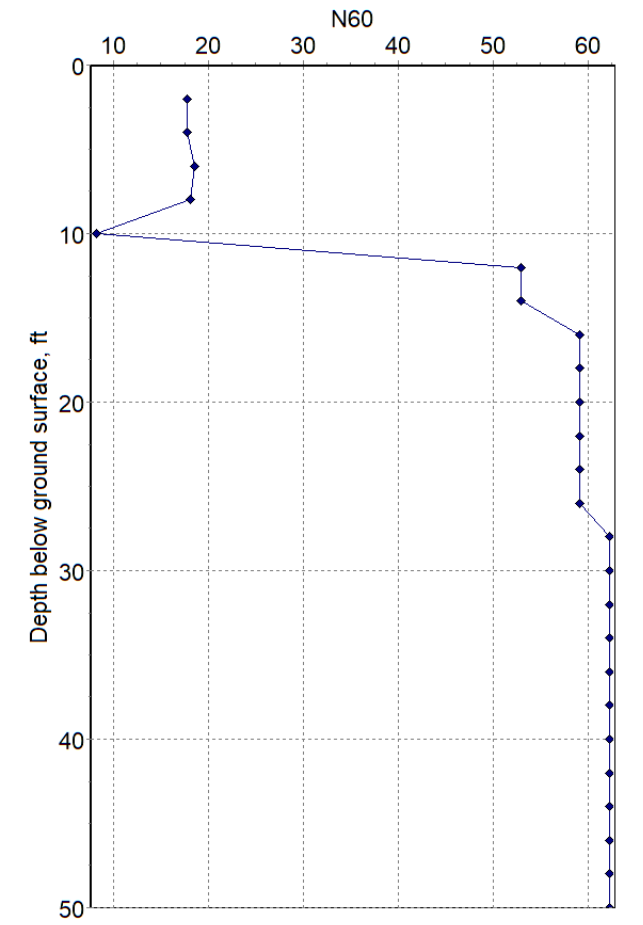
Sample #	Depth, ft	K_σSand	CRR-M=7.5 & σvc=1	CRR	Liq. F.S.
1	2.00	1.100	0.82	n.a	n.a
2	4.00	1.100	0.71	n.a	n.a
3	6.00	1.100	0.52	n.a	n.a
4	8.00	1.100	0.37	n.a	n.a
5	10.00	1.071	0.15	n.a	n.a
6	12.00	1.100	2.00	2.000	2.00
7	14.00	1.100	2.00	2.000	2.00
8	16.00	1.100	2.00	2.000	2.00
9	18.00	1.078	2.00	2.000	2.00
10	20.00	1.056	2.00	2.000	2.00
11	22.00	1.034	2.00	2.000	2.00
12	24.00	1.015	2.00	2.000	2.00
13	26.00	0.996	2.00	2.000	2.00
14	28.00	0.979	2.00	2.000	2.00
15	30.00	0.962	2.00	2.000	2.00
16	32.00	0.947	2.00	2.000	2.00
17	34.00	0.932	2.00	2.000	2.00
18	36.00	0.918	2.00	2.000	2.00
19	38.00	0.904	2.00	2.000	2.00
20	40.00	0.892	2.00	2.000	2.00
21	42.00	0.879	2.00	2.000	2.00
22	44.00	0.867	2.00	1.980	2.00
23	46.00	0.856	2.00	1.954	2.00
24	48.00	0.845	2.00	1.929	2.00
25	50.00	0.835	2.00	1.905	2.00

Dynamic Settlement - Set 1/2

Sample #	Depth, ft	Lim. Shear Strain, γlim	Fα Parameter	Max. Shear Strain, γmax	ΔH I, ft
1	2.00	0.03	-0.325	0.000	2.00
2	4.00	0.03	-0.268	0.000	2.00
3	6.00	0.04	-0.120	0.000	2.00
4	8.00	0.06	0.068	0.000	2.00
5	10.00	0.29	0.774	0.000	2.00
6	12.00	0.00	-2.513	0.000	2.00
7	14.00	0.00	-2.377	0.000	2.00
8	16.00	0.00	-2.844	0.000	2.00
9	18.00	0.00	-2.721	0.000	2.00
10	20.00	0.00	-2.611	0.000	2.00
11	22.00	0.00	-2.511	0.000	2.00
12	24.00	0.00	-2.420	0.000	2.00
13	26.00	0.00	-2.336	0.000	2.00
14	28.00	0.00	-2.520	0.000	2.00
15	30.00	0.00	-2.444	0.000	2.00
16	32.00	0.00	-2.373	0.000	2.00
17	34.00	0.00	-2.307	0.000	2.00
18	36.00	0.00	-2.244	0.000	2.00
19	38.00	0.00	-2.186	0.000	2.00
20	40.00	0.00	-2.131	0.000	2.00
21	42.00	0.00	-2.079	0.000	2.00
22	44.00	0.00	-2.030	0.000	2.00
23	46.00	0.00	-1.984	0.000	2.00
24	48.00	0.00	-1.939	0.000	2.00
25	50.00	0.00	-1.897	0.000	2.00

Dynamic Settlement - Set 2/2

Sample #	Depth, ft	Vert. Consol. Str, εV	Dyn. Sett, in	Accum. Sett, in
1	2.00	0.000	0.007	0.007
2	4.00	0.000	0.003	0.009
3	6.00	0.000	0.002	0.012
4	8.00	0.000	0.002	0.014
5	10.00	0.000	0.006	0.020
6	12.00	0.000	0.000	0.021
7	14.00	0.000	0.000	0.021
8	16.00	0.000	0.000	0.021
9	18.00	0.000	0.000	0.022
10	20.00	0.000	0.000	0.022
11	22.00	0.000	0.000	0.022
12	24.00	0.000	0.000	0.022
13	26.00	0.000	0.000	0.023
14	28.00	0.000	0.000	0.023
15	30.00	0.000	0.000	0.023
16	32.00	0.000	0.000	0.024
17	34.00	0.000	0.000	0.024
18	36.00	0.000	0.000	0.024
19	38.00	0.000	0.000	0.024
20	40.00	0.000	0.000	0.024
21	42.00	0.000	0.000	0.025
22	44.00	0.000	0.000	0.025
23	46.00	0.000	0.000	0.025
24	48.00	0.000	0.000	0.025
25	50.00	0.000	0.000	0.026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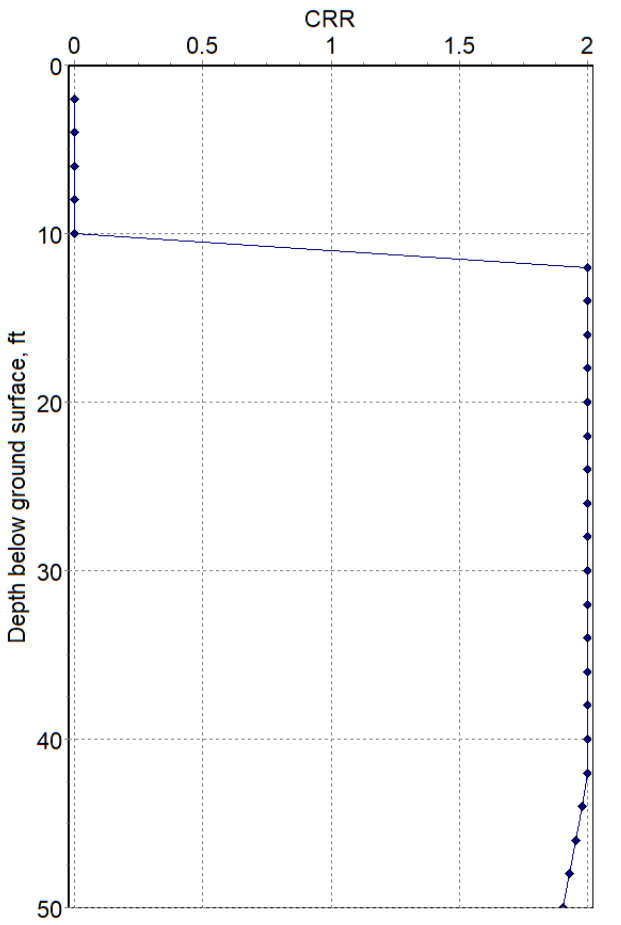
Depth below ground surface, ft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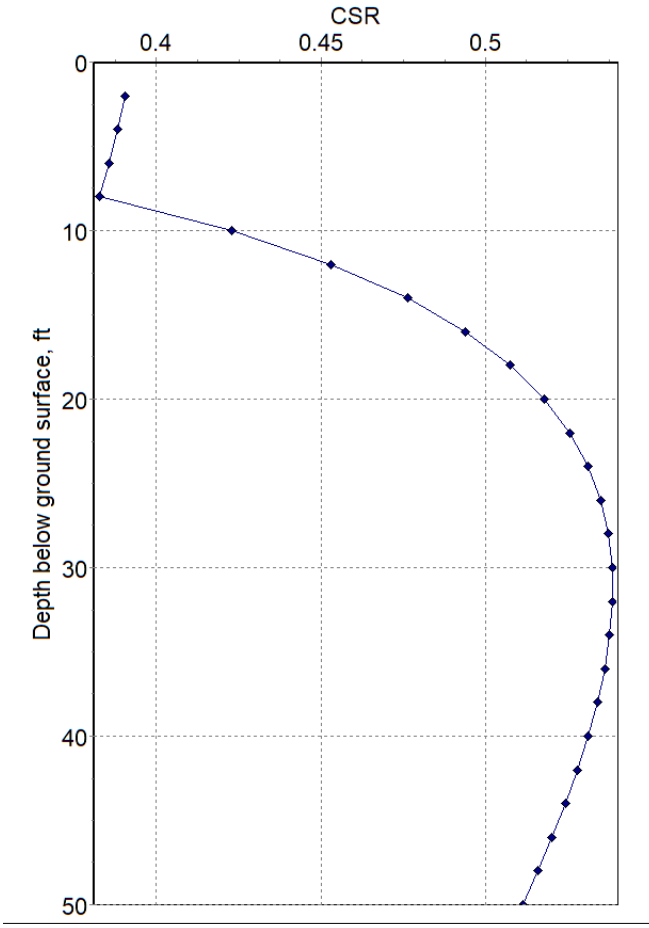
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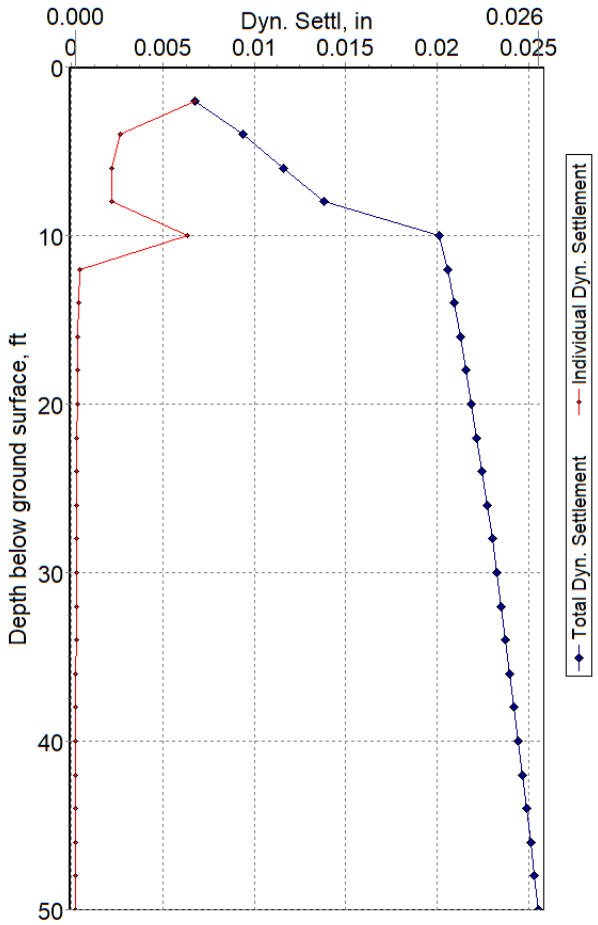

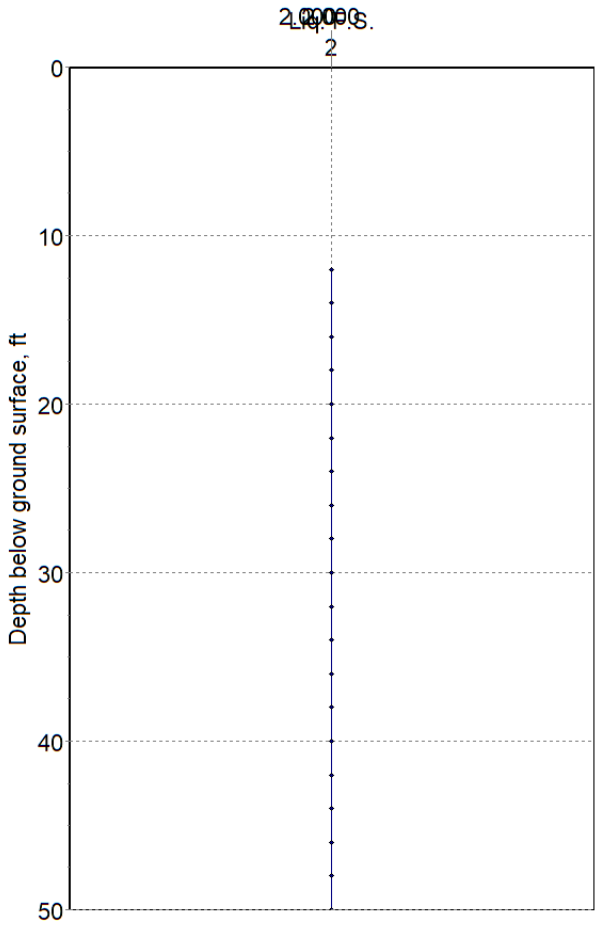

References:

1. "Soil Liquefaction During Earthquakes", I.M. Idriss & R.W. Boulanger, 2008, MNO-12, EERI
2. LiquefactionSPT by SoilStructure.com

IS/MND Appendix E

Paleontological Resource Assessment

PALEOWEST

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July 20, 2021

Yara L. Fisher, AICP
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HELIX Environmental Planning, Inc.
7578 El Cajon Boulevard
La Mesa, CA 91942
Transmitted via email to: yaraf@helixepi.com

RE: Paleontological Resource Assessment for Evans Park, City of Menifee, Riverside County, California

Dear Ms. Fisher,

At the request of HELIX Environmental Planning, Inc. (HELIX), PaleoWest, LLC (PaleoWest) conducted a paleontological resource assessment for the Evans Park Project (Project) in the City of Menifee, Riverside County, California.The goal of the assessment is to identify the geologic units that may be impacted by development of the Project, determine the paleontological sensitivity of geologic units within the Project area, assess potential for impacts to paleontological resources from development of the Project, and recommend mitigation measures to avoid or mitigate impacts to scientifically significant paleontological resources, as necessary.

This paleontological resource assessment included a fossil locality records search conducted by the Western Science Center (WSC) in Hemet, California. The records search was supplemented by a review of existing geologic maps and primary literature regarding fossiliferous geologic units within the proposed Project vicinity and region. This technical memorandum, which was written in accordance with the guidelines set forth by the Society of Vertebrate Paleontology (SVP) (2010), has been prepared to support environmental review under the California Environmental Quality Act (CEQA).

PROJECT DESCRIPTION

The proposed project (Project) is the construction of a community park on the Evans Park site in the city of Menifee (Figure 1). The park, located east of Evans Road and north and south of Craig Avenue, would be constructed in two separate phases. The first phase, which would encompass the southern six acres of the site, is currently funded and designed. The second phase, which would encompass the northern 12.88 acres of the site is in the conceptual phase. Once complete, Evans Park would provide approximately 19 acres of recreational and open space facilities. The Project site is situated within Township 6 South, Range 3 West in Section 9 on the Romoland, CA U. S. Geological Survey 7.5-minute quadrangle (Figure 2).



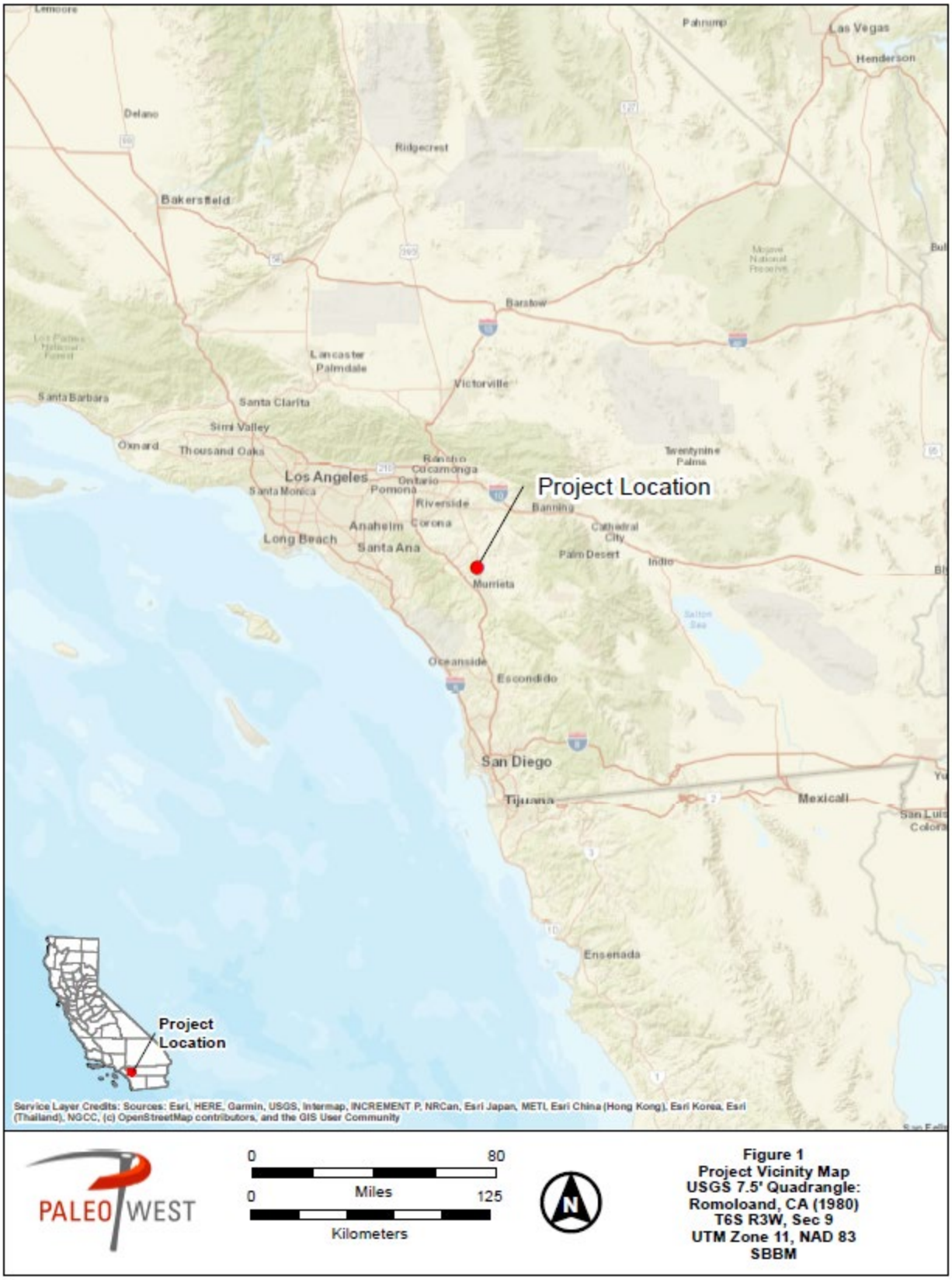


Figure 1. Project Vicinity Map

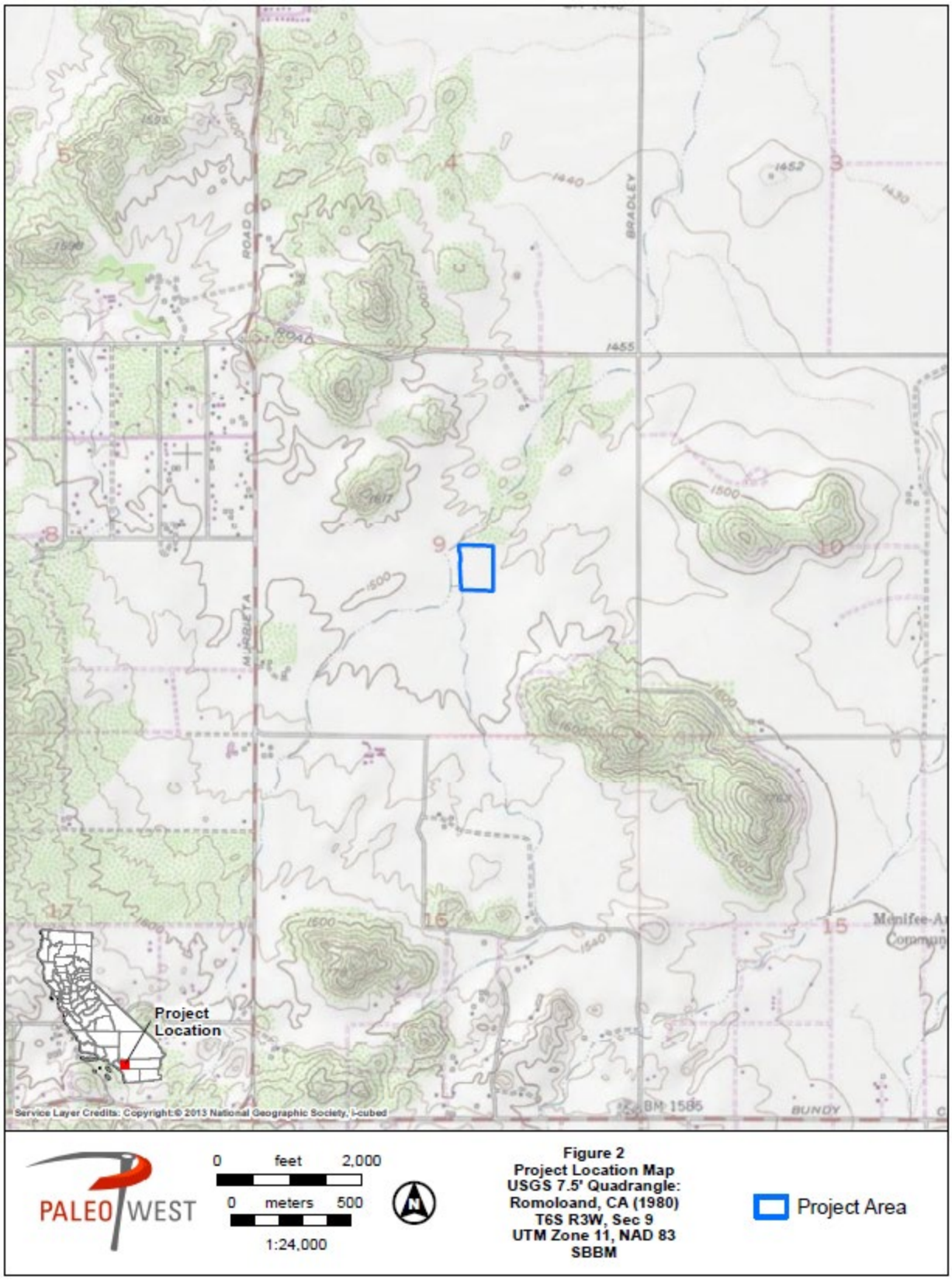


Figure 2. Project Location Map

SOUTHERN PHASE

For the first (southern) phase, the City proposes to build an approximate six-acre bicycle trails park on the six-acre site near the southeast corner of Evans Road and Craig Avenue. The bicycle trails park would include a parking lot at the northeast corner with an entrance off Craig Avenue and a prefabricated restroom. The park would be divided into two separate sections a smaller paved tight circuit area called a "Pump Track" and the larger dirt trail portion of the track, which would have some wooden slat sections to add challenging elements to the track.

Parking would be provided via a 12,000 square foot gravel parking lot in the northeast portion of the site, accessible from Craig Avenue and accommodate approximately 45 vehicles. While the parking lot would be gravel at the opening of the southern phase, it would transition to a paved lot approximately one year after the southern phase becomes operational. Lighting would be provided via a combination of solar and LED powered light standards. The park would operate from dawn until dusk until the installation of the light standards (to occur approximately one-year after the opening of the southern phase), at which point the park would operate until 9 p.m. Special events would be held at the park approximately four to five times a year and would include the use of a public address system.

It is anticipated that construction on the southern phase would commence in winter 2021 to spring 2022 with an opening date of late spring to early summer 2022. Once the southern phase becomes operational, regular maintenance would occur such as trash clean up and restroom servicing. The tracks themselves would be subject to maintenance after heavy rains and one to two times a year, however, no regular reshaping of the dirt trails is expected to occur.

This southern phase of the project is in the design stage and is analyzed at a project-level of detail.

NORTHERN PHASE

The second (northern) phase, which encompasses the 12.88 acres north of Craig Avenue would include a mixture of active and passive spaces. It is the intent to develop the northern phase with a multi-use ball field, splash pad, picnic areas, and trails. Access would be via Evans Road with an internal drive to access the facilities. Ornamental landscaping would be provided throughout, however the existing wetland habitat in the southeastern portion would be retained in its natural state. It is anticipated that construction of the northern phase would commence in the year 2025.

Because the northern phase is conceptual in nature and not expected to be developed in the immediate future, the northern phase is analyzed at a program-level of analysis.

REGULATORY CONTEXT

Paleontological resources (i.e., fossils) are considered nonrenewable scientific resources because once destroyed, they cannot be replaced. As such, paleontological resources are afforded protection under various federal, state, and local laws and regulations. Laws pertinent to this Project are discussed below.

STATE LAWS AND REGULATIONS

California Environmental Quality Act

CEQA requires that public agencies and private interests identify the potential environmental consequences of their Projects on any object or site of significance to the scientific annals of California (Division I, California Public Resources Code [PRC] Section 5020.1 [b]). Appendix G in Section 15023 provides an Environmental Checklist of questions (PRC 15023, Appendix G, Section VII, Part f) that includes the following: "Would the project directly or indirectly destroy a unique paleontological resource or site or unique geological feature?"
CEQA does not define "a unique paleontological resource or site." However, the Society of Vertebrate Paleontology (SVP) has provided guidance specifically designed to support state and Federal environmental review. The SVP broadly defines significant paleontological resources as follows (SVP 2010, page 11):

> "Fossils and fossiliferous deposits consisting of identifiable vertebrate fossils, large or small, uncommon invertebrate, plant, and trace fossils, and other data that provide taphonomic, taxonomic, phylogenetic, paleoecologic, stratigraphic, and/or biochronologic information. Paleontological resources are considered to be older than recorded human history and/or older than middle Holocene (i.e., older than about 5,000 radiocarbon years)."

Significant paleontological resources are determined to be fossils or assemblages of fossils that are unique, unusual, rare, diagnostically important, or are common but have the potential to provide valuable scientific information for evaluating evolutionary patterns and processes, or which could improve our understanding of paleochronology,
paleoecology, paleophylogeography, or depositional histories. New or unique specimens can provide new insights into evolutionary history; however, additional specimens of even well represented lineages can be equally important for studying evolutionary pattern and process, evolutionary rates, and paleophylogeography. Even unidentifiable material can provide useful data for dating geologic units if radiometric dating is possible. As such, common fossils (especially vertebrates) may be scientifically important, and therefore considered significant.

California Public Resources Code

Section 5097.5 of the Public Resources Code (PRC) states:

> "No person shall knowingly and willfully excavate upon, or remove, destroy, injure or deface any historic or prehistoric ruins, burial grounds, archaeological or vertebrate paleontological site, including fossilized footprints, inscriptions made by human agency, or any other archaeological, paleontological or historical feature, situated on public lands, except with the express permission of the public agency having jurisdiction over such lands. Violation of this section is a misdemeanor."

As used in this PRC section, "public lands" means lands owned by, or under the jurisdiction of, the state or any city, county, district, authority, or public corporation, or any agency thereof. Consequently, public agencies are required to comply with PRC 5097.5 for their own activities, including construction and maintenance, as well as for permit actions (e.g., encroachment permits) undertaken by others.

LOCAL

Paleontological resources are addressed under the Open Space and Conservation Element OSC-5 of the City of Menifee General Plan, Goal OSC-5, which aims to "protect" cultural resources, including paleontological resources. Specifically, Policy OCS-5.1 mandates that City (2013) "preserve and protect archaeological and historic resources and cultural sites, places, districts, structures, landforms, objects and native burial sites, traditional cultural landscapes and other features, consistent with state law and any laws, regulations or policies which may be adopted by the city to implement this goal and associated policies."

PALEONTOLOGICAL RESOURCE POTENTIAL

Absent specific agency guidelines, most professional paleontologists in California adhere to the guidelines set forth by SVP (2010) to determine the course of paleontological mitigation for a given project. These guidelines establish protocols for the assessment of the paleontological resource potential of underlying geologic units and outline measures to mitigate adverse impacts that could result from project development. Using baseline information gathered during a paleontological resource assessment, the paleontological resource potential of the geologic unit(s) (or members thereof) underlying a Project area can be assigned to one of four categories defined by SVP (2010). These categories include high, undetermined, low and no paleontological resource potential (see Table 1 below):

Table 1
Paleontological Sensitivity Categories

Resource Potential*	Criteria	Mitigation Recommendations
High Potential (sensitivity)	Rock units from which significant vertebrate or significant invertebrate fossils or significant suites of plant fossils have been recovered are considered to have a high potential for containing significant non-renewable fossiliferous resources. These units include but are not limited to, sedimentary formations and some volcanic formations which contain significant nonrenewable paleontological resources anywhere within their geographical extent, and sedimentary rock units temporally or lithologically suitable for the preservation of fossils. Sensitivity comprises both (a) the potential for yielding abundant or significant vertebrate fossils or for yielding a few significant fossils, large or small, vertebrate, invertebrate, or botanical and (b) the importance of recovered evidence for new and significant taxonomic, phylogenetic, ecologic, or stratigraphic data. Areas which contain potentially datable organic remains older than Recent, including deposits associated with nests or middens, and areas which may contain new vertebrate deposits, traces, or trackways are also classified as significant.	Typically, a field survey (dependent on field conditions) as well as onsite construction monitoring will be required. Any significant specimens discovered will need to be prepared, identified, and curated into a museum. A final report documenting the significance of the finds will also be required.
Low Potential (sensitivity)	Sedimentary rock units that are potentially fossiliferous, but have not yielded fossils in the past or contain common and/or widespread invertebrate fossils of well documented and understood taphonomic, phylogenetic species and habitat ecology. Reports in the paleontological literature or field surveys by a	Mitigation is not typically required.

	qualified vertebrate paleontologist may allow determination that some areas or units have low potentials for yielding significant fossils prior to the start of construction. Generally, these units will be poorly represented by specimens in institutional collections and will not require protection or salvage operations. However, as excavation for construction gets underway it is possible that significant and unanticipated paleontological resources might be encountered and require a change of classification from Low to High Potential and, thus, require monitoring and mitigation if the resources are found to be significant.	
Undetermined Potential (sensitivity)	Specific areas underlain by sedimentary rock units for which little information is available are considered to have undetermined fossiliferous potentials. Field surveys by a qualified vertebrate paleontologist to specifically determine the potentials of the rock units are required before programs of impact mitigation for such areas may be developed.	A field survey is required to further assess the unit's paleontological potential.
No Potential	Rock units of metamorphic or igneous origin are commonly classified as having no potential for containing significant paleontological resources.	No mitigation required.

*Adapted from SVP (2010)

METHODS

In order to assess whether or not a particular area has the potential to contain significant fossil resources at the subsurface, it is necessary to review published geologic mapping to determine the geology and stratigraphy of the area. Geologic units are considered to be "sensitive" for paleontological resources if they are known to contain significant fossils anywhere in their extent. Therefore, a search of pertinent local and regional museum repositories for paleontological localities within and nearby the project area is necessary to determine whether or not fossil localities have been previously discovered within a particular rock unit. For this Project, a formal museum records search was conducted at the WSC, and an informal on-line records search was conducted of the University of California Museum of Paleontology (UCMP) at Berkeley, California.

RESOURCE CONTEXT

GEOLOGIC SETTING

The proposed Project area is located within the geologically complex Peninsular Ranges geomorphic province (Morton and Miller 2006). A geomorphic province is a region of unique topography and geology that is distinguished from other regions based on its landforms and diastrophic history. The Peninsular Ranges are a northwest-southeast oriented complex of blocks that extend 125 miles from the Transverse Ranges and Los Angeles Basin to the tip of Baja California. The Peninsular Ranges are bounded to the east by the Colorado Desert and range in width from 30 to 100 miles (Norris and Webb 1976). Structurally the Project area sits on the Perris Block, a relatively stable rectangular structural unit between the Elsinore and San Jacinto fault zones (Morton et al. 2003). The surrounding geology of the Santa Anna Range is

composed of igneous and metasedimentary rocks with an alluvial apron of Quaternary alluvial fan and plain deposits (Morton et al. 2003).

SITE SPECIFIC GEOLOGY AND PALEONTOLOGY

According to published geologic maps, the Project area is underlain by middle to early Pleistocene age very old alluvial channel deposits (Qof_a) that locally consist of moderately to well-indurated, reddish-brown, gravel, sand, silt, and clay (Figure 3). To the southeast of the Project area is an outcropping of Cretaceous age plutonic rocks made up of granodiorite to tonalite (Kdvg) (Morton et al. 2003). Plutonic igneous rocks do not contain fossils due to their high heat of formation deep below the surface of the Earth. However, Pleistocene age alluvial, fluvial and lacustrine deposits have proven to yield scientifically significant paleontological resources throughout southern California from the coastal areas to the inland valleys. Middle to late Pleistocene alluvial sediments in the vicinity of the Project area are potentially highly fossiliferous, and many nearby localities within these deposits have preserved a diverse fossil assemblage of Ice Age fauna (McDonald 2021). To the northeast of the Project near Lakeview, a diverse assemblage of fossil resources have been recovered including *Mammuthus sp.* (mammoth), *Smilodon sp.* (sabre-toothed cat), *Equus sp.* (extinct horse), *Bison sp.* cf. *B. antiquus* (bison), and numerous small mammals, reptiles, invertebrates, and plant remains (Springer et al. 2009). Directly east-southeast of the Project, the largest known open-environment non-asphaltic late Pleistocene fossil assemblage has been documented in Diamond and Domenigoni valleys. Discovered during excavations of the Diamond Valley Lake, this locality has yielded nearly 100,000 identifiable fossils representing over 105 vertebrate, invertebrate, and plant taxa. The vertebrate taxa recovered includes reptiles such as frogs, turtles, and lizards; birds such as robins, swallows, jays, ravens, hawks, and ducks; small mammals such as rabbit, squirrel, mice, and weasels; and large mammals such as fox, bear, coyote, deer, bison, mammoths, mastodons, and ground sloths (Springer et al. 2009). The invertebrate taxa recovered includes ostracodes, snails, termites, slugs, beetles, and bivalves and the plant taxa recovered includes well preserved diatoms, pollen, and wood debris (Springer et al. 2009; Anderson et al. 2002). Finally, southeast of the Project area in the vicinity of Skinner Reservoir fossil remains of *Mammuthus sp.* (mammoth) and *Bison sp.* (bison) have been discovered. These specimens were recovered from within older Quaternary deposits of Pleistocene age.

RECORDS SEARCH RESULTS

The WSC records no fossil localities from within the Project area; however, they note that Pleistocene age deposits underlying the Project area have a well-documented record of yielding abundant fossil resources in southern California including *Mammuthus columbi* (Columbian mammoth), *Mammut pacificus* (Pacific mastodon), *Smilodon fatalis* (sabertooth cat), and *Equus* (ancient horse). An online search of the University of California Museum of Paleontology (UCMP) database revealed 18 Pleistocene age vertebrate fossil localities in Riverside County, of which five are from unnamed Pleistocene age deposits. UCMP RV8601 yielded 10 fossil specimens of unspecified Mammalia (mammal), *Neotoma sp.* (packrat), and *Microtus sp.* (vole). UCMP V7006 yielded a single specimen of *Gopherus sp.* (tortoise) and UCMP V65248 yielded a specimen belonging to *Mammuthus sp.* (mammoth). The remaining two localities reported did not contain specimen data (UCMP 2021).

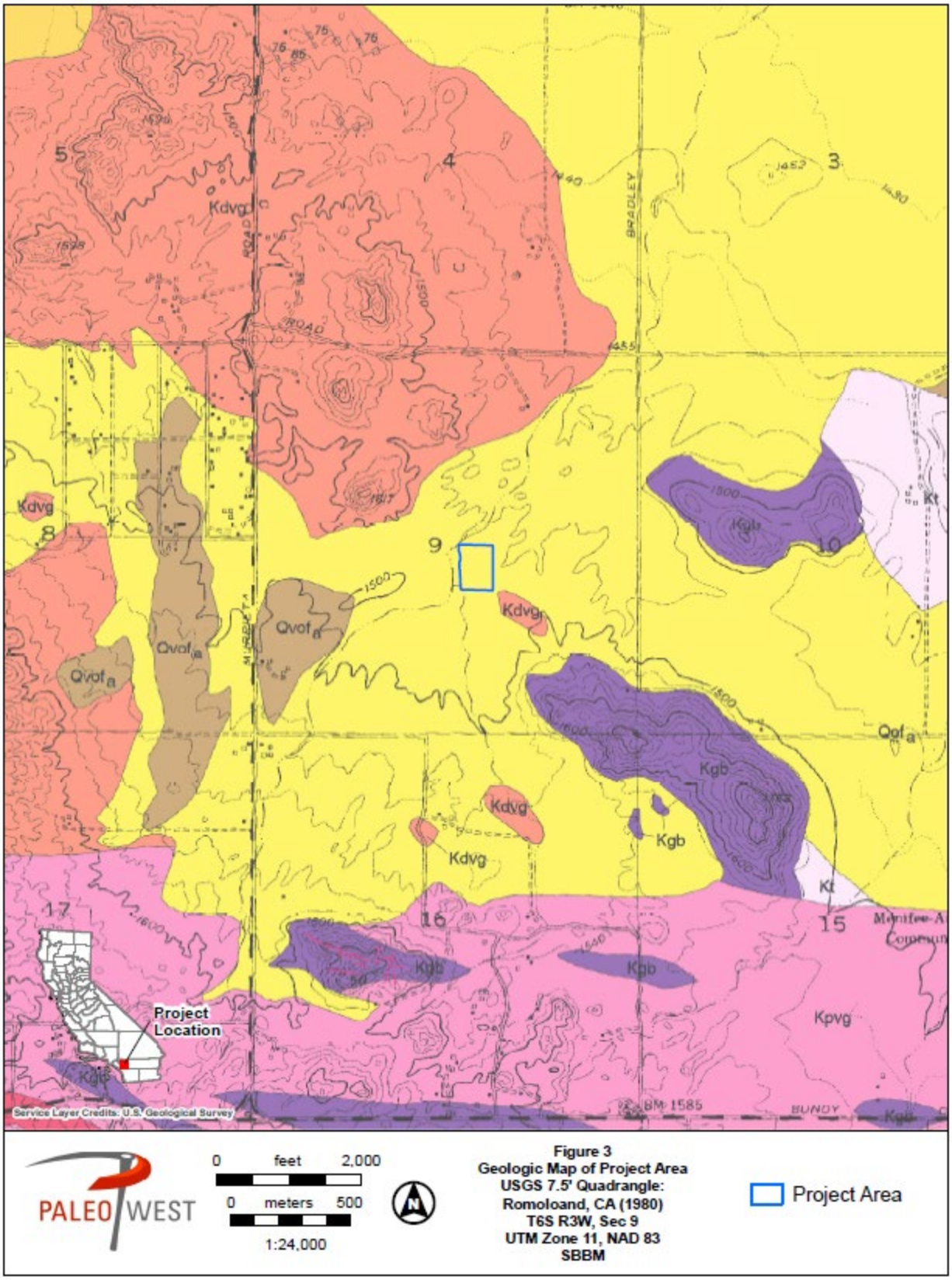


Figure 3. Geologic Map, Qofa = Pleistocene age very old alluvial channel deposits, Kdvg = granodiorite to tonalite

Table 2
Pleistocene Fossil Localities in the Project Vicinity

Locality No.	Geologic Unit	Age	Taxa
WSC N/A	Unknown Formation	Pleistocene	*Mammuthus columbi* (Columbian mammoth), *Mammut pacificus* (Pacific mastodon), *Smilodon fatalis* (sabertooth cat), and *Equus* (ancient horse)
UCMP RV8601	Unknown Formation	Pleistocene	Mammalia (mammal), *Neotoma* sp. (packrat), and *Microtus* sp. (vole)
UCMP V7006	Unknown Formation	Pleistocene	*Gopherus* sp. (tortoise)
UCMP V65248	Unknown Formation	Pleistocene	*Mammuthus* sp. (mammoth)

Sources: McDonald 2021, UCMP online database

FINDINGS

Pleistocene age very old alluvial channel deposits mapped in the Project area are considered to have a high paleontological sensitivity and have proven to yield significant paleontological resources (i.e., identifiable vertebrate fossils). In addition, the Project area is underlain by geologic sediments classified as having a "High-B" potential to contain paleontological resources according to *Figure 4.9.3: Paleontological Sensitivity in Jurupa Valley* (County of Riverside 2015). Consequently, any Project related grading, trenching, or excavations in areas previously undisturbed should be monitored by a qualified paleontological monitor to identify and effectively salvage any recovered resources while minimizing construction delays.

RECOMMENDATIONS

In general, the potential for a given project to result in negative impacts to paleontological resources is directly proportional to the amount of ground disturbance associated with the project; thus, the higher the amount of ground disturbances within geological deposits with a known paleontological sensitivity, the greater the potential for negative impacts to paleontological resources. Since this Project entails excavations for a park new ground disturbances are anticipated. Geologic units in the Project area have a high paleontological sensitivity, with older alluvial fan facies (Qof_a) being highly sensitive. Ground disturbing activities in the Project may result in significant impacts under CEQA to paleontological resources, such as destruction, damage, or loss of scientifically important paleontological resources. A qualified paleontologist should be retained to develop and implement the measures recommended below. These measures have been developed in accordance with SVP guidelines; if implemented, these measures will satisfy the requirements of CEQA.

WORKER'S ENVIRONMENTAL AWARENESS PROGRAM (WEAP)

Prior to the start of the proposed Project activities, all field personnel will receive a worker's environmental awareness training on paleontological resources. The training will provide a

description of the laws and ordinances protecting fossil resources, the types of fossil resources that may be encountered in the Project area, the role of the paleontological monitor, outline steps to follow in the event that a fossil discovery is made, and provide contact information for the Project Paleontologist. The training will be developed by the Project Paleontologist and can be delivered concurrent with other training including cultural, biological, safety, etc.

PALEONTOLOGICAL MITIGATION MONITORING

Prior to the commencement of ground-disturbing activities, a professional paleontologist will be retained to prepare and implement a PRMMP for the proposed Project. The PRMMP will describe the monitoring required during excavations that extend into older Quaternary (Pleistocene) age sediments, and the location of areas deemed to have a high paleontological resource potential. Monitoring will entail the visual inspection of excavated or graded areas and trench sidewalls. If the Project Paleontologist determines full-time monitoring is no longer warranted, based on the geologic conditions at depth, he or she may recommend that monitoring be reduced or cease entirely.

FOSSIL DISCOVERIES

In the event that a paleontological resource is discovered, the monitor will have the authority to temporarily divert the construction equipment around the find until it is assessed for scientific significance and, if appropriate, collected. If the resource is determined to be of scientific significance, the Project Paleontologist shall complete the following:

1. Salvage of Fossils. If fossils are discovered, all work in the immediate vicinity should be halted to allow the paleontological monitor, and/or Project Paleontologist to evaluate the discovery and determine if the fossil may be considered significant. If the fossils are determined to be potentially significant, the Project Paleontologist (or paleontological monitor) should recover them following standard field procedures for collecting paleontological as outlined in the PRMMP prepared for the project. Typically, fossils can be safely salvaged quickly by a single paleontologist and not disrupt construction activity. In some cases, larger fossils (such as complete skeletons or large mammal fossils) require more extensive excavation and longer salvage periods. In this case the paleontologist should have the authority to temporarily direct, divert or halt construction activity to ensure that the fossil(s) can be removed in a safe and timely manner.

2. Fossil Preparation and Curation. The PRMMP will identify the museum that has agreed to accept fossils that may be discovered during project-related excavations. Upon completion of fieldwork, all significant fossils collected will be prepared in a properly equipped laboratory to a point ready for curation. Preparation may include the removal of excess matrix from fossil materials and stabilizing or repairing specimens. During preparation and inventory, the fossils specimens will be identified to the lowest taxonomic level practical prior to curation at an accredited museum. The fossil specimens must be delivered to the accredited museum or repository no later than 90 days after all fieldwork is completed. The cost of curation will be assessed by the repository and will be the responsibility of the client.

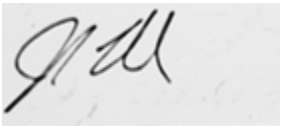
FINAL PALEONTOLOGICAL MITIGATION REPORT

Upon completion of ground disturbing activity (and curation of fossils if necessary) the Project Paleontologist should prepare a final mitigation and monitoring report outlining the results of the mitigation and monitoring program. The report should include discussion of the location, duration and methods of the monitoring, stratigraphic sections, any recovered fossils, and the scientific significance of those fossils, and where fossils were curated.

It has been a pleasure working with you on this Project. If you have any questions, please do not hesitate to contact us.

Sincerely,

PALEOWEST



Joshua Bonde, Ph.D. Senior Paleontologist

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IS/MND Appendix F

Hydrology and Water Quality Reports

Evans Community Park Preliminary Drainage Study

Menifee, California



Prepared November 9, 2021

Prepared By:
CValdo Corporation

CVALDO CORPORATION

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Table of Contents

Purpose of Study 1

Rational Method Hydrologic Modeling 2

Unit Hydrograph Hydrologic Modeling 4

Figures

Figure 1 Vicinity Map

Tables

Table 1 Results of Rational Method Hydrologic Analysis

Appendices

Appendix A Rational Method Hydrology Workmap

Appendix B Rational Method Hydrologic Calculations

Appendix C Unit Hydrograph Hydrologic Workmap

Appendix D Unit Hydrograph Hydrologic Calculations

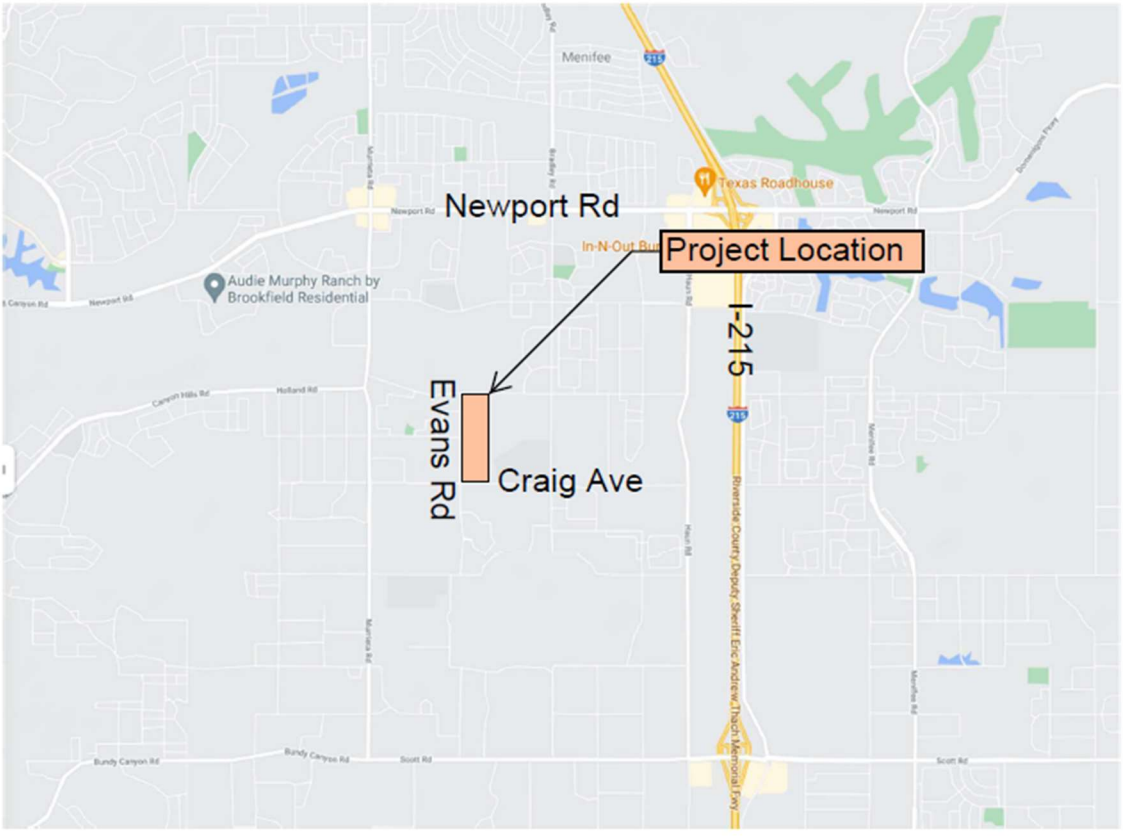
Appendix E Preliminary Site Plan

Appendix F Excerpt from City of Menifee Zoning Map

Purpose of Study

This study presents the preliminary hydrologic analysis for the Evans Community Park project. The study is intended to support the project environmental document and permitting process. The project is located in the city of Menifee, California (see Figure 1 - Vicinity Map below). The 19.6-acre project site is located northeast of the intersection of Evans Road and Craig Avenue. The purpose of this study is to determine the onsite and offsite tributary peak flow rates for the 10- and 100-year storm events, and to establish approximate onsite detention basin sizing should the project be required to mitigate increased runoff for up to the 10-year 24-hour storm event. Note that this increased runoff mitigation may be required considering that there is an existing natural channel downstream (easterly) of the site, which could be susceptible to hydromodification impacts.

Figure 1 - Vicinity Map



Rational Method Hydrologic Modeling

CivilDesign Corporation's rational method modeling software was used in preparing the rational method hydrologic analysis. The hydrologic models were prepared utilizing the methodology contained in the Riverside County Flood Control and Water Conservation District (RCFCWCD) Hydrology Manual (April 1978). A hydrologic workmap is presented in Appendix A and calculations are presented in Appendix B. Note that since there is no drainage pattern indicated on the preliminary site plan, the assumption was made that major flow paths and the node link network do not change in the developed condition. Therefore, the same hydrologic workmap is utilized for both existing and developed conditions.

Ground surface elevations were obtained from from 4-foot contour interval topographic mapping from RCFCWCD dated 08-15-2012. The hydrologic soil groups were obtained from the Natural Resources Conservation Service website. Offsite areas contain mostly soil groups C and D, with smaller portions of group A and B. Onsite soils consists of mostly group C with a small portion of group D.

Runoff coefficients for offsite areas assumed ultimate (built-out) condition land use based on the current City of Menifee Zoning Map (see map excerpt in Appendix F). Runoff coefficients for onsite areas reflect undeveloped land use for the existing condition. In the developed condition the runoff coefficient reflects a range of site ground covers including pavement, turf, and landscaping.

Onsite hydrologic analyses were prepared for the existing and developed condition, while the offsite analysis assumed the built-out watershed condition only. Peak flow rates were calculated at two locations where offsite runoff enters the site (nodes 205 and 212) and at three locations where combined onsite and offsite runoff exits the site (nodes 206, 213, and 216). Runoff also enters the site at a third location (just east of node 214) via a reinforced concrete box culvert (RCB) within Craig Avenue and flows northeasterly through the site within an earthen channel (Evans Road Channel). The

100-year flow rate for the channel through the site of 2093.6 cfs was obtained from Riverside County Flood Control and Water Conservation District Drawing No. 4-1005. Hydrologic modeling nodes and major flow paths are identified on the hydrologic workmap presented in Appendix A. A preliminary site plan provided by Helix Environmental is presented in Appendix E.

Results of the rational method hydrologic modeling are presented in Table 1 below. Onsite drainage systems should be designed to convey the 100-year peak flow rate without adversely impacting site or adjacent improvements. Design for the 10-year peak flow rate may be utilized with approval of the City, provided that conveyance of flows in excess of the 10-year event (up to the 100-year event) do not cause adverse impacts.

Table 1 - Results of Rational Method Hydrologic Analysis

Location	Node	Existing 10-yr Peak Flow Rate (cfs)	Developed 10-yr Peak Flow Rate (cfs)	Existing 100-yr Peak Flow Rate (cfs)	Developed 100-yr Peak Flow Rate (cfs)
West Boundary (Northerly)	205	42.9	42.9	67.5	67.5
North Boundary	206	52.5	52.7	82.1	82.7
West Boundary (Southerly)	212	25.2	25.2	42.2	42.2
Northeast Boundary	213	34.3	35.3	57.2	58.7
Craig Avenue RCB outlet	214	-	-	2,093.6	2,093.6
East Boundary*	216	7.1	6.9	11.2	11.1
East Boundary**	216	-	-	2,104.8	2,104.7

* Value considers onsite runoff only tributary to node 216.

** Value assumes addition of Evans Road Channel discharge plus onsite runoff tributary to node 219. Note 10-year Evans Road Channel discharge not available from facility drawings.

Unit Hydrograph Hydrologic Modeling

Unit hydrograph modeling was performed to establish approximate detention basin sizing should the project be required at the final design phase to mitigate for increased runoff due to development. Increased runoff mitigation may be required for the 2-, 5-, and 10-year, 1-, 3-, 6-, and 24-hour storm events. Where downstream offsite drainage systems are extremely sensitive to increased runoff impacts, mitigation may also be required for the 100-year event. For purposes of this analysis, we are assuming 10-year mitigation would be sufficient. A reasonable approximation of increased runoff basin sizing for preliminary engineering can be achieved by comparing the runoff volume for the 10-year, 24-hour storm event for existing versus developed conditions, and sizing the basin for that volume difference. This analysis is performed using unit hydrograph hydrologic modeling.

CivilDesign Corporation's unit hydrograph modeling software was used in preparing the unit hydrograph analysis. The hydrograph models were prepared utilizing the methodology contained in the Riverside County Flood Control and Water Conservation District (RCFCWCD) Hydrology Manual (April 1978). A hydrologic workmap is presented in Appendix C and calculations are presented in Appendix D. Note that the same hydrologic workmap is used for the existing and developed conditions as drainage areas and flow paths are assumed unchanged based on available site plan information. Results of the preliminary unit hydrograph calculations show that the project detention basin would have to accommodate a volume of approximately 15,792 cubic feet for the central portion of the site to satisfy the increased runoff mitigation requirements (2-, 5-, and 10-year, 1-, 3-, 6-, and 24-hour storm events). For the northerly and southerly portions of the site, the runoff volumes for the existing conditions (native soil and ground cover) are greater than the developed conditions (irrigated and maintained grass with some pavement), therefore there is no minimum basin volume requirement to satisfy the increased runoff mitigation requirements for these cases.

It is worth noting that the project Santa Ana Water Quality Management Plan (WQMP) requires hydromodification mitigation for the 2-year, 24-hour storm event, as well as providing infiltration or treatment for the water quality volume (85% storm event runoff). A reasonable approximation of basin sizing for WQMP preliminary engineering can be achieved by comparing the runoff volume for the 2-year, 24-hour storm event for existing versus developed conditions, and sizing the basin for that volume difference plus the water quality volume.

In cases where the increased runoff mitigation (2-, 5-, and 10-year, 1-, 3-, 6-, and 24-hour storms) is required in addition to the WQMP hydromodification and treatment requirements, the basin must be sized to satisfy all requirements. This process typically involves setting the basin footprint to accommodate the water quality volume and then adjusting the basin depth to ensure mitigation is achieved for each of the increased runoff storm events. A conservative assumption for preliminary engineering is to add the water quality volume to the volume difference between the 10-year, 24-hour storm event for existing versus developed conditions. Assuming a water quality volume of 4,023 cubic feet for the northerly portion of the site, 10,971 cubic feet for the central portion, and 4,112 cubic feet for the southerly portion (see Evans Park Preliminary WQMP), the project water quality / detention basins would have to accommodate volumes of approximately 4,023, 26,763, and 4,112 cubic feet, respectively. Determination of the project increased runoff / hydromodification requirements by the City during the final design phase will dictate the actual basin volume requirements.

APPENDIX A

RATIONAL METHOD HYDROLOGY WORKMAP



CVALDO CORPORATION
CIVIL ENGINEERING
2255 AVENIDA DE LA PLAYA, SUITE 5
LA JOLLA, CA 92037
(P) 858-866-0128

N

0 200' 400'

1 INCH = 100 FT

Note: Drawing will plot to scale if plotted on arch. E sheet

EVANS COMMUNITY PARK
RATIONAL METHOD HYDROLOGY WORKMAP

LEGEND

SUBAREA ACREAGE	(76.4 AC)
NODE NUMBER	[200]
RUNOFF FLOW PATH	----·---·----
WATERSHED BOUNDARY	———

APPENDIX B

RATIONAL METHOD HYDROLOGIC CALCULATIONS

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 11/08/21 File:north10exA.out

Evans Community Park Preliminary Hydrologic Analysis
10-year Existing Condition (Northerly Portion of Site)
Job 21-003
11/8/21

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 4011

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 10.00 Antecedent Moisture Condition = 2

Standard intensity-duration curves data (Plate D-4.1)
For the [Sun City] area used.
10 year storm 10 minute intensity = 2.250(In/Hr)
10 year storm 60 minute intensity = 0.870(In/Hr)
100 year storm 10 minute intensity = 3.360(In/Hr)
100 year storm 60 minute intensity = 1.300(In/Hr)

Storm event year = 10.0
Calculated rainfall intensity data:
1 hour intensity = 0.870(In/Hr)
Slope of intensity duration curve = 0.5300

++
Process from Point/Station 201.000 to Point/Station 202.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 821.000(Ft.)
Top (of initial area) elevation = 1642.000(Ft.)
Bottom (of initial area) elevation = 1540.000(Ft.)
Difference in elevation = 102.000(Ft.)
Slope = 0.12424 s(percent)= 12.42
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 11.780 min.
Rainfall intensity = 2.062(In/Hr) for a 10.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.833

```
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      4.295(CFS)
Total initial stream area =        2.500(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      202.000 to Point/Station      203.000
**** IMPROVED CHANNEL TRAVEL TIME ****
________________________________________________________________________
Upstream point elevation =  1540.000(Ft.)
Downstream point elevation =  1520.000(Ft.)
Channel length thru subarea  =   178.000(Ft.)
Channel base width      =    0.000(Ft.)
Slope or 'Z' of left channel bank =   1.000
Slope or 'Z' of right channel bank =   1.000
Estimated mean flow rate at midpoint of channel =      4.330(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    5.000(Ft.)
Flow(q) thru subarea =      4.330(CFS)
Depth of flow =   0.604(Ft.), Average velocity =  11.865(Ft/s)
Channel flow top width =    1.208(Ft.)
Flow Velocity =   11.86(Ft/s)
Travel time  =    0.25 min.
Time of concentration =   12.03 min.

Sub-Channel No. 1 Critical depth =      1.031(Ft.)
  '     '       '     Critical flow top width =      2.063(Ft.)
  '     '       '     Critical flow velocity=    4.071(Ft/s)
  '     '       '     Critical flow area =      1.063(Sq.Ft)

 Adding area flow to channel
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.747
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
Rainfall intensity =      2.039(In/Hr) for a    10.0 year storm
Subarea runoff =      0.061(CFS) for      0.040(Ac.)
Total runoff =      4.356(CFS)      Total area =       2.540(Ac.)
Depth of flow =   0.605(Ft.), Average velocity =  11.883(Ft/s)

Sub-Channel No. 1 Critical depth =      1.031(Ft.)
  '     '       '     Critical flow top width =      2.063(Ft.)
  '     '       '     Critical flow velocity=    4.096(Ft/s)
  '     '       '     Critical flow area =      1.063(Sq.Ft)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      203.000 to Point/Station      204.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
Top of street segment elevation =  1520.000(Ft.)
End of street segment elevation =  1505.000(Ft.)
Length of street segment  =   827.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  22.000(Ft.)
Distance from crown to crossfall grade break  =  18.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.083
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [1] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =     12.932(CFS)
Depth of flow =   0.578(Ft.), Average velocity =   3.926(Ft/s)
Warning: depth of flow exceeds top of curb
Distance that curb overflow reaches into property =    3.88(Ft.)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  16.246(Ft.)
Flow velocity =   3.93(Ft/s)
Travel time =    3.51 min.     TC =   15.54  min.
 Adding area flow to street
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.780
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.400
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.600
RI index for soil(AMC 2)  =  67.40
Pervious area fraction =  0.500; Impervious fraction =  0.500
Rainfall intensity =      1.780(In/Hr) for a    10.0 year storm
Subarea runoff =     17.086(CFS) for     12.300(Ac.)
Total runoff =     21.442(CFS)      Total area =      14.840(Ac.)
Street flow at end of street =     21.442(CFS)
Half street flow at end of street =     21.442(CFS)
Depth of flow =   0.651(Ft.), Average velocity =   4.255(Ft/s)
Warning: depth of flow exceeds top of curb
Distance that curb overflow reaches into property =    7.55(Ft.)
Flow width (from curb towards crown)=  19.912(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      204.000 to Point/Station      205.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
_____________________________________________________________________________
Upstream point/station elevation =  1505.000(Ft.)
Downstream point/station elevation =  1488.000(Ft.)
Pipe length  =   917.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    21.442(CFS)
Nearest computed pipe diameter  =     21.00(In.)
```

```
Calculated individual pipe flow  =    21.442(CFS)
Normal flow depth in pipe =   17.11(In.)
Flow top width inside pipe =   16.32(In.)
Critical Depth =   19.54(In.)
Pipe flow velocity =     10.23(Ft/s)
Travel time through pipe =    1.49 min.
Time of concentration (TC) =    17.04 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      204.000 to Point/Station      205.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.777
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.240
Decimal fraction soil group C = 0.450
Decimal fraction soil group D = 0.310
RI index for soil(AMC 2)  =  67.74
Pervious area fraction =  0.500; Impervious fraction =  0.500
Time of concentration =    17.04 min.
Rainfall intensity =      1.696(In/Hr) for a    10.0 year storm
Subarea runoff =     21.485(CFS) for     16.300(Ac.)
Total runoff =     42.927(CFS)      Total area =      31.140(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      205.000 to Point/Station      206.000
**** IMPROVED CHANNEL TRAVEL TIME ****
________________________________________________________________________
Upstream point elevation =  1488.000(Ft.)
Downstream point elevation =  1477.000(Ft.)
Channel length thru subarea  =   602.000(Ft.)
Channel base width      =    0.000(Ft.)
Slope or 'Z' of left channel bank =  10.000
Slope or 'Z' of right channel bank =  10.000
Manning's 'N'    = 0.035
Maximum depth of channel  =    5.000(Ft.)
Flow(q) thru subarea =     42.927(CFS)
Depth of flow =   1.068(Ft.), Average velocity =   3.765(Ft/s)
Channel flow top width =   21.357(Ft.)
Flow Velocity =    3.76(Ft/s)
Travel time  =    2.67 min.
Time of concentration =   19.70 min.

Sub-Channel No. 1 Critical depth =      1.031(Ft.)
  '     '       '     Critical flow top width =     20.625(Ft.)
  '     '       '     Critical flow velocity=    4.036(Ft/s)
  '     '       '     Critical flow area =     10.635(Sq.Ft)



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      205.000 to Point/Station      206.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
```

```
Along Main Stream number: 1 in normal stream number 1
Stream flow area =     31.140(Ac.)
Runoff from this stream =     42.927(CFS)
Time of concentration =   19.70 min.
Rainfall intensity =     1.570(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      207.000 to Point/Station      206.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   581.000(Ft.)
Top (of initial area) elevation =  1520.000(Ft.)
Bottom (of initial area) elevation =  1477.000(Ft.)
Difference in elevation =    43.000(Ft.)
Slope =    0.07401  s(percent)=       7.40
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   11.379 min.
Rainfall intensity =      2.100(In/Hr) for a    10.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.782
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.740
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.260
RI index for soil(AMC 2)  =  80.86
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      4.091(CFS)
Total initial stream area =        2.490(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      207.000 to Point/Station      206.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      2.490(Ac.)
Runoff from this stream =      4.091(CFS)
Time of concentration =   11.38 min.
Rainfall intensity =     2.100(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      217.000 to Point/Station      206.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   828.000(Ft.)
Top (of initial area) elevation =  1485.000(Ft.)
Bottom (of initial area) elevation =  1477.000(Ft.)
Difference in elevation =     8.000(Ft.)
Slope =    0.00966  s(percent)=       0.97
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   19.700 min.
Rainfall intensity =      1.570(In/Hr) for a    10.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.791
```

```
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  86.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      6.504(CFS)
Total initial stream area =        5.240(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      217.000 to Point/Station      206.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 3
Stream flow area =      5.240(Ac.)
Runoff from this stream =      6.504(CFS)
Time of concentration =   19.70 min.
Rainfall intensity =     1.570(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1       42.927     19.70                1.570
2        4.091     11.38                2.100
3        6.504     19.70                1.570
Largest stream flow has longer time of concentration
Qp =     42.927 + sum of
        Qb         Ia/Ib
         4.091 *    0.748 =      3.058
        Qb         Ia/Ib
         6.504 *    1.000 =      6.504
Qp =     52.490

Total of 3 streams to confluence:
Flow rates before confluence point:
      42.927       4.091       6.504
Area of streams before confluence:
       31.140        2.490        5.240
Results of confluence:
Total flow rate =     52.490(CFS)
Time of concentration =    19.701 min.
Effective stream area after confluence =     38.870(Ac.)
End of computations, total study area =           38.87 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.632
Area averaged RI index number =  72.3
```

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 11/08/21 File:north10exB.out

Evans Community Park Preliminary Hydrologic Analysis
10-year Existing Condition (Central Portion of Site)
Job 21-003
11/8/21

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 4011

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 10.00 Antecedent Moisture Condition = 2

Standard intensity-duration curves data (Plate D-4.1)
For the [Sun City] area used.
10 year storm 10 minute intensity = 2.250(In/Hr)
10 year storm 60 minute intensity = 0.870(In/Hr)
100 year storm 10 minute intensity = 3.360(In/Hr)
100 year storm 60 minute intensity = 1.300(In/Hr)

Storm event year = 10.0
Calculated rainfall intensity data:
1 hour intensity = 0.870(In/Hr)
Slope of intensity duration curve = 0.5300

++
Process from Point/Station 208.000 to Point/Station 209.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 759.000(Ft.)
Top (of initial area) elevation = 1616.000(Ft.)
Bottom (of initial area) elevation = 1508.000(Ft.)
Difference in elevation = 108.000(Ft.)
Slope = 0.14229 s(percent)= 14.23
TC = k(0.480)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 10.062 min.
Rainfall intensity = 2.241(In/Hr) for a 10.0 year storm
SINGLE FAMILY (1 Acre Lot)
Runoff Coefficient = 0.781

```
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.800; Impervious fraction =  0.200
Initial subarea runoff =      3.010(CFS)
Total initial stream area =        1.720(Ac.)
Pervious area fraction = 0.800


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      209.000 to Point/Station      210.000
**** IMPROVED CHANNEL TRAVEL TIME ****
________________________________________________________________________
Upstream point elevation =  1508.000(Ft.)
Downstream point elevation =  1494.000(Ft.)
Channel length thru subarea  =   332.000(Ft.)
Channel base width      =    0.000(Ft.)
Slope or 'Z' of left channel bank =   1.000
Slope or 'Z' of right channel bank =   1.000
Estimated mean flow rate at midpoint of channel =      4.033(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    5.000(Ft.)
Flow(q) thru subarea =      4.033(CFS)
Depth of flow =   0.707(Ft.), Average velocity =   8.072(Ft/s)
Channel flow top width =    1.414(Ft.)
Flow Velocity =    8.07(Ft/s)
Travel time  =    0.69 min.
Time of concentration =   10.75 min.

Sub-Channel No. 1 Critical depth =      1.000(Ft.)
  '     '       '     Critical flow top width =      2.000(Ft.)
  '     '       '     Critical flow velocity=    4.033(Ft/s)
  '     '       '     Critical flow area =      1.000(Sq.Ft)

 Adding area flow to channel
SINGLE FAMILY (1 Acre Lot)
Runoff Coefficient = 0.561
Decimal fraction soil group A = 0.760
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.240
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  40.88
Pervious area fraction =  0.800; Impervious fraction =  0.200
Rainfall intensity =      2.164(In/Hr) for a    10.0 year storm
Subarea runoff =      1.991(CFS) for      1.640(Ac.)
Total runoff =      5.001(CFS)      Total area =       3.360(Ac.)
Depth of flow =   0.766(Ft.), Average velocity =   8.517(Ft/s)

Sub-Channel No. 1 Critical depth =      1.094(Ft.)
  '     '       '     Critical flow top width =      2.188(Ft.)
  '     '       '     Critical flow velocity=    4.180(Ft/s)
  '     '       '     Critical flow area =      1.196(Sq.Ft)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      210.000 to Point/Station      211.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
Top of street segment elevation =  1494.000(Ft.)
End of street segment elevation =  1486.000(Ft.)
Length of street segment  =  1645.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  22.000(Ft.)
Distance from crown to crossfall grade break  =  18.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.083
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [1] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =     15.115(CFS)
Depth of flow =   0.698(Ft.), Average velocity =   2.351(Ft/s)
Warning: depth of flow exceeds top of curb
Note:  depth of flow exceeds top of street crown.
Distance that curb overflow reaches into property =    9.88(Ft.)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  22.000(Ft.)
Flow velocity =   2.35(Ft/s)
Travel time =   11.66 min.     TC =   22.41  min.
 Adding area flow to street
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.691
Decimal fraction soil group A = 0.480
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.520
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  51.24
Pervious area fraction =  0.500; Impervious fraction =  0.500
Rainfall intensity =      1.466(In/Hr) for a    10.0 year storm
Subarea runoff =     20.168(CFS) for     19.900(Ac.)
Total runoff =     25.169(CFS)      Total area =      23.260(Ac.)
Street flow at end of street =     25.169(CFS)
Half street flow at end of street =     25.169(CFS)
Depth of flow =   0.770(Ft.), Average velocity =   2.878(Ft/s)
Warning: depth of flow exceeds top of curb
Note:  depth of flow exceeds top of street crown.
Distance that curb overflow reaches into property =   13.50(Ft.)
Flow width (from curb towards crown)=  22.000(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      211.000 to Point/Station      212.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
_____________________________________________________________________________
Upstream point/station elevation =  1486.000(Ft.)
Downstream point/station elevation =  1485.000(Ft.)
Pipe length  =   283.00(Ft.)   Manning's N = 0.013
```

```
No. of pipes = 1  Required pipe flow  =    25.169(CFS)
Nearest computed pipe diameter  =     30.00(In.)
Calculated individual pipe flow  =    25.169(CFS)
Normal flow depth in pipe =   25.59(In.)
Flow top width inside pipe =   21.24(In.)
Critical Depth =   20.51(In.)
Pipe flow velocity =      5.65(Ft/s)
Travel time through pipe =    0.84 min.
Time of concentration (TC) =    23.25 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      212.000 to Point/Station      213.000
**** IMPROVED CHANNEL TRAVEL TIME ****
________________________________________________________________________
Upstream point elevation =  1485.000(Ft.)
Downstream point elevation =  1477.000(Ft.)
Channel length thru subarea  =  1145.000(Ft.)
Channel base width      =    0.000(Ft.)
Slope or 'Z' of left channel bank =  10.000
Slope or 'Z' of right channel bank =  10.000
Manning's 'N'    = 0.035
Maximum depth of channel  =    5.000(Ft.)
Flow(q) thru subarea =     25.169(CFS)
Depth of flow =   1.047(Ft.), Average velocity =   2.297(Ft/s)
Channel flow top width =   20.935(Ft.)
Flow Velocity =    2.30(Ft/s)
Travel time  =    8.31 min.
Time of concentration =   31.55 min.

Sub-Channel No. 1 Critical depth =      0.828(Ft.)
  '     '       '     Critical flow top width =     16.563(Ft.)
  '     '       '     Critical flow velocity=    3.670(Ft/s)
  '     '       '     Critical flow area =      6.858(Sq.Ft)



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      212.000 to Point/Station      213.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =     23.260(Ac.)
Runoff from this stream =     25.169(CFS)
Time of concentration =   31.55 min.
Rainfall intensity =     1.223(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      218.000 to Point/Station      219.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   180.000(Ft.)
Top (of initial area) elevation =  1485.000(Ft.)
Bottom (of initial area) elevation =  1482.000(Ft.)
Difference in elevation =     3.000(Ft.)
Slope =    0.01667  s(percent)=       1.67
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TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    9.594 min.
Rainfall intensity =      2.299(In/Hr) for a    10.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.822
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  86.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      0.756(CFS)
Total initial stream area =        0.400(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      219.000 to Point/Station      213.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1482.000(Ft.)
End of natural channel elevation =   1477.000(Ft.)
Length of natural channel  =  1188.000(Ft.)
Estimated mean flow rate at midpoint of channel =      9.092(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   1.58(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
      Normal channel slope =  0.0042
Corrected/adjusted channel slope =  0.0042
Travel time =   12.51 min.     TC =   22.10  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.785
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  86.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.477(In/Hr) for a    10.0 year storm
Subarea runoff =     10.222(CFS) for      8.820(Ac.)
Total runoff =     10.978(CFS)      Total area =       9.220(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      219.000 to Point/Station      213.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      9.220(Ac.)
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```
Runoff from this stream =     10.978(CFS)
Time of concentration =   22.10 min.
Rainfall intensity =     1.477(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                  (In/Hr)


1       25.169     31.55                 1.223
2       10.978     22.10                 1.477
Largest stream flow has longer time of concentration
Qp =     25.169 + sum of
        Qb         Ia/Ib
        10.978 *    0.828 =      9.091
Qp =     34.260

Total of 2 streams to confluence:
Flow rates before confluence point:
      25.169      10.978
Area of streams before confluence:
       23.260        9.220
Results of confluence:
Total flow rate =     34.260(CFS)
Time of concentration =    31.554 min.
Effective stream area after confluence =     32.480(Ac.)
End of computations, total study area =           32.48 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.673
Area averaged RI index number =  61.8
```

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 11/08/21 File:north10exC.out

Evans Community Park Preliminary Hydrologic Analysis
10-year Existing Condition (Southerly Portion of Site)
Job 21-003
11/8/21

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 4011

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 10.00 Antecedent Moisture Condition = 2

Standard intensity-duration curves data (Plate D-4.1)
For the [Sun City] area used.
10 year storm 10 minute intensity = 2.250(In/Hr)
10 year storm 60 minute intensity = 0.870(In/Hr)
100 year storm 10 minute intensity = 3.360(In/Hr)
100 year storm 60 minute intensity = 1.300(In/Hr)

Storm event year = 10.0
Calculated rainfall intensity data:
1 hour intensity = 0.870(In/Hr)
Slope of intensity duration curve = 0.5300

++
Process from Point/Station 214.000 to Point/Station 215.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 269.000(Ft.)
Top (of initial area) elevation = 1480.000(Ft.)
Bottom (of initial area) elevation = 1476.000(Ft.)
Difference in elevation = 4.000(Ft.)
Slope = 0.01487 s(percent)= 1.49
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 11.527 min.
Rainfall intensity = 2.086(In/Hr) for a 10.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.817

```
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.880
Decimal fraction soil group D = 0.120
RI index for soil(AMC 2)  =  86.36
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      1.023(CFS)
Total initial stream area =        0.600(Ac.)
Pervious area fraction = 1.000


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Process from Point/Station      215.000 to Point/Station      216.000
**** IMPROVED CHANNEL TRAVEL TIME ****
________________________________________________________________________
Upstream point elevation =  1476.000(Ft.)
Downstream point elevation =  1473.360(Ft.)
Channel length thru subarea  =   625.000(Ft.)
Channel base width      =    0.000(Ft.)
Slope or 'Z' of left channel bank =   2.000
Slope or 'Z' of right channel bank =   2.000
Estimated mean flow rate at midpoint of channel =      4.095(CFS)
Manning's 'N'    = 0.035
Maximum depth of channel  =    5.000(Ft.)
Flow(q) thru subarea =      4.095(CFS)
Depth of flow =   1.093(Ft.), Average velocity =   1.713(Ft/s)
Channel flow top width =    4.374(Ft.)
Flow Velocity =    1.71(Ft/s)
Travel time  =    6.08 min.
Time of concentration =   17.61 min.

Sub-Channel No. 1 Critical depth =      0.766(Ft.)
  '     '       '     Critical flow top width =      3.063(Ft.)
  '     '       '     Critical flow velocity=    3.493(Ft/s)
  '     '       '     Critical flow area =      1.172(Sq.Ft)

 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.804
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.640
Decimal fraction soil group D = 0.360
RI index for soil(AMC 2)  =  87.08
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.666(In/Hr) for a    10.0 year storm
Subarea runoff =      6.085(CFS) for      4.540(Ac.)
Total runoff =      7.108(CFS)      Total area =       5.140(Ac.)
Depth of flow =   1.345(Ft.), Average velocity =   1.966(Ft/s)

Sub-Channel No. 1 Critical depth =      0.953(Ft.)
  '     '       '     Critical flow top width =      3.813(Ft.)
  '     '       '     Critical flow velocity=    3.912(Ft/s)
  '     '       '     Critical flow area =      1.817(Sq.Ft)

End of computations, total study area =            5.14 (Ac.)
The following figures may
```

be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number = 87.0

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 11/09/21 File:north10devA.out

Evans Community Park Preliminary Hydrologic Analysis
10-year Developed Condition (Northerly Portion of Site)
Job 21-003
11/9/21

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 4011

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 10.00 Antecedent Moisture Condition = 2

Standard intensity-duration curves data (Plate D-4.1)
For the [Sun City] area used.
10 year storm 10 minute intensity = 2.250(In/Hr)
10 year storm 60 minute intensity = 0.870(In/Hr)
100 year storm 10 minute intensity = 3.360(In/Hr)
100 year storm 60 minute intensity = 1.300(In/Hr)

Storm event year = 10.0
Calculated rainfall intensity data:
1 hour intensity = 0.870(In/Hr)
Slope of intensity duration curve = 0.5300

++
Process from Point/Station 201.000 to Point/Station 202.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 821.000(Ft.)
Top (of initial area) elevation = 1642.000(Ft.)
Bottom (of initial area) elevation = 1540.000(Ft.)
Difference in elevation = 102.000(Ft.)
Slope = 0.12424 s(percent)= 12.42
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 11.780 min.
Rainfall intensity = 2.062(In/Hr) for a 10.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.833

```
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      4.295(CFS)
Total initial stream area =        2.500(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      202.000 to Point/Station      203.000
**** IMPROVED CHANNEL TRAVEL TIME ****
________________________________________________________________________
Upstream point elevation =  1540.000(Ft.)
Downstream point elevation =  1520.000(Ft.)
Channel length thru subarea  =   178.000(Ft.)
Channel base width      =    0.000(Ft.)
Slope or 'Z' of left channel bank =   1.000
Slope or 'Z' of right channel bank =   1.000
Estimated mean flow rate at midpoint of channel =      4.330(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    5.000(Ft.)
Flow(q) thru subarea =      4.330(CFS)
Depth of flow =   0.604(Ft.), Average velocity =  11.865(Ft/s)
Channel flow top width =    1.208(Ft.)
Flow Velocity =   11.86(Ft/s)
Travel time  =    0.25 min.
Time of concentration =   12.03 min.

Sub-Channel No. 1 Critical depth =      1.031(Ft.)
  '     '       '     Critical flow top width =      2.063(Ft.)
  '     '       '     Critical flow velocity=    4.071(Ft/s)
  '     '       '     Critical flow area =      1.063(Sq.Ft)

 Adding area flow to channel
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.747
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
Rainfall intensity =      2.039(In/Hr) for a    10.0 year storm
Subarea runoff =      0.061(CFS) for      0.040(Ac.)
Total runoff =      4.356(CFS)      Total area =       2.540(Ac.)
Depth of flow =   0.605(Ft.), Average velocity =  11.883(Ft/s)

Sub-Channel No. 1 Critical depth =      1.031(Ft.)
  '     '       '     Critical flow top width =      2.063(Ft.)
  '     '       '     Critical flow velocity=    4.096(Ft/s)
  '     '       '     Critical flow area =      1.063(Sq.Ft)
```

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Process from Point/Station      203.000 to Point/Station      204.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
Top of street segment elevation =  1520.000(Ft.)
End of street segment elevation =  1505.000(Ft.)
Length of street segment  =   827.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  22.000(Ft.)
Distance from crown to crossfall grade break  =  18.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.083
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [1] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =     12.932(CFS)
Depth of flow =   0.578(Ft.), Average velocity =   3.926(Ft/s)
Warning: depth of flow exceeds top of curb
Distance that curb overflow reaches into property =    3.88(Ft.)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  16.246(Ft.)
Flow velocity =   3.93(Ft/s)
Travel time =    3.51 min.     TC =   15.54  min.
 Adding area flow to street
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.780
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.400
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.600
RI index for soil(AMC 2)  =  67.40
Pervious area fraction =  0.500; Impervious fraction =  0.500
Rainfall intensity =      1.780(In/Hr) for a    10.0 year storm
Subarea runoff =     17.086(CFS) for     12.300(Ac.)
Total runoff =     21.442(CFS)      Total area =      14.840(Ac.)
Street flow at end of street =     21.442(CFS)
Half street flow at end of street =     21.442(CFS)
Depth of flow =   0.651(Ft.), Average velocity =   4.255(Ft/s)
Warning: depth of flow exceeds top of curb
Distance that curb overflow reaches into property =    7.55(Ft.)
Flow width (from curb towards crown)=  19.912(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      204.000 to Point/Station      205.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
_____________________________________________________________________________
Upstream point/station elevation =  1505.000(Ft.)
Downstream point/station elevation =  1488.000(Ft.)
Pipe length  =   917.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    21.442(CFS)
Nearest computed pipe diameter  =     21.00(In.)
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```
Calculated individual pipe flow  =    21.442(CFS)
Normal flow depth in pipe =   17.11(In.)
Flow top width inside pipe =   16.32(In.)
Critical Depth =   19.54(In.)
Pipe flow velocity =     10.23(Ft/s)
Travel time through pipe =    1.49 min.
Time of concentration (TC) =    17.04 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      204.000 to Point/Station      205.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.777
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.240
Decimal fraction soil group C = 0.450
Decimal fraction soil group D = 0.310
RI index for soil(AMC 2)  =  67.74
Pervious area fraction =  0.500; Impervious fraction =  0.500
Time of concentration =    17.04 min.
Rainfall intensity =      1.696(In/Hr) for a    10.0 year storm
Subarea runoff =     21.485(CFS) for     16.300(Ac.)
Total runoff =     42.927(CFS)      Total area =      31.140(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      205.000 to Point/Station      206.000
**** IMPROVED CHANNEL TRAVEL TIME ****
________________________________________________________________________
Upstream point elevation =  1488.000(Ft.)
Downstream point elevation =  1477.000(Ft.)
Channel length thru subarea  =   602.000(Ft.)
Channel base width      =    0.000(Ft.)
Slope or 'Z' of left channel bank =   1.000
Slope or 'Z' of right channel bank =   1.000
Manning's 'N'    = 0.015
Maximum depth of channel  =    5.000(Ft.)
Flow(q) thru subarea =     42.927(CFS)
Depth of flow =   2.007(Ft.), Average velocity =  10.654(Ft/s)
Channel flow top width =    4.014(Ft.)
Flow Velocity =   10.65(Ft/s)
Travel time  =    0.94 min.
Time of concentration =   17.98 min.

Sub-Channel No. 1 Critical depth =      2.578(Ft.)
  '     '       '     Critical flow top width =      5.156(Ft.)
  '     '       '     Critical flow velocity=    6.458(Ft/s)
  '     '       '     Critical flow area =      6.647(Sq.Ft)



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Process from Point/Station      205.000 to Point/Station      206.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
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Along Main Stream number: 1 in normal stream number 1
Stream flow area =     31.140(Ac.)
Runoff from this stream =     42.927(CFS)
Time of concentration =   17.98 min.
Rainfall intensity =     1.648(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      207.000 to Point/Station      206.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   581.000(Ft.)
Top (of initial area) elevation =  1520.000(Ft.)
Bottom (of initial area) elevation =  1477.000(Ft.)
Difference in elevation =    43.000(Ft.)
Slope =    0.07401  s(percent)=       7.40
TC = k(0.390)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.373 min.
Rainfall intensity =      2.471(In/Hr) for a    10.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.784
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.740
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.260
RI index for soil(AMC 2)  =  60.94
Pervious area fraction =  0.500; Impervious fraction =  0.500
Initial subarea runoff =      4.825(CFS)
Total initial stream area =        2.490(Ac.)
Pervious area fraction = 0.500


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      207.000 to Point/Station      206.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      2.490(Ac.)
Runoff from this stream =      4.825(CFS)
Time of concentration =    8.37 min.
Rainfall intensity =     2.471(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      217.000 to Point/Station      206.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   828.000(Ft.)
Top (of initial area) elevation =  1485.000(Ft.)
Bottom (of initial area) elevation =  1477.000(Ft.)
Difference in elevation =     8.000(Ft.)
Slope =    0.00966  s(percent)=       0.97
TC = k(0.480)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   17.842 min.
Rainfall intensity =      1.655(In/Hr) for a    10.0 year storm
USER INPUT of soil data for subarea
Runoff Coefficient = 0.760
```

```
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  77.00
Pervious area fraction =  0.800; Impervious fraction =  0.200
Initial subarea runoff =      6.592(CFS)
Total initial stream area =        5.240(Ac.)
Pervious area fraction = 0.800


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      217.000 to Point/Station      206.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 3
Stream flow area =      5.240(Ac.)
Runoff from this stream =      6.592(CFS)
Time of concentration =   17.84 min.
Rainfall intensity =     1.655(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1       42.927     17.98                1.648
2        4.825      8.37                2.471
3        6.592     17.84                1.655
Largest stream flow has longer time of concentration
Qp =     42.927 + sum of
        Qb         Ia/Ib
         4.825 *    0.667 =      3.218
        Qb         Ia/Ib
         6.592 *    0.996 =      6.565
Qp =     52.711

Total of 3 streams to confluence:
Flow rates before confluence point:
      42.927       4.825       6.592
Area of streams before confluence:
       31.140        2.490        5.240
Results of confluence:
Total flow rate =     52.711(CFS)
Time of concentration =    17.978 min.
Effective stream area after confluence =     38.870(Ac.)
End of computations, total study area =           38.87 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.573
Area averaged RI index number =  69.8
```

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 11/09/21 File:north10devB.out

Evans Community Park Preliminary Hydrologic Analysis
10-year Developed Condition (Central Portion of Site)
Job 21-003
11/9/21

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 4011

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 10.00 Antecedent Moisture Condition = 2

Standard intensity-duration curves data (Plate D-4.1)
For the [Sun City] area used.
10 year storm 10 minute intensity = 2.250(In/Hr)
10 year storm 60 minute intensity = 0.870(In/Hr)
100 year storm 10 minute intensity = 3.360(In/Hr)
100 year storm 60 minute intensity = 1.300(In/Hr)

Storm event year = 10.0
Calculated rainfall intensity data:
1 hour intensity = 0.870(In/Hr)
Slope of intensity duration curve = 0.5300

++
Process from Point/Station 208.000 to Point/Station 209.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 759.000(Ft.)
Top (of initial area) elevation = 1616.000(Ft.)
Bottom (of initial area) elevation = 1508.000(Ft.)
Difference in elevation = 108.000(Ft.)
Slope = 0.14229 s(percent)= 14.23
TC = k(0.480)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 10.062 min.
Rainfall intensity = 2.241(In/Hr) for a 10.0 year storm
SINGLE FAMILY (1 Acre Lot)
Runoff Coefficient = 0.781

```
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.800; Impervious fraction =  0.200
Initial subarea runoff =      3.010(CFS)
Total initial stream area =        1.720(Ac.)
Pervious area fraction = 0.800


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      209.000 to Point/Station      210.000
**** IMPROVED CHANNEL TRAVEL TIME ****
________________________________________________________________________
Upstream point elevation =  1508.000(Ft.)
Downstream point elevation =  1494.000(Ft.)
Channel length thru subarea  =   332.000(Ft.)
Channel base width      =    0.000(Ft.)
Slope or 'Z' of left channel bank =   1.000
Slope or 'Z' of right channel bank =   1.000
Estimated mean flow rate at midpoint of channel =      4.033(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    5.000(Ft.)
Flow(q) thru subarea =      4.033(CFS)
Depth of flow =   0.707(Ft.), Average velocity =   8.072(Ft/s)
Channel flow top width =    1.414(Ft.)
Flow Velocity =    8.07(Ft/s)
Travel time  =    0.69 min.
Time of concentration =   10.75 min.

Sub-Channel No. 1 Critical depth =      1.000(Ft.)
  '     '       '     Critical flow top width =      2.000(Ft.)
  '     '       '     Critical flow velocity=    4.033(Ft/s)
  '     '       '     Critical flow area =      1.000(Sq.Ft)

 Adding area flow to channel
SINGLE FAMILY (1 Acre Lot)
Runoff Coefficient = 0.561
Decimal fraction soil group A = 0.760
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.240
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  40.88
Pervious area fraction =  0.800; Impervious fraction =  0.200
Rainfall intensity =      2.164(In/Hr) for a    10.0 year storm
Subarea runoff =      1.991(CFS) for      1.640(Ac.)
Total runoff =      5.001(CFS)      Total area =       3.360(Ac.)
Depth of flow =   0.766(Ft.), Average velocity =   8.517(Ft/s)

Sub-Channel No. 1 Critical depth =      1.094(Ft.)
  '     '       '     Critical flow top width =      2.188(Ft.)
  '     '       '     Critical flow velocity=    4.180(Ft/s)
  '     '       '     Critical flow area =      1.196(Sq.Ft)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      210.000 to Point/Station      211.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
Top of street segment elevation =  1494.000(Ft.)
End of street segment elevation =  1486.000(Ft.)
Length of street segment  =  1645.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  22.000(Ft.)
Distance from crown to crossfall grade break  =  18.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.083
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [1] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =     15.115(CFS)
Depth of flow =   0.698(Ft.), Average velocity =   2.351(Ft/s)
Warning: depth of flow exceeds top of curb
Note:  depth of flow exceeds top of street crown.
Distance that curb overflow reaches into property =    9.88(Ft.)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  22.000(Ft.)
Flow velocity =   2.35(Ft/s)
Travel time =   11.66 min.     TC =   22.41  min.
 Adding area flow to street
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.691
Decimal fraction soil group A = 0.480
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.520
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  51.24
Pervious area fraction =  0.500; Impervious fraction =  0.500
Rainfall intensity =      1.466(In/Hr) for a    10.0 year storm
Subarea runoff =     20.168(CFS) for     19.900(Ac.)
Total runoff =     25.169(CFS)      Total area =      23.260(Ac.)
Street flow at end of street =     25.169(CFS)
Half street flow at end of street =     25.169(CFS)
Depth of flow =   0.770(Ft.), Average velocity =   2.878(Ft/s)
Warning: depth of flow exceeds top of curb
Note:  depth of flow exceeds top of street crown.
Distance that curb overflow reaches into property =   13.50(Ft.)
Flow width (from curb towards crown)=  22.000(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      211.000 to Point/Station      212.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
_____________________________________________________________________________
Upstream point/station elevation =  1486.000(Ft.)
Downstream point/station elevation =  1485.000(Ft.)
Pipe length  =   283.00(Ft.)   Manning's N = 0.013
```

```
No. of pipes = 1  Required pipe flow  =    25.169(CFS)
Nearest computed pipe diameter  =     30.00(In.)
Calculated individual pipe flow  =    25.169(CFS)
Normal flow depth in pipe =   25.59(In.)
Flow top width inside pipe =   21.24(In.)
Critical Depth =   20.51(In.)
Pipe flow velocity =      5.65(Ft/s)
Travel time through pipe =    0.84 min.
Time of concentration (TC) =    23.25 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      212.000 to Point/Station      213.000
**** IMPROVED CHANNEL TRAVEL TIME ****
________________________________________________________________________
Upstream point elevation =  1485.000(Ft.)
Downstream point elevation =  1477.000(Ft.)
Channel length thru subarea  =  1145.000(Ft.)
Channel base width      =    0.000(Ft.)
Slope or 'Z' of left channel bank =   1.000
Slope or 'Z' of right channel bank =   1.000
Manning's 'N'    = 0.015
Maximum depth of channel  =    5.000(Ft.)
Flow(q) thru subarea =     25.169(CFS)
Depth of flow =   1.968(Ft.), Average velocity =   6.501(Ft/s)
Channel flow top width =    3.935(Ft.)
Flow Velocity =    6.50(Ft/s)
Travel time  =    2.94 min.
Time of concentration =   26.18 min.

Sub-Channel No. 1 Critical depth =      2.078(Ft.)
  '     '       '     Critical flow top width =      4.156(Ft.)
  '     '       '     Critical flow velocity=    5.828(Ft/s)
  '     '       '     Critical flow area =      4.319(Sq.Ft)



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      212.000 to Point/Station      213.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =     23.260(Ac.)
Runoff from this stream =     25.169(CFS)
Time of concentration =   26.18 min.
Rainfall intensity =     1.350(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      218.000 to Point/Station      219.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   180.000(Ft.)
Top (of initial area) elevation =  1485.000(Ft.)
Bottom (of initial area) elevation =  1482.000(Ft.)
Difference in elevation =     3.000(Ft.)
Slope =    0.01667  s(percent)=       1.67
```

```
TC = k(0.390)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    7.060 min.
Rainfall intensity =      2.704(In/Hr) for a    10.0 year storm
USER INPUT of soil data for subarea
Runoff Coefficient = 0.818
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  69.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
Initial subarea runoff =      0.885(CFS)
Total initial stream area =        0.400(Ac.)
Pervious area fraction = 0.500


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      219.000 to Point/Station      213.000
**** IMPROVED CHANNEL TRAVEL TIME ****
________________________________________________________________________
Upstream point elevation =  1482.000(Ft.)
Downstream point elevation =  1477.000(Ft.)
Channel length thru subarea  =  1188.000(Ft.)
Channel base width      =    0.000(Ft.)
Slope or 'Z' of left channel bank =   1.000
Slope or 'Z' of right channel bank =   1.000
Estimated mean flow rate at midpoint of channel =      8.114(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    5.000(Ft.)
Flow(q) thru subarea =      8.114(CFS)
Depth of flow =   1.415(Ft.), Average velocity =   4.051(Ft/s)
Channel flow top width =    2.831(Ft.)
Flow Velocity =    4.05(Ft/s)
Travel time  =    4.89 min.
Time of concentration =   11.95 min.

Sub-Channel No. 1 Critical depth =      1.328(Ft.)
  '     '       '     Critical flow top width =      2.656(Ft.)
  '     '       '     Critical flow velocity=    4.600(Ft/s)
  '     '       '     Critical flow area =      1.764(Sq.Ft)

 Adding area flow to channel
USER INPUT of soil data for subarea
Runoff Coefficient = 0.798
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  69.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
Rainfall intensity =      2.046(In/Hr) for a    10.0 year storm
Subarea runoff =     14.405(CFS) for      8.820(Ac.)
Total runoff =     15.290(CFS)      Total area =       9.220(Ac.)
Depth of flow =   1.795(Ft.), Average velocity =   4.746(Ft/s)

Sub-Channel No. 1 Critical depth =      1.703(Ft.)
  '     '       '     Critical flow top width =      3.406(Ft.)
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  '     '       '     Critical flow velocity=    5.271(Ft/s)
  '     '       '     Critical flow area =      2.901(Sq.Ft)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      219.000 to Point/Station      213.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      9.220(Ac.)
Runoff from this stream =     15.290(CFS)
Time of concentration =   11.95 min.
Rainfall intensity =     2.046(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1       25.169     26.18                1.350
2       15.290     11.95                2.046
Largest stream flow has longer time of concentration
Qp =     25.169 + sum of
        Qb         Ia/Ib
        15.290 *    0.660 =     10.088
Qp =     35.257

Total of 2 streams to confluence:
Flow rates before confluence point:
      25.169      15.290
Area of streams before confluence:
       23.260        9.220
Results of confluence:
Total flow rate =     35.257(CFS)
Time of concentration =    26.182 min.
Effective stream area after confluence =     32.480(Ac.)
End of computations, total study area =           32.48 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.531
Area averaged RI index number =  57.0
```

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 11/09/21 File:north10devC.out

Evans Community Park Preliminary Hydrologic Analysis
10-year Developed Condition (Southerly Portion of Site)
Job 21-003
11/9/21

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 4011

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 10.00 Antecedent Moisture Condition = 2

Standard intensity-duration curves data (Plate D-4.1)
For the [Sun City] area used.
10 year storm 10 minute intensity = 2.250(In/Hr)
10 year storm 60 minute intensity = 0.870(In/Hr)
100 year storm 10 minute intensity = 3.360(In/Hr)
100 year storm 60 minute intensity = 1.300(In/Hr)

Storm event year = 10.0
Calculated rainfall intensity data:
1 hour intensity = 0.870(In/Hr)
Slope of intensity duration curve = 0.5300

++
Process from Point/Station 214.000 to Point/Station 215.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 269.000(Ft.)
Top (of initial area) elevation = 1480.000(Ft.)
Bottom (of initial area) elevation = 1476.000(Ft.)
Difference in elevation = 4.000(Ft.)
Slope = 0.01487 s(percent)= 1.49
TC = k(0.480)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 10.440 min.
Rainfall intensity = 2.198(In/Hr) for a 10.0 year storm
USER INPUT of soil data for subarea
Runoff Coefficient = 0.779

```
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.880
Decimal fraction soil group D = 0.120
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.800; Impervious fraction =  0.200
Initial subarea runoff =      1.027(CFS)
Total initial stream area =        0.600(Ac.)
Pervious area fraction = 0.800


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      215.000 to Point/Station      216.000
**** IMPROVED CHANNEL TRAVEL TIME ****
________________________________________________________________________
Upstream point elevation =  1476.000(Ft.)
Downstream point elevation =  1473.360(Ft.)
Channel length thru subarea  =   625.000(Ft.)
Channel base width      =    0.000(Ft.)
Slope or 'Z' of left channel bank =   2.000
Slope or 'Z' of right channel bank =   2.000
Estimated mean flow rate at midpoint of channel =      4.001(CFS)
Manning's 'N'    = 0.035
Maximum depth of channel  =    5.000(Ft.)
Flow(q) thru subarea =      4.001(CFS)
Depth of flow =   1.084(Ft.), Average velocity =   1.703(Ft/s)
Channel flow top width =    4.336(Ft.)
Flow Velocity =    1.70(Ft/s)
Travel time  =    6.12 min.
Time of concentration =   16.56 min.

Sub-Channel No. 1 Critical depth =      0.758(Ft.)
  '     '       '     Critical flow top width =      3.031(Ft.)
  '     '       '     Critical flow velocity=    3.484(Ft/s)
  '     '       '     Critical flow area =      1.149(Sq.Ft)

 Adding area flow to channel
USER INPUT of soil data for subarea
Runoff Coefficient = 0.752
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.640
Decimal fraction soil group D = 0.360
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.800; Impervious fraction =  0.200
Rainfall intensity =      1.721(In/Hr) for a    10.0 year storm
Subarea runoff =      5.879(CFS) for      4.540(Ac.)
Total runoff =      6.906(CFS)      Total area =       5.140(Ac.)
Depth of flow =   1.330(Ft.), Average velocity =   1.952(Ft/s)

Sub-Channel No. 1 Critical depth =      0.945(Ft.)
  '     '       '     Critical flow top width =      3.781(Ft.)
  '     '       '     Critical flow velocity=    3.864(Ft/s)
  '     '       '     Critical flow area =      1.787(Sq.Ft)

End of computations, total study area =            5.14 (Ac.)
The following figures may
```

be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.800
Area averaged RI index number = 75.0

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 11/08/21 File:north100exA.out

Evans Community Park Preliminary Hydrologic Analysis
100-year Existing Condition (Northerly Portion of Site)
Job 21-003
11/8/21

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 4011

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 2

Standard intensity-duration curves data (Plate D-4.1)
For the [Sun City] area used.
10 year storm 10 minute intensity = 2.250(In/Hr)
10 year storm 60 minute intensity = 0.870(In/Hr)
100 year storm 10 minute intensity = 3.360(In/Hr)
100 year storm 60 minute intensity = 1.300(In/Hr)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.300(In/Hr)
Slope of intensity duration curve = 0.5300

++
Process from Point/Station 201.000 to Point/Station 202.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 821.000(Ft.)
Top (of initial area) elevation = 1642.000(Ft.)
Bottom (of initial area) elevation = 1540.000(Ft.)
Difference in elevation = 102.000(Ft.)
Slope = 0.12424 s(percent)= 12.42
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 11.780 min.
Rainfall intensity = 3.081(In/Hr) for a 100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.854

```
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      6.580(CFS)
Total initial stream area =        2.500(Ac.)
Pervious area fraction = 1.000


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Process from Point/Station      202.000 to Point/Station      203.000
**** IMPROVED CHANNEL TRAVEL TIME ****
________________________________________________________________________
Upstream point elevation =  1540.000(Ft.)
Downstream point elevation =  1520.000(Ft.)
Channel length thru subarea  =   178.000(Ft.)
Channel base width      =    0.000(Ft.)
Slope or 'Z' of left channel bank =   1.000
Slope or 'Z' of right channel bank =   1.000
Estimated mean flow rate at midpoint of channel =      6.632(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    5.000(Ft.)
Flow(q) thru subarea =      6.632(CFS)
Depth of flow =   0.709(Ft.), Average velocity =  13.200(Ft/s)
Channel flow top width =    1.418(Ft.)
Flow Velocity =   13.20(Ft/s)
Travel time  =    0.22 min.
Time of concentration =   12.01 min.

Sub-Channel No. 1 Critical depth =      1.219(Ft.)
  '     '       '     Critical flow top width =      2.438(Ft.)
  '     '       '     Critical flow velocity=    4.465(Ft/s)
  '     '       '     Critical flow area =      1.485(Sq.Ft)

 Adding area flow to channel
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.785
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
Rainfall intensity =      3.050(In/Hr) for a   100.0 year storm
Subarea runoff =      0.096(CFS) for      0.040(Ac.)
Total runoff =      6.675(CFS)      Total area =       2.540(Ac.)
Depth of flow =   0.711(Ft.), Average velocity =  13.221(Ft/s)

Sub-Channel No. 1 Critical depth =      1.227(Ft.)
  '     '       '     Critical flow top width =      2.453(Ft.)
  '     '       '     Critical flow velocity=    4.437(Ft/s)
  '     '       '     Critical flow area =      1.504(Sq.Ft)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      203.000 to Point/Station      204.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
Top of street segment elevation =  1520.000(Ft.)
End of street segment elevation =  1505.000(Ft.)
Length of street segment  =   827.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  22.000(Ft.)
Distance from crown to crossfall grade break  =  18.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.083
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [1] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =     20.137(CFS)
Depth of flow =   0.642(Ft.), Average velocity =   4.206(Ft/s)
Warning: depth of flow exceeds top of curb
Distance that curb overflow reaches into property =    7.08(Ft.)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  19.446(Ft.)
Flow velocity =   4.21(Ft/s)
Travel time =    3.28 min.     TC =   15.28  min.
 Adding area flow to street
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.813
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.400
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.600
RI index for soil(AMC 2)  =  67.40
Pervious area fraction =  0.500; Impervious fraction =  0.500
Rainfall intensity =      2.684(In/Hr) for a   100.0 year storm
Subarea runoff =     26.832(CFS) for     12.300(Ac.)
Total runoff =     33.507(CFS)      Total area =      14.840(Ac.)
Street flow at end of street =     33.507(CFS)
Half street flow at end of street =     33.507(CFS)
Depth of flow =   0.715(Ft.), Average velocity =   4.790(Ft/s)
Warning: depth of flow exceeds top of curb
Note:  depth of flow exceeds top of street crown.
Distance that curb overflow reaches into property =   10.76(Ft.)
Flow width (from curb towards crown)=  22.000(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      204.000 to Point/Station      205.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
_____________________________________________________________________________
Upstream point/station elevation =  1505.000(Ft.)
Downstream point/station elevation =  1488.000(Ft.)
Pipe length  =   917.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    33.507(CFS)
```

```
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    33.507(CFS)
Normal flow depth in pipe =   18.19(In.)
Flow top width inside pipe =   25.32(In.)
Critical Depth =   23.77(In.)
Pipe flow velocity =     11.77(Ft/s)
Travel time through pipe =    1.30 min.
Time of concentration (TC) =    16.58 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      204.000 to Point/Station      205.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.811
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.240
Decimal fraction soil group C = 0.450
Decimal fraction soil group D = 0.310
RI index for soil(AMC 2)  =  67.74
Pervious area fraction =  0.500; Impervious fraction =  0.500
Time of concentration =    16.58 min.
Rainfall intensity =      2.570(In/Hr) for a   100.0 year storm
Subarea runoff =     33.971(CFS) for     16.300(Ac.)
Total runoff =     67.478(CFS)      Total area =      31.140(Ac.)


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Process from Point/Station      205.000 to Point/Station      206.000
**** IMPROVED CHANNEL TRAVEL TIME ****
________________________________________________________________________
Upstream point elevation =  1488.000(Ft.)
Downstream point elevation =  1477.000(Ft.)
Channel length thru subarea  =   602.000(Ft.)
Channel base width      =    0.000(Ft.)
Slope or 'Z' of left channel bank =  10.000
Slope or 'Z' of right channel bank =  10.000
Manning's 'N'    = 0.035
Maximum depth of channel  =    5.000(Ft.)
Flow(q) thru subarea =     67.478(CFS)
Depth of flow =   1.265(Ft.), Average velocity =   4.215(Ft/s)
Channel flow top width =   25.304(Ft.)
Flow Velocity =    4.22(Ft/s)
Travel time  =    2.38 min.
Time of concentration =   18.96 min.

Sub-Channel No. 1 Critical depth =      1.234(Ft.)
  '     '       '     Critical flow top width =     24.688(Ft.)
  '     '       '     Critical flow velocity=    4.429(Ft/s)
  '     '       '     Critical flow area =     15.237(Sq.Ft)



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Process from Point/Station      205.000 to Point/Station      206.000
**** CONFLUENCE OF MINOR STREAMS ****
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_____________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =     31.140(Ac.)
Runoff from this stream =     67.478(CFS)
Time of concentration =   18.96 min.
Rainfall intensity =     2.394(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      207.000 to Point/Station      206.000
**** INITIAL AREA EVALUATION ****
_____________________________________________________________________
Initial area flow distance =   581.000(Ft.)
Top (of initial area) elevation =  1520.000(Ft.)
Bottom (of initial area) elevation =  1477.000(Ft.)
Difference in elevation =    43.000(Ft.)
Slope =    0.07401  s(percent)=       7.40
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   11.379 min.
Rainfall intensity =      3.138(In/Hr) for a   100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.818
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.740
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.260
RI index for soil(AMC 2)  =  80.86
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      6.389(CFS)
Total initial stream area =        2.490(Ac.)
Pervious area fraction = 1.000


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Process from Point/Station      207.000 to Point/Station      206.000
**** CONFLUENCE OF MINOR STREAMS ****
_____________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      2.490(Ac.)
Runoff from this stream =      6.389(CFS)
Time of concentration =   11.38 min.
Rainfall intensity =     3.138(In/Hr)


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Process from Point/Station      217.000 to Point/Station      206.000
**** INITIAL AREA EVALUATION ****
_____________________________________________________________________
Initial area flow distance =   828.000(Ft.)
Top (of initial area) elevation =  1485.000(Ft.)
Bottom (of initial area) elevation =  1477.000(Ft.)
Difference in elevation =     8.000(Ft.)
Slope =    0.00966  s(percent)=       0.97
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   19.700 min.
Rainfall intensity =      2.346(In/Hr) for a   100.0 year storm
UNDEVELOPED (poor cover) subarea
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```
Runoff Coefficient = 0.824
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  86.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =     10.126(CFS)
Total initial stream area =        5.240(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      217.000 to Point/Station      206.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 3
Stream flow area =      5.240(Ac.)
Runoff from this stream =     10.126(CFS)
Time of concentration =   19.70 min.
Rainfall intensity =     2.346(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1       67.478     18.96                2.394
2        6.389     11.38                3.138
3       10.126     19.70                2.346
Largest stream flow has longer or shorter time of concentration
Qp =     67.478 + sum of
        Qb         Ia/Ib
         6.389 *    0.763 =      4.874
        Qa          Tb/Ta
        10.126 *    0.962 =      9.746
Qp =     82.098

Total of 3 streams to confluence:
Flow rates before confluence point:
      67.478       6.389      10.126
Area of streams before confluence:
       31.140        2.490        5.240
Results of confluence:
Total flow rate =     82.098(CFS)
Time of concentration =    18.961 min.
Effective stream area after confluence =     38.870(Ac.)
End of computations, total study area =           38.87 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.632
Area averaged RI index number =  72.3
```

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 11/08/21 File:north100exB.out

Evans Community Park Preliminary Hydrologic Analysis
100-year Existing Condition (Central Portion of Site)
Job 21-003
11/8/21

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 4011

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 2

Standard intensity-duration curves data (Plate D-4.1)
For the [Sun City] area used.
10 year storm 10 minute intensity = 2.250(In/Hr)
10 year storm 60 minute intensity = 0.870(In/Hr)
100 year storm 10 minute intensity = 3.360(In/Hr)
100 year storm 60 minute intensity = 1.300(In/Hr)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.300(In/Hr)
Slope of intensity duration curve = 0.5300

++
Process from Point/Station 208.000 to Point/Station 209.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 759.000(Ft.)
Top (of initial area) elevation = 1616.000(Ft.)
Bottom (of initial area) elevation = 1508.000(Ft.)
Difference in elevation = 108.000(Ft.)
Slope = 0.14229 s(percent)= 14.23
TC = k(0.480)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 10.062 min.
Rainfall intensity = 3.349(In/Hr) for a 100.0 year storm
SINGLE FAMILY (1 Acre Lot)
Runoff Coefficient = 0.816

```
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.800; Impervious fraction =  0.200
Initial subarea runoff =      4.699(CFS)
Total initial stream area =        1.720(Ac.)
Pervious area fraction = 0.800


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Process from Point/Station      209.000 to Point/Station      210.000
**** IMPROVED CHANNEL TRAVEL TIME ****
________________________________________________________________________
Upstream point elevation =  1508.000(Ft.)
Downstream point elevation =  1494.000(Ft.)
Channel length thru subarea  =   332.000(Ft.)
Channel base width      =    0.000(Ft.)
Slope or 'Z' of left channel bank =   1.000
Slope or 'Z' of right channel bank =   1.000
Estimated mean flow rate at midpoint of channel =      6.415(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    5.000(Ft.)
Flow(q) thru subarea =      6.415(CFS)
Depth of flow =   0.841(Ft.), Average velocity =   9.065(Ft/s)
Channel flow top width =    1.683(Ft.)
Flow Velocity =    9.06(Ft/s)
Travel time  =    0.61 min.
Time of concentration =   10.67 min.

Sub-Channel No. 1 Critical depth =      1.203(Ft.)
  '     '       '     Critical flow top width =      2.406(Ft.)
  '     '       '     Critical flow velocity=    4.432(Ft/s)
  '     '       '     Critical flow area =      1.448(Sq.Ft)

 Adding area flow to channel
SINGLE FAMILY (1 Acre Lot)
Runoff Coefficient = 0.632
Decimal fraction soil group A = 0.760
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.240
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  40.88
Pervious area fraction =  0.800; Impervious fraction =  0.200
Rainfall intensity =      3.246(In/Hr) for a   100.0 year storm
Subarea runoff =      3.363(CFS) for      1.640(Ac.)
Total runoff =      8.062(CFS)      Total area =       3.360(Ac.)
Depth of flow =   0.917(Ft.), Average velocity =   9.597(Ft/s)

Sub-Channel No. 1 Critical depth =      1.320(Ft.)
  '     '       '     Critical flow top width =      2.641(Ft.)
  '     '       '     Critical flow velocity=    4.624(Ft/s)
  '     '       '     Critical flow area =      1.743(Sq.Ft)
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Process from Point/Station      210.000 to Point/Station      211.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
Top of street segment elevation =  1494.000(Ft.)
End of street segment elevation =  1486.000(Ft.)
Length of street segment  =  1645.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  22.000(Ft.)
Distance from crown to crossfall grade break  =  18.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.083
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [1] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =     25.166(CFS)
Depth of flow =   0.770(Ft.), Average velocity =   2.878(Ft/s)
Warning: depth of flow exceeds top of curb
Note:  depth of flow exceeds top of street crown.
Distance that curb overflow reaches into property =   13.50(Ft.)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  22.000(Ft.)
Flow velocity =   2.88(Ft/s)
Travel time =    9.53 min.     TC =   20.20  min.
 Adding area flow to street
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.741
Decimal fraction soil group A = 0.480
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.520
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  51.24
Pervious area fraction =  0.500; Impervious fraction =  0.500
Rainfall intensity =      2.315(In/Hr) for a   100.0 year storm
Subarea runoff =     34.121(CFS) for     19.900(Ac.)
Total runoff =     42.183(CFS)      Total area =      23.260(Ac.)
Street flow at end of street =     42.183(CFS)
Half street flow at end of street =     42.183(CFS)
Depth of flow =   0.869(Ft.), Average velocity =   3.539(Ft/s)
Warning: depth of flow exceeds top of curb
Note:  depth of flow exceeds top of street crown.
Distance that curb overflow reaches into property =   18.46(Ft.)
Flow width (from curb towards crown)=  22.000(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      211.000 to Point/Station      212.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
_____________________________________________________________________________
Upstream point/station elevation =  1486.000(Ft.)
Downstream point/station elevation =  1485.000(Ft.)
Pipe length  =   283.00(Ft.)   Manning's N = 0.013
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No. of pipes = 1  Required pipe flow  =    42.183(CFS)
Nearest computed pipe diameter  =     36.00(In.)
Calculated individual pipe flow  =    42.183(CFS)
Normal flow depth in pipe =   32.25(In.)
Flow top width inside pipe =   21.99(In.)
Critical Depth =   25.40(In.)
Pipe flow velocity =      6.32(Ft/s)
Travel time through pipe =    0.75 min.
Time of concentration (TC) =    20.95 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      212.000 to Point/Station      213.000
**** IMPROVED CHANNEL TRAVEL TIME ****
______________________________________________________________________________
Upstream point elevation =  1485.000(Ft.)
Downstream point elevation =  1477.000(Ft.)
Channel length thru subarea  =  1145.000(Ft.)
Channel base width      =    0.000(Ft.)
Slope or 'Z' of left channel bank =  10.000
Slope or 'Z' of right channel bank =  10.000
Manning's 'N'    = 0.035
Maximum depth of channel  =    5.000(Ft.)
Flow(q) thru subarea =     42.183(CFS)
Depth of flow =   1.270(Ft.), Average velocity =   2.614(Ft/s)
Channel flow top width =   25.408(Ft.)
Flow Velocity =    2.61(Ft/s)
Travel time  =    7.30 min.
Time of concentration =   28.25 min.

Sub-Channel No. 1 Critical depth =      1.023(Ft.)
  '     '       '     Critical flow top width =     20.469(Ft.)
  '     '       '     Critical flow velocity=    4.027(Ft/s)
  '     '       '     Critical flow area =     10.474(Sq.Ft)



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      212.000 to Point/Station      213.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =     23.260(Ac.)
Runoff from this stream =     42.183(CFS)
Time of concentration =   28.25 min.
Rainfall intensity =     1.938(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      218.000 to Point/Station      219.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   180.000(Ft.)
Top (of initial area) elevation =  1485.000(Ft.)
Bottom (of initial area) elevation =  1482.000(Ft.)
Difference in elevation =     3.000(Ft.)
Slope =    0.01667  s(percent)=       1.67
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```
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    9.594 min.
Rainfall intensity =      3.435(In/Hr) for a   100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.847
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  86.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      1.163(CFS)
Total initial stream area =        0.400(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      219.000 to Point/Station      213.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1482.000(Ft.)
End of natural channel elevation =   1477.000(Ft.)
Length of natural channel  =  1188.000(Ft.)
Estimated mean flow rate at midpoint of channel =     13.985(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   1.77(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
      Normal channel slope =  0.0042
Corrected/adjusted channel slope =  0.0042
Travel time =   11.20 min.     TC =   20.80  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.822
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  86.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.279(In/Hr) for a   100.0 year storm
Subarea runoff =     16.521(CFS) for      8.820(Ac.)
Total runoff =     17.684(CFS)      Total area =       9.220(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      219.000 to Point/Station      213.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      9.220(Ac.)
```

Runoff from this stream = 17.684(CFS)
Time of concentration = 20.80 min.
Rainfall intensity = 2.279(In/Hr)
Summary of stream data:

Stream No.	Flow rate (CFS)	TC (min)	Rainfall Intensity (In/Hr)
1	42.183	28.25	1.938
2	17.684	20.80	2.279

Largest stream flow has longer time of concentration
Qp = 42.183 + sum of
Qb Ia/Ib
17.684 * 0.850 = 15.035
Qp = 57.218

Total of 2 streams to confluence:
Flow rates before confluence point:
42.183 17.684
Area of streams before confluence:
23.260 9.220
Results of confluence:
Total flow rate = 57.218(CFS)
Time of concentration = 28.247 min.
Effective stream area after confluence = 32.480(Ac.)
End of computations, total study area = 32.48 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.673
Area averaged RI index number = 61.8

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 11/08/21 File:north100exC.out

Evans Community Park Preliminary Hydrologic Analysis
100-year Existing Condition (Southerly Portion of Site)
Job 21-003
11/8/21

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 4011

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 2

Standard intensity-duration curves data (Plate D-4.1)
For the [Sun City] area used.
10 year storm 10 minute intensity = 2.250(In/Hr)
10 year storm 60 minute intensity = 0.870(In/Hr)
100 year storm 10 minute intensity = 3.360(In/Hr)
100 year storm 60 minute intensity = 1.300(In/Hr)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.300(In/Hr)
Slope of intensity duration curve = 0.5300

++
Process from Point/Station 214.000 to Point/Station 215.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 269.000(Ft.)
Top (of initial area) elevation = 1480.000(Ft.)
Bottom (of initial area) elevation = 1476.000(Ft.)
Difference in elevation = 4.000(Ft.)
Slope = 0.01487 s(percent)= 1.49
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 11.527 min.
Rainfall intensity = 3.116(In/Hr) for a 100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.843

```
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.880
Decimal fraction soil group D = 0.120
RI index for soil(AMC 2)  =  86.36
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      1.576(CFS)
Total initial stream area =        0.600(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      215.000 to Point/Station      216.000
**** IMPROVED CHANNEL TRAVEL TIME ****
________________________________________________________________________
Upstream point elevation =  1476.000(Ft.)
Downstream point elevation =  1473.360(Ft.)
Channel length thru subarea  =   625.000(Ft.)
Channel base width      =    0.000(Ft.)
Slope or 'Z' of left channel bank =   2.000
Slope or 'Z' of right channel bank =   2.000
Estimated mean flow rate at midpoint of channel =      6.431(CFS)
Manning's 'N'    = 0.035
Maximum depth of channel  =    5.000(Ft.)
Flow(q) thru subarea =      6.431(CFS)
Depth of flow =   1.295(Ft.), Average velocity =   1.917(Ft/s)
Channel flow top width =    5.180(Ft.)
Flow Velocity =    1.92(Ft/s)
Travel time  =    5.43 min.
Time of concentration =   16.96 min.

Sub-Channel No. 1 Critical depth =      0.914(Ft.)
  '     '       '     Critical flow top width =      3.656(Ft.)
  '     '       '     Critical flow velocity=    3.848(Ft/s)
  '     '       '     Critical flow area =      1.671(Sq.Ft)

 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.835
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.640
Decimal fraction soil group D = 0.360
RI index for soil(AMC 2)  =  87.08
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.540(In/Hr) for a   100.0 year storm
Subarea runoff =      9.627(CFS) for      4.540(Ac.)
Total runoff =     11.203(CFS)      Total area =       5.140(Ac.)
Depth of flow =   1.595(Ft.), Average velocity =   2.203(Ft/s)

Sub-Channel No. 1 Critical depth =      1.141(Ft.)
  '     '       '     Critical flow top width =      4.563(Ft.)
  '     '       '     Critical flow velocity=    4.306(Ft/s)
  '     '       '     Critical flow area =      2.602(Sq.Ft)

End of computations, total study area =            5.14 (Ac.)
The following figures may
```

be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number = 87.0

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 11/09/21 File:north100devA.out

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Evans Community Park Preliminary Hydrologic Analysis
100-year Developed Condition (Northerly Portion of Site)
Job 21-003
11/9/21

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 4011

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 2

Standard intensity-duration curves data (Plate D-4.1)
For the [Sun City] area used.
10 year storm 10 minute intensity = 2.250(In/Hr)
10 year storm 60 minute intensity = 0.870(In/Hr)
100 year storm 10 minute intensity = 3.360(In/Hr)
100 year storm 60 minute intensity = 1.300(In/Hr)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.300(In/Hr)
Slope of intensity duration curve = 0.5300

++
Process from Point/Station 201.000 to Point/Station 202.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 821.000(Ft.)
Top (of initial area) elevation = 1642.000(Ft.)
Bottom (of initial area) elevation = 1540.000(Ft.)
Difference in elevation = 102.000(Ft.)
Slope = 0.12424 s(percent)= 12.42
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 11.780 min.
Rainfall intensity = 3.081(In/Hr) for a 100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.854

```
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      6.580(CFS)
Total initial stream area =        2.500(Ac.)
Pervious area fraction = 1.000


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Process from Point/Station      202.000 to Point/Station      203.000
**** IMPROVED CHANNEL TRAVEL TIME ****
________________________________________________________________________
Upstream point elevation =  1540.000(Ft.)
Downstream point elevation =  1520.000(Ft.)
Channel length thru subarea  =   178.000(Ft.)
Channel base width      =    0.000(Ft.)
Slope or 'Z' of left channel bank =   1.000
Slope or 'Z' of right channel bank =   1.000
Estimated mean flow rate at midpoint of channel =      6.632(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    5.000(Ft.)
Flow(q) thru subarea =      6.632(CFS)
Depth of flow =   0.709(Ft.), Average velocity =  13.200(Ft/s)
Channel flow top width =    1.418(Ft.)
Flow Velocity =   13.20(Ft/s)
Travel time  =    0.22 min.
Time of concentration =   12.01 min.

Sub-Channel No. 1 Critical depth =      1.219(Ft.)
  '     '       '     Critical flow top width =      2.438(Ft.)
  '     '       '     Critical flow velocity=    4.465(Ft/s)
  '     '       '     Critical flow area =      1.485(Sq.Ft)

 Adding area flow to channel
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.785
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
Rainfall intensity =      3.050(In/Hr) for a   100.0 year storm
Subarea runoff =      0.096(CFS) for      0.040(Ac.)
Total runoff =      6.675(CFS)      Total area =       2.540(Ac.)
Depth of flow =   0.711(Ft.), Average velocity =  13.221(Ft/s)

Sub-Channel No. 1 Critical depth =      1.227(Ft.)
  '     '       '     Critical flow top width =      2.453(Ft.)
  '     '       '     Critical flow velocity=    4.437(Ft/s)
  '     '       '     Critical flow area =      1.504(Sq.Ft)
```

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Process from Point/Station      203.000 to Point/Station      204.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
Top of street segment elevation =  1520.000(Ft.)
End of street segment elevation =  1505.000(Ft.)
Length of street segment  =   827.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  22.000(Ft.)
Distance from crown to crossfall grade break  =  18.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.083
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [1] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =     20.137(CFS)
Depth of flow =   0.642(Ft.), Average velocity =   4.206(Ft/s)
Warning: depth of flow exceeds top of curb
Distance that curb overflow reaches into property =    7.08(Ft.)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  19.446(Ft.)
Flow velocity =   4.21(Ft/s)
Travel time =    3.28 min.     TC =   15.28  min.
 Adding area flow to street
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.813
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.400
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.600
RI index for soil(AMC 2)  =  67.40
Pervious area fraction =  0.500; Impervious fraction =  0.500
Rainfall intensity =      2.684(In/Hr) for a   100.0 year storm
Subarea runoff =     26.832(CFS) for     12.300(Ac.)
Total runoff =     33.507(CFS)      Total area =      14.840(Ac.)
Street flow at end of street =     33.507(CFS)
Half street flow at end of street =     33.507(CFS)
Depth of flow =   0.715(Ft.), Average velocity =   4.790(Ft/s)
Warning: depth of flow exceeds top of curb
Note:  depth of flow exceeds top of street crown.
Distance that curb overflow reaches into property =   10.76(Ft.)
Flow width (from curb towards crown)=  22.000(Ft.)


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Process from Point/Station      204.000 to Point/Station      205.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
_____________________________________________________________________________
Upstream point/station elevation =  1505.000(Ft.)
Downstream point/station elevation =  1488.000(Ft.)
Pipe length  =   917.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    33.507(CFS)
```

```
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    33.507(CFS)
Normal flow depth in pipe =   18.19(In.)
Flow top width inside pipe =   25.32(In.)
Critical Depth =   23.77(In.)
Pipe flow velocity =     11.77(Ft/s)
Travel time through pipe =    1.30 min.
Time of concentration (TC) =    16.58 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      204.000 to Point/Station      205.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.811
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.240
Decimal fraction soil group C = 0.450
Decimal fraction soil group D = 0.310
RI index for soil(AMC 2)  =  67.74
Pervious area fraction =  0.500; Impervious fraction =  0.500
Time of concentration =    16.58 min.
Rainfall intensity =      2.570(In/Hr) for a   100.0 year storm
Subarea runoff =     33.971(CFS) for     16.300(Ac.)
Total runoff =     67.478(CFS)      Total area =      31.140(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      205.000 to Point/Station      206.000
**** IMPROVED CHANNEL TRAVEL TIME ****
________________________________________________________________________
Upstream point elevation =  1488.000(Ft.)
Downstream point elevation =  1477.000(Ft.)
Channel length thru subarea  =   602.000(Ft.)
Channel base width      =    0.000(Ft.)
Slope or 'Z' of left channel bank =   1.000
Slope or 'Z' of right channel bank =   1.000
Manning's 'N'    = 0.015
Maximum depth of channel  =    5.000(Ft.)
Flow(q) thru subarea =     67.478(CFS)
Depth of flow =   2.378(Ft.), Average velocity =  11.930(Ft/s)
Channel flow top width =    4.757(Ft.)
Flow Velocity =   11.93(Ft/s)
Travel time  =    0.84 min.
Time of concentration =   17.42 min.

Sub-Channel No. 1 Critical depth =      3.094(Ft.)
  '     '       '     Critical flow top width =      6.188(Ft.)
  '     '       '     Critical flow velocity=    7.050(Ft/s)
  '     '       '     Critical flow area =      9.571(Sq.Ft)



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Process from Point/Station      205.000 to Point/Station      206.000
**** CONFLUENCE OF MINOR STREAMS ****
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_____________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =     31.140(Ac.)
Runoff from this stream =     67.478(CFS)
Time of concentration =   17.42 min.
Rainfall intensity =     2.504(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      207.000 to Point/Station      206.000
**** INITIAL AREA EVALUATION ****
_____________________________________________________________________
Initial area flow distance =   581.000(Ft.)
Top (of initial area) elevation =  1520.000(Ft.)
Bottom (of initial area) elevation =  1477.000(Ft.)
Difference in elevation =    43.000(Ft.)
Slope =    0.07401  s(percent)=       7.40
TC = k(0.390)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.373 min.
Rainfall intensity =      3.692(In/Hr) for a   100.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.815
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.740
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.260
RI index for soil(AMC 2)  =  60.94
Pervious area fraction =  0.500; Impervious fraction =  0.500
Initial subarea runoff =      7.496(CFS)
Total initial stream area =        2.490(Ac.)
Pervious area fraction = 0.500


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      207.000 to Point/Station      206.000
**** CONFLUENCE OF MINOR STREAMS ****
_____________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      2.490(Ac.)
Runoff from this stream =      7.496(CFS)
Time of concentration =    8.37 min.
Rainfall intensity =     3.692(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      217.000 to Point/Station      206.000
**** INITIAL AREA EVALUATION ****
_____________________________________________________________________
Initial area flow distance =   828.000(Ft.)
Top (of initial area) elevation =  1485.000(Ft.)
Bottom (of initial area) elevation =  1477.000(Ft.)
Difference in elevation =     8.000(Ft.)
Slope =    0.00966  s(percent)=       0.97
TC = k(0.480)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   17.842 min.
Rainfall intensity =      2.472(In/Hr) for a   100.0 year storm
USER INPUT of soil data for subarea
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Runoff Coefficient = 0.800
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  77.00
Pervious area fraction =  0.800; Impervious fraction =  0.200
Initial subarea runoff =     10.365(CFS)
Total initial stream area =        5.240(Ac.)
Pervious area fraction = 0.800


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      217.000 to Point/Station      206.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 3
Stream flow area =      5.240(Ac.)
Runoff from this stream =     10.365(CFS)
Time of concentration =   17.84 min.
Rainfall intensity =     2.472(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1       67.478     17.42                2.504
2        7.496      8.37                3.692
3       10.365     17.84                2.472
Largest stream flow has longer or shorter time of concentration
Qp =     67.478 + sum of
        Qb         Ia/Ib
         7.496 *    0.678 =      5.084
        Qa          Tb/Ta
        10.365 *    0.976 =     10.121
Qp =     82.682

Total of 3 streams to confluence:
Flow rates before confluence point:
      67.478       7.496      10.365
Area of streams before confluence:
       31.140        2.490        5.240
Results of confluence:
Total flow rate =     82.682(CFS)
Time of concentration =    17.422 min.
Effective stream area after confluence =     38.870(Ac.)
End of computations, total study area =           38.87 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.573
Area averaged RI index number =  69.8
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Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 11/09/21 File:north100devB.out

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Evans Community Park Preliminary Hydrologic Analysis
100-year Developed Condition (Central Portion of Site)
Job 21-003
11/9/21

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 4011

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 2

Standard intensity-duration curves data (Plate D-4.1)
For the [Sun City] area used.
10 year storm 10 minute intensity = 2.250(In/Hr)
10 year storm 60 minute intensity = 0.870(In/Hr)
100 year storm 10 minute intensity = 3.360(In/Hr)
100 year storm 60 minute intensity = 1.300(In/Hr)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.300(In/Hr)
Slope of intensity duration curve = 0.5300

++
Process from Point/Station 208.000 to Point/Station 209.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 759.000(Ft.)
Top (of initial area) elevation = 1616.000(Ft.)
Bottom (of initial area) elevation = 1508.000(Ft.)
Difference in elevation = 108.000(Ft.)
Slope = 0.14229 s(percent)= 14.23
TC = k(0.480)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 10.062 min.
Rainfall intensity = 3.349(In/Hr) for a 100.0 year storm
SINGLE FAMILY (1 Acre Lot)
Runoff Coefficient = 0.816

```
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.800; Impervious fraction =  0.200
Initial subarea runoff =      4.699(CFS)
Total initial stream area =        1.720(Ac.)
Pervious area fraction = 0.800


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      209.000 to Point/Station      210.000
**** IMPROVED CHANNEL TRAVEL TIME ****
________________________________________________________________________
Upstream point elevation =  1508.000(Ft.)
Downstream point elevation =  1494.000(Ft.)
Channel length thru subarea  =   332.000(Ft.)
Channel base width      =    0.000(Ft.)
Slope or 'Z' of left channel bank =   1.000
Slope or 'Z' of right channel bank =   1.000
Estimated mean flow rate at midpoint of channel =      6.415(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    5.000(Ft.)
Flow(q) thru subarea =      6.415(CFS)
Depth of flow =   0.841(Ft.), Average velocity =   9.065(Ft/s)
Channel flow top width =    1.683(Ft.)
Flow Velocity =    9.06(Ft/s)
Travel time  =    0.61 min.
Time of concentration =   10.67 min.

Sub-Channel No. 1 Critical depth =      1.203(Ft.)
  '     '       '     Critical flow top width =      2.406(Ft.)
  '     '       '     Critical flow velocity=    4.432(Ft/s)
  '     '       '     Critical flow area =      1.448(Sq.Ft)

 Adding area flow to channel
SINGLE FAMILY (1 Acre Lot)
Runoff Coefficient = 0.632
Decimal fraction soil group A = 0.760
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.240
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  40.88
Pervious area fraction =  0.800; Impervious fraction =  0.200
Rainfall intensity =      3.246(In/Hr) for a   100.0 year storm
Subarea runoff =      3.363(CFS) for      1.640(Ac.)
Total runoff =      8.062(CFS)      Total area =       3.360(Ac.)
Depth of flow =   0.917(Ft.), Average velocity =   9.597(Ft/s)

Sub-Channel No. 1 Critical depth =      1.320(Ft.)
  '     '       '     Critical flow top width =      2.641(Ft.)
  '     '       '     Critical flow velocity=    4.624(Ft/s)
  '     '       '     Critical flow area =      1.743(Sq.Ft)
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Process from Point/Station      210.000 to Point/Station      211.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
Top of street segment elevation =  1494.000(Ft.)
End of street segment elevation =  1486.000(Ft.)
Length of street segment  =  1645.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  22.000(Ft.)
Distance from crown to crossfall grade break  =  18.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.083
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [1] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =     25.166(CFS)
Depth of flow =   0.770(Ft.), Average velocity =   2.878(Ft/s)
Warning: depth of flow exceeds top of curb
Note:  depth of flow exceeds top of street crown.
Distance that curb overflow reaches into property =   13.50(Ft.)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  22.000(Ft.)
Flow velocity =   2.88(Ft/s)
Travel time =    9.53 min.     TC =   20.20  min.
 Adding area flow to street
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.741
Decimal fraction soil group A = 0.480
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.520
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  51.24
Pervious area fraction =  0.500; Impervious fraction =  0.500
Rainfall intensity =      2.315(In/Hr) for a   100.0 year storm
Subarea runoff =     34.121(CFS) for     19.900(Ac.)
Total runoff =     42.183(CFS)      Total area =      23.260(Ac.)
Street flow at end of street =     42.183(CFS)
Half street flow at end of street =     42.183(CFS)
Depth of flow =   0.869(Ft.), Average velocity =   3.539(Ft/s)
Warning: depth of flow exceeds top of curb
Note:  depth of flow exceeds top of street crown.
Distance that curb overflow reaches into property =   18.46(Ft.)
Flow width (from curb towards crown)=  22.000(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      211.000 to Point/Station      212.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
_____________________________________________________________________________
Upstream point/station elevation =  1486.000(Ft.)
Downstream point/station elevation =  1485.000(Ft.)
Pipe length  =   283.00(Ft.)   Manning's N = 0.013
```

```
No. of pipes = 1  Required pipe flow  =    42.183(CFS)
Nearest computed pipe diameter  =     36.00(In.)
Calculated individual pipe flow  =    42.183(CFS)
Normal flow depth in pipe =   32.25(In.)
Flow top width inside pipe =   21.99(In.)
Critical Depth =   25.40(In.)
Pipe flow velocity =      6.32(Ft/s)
Travel time through pipe =    0.75 min.
Time of concentration (TC) =    20.95 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      212.000 to Point/Station      213.000
**** IMPROVED CHANNEL TRAVEL TIME ****
________________________________________________________________________
Upstream point elevation =  1485.000(Ft.)
Downstream point elevation =  1477.000(Ft.)
Channel length thru subarea  =  1145.000(Ft.)
Channel base width      =    0.000(Ft.)
Slope or 'Z' of left channel bank =   1.000
Slope or 'Z' of right channel bank =   1.000
Manning's 'N'    = 0.015
Maximum depth of channel  =    5.000(Ft.)
Flow(q) thru subarea =     42.183(CFS)
Depth of flow =   2.388(Ft.), Average velocity =   7.397(Ft/s)
Channel flow top width =    4.776(Ft.)
Flow Velocity =    7.40(Ft/s)
Travel time  =    2.58 min.
Time of concentration =   23.53 min.

Sub-Channel No. 1 Critical depth =      2.563(Ft.)
  '     '       '     Critical flow top width =      5.125(Ft.)
  '     '       '     Critical flow velocity=    6.424(Ft/s)
  '     '       '     Critical flow area =      6.566(Sq.Ft)



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      212.000 to Point/Station      213.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =     23.260(Ac.)
Runoff from this stream =     42.183(CFS)
Time of concentration =   23.53 min.
Rainfall intensity =     2.135(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      218.000 to Point/Station      219.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   180.000(Ft.)
Top (of initial area) elevation =  1485.000(Ft.)
Bottom (of initial area) elevation =  1482.000(Ft.)
Difference in elevation =     3.000(Ft.)
Slope =    0.01667  s(percent)=       1.67
```

```
TC = k(0.390)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    7.060 min.
Rainfall intensity =      4.041(In/Hr) for a   100.0 year storm
USER INPUT of soil data for subarea
Runoff Coefficient = 0.842
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  69.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
Initial subarea runoff =      1.361(CFS)
Total initial stream area =        0.400(Ac.)
Pervious area fraction = 0.500


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      219.000 to Point/Station      213.000
**** IMPROVED CHANNEL TRAVEL TIME ****
________________________________________________________________________
Upstream point elevation =  1482.000(Ft.)
Downstream point elevation =  1477.000(Ft.)
Channel length thru subarea  =  1188.000(Ft.)
Channel base width      =    0.000(Ft.)
Slope or 'Z' of left channel bank =   1.000
Slope or 'Z' of right channel bank =   1.000
Estimated mean flow rate at midpoint of channel =     12.830(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    5.000(Ft.)
Flow(q) thru subarea =     12.830(CFS)
Depth of flow =   1.681(Ft.), Average velocity =   4.542(Ft/s)
Channel flow top width =    3.361(Ft.)
Flow Velocity =    4.54(Ft/s)
Travel time  =    4.36 min.
Time of concentration =   11.42 min.

Sub-Channel No. 1 Critical depth =      1.594(Ft.)
  '     '       '     Critical flow top width =      3.188(Ft.)
  '     '       '     Critical flow velocity=    5.051(Ft/s)
  '     '       '     Critical flow area =      2.540(Sq.Ft)

 Adding area flow to channel
USER INPUT of soil data for subarea
Runoff Coefficient = 0.828
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  69.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
Rainfall intensity =      3.132(In/Hr) for a   100.0 year storm
Subarea runoff =     22.866(CFS) for      8.820(Ac.)
Total runoff =     24.227(CFS)      Total area =       9.220(Ac.)
Depth of flow =   2.133(Ft.), Average velocity =   5.325(Ft/s)

Sub-Channel No. 1 Critical depth =      2.047(Ft.)
  '     '       '     Critical flow top width =      4.094(Ft.)
```

```
  '     '       '     Critical flow velocity=    5.783(Ft/s)
  '     '       '     Critical flow area =      4.190(Sq.Ft)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      219.000 to Point/Station      213.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      9.220(Ac.)
Runoff from this stream =     24.227(CFS)
Time of concentration =   11.42 min.
Rainfall intensity =     3.132(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1       42.183     23.53                2.135
2       24.227     11.42                3.132
Largest stream flow has longer time of concentration
Qp =     42.183 + sum of
        Qb         Ia/Ib
        24.227 *    0.682 =     16.517
Qp =     58.699

Total of 2 streams to confluence:
Flow rates before confluence point:
      42.183      24.227
Area of streams before confluence:
       23.260        9.220
Results of confluence:
Total flow rate =     58.699(CFS)
Time of concentration =    23.526 min.
Effective stream area after confluence =     32.480(Ac.)
End of computations, total study area =           32.48 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.531
Area averaged RI index number =  57.0
```

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 11/09/21 File:north100devC.out

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Evans Community Park Preliminary Hydrologic Analysis
100-year Developed Condition (Southerly Portion of Site)
Job 21-003
11/9/21

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 4011

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 2

Standard intensity-duration curves data (Plate D-4.1)
For the [Sun City] area used.
10 year storm 10 minute intensity = 2.250(In/Hr)
10 year storm 60 minute intensity = 0.870(In/Hr)
100 year storm 10 minute intensity = 3.360(In/Hr)
100 year storm 60 minute intensity = 1.300(In/Hr)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.300(In/Hr)
Slope of intensity duration curve = 0.5300

++
Process from Point/Station 214.000 to Point/Station 215.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 269.000(Ft.)
Top (of initial area) elevation = 1480.000(Ft.)
Bottom (of initial area) elevation = 1476.000(Ft.)
Difference in elevation = 4.000(Ft.)
Slope = 0.01487 s(percent)= 1.49
TC = k(0.480)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 10.440 min.
Rainfall intensity = 3.284(In/Hr) for a 100.0 year storm
USER INPUT of soil data for subarea
Runoff Coefficient = 0.814

```
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.880
Decimal fraction soil group D = 0.120
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.800; Impervious fraction =  0.200
Initial subarea runoff =      1.604(CFS)
Total initial stream area =        0.600(Ac.)
Pervious area fraction = 0.800


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      215.000 to Point/Station      216.000
**** IMPROVED CHANNEL TRAVEL TIME ****
________________________________________________________________________
Upstream point elevation =  1476.000(Ft.)
Downstream point elevation =  1473.360(Ft.)
Channel length thru subarea  =   625.000(Ft.)
Channel base width      =    0.000(Ft.)
Slope or 'Z' of left channel bank =   2.000
Slope or 'Z' of right channel bank =   2.000
Estimated mean flow rate at midpoint of channel =      6.403(CFS)
Manning's 'N'    = 0.035
Maximum depth of channel  =    5.000(Ft.)
Flow(q) thru subarea =      6.403(CFS)
Depth of flow =   1.293(Ft.), Average velocity =   1.915(Ft/s)
Channel flow top width =    5.172(Ft.)
Flow Velocity =    1.92(Ft/s)
Travel time  =    5.44 min.
Time of concentration =   15.88 min.

Sub-Channel No. 1 Critical depth =      0.914(Ft.)
  '     '       '     Critical flow top width =      3.656(Ft.)
  '     '       '     Critical flow velocity=    3.832(Ft/s)
  '     '       '     Critical flow area =      1.671(Sq.Ft)

 Adding area flow to channel
USER INPUT of soil data for subarea
Runoff Coefficient = 0.796
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.640
Decimal fraction soil group D = 0.360
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.800; Impervious fraction =  0.200
Rainfall intensity =      2.630(In/Hr) for a   100.0 year storm
Subarea runoff =      9.503(CFS) for      4.540(Ac.)
Total runoff =     11.107(CFS)      Total area =       5.140(Ac.)
Depth of flow =   1.590(Ft.), Average velocity =   2.198(Ft/s)

Sub-Channel No. 1 Critical depth =      1.141(Ft.)
  '     '       '     Critical flow top width =      4.563(Ft.)
  '     '       '     Critical flow velocity=    4.269(Ft/s)
  '     '       '     Critical flow area =      2.602(Sq.Ft)

End of computations, total study area =            5.14 (Ac.)
The following figures may
```

be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.800
Area averaged RI index number = 75.0

APPENDIX C

UNIT HYDROGRAPH HYDROLOGIC WORKMAP



CVALDO CORPORATION
CIVIL ENGINEERING
2255 AVENIDA DE LA PLAYA, SUITE 5
LA JOLLA, CA 92037
(P) 858-866-0128

N

0 100' 200'

1 INCH = 50 FT

Note: Drawing will plot to scale if plotted on arch. E sheet

EVANS COMMUNITY PARK
UNIT HYDROGRAPH HYDROLOGY WORKMAP

LEGEND

SUBAREA ACREAGE	(76.4 AC)
WATERSHED CENTROID	◓
NODE NUMBER	[200]
RUNOFF FLOW PATH	- - - -
WATERSHED BOUNDARY	———

APPENDIX D

UNIT HYDROGRAPH HYDROLOGIC CALCULATIONS

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2008, Version 8.1
Study date 11/05/21 File: northexA2410.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 4011

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Evans Community Park 10-year, 24-hour Storm Event
Existing Condition (Northerly Portion of Site)
Job 21-003
11/5/21

Drainage Area = 5.24(Ac.) = 0.008 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 5.24(Ac.) = 0.008 Sq. Mi.
Length along longest watercourse = 828.00(Ft.)
Length along longest watercourse measured to centroid = 472.00(Ft.)
Length along longest watercourse = 0.157 Mi.
Length along longest watercourse measured to centroid = 0.089 Mi.
Difference in elevation = 7.00(Ft.)
Slope along watercourse = 44.6377 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.069 Hr.
Lag time = 4.15 Min.
25% of lag time = 1.04 Min.
40% of lag time = 1.66 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.24	1.90	9.96

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]

5.24 5.00 26.20

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 1.900(In)
Area Averaged 100-Year Rainfall = 5.000(In)

Point rain (area averaged) = 3.175(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 3.175(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.240	88.00	0.000

Total Area Entered = 5.24(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
88.0	88.0	0.153	0.000	0.153	1.000	0.153
					Sum (F) =	0.153

Area averaged mean soil loss (F) (In/Hr) = 0.153
Minimum soil loss rate ((In/Hr)) = 0.076
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	120.554	25.359	1.339
2	0.167	241.108	48.702	2.572
3	0.250	361.662	13.261	0.700
4	0.333	482.216	5.999	0.317
5	0.417	602.770	3.358	0.177
6	0.500	723.324	1.915	0.101
7	0.583	843.878	1.407	0.074
		Sum = 100.000	Sum=	5.281

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.025	(0.271)	0.023	0.003
2	0.17	0.07	0.025	(0.270)	0.023	0.003
3	0.25	0.07	0.025	(0.269)	0.023	0.003
4	0.33	0.10	0.038	(0.268)	0.034	0.004
5	0.42	0.10	0.038	(0.267)	0.034	0.004
6	0.50	0.10	0.038	(0.266)	0.034	0.004
7	0.58	0.10	0.038	(0.265)	0.034	0.004

8	0.67	0.10	0.038	(0.264)	0.034	0.004
9	0.75	0.10	0.038	(0.263)	0.034	0.004
10	0.83	0.13	0.051	(0.262)	0.046	0.005
11	0.92	0.13	0.051	(0.260)	0.046	0.005
12	1.00	0.13	0.051	(0.259)	0.046	0.005
13	1.08	0.10	0.038	(0.258)	0.034	0.004
14	1.17	0.10	0.038	(0.257)	0.034	0.004
15	1.25	0.10	0.038	(0.256)	0.034	0.004
16	1.33	0.10	0.038	(0.255)	0.034	0.004
17	1.42	0.10	0.038	(0.254)	0.034	0.004
18	1.50	0.10	0.038	(0.253)	0.034	0.004
19	1.58	0.10	0.038	(0.252)	0.034	0.004
20	1.67	0.10	0.038	(0.251)	0.034	0.004
21	1.75	0.10	0.038	(0.250)	0.034	0.004
22	1.83	0.13	0.051	(0.249)	0.046	0.005
23	1.92	0.13	0.051	(0.248)	0.046	0.005
24	2.00	0.13	0.051	(0.247)	0.046	0.005
25	2.08	0.13	0.051	(0.246)	0.046	0.005
26	2.17	0.13	0.051	(0.245)	0.046	0.005
27	2.25	0.13	0.051	(0.244)	0.046	0.005
28	2.33	0.13	0.051	(0.243)	0.046	0.005
29	2.42	0.13	0.051	(0.242)	0.046	0.005
30	2.50	0.13	0.051	(0.241)	0.046	0.005
31	2.58	0.17	0.064	(0.240)	0.057	0.006
32	2.67	0.17	0.064	(0.239)	0.057	0.006
33	2.75	0.17	0.064	(0.238)	0.057	0.006
34	2.83	0.17	0.064	(0.237)	0.057	0.006
35	2.92	0.17	0.064	(0.236)	0.057	0.006
36	3.00	0.17	0.064	(0.235)	0.057	0.006
37	3.08	0.17	0.064	(0.234)	0.057	0.006
38	3.17	0.17	0.064	(0.233)	0.057	0.006
39	3.25	0.17	0.064	(0.233)	0.057	0.006
40	3.33	0.17	0.064	(0.232)	0.057	0.006
41	3.42	0.17	0.064	(0.231)	0.057	0.006
42	3.50	0.17	0.064	(0.230)	0.057	0.006
43	3.58	0.17	0.064	(0.229)	0.057	0.006
44	3.67	0.17	0.064	(0.228)	0.057	0.006
45	3.75	0.17	0.064	(0.227)	0.057	0.006
46	3.83	0.20	0.076	(0.226)	0.069	0.008
47	3.92	0.20	0.076	(0.225)	0.069	0.008
48	4.00	0.20	0.076	(0.224)	0.069	0.008
49	4.08	0.20	0.076	(0.223)	0.069	0.008
50	4.17	0.20	0.076	(0.222)	0.069	0.008
51	4.25	0.20	0.076	(0.221)	0.069	0.008
52	4.33	0.23	0.089	(0.220)	0.080	0.009
53	4.42	0.23	0.089	(0.219)	0.080	0.009
54	4.50	0.23	0.089	(0.218)	0.080	0.009
55	4.58	0.23	0.089	(0.217)	0.080	0.009
56	4.67	0.23	0.089	(0.216)	0.080	0.009
57	4.75	0.23	0.089	(0.215)	0.080	0.009
58	4.83	0.27	0.102	(0.214)	0.091	0.010
59	4.92	0.27	0.102	(0.214)	0.091	0.010
60	5.00	0.27	0.102	(0.213)	0.091	0.010
61	5.08	0.20	0.076	(0.212)	0.069	0.008
62	5.17	0.20	0.076	(0.211)	0.069	0.008
63	5.25	0.20	0.076	(0.210)	0.069	0.008
64	5.33	0.23	0.089	(0.209)	0.080	0.009

65	5.42	0.23	0.089	(0.208)	0.080	0.009
66	5.50	0.23	0.089	(0.207)	0.080	0.009
67	5.58	0.27	0.102	(0.206)	0.091	0.010
68	5.67	0.27	0.102	(0.205)	0.091	0.010
69	5.75	0.27	0.102	(0.204)	0.091	0.010
70	5.83	0.27	0.102	(0.203)	0.091	0.010
71	5.92	0.27	0.102	(0.203)	0.091	0.010
72	6.00	0.27	0.102	(0.202)	0.091	0.010
73	6.08	0.30	0.114	(0.201)	0.103	0.011
74	6.17	0.30	0.114	(0.200)	0.103	0.011
75	6.25	0.30	0.114	(0.199)	0.103	0.011
76	6.33	0.30	0.114	(0.198)	0.103	0.011
77	6.42	0.30	0.114	(0.197)	0.103	0.011
78	6.50	0.30	0.114	(0.196)	0.103	0.011
79	6.58	0.33	0.127	(0.195)	0.114	0.013
80	6.67	0.33	0.127	(0.195)	0.114	0.013
81	6.75	0.33	0.127	(0.194)	0.114	0.013
82	6.83	0.33	0.127	(0.193)	0.114	0.013
83	6.92	0.33	0.127	(0.192)	0.114	0.013
84	7.00	0.33	0.127	(0.191)	0.114	0.013
85	7.08	0.33	0.127	(0.190)	0.114	0.013
86	7.17	0.33	0.127	(0.189)	0.114	0.013
87	7.25	0.33	0.127	(0.188)	0.114	0.013
88	7.33	0.37	0.140	(0.188)	0.126	0.014
89	7.42	0.37	0.140	(0.187)	0.126	0.014
90	7.50	0.37	0.140	(0.186)	0.126	0.014
91	7.58	0.40	0.152	(0.185)	0.137	0.015
92	7.67	0.40	0.152	(0.184)	0.137	0.015
93	7.75	0.40	0.152	(0.183)	0.137	0.015
94	7.83	0.43	0.165	(0.183)	0.149	0.017
95	7.92	0.43	0.165	(0.182)	0.149	0.017
96	8.00	0.43	0.165	(0.181)	0.149	0.017
97	8.08	0.50	0.191	(0.180)	0.171	0.019
98	8.17	0.50	0.191	(0.179)	0.171	0.019
99	8.25	0.50	0.191	(0.178)	0.171	0.019
100	8.33	0.50	0.191	(0.177)	0.171	0.019
101	8.42	0.50	0.191	(0.177)	0.171	0.019
102	8.50	0.50	0.191	(0.176)	0.171	0.019
103	8.58	0.53	0.203	0.175	(0.183)	0.028
104	8.67	0.53	0.203	0.174	(0.183)	0.029
105	8.75	0.53	0.203	0.173	(0.183)	0.030
106	8.83	0.57	0.216	0.173	(0.194)	0.043
107	8.92	0.57	0.216	0.172	(0.194)	0.044
108	9.00	0.57	0.216	0.171	(0.194)	0.045
109	9.08	0.63	0.241	0.170	(0.217)	0.071
110	9.17	0.63	0.241	0.169	(0.217)	0.072
111	9.25	0.63	0.241	0.168	(0.217)	0.073
112	9.33	0.67	0.254	0.168	(0.229)	0.086
113	9.42	0.67	0.254	0.167	(0.229)	0.087
114	9.50	0.67	0.254	0.166	(0.229)	0.088
115	9.58	0.70	0.267	0.165	(0.240)	0.101
116	9.67	0.70	0.267	0.165	(0.240)	0.102
117	9.75	0.70	0.267	0.164	(0.240)	0.103
118	9.83	0.73	0.279	0.163	(0.251)	0.117
119	9.92	0.73	0.279	0.162	(0.251)	0.117
120	10.00	0.73	0.279	0.161	(0.251)	0.118
121	10.08	0.50	0.191	0.161	(0.171)	0.030

122	10.17	0.50	0.191	0.160	(	0.171)	0.031
123	10.25	0.50	0.191	0.159	(	0.171)	0.031
124	10.33	0.50	0.191	0.158	(	0.171)	0.032
125	10.42	0.50	0.191	0.157	(	0.171)	0.033
126	10.50	0.50	0.191	0.157	(	0.171)	0.034
127	10.58	0.67	0.254	0.156	(	0.229)	0.098
128	10.67	0.67	0.254	0.155	(	0.229)	0.099
129	10.75	0.67	0.254	0.154	(	0.229)	0.100
130	10.83	0.67	0.254	0.154	(	0.229)	0.100
131	10.92	0.67	0.254	0.153	(	0.229)	0.101
132	11.00	0.67	0.254	0.152	(	0.229)	0.102
133	11.08	0.63	0.241	0.151	(	0.217)	0.090
134	11.17	0.63	0.241	0.151	(	0.217)	0.091
135	11.25	0.63	0.241	0.150	(	0.217)	0.091
136	11.33	0.63	0.241	0.149	(	0.217)	0.092
137	11.42	0.63	0.241	0.148	(	0.217)	0.093
138	11.50	0.63	0.241	0.148	(	0.217)	0.094
139	11.58	0.57	0.216	0.147	(	0.194)	0.069
140	11.67	0.57	0.216	0.146	(	0.194)	0.070
141	11.75	0.57	0.216	0.146	(	0.194)	0.070
142	11.83	0.60	0.229	0.145	(	0.206)	0.084
143	11.92	0.60	0.229	0.144	(	0.206)	0.085
144	12.00	0.60	0.229	0.143	(	0.206)	0.085
145	12.08	0.83	0.318	0.143	(	0.286)	0.175
146	12.17	0.83	0.318	0.142	(	0.286)	0.176
147	12.25	0.83	0.318	0.141	(	0.286)	0.176
148	12.33	0.87	0.330	0.141	(	0.297)	0.190
149	12.42	0.87	0.330	0.140	(	0.297)	0.190
150	12.50	0.87	0.330	0.139	(	0.297)	0.191
151	12.58	0.93	0.356	0.138	(	0.320)	0.217
152	12.67	0.93	0.356	0.138	(	0.320)	0.218
153	12.75	0.93	0.356	0.137	(	0.320)	0.219
154	12.83	0.97	0.368	0.136	(	0.332)	0.232
155	12.92	0.97	0.368	0.136	(	0.332)	0.233
156	13.00	0.97	0.368	0.135	(	0.332)	0.233
157	13.08	1.13	0.432	0.134	(	0.389)	0.298
158	13.17	1.13	0.432	0.134	(	0.389)	0.298
159	13.25	1.13	0.432	0.133	(	0.389)	0.299
160	13.33	1.13	0.432	0.132	(	0.389)	0.300
161	13.42	1.13	0.432	0.132	(	0.389)	0.300
162	13.50	1.13	0.432	0.131	(	0.389)	0.301
163	13.58	0.77	0.292	0.130	(	0.263)	0.162
164	13.67	0.77	0.292	0.130	(	0.263)	0.163
165	13.75	0.77	0.292	0.129	(	0.263)	0.163
166	13.83	0.77	0.292	0.128	(	0.263)	0.164
167	13.92	0.77	0.292	0.128	(	0.263)	0.165
168	14.00	0.77	0.292	0.127	(	0.263)	0.165
169	14.08	0.90	0.343	0.126	(	0.309)	0.217
170	14.17	0.90	0.343	0.126	(	0.309)	0.217
171	14.25	0.90	0.343	0.125	(	0.309)	0.218
172	14.33	0.87	0.330	0.124	(	0.297)	0.206
173	14.42	0.87	0.330	0.124	(	0.297)	0.207
174	14.50	0.87	0.330	0.123	(	0.297)	0.207
175	14.58	0.87	0.330	0.122	(	0.297)	0.208
176	14.67	0.87	0.330	0.122	(	0.297)	0.208
177	14.75	0.87	0.330	0.121	(	0.297)	0.209
178	14.83	0.83	0.318	0.121	(	0.286)	0.197

179	14.92	0.83	0.318	0.120	(0.286)	0.198
180	15.00	0.83	0.318	0.119	(0.286)	0.198
181	15.08	0.80	0.305	0.119	(0.274)	0.186
182	15.17	0.80	0.305	0.118	(0.274)	0.187
183	15.25	0.80	0.305	0.118	(0.274)	0.187
184	15.33	0.77	0.292	0.117	(0.263)	0.175
185	15.42	0.77	0.292	0.116	(0.263)	0.176
186	15.50	0.77	0.292	0.116	(0.263)	0.176
187	15.58	0.63	0.241	0.115	(0.217)	0.126
188	15.67	0.63	0.241	0.115	(0.217)	0.127
189	15.75	0.63	0.241	0.114	(0.217)	0.127
190	15.83	0.63	0.241	0.113	(0.217)	0.128
191	15.92	0.63	0.241	0.113	(0.217)	0.129
192	16.00	0.63	0.241	0.112	(0.217)	0.129
193	16.08	0.13	0.051	(0.112)	0.046	0.005
194	16.17	0.13	0.051	(0.111)	0.046	0.005
195	16.25	0.13	0.051	(0.110)	0.046	0.005
196	16.33	0.13	0.051	(0.110)	0.046	0.005
197	16.42	0.13	0.051	(0.109)	0.046	0.005
198	16.50	0.13	0.051	(0.109)	0.046	0.005
199	16.58	0.10	0.038	(0.108)	0.034	0.004
200	16.67	0.10	0.038	(0.108)	0.034	0.004
201	16.75	0.10	0.038	(0.107)	0.034	0.004
202	16.83	0.10	0.038	(0.107)	0.034	0.004
203	16.92	0.10	0.038	(0.106)	0.034	0.004
204	17.00	0.10	0.038	(0.106)	0.034	0.004
205	17.08	0.17	0.064	(0.105)	0.057	0.006
206	17.17	0.17	0.064	(0.104)	0.057	0.006
207	17.25	0.17	0.064	(0.104)	0.057	0.006
208	17.33	0.17	0.064	(0.103)	0.057	0.006
209	17.42	0.17	0.064	(0.103)	0.057	0.006
210	17.50	0.17	0.064	(0.102)	0.057	0.006
211	17.58	0.17	0.064	(0.102)	0.057	0.006
212	17.67	0.17	0.064	(0.101)	0.057	0.006
213	17.75	0.17	0.064	(0.101)	0.057	0.006
214	17.83	0.13	0.051	(0.100)	0.046	0.005
215	17.92	0.13	0.051	(0.100)	0.046	0.005
216	18.00	0.13	0.051	(0.099)	0.046	0.005
217	18.08	0.13	0.051	(0.099)	0.046	0.005
218	18.17	0.13	0.051	(0.098)	0.046	0.005
219	18.25	0.13	0.051	(0.098)	0.046	0.005
220	18.33	0.13	0.051	(0.097)	0.046	0.005
221	18.42	0.13	0.051	(0.097)	0.046	0.005
222	18.50	0.13	0.051	(0.097)	0.046	0.005
223	18.58	0.10	0.038	(0.096)	0.034	0.004
224	18.67	0.10	0.038	(0.096)	0.034	0.004
225	18.75	0.10	0.038	(0.095)	0.034	0.004
226	18.83	0.07	0.025	(0.095)	0.023	0.003
227	18.92	0.07	0.025	(0.094)	0.023	0.003
228	19.00	0.07	0.025	(0.094)	0.023	0.003
229	19.08	0.10	0.038	(0.093)	0.034	0.004
230	19.17	0.10	0.038	(0.093)	0.034	0.004
231	19.25	0.10	0.038	(0.092)	0.034	0.004
232	19.33	0.13	0.051	(0.092)	0.046	0.005
233	19.42	0.13	0.051	(0.092)	0.046	0.005
234	19.50	0.13	0.051	(0.091)	0.046	0.005
235	19.58	0.10	0.038	(0.091)	0.034	0.004

236	19.67	0.10	0.038	(0.090)	0.034	0.004
237	19.75	0.10	0.038	(0.090)	0.034	0.004
238	19.83	0.07	0.025	(0.090)	0.023	0.003
239	19.92	0.07	0.025	(0.089)	0.023	0.003
240	20.00	0.07	0.025	(0.089)	0.023	0.003
241	20.08	0.10	0.038	(0.088)	0.034	0.004
242	20.17	0.10	0.038	(0.088)	0.034	0.004
243	20.25	0.10	0.038	(0.088)	0.034	0.004
244	20.33	0.10	0.038	(0.087)	0.034	0.004
245	20.42	0.10	0.038	(0.087)	0.034	0.004
246	20.50	0.10	0.038	(0.086)	0.034	0.004
247	20.58	0.10	0.038	(0.086)	0.034	0.004
248	20.67	0.10	0.038	(0.086)	0.034	0.004
249	20.75	0.10	0.038	(0.085)	0.034	0.004
250	20.83	0.07	0.025	(0.085)	0.023	0.003
251	20.92	0.07	0.025	(0.085)	0.023	0.003
252	21.00	0.07	0.025	(0.084)	0.023	0.003
253	21.08	0.10	0.038	(0.084)	0.034	0.004
254	21.17	0.10	0.038	(0.084)	0.034	0.004
255	21.25	0.10	0.038	(0.083)	0.034	0.004
256	21.33	0.07	0.025	(0.083)	0.023	0.003
257	21.42	0.07	0.025	(0.083)	0.023	0.003
258	21.50	0.07	0.025	(0.082)	0.023	0.003
259	21.58	0.10	0.038	(0.082)	0.034	0.004
260	21.67	0.10	0.038	(0.082)	0.034	0.004
261	21.75	0.10	0.038	(0.082)	0.034	0.004
262	21.83	0.07	0.025	(0.081)	0.023	0.003
263	21.92	0.07	0.025	(0.081)	0.023	0.003
264	22.00	0.07	0.025	(0.081)	0.023	0.003
265	22.08	0.10	0.038	(0.080)	0.034	0.004
266	22.17	0.10	0.038	(0.080)	0.034	0.004
267	22.25	0.10	0.038	(0.080)	0.034	0.004
268	22.33	0.07	0.025	(0.080)	0.023	0.003
269	22.42	0.07	0.025	(0.079)	0.023	0.003
270	22.50	0.07	0.025	(0.079)	0.023	0.003
271	22.58	0.07	0.025	(0.079)	0.023	0.003
272	22.67	0.07	0.025	(0.079)	0.023	0.003
273	22.75	0.07	0.025	(0.079)	0.023	0.003
274	22.83	0.07	0.025	(0.078)	0.023	0.003
275	22.92	0.07	0.025	(0.078)	0.023	0.003
276	23.00	0.07	0.025	(0.078)	0.023	0.003
277	23.08	0.07	0.025	(0.078)	0.023	0.003
278	23.17	0.07	0.025	(0.078)	0.023	0.003
279	23.25	0.07	0.025	(0.077)	0.023	0.003
280	23.33	0.07	0.025	(0.077)	0.023	0.003
281	23.42	0.07	0.025	(0.077)	0.023	0.003
282	23.50	0.07	0.025	(0.077)	0.023	0.003
283	23.58	0.07	0.025	(0.077)	0.023	0.003
284	23.67	0.07	0.025	(0.077)	0.023	0.003
285	23.75	0.07	0.025	(0.077)	0.023	0.003
286	23.83	0.07	0.025	(0.077)	0.023	0.003
287	23.92	0.07	0.025	(0.076)	0.023	0.003
288	24.00	0.07	0.025	(0.076)	0.023	0.003

(Loss Rate Not Used)

Sum = 100.0 Sum = 14.0

Flood volume = Effective rainfall 1.17(In)
times area 5.2(Ac.)/[(In)/(Ft.)] = 0.5(Ac.Ft)

Total soil loss = 2.01(In)
Total soil loss = 0.877(Ac.Ft)
Total rainfall = 3.18(In)
Flood volume = 22178.1 Cubic Feet
Total soil loss = 38220.5 Cubic Feet

Peak flow rate of this hydrograph = 1.581(CFS)

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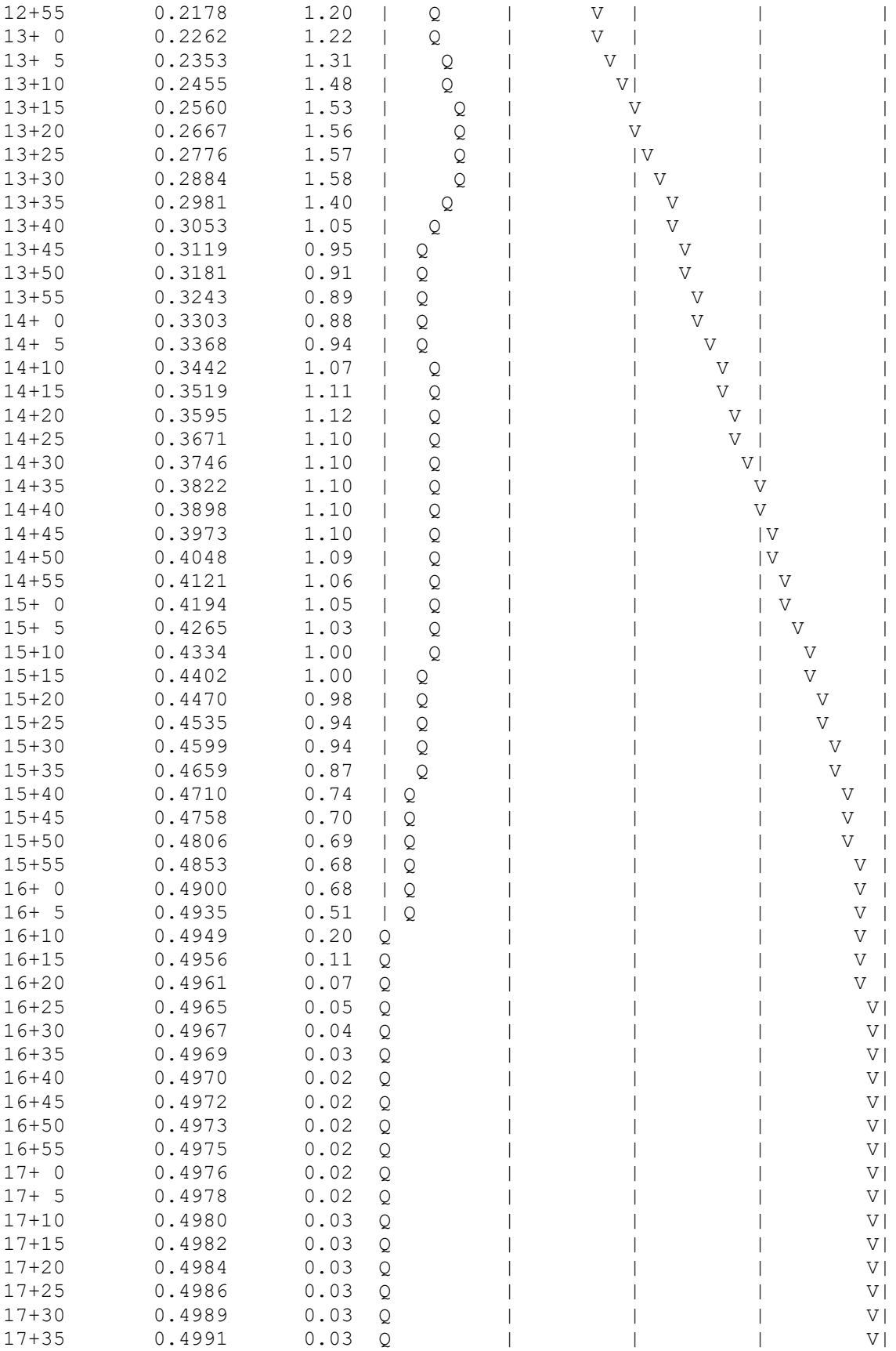
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0000	0.00	Q				
0+10	0.0001	0.01	Q				
0+15	0.0002	0.01	Q				
0+20	0.0003	0.01	Q				
0+25	0.0004	0.02	Q				
0+30	0.0005	0.02	Q				
0+35	0.0007	0.02	Q				
0+40	0.0008	0.02	Q				
0+45	0.0009	0.02	Q				
0+50	0.0011	0.02	Q				
0+55	0.0013	0.03	Q				
1+ 0	0.0014	0.03	Q				
1+ 5	0.0016	0.02	Q				
1+10	0.0018	0.02	Q				
1+15	0.0019	0.02	Q				
1+20	0.0020	0.02	Q				
1+25	0.0022	0.02	Q				
1+30	0.0023	0.02	Q				
1+35	0.0025	0.02	Q				
1+40	0.0026	0.02	Q				
1+45	0.0027	0.02	Q				
1+50	0.0029	0.02	Q				
1+55	0.0031	0.03	Q				
2+ 0	0.0032	0.03	Q				
2+ 5	0.0034	0.03	Q				
2+10	0.0036	0.03	Q				
2+15	0.0038	0.03	Q				
2+20	0.0040	0.03	Q				
2+25	0.0042	0.03	Q				
2+30	0.0043	0.03	Q				
2+35	0.0045	0.03	Q				
2+40	0.0048	0.03	Q				
2+45	0.0050	0.03	Q				
2+50	0.0052	0.03	Q				
2+55	0.0054	0.03	Q				
3+ 0	0.0057	0.03	Q				
3+ 5	0.0059	0.03	Q				
3+10	0.0061	0.03	Q				
3+15	0.0064	0.03	Q				
3+20	0.0066	0.03	Q				

3+25	0.0068	0.03	Q				
3+30	0.0071	0.03	Q				
3+35	0.0073	0.03	Q				
3+40	0.0075	0.03	Q				
3+45	0.0078	0.03	Q				
3+50	0.0080	0.04	Q				
3+55	0.0083	0.04	Q				
4+ 0	0.0085	0.04	Q				
4+ 5	0.0088	0.04	Q				
4+10	0.0091	0.04	Q				
4+15	0.0094	0.04	Q				
4+20	0.0096	0.04	Q				
4+25	0.0100	0.05	Q				
4+30	0.0103	0.05	Q				
4+35	0.0106	0.05	Q				
4+40	0.0109	0.05	Q				
4+45	0.0112	0.05	Q				
4+50	0.0116	0.05	Q				
4+55	0.0119	0.05	Q				
5+ 0	0.0123	0.05	Q				
5+ 5	0.0126	0.05	Q				
5+10	0.0129	0.04	QV				
5+15	0.0132	0.04	QV				
5+20	0.0135	0.04	QV				
5+25	0.0138	0.05	QV				
5+30	0.0142	0.05	QV				
5+35	0.0145	0.05	QV				
5+40	0.0148	0.05	QV				
5+45	0.0152	0.05	QV				
5+50	0.0156	0.05	QV				
5+55	0.0159	0.05	QV				
6+ 0	0.0163	0.05	QV				
6+ 5	0.0167	0.06	QV				
6+10	0.0171	0.06	QV				
6+15	0.0175	0.06	QV				
6+20	0.0179	0.06	QV				
6+25	0.0183	0.06	QV				
6+30	0.0188	0.06	QV				
6+35	0.0192	0.06	QV				
6+40	0.0196	0.07	QV				
6+45	0.0201	0.07	QV				
6+50	0.0205	0.07	QV				
6+55	0.0210	0.07	QV				
7+ 0	0.0215	0.07	QV				
7+ 5	0.0219	0.07	QV				
7+10	0.0224	0.07	QV				
7+15	0.0229	0.07	QV				
7+20	0.0233	0.07	QV				
7+25	0.0238	0.07	QV				
7+30	0.0243	0.07	QV				
7+35	0.0248	0.08	QV				
7+40	0.0254	0.08	QV				
7+45	0.0259	0.08	Q V				
7+50	0.0265	0.08	Q V				
7+55	0.0271	0.09	Q V				
8+ 0	0.0277	0.09	Q V				
8+ 5	0.0283	0.09	Q V				

8+10	0.0290	0.10	Q V	|	|	|	|
8+15	0.0297	0.10	Q V	|	|	|	|
8+20	0.0303	0.10	Q V	|	|	|	|
8+25	0.0310	0.10	Q V	|	|	|	|
8+30	0.0317	0.10	Q V	|	|	|	|
8+35	0.0325	0.11	Q V	|	|	|	|
8+40	0.0334	0.14	Q V	|	|	|	|
8+45	0.0345	0.15	Q V	|	|	|	|
8+50	0.0356	0.17	Q V	|	|	|	|
8+55	0.0371	0.21	Q V	|	|	|	|
9+ 0	0.0386	0.22	Q V	|	|	|	|
9+ 5	0.0405	0.27	|Q V	|	|	|	|
9+10	0.0428	0.34	|Q V	|	|	|	|
9+15	0.0453	0.36	|Q V	|	|	|	|
9+20	0.0480	0.39	|Q V	|	|	|	|
9+25	0.0510	0.43	|Q V	|	|	|	|
9+30	0.0540	0.45	|Q V	|	|	|	|
9+35	0.0573	0.48	|Q V	|	|	|	|
9+40	0.0609	0.52	| Q V	|	|	|	|
9+45	0.0645	0.53	| Q V	|	|	|	|
9+50	0.0683	0.56	| Q V	|	|	|	|
9+55	0.0724	0.59	| Q V	|	|	|	|
10+ 0	0.0766	0.61	| Q V	|	|	|	|
10+ 5	0.0801	0.50	|Q V	|	|	|	|
10+10	0.0820	0.28	|Q V	|	|	|	|
10+15	0.0835	0.22	Q V	|	|	|	|
10+20	0.0849	0.20	Q V	|	|	|	|
10+25	0.0861	0.19	Q V	|	|	|	|
10+30	0.0874	0.18	Q V	|	|	|	|
10+35	0.0892	0.26	|Q V	|	|	|	|
10+40	0.0921	0.43	|Q V	|	|	|	|
10+45	0.0954	0.48	|Q V	|	|	|	|
10+50	0.0989	0.50	| Q V	|	|	|	|
10+55	0.1025	0.52	| Q V	|	|	|	|
11+ 0	0.1061	0.53	| Q V	|	|	|	|
11+ 5	0.1097	0.52	| Q V	|	|	|	|
11+10	0.1131	0.49	|Q V	|	|	|	|
11+15	0.1164	0.49	|Q V|	|	|	|	|
11+20	0.1198	0.49	|Q V|	|	|	|	|
11+25	0.1231	0.49	|Q V|	|	|	|	|
11+30	0.1265	0.49	|Q V|	|	|	|	|
11+35	0.1297	0.46	|Q V	|	|	|	|
11+40	0.1324	0.40	|Q V	|	|	|	|
11+45	0.1351	0.38	|Q V	|	|	|	|
11+50	0.1378	0.40	|Q V	|	|	|	|
11+55	0.1408	0.43	|Q |V	|	|	|	|
12+ 0	0.1438	0.44	|Q |V	|	|	|	|
12+ 5	0.1477	0.56	| Q |V	|	|	|	|
12+10	0.1532	0.80	| Q | V	|	|	|	|
12+15	0.1591	0.87	| Q | V	|	|	|	|
12+20	0.1655	0.92	| Q | V	|	|	|	|
12+25	0.1721	0.97	| Q | V	|	|	|	|
12+30	0.1789	0.99	| Q | V	|	|	|	|
12+35	0.1861	1.04	| Q | V	|	|	|	|
12+40	0.1937	1.11	| Q | V	|	|	|	|
12+45	0.2015	1.13	| Q | V	|	|	|	|
12+50	0.2095	1.16	| Q | V	|	|	|	|



17+40	0.4993	0.03	Q	|	|	|	V|
17+45	0.4996	0.03	Q	|	|	|	V|
17+50	0.4998	0.03	Q	|	|	|	V|
17+55	0.5000	0.03	Q	|	|	|	V|
18+ 0	0.5002	0.03	Q	|	|	|	V|
18+ 5	0.5004	0.03	Q	|	|	|	V|
18+10	0.5005	0.03	Q	|	|	|	V|
18+15	0.5007	0.03	Q	|	|	|	V|
18+20	0.5009	0.03	Q	|	|	|	V|
18+25	0.5011	0.03	Q	|	|	|	V|
18+30	0.5013	0.03	Q	|	|	|	V|
18+35	0.5015	0.03	Q	|	|	|	V|
18+40	0.5016	0.02	Q	|	|	|	V|
18+45	0.5018	0.02	Q	|	|	|	V|
18+50	0.5019	0.02	Q	|	|	|	V|
18+55	0.5020	0.02	Q	|	|	|	V|
19+ 0	0.5021	0.01	Q	|	|	|	V|
19+ 5	0.5022	0.02	Q	|	|	|	V|
19+10	0.5023	0.02	Q	|	|	|	V|
19+15	0.5025	0.02	Q	|	|	|	V|
19+20	0.5026	0.02	Q	|	|	|	V|
19+25	0.5028	0.02	Q	|	|	|	V|
19+30	0.5030	0.03	Q	|	|	|	V|
19+35	0.5031	0.02	Q	|	|	|	V|
19+40	0.5033	0.02	Q	|	|	|	V|
19+45	0.5034	0.02	Q	|	|	|	V|
19+50	0.5035	0.02	Q	|	|	|	V|
19+55	0.5037	0.02	Q	|	|	|	V|
20+ 0	0.5037	0.01	Q	|	|	|	V|
20+ 5	0.5039	0.02	Q	|	|	|	V|
20+10	0.5040	0.02	Q	|	|	|	V|
20+15	0.5041	0.02	Q	|	|	|	V|
20+20	0.5043	0.02	Q	|	|	|	V|
20+25	0.5044	0.02	Q	|	|	|	V|
20+30	0.5045	0.02	Q	|	|	|	V|
20+35	0.5047	0.02	Q	|	|	|	V|
20+40	0.5048	0.02	Q	|	|	|	V|
20+45	0.5049	0.02	Q	|	|	|	V|
20+50	0.5051	0.02	Q	|	|	|	V|
20+55	0.5052	0.02	Q	|	|	|	V|
21+ 0	0.5053	0.01	Q	|	|	|	V|
21+ 5	0.5054	0.02	Q	|	|	|	V|
21+10	0.5055	0.02	Q	|	|	|	V|
21+15	0.5056	0.02	Q	|	|	|	V|
21+20	0.5058	0.02	Q	|	|	|	V|
21+25	0.5059	0.01	Q	|	|	|	V|
21+30	0.5060	0.01	Q	|	|	|	V|
21+35	0.5061	0.02	Q	|	|	|	V|
21+40	0.5062	0.02	Q	|	|	|	V|
21+45	0.5063	0.02	Q	|	|	|	V|
21+50	0.5065	0.02	Q	|	|	|	V|
21+55	0.5066	0.01	Q	|	|	|	V|
22+ 0	0.5067	0.01	Q	|	|	|	V|
22+ 5	0.5068	0.02	Q	|	|	|	V|
22+10	0.5069	0.02	Q	|	|	|	V|
22+15	0.5070	0.02	Q	|	|	|	V|
22+20	0.5072	0.02	Q	|	|	|	V|

22+25	0.5073	0.01	Q	|	|	|	V|
22+30	0.5074	0.01	Q	|	|	|	V|
22+35	0.5075	0.01	Q	|	|	|	V|
22+40	0.5075	0.01	Q	|	|	|	V|
22+45	0.5076	0.01	Q	|	|	|	V|
22+50	0.5077	0.01	Q	|	|	|	V|
22+55	0.5078	0.01	Q	|	|	|	V|
23+ 0	0.5079	0.01	Q	|	|	|	V|
23+ 5	0.5080	0.01	Q	|	|	|	V|
23+10	0.5081	0.01	Q	|	|	|	V|
23+15	0.5082	0.01	Q	|	|	|	V|
23+20	0.5083	0.01	Q	|	|	|	V|
23+25	0.5084	0.01	Q	|	|	|	V|
23+30	0.5085	0.01	Q	|	|	|	V|
23+35	0.5086	0.01	Q	|	|	|	V|
23+40	0.5087	0.01	Q	|	|	|	V|
23+45	0.5087	0.01	Q	|	|	|	V|
23+50	0.5088	0.01	Q	|	|	|	V|
23+55	0.5089	0.01	Q	|	|	|	V|
24+ 0	0.5090	0.01	Q	|	|	|	V|
24+ 5	0.5091	0.01	Q	|	|	|	V|
24+10	0.5091	0.00	Q	|	|	|	V|
24+15	0.5091	0.00	Q	|	|	|	V|
24+20	0.5091	0.00	Q	|	|	|	V|
24+25	0.5091	0.00	Q	|	|	|	V|
24+30	0.5091	0.00	Q	|	|	|	V

U n i t H y d r o g r a p h A n a l y s i s

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Study date 11/05/21 File: northexB2410.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 4011

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Evans Community Park 10-year, 24-hour Storm Event
Existing Condition (Central Portion of Site)
Job 21-003
11/5/21

Drainage Area = 9.17(Ac.) = 0.014 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 9.17(Ac.) = 0.014 Sq. Mi.
Length along longest watercourse = 1368.00(Ft.)
Length along longest watercourse measured to centroid = 749.00(Ft.)
Length along longest watercourse = 0.259 Mi.
Length along longest watercourse measured to centroid = 0.142 Mi.
Difference in elevation = 8.00(Ft.)
Slope along watercourse = 30.8772 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.107 Hr.
Lag time = 6.42 Min.
25% of lag time = 1.60 Min.
40% of lag time = 2.57 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
9.17	1.90	17.42

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]

9.17 5.00 45.85

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 1.900(In)
Area Averaged 100-Year Rainfall = 5.000(In)

Point rain (area averaged) = 3.175(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 3.175(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
9.170	88.00	0.000

Total Area Entered = 9.17(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
88.0	88.0	0.153	0.000	0.153	1.000	0.153
					Sum (F) =	0.153

Area averaged mean soil loss (F) (In/Hr) = 0.153
Minimum soil loss rate ((In/Hr)) = 0.076
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	77.930	12.727	1.176
2	0.167	155.860	43.672	4.036
3	0.250	233.789	20.548	1.899
4	0.333	311.719	8.386	0.775
5	0.417	389.649	5.047	0.466
6	0.500	467.579	3.224	0.298
7	0.583	545.508	2.287	0.211
8	0.667	623.438	1.616	0.149
9	0.750	701.368	1.100	0.102
10	0.833	779.298	0.797	0.074
11	0.917	857.228	0.597	0.055
		Sum =	100.000 Sum=	9.242

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.025	(0.271)	0.023	0.003
2	0.17	0.07	0.025	(0.270)	0.023	0.003
3	0.25	0.07	0.025	(0.269)	0.023	0.003

4	0.33	0.10	0.038	(0.268)	0.034	0.004
5	0.42	0.10	0.038	(0.267)	0.034	0.004
6	0.50	0.10	0.038	(0.266)	0.034	0.004
7	0.58	0.10	0.038	(0.265)	0.034	0.004
8	0.67	0.10	0.038	(0.264)	0.034	0.004
9	0.75	0.10	0.038	(0.263)	0.034	0.004
10	0.83	0.13	0.051	(0.262)	0.046	0.005
11	0.92	0.13	0.051	(0.260)	0.046	0.005
12	1.00	0.13	0.051	(0.259)	0.046	0.005
13	1.08	0.10	0.038	(0.258)	0.034	0.004
14	1.17	0.10	0.038	(0.257)	0.034	0.004
15	1.25	0.10	0.038	(0.256)	0.034	0.004
16	1.33	0.10	0.038	(0.255)	0.034	0.004
17	1.42	0.10	0.038	(0.254)	0.034	0.004
18	1.50	0.10	0.038	(0.253)	0.034	0.004
19	1.58	0.10	0.038	(0.252)	0.034	0.004
20	1.67	0.10	0.038	(0.251)	0.034	0.004
21	1.75	0.10	0.038	(0.250)	0.034	0.004
22	1.83	0.13	0.051	(0.249)	0.046	0.005
23	1.92	0.13	0.051	(0.248)	0.046	0.005
24	2.00	0.13	0.051	(0.247)	0.046	0.005
25	2.08	0.13	0.051	(0.246)	0.046	0.005
26	2.17	0.13	0.051	(0.245)	0.046	0.005
27	2.25	0.13	0.051	(0.244)	0.046	0.005
28	2.33	0.13	0.051	(0.243)	0.046	0.005
29	2.42	0.13	0.051	(0.242)	0.046	0.005
30	2.50	0.13	0.051	(0.241)	0.046	0.005
31	2.58	0.17	0.064	(0.240)	0.057	0.006
32	2.67	0.17	0.064	(0.239)	0.057	0.006
33	2.75	0.17	0.064	(0.238)	0.057	0.006
34	2.83	0.17	0.064	(0.237)	0.057	0.006
35	2.92	0.17	0.064	(0.236)	0.057	0.006
36	3.00	0.17	0.064	(0.235)	0.057	0.006
37	3.08	0.17	0.064	(0.234)	0.057	0.006
38	3.17	0.17	0.064	(0.233)	0.057	0.006
39	3.25	0.17	0.064	(0.233)	0.057	0.006
40	3.33	0.17	0.064	(0.232)	0.057	0.006
41	3.42	0.17	0.064	(0.231)	0.057	0.006
42	3.50	0.17	0.064	(0.230)	0.057	0.006
43	3.58	0.17	0.064	(0.229)	0.057	0.006
44	3.67	0.17	0.064	(0.228)	0.057	0.006
45	3.75	0.17	0.064	(0.227)	0.057	0.006
46	3.83	0.20	0.076	(0.226)	0.069	0.008
47	3.92	0.20	0.076	(0.225)	0.069	0.008
48	4.00	0.20	0.076	(0.224)	0.069	0.008
49	4.08	0.20	0.076	(0.223)	0.069	0.008
50	4.17	0.20	0.076	(0.222)	0.069	0.008
51	4.25	0.20	0.076	(0.221)	0.069	0.008
52	4.33	0.23	0.089	(0.220)	0.080	0.009
53	4.42	0.23	0.089	(0.219)	0.080	0.009
54	4.50	0.23	0.089	(0.218)	0.080	0.009
55	4.58	0.23	0.089	(0.217)	0.080	0.009
56	4.67	0.23	0.089	(0.216)	0.080	0.009
57	4.75	0.23	0.089	(0.215)	0.080	0.009
58	4.83	0.27	0.102	(0.214)	0.091	0.010
59	4.92	0.27	0.102	(0.214)	0.091	0.010
60	5.00	0.27	0.102	(0.213)	0.091	0.010

61	5.08	0.20	0.076	(0.212)	0.069	0.008
62	5.17	0.20	0.076	(0.211)	0.069	0.008
63	5.25	0.20	0.076	(0.210)	0.069	0.008
64	5.33	0.23	0.089	(0.209)	0.080	0.009
65	5.42	0.23	0.089	(0.208)	0.080	0.009
66	5.50	0.23	0.089	(0.207)	0.080	0.009
67	5.58	0.27	0.102	(0.206)	0.091	0.010
68	5.67	0.27	0.102	(0.205)	0.091	0.010
69	5.75	0.27	0.102	(0.204)	0.091	0.010
70	5.83	0.27	0.102	(0.203)	0.091	0.010
71	5.92	0.27	0.102	(0.203)	0.091	0.010
72	6.00	0.27	0.102	(0.202)	0.091	0.010
73	6.08	0.30	0.114	(0.201)	0.103	0.011
74	6.17	0.30	0.114	(0.200)	0.103	0.011
75	6.25	0.30	0.114	(0.199)	0.103	0.011
76	6.33	0.30	0.114	(0.198)	0.103	0.011
77	6.42	0.30	0.114	(0.197)	0.103	0.011
78	6.50	0.30	0.114	(0.196)	0.103	0.011
79	6.58	0.33	0.127	(0.195)	0.114	0.013
80	6.67	0.33	0.127	(0.195)	0.114	0.013
81	6.75	0.33	0.127	(0.194)	0.114	0.013
82	6.83	0.33	0.127	(0.193)	0.114	0.013
83	6.92	0.33	0.127	(0.192)	0.114	0.013
84	7.00	0.33	0.127	(0.191)	0.114	0.013
85	7.08	0.33	0.127	(0.190)	0.114	0.013
86	7.17	0.33	0.127	(0.189)	0.114	0.013
87	7.25	0.33	0.127	(0.188)	0.114	0.013
88	7.33	0.37	0.140	(0.188)	0.126	0.014
89	7.42	0.37	0.140	(0.187)	0.126	0.014
90	7.50	0.37	0.140	(0.186)	0.126	0.014
91	7.58	0.40	0.152	(0.185)	0.137	0.015
92	7.67	0.40	0.152	(0.184)	0.137	0.015
93	7.75	0.40	0.152	(0.183)	0.137	0.015
94	7.83	0.43	0.165	(0.183)	0.149	0.017
95	7.92	0.43	0.165	(0.182)	0.149	0.017
96	8.00	0.43	0.165	(0.181)	0.149	0.017
97	8.08	0.50	0.191	(0.180)	0.171	0.019
98	8.17	0.50	0.191	(0.179)	0.171	0.019
99	8.25	0.50	0.191	(0.178)	0.171	0.019
100	8.33	0.50	0.191	(0.177)	0.171	0.019
101	8.42	0.50	0.191	(0.177)	0.171	0.019
102	8.50	0.50	0.191	(0.176)	0.171	0.019
103	8.58	0.53	0.203	0.175	(0.183)	0.028
104	8.67	0.53	0.203	0.174	(0.183)	0.029
105	8.75	0.53	0.203	0.173	(0.183)	0.030
106	8.83	0.57	0.216	0.173	(0.194)	0.043
107	8.92	0.57	0.216	0.172	(0.194)	0.044
108	9.00	0.57	0.216	0.171	(0.194)	0.045
109	9.08	0.63	0.241	0.170	(0.217)	0.071
110	9.17	0.63	0.241	0.169	(0.217)	0.072
111	9.25	0.63	0.241	0.168	(0.217)	0.073
112	9.33	0.67	0.254	0.168	(0.229)	0.086
113	9.42	0.67	0.254	0.167	(0.229)	0.087
114	9.50	0.67	0.254	0.166	(0.229)	0.088
115	9.58	0.70	0.267	0.165	(0.240)	0.101
116	9.67	0.70	0.267	0.165	(0.240)	0.102
117	9.75	0.70	0.267	0.164	(0.240)	0.103

118	9.83	0.73	0.279	0.163	(	0.251)	0.117
119	9.92	0.73	0.279	0.162	(	0.251)	0.117
120	10.00	0.73	0.279	0.161	(	0.251)	0.118
121	10.08	0.50	0.191	0.161	(	0.171)	0.030
122	10.17	0.50	0.191	0.160	(	0.171)	0.031
123	10.25	0.50	0.191	0.159	(	0.171)	0.031
124	10.33	0.50	0.191	0.158	(	0.171)	0.032
125	10.42	0.50	0.191	0.157	(	0.171)	0.033
126	10.50	0.50	0.191	0.157	(	0.171)	0.034
127	10.58	0.67	0.254	0.156	(	0.229)	0.098
128	10.67	0.67	0.254	0.155	(	0.229)	0.099
129	10.75	0.67	0.254	0.154	(	0.229)	0.100
130	10.83	0.67	0.254	0.154	(	0.229)	0.100
131	10.92	0.67	0.254	0.153	(	0.229)	0.101
132	11.00	0.67	0.254	0.152	(	0.229)	0.102
133	11.08	0.63	0.241	0.151	(	0.217)	0.090
134	11.17	0.63	0.241	0.151	(	0.217)	0.091
135	11.25	0.63	0.241	0.150	(	0.217)	0.091
136	11.33	0.63	0.241	0.149	(	0.217)	0.092
137	11.42	0.63	0.241	0.148	(	0.217)	0.093
138	11.50	0.63	0.241	0.148	(	0.217)	0.094
139	11.58	0.57	0.216	0.147	(	0.194)	0.069
140	11.67	0.57	0.216	0.146	(	0.194)	0.070
141	11.75	0.57	0.216	0.146	(	0.194)	0.070
142	11.83	0.60	0.229	0.145	(	0.206)	0.084
143	11.92	0.60	0.229	0.144	(	0.206)	0.085
144	12.00	0.60	0.229	0.143	(	0.206)	0.085
145	12.08	0.83	0.318	0.143	(	0.286)	0.175
146	12.17	0.83	0.318	0.142	(	0.286)	0.176
147	12.25	0.83	0.318	0.141	(	0.286)	0.176
148	12.33	0.87	0.330	0.141	(	0.297)	0.190
149	12.42	0.87	0.330	0.140	(	0.297)	0.190
150	12.50	0.87	0.330	0.139	(	0.297)	0.191
151	12.58	0.93	0.356	0.138	(	0.320)	0.217
152	12.67	0.93	0.356	0.138	(	0.320)	0.218
153	12.75	0.93	0.356	0.137	(	0.320)	0.219
154	12.83	0.97	0.368	0.136	(	0.332)	0.232
155	12.92	0.97	0.368	0.136	(	0.332)	0.233
156	13.00	0.97	0.368	0.135	(	0.332)	0.233
157	13.08	1.13	0.432	0.134	(	0.389)	0.298
158	13.17	1.13	0.432	0.134	(	0.389)	0.298
159	13.25	1.13	0.432	0.133	(	0.389)	0.299
160	13.33	1.13	0.432	0.132	(	0.389)	0.300
161	13.42	1.13	0.432	0.132	(	0.389)	0.300
162	13.50	1.13	0.432	0.131	(	0.389)	0.301
163	13.58	0.77	0.292	0.130	(	0.263)	0.162
164	13.67	0.77	0.292	0.130	(	0.263)	0.163
165	13.75	0.77	0.292	0.129	(	0.263)	0.163
166	13.83	0.77	0.292	0.128	(	0.263)	0.164
167	13.92	0.77	0.292	0.128	(	0.263)	0.165
168	14.00	0.77	0.292	0.127	(	0.263)	0.165
169	14.08	0.90	0.343	0.126	(	0.309)	0.217
170	14.17	0.90	0.343	0.126	(	0.309)	0.217
171	14.25	0.90	0.343	0.125	(	0.309)	0.218
172	14.33	0.87	0.330	0.124	(	0.297)	0.206
173	14.42	0.87	0.330	0.124	(	0.297)	0.207

174	14.50	0.87	0.330	0.123	(0.297)	0.207
175	14.58	0.87	0.330	0.122	(0.297)	0.208
176	14.67	0.87	0.330	0.122	(0.297)	0.208
177	14.75	0.87	0.330	0.121	(0.297)	0.209
178	14.83	0.83	0.318	0.121	(0.286)	0.197
179	14.92	0.83	0.318	0.120	(0.286)	0.198
180	15.00	0.83	0.318	0.119	(0.286)	0.198
181	15.08	0.80	0.305	0.119	(0.274)	0.186
182	15.17	0.80	0.305	0.118	(0.274)	0.187
183	15.25	0.80	0.305	0.118	(0.274)	0.187
184	15.33	0.77	0.292	0.117	(0.263)	0.175
185	15.42	0.77	0.292	0.116	(0.263)	0.176
186	15.50	0.77	0.292	0.116	(0.263)	0.176
187	15.58	0.63	0.241	0.115	(0.217)	0.126
188	15.67	0.63	0.241	0.115	(0.217)	0.127
189	15.75	0.63	0.241	0.114	(0.217)	0.127
190	15.83	0.63	0.241	0.113	(0.217)	0.128
191	15.92	0.63	0.241	0.113	(0.217)	0.129
192	16.00	0.63	0.241	0.112	(0.217)	0.129
193	16.08	0.13	0.051	(0.112)	0.046	0.005
194	16.17	0.13	0.051	(0.111)	0.046	0.005
195	16.25	0.13	0.051	(0.110)	0.046	0.005
196	16.33	0.13	0.051	(0.110)	0.046	0.005
197	16.42	0.13	0.051	(0.109)	0.046	0.005
198	16.50	0.13	0.051	(0.109)	0.046	0.005
199	16.58	0.10	0.038	(0.108)	0.034	0.004
200	16.67	0.10	0.038	(0.108)	0.034	0.004
201	16.75	0.10	0.038	(0.107)	0.034	0.004
202	16.83	0.10	0.038	(0.107)	0.034	0.004
203	16.92	0.10	0.038	(0.106)	0.034	0.004
204	17.00	0.10	0.038	(0.106)	0.034	0.004
205	17.08	0.17	0.064	(0.105)	0.057	0.006
206	17.17	0.17	0.064	(0.104)	0.057	0.006
207	17.25	0.17	0.064	(0.104)	0.057	0.006
208	17.33	0.17	0.064	(0.103)	0.057	0.006
209	17.42	0.17	0.064	(0.103)	0.057	0.006
210	17.50	0.17	0.064	(0.102)	0.057	0.006
211	17.58	0.17	0.064	(0.102)	0.057	0.006
212	17.67	0.17	0.064	(0.101)	0.057	0.006
213	17.75	0.17	0.064	(0.101)	0.057	0.006
214	17.83	0.13	0.051	(0.100)	0.046	0.005
215	17.92	0.13	0.051	(0.100)	0.046	0.005
216	18.00	0.13	0.051	(0.099)	0.046	0.005
217	18.08	0.13	0.051	(0.099)	0.046	0.005
218	18.17	0.13	0.051	(0.098)	0.046	0.005
219	18.25	0.13	0.051	(0.098)	0.046	0.005
220	18.33	0.13	0.051	(0.097)	0.046	0.005
221	18.42	0.13	0.051	(0.097)	0.046	0.005
222	18.50	0.13	0.051	(0.097)	0.046	0.005
223	18.58	0.10	0.038	(0.096)	0.034	0.004
224	18.67	0.10	0.038	(0.096)	0.034	0.004
225	18.75	0.10	0.038	(0.095)	0.034	0.004
226	18.83	0.07	0.025	(0.095)	0.023	0.003
227	18.92	0.07	0.025	(0.094)	0.023	0.003
228	19.00	0.07	0.025	(0.094)	0.023	0.003
229	19.08	0.10	0.038	(0.093)	0.034	0.004
230	19.17	0.10	0.038	(0.093)	0.034	0.004

231	19.25	0.10	0.038	(0.092)	0.034	0.004
232	19.33	0.13	0.051	(0.092)	0.046	0.005
233	19.42	0.13	0.051	(0.092)	0.046	0.005
234	19.50	0.13	0.051	(0.091)	0.046	0.005
235	19.58	0.10	0.038	(0.091)	0.034	0.004
236	19.67	0.10	0.038	(0.090)	0.034	0.004
237	19.75	0.10	0.038	(0.090)	0.034	0.004
238	19.83	0.07	0.025	(0.090)	0.023	0.003
239	19.92	0.07	0.025	(0.089)	0.023	0.003
240	20.00	0.07	0.025	(0.089)	0.023	0.003
241	20.08	0.10	0.038	(0.088)	0.034	0.004
242	20.17	0.10	0.038	(0.088)	0.034	0.004
243	20.25	0.10	0.038	(0.088)	0.034	0.004
244	20.33	0.10	0.038	(0.087)	0.034	0.004
245	20.42	0.10	0.038	(0.087)	0.034	0.004
246	20.50	0.10	0.038	(0.086)	0.034	0.004
247	20.58	0.10	0.038	(0.086)	0.034	0.004
248	20.67	0.10	0.038	(0.086)	0.034	0.004
249	20.75	0.10	0.038	(0.085)	0.034	0.004
250	20.83	0.07	0.025	(0.085)	0.023	0.003
251	20.92	0.07	0.025	(0.085)	0.023	0.003
252	21.00	0.07	0.025	(0.084)	0.023	0.003
253	21.08	0.10	0.038	(0.084)	0.034	0.004
254	21.17	0.10	0.038	(0.084)	0.034	0.004
255	21.25	0.10	0.038	(0.083)	0.034	0.004
256	21.33	0.07	0.025	(0.083)	0.023	0.003
257	21.42	0.07	0.025	(0.083)	0.023	0.003
258	21.50	0.07	0.025	(0.082)	0.023	0.003
259	21.58	0.10	0.038	(0.082)	0.034	0.004
260	21.67	0.10	0.038	(0.082)	0.034	0.004
261	21.75	0.10	0.038	(0.082)	0.034	0.004
262	21.83	0.07	0.025	(0.081)	0.023	0.003
263	21.92	0.07	0.025	(0.081)	0.023	0.003
264	22.00	0.07	0.025	(0.081)	0.023	0.003
265	22.08	0.10	0.038	(0.080)	0.034	0.004
266	22.17	0.10	0.038	(0.080)	0.034	0.004
267	22.25	0.10	0.038	(0.080)	0.034	0.004
268	22.33	0.07	0.025	(0.080)	0.023	0.003
269	22.42	0.07	0.025	(0.079)	0.023	0.003
270	22.50	0.07	0.025	(0.079)	0.023	0.003
271	22.58	0.07	0.025	(0.079)	0.023	0.003
272	22.67	0.07	0.025	(0.079)	0.023	0.003
273	22.75	0.07	0.025	(0.079)	0.023	0.003
274	22.83	0.07	0.025	(0.078)	0.023	0.003
275	22.92	0.07	0.025	(0.078)	0.023	0.003
276	23.00	0.07	0.025	(0.078)	0.023	0.003
277	23.08	0.07	0.025	(0.078)	0.023	0.003
278	23.17	0.07	0.025	(0.078)	0.023	0.003
279	23.25	0.07	0.025	(0.077)	0.023	0.003
280	23.33	0.07	0.025	(0.077)	0.023	0.003
281	23.42	0.07	0.025	(0.077)	0.023	0.003
282	23.50	0.07	0.025	(0.077)	0.023	0.003
283	23.58	0.07	0.025	(0.077)	0.023	0.003
284	23.67	0.07	0.025	(0.077)	0.023	0.003
285	23.75	0.07	0.025	(0.077)	0.023	0.003
286	23.83	0.07	0.025	(0.077)	0.023	0.003
287	23.92	0.07	0.025	(0.076)	0.023	0.003

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288  24.00     0.07      0.025       (  0.076)       0.023        0.003
            (Loss Rate Not Used)
    Sum =     100.0                                    Sum =    14.0
     Flood volume = Effective rainfall      1.17(In)
      times area       9.2(Ac.)/[(In)/(Ft.)] =       0.9(Ac.Ft)
     Total soil loss =      2.01(In)
     Total soil loss =     1.535(Ac.Ft)
     Total rainfall =      3.18(In)
     Flood volume =       38811.1 Cubic Feet
     Total soil loss =       66885.7 Cubic Feet
     ---------------------------------------------------------------------
      Peak flow rate of this hydrograph =      2.732(CFS)
     ---------------------------------------------------------------------
     +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                        24 - H O U R    S T O R M
                    R u n o f f      H y d r o g r a p h
     ---------------------------------------------------------------------
                 Hydrograph in   5   Minute intervals ((CFS))

     ---------------------------------------------------------------------
 Time(h+m) Volume Ac.Ft   Q(CFS)  0        2.5       5.0       7.5      10.0
 ----------------------------------------------------------------------------
   0+ 5       0.0000      0.00  Q         |         |         |         |
   0+10       0.0001      0.01  Q         |         |         |         |
   0+15       0.0002      0.02  Q         |         |         |         |
   0+20       0.0004      0.02  Q         |         |         |         |
   0+25       0.0006      0.03  Q         |         |         |         |
   0+30       0.0008      0.03  Q         |         |         |         |
   0+35       0.0010      0.03  Q         |         |         |         |
   0+40       0.0012      0.03  Q         |         |         |         |
   0+45       0.0015      0.03  Q         |         |         |         |
   0+50       0.0017      0.04  Q         |         |         |         |
   0+55       0.0020      0.04  Q         |         |         |         |
   1+ 0       0.0023      0.04  Q         |         |         |         |
   1+ 5       0.0026      0.04  Q         |         |         |         |
   1+10       0.0029      0.04  Q         |         |         |         |
   1+15       0.0031      0.04  Q         |         |         |         |
   1+20       0.0034      0.04  Q         |         |         |         |
   1+25       0.0036      0.04  Q         |         |         |         |
   1+30       0.0039      0.04  Q         |         |         |         |
   1+35       0.0041      0.04  Q         |         |         |         |
   1+40       0.0044      0.04  Q         |         |         |         |
   1+45       0.0046      0.04  Q         |         |         |         |
   1+50       0.0049      0.04  Q         |         |         |         |
   1+55       0.0052      0.04  Q         |         |         |         |
   2+ 0       0.0055      0.04  Q         |         |         |         |
   2+ 5       0.0058      0.05  Q         |         |         |         |
   2+10       0.0061      0.05  Q         |         |         |         |
   2+15       0.0064      0.05  Q         |         |         |         |
   2+20       0.0067      0.05  Q         |         |         |         |
   2+25       0.0071      0.05  Q         |         |         |         |
   2+30       0.0074      0.05  Q         |         |         |         |
   2+35       0.0077      0.05  Q         |         |         |         |
   2+40       0.0081      0.05  Q         |         |         |         |
   2+45       0.0085      0.06  Q         |         |         |         |
   2+50       0.0089      0.06  Q         |         |         |         |
   2+55       0.0093      0.06  Q         |         |         |         |
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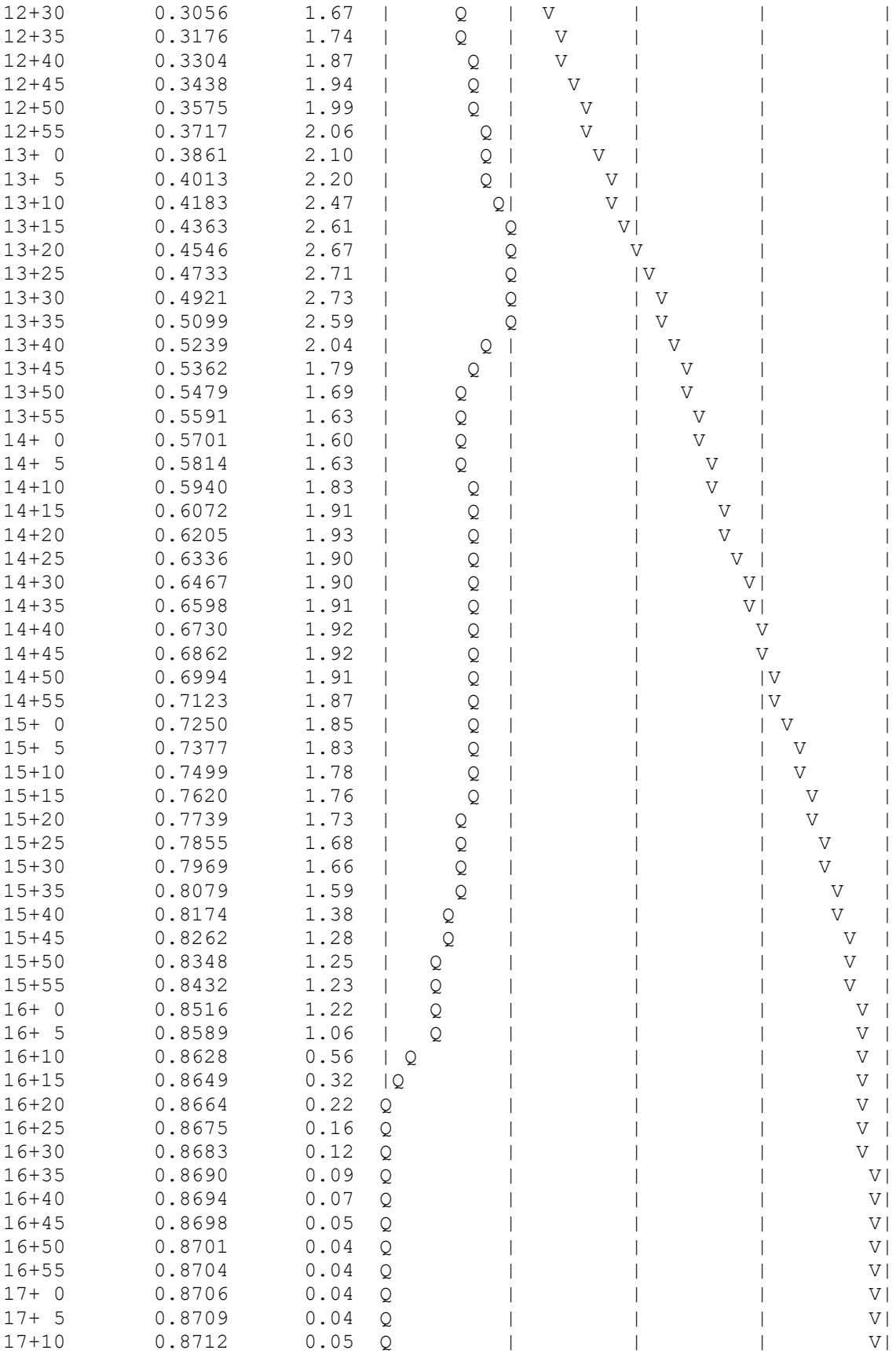
3+ 0	0.0097	0.06	Q				
3+ 5	0.0101	0.06	Q				
3+10	0.0105	0.06	Q				
3+15	0.0109	0.06	Q				
3+20	0.0113	0.06	Q				
3+25	0.0117	0.06	Q				
3+30	0.0121	0.06	Q				
3+35	0.0125	0.06	Q				
3+40	0.0129	0.06	Q				
3+45	0.0133	0.06	Q				
3+50	0.0137	0.06	Q				
3+55	0.0142	0.07	Q				
4+ 0	0.0146	0.07	Q				
4+ 5	0.0151	0.07	Q				
4+10	0.0156	0.07	Q				
4+15	0.0161	0.07	Q				
4+20	0.0165	0.07	Q				
4+25	0.0171	0.08	Q				
4+30	0.0176	0.08	Q				
4+35	0.0182	0.08	Q				
4+40	0.0187	0.08	Q				
4+45	0.0193	0.08	Q				
4+50	0.0199	0.08	Q				
4+55	0.0205	0.09	Q				
5+ 0	0.0211	0.09	Q				
5+ 5	0.0217	0.09	Q				
5+10	0.0223	0.08	Q				
5+15	0.0228	0.08	QV				
5+20	0.0233	0.07	QV				
5+25	0.0238	0.08	QV				
5+30	0.0244	0.08	QV				
5+35	0.0250	0.08	QV				
5+40	0.0256	0.09	QV				
5+45	0.0262	0.09	QV				
5+50	0.0268	0.09	QV				
5+55	0.0275	0.09	QV				
6+ 0	0.0281	0.09	QV				
6+ 5	0.0288	0.09	QV				
6+10	0.0295	0.10	QV				
6+15	0.0302	0.10	QV				
6+20	0.0309	0.10	QV				
6+25	0.0316	0.10	QV				
6+30	0.0323	0.10	QV				
6+35	0.0331	0.11	QV				
6+40	0.0338	0.11	QV				
6+45	0.0346	0.11	QV				
6+50	0.0354	0.12	QV				
6+55	0.0362	0.12	QV				
7+ 0	0.0370	0.12	QV				
7+ 5	0.0378	0.12	QV				
7+10	0.0386	0.12	QV				
7+15	0.0394	0.12	QV				
7+20	0.0403	0.12	QV				
7+25	0.0411	0.12	QV				
7+30	0.0420	0.13	QV				
7+35	0.0429	0.13	QV				
7+40	0.0438	0.13	QV				

7+45	0.0448	0.14	Q V	|	|	|	|
7+50	0.0457	0.14	Q V	|	|	|	|
7+55	0.0467	0.15	Q V	|	|	|	|
8+ 0	0.0478	0.15	Q V	|	|	|	|
8+ 5	0.0488	0.15	Q V	|	|	|	|
8+10	0.0499	0.16	Q V	|	|	|	|
8+15	0.0511	0.17	Q V	|	|	|	|
8+20	0.0523	0.17	Q V	|	|	|	|
8+25	0.0535	0.17	Q V	|	|	|	|
8+30	0.0547	0.17	Q V	|	|	|	|
8+35	0.0560	0.19	Q V	|	|	|	|
8+40	0.0575	0.22	Q V	|	|	|	|
8+45	0.0592	0.25	Q V	|	|	|	|
8+50	0.0611	0.27	|QV	|	|	|	|
8+55	0.0634	0.34	|QV	|	|	|	|
9+ 0	0.0660	0.37	|QV	|	|	|	|
9+ 5	0.0689	0.42	|Q V	|	|	|	|
9+10	0.0725	0.54	| QV	|	|	|	|
9+15	0.0767	0.60	| QV	|	|	|	|
9+20	0.0811	0.64	| QV	|	|	|	|
9+25	0.0860	0.71	| QV	|	|	|	|
9+30	0.0912	0.76	| QV	|	|	|	|
9+35	0.0967	0.79	| QV	|	|	|	|
9+40	0.1026	0.86	| QV	|	|	|	|
9+45	0.1088	0.90	| QV	|	|	|	|
9+50	0.1153	0.94	| Q V	|	|	|	|
9+55	0.1222	1.00	| QV	|	|	|	|
10+ 0	0.1293	1.04	| QV	|	|	|	|
10+ 5	0.1359	0.96	| Q V	|	|	|	|
10+10	0.1402	0.61	| Q V	|	|	|	|
10+15	0.1433	0.46	|Q V	|	|	|	|
10+20	0.1461	0.40	|Q V	|	|	|	|
10+25	0.1486	0.37	|Q V	|	|	|	|
10+30	0.1510	0.35	|Q V	|	|	|	|
10+35	0.1539	0.41	|Q V	|	|	|	|
10+40	0.1584	0.66	| Q V	|	|	|	|
10+45	0.1638	0.78	| Q V	|	|	|	|
10+50	0.1696	0.83	| Q V	|	|	|	|
10+55	0.1755	0.86	| Q V	|	|	|	|
11+ 0	0.1817	0.89	| Q V |	|	|	|	|
11+ 5	0.1878	0.90	| Q V |	|	|	|	|
11+10	0.1938	0.86	| Q V |	|	|	|	|
11+15	0.1996	0.85	| Q V |	|	|	|	|
11+20	0.2055	0.85	| Q V|	|	|	|	|
11+25	0.2114	0.86	| Q V|	|	|	|	|
11+30	0.2173	0.86	| Q V|	|	|	|	|
11+35	0.2231	0.83	| Q V	|	|	|	|
11+40	0.2281	0.74	| Q V	|	|	|	|
11+45	0.2329	0.69	| Q V	|	|	|	|
11+50	0.2377	0.69	| Q V	|	|	|	|
11+55	0.2428	0.74	| Q V	|	|	|	|
12+ 0	0.2481	0.76	| Q |V	|	|	|	|
12+ 5	0.2541	0.88	| Q |V	|	|	|	|
12+10	0.2627	1.25	| Q |V	|	|	|	|
12+15	0.2725	1.42	| Q | V	|	|	|	|
12+20	0.2829	1.52	| Q | V	|	|	|	|
12+25	0.2941	1.61	| Q | V	|	|	|	|



17+15	0.8716	0.05	Q	|	|	|	V|
17+20	0.8720	0.06	Q	|	|	|	V|
17+25	0.8723	0.06	Q	|	|	|	V|
17+30	0.8727	0.06	Q	|	|	|	V|
17+35	0.8731	0.06	Q	|	|	|	V|
17+40	0.8735	0.06	Q	|	|	|	V|
17+45	0.8739	0.06	Q	|	|	|	V|
17+50	0.8743	0.06	Q	|	|	|	V|
17+55	0.8747	0.05	Q	|	|	|	V|
18+ 0	0.8750	0.05	Q	|	|	|	V|
18+ 5	0.8754	0.05	Q	|	|	|	V|
18+10	0.8757	0.05	Q	|	|	|	V|
18+15	0.8760	0.05	Q	|	|	|	V|
18+20	0.8764	0.05	Q	|	|	|	V|
18+25	0.8767	0.05	Q	|	|	|	V|
18+30	0.8770	0.05	Q	|	|	|	V|
18+35	0.8773	0.05	Q	|	|	|	V|
18+40	0.8776	0.04	Q	|	|	|	V|
18+45	0.8779	0.04	Q	|	|	|	V|
18+50	0.8781	0.04	Q	|	|	|	V|
18+55	0.8783	0.03	Q	|	|	|	V|
19+ 0	0.8785	0.03	Q	|	|	|	V|
19+ 5	0.8787	0.03	Q	|	|	|	V|
19+10	0.8789	0.03	Q	|	|	|	V|
19+15	0.8791	0.03	Q	|	|	|	V|
19+20	0.8794	0.04	Q	|	|	|	V|
19+25	0.8797	0.04	Q	|	|	|	V|
19+30	0.8800	0.04	Q	|	|	|	V|
19+35	0.8803	0.04	Q	|	|	|	V|
19+40	0.8805	0.04	Q	|	|	|	V|
19+45	0.8808	0.04	Q	|	|	|	V|
19+50	0.8810	0.03	Q	|	|	|	V|
19+55	0.8812	0.03	Q	|	|	|	V|
20+ 0	0.8814	0.03	Q	|	|	|	V|
20+ 5	0.8816	0.03	Q	|	|	|	V|
20+10	0.8818	0.03	Q	|	|	|	V|
20+15	0.8820	0.03	Q	|	|	|	V|
20+20	0.8823	0.03	Q	|	|	|	V|
20+25	0.8825	0.03	Q	|	|	|	V|
20+30	0.8828	0.03	Q	|	|	|	V|
20+35	0.8830	0.03	Q	|	|	|	V|
20+40	0.8832	0.03	Q	|	|	|	V|
20+45	0.8835	0.04	Q	|	|	|	V|
20+50	0.8837	0.03	Q	|	|	|	V|
20+55	0.8839	0.03	Q	|	|	|	V|
21+ 0	0.8841	0.03	Q	|	|	|	V|
21+ 5	0.8843	0.03	Q	|	|	|	V|
21+10	0.8845	0.03	Q	|	|	|	V|
21+15	0.8847	0.03	Q	|	|	|	V|
21+20	0.8849	0.03	Q	|	|	|	V|
21+25	0.8851	0.03	Q	|	|	|	V|
21+30	0.8853	0.03	Q	|	|	|	V|
21+35	0.8855	0.03	Q	|	|	|	V|
21+40	0.8857	0.03	Q	|	|	|	V|
21+45	0.8859	0.03	Q	|	|	|	V|
21+50	0.8862	0.03	Q	|	|	|	V|
21+55	0.8863	0.03	Q	|	|	|	V|

22+ 0	0.8865	0.03	Q	|	|	|	V|
22+ 5	0.8867	0.03	Q	|	|	|	V|
22+10	0.8869	0.03	Q	|	|	|	V|
22+15	0.8871	0.03	Q	|	|	|	V|
22+20	0.8874	0.03	Q	|	|	|	V|
22+25	0.8876	0.03	Q	|	|	|	V|
22+30	0.8877	0.03	Q	|	|	|	V|
22+35	0.8879	0.02	Q	|	|	|	V|
22+40	0.8881	0.02	Q	|	|	|	V|
22+45	0.8882	0.02	Q	|	|	|	V|
22+50	0.8884	0.02	Q	|	|	|	V|
22+55	0.8886	0.02	Q	|	|	|	V|
23+ 0	0.8887	0.02	Q	|	|	|	V|
23+ 5	0.8889	0.02	Q	|	|	|	V|
23+10	0.8891	0.02	Q	|	|	|	V|
23+15	0.8892	0.02	Q	|	|	|	V|
23+20	0.8894	0.02	Q	|	|	|	V|
23+25	0.8895	0.02	Q	|	|	|	V|
23+30	0.8897	0.02	Q	|	|	|	V|
23+35	0.8899	0.02	Q	|	|	|	V|
23+40	0.8900	0.02	Q	|	|	|	V|
23+45	0.8902	0.02	Q	|	|	|	V|
23+50	0.8903	0.02	Q	|	|	|	V|
23+55	0.8905	0.02	Q	|	|	|	V|
24+ 0	0.8907	0.02	Q	|	|	|	V|
24+ 5	0.8908	0.02	Q	|	|	|	V|
24+10	0.8909	0.01	Q	|	|	|	V|
24+15	0.8909	0.01	Q	|	|	|	V|
24+20	0.8909	0.00	Q	|	|	|	V|
24+25	0.8910	0.00	Q	|	|	|	V|
24+30	0.8910	0.00	Q	|	|	|	V|
24+35	0.8910	0.00	Q	|	|	|	V|
24+40	0.8910	0.00	Q	|	|	|	V|
24+45	0.8910	0.00	Q	|	|	|	V|
24+50	0.8910	0.00	Q	|	|	|	V|

U n i t H y d r o g r a p h A n a l y s i s

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Study date 11/05/21 File: northexC2410.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 4011

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Evans Community Park 10-year, 24-hour Storm Event
Existing Condition (Southerly Portion of Site)
Job 21-003
11/5/21

Drainage Area = 5.15(Ac.) = 0.008 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 5.15(Ac.) = 0.008 Sq. Mi.
Length along longest watercourse = 895.00(Ft.)
Length along longest watercourse measured to centroid = 493.00(Ft.)
Length along longest watercourse = 0.170 Mi.
Length along longest watercourse measured to centroid = 0.093 Mi.
Difference in elevation = 9.00(Ft.)
Slope along watercourse = 53.0950 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.070 Hr.
Lag time = 4.20 Min.
25% of lag time = 1.05 Min.
40% of lag time = 1.68 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.15	1.90	9.79

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]

5.15 5.00 25.75

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 1.900(In)
Area Averaged 100-Year Rainfall = 5.000(In)

Point rain (area averaged) = 3.175(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 3.175(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
0.980	75.00	0.000
4.170	90.00	0.000

Total Area Entered = 5.15(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
75.0	75.0	0.303	0.000	0.303	0.190	0.058
90.0	90.0	0.130	0.000	0.130	0.810	0.105
					Sum (F) =	0.163

Area averaged mean soil loss (F) (In/Hr) = 0.163
Minimum soil loss rate ((In/Hr)) = 0.081
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	118.980	24.903	1.293
2	0.167	237.960	48.748	2.530
3	0.250	356.940	13.399	0.695
4	0.333	475.920	6.077	0.315
5	0.417	594.900	3.399	0.176
6	0.500	713.879	1.967	0.102
7	0.583	832.859	1.508	0.078
			Sum = 100.000	Sum= 5.190

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.025	(0.289)	0.023	0.003
2	0.17	0.07	0.025	(0.288)	0.023	0.003
3	0.25	0.07	0.025	(0.287)	0.023	0.003
4	0.33	0.10	0.038	(0.285)	0.034	0.004
5	0.42	0.10	0.038	(0.284)	0.034	0.004

6	0.50	0.10	0.038	(0.283)	0.034	0.004
7	0.58	0.10	0.038	(0.282)	0.034	0.004
8	0.67	0.10	0.038	(0.281)	0.034	0.004
9	0.75	0.10	0.038	(0.280)	0.034	0.004
10	0.83	0.13	0.051	(0.279)	0.046	0.005
11	0.92	0.13	0.051	(0.278)	0.046	0.005
12	1.00	0.13	0.051	(0.277)	0.046	0.005
13	1.08	0.10	0.038	(0.276)	0.034	0.004
14	1.17	0.10	0.038	(0.274)	0.034	0.004
15	1.25	0.10	0.038	(0.273)	0.034	0.004
16	1.33	0.10	0.038	(0.272)	0.034	0.004
17	1.42	0.10	0.038	(0.271)	0.034	0.004
18	1.50	0.10	0.038	(0.270)	0.034	0.004
19	1.58	0.10	0.038	(0.269)	0.034	0.004
20	1.67	0.10	0.038	(0.268)	0.034	0.004
21	1.75	0.10	0.038	(0.267)	0.034	0.004
22	1.83	0.13	0.051	(0.266)	0.046	0.005
23	1.92	0.13	0.051	(0.265)	0.046	0.005
24	2.00	0.13	0.051	(0.264)	0.046	0.005
25	2.08	0.13	0.051	(0.263)	0.046	0.005
26	2.17	0.13	0.051	(0.262)	0.046	0.005
27	2.25	0.13	0.051	(0.260)	0.046	0.005
28	2.33	0.13	0.051	(0.259)	0.046	0.005
29	2.42	0.13	0.051	(0.258)	0.046	0.005
30	2.50	0.13	0.051	(0.257)	0.046	0.005
31	2.58	0.17	0.064	(0.256)	0.057	0.006
32	2.67	0.17	0.064	(0.255)	0.057	0.006
33	2.75	0.17	0.064	(0.254)	0.057	0.006
34	2.83	0.17	0.064	(0.253)	0.057	0.006
35	2.92	0.17	0.064	(0.252)	0.057	0.006
36	3.00	0.17	0.064	(0.251)	0.057	0.006
37	3.08	0.17	0.064	(0.250)	0.057	0.006
38	3.17	0.17	0.064	(0.249)	0.057	0.006
39	3.25	0.17	0.064	(0.248)	0.057	0.006
40	3.33	0.17	0.064	(0.247)	0.057	0.006
41	3.42	0.17	0.064	(0.246)	0.057	0.006
42	3.50	0.17	0.064	(0.245)	0.057	0.006
43	3.58	0.17	0.064	(0.244)	0.057	0.006
44	3.67	0.17	0.064	(0.243)	0.057	0.006
45	3.75	0.17	0.064	(0.242)	0.057	0.006
46	3.83	0.20	0.076	(0.241)	0.069	0.008
47	3.92	0.20	0.076	(0.240)	0.069	0.008
48	4.00	0.20	0.076	(0.239)	0.069	0.008
49	4.08	0.20	0.076	(0.238)	0.069	0.008
50	4.17	0.20	0.076	(0.237)	0.069	0.008
51	4.25	0.20	0.076	(0.236)	0.069	0.008
52	4.33	0.23	0.089	(0.235)	0.080	0.009
53	4.42	0.23	0.089	(0.234)	0.080	0.009
54	4.50	0.23	0.089	(0.233)	0.080	0.009
55	4.58	0.23	0.089	(0.232)	0.080	0.009
56	4.67	0.23	0.089	(0.231)	0.080	0.009
57	4.75	0.23	0.089	(0.230)	0.080	0.009
58	4.83	0.27	0.102	(0.229)	0.091	0.010
59	4.92	0.27	0.102	(0.228)	0.091	0.010
60	5.00	0.27	0.102	(0.227)	0.091	0.010
61	5.08	0.20	0.076	(0.226)	0.069	0.008
62	5.17	0.20	0.076	(0.225)	0.069	0.008

63	5.25	0.20	0.076	(0.224)	0.069	0.008
64	5.33	0.23	0.089	(0.223)	0.080	0.009
65	5.42	0.23	0.089	(0.222)	0.080	0.009
66	5.50	0.23	0.089	(0.221)	0.080	0.009
67	5.58	0.27	0.102	(0.220)	0.091	0.010
68	5.67	0.27	0.102	(0.219)	0.091	0.010
69	5.75	0.27	0.102	(0.218)	0.091	0.010
70	5.83	0.27	0.102	(0.217)	0.091	0.010
71	5.92	0.27	0.102	(0.216)	0.091	0.010
72	6.00	0.27	0.102	(0.215)	0.091	0.010
73	6.08	0.30	0.114	(0.214)	0.103	0.011
74	6.17	0.30	0.114	(0.213)	0.103	0.011
75	6.25	0.30	0.114	(0.212)	0.103	0.011
76	6.33	0.30	0.114	(0.211)	0.103	0.011
77	6.42	0.30	0.114	(0.210)	0.103	0.011
78	6.50	0.30	0.114	(0.209)	0.103	0.011
79	6.58	0.33	0.127	(0.208)	0.114	0.013
80	6.67	0.33	0.127	(0.207)	0.114	0.013
81	6.75	0.33	0.127	(0.207)	0.114	0.013
82	6.83	0.33	0.127	(0.206)	0.114	0.013
83	6.92	0.33	0.127	(0.205)	0.114	0.013
84	7.00	0.33	0.127	(0.204)	0.114	0.013
85	7.08	0.33	0.127	(0.203)	0.114	0.013
86	7.17	0.33	0.127	(0.202)	0.114	0.013
87	7.25	0.33	0.127	(0.201)	0.114	0.013
88	7.33	0.37	0.140	(0.200)	0.126	0.014
89	7.42	0.37	0.140	(0.199)	0.126	0.014
90	7.50	0.37	0.140	(0.198)	0.126	0.014
91	7.58	0.40	0.152	(0.197)	0.137	0.015
92	7.67	0.40	0.152	(0.196)	0.137	0.015
93	7.75	0.40	0.152	(0.196)	0.137	0.015
94	7.83	0.43	0.165	(0.195)	0.149	0.017
95	7.92	0.43	0.165	(0.194)	0.149	0.017
96	8.00	0.43	0.165	(0.193)	0.149	0.017
97	8.08	0.50	0.191	(0.192)	0.171	0.019
98	8.17	0.50	0.191	(0.191)	0.171	0.019
99	8.25	0.50	0.191	(0.190)	0.171	0.019
100	8.33	0.50	0.191	(0.189)	0.171	0.019
101	8.42	0.50	0.191	(0.188)	0.171	0.019
102	8.50	0.50	0.191	(0.187)	0.171	0.019
103	8.58	0.53	0.203	(0.187)	0.183	0.020
104	8.67	0.53	0.203	(0.186)	0.183	0.020
105	8.75	0.53	0.203	(0.185)	0.183	0.020
106	8.83	0.57	0.216	0.184	(0.194)	0.032
107	8.92	0.57	0.216	0.183	(0.194)	0.033
108	9.00	0.57	0.216	0.182	(0.194)	0.034
109	9.08	0.63	0.241	0.181	(0.217)	0.060
110	9.17	0.63	0.241	0.181	(0.217)	0.061
111	9.25	0.63	0.241	0.180	(0.217)	0.062
112	9.33	0.67	0.254	0.179	(0.229)	0.075
113	9.42	0.67	0.254	0.178	(0.229)	0.076
114	9.50	0.67	0.254	0.177	(0.229)	0.077
115	9.58	0.70	0.267	0.176	(0.240)	0.090
116	9.67	0.70	0.267	0.175	(0.240)	0.091
117	9.75	0.70	0.267	0.175	(0.240)	0.092
118	9.83	0.73	0.279	0.174	(0.251)	0.106
119	9.92	0.73	0.279	0.173	(0.251)	0.107

120	10.00	0.73	0.279	0.172	(	0.251)	0.107
121	10.08	0.50	0.191	0.171	(	0.171)	0.019
122	10.17	0.50	0.191	0.170	(	0.171)	0.020
123	10.25	0.50	0.191	0.170	(	0.171)	0.021
124	10.33	0.50	0.191	0.169	(	0.171)	0.022
125	10.42	0.50	0.191	0.168	(	0.171)	0.023
126	10.50	0.50	0.191	0.167	(	0.171)	0.023
127	10.58	0.67	0.254	0.166	(	0.229)	0.088
128	10.67	0.67	0.254	0.165	(	0.229)	0.089
129	10.75	0.67	0.254	0.165	(	0.229)	0.089
130	10.83	0.67	0.254	0.164	(	0.229)	0.090
131	10.92	0.67	0.254	0.163	(	0.229)	0.091
132	11.00	0.67	0.254	0.162	(	0.229)	0.092
133	11.08	0.63	0.241	0.161	(	0.217)	0.080
134	11.17	0.63	0.241	0.161	(	0.217)	0.081
135	11.25	0.63	0.241	0.160	(	0.217)	0.081
136	11.33	0.63	0.241	0.159	(	0.217)	0.082
137	11.42	0.63	0.241	0.158	(	0.217)	0.083
138	11.50	0.63	0.241	0.157	(	0.217)	0.084
139	11.58	0.57	0.216	0.157	(	0.194)	0.059
140	11.67	0.57	0.216	0.156	(	0.194)	0.060
141	11.75	0.57	0.216	0.155	(	0.194)	0.061
142	11.83	0.60	0.229	0.154	(	0.206)	0.074
143	11.92	0.60	0.229	0.154	(	0.206)	0.075
144	12.00	0.60	0.229	0.153	(	0.206)	0.076
145	12.08	0.83	0.318	0.152	(	0.286)	0.165
146	12.17	0.83	0.318	0.151	(	0.286)	0.166
147	12.25	0.83	0.318	0.151	(	0.286)	0.167
148	12.33	0.87	0.330	0.150	(	0.297)	0.180
149	12.42	0.87	0.330	0.149	(	0.297)	0.181
150	12.50	0.87	0.330	0.148	(	0.297)	0.182
151	12.58	0.93	0.356	0.148	(	0.320)	0.208
152	12.67	0.93	0.356	0.147	(	0.320)	0.209
153	12.75	0.93	0.356	0.146	(	0.320)	0.210
154	12.83	0.97	0.368	0.145	(	0.332)	0.223
155	12.92	0.97	0.368	0.145	(	0.332)	0.224
156	13.00	0.97	0.368	0.144	(	0.332)	0.224
157	13.08	1.13	0.432	0.143	(	0.389)	0.289
158	13.17	1.13	0.432	0.142	(	0.389)	0.289
159	13.25	1.13	0.432	0.142	(	0.389)	0.290
160	13.33	1.13	0.432	0.141	(	0.389)	0.291
161	13.42	1.13	0.432	0.140	(	0.389)	0.292
162	13.50	1.13	0.432	0.140	(	0.389)	0.292
163	13.58	0.77	0.292	0.139	(	0.263)	0.153
164	13.67	0.77	0.292	0.138	(	0.263)	0.154
165	13.75	0.77	0.292	0.137	(	0.263)	0.155
166	13.83	0.77	0.292	0.137	(	0.263)	0.155
167	13.92	0.77	0.292	0.136	(	0.263)	0.156
168	14.00	0.77	0.292	0.135	(	0.263)	0.157
169	14.08	0.90	0.343	0.135	(	0.309)	0.208
170	14.17	0.90	0.343	0.134	(	0.309)	0.209
171	14.25	0.90	0.343	0.133	(	0.309)	0.210
172	14.33	0.87	0.330	0.133	(	0.297)	0.198
173	14.42	0.87	0.330	0.132	(	0.297)	0.198
174	14.50	0.87	0.330	0.131	(	0.297)	0.199
175	14.58	0.87	0.330	0.131	(	0.297)	0.200
176	14.67	0.87	0.330	0.130	(	0.297)	0.200

177	14.75	0.87	0.330	0.129	(0.297)	0.201
178	14.83	0.83	0.318	0.129	(0.286)	0.189
179	14.92	0.83	0.318	0.128	(0.286)	0.190
180	15.00	0.83	0.318	0.127	(0.286)	0.190
181	15.08	0.80	0.305	0.127	(0.274)	0.178
182	15.17	0.80	0.305	0.126	(0.274)	0.179
183	15.25	0.80	0.305	0.125	(0.274)	0.180
184	15.33	0.77	0.292	0.125	(0.263)	0.167
185	15.42	0.77	0.292	0.124	(0.263)	0.168
186	15.50	0.77	0.292	0.123	(0.263)	0.169
187	15.58	0.63	0.241	0.123	(0.217)	0.119
188	15.67	0.63	0.241	0.122	(0.217)	0.119
189	15.75	0.63	0.241	0.121	(0.217)	0.120
190	15.83	0.63	0.241	0.121	(0.217)	0.120
191	15.92	0.63	0.241	0.120	(0.217)	0.121
192	16.00	0.63	0.241	0.120	(0.217)	0.122
193	16.08	0.13	0.051	(0.119)	0.046	0.005
194	16.17	0.13	0.051	(0.118)	0.046	0.005
195	16.25	0.13	0.051	(0.118)	0.046	0.005
196	16.33	0.13	0.051	(0.117)	0.046	0.005
197	16.42	0.13	0.051	(0.117)	0.046	0.005
198	16.50	0.13	0.051	(0.116)	0.046	0.005
199	16.58	0.10	0.038	(0.115)	0.034	0.004
200	16.67	0.10	0.038	(0.115)	0.034	0.004
201	16.75	0.10	0.038	(0.114)	0.034	0.004
202	16.83	0.10	0.038	(0.114)	0.034	0.004
203	16.92	0.10	0.038	(0.113)	0.034	0.004
204	17.00	0.10	0.038	(0.113)	0.034	0.004
205	17.08	0.17	0.064	(0.112)	0.057	0.006
206	17.17	0.17	0.064	(0.111)	0.057	0.006
207	17.25	0.17	0.064	(0.111)	0.057	0.006
208	17.33	0.17	0.064	(0.110)	0.057	0.006
209	17.42	0.17	0.064	(0.110)	0.057	0.006
210	17.50	0.17	0.064	(0.109)	0.057	0.006
211	17.58	0.17	0.064	(0.109)	0.057	0.006
212	17.67	0.17	0.064	(0.108)	0.057	0.006
213	17.75	0.17	0.064	(0.108)	0.057	0.006
214	17.83	0.13	0.051	(0.107)	0.046	0.005
215	17.92	0.13	0.051	(0.106)	0.046	0.005
216	18.00	0.13	0.051	(0.106)	0.046	0.005
217	18.08	0.13	0.051	(0.105)	0.046	0.005
218	18.17	0.13	0.051	(0.105)	0.046	0.005
219	18.25	0.13	0.051	(0.104)	0.046	0.005
220	18.33	0.13	0.051	(0.104)	0.046	0.005
221	18.42	0.13	0.051	(0.103)	0.046	0.005
222	18.50	0.13	0.051	(0.103)	0.046	0.005
223	18.58	0.10	0.038	(0.102)	0.034	0.004
224	18.67	0.10	0.038	(0.102)	0.034	0.004
225	18.75	0.10	0.038	(0.101)	0.034	0.004
226	18.83	0.07	0.025	(0.101)	0.023	0.003
227	18.92	0.07	0.025	(0.100)	0.023	0.003
228	19.00	0.07	0.025	(0.100)	0.023	0.003
229	19.08	0.10	0.038	(0.100)	0.034	0.004
230	19.17	0.10	0.038	(0.099)	0.034	0.004
231	19.25	0.10	0.038	(0.099)	0.034	0.004
232	19.33	0.13	0.051	(0.098)	0.046	0.005
233	19.42	0.13	0.051	(0.098)	0.046	0.005

234	19.50	0.13	0.051	(0.097)	0.046	0.005
235	19.58	0.10	0.038	(0.097)	0.034	0.004
236	19.67	0.10	0.038	(0.096)	0.034	0.004
237	19.75	0.10	0.038	(0.096)	0.034	0.004
238	19.83	0.07	0.025	(0.095)	0.023	0.003
239	19.92	0.07	0.025	(0.095)	0.023	0.003
240	20.00	0.07	0.025	(0.095)	0.023	0.003
241	20.08	0.10	0.038	(0.094)	0.034	0.004
242	20.17	0.10	0.038	(0.094)	0.034	0.004
243	20.25	0.10	0.038	(0.093)	0.034	0.004
244	20.33	0.10	0.038	(0.093)	0.034	0.004
245	20.42	0.10	0.038	(0.093)	0.034	0.004
246	20.50	0.10	0.038	(0.092)	0.034	0.004
247	20.58	0.10	0.038	(0.092)	0.034	0.004
248	20.67	0.10	0.038	(0.091)	0.034	0.004
249	20.75	0.10	0.038	(0.091)	0.034	0.004
250	20.83	0.07	0.025	(0.091)	0.023	0.003
251	20.92	0.07	0.025	(0.090)	0.023	0.003
252	21.00	0.07	0.025	(0.090)	0.023	0.003
253	21.08	0.10	0.038	(0.090)	0.034	0.004
254	21.17	0.10	0.038	(0.089)	0.034	0.004
255	21.25	0.10	0.038	(0.089)	0.034	0.004
256	21.33	0.07	0.025	(0.089)	0.023	0.003
257	21.42	0.07	0.025	(0.088)	0.023	0.003
258	21.50	0.07	0.025	(0.088)	0.023	0.003
259	21.58	0.10	0.038	(0.088)	0.034	0.004
260	21.67	0.10	0.038	(0.087)	0.034	0.004
261	21.75	0.10	0.038	(0.087)	0.034	0.004
262	21.83	0.07	0.025	(0.087)	0.023	0.003
263	21.92	0.07	0.025	(0.086)	0.023	0.003
264	22.00	0.07	0.025	(0.086)	0.023	0.003
265	22.08	0.10	0.038	(0.086)	0.034	0.004
266	22.17	0.10	0.038	(0.085)	0.034	0.004
267	22.25	0.10	0.038	(0.085)	0.034	0.004
268	22.33	0.07	0.025	(0.085)	0.023	0.003
269	22.42	0.07	0.025	(0.085)	0.023	0.003
270	22.50	0.07	0.025	(0.084)	0.023	0.003
271	22.58	0.07	0.025	(0.084)	0.023	0.003
272	22.67	0.07	0.025	(0.084)	0.023	0.003
273	22.75	0.07	0.025	(0.084)	0.023	0.003
274	22.83	0.07	0.025	(0.083)	0.023	0.003
275	22.92	0.07	0.025	(0.083)	0.023	0.003
276	23.00	0.07	0.025	(0.083)	0.023	0.003
277	23.08	0.07	0.025	(0.083)	0.023	0.003
278	23.17	0.07	0.025	(0.083)	0.023	0.003
279	23.25	0.07	0.025	(0.083)	0.023	0.003
280	23.33	0.07	0.025	(0.082)	0.023	0.003
281	23.42	0.07	0.025	(0.082)	0.023	0.003
282	23.50	0.07	0.025	(0.082)	0.023	0.003
283	23.58	0.07	0.025	(0.082)	0.023	0.003
284	23.67	0.07	0.025	(0.082)	0.023	0.003
285	23.75	0.07	0.025	(0.082)	0.023	0.003
286	23.83	0.07	0.025	(0.082)	0.023	0.003
287	23.92	0.07	0.025	(0.082)	0.023	0.003
288	24.00	0.07	0.025	(0.081)	0.023	0.003
		(Loss Rate Not Used)				
	Sum =	100.0			Sum =	13.2

Flood volume = Effective rainfall 1.10(In)
times area 5.2(Ac.)/[(In)/(Ft.)] = 0.5(Ac.Ft)
Total soil loss = 2.08(In)
Total soil loss = 0.892(Ac.Ft)
Total rainfall = 3.18(In)
Flood volume = 20493.6 Cubic Feet
Total soil loss = 38867.6 Cubic Feet

Peak flow rate of this hydrograph = 1.508(CFS)

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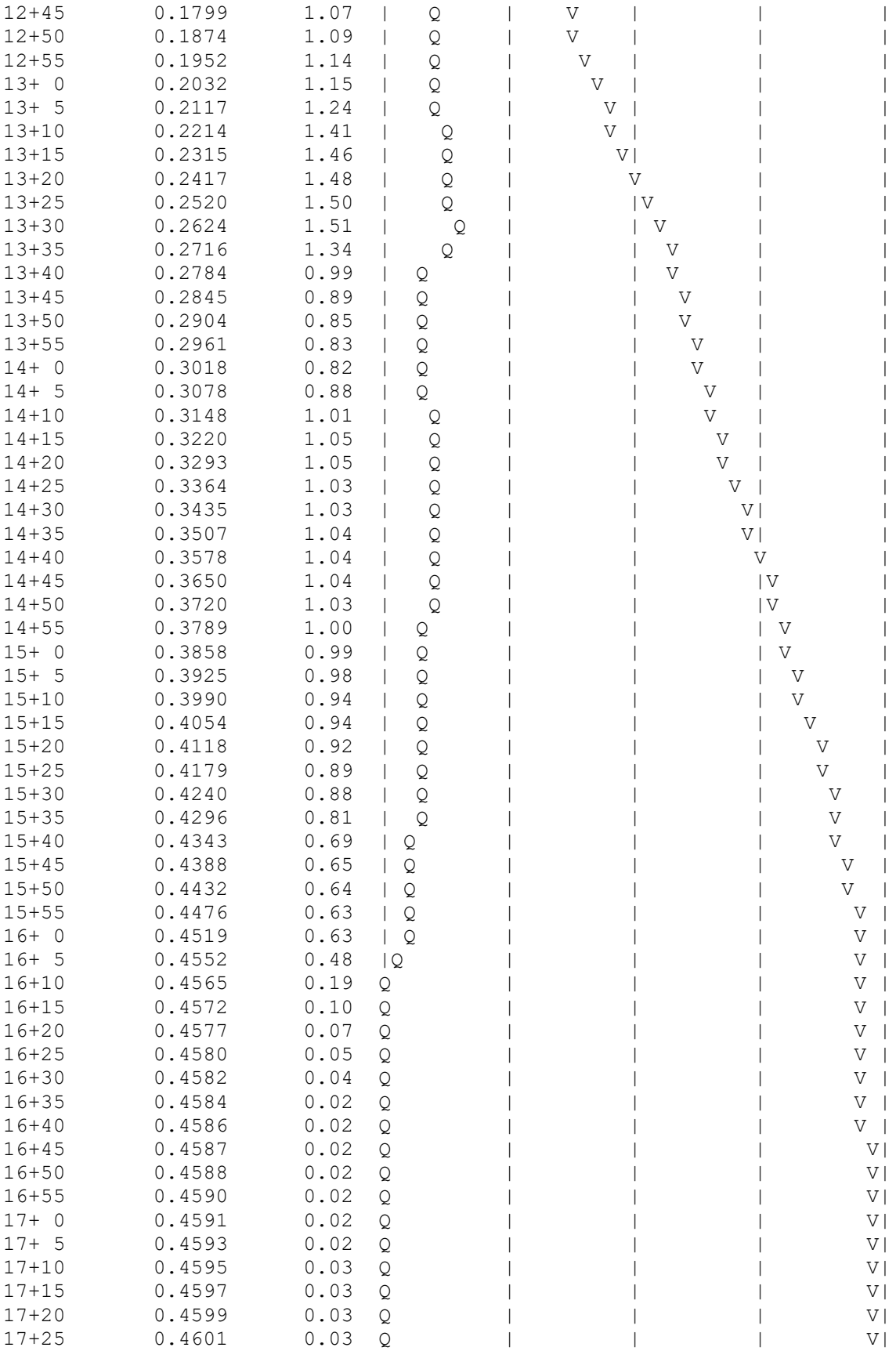
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0000	0.00	Q				
0+10	0.0001	0.01	Q				
0+15	0.0002	0.01	Q				
0+20	0.0003	0.01	Q				
0+25	0.0004	0.02	Q				
0+30	0.0005	0.02	Q				
0+35	0.0006	0.02	Q				
0+40	0.0008	0.02	Q				
0+45	0.0009	0.02	Q				
0+50	0.0011	0.02	Q				
0+55	0.0012	0.02	Q				
1+ 0	0.0014	0.03	Q				
1+ 5	0.0016	0.02	Q				
1+10	0.0017	0.02	Q				
1+15	0.0019	0.02	Q				
1+20	0.0020	0.02	Q				
1+25	0.0021	0.02	Q				
1+30	0.0023	0.02	Q				
1+35	0.0024	0.02	Q				
1+40	0.0026	0.02	Q				
1+45	0.0027	0.02	Q				
1+50	0.0028	0.02	Q				
1+55	0.0030	0.02	Q				
2+ 0	0.0032	0.03	Q				
2+ 5	0.0034	0.03	Q				
2+10	0.0035	0.03	Q				
2+15	0.0037	0.03	Q				
2+20	0.0039	0.03	Q				
2+25	0.0041	0.03	Q				
2+30	0.0043	0.03	Q				
2+35	0.0045	0.03	Q				
2+40	0.0047	0.03	Q				
2+45	0.0049	0.03	Q				
2+50	0.0051	0.03	Q				
2+55	0.0053	0.03	Q				
3+ 0	0.0056	0.03	Q				
3+ 5	0.0058	0.03	Q				
3+10	0.0060	0.03	Q				

3+15	0.0063	0.03	Q				
3+20	0.0065	0.03	Q				
3+25	0.0067	0.03	Q				
3+30	0.0069	0.03	Q				
3+35	0.0072	0.03	Q				
3+40	0.0074	0.03	Q				
3+45	0.0076	0.03	Q				
3+50	0.0079	0.03	Q				
3+55	0.0081	0.04	Q				
4+ 0	0.0084	0.04	Q				
4+ 5	0.0087	0.04	Q				
4+10	0.0089	0.04	Q				
4+15	0.0092	0.04	Q				
4+20	0.0095	0.04	Q				
4+25	0.0098	0.04	Q				
4+30	0.0101	0.05	Q				
4+35	0.0104	0.05	Q				
4+40	0.0107	0.05	Q				
4+45	0.0110	0.05	Q				
4+50	0.0114	0.05	Q				
4+55	0.0117	0.05	Q				
5+ 0	0.0121	0.05	QV				
5+ 5	0.0124	0.05	QV				
5+10	0.0127	0.04	QV				
5+15	0.0130	0.04	QV				
5+20	0.0133	0.04	QV				
5+25	0.0136	0.04	QV				
5+30	0.0139	0.05	QV				
5+35	0.0142	0.05	QV				
5+40	0.0146	0.05	QV				
5+45	0.0149	0.05	QV				
5+50	0.0153	0.05	QV				
5+55	0.0157	0.05	QV				
6+ 0	0.0160	0.05	QV				
6+ 5	0.0164	0.05	QV				
6+10	0.0168	0.06	QV				
6+15	0.0172	0.06	QV				
6+20	0.0176	0.06	QV				
6+25	0.0180	0.06	QV				
6+30	0.0184	0.06	QV				
6+35	0.0188	0.06	QV				
6+40	0.0193	0.06	QV				
6+45	0.0197	0.07	QV				
6+50	0.0202	0.07	QV				
6+55	0.0206	0.07	QV				
7+ 0	0.0211	0.07	QV				
7+ 5	0.0215	0.07	QV				
7+10	0.0220	0.07	QV				
7+15	0.0225	0.07	QV				
7+20	0.0229	0.07	QV				
7+25	0.0234	0.07	QV				
7+30	0.0239	0.07	Q V				
7+35	0.0244	0.07	Q V				
7+40	0.0249	0.08	Q V				
7+45	0.0255	0.08	Q V				
7+50	0.0260	0.08	Q V				
7+55	0.0266	0.08	Q V				

8+ 0	0.0272	0.08	Q V	|	|	|	|
8+ 5	0.0278	0.09	Q V	|	|	|	|
8+10	0.0285	0.10	Q V	|	|	|	|
8+15	0.0291	0.10	Q V	|	|	|	|
8+20	0.0298	0.10	Q V	|	|	|	|
8+25	0.0305	0.10	Q V	|	|	|	|
8+30	0.0312	0.10	Q V	|	|	|	|
8+35	0.0319	0.10	Q V	|	|	|	|
8+40	0.0326	0.10	Q V	|	|	|	|
8+45	0.0333	0.10	Q V	|	|	|	|
8+50	0.0341	0.12	Q V	|	|	|	|
8+55	0.0352	0.15	Q V	|	|	|	|
9+ 0	0.0363	0.16	Q V	|	|	|	|
9+ 5	0.0377	0.20	Q V	|	|	|	|
9+10	0.0396	0.27	|Q V	|	|	|	|
9+15	0.0416	0.30	|Q V	|	|	|	|
9+20	0.0439	0.33	|Q V	|	|	|	|
9+25	0.0464	0.37	|Q V	|	|	|	|
9+30	0.0490	0.38	|Q V	|	|	|	|
9+35	0.0518	0.41	|Q V	|	|	|	|
9+40	0.0549	0.45	|Q V	|	|	|	|
9+45	0.0581	0.46	|Q V	|	|	|	|
9+50	0.0615	0.49	|Q V	|	|	|	|
9+55	0.0651	0.53	| Q V	|	|	|	|
10+ 0	0.0689	0.54	| Q V	|	|	|	|
10+ 5	0.0719	0.44	|Q V	|	|	|	|
10+10	0.0734	0.22	Q V	|	|	|	|
10+15	0.0745	0.16	Q V	|	|	|	|
10+20	0.0755	0.14	Q V	|	|	|	|
10+25	0.0764	0.13	Q V	|	|	|	|
10+30	0.0772	0.12	Q V	|	|	|	|
10+35	0.0786	0.20	Q V	|	|	|	|
10+40	0.0811	0.37	|Q V	|	|	|	|
10+45	0.0840	0.42	|Q V	|	|	|	|
10+50	0.0870	0.44	|Q V	|	|	|	|
10+55	0.0902	0.46	|Q V	|	|	|	|
11+ 0	0.0934	0.47	|Q V	|	|	|	|
11+ 5	0.0965	0.46	|Q V	|	|	|	|
11+10	0.0995	0.43	|Q V	|	|	|	|
11+15	0.1024	0.43	|Q V	|	|	|	|
11+20	0.1054	0.43	|Q V	|	|	|	|
11+25	0.1083	0.43	|Q V|	|	|	|	|
11+30	0.1113	0.43	|Q V|	|	|	|	|
11+35	0.1141	0.40	|Q V|	|	|	|	|
11+40	0.1164	0.34	|Q V|	|	|	|	|
11+45	0.1187	0.33	|Q V	|	|	|	|
11+50	0.1210	0.34	|Q V	|	|	|	|
11+55	0.1236	0.37	|Q V	|	|	|	|
12+ 0	0.1262	0.38	|Q V	|	|	|	|
12+ 5	0.1297	0.50	| Q |V	|	|	|	|
12+10	0.1347	0.73	| Q |V	|	|	|	|
12+15	0.1402	0.80	| Q |V	|	|	|	|
12+20	0.1461	0.85	| Q | V	|	|	|	|
12+25	0.1523	0.90	| Q | V	|	|	|	|
12+30	0.1587	0.92	| Q | V	|	|	|	|
12+35	0.1654	0.97	| Q | V	|	|	|	|
12+40	0.1726	1.04	| Q | V	|	|	|	|



17+30	0.4604	0.03	Q	|	|	|	V|
17+35	0.4606	0.03	Q	|	|	|	V|
17+40	0.4608	0.03	Q	|	|	|	V|
17+45	0.4611	0.03	Q	|	|	|	V|
17+50	0.4613	0.03	Q	|	|	|	V|
17+55	0.4615	0.03	Q	|	|	|	V|
18+ 0	0.4616	0.03	Q	|	|	|	V|
18+ 5	0.4618	0.03	Q	|	|	|	V|
18+10	0.4620	0.03	Q	|	|	|	V|
18+15	0.4622	0.03	Q	|	|	|	V|
18+20	0.4624	0.03	Q	|	|	|	V|
18+25	0.4626	0.03	Q	|	|	|	V|
18+30	0.4627	0.03	Q	|	|	|	V|
18+35	0.4629	0.02	Q	|	|	|	V|
18+40	0.4631	0.02	Q	|	|	|	V|
18+45	0.4632	0.02	Q	|	|	|	V|
18+50	0.4633	0.02	Q	|	|	|	V|
18+55	0.4634	0.02	Q	|	|	|	V|
19+ 0	0.4635	0.01	Q	|	|	|	V|
19+ 5	0.4636	0.02	Q	|	|	|	V|
19+10	0.4638	0.02	Q	|	|	|	V|
19+15	0.4639	0.02	Q	|	|	|	V|
19+20	0.4640	0.02	Q	|	|	|	V|
19+25	0.4642	0.02	Q	|	|	|	V|
19+30	0.4644	0.03	Q	|	|	|	V|
19+35	0.4646	0.02	Q	|	|	|	V|
19+40	0.4647	0.02	Q	|	|	|	V|
19+45	0.4648	0.02	Q	|	|	|	V|
19+50	0.4650	0.02	Q	|	|	|	V|
19+55	0.4651	0.02	Q	|	|	|	V|
20+ 0	0.4652	0.01	Q	|	|	|	V|
20+ 5	0.4653	0.02	Q	|	|	|	V|
20+10	0.4654	0.02	Q	|	|	|	V|
20+15	0.4655	0.02	Q	|	|	|	V|
20+20	0.4657	0.02	Q	|	|	|	V|
20+25	0.4658	0.02	Q	|	|	|	V|
20+30	0.4659	0.02	Q	|	|	|	V|
20+35	0.4661	0.02	Q	|	|	|	V|
20+40	0.4662	0.02	Q	|	|	|	V|
20+45	0.4663	0.02	Q	|	|	|	V|
20+50	0.4665	0.02	Q	|	|	|	V|
20+55	0.4666	0.01	Q	|	|	|	V|
21+ 0	0.4667	0.01	Q	|	|	|	V|
21+ 5	0.4668	0.02	Q	|	|	|	V|
21+10	0.4669	0.02	Q	|	|	|	V|
21+15	0.4670	0.02	Q	|	|	|	V|
21+20	0.4672	0.02	Q	|	|	|	V|
21+25	0.4673	0.01	Q	|	|	|	V|
21+30	0.4674	0.01	Q	|	|	|	V|
21+35	0.4675	0.02	Q	|	|	|	V|
21+40	0.4676	0.02	Q	|	|	|	V|
21+45	0.4677	0.02	Q	|	|	|	V|
21+50	0.4678	0.02	Q	|	|	|	V|
21+55	0.4679	0.01	Q	|	|	|	V|
22+ 0	0.4680	0.01	Q	|	|	|	V|
22+ 5	0.4681	0.02	Q	|	|	|	V|
22+10	0.4683	0.02	Q	|	|	|	V|

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  22+15       0.4684      0.02  Q          |          |          |         V|
  22+20       0.4685      0.02  Q          |          |          |         V|
  22+25       0.4686      0.01  Q          |          |          |         V|
  22+30       0.4687      0.01  Q          |          |          |         V|
  22+35       0.4688      0.01  Q          |          |          |         V|
  22+40       0.4689      0.01  Q          |          |          |         V|
  22+45       0.4690      0.01  Q          |          |          |         V|
  22+50       0.4691      0.01  Q          |          |          |         V|
  22+55       0.4692      0.01  Q          |          |          |         V|
  23+ 0       0.4693      0.01  Q          |          |          |         V|
  23+ 5       0.4694      0.01  Q          |          |          |         V|
  23+10       0.4694      0.01  Q          |          |          |         V|
  23+15       0.4695      0.01  Q          |          |          |         V|
  23+20       0.4696      0.01  Q          |          |          |         V|
  23+25       0.4697      0.01  Q          |          |          |         V|
  23+30       0.4698      0.01  Q          |          |          |         V|
  23+35       0.4699      0.01  Q          |          |          |         V|
  23+40       0.4700      0.01  Q          |          |          |         V|
  23+45       0.4701      0.01  Q          |          |          |         V|
  23+50       0.4702      0.01  Q          |          |          |         V|
  23+55       0.4703      0.01  Q          |          |          |         V|
  24+ 0       0.4704      0.01  Q          |          |          |         V|
  24+ 5       0.4704      0.01  Q          |          |          |         V|
  24+10       0.4704      0.00  Q          |          |          |         V|
  24+15       0.4705      0.00  Q          |          |          |         V|
  24+20       0.4705      0.00  Q          |          |          |         V|
  24+25       0.4705      0.00  Q          |          |          |         V|
  24+30       0.4705      0.00  Q          |          |          |          V
-------------------------------------------------------------------------
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U n i t H y d r o g r a p h A n a l y s i s

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Study date 11/05/21 File: northdevA2410.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 4011

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Evans Community Park 10-year 24-hour Storm Event
Developed Condition (Northerly Portion of Site)
Job 21-003
11/5/21

Drainage Area = 5.24(Ac.) = 0.008 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 5.24(Ac.) = 0.008 Sq. Mi.
Length along longest watercourse = 828.00(Ft.)
Length along longest watercourse measured to centroid = 472.00(Ft.)
Length along longest watercourse = 0.157 Mi.
Length along longest watercourse measured to centroid = 0.089 Mi.
Difference in elevation = 7.00(Ft.)
Slope along watercourse = 44.6377 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.035 Hr.
Lag time = 2.07 Min.
25% of lag time = 0.52 Min.
40% of lag time = 0.83 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.24	1.90	9.96

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]

5.24 5.00 26.20

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 1.900(In)
Area Averaged 100-Year Rainfall = 5.000(In)

Point rain (area averaged) = 3.175(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 3.175(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
1.048	100.00	1.000
4.192	77.00	0.000

Total Area Entered = 5.24(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
100.0	100.0	0.000	1.000	0.000	0.200	0.000
77.0	77.0	0.279	0.000	0.279	0.800	0.224
					Sum (F) =	0.224

Area averaged mean soil loss (F) (In/Hr) = 0.224
Minimum soil loss rate ((In/Hr)) = 0.112
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.740

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	241.108	49.710	2.625
2	0.167	482.216	40.611	2.145
3	0.250	723.324	7.315	0.386
4	0.333	964.433	2.364	0.125
		Sum = 100.000	Sum=	5.281

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max		Low	Effective (In/Hr)
1	0.08	0.07	0.025	(0.396)	0.019	0.007
2	0.17	0.07	0.025	(0.395)	0.019	0.007
3	0.25	0.07	0.025	(0.393)	0.019	0.007
4	0.33	0.10	0.038	(0.392)	0.028	0.010
5	0.42	0.10	0.038	(0.390)	0.028	0.010
6	0.50	0.10	0.038	(0.389)	0.028	0.010
7	0.58	0.10	0.038	(0.387)	0.028	0.010
8	0.67	0.10	0.038	(0.386)	0.028	0.010

9	0.75	0.10	0.038	(0.384)	0.028	0.010
10	0.83	0.13	0.051	(0.383)	0.038	0.013
11	0.92	0.13	0.051	(0.381)	0.038	0.013
12	1.00	0.13	0.051	(0.380)	0.038	0.013
13	1.08	0.10	0.038	(0.378)	0.028	0.010
14	1.17	0.10	0.038	(0.377)	0.028	0.010
15	1.25	0.10	0.038	(0.375)	0.028	0.010
16	1.33	0.10	0.038	(0.374)	0.028	0.010
17	1.42	0.10	0.038	(0.372)	0.028	0.010
18	1.50	0.10	0.038	(0.371)	0.028	0.010
19	1.58	0.10	0.038	(0.369)	0.028	0.010
20	1.67	0.10	0.038	(0.368)	0.028	0.010
21	1.75	0.10	0.038	(0.366)	0.028	0.010
22	1.83	0.13	0.051	(0.365)	0.038	0.013
23	1.92	0.13	0.051	(0.363)	0.038	0.013
24	2.00	0.13	0.051	(0.362)	0.038	0.013
25	2.08	0.13	0.051	(0.360)	0.038	0.013
26	2.17	0.13	0.051	(0.359)	0.038	0.013
27	2.25	0.13	0.051	(0.357)	0.038	0.013
28	2.33	0.13	0.051	(0.356)	0.038	0.013
29	2.42	0.13	0.051	(0.354)	0.038	0.013
30	2.50	0.13	0.051	(0.353)	0.038	0.013
31	2.58	0.17	0.064	(0.352)	0.047	0.017
32	2.67	0.17	0.064	(0.350)	0.047	0.017
33	2.75	0.17	0.064	(0.349)	0.047	0.017
34	2.83	0.17	0.064	(0.347)	0.047	0.017
35	2.92	0.17	0.064	(0.346)	0.047	0.017
36	3.00	0.17	0.064	(0.344)	0.047	0.017
37	3.08	0.17	0.064	(0.343)	0.047	0.017
38	3.17	0.17	0.064	(0.342)	0.047	0.017
39	3.25	0.17	0.064	(0.340)	0.047	0.017
40	3.33	0.17	0.064	(0.339)	0.047	0.017
41	3.42	0.17	0.064	(0.337)	0.047	0.017
42	3.50	0.17	0.064	(0.336)	0.047	0.017
43	3.58	0.17	0.064	(0.334)	0.047	0.017
44	3.67	0.17	0.064	(0.333)	0.047	0.017
45	3.75	0.17	0.064	(0.332)	0.047	0.017
46	3.83	0.20	0.076	(0.330)	0.056	0.020
47	3.92	0.20	0.076	(0.329)	0.056	0.020
48	4.00	0.20	0.076	(0.327)	0.056	0.020
49	4.08	0.20	0.076	(0.326)	0.056	0.020
50	4.17	0.20	0.076	(0.325)	0.056	0.020
51	4.25	0.20	0.076	(0.323)	0.056	0.020
52	4.33	0.23	0.089	(0.322)	0.066	0.023
53	4.42	0.23	0.089	(0.321)	0.066	0.023
54	4.50	0.23	0.089	(0.319)	0.066	0.023
55	4.58	0.23	0.089	(0.318)	0.066	0.023
56	4.67	0.23	0.089	(0.316)	0.066	0.023
57	4.75	0.23	0.089	(0.315)	0.066	0.023
58	4.83	0.27	0.102	(0.314)	0.075	0.026
59	4.92	0.27	0.102	(0.312)	0.075	0.026
60	5.00	0.27	0.102	(0.311)	0.075	0.026
61	5.08	0.20	0.076	(0.310)	0.056	0.020
62	5.17	0.20	0.076	(0.308)	0.056	0.020
63	5.25	0.20	0.076	(0.307)	0.056	0.020
64	5.33	0.23	0.089	(0.306)	0.066	0.023
65	5.42	0.23	0.089	(0.304)	0.066	0.023

66	5.50	0.23	0.089	(0.303)	0.066	0.023
67	5.58	0.27	0.102	(0.302)	0.075	0.026
68	5.67	0.27	0.102	(0.300)	0.075	0.026
69	5.75	0.27	0.102	(0.299)	0.075	0.026
70	5.83	0.27	0.102	(0.298)	0.075	0.026
71	5.92	0.27	0.102	(0.296)	0.075	0.026
72	6.00	0.27	0.102	(0.295)	0.075	0.026
73	6.08	0.30	0.114	(0.294)	0.085	0.030
74	6.17	0.30	0.114	(0.292)	0.085	0.030
75	6.25	0.30	0.114	(0.291)	0.085	0.030
76	6.33	0.30	0.114	(0.290)	0.085	0.030
77	6.42	0.30	0.114	(0.289)	0.085	0.030
78	6.50	0.30	0.114	(0.287)	0.085	0.030
79	6.58	0.33	0.127	(0.286)	0.094	0.033
80	6.67	0.33	0.127	(0.285)	0.094	0.033
81	6.75	0.33	0.127	(0.283)	0.094	0.033
82	6.83	0.33	0.127	(0.282)	0.094	0.033
83	6.92	0.33	0.127	(0.281)	0.094	0.033
84	7.00	0.33	0.127	(0.280)	0.094	0.033
85	7.08	0.33	0.127	(0.278)	0.094	0.033
86	7.17	0.33	0.127	(0.277)	0.094	0.033
87	7.25	0.33	0.127	(0.276)	0.094	0.033
88	7.33	0.37	0.140	(0.274)	0.103	0.036
89	7.42	0.37	0.140	(0.273)	0.103	0.036
90	7.50	0.37	0.140	(0.272)	0.103	0.036
91	7.58	0.40	0.152	(0.271)	0.113	0.040
92	7.67	0.40	0.152	(0.269)	0.113	0.040
93	7.75	0.40	0.152	(0.268)	0.113	0.040
94	7.83	0.43	0.165	(0.267)	0.122	0.043
95	7.92	0.43	0.165	(0.266)	0.122	0.043
96	8.00	0.43	0.165	(0.265)	0.122	0.043
97	8.08	0.50	0.191	(0.263)	0.141	0.050
98	8.17	0.50	0.191	(0.262)	0.141	0.050
99	8.25	0.50	0.191	(0.261)	0.141	0.050
100	8.33	0.50	0.191	(0.260)	0.141	0.050
101	8.42	0.50	0.191	(0.258)	0.141	0.050
102	8.50	0.50	0.191	(0.257)	0.141	0.050
103	8.58	0.53	0.203	(0.256)	0.150	0.053
104	8.67	0.53	0.203	(0.255)	0.150	0.053
105	8.75	0.53	0.203	(0.254)	0.150	0.053
106	8.83	0.57	0.216	(0.252)	0.160	0.056
107	8.92	0.57	0.216	(0.251)	0.160	0.056
108	9.00	0.57	0.216	(0.250)	0.160	0.056
109	9.08	0.63	0.241	(0.249)	0.179	0.063
110	9.17	0.63	0.241	(0.248)	0.179	0.063
111	9.25	0.63	0.241	(0.246)	0.179	0.063
112	9.33	0.67	0.254	(0.245)	0.188	0.066
113	9.42	0.67	0.254	(0.244)	0.188	0.066
114	9.50	0.67	0.254	(0.243)	0.188	0.066
115	9.58	0.70	0.267	(0.242)	0.197	0.069
116	9.67	0.70	0.267	(0.241)	0.197	0.069
117	9.75	0.70	0.267	(0.239)	0.197	0.069
118	9.83	0.73	0.279	(0.238)	0.207	0.073
119	9.92	0.73	0.279	(0.237)	0.207	0.073
120	10.00	0.73	0.279	(0.236)	0.207	0.073
121	10.08	0.50	0.191	(0.235)	0.141	0.050
122	10.17	0.50	0.191	(0.234)	0.141	0.050

123	10.25	0.50	0.191	(0.233)	0.141	0.050
124	10.33	0.50	0.191	(0.231)	0.141	0.050
125	10.42	0.50	0.191	(0.230)	0.141	0.050
126	10.50	0.50	0.191	(0.229)	0.141	0.050
127	10.58	0.67	0.254	(0.228)	0.188	0.066
128	10.67	0.67	0.254	(0.227)	0.188	0.066
129	10.75	0.67	0.254	(0.226)	0.188	0.066
130	10.83	0.67	0.254	(0.225)	0.188	0.066
131	10.92	0.67	0.254	(0.224)	0.188	0.066
132	11.00	0.67	0.254	(0.223)	0.188	0.066
133	11.08	0.63	0.241	(0.221)	0.179	0.063
134	11.17	0.63	0.241	(0.220)	0.179	0.063
135	11.25	0.63	0.241	(0.219)	0.179	0.063
136	11.33	0.63	0.241	(0.218)	0.179	0.063
137	11.42	0.63	0.241	(0.217)	0.179	0.063
138	11.50	0.63	0.241	(0.216)	0.179	0.063
139	11.58	0.57	0.216	(0.215)	0.160	0.056
140	11.67	0.57	0.216	(0.214)	0.160	0.056
141	11.75	0.57	0.216	(0.213)	0.160	0.056
142	11.83	0.60	0.229	(0.212)	0.169	0.059
143	11.92	0.60	0.229	(0.211)	0.169	0.059
144	12.00	0.60	0.229	(0.210)	0.169	0.059
145	12.08	0.83	0.318	0.209	(0.235)	0.109
146	12.17	0.83	0.318	0.208	(0.235)	0.110
147	12.25	0.83	0.318	0.207	(0.235)	0.111
148	12.33	0.87	0.330	0.206	(0.244)	0.125
149	12.42	0.87	0.330	0.204	(0.244)	0.126
150	12.50	0.87	0.330	0.203	(0.244)	0.127
151	12.58	0.93	0.356	0.202	(0.263)	0.153
152	12.67	0.93	0.356	0.201	(0.263)	0.154
153	12.75	0.93	0.356	0.200	(0.263)	0.155
154	12.83	0.97	0.368	0.199	(0.273)	0.169
155	12.92	0.97	0.368	0.198	(0.273)	0.170
156	13.00	0.97	0.368	0.197	(0.273)	0.171
157	13.08	1.13	0.432	0.196	(0.320)	0.235
158	13.17	1.13	0.432	0.195	(0.320)	0.236
159	13.25	1.13	0.432	0.194	(0.320)	0.237
160	13.33	1.13	0.432	0.193	(0.320)	0.238
161	13.42	1.13	0.432	0.192	(0.320)	0.239
162	13.50	1.13	0.432	0.191	(0.320)	0.240
163	13.58	0.77	0.292	0.190	(0.216)	0.102
164	13.67	0.77	0.292	0.190	(0.216)	0.103
165	13.75	0.77	0.292	0.189	(0.216)	0.104
166	13.83	0.77	0.292	0.188	(0.216)	0.105
167	13.92	0.77	0.292	0.187	(0.216)	0.106
168	14.00	0.77	0.292	0.186	(0.216)	0.106
169	14.08	0.90	0.343	0.185	(0.254)	0.158
170	14.17	0.90	0.343	0.184	(0.254)	0.159
171	14.25	0.90	0.343	0.183	(0.254)	0.160
172	14.33	0.87	0.330	0.182	(0.244)	0.148
173	14.42	0.87	0.330	0.181	(0.244)	0.149
174	14.50	0.87	0.330	0.180	(0.244)	0.150
175	14.58	0.87	0.330	0.179	(0.244)	0.151
176	14.67	0.87	0.330	0.178	(0.244)	0.152
177	14.75	0.87	0.330	0.177	(0.244)	0.153
178	14.83	0.83	0.318	0.176	(0.235)	0.141
179	14.92	0.83	0.318	0.175	(0.235)	0.142

180	15.00	0.83	0.318	0.175	(0.235)	0.143
181	15.08	0.80	0.305	0.174	(0.226)	0.131
182	15.17	0.80	0.305	0.173	(0.226)	0.132
183	15.25	0.80	0.305	0.172	(0.226)	0.133
184	15.33	0.77	0.292	0.171	(0.216)	0.121
185	15.42	0.77	0.292	0.170	(0.216)	0.122
186	15.50	0.77	0.292	0.169	(0.216)	0.123
187	15.58	0.63	0.241	0.168	(0.179)	0.073
188	15.67	0.63	0.241	0.168	(0.179)	0.074
189	15.75	0.63	0.241	0.167	(0.179)	0.075
190	15.83	0.63	0.241	0.166	(0.179)	0.075
191	15.92	0.63	0.241	0.165	(0.179)	0.076
192	16.00	0.63	0.241	0.164	(0.179)	0.077
193	16.08	0.13	0.051	(0.163)	0.038	0.013
194	16.17	0.13	0.051	(0.162)	0.038	0.013
195	16.25	0.13	0.051	(0.162)	0.038	0.013
196	16.33	0.13	0.051	(0.161)	0.038	0.013
197	16.42	0.13	0.051	(0.160)	0.038	0.013
198	16.50	0.13	0.051	(0.159)	0.038	0.013
199	16.58	0.10	0.038	(0.158)	0.028	0.010
200	16.67	0.10	0.038	(0.158)	0.028	0.010
201	16.75	0.10	0.038	(0.157)	0.028	0.010
202	16.83	0.10	0.038	(0.156)	0.028	0.010
203	16.92	0.10	0.038	(0.155)	0.028	0.010
204	17.00	0.10	0.038	(0.154)	0.028	0.010
205	17.08	0.17	0.064	(0.154)	0.047	0.017
206	17.17	0.17	0.064	(0.153)	0.047	0.017
207	17.25	0.17	0.064	(0.152)	0.047	0.017
208	17.33	0.17	0.064	(0.151)	0.047	0.017
209	17.42	0.17	0.064	(0.151)	0.047	0.017
210	17.50	0.17	0.064	(0.150)	0.047	0.017
211	17.58	0.17	0.064	(0.149)	0.047	0.017
212	17.67	0.17	0.064	(0.148)	0.047	0.017
213	17.75	0.17	0.064	(0.148)	0.047	0.017
214	17.83	0.13	0.051	(0.147)	0.038	0.013
215	17.92	0.13	0.051	(0.146)	0.038	0.013
216	18.00	0.13	0.051	(0.145)	0.038	0.013
217	18.08	0.13	0.051	(0.145)	0.038	0.013
218	18.17	0.13	0.051	(0.144)	0.038	0.013
219	18.25	0.13	0.051	(0.143)	0.038	0.013
220	18.33	0.13	0.051	(0.143)	0.038	0.013
221	18.42	0.13	0.051	(0.142)	0.038	0.013
222	18.50	0.13	0.051	(0.141)	0.038	0.013
223	18.58	0.10	0.038	(0.140)	0.028	0.010
224	18.67	0.10	0.038	(0.140)	0.028	0.010
225	18.75	0.10	0.038	(0.139)	0.028	0.010
226	18.83	0.07	0.025	(0.138)	0.019	0.007
227	18.92	0.07	0.025	(0.138)	0.019	0.007
228	19.00	0.07	0.025	(0.137)	0.019	0.007
229	19.08	0.10	0.038	(0.137)	0.028	0.010
230	19.17	0.10	0.038	(0.136)	0.028	0.010
231	19.25	0.10	0.038	(0.135)	0.028	0.010
232	19.33	0.13	0.051	(0.135)	0.038	0.013
233	19.42	0.13	0.051	(0.134)	0.038	0.013
234	19.50	0.13	0.051	(0.133)	0.038	0.013
235	19.58	0.10	0.038	(0.133)	0.028	0.010
236	19.67	0.10	0.038	(0.132)	0.028	0.010

237	19.75	0.10	0.038	(0.132)	0.028	0.010
238	19.83	0.07	0.025	(0.131)	0.019	0.007
239	19.92	0.07	0.025	(0.130)	0.019	0.007
240	20.00	0.07	0.025	(0.130)	0.019	0.007
241	20.08	0.10	0.038	(0.129)	0.028	0.010
242	20.17	0.10	0.038	(0.129)	0.028	0.010
243	20.25	0.10	0.038	(0.128)	0.028	0.010
244	20.33	0.10	0.038	(0.128)	0.028	0.010
245	20.42	0.10	0.038	(0.127)	0.028	0.010
246	20.50	0.10	0.038	(0.126)	0.028	0.010
247	20.58	0.10	0.038	(0.126)	0.028	0.010
248	20.67	0.10	0.038	(0.125)	0.028	0.010
249	20.75	0.10	0.038	(0.125)	0.028	0.010
250	20.83	0.07	0.025	(0.124)	0.019	0.007
251	20.92	0.07	0.025	(0.124)	0.019	0.007
252	21.00	0.07	0.025	(0.123)	0.019	0.007
253	21.08	0.10	0.038	(0.123)	0.028	0.010
254	21.17	0.10	0.038	(0.122)	0.028	0.010
255	21.25	0.10	0.038	(0.122)	0.028	0.010
256	21.33	0.07	0.025	(0.121)	0.019	0.007
257	21.42	0.07	0.025	(0.121)	0.019	0.007
258	21.50	0.07	0.025	(0.121)	0.019	0.007
259	21.58	0.10	0.038	(0.120)	0.028	0.010
260	21.67	0.10	0.038	(0.120)	0.028	0.010
261	21.75	0.10	0.038	(0.119)	0.028	0.010
262	21.83	0.07	0.025	(0.119)	0.019	0.007
263	21.92	0.07	0.025	(0.118)	0.019	0.007
264	22.00	0.07	0.025	(0.118)	0.019	0.007
265	22.08	0.10	0.038	(0.118)	0.028	0.010
266	22.17	0.10	0.038	(0.117)	0.028	0.010
267	22.25	0.10	0.038	(0.117)	0.028	0.010
268	22.33	0.07	0.025	(0.117)	0.019	0.007
269	22.42	0.07	0.025	(0.116)	0.019	0.007
270	22.50	0.07	0.025	(0.116)	0.019	0.007
271	22.58	0.07	0.025	(0.115)	0.019	0.007
272	22.67	0.07	0.025	(0.115)	0.019	0.007
273	22.75	0.07	0.025	(0.115)	0.019	0.007
274	22.83	0.07	0.025	(0.115)	0.019	0.007
275	22.92	0.07	0.025	(0.114)	0.019	0.007
276	23.00	0.07	0.025	(0.114)	0.019	0.007
277	23.08	0.07	0.025	(0.114)	0.019	0.007
278	23.17	0.07	0.025	(0.113)	0.019	0.007
279	23.25	0.07	0.025	(0.113)	0.019	0.007
280	23.33	0.07	0.025	(0.113)	0.019	0.007
281	23.42	0.07	0.025	(0.113)	0.019	0.007
282	23.50	0.07	0.025	(0.113)	0.019	0.007
283	23.58	0.07	0.025	(0.112)	0.019	0.007
284	23.67	0.07	0.025	(0.112)	0.019	0.007
285	23.75	0.07	0.025	(0.112)	0.019	0.007
286	23.83	0.07	0.025	(0.112)	0.019	0.007
287	23.92	0.07	0.025	(0.112)	0.019	0.007
288	24.00	0.07	0.025	(0.112)	0.019	0.007

(Loss Rate Not Used)

Sum = 100.0 Sum = 12.6

Flood volume = Effective rainfall 1.05(In)

times area 5.2(Ac.)/[(In)/(Ft.)] = 0.5(Ac.Ft)

Total soil loss = 2.13(In)

Total soil loss = 0.929(Ac.Ft)
Total rainfall = 3.18(In)
Flood volume = 19951.1 Cubic Feet
Total soil loss = 40447.5 Cubic Feet

Peak flow rate of this hydrograph = 1.267(CFS)

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24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0001	0.02	Q				
0+10	0.0003	0.03	Q				
0+15	0.0006	0.03	Q				
0+20	0.0009	0.04	Q				
0+25	0.0012	0.05	Q				
0+30	0.0016	0.05	Q				
0+35	0.0019	0.05	Q				
0+40	0.0023	0.05	Q				
0+45	0.0027	0.05	Q				
0+50	0.0031	0.06	Q				
0+55	0.0035	0.07	Q				
1+ 0	0.0040	0.07	Q				
1+ 5	0.0044	0.06	Q				
1+10	0.0048	0.05	Q				
1+15	0.0052	0.05	Q				
1+20	0.0055	0.05	Q				
1+25	0.0059	0.05	Q				
1+30	0.0063	0.05	Q				
1+35	0.0066	0.05	Q				
1+40	0.0070	0.05	Q				
1+45	0.0073	0.05	Q				
1+50	0.0078	0.06	Q				
1+55	0.0082	0.07	Q				
2+ 0	0.0087	0.07	Q				
2+ 5	0.0092	0.07	Q				
2+10	0.0097	0.07	Q				
2+15	0.0102	0.07	Q				
2+20	0.0106	0.07	Q				
2+25	0.0111	0.07	Q				
2+30	0.0116	0.07	QV				
2+35	0.0121	0.08	QV				
2+40	0.0127	0.09	QV				
2+45	0.0133	0.09	QV				
2+50	0.0139	0.09	QV				
2+55	0.0145	0.09	QV				
3+ 0	0.0151	0.09	QV				
3+ 5	0.0157	0.09	QV				
3+10	0.0163	0.09	QV				
3+15	0.0169	0.09	QV				
3+20	0.0175	0.09	QV				
3+25	0.0181	0.09	QV				

3+30	0.0187	0.09	QV	|	|	|	|
3+35	0.0193	0.09	QV	|	|	|	|
3+40	0.0199	0.09	QV	|	|	|	|
3+45	0.0205	0.09	QV	|	|	|	|
3+50	0.0212	0.10	QV	|	|	|	|
3+55	0.0219	0.10	QV	|	|	|	|
4+ 0	0.0226	0.10	QV	|	|	|	|
4+ 5	0.0233	0.10	Q V	|	|	|	|
4+10	0.0241	0.10	Q V	|	|	|	|
4+15	0.0248	0.10	Q V	|	|	|	|
4+20	0.0256	0.11	Q V	|	|	|	|
4+25	0.0264	0.12	Q V	|	|	|	|
4+30	0.0272	0.12	Q V	|	|	|	|
4+35	0.0281	0.12	Q V	|	|	|	|
4+40	0.0289	0.12	Q V	|	|	|	|
4+45	0.0298	0.12	Q V	|	|	|	|
4+50	0.0307	0.13	Q V	|	|	|	|
4+55	0.0316	0.14	Q V	|	|	|	|
5+ 0	0.0326	0.14	Q V	|	|	|	|
5+ 5	0.0334	0.12	Q V	|	|	|	|
5+10	0.0342	0.11	Q V	|	|	|	|
5+15	0.0349	0.11	Q V	|	|	|	|
5+20	0.0357	0.11	Q V	|	|	|	|
5+25	0.0365	0.12	Q V	|	|	|	|
5+30	0.0373	0.12	Q V	|	|	|	|
5+35	0.0382	0.13	Q V	|	|	|	|
5+40	0.0392	0.14	Q V	|	|	|	|
5+45	0.0401	0.14	Q V	|	|	|	|
5+50	0.0411	0.14	Q V	|	|	|	|
5+55	0.0421	0.14	Q V	|	|	|	|
6+ 0	0.0430	0.14	Q V	|	|	|	|
6+ 5	0.0440	0.15	Q V	|	|	|	|
6+10	0.0451	0.16	Q V	|	|	|	|
6+15	0.0462	0.16	Q V	|	|	|	|
6+20	0.0473	0.16	Q V	|	|	|	|
6+25	0.0484	0.16	Q V	|	|	|	|
6+30	0.0494	0.16	Q V	|	|	|	|
6+35	0.0506	0.17	Q V	|	|	|	|
6+40	0.0518	0.17	Q V	|	|	|	|
6+45	0.0530	0.17	Q V	|	|	|	|
6+50	0.0542	0.17	Q V	|	|	|	|
6+55	0.0554	0.17	Q V	|	|	|	|
7+ 0	0.0566	0.17	Q V	|	|	|	|
7+ 5	0.0578	0.17	Q V	|	|	|	|
7+10	0.0590	0.17	Q V	|	|	|	|
7+15	0.0602	0.17	Q V	|	|	|	|
7+20	0.0614	0.18	Q V	|	|	|	|
7+25	0.0627	0.19	Q V	|	|	|	|
7+30	0.0641	0.19	Q V	|	|	|	|
7+35	0.0654	0.20	Q V	|	|	|	|
7+40	0.0669	0.21	Q V	|	|	|	|
7+45	0.0683	0.21	Q V	|	|	|	|
7+50	0.0698	0.22	Q V	|	|	|	|
7+55	0.0714	0.23	Q V	|	|	|	|
8+ 0	0.0729	0.23	Q V	|	|	|	|
8+ 5	0.0746	0.24	Q V	|	|	|	|
8+10	0.0764	0.26	|Q V	|	|	|	|

8+15	0.0782	0.26	Q V				
8+20	0.0800	0.26	Q V				
8+25	0.0818	0.26	Q V				
8+30	0.0836	0.26	Q V				
8+35	0.0855	0.27	Q V				
8+40	0.0874	0.28	Q V				
8+45	0.0893	0.28	Q V				
8+50	0.0913	0.29	Q V				
8+55	0.0933	0.29	Q V				
9+ 0	0.0953	0.30	Q V				
9+ 5	0.0975	0.31	Q V				
9+10	0.0998	0.33	Q V				
9+15	0.1020	0.33	Q V				
9+20	0.1044	0.34	Q V				
9+25	0.1068	0.35	Q V				
9+30	0.1092	0.35	Q V				
9+35	0.1116	0.36	Q V				
9+40	0.1142	0.36	Q V				
9+45	0.1167	0.37	Q V				
9+50	0.1193	0.38	Q V				
9+55	0.1219	0.38	Q V				
10+ 0	0.1245	0.38	Q V				
10+ 5	0.1268	0.32	Q V				
10+10	0.1286	0.27	Q V				
10+15	0.1305	0.26	Q V				
10+20	0.1323	0.26	Q V				
10+25	0.1341	0.26	Q V				
10+30	0.1359	0.26	Q V				
10+35	0.1380	0.31	Q V				
10+40	0.1403	0.34	Q V				
10+45	0.1427	0.35	Q V				
10+50	0.1451	0.35	Q V				
10+55	0.1475	0.35	Q V				
11+ 0	0.1499	0.35	Q V				
11+ 5	0.1523	0.34	Q V				
11+10	0.1546	0.33	Q V				
11+15	0.1568	0.33	Q V				
11+20	0.1591	0.33	Q V				
11+25	0.1614	0.33	Q V				
11+30	0.1637	0.33	Q V				
11+35	0.1659	0.31	Q V				
11+40	0.1679	0.30	Q V				
11+45	0.1700	0.30	Q V				
11+50	0.1721	0.31	Q V				
11+55	0.1742	0.31	Q V				
12+ 0	0.1764	0.31	Q V				
12+ 5	0.1794	0.44	Q V				
12+10	0.1832	0.55	Q V				
12+15	0.1872	0.58	Q V				
12+20	0.1915	0.62	Q V				
12+25	0.1960	0.65	Q V				
12+30	0.2006	0.66	Q V				
12+35	0.2057	0.74	Q V				
12+40	0.2112	0.80	Q V				
12+45	0.2168	0.81	Q V				
12+50	0.2227	0.86	Q V				
12+55	0.2288	0.89	Q V				

13+ 0	0.2350	0.90	| Q |	V |	|
13+ 5	0.2424	1.07	| Q |	|V |	|
13+10	0.2507	1.21	| Q |	|V |	|
13+15	0.2593	1.24	| Q |	| V |	|
13+20	0.2679	1.26	| Q |	| V |	|
13+25	0.2766	1.26	| Q |	| V |	|
13+30	0.2853	1.27	| Q |	| V |	|
13+35	0.2916	0.91	| Q |	| V |	|
13+40	0.2958	0.61	| Q |	| V |	|
13+45	0.2997	0.56	| Q |	| V |	|
13+50	0.3034	0.55	| Q |	| V |	|
13+55	0.3073	0.55	| Q |	| V |	|
14+ 0	0.3111	0.56	| Q |	| V |	|
14+ 5	0.3159	0.70	| Q |	| V |	|
14+10	0.3215	0.81	| Q |	| V |	|
14+15	0.3273	0.84	| Q |	| V |	|
14+20	0.3329	0.81	| Q |	| V|	|
14+25	0.3383	0.79	| Q |	| V|	|
14+30	0.3438	0.79	| Q |	| V |	|
14+35	0.3493	0.80	| Q |	| V |	|
14+40	0.3548	0.80	| Q |	| V |	|
14+45	0.3603	0.81	| Q |	| |V |	|
14+50	0.3657	0.78	| Q |	| |V |	|
14+55	0.3709	0.75	| Q |	| | V |	|
15+ 0	0.3760	0.75	| Q |	| | V |	|
15+ 5	0.3810	0.72	| Q |	| | V |	|
15+10	0.3859	0.70	| Q |	| | V |	|
15+15	0.3907	0.70	| Q |	| | V |	|
15+20	0.3953	0.67	| Q |	| | V |	|
15+25	0.3998	0.65	| Q |	| | V |	|
15+30	0.4042	0.65	| Q |	| | V |	|
15+35	0.4078	0.52	| Q |	| | V |	|
15+40	0.4106	0.41	|Q |	| | V |	|
15+45	0.4134	0.40	|Q |	| | V |	|
15+50	0.4161	0.40	|Q |	| | V |	|
15+55	0.4189	0.40	|Q |	| | V |	|
16+ 0	0.4217	0.41	|Q |	| | V |	|
16+ 5	0.4233	0.24	Q |	| | V |	|
16+10	0.4240	0.10	Q |	| | V |	|
16+15	0.4245	0.08	Q |	| | V |	|
16+20	0.4250	0.07	Q |	| | V |	|
16+25	0.4255	0.07	Q |	| | V |	|
16+30	0.4260	0.07	Q |	| | V |	|
16+35	0.4264	0.06	Q |	| | V |	|
16+40	0.4268	0.05	Q |	| | V |	|
16+45	0.4271	0.05	Q |	| | V |	|
16+50	0.4275	0.05	Q |	| | V |	|
16+55	0.4279	0.05	Q |	| | V |	|
17+ 0	0.4282	0.05	Q |	| | V |	|
17+ 5	0.4287	0.07	Q |	| | V |	|
17+10	0.4293	0.08	Q |	| | V |	|
17+15	0.4299	0.09	Q |	| | V |	|
17+20	0.4305	0.09	Q |	| | V |	|
17+25	0.4311	0.09	Q |	| | V |	|
17+30	0.4317	0.09	Q |	| | V |	|
17+35	0.4323	0.09	Q |	| | V |	|
17+40	0.4329	0.09	Q |	| | V |	|

17+45	0.4335	0.09	Q	|	|	|	V |
17+50	0.4340	0.08	Q	|	|	|	V |
17+55	0.4345	0.07	Q	|	|	|	V |
18+ 0	0.4350	0.07	Q	|	|	|	V |
18+ 5	0.4355	0.07	Q	|	|	|	V |
18+10	0.4360	0.07	Q	|	|	|	V |
18+15	0.4364	0.07	Q	|	|	|	V |
18+20	0.4369	0.07	Q	|	|	|	V |
18+25	0.4374	0.07	Q	|	|	|	V |
18+30	0.4379	0.07	Q	|	|	|	V |
18+35	0.4383	0.06	Q	|	|	|	V |
18+40	0.4387	0.05	Q	|	|	|	V |
18+45	0.4390	0.05	Q	|	|	|	V |
18+50	0.4393	0.04	Q	|	|	|	V |
18+55	0.4396	0.04	Q	|	|	|	V |
19+ 0	0.4398	0.04	Q	|	|	|	V |
19+ 5	0.4401	0.04	Q	|	|	|	V |
19+10	0.4405	0.05	Q	|	|	|	V |
19+15	0.4408	0.05	Q	|	|	|	V |
19+20	0.4413	0.06	Q	|	|	|	V |
19+25	0.4417	0.07	Q	|	|	|	V |
19+30	0.4422	0.07	Q	|	|	|	V |
19+35	0.4426	0.06	Q	|	|	|	V |
19+40	0.4430	0.05	Q	|	|	|	V |
19+45	0.4434	0.05	Q	|	|	|	V |
19+50	0.4437	0.04	Q	|	|	|	V |
19+55	0.4439	0.04	Q	|	|	|	V |
20+ 0	0.4442	0.04	Q	|	|	|	V |
20+ 5	0.4445	0.04	Q	|	|	|	V |
20+10	0.4448	0.05	Q	|	|	|	V |
20+15	0.4452	0.05	Q	|	|	|	V |
20+20	0.4455	0.05	Q	|	|	|	V |
20+25	0.4459	0.05	Q	|	|	|	V |
20+30	0.4463	0.05	Q	|	|	|	V |
20+35	0.4466	0.05	Q	|	|	|	V|
20+40	0.4470	0.05	Q	|	|	|	V|
20+45	0.4473	0.05	Q	|	|	|	V|
20+50	0.4476	0.04	Q	|	|	|	V|
20+55	0.4479	0.04	Q	|	|	|	V|
21+ 0	0.4481	0.04	Q	|	|	|	V|
21+ 5	0.4484	0.04	Q	|	|	|	V|
21+10	0.4488	0.05	Q	|	|	|	V|
21+15	0.4491	0.05	Q	|	|	|	V|
21+20	0.4494	0.04	Q	|	|	|	V|
21+25	0.4497	0.04	Q	|	|	|	V|
21+30	0.4499	0.04	Q	|	|	|	V|
21+35	0.4502	0.04	Q	|	|	|	V|
21+40	0.4506	0.05	Q	|	|	|	V|
21+45	0.4509	0.05	Q	|	|	|	V|
21+50	0.4512	0.04	Q	|	|	|	V|
21+55	0.4515	0.04	Q	|	|	|	V|
22+ 0	0.4517	0.04	Q	|	|	|	V|
22+ 5	0.4520	0.04	Q	|	|	|	V|
22+10	0.4524	0.05	Q	|	|	|	V|
22+15	0.4527	0.05	Q	|	|	|	V|
22+20	0.4530	0.04	Q	|	|	|	V|
22+25	0.4533	0.04	Q	|	|	|	V|

22+30	0.4535	0.04	Q	|	|	|	V|
22+35	0.4538	0.03	Q	|	|	|	V|
22+40	0.4540	0.03	Q	|	|	|	V|
22+45	0.4543	0.03	Q	|	|	|	V|
22+50	0.4545	0.03	Q	|	|	|	V|
22+55	0.4547	0.03	Q	|	|	|	V|
23+ 0	0.4550	0.03	Q	|	|	|	V|
23+ 5	0.4552	0.03	Q	|	|	|	V|
23+10	0.4555	0.03	Q	|	|	|	V|
23+15	0.4557	0.03	Q	|	|	|	V|
23+20	0.4559	0.03	Q	|	|	|	V|
23+25	0.4562	0.03	Q	|	|	|	V|
23+30	0.4564	0.03	Q	|	|	|	V|
23+35	0.4567	0.03	Q	|	|	|	V|
23+40	0.4569	0.03	Q	|	|	|	V|
23+45	0.4571	0.03	Q	|	|	|	V|
23+50	0.4574	0.03	Q	|	|	|	V|
23+55	0.4576	0.03	Q	|	|	|	V|
24+ 0	0.4579	0.03	Q	|	|	|	V|
24+ 5	0.4580	0.02	Q	|	|	|	V|
24+10	0.4580	0.00	Q	|	|	|	V|
24+15	0.4580	0.00	Q	|	|	|	V

U n i t H y d r o g r a p h A n a l y s i s

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 4011

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Evans Community Park 10-year, 24-hour Storm Event
Developed Condition (Central Portion of Site)
Job 21-003
11/5/21

Drainage Area = 9.17(Ac.) = 0.014 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 9.17(Ac.) = 0.014 Sq. Mi.
Length along longest watercourse = 1368.00(Ft.)
Length along longest watercourse measured to centroid = 749.00(Ft.)
Length along longest watercourse = 0.259 Mi.
Length along longest watercourse measured to centroid = 0.142 Mi.
Difference in elevation = 8.00(Ft.)
Slope along watercourse = 30.8772 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.053 Hr.
Lag time = 3.21 Min.
25% of lag time = 0.80 Min.
40% of lag time = 1.28 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
9.17	1.90	17.42

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]

9.17 5.00 45.85

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 1.900(In)
Area Averaged 100-Year Rainfall = 5.000(In)

Point rain (area averaged) = 3.175(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 3.175(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
4.585	100.00	1.000
4.585	69.00	0.000

Total Area Entered = 9.17(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
100.0	100.0	0.000	1.000	0.000	0.500	0.000
69.0	69.0	0.373	0.000	0.373	0.500	0.186
					Sum (F) =	0.186

Area averaged mean soil loss (F) (In/Hr) = 0.186
Minimum soil loss rate ((In/Hr)) = 0.093
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.500

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	155.860	34.563	3.194
2	0.167	311.719	46.577	4.304
3	0.250	467.579	10.851	1.003
4	0.333	623.438	4.706	0.435
5	0.417	779.298	2.307	0.213
6	0.500	935.157	0.995	0.092
		Sum =	100.000 Sum=	9.242

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.025	(0.330)	0.013	0.013
2	0.17	0.07	0.025	(0.329)	0.013	0.013
3	0.25	0.07	0.025	(0.328)	0.013	0.013
4	0.33	0.10	0.038	(0.327)	0.019	0.019
5	0.42	0.10	0.038	(0.325)	0.019	0.019
6	0.50	0.10	0.038	(0.324)	0.019	0.019

7	0.58	0.10	0.038	(0.323)	0.019	0.019
8	0.67	0.10	0.038	(0.322)	0.019	0.019
9	0.75	0.10	0.038	(0.320)	0.019	0.019
10	0.83	0.13	0.051	(0.319)	0.025	0.025
11	0.92	0.13	0.051	(0.318)	0.025	0.025
12	1.00	0.13	0.051	(0.317)	0.025	0.025
13	1.08	0.10	0.038	(0.315)	0.019	0.019
14	1.17	0.10	0.038	(0.314)	0.019	0.019
15	1.25	0.10	0.038	(0.313)	0.019	0.019
16	1.33	0.10	0.038	(0.312)	0.019	0.019
17	1.42	0.10	0.038	(0.310)	0.019	0.019
18	1.50	0.10	0.038	(0.309)	0.019	0.019
19	1.58	0.10	0.038	(0.308)	0.019	0.019
20	1.67	0.10	0.038	(0.307)	0.019	0.019
21	1.75	0.10	0.038	(0.305)	0.019	0.019
22	1.83	0.13	0.051	(0.304)	0.025	0.025
23	1.92	0.13	0.051	(0.303)	0.025	0.025
24	2.00	0.13	0.051	(0.302)	0.025	0.025
25	2.08	0.13	0.051	(0.300)	0.025	0.025
26	2.17	0.13	0.051	(0.299)	0.025	0.025
27	2.25	0.13	0.051	(0.298)	0.025	0.025
28	2.33	0.13	0.051	(0.297)	0.025	0.025
29	2.42	0.13	0.051	(0.296)	0.025	0.025
30	2.50	0.13	0.051	(0.294)	0.025	0.025
31	2.58	0.17	0.064	(0.293)	0.032	0.032
32	2.67	0.17	0.064	(0.292)	0.032	0.032
33	2.75	0.17	0.064	(0.291)	0.032	0.032
34	2.83	0.17	0.064	(0.290)	0.032	0.032
35	2.92	0.17	0.064	(0.288)	0.032	0.032
36	3.00	0.17	0.064	(0.287)	0.032	0.032
37	3.08	0.17	0.064	(0.286)	0.032	0.032
38	3.17	0.17	0.064	(0.285)	0.032	0.032
39	3.25	0.17	0.064	(0.284)	0.032	0.032
40	3.33	0.17	0.064	(0.282)	0.032	0.032
41	3.42	0.17	0.064	(0.281)	0.032	0.032
42	3.50	0.17	0.064	(0.280)	0.032	0.032
43	3.58	0.17	0.064	(0.279)	0.032	0.032
44	3.67	0.17	0.064	(0.278)	0.032	0.032
45	3.75	0.17	0.064	(0.277)	0.032	0.032
46	3.83	0.20	0.076	(0.275)	0.038	0.038
47	3.92	0.20	0.076	(0.274)	0.038	0.038
48	4.00	0.20	0.076	(0.273)	0.038	0.038
49	4.08	0.20	0.076	(0.272)	0.038	0.038
50	4.17	0.20	0.076	(0.271)	0.038	0.038
51	4.25	0.20	0.076	(0.270)	0.038	0.038
52	4.33	0.23	0.089	(0.268)	0.044	0.044
53	4.42	0.23	0.089	(0.267)	0.044	0.044
54	4.50	0.23	0.089	(0.266)	0.044	0.044
55	4.58	0.23	0.089	(0.265)	0.044	0.044
56	4.67	0.23	0.089	(0.264)	0.044	0.044
57	4.75	0.23	0.089	(0.263)	0.044	0.044
58	4.83	0.27	0.102	(0.262)	0.051	0.051
59	4.92	0.27	0.102	(0.261)	0.051	0.051
60	5.00	0.27	0.102	(0.259)	0.051	0.051
61	5.08	0.20	0.076	(0.258)	0.038	0.038
62	5.17	0.20	0.076	(0.257)	0.038	0.038
63	5.25	0.20	0.076	(0.256)	0.038	0.038

64	5.33	0.23	0.089	(0.255)	0.044	0.044
65	5.42	0.23	0.089	(0.254)	0.044	0.044
66	5.50	0.23	0.089	(0.253)	0.044	0.044
67	5.58	0.27	0.102	(0.252)	0.051	0.051
68	5.67	0.27	0.102	(0.250)	0.051	0.051
69	5.75	0.27	0.102	(0.249)	0.051	0.051
70	5.83	0.27	0.102	(0.248)	0.051	0.051
71	5.92	0.27	0.102	(0.247)	0.051	0.051
72	6.00	0.27	0.102	(0.246)	0.051	0.051
73	6.08	0.30	0.114	(0.245)	0.057	0.057
74	6.17	0.30	0.114	(0.244)	0.057	0.057
75	6.25	0.30	0.114	(0.243)	0.057	0.057
76	6.33	0.30	0.114	(0.242)	0.057	0.057
77	6.42	0.30	0.114	(0.241)	0.057	0.057
78	6.50	0.30	0.114	(0.240)	0.057	0.057
79	6.58	0.33	0.127	(0.238)	0.064	0.064
80	6.67	0.33	0.127	(0.237)	0.064	0.064
81	6.75	0.33	0.127	(0.236)	0.064	0.064
82	6.83	0.33	0.127	(0.235)	0.064	0.064
83	6.92	0.33	0.127	(0.234)	0.064	0.064
84	7.00	0.33	0.127	(0.233)	0.064	0.064
85	7.08	0.33	0.127	(0.232)	0.064	0.064
86	7.17	0.33	0.127	(0.231)	0.064	0.064
87	7.25	0.33	0.127	(0.230)	0.064	0.064
88	7.33	0.37	0.140	(0.229)	0.070	0.070
89	7.42	0.37	0.140	(0.228)	0.070	0.070
90	7.50	0.37	0.140	(0.227)	0.070	0.070
91	7.58	0.40	0.152	(0.226)	0.076	0.076
92	7.67	0.40	0.152	(0.225)	0.076	0.076
93	7.75	0.40	0.152	(0.224)	0.076	0.076
94	7.83	0.43	0.165	(0.223)	0.083	0.083
95	7.92	0.43	0.165	(0.222)	0.083	0.083
96	8.00	0.43	0.165	(0.221)	0.083	0.083
97	8.08	0.50	0.191	(0.220)	0.095	0.095
98	8.17	0.50	0.191	(0.219)	0.095	0.095
99	8.25	0.50	0.191	(0.218)	0.095	0.095
100	8.33	0.50	0.191	(0.217)	0.095	0.095
101	8.42	0.50	0.191	(0.216)	0.095	0.095
102	8.50	0.50	0.191	(0.214)	0.095	0.095
103	8.58	0.53	0.203	(0.213)	0.102	0.102
104	8.67	0.53	0.203	(0.212)	0.102	0.102
105	8.75	0.53	0.203	(0.211)	0.102	0.102
106	8.83	0.57	0.216	(0.210)	0.108	0.108
107	8.92	0.57	0.216	(0.209)	0.108	0.108
108	9.00	0.57	0.216	(0.209)	0.108	0.108
109	9.08	0.63	0.241	(0.208)	0.121	0.121
110	9.17	0.63	0.241	(0.207)	0.121	0.121
111	9.25	0.63	0.241	(0.206)	0.121	0.121
112	9.33	0.67	0.254	(0.205)	0.127	0.127
113	9.42	0.67	0.254	(0.204)	0.127	0.127
114	9.50	0.67	0.254	(0.203)	0.127	0.127
115	9.58	0.70	0.267	(0.202)	0.133	0.133
116	9.67	0.70	0.267	(0.201)	0.133	0.133
117	9.75	0.70	0.267	(0.200)	0.133	0.133
118	9.83	0.73	0.279	(0.199)	0.140	0.140
119	9.92	0.73	0.279	(0.198)	0.140	0.140
120	10.00	0.73	0.279	(0.197)	0.140	0.140

121	10.08	0.50	0.191	(0.196)	0.095	0.095
122	10.17	0.50	0.191	(0.195)	0.095	0.095
123	10.25	0.50	0.191	(0.194)	0.095	0.095
124	10.33	0.50	0.191	(0.193)	0.095	0.095
125	10.42	0.50	0.191	(0.192)	0.095	0.095
126	10.50	0.50	0.191	(0.191)	0.095	0.095
127	10.58	0.67	0.254	(0.190)	0.127	0.127
128	10.67	0.67	0.254	(0.189)	0.127	0.127
129	10.75	0.67	0.254	(0.188)	0.127	0.127
130	10.83	0.67	0.254	(0.187)	0.127	0.127
131	10.92	0.67	0.254	(0.187)	0.127	0.127
132	11.00	0.67	0.254	(0.186)	0.127	0.127
133	11.08	0.63	0.241	(0.185)	0.121	0.121
134	11.17	0.63	0.241	(0.184)	0.121	0.121
135	11.25	0.63	0.241	(0.183)	0.121	0.121
136	11.33	0.63	0.241	(0.182)	0.121	0.121
137	11.42	0.63	0.241	(0.181)	0.121	0.121
138	11.50	0.63	0.241	(0.180)	0.121	0.121
139	11.58	0.57	0.216	(0.179)	0.108	0.108
140	11.67	0.57	0.216	(0.178)	0.108	0.108
141	11.75	0.57	0.216	(0.178)	0.108	0.108
142	11.83	0.60	0.229	(0.177)	0.114	0.114
143	11.92	0.60	0.229	(0.176)	0.114	0.114
144	12.00	0.60	0.229	(0.175)	0.114	0.114
145	12.08	0.83	0.318	(0.174)	0.159	0.159
146	12.17	0.83	0.318	(0.173)	0.159	0.159
147	12.25	0.83	0.318	(0.172)	0.159	0.159
148	12.33	0.87	0.330	(0.171)	0.165	0.165
149	12.42	0.87	0.330	(0.171)	0.165	0.165
150	12.50	0.87	0.330	(0.170)	0.165	0.165
151	12.58	0.93	0.356	0.169	(0.178)	0.187
152	12.67	0.93	0.356	0.168	(0.178)	0.188
153	12.75	0.93	0.356	0.167	(0.178)	0.189
154	12.83	0.97	0.368	0.166	(0.184)	0.202
155	12.92	0.97	0.368	0.165	(0.184)	0.203
156	13.00	0.97	0.368	0.165	(0.184)	0.204
157	13.08	1.13	0.432	0.164	(0.216)	0.268
158	13.17	1.13	0.432	0.163	(0.216)	0.269
159	13.25	1.13	0.432	0.162	(0.216)	0.270
160	13.33	1.13	0.432	0.161	(0.216)	0.271
161	13.42	1.13	0.432	0.160	(0.216)	0.271
162	13.50	1.13	0.432	0.160	(0.216)	0.272
163	13.58	0.77	0.292	(0.159)	0.146	0.146
164	13.67	0.77	0.292	(0.158)	0.146	0.146
165	13.75	0.77	0.292	(0.157)	0.146	0.146
166	13.83	0.77	0.292	(0.156)	0.146	0.146
167	13.92	0.77	0.292	(0.156)	0.146	0.146
168	14.00	0.77	0.292	(0.155)	0.146	0.146
169	14.08	0.90	0.343	0.154	(0.171)	0.189
170	14.17	0.90	0.343	0.153	(0.171)	0.190
171	14.25	0.90	0.343	0.152	(0.171)	0.190
172	14.33	0.87	0.330	0.152	(0.165)	0.179
173	14.42	0.87	0.330	0.151	(0.165)	0.179
174	14.50	0.87	0.330	0.150	(0.165)	0.180
175	14.58	0.87	0.330	0.149	(0.165)	0.181
176	14.67	0.87	0.330	0.149	(0.165)	0.182
177	14.75	0.87	0.330	0.148	(0.165)	0.182

178	14.83	0.83	0.318	0.147	(0.159)	0.170
179	14.92	0.83	0.318	0.146	(0.159)	0.171
180	15.00	0.83	0.318	0.146	(0.159)	0.172
181	15.08	0.80	0.305	0.145	(0.152)	0.160
182	15.17	0.80	0.305	0.144	(0.152)	0.161
183	15.25	0.80	0.305	0.143	(0.152)	0.161
184	15.33	0.77	0.292	0.143	(0.146)	0.150
185	15.42	0.77	0.292	0.142	(0.146)	0.150
186	15.50	0.77	0.292	0.141	(0.146)	0.151
187	15.58	0.63	0.241	(0.140)	0.121	0.121
188	15.67	0.63	0.241	(0.140)	0.121	0.121
189	15.75	0.63	0.241	(0.139)	0.121	0.121
190	15.83	0.63	0.241	(0.138)	0.121	0.121
191	15.92	0.63	0.241	(0.138)	0.121	0.121
192	16.00	0.63	0.241	(0.137)	0.121	0.121
193	16.08	0.13	0.051	(0.136)	0.025	0.025
194	16.17	0.13	0.051	(0.135)	0.025	0.025
195	16.25	0.13	0.051	(0.135)	0.025	0.025
196	16.33	0.13	0.051	(0.134)	0.025	0.025
197	16.42	0.13	0.051	(0.133)	0.025	0.025
198	16.50	0.13	0.051	(0.133)	0.025	0.025
199	16.58	0.10	0.038	(0.132)	0.019	0.019
200	16.67	0.10	0.038	(0.131)	0.019	0.019
201	16.75	0.10	0.038	(0.131)	0.019	0.019
202	16.83	0.10	0.038	(0.130)	0.019	0.019
203	16.92	0.10	0.038	(0.129)	0.019	0.019
204	17.00	0.10	0.038	(0.129)	0.019	0.019
205	17.08	0.17	0.064	(0.128)	0.032	0.032
206	17.17	0.17	0.064	(0.127)	0.032	0.032
207	17.25	0.17	0.064	(0.127)	0.032	0.032
208	17.33	0.17	0.064	(0.126)	0.032	0.032
209	17.42	0.17	0.064	(0.126)	0.032	0.032
210	17.50	0.17	0.064	(0.125)	0.032	0.032
211	17.58	0.17	0.064	(0.124)	0.032	0.032
212	17.67	0.17	0.064	(0.124)	0.032	0.032
213	17.75	0.17	0.064	(0.123)	0.032	0.032
214	17.83	0.13	0.051	(0.122)	0.025	0.025
215	17.92	0.13	0.051	(0.122)	0.025	0.025
216	18.00	0.13	0.051	(0.121)	0.025	0.025
217	18.08	0.13	0.051	(0.121)	0.025	0.025
218	18.17	0.13	0.051	(0.120)	0.025	0.025
219	18.25	0.13	0.051	(0.119)	0.025	0.025
220	18.33	0.13	0.051	(0.119)	0.025	0.025
221	18.42	0.13	0.051	(0.118)	0.025	0.025
222	18.50	0.13	0.051	(0.118)	0.025	0.025
223	18.58	0.10	0.038	(0.117)	0.019	0.019
224	18.67	0.10	0.038	(0.117)	0.019	0.019
225	18.75	0.10	0.038	(0.116)	0.019	0.019
226	18.83	0.07	0.025	(0.115)	0.013	0.013
227	18.92	0.07	0.025	(0.115)	0.013	0.013
228	19.00	0.07	0.025	(0.114)	0.013	0.013
229	19.08	0.10	0.038	(0.114)	0.019	0.019
230	19.17	0.10	0.038	(0.113)	0.019	0.019
231	19.25	0.10	0.038	(0.113)	0.019	0.019
232	19.33	0.13	0.051	(0.112)	0.025	0.025
233	19.42	0.13	0.051	(0.112)	0.025	0.025
234	19.50	0.13	0.051	(0.111)	0.025	0.025

235	19.58	0.10	0.038	(0.111)	0.019	0.019
236	19.67	0.10	0.038	(0.110)	0.019	0.019
237	19.75	0.10	0.038	(0.110)	0.019	0.019
238	19.83	0.07	0.025	(0.109)	0.013	0.013
239	19.92	0.07	0.025	(0.109)	0.013	0.013
240	20.00	0.07	0.025	(0.108)	0.013	0.013
241	20.08	0.10	0.038	(0.108)	0.019	0.019
242	20.17	0.10	0.038	(0.107)	0.019	0.019
243	20.25	0.10	0.038	(0.107)	0.019	0.019
244	20.33	0.10	0.038	(0.106)	0.019	0.019
245	20.42	0.10	0.038	(0.106)	0.019	0.019
246	20.50	0.10	0.038	(0.105)	0.019	0.019
247	20.58	0.10	0.038	(0.105)	0.019	0.019
248	20.67	0.10	0.038	(0.105)	0.019	0.019
249	20.75	0.10	0.038	(0.104)	0.019	0.019
250	20.83	0.07	0.025	(0.104)	0.013	0.013
251	20.92	0.07	0.025	(0.103)	0.013	0.013
252	21.00	0.07	0.025	(0.103)	0.013	0.013
253	21.08	0.10	0.038	(0.102)	0.019	0.019
254	21.17	0.10	0.038	(0.102)	0.019	0.019
255	21.25	0.10	0.038	(0.102)	0.019	0.019
256	21.33	0.07	0.025	(0.101)	0.013	0.013
257	21.42	0.07	0.025	(0.101)	0.013	0.013
258	21.50	0.07	0.025	(0.101)	0.013	0.013
259	21.58	0.10	0.038	(0.100)	0.019	0.019
260	21.67	0.10	0.038	(0.100)	0.019	0.019
261	21.75	0.10	0.038	(0.099)	0.019	0.019
262	21.83	0.07	0.025	(0.099)	0.013	0.013
263	21.92	0.07	0.025	(0.099)	0.013	0.013
264	22.00	0.07	0.025	(0.098)	0.013	0.013
265	22.08	0.10	0.038	(0.098)	0.019	0.019
266	22.17	0.10	0.038	(0.098)	0.019	0.019
267	22.25	0.10	0.038	(0.097)	0.019	0.019
268	22.33	0.07	0.025	(0.097)	0.013	0.013
269	22.42	0.07	0.025	(0.097)	0.013	0.013
270	22.50	0.07	0.025	(0.097)	0.013	0.013
271	22.58	0.07	0.025	(0.096)	0.013	0.013
272	22.67	0.07	0.025	(0.096)	0.013	0.013
273	22.75	0.07	0.025	(0.096)	0.013	0.013
274	22.83	0.07	0.025	(0.096)	0.013	0.013
275	22.92	0.07	0.025	(0.095)	0.013	0.013
276	23.00	0.07	0.025	(0.095)	0.013	0.013
277	23.08	0.07	0.025	(0.095)	0.013	0.013
278	23.17	0.07	0.025	(0.095)	0.013	0.013
279	23.25	0.07	0.025	(0.094)	0.013	0.013
280	23.33	0.07	0.025	(0.094)	0.013	0.013
281	23.42	0.07	0.025	(0.094)	0.013	0.013
282	23.50	0.07	0.025	(0.094)	0.013	0.013
283	23.58	0.07	0.025	(0.094)	0.013	0.013
284	23.67	0.07	0.025	(0.094)	0.013	0.013
285	23.75	0.07	0.025	(0.093)	0.013	0.013
286	23.83	0.07	0.025	(0.093)	0.013	0.013
287	23.92	0.07	0.025	(0.093)	0.013	0.013
288	24.00	0.07	0.025	(0.093)	0.013	0.013
		(Loss Rate Not Used)				
Sum =		100.0			Sum =	19.7

Flood volume = Effective rainfall 1.64(In)

```
 times area       9.2(Ac.)/[(In)/(Ft.)] =       1.3(Ac.Ft)
Total soil loss =      1.53(In)
Total soil loss =     1.173(Ac.Ft)
Total rainfall =      3.18(In)
Flood volume =       54602.9 Cubic Feet
Total soil loss =       51093.9 Cubic Feet
--------------------------------------------------------------------
 Peak flow rate of this hydrograph =      2.509(CFS)
--------------------------------------------------------------------
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                  24 - H O U R    S T O R M
               R u n o f f      H y d r o g r a p h
--------------------------------------------------------------------
            Hydrograph in   5   Minute intervals ((CFS))

--------------------------------------------------------------------
```

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0003	0.04	Q				
0+10	0.0009	0.10	Q				
0+15	0.0017	0.11	Q				
0+20	0.0026	0.13	Q				
0+25	0.0037	0.16	Q				
0+30	0.0049	0.17	Q				
0+35	0.0061	0.17	Q				
0+40	0.0073	0.18	Q				
0+45	0.0085	0.18	Q				
0+50	0.0099	0.20	Q				
0+55	0.0114	0.22	Q				
1+ 0	0.0130	0.23	Q				
1+ 5	0.0145	0.21	Q				
1+10	0.0158	0.19	Q				
1+15	0.0170	0.18	Q				
1+20	0.0182	0.18	Q				
1+25	0.0195	0.18	Q				
1+30	0.0207	0.18	Q				
1+35	0.0219	0.18	Q				
1+40	0.0231	0.18	Q				
1+45	0.0243	0.18	Q				
1+50	0.0257	0.20	Q				
1+55	0.0272	0.22	Q				
2+ 0	0.0288	0.23	Q				
2+ 5	0.0304	0.23	Q				
2+10	0.0320	0.23	QV				
2+15	0.0336	0.23	QV				
2+20	0.0352	0.23	QV				
2+25	0.0369	0.23	QV				
2+30	0.0385	0.23	QV				
2+35	0.0402	0.26	|Q				
2+40	0.0422	0.28	|Q				
2+45	0.0442	0.29	|Q				
2+50	0.0462	0.29	|Q				
2+55	0.0482	0.29	|Q				
3+ 0	0.0502	0.29	|Q				
3+ 5	0.0522	0.29	|Q				
3+10	0.0543	0.29	|Q				
3+15	0.0563	0.29	|Q				

3+20	0.0583	0.29	|Q	|	|	|	|
3+25	0.0603	0.29	|Q	|	|	|	|
3+30	0.0623	0.29	|Q	|	|	|	|
3+35	0.0644	0.29	|QV	|	|	|	|
3+40	0.0664	0.29	|QV	|	|	|	|
3+45	0.0684	0.29	|QV	|	|	|	|
3+50	0.0706	0.31	|QV	|	|	|	|
3+55	0.0729	0.34	|QV	|	|	|	|
4+ 0	0.0753	0.35	|QV	|	|	|	|
4+ 5	0.0777	0.35	|QV	|	|	|	|
4+10	0.0802	0.35	|QV	|	|	|	|
4+15	0.0826	0.35	|QV	|	|	|	|
4+20	0.0851	0.37	|QV	|	|	|	|
4+25	0.0879	0.40	|QV	|	|	|	|
4+30	0.0907	0.41	|QV	|	|	|	|
4+35	0.0935	0.41	|QV	|	|	|	|
4+40	0.0963	0.41	|Q V	|	|	|	|
4+45	0.0992	0.41	|Q V	|	|	|	|
4+50	0.1021	0.43	|Q V	|	|	|	|
4+55	0.1053	0.46	|Q V	|	|	|	|
5+ 0	0.1085	0.47	|Q V	|	|	|	|
5+ 5	0.1115	0.43	|Q V	|	|	|	|
5+10	0.1140	0.37	|Q V	|	|	|	|
5+15	0.1165	0.36	|Q V	|	|	|	|
5+20	0.1191	0.38	|Q V	|	|	|	|
5+25	0.1219	0.40	|Q V	|	|	|	|
5+30	0.1247	0.41	|Q V	|	|	|	|
5+35	0.1276	0.43	|Q V	|	|	|	|
5+40	0.1308	0.46	|Q V	|	|	|	|
5+45	0.1340	0.47	|Q V	|	|	|	|
5+50	0.1372	0.47	|Q V	|	|	|	|
5+55	0.1404	0.47	|Q V	|	|	|	|
6+ 0	0.1437	0.47	|Q V	|	|	|	|
6+ 5	0.1471	0.49	|Q V	|	|	|	|
6+10	0.1506	0.52	| Q V	|	|	|	|
6+15	0.1542	0.52	| Q V	|	|	|	|
6+20	0.1578	0.53	| Q V	|	|	|	|
6+25	0.1615	0.53	| Q V	|	|	|	|
6+30	0.1651	0.53	| Q V	|	|	|	|
6+35	0.1689	0.55	| Q V	|	|	|	|
6+40	0.1729	0.58	| Q V	|	|	|	|
6+45	0.1769	0.58	| Q V	|	|	|	|
6+50	0.1809	0.59	| Q V	|	|	|	|
6+55	0.1850	0.59	| Q V	|	|	|	|
7+ 0	0.1890	0.59	| Q V	|	|	|	|
7+ 5	0.1930	0.59	| Q V	|	|	|	|
7+10	0.1971	0.59	| Q V	|	|	|	|
7+15	0.2011	0.59	| Q V	|	|	|	|
7+20	0.2053	0.61	| Q V	|	|	|	|
7+25	0.2097	0.63	| Q V	|	|	|	|
7+30	0.2141	0.64	| Q V	|	|	|	|
7+35	0.2187	0.66	| Q V	|	|	|	|
7+40	0.2234	0.69	| Q V	|	|	|	|
7+45	0.2283	0.70	| Q V	|	|	|	|
7+50	0.2332	0.72	| Q V	|	|	|	|
7+55	0.2384	0.75	| Q V	|	|	|	|
8+ 0	0.2437	0.76	| Q V	|	|	|	|

8+ 5	0.2492	0.80	Q V			
8+10	0.2551	0.86	Q V			
8+15	0.2611	0.87	Q V			
8+20	0.2671	0.88	Q V			
8+25	0.2732	0.88	Q V			
8+30	0.2792	0.88	Q V			
8+35	0.2855	0.90	Q V			
8+40	0.2918	0.93	Q V			
8+45	0.2983	0.93	Q V			
8+50	0.3049	0.96	Q V			
8+55	0.3117	0.99	Q V			
9+ 0	0.3185	0.99	Q V			
9+ 5	0.3257	1.04	Q V			
9+10	0.3332	1.09	Q V			
9+15	0.3408	1.11	Q V			
9+20	0.3486	1.13	Q V			
9+25	0.3566	1.16	Q V			
9+30	0.3647	1.17	Q V			
9+35	0.3729	1.19	Q V			
9+40	0.3813	1.22	Q V			
9+45	0.3898	1.23	Q V			
9+50	0.3984	1.25	Q V			
9+55	0.4072	1.28	Q V			
10+ 0	0.4161	1.29	Q V			
10+ 5	0.4240	1.15	Q V			
10+10	0.4306	0.96	Q V			
10+15	0.4368	0.91	Q V			
10+20	0.4430	0.89	Q V			
10+25	0.4491	0.88	Q V			
10+30	0.4552	0.88	Q V			
10+35	0.4619	0.98	Q V			
10+40	0.4696	1.12	Q V			
10+45	0.4776	1.15	Q V			
10+50	0.4856	1.16	Q V			
10+55	0.4937	1.17	Q V			
11+ 0	0.5017	1.17	Q V			
11+ 5	0.5097	1.15	Q V			
11+10	0.5175	1.13	Q V			
11+15	0.5252	1.12	Q V			
11+20	0.5329	1.12	Q V			
11+25	0.5406	1.12	Q V			
11+30	0.5482	1.12	Q V			
11+35	0.5556	1.08	Q V			
11+40	0.5627	1.02	Q V			
11+45	0.5696	1.01	Q V			
11+50	0.5767	1.02	Q V			
11+55	0.5839	1.05	Q V			
12+ 0	0.5911	1.05	Q V			
12+ 5	0.5994	1.20	Q V			
12+10	0.6089	1.39	Q V			
12+15	0.6188	1.44	Q V			
12+20	0.6290	1.47	Q V			
12+25	0.6394	1.51	Q V			
12+30	0.6499	1.52	Q V			
12+35	0.6608	1.59	Q V			
12+40	0.6725	1.69	Q V			
12+45	0.6843	1.72	Q V			

12+50	0.6966	1.78	| Q |	| V |	|
12+55	0.7093	1.84	| Q |	| V |	|
13+ 0	0.7221	1.87	| Q |	| V |	|
13+ 5	0.7365	2.08	| Q |	| V |	|
13+10	0.7528	2.37	| Q|	| V |	|
13+15	0.7696	2.44	| Q|	| V |	|
13+20	0.7866	2.47	| Q|	| V |	|
13+25	0.8038	2.50	| Q|	| V |	|
13+30	0.8211	2.51	| Q |	| V |	|
13+35	0.8356	2.11	| Q |	| V |	|
13+40	0.8465	1.57	| Q |	| V |	|
13+45	0.8564	1.44	| Q |	| V |	|
13+50	0.8660	1.39	| Q |	| V |	|
13+55	0.8753	1.36	| Q |	| V |	|
14+ 0	0.8846	1.35	| Q |	| V |	|
14+ 5	0.8949	1.49	| Q |	| V |	|
14+10	0.9064	1.67	| Q |	| V |	|
14+15	0.9183	1.72	| Q |	| V|	|
14+20	0.9301	1.71	| Q |	| V|	|
14+25	0.9416	1.67	| Q |	| V |	|
14+30	0.9530	1.67	| Q |	| V |	|
14+35	0.9645	1.67	| Q |	| V |	|
14+40	0.9761	1.67	| Q |	| |V |	|
14+45	0.9876	1.68	| Q |	| |V |	|
14+50	0.9990	1.65	| Q |	| |V |	|
14+55	1.0100	1.60	| Q |	| | V |	|
15+ 0	1.0209	1.59	| Q |	| | V |	|
15+ 5	1.0316	1.55	| Q |	| | V |	|
15+10	1.0420	1.50	| Q |	| | V |	|
15+15	1.0523	1.50	| Q |	| | V |	|
15+20	1.0623	1.46	| Q |	| | V |	|
15+25	1.0720	1.41	| Q |	| | V |	|
15+30	1.0816	1.40	| Q |	| | V |	|
15+35	1.0906	1.30	| Q |	| | V |	|
15+40	1.0986	1.17	| Q |	| | V |	|
15+45	1.1065	1.14	| Q |	| | V |	|
15+50	1.1142	1.12	| Q |	| | V |	|
15+55	1.1219	1.12	| Q |	| | V |	|
16+ 0	1.1296	1.12	| Q |	| | V |	|
16+ 5	1.1352	0.81	| Q |	| | V |	|
16+10	1.1380	0.40	|Q |	| | V |	|
16+15	1.1401	0.31	|Q |	| | V |	|
16+20	1.1419	0.26	|Q |	| | V |	|
16+25	1.1436	0.24	Q |	| | V |	|
16+30	1.1452	0.23	Q |	| | V |	|
16+35	1.1467	0.21	Q |	| | V |	|
16+40	1.1479	0.19	Q |	| | V |	|
16+45	1.1492	0.18	Q |	| | V |	|
16+50	1.1504	0.18	Q |	| | V |	|
16+55	1.1516	0.18	Q |	| | V |	|
17+ 0	1.1529	0.18	Q |	| | V |	|
17+ 5	1.1543	0.22	Q |	| | V |	|
17+10	1.1562	0.27	|Q |	| | V |	|
17+15	1.1582	0.28	|Q |	| | V |	|
17+20	1.1602	0.29	|Q |	| | V |	|
17+25	1.1622	0.29	|Q |	| | V |	|
17+30	1.1642	0.29	|Q |	| | V |	|

17+35	1.1662	0.29	|Q	|	|	|	V |
17+40	1.1682	0.29	|Q	|	|	|	V |
17+45	1.1703	0.29	|Q	|	|	|	V |
17+50	1.1722	0.27	|Q	|	|	|	V |
17+55	1.1738	0.25	Q	|	|	|	V |
18+ 0	1.1755	0.24	Q	|	|	|	V |
18+ 5	1.1771	0.24	Q	|	|	|	V |
18+10	1.1787	0.24	Q	|	|	|	V |
18+15	1.1804	0.23	Q	|	|	|	V |
18+20	1.1820	0.23	Q	|	|	|	V |
18+25	1.1836	0.23	Q	|	|	|	V |
18+30	1.1852	0.23	Q	|	|	|	V |
18+35	1.1867	0.21	Q	|	|	|	V |
18+40	1.1880	0.19	Q	|	|	|	V |
18+45	1.1892	0.18	Q	|	|	|	V |
18+50	1.1903	0.16	Q	|	|	|	V |
18+55	1.1912	0.13	Q	|	|	|	V |
19+ 0	1.1920	0.12	Q	|	|	|	V |
19+ 5	1.1930	0.14	Q	|	|	|	V |
19+10	1.1942	0.17	Q	|	|	|	V |
19+15	1.1953	0.17	Q	|	|	|	V |
19+20	1.1967	0.19	Q	|	|	|	V |
19+25	1.1982	0.22	Q	|	|	|	V |
19+30	1.1998	0.23	Q	|	|	|	V |
19+35	1.2013	0.21	Q	|	|	|	V |
19+40	1.2025	0.19	Q	|	|	|	V |
19+45	1.2038	0.18	Q	|	|	|	V |
19+50	1.2049	0.16	Q	|	|	|	V |
19+55	1.2058	0.13	Q	|	|	|	V |
20+ 0	1.2066	0.12	Q	|	|	|	V |
20+ 5	1.2076	0.14	Q	|	|	|	V |
20+10	1.2087	0.17	Q	|	|	|	V |
20+15	1.2099	0.17	Q	|	|	|	V |
20+20	1.2111	0.17	Q	|	|	|	V |
20+25	1.2123	0.18	Q	|	|	|	V |
20+30	1.2135	0.18	Q	|	|	|	V |
20+35	1.2147	0.18	Q	|	|	|	V |
20+40	1.2159	0.18	Q	|	|	|	V |
20+45	1.2172	0.18	Q	|	|	|	V |
20+50	1.2182	0.16	Q	|	|	|	V |
20+55	1.2191	0.13	Q	|	|	|	V |
21+ 0	1.2200	0.12	Q	|	|	|	V |
21+ 5	1.2209	0.14	Q	|	|	|	V |
21+10	1.2221	0.17	Q	|	|	|	V |
21+15	1.2232	0.17	Q	|	|	|	V|
21+20	1.2243	0.15	Q	|	|	|	V|
21+25	1.2252	0.13	Q	|	|	|	V|
21+30	1.2260	0.12	Q	|	|	|	V|
21+35	1.2270	0.14	Q	|	|	|	V|
21+40	1.2281	0.17	Q	|	|	|	V|
21+45	1.2293	0.17	Q	|	|	|	V|
21+50	1.2304	0.15	Q	|	|	|	V|
21+55	1.2312	0.13	Q	|	|	|	V|
22+ 0	1.2321	0.12	Q	|	|	|	V|
22+ 5	1.2330	0.14	Q	|	|	|	V|
22+10	1.2342	0.17	Q	|	|	|	V|
22+15	1.2354	0.17	Q	|	|	|	V|

22+20	1.2364	0.15	Q	|	|	|	V|
22+25	1.2373	0.13	Q	|	|	|	V|
22+30	1.2382	0.12	Q	|	|	|	V|
22+35	1.2390	0.12	Q	|	|	|	V|
22+40	1.2398	0.12	Q	|	|	|	V|
22+45	1.2406	0.12	Q	|	|	|	V|
22+50	1.2414	0.12	Q	|	|	|	V|
22+55	1.2422	0.12	Q	|	|	|	V|
23+ 0	1.2430	0.12	Q	|	|	|	V|
23+ 5	1.2438	0.12	Q	|	|	|	V|
23+10	1.2446	0.12	Q	|	|	|	V|
23+15	1.2454	0.12	Q	|	|	|	V|
23+20	1.2463	0.12	Q	|	|	|	V|
23+25	1.2471	0.12	Q	|	|	|	V|
23+30	1.2479	0.12	Q	|	|	|	V|
23+35	1.2487	0.12	Q	|	|	|	V|
23+40	1.2495	0.12	Q	|	|	|	V|
23+45	1.2503	0.12	Q	|	|	|	V|
23+50	1.2511	0.12	Q	|	|	|	V|
23+55	1.2519	0.12	Q	|	|	|	V|
24+ 0	1.2527	0.12	Q	|	|	|	V|
24+ 5	1.2533	0.08	Q	|	|	|	V|
24+10	1.2534	0.02	Q	|	|	|	V|
24+15	1.2535	0.01	Q	|	|	|	V|
24+20	1.2535	0.00	Q	|	|	|	V|
24+25	1.2535	0.00	Q	|	|	|	V|

U n i t H y d r o g r a p h A n a l y s i s

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Study date 11/05/21 File: northdevC2410.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 4011

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Evans Community Park 10-year 24-hour Storm Event
Developed Condition (Southerly Portion of Site)
Job 21-003
11/5/21

Drainage Area = 5.15(Ac.) = 0.008 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 5.15(Ac.) = 0.008 Sq. Mi.
Length along longest watercourse = 895.00(Ft.)
Length along longest watercourse measured to centroid = 493.00(Ft.)
Length along longest watercourse = 0.170 Mi.
Length along longest watercourse measured to centroid = 0.093 Mi.
Difference in elevation = 9.00(Ft.)
Slope along watercourse = 53.0950 Ft./Mi.
Average Manning's 'N' = 0.020
Lag time = 0.047 Hr.
Lag time = 2.80 Min.
25% of lag time = 0.70 Min.
40% of lag time = 1.12 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.15	1.90	9.79

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]

5.15 5.00 25.75

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 1.900(In)
Area Averaged 100-Year Rainfall = 5.000(In)

Point rain (area averaged) = 3.175(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 3.175(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
1.030	100.00	1.000
4.120	75.00	0.000

Total Area Entered = 5.15(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
100.0	100.0	0.000	1.000	0.000	0.200	0.000
75.0	75.0	0.303	0.000	0.303	0.800	0.242
					Sum (F) =	0.242

Area averaged mean soil loss (F) (In/Hr) = 0.242
Minimum soil loss rate ((In/Hr)) = 0.121
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.740

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	178.470	39.420	2.046
2	0.167	356.940	44.897	2.330
3	0.250	535.410	9.730	0.505
4	0.333	713.879	4.004	0.208
5	0.417	892.349	1.950	0.101
		Sum =	100.000 Sum=	5.190

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.025	(0.430)	0.019	0.007
2	0.17	0.07	0.025	(0.428)	0.019	0.007
3	0.25	0.07	0.025	(0.426)	0.019	0.007
4	0.33	0.10	0.038	(0.425)	0.028	0.010
5	0.42	0.10	0.038	(0.423)	0.028	0.010
6	0.50	0.10	0.038	(0.421)	0.028	0.010
7	0.58	0.10	0.038	(0.420)	0.028	0.010

8	0.67	0.10	0.038	(0.418)	0.028	0.010
9	0.75	0.10	0.038	(0.417)	0.028	0.010
10	0.83	0.13	0.051	(0.415)	0.038	0.013
11	0.92	0.13	0.051	(0.413)	0.038	0.013
12	1.00	0.13	0.051	(0.412)	0.038	0.013
13	1.08	0.10	0.038	(0.410)	0.028	0.010
14	1.17	0.10	0.038	(0.408)	0.028	0.010
15	1.25	0.10	0.038	(0.407)	0.028	0.010
16	1.33	0.10	0.038	(0.405)	0.028	0.010
17	1.42	0.10	0.038	(0.404)	0.028	0.010
18	1.50	0.10	0.038	(0.402)	0.028	0.010
19	1.58	0.10	0.038	(0.400)	0.028	0.010
20	1.67	0.10	0.038	(0.399)	0.028	0.010
21	1.75	0.10	0.038	(0.397)	0.028	0.010
22	1.83	0.13	0.051	(0.395)	0.038	0.013
23	1.92	0.13	0.051	(0.394)	0.038	0.013
24	2.00	0.13	0.051	(0.392)	0.038	0.013
25	2.08	0.13	0.051	(0.391)	0.038	0.013
26	2.17	0.13	0.051	(0.389)	0.038	0.013
27	2.25	0.13	0.051	(0.388)	0.038	0.013
28	2.33	0.13	0.051	(0.386)	0.038	0.013
29	2.42	0.13	0.051	(0.384)	0.038	0.013
30	2.50	0.13	0.051	(0.383)	0.038	0.013
31	2.58	0.17	0.064	(0.381)	0.047	0.017
32	2.67	0.17	0.064	(0.380)	0.047	0.017
33	2.75	0.17	0.064	(0.378)	0.047	0.017
34	2.83	0.17	0.064	(0.377)	0.047	0.017
35	2.92	0.17	0.064	(0.375)	0.047	0.017
36	3.00	0.17	0.064	(0.373)	0.047	0.017
37	3.08	0.17	0.064	(0.372)	0.047	0.017
38	3.17	0.17	0.064	(0.370)	0.047	0.017
39	3.25	0.17	0.064	(0.369)	0.047	0.017
40	3.33	0.17	0.064	(0.367)	0.047	0.017
41	3.42	0.17	0.064	(0.366)	0.047	0.017
42	3.50	0.17	0.064	(0.364)	0.047	0.017
43	3.58	0.17	0.064	(0.363)	0.047	0.017
44	3.67	0.17	0.064	(0.361)	0.047	0.017
45	3.75	0.17	0.064	(0.360)	0.047	0.017
46	3.83	0.20	0.076	(0.358)	0.056	0.020
47	3.92	0.20	0.076	(0.357)	0.056	0.020
48	4.00	0.20	0.076	(0.355)	0.056	0.020
49	4.08	0.20	0.076	(0.354)	0.056	0.020
50	4.17	0.20	0.076	(0.352)	0.056	0.020
51	4.25	0.20	0.076	(0.351)	0.056	0.020
52	4.33	0.23	0.089	(0.349)	0.066	0.023
53	4.42	0.23	0.089	(0.348)	0.066	0.023
54	4.50	0.23	0.089	(0.346)	0.066	0.023
55	4.58	0.23	0.089	(0.345)	0.066	0.023
56	4.67	0.23	0.089	(0.343)	0.066	0.023
57	4.75	0.23	0.089	(0.342)	0.066	0.023
58	4.83	0.27	0.102	(0.340)	0.075	0.026
59	4.92	0.27	0.102	(0.339)	0.075	0.026
60	5.00	0.27	0.102	(0.337)	0.075	0.026
61	5.08	0.20	0.076	(0.336)	0.056	0.020
62	5.17	0.20	0.076	(0.334)	0.056	0.020
63	5.25	0.20	0.076	(0.333)	0.056	0.020
64	5.33	0.23	0.089	(0.331)	0.066	0.023

65	5.42	0.23	0.089	(0.330)	0.066	0.023
66	5.50	0.23	0.089	(0.329)	0.066	0.023
67	5.58	0.27	0.102	(0.327)	0.075	0.026
68	5.67	0.27	0.102	(0.326)	0.075	0.026
69	5.75	0.27	0.102	(0.324)	0.075	0.026
70	5.83	0.27	0.102	(0.323)	0.075	0.026
71	5.92	0.27	0.102	(0.321)	0.075	0.026
72	6.00	0.27	0.102	(0.320)	0.075	0.026
73	6.08	0.30	0.114	(0.319)	0.085	0.030
74	6.17	0.30	0.114	(0.317)	0.085	0.030
75	6.25	0.30	0.114	(0.316)	0.085	0.030
76	6.33	0.30	0.114	(0.314)	0.085	0.030
77	6.42	0.30	0.114	(0.313)	0.085	0.030
78	6.50	0.30	0.114	(0.311)	0.085	0.030
79	6.58	0.33	0.127	(0.310)	0.094	0.033
80	6.67	0.33	0.127	(0.309)	0.094	0.033
81	6.75	0.33	0.127	(0.307)	0.094	0.033
82	6.83	0.33	0.127	(0.306)	0.094	0.033
83	6.92	0.33	0.127	(0.305)	0.094	0.033
84	7.00	0.33	0.127	(0.303)	0.094	0.033
85	7.08	0.33	0.127	(0.302)	0.094	0.033
86	7.17	0.33	0.127	(0.300)	0.094	0.033
87	7.25	0.33	0.127	(0.299)	0.094	0.033
88	7.33	0.37	0.140	(0.298)	0.103	0.036
89	7.42	0.37	0.140	(0.296)	0.103	0.036
90	7.50	0.37	0.140	(0.295)	0.103	0.036
91	7.58	0.40	0.152	(0.294)	0.113	0.040
92	7.67	0.40	0.152	(0.292)	0.113	0.040
93	7.75	0.40	0.152	(0.291)	0.113	0.040
94	7.83	0.43	0.165	(0.290)	0.122	0.043
95	7.92	0.43	0.165	(0.288)	0.122	0.043
96	8.00	0.43	0.165	(0.287)	0.122	0.043
97	8.08	0.50	0.191	(0.286)	0.141	0.050
98	8.17	0.50	0.191	(0.284)	0.141	0.050
99	8.25	0.50	0.191	(0.283)	0.141	0.050
100	8.33	0.50	0.191	(0.282)	0.141	0.050
101	8.42	0.50	0.191	(0.280)	0.141	0.050
102	8.50	0.50	0.191	(0.279)	0.141	0.050
103	8.58	0.53	0.203	(0.278)	0.150	0.053
104	8.67	0.53	0.203	(0.276)	0.150	0.053
105	8.75	0.53	0.203	(0.275)	0.150	0.053
106	8.83	0.57	0.216	(0.274)	0.160	0.056
107	8.92	0.57	0.216	(0.272)	0.160	0.056
108	9.00	0.57	0.216	(0.271)	0.160	0.056
109	9.08	0.63	0.241	(0.270)	0.179	0.063
110	9.17	0.63	0.241	(0.269)	0.179	0.063
111	9.25	0.63	0.241	(0.267)	0.179	0.063
112	9.33	0.67	0.254	(0.266)	0.188	0.066
113	9.42	0.67	0.254	(0.265)	0.188	0.066
114	9.50	0.67	0.254	(0.263)	0.188	0.066
115	9.58	0.70	0.267	(0.262)	0.197	0.069
116	9.67	0.70	0.267	(0.261)	0.197	0.069
117	9.75	0.70	0.267	(0.260)	0.197	0.069
118	9.83	0.73	0.279	(0.258)	0.207	0.073
119	9.92	0.73	0.279	(0.257)	0.207	0.073
120	10.00	0.73	0.279	(0.256)	0.207	0.073
121	10.08	0.50	0.191	(0.255)	0.141	0.050

122	10.17	0.50	0.191	(0.254)	0.141	0.050
123	10.25	0.50	0.191	(0.252)	0.141	0.050
124	10.33	0.50	0.191	(0.251)	0.141	0.050
125	10.42	0.50	0.191	(0.250)	0.141	0.050
126	10.50	0.50	0.191	(0.249)	0.141	0.050
127	10.58	0.67	0.254	(0.247)	0.188	0.066
128	10.67	0.67	0.254	(0.246)	0.188	0.066
129	10.75	0.67	0.254	(0.245)	0.188	0.066
130	10.83	0.67	0.254	(0.244)	0.188	0.066
131	10.92	0.67	0.254	(0.243)	0.188	0.066
132	11.00	0.67	0.254	(0.241)	0.188	0.066
133	11.08	0.63	0.241	(0.240)	0.179	0.063
134	11.17	0.63	0.241	(0.239)	0.179	0.063
135	11.25	0.63	0.241	(0.238)	0.179	0.063
136	11.33	0.63	0.241	(0.237)	0.179	0.063
137	11.42	0.63	0.241	(0.235)	0.179	0.063
138	11.50	0.63	0.241	(0.234)	0.179	0.063
139	11.58	0.57	0.216	(0.233)	0.160	0.056
140	11.67	0.57	0.216	(0.232)	0.160	0.056
141	11.75	0.57	0.216	(0.231)	0.160	0.056
142	11.83	0.60	0.229	(0.230)	0.169	0.059
143	11.92	0.60	0.229	(0.229)	0.169	0.059
144	12.00	0.60	0.229	(0.227)	0.169	0.059
145	12.08	0.83	0.318	0.226	(0.235)	0.091
146	12.17	0.83	0.318	0.225	(0.235)	0.092
147	12.25	0.83	0.318	0.224	(0.235)	0.094
148	12.33	0.87	0.330	0.223	(0.244)	0.107
149	12.42	0.87	0.330	0.222	(0.244)	0.108
150	12.50	0.87	0.330	0.221	(0.244)	0.110
151	12.58	0.93	0.356	0.220	(0.263)	0.136
152	12.67	0.93	0.356	0.218	(0.263)	0.137
153	12.75	0.93	0.356	0.217	(0.263)	0.138
154	12.83	0.97	0.368	0.216	(0.273)	0.152
155	12.92	0.97	0.368	0.215	(0.273)	0.153
156	13.00	0.97	0.368	0.214	(0.273)	0.154
157	13.08	1.13	0.432	0.213	(0.320)	0.219
158	13.17	1.13	0.432	0.212	(0.320)	0.220
159	13.25	1.13	0.432	0.211	(0.320)	0.221
160	13.33	1.13	0.432	0.210	(0.320)	0.222
161	13.42	1.13	0.432	0.209	(0.320)	0.223
162	13.50	1.13	0.432	0.208	(0.320)	0.224
163	13.58	0.77	0.292	0.207	(0.216)	0.086
164	13.67	0.77	0.292	0.206	(0.216)	0.087
165	13.75	0.77	0.292	0.204	(0.216)	0.088
166	13.83	0.77	0.292	0.203	(0.216)	0.089
167	13.92	0.77	0.292	0.202	(0.216)	0.090
168	14.00	0.77	0.292	0.201	(0.216)	0.091
169	14.08	0.90	0.343	0.200	(0.254)	0.143
170	14.17	0.90	0.343	0.199	(0.254)	0.144
171	14.25	0.90	0.343	0.198	(0.254)	0.145
172	14.33	0.87	0.330	0.197	(0.244)	0.133
173	14.42	0.87	0.330	0.196	(0.244)	0.134
174	14.50	0.87	0.330	0.195	(0.244)	0.135
175	14.58	0.87	0.330	0.194	(0.244)	0.136
176	14.67	0.87	0.330	0.193	(0.244)	0.137
177	14.75	0.87	0.330	0.192	(0.244)	0.138
178	14.83	0.83	0.318	0.191	(0.235)	0.126

179	14.92	0.83	0.318	0.190	(0.235)	0.127
180	15.00	0.83	0.318	0.189	(0.235)	0.128
181	15.08	0.80	0.305	0.188	(0.226)	0.116
182	15.17	0.80	0.305	0.187	(0.226)	0.117
183	15.25	0.80	0.305	0.186	(0.226)	0.118
184	15.33	0.77	0.292	0.185	(0.216)	0.107
185	15.42	0.77	0.292	0.185	(0.216)	0.108
186	15.50	0.77	0.292	0.184	(0.216)	0.109
187	15.58	0.63	0.241	(0.183)	0.179	0.063
188	15.67	0.63	0.241	(0.182)	0.179	0.063
189	15.75	0.63	0.241	(0.181)	0.179	0.063
190	15.83	0.63	0.241	(0.180)	0.179	0.063
191	15.92	0.63	0.241	(0.179)	0.179	0.063
192	16.00	0.63	0.241	0.178	(0.179)	0.063
193	16.08	0.13	0.051	(0.177)	0.038	0.013
194	16.17	0.13	0.051	(0.176)	0.038	0.013
195	16.25	0.13	0.051	(0.175)	0.038	0.013
196	16.33	0.13	0.051	(0.174)	0.038	0.013
197	16.42	0.13	0.051	(0.174)	0.038	0.013
198	16.50	0.13	0.051	(0.173)	0.038	0.013
199	16.58	0.10	0.038	(0.172)	0.028	0.010
200	16.67	0.10	0.038	(0.171)	0.028	0.010
201	16.75	0.10	0.038	(0.170)	0.028	0.010
202	16.83	0.10	0.038	(0.169)	0.028	0.010
203	16.92	0.10	0.038	(0.168)	0.028	0.010
204	17.00	0.10	0.038	(0.167)	0.028	0.010
205	17.08	0.17	0.064	(0.167)	0.047	0.017
206	17.17	0.17	0.064	(0.166)	0.047	0.017
207	17.25	0.17	0.064	(0.165)	0.047	0.017
208	17.33	0.17	0.064	(0.164)	0.047	0.017
209	17.42	0.17	0.064	(0.163)	0.047	0.017
210	17.50	0.17	0.064	(0.162)	0.047	0.017
211	17.58	0.17	0.064	(0.162)	0.047	0.017
212	17.67	0.17	0.064	(0.161)	0.047	0.017
213	17.75	0.17	0.064	(0.160)	0.047	0.017
214	17.83	0.13	0.051	(0.159)	0.038	0.013
215	17.92	0.13	0.051	(0.158)	0.038	0.013
216	18.00	0.13	0.051	(0.158)	0.038	0.013
217	18.08	0.13	0.051	(0.157)	0.038	0.013
218	18.17	0.13	0.051	(0.156)	0.038	0.013
219	18.25	0.13	0.051	(0.155)	0.038	0.013
220	18.33	0.13	0.051	(0.155)	0.038	0.013
221	18.42	0.13	0.051	(0.154)	0.038	0.013
222	18.50	0.13	0.051	(0.153)	0.038	0.013
223	18.58	0.10	0.038	(0.152)	0.028	0.010
224	18.67	0.10	0.038	(0.152)	0.028	0.010
225	18.75	0.10	0.038	(0.151)	0.028	0.010
226	18.83	0.07	0.025	(0.150)	0.019	0.007
227	18.92	0.07	0.025	(0.149)	0.019	0.007
228	19.00	0.07	0.025	(0.149)	0.019	0.007
229	19.08	0.10	0.038	(0.148)	0.028	0.010
230	19.17	0.10	0.038	(0.147)	0.028	0.010
231	19.25	0.10	0.038	(0.147)	0.028	0.010
232	19.33	0.13	0.051	(0.146)	0.038	0.013
233	19.42	0.13	0.051	(0.145)	0.038	0.013
234	19.50	0.13	0.051	(0.145)	0.038	0.013
235	19.58	0.10	0.038	(0.144)	0.028	0.010

236	19.67	0.10	0.038	(0.143)	0.028	0.010
237	19.75	0.10	0.038	(0.143)	0.028	0.010
238	19.83	0.07	0.025	(0.142)	0.019	0.007
239	19.92	0.07	0.025	(0.141)	0.019	0.007
240	20.00	0.07	0.025	(0.141)	0.019	0.007
241	20.08	0.10	0.038	(0.140)	0.028	0.010
242	20.17	0.10	0.038	(0.140)	0.028	0.010
243	20.25	0.10	0.038	(0.139)	0.028	0.010
244	20.33	0.10	0.038	(0.138)	0.028	0.010
245	20.42	0.10	0.038	(0.138)	0.028	0.010
246	20.50	0.10	0.038	(0.137)	0.028	0.010
247	20.58	0.10	0.038	(0.137)	0.028	0.010
248	20.67	0.10	0.038	(0.136)	0.028	0.010
249	20.75	0.10	0.038	(0.135)	0.028	0.010
250	20.83	0.07	0.025	(0.135)	0.019	0.007
251	20.92	0.07	0.025	(0.134)	0.019	0.007
252	21.00	0.07	0.025	(0.134)	0.019	0.007
253	21.08	0.10	0.038	(0.133)	0.028	0.010
254	21.17	0.10	0.038	(0.133)	0.028	0.010
255	21.25	0.10	0.038	(0.132)	0.028	0.010
256	21.33	0.07	0.025	(0.132)	0.019	0.007
257	21.42	0.07	0.025	(0.131)	0.019	0.007
258	21.50	0.07	0.025	(0.131)	0.019	0.007
259	21.58	0.10	0.038	(0.130)	0.028	0.010
260	21.67	0.10	0.038	(0.130)	0.028	0.010
261	21.75	0.10	0.038	(0.129)	0.028	0.010
262	21.83	0.07	0.025	(0.129)	0.019	0.007
263	21.92	0.07	0.025	(0.128)	0.019	0.007
264	22.00	0.07	0.025	(0.128)	0.019	0.007
265	22.08	0.10	0.038	(0.128)	0.028	0.010
266	22.17	0.10	0.038	(0.127)	0.028	0.010
267	22.25	0.10	0.038	(0.127)	0.028	0.010
268	22.33	0.07	0.025	(0.126)	0.019	0.007
269	22.42	0.07	0.025	(0.126)	0.019	0.007
270	22.50	0.07	0.025	(0.126)	0.019	0.007
271	22.58	0.07	0.025	(0.125)	0.019	0.007
272	22.67	0.07	0.025	(0.125)	0.019	0.007
273	22.75	0.07	0.025	(0.125)	0.019	0.007
274	22.83	0.07	0.025	(0.124)	0.019	0.007
275	22.92	0.07	0.025	(0.124)	0.019	0.007
276	23.00	0.07	0.025	(0.124)	0.019	0.007
277	23.08	0.07	0.025	(0.123)	0.019	0.007
278	23.17	0.07	0.025	(0.123)	0.019	0.007
279	23.25	0.07	0.025	(0.123)	0.019	0.007
280	23.33	0.07	0.025	(0.123)	0.019	0.007
281	23.42	0.07	0.025	(0.122)	0.019	0.007
282	23.50	0.07	0.025	(0.122)	0.019	0.007
283	23.58	0.07	0.025	(0.122)	0.019	0.007
284	23.67	0.07	0.025	(0.122)	0.019	0.007
285	23.75	0.07	0.025	(0.122)	0.019	0.007
286	23.83	0.07	0.025	(0.121)	0.019	0.007
287	23.92	0.07	0.025	(0.121)	0.019	0.007
288	24.00	0.07	0.025	(0.121)	0.019	0.007

(Loss Rate Not Used)

Sum = 100.0 Sum = 11.8

Flood volume = Effective rainfall 0.99(In)

times area 5.2(Ac.)/[(In)/(Ft.)] = 0.4(Ac.Ft)

Total soil loss = 2.19(In)
Total soil loss = 0.939(Ac.Ft)
Total rainfall = 3.18(In)
Flood volume = 18453.2 Cubic Feet
Total soil loss = 40908.1 Cubic Feet

Peak flow rate of this hydrograph = 1.160(CFS)

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24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0001	0.01	Q				
0+10	0.0003	0.03	Q				
0+15	0.0005	0.03	Q				
0+20	0.0008	0.04	Q				
0+25	0.0011	0.05	Q				
0+30	0.0015	0.05	Q				
0+35	0.0018	0.05	Q				
0+40	0.0022	0.05	Q				
0+45	0.0025	0.05	Q				
0+50	0.0029	0.06	Q				
0+55	0.0034	0.07	Q				
1+ 0	0.0039	0.07	Q				
1+ 5	0.0043	0.06	Q				
1+10	0.0047	0.05	Q				
1+15	0.0050	0.05	Q				
1+20	0.0054	0.05	Q				
1+25	0.0057	0.05	Q				
1+30	0.0061	0.05	Q				
1+35	0.0064	0.05	Q				
1+40	0.0068	0.05	Q				
1+45	0.0071	0.05	Q				
1+50	0.0075	0.06	Q				
1+55	0.0080	0.07	Q				
2+ 0	0.0085	0.07	Q				
2+ 5	0.0089	0.07	Q				
2+10	0.0094	0.07	Q				
2+15	0.0099	0.07	Q				
2+20	0.0103	0.07	Q				
2+25	0.0108	0.07	QV				
2+30	0.0113	0.07	QV				
2+35	0.0118	0.08	QV				
2+40	0.0124	0.08	QV				
2+45	0.0130	0.08	QV				
2+50	0.0136	0.09	QV				
2+55	0.0141	0.09	QV				
3+ 0	0.0147	0.09	QV				
3+ 5	0.0153	0.09	QV				
3+10	0.0159	0.09	QV				
3+15	0.0165	0.09	QV				
3+20	0.0171	0.09	QV				

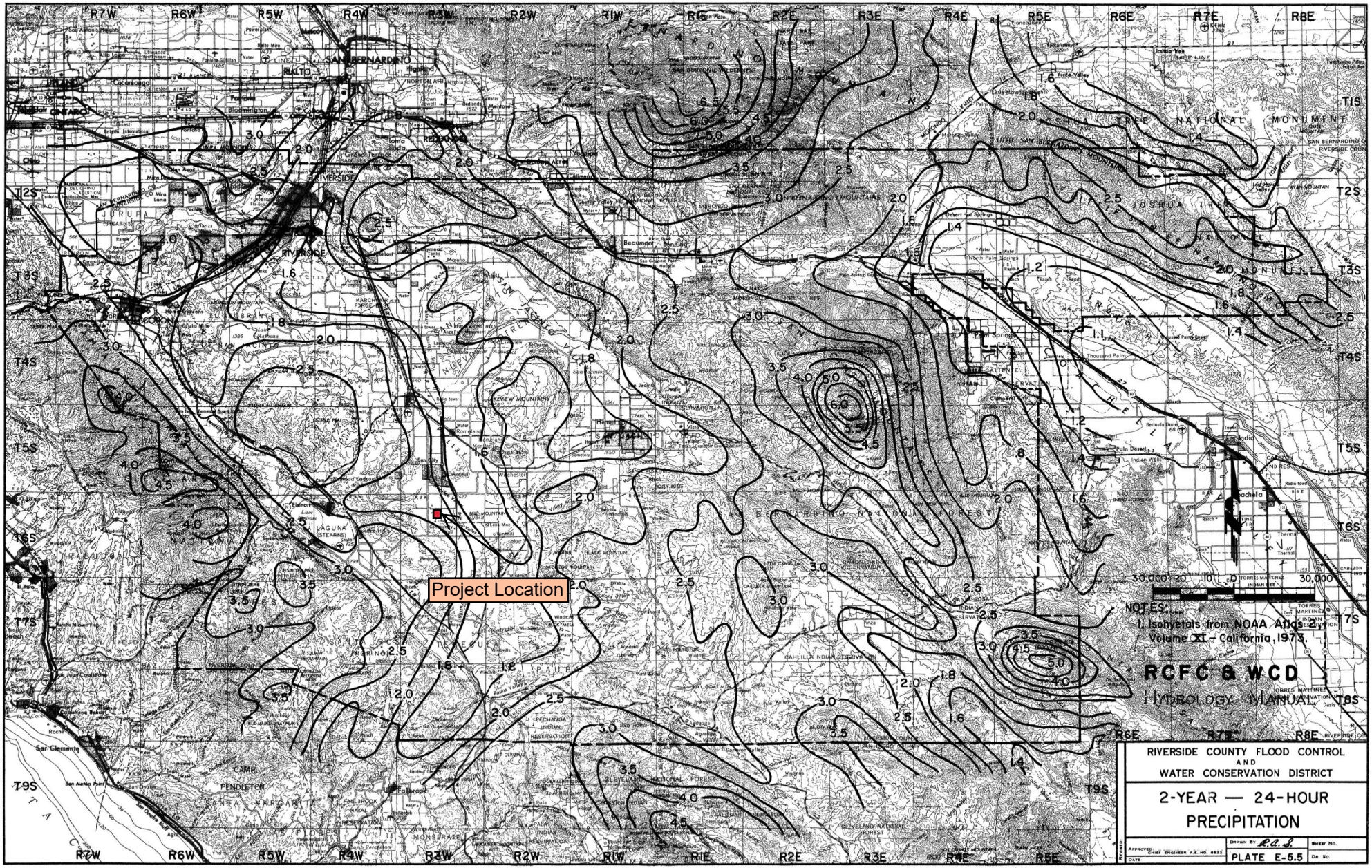
3+25	0.0177	0.09	QV	|	|	|	|
3+30	0.0183	0.09	QV	|	|	|	|
3+35	0.0189	0.09	QV	|	|	|	|
3+40	0.0195	0.09	QV	|	|	|	|
3+45	0.0201	0.09	QV	|	|	|	|
3+50	0.0207	0.09	QV	|	|	|	|
3+55	0.0214	0.10	Q V	|	|	|	|
4+ 0	0.0221	0.10	Q V	|	|	|	|
4+ 5	0.0228	0.10	Q V	|	|	|	|
4+10	0.0235	0.10	Q V	|	|	|	|
4+15	0.0242	0.10	Q V	|	|	|	|
4+20	0.0250	0.11	Q V	|	|	|	|
4+25	0.0258	0.12	Q V	|	|	|	|
4+30	0.0266	0.12	Q V	|	|	|	|
4+35	0.0274	0.12	Q V	|	|	|	|
4+40	0.0282	0.12	Q V	|	|	|	|
4+45	0.0291	0.12	Q V	|	|	|	|
4+50	0.0299	0.13	Q V	|	|	|	|
4+55	0.0309	0.13	Q V	|	|	|	|
5+ 0	0.0318	0.14	Q V	|	|	|	|
5+ 5	0.0327	0.12	Q V	|	|	|	|
5+10	0.0334	0.11	Q V	|	|	|	|
5+15	0.0341	0.10	Q V	|	|	|	|
5+20	0.0349	0.11	Q V	|	|	|	|
5+25	0.0357	0.12	Q V	|	|	|	|
5+30	0.0365	0.12	Q V	|	|	|	|
5+35	0.0374	0.13	Q V	|	|	|	|
5+40	0.0383	0.13	Q V	|	|	|	|
5+45	0.0392	0.14	Q V	|	|	|	|
5+50	0.0402	0.14	Q V	|	|	|	|
5+55	0.0411	0.14	Q V	|	|	|	|
6+ 0	0.0421	0.14	Q V	|	|	|	|
6+ 5	0.0431	0.14	Q V	|	|	|	|
6+10	0.0441	0.15	Q V	|	|	|	|
6+15	0.0452	0.15	Q V	|	|	|	|
6+20	0.0462	0.15	Q V	|	|	|	|
6+25	0.0473	0.15	Q V	|	|	|	|
6+30	0.0484	0.15	Q V	|	|	|	|
6+35	0.0495	0.16	Q V	|	|	|	|
6+40	0.0506	0.17	Q V	|	|	|	|
6+45	0.0518	0.17	Q V	|	|	|	|
6+50	0.0530	0.17	Q V	|	|	|	|
6+55	0.0542	0.17	Q V	|	|	|	|
7+ 0	0.0553	0.17	Q V	|	|	|	|
7+ 5	0.0565	0.17	Q V	|	|	|	|
7+10	0.0577	0.17	Q V	|	|	|	|
7+15	0.0589	0.17	Q V	|	|	|	|
7+20	0.0601	0.18	Q V	|	|	|	|
7+25	0.0614	0.19	Q V	|	|	|	|
7+30	0.0627	0.19	Q V	|	|	|	|
7+35	0.0640	0.20	Q V	|	|	|	|
7+40	0.0654	0.20	Q V	|	|	|	|
7+45	0.0668	0.20	Q V	|	|	|	|
7+50	0.0683	0.21	Q V	|	|	|	|
7+55	0.0698	0.22	Q V	|	|	|	|
8+ 0	0.0713	0.22	Q V	|	|	|	|
8+ 5	0.0730	0.24	Q V	|	|	|	|

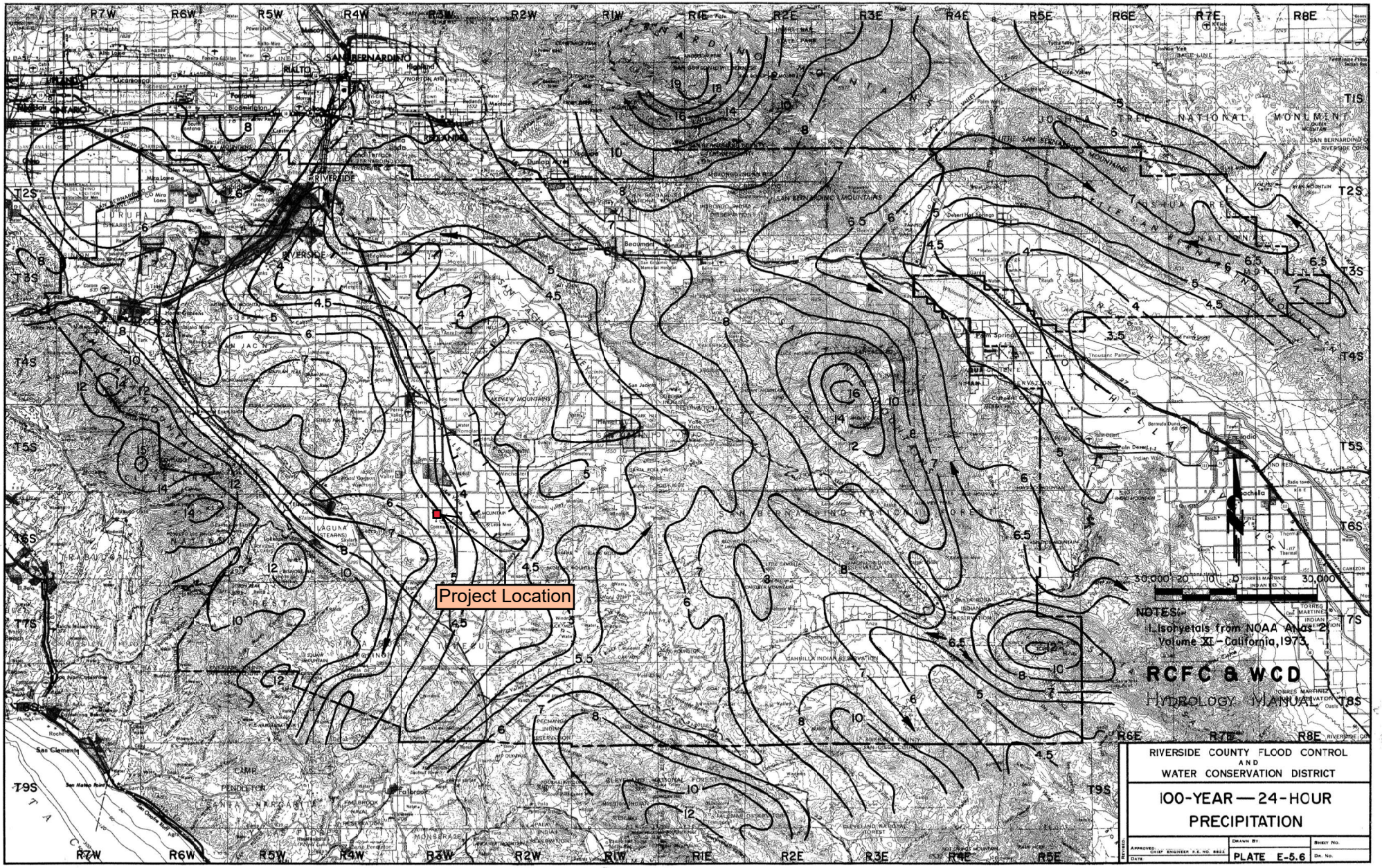
8+10	0.0747	0.25	Q V				
8+15	0.0765	0.26	Q V				
8+20	0.0782	0.26	Q V				
8+25	0.0800	0.26	Q V				
8+30	0.0818	0.26	Q V				
8+35	0.0836	0.26	Q V				
8+40	0.0855	0.27	Q V				
8+45	0.0873	0.27	Q V				
8+50	0.0893	0.28	Q V				
8+55	0.0913	0.29	Q V				
9+ 0	0.0933	0.29	Q V				
9+ 5	0.0954	0.30	Q V				
9+10	0.0976	0.32	Q V				
9+15	0.0998	0.32	Q V				
9+20	0.1021	0.33	Q V				
9+25	0.1044	0.34	Q V				
9+30	0.1068	0.34	Q V				
9+35	0.1092	0.35	Q V				
9+40	0.1117	0.36	Q V				
9+45	0.1141	0.36	Q V				
9+50	0.1167	0.37	Q V				
9+55	0.1192	0.37	Q V				
10+ 0	0.1218	0.38	Q V				
10+ 5	0.1241	0.33	Q V				
10+10	0.1260	0.28	Q V				
10+15	0.1278	0.26	Q V				
10+20	0.1296	0.26	Q V				
10+25	0.1314	0.26	Q V				
10+30	0.1331	0.26	Q V				
10+35	0.1352	0.29	Q V				
10+40	0.1374	0.33	Q V				
10+45	0.1397	0.34	Q V				
10+50	0.1421	0.34	Q V				
10+55	0.1445	0.34	Q V				
11+ 0	0.1468	0.34	Q V				
11+ 5	0.1491	0.34	Q V				
11+10	0.1514	0.33	Q V				
11+15	0.1537	0.33	Q V				
11+20	0.1559	0.33	Q V				
11+25	0.1581	0.33	Q V				
11+30	0.1604	0.33	Q V				
11+35	0.1625	0.31	Q V				
11+40	0.1646	0.30	Q V				
11+45	0.1666	0.29	Q V				
11+50	0.1687	0.30	Q V				
11+55	0.1708	0.31	Q V				
12+ 0	0.1729	0.31	Q V				
12+ 5	0.1755	0.37	Q V				
12+10	0.1786	0.45	Q V				
12+15	0.1818	0.47	Q V				
12+20	0.1853	0.51	Q V				
12+25	0.1891	0.55	Q V				
12+30	0.1930	0.56	Q V				
12+35	0.1972	0.62	Q V				
12+40	0.2020	0.69	Q V				
12+45	0.2068	0.71	Q V				
12+50	0.2119	0.74	Q V				

12+55	0.2173	0.78	| Q	|	V	|	|
13+ 0	0.2228	0.79	| Q	|	|V	|	|
13+ 5	0.2292	0.93	| Q	|	|V	|	|
13+10	0.2366	1.09	| Q	|	| V	|	|
13+15	0.2444	1.12	| Q	|	| V	|	|
13+20	0.2523	1.14	| Q	|	| V	|	|
13+25	0.2602	1.15	| Q	|	| V	|	|
13+30	0.2682	1.16	| Q	|	| V	|	|
13+35	0.2742	0.88	| Q	|	| V	|	|
13+40	0.2781	0.56	| Q	|	| V	|	|
13+45	0.2815	0.49	|Q	|	| V	|	|
13+50	0.2847	0.47	|Q	|	| V	|	|
13+55	0.2879	0.46	|Q	|	| V	|	|
14+ 0	0.2911	0.47	|Q	|	| V	|	|
14+ 5	0.2951	0.58	| Q	|	| V	|	|
14+10	0.2999	0.70	| Q	|	| V	|	|
14+15	0.3050	0.73	| Q	|	| V	|	|
14+20	0.3099	0.72	| Q	|	| V|	|	|
14+25	0.3147	0.70	| Q	|	| V|	|	|
14+30	0.3196	0.70	| Q	|	| V	|	|
14+35	0.3244	0.70	| Q	|	| V	|	|
14+40	0.3293	0.71	| Q	|	| |V	|	|
14+45	0.3342	0.71	| Q	|	| |V	|	|
14+50	0.3389	0.69	| Q	|	| | V	|	|
14+55	0.3435	0.67	| Q	|	| | V	|	|
15+ 0	0.3481	0.67	| Q	|	| | V	|	|
15+ 5	0.3525	0.64	| Q	|	| | V	|	|
15+10	0.3568	0.62	| Q	|	| | V	|	|
15+15	0.3610	0.61	| Q	|	| | V	|	|
15+20	0.3651	0.59	| Q	|	| | V	|	|
15+25	0.3690	0.56	| Q	|	| | V	|	|
15+30	0.3729	0.56	| Q	|	| | V	|	|
15+35	0.3761	0.47	|Q	|	| | V	|	|
15+40	0.3786	0.36	|Q	|	| | V	|	|
15+45	0.3809	0.34	|Q	|	| | V	|	|
15+50	0.3832	0.33	|Q	|	| | V	|	|
15+55	0.3855	0.33	|Q	|	| | V	|	|
16+ 0	0.3877	0.33	|Q	|	| | V	|	|
16+ 5	0.3893	0.23	Q	|	| | V	|	|
16+10	0.3900	0.11	Q	|	| | V	|	|
16+15	0.3906	0.08	Q	|	| | V	|	|
16+20	0.3911	0.07	Q	|	| | V	|	|
16+25	0.3916	0.07	Q	|	| | V	|	|
16+30	0.3920	0.07	Q	|	| | V	|	|
16+35	0.3925	0.06	Q	|	| | V	|	|
16+40	0.3928	0.05	Q	|	| | V	|	|
16+45	0.3932	0.05	Q	|	| | V	|	|
16+50	0.3936	0.05	Q	|	| | V	|	|
16+55	0.3939	0.05	Q	|	| | V	|	|
17+ 0	0.3943	0.05	Q	|	| | V	|	|
17+ 5	0.3947	0.06	Q	|	| | V	|	|
17+10	0.3953	0.08	Q	|	| | V	|	|
17+15	0.3959	0.08	Q	|	| | V	|	|
17+20	0.3964	0.09	Q	|	| | V	|	|
17+25	0.3970	0.09	Q	|	| | V	|	|
17+30	0.3976	0.09	Q	|	| | V	|	|
17+35	0.3982	0.09	Q	|	| | V	|	|

17+40	0.3988	0.09	Q	|	|	|	V |
17+45	0.3994	0.09	Q	|	|	|	V |
17+50	0.3999	0.08	Q	|	|	|	V |
17+55	0.4004	0.07	Q	|	|	|	V |
18+ 0	0.4009	0.07	Q	|	|	|	V |
18+ 5	0.4014	0.07	Q	|	|	|	V |
18+10	0.4019	0.07	Q	|	|	|	V |
18+15	0.4023	0.07	Q	|	|	|	V |
18+20	0.4028	0.07	Q	|	|	|	V |
18+25	0.4033	0.07	Q	|	|	|	V |
18+30	0.4037	0.07	Q	|	|	|	V |
18+35	0.4042	0.06	Q	|	|	|	V |
18+40	0.4045	0.05	Q	|	|	|	V |
18+45	0.4049	0.05	Q	|	|	|	V |
18+50	0.4052	0.05	Q	|	|	|	V |
18+55	0.4055	0.04	Q	|	|	|	V |
19+ 0	0.4057	0.04	Q	|	|	|	V |
19+ 5	0.4060	0.04	Q	|	|	|	V |
19+10	0.4063	0.05	Q	|	|	|	V |
19+15	0.4067	0.05	Q	|	|	|	V |
19+20	0.4071	0.06	Q	|	|	|	V |
19+25	0.4075	0.07	Q	|	|	|	V |
19+30	0.4080	0.07	Q	|	|	|	V |
19+35	0.4084	0.06	Q	|	|	|	V |
19+40	0.4088	0.05	Q	|	|	|	V |
19+45	0.4092	0.05	Q	|	|	|	V |
19+50	0.4095	0.05	Q	|	|	|	V |
19+55	0.4097	0.04	Q	|	|	|	V |
20+ 0	0.4100	0.04	Q	|	|	|	V |
20+ 5	0.4102	0.04	Q	|	|	|	V |
20+10	0.4106	0.05	Q	|	|	|	V |
20+15	0.4109	0.05	Q	|	|	|	V |
20+20	0.4113	0.05	Q	|	|	|	V |
20+25	0.4116	0.05	Q	|	|	|	V |
20+30	0.4120	0.05	Q	|	|	|	V |
20+35	0.4123	0.05	Q	|	|	|	V |
20+40	0.4127	0.05	Q	|	|	|	V |
20+45	0.4131	0.05	Q	|	|	|	V|
20+50	0.4134	0.04	Q	|	|	|	V|
20+55	0.4136	0.04	Q	|	|	|	V|
21+ 0	0.4139	0.04	Q	|	|	|	V|
21+ 5	0.4141	0.04	Q	|	|	|	V|
21+10	0.4145	0.05	Q	|	|	|	V|
21+15	0.4148	0.05	Q	|	|	|	V|
21+20	0.4151	0.04	Q	|	|	|	V|
21+25	0.4154	0.04	Q	|	|	|	V|
21+30	0.4156	0.04	Q	|	|	|	V|
21+35	0.4159	0.04	Q	|	|	|	V|
21+40	0.4163	0.05	Q	|	|	|	V|
21+45	0.4166	0.05	Q	|	|	|	V|
21+50	0.4169	0.04	Q	|	|	|	V|
21+55	0.4172	0.04	Q	|	|	|	V|
22+ 0	0.4174	0.04	Q	|	|	|	V|
22+ 5	0.4177	0.04	Q	|	|	|	V|
22+10	0.4180	0.05	Q	|	|	|	V|
22+15	0.4184	0.05	Q	|	|	|	V|
22+20	0.4187	0.04	Q	|	|	|	V|

22+25	0.4189	0.04	Q	|	|	|	V|
22+30	0.4192	0.04	Q	|	|	|	V|
22+35	0.4194	0.03	Q	|	|	|	V|
22+40	0.4196	0.03	Q	|	|	|	V|
22+45	0.4199	0.03	Q	|	|	|	V|
22+50	0.4201	0.03	Q	|	|	|	V|
22+55	0.4204	0.03	Q	|	|	|	V|
23+ 0	0.4206	0.03	Q	|	|	|	V|
23+ 5	0.4208	0.03	Q	|	|	|	V|
23+10	0.4211	0.03	Q	|	|	|	V|
23+15	0.4213	0.03	Q	|	|	|	V|
23+20	0.4215	0.03	Q	|	|	|	V|
23+25	0.4218	0.03	Q	|	|	|	V|
23+30	0.4220	0.03	Q	|	|	|	V|
23+35	0.4222	0.03	Q	|	|	|	V|
23+40	0.4225	0.03	Q	|	|	|	V|
23+45	0.4227	0.03	Q	|	|	|	V|
23+50	0.4230	0.03	Q	|	|	|	V|
23+55	0.4232	0.03	Q	|	|	|	V|
24+ 0	0.4234	0.03	Q	|	|	|	V|
24+ 5	0.4236	0.02	Q	|	|	|	V|
24+10	0.4236	0.01	Q	|	|	|	V|
24+15	0.4236	0.00	Q	|	|	|	V|
24+20	0.4236	0.00	Q	|	|	|	V


Project Location
NOTES:
1. Isohyetals from NOAA Atlas 2, Volume XI - California, 1973.
RCFC & WCD
HYDROLOGY MANUAL
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
2-YEAR — 24-HOUR PRECIPITATION
PLATE E-5.5


Project Location
NOTES:
1. Isohyetals from NOAA Atlas 2, Volume XI - California, 1973.
RCFC & WCD
HYDROLOGY MANUAL
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
100-YEAR — 24-HOUR PRECIPITATION
PLATE E-5.6

APPENDIX E
PRELIMINARY SITE PLAN

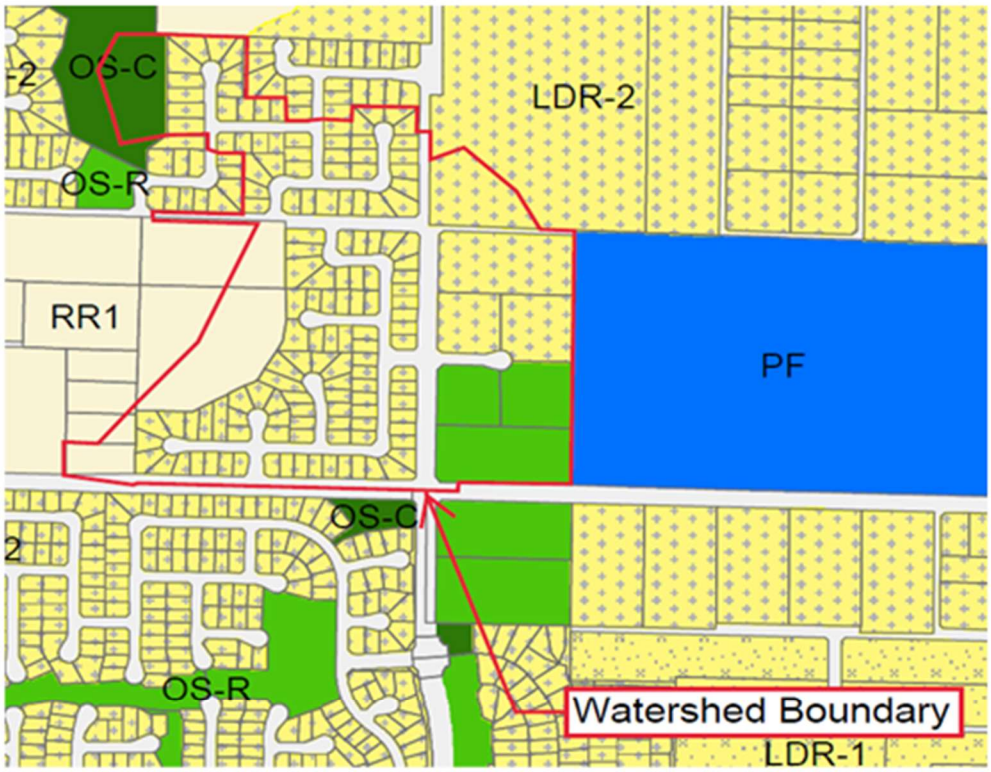


Potential Improvements Include:

- Aquatics (Possible partnership with adjacent school facility)
- Basketball
- Ballfields / Soccer Overlay
- Tot lots
- Parking Support

APPENDIX F

EXCERPT FROM CITY OF MENIFEE ZONING MAP



Rural Residential, 1-acre minimum (RR1)

Low Density Residential-2 (LDR-2) [7,200 SF]

Open Space-Recreation (OS-R)

Open Space-Conservation (OS-C)

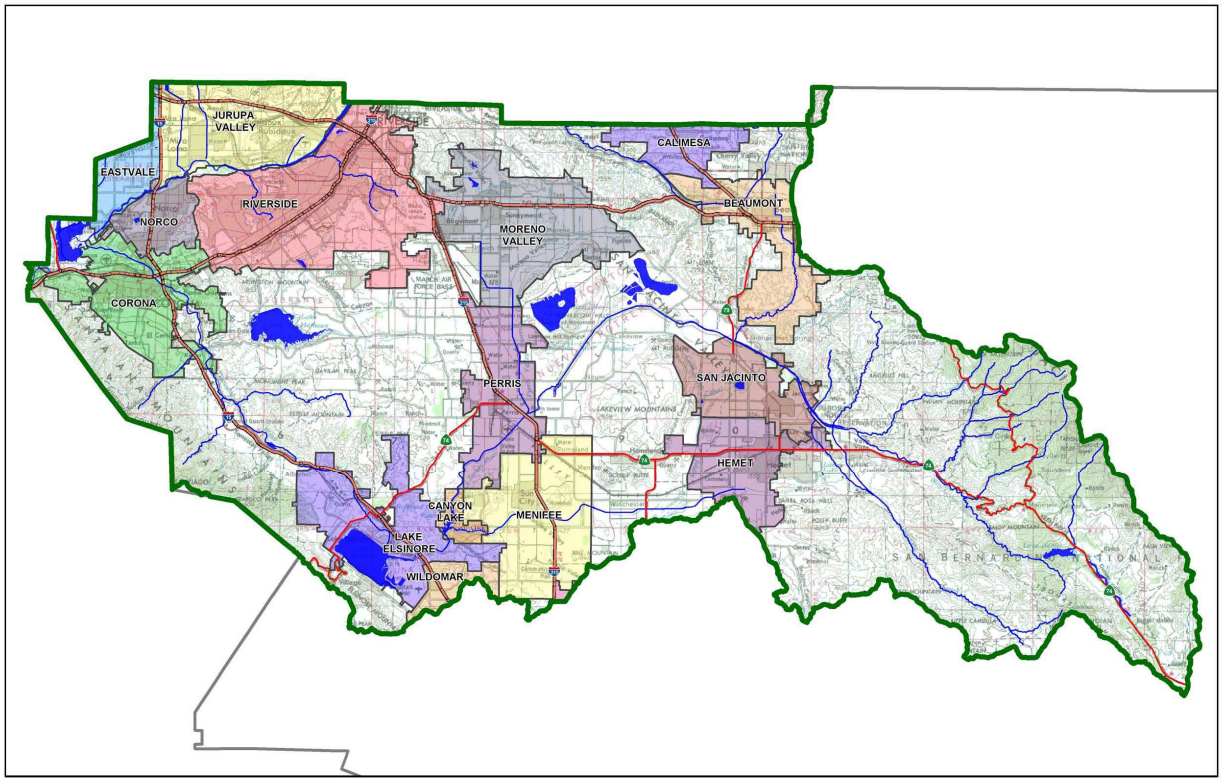
Project Specific Water Quality Management Plan

*A Template for Projects located within the **Santa Ana Watershed** Region of Riverside County*

Project Title: Evans Community Park

Development No: Insert text here

Design Review/Case No: Insert text here



Contact Information:

Prepared for: City of Menifee

Prepared by: CValdo Corporation

☒ **Preliminary**
☐ **Final**

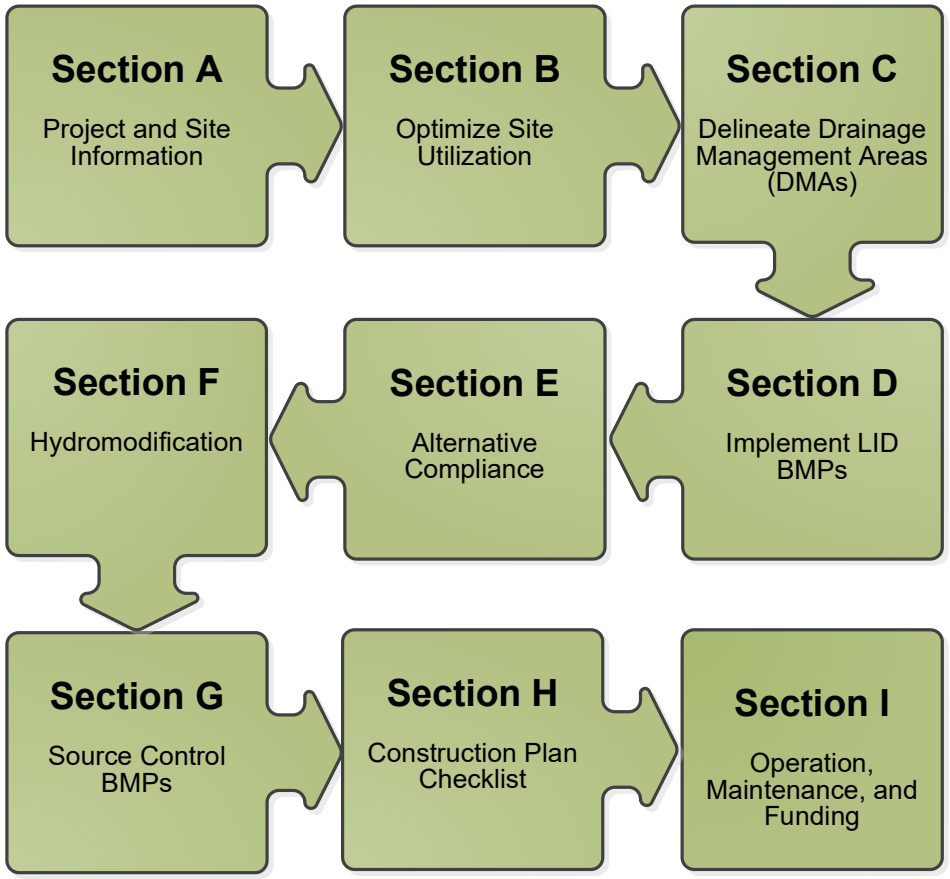
Original Date Prepared: November 9, 2021

Revision Date(s): N/A

Prepared for Compliance with
Regional Board Order No. **R8-2010-0033**

A Brief Introduction

This Project-Specific WQMP Template for the **Santa Ana Region** has been prepared to help guide you in documenting compliance for your project. Because this document has been designed to specifically document compliance, you will need to utilize the WQMP Guidance Document as your "how-to" manual to help guide you through this process. Both the Template and Guidance Document go hand-in-hand, and will help facilitate a well prepared Project-Specific WQMP. Below is a flowchart for the layout of this Template that will provide the steps required to document compliance.



OWNER'S CERTIFICATION

This Project-Specific Water Quality Management Plan (WQMP) has been prepared for The City of Menifee by CValdo Corporation for the Evans Park project.

This WQMP is intended to comply with the requirements of The City of Menifee for Municipal Code Section 15.01 which includes the requirement for the preparation and implementation of a Project-Specific WQMP.

The undersigned, while owning the property/project described in the preceding paragraph, shall be responsible for the implementation and funding of this WQMP and will ensure that this WQMP is amended as appropriate to reflect up-to-date conditions on the site. In addition, the property owner accepts responsibility for interim operation and maintenance of Stormwater BMPs until such time as this responsibility is formally transferred to a subsequent owner. This WQMP will be reviewed with the facility operator, facility supervisors, employees, tenants, maintenance and service contractors, or any other party (or parties) having responsibility for implementing portions of this WQMP. At least one copy of this WQMP will be maintained at the project site or project office in perpetuity. The undersigned is authorized to certify and to approve implementation of this WQMP. The undersigned is aware that implementation of this WQMP is enforceable under the City of Menifee Water Quality Ordinance (Municipal Code Section 15.01).

"I, the undersigned, certify under penalty of law that the provisions of this WQMP have been reviewed and accepted and that the WQMP will be transferred to future successors in interest."

Owner's Signature	Date
Owner's Printed Name	Owner's Title/Position

PREPARER'S CERTIFICATION

"The selection, sizing and design of stormwater treatment and other stormwater quality and quantity control measures in this plan meet the requirements of Regional Water Quality Control Board Order No. **R8-2010-0033** and any subsequent amendments thereto."

Preparer's Signature	Date
Preparer's Printed Name	Preparer's Title/Position

Preparer's Licensure:

Table of Contents

Section A: Project and Site Information 6

A.1 Maps and Site Plans 6
A.2 Identify Receiving Waters 7
A.3 Additional Permits/Approvals required for the Project: 7

Section B: Optimize Site Utilization (LID Principles) 8

Section C: Delineate Drainage Management Areas (DMAs) 9

Section D: Implement LID BMPs 11

D.1 Infiltration Applicability 11
D.2 Harvest and Use Assessment 12
D.3 Bioretention and Biotreatment Assessment 14
D.4 Feasibility Assessment Summaries 15
D.5 LID BMP Sizing 16

Section E: Alternative Compliance (LID Waiver Program) 18

E.1 Identify Pollutants of Concern 19
E.2 Stormwater Credits 20
E.3 Sizing Criteria 20
E.4 Treatment Control BMP Selection 21

Section F: Hydromodification 22

F.1 Hydrologic Conditions of Concern (HCOC) Analysis 22
F.2 HCOC Mitigation 23

Section G: Source Control BMPs 24

Section H: Construction Plan Checklist 26

Section I: Operation, Maintenance and Funding 27

List of Tables

Table A.1 Identification of Receiving Waters 7
Table A.2 Other Applicable Permits 7
Table C.1 DMA Classifications 9
Table C.2 Type 'A', Self-Treating Areas 9
Table C.3 Type 'B', Self-Retaining Areas 9
Table C.4 Type 'C', Areas that Drain to Self-Retaining Areas 10
Table C.5 Type 'D', Areas Draining to BMPs 10
Table D.1 Infiltration Feasibility 11
Table D.2 LID Prioritization Summary Matrix 15
Table D.3.1-D.3.3 DCV Calculations for LID BMPs 17
Table E.1 Potential Pollutants by Land Use Type 19
Table E.2 Water Quality Credits 20
Table E.3 Treatment Control BMP Sizing 20
Table E.4 Treatment Control BMP Selection 21
Table F.1 Hydrologic Conditions of Concern Summary 22
Table G.1 Permanent and Operational Source Control Measures 24
Table H.1 Construction Plan Cross-reference 26

List of Appendices

Appendix 1: Maps and Site Plans

Appendix 2: Construction Plans

Appendix 3: Soils Information

Appendix 4: Historical Site Conditions

Appendix 5: LID Infeasibility

Appendix 6: BMP Design Details

Appendix 7: Hydromodification

Appendix 8: Source Control

Appendix 9: O&M

Appendix 10: Educational Materials

Section A: Project and Site Information

PROJECT INFORMATION	
Type of Project:	Park Site
Planning Area:	City of Menifee
Community Name:	City of Menifee
Development Name:	Evans Park

PROJECT LOCATION
Latitude & Longitude (DMS): 33°39'55.3"N, 117°11'46.6"W
Project Watershed and Sub-Watershed: Santa Ana Watershed, San Jacinto River Sub-Watershed
APN(s): 360170001, 360170002, 360170003, 360170004, 360170005, 360170006
Map Book and Page No.: Insert text here

PROJECT CHARACTERISTICS		
Proposed or Potential Land Use(s)	Park	
Proposed or Potential SIC Code(s)	7999	
Area of Impervious Project Footprint (SF)	290,218	
Total Area of proposed Impervious Surfaces within the Project Limits (SF)/or Replacement	290,218	
Does the project consist of offsite road improvements?	☐ Y	☒ N
Does the project propose to construct unpaved roads?	☐ Y	☒ N
Is the project part of a larger common plan of development (phased project)?	☐ Y	☒ N
EXISTING SITE CHARACTERISTICS		
Total area of existing Impervious Surfaces within the project limits (SF)	0	
Is the project located within any MSHCP Criteria Cell?	☐ Y	☒ N
If so, identify the Cell number:	N/A	
Are there any natural hydrologic features on the project site?	☒ Y	☐ N
Is a Geotechnical Report attached?	☐ Y	☒ N
If no Geotech. Report, list the NRCS soils type(s) present on the site (A, B, C and/or D)	C & D	
What is the Water Quality Design Storm Depth for the project?	0.59"	

A.1 Maps and Site Plans

When completing your Project-Specific WQMP, include a map of the local vicinity and existing site. In addition, include all grading, drainage, landscape/plant palette and other pertinent construction plans in Appendix 2. At a **minimum**, your WQMP Site Plan should include the following:

- Drainage Management Areas
- Proposed Structural BMPs
- Drainage Path
- Drainage Infrastructure, Inlets, Overflows
- Source Control BMPs
- Buildings, Roof Lines, Downspouts
- Impervious Surfaces
- Standard Labeling

Use your discretion on whether or not you may need to create multiple sheets or can appropriately accommodate these features on one or two sheets. Keep in mind that the Co-Permittee plan reviewer must be able to easily analyze your project utilizing this template and its associated site plans and maps.

A.2 Identify Receiving Waters

Using Table A.1 below, list in order of upstream to downstream, the receiving waters that the project site is tributary to. Continue to fill each row with the Receiving Water's 303(d) listed impairments (if any), designated beneficial uses, and proximity, if any, to a RARE beneficial use. Include a map of the receiving waters in Appendix 1.

Table A.1 Identification of Receiving Waters

Receiving Waters	EPA Approved 303(d) List Impairments	Designated Beneficial Uses	Proximity to RARE Beneficial Use
Evans Road Channel	N/A	N/A	N/A
Bradley Road Channel	N/A	N/A	N/A
Salt Creek Channel	N/A	N/A	N/A
Canyon Lake	Nutrients	MUN, AGR, GWR, REC1, REC2, COMM, WARM, WILD	N/A
San Jacinto River Reach 1	None	MUN, AGR, GWR, REC1, REC2, WARM, WILD, RARE	6 miles
Lake Elsinore	DDT (Dichlorodiphenyltrichloroethane), Nutrients, Organic Enrichment/Low Dissolved Oxygen, PCBs (Polychlorinated biphenyls), Toxicity	REC1, REC2, COMM, WARM, WILD, RARE, excepted from MUN	8 miles

A.3 Additional Permits/Approvals required for the Project:

Table A.2 Other Applicable Permits

Agency	Permit Required	
State Department of Fish and Game, 1602 Streambed Alteration Agreement	☒ Y	☐ N
State Water Resources Control Board, Clean Water Act (CWA) Section 401 Water Quality Cert.	☒ Y	☐ N
US Army Corps of Engineers, CWA Section 404 Permit	☒ Y	☐ N
US Fish and Wildlife, Endangered Species Act Section 7 Biological Opinion	☒ Y	☐ N
Statewide Construction General Permit Coverage	☒ Y	☐ N
Statewide Industrial General Permit Coverage	☐ Y	☒ N
Western Riverside MSHCP Consistency Approval (e.g., JPR, DBESP)	☒ Y	☐ N
Other *(please list in the space below as required)*	☐ Y	☒ N

If yes is answered to any of the questions above, the Co-Permittee may require proof of approval/coverage from those agencies as applicable including documentation of any associated requirements that may affect this Project-Specific WQMP.

Section B: Optimize Site Utilization (LID Principles)

Review of the information collected in Section 'A' will aid in identifying the principal constraints on site design and selection of LID BMPs as well as opportunities to reduce imperviousness and incorporate LID Principles into the site and landscape design. For example, **constraints** might include impermeable soils, high groundwater, groundwater pollution or contaminated soils, steep slopes, geotechnical instability, high-intensity land use, heavy pedestrian or vehicular traffic, utility locations or safety concerns. **Opportunities** might include existing natural areas, low areas, oddly configured or otherwise unbuildable parcels, easements and landscape amenities including open space and buffers (which can double as locations for bioretention BMPs), and differences in elevation (which can provide hydraulic head). Prepare a brief narrative for each of the site optimization strategies described below. This narrative will help you as you proceed with your LID design and explain your design decisions to others.

The 2010 Santa Ana MS4 Permit further requires that LID Retention BMPs (Infiltration Only or Harvest and Use) be used unless it can be shown that those BMPs are infeasible. Therefore, it is important that your narrative identify and justify if there are any constraints that would prevent the use of those categories of LID BMPs. Similarly, you should also note opportunities that exist which will be utilized during project design. Upon completion of identifying Constraints and Opportunities, include these on your WQMP Site plan in Appendix 1.

Site Optimization

The following questions are based upon Section 3.2 of the WQMP Guidance Document. Review of the WQMP Guidance Document will help you determine how best to optimize your site and subsequently identify opportunities and/or constraints, and document compliance.

Did you identify and preserve existing drainage patterns? If so, how? If not, why?

This will be done to the maximum extent practicable (MEP) during design phase.

Did you identify and protect existing vegetation? If so, how? If not, why?

This will be done to the maximum extent practicable (MEP) during design phase.

Did you identify and preserve natural infiltration capacity? If so, how? If not, why?

This will be done to the maximum extent practicable (MEP) during design phase.

Did you identify and minimize impervious area? If so, how? If not, why?

This will be done to the maximum extent practicable (MEP) during design phase.

Did you identify and disperse runoff to adjacent pervious areas? If so, how? If not, why?

This will be done to the maximum extent practicable (MEP) during design phase.

Section C: Delineate Drainage Management Areas (DMAs)

Utilizing the procedure in Section 3.3 of the WQMP Guidance Document which discusses the methods of delineating and mapping your project site into individual DMAs, complete Table C.1 below to appropriately categorize the types of classification (e.g., Type A, Type B, etc.) per DMA for your project site. Upon completion of this table, this information will then be used to populate and tabulate the corresponding tables for their respective DMA classifications.

Note that since the conceptual design of the park is still in the very early stages, multiple surface types (i.e., concrete or asphalt, and natural soil cover) were included in each DMA for this preliminary analysis. These values are based on a very preliminary conceptual design, and equate to 20% impervious for DMA 1, 50% impervious for DMA 2, and 20% impervious for DMA 3.

Table C.1 DMA Classifications

DMA Name or ID	Surface Type(s)[1]	Area (Sq. Ft.)	DMA Type
DMA 1	Concrete or Asphalt, Natural (C Soil)	228,216 - estimated per conceptual site plan	Type D
DMA 2	Concrete or Asphalt, Natural (C Soil)	399,481 - estimated per conceptual site plan	Type D
DMA 3	Concrete or Asphalt, Natural (C Soil), Natural (D Soil)	224,168 - estimated per conceptual site plan	Type D

[1]*Reference Table 2-1 in the WQMP Guidance Document to populate this column*

Table C.2 Type 'A', Self-Treating Areas

DMA Name or ID	Area (Sq. Ft.)	Stabilization Type	Irrigation Type (if any)
N/A			

Table C.3 Type 'B', Self-Retaining Areas

Self-Retaining Area				**Type 'C' DMAs that are draining to the Self-Retaining Area**		
DMA Name/ ID	Post-project surface type	Area (square feet) [A]	Storm Depth (inches) [B]	DMA Name / ID	[C] from Table C.4 = [C]	Required Retention Depth (inches) [D]
N/A						

$$[D] = [B] + \frac{[B] \cdot [C]}{[A]}$$

Table C.4 Type 'C', Areas that Drain to Self-Retaining Areas

DMA					Receiving Self-Retaining DMA		
DMA Name/ ID	Area (square feet)	Post-project surface type	Runoff factor	Product		Area (square feet)	Ratio
	[A]		[B]	[C] = [A] x [B]	DMA name /ID	[D]	[C]/[D]
N/A							

Table C.5 Type 'D', Areas Draining to BMPs

DMA Name or ID	BMP Name or ID
DMA 1	Basin 1
DMA 2	Basin 2
DMA 3	Basin 3

Note: More than one drainage management area can drain to a single LID BMP, however, one drainage management area may not drain to more than one BMP.

Section D: Implement LID BMPs

D.1 Infiltration Applicability

Is there an approved downstream 'Highest and Best Use' for stormwater runoff (see discussion in Chapter 2.4.4 of the WQMP Guidance Document for further details)? ☐ Y ☒ N

(It is noted that Lake Elsinore is evaporating faster than natural precipitation can recharge it. However no revision to LID requirements in the watershed has been approved.) If yes has been checked, Infiltration BMPs shall not be used for the site. If no, continue working through this section to implement your LID BMPs. It is recommended that you contact your Co-Permittee to verify whether or not your project discharges to an approved downstream 'Highest and Best Use' feature.

Geotechnical Report

A Geotechnical Report or Phase I Environmental Site Assessment may be required by the Copermittee to confirm present and past site characteristics that may affect the use of Infiltration BMPs. In addition, the Co-Permittee, at their discretion, may not require a geotechnical report for small projects as described in Chapter 2 of the WQMP Guidance Document. If a geotechnical report has been prepared, include it in Appendix 3. In addition, if a Phase I Environmental Site Assessment has been prepared, include it in Appendix 4.

Is this project classified as a small project consistent with the requirements of Chapter 2 of the WQMP Guidance Document? ☐ Y ☒ N

Infiltration Feasibility

Table D.1 below is meant to provide a simple means of assessing which DMAs on your site support Infiltration BMPs and is discussed in the WQMP Guidance Document in Chapter 2.4.5. Check the appropriate box for each question and then list affected DMAs as applicable. If additional space is needed, add a row below the corresponding answer.

Table D.1 Infiltration Feasibility

*(Table D.1 is not being used as a soils report has not been prepared for this Preliminary WQMP)

Does the project site…	YES	NO
…have any DMAs with a seasonal high groundwater mark shallower than 10 feet?	*	*
If Yes, list affected DMAs:	*	*
…have any DMAs located within 100 feet of a water supply well?	*	*
If Yes, list affected DMAs:	*	*
…have any areas identified by the geotechnical report as posing a public safety risk where infiltration of stormwater could have a negative impact?	*	*
If Yes, list affected DMAs:	*	*
…have measured in-situ infiltration rates of less than 1.6 inches / hour?	*	*
If Yes, list affected DMAs:	*	*
…have significant cut and/or fill conditions that would preclude in-situ testing of infiltration rates at the final infiltration surface?	*	*
If Yes, list affected DMAs:	*	*
…geotechnical report identify other site-specific factors that would preclude effective and safe infiltration?	*	*
Describe here:	*	*

If you answered "Yes" to any of the questions above for any DMA, Infiltration BMPs should not be used for those DMAs and you should proceed to the assessment for Harvest and Use below.

D.2 Harvest and Use Assessment

Please check what applies*:*

☐ Reclaimed water will be used for the non-potable water demands for the project.

☐Downstream water rights may be impacted by Harvest and Use as approved by the Regional Board (verify with the Copermittee).

☐The Design Capture Volume will be addressed using Infiltration Only BMPs. In such a case, Harvest and Use BMPs are still encouraged, but it would not be required if the Design Capture Volume will be infiltrated or evapotranspired.

If any of the above boxes have been checked, Harvest and Use BMPs need not be assessed for the site. If neither of the above criteria applies, follow the steps below to assess the feasibility of irrigation use, toilet use and other non-potable uses (e.g., industrial use).

Irrigation Use Feasibility

Complete the following steps to determine the feasibility of harvesting stormwater runoff for Irrigation Use BMPs on your site:

Step 1: Identify the total area of irrigated landscape on the site, and the type of landscaping used.

Total Area of Irrigated Landscape: 12.9 acres

Type of Landscaping (Conservation Design or Active Turf): Conservation Design

Step 2: Identify the planned total of all impervious areas on the proposed project from which runoff might be feasibly captured and stored for irrigation use. Depending on the configuration of buildings and other impervious areas on the site, you may consider the site as a whole, or parts of the site, to evaluate reasonable scenarios for capturing and storing runoff and directing the stored runoff to the potential use(s) identified in Step 1 above.

Total Area of Impervious Surfaces: 6.66 acres - estimated per conceptual site plan

Step 3: Cross reference the Design Storm depth for the project site (see Exhibit A of the WQMP Guidance Document) with the left column of Table 2-3 in Chapter 2 to determine the minimum area of Effective Irrigated Area per Tributary Impervious Area (EIATIA).

Enter your EIATIA factor: 0.47

Step 4: Multiply the unit value obtained from Step 3 by the total of impervious areas from Step 2 to develop the minimum irrigated area that would be required.

Minimum required irrigated area: 3.13 acres

Step 5: Determine if harvesting stormwater runoff for irrigation use is feasible for the project by comparing the total area of irrigated landscape (Step 1) to the minimum required irrigated area (Step 4).

Minimum required irrigated area (Step 4)	Available Irrigated Landscape (Step 1)
3.13 acres	12.9 acres - to be confirmed during final design phase

Toilet Use Feasibility

Complete the following steps to determine the feasibility of harvesting stormwater runoff for toilet flushing uses on your site:

Step 1: Identify the projected total number of daily toilet users during the wet season, and account for any periodic shut downs or other lapses in occupancy:

Projected Number of Daily Toilet Users: 50 (TBD)

Project Type: Commercial/Park

Step 2: Identify the planned total of all impervious areas on the proposed project from which runoff might be feasibly captured and stored for toilet use. Depending on the configuration of buildings and other impervious areas on the site, you may consider the site as a whole, or parts of the site, to evaluate reasonable scenarios for capturing and storing runoff and directing the stored runoff to the potential use(s) identified in Step 1 above.

Total Area of Impervious Surfaces: 6.66 acres

Step 3: Enter the Design Storm depth for the project site (see Exhibit A) into the left column of Table 2-1 in Chapter 2 to determine the minimum number or toilet users per tributary impervious acre (TUTIA).

Enter your TUTIA factor: 132

Step 4: Multiply the unit value obtained from Step 3 by the total of impervious areas from Step 2 to develop the minimum number of toilet users that would be required.

Minimum number of toilet users: 879

Step 5: Determine if harvesting stormwater runoff for toilet flushing use is feasible for the project by comparing the Number of Daily Toilet Users (Step 1) to the minimum required number of toilet users (Step 4).

Minimum required Toilet Users (Step 4)	Projected number of toilet users (Step 1)
879	50 (TBD)

Other Non-Potable Use Feasibility

Are there other non-potable uses for stormwater runoff on the site (e.g. industrial use)? See Chapter 2 of the Guidance for further information. If yes, describe below. If no, write N/A.

N/A

Step 1: Identify the projected average daily non-potable demand, in gallons per day, during the wet season and accounting for any periodic shut downs or other lapses in occupancy or operation.

Average Daily Demand: Projected Average Daily Use (gpd)

Step 2: Identify the planned total of all impervious areas on the proposed project from which runoff might be feasibly captured and stored for the identified non-potable use. Depending on the configuration of buildings and other impervious areas on the site, you may consider the site as a whole, or parts of the site, to evaluate reasonable scenarios for capturing and storing runoff and directing the stored runoff to the potential use(s) identified in Step 1 above.

Total Area of Impervious Surfaces: Insert Area (Acres)

Step 3: Enter the Design Storm depth for the project site (see Exhibit A) into the left column of Table 2-3 in Chapter 2 to determine the minimum demand for non-potable uses per tributary impervious acre.

Enter the factor from Table 2-3: Enter Value

Step 4: Multiply the unit value obtained from Step 4 by the total of impervious areas from Step 3 to develop the minimum number of gallons per day of non-potable use that would be required.

Minimum required use: Minimum use required (gpd)

Step 5: Determine if harvesting stormwater runoff for other non-potable use is feasible for the project by comparing the Number of Daily Toilet Users (Step 1) to the minimum required number of toilet users (Step 4).

Minimum required non-potable use (Step 4)	**Projected average daily use (Step 1)**
Minimum use required (gpd)	Projected Average Daily Use (gpd)

If Irrigation, Toilet and Other Use feasibility anticipated demands are less than the applicable minimum values, Harvest and Use BMPs are not required and you should proceed to utilize LID Bioretention and Biotreatment, unless a site-specific analysis has been completed that demonstrates technical infeasibility as noted in D.3 below.

D.3 Bioretention and Biotreatment Assessment

Other LID Bioretention and Biotreatment BMPs as described in Chapter 2.4.7 of the WQMP Guidance Document are feasible on nearly all development sites with sufficient advance planning.

Select one of the following:

☒ LID Bioretention/Biotreatment BMPs will be used for some or all DMAs of the project as noted below in Section D.4 (note the requirements of Section 3.4.2 in the WQMP Guidance Document).

☐ A site-specific analysis demonstrating the technical infeasibility of all LID BMPs has been performed and is included in Appendix 5. If you plan to submit an analysis demonstrating the technical infeasibility of LID BMPs, request a pre-submittal meeting with the Copermittee to discuss this option. Proceed to Section E to document your alternative compliance measures.

D.4 Feasibility Assessment Summaries

From the Infiltration, Harvest and Use, Bioretention and Biotreatment Sections above, complete Table D.2 below to summarize which LID BMPs are technically feasible, and which are not, based upon the established hierarchy.

Table D.2 LID Prioritization Summary Matrix

DMA Name/ID	LID BMP Hierarchy				No LID (Alternative Compliance)
	1. Infiltration	2. Harvest and use	3. Bioretention	4. Biotreatment	
DMA 1	☐	☐	☒	☐	☐
DMA 2	☐	☐	☒	☐	☐
DMA 3	☐	☐	☒	☐	☐
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐

For those DMAs where LID BMPs are not feasible, provide a brief narrative below summarizing why they are not feasible, include your technical infeasibility criteria in Appendix 5, and proceed to Section E below to document Alternative Compliance measures for those DMAs. Recall that each proposed DMA must pass through the LID BMP hierarchy before alternative compliance measures may be considered.

Insert narrative description here.

D.5 LID BMP Sizing

Each LID BMP must be designed to ensure that the Design Capture Volume will be addressed by the selected BMPs. First**,** calculate the Design Capture Volume for each LID BMP using the V_{BMP} worksheet in Appendix F of the LID BMP Design Handbook. Second**,** design the LID BMP to meet the required V_{BMP} using a method approved by the Copermittee. Utilize the worksheets found in the LID BMP Design Handbook or consult with your Copermittee to assist you in correctly sizing your LID BMPs. Complete Table D.3 below to document the Design Capture Volume and the Proposed Volume for each LID BMP. Provide the completed design procedure sheets for each LID BMP in Appendix 6. You may add additional rows to the table below as needed.

Table D.3.1 DCV Calculations for LID BMPs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Basin 1*		
	[A]		[B]	[C]	[A] x [C]			
DMA 1	*45,643*	*Concrete or Asphalt*	*1*	*0.89*	*40,713.6*	*Design Storm Depth (in)*	*Design Capture Volume,* V_{BMP} *(cubic feet)*	*Proposed Volume on Plans (cubic feet)*
	182,573	*Natural (C Soil)*	*0.3*	*0.23*	*41,109.2*			
	228,216				81,822.8	0.59	4,023	4,023

Table D.3.2 DCV Calculations for LID BMPs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Basin 2*		
	[A]		[B]	[C]	[A] x [C]			
DMA 2	*199,740.5*	*Concrete or Asphalt*	*1*	*0.89*	*178,168.5*	*Design Storm Depth (in)*	*Design Capture Volume,* V_{BMP} *(cubic feet)*	*Proposed Volume on Plans (cubic feet)*
	199,740.5	*Natural (C Soil)*	*0.3*	*0.23*	*44,974.8*			
	399,481				223,143.3	0.59	10,971.2	10,971.2

Table D.3.3 DCV Calculations for LID BMPs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Basin 3*		
	[A]		[B]	[C]	[A] x [C]			
DMA 3	*44,834*	*Concrete or Asphalt*	*1*	*0.89*	*39,991.9*			
	119,556	*Natural (C Soil)*	*0.3*	*0.23*	*26,919.9*			
	59,778	*Natural (D Soil)*	*0.4*	*0.28*	*16,720.6*			
						Design Storm Depth (in)	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
	224,168				83,632.4	0.59	4,111.9	4,111.9

[B], [C] is obtained as described in Section 2.3.1 of the WQMP Guidance Document

[E] is obtained from Exhibit A in the WQMP Guidance Document

[G] is obtained from a design procedure sheet, such as in LID BMP Design Handbook and placed in Appendix 6

Section E: Alternative Compliance (LID Waiver Program)

LID BMPs are expected to be feasible on virtually all projects. Where LID BMPs have been demonstrated to be infeasible as documented in Section D, other Treatment Control BMPs must be used (subject to LID waiver approval by the Copermittee). Check one of the following Boxes:

☒ LID Principles and LID BMPs have been incorporated into the site design to fully address all Drainage Management Areas. No alternative compliance measures are required for this project and thus this Section is not required to be completed.

- *Or* -

☐ The following Drainage Management Areas are unable to be addressed using LID BMPs. A site-specific analysis demonstrating technical infeasibility of LID BMPs has been approved by the Co-Permittee and included in Appendix 5. Additionally, no downstream regional and/or sub-regional LID BMPs exist or are available for use by the project. The following alternative compliance measures on the following pages are being implemented to ensure that any pollutant loads expected to be discharged by not incorporating LID BMPs, are fully mitigated.

List DMAs here.

E.1 Identify Pollutants of Concern

Utilizing Table A.1 from Section A above which noted your project's receiving waters and their associated EPA approved 303(d) listed impairments, cross reference this information with that of your selected Priority Development Project Category in Table E.1 below. If the identified General Pollutant Categories are the same as those listed for your receiving waters, then these will be your Pollutants of Concern and the appropriate box or boxes will be checked on the last row. The purpose of this is to document compliance and to help you appropriately plan for mitigating your Pollutants of Concern in lieu of implementing LID BMPs.

Table E.1 Potential Pollutants by Land Use Type

Priority Development Project Categories and/or Project Features (check those that apply)	General Pollutant Categories							
	Bacterial Indicators	Metals	Nutrients	Pesticides	Toxic Organic Compounds	Sediments	Trash & Debris	Oil & Grease
☐ Detached Residential Development	P	N	P	P	N	P	P	P
☐ Attached Residential Development	P	N	P	P	N	P	P	P(2)
☐ Commercial/Industrial Development	P(3)	P	P(1)	P(1)	P(5)	P(1)	P	P
☐ Automotive Repair Shops	N	P	N	N	P(4, 5)	N	P	P
☐ Restaurants (>5,000 ft^2)	P	N	N	N	N	N	P	P
☐ Hillside Development (>5,000 ft^2)	P	N	P	P	N	P	P	P
☐ Parking Lots (>5,000 ft^2)	P(6)	P	P(1)	P(1)	P(4)	P(1)	P	P
☐ Retail Gasoline Outlets	N	P	N	N	P	N	P	P
Project Priority Pollutant(s) of Concern	☐	☐	☐	☐	☐	☐	☐	☐

P = Potential

N = Not Potential

(1) A potential Pollutant if non-native landscaping exists or is proposed onsite; otherwise not expected

(2) A potential Pollutant if the project includes uncovered parking areas; otherwise not expected

(3) A potential Pollutant is land use involving animal waste

(4) Specifically petroleum hydrocarbons

(5) Specifically solvents

(6) Bacterial indicators are routinely detected in pavement runoff

E.2 Stormwater Credits

Projects that cannot implement LID BMPs but nevertheless implement smart growth principles are potentially eligible for Stormwater Credits. Utilize Table 3-8 within the WQMP Guidance Document to identify your Project Category and its associated Water Quality Credit. If not applicable, write N/A.

Table E.2 Water Quality Credits

Qualifying Project Categories	Credit Percentage[2]
Total Credit Percentage[1]	

[1]*Cannot Exceed 50%*
[2]*Obtain corresponding data from Table 3-8 in the WQMP Guidance Document*

E.3 Sizing Criteria

After you appropriately considered Stormwater Credits for your project, utilize Table E.3 below to appropriately size them to the DCV, or Design Flow Rate, as applicable. Please reference Chapter 3.5.2 of the WQMP Guidance Document for further information.

Table E.3 Treatment Control BMP Sizing

DMA Type/ID	**DMA Area (square feet)**	**Post-Project Surface Type**	**Effective Impervious Fraction, I_f**	**DMA Runoff Factor**	**DMA Area x Runoff Factor**		***Enter BMP Name / Identifier Here***		
	[A]		[B]	[C]	[A] x [C]				
						Design Storm Depth (in)	*Minimum Design Capture Volume or Design Flow Rate (cubic feet or cfs)*	*Total Storm Water Credit % Reduction*	*Proposed Volume or Flow on Plans (cubic feet or cfs)*
	A_T = Σ[A]				Σ= [D]	[E]	$[F] = \frac{[D]x[E]}{[G]}$	[F] X (1-[H])	[I]

[B], [C] is obtained as described in Section 2.3.1 from the WQMP Guidance Document
[E] is obtained from Exhibit A in the WQMP Guidance Document
[G] is for Flow-Based Treatment Control BMPs [G] = 43,560, for Volume-Based Control Treatment BMPs, [G] = 12
[H] is from the Total Credit Percentage as Calculated from Table E.2 above
[I] as obtained from a design procedure sheet from the BMP manufacturer and should be included in Appendix 6

E.4 Treatment Control BMP Selection

Treatment Control BMPs typically provide proprietary treatment mechanisms to treat potential pollutants in runoff, but do not sustain significant biological processes. Treatment Control BMPs must have a removal efficiency of a medium or high effectiveness as quantified below:

- **High**: equal to or greater than 80% removal efficiency
- **Medium**: between 40% and 80% removal efficiency

Such removal efficiency documentation (e.g., studies, reports, etc.) as further discussed in Chapter 3.5.2 of the WQMP Guidance Document, must be included in Appendix 6. In addition, ensure that proposed Treatment Control BMPs are properly identified on the WQMP Site Plan in Appendix 1.

Table E.4 Treatment Control BMP Selection

Selected Treatment Control BMP Name or ID[1]	Priority Pollutant(s) of Concern to Mitigate[2]	Removal Efficiency Percentage[3]

[1] *Treatment Control BMPs must not be constructed within Receiving Waters. In addition, a proposed Treatment Control BMP may be listed more than once if they possess more than one qualifying pollutant removal efficiency.*
[2] *Cross Reference Table E.1 above to populate this column.*
[3] *As documented in a Co-Permittee Approved Study and provided in Appendix 6.*

Section F: Hydromodification

F.1 Hydrologic Conditions of Concern (HCOC) Analysis

Once you have determined that the LID design is adequate to address water quality requirements, you will need to assess if the proposed LID Design may still create a HCOC. Review Chapters 2 and 3 (including Figure 3-7) of the WQMP Guidance Document to determine if your project must mitigate for Hydromodification impacts. If your project meets one of the following criteria which will be indicated by the check boxes below, you do not need to address Hydromodification at this time. However, if the project does not qualify for Exemptions 1, 2 or 3, then additional measures must be added to the design to comply with HCOC criteria. This is discussed in further detail below in Section F.2.

HCOC EXEMPTION 1: The Priority Development Project disturbs less than one acre. The Copermittee has the discretion to require a Project-Specific WQMP to address HCOCs on projects less than one acre on a case by case basis. The disturbed area calculation should include all disturbances associated with larger common plans of development.

Does the project qualify for this HCOC Exemption? ☐ Y ☒ N

If Yes, HCOC criteria do not apply.

HCOC EXEMPTION 2: The volume and time of concentration[1] of storm water runoff for the post-development condition is not significantly different from the pre-development condition for a 2-year return frequency storm (a difference of 5% or less is considered insignificant) using one of the following methods to calculate:

- Riverside County Hydrology Manual
- Technical Release 55 (TR-55): Urban Hydrology for Small Watersheds (NRCS 1986), or derivatives thereof, such as the Santa Barbara Urban Hydrograph Method
- Other methods acceptable to the Co-Permittee

Does the project qualify for this HCOC Exemption? ☐ Y ☒ N

If Yes, report results in Table F.1 below and provide your substantiated hydrologic analysis in Appendix 7.

Table F.1 Hydrologic Conditions of Concern Summary

	2 year – 24 hour		
	Pre-condition	**Post-condition**	**% Difference**
Time of Concentration	INSERT VALUE	INSERT VALUE	INSERT VALUE
Volume (Cubic Feet)	INSERT VALUE	INSERT VALUE	INSERT VALUE

[1] Time of concentration is defined as the time after the beginning of the rainfall when all portions of the drainage basin are contributing to flow at the outlet.

HCOC EXEMPTION 3: All downstream conveyance channels to an adequate sump (for example, Prado Dam, Lake Elsinore, Canyon Lake, Santa Ana River, or other lake, reservoir or naturally erosion resistant feature) that will receive runoff from the project are engineered and regularly maintained to ensure design flow capacity; no sensitive stream habitat areas will be adversely affected; or are not identified on the Co-Permittees Hydromodification Sensitivity Maps.

Does the project qualify for this HCOC Exemption? ☐ Y ☒ N

If Yes, HCOC criteria do not apply and note below which adequate sump applies to this HCOC qualifier:

INSERT TEXT HERE

F.2 HCOC Mitigation*

If none of the above HCOC Exemption Criteria are applicable, HCOC criteria is considered mitigated if they meet one of the following conditions:

a. Additional LID BMPS are implemented onsite or offsite to mitigate potential erosion or habitat impacts as a result of HCOCs. This can be conducted by an evaluation of site-specific conditions utilizing accepted professional methodologies published by entities such as the California Stormwater Quality Association (CASQA), the Southern California Coastal Water Research Project (SCCRWP), or other Co-Permittee approved methodologies for site-specific HCOC analysis.

b. The project is developed consistent with an approved Watershed Action Plan that addresses HCOC in Receiving Waters.

c. Mimicking the pre-development hydrograph with the post-development hydrograph, for a 2-year return frequency storm. Generally, the hydrologic conditions of concern are not significant, if the post-development hydrograph is no more than 10% greater than pre-development hydrograph. In cases where excess volume cannot be infiltrated or captured and reused, discharge from the site must be limited to a flow rate no greater than 110% of the pre-development 2-year peak flow.

   *For the Preliminary WQMP, in lieu of preparing detailed routing calculations, the basin size may be estimated as the difference in volume between the pre-development and post-development hydrograph for the 2-year 24-hour storm event plus the V_{bmp}.

Be sure to include all pertinent documentation used in your analysis of the items a, b or c in Appendix 7.

Section G: Source Control BMPs

Source control BMPs include permanent, structural features that may be required in your project plans — such as roofs over and berms around trash and recycling areas — and Operational BMPs, such as regular sweeping and "housekeeping", that must be implemented by the site's occupant or user. The MEP standard typically requires both types of BMPs. In general, Operational BMPs cannot be substituted for a feasible and effective permanent BMP. Using the Pollutant Sources/Source Control Checklist in Appendix 8, review the following procedure to specify Source Control BMPs for your site:

1. ***Identify Pollutant Sources*:** Review Column 1 in the Pollutant Sources/Source Control Checklist. Check off the potential sources of Pollutants that apply to your site.

2. ***Note Locations on Project-Specific WQMP Exhibit*:** Note the corresponding requirements listed in Column 2 of the Pollutant Sources/Source Control Checklist. Show the location of each Pollutant source and each permanent Source Control BMP in your Project-Specific WQMP Exhibit located in Appendix 1.

3. ***Prepare a Table and Narrative*:** Check off the corresponding requirements listed in Column 3 in the Pollutant Sources/Source Control Checklist. In the left column of Table G.1 below, list each potential source of runoff Pollutants on your site (from those that you checked in the Pollutant Sources/Source Control Checklist). In the middle column, list the corresponding permanent, Structural Source Control BMPs (from Columns 2 and 3 of the Pollutant Sources/Source Control Checklist) used to prevent Pollutants from entering runoff. **Add additional narrative** in this column that explains any special features, materials or methods of construction that will be used to implement these permanent, Structural Source Control BMPs.

4. ***Identify Operational Source Control BMPs:*** To complete your table, refer once again to the Pollutant Sources/Source Control Checklist. List in the right column of your table the Operational BMPs that should be implemented as long as the anticipated activities continue at the site. Copermittee stormwater ordinances require that applicable Source Control BMPs be implemented; the same BMPs may also be required as a condition of a use permit or other revocable Discretionary Approval for use of the site.

Table G.1 Permanent and Operational Source Control Measures

Potential Sources of Runoff pollutants	Permanent Structural Source Control BMPs	Operational Source Control BMPs
On-site storm drain inlets	Stencil inlets	Inlet cleaning and repaint stenciling when necessary
Landscape/outdoor pesticide use	Design landscaping to minimize runoff and preserve existing native ground cover when possible	Avoid use of pesticides to the maximum extent practicable
Pools, spas, ponds, decorative fountains, and other water features	If pools are required to be plumbed to the sanitary sewer, note that local requirements will be followed	See "Guidelines for Maintaining Your Swimming Pool, Jacuzzi and Garden Fountain" at http://rcflood.org/stormwater

Refuse areas	Signage restricting hazardous materials. Provide covers for all receptacles.	Provide adequate number of receptacles. Inspect receptacles regularly; repair or replace leaky receptacles. Keep receptacles covered. Prohibit/prevent dumping of liquid or hazardous wastes. Post "no hazardous materials" signs. Inspect and pick up litter daily and clean up spills immediately. Keep spill control materials available on-site.
Roofing, gutters, and trim	Avoid roofing, gutters, and trim made of copper or other unprotected metals that may leach into runoff	
Plazas, sidewalks, and parking lots		Sweep plazas, sidewalks, and parking lots regularly to prevent accumulation of litter and debris. Collect debris from pressure washing to prevent entry into the storm drain system. Collect washwater containing any cleaning agent or degreaser and discharge to the sanitary sewer not to a storm drain.

Section H: Construction Plan Checklist

Populate Table H.1 below to assist the plan checker in an expeditious review of your project. The first two columns will contain information that was prepared in previous steps, while the last column will be populated with the corresponding plan sheets. This table is to be completed with the submittal of your final Project-Specific WQMP.

Table will be completed at Final WQMP phase.

Table H.1 Construction Plan Cross-reference

BMP No. or ID	BMP Identifier and Description	Corresponding Plan Sheet(s)

Note that the updated table — or Construction Plan WQMP Checklist — is **only a reference tool** to facilitate an easy comparison of the construction plans to your Project-Specific WQMP. Co-Permittee staff can advise you regarding the process required to propose changes to the approved Project-Specific WQMP.

Section I: Operation, Maintenance and Funding

The Copermittee will periodically verify that Stormwater BMPs on your site are maintained and continue to operate as designed. To make this possible, your Copermittee will require that you include in Appendix 9 of this Project-Specific WQMP:

1. A means to finance and implement facility maintenance in perpetuity, including replacement cost.
2. Acceptance of responsibility for maintenance from the time the BMPs are constructed until responsibility for operation and maintenance is legally transferred. A warranty covering a period following construction may also be required.
3. An outline of general maintenance requirements for the Stormwater BMPs you have selected.
4. Figures delineating and designating pervious and impervious areas, location, and type of Stormwater BMP, and tables of pervious and impervious areas served by each facility. Geo-locating the BMPs using a coordinate system of latitude and longitude is recommended to help facilitate a future statewide database system.
5. A separate list and location of self-retaining areas or areas addressed by LID Principles that do not require specialized O&M or inspections but will require typical landscape maintenance as noted in Chapter 5, pages 85-86, in the WQMP Guidance. Include a brief description of typical landscape maintenance for these areas.

Your local Co-Permittee will also require that you prepare and submit a detailed Stormwater BMP Operation and Maintenance Plan that sets forth a maintenance schedule for each of the Stormwater BMPs built on your site. An agreement assigning responsibility for maintenance and providing for inspections and certification may also be required.

Details of these requirements and instructions for preparing a Stormwater BMP Operation and Maintenance Plan are in Chapter 5 of the WQMP Guidance Document.

Maintenance Mechanism: The City of Menifee is anticipated to maintain the park.

Will the proposed BMPs be maintained by a Home Owners' Association (HOA) or Property Owners Association (POA)?

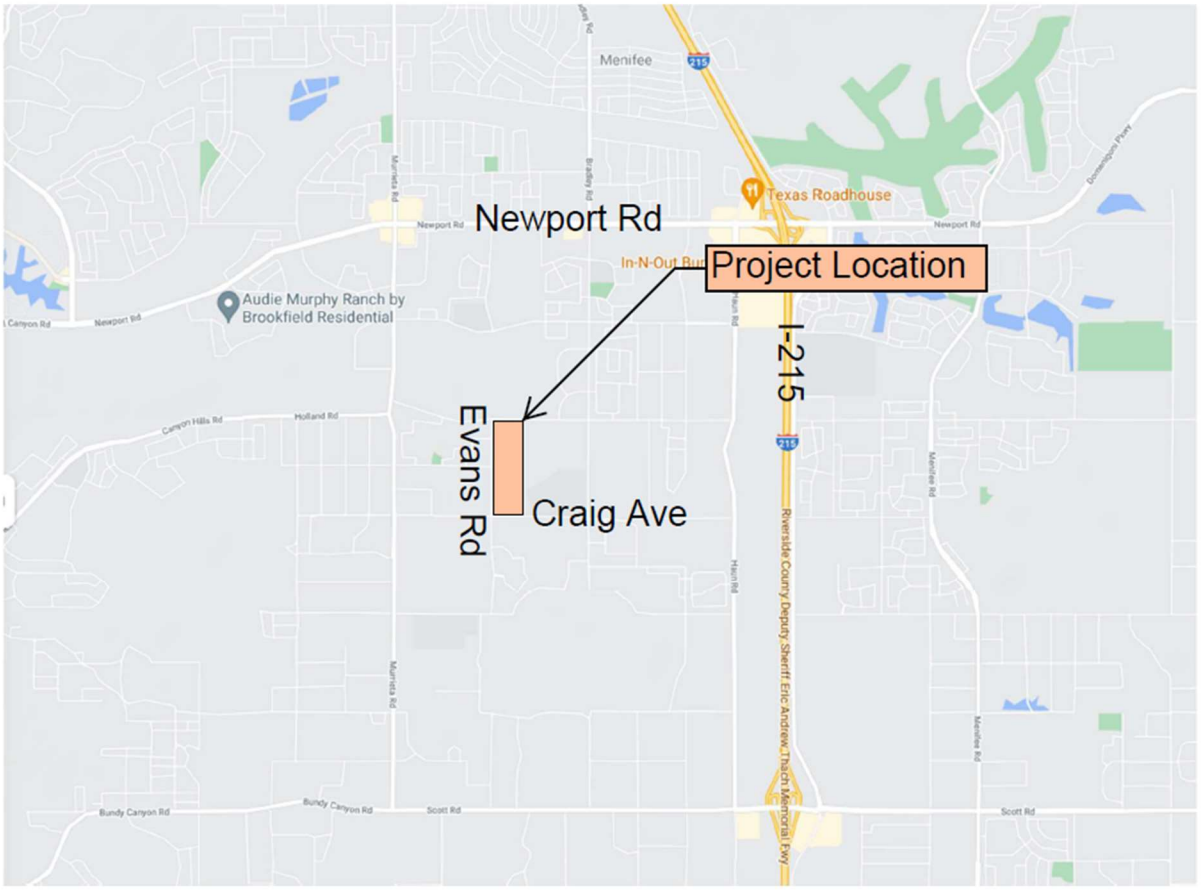
☐ Y ☒ N

Include your Operation and Maintenance Plan and Maintenance Mechanism in Appendix 9. Additionally, include all pertinent forms of educational materials for those personnel that will be maintaining the proposed BMPs within this Project-Specific WQMP in Appendix 10.

Appendix 1: Maps and Site Plans

Location Map, WQMP Site Plan and Receiving Waters Map

Vicinity Map



Conceptual Site Plan

Figure 5.5-7: Evans Park Recommendation Option A





CVALDO CORPORATION
CIVIL ENGINEERING
2255 AVENIDA DE LA PLAYA, SUITE 5
LA JOLLA, CA 92037
(P) 858-866-0128

N

0 100' 200'

1 INCH = 50 FT

Note: Drawing will plot to scale if plotted on arch. E sheet

EVANS COMMUNITY PARK
WQMP SITE PLAN

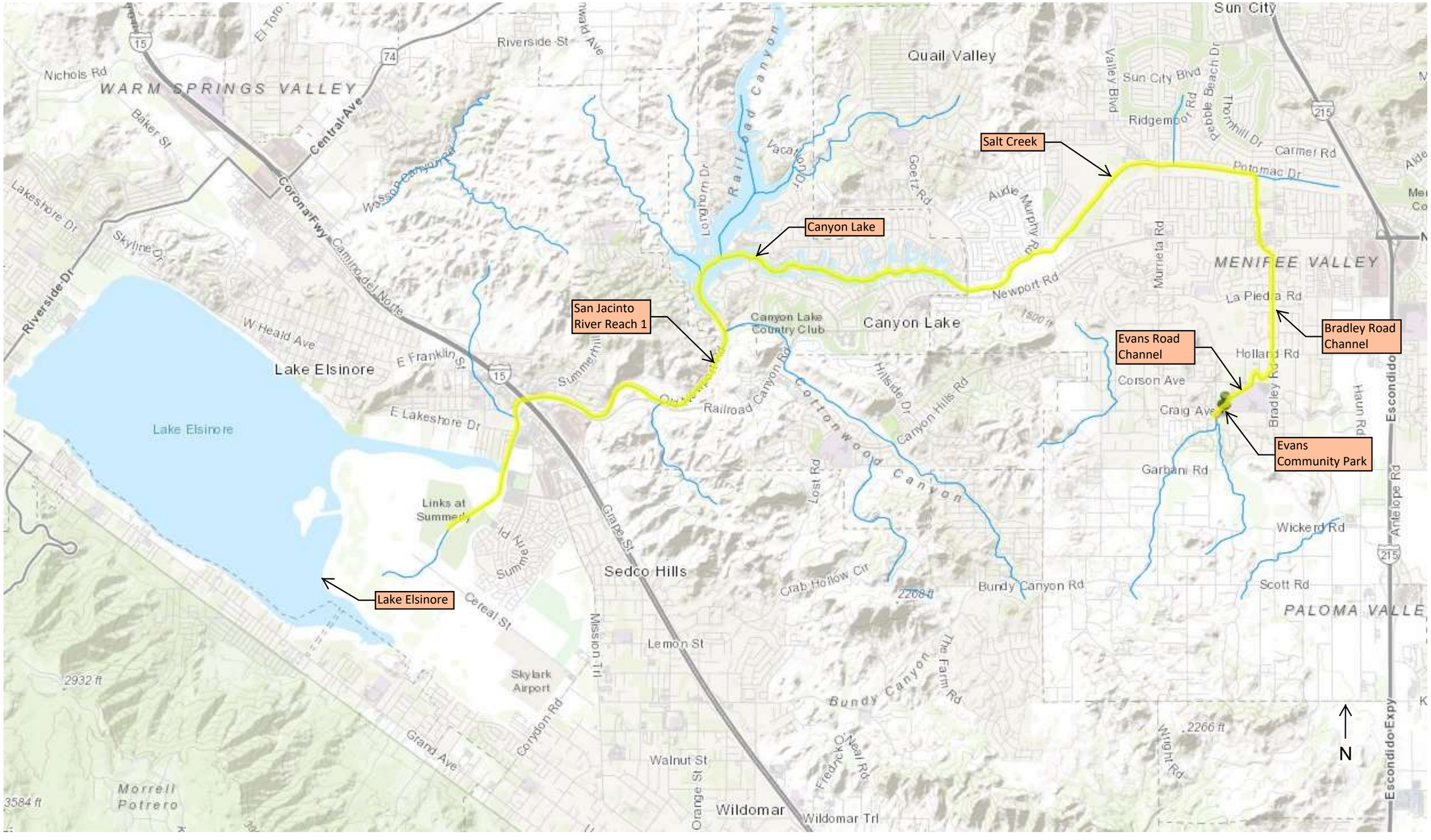
LEGEND

DRAINAGE MANAGEMENT AREA — DMA 1

RUNOFF FLOW PATH

WATERSHED BOUNDARY

Receiving Waters Map



Appendix 2: Construction Plans

Grading and Drainage Plans

Construction drawings will be provided with the Final WQMP.

Appendix 3: Soils Information

Geotechnical Study and Other Infiltration Testing Data

Geotechnical Report to be provided with Final WQMP.

Appendix 4: Historical Site Conditions

Phase I Environmental Site Assessment or Other Information on Past Site Use

No Phase 1 ESA or other historical site use information available.

Appendix 5: LID Infeasibility

LID Technical Infeasibility Analysis

N/A

Appendix 6: BMP Design Details

BMP Sizing, Design Details and other Supporting Documentation

VBMP calculations and Bioretention Basin sizing calculations are preliminary. Final analysis will be done with the Final WQMP and will be based on the final design of the park and associated BMPs.

R 07 W | R 06 W | R 05 W | R 04 W | R 03 W | R 02 W | R 01 W | R 01 E | R 02 E | R 03 E | R 04 E | R 05 E

T 01 S
T 02 S
T 03 S
T 04 S
T 05 S
T 06 S
T 07 S
T 08 S

06	05	04	03	02	01
07	08	09	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

0.85 MiraLoma
0.61 RiversideNorth
0.54 RiversideSouth
0.88 PradoDam
0.50 LakeMathews
0.51 Woodcrest
0.68 PigeonPass
0.66 MorenoEast
0.68 PerrisReservoir
0.85 Beaumont
0.70 SanJacintoNWS
0.87 VistaGrandeGS
1.18 Idyllwild
0.90 HurkeyCreek
0.65 Anza
0.58 SunCity
0.68 Winchester
0.70 ElsinoreNWS
1.11 ElCarisoStation
0.77 WildomarLaCresta
0.52 SkinnerLake
0.77 SantaRosaPlateau
1.00 TemeculaNWS
0.64 AguangaValley

Project Location

Santa Ana River Watershed
Santa Margarita Watershed

JURUPA VALLEY | EASTVALE | NORCO | CORONA | RIVERSIDE | MORENO VALLEY | CALIMESA | BEAUMONT | SAN JACINTO | PERRIS | CANYON LAKE | LAKE ELSINORE | MENIFEE | HEMET | WILDOMAR | MURRIETA | TEMECULA

N

Rain Gage Locations

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

Isohyetal Map for the 85th Percentile 24 hour Storm Event

July 2011

Santa Ana Watershed - BMP Design Volume, V_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	Cvaldo Corporation	Date	11/5/2021
Designed by	Mikayla Lopez	Case No	
Company Project Number/Name	Evans Community Park (Northerly Portion of Site)		

BMP Identification

BMP NAME / ID: Basin 1

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85} = 0.59 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
DMA 1	*45643*	*Concrete or Asphalt*	*1*	*0.89*	*40713.6*			
	182573	*Natural (C Soil)*	*0.3*	*0.23*	*41109.2*			

Santa Ana Watershed - BMP Design Volume, V_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	Cvaldo Corporation	Date	11/5/2021
Designed by	Mikayla Lopez	Case No	
Company Project Number/Name	Evans Community Park (Central Portion of Site)		

BMP Identification

BMP NAME / ID: Basin 2

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85} = 0.59 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
DMA 2	*199740.5*	*Concrete or Asphalt*	*1*	*0.89*	*178168.5*			
	199740.5	*Natural (C Soil)*	*0.3*	*0.23*	*44974.8*			

Santa Ana Watershed - BMP Design Volume, V_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	Cvaldo Corporation	Date	11/5/2021
Designed by	Mikayla Lopez	Case No	
Company Project Number/Name	Evans Community Park (Southerly Portion of Site)		

BMP Identification

BMP NAME / ID: Basin 3

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85} = 0.59 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
DMA 3	*44834*	*Concrete or Asphalt*	*1*	*0.89*	*39991.9*			
	119556	*Natural (C Soil)*	*0.3*	*0.23*	*26919.9*			
	59778	*Natural (D Soil)*	*0.4*	*0.28*	*16720.6*			
	224168		***Total***		**83632.4**	**0.59**	***4111.9***	***4,111.90***

Notes:

Appendix 7: Hydromodification

Supporting Detail Relating to Hydrologic Conditions of Concern



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N

0 100' 200'

1 INCH = 50 FT

Note: Drawing will plot to scale if plotted on arch. E sheet

EVANS COMMUNITY PARK
UNIT HYDROGRAPH HYDROLOGY WORKMAP

LEGEND

SUBAREA ACREAGE	(76.4 AC)
WATERSHED CENTROID	◓
NODE NUMBER	[200]
RUNOFF FLOW PATH	- - - -
WATERSHED BOUNDARY	———

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2008, Version 8.1
Study date 11/05/21 File: northexA2242.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 4011

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Evans Community Park 2-year, 24-hour Storm Event
Existing Condition (Northerly Portion of Site)
Job 21-003
11/5/21

Drainage Area = 5.24(Ac.) = 0.008 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 5.24(Ac.) = 0.008 Sq. Mi.
Length along longest watercourse = 828.00(Ft.)
Length along longest watercourse measured to centroid = 472.00(Ft.)
Length along longest watercourse = 0.157 Mi.
Length along longest watercourse measured to centroid = 0.089 Mi.
Difference in elevation = 7.00(Ft.)
Slope along watercourse = 44.6377 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.069 Hr.
Lag time = 4.15 Min.
25% of lag time = 1.04 Min.
40% of lag time = 1.66 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.24	1.90	9.96

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]

5.24 5.00 26.20

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 1.900(In)
Area Averaged 100-Year Rainfall = 5.000(In)

Point rain (area averaged) = 1.900(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.900(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.240	88.00	0.000

Total Area Entered = 5.24(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
88.0	88.0	0.153	0.000	0.153	1.000	0.153
					Sum (F) =	0.153

Area averaged mean soil loss (F) (In/Hr) = 0.153
Minimum soil loss rate ((In/Hr)) = 0.076
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	120.554	25.359	1.339
2	0.167	241.108	48.702	2.572
3	0.250	361.662	13.261	0.700
4	0.333	482.216	5.999	0.317
5	0.417	602.770	3.358	0.177
6	0.500	723.324	1.915	0.101
7	0.583	843.878	1.407	0.074
		Sum =	100.000 Sum=	5.281

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.015	(0.271)	0.014	0.002
2	0.17	0.07	0.015	(0.270)	0.014	0.002
3	0.25	0.07	0.015	(0.269)	0.014	0.002
4	0.33	0.10	0.023	(0.268)	0.021	0.002
5	0.42	0.10	0.023	(0.267)	0.021	0.002
6	0.50	0.10	0.023	(0.266)	0.021	0.002
7	0.58	0.10	0.023	(0.265)	0.021	0.002

8	0.67	0.10	0.023	(0.264)	0.021	0.002
9	0.75	0.10	0.023	(0.263)	0.021	0.002
10	0.83	0.13	0.030	(0.262)	0.027	0.003
11	0.92	0.13	0.030	(0.260)	0.027	0.003
12	1.00	0.13	0.030	(0.259)	0.027	0.003
13	1.08	0.10	0.023	(0.258)	0.021	0.002
14	1.17	0.10	0.023	(0.257)	0.021	0.002
15	1.25	0.10	0.023	(0.256)	0.021	0.002
16	1.33	0.10	0.023	(0.255)	0.021	0.002
17	1.42	0.10	0.023	(0.254)	0.021	0.002
18	1.50	0.10	0.023	(0.253)	0.021	0.002
19	1.58	0.10	0.023	(0.252)	0.021	0.002
20	1.67	0.10	0.023	(0.251)	0.021	0.002
21	1.75	0.10	0.023	(0.250)	0.021	0.002
22	1.83	0.13	0.030	(0.249)	0.027	0.003
23	1.92	0.13	0.030	(0.248)	0.027	0.003
24	2.00	0.13	0.030	(0.247)	0.027	0.003
25	2.08	0.13	0.030	(0.246)	0.027	0.003
26	2.17	0.13	0.030	(0.245)	0.027	0.003
27	2.25	0.13	0.030	(0.244)	0.027	0.003
28	2.33	0.13	0.030	(0.243)	0.027	0.003
29	2.42	0.13	0.030	(0.242)	0.027	0.003
30	2.50	0.13	0.030	(0.241)	0.027	0.003
31	2.58	0.17	0.038	(0.240)	0.034	0.004
32	2.67	0.17	0.038	(0.239)	0.034	0.004
33	2.75	0.17	0.038	(0.238)	0.034	0.004
34	2.83	0.17	0.038	(0.237)	0.034	0.004
35	2.92	0.17	0.038	(0.236)	0.034	0.004
36	3.00	0.17	0.038	(0.235)	0.034	0.004
37	3.08	0.17	0.038	(0.234)	0.034	0.004
38	3.17	0.17	0.038	(0.233)	0.034	0.004
39	3.25	0.17	0.038	(0.233)	0.034	0.004
40	3.33	0.17	0.038	(0.232)	0.034	0.004
41	3.42	0.17	0.038	(0.231)	0.034	0.004
42	3.50	0.17	0.038	(0.230)	0.034	0.004
43	3.58	0.17	0.038	(0.229)	0.034	0.004
44	3.67	0.17	0.038	(0.228)	0.034	0.004
45	3.75	0.17	0.038	(0.227)	0.034	0.004
46	3.83	0.20	0.046	(0.226)	0.041	0.005
47	3.92	0.20	0.046	(0.225)	0.041	0.005
48	4.00	0.20	0.046	(0.224)	0.041	0.005
49	4.08	0.20	0.046	(0.223)	0.041	0.005
50	4.17	0.20	0.046	(0.222)	0.041	0.005
51	4.25	0.20	0.046	(0.221)	0.041	0.005
52	4.33	0.23	0.053	(0.220)	0.048	0.005
53	4.42	0.23	0.053	(0.219)	0.048	0.005
54	4.50	0.23	0.053	(0.218)	0.048	0.005
55	4.58	0.23	0.053	(0.217)	0.048	0.005
56	4.67	0.23	0.053	(0.216)	0.048	0.005
57	4.75	0.23	0.053	(0.215)	0.048	0.005
58	4.83	0.27	0.061	(0.214)	0.055	0.006
59	4.92	0.27	0.061	(0.214)	0.055	0.006
60	5.00	0.27	0.061	(0.213)	0.055	0.006
61	5.08	0.20	0.046	(0.212)	0.041	0.005
62	5.17	0.20	0.046	(0.211)	0.041	0.005
63	5.25	0.20	0.046	(0.210)	0.041	0.005
64	5.33	0.23	0.053	(0.209)	0.048	0.005

65	5.42	0.23	0.053	(0.208)	0.048	0.005
66	5.50	0.23	0.053	(0.207)	0.048	0.005
67	5.58	0.27	0.061	(0.206)	0.055	0.006
68	5.67	0.27	0.061	(0.205)	0.055	0.006
69	5.75	0.27	0.061	(0.204)	0.055	0.006
70	5.83	0.27	0.061	(0.203)	0.055	0.006
71	5.92	0.27	0.061	(0.203)	0.055	0.006
72	6.00	0.27	0.061	(0.202)	0.055	0.006
73	6.08	0.30	0.068	(0.201)	0.062	0.007
74	6.17	0.30	0.068	(0.200)	0.062	0.007
75	6.25	0.30	0.068	(0.199)	0.062	0.007
76	6.33	0.30	0.068	(0.198)	0.062	0.007
77	6.42	0.30	0.068	(0.197)	0.062	0.007
78	6.50	0.30	0.068	(0.196)	0.062	0.007
79	6.58	0.33	0.076	(0.195)	0.068	0.008
80	6.67	0.33	0.076	(0.195)	0.068	0.008
81	6.75	0.33	0.076	(0.194)	0.068	0.008
82	6.83	0.33	0.076	(0.193)	0.068	0.008
83	6.92	0.33	0.076	(0.192)	0.068	0.008
84	7.00	0.33	0.076	(0.191)	0.068	0.008
85	7.08	0.33	0.076	(0.190)	0.068	0.008
86	7.17	0.33	0.076	(0.189)	0.068	0.008
87	7.25	0.33	0.076	(0.188)	0.068	0.008
88	7.33	0.37	0.084	(0.188)	0.075	0.008
89	7.42	0.37	0.084	(0.187)	0.075	0.008
90	7.50	0.37	0.084	(0.186)	0.075	0.008
91	7.58	0.40	0.091	(0.185)	0.082	0.009
92	7.67	0.40	0.091	(0.184)	0.082	0.009
93	7.75	0.40	0.091	(0.183)	0.082	0.009
94	7.83	0.43	0.099	(0.183)	0.089	0.010
95	7.92	0.43	0.099	(0.182)	0.089	0.010
96	8.00	0.43	0.099	(0.181)	0.089	0.010
97	8.08	0.50	0.114	(0.180)	0.103	0.011
98	8.17	0.50	0.114	(0.179)	0.103	0.011
99	8.25	0.50	0.114	(0.178)	0.103	0.011
100	8.33	0.50	0.114	(0.177)	0.103	0.011
101	8.42	0.50	0.114	(0.177)	0.103	0.011
102	8.50	0.50	0.114	(0.176)	0.103	0.011
103	8.58	0.53	0.122	(0.175)	0.109	0.012
104	8.67	0.53	0.122	(0.174)	0.109	0.012
105	8.75	0.53	0.122	(0.173)	0.109	0.012
106	8.83	0.57	0.129	(0.173)	0.116	0.013
107	8.92	0.57	0.129	(0.172)	0.116	0.013
108	9.00	0.57	0.129	(0.171)	0.116	0.013
109	9.08	0.63	0.144	(0.170)	0.130	0.014
110	9.17	0.63	0.144	(0.169)	0.130	0.014
111	9.25	0.63	0.144	(0.168)	0.130	0.014
112	9.33	0.67	0.152	(0.168)	0.137	0.015
113	9.42	0.67	0.152	(0.167)	0.137	0.015
114	9.50	0.67	0.152	(0.166)	0.137	0.015
115	9.58	0.70	0.160	(0.165)	0.144	0.016
116	9.67	0.70	0.160	(0.165)	0.144	0.016
117	9.75	0.70	0.160	(0.164)	0.144	0.016
118	9.83	0.73	0.167	(0.163)	0.150	0.017
119	9.92	0.73	0.167	(0.162)	0.150	0.017
120	10.00	0.73	0.167	(0.161)	0.150	0.017
121	10.08	0.50	0.114	(0.161)	0.103	0.011

122	10.17	0.50	0.114	(0.160)	0.103	0.011
123	10.25	0.50	0.114	(0.159)	0.103	0.011
124	10.33	0.50	0.114	(0.158)	0.103	0.011
125	10.42	0.50	0.114	(0.157)	0.103	0.011
126	10.50	0.50	0.114	(0.157)	0.103	0.011
127	10.58	0.67	0.152	(0.156)	0.137	0.015
128	10.67	0.67	0.152	(0.155)	0.137	0.015
129	10.75	0.67	0.152	(0.154)	0.137	0.015
130	10.83	0.67	0.152	(0.154)	0.137	0.015
131	10.92	0.67	0.152	(0.153)	0.137	0.015
132	11.00	0.67	0.152	(0.152)	0.137	0.015
133	11.08	0.63	0.144	(0.151)	0.130	0.014
134	11.17	0.63	0.144	(0.151)	0.130	0.014
135	11.25	0.63	0.144	(0.150)	0.130	0.014
136	11.33	0.63	0.144	(0.149)	0.130	0.014
137	11.42	0.63	0.144	(0.148)	0.130	0.014
138	11.50	0.63	0.144	(0.148)	0.130	0.014
139	11.58	0.57	0.129	(0.147)	0.116	0.013
140	11.67	0.57	0.129	(0.146)	0.116	0.013
141	11.75	0.57	0.129	(0.146)	0.116	0.013
142	11.83	0.60	0.137	(0.145)	0.123	0.014
143	11.92	0.60	0.137	(0.144)	0.123	0.014
144	12.00	0.60	0.137	(0.143)	0.123	0.014
145	12.08	0.83	0.190	0.143	(0.171)	0.047
146	12.17	0.83	0.190	0.142	(0.171)	0.048
147	12.25	0.83	0.190	0.141	(0.171)	0.049
148	12.33	0.87	0.198	0.141	(0.178)	0.057
149	12.42	0.87	0.198	0.140	(0.178)	0.058
150	12.50	0.87	0.198	0.139	(0.178)	0.059
151	12.58	0.93	0.213	0.138	(0.192)	0.074
152	12.67	0.93	0.213	0.138	(0.192)	0.075
153	12.75	0.93	0.213	0.137	(0.192)	0.076
154	12.83	0.97	0.220	0.136	(0.198)	0.084
155	12.92	0.97	0.220	0.136	(0.198)	0.085
156	13.00	0.97	0.220	0.135	(0.198)	0.085
157	13.08	1.13	0.258	0.134	(0.233)	0.124
158	13.17	1.13	0.258	0.134	(0.233)	0.125
159	13.25	1.13	0.258	0.133	(0.233)	0.126
160	13.33	1.13	0.258	0.132	(0.233)	0.126
161	13.42	1.13	0.258	0.132	(0.233)	0.127
162	13.50	1.13	0.258	0.131	(0.233)	0.128
163	13.58	0.77	0.175	0.130	(0.157)	0.045
164	13.67	0.77	0.175	0.130	(0.157)	0.045
165	13.75	0.77	0.175	0.129	(0.157)	0.046
166	13.83	0.77	0.175	0.128	(0.157)	0.047
167	13.92	0.77	0.175	0.128	(0.157)	0.047
168	14.00	0.77	0.175	0.127	(0.157)	0.048
169	14.08	0.90	0.205	0.126	(0.185)	0.079
170	14.17	0.90	0.205	0.126	(0.185)	0.080
171	14.25	0.90	0.205	0.125	(0.185)	0.080
172	14.33	0.87	0.198	0.124	(0.178)	0.073
173	14.42	0.87	0.198	0.124	(0.178)	0.074
174	14.50	0.87	0.198	0.123	(0.178)	0.075
175	14.58	0.87	0.198	0.122	(0.178)	0.075
176	14.67	0.87	0.198	0.122	(0.178)	0.076
177	14.75	0.87	0.198	0.121	(0.178)	0.076
178	14.83	0.83	0.190	0.121	(0.171)	0.069

179	14.92	0.83	0.190	0.120	(0.171)	0.070
180	15.00	0.83	0.190	0.119	(0.171)	0.071
181	15.08	0.80	0.182	0.119	(0.164)	0.064
182	15.17	0.80	0.182	0.118	(0.164)	0.064
183	15.25	0.80	0.182	0.118	(0.164)	0.065
184	15.33	0.77	0.175	0.117	(0.157)	0.058
185	15.42	0.77	0.175	0.116	(0.157)	0.058
186	15.50	0.77	0.175	0.116	(0.157)	0.059
187	15.58	0.63	0.144	0.115	(0.130)	0.029
188	15.67	0.63	0.144	0.115	(0.130)	0.030
189	15.75	0.63	0.144	0.114	(0.130)	0.030
190	15.83	0.63	0.144	0.113	(0.130)	0.031
191	15.92	0.63	0.144	0.113	(0.130)	0.032
192	16.00	0.63	0.144	0.112	(0.130)	0.032
193	16.08	0.13	0.030	(0.112)	0.027	0.003
194	16.17	0.13	0.030	(0.111)	0.027	0.003
195	16.25	0.13	0.030	(0.110)	0.027	0.003
196	16.33	0.13	0.030	(0.110)	0.027	0.003
197	16.42	0.13	0.030	(0.109)	0.027	0.003
198	16.50	0.13	0.030	(0.109)	0.027	0.003
199	16.58	0.10	0.023	(0.108)	0.021	0.002
200	16.67	0.10	0.023	(0.108)	0.021	0.002
201	16.75	0.10	0.023	(0.107)	0.021	0.002
202	16.83	0.10	0.023	(0.107)	0.021	0.002
203	16.92	0.10	0.023	(0.106)	0.021	0.002
204	17.00	0.10	0.023	(0.106)	0.021	0.002
205	17.08	0.17	0.038	(0.105)	0.034	0.004
206	17.17	0.17	0.038	(0.104)	0.034	0.004
207	17.25	0.17	0.038	(0.104)	0.034	0.004
208	17.33	0.17	0.038	(0.103)	0.034	0.004
209	17.42	0.17	0.038	(0.103)	0.034	0.004
210	17.50	0.17	0.038	(0.102)	0.034	0.004
211	17.58	0.17	0.038	(0.102)	0.034	0.004
212	17.67	0.17	0.038	(0.101)	0.034	0.004
213	17.75	0.17	0.038	(0.101)	0.034	0.004
214	17.83	0.13	0.030	(0.100)	0.027	0.003
215	17.92	0.13	0.030	(0.100)	0.027	0.003
216	18.00	0.13	0.030	(0.099)	0.027	0.003
217	18.08	0.13	0.030	(0.099)	0.027	0.003
218	18.17	0.13	0.030	(0.098)	0.027	0.003
219	18.25	0.13	0.030	(0.098)	0.027	0.003
220	18.33	0.13	0.030	(0.097)	0.027	0.003
221	18.42	0.13	0.030	(0.097)	0.027	0.003
222	18.50	0.13	0.030	(0.097)	0.027	0.003
223	18.58	0.10	0.023	(0.096)	0.021	0.002
224	18.67	0.10	0.023	(0.096)	0.021	0.002
225	18.75	0.10	0.023	(0.095)	0.021	0.002
226	18.83	0.07	0.015	(0.095)	0.014	0.002
227	18.92	0.07	0.015	(0.094)	0.014	0.002
228	19.00	0.07	0.015	(0.094)	0.014	0.002
229	19.08	0.10	0.023	(0.093)	0.021	0.002
230	19.17	0.10	0.023	(0.093)	0.021	0.002
231	19.25	0.10	0.023	(0.092)	0.021	0.002
232	19.33	0.13	0.030	(0.092)	0.027	0.003
233	19.42	0.13	0.030	(0.092)	0.027	0.003
234	19.50	0.13	0.030	(0.091)	0.027	0.003
235	19.58	0.10	0.023	(0.091)	0.021	0.002

236	19.67	0.10	0.023	(0.090)	0.021	0.002
237	19.75	0.10	0.023	(0.090)	0.021	0.002
238	19.83	0.07	0.015	(0.090)	0.014	0.002
239	19.92	0.07	0.015	(0.089)	0.014	0.002
240	20.00	0.07	0.015	(0.089)	0.014	0.002
241	20.08	0.10	0.023	(0.088)	0.021	0.002
242	20.17	0.10	0.023	(0.088)	0.021	0.002
243	20.25	0.10	0.023	(0.088)	0.021	0.002
244	20.33	0.10	0.023	(0.087)	0.021	0.002
245	20.42	0.10	0.023	(0.087)	0.021	0.002
246	20.50	0.10	0.023	(0.086)	0.021	0.002
247	20.58	0.10	0.023	(0.086)	0.021	0.002
248	20.67	0.10	0.023	(0.086)	0.021	0.002
249	20.75	0.10	0.023	(0.085)	0.021	0.002
250	20.83	0.07	0.015	(0.085)	0.014	0.002
251	20.92	0.07	0.015	(0.085)	0.014	0.002
252	21.00	0.07	0.015	(0.084)	0.014	0.002
253	21.08	0.10	0.023	(0.084)	0.021	0.002
254	21.17	0.10	0.023	(0.084)	0.021	0.002
255	21.25	0.10	0.023	(0.083)	0.021	0.002
256	21.33	0.07	0.015	(0.083)	0.014	0.002
257	21.42	0.07	0.015	(0.083)	0.014	0.002
258	21.50	0.07	0.015	(0.082)	0.014	0.002
259	21.58	0.10	0.023	(0.082)	0.021	0.002
260	21.67	0.10	0.023	(0.082)	0.021	0.002
261	21.75	0.10	0.023	(0.082)	0.021	0.002
262	21.83	0.07	0.015	(0.081)	0.014	0.002
263	21.92	0.07	0.015	(0.081)	0.014	0.002
264	22.00	0.07	0.015	(0.081)	0.014	0.002
265	22.08	0.10	0.023	(0.080)	0.021	0.002
266	22.17	0.10	0.023	(0.080)	0.021	0.002
267	22.25	0.10	0.023	(0.080)	0.021	0.002
268	22.33	0.07	0.015	(0.080)	0.014	0.002
269	22.42	0.07	0.015	(0.079)	0.014	0.002
270	22.50	0.07	0.015	(0.079)	0.014	0.002
271	22.58	0.07	0.015	(0.079)	0.014	0.002
272	22.67	0.07	0.015	(0.079)	0.014	0.002
273	22.75	0.07	0.015	(0.079)	0.014	0.002
274	22.83	0.07	0.015	(0.078)	0.014	0.002
275	22.92	0.07	0.015	(0.078)	0.014	0.002
276	23.00	0.07	0.015	(0.078)	0.014	0.002
277	23.08	0.07	0.015	(0.078)	0.014	0.002
278	23.17	0.07	0.015	(0.078)	0.014	0.002
279	23.25	0.07	0.015	(0.077)	0.014	0.002
280	23.33	0.07	0.015	(0.077)	0.014	0.002
281	23.42	0.07	0.015	(0.077)	0.014	0.002
282	23.50	0.07	0.015	(0.077)	0.014	0.002
283	23.58	0.07	0.015	(0.077)	0.014	0.002
284	23.67	0.07	0.015	(0.077)	0.014	0.002
285	23.75	0.07	0.015	(0.077)	0.014	0.002
286	23.83	0.07	0.015	(0.077)	0.014	0.002
287	23.92	0.07	0.015	(0.076)	0.014	0.002
288	24.00	0.07	0.015	(0.076)	0.014	0.002

(Loss Rate Not Used)

Sum = 100.0 Sum = 4.6

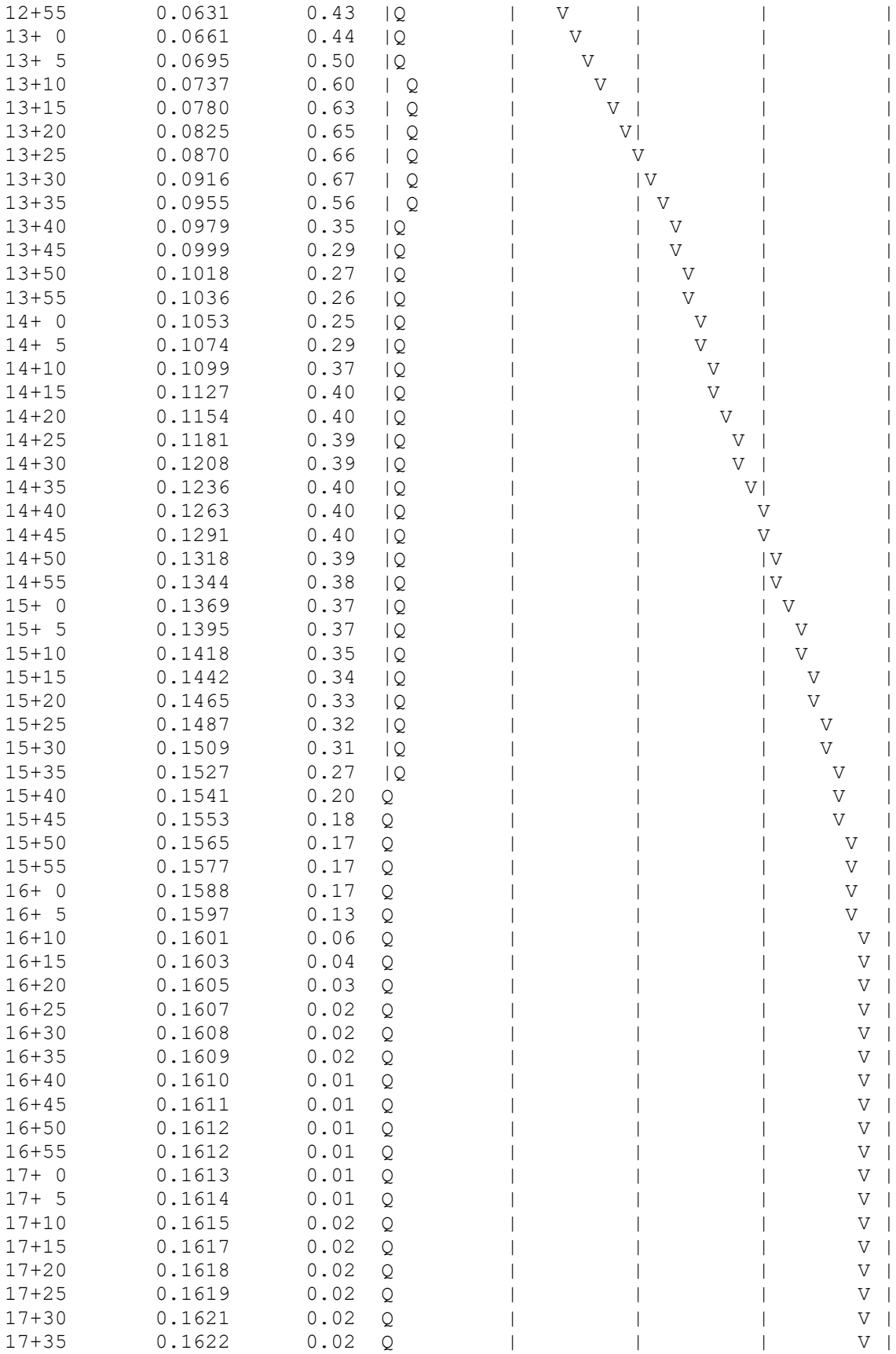
Flood volume = Effective rainfall 0.39(In)
times area 5.2(Ac.)/[(In)/(Ft.)] = 0.2(Ac.Ft)

```
    Total soil loss =      1.51(In)
    Total soil loss =     0.661(Ac.Ft)
    Total rainfall =      1.90(In)
    Flood volume =        7328.1 Cubic Feet
    Total soil loss =       28811.8 Cubic Feet
    ---------------------------------------------------------------------
     Peak flow rate of this hydrograph =      0.667(CFS)
    ---------------------------------------------------------------------
    +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                        24 - H O U R    S T O R M
                    R u n o f f      H y d r o g r a p h
    ---------------------------------------------------------------------
                Hydrograph in   5   Minute intervals ((CFS))

    ---------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0        2.5       5.0       7.5      10.0
---------------------------------------------------------------------------
  0+ 5       0.0000      0.00  Q         |         |         |         |
  0+10       0.0001      0.01  Q         |         |         |         |
  0+15       0.0001      0.01  Q         |         |         |         |
  0+20       0.0002      0.01  Q         |         |         |         |
  0+25       0.0002      0.01  Q         |         |         |         |
  0+30       0.0003      0.01  Q         |         |         |         |
  0+35       0.0004      0.01  Q         |         |         |         |
  0+40       0.0005      0.01  Q         |         |         |         |
  0+45       0.0006      0.01  Q         |         |         |         |
  0+50       0.0007      0.01  Q         |         |         |         |
  0+55       0.0008      0.02  Q         |         |         |         |
  1+ 0       0.0009      0.02  Q         |         |         |         |
  1+ 5       0.0010      0.01  Q         |         |         |         |
  1+10       0.0011      0.01  Q         |         |         |         |
  1+15       0.0011      0.01  Q         |         |         |         |
  1+20       0.0012      0.01  Q         |         |         |         |
  1+25       0.0013      0.01  Q         |         |         |         |
  1+30       0.0014      0.01  Q         |         |         |         |
  1+35       0.0015      0.01  Q         |         |         |         |
  1+40       0.0016      0.01  Q         |         |         |         |
  1+45       0.0016      0.01  Q         |         |         |         |
  1+50       0.0017      0.01  Q         |         |         |         |
  1+55       0.0018      0.02  Q         |         |         |         |
  2+ 0       0.0019      0.02  Q         |         |         |         |
  2+ 5       0.0020      0.02  Q         |         |         |         |
  2+10       0.0022      0.02  Q         |         |         |         |
  2+15       0.0023      0.02  Q         |         |         |         |
  2+20       0.0024      0.02  Q         |         |         |         |
  2+25       0.0025      0.02  Q         |         |         |         |
  2+30       0.0026      0.02  Q         |         |         |         |
  2+35       0.0027      0.02  Q         |         |         |         |
  2+40       0.0028      0.02  Q         |         |         |         |
  2+45       0.0030      0.02  Q         |         |         |         |
  2+50       0.0031      0.02  Q         |         |         |         |
  2+55       0.0033      0.02  Q         |         |         |         |
  3+ 0       0.0034      0.02  Q         |         |         |         |
  3+ 5       0.0035      0.02  Q         |         |         |         |
  3+10       0.0037      0.02  Q         |         |         |         |
  3+15       0.0038      0.02  Q         |         |         |         |
  3+20       0.0039      0.02  Q         |         |         |         |
```

3+25	0.0041	0.02	Q				
3+30	0.0042	0.02	QV				
3+35	0.0044	0.02	QV				
3+40	0.0045	0.02	QV				
3+45	0.0046	0.02	QV				
3+50	0.0048	0.02	QV				
3+55	0.0049	0.02	QV				
4+ 0	0.0051	0.02	QV				
4+ 5	0.0053	0.02	QV				
4+10	0.0054	0.02	QV				
4+15	0.0056	0.02	QV				
4+20	0.0058	0.03	QV				
4+25	0.0060	0.03	QV				
4+30	0.0062	0.03	QV				
4+35	0.0063	0.03	QV				
4+40	0.0065	0.03	QV				
4+45	0.0067	0.03	QV				
4+50	0.0069	0.03	QV				
4+55	0.0071	0.03	QV				
5+ 0	0.0074	0.03	QV				
5+ 5	0.0076	0.03	QV				
5+10	0.0077	0.03	QV				
5+15	0.0079	0.03	QV				
5+20	0.0081	0.03	QV				
5+25	0.0083	0.03	QV				
5+30	0.0085	0.03	Q V				
5+35	0.0087	0.03	Q V				
5+40	0.0089	0.03	Q V				
5+45	0.0091	0.03	Q V				
5+50	0.0093	0.03	Q V				
5+55	0.0095	0.03	Q V				
6+ 0	0.0098	0.03	Q V				
6+ 5	0.0100	0.03	Q V				
6+10	0.0102	0.04	Q V				
6+15	0.0105	0.04	Q V				
6+20	0.0107	0.04	Q V				
6+25	0.0110	0.04	Q V				
6+30	0.0112	0.04	Q V				
6+35	0.0115	0.04	Q V				
6+40	0.0117	0.04	Q V				
6+45	0.0120	0.04	Q V				
6+50	0.0123	0.04	Q V				
6+55	0.0126	0.04	Q V				
7+ 0	0.0128	0.04	Q V				
7+ 5	0.0131	0.04	Q V				
7+10	0.0134	0.04	Q V				
7+15	0.0137	0.04	Q V				
7+20	0.0140	0.04	Q V				
7+25	0.0143	0.04	Q V				
7+30	0.0146	0.04	Q V				
7+35	0.0149	0.04	Q V				
7+40	0.0152	0.05	Q V				
7+45	0.0155	0.05	Q V				
7+50	0.0159	0.05	Q V				
7+55	0.0162	0.05	Q V				
8+ 0	0.0166	0.05	Q V				
8+ 5	0.0169	0.05	Q V				

8+10	0.0173	0.06	Q	V	|	|	|	|
8+15	0.0177	0.06	Q	V	|	|	|	|
8+20	0.0182	0.06	Q	V	|	|	|	|
8+25	0.0186	0.06	Q	V	|	|	|	|
8+30	0.0190	0.06	Q	V	|	|	|	|
8+35	0.0194	0.06	Q	V	|	|	|	|
8+40	0.0198	0.06	Q	V	|	|	|	|
8+45	0.0203	0.06	Q	V	|	|	|	|
8+50	0.0207	0.06	Q	V	|	|	|	|
8+55	0.0212	0.07	Q	V	|	|	|	|
9+ 0	0.0217	0.07	Q	V	|	|	|	|
9+ 5	0.0221	0.07	Q	V	|	|	|	|
9+10	0.0226	0.07	Q	V	|	|	|	|
9+15	0.0232	0.08	Q	V	|	|	|	|
9+20	0.0237	0.08	Q	V	|	|	|	|
9+25	0.0242	0.08	Q	V	|	|	|	|
9+30	0.0248	0.08	Q	V	|	|	|	|
9+35	0.0253	0.08	Q	V	|	|	|	|
9+40	0.0259	0.08	Q	V	|	|	|	|
9+45	0.0265	0.08	Q	V	|	|	|	|
9+50	0.0271	0.09	Q	V	|	|	|	|
9+55	0.0277	0.09	Q	V	|	|	|	|
10+ 0	0.0283	0.09	Q	V	|	|	|	|
10+ 5	0.0288	0.08	Q	V	|	|	|	|
10+10	0.0293	0.07	Q	V	|	|	|	|
10+15	0.0297	0.06	Q	V	|	|	|	|
10+20	0.0302	0.06	Q	V	|	|	|	|
10+25	0.0306	0.06	Q	V	|	|	|	|
10+30	0.0310	0.06	Q	V	|	|	|	|
10+35	0.0315	0.07	Q	V	|	|	|	|
10+40	0.0320	0.08	Q	V	|	|	|	|
10+45	0.0325	0.08	Q	V	|	|	|	|
10+50	0.0331	0.08	Q	V	|	|	|	|
10+55	0.0336	0.08	Q	V	|	|	|	|
11+ 0	0.0342	0.08	Q	V	|	|	|	|
11+ 5	0.0347	0.08	Q	V	|	|	|	|
11+10	0.0352	0.08	Q	V	|	|	|	|
11+15	0.0358	0.08	Q	V	|	|	|	|
11+20	0.0363	0.08	Q	V	|	|	|	|
11+25	0.0368	0.08	Q	V	|	|	|	|
11+30	0.0373	0.08	Q	V	|	|	|	|
11+35	0.0379	0.07	Q	V	|	|	|	|
11+40	0.0383	0.07	Q	V	|	|	|	|
11+45	0.0388	0.07	Q	V	|	|	|	|
11+50	0.0393	0.07	Q	V	|	|	|	|
11+55	0.0398	0.07	Q	V	|	|	|	|
12+ 0	0.0403	0.07	Q	V	|	|	|	|
12+ 5	0.0411	0.12	Q	V	|	|	|	|
12+10	0.0425	0.20	Q	V	|	|	|	|
12+15	0.0441	0.23	Q	V	|	|	|	|
12+20	0.0459	0.26	|Q	V	|	|	|	|
12+25	0.0478	0.28	|Q	|V	|	|	|	|
12+30	0.0499	0.30	|Q	|V	|	|	|	|
12+35	0.0521	0.33	|Q	| V	|	|	|	|
12+40	0.0547	0.37	|Q	| V	|	|	|	|
12+45	0.0573	0.39	|Q	| V	|	|	|	|
12+50	0.0601	0.40	|Q	| V	|	|	|	|



17+40	0.1624	0.02	Q	|	|	|	V |
17+45	0.1625	0.02	Q	|	|	|	V |
17+50	0.1626	0.02	Q	|	|	|	V |
17+55	0.1627	0.02	Q	|	|	|	V |
18+ 0	0.1629	0.02	Q	|	|	|	V |
18+ 5	0.1630	0.02	Q	|	|	|	V |
18+10	0.1631	0.02	Q	|	|	|	V |
18+15	0.1632	0.02	Q	|	|	|	V |
18+20	0.1633	0.02	Q	|	|	|	V |
18+25	0.1634	0.02	Q	|	|	|	V |
18+30	0.1635	0.02	Q	|	|	|	V |
18+35	0.1636	0.02	Q	|	|	|	V |
18+40	0.1637	0.01	Q	|	|	|	V |
18+45	0.1638	0.01	Q	|	|	|	V |
18+50	0.1639	0.01	Q	|	|	|	V |
18+55	0.1640	0.01	Q	|	|	|	V |
19+ 0	0.1640	0.01	Q	|	|	|	V |
19+ 5	0.1641	0.01	Q	|	|	|	V|
19+10	0.1642	0.01	Q	|	|	|	V|
19+15	0.1642	0.01	Q	|	|	|	V|
19+20	0.1643	0.01	Q	|	|	|	V|
19+25	0.1644	0.01	Q	|	|	|	V|
19+30	0.1645	0.02	Q	|	|	|	V|
19+35	0.1646	0.01	Q	|	|	|	V|
19+40	0.1647	0.01	Q	|	|	|	V|
19+45	0.1648	0.01	Q	|	|	|	V|
19+50	0.1649	0.01	Q	|	|	|	V|
19+55	0.1649	0.01	Q	|	|	|	V|
20+ 0	0.1650	0.01	Q	|	|	|	V|
20+ 5	0.1651	0.01	Q	|	|	|	V|
20+10	0.1651	0.01	Q	|	|	|	V|
20+15	0.1652	0.01	Q	|	|	|	V|
20+20	0.1653	0.01	Q	|	|	|	V|
20+25	0.1654	0.01	Q	|	|	|	V|
20+30	0.1655	0.01	Q	|	|	|	V|
20+35	0.1656	0.01	Q	|	|	|	V|
20+40	0.1656	0.01	Q	|	|	|	V|
20+45	0.1657	0.01	Q	|	|	|	V|
20+50	0.1658	0.01	Q	|	|	|	V|
20+55	0.1659	0.01	Q	|	|	|	V|
21+ 0	0.1659	0.01	Q	|	|	|	V|
21+ 5	0.1660	0.01	Q	|	|	|	V|
21+10	0.1661	0.01	Q	|	|	|	V|
21+15	0.1661	0.01	Q	|	|	|	V|
21+20	0.1662	0.01	Q	|	|	|	V|
21+25	0.1663	0.01	Q	|	|	|	V|
21+30	0.1663	0.01	Q	|	|	|	V|
21+35	0.1664	0.01	Q	|	|	|	V|
21+40	0.1665	0.01	Q	|	|	|	V|
21+45	0.1666	0.01	Q	|	|	|	V|
21+50	0.1666	0.01	Q	|	|	|	V|
21+55	0.1667	0.01	Q	|	|	|	V|
22+ 0	0.1667	0.01	Q	|	|	|	V|
22+ 5	0.1668	0.01	Q	|	|	|	V|
22+10	0.1669	0.01	Q	|	|	|	V|
22+15	0.1670	0.01	Q	|	|	|	V|
22+20	0.1670	0.01	Q	|	|	|	V|

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  22+25       0.1671      0.01  Q          |          |          |         V|
  22+30       0.1672      0.01  Q          |          |          |         V|
  22+35       0.1672      0.01  Q          |          |          |         V|
  22+40       0.1673      0.01  Q          |          |          |         V|
  22+45       0.1673      0.01  Q          |          |          |         V|
  22+50       0.1674      0.01  Q          |          |          |         V|
  22+55       0.1674      0.01  Q          |          |          |         V|
  23+ 0       0.1675      0.01  Q          |          |          |         V|
  23+ 5       0.1676      0.01  Q          |          |          |         V|
  23+10       0.1676      0.01  Q          |          |          |         V|
  23+15       0.1677      0.01  Q          |          |          |         V|
  23+20       0.1677      0.01  Q          |          |          |         V|
  23+25       0.1678      0.01  Q          |          |          |         V|
  23+30       0.1678      0.01  Q          |          |          |         V|
  23+35       0.1679      0.01  Q          |          |          |         V|
  23+40       0.1679      0.01  Q          |          |          |         V|
  23+45       0.1680      0.01  Q          |          |          |         V|
  23+50       0.1681      0.01  Q          |          |          |         V|
  23+55       0.1681      0.01  Q          |          |          |         V|
  24+ 0       0.1682      0.01  Q          |          |          |         V|
  24+ 5       0.1682      0.01  Q          |          |          |         V|
  24+10       0.1682      0.00  Q          |          |          |         V|
  24+15       0.1682      0.00  Q          |          |          |         V|
  24+20       0.1682      0.00  Q          |          |          |         V|
  24+25       0.1682      0.00  Q          |          |          |         V|
  24+30       0.1682      0.00  Q          |          |          |          V
--------------------------------------------------------------------------
```

U n i t H y d r o g r a p h A n a l y s i s

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Study date 11/05/21 File: northexB2242.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 4011

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Evans Community Park 2-year, 24-hour Storm Event
Existing Condition (Central Portion of Site)
Job 21-003
11/5/21

Drainage Area = 9.17(Ac.) = 0.014 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 9.17(Ac.) = 0.014 Sq. Mi.
Length along longest watercourse = 1368.00(Ft.)
Length along longest watercourse measured to centroid = 749.00(Ft.)
Length along longest watercourse = 0.259 Mi.
Length along longest watercourse measured to centroid = 0.142 Mi.
Difference in elevation = 8.00(Ft.)
Slope along watercourse = 30.8772 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.107 Hr.
Lag time = 6.42 Min.
25% of lag time = 1.60 Min.
40% of lag time = 2.57 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
9.17	1.90	17.42

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]

9.17 5.00 45.85

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 1.900(In)
Area Averaged 100-Year Rainfall = 5.000(In)

Point rain (area averaged) = 1.900(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.900(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
9.170	88.00	0.000

Total Area Entered = 9.17(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
88.0	88.0	0.153	0.000	0.153	1.000	0.153
					Sum (F) =	0.153

Area averaged mean soil loss (F) (In/Hr) = 0.153
Minimum soil loss rate ((In/Hr)) = 0.076
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	77.930	12.727	1.176
2	0.167	155.860	43.672	4.036
3	0.250	233.789	20.548	1.899
4	0.333	311.719	8.386	0.775
5	0.417	389.649	5.047	0.466
6	0.500	467.579	3.224	0.298
7	0.583	545.508	2.287	0.211
8	0.667	623.438	1.616	0.149
9	0.750	701.368	1.100	0.102
10	0.833	779.298	0.797	0.074
11	0.917	857.228	0.597	0.055
		Sum =	100.000 Sum=	9.242

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.015	(0.271)	0.014	0.002
2	0.17	0.07	0.015	(0.270)	0.014	0.002
3	0.25	0.07	0.015	(0.269)	0.014	0.002

4	0.33	0.10	0.023	(0.268)	0.021	0.002
5	0.42	0.10	0.023	(0.267)	0.021	0.002
6	0.50	0.10	0.023	(0.266)	0.021	0.002
7	0.58	0.10	0.023	(0.265)	0.021	0.002
8	0.67	0.10	0.023	(0.264)	0.021	0.002
9	0.75	0.10	0.023	(0.263)	0.021	0.002
10	0.83	0.13	0.030	(0.262)	0.027	0.003
11	0.92	0.13	0.030	(0.260)	0.027	0.003
12	1.00	0.13	0.030	(0.259)	0.027	0.003
13	1.08	0.10	0.023	(0.258)	0.021	0.002
14	1.17	0.10	0.023	(0.257)	0.021	0.002
15	1.25	0.10	0.023	(0.256)	0.021	0.002
16	1.33	0.10	0.023	(0.255)	0.021	0.002
17	1.42	0.10	0.023	(0.254)	0.021	0.002
18	1.50	0.10	0.023	(0.253)	0.021	0.002
19	1.58	0.10	0.023	(0.252)	0.021	0.002
20	1.67	0.10	0.023	(0.251)	0.021	0.002
21	1.75	0.10	0.023	(0.250)	0.021	0.002
22	1.83	0.13	0.030	(0.249)	0.027	0.003
23	1.92	0.13	0.030	(0.248)	0.027	0.003
24	2.00	0.13	0.030	(0.247)	0.027	0.003
25	2.08	0.13	0.030	(0.246)	0.027	0.003
26	2.17	0.13	0.030	(0.245)	0.027	0.003
27	2.25	0.13	0.030	(0.244)	0.027	0.003
28	2.33	0.13	0.030	(0.243)	0.027	0.003
29	2.42	0.13	0.030	(0.242)	0.027	0.003
30	2.50	0.13	0.030	(0.241)	0.027	0.003
31	2.58	0.17	0.038	(0.240)	0.034	0.004
32	2.67	0.17	0.038	(0.239)	0.034	0.004
33	2.75	0.17	0.038	(0.238)	0.034	0.004
34	2.83	0.17	0.038	(0.237)	0.034	0.004
35	2.92	0.17	0.038	(0.236)	0.034	0.004
36	3.00	0.17	0.038	(0.235)	0.034	0.004
37	3.08	0.17	0.038	(0.234)	0.034	0.004
38	3.17	0.17	0.038	(0.233)	0.034	0.004
39	3.25	0.17	0.038	(0.233)	0.034	0.004
40	3.33	0.17	0.038	(0.232)	0.034	0.004
41	3.42	0.17	0.038	(0.231)	0.034	0.004
42	3.50	0.17	0.038	(0.230)	0.034	0.004
43	3.58	0.17	0.038	(0.229)	0.034	0.004
44	3.67	0.17	0.038	(0.228)	0.034	0.004
45	3.75	0.17	0.038	(0.227)	0.034	0.004
46	3.83	0.20	0.046	(0.226)	0.041	0.005
47	3.92	0.20	0.046	(0.225)	0.041	0.005
48	4.00	0.20	0.046	(0.224)	0.041	0.005
49	4.08	0.20	0.046	(0.223)	0.041	0.005
50	4.17	0.20	0.046	(0.222)	0.041	0.005
51	4.25	0.20	0.046	(0.221)	0.041	0.005
52	4.33	0.23	0.053	(0.220)	0.048	0.005
53	4.42	0.23	0.053	(0.219)	0.048	0.005
54	4.50	0.23	0.053	(0.218)	0.048	0.005
55	4.58	0.23	0.053	(0.217)	0.048	0.005
56	4.67	0.23	0.053	(0.216)	0.048	0.005
57	4.75	0.23	0.053	(0.215)	0.048	0.005
58	4.83	0.27	0.061	(0.214)	0.055	0.006
59	4.92	0.27	0.061	(0.214)	0.055	0.006
60	5.00	0.27	0.061	(0.213)	0.055	0.006

61	5.08	0.20	0.046	(0.212)	0.041	0.005
62	5.17	0.20	0.046	(0.211)	0.041	0.005
63	5.25	0.20	0.046	(0.210)	0.041	0.005
64	5.33	0.23	0.053	(0.209)	0.048	0.005
65	5.42	0.23	0.053	(0.208)	0.048	0.005
66	5.50	0.23	0.053	(0.207)	0.048	0.005
67	5.58	0.27	0.061	(0.206)	0.055	0.006
68	5.67	0.27	0.061	(0.205)	0.055	0.006
69	5.75	0.27	0.061	(0.204)	0.055	0.006
70	5.83	0.27	0.061	(0.203)	0.055	0.006
71	5.92	0.27	0.061	(0.203)	0.055	0.006
72	6.00	0.27	0.061	(0.202)	0.055	0.006
73	6.08	0.30	0.068	(0.201)	0.062	0.007
74	6.17	0.30	0.068	(0.200)	0.062	0.007
75	6.25	0.30	0.068	(0.199)	0.062	0.007
76	6.33	0.30	0.068	(0.198)	0.062	0.007
77	6.42	0.30	0.068	(0.197)	0.062	0.007
78	6.50	0.30	0.068	(0.196)	0.062	0.007
79	6.58	0.33	0.076	(0.195)	0.068	0.008
80	6.67	0.33	0.076	(0.195)	0.068	0.008
81	6.75	0.33	0.076	(0.194)	0.068	0.008
82	6.83	0.33	0.076	(0.193)	0.068	0.008
83	6.92	0.33	0.076	(0.192)	0.068	0.008
84	7.00	0.33	0.076	(0.191)	0.068	0.008
85	7.08	0.33	0.076	(0.190)	0.068	0.008
86	7.17	0.33	0.076	(0.189)	0.068	0.008
87	7.25	0.33	0.076	(0.188)	0.068	0.008
88	7.33	0.37	0.084	(0.188)	0.075	0.008
89	7.42	0.37	0.084	(0.187)	0.075	0.008
90	7.50	0.37	0.084	(0.186)	0.075	0.008
91	7.58	0.40	0.091	(0.185)	0.082	0.009
92	7.67	0.40	0.091	(0.184)	0.082	0.009
93	7.75	0.40	0.091	(0.183)	0.082	0.009
94	7.83	0.43	0.099	(0.183)	0.089	0.010
95	7.92	0.43	0.099	(0.182)	0.089	0.010
96	8.00	0.43	0.099	(0.181)	0.089	0.010
97	8.08	0.50	0.114	(0.180)	0.103	0.011
98	8.17	0.50	0.114	(0.179)	0.103	0.011
99	8.25	0.50	0.114	(0.178)	0.103	0.011
100	8.33	0.50	0.114	(0.177)	0.103	0.011
101	8.42	0.50	0.114	(0.177)	0.103	0.011
102	8.50	0.50	0.114	(0.176)	0.103	0.011
103	8.58	0.53	0.122	(0.175)	0.109	0.012
104	8.67	0.53	0.122	(0.174)	0.109	0.012
105	8.75	0.53	0.122	(0.173)	0.109	0.012
106	8.83	0.57	0.129	(0.173)	0.116	0.013
107	8.92	0.57	0.129	(0.172)	0.116	0.013
108	9.00	0.57	0.129	(0.171)	0.116	0.013
109	9.08	0.63	0.144	(0.170)	0.130	0.014
110	9.17	0.63	0.144	(0.169)	0.130	0.014
111	9.25	0.63	0.144	(0.168)	0.130	0.014
112	9.33	0.67	0.152	(0.168)	0.137	0.015
113	9.42	0.67	0.152	(0.167)	0.137	0.015
114	9.50	0.67	0.152	(0.166)	0.137	0.015
115	9.58	0.70	0.160	(0.165)	0.144	0.016
116	9.67	0.70	0.160	(0.165)	0.144	0.016
117	9.75	0.70	0.160	(0.164)	0.144	0.016

118	9.83	0.73	0.167	(	0.163)	0.150		0.017
119	9.92	0.73	0.167	(	0.162)	0.150		0.017
120	10.00	0.73	0.167	(	0.161)	0.150		0.017
121	10.08	0.50	0.114	(	0.161)	0.103		0.011
122	10.17	0.50	0.114	(	0.160)	0.103		0.011
123	10.25	0.50	0.114	(	0.159)	0.103		0.011
124	10.33	0.50	0.114	(	0.158)	0.103		0.011
125	10.42	0.50	0.114	(	0.157)	0.103		0.011
126	10.50	0.50	0.114	(	0.157)	0.103		0.011
127	10.58	0.67	0.152	(	0.156)	0.137		0.015
128	10.67	0.67	0.152	(	0.155)	0.137		0.015
129	10.75	0.67	0.152	(	0.154)	0.137		0.015
130	10.83	0.67	0.152	(	0.154)	0.137		0.015
131	10.92	0.67	0.152	(	0.153)	0.137		0.015
132	11.00	0.67	0.152	(	0.152)	0.137		0.015
133	11.08	0.63	0.144	(	0.151)	0.130		0.014
134	11.17	0.63	0.144	(	0.151)	0.130		0.014
135	11.25	0.63	0.144	(	0.150)	0.130		0.014
136	11.33	0.63	0.144	(	0.149)	0.130		0.014
137	11.42	0.63	0.144	(	0.148)	0.130		0.014
138	11.50	0.63	0.144	(	0.148)	0.130		0.014
139	11.58	0.57	0.129	(	0.147)	0.116		0.013
140	11.67	0.57	0.129	(	0.146)	0.116		0.013
141	11.75	0.57	0.129	(	0.146)	0.116		0.013
142	11.83	0.60	0.137	(	0.145)	0.123		0.014
143	11.92	0.60	0.137	(	0.144)	0.123		0.014
144	12.00	0.60	0.137	(	0.143)	0.123		0.014
145	12.08	0.83	0.190		0.143	(	0.171)	0.047
146	12.17	0.83	0.190		0.142	(	0.171)	0.048
147	12.25	0.83	0.190		0.141	(	0.171)	0.049
148	12.33	0.87	0.198		0.141	(	0.178)	0.057
149	12.42	0.87	0.198		0.140	(	0.178)	0.058
150	12.50	0.87	0.198		0.139	(	0.178)	0.059
151	12.58	0.93	0.213		0.138	(	0.192)	0.074
152	12.67	0.93	0.213		0.138	(	0.192)	0.075
153	12.75	0.93	0.213		0.137	(	0.192)	0.076
154	12.83	0.97	0.220		0.136	(	0.198)	0.084
155	12.92	0.97	0.220		0.136	(	0.198)	0.085
156	13.00	0.97	0.220		0.135	(	0.198)	0.085
157	13.08	1.13	0.258		0.134	(	0.233)	0.124
158	13.17	1.13	0.258		0.134	(	0.233)	0.125
159	13.25	1.13	0.258		0.133	(	0.233)	0.126
160	13.33	1.13	0.258		0.132	(	0.233)	0.126
161	13.42	1.13	0.258		0.132	(	0.233)	0.127
162	13.50	1.13	0.258		0.131	(	0.233)	0.128
163	13.58	0.77	0.175		0.130	(	0.157)	0.045
164	13.67	0.77	0.175		0.130	(	0.157)	0.045
165	13.75	0.77	0.175		0.129	(	0.157)	0.046
166	13.83	0.77	0.175		0.128	(	0.157)	0.047
167	13.92	0.77	0.175		0.128	(	0.157)	0.047
168	14.00	0.77	0.175		0.127	(	0.157)	0.048
169	14.08	0.90	0.205		0.126	(	0.185)	0.079
170	14.17	0.90	0.205		0.126	(	0.185)	0.080
171	14.25	0.90	0.205		0.125	(	0.185)	0.080
172	14.33	0.87	0.198		0.124	(	0.178)	0.073
173	14.42	0.87	0.198		0.124	(	0.178)	0.074
174	14.50	0.87	0.198		0.123	(	0.178)	0.075

175	14.58	0.87	0.198		0.122	(	0.178)	0.075
176	14.67	0.87	0.198		0.122	(	0.178)	0.076
177	14.75	0.87	0.198		0.121	(	0.178)	0.076
178	14.83	0.83	0.190		0.121	(	0.171)	0.069
179	14.92	0.83	0.190		0.120	(	0.171)	0.070
180	15.00	0.83	0.190		0.119	(	0.171)	0.071
181	15.08	0.80	0.182		0.119	(	0.164)	0.064
182	15.17	0.80	0.182		0.118	(	0.164)	0.064
183	15.25	0.80	0.182		0.118	(	0.164)	0.065
184	15.33	0.77	0.175		0.117	(	0.157)	0.058
185	15.42	0.77	0.175		0.116	(	0.157)	0.058
186	15.50	0.77	0.175		0.116	(	0.157)	0.059
187	15.58	0.63	0.144		0.115	(	0.130)	0.029
188	15.67	0.63	0.144		0.115	(	0.130)	0.030
189	15.75	0.63	0.144		0.114	(	0.130)	0.030
190	15.83	0.63	0.144		0.113	(	0.130)	0.031
191	15.92	0.63	0.144		0.113	(	0.130)	0.032
192	16.00	0.63	0.144		0.112	(	0.130)	0.032
193	16.08	0.13	0.030	(	0.112)		0.027	0.003
194	16.17	0.13	0.030	(	0.111)		0.027	0.003
195	16.25	0.13	0.030	(	0.110)		0.027	0.003
196	16.33	0.13	0.030	(	0.110)		0.027	0.003
197	16.42	0.13	0.030	(	0.109)		0.027	0.003
198	16.50	0.13	0.030	(	0.109)		0.027	0.003
199	16.58	0.10	0.023	(	0.108)		0.021	0.002
200	16.67	0.10	0.023	(	0.108)		0.021	0.002
201	16.75	0.10	0.023	(	0.107)		0.021	0.002
202	16.83	0.10	0.023	(	0.107)		0.021	0.002
203	16.92	0.10	0.023	(	0.106)		0.021	0.002
204	17.00	0.10	0.023	(	0.106)		0.021	0.002
205	17.08	0.17	0.038	(	0.105)		0.034	0.004
206	17.17	0.17	0.038	(	0.104)		0.034	0.004
207	17.25	0.17	0.038	(	0.104)		0.034	0.004
208	17.33	0.17	0.038	(	0.103)		0.034	0.004
209	17.42	0.17	0.038	(	0.103)		0.034	0.004
210	17.50	0.17	0.038	(	0.102)		0.034	0.004
211	17.58	0.17	0.038	(	0.102)		0.034	0.004
212	17.67	0.17	0.038	(	0.101)		0.034	0.004
213	17.75	0.17	0.038	(	0.101)		0.034	0.004
214	17.83	0.13	0.030	(	0.100)		0.027	0.003
215	17.92	0.13	0.030	(	0.100)		0.027	0.003
216	18.00	0.13	0.030	(	0.099)		0.027	0.003
217	18.08	0.13	0.030	(	0.099)		0.027	0.003
218	18.17	0.13	0.030	(	0.098)		0.027	0.003
219	18.25	0.13	0.030	(	0.098)		0.027	0.003
220	18.33	0.13	0.030	(	0.097)		0.027	0.003
221	18.42	0.13	0.030	(	0.097)		0.027	0.003
222	18.50	0.13	0.030	(	0.097)		0.027	0.003
223	18.58	0.10	0.023	(	0.096)		0.021	0.002
224	18.67	0.10	0.023	(	0.096)		0.021	0.002
225	18.75	0.10	0.023	(	0.095)		0.021	0.002
226	18.83	0.07	0.015	(	0.095)		0.014	0.002
227	18.92	0.07	0.015	(	0.094)		0.014	0.002
228	19.00	0.07	0.015	(	0.094)		0.014	0.002
229	19.08	0.10	0.023	(	0.093)		0.021	0.002
230	19.17	0.10	0.023	(	0.093)		0.021	0.002
231	19.25	0.10	0.023	(	0.092)		0.021	0.002

232	19.33	0.13	0.030	(0.092)	0.027	0.003
233	19.42	0.13	0.030	(0.092)	0.027	0.003
234	19.50	0.13	0.030	(0.091)	0.027	0.003
235	19.58	0.10	0.023	(0.091)	0.021	0.002
236	19.67	0.10	0.023	(0.090)	0.021	0.002
237	19.75	0.10	0.023	(0.090)	0.021	0.002
238	19.83	0.07	0.015	(0.090)	0.014	0.002
239	19.92	0.07	0.015	(0.089)	0.014	0.002
240	20.00	0.07	0.015	(0.089)	0.014	0.002
241	20.08	0.10	0.023	(0.088)	0.021	0.002
242	20.17	0.10	0.023	(0.088)	0.021	0.002
243	20.25	0.10	0.023	(0.088)	0.021	0.002
244	20.33	0.10	0.023	(0.087)	0.021	0.002
245	20.42	0.10	0.023	(0.087)	0.021	0.002
246	20.50	0.10	0.023	(0.086)	0.021	0.002
247	20.58	0.10	0.023	(0.086)	0.021	0.002
248	20.67	0.10	0.023	(0.086)	0.021	0.002
249	20.75	0.10	0.023	(0.085)	0.021	0.002
250	20.83	0.07	0.015	(0.085)	0.014	0.002
251	20.92	0.07	0.015	(0.085)	0.014	0.002
252	21.00	0.07	0.015	(0.084)	0.014	0.002
253	21.08	0.10	0.023	(0.084)	0.021	0.002
254	21.17	0.10	0.023	(0.084)	0.021	0.002
255	21.25	0.10	0.023	(0.083)	0.021	0.002
256	21.33	0.07	0.015	(0.083)	0.014	0.002
257	21.42	0.07	0.015	(0.083)	0.014	0.002
258	21.50	0.07	0.015	(0.082)	0.014	0.002
259	21.58	0.10	0.023	(0.082)	0.021	0.002
260	21.67	0.10	0.023	(0.082)	0.021	0.002
261	21.75	0.10	0.023	(0.082)	0.021	0.002
262	21.83	0.07	0.015	(0.081)	0.014	0.002
263	21.92	0.07	0.015	(0.081)	0.014	0.002
264	22.00	0.07	0.015	(0.081)	0.014	0.002
265	22.08	0.10	0.023	(0.080)	0.021	0.002
266	22.17	0.10	0.023	(0.080)	0.021	0.002
267	22.25	0.10	0.023	(0.080)	0.021	0.002
268	22.33	0.07	0.015	(0.080)	0.014	0.002
269	22.42	0.07	0.015	(0.079)	0.014	0.002
270	22.50	0.07	0.015	(0.079)	0.014	0.002
271	22.58	0.07	0.015	(0.079)	0.014	0.002
272	22.67	0.07	0.015	(0.079)	0.014	0.002
273	22.75	0.07	0.015	(0.079)	0.014	0.002
274	22.83	0.07	0.015	(0.078)	0.014	0.002
275	22.92	0.07	0.015	(0.078)	0.014	0.002
276	23.00	0.07	0.015	(0.078)	0.014	0.002
277	23.08	0.07	0.015	(0.078)	0.014	0.002
278	23.17	0.07	0.015	(0.078)	0.014	0.002
279	23.25	0.07	0.015	(0.077)	0.014	0.002
280	23.33	0.07	0.015	(0.077)	0.014	0.002
281	23.42	0.07	0.015	(0.077)	0.014	0.002
282	23.50	0.07	0.015	(0.077)	0.014	0.002
283	23.58	0.07	0.015	(0.077)	0.014	0.002
284	23.67	0.07	0.015	(0.077)	0.014	0.002
285	23.75	0.07	0.015	(0.077)	0.014	0.002
286	23.83	0.07	0.015	(0.077)	0.014	0.002
287	23.92	0.07	0.015	(0.076)	0.014	0.002
288	24.00	0.07	0.015	(0.076)	0.014	0.002

(Loss Rate Not Used)

Sum = 100.0 Sum = 4.6

Flood volume = Effective rainfall 0.39(In)
times area 9.2(Ac.)/[(In)/(Ft.)] = 0.3(Ac.Ft)
Total soil loss = 1.51(In)
Total soil loss = 1.157(Ac.Ft)
Total rainfall = 1.90(In)
Flood volume = 12824.0 Cubic Feet
Total soil loss = 50420.4 Cubic Feet

Peak flow rate of this hydrograph = 1.144(CFS)

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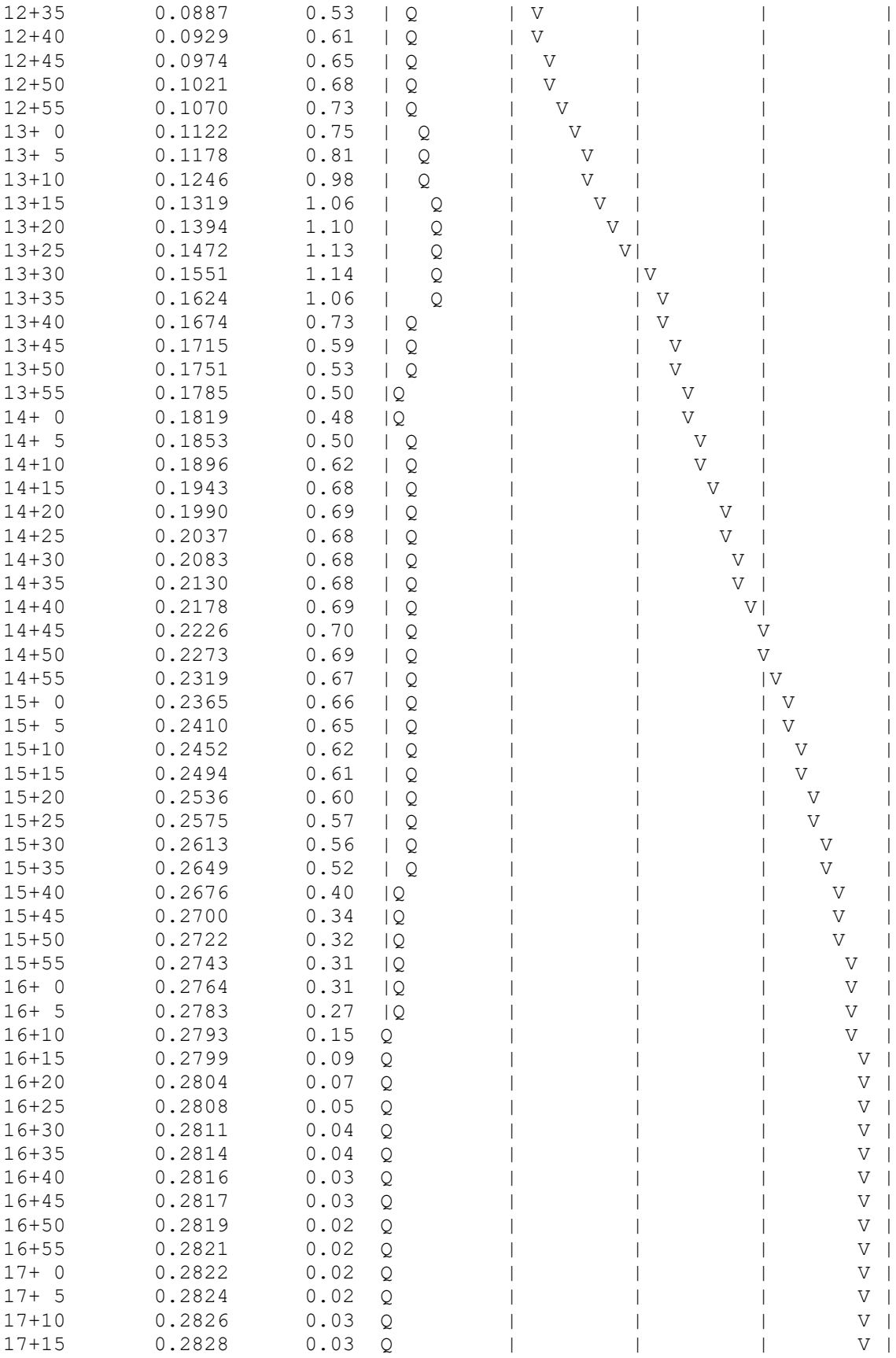
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0000	0.00	Q				
0+10	0.0001	0.01	Q				
0+15	0.0001	0.01	Q				
0+20	0.0002	0.01	Q				
0+25	0.0003	0.02	Q				
0+30	0.0005	0.02	Q				
0+35	0.0006	0.02	Q				
0+40	0.0007	0.02	Q				
0+45	0.0009	0.02	Q				
0+50	0.0010	0.02	Q				
0+55	0.0012	0.02	Q				
1+ 0	0.0014	0.03	Q				
1+ 5	0.0016	0.03	Q				
1+10	0.0017	0.02	Q				
1+15	0.0019	0.02	Q				
1+20	0.0020	0.02	Q				
1+25	0.0022	0.02	Q				
1+30	0.0023	0.02	Q				
1+35	0.0025	0.02	Q				
1+40	0.0026	0.02	Q				
1+45	0.0028	0.02	Q				
1+50	0.0029	0.02	Q				
1+55	0.0031	0.03	Q				
2+ 0	0.0033	0.03	Q				
2+ 5	0.0035	0.03	Q				
2+10	0.0037	0.03	Q				
2+15	0.0038	0.03	Q				
2+20	0.0040	0.03	Q				
2+25	0.0042	0.03	Q				
2+30	0.0044	0.03	Q				
2+35	0.0046	0.03	Q				
2+40	0.0048	0.03	Q				
2+45	0.0051	0.03	Q				
2+50	0.0053	0.03	Q				
2+55	0.0055	0.03	Q				
3+ 0	0.0058	0.03	Q				

3+ 5	0.0060	0.03	Q	|	|	|	|
3+10	0.0063	0.03	Q	|	|	|	|
3+15	0.0065	0.04	Q	|	|	|	|
3+20	0.0067	0.04	Q	|	|	|	|
3+25	0.0070	0.04	Q	|	|	|	|
3+30	0.0072	0.04	Q	|	|	|	|
3+35	0.0075	0.04	QV	|	|	|	|
3+40	0.0077	0.04	QV	|	|	|	|
3+45	0.0080	0.04	QV	|	|	|	|
3+50	0.0082	0.04	QV	|	|	|	|
3+55	0.0085	0.04	QV	|	|	|	|
4+ 0	0.0088	0.04	QV	|	|	|	|
4+ 5	0.0090	0.04	QV	|	|	|	|
4+10	0.0093	0.04	QV	|	|	|	|
4+15	0.0096	0.04	QV	|	|	|	|
4+20	0.0099	0.04	QV	|	|	|	|
4+25	0.0102	0.05	QV	|	|	|	|
4+30	0.0105	0.05	QV	|	|	|	|
4+35	0.0109	0.05	QV	|	|	|	|
4+40	0.0112	0.05	QV	|	|	|	|
4+45	0.0115	0.05	QV	|	|	|	|
4+50	0.0119	0.05	QV	|	|	|	|
4+55	0.0123	0.05	QV	|	|	|	|
5+ 0	0.0126	0.05	QV	|	|	|	|
5+ 5	0.0130	0.05	QV	|	|	|	|
5+10	0.0133	0.05	QV	|	|	|	|
5+15	0.0136	0.04	QV	|	|	|	|
5+20	0.0139	0.04	QV	|	|	|	|
5+25	0.0143	0.05	QV	|	|	|	|
5+30	0.0146	0.05	QV	|	|	|	|
5+35	0.0149	0.05	Q V	|	|	|	|
5+40	0.0153	0.05	Q V	|	|	|	|
5+45	0.0157	0.05	Q V	|	|	|	|
5+50	0.0161	0.05	Q V	|	|	|	|
5+55	0.0164	0.06	Q V	|	|	|	|
6+ 0	0.0168	0.06	Q V	|	|	|	|
6+ 5	0.0172	0.06	Q V	|	|	|	|
6+10	0.0176	0.06	Q V	|	|	|	|
6+15	0.0181	0.06	Q V	|	|	|	|
6+20	0.0185	0.06	Q V	|	|	|	|
6+25	0.0189	0.06	Q V	|	|	|	|
6+30	0.0193	0.06	Q V	|	|	|	|
6+35	0.0198	0.06	Q V	|	|	|	|
6+40	0.0202	0.07	Q V	|	|	|	|
6+45	0.0207	0.07	Q V	|	|	|	|
6+50	0.0212	0.07	Q V	|	|	|	|
6+55	0.0217	0.07	Q V	|	|	|	|
7+ 0	0.0222	0.07	Q V	|	|	|	|
7+ 5	0.0226	0.07	Q V	|	|	|	|
7+10	0.0231	0.07	Q V	|	|	|	|
7+15	0.0236	0.07	Q V	|	|	|	|
7+20	0.0241	0.07	Q V	|	|	|	|
7+25	0.0246	0.07	Q V	|	|	|	|
7+30	0.0251	0.08	Q V	|	|	|	|
7+35	0.0257	0.08	Q V	|	|	|	|
7+40	0.0262	0.08	Q V	|	|	|	|
7+45	0.0268	0.08	Q V	|	|	|	|

7+50	0.0274	0.08	Q V	|	|	|	|
7+55	0.0280	0.09	Q V	|	|	|	|
8+ 0	0.0286	0.09	Q V	|	|	|	|
8+ 5	0.0292	0.09	Q V	|	|	|	|
8+10	0.0299	0.10	Q V	|	|	|	|
8+15	0.0306	0.10	Q V	|	|	|	|
8+20	0.0313	0.10	Q V	|	|	|	|
8+25	0.0320	0.10	Q V	|	|	|	|
8+30	0.0327	0.10	Q V	|	|	|	|
8+35	0.0335	0.11	Q V	|	|	|	|
8+40	0.0342	0.11	Q V	|	|	|	|
8+45	0.0350	0.11	Q V	|	|	|	|
8+50	0.0357	0.11	Q V	|	|	|	|
8+55	0.0365	0.12	Q V	|	|	|	|
9+ 0	0.0373	0.12	Q V	|	|	|	|
9+ 5	0.0382	0.12	Q V	|	|	|	|
9+10	0.0390	0.13	Q V	|	|	|	|
9+15	0.0399	0.13	Q V	|	|	|	|
9+20	0.0408	0.13	Q V	|	|	|	|
9+25	0.0418	0.14	Q V	|	|	|	|
9+30	0.0427	0.14	Q V	|	|	|	|
9+35	0.0437	0.14	Q V	|	|	|	|
9+40	0.0447	0.14	Q V	|	|	|	|
9+45	0.0457	0.15	Q V	|	|	|	|
9+50	0.0467	0.15	Q V	|	|	|	|
9+55	0.0477	0.15	Q V	|	|	|	|
10+ 0	0.0488	0.15	Q V	|	|	|	|
10+ 5	0.0498	0.15	Q V	|	|	|	|
10+10	0.0507	0.13	Q V	|	|	|	|
10+15	0.0515	0.12	Q V	|	|	|	|
10+20	0.0522	0.11	Q V	|	|	|	|
10+25	0.0530	0.11	Q V	|	|	|	|
10+30	0.0537	0.11	Q V	|	|	|	|
10+35	0.0545	0.11	Q V	|	|	|	|
10+40	0.0554	0.13	Q V	|	|	|	|
10+45	0.0563	0.13	Q V	|	|	|	|
10+50	0.0572	0.14	Q V	|	|	|	|
10+55	0.0582	0.14	Q V	|	|	|	|
11+ 0	0.0591	0.14	Q V	|	|	|	|
11+ 5	0.0601	0.14	Q V	|	|	|	|
11+10	0.0610	0.14	Q V	|	|	|	|
11+15	0.0619	0.13	Q V	|	|	|	|
11+20	0.0629	0.13	Q V	|	|	|	|
11+25	0.0638	0.13	Q V	|	|	|	|
11+30	0.0647	0.13	Q V	|	|	|	|
11+35	0.0656	0.13	Q V	|	|	|	|
11+40	0.0665	0.13	Q V	|	|	|	|
11+45	0.0673	0.12	Q V	|	|	|	|
11+50	0.0682	0.12	Q V	|	|	|	|
11+55	0.0690	0.12	Q V	|	|	|	|
12+ 0	0.0699	0.13	Q V	|	|	|	|
12+ 5	0.0710	0.17	Q V	|	|	|	|
12+10	0.0731	0.30	|Q V	|	|	|	|
12+15	0.0757	0.37	|Q V	|	|	|	|
12+20	0.0785	0.41	|Q V	|	|	|	|
12+25	0.0817	0.46	|Q |V	|	|	|	|
12+30	0.0851	0.49	|Q |V	|	|	|	|



17+20	0.2830	0.03	Q	|	|	|	V |
17+25	0.2832	0.03	Q	|	|	|	V |
17+30	0.2835	0.03	Q	|	|	|	V |
17+35	0.2837	0.03	Q	|	|	|	V |
17+40	0.2840	0.03	Q	|	|	|	V |
17+45	0.2842	0.03	Q	|	|	|	V |
17+50	0.2844	0.03	Q	|	|	|	V |
17+55	0.2847	0.03	Q	|	|	|	V |
18+ 0	0.2849	0.03	Q	|	|	|	V |
18+ 5	0.2851	0.03	Q	|	|	|	V |
18+10	0.2853	0.03	Q	|	|	|	V |
18+15	0.2855	0.03	Q	|	|	|	V |
18+20	0.2856	0.03	Q	|	|	|	V |
18+25	0.2858	0.03	Q	|	|	|	V |
18+30	0.2860	0.03	Q	|	|	|	V |
18+35	0.2862	0.03	Q	|	|	|	V |
18+40	0.2864	0.02	Q	|	|	|	V |
18+45	0.2865	0.02	Q	|	|	|	V |
18+50	0.2867	0.02	Q	|	|	|	V |
18+55	0.2868	0.02	Q	|	|	|	V |
19+ 0	0.2869	0.02	Q	|	|	|	V |
19+ 5	0.2870	0.02	Q	|	|	|	V|
19+10	0.2872	0.02	Q	|	|	|	V|
19+15	0.2873	0.02	Q	|	|	|	V|
19+20	0.2875	0.02	Q	|	|	|	V|
19+25	0.2876	0.02	Q	|	|	|	V|
19+30	0.2878	0.03	Q	|	|	|	V|
19+35	0.2880	0.03	Q	|	|	|	V|
19+40	0.2881	0.02	Q	|	|	|	V|
19+45	0.2883	0.02	Q	|	|	|	V|
19+50	0.2884	0.02	Q	|	|	|	V|
19+55	0.2886	0.02	Q	|	|	|	V|
20+ 0	0.2887	0.02	Q	|	|	|	V|
20+ 5	0.2888	0.02	Q	|	|	|	V|
20+10	0.2889	0.02	Q	|	|	|	V|
20+15	0.2891	0.02	Q	|	|	|	V|
20+20	0.2892	0.02	Q	|	|	|	V|
20+25	0.2893	0.02	Q	|	|	|	V|
20+30	0.2895	0.02	Q	|	|	|	V|
20+35	0.2896	0.02	Q	|	|	|	V|
20+40	0.2898	0.02	Q	|	|	|	V|
20+45	0.2899	0.02	Q	|	|	|	V|
20+50	0.2900	0.02	Q	|	|	|	V|
20+55	0.2902	0.02	Q	|	|	|	V|
21+ 0	0.2903	0.02	Q	|	|	|	V|
21+ 5	0.2904	0.02	Q	|	|	|	V|
21+10	0.2905	0.02	Q	|	|	|	V|
21+15	0.2906	0.02	Q	|	|	|	V|
21+20	0.2908	0.02	Q	|	|	|	V|
21+25	0.2909	0.02	Q	|	|	|	V|
21+30	0.2910	0.02	Q	|	|	|	V|
21+35	0.2911	0.02	Q	|	|	|	V|
21+40	0.2912	0.02	Q	|	|	|	V|
21+45	0.2914	0.02	Q	|	|	|	V|
21+50	0.2915	0.02	Q	|	|	|	V|
21+55	0.2916	0.02	Q	|	|	|	V|
22+ 0	0.2917	0.02	Q	|	|	|	V|

22+ 5	0.2918	0.02	Q	|	|	|	V|
22+10	0.2920	0.02	Q	|	|	|	V|
22+15	0.2921	0.02	Q	|	|	|	V|
22+20	0.2922	0.02	Q	|	|	|	V|
22+25	0.2923	0.02	Q	|	|	|	V|
22+30	0.2925	0.02	Q	|	|	|	V|
22+35	0.2926	0.01	Q	|	|	|	V|
22+40	0.2927	0.01	Q	|	|	|	V|
22+45	0.2928	0.01	Q	|	|	|	V|
22+50	0.2929	0.01	Q	|	|	|	V|
22+55	0.2930	0.01	Q	|	|	|	V|
23+ 0	0.2930	0.01	Q	|	|	|	V|
23+ 5	0.2931	0.01	Q	|	|	|	V|
23+10	0.2932	0.01	Q	|	|	|	V|
23+15	0.2933	0.01	Q	|	|	|	V|
23+20	0.2934	0.01	Q	|	|	|	V|
23+25	0.2935	0.01	Q	|	|	|	V|
23+30	0.2936	0.01	Q	|	|	|	V|
23+35	0.2937	0.01	Q	|	|	|	V|
23+40	0.2938	0.01	Q	|	|	|	V|
23+45	0.2939	0.01	Q	|	|	|	V|
23+50	0.2940	0.01	Q	|	|	|	V|
23+55	0.2941	0.01	Q	|	|	|	V|
24+ 0	0.2942	0.01	Q	|	|	|	V|
24+ 5	0.2943	0.01	Q	|	|	|	V|
24+10	0.2943	0.01	Q	|	|	|	V|
24+15	0.2944	0.00	Q	|	|	|	V|
24+20	0.2944	0.00	Q	|	|	|	V|
24+25	0.2944	0.00	Q	|	|	|	V|
24+30	0.2944	0.00	Q	|	|	|	V|
24+35	0.2944	0.00	Q	|	|	|	V|
24+40	0.2944	0.00	Q	|	|	|	V|
24+45	0.2944	0.00	Q	|	|	|	V|
24+50	0.2944	0.00	Q	|	|	|	V

U n i t H y d r o g r a p h A n a l y s i s

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Study date 11/05/21 File: northexC2242.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 4011

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Evans Community Park 2-year, 24-hour Storm Event
Existing Condition (Southerly Portion of Site)
Job 21-003
11/5/21

Drainage Area = 5.15(Ac.) = 0.008 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 5.15(Ac.) = 0.008 Sq. Mi.
Length along longest watercourse = 895.00(Ft.)
Length along longest watercourse measured to centroid = 493.00(Ft.)
Length along longest watercourse = 0.170 Mi.
Length along longest watercourse measured to centroid = 0.093 Mi.
Difference in elevation = 9.00(Ft.)
Slope along watercourse = 53.0950 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.070 Hr.
Lag time = 4.20 Min.
25% of lag time = 1.05 Min.
40% of lag time = 1.68 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.15	1.90	9.79

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]

5.15 5.00 25.75

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 1.900(In)
Area Averaged 100-Year Rainfall = 5.000(In)

Point rain (area averaged) = 1.900(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.900(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
0.980	75.00	0.000
4.170	90.00	0.000

Total Area Entered = 5.15(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
75.0	75.0	0.303	0.000	0.303	0.190	0.058
90.0	90.0	0.130	0.000	0.130	0.810	0.105
					Sum (F) =	0.163

Area averaged mean soil loss (F) (In/Hr) = 0.163
Minimum soil loss rate ((In/Hr)) = 0.081
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	118.980	24.903	1.293
2	0.167	237.960	48.748	2.530
3	0.250	356.940	13.399	0.695
4	0.333	475.920	6.077	0.315
5	0.417	594.900	3.399	0.176
6	0.500	713.879	1.967	0.102
7	0.583	832.859	1.508	0.078
		Sum =	100.000 Sum=	5.190

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.015	(0.289)	0.014	0.002
2	0.17	0.07	0.015	(0.288)	0.014	0.002
3	0.25	0.07	0.015	(0.287)	0.014	0.002
4	0.33	0.10	0.023	(0.285)	0.021	0.002
5	0.42	0.10	0.023	(0.284)	0.021	0.002

6	0.50	0.10	0.023	(0.283)	0.021	0.002
7	0.58	0.10	0.023	(0.282)	0.021	0.002
8	0.67	0.10	0.023	(0.281)	0.021	0.002
9	0.75	0.10	0.023	(0.280)	0.021	0.002
10	0.83	0.13	0.030	(0.279)	0.027	0.003
11	0.92	0.13	0.030	(0.278)	0.027	0.003
12	1.00	0.13	0.030	(0.277)	0.027	0.003
13	1.08	0.10	0.023	(0.276)	0.021	0.002
14	1.17	0.10	0.023	(0.274)	0.021	0.002
15	1.25	0.10	0.023	(0.273)	0.021	0.002
16	1.33	0.10	0.023	(0.272)	0.021	0.002
17	1.42	0.10	0.023	(0.271)	0.021	0.002
18	1.50	0.10	0.023	(0.270)	0.021	0.002
19	1.58	0.10	0.023	(0.269)	0.021	0.002
20	1.67	0.10	0.023	(0.268)	0.021	0.002
21	1.75	0.10	0.023	(0.267)	0.021	0.002
22	1.83	0.13	0.030	(0.266)	0.027	0.003
23	1.92	0.13	0.030	(0.265)	0.027	0.003
24	2.00	0.13	0.030	(0.264)	0.027	0.003
25	2.08	0.13	0.030	(0.263)	0.027	0.003
26	2.17	0.13	0.030	(0.262)	0.027	0.003
27	2.25	0.13	0.030	(0.260)	0.027	0.003
28	2.33	0.13	0.030	(0.259)	0.027	0.003
29	2.42	0.13	0.030	(0.258)	0.027	0.003
30	2.50	0.13	0.030	(0.257)	0.027	0.003
31	2.58	0.17	0.038	(0.256)	0.034	0.004
32	2.67	0.17	0.038	(0.255)	0.034	0.004
33	2.75	0.17	0.038	(0.254)	0.034	0.004
34	2.83	0.17	0.038	(0.253)	0.034	0.004
35	2.92	0.17	0.038	(0.252)	0.034	0.004
36	3.00	0.17	0.038	(0.251)	0.034	0.004
37	3.08	0.17	0.038	(0.250)	0.034	0.004
38	3.17	0.17	0.038	(0.249)	0.034	0.004
39	3.25	0.17	0.038	(0.248)	0.034	0.004
40	3.33	0.17	0.038	(0.247)	0.034	0.004
41	3.42	0.17	0.038	(0.246)	0.034	0.004
42	3.50	0.17	0.038	(0.245)	0.034	0.004
43	3.58	0.17	0.038	(0.244)	0.034	0.004
44	3.67	0.17	0.038	(0.243)	0.034	0.004
45	3.75	0.17	0.038	(0.242)	0.034	0.004
46	3.83	0.20	0.046	(0.241)	0.041	0.005
47	3.92	0.20	0.046	(0.240)	0.041	0.005
48	4.00	0.20	0.046	(0.239)	0.041	0.005
49	4.08	0.20	0.046	(0.238)	0.041	0.005
50	4.17	0.20	0.046	(0.237)	0.041	0.005
51	4.25	0.20	0.046	(0.236)	0.041	0.005
52	4.33	0.23	0.053	(0.235)	0.048	0.005
53	4.42	0.23	0.053	(0.234)	0.048	0.005
54	4.50	0.23	0.053	(0.233)	0.048	0.005
55	4.58	0.23	0.053	(0.232)	0.048	0.005
56	4.67	0.23	0.053	(0.231)	0.048	0.005
57	4.75	0.23	0.053	(0.230)	0.048	0.005
58	4.83	0.27	0.061	(0.229)	0.055	0.006
59	4.92	0.27	0.061	(0.228)	0.055	0.006
60	5.00	0.27	0.061	(0.227)	0.055	0.006
61	5.08	0.20	0.046	(0.226)	0.041	0.005
62	5.17	0.20	0.046	(0.225)	0.041	0.005

63	5.25	0.20	0.046	(0.224)	0.041	0.005
64	5.33	0.23	0.053	(0.223)	0.048	0.005
65	5.42	0.23	0.053	(0.222)	0.048	0.005
66	5.50	0.23	0.053	(0.221)	0.048	0.005
67	5.58	0.27	0.061	(0.220)	0.055	0.006
68	5.67	0.27	0.061	(0.219)	0.055	0.006
69	5.75	0.27	0.061	(0.218)	0.055	0.006
70	5.83	0.27	0.061	(0.217)	0.055	0.006
71	5.92	0.27	0.061	(0.216)	0.055	0.006
72	6.00	0.27	0.061	(0.215)	0.055	0.006
73	6.08	0.30	0.068	(0.214)	0.062	0.007
74	6.17	0.30	0.068	(0.213)	0.062	0.007
75	6.25	0.30	0.068	(0.212)	0.062	0.007
76	6.33	0.30	0.068	(0.211)	0.062	0.007
77	6.42	0.30	0.068	(0.210)	0.062	0.007
78	6.50	0.30	0.068	(0.209)	0.062	0.007
79	6.58	0.33	0.076	(0.208)	0.068	0.008
80	6.67	0.33	0.076	(0.207)	0.068	0.008
81	6.75	0.33	0.076	(0.207)	0.068	0.008
82	6.83	0.33	0.076	(0.206)	0.068	0.008
83	6.92	0.33	0.076	(0.205)	0.068	0.008
84	7.00	0.33	0.076	(0.204)	0.068	0.008
85	7.08	0.33	0.076	(0.203)	0.068	0.008
86	7.17	0.33	0.076	(0.202)	0.068	0.008
87	7.25	0.33	0.076	(0.201)	0.068	0.008
88	7.33	0.37	0.084	(0.200)	0.075	0.008
89	7.42	0.37	0.084	(0.199)	0.075	0.008
90	7.50	0.37	0.084	(0.198)	0.075	0.008
91	7.58	0.40	0.091	(0.197)	0.082	0.009
92	7.67	0.40	0.091	(0.196)	0.082	0.009
93	7.75	0.40	0.091	(0.196)	0.082	0.009
94	7.83	0.43	0.099	(0.195)	0.089	0.010
95	7.92	0.43	0.099	(0.194)	0.089	0.010
96	8.00	0.43	0.099	(0.193)	0.089	0.010
97	8.08	0.50	0.114	(0.192)	0.103	0.011
98	8.17	0.50	0.114	(0.191)	0.103	0.011
99	8.25	0.50	0.114	(0.190)	0.103	0.011
100	8.33	0.50	0.114	(0.189)	0.103	0.011
101	8.42	0.50	0.114	(0.188)	0.103	0.011
102	8.50	0.50	0.114	(0.187)	0.103	0.011
103	8.58	0.53	0.122	(0.187)	0.109	0.012
104	8.67	0.53	0.122	(0.186)	0.109	0.012
105	8.75	0.53	0.122	(0.185)	0.109	0.012
106	8.83	0.57	0.129	(0.184)	0.116	0.013
107	8.92	0.57	0.129	(0.183)	0.116	0.013
108	9.00	0.57	0.129	(0.182)	0.116	0.013
109	9.08	0.63	0.144	(0.181)	0.130	0.014
110	9.17	0.63	0.144	(0.181)	0.130	0.014
111	9.25	0.63	0.144	(0.180)	0.130	0.014
112	9.33	0.67	0.152	(0.179)	0.137	0.015
113	9.42	0.67	0.152	(0.178)	0.137	0.015
114	9.50	0.67	0.152	(0.177)	0.137	0.015
115	9.58	0.70	0.160	(0.176)	0.144	0.016
116	9.67	0.70	0.160	(0.175)	0.144	0.016
117	9.75	0.70	0.160	(0.175)	0.144	0.016
118	9.83	0.73	0.167	(0.174)	0.150	0.017
119	9.92	0.73	0.167	(0.173)	0.150	0.017

120	10.00	0.73	0.167	(	0.172)	0.150		0.017
121	10.08	0.50	0.114	(	0.171)	0.103		0.011
122	10.17	0.50	0.114	(	0.170)	0.103		0.011
123	10.25	0.50	0.114	(	0.170)	0.103		0.011
124	10.33	0.50	0.114	(	0.169)	0.103		0.011
125	10.42	0.50	0.114	(	0.168)	0.103		0.011
126	10.50	0.50	0.114	(	0.167)	0.103		0.011
127	10.58	0.67	0.152	(	0.166)	0.137		0.015
128	10.67	0.67	0.152	(	0.165)	0.137		0.015
129	10.75	0.67	0.152	(	0.165)	0.137		0.015
130	10.83	0.67	0.152	(	0.164)	0.137		0.015
131	10.92	0.67	0.152	(	0.163)	0.137		0.015
132	11.00	0.67	0.152	(	0.162)	0.137		0.015
133	11.08	0.63	0.144	(	0.161)	0.130		0.014
134	11.17	0.63	0.144	(	0.161)	0.130		0.014
135	11.25	0.63	0.144	(	0.160)	0.130		0.014
136	11.33	0.63	0.144	(	0.159)	0.130		0.014
137	11.42	0.63	0.144	(	0.158)	0.130		0.014
138	11.50	0.63	0.144	(	0.157)	0.130		0.014
139	11.58	0.57	0.129	(	0.157)	0.116		0.013
140	11.67	0.57	0.129	(	0.156)	0.116		0.013
141	11.75	0.57	0.129	(	0.155)	0.116		0.013
142	11.83	0.60	0.137	(	0.154)	0.123		0.014
143	11.92	0.60	0.137	(	0.154)	0.123		0.014
144	12.00	0.60	0.137	(	0.153)	0.123		0.014
145	12.08	0.83	0.190		0.152	(	0.171)	0.038
146	12.17	0.83	0.190		0.151	(	0.171)	0.039
147	12.25	0.83	0.190		0.151	(	0.171)	0.039
148	12.33	0.87	0.198		0.150	(	0.178)	0.048
149	12.42	0.87	0.198		0.149	(	0.178)	0.049
150	12.50	0.87	0.198		0.148	(	0.178)	0.049
151	12.58	0.93	0.213		0.148	(	0.192)	0.065
152	12.67	0.93	0.213		0.147	(	0.192)	0.066
153	12.75	0.93	0.213		0.146	(	0.192)	0.067
154	12.83	0.97	0.220		0.145	(	0.198)	0.075
155	12.92	0.97	0.220		0.145	(	0.198)	0.076
156	13.00	0.97	0.220		0.144	(	0.198)	0.077
157	13.08	1.13	0.258		0.143	(	0.233)	0.115
158	13.17	1.13	0.258		0.142	(	0.233)	0.116
159	13.25	1.13	0.258		0.142	(	0.233)	0.117
160	13.33	1.13	0.258		0.141	(	0.233)	0.117
161	13.42	1.13	0.258		0.140	(	0.233)	0.118
162	13.50	1.13	0.258		0.140	(	0.233)	0.119
163	13.58	0.77	0.175		0.139	(	0.157)	0.036
164	13.67	0.77	0.175		0.138	(	0.157)	0.037
165	13.75	0.77	0.175		0.137	(	0.157)	0.037
166	13.83	0.77	0.175		0.137	(	0.157)	0.038
167	13.92	0.77	0.175		0.136	(	0.157)	0.039
168	14.00	0.77	0.175		0.135	(	0.157)	0.039
169	14.08	0.90	0.205		0.135	(	0.185)	0.071
170	14.17	0.90	0.205		0.134	(	0.185)	0.071
171	14.25	0.90	0.205		0.133	(	0.185)	0.072
172	14.33	0.87	0.198		0.133	(	0.178)	0.065
173	14.42	0.87	0.198		0.132	(	0.178)	0.066
174	14.50	0.87	0.198		0.131	(	0.178)	0.066
175	14.58	0.87	0.198		0.131	(	0.178)	0.067
176	14.67	0.87	0.198		0.130	(	0.178)	0.068

177	14.75	0.87	0.198	0.129	(0.178)	0.068
178	14.83	0.83	0.190	0.129	(0.171)	0.061
179	14.92	0.83	0.190	0.128	(0.171)	0.062
180	15.00	0.83	0.190	0.127	(0.171)	0.063
181	15.08	0.80	0.182	0.127	(0.164)	0.056
182	15.17	0.80	0.182	0.126	(0.164)	0.056
183	15.25	0.80	0.182	0.125	(0.164)	0.057
184	15.33	0.77	0.175	0.125	(0.157)	0.050
185	15.42	0.77	0.175	0.124	(0.157)	0.051
186	15.50	0.77	0.175	0.123	(0.157)	0.051
187	15.58	0.63	0.144	0.123	(0.130)	0.022
188	15.67	0.63	0.144	0.122	(0.130)	0.022
189	15.75	0.63	0.144	0.121	(0.130)	0.023
190	15.83	0.63	0.144	0.121	(0.130)	0.024
191	15.92	0.63	0.144	0.120	(0.130)	0.024
192	16.00	0.63	0.144	0.120	(0.130)	0.025
193	16.08	0.13	0.030	(0.119)	0.027	0.003
194	16.17	0.13	0.030	(0.118)	0.027	0.003
195	16.25	0.13	0.030	(0.118)	0.027	0.003
196	16.33	0.13	0.030	(0.117)	0.027	0.003
197	16.42	0.13	0.030	(0.117)	0.027	0.003
198	16.50	0.13	0.030	(0.116)	0.027	0.003
199	16.58	0.10	0.023	(0.115)	0.021	0.002
200	16.67	0.10	0.023	(0.115)	0.021	0.002
201	16.75	0.10	0.023	(0.114)	0.021	0.002
202	16.83	0.10	0.023	(0.114)	0.021	0.002
203	16.92	0.10	0.023	(0.113)	0.021	0.002
204	17.00	0.10	0.023	(0.113)	0.021	0.002
205	17.08	0.17	0.038	(0.112)	0.034	0.004
206	17.17	0.17	0.038	(0.111)	0.034	0.004
207	17.25	0.17	0.038	(0.111)	0.034	0.004
208	17.33	0.17	0.038	(0.110)	0.034	0.004
209	17.42	0.17	0.038	(0.110)	0.034	0.004
210	17.50	0.17	0.038	(0.109)	0.034	0.004
211	17.58	0.17	0.038	(0.109)	0.034	0.004
212	17.67	0.17	0.038	(0.108)	0.034	0.004
213	17.75	0.17	0.038	(0.108)	0.034	0.004
214	17.83	0.13	0.030	(0.107)	0.027	0.003
215	17.92	0.13	0.030	(0.106)	0.027	0.003
216	18.00	0.13	0.030	(0.106)	0.027	0.003
217	18.08	0.13	0.030	(0.105)	0.027	0.003
218	18.17	0.13	0.030	(0.105)	0.027	0.003
219	18.25	0.13	0.030	(0.104)	0.027	0.003
220	18.33	0.13	0.030	(0.104)	0.027	0.003
221	18.42	0.13	0.030	(0.103)	0.027	0.003
222	18.50	0.13	0.030	(0.103)	0.027	0.003
223	18.58	0.10	0.023	(0.102)	0.021	0.002
224	18.67	0.10	0.023	(0.102)	0.021	0.002
225	18.75	0.10	0.023	(0.101)	0.021	0.002
226	18.83	0.07	0.015	(0.101)	0.014	0.002
227	18.92	0.07	0.015	(0.100)	0.014	0.002
228	19.00	0.07	0.015	(0.100)	0.014	0.002
229	19.08	0.10	0.023	(0.100)	0.021	0.002
230	19.17	0.10	0.023	(0.099)	0.021	0.002
231	19.25	0.10	0.023	(0.099)	0.021	0.002
232	19.33	0.13	0.030	(0.098)	0.027	0.003
233	19.42	0.13	0.030	(0.098)	0.027	0.003

234	19.50	0.13	0.030	(0.097)	0.027	0.003
235	19.58	0.10	0.023	(0.097)	0.021	0.002
236	19.67	0.10	0.023	(0.096)	0.021	0.002
237	19.75	0.10	0.023	(0.096)	0.021	0.002
238	19.83	0.07	0.015	(0.095)	0.014	0.002
239	19.92	0.07	0.015	(0.095)	0.014	0.002
240	20.00	0.07	0.015	(0.095)	0.014	0.002
241	20.08	0.10	0.023	(0.094)	0.021	0.002
242	20.17	0.10	0.023	(0.094)	0.021	0.002
243	20.25	0.10	0.023	(0.093)	0.021	0.002
244	20.33	0.10	0.023	(0.093)	0.021	0.002
245	20.42	0.10	0.023	(0.093)	0.021	0.002
246	20.50	0.10	0.023	(0.092)	0.021	0.002
247	20.58	0.10	0.023	(0.092)	0.021	0.002
248	20.67	0.10	0.023	(0.091)	0.021	0.002
249	20.75	0.10	0.023	(0.091)	0.021	0.002
250	20.83	0.07	0.015	(0.091)	0.014	0.002
251	20.92	0.07	0.015	(0.090)	0.014	0.002
252	21.00	0.07	0.015	(0.090)	0.014	0.002
253	21.08	0.10	0.023	(0.090)	0.021	0.002
254	21.17	0.10	0.023	(0.089)	0.021	0.002
255	21.25	0.10	0.023	(0.089)	0.021	0.002
256	21.33	0.07	0.015	(0.089)	0.014	0.002
257	21.42	0.07	0.015	(0.088)	0.014	0.002
258	21.50	0.07	0.015	(0.088)	0.014	0.002
259	21.58	0.10	0.023	(0.088)	0.021	0.002
260	21.67	0.10	0.023	(0.087)	0.021	0.002
261	21.75	0.10	0.023	(0.087)	0.021	0.002
262	21.83	0.07	0.015	(0.087)	0.014	0.002
263	21.92	0.07	0.015	(0.086)	0.014	0.002
264	22.00	0.07	0.015	(0.086)	0.014	0.002
265	22.08	0.10	0.023	(0.086)	0.021	0.002
266	22.17	0.10	0.023	(0.085)	0.021	0.002
267	22.25	0.10	0.023	(0.085)	0.021	0.002
268	22.33	0.07	0.015	(0.085)	0.014	0.002
269	22.42	0.07	0.015	(0.085)	0.014	0.002
270	22.50	0.07	0.015	(0.084)	0.014	0.002
271	22.58	0.07	0.015	(0.084)	0.014	0.002
272	22.67	0.07	0.015	(0.084)	0.014	0.002
273	22.75	0.07	0.015	(0.084)	0.014	0.002
274	22.83	0.07	0.015	(0.083)	0.014	0.002
275	22.92	0.07	0.015	(0.083)	0.014	0.002
276	23.00	0.07	0.015	(0.083)	0.014	0.002
277	23.08	0.07	0.015	(0.083)	0.014	0.002
278	23.17	0.07	0.015	(0.083)	0.014	0.002
279	23.25	0.07	0.015	(0.083)	0.014	0.002
280	23.33	0.07	0.015	(0.082)	0.014	0.002
281	23.42	0.07	0.015	(0.082)	0.014	0.002
282	23.50	0.07	0.015	(0.082)	0.014	0.002
283	23.58	0.07	0.015	(0.082)	0.014	0.002
284	23.67	0.07	0.015	(0.082)	0.014	0.002
285	23.75	0.07	0.015	(0.082)	0.014	0.002
286	23.83	0.07	0.015	(0.082)	0.014	0.002
287	23.92	0.07	0.015	(0.082)	0.014	0.002
288	24.00	0.07	0.015	(0.081)	0.014	0.002
		(Loss Rate Not Used)				
	Sum =	100.0			Sum =	4.2

Flood volume = Effective rainfall 0.35(In)
times area 5.2(Ac.)/[(In)/(Ft.)] = 0.2(Ac.Ft)
Total soil loss = 1.55(In)
Total soil loss = 0.664(Ac.Ft)
Total rainfall = 1.90(In)
Flood volume = 6573.8 Cubic Feet
Total soil loss = 28945.4 Cubic Feet

Peak flow rate of this hydrograph = 0.610(CFS)

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24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0000	0.00	Q				
0+10	0.0001	0.01	Q				
0+15	0.0001	0.01	Q				
0+20	0.0002	0.01	Q				
0+25	0.0002	0.01	Q				
0+30	0.0003	0.01	Q				
0+35	0.0004	0.01	Q				
0+40	0.0005	0.01	Q				
0+45	0.0005	0.01	Q				
0+50	0.0006	0.01	Q				
0+55	0.0007	0.01	Q				
1+ 0	0.0008	0.02	Q				
1+ 5	0.0009	0.01	Q				
1+10	0.0010	0.01	Q				
1+15	0.0011	0.01	Q				
1+20	0.0012	0.01	Q				
1+25	0.0013	0.01	Q				
1+30	0.0014	0.01	Q				
1+35	0.0014	0.01	Q				
1+40	0.0015	0.01	Q				
1+45	0.0016	0.01	Q				
1+50	0.0017	0.01	Q				
1+55	0.0018	0.01	Q				
2+ 0	0.0019	0.02	Q				
2+ 5	0.0020	0.02	Q				
2+10	0.0021	0.02	Q				
2+15	0.0022	0.02	Q				
2+20	0.0023	0.02	Q				
2+25	0.0024	0.02	Q				
2+30	0.0026	0.02	Q				
2+35	0.0027	0.02	Q				
2+40	0.0028	0.02	Q				
2+45	0.0029	0.02	Q				
2+50	0.0031	0.02	Q				
2+55	0.0032	0.02	Q				
3+ 0	0.0033	0.02	Q				
3+ 5	0.0035	0.02	Q				
3+10	0.0036	0.02	Q				

3+15	0.0037	0.02	Q				
3+20	0.0039	0.02	QV				
3+25	0.0040	0.02	QV				
3+30	0.0042	0.02	QV				
3+35	0.0043	0.02	QV				
3+40	0.0044	0.02	QV				
3+45	0.0046	0.02	QV				
3+50	0.0047	0.02	QV				
3+55	0.0049	0.02	QV				
4+ 0	0.0050	0.02	QV				
4+ 5	0.0052	0.02	QV				
4+10	0.0053	0.02	QV				
4+15	0.0055	0.02	QV				
4+20	0.0057	0.02	QV				
4+25	0.0059	0.03	QV				
4+30	0.0060	0.03	QV				
4+35	0.0062	0.03	QV				
4+40	0.0064	0.03	QV				
4+45	0.0066	0.03	QV				
4+50	0.0068	0.03	QV				
4+55	0.0070	0.03	QV				
5+ 0	0.0072	0.03	QV				
5+ 5	0.0074	0.03	QV				
5+10	0.0076	0.03	Q V				
5+15	0.0078	0.02	Q V				
5+20	0.0080	0.03	Q V				
5+25	0.0081	0.03	Q V				
5+30	0.0083	0.03	Q V				
5+35	0.0085	0.03	Q V				
5+40	0.0087	0.03	Q V				
5+45	0.0089	0.03	Q V				
5+50	0.0092	0.03	Q V				
5+55	0.0094	0.03	Q V				
6+ 0	0.0096	0.03	Q V				
6+ 5	0.0098	0.03	Q V				
6+10	0.0101	0.03	Q V				
6+15	0.0103	0.04	Q V				
6+20	0.0105	0.04	Q V				
6+25	0.0108	0.04	Q V				
6+30	0.0110	0.04	Q V				
6+35	0.0113	0.04	Q V				
6+40	0.0115	0.04	Q V				
6+45	0.0118	0.04	Q V				
6+50	0.0121	0.04	Q V				
6+55	0.0124	0.04	Q V				
7+ 0	0.0126	0.04	Q V				
7+ 5	0.0129	0.04	Q V				
7+10	0.0132	0.04	Q V				
7+15	0.0134	0.04	Q V				
7+20	0.0137	0.04	Q V				
7+25	0.0140	0.04	Q V				
7+30	0.0143	0.04	Q V				
7+35	0.0146	0.04	Q V				
7+40	0.0149	0.05	Q V				
7+45	0.0152	0.05	Q V				
7+50	0.0156	0.05	Q V				
7+55	0.0159	0.05	Q V				

8+ 0	0.0163	0.05	Q	V	|	|	|	|
8+ 5	0.0166	0.05	Q	V	|	|	|	|
8+10	0.0170	0.06	Q	V	|	|	|	|
8+15	0.0174	0.06	Q	V	|	|	|	|
8+20	0.0178	0.06	Q	V	|	|	|	|
8+25	0.0182	0.06	Q	V	|	|	|	|
8+30	0.0186	0.06	Q	V	|	|	|	|
8+35	0.0191	0.06	Q	V	|	|	|	|
8+40	0.0195	0.06	Q	V	|	|	|	|
8+45	0.0199	0.06	Q	V	|	|	|	|
8+50	0.0204	0.06	Q	V	|	|	|	|
8+55	0.0208	0.07	Q	V	|	|	|	|
9+ 0	0.0213	0.07	Q	V	|	|	|	|
9+ 5	0.0217	0.07	Q	V	|	|	|	|
9+10	0.0222	0.07	Q	V	|	|	|	|
9+15	0.0228	0.07	Q	V	|	|	|	|
9+20	0.0233	0.08	Q	V	|	|	|	|
9+25	0.0238	0.08	Q	V	|	|	|	|
9+30	0.0243	0.08	Q	V	|	|	|	|
9+35	0.0249	0.08	Q	V	|	|	|	|
9+40	0.0255	0.08	Q	V	|	|	|	|
9+45	0.0260	0.08	Q	V	|	|	|	|
9+50	0.0266	0.08	Q	V	|	|	|	|
9+55	0.0272	0.09	Q	V	|	|	|	|
10+ 0	0.0278	0.09	Q	V	|	|	|	|
10+ 5	0.0283	0.08	Q	V	|	|	|	|
10+10	0.0288	0.07	Q	V	|	|	|	|
10+15	0.0292	0.06	Q	V	|	|	|	|
10+20	0.0296	0.06	Q	V	|	|	|	|
10+25	0.0301	0.06	Q	V	|	|	|	|
10+30	0.0305	0.06	Q	V	|	|	|	|
10+35	0.0309	0.06	Q	V	|	|	|	|
10+40	0.0314	0.07	Q	V	|	|	|	|
10+45	0.0319	0.08	Q	V	|	|	|	|
10+50	0.0325	0.08	Q	V	|	|	|	|
10+55	0.0330	0.08	Q	V	|	|	|	|
11+ 0	0.0336	0.08	Q	V	|	|	|	|
11+ 5	0.0341	0.08	Q	V	|	|	|	|
11+10	0.0346	0.08	Q	V	|	|	|	|
11+15	0.0351	0.08	Q	V	|	|	|	|
11+20	0.0357	0.08	Q	V	|	|	|	|
11+25	0.0362	0.08	Q	V	|	|	|	|
11+30	0.0367	0.08	Q	V	|	|	|	|
11+35	0.0372	0.07	Q	V	|	|	|	|
11+40	0.0377	0.07	Q	V	|	|	|	|
11+45	0.0381	0.07	Q	V	|	|	|	|
11+50	0.0386	0.07	Q	V	|	|	|	|
11+55	0.0391	0.07	Q	V	|	|	|	|
12+ 0	0.0396	0.07	Q	V	|	|	|	|
12+ 5	0.0403	0.10	Q	V	|	|	|	|
12+10	0.0414	0.16	Q	V	|	|	|	|
12+15	0.0427	0.18	Q	|V	|	|	|	|
12+20	0.0441	0.21	Q	|V	|	|	|	|
12+25	0.0457	0.23	Q	| V	|	|	|	|
12+30	0.0474	0.24	Q	| V	|	|	|	|
12+35	0.0493	0.27	|Q	| V	|	|	|	|
12+40	0.0514	0.32	|Q	| V	|	|	|	|

12+45	0.0537	0.33	|Q	| V	|	|	|
12+50	0.0561	0.35	|Q	| V	|	|	|
12+55	0.0587	0.38	|Q	| V	|	|	|
13+ 0	0.0614	0.39	|Q	| V	|	|	|
13+ 5	0.0644	0.44	|Q	| V	|	|	|
13+10	0.0682	0.54	| Q	| V	|	|	|
13+15	0.0721	0.58	| Q	| V|	|	|	|
13+20	0.0762	0.59	| Q	| V	|	|	|
13+25	0.0803	0.60	| Q	| |V	|	|	|
13+30	0.0845	0.61	| Q	| | V	|	|	|
13+35	0.0880	0.51	| Q	| | V	|	|	|
13+40	0.0901	0.30	|Q	| | V	|	|	|
13+45	0.0918	0.25	Q	| | V	|	|	|
13+50	0.0933	0.22	Q	| | V	|	|	|
13+55	0.0948	0.21	Q	| | V	|	|	|
14+ 0	0.0962	0.21	Q	| | V	|	|	|
14+ 5	0.0979	0.24	Q	| | V	|	|	|
14+10	0.1001	0.32	|Q	| | V	|	|	|
14+15	0.1025	0.35	|Q	| | V	|	|	|
14+20	0.1050	0.35	|Q	| | V	|	|	|
14+25	0.1073	0.34	|Q	| | V |	|	|	|
14+30	0.1097	0.34	|Q	| | V|	|	|	|
14+35	0.1121	0.35	|Q	| | V|	|	|	|
14+40	0.1145	0.35	|Q	| | V	|	|	|
14+45	0.1169	0.35	|Q	| | V	|	|	|
14+50	0.1192	0.34	|Q	| | |V	|	|	|
14+55	0.1215	0.33	|Q	| | | V	|	|	|
15+ 0	0.1238	0.33	|Q	| | | V	|	|	|
15+ 5	0.1259	0.32	|Q	| | | V	|	|	|
15+10	0.1280	0.30	|Q	| | | V	|	|	|
15+15	0.1301	0.30	|Q	| | | V	|	|	|
15+20	0.1321	0.29	|Q	| | | V	|	|	|
15+25	0.1339	0.27	|Q	| | | V	|	|	|
15+30	0.1358	0.27	|Q	| | | V	|	|	|
15+35	0.1374	0.23	Q	| | | V	|	|	|
15+40	0.1384	0.15	Q	| | | V	|	|	|
15+45	0.1394	0.14	Q	| | | V	|	|	|
15+50	0.1402	0.13	Q	| | | V	|	|	|
15+55	0.1411	0.13	Q	| | | V	|	|	|
16+ 0	0.1420	0.13	Q	| | | V	|	|	|
16+ 5	0.1427	0.10	Q	| | | V	|	|	|
16+10	0.1430	0.04	Q	| | | V	|	|	|
16+15	0.1432	0.03	Q	| | | V	|	|	|
16+20	0.1433	0.02	Q	| | | V	|	|	|
16+25	0.1435	0.02	Q	| | | V	|	|	|
16+30	0.1436	0.02	Q	| | | V	|	|	|
16+35	0.1437	0.01	Q	| | | V	|	|	|
16+40	0.1438	0.01	Q	| | | V	|	|	|
16+45	0.1439	0.01	Q	| | | V	|	|	|
16+50	0.1440	0.01	Q	| | | V	|	|	|
16+55	0.1440	0.01	Q	| | | V	|	|	|
17+ 0	0.1441	0.01	Q	| | | V	|	|	|
17+ 5	0.1442	0.01	Q	| | | V	|	|	|
17+10	0.1443	0.02	Q	| | | V	|	|	|
17+15	0.1445	0.02	Q	| | | V	|	|	|
17+20	0.1446	0.02	Q	| | | V	|	|	|
17+25	0.1447	0.02	Q	| | | V	|	|	|

17+30	0.1449	0.02	Q	|	|	|	V |
17+35	0.1450	0.02	Q	|	|	|	V |
17+40	0.1451	0.02	Q	|	|	|	V |
17+45	0.1453	0.02	Q	|	|	|	V |
17+50	0.1454	0.02	Q	|	|	|	V |
17+55	0.1455	0.02	Q	|	|	|	V |
18+ 0	0.1456	0.02	Q	|	|	|	V |
18+ 5	0.1457	0.02	Q	|	|	|	V |
18+10	0.1459	0.02	Q	|	|	|	V |
18+15	0.1460	0.02	Q	|	|	|	V |
18+20	0.1461	0.02	Q	|	|	|	V |
18+25	0.1462	0.02	Q	|	|	|	V |
18+30	0.1463	0.02	Q	|	|	|	V |
18+35	0.1464	0.01	Q	|	|	|	V |
18+40	0.1465	0.01	Q	|	|	|	V |
18+45	0.1466	0.01	Q	|	|	|	V |
18+50	0.1466	0.01	Q	|	|	|	V |
18+55	0.1467	0.01	Q	|	|	|	V |
19+ 0	0.1468	0.01	Q	|	|	|	V |
19+ 5	0.1468	0.01	Q	|	|	|	V |
19+10	0.1469	0.01	Q	|	|	|	V |
19+15	0.1470	0.01	Q	|	|	|	V |
19+20	0.1471	0.01	Q	|	|	|	V |
19+25	0.1472	0.01	Q	|	|	|	V|
19+30	0.1473	0.02	Q	|	|	|	V|
19+35	0.1474	0.01	Q	|	|	|	V|
19+40	0.1475	0.01	Q	|	|	|	V|
19+45	0.1475	0.01	Q	|	|	|	V|
19+50	0.1476	0.01	Q	|	|	|	V|
19+55	0.1477	0.01	Q	|	|	|	V|
20+ 0	0.1477	0.01	Q	|	|	|	V|
20+ 5	0.1478	0.01	Q	|	|	|	V|
20+10	0.1479	0.01	Q	|	|	|	V|
20+15	0.1480	0.01	Q	|	|	|	V|
20+20	0.1480	0.01	Q	|	|	|	V|
20+25	0.1481	0.01	Q	|	|	|	V|
20+30	0.1482	0.01	Q	|	|	|	V|
20+35	0.1483	0.01	Q	|	|	|	V|
20+40	0.1484	0.01	Q	|	|	|	V|
20+45	0.1484	0.01	Q	|	|	|	V|
20+50	0.1485	0.01	Q	|	|	|	V|
20+55	0.1486	0.01	Q	|	|	|	V|
21+ 0	0.1486	0.01	Q	|	|	|	V|
21+ 5	0.1487	0.01	Q	|	|	|	V|
21+10	0.1488	0.01	Q	|	|	|	V|
21+15	0.1489	0.01	Q	|	|	|	V|
21+20	0.1489	0.01	Q	|	|	|	V|
21+25	0.1490	0.01	Q	|	|	|	V|
21+30	0.1490	0.01	Q	|	|	|	V|
21+35	0.1491	0.01	Q	|	|	|	V|
21+40	0.1492	0.01	Q	|	|	|	V|
21+45	0.1493	0.01	Q	|	|	|	V|
21+50	0.1493	0.01	Q	|	|	|	V|
21+55	0.1494	0.01	Q	|	|	|	V|
22+ 0	0.1495	0.01	Q	|	|	|	V|
22+ 5	0.1495	0.01	Q	|	|	|	V|
22+10	0.1496	0.01	Q	|	|	|	V|

22+15	0.1497	0.01	Q	|	|	|	V|
22+20	0.1497	0.01	Q	|	|	|	V|
22+25	0.1498	0.01	Q	|	|	|	V|
22+30	0.1499	0.01	Q	|	|	|	V|
22+35	0.1499	0.01	Q	|	|	|	V|
22+40	0.1500	0.01	Q	|	|	|	V|
22+45	0.1500	0.01	Q	|	|	|	V|
22+50	0.1501	0.01	Q	|	|	|	V|
22+55	0.1501	0.01	Q	|	|	|	V|
23+ 0	0.1502	0.01	Q	|	|	|	V|
23+ 5	0.1502	0.01	Q	|	|	|	V|
23+10	0.1503	0.01	Q	|	|	|	V|
23+15	0.1504	0.01	Q	|	|	|	V|
23+20	0.1504	0.01	Q	|	|	|	V|
23+25	0.1505	0.01	Q	|	|	|	V|
23+30	0.1505	0.01	Q	|	|	|	V|
23+35	0.1506	0.01	Q	|	|	|	V|
23+40	0.1506	0.01	Q	|	|	|	V|
23+45	0.1507	0.01	Q	|	|	|	V|
23+50	0.1507	0.01	Q	|	|	|	V|
23+55	0.1508	0.01	Q	|	|	|	V|
24+ 0	0.1508	0.01	Q	|	|	|	V|
24+ 5	0.1509	0.01	Q	|	|	|	V|
24+10	0.1509	0.00	Q	|	|	|	V|
24+15	0.1509	0.00	Q	|	|	|	V|
24+20	0.1509	0.00	Q	|	|	|	V|
24+25	0.1509	0.00	Q	|	|	|	V|
24+30	0.1509	0.00	Q	|	|	|	V|

U n i t H y d r o g r a p h A n a l y s i s

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Study date 11/05/21 File: northdevA2242.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 4011

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Evans Community Park 2-year, 24-hour Storm Event
Developed Condition (Northerly Portion of Site)
Job 21-003
11/5/21

Drainage Area = 5.24(Ac.) = 0.008 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 5.24(Ac.) = 0.008 Sq. Mi.
Length along longest watercourse = 828.00(Ft.)
Length along longest watercourse measured to centroid = 472.00(Ft.)
Length along longest watercourse = 0.157 Mi.
Length along longest watercourse measured to centroid = 0.089 Mi.
Difference in elevation = 7.00(Ft.)
Slope along watercourse = 44.6377 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.035 Hr.
Lag time = 2.07 Min.
25% of lag time = 0.52 Min.
40% of lag time = 0.83 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.24	1.90	9.96

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]

5.24 5.00 26.20

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 1.900(In)
Area Averaged 100-Year Rainfall = 5.000(In)

Point rain (area averaged) = 1.900(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.900(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
1.048	100.00	1.000
4.192	77.00	0.000

Total Area Entered = 5.24(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
100.0	100.0	0.000	1.000	0.000	0.200	0.000
77.0	77.0	0.279	0.000	0.279	0.800	0.224
					Sum (F) =	0.224

Area averaged mean soil loss (F) (In/Hr) = 0.224
Minimum soil loss rate ((In/Hr)) = 0.112
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.740

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	241.108	49.710	2.625
2	0.167	482.216	40.611	2.145
3	0.250	723.324	7.315	0.386
4	0.333	964.433	2.364	0.125
		Sum = 100.000	Sum=	5.281

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.015	(0.396)	0.011	0.004
2	0.17	0.07	0.015	(0.395)	0.011	0.004
3	0.25	0.07	0.015	(0.393)	0.011	0.004
4	0.33	0.10	0.023	(0.392)	0.017	0.006
5	0.42	0.10	0.023	(0.390)	0.017	0.006
6	0.50	0.10	0.023	(0.389)	0.017	0.006
7	0.58	0.10	0.023	(0.387)	0.017	0.006
8	0.67	0.10	0.023	(0.386)	0.017	0.006

9	0.75	0.10	0.023	(0.384)	0.017	0.006
10	0.83	0.13	0.030	(0.383)	0.022	0.008
11	0.92	0.13	0.030	(0.381)	0.022	0.008
12	1.00	0.13	0.030	(0.380)	0.022	0.008
13	1.08	0.10	0.023	(0.378)	0.017	0.006
14	1.17	0.10	0.023	(0.377)	0.017	0.006
15	1.25	0.10	0.023	(0.375)	0.017	0.006
16	1.33	0.10	0.023	(0.374)	0.017	0.006
17	1.42	0.10	0.023	(0.372)	0.017	0.006
18	1.50	0.10	0.023	(0.371)	0.017	0.006
19	1.58	0.10	0.023	(0.369)	0.017	0.006
20	1.67	0.10	0.023	(0.368)	0.017	0.006
21	1.75	0.10	0.023	(0.366)	0.017	0.006
22	1.83	0.13	0.030	(0.365)	0.022	0.008
23	1.92	0.13	0.030	(0.363)	0.022	0.008
24	2.00	0.13	0.030	(0.362)	0.022	0.008
25	2.08	0.13	0.030	(0.360)	0.022	0.008
26	2.17	0.13	0.030	(0.359)	0.022	0.008
27	2.25	0.13	0.030	(0.357)	0.022	0.008
28	2.33	0.13	0.030	(0.356)	0.022	0.008
29	2.42	0.13	0.030	(0.354)	0.022	0.008
30	2.50	0.13	0.030	(0.353)	0.022	0.008
31	2.58	0.17	0.038	(0.352)	0.028	0.010
32	2.67	0.17	0.038	(0.350)	0.028	0.010
33	2.75	0.17	0.038	(0.349)	0.028	0.010
34	2.83	0.17	0.038	(0.347)	0.028	0.010
35	2.92	0.17	0.038	(0.346)	0.028	0.010
36	3.00	0.17	0.038	(0.344)	0.028	0.010
37	3.08	0.17	0.038	(0.343)	0.028	0.010
38	3.17	0.17	0.038	(0.342)	0.028	0.010
39	3.25	0.17	0.038	(0.340)	0.028	0.010
40	3.33	0.17	0.038	(0.339)	0.028	0.010
41	3.42	0.17	0.038	(0.337)	0.028	0.010
42	3.50	0.17	0.038	(0.336)	0.028	0.010
43	3.58	0.17	0.038	(0.334)	0.028	0.010
44	3.67	0.17	0.038	(0.333)	0.028	0.010
45	3.75	0.17	0.038	(0.332)	0.028	0.010
46	3.83	0.20	0.046	(0.330)	0.034	0.012
47	3.92	0.20	0.046	(0.329)	0.034	0.012
48	4.00	0.20	0.046	(0.327)	0.034	0.012
49	4.08	0.20	0.046	(0.326)	0.034	0.012
50	4.17	0.20	0.046	(0.325)	0.034	0.012
51	4.25	0.20	0.046	(0.323)	0.034	0.012
52	4.33	0.23	0.053	(0.322)	0.039	0.014
53	4.42	0.23	0.053	(0.321)	0.039	0.014
54	4.50	0.23	0.053	(0.319)	0.039	0.014
55	4.58	0.23	0.053	(0.318)	0.039	0.014
56	4.67	0.23	0.053	(0.316)	0.039	0.014
57	4.75	0.23	0.053	(0.315)	0.039	0.014
58	4.83	0.27	0.061	(0.314)	0.045	0.016
59	4.92	0.27	0.061	(0.312)	0.045	0.016
60	5.00	0.27	0.061	(0.311)	0.045	0.016
61	5.08	0.20	0.046	(0.310)	0.034	0.012
62	5.17	0.20	0.046	(0.308)	0.034	0.012
63	5.25	0.20	0.046	(0.307)	0.034	0.012
64	5.33	0.23	0.053	(0.306)	0.039	0.014
65	5.42	0.23	0.053	(0.304)	0.039	0.014

66	5.50	0.23	0.053	(0.303)	0.039	0.014
67	5.58	0.27	0.061	(0.302)	0.045	0.016
68	5.67	0.27	0.061	(0.300)	0.045	0.016
69	5.75	0.27	0.061	(0.299)	0.045	0.016
70	5.83	0.27	0.061	(0.298)	0.045	0.016
71	5.92	0.27	0.061	(0.296)	0.045	0.016
72	6.00	0.27	0.061	(0.295)	0.045	0.016
73	6.08	0.30	0.068	(0.294)	0.051	0.018
74	6.17	0.30	0.068	(0.292)	0.051	0.018
75	6.25	0.30	0.068	(0.291)	0.051	0.018
76	6.33	0.30	0.068	(0.290)	0.051	0.018
77	6.42	0.30	0.068	(0.289)	0.051	0.018
78	6.50	0.30	0.068	(0.287)	0.051	0.018
79	6.58	0.33	0.076	(0.286)	0.056	0.020
80	6.67	0.33	0.076	(0.285)	0.056	0.020
81	6.75	0.33	0.076	(0.283)	0.056	0.020
82	6.83	0.33	0.076	(0.282)	0.056	0.020
83	6.92	0.33	0.076	(0.281)	0.056	0.020
84	7.00	0.33	0.076	(0.280)	0.056	0.020
85	7.08	0.33	0.076	(0.278)	0.056	0.020
86	7.17	0.33	0.076	(0.277)	0.056	0.020
87	7.25	0.33	0.076	(0.276)	0.056	0.020
88	7.33	0.37	0.084	(0.274)	0.062	0.022
89	7.42	0.37	0.084	(0.273)	0.062	0.022
90	7.50	0.37	0.084	(0.272)	0.062	0.022
91	7.58	0.40	0.091	(0.271)	0.067	0.024
92	7.67	0.40	0.091	(0.269)	0.067	0.024
93	7.75	0.40	0.091	(0.268)	0.067	0.024
94	7.83	0.43	0.099	(0.267)	0.073	0.026
95	7.92	0.43	0.099	(0.266)	0.073	0.026
96	8.00	0.43	0.099	(0.265)	0.073	0.026
97	8.08	0.50	0.114	(0.263)	0.084	0.030
98	8.17	0.50	0.114	(0.262)	0.084	0.030
99	8.25	0.50	0.114	(0.261)	0.084	0.030
100	8.33	0.50	0.114	(0.260)	0.084	0.030
101	8.42	0.50	0.114	(0.258)	0.084	0.030
102	8.50	0.50	0.114	(0.257)	0.084	0.030
103	8.58	0.53	0.122	(0.256)	0.090	0.032
104	8.67	0.53	0.122	(0.255)	0.090	0.032
105	8.75	0.53	0.122	(0.254)	0.090	0.032
106	8.83	0.57	0.129	(0.252)	0.096	0.034
107	8.92	0.57	0.129	(0.251)	0.096	0.034
108	9.00	0.57	0.129	(0.250)	0.096	0.034
109	9.08	0.63	0.144	(0.249)	0.107	0.038
110	9.17	0.63	0.144	(0.248)	0.107	0.038
111	9.25	0.63	0.144	(0.246)	0.107	0.038
112	9.33	0.67	0.152	(0.245)	0.112	0.040
113	9.42	0.67	0.152	(0.244)	0.112	0.040
114	9.50	0.67	0.152	(0.243)	0.112	0.040
115	9.58	0.70	0.160	(0.242)	0.118	0.041
116	9.67	0.70	0.160	(0.241)	0.118	0.041
117	9.75	0.70	0.160	(0.239)	0.118	0.041
118	9.83	0.73	0.167	(0.238)	0.124	0.043
119	9.92	0.73	0.167	(0.237)	0.124	0.043
120	10.00	0.73	0.167	(0.236)	0.124	0.043
121	10.08	0.50	0.114	(0.235)	0.084	0.030
122	10.17	0.50	0.114	(0.234)	0.084	0.030

123	10.25	0.50	0.114	(0.233)	0.084	0.030
124	10.33	0.50	0.114	(0.231)	0.084	0.030
125	10.42	0.50	0.114	(0.230)	0.084	0.030
126	10.50	0.50	0.114	(0.229)	0.084	0.030
127	10.58	0.67	0.152	(0.228)	0.112	0.040
128	10.67	0.67	0.152	(0.227)	0.112	0.040
129	10.75	0.67	0.152	(0.226)	0.112	0.040
130	10.83	0.67	0.152	(0.225)	0.112	0.040
131	10.92	0.67	0.152	(0.224)	0.112	0.040
132	11.00	0.67	0.152	(0.223)	0.112	0.040
133	11.08	0.63	0.144	(0.221)	0.107	0.038
134	11.17	0.63	0.144	(0.220)	0.107	0.038
135	11.25	0.63	0.144	(0.219)	0.107	0.038
136	11.33	0.63	0.144	(0.218)	0.107	0.038
137	11.42	0.63	0.144	(0.217)	0.107	0.038
138	11.50	0.63	0.144	(0.216)	0.107	0.038
139	11.58	0.57	0.129	(0.215)	0.096	0.034
140	11.67	0.57	0.129	(0.214)	0.096	0.034
141	11.75	0.57	0.129	(0.213)	0.096	0.034
142	11.83	0.60	0.137	(0.212)	0.101	0.036
143	11.92	0.60	0.137	(0.211)	0.101	0.036
144	12.00	0.60	0.137	(0.210)	0.101	0.036
145	12.08	0.83	0.190	(0.209)	0.141	0.049
146	12.17	0.83	0.190	(0.208)	0.141	0.049
147	12.25	0.83	0.190	(0.207)	0.141	0.049
148	12.33	0.87	0.198	(0.206)	0.146	0.051
149	12.42	0.87	0.198	(0.204)	0.146	0.051
150	12.50	0.87	0.198	(0.203)	0.146	0.051
151	12.58	0.93	0.213	(0.202)	0.157	0.055
152	12.67	0.93	0.213	(0.201)	0.157	0.055
153	12.75	0.93	0.213	(0.200)	0.157	0.055
154	12.83	0.97	0.220	(0.199)	0.163	0.057
155	12.92	0.97	0.220	(0.198)	0.163	0.057
156	13.00	0.97	0.220	(0.197)	0.163	0.057
157	13.08	1.13	0.258	(0.196)	0.191	0.067
158	13.17	1.13	0.258	(0.195)	0.191	0.067
159	13.25	1.13	0.258	(0.194)	0.191	0.067
160	13.33	1.13	0.258	(0.193)	0.191	0.067
161	13.42	1.13	0.258	(0.192)	0.191	0.067
162	13.50	1.13	0.258	(0.191)	0.191	0.067
163	13.58	0.77	0.175	(0.190)	0.129	0.045
164	13.67	0.77	0.175	(0.190)	0.129	0.045
165	13.75	0.77	0.175	(0.189)	0.129	0.045
166	13.83	0.77	0.175	(0.188)	0.129	0.045
167	13.92	0.77	0.175	(0.187)	0.129	0.045
168	14.00	0.77	0.175	(0.186)	0.129	0.045
169	14.08	0.90	0.205	(0.185)	0.152	0.053
170	14.17	0.90	0.205	(0.184)	0.152	0.053
171	14.25	0.90	0.205	(0.183)	0.152	0.053
172	14.33	0.87	0.198	(0.182)	0.146	0.051
173	14.42	0.87	0.198	(0.181)	0.146	0.051
174	14.50	0.87	0.198	(0.180)	0.146	0.051
175	14.58	0.87	0.198	(0.179)	0.146	0.051
176	14.67	0.87	0.198	(0.178)	0.146	0.051
177	14.75	0.87	0.198	(0.177)	0.146	0.051
178	14.83	0.83	0.190	(0.176)	0.141	0.049
179	14.92	0.83	0.190	(0.175)	0.141	0.049

180	15.00	0.83	0.190	(0.175)	0.141	0.049
181	15.08	0.80	0.182	(0.174)	0.135	0.047
182	15.17	0.80	0.182	(0.173)	0.135	0.047
183	15.25	0.80	0.182	(0.172)	0.135	0.047
184	15.33	0.77	0.175	(0.171)	0.129	0.045
185	15.42	0.77	0.175	(0.170)	0.129	0.045
186	15.50	0.77	0.175	(0.169)	0.129	0.045
187	15.58	0.63	0.144	(0.168)	0.107	0.038
188	15.67	0.63	0.144	(0.168)	0.107	0.038
189	15.75	0.63	0.144	(0.167)	0.107	0.038
190	15.83	0.63	0.144	(0.166)	0.107	0.038
191	15.92	0.63	0.144	(0.165)	0.107	0.038
192	16.00	0.63	0.144	(0.164)	0.107	0.038
193	16.08	0.13	0.030	(0.163)	0.022	0.008
194	16.17	0.13	0.030	(0.162)	0.022	0.008
195	16.25	0.13	0.030	(0.162)	0.022	0.008
196	16.33	0.13	0.030	(0.161)	0.022	0.008
197	16.42	0.13	0.030	(0.160)	0.022	0.008
198	16.50	0.13	0.030	(0.159)	0.022	0.008
199	16.58	0.10	0.023	(0.158)	0.017	0.006
200	16.67	0.10	0.023	(0.158)	0.017	0.006
201	16.75	0.10	0.023	(0.157)	0.017	0.006
202	16.83	0.10	0.023	(0.156)	0.017	0.006
203	16.92	0.10	0.023	(0.155)	0.017	0.006
204	17.00	0.10	0.023	(0.154)	0.017	0.006
205	17.08	0.17	0.038	(0.154)	0.028	0.010
206	17.17	0.17	0.038	(0.153)	0.028	0.010
207	17.25	0.17	0.038	(0.152)	0.028	0.010
208	17.33	0.17	0.038	(0.151)	0.028	0.010
209	17.42	0.17	0.038	(0.151)	0.028	0.010
210	17.50	0.17	0.038	(0.150)	0.028	0.010
211	17.58	0.17	0.038	(0.149)	0.028	0.010
212	17.67	0.17	0.038	(0.148)	0.028	0.010
213	17.75	0.17	0.038	(0.148)	0.028	0.010
214	17.83	0.13	0.030	(0.147)	0.022	0.008
215	17.92	0.13	0.030	(0.146)	0.022	0.008
216	18.00	0.13	0.030	(0.145)	0.022	0.008
217	18.08	0.13	0.030	(0.145)	0.022	0.008
218	18.17	0.13	0.030	(0.144)	0.022	0.008
219	18.25	0.13	0.030	(0.143)	0.022	0.008
220	18.33	0.13	0.030	(0.143)	0.022	0.008
221	18.42	0.13	0.030	(0.142)	0.022	0.008
222	18.50	0.13	0.030	(0.141)	0.022	0.008
223	18.58	0.10	0.023	(0.140)	0.017	0.006
224	18.67	0.10	0.023	(0.140)	0.017	0.006
225	18.75	0.10	0.023	(0.139)	0.017	0.006
226	18.83	0.07	0.015	(0.138)	0.011	0.004
227	18.92	0.07	0.015	(0.138)	0.011	0.004
228	19.00	0.07	0.015	(0.137)	0.011	0.004
229	19.08	0.10	0.023	(0.137)	0.017	0.006
230	19.17	0.10	0.023	(0.136)	0.017	0.006
231	19.25	0.10	0.023	(0.135)	0.017	0.006
232	19.33	0.13	0.030	(0.135)	0.022	0.008
233	19.42	0.13	0.030	(0.134)	0.022	0.008
234	19.50	0.13	0.030	(0.133)	0.022	0.008
235	19.58	0.10	0.023	(0.133)	0.017	0.006
236	19.67	0.10	0.023	(0.132)	0.017	0.006

237	19.75	0.10	0.023	(0.132)	0.017	0.006
238	19.83	0.07	0.015	(0.131)	0.011	0.004
239	19.92	0.07	0.015	(0.130)	0.011	0.004
240	20.00	0.07	0.015	(0.130)	0.011	0.004
241	20.08	0.10	0.023	(0.129)	0.017	0.006
242	20.17	0.10	0.023	(0.129)	0.017	0.006
243	20.25	0.10	0.023	(0.128)	0.017	0.006
244	20.33	0.10	0.023	(0.128)	0.017	0.006
245	20.42	0.10	0.023	(0.127)	0.017	0.006
246	20.50	0.10	0.023	(0.126)	0.017	0.006
247	20.58	0.10	0.023	(0.126)	0.017	0.006
248	20.67	0.10	0.023	(0.125)	0.017	0.006
249	20.75	0.10	0.023	(0.125)	0.017	0.006
250	20.83	0.07	0.015	(0.124)	0.011	0.004
251	20.92	0.07	0.015	(0.124)	0.011	0.004
252	21.00	0.07	0.015	(0.123)	0.011	0.004
253	21.08	0.10	0.023	(0.123)	0.017	0.006
254	21.17	0.10	0.023	(0.122)	0.017	0.006
255	21.25	0.10	0.023	(0.122)	0.017	0.006
256	21.33	0.07	0.015	(0.121)	0.011	0.004
257	21.42	0.07	0.015	(0.121)	0.011	0.004
258	21.50	0.07	0.015	(0.121)	0.011	0.004
259	21.58	0.10	0.023	(0.120)	0.017	0.006
260	21.67	0.10	0.023	(0.120)	0.017	0.006
261	21.75	0.10	0.023	(0.119)	0.017	0.006
262	21.83	0.07	0.015	(0.119)	0.011	0.004
263	21.92	0.07	0.015	(0.118)	0.011	0.004
264	22.00	0.07	0.015	(0.118)	0.011	0.004
265	22.08	0.10	0.023	(0.118)	0.017	0.006
266	22.17	0.10	0.023	(0.117)	0.017	0.006
267	22.25	0.10	0.023	(0.117)	0.017	0.006
268	22.33	0.07	0.015	(0.117)	0.011	0.004
269	22.42	0.07	0.015	(0.116)	0.011	0.004
270	22.50	0.07	0.015	(0.116)	0.011	0.004
271	22.58	0.07	0.015	(0.115)	0.011	0.004
272	22.67	0.07	0.015	(0.115)	0.011	0.004
273	22.75	0.07	0.015	(0.115)	0.011	0.004
274	22.83	0.07	0.015	(0.115)	0.011	0.004
275	22.92	0.07	0.015	(0.114)	0.011	0.004
276	23.00	0.07	0.015	(0.114)	0.011	0.004
277	23.08	0.07	0.015	(0.114)	0.011	0.004
278	23.17	0.07	0.015	(0.113)	0.011	0.004
279	23.25	0.07	0.015	(0.113)	0.011	0.004
280	23.33	0.07	0.015	(0.113)	0.011	0.004
281	23.42	0.07	0.015	(0.113)	0.011	0.004
282	23.50	0.07	0.015	(0.113)	0.011	0.004
283	23.58	0.07	0.015	(0.112)	0.011	0.004
284	23.67	0.07	0.015	(0.112)	0.011	0.004
285	23.75	0.07	0.015	(0.112)	0.011	0.004
286	23.83	0.07	0.015	(0.112)	0.011	0.004
287	23.92	0.07	0.015	(0.112)	0.011	0.004
288	24.00	0.07	0.015	(0.112)	0.011	0.004

(Loss Rate Not Used)

Sum = 100.0 Sum = 5.9

Flood volume = Effective rainfall 0.49(In)

times area 5.2(Ac.)/[(In)/(Ft.)] = 0.2(Ac.Ft)

Total soil loss = 1.41(In)

Total soil loss = 0.614(Ac.Ft)
Total rainfall = 1.90(In)
Flood volume = 9396.4 Cubic Feet
Total soil loss = 26743.5 Cubic Feet

Peak flow rate of this hydrograph = 0.355(CFS)

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24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0001	0.01	Q				
0+10	0.0002	0.02	Q				
0+15	0.0003	0.02	Q				
0+20	0.0005	0.03	Q				
0+25	0.0007	0.03	Q				
0+30	0.0009	0.03	Q				
0+35	0.0012	0.03	Q				
0+40	0.0014	0.03	Q				
0+45	0.0016	0.03	Q				
0+50	0.0018	0.04	Q				
0+55	0.0021	0.04	Q				
1+ 0	0.0024	0.04	Q				
1+ 5	0.0027	0.04	Q				
1+10	0.0029	0.03	Q				
1+15	0.0031	0.03	Q				
1+20	0.0033	0.03	Q				
1+25	0.0035	0.03	Q				
1+30	0.0037	0.03	Q				
1+35	0.0040	0.03	Q				
1+40	0.0042	0.03	Q				
1+45	0.0044	0.03	Q				
1+50	0.0046	0.04	Q				
1+55	0.0049	0.04	Q				
2+ 0	0.0052	0.04	Q				
2+ 5	0.0055	0.04	QV				
2+10	0.0058	0.04	QV				
2+15	0.0061	0.04	QV				
2+20	0.0064	0.04	QV				
2+25	0.0067	0.04	QV				
2+30	0.0069	0.04	QV				
2+35	0.0073	0.05	QV				
2+40	0.0076	0.05	QV				
2+45	0.0080	0.05	QV				
2+50	0.0083	0.05	QV				
2+55	0.0087	0.05	QV				
3+ 0	0.0091	0.05	QV				
3+ 5	0.0094	0.05	QV				
3+10	0.0098	0.05	QV				
3+15	0.0101	0.05	QV				
3+20	0.0105	0.05	QV				
3+25	0.0108	0.05	Q V				

3+30	0.0112	0.05	Q V	|	|	|	|
3+35	0.0116	0.05	Q V	|	|	|	|
3+40	0.0119	0.05	Q V	|	|	|	|
3+45	0.0123	0.05	Q V	|	|	|	|
3+50	0.0127	0.06	Q V	|	|	|	|
3+55	0.0131	0.06	Q V	|	|	|	|
4+ 0	0.0135	0.06	Q V	|	|	|	|
4+ 5	0.0140	0.06	Q V	|	|	|	|
4+10	0.0144	0.06	Q V	|	|	|	|
4+15	0.0148	0.06	Q V	|	|	|	|
4+20	0.0153	0.07	Q V	|	|	|	|
4+25	0.0158	0.07	Q V	|	|	|	|
4+30	0.0163	0.07	Q V	|	|	|	|
4+35	0.0168	0.07	Q V	|	|	|	|
4+40	0.0173	0.07	Q V	|	|	|	|
4+45	0.0178	0.07	Q V	|	|	|	|
4+50	0.0183	0.08	Q V	|	|	|	|
4+55	0.0189	0.08	Q V	|	|	|	|
5+ 0	0.0195	0.08	Q V	|	|	|	|
5+ 5	0.0200	0.07	Q V	|	|	|	|
5+10	0.0204	0.06	Q V	|	|	|	|
5+15	0.0209	0.06	Q V	|	|	|	|
5+20	0.0213	0.07	Q V	|	|	|	|
5+25	0.0218	0.07	Q V	|	|	|	|
5+30	0.0223	0.07	Q V	|	|	|	|
5+35	0.0229	0.08	Q V	|	|	|	|
5+40	0.0234	0.08	Q V	|	|	|	|
5+45	0.0240	0.08	Q V	|	|	|	|
5+50	0.0246	0.08	Q V	|	|	|	|
5+55	0.0252	0.08	Q V	|	|	|	|
6+ 0	0.0257	0.08	Q V	|	|	|	|
6+ 5	0.0264	0.09	Q V	|	|	|	|
6+10	0.0270	0.09	Q V	|	|	|	|
6+15	0.0276	0.09	Q V	|	|	|	|
6+20	0.0283	0.09	Q V	|	|	|	|
6+25	0.0289	0.09	Q V	|	|	|	|
6+30	0.0296	0.09	Q V	|	|	|	|
6+35	0.0303	0.10	Q V	|	|	|	|
6+40	0.0310	0.10	Q V	|	|	|	|
6+45	0.0317	0.10	Q V	|	|	|	|
6+50	0.0324	0.10	Q V	|	|	|	|
6+55	0.0331	0.10	Q V	|	|	|	|
7+ 0	0.0338	0.10	Q V	|	|	|	|
7+ 5	0.0346	0.10	Q V	|	|	|	|
7+10	0.0353	0.10	Q V	|	|	|	|
7+15	0.0360	0.10	Q V	|	|	|	|
7+20	0.0368	0.11	Q V	|	|	|	|
7+25	0.0375	0.11	Q V	|	|	|	|
7+30	0.0383	0.11	Q V	|	|	|	|
7+35	0.0392	0.12	Q V	|	|	|	|
7+40	0.0400	0.12	Q V	|	|	|	|
7+45	0.0409	0.13	Q V	|	|	|	|
7+50	0.0418	0.13	Q V	|	|	|	|
7+55	0.0427	0.13	Q V	|	|	|	|
8+ 0	0.0436	0.14	Q V	|	|	|	|
8+ 5	0.0446	0.15	Q V	|	|	|	|
8+10	0.0457	0.15	Q V	|	|	|	|

8+15	0.0468	0.16	Q	V	|	|	|	|
8+20	0.0479	0.16	Q	V	|	|	|	|
8+25	0.0489	0.16	Q		V|	|	|	|
8+30	0.0500	0.16	Q		V|	|	|	|
8+35	0.0511	0.16	Q		V|	|	|	|
8+40	0.0523	0.17	Q		V|	|	|	|
8+45	0.0534	0.17	Q		V|	|	|	|
8+50	0.0546	0.17	Q		V	|	|	|
8+55	0.0558	0.18	Q		V	|	|	|
9+ 0	0.0570	0.18	Q		V	|	|	|
9+ 5	0.0583	0.19	Q		V	|	|	|
9+10	0.0597	0.20	Q		|V	|	|	|
9+15	0.0611	0.20	Q		|V	|	|	|
9+20	0.0625	0.20	Q		|V	|	|	|
9+25	0.0639	0.21	Q		|V	|	|	|
9+30	0.0653	0.21	Q		| V	|	|	|
9+35	0.0668	0.21	Q		| V	|	|	|
9+40	0.0683	0.22	Q		| V	|	|	|
9+45	0.0698	0.22	Q		| V	|	|	|
9+50	0.0714	0.22	Q		| V	|	|	|
9+55	0.0729	0.23	Q		| V	|	|	|
10+ 0	0.0745	0.23	Q		| V	|	|	|
10+ 5	0.0758	0.19	Q		| V	|	|	|
10+10	0.0770	0.16	Q		| V	|	|	|
10+15	0.0781	0.16	Q		| V	|	|	|
10+20	0.0791	0.16	Q		| V	|	|	|
10+25	0.0802	0.16	Q		| V	|	|	|
10+30	0.0813	0.16	Q		| V	|	|	|
10+35	0.0826	0.18	Q		| V	|	|	|
10+40	0.0840	0.20	Q		| V	|	|	|
10+45	0.0854	0.21	Q		| V	|	|	|
10+50	0.0868	0.21	Q		| V	|	|	|
10+55	0.0883	0.21	Q		| V	|	|	|
11+ 0	0.0897	0.21	Q		| V	|	|	|
11+ 5	0.0911	0.20	Q		| V	|	|	|
11+10	0.0925	0.20	Q		| V	|	|	|
11+15	0.0938	0.20	Q		| V	|	|	|
11+20	0.0952	0.20	Q		| V	|	|	|
11+25	0.0966	0.20	Q		| V	|	|	|
11+30	0.0979	0.20	Q		| V	|	|	|
11+35	0.0992	0.19	Q		| V	|	|	|
11+40	0.1005	0.18	Q		| V	|	|	|
11+45	0.1017	0.18	Q		| V	|	|	|
11+50	0.1030	0.18	Q		| V	|	|	|
11+55	0.1042	0.19	Q		| V	|	|	|
12+ 0	0.1055	0.19	Q		| V	|	|	|
12+ 5	0.1071	0.22	Q		| V	|	|	|
12+10	0.1088	0.25	|Q		| V	|	|	|
12+15	0.1106	0.26	|Q		| V	|	|	|
12+20	0.1125	0.27	|Q		| V	|	|	|
12+25	0.1143	0.27	|Q		| |V	|	|	|
12+30	0.1162	0.27	|Q		| |V	|	|	|
12+35	0.1181	0.28	|Q		| |V	|	|	|
12+40	0.1201	0.29	|Q		| | V	|	|	|
12+45	0.1221	0.29	|Q		| | V	|	|	|
12+50	0.1242	0.30	|Q		| | V	|	|	|
12+55	0.1263	0.30	|Q		| | V	|	|	|

13+ 0	0.1283	0.30	|Q	|	|	V |	|
13+ 5	0.1306	0.33	|Q	|	|	V |	|
13+10	0.1330	0.35	|Q	|	|	V |	|
13+15	0.1355	0.35	|Q	|	|	V |	|
13+20	0.1379	0.35	|Q	|	|	V |	|
13+25	0.1403	0.35	|Q	|	|	V |	|
13+30	0.1428	0.35	|Q	|	|	V |	|
13+35	0.1448	0.30	|Q	|	|	V |	|
13+40	0.1466	0.25	|Q	|	|	V |	|
13+45	0.1482	0.24	Q	|	|	V |	|
13+50	0.1499	0.24	Q	|	|	V |	|
13+55	0.1515	0.24	Q	|	|	V |	|
14+ 0	0.1532	0.24	Q	|	|	V |	|
14+ 5	0.1550	0.26	|Q	|	|	V |	|
14+10	0.1569	0.28	|Q	|	|	V|	|
14+15	0.1588	0.28	|Q	|	|	V|	|
14+20	0.1608	0.28	|Q	|	|	V|	|
14+25	0.1626	0.27	|Q	|	|	V	|
14+30	0.1645	0.27	|Q	|	|	V	|
14+35	0.1664	0.27	|Q	|	|	V	|
14+40	0.1682	0.27	|Q	|	|	|V	|
14+45	0.1701	0.27	|Q	|	|	|V	|
14+50	0.1719	0.27	|Q	|	|	|V	|
14+55	0.1737	0.26	|Q	|	|	| V	|
15+ 0	0.1755	0.26	|Q	|	|	| V	|
15+ 5	0.1773	0.26	|Q	|	|	| V	|
15+10	0.1790	0.25	|Q	|	|	| V	|
15+15	0.1808	0.25	|Q	|	|	| V	|
15+20	0.1825	0.25	Q	|	|	| V	|
15+25	0.1841	0.24	Q	|	|	| V	|
15+30	0.1858	0.24	Q	|	|	| V	|
15+35	0.1873	0.22	Q	|	|	| V	|
15+40	0.1887	0.20	Q	|	|	| V	|
15+45	0.1901	0.20	Q	|	|	| V	|
15+50	0.1914	0.20	Q	|	|	| V	|
15+55	0.1928	0.20	Q	|	|	| V	|
16+ 0	0.1942	0.20	Q	|	|	| V	|
16+ 5	0.1950	0.12	Q	|	|	| V	|
16+10	0.1954	0.06	Q	|	|	| V	|
16+15	0.1957	0.05	Q	|	|	| V	|
16+20	0.1960	0.04	Q	|	|	| V	|
16+25	0.1963	0.04	Q	|	|	| V	|
16+30	0.1965	0.04	Q	|	|	| V	|
16+35	0.1968	0.04	Q	|	|	| V	|
16+40	0.1970	0.03	Q	|	|	| V	|
16+45	0.1972	0.03	Q	|	|	| V	|
16+50	0.1975	0.03	Q	|	|	| V	|
16+55	0.1977	0.03	Q	|	|	| V	|
17+ 0	0.1979	0.03	Q	|	|	| V	|
17+ 5	0.1982	0.04	Q	|	|	| V	|
17+10	0.1985	0.05	Q	|	|	| V	|
17+15	0.1989	0.05	Q	|	|	| V	|
17+20	0.1992	0.05	Q	|	|	| V	|
17+25	0.1996	0.05	Q	|	|	| V	|
17+30	0.2000	0.05	Q	|	|	| V	|
17+35	0.2003	0.05	Q	|	|	| V	|
17+40	0.2007	0.05	Q	|	|	| V	|

17+45	0.2010	0.05	Q	|	|	|	V |
17+50	0.2014	0.05	Q	|	|	|	V |
17+55	0.2017	0.04	Q	|	|	|	V |
18+ 0	0.2019	0.04	Q	|	|	|	V |
18+ 5	0.2022	0.04	Q	|	|	|	V |
18+10	0.2025	0.04	Q	|	|	|	V |
18+15	0.2028	0.04	Q	|	|	|	V |
18+20	0.2031	0.04	Q	|	|	|	V |
18+25	0.2034	0.04	Q	|	|	|	V |
18+30	0.2037	0.04	Q	|	|	|	V |
18+35	0.2039	0.04	Q	|	|	|	V |
18+40	0.2041	0.03	Q	|	|	|	V |
18+45	0.2044	0.03	Q	|	|	|	V |
18+50	0.2045	0.03	Q	|	|	|	V |
18+55	0.2047	0.02	Q	|	|	|	V |
19+ 0	0.2048	0.02	Q	|	|	|	V |
19+ 5	0.2050	0.03	Q	|	|	|	V |
19+10	0.2052	0.03	Q	|	|	|	V |
19+15	0.2054	0.03	Q	|	|	|	V |
19+20	0.2057	0.04	Q	|	|	|	V |
19+25	0.2060	0.04	Q	|	|	|	V |
19+30	0.2063	0.04	Q	|	|	|	V |
19+35	0.2065	0.04	Q	|	|	|	V |
19+40	0.2067	0.03	Q	|	|	|	V |
19+45	0.2069	0.03	Q	|	|	|	V |
19+50	0.2071	0.03	Q	|	|	|	V |
19+55	0.2073	0.02	Q	|	|	|	V |
20+ 0	0.2074	0.02	Q	|	|	|	V |
20+ 5	0.2076	0.03	Q	|	|	|	V |
20+10	0.2078	0.03	Q	|	|	|	V |
20+15	0.2080	0.03	Q	|	|	|	V |
20+20	0.2082	0.03	Q	|	|	|	V |
20+25	0.2085	0.03	Q	|	|	|	V |
20+30	0.2087	0.03	Q	|	|	|	V |
20+35	0.2089	0.03	Q	|	|	|	V |
20+40	0.2091	0.03	Q	|	|	|	V |
20+45	0.2093	0.03	Q	|	|	|	V |
20+50	0.2095	0.03	Q	|	|	|	V |
20+55	0.2097	0.02	Q	|	|	|	V |
21+ 0	0.2098	0.02	Q	|	|	|	V |
21+ 5	0.2100	0.03	Q	|	|	|	V |
21+10	0.2102	0.03	Q	|	|	|	V |
21+15	0.2104	0.03	Q	|	|	|	V|
21+20	0.2106	0.03	Q	|	|	|	V|
21+25	0.2107	0.02	Q	|	|	|	V|
21+30	0.2109	0.02	Q	|	|	|	V|
21+35	0.2111	0.03	Q	|	|	|	V|
21+40	0.2113	0.03	Q	|	|	|	V|
21+45	0.2115	0.03	Q	|	|	|	V|
21+50	0.2117	0.03	Q	|	|	|	V|
21+55	0.2118	0.02	Q	|	|	|	V|
22+ 0	0.2120	0.02	Q	|	|	|	V|
22+ 5	0.2121	0.03	Q	|	|	|	V|
22+10	0.2123	0.03	Q	|	|	|	V|
22+15	0.2126	0.03	Q	|	|	|	V|
22+20	0.2127	0.03	Q	|	|	|	V|
22+25	0.2129	0.02	Q	|	|	|	V|

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   22+30       0.2130      0.02  Q          |          |          |         V|
   22+35       0.2132      0.02  Q          |          |          |         V|
   22+40       0.2133      0.02  Q          |          |          |         V|
   22+45       0.2135      0.02  Q          |          |          |         V|
   22+50       0.2136      0.02  Q          |          |          |         V|
   22+55       0.2138      0.02  Q          |          |          |         V|
   23+ 0       0.2139      0.02  Q          |          |          |         V|
   23+ 5       0.2140      0.02  Q          |          |          |         V|
   23+10       0.2142      0.02  Q          |          |          |         V|
   23+15       0.2143      0.02  Q          |          |          |         V|
   23+20       0.2145      0.02  Q          |          |          |         V|
   23+25       0.2146      0.02  Q          |          |          |         V|
   23+30       0.2148      0.02  Q          |          |          |         V|
   23+35       0.2149      0.02  Q          |          |          |         V|
   23+40       0.2150      0.02  Q          |          |          |         V|
   23+45       0.2152      0.02  Q          |          |          |         V|
   23+50       0.2153      0.02  Q          |          |          |         V|
   23+55       0.2155      0.02  Q          |          |          |         V|
   24+ 0       0.2156      0.02  Q          |          |          |         V|
   24+ 5       0.2157      0.01  Q          |          |          |         V|
   24+10       0.2157      0.00  Q          |          |          |         V|
   24+15       0.2157      0.00  Q          |          |          |          V
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U n i t H y d r o g r a p h A n a l y s i s

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Study date 11/05/21 File: northdevB2242.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 4011

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Evans Community Park 2-year, 24-hour Storm Event
Developed Condition (Central Portion of Site)
Job 21-003
11/5/21

Drainage Area = 9.17(Ac.) = 0.014 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 9.17(Ac.) = 0.014 Sq. Mi.
Length along longest watercourse = 1368.00(Ft.)
Length along longest watercourse measured to centroid = 749.00(Ft.)
Length along longest watercourse = 0.259 Mi.
Length along longest watercourse measured to centroid = 0.142 Mi.
Difference in elevation = 8.00(Ft.)
Slope along watercourse = 30.8772 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.053 Hr.
Lag time = 3.21 Min.
25% of lag time = 0.80 Min.
40% of lag time = 1.28 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
9.17	1.90	17.42

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]

9.17 5.00 45.85

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 1.900(In)
Area Averaged 100-Year Rainfall = 5.000(In)

Point rain (area averaged) = 1.900(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.900(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
4.585	100.00	1.000
4.585	69.00	0.000

Total Area Entered = 9.17(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
100.0	100.0	0.000	1.000	0.000	0.500	0.000
69.0	69.0	0.373	0.000	0.373	0.500	0.186
					Sum (F) =	0.186

Area averaged mean soil loss (F) (In/Hr) = 0.186
Minimum soil loss rate ((In/Hr)) = 0.093
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.500

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	155.860	34.563	3.194
2	0.167	311.719	46.577	4.304
3	0.250	467.579	10.851	1.003
4	0.333	623.438	4.706	0.435
5	0.417	779.298	2.307	0.213
6	0.500	935.157	0.995	0.092
		Sum =	100.000 Sum=	9.242

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.015	(0.330)	0.008	0.008
2	0.17	0.07	0.015	(0.329)	0.008	0.008
3	0.25	0.07	0.015	(0.328)	0.008	0.008
4	0.33	0.10	0.023	(0.327)	0.011	0.011
5	0.42	0.10	0.023	(0.325)	0.011	0.011
6	0.50	0.10	0.023	(0.324)	0.011	0.011

7	0.58	0.10	0.023	(0.323)	0.011	0.011
8	0.67	0.10	0.023	(0.322)	0.011	0.011
9	0.75	0.10	0.023	(0.320)	0.011	0.011
10	0.83	0.13	0.030	(0.319)	0.015	0.015
11	0.92	0.13	0.030	(0.318)	0.015	0.015
12	1.00	0.13	0.030	(0.317)	0.015	0.015
13	1.08	0.10	0.023	(0.315)	0.011	0.011
14	1.17	0.10	0.023	(0.314)	0.011	0.011
15	1.25	0.10	0.023	(0.313)	0.011	0.011
16	1.33	0.10	0.023	(0.312)	0.011	0.011
17	1.42	0.10	0.023	(0.310)	0.011	0.011
18	1.50	0.10	0.023	(0.309)	0.011	0.011
19	1.58	0.10	0.023	(0.308)	0.011	0.011
20	1.67	0.10	0.023	(0.307)	0.011	0.011
21	1.75	0.10	0.023	(0.305)	0.011	0.011
22	1.83	0.13	0.030	(0.304)	0.015	0.015
23	1.92	0.13	0.030	(0.303)	0.015	0.015
24	2.00	0.13	0.030	(0.302)	0.015	0.015
25	2.08	0.13	0.030	(0.300)	0.015	0.015
26	2.17	0.13	0.030	(0.299)	0.015	0.015
27	2.25	0.13	0.030	(0.298)	0.015	0.015
28	2.33	0.13	0.030	(0.297)	0.015	0.015
29	2.42	0.13	0.030	(0.296)	0.015	0.015
30	2.50	0.13	0.030	(0.294)	0.015	0.015
31	2.58	0.17	0.038	(0.293)	0.019	0.019
32	2.67	0.17	0.038	(0.292)	0.019	0.019
33	2.75	0.17	0.038	(0.291)	0.019	0.019
34	2.83	0.17	0.038	(0.290)	0.019	0.019
35	2.92	0.17	0.038	(0.288)	0.019	0.019
36	3.00	0.17	0.038	(0.287)	0.019	0.019
37	3.08	0.17	0.038	(0.286)	0.019	0.019
38	3.17	0.17	0.038	(0.285)	0.019	0.019
39	3.25	0.17	0.038	(0.284)	0.019	0.019
40	3.33	0.17	0.038	(0.282)	0.019	0.019
41	3.42	0.17	0.038	(0.281)	0.019	0.019
42	3.50	0.17	0.038	(0.280)	0.019	0.019
43	3.58	0.17	0.038	(0.279)	0.019	0.019
44	3.67	0.17	0.038	(0.278)	0.019	0.019
45	3.75	0.17	0.038	(0.277)	0.019	0.019
46	3.83	0.20	0.046	(0.275)	0.023	0.023
47	3.92	0.20	0.046	(0.274)	0.023	0.023
48	4.00	0.20	0.046	(0.273)	0.023	0.023
49	4.08	0.20	0.046	(0.272)	0.023	0.023
50	4.17	0.20	0.046	(0.271)	0.023	0.023
51	4.25	0.20	0.046	(0.270)	0.023	0.023
52	4.33	0.23	0.053	(0.268)	0.027	0.027
53	4.42	0.23	0.053	(0.267)	0.027	0.027
54	4.50	0.23	0.053	(0.266)	0.027	0.027
55	4.58	0.23	0.053	(0.265)	0.027	0.027
56	4.67	0.23	0.053	(0.264)	0.027	0.027
57	4.75	0.23	0.053	(0.263)	0.027	0.027
58	4.83	0.27	0.061	(0.262)	0.030	0.030
59	4.92	0.27	0.061	(0.261)	0.030	0.030
60	5.00	0.27	0.061	(0.259)	0.030	0.030
61	5.08	0.20	0.046	(0.258)	0.023	0.023
62	5.17	0.20	0.046	(0.257)	0.023	0.023
63	5.25	0.20	0.046	(0.256)	0.023	0.023

64	5.33	0.23	0.053	(0.255)	0.027	0.027
65	5.42	0.23	0.053	(0.254)	0.027	0.027
66	5.50	0.23	0.053	(0.253)	0.027	0.027
67	5.58	0.27	0.061	(0.252)	0.030	0.030
68	5.67	0.27	0.061	(0.250)	0.030	0.030
69	5.75	0.27	0.061	(0.249)	0.030	0.030
70	5.83	0.27	0.061	(0.248)	0.030	0.030
71	5.92	0.27	0.061	(0.247)	0.030	0.030
72	6.00	0.27	0.061	(0.246)	0.030	0.030
73	6.08	0.30	0.068	(0.245)	0.034	0.034
74	6.17	0.30	0.068	(0.244)	0.034	0.034
75	6.25	0.30	0.068	(0.243)	0.034	0.034
76	6.33	0.30	0.068	(0.242)	0.034	0.034
77	6.42	0.30	0.068	(0.241)	0.034	0.034
78	6.50	0.30	0.068	(0.240)	0.034	0.034
79	6.58	0.33	0.076	(0.238)	0.038	0.038
80	6.67	0.33	0.076	(0.237)	0.038	0.038
81	6.75	0.33	0.076	(0.236)	0.038	0.038
82	6.83	0.33	0.076	(0.235)	0.038	0.038
83	6.92	0.33	0.076	(0.234)	0.038	0.038
84	7.00	0.33	0.076	(0.233)	0.038	0.038
85	7.08	0.33	0.076	(0.232)	0.038	0.038
86	7.17	0.33	0.076	(0.231)	0.038	0.038
87	7.25	0.33	0.076	(0.230)	0.038	0.038
88	7.33	0.37	0.084	(0.229)	0.042	0.042
89	7.42	0.37	0.084	(0.228)	0.042	0.042
90	7.50	0.37	0.084	(0.227)	0.042	0.042
91	7.58	0.40	0.091	(0.226)	0.046	0.046
92	7.67	0.40	0.091	(0.225)	0.046	0.046
93	7.75	0.40	0.091	(0.224)	0.046	0.046
94	7.83	0.43	0.099	(0.223)	0.049	0.049
95	7.92	0.43	0.099	(0.222)	0.049	0.049
96	8.00	0.43	0.099	(0.221)	0.049	0.049
97	8.08	0.50	0.114	(0.220)	0.057	0.057
98	8.17	0.50	0.114	(0.219)	0.057	0.057
99	8.25	0.50	0.114	(0.218)	0.057	0.057
100	8.33	0.50	0.114	(0.217)	0.057	0.057
101	8.42	0.50	0.114	(0.216)	0.057	0.057
102	8.50	0.50	0.114	(0.214)	0.057	0.057
103	8.58	0.53	0.122	(0.213)	0.061	0.061
104	8.67	0.53	0.122	(0.212)	0.061	0.061
105	8.75	0.53	0.122	(0.211)	0.061	0.061
106	8.83	0.57	0.129	(0.210)	0.065	0.065
107	8.92	0.57	0.129	(0.209)	0.065	0.065
108	9.00	0.57	0.129	(0.209)	0.065	0.065
109	9.08	0.63	0.144	(0.208)	0.072	0.072
110	9.17	0.63	0.144	(0.207)	0.072	0.072
111	9.25	0.63	0.144	(0.206)	0.072	0.072
112	9.33	0.67	0.152	(0.205)	0.076	0.076
113	9.42	0.67	0.152	(0.204)	0.076	0.076
114	9.50	0.67	0.152	(0.203)	0.076	0.076
115	9.58	0.70	0.160	(0.202)	0.080	0.080
116	9.67	0.70	0.160	(0.201)	0.080	0.080
117	9.75	0.70	0.160	(0.200)	0.080	0.080
118	9.83	0.73	0.167	(0.199)	0.084	0.084
119	9.92	0.73	0.167	(0.198)	0.084	0.084
120	10.00	0.73	0.167	(0.197)	0.084	0.084

121	10.08	0.50	0.114	(0.196)	0.057	0.057
122	10.17	0.50	0.114	(0.195)	0.057	0.057
123	10.25	0.50	0.114	(0.194)	0.057	0.057
124	10.33	0.50	0.114	(0.193)	0.057	0.057
125	10.42	0.50	0.114	(0.192)	0.057	0.057
126	10.50	0.50	0.114	(0.191)	0.057	0.057
127	10.58	0.67	0.152	(0.190)	0.076	0.076
128	10.67	0.67	0.152	(0.189)	0.076	0.076
129	10.75	0.67	0.152	(0.188)	0.076	0.076
130	10.83	0.67	0.152	(0.187)	0.076	0.076
131	10.92	0.67	0.152	(0.187)	0.076	0.076
132	11.00	0.67	0.152	(0.186)	0.076	0.076
133	11.08	0.63	0.144	(0.185)	0.072	0.072
134	11.17	0.63	0.144	(0.184)	0.072	0.072
135	11.25	0.63	0.144	(0.183)	0.072	0.072
136	11.33	0.63	0.144	(0.182)	0.072	0.072
137	11.42	0.63	0.144	(0.181)	0.072	0.072
138	11.50	0.63	0.144	(0.180)	0.072	0.072
139	11.58	0.57	0.129	(0.179)	0.065	0.065
140	11.67	0.57	0.129	(0.178)	0.065	0.065
141	11.75	0.57	0.129	(0.178)	0.065	0.065
142	11.83	0.60	0.137	(0.177)	0.068	0.068
143	11.92	0.60	0.137	(0.176)	0.068	0.068
144	12.00	0.60	0.137	(0.175)	0.068	0.068
145	12.08	0.83	0.190	(0.174)	0.095	0.095
146	12.17	0.83	0.190	(0.173)	0.095	0.095
147	12.25	0.83	0.190	(0.172)	0.095	0.095
148	12.33	0.87	0.198	(0.171)	0.099	0.099
149	12.42	0.87	0.198	(0.171)	0.099	0.099
150	12.50	0.87	0.198	(0.170)	0.099	0.099
151	12.58	0.93	0.213	(0.169)	0.106	0.106
152	12.67	0.93	0.213	(0.168)	0.106	0.106
153	12.75	0.93	0.213	(0.167)	0.106	0.106
154	12.83	0.97	0.220	(0.166)	0.110	0.110
155	12.92	0.97	0.220	(0.165)	0.110	0.110
156	13.00	0.97	0.220	(0.165)	0.110	0.110
157	13.08	1.13	0.258	(0.164)	0.129	0.129
158	13.17	1.13	0.258	(0.163)	0.129	0.129
159	13.25	1.13	0.258	(0.162)	0.129	0.129
160	13.33	1.13	0.258	(0.161)	0.129	0.129
161	13.42	1.13	0.258	(0.160)	0.129	0.129
162	13.50	1.13	0.258	(0.160)	0.129	0.129
163	13.58	0.77	0.175	(0.159)	0.087	0.087
164	13.67	0.77	0.175	(0.158)	0.087	0.087
165	13.75	0.77	0.175	(0.157)	0.087	0.087
166	13.83	0.77	0.175	(0.156)	0.087	0.087
167	13.92	0.77	0.175	(0.156)	0.087	0.087
168	14.00	0.77	0.175	(0.155)	0.087	0.087
169	14.08	0.90	0.205	(0.154)	0.103	0.103
170	14.17	0.90	0.205	(0.153)	0.103	0.103
171	14.25	0.90	0.205	(0.152)	0.103	0.103
172	14.33	0.87	0.198	(0.152)	0.099	0.099
173	14.42	0.87	0.198	(0.151)	0.099	0.099
174	14.50	0.87	0.198	(0.150)	0.099	0.099
175	14.58	0.87	0.198	(0.149)	0.099	0.099
176	14.67	0.87	0.198	(0.149)	0.099	0.099
177	14.75	0.87	0.198	(0.148)	0.099	0.099

178	14.83	0.83	0.190	(0.147)	0.095	0.095
179	14.92	0.83	0.190	(0.146)	0.095	0.095
180	15.00	0.83	0.190	(0.146)	0.095	0.095
181	15.08	0.80	0.182	(0.145)	0.091	0.091
182	15.17	0.80	0.182	(0.144)	0.091	0.091
183	15.25	0.80	0.182	(0.143)	0.091	0.091
184	15.33	0.77	0.175	(0.143)	0.087	0.087
185	15.42	0.77	0.175	(0.142)	0.087	0.087
186	15.50	0.77	0.175	(0.141)	0.087	0.087
187	15.58	0.63	0.144	(0.140)	0.072	0.072
188	15.67	0.63	0.144	(0.140)	0.072	0.072
189	15.75	0.63	0.144	(0.139)	0.072	0.072
190	15.83	0.63	0.144	(0.138)	0.072	0.072
191	15.92	0.63	0.144	(0.138)	0.072	0.072
192	16.00	0.63	0.144	(0.137)	0.072	0.072
193	16.08	0.13	0.030	(0.136)	0.015	0.015
194	16.17	0.13	0.030	(0.135)	0.015	0.015
195	16.25	0.13	0.030	(0.135)	0.015	0.015
196	16.33	0.13	0.030	(0.134)	0.015	0.015
197	16.42	0.13	0.030	(0.133)	0.015	0.015
198	16.50	0.13	0.030	(0.133)	0.015	0.015
199	16.58	0.10	0.023	(0.132)	0.011	0.011
200	16.67	0.10	0.023	(0.131)	0.011	0.011
201	16.75	0.10	0.023	(0.131)	0.011	0.011
202	16.83	0.10	0.023	(0.130)	0.011	0.011
203	16.92	0.10	0.023	(0.129)	0.011	0.011
204	17.00	0.10	0.023	(0.129)	0.011	0.011
205	17.08	0.17	0.038	(0.128)	0.019	0.019
206	17.17	0.17	0.038	(0.127)	0.019	0.019
207	17.25	0.17	0.038	(0.127)	0.019	0.019
208	17.33	0.17	0.038	(0.126)	0.019	0.019
209	17.42	0.17	0.038	(0.126)	0.019	0.019
210	17.50	0.17	0.038	(0.125)	0.019	0.019
211	17.58	0.17	0.038	(0.124)	0.019	0.019
212	17.67	0.17	0.038	(0.124)	0.019	0.019
213	17.75	0.17	0.038	(0.123)	0.019	0.019
214	17.83	0.13	0.030	(0.122)	0.015	0.015
215	17.92	0.13	0.030	(0.122)	0.015	0.015
216	18.00	0.13	0.030	(0.121)	0.015	0.015
217	18.08	0.13	0.030	(0.121)	0.015	0.015
218	18.17	0.13	0.030	(0.120)	0.015	0.015
219	18.25	0.13	0.030	(0.119)	0.015	0.015
220	18.33	0.13	0.030	(0.119)	0.015	0.015
221	18.42	0.13	0.030	(0.118)	0.015	0.015
222	18.50	0.13	0.030	(0.118)	0.015	0.015
223	18.58	0.10	0.023	(0.117)	0.011	0.011
224	18.67	0.10	0.023	(0.117)	0.011	0.011
225	18.75	0.10	0.023	(0.116)	0.011	0.011
226	18.83	0.07	0.015	(0.115)	0.008	0.008
227	18.92	0.07	0.015	(0.115)	0.008	0.008
228	19.00	0.07	0.015	(0.114)	0.008	0.008
229	19.08	0.10	0.023	(0.114)	0.011	0.011
230	19.17	0.10	0.023	(0.113)	0.011	0.011
231	19.25	0.10	0.023	(0.113)	0.011	0.011
232	19.33	0.13	0.030	(0.112)	0.015	0.015
233	19.42	0.13	0.030	(0.112)	0.015	0.015
234	19.50	0.13	0.030	(0.111)	0.015	0.015

235	19.58	0.10	0.023	(0.111)	0.011	0.011
236	19.67	0.10	0.023	(0.110)	0.011	0.011
237	19.75	0.10	0.023	(0.110)	0.011	0.011
238	19.83	0.07	0.015	(0.109)	0.008	0.008
239	19.92	0.07	0.015	(0.109)	0.008	0.008
240	20.00	0.07	0.015	(0.108)	0.008	0.008
241	20.08	0.10	0.023	(0.108)	0.011	0.011
242	20.17	0.10	0.023	(0.107)	0.011	0.011
243	20.25	0.10	0.023	(0.107)	0.011	0.011
244	20.33	0.10	0.023	(0.106)	0.011	0.011
245	20.42	0.10	0.023	(0.106)	0.011	0.011
246	20.50	0.10	0.023	(0.105)	0.011	0.011
247	20.58	0.10	0.023	(0.105)	0.011	0.011
248	20.67	0.10	0.023	(0.105)	0.011	0.011
249	20.75	0.10	0.023	(0.104)	0.011	0.011
250	20.83	0.07	0.015	(0.104)	0.008	0.008
251	20.92	0.07	0.015	(0.103)	0.008	0.008
252	21.00	0.07	0.015	(0.103)	0.008	0.008
253	21.08	0.10	0.023	(0.102)	0.011	0.011
254	21.17	0.10	0.023	(0.102)	0.011	0.011
255	21.25	0.10	0.023	(0.102)	0.011	0.011
256	21.33	0.07	0.015	(0.101)	0.008	0.008
257	21.42	0.07	0.015	(0.101)	0.008	0.008
258	21.50	0.07	0.015	(0.101)	0.008	0.008
259	21.58	0.10	0.023	(0.100)	0.011	0.011
260	21.67	0.10	0.023	(0.100)	0.011	0.011
261	21.75	0.10	0.023	(0.099)	0.011	0.011
262	21.83	0.07	0.015	(0.099)	0.008	0.008
263	21.92	0.07	0.015	(0.099)	0.008	0.008
264	22.00	0.07	0.015	(0.098)	0.008	0.008
265	22.08	0.10	0.023	(0.098)	0.011	0.011
266	22.17	0.10	0.023	(0.098)	0.011	0.011
267	22.25	0.10	0.023	(0.097)	0.011	0.011
268	22.33	0.07	0.015	(0.097)	0.008	0.008
269	22.42	0.07	0.015	(0.097)	0.008	0.008
270	22.50	0.07	0.015	(0.097)	0.008	0.008
271	22.58	0.07	0.015	(0.096)	0.008	0.008
272	22.67	0.07	0.015	(0.096)	0.008	0.008
273	22.75	0.07	0.015	(0.096)	0.008	0.008
274	22.83	0.07	0.015	(0.096)	0.008	0.008
275	22.92	0.07	0.015	(0.095)	0.008	0.008
276	23.00	0.07	0.015	(0.095)	0.008	0.008
277	23.08	0.07	0.015	(0.095)	0.008	0.008
278	23.17	0.07	0.015	(0.095)	0.008	0.008
279	23.25	0.07	0.015	(0.094)	0.008	0.008
280	23.33	0.07	0.015	(0.094)	0.008	0.008
281	23.42	0.07	0.015	(0.094)	0.008	0.008
282	23.50	0.07	0.015	(0.094)	0.008	0.008
283	23.58	0.07	0.015	(0.094)	0.008	0.008
284	23.67	0.07	0.015	(0.094)	0.008	0.008
285	23.75	0.07	0.015	(0.093)	0.008	0.008
286	23.83	0.07	0.015	(0.093)	0.008	0.008
287	23.92	0.07	0.015	(0.093)	0.008	0.008
288	24.00	0.07	0.015	(0.093)	0.008	0.008
		(Loss Rate Not Used)				
Sum =		100.0			Sum =	11.4

Flood volume = Effective rainfall 0.95(In)

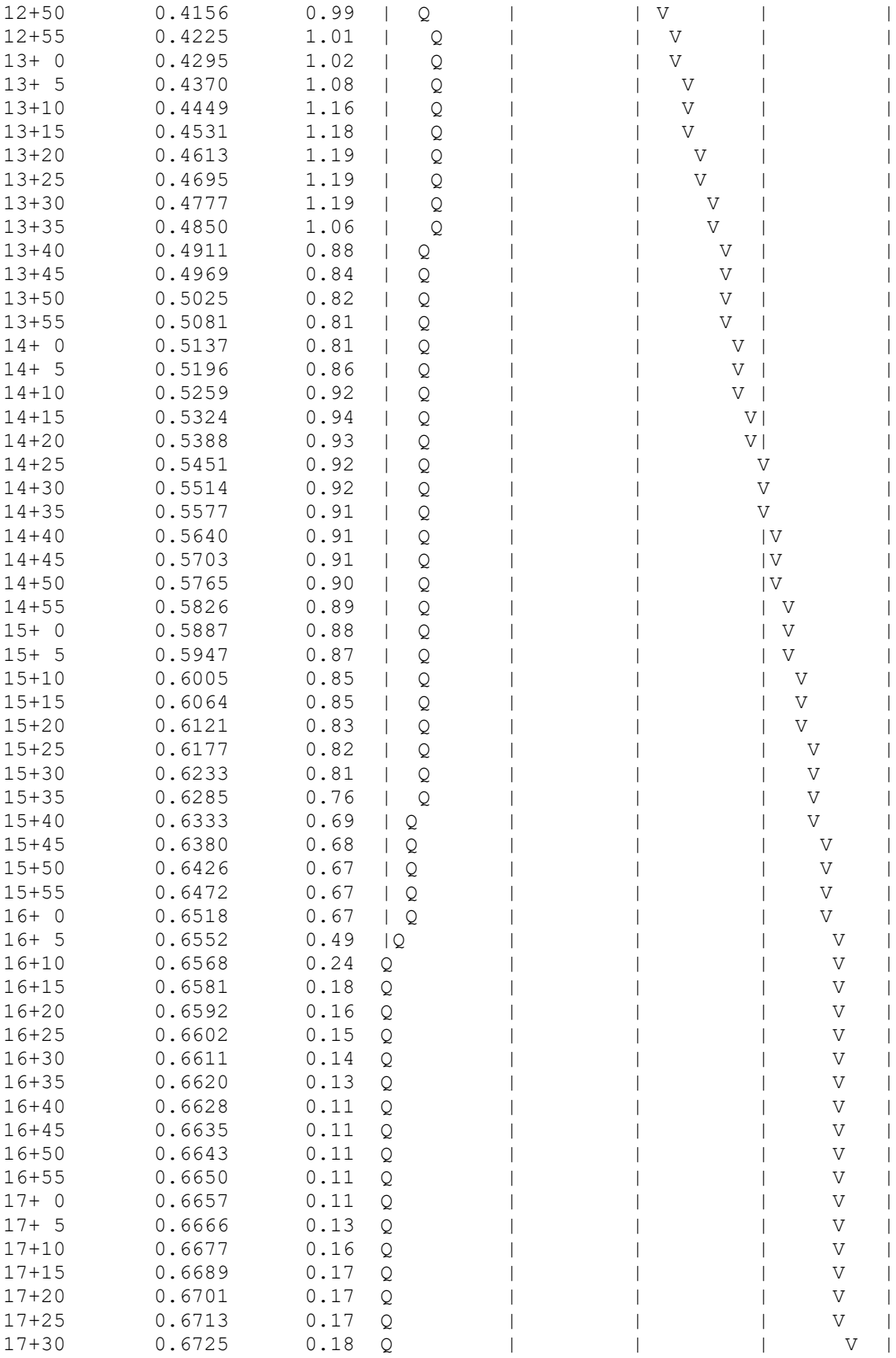
```
 times area       9.2(Ac.)/[(In)/(Ft.)] =       0.7(Ac.Ft)
Total soil loss =      0.95(In)
Total soil loss =     0.726(Ac.Ft)
Total rainfall =      1.90(In)
Flood volume =       31622.2 Cubic Feet
Total soil loss =       31622.2 Cubic Feet
---------------------------------------------------------------------
 Peak flow rate of this hydrograph =      1.195(CFS)
---------------------------------------------------------------------
+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                    24 - H O U R    S T O R M
                R u n o f f      H y d r o g r a p h
---------------------------------------------------------------------
            Hydrograph in   5   Minute intervals ((CFS))

---------------------------------------------------------------------
```

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0002	0.02	Q				
0+10	0.0006	0.06	Q				
0+15	0.0010	0.06	Q				
0+20	0.0016	0.08	Q				
0+25	0.0022	0.10	Q				
0+30	0.0029	0.10	Q				
0+35	0.0037	0.10	Q				
0+40	0.0044	0.11	Q				
0+45	0.0051	0.11	Q				
0+50	0.0059	0.12	Q				
0+55	0.0068	0.13	Q				
1+ 0	0.0078	0.14	Q				
1+ 5	0.0087	0.13	Q				
1+10	0.0094	0.11	Q				
1+15	0.0102	0.11	Q				
1+20	0.0109	0.11	Q				
1+25	0.0116	0.11	Q				
1+30	0.0124	0.11	Q				
1+35	0.0131	0.11	Q				
1+40	0.0138	0.11	Q				
1+45	0.0145	0.11	Q				
1+50	0.0154	0.12	Q				
1+55	0.0163	0.13	Q				
2+ 0	0.0172	0.14	Q				
2+ 5	0.0182	0.14	QV				
2+10	0.0191	0.14	QV				
2+15	0.0201	0.14	QV				
2+20	0.0211	0.14	QV				
2+25	0.0221	0.14	QV				
2+30	0.0230	0.14	QV				
2+35	0.0241	0.15	QV				
2+40	0.0252	0.17	QV				
2+45	0.0264	0.17	QV				
2+50	0.0276	0.17	QV				
2+55	0.0288	0.18	QV				
3+ 0	0.0300	0.18	QV				
3+ 5	0.0313	0.18	QV				
3+10	0.0325	0.18	QV				
3+15	0.0337	0.18	QV				

3+20	0.0349	0.18	QV	|	|	|	|
3+25	0.0361	0.18	QV	|	|	|	|
3+30	0.0373	0.18	Q V	|	|	|	|
3+35	0.0385	0.18	Q V	|	|	|	|
3+40	0.0397	0.18	Q V	|	|	|	|
3+45	0.0409	0.18	Q V	|	|	|	|
3+50	0.0422	0.19	Q V	|	|	|	|
3+55	0.0436	0.20	Q V	|	|	|	|
4+ 0	0.0451	0.21	Q V	|	|	|	|
4+ 5	0.0465	0.21	Q V	|	|	|	|
4+10	0.0480	0.21	Q V	|	|	|	|
4+15	0.0494	0.21	Q V	|	|	|	|
4+20	0.0509	0.22	Q V	|	|	|	|
4+25	0.0526	0.24	Q V	|	|	|	|
4+30	0.0543	0.24	Q V	|	|	|	|
4+35	0.0560	0.24	Q V	|	|	|	|
4+40	0.0576	0.25	Q V	|	|	|	|
4+45	0.0593	0.25	Q V	|	|	|	|
4+50	0.0611	0.26	|Q V	|	|	|	|
4+55	0.0630	0.27	|Q V	|	|	|	|
5+ 0	0.0649	0.28	|Q V	|	|	|	|
5+ 5	0.0667	0.26	|Q V	|	|	|	|
5+10	0.0682	0.22	Q V	|	|	|	|
5+15	0.0697	0.22	Q V	|	|	|	|
5+20	0.0713	0.23	Q V	|	|	|	|
5+25	0.0729	0.24	Q V	|	|	|	|
5+30	0.0746	0.24	Q V	|	|	|	|
5+35	0.0764	0.26	|Q V	|	|	|	|
5+40	0.0783	0.27	|Q V	|	|	|	|
5+45	0.0802	0.28	|Q V	|	|	|	|
5+50	0.0821	0.28	|Q V	|	|	|	|
5+55	0.0840	0.28	|Q V	|	|	|	|
6+ 0	0.0860	0.28	|Q V	|	|	|	|
6+ 5	0.0880	0.29	|Q V	|	|	|	|
6+10	0.0901	0.31	|Q V	|	|	|	|
6+15	0.0923	0.31	|Q V	|	|	|	|
6+20	0.0944	0.32	|Q V	|	|	|	|
6+25	0.0966	0.32	|Q V	|	|	|	|
6+30	0.0988	0.32	|Q V	|	|	|	|
6+35	0.1011	0.33	|Q V	|	|	|	|
6+40	0.1034	0.34	|Q V	|	|	|	|
6+45	0.1058	0.35	|Q V	|	|	|	|
6+50	0.1083	0.35	|Q V	|	|	|	|
6+55	0.1107	0.35	|Q V	|	|	|	|
7+ 0	0.1131	0.35	|Q V	|	|	|	|
7+ 5	0.1155	0.35	|Q V	|	|	|	|
7+10	0.1179	0.35	|Q V	|	|	|	|
7+15	0.1203	0.35	|Q V	|	|	|	|
7+20	0.1229	0.36	|Q V	|	|	|	|
7+25	0.1255	0.38	|Q V	|	|	|	|
7+30	0.1281	0.38	|Q V	|	|	|	|
7+35	0.1308	0.40	|Q V	|	|	|	|
7+40	0.1337	0.41	|Q V	|	|	|	|
7+45	0.1366	0.42	|Q V	|	|	|	|
7+50	0.1396	0.43	|Q V	|	|	|	|
7+55	0.1427	0.45	|Q V	|	|	|	|
8+ 0	0.1458	0.45	|Q V	|	|	|	|

8+ 5	0.1491	0.48	Q V				
8+10	0.1526	0.51	Q V				
8+15	0.1562	0.52	Q V				
8+20	0.1598	0.52	Q V				
8+25	0.1635	0.53	Q V				
8+30	0.1671	0.53	Q V				
8+35	0.1708	0.54	Q V				
8+40	0.1746	0.56	Q V				
8+45	0.1785	0.56	Q V				
8+50	0.1824	0.57	Q V				
8+55	0.1865	0.59	Q V				
9+ 0	0.1906	0.59	Q V				
9+ 5	0.1949	0.62	Q V				
9+10	0.1994	0.65	Q V				
9+15	0.2039	0.66	Q V				
9+20	0.2086	0.68	Q V				
9+25	0.2134	0.70	Q V				
9+30	0.2182	0.70	Q V				
9+35	0.2231	0.71	Q V				
9+40	0.2281	0.73	Q V				
9+45	0.2332	0.74	Q V				
9+50	0.2384	0.75	Q V				
9+55	0.2436	0.77	Q V				
10+ 0	0.2489	0.77	Q V				
10+ 5	0.2537	0.69	Q V				
10+10	0.2576	0.57	Q V				
10+15	0.2614	0.55	Q V				
10+20	0.2651	0.54	Q V				
10+25	0.2687	0.53	Q V				
10+30	0.2724	0.53	Q V				
10+35	0.2764	0.59	Q V				
10+40	0.2810	0.67	Q V				
10+45	0.2858	0.69	Q V				
10+50	0.2906	0.70	Q V				
10+55	0.2954	0.70	Q V				
11+ 0	0.3002	0.70	Q V				
11+ 5	0.3050	0.69	Q V				
11+10	0.3096	0.67	Q V				
11+15	0.3142	0.67	Q V				
11+20	0.3188	0.67	Q V				
11+25	0.3234	0.67	Q V				
11+30	0.3280	0.67	Q V				
11+35	0.3325	0.64	Q V				
11+40	0.3367	0.61	Q V				
11+45	0.3408	0.60	Q V				
11+50	0.3450	0.61	Q V				
11+55	0.3494	0.63	Q V				
12+ 0	0.3537	0.63	Q V				
12+ 5	0.3586	0.72	Q V				
12+10	0.3644	0.83	Q V				
12+15	0.3703	0.86	Q V				
12+20	0.3763	0.88	Q V				
12+25	0.3826	0.90	Q V				
12+30	0.3888	0.91	Q V				
12+35	0.3953	0.94	Q V				
12+40	0.4020	0.97	Q V				
12+45	0.4087	0.98	Q V				



17+35	0.6737	0.18	Q	|	|	|	V |
17+40	0.6749	0.18	Q	|	|	|	V |
17+45	0.6761	0.18	Q	|	|	|	V |
17+50	0.6773	0.16	Q	|	|	|	V |
17+55	0.6783	0.15	Q	|	|	|	V |
18+ 0	0.6793	0.14	Q	|	|	|	V |
18+ 5	0.6802	0.14	Q	|	|	|	V |
18+10	0.6812	0.14	Q	|	|	|	V |
18+15	0.6822	0.14	Q	|	|	|	V |
18+20	0.6831	0.14	Q	|	|	|	V |
18+25	0.6841	0.14	Q	|	|	|	V |
18+30	0.6851	0.14	Q	|	|	|	V |
18+35	0.6860	0.13	Q	|	|	|	V |
18+40	0.6867	0.11	Q	|	|	|	V |
18+45	0.6875	0.11	Q	|	|	|	V |
18+50	0.6881	0.09	Q	|	|	|	V |
18+55	0.6887	0.08	Q	|	|	|	V |
19+ 0	0.6892	0.07	Q	|	|	|	V |
19+ 5	0.6897	0.08	Q	|	|	|	V |
19+10	0.6904	0.10	Q	|	|	|	V |
19+15	0.6911	0.10	Q	|	|	|	V |
19+20	0.6919	0.12	Q	|	|	|	V |
19+25	0.6929	0.13	Q	|	|	|	V |
19+30	0.6938	0.14	Q	|	|	|	V |
19+35	0.6947	0.13	Q	|	|	|	V |
19+40	0.6955	0.11	Q	|	|	|	V |
19+45	0.6962	0.11	Q	|	|	|	V |
19+50	0.6968	0.09	Q	|	|	|	V |
19+55	0.6974	0.08	Q	|	|	|	V |
20+ 0	0.6979	0.07	Q	|	|	|	V |
20+ 5	0.6985	0.08	Q	|	|	|	V |
20+10	0.6991	0.10	Q	|	|	|	V |
20+15	0.6998	0.10	Q	|	|	|	V |
20+20	0.7006	0.10	Q	|	|	|	V |
20+25	0.7013	0.11	Q	|	|	|	V |
20+30	0.7020	0.11	Q	|	|	|	V |
20+35	0.7027	0.11	Q	|	|	|	V |
20+40	0.7035	0.11	Q	|	|	|	V |
20+45	0.7042	0.11	Q	|	|	|	V |
20+50	0.7048	0.09	Q	|	|	|	V |
20+55	0.7054	0.08	Q	|	|	|	V |
21+ 0	0.7059	0.07	Q	|	|	|	V |
21+ 5	0.7064	0.08	Q	|	|	|	V |
21+10	0.7071	0.10	Q	|	|	|	V |
21+15	0.7078	0.10	Q	|	|	|	V|
21+20	0.7085	0.09	Q	|	|	|	V|
21+25	0.7090	0.08	Q	|	|	|	V|
21+30	0.7095	0.07	Q	|	|	|	V|
21+35	0.7101	0.08	Q	|	|	|	V|
21+40	0.7108	0.10	Q	|	|	|	V|
21+45	0.7115	0.10	Q	|	|	|	V|
21+50	0.7121	0.09	Q	|	|	|	V|
21+55	0.7126	0.08	Q	|	|	|	V|
22+ 0	0.7131	0.07	Q	|	|	|	V|
22+ 5	0.7137	0.08	Q	|	|	|	V|
22+10	0.7144	0.10	Q	|	|	|	V|
22+15	0.7151	0.10	Q	|	|	|	V|

22+20	0.7157	0.09	Q	|	|	|	V|
22+25	0.7163	0.08	Q	|	|	|	V|
22+30	0.7168	0.07	Q	|	|	|	V|
22+35	0.7172	0.07	Q	|	|	|	V|
22+40	0.7177	0.07	Q	|	|	|	V|
22+45	0.7182	0.07	Q	|	|	|	V|
22+50	0.7187	0.07	Q	|	|	|	V|
22+55	0.7192	0.07	Q	|	|	|	V|
23+ 0	0.7197	0.07	Q	|	|	|	V|
23+ 5	0.7202	0.07	Q	|	|	|	V|
23+10	0.7206	0.07	Q	|	|	|	V|
23+15	0.7211	0.07	Q	|	|	|	V|
23+20	0.7216	0.07	Q	|	|	|	V|
23+25	0.7221	0.07	Q	|	|	|	V|
23+30	0.7226	0.07	Q	|	|	|	V|
23+35	0.7231	0.07	Q	|	|	|	V|
23+40	0.7235	0.07	Q	|	|	|	V|
23+45	0.7240	0.07	Q	|	|	|	V|
23+50	0.7245	0.07	Q	|	|	|	V|
23+55	0.7250	0.07	Q	|	|	|	V|
24+ 0	0.7255	0.07	Q	|	|	|	V|
24+ 5	0.7258	0.05	Q	|	|	|	V|
24+10	0.7259	0.01	Q	|	|	|	V|
24+15	0.7259	0.01	Q	|	|	|	V|
24+20	0.7259	0.00	Q	|	|	|	V|
24+25	0.7259	0.00	Q	|	|	|	V|

U n i t H y d r o g r a p h A n a l y s i s

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Study date 11/05/21 File: northdevC2242.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 4011

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Evans Community Park 2-year, 24-hour Storm Event
Developed Condition (Southerly Portion of Site)
Job 21-003
11/5/21

Drainage Area = 5.15(Ac.) = 0.008 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 5.15(Ac.) = 0.008 Sq. Mi.
Length along longest watercourse = 895.00(Ft.)
Length along longest watercourse measured to centroid = 493.00(Ft.)
Length along longest watercourse = 0.170 Mi.
Length along longest watercourse measured to centroid = 0.093 Mi.
Difference in elevation = 9.00(Ft.)
Slope along watercourse = 53.0950 Ft./Mi.
Average Manning's 'N' = 0.020
Lag time = 0.047 Hr.
Lag time = 2.80 Min.
25% of lag time = 0.70 Min.
40% of lag time = 1.12 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.15	1.90	9.79

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]

5.15 5.00 25.75

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 1.900(In)
Area Averaged 100-Year Rainfall = 5.000(In)

Point rain (area averaged) = 1.900(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.900(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
1.030	100.00	1.000
4.120	75.00	0.000

Total Area Entered = 5.15(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
100.0	100.0	0.000	1.000	0.000	0.200	0.000
75.0	75.0	0.303	0.000	0.303	0.800	0.242
					Sum (F) =	0.242

Area averaged mean soil loss (F) (In/Hr) = 0.242
Minimum soil loss rate ((In/Hr)) = 0.121
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.740

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	178.470	39.420	2.046
2	0.167	356.940	44.897	2.330
3	0.250	535.410	9.730	0.505
4	0.333	713.879	4.004	0.208
5	0.417	892.349	1.950	0.101
		Sum =	100.000 Sum=	5.190

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.015	(0.430)	0.011	0.004
2	0.17	0.07	0.015	(0.428)	0.011	0.004
3	0.25	0.07	0.015	(0.426)	0.011	0.004
4	0.33	0.10	0.023	(0.425)	0.017	0.006
5	0.42	0.10	0.023	(0.423)	0.017	0.006
6	0.50	0.10	0.023	(0.421)	0.017	0.006
7	0.58	0.10	0.023	(0.420)	0.017	0.006

8	0.67	0.10	0.023	(0.418)	0.017	0.006
9	0.75	0.10	0.023	(0.417)	0.017	0.006
10	0.83	0.13	0.030	(0.415)	0.022	0.008
11	0.92	0.13	0.030	(0.413)	0.022	0.008
12	1.00	0.13	0.030	(0.412)	0.022	0.008
13	1.08	0.10	0.023	(0.410)	0.017	0.006
14	1.17	0.10	0.023	(0.408)	0.017	0.006
15	1.25	0.10	0.023	(0.407)	0.017	0.006
16	1.33	0.10	0.023	(0.405)	0.017	0.006
17	1.42	0.10	0.023	(0.404)	0.017	0.006
18	1.50	0.10	0.023	(0.402)	0.017	0.006
19	1.58	0.10	0.023	(0.400)	0.017	0.006
20	1.67	0.10	0.023	(0.399)	0.017	0.006
21	1.75	0.10	0.023	(0.397)	0.017	0.006
22	1.83	0.13	0.030	(0.395)	0.022	0.008
23	1.92	0.13	0.030	(0.394)	0.022	0.008
24	2.00	0.13	0.030	(0.392)	0.022	0.008
25	2.08	0.13	0.030	(0.391)	0.022	0.008
26	2.17	0.13	0.030	(0.389)	0.022	0.008
27	2.25	0.13	0.030	(0.388)	0.022	0.008
28	2.33	0.13	0.030	(0.386)	0.022	0.008
29	2.42	0.13	0.030	(0.384)	0.022	0.008
30	2.50	0.13	0.030	(0.383)	0.022	0.008
31	2.58	0.17	0.038	(0.381)	0.028	0.010
32	2.67	0.17	0.038	(0.380)	0.028	0.010
33	2.75	0.17	0.038	(0.378)	0.028	0.010
34	2.83	0.17	0.038	(0.377)	0.028	0.010
35	2.92	0.17	0.038	(0.375)	0.028	0.010
36	3.00	0.17	0.038	(0.373)	0.028	0.010
37	3.08	0.17	0.038	(0.372)	0.028	0.010
38	3.17	0.17	0.038	(0.370)	0.028	0.010
39	3.25	0.17	0.038	(0.369)	0.028	0.010
40	3.33	0.17	0.038	(0.367)	0.028	0.010
41	3.42	0.17	0.038	(0.366)	0.028	0.010
42	3.50	0.17	0.038	(0.364)	0.028	0.010
43	3.58	0.17	0.038	(0.363)	0.028	0.010
44	3.67	0.17	0.038	(0.361)	0.028	0.010
45	3.75	0.17	0.038	(0.360)	0.028	0.010
46	3.83	0.20	0.046	(0.358)	0.034	0.012
47	3.92	0.20	0.046	(0.357)	0.034	0.012
48	4.00	0.20	0.046	(0.355)	0.034	0.012
49	4.08	0.20	0.046	(0.354)	0.034	0.012
50	4.17	0.20	0.046	(0.352)	0.034	0.012
51	4.25	0.20	0.046	(0.351)	0.034	0.012
52	4.33	0.23	0.053	(0.349)	0.039	0.014
53	4.42	0.23	0.053	(0.348)	0.039	0.014
54	4.50	0.23	0.053	(0.346)	0.039	0.014
55	4.58	0.23	0.053	(0.345)	0.039	0.014
56	4.67	0.23	0.053	(0.343)	0.039	0.014
57	4.75	0.23	0.053	(0.342)	0.039	0.014
58	4.83	0.27	0.061	(0.340)	0.045	0.016
59	4.92	0.27	0.061	(0.339)	0.045	0.016
60	5.00	0.27	0.061	(0.337)	0.045	0.016
61	5.08	0.20	0.046	(0.336)	0.034	0.012
62	5.17	0.20	0.046	(0.334)	0.034	0.012
63	5.25	0.20	0.046	(0.333)	0.034	0.012
64	5.33	0.23	0.053	(0.331)	0.039	0.014

65	5.42	0.23	0.053	(0.330)	0.039	0.014
66	5.50	0.23	0.053	(0.329)	0.039	0.014
67	5.58	0.27	0.061	(0.327)	0.045	0.016
68	5.67	0.27	0.061	(0.326)	0.045	0.016
69	5.75	0.27	0.061	(0.324)	0.045	0.016
70	5.83	0.27	0.061	(0.323)	0.045	0.016
71	5.92	0.27	0.061	(0.321)	0.045	0.016
72	6.00	0.27	0.061	(0.320)	0.045	0.016
73	6.08	0.30	0.068	(0.319)	0.051	0.018
74	6.17	0.30	0.068	(0.317)	0.051	0.018
75	6.25	0.30	0.068	(0.316)	0.051	0.018
76	6.33	0.30	0.068	(0.314)	0.051	0.018
77	6.42	0.30	0.068	(0.313)	0.051	0.018
78	6.50	0.30	0.068	(0.311)	0.051	0.018
79	6.58	0.33	0.076	(0.310)	0.056	0.020
80	6.67	0.33	0.076	(0.309)	0.056	0.020
81	6.75	0.33	0.076	(0.307)	0.056	0.020
82	6.83	0.33	0.076	(0.306)	0.056	0.020
83	6.92	0.33	0.076	(0.305)	0.056	0.020
84	7.00	0.33	0.076	(0.303)	0.056	0.020
85	7.08	0.33	0.076	(0.302)	0.056	0.020
86	7.17	0.33	0.076	(0.300)	0.056	0.020
87	7.25	0.33	0.076	(0.299)	0.056	0.020
88	7.33	0.37	0.084	(0.298)	0.062	0.022
89	7.42	0.37	0.084	(0.296)	0.062	0.022
90	7.50	0.37	0.084	(0.295)	0.062	0.022
91	7.58	0.40	0.091	(0.294)	0.067	0.024
92	7.67	0.40	0.091	(0.292)	0.067	0.024
93	7.75	0.40	0.091	(0.291)	0.067	0.024
94	7.83	0.43	0.099	(0.290)	0.073	0.026
95	7.92	0.43	0.099	(0.288)	0.073	0.026
96	8.00	0.43	0.099	(0.287)	0.073	0.026
97	8.08	0.50	0.114	(0.286)	0.084	0.030
98	8.17	0.50	0.114	(0.284)	0.084	0.030
99	8.25	0.50	0.114	(0.283)	0.084	0.030
100	8.33	0.50	0.114	(0.282)	0.084	0.030
101	8.42	0.50	0.114	(0.280)	0.084	0.030
102	8.50	0.50	0.114	(0.279)	0.084	0.030
103	8.58	0.53	0.122	(0.278)	0.090	0.032
104	8.67	0.53	0.122	(0.276)	0.090	0.032
105	8.75	0.53	0.122	(0.275)	0.090	0.032
106	8.83	0.57	0.129	(0.274)	0.096	0.034
107	8.92	0.57	0.129	(0.272)	0.096	0.034
108	9.00	0.57	0.129	(0.271)	0.096	0.034
109	9.08	0.63	0.144	(0.270)	0.107	0.038
110	9.17	0.63	0.144	(0.269)	0.107	0.038
111	9.25	0.63	0.144	(0.267)	0.107	0.038
112	9.33	0.67	0.152	(0.266)	0.112	0.040
113	9.42	0.67	0.152	(0.265)	0.112	0.040
114	9.50	0.67	0.152	(0.263)	0.112	0.040
115	9.58	0.70	0.160	(0.262)	0.118	0.041
116	9.67	0.70	0.160	(0.261)	0.118	0.041
117	9.75	0.70	0.160	(0.260)	0.118	0.041
118	9.83	0.73	0.167	(0.258)	0.124	0.043
119	9.92	0.73	0.167	(0.257)	0.124	0.043
120	10.00	0.73	0.167	(0.256)	0.124	0.043
121	10.08	0.50	0.114	(0.255)	0.084	0.030

122	10.17	0.50	0.114	(0.254)	0.084	0.030
123	10.25	0.50	0.114	(0.252)	0.084	0.030
124	10.33	0.50	0.114	(0.251)	0.084	0.030
125	10.42	0.50	0.114	(0.250)	0.084	0.030
126	10.50	0.50	0.114	(0.249)	0.084	0.030
127	10.58	0.67	0.152	(0.247)	0.112	0.040
128	10.67	0.67	0.152	(0.246)	0.112	0.040
129	10.75	0.67	0.152	(0.245)	0.112	0.040
130	10.83	0.67	0.152	(0.244)	0.112	0.040
131	10.92	0.67	0.152	(0.243)	0.112	0.040
132	11.00	0.67	0.152	(0.241)	0.112	0.040
133	11.08	0.63	0.144	(0.240)	0.107	0.038
134	11.17	0.63	0.144	(0.239)	0.107	0.038
135	11.25	0.63	0.144	(0.238)	0.107	0.038
136	11.33	0.63	0.144	(0.237)	0.107	0.038
137	11.42	0.63	0.144	(0.235)	0.107	0.038
138	11.50	0.63	0.144	(0.234)	0.107	0.038
139	11.58	0.57	0.129	(0.233)	0.096	0.034
140	11.67	0.57	0.129	(0.232)	0.096	0.034
141	11.75	0.57	0.129	(0.231)	0.096	0.034
142	11.83	0.60	0.137	(0.230)	0.101	0.036
143	11.92	0.60	0.137	(0.229)	0.101	0.036
144	12.00	0.60	0.137	(0.227)	0.101	0.036
145	12.08	0.83	0.190	(0.226)	0.141	0.049
146	12.17	0.83	0.190	(0.225)	0.141	0.049
147	12.25	0.83	0.190	(0.224)	0.141	0.049
148	12.33	0.87	0.198	(0.223)	0.146	0.051
149	12.42	0.87	0.198	(0.222)	0.146	0.051
150	12.50	0.87	0.198	(0.221)	0.146	0.051
151	12.58	0.93	0.213	(0.220)	0.157	0.055
152	12.67	0.93	0.213	(0.218)	0.157	0.055
153	12.75	0.93	0.213	(0.217)	0.157	0.055
154	12.83	0.97	0.220	(0.216)	0.163	0.057
155	12.92	0.97	0.220	(0.215)	0.163	0.057
156	13.00	0.97	0.220	(0.214)	0.163	0.057
157	13.08	1.13	0.258	(0.213)	0.191	0.067
158	13.17	1.13	0.258	(0.212)	0.191	0.067
159	13.25	1.13	0.258	(0.211)	0.191	0.067
160	13.33	1.13	0.258	(0.210)	0.191	0.067
161	13.42	1.13	0.258	(0.209)	0.191	0.067
162	13.50	1.13	0.258	(0.208)	0.191	0.067
163	13.58	0.77	0.175	(0.207)	0.129	0.045
164	13.67	0.77	0.175	(0.206)	0.129	0.045
165	13.75	0.77	0.175	(0.204)	0.129	0.045
166	13.83	0.77	0.175	(0.203)	0.129	0.045
167	13.92	0.77	0.175	(0.202)	0.129	0.045
168	14.00	0.77	0.175	(0.201)	0.129	0.045
169	14.08	0.90	0.205	(0.200)	0.152	0.053
170	14.17	0.90	0.205	(0.199)	0.152	0.053
171	14.25	0.90	0.205	(0.198)	0.152	0.053
172	14.33	0.87	0.198	(0.197)	0.146	0.051
173	14.42	0.87	0.198	(0.196)	0.146	0.051
174	14.50	0.87	0.198	(0.195)	0.146	0.051
175	14.58	0.87	0.198	(0.194)	0.146	0.051
176	14.67	0.87	0.198	(0.193)	0.146	0.051
177	14.75	0.87	0.198	(0.192)	0.146	0.051
178	14.83	0.83	0.190	(0.191)	0.141	0.049

179	14.92	0.83	0.190	(0.190)	0.141	0.049
180	15.00	0.83	0.190	(0.189)	0.141	0.049
181	15.08	0.80	0.182	(0.188)	0.135	0.047
182	15.17	0.80	0.182	(0.187)	0.135	0.047
183	15.25	0.80	0.182	(0.186)	0.135	0.047
184	15.33	0.77	0.175	(0.185)	0.129	0.045
185	15.42	0.77	0.175	(0.185)	0.129	0.045
186	15.50	0.77	0.175	(0.184)	0.129	0.045
187	15.58	0.63	0.144	(0.183)	0.107	0.038
188	15.67	0.63	0.144	(0.182)	0.107	0.038
189	15.75	0.63	0.144	(0.181)	0.107	0.038
190	15.83	0.63	0.144	(0.180)	0.107	0.038
191	15.92	0.63	0.144	(0.179)	0.107	0.038
192	16.00	0.63	0.144	(0.178)	0.107	0.038
193	16.08	0.13	0.030	(0.177)	0.022	0.008
194	16.17	0.13	0.030	(0.176)	0.022	0.008
195	16.25	0.13	0.030	(0.175)	0.022	0.008
196	16.33	0.13	0.030	(0.174)	0.022	0.008
197	16.42	0.13	0.030	(0.174)	0.022	0.008
198	16.50	0.13	0.030	(0.173)	0.022	0.008
199	16.58	0.10	0.023	(0.172)	0.017	0.006
200	16.67	0.10	0.023	(0.171)	0.017	0.006
201	16.75	0.10	0.023	(0.170)	0.017	0.006
202	16.83	0.10	0.023	(0.169)	0.017	0.006
203	16.92	0.10	0.023	(0.168)	0.017	0.006
204	17.00	0.10	0.023	(0.167)	0.017	0.006
205	17.08	0.17	0.038	(0.167)	0.028	0.010
206	17.17	0.17	0.038	(0.166)	0.028	0.010
207	17.25	0.17	0.038	(0.165)	0.028	0.010
208	17.33	0.17	0.038	(0.164)	0.028	0.010
209	17.42	0.17	0.038	(0.163)	0.028	0.010
210	17.50	0.17	0.038	(0.162)	0.028	0.010
211	17.58	0.17	0.038	(0.162)	0.028	0.010
212	17.67	0.17	0.038	(0.161)	0.028	0.010
213	17.75	0.17	0.038	(0.160)	0.028	0.010
214	17.83	0.13	0.030	(0.159)	0.022	0.008
215	17.92	0.13	0.030	(0.158)	0.022	0.008
216	18.00	0.13	0.030	(0.158)	0.022	0.008
217	18.08	0.13	0.030	(0.157)	0.022	0.008
218	18.17	0.13	0.030	(0.156)	0.022	0.008
219	18.25	0.13	0.030	(0.155)	0.022	0.008
220	18.33	0.13	0.030	(0.155)	0.022	0.008
221	18.42	0.13	0.030	(0.154)	0.022	0.008
222	18.50	0.13	0.030	(0.153)	0.022	0.008
223	18.58	0.10	0.023	(0.152)	0.017	0.006
224	18.67	0.10	0.023	(0.152)	0.017	0.006
225	18.75	0.10	0.023	(0.151)	0.017	0.006
226	18.83	0.07	0.015	(0.150)	0.011	0.004
227	18.92	0.07	0.015	(0.149)	0.011	0.004
228	19.00	0.07	0.015	(0.149)	0.011	0.004
229	19.08	0.10	0.023	(0.148)	0.017	0.006
230	19.17	0.10	0.023	(0.147)	0.017	0.006
231	19.25	0.10	0.023	(0.147)	0.017	0.006
232	19.33	0.13	0.030	(0.146)	0.022	0.008
233	19.42	0.13	0.030	(0.145)	0.022	0.008
234	19.50	0.13	0.030	(0.145)	0.022	0.008
235	19.58	0.10	0.023	(0.144)	0.017	0.006

236	19.67	0.10	0.023	(0.143)	0.017	0.006
237	19.75	0.10	0.023	(0.143)	0.017	0.006
238	19.83	0.07	0.015	(0.142)	0.011	0.004
239	19.92	0.07	0.015	(0.141)	0.011	0.004
240	20.00	0.07	0.015	(0.141)	0.011	0.004
241	20.08	0.10	0.023	(0.140)	0.017	0.006
242	20.17	0.10	0.023	(0.140)	0.017	0.006
243	20.25	0.10	0.023	(0.139)	0.017	0.006
244	20.33	0.10	0.023	(0.138)	0.017	0.006
245	20.42	0.10	0.023	(0.138)	0.017	0.006
246	20.50	0.10	0.023	(0.137)	0.017	0.006
247	20.58	0.10	0.023	(0.137)	0.017	0.006
248	20.67	0.10	0.023	(0.136)	0.017	0.006
249	20.75	0.10	0.023	(0.135)	0.017	0.006
250	20.83	0.07	0.015	(0.135)	0.011	0.004
251	20.92	0.07	0.015	(0.134)	0.011	0.004
252	21.00	0.07	0.015	(0.134)	0.011	0.004
253	21.08	0.10	0.023	(0.133)	0.017	0.006
254	21.17	0.10	0.023	(0.133)	0.017	0.006
255	21.25	0.10	0.023	(0.132)	0.017	0.006
256	21.33	0.07	0.015	(0.132)	0.011	0.004
257	21.42	0.07	0.015	(0.131)	0.011	0.004
258	21.50	0.07	0.015	(0.131)	0.011	0.004
259	21.58	0.10	0.023	(0.130)	0.017	0.006
260	21.67	0.10	0.023	(0.130)	0.017	0.006
261	21.75	0.10	0.023	(0.129)	0.017	0.006
262	21.83	0.07	0.015	(0.129)	0.011	0.004
263	21.92	0.07	0.015	(0.128)	0.011	0.004
264	22.00	0.07	0.015	(0.128)	0.011	0.004
265	22.08	0.10	0.023	(0.128)	0.017	0.006
266	22.17	0.10	0.023	(0.127)	0.017	0.006
267	22.25	0.10	0.023	(0.127)	0.017	0.006
268	22.33	0.07	0.015	(0.126)	0.011	0.004
269	22.42	0.07	0.015	(0.126)	0.011	0.004
270	22.50	0.07	0.015	(0.126)	0.011	0.004
271	22.58	0.07	0.015	(0.125)	0.011	0.004
272	22.67	0.07	0.015	(0.125)	0.011	0.004
273	22.75	0.07	0.015	(0.125)	0.011	0.004
274	22.83	0.07	0.015	(0.124)	0.011	0.004
275	22.92	0.07	0.015	(0.124)	0.011	0.004
276	23.00	0.07	0.015	(0.124)	0.011	0.004
277	23.08	0.07	0.015	(0.123)	0.011	0.004
278	23.17	0.07	0.015	(0.123)	0.011	0.004
279	23.25	0.07	0.015	(0.123)	0.011	0.004
280	23.33	0.07	0.015	(0.123)	0.011	0.004
281	23.42	0.07	0.015	(0.122)	0.011	0.004
282	23.50	0.07	0.015	(0.122)	0.011	0.004
283	23.58	0.07	0.015	(0.122)	0.011	0.004
284	23.67	0.07	0.015	(0.122)	0.011	0.004
285	23.75	0.07	0.015	(0.122)	0.011	0.004
286	23.83	0.07	0.015	(0.121)	0.011	0.004
287	23.92	0.07	0.015	(0.121)	0.011	0.004
288	24.00	0.07	0.015	(0.121)	0.011	0.004

(Loss Rate Not Used)

Sum = 100.0 Sum = 5.9

Flood volume = Effective rainfall 0.49(In)
times area 5.2(Ac.)/[(In)/(Ft.)] = 0.2(Ac.Ft)

Total soil loss = 1.41(In)
Total soil loss = 0.603(Ac.Ft)
Total rainfall = 1.90(In)
Flood volume = 9235.0 Cubic Feet
Total soil loss = 26284.2 Cubic Feet

Peak flow rate of this hydrograph = 0.349(CFS)

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24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0001	0.01	Q				
0+10	0.0002	0.02	Q				
0+15	0.0003	0.02	Q				
0+20	0.0005	0.02	Q				
0+25	0.0007	0.03	Q				
0+30	0.0009	0.03	Q				
0+35	0.0011	0.03	Q				
0+40	0.0013	0.03	Q				
0+45	0.0015	0.03	Q				
0+50	0.0018	0.03	Q				
0+55	0.0020	0.04	Q				
1+ 0	0.0023	0.04	Q				
1+ 5	0.0026	0.04	Q				
1+10	0.0028	0.03	Q				
1+15	0.0030	0.03	Q				
1+20	0.0032	0.03	Q				
1+25	0.0034	0.03	Q				
1+30	0.0036	0.03	Q				
1+35	0.0038	0.03	Q				
1+40	0.0041	0.03	Q				
1+45	0.0043	0.03	Q				
1+50	0.0045	0.03	Q				
1+55	0.0048	0.04	Q				
2+ 0	0.0051	0.04	Q				
2+ 5	0.0053	0.04	QV				
2+10	0.0056	0.04	QV				
2+15	0.0059	0.04	QV				
2+20	0.0062	0.04	QV				
2+25	0.0065	0.04	QV				
2+30	0.0068	0.04	QV				
2+35	0.0071	0.05	QV				
2+40	0.0074	0.05	QV				
2+45	0.0078	0.05	QV				
2+50	0.0081	0.05	QV				
2+55	0.0085	0.05	QV				
3+ 0	0.0088	0.05	QV				
3+ 5	0.0092	0.05	QV				
3+10	0.0095	0.05	QV				
3+15	0.0099	0.05	QV				
3+20	0.0102	0.05	QV				

3+25	0.0106	0.05	QV	|	|	|	|
3+30	0.0109	0.05	Q V	|	|	|	|
3+35	0.0113	0.05	Q V	|	|	|	|
3+40	0.0116	0.05	Q V	|	|	|	|
3+45	0.0120	0.05	Q V	|	|	|	|
3+50	0.0124	0.06	Q V	|	|	|	|
3+55	0.0128	0.06	Q V	|	|	|	|
4+ 0	0.0132	0.06	Q V	|	|	|	|
4+ 5	0.0136	0.06	Q V	|	|	|	|
4+10	0.0141	0.06	Q V	|	|	|	|
4+15	0.0145	0.06	Q V	|	|	|	|
4+20	0.0149	0.07	Q V	|	|	|	|
4+25	0.0154	0.07	Q V	|	|	|	|
4+30	0.0159	0.07	Q V	|	|	|	|
4+35	0.0164	0.07	Q V	|	|	|	|
4+40	0.0169	0.07	Q V	|	|	|	|
4+45	0.0174	0.07	Q V	|	|	|	|
4+50	0.0179	0.08	Q V	|	|	|	|
4+55	0.0185	0.08	Q V	|	|	|	|
5+ 0	0.0190	0.08	Q V	|	|	|	|
5+ 5	0.0195	0.07	Q V	|	|	|	|
5+10	0.0200	0.06	Q V	|	|	|	|
5+15	0.0204	0.06	Q V	|	|	|	|
5+20	0.0209	0.07	Q V	|	|	|	|
5+25	0.0214	0.07	Q V	|	|	|	|
5+30	0.0218	0.07	Q V	|	|	|	|
5+35	0.0224	0.08	Q V	|	|	|	|
5+40	0.0229	0.08	Q V	|	|	|	|
5+45	0.0235	0.08	Q V	|	|	|	|
5+50	0.0240	0.08	Q V	|	|	|	|
5+55	0.0246	0.08	Q V	|	|	|	|
6+ 0	0.0252	0.08	Q V	|	|	|	|
6+ 5	0.0258	0.09	Q V	|	|	|	|
6+10	0.0264	0.09	Q V	|	|	|	|
6+15	0.0270	0.09	Q V	|	|	|	|
6+20	0.0277	0.09	Q V	|	|	|	|
6+25	0.0283	0.09	Q V	|	|	|	|
6+30	0.0289	0.09	Q V	|	|	|	|
6+35	0.0296	0.10	Q V	|	|	|	|
6+40	0.0303	0.10	Q V	|	|	|	|
6+45	0.0310	0.10	Q V	|	|	|	|
6+50	0.0317	0.10	Q V	|	|	|	|
6+55	0.0324	0.10	Q V	|	|	|	|
7+ 0	0.0331	0.10	Q V	|	|	|	|
7+ 5	0.0338	0.10	Q V	|	|	|	|
7+10	0.0345	0.10	Q V	|	|	|	|
7+15	0.0352	0.10	Q V	|	|	|	|
7+20	0.0360	0.11	Q V	|	|	|	|
7+25	0.0367	0.11	Q V	|	|	|	|
7+30	0.0375	0.11	Q V	|	|	|	|
7+35	0.0383	0.12	Q V	|	|	|	|
7+40	0.0391	0.12	Q V	|	|	|	|
7+45	0.0400	0.12	Q V	|	|	|	|
7+50	0.0409	0.13	Q V	|	|	|	|
7+55	0.0418	0.13	Q V	|	|	|	|
8+ 0	0.0427	0.13	Q V	|	|	|	|
8+ 5	0.0437	0.14	Q V	|	|	|	|

8+10	0.0447	0.15	Q	V			
8+15	0.0458	0.15	Q	V			
8+20	0.0468	0.15	Q	V			
8+25	0.0479	0.15	Q	V			
8+30	0.0489	0.15	Q	V			
8+35	0.0500	0.16	Q	V			
8+40	0.0511	0.16	Q	V			
8+45	0.0523	0.16	Q	V			
8+50	0.0534	0.17	Q	V			
8+55	0.0546	0.17	Q	V			
9+ 0	0.0558	0.17	Q	V			
9+ 5	0.0571	0.18	Q	V			
9+10	0.0584	0.19	Q	V			
9+15	0.0597	0.19	Q	V			
9+20	0.0611	0.20	Q	V			
9+25	0.0625	0.20	Q	V			
9+30	0.0639	0.20	Q	V			
9+35	0.0653	0.21	Q	V			
9+40	0.0668	0.21	Q	V			
9+45	0.0683	0.21	Q	V			
9+50	0.0698	0.22	Q	V			
9+55	0.0713	0.22	Q	V			
10+ 0	0.0729	0.23	Q	V			
10+ 5	0.0743	0.20	Q	V			
10+10	0.0754	0.17	Q	V			
10+15	0.0765	0.16	Q	V			
10+20	0.0776	0.16	Q	V			
10+25	0.0786	0.15	Q	V			
10+30	0.0797	0.15	Q	V			
10+35	0.0809	0.17	Q	V			
10+40	0.0822	0.20	Q	V			
10+45	0.0836	0.20	Q	V			
10+50	0.0850	0.20	Q	V			
10+55	0.0864	0.21	Q	V			
11+ 0	0.0879	0.21	Q	V			
11+ 5	0.0892	0.20	Q	V			
11+10	0.0906	0.20	Q	V			
11+15	0.0919	0.20	Q	V			
11+20	0.0933	0.20	Q	V			
11+25	0.0946	0.19	Q	V			
11+30	0.0960	0.19	Q	V			
11+35	0.0973	0.19	Q	V			
11+40	0.0985	0.18	Q	V			
11+45	0.0997	0.18	Q	V			
11+50	0.1009	0.18	Q	V			
11+55	0.1022	0.18	Q	V			
12+ 0	0.1034	0.18	Q	V			
12+ 5	0.1049	0.21	Q	V			
12+10	0.1066	0.25	Q	V			
12+15	0.1083	0.25	Q	V			
12+20	0.1101	0.26	Q	V			
12+25	0.1120	0.27	Q	V			
12+30	0.1138	0.27	Q	V			
12+35	0.1157	0.27	Q	V			
12+40	0.1176	0.28	Q	V			
12+45	0.1196	0.29	Q	V			
12+50	0.1216	0.29	Q	V			

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12+55       0.1236      0.30  |Q        |          |  V       |          |
13+ 0       0.1257      0.30  |Q        |          |  V       |          |
13+ 5       0.1279      0.32  |Q        |          |   V      |          |
13+10       0.1302      0.34  |Q        |          |   V      |          |
13+15       0.1326      0.35  |Q        |          |    V     |          |
13+20       0.1350      0.35  |Q        |          |    V     |          |
13+25       0.1374      0.35  |Q        |          |    V     |          |
13+30       0.1398      0.35  |Q        |          |     V    |          |
13+35       0.1419      0.30  |Q        |          |     V    |          |
13+40       0.1437      0.25  |Q        |          |      V   |          |
13+45       0.1453      0.24  Q         |          |      V   |          |
13+50       0.1470      0.24  Q         |          |      V   |          |
13+55       0.1486      0.24  Q         |          |       V  |          |
14+ 0       0.1502      0.24  Q         |          |       V  |          |
14+ 5       0.1520      0.25  |Q        |          |       V  |          |
14+10       0.1538      0.27  |Q        |          |        V |          |
14+15       0.1557      0.27  |Q        |          |        V |          |
14+20       0.1576      0.27  |Q        |          |        V |          |
14+25       0.1594      0.27  |Q        |          |         V          |
14+30       0.1613      0.27  |Q        |          |         V          |
14+35       0.1631      0.27  |Q        |          |         V          |
14+40       0.1649      0.27  |Q        |          |         |V         |
14+45       0.1668      0.27  |Q        |          |         |V         |
14+50       0.1686      0.26  |Q        |          |         |V         |
14+55       0.1704      0.26  |Q        |          |         | V        |
15+ 0       0.1721      0.26  |Q        |          |         | V        |
15+ 5       0.1739      0.25  |Q        |          |         | V        |
15+10       0.1756      0.25  Q         |          |         |  V       |
15+15       0.1773      0.25  Q         |          |         |  V       |
15+20       0.1790      0.24  Q         |          |         |  V       |
15+25       0.1806      0.24  Q         |          |         |   V      |
15+30       0.1822      0.24  Q         |          |         |   V      |
15+35       0.1837      0.22  Q         |          |         |   V      |
15+40       0.1851      0.20  Q         |          |         |   V      |
15+45       0.1865      0.20  Q         |          |         |    V     |
15+50       0.1878      0.20  Q         |          |         |    V     |
15+55       0.1892      0.19  Q         |          |         |    V     |
16+ 0       0.1905      0.19  Q         |          |         |    V     |
16+ 5       0.1914      0.13  Q         |          |         |     V    |
16+10       0.1919      0.07  Q         |          |         |     V    |
16+15       0.1922      0.05  Q         |          |         |     V    |
16+20       0.1925      0.04  Q         |          |         |     V    |
16+25       0.1928      0.04  Q         |          |         |     V    |
16+30       0.1931      0.04  Q         |          |         |     V    |
16+35       0.1934      0.04  Q         |          |         |     V    |
16+40       0.1936      0.03  Q         |          |         |     V    |
16+45       0.1938      0.03  Q         |          |         |     V    |
16+50       0.1940      0.03  Q         |          |         |     V    |
16+55       0.1942      0.03  Q         |          |         |     V    |
17+ 0       0.1944      0.03  Q         |          |         |     V    |
17+ 5       0.1947      0.04  Q         |          |         |     V    |
17+10       0.1950      0.05  Q         |          |         |     V    |
17+15       0.1954      0.05  Q         |          |         |     V    |
17+20       0.1957      0.05  Q         |          |         |     V    |
17+25       0.1961      0.05  Q         |          |         |     V    |
17+30       0.1964      0.05  Q         |          |         |      V   |
17+35       0.1968      0.05  Q         |          |         |      V   |
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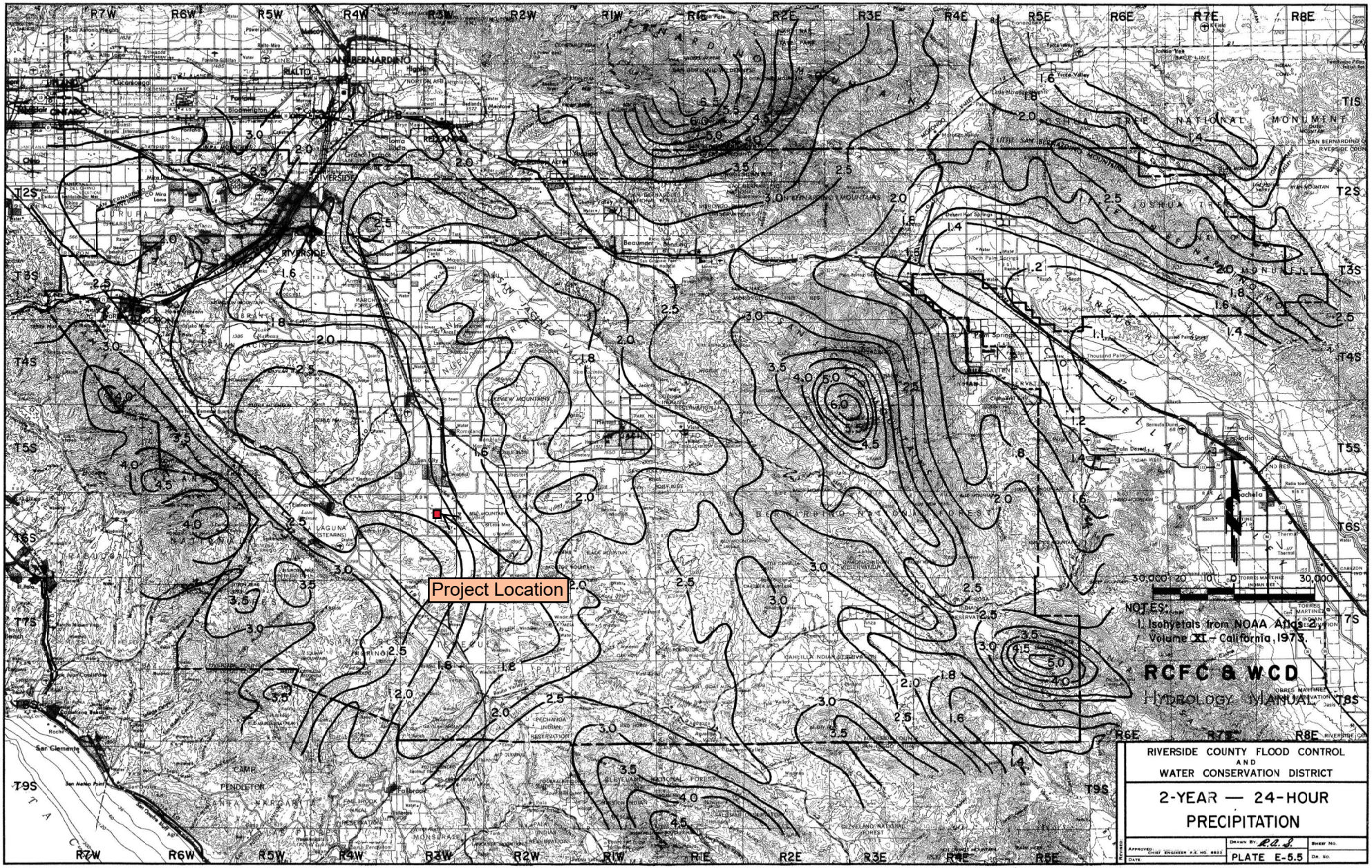
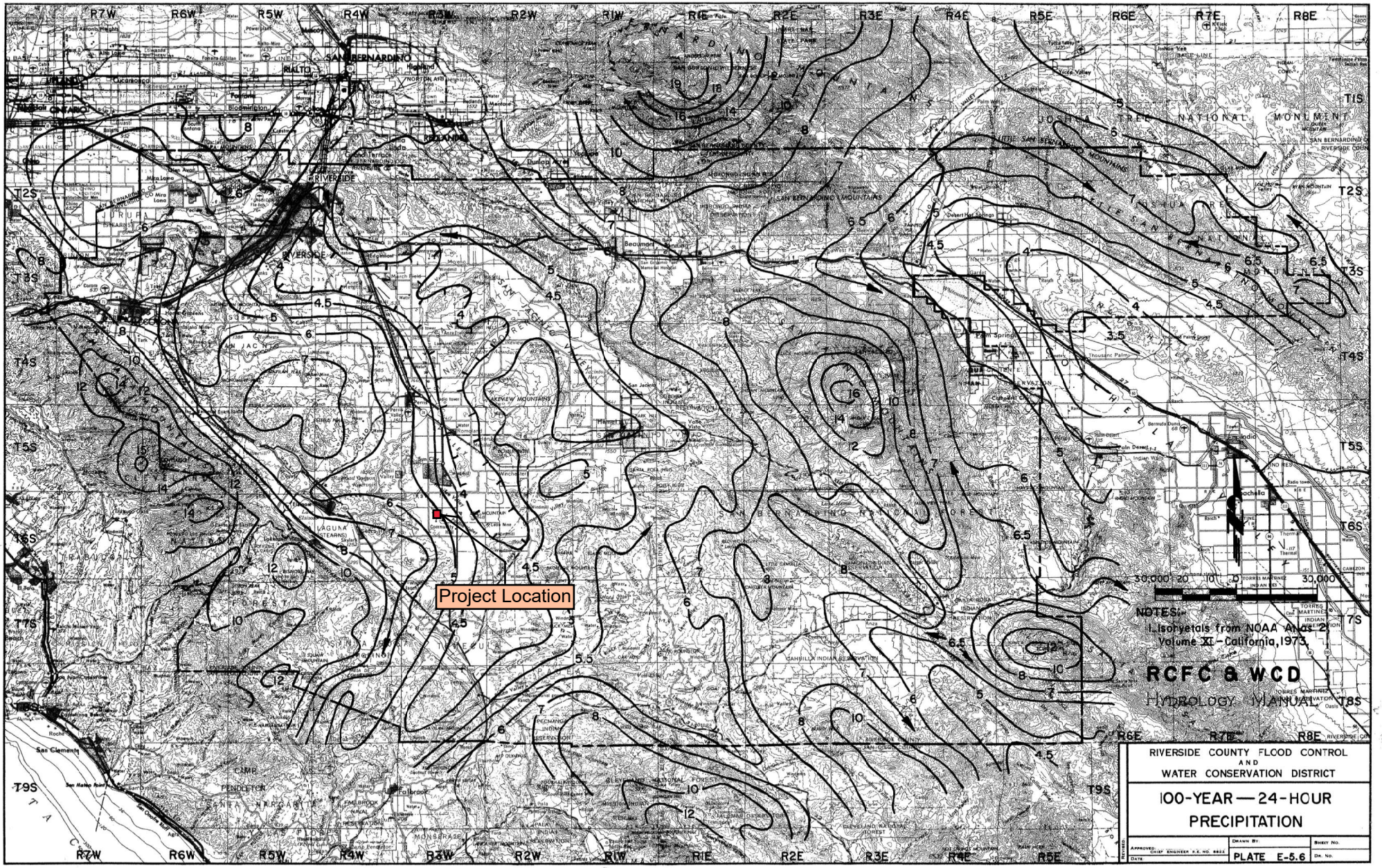
17+40	0.1972	0.05	Q	|	|	|	V |
17+45	0.1975	0.05	Q	|	|	|	V |
17+50	0.1978	0.05	Q	|	|	|	V |
17+55	0.1981	0.04	Q	|	|	|	V |
18+ 0	0.1984	0.04	Q	|	|	|	V |
18+ 5	0.1987	0.04	Q	|	|	|	V |
18+10	0.1990	0.04	Q	|	|	|	V |
18+15	0.1993	0.04	Q	|	|	|	V |
18+20	0.1995	0.04	Q	|	|	|	V |
18+25	0.1998	0.04	Q	|	|	|	V |
18+30	0.2001	0.04	Q	|	|	|	V |
18+35	0.2004	0.04	Q	|	|	|	V |
18+40	0.2006	0.03	Q	|	|	|	V |
18+45	0.2008	0.03	Q	|	|	|	V |
18+50	0.2010	0.03	Q	|	|	|	V |
18+55	0.2011	0.02	Q	|	|	|	V |
19+ 0	0.2013	0.02	Q	|	|	|	V |
19+ 5	0.2015	0.02	Q	|	|	|	V |
19+10	0.2017	0.03	Q	|	|	|	V |
19+15	0.2019	0.03	Q	|	|	|	V |
19+20	0.2021	0.03	Q	|	|	|	V |
19+25	0.2024	0.04	Q	|	|	|	V |
19+30	0.2027	0.04	Q	|	|	|	V |
19+35	0.2029	0.04	Q	|	|	|	V |
19+40	0.2031	0.03	Q	|	|	|	V |
19+45	0.2033	0.03	Q	|	|	|	V |
19+50	0.2035	0.03	Q	|	|	|	V |
19+55	0.2037	0.02	Q	|	|	|	V |
20+ 0	0.2038	0.02	Q	|	|	|	V |
20+ 5	0.2040	0.02	Q	|	|	|	V |
20+10	0.2042	0.03	Q	|	|	|	V |
20+15	0.2044	0.03	Q	|	|	|	V |
20+20	0.2046	0.03	Q	|	|	|	V |
20+25	0.2048	0.03	Q	|	|	|	V |
20+30	0.2050	0.03	Q	|	|	|	V |
20+35	0.2053	0.03	Q	|	|	|	V |
20+40	0.2055	0.03	Q	|	|	|	V |
20+45	0.2057	0.03	Q	|	|	|	V |
20+50	0.2059	0.03	Q	|	|	|	V |
20+55	0.2060	0.02	Q	|	|	|	V |
21+ 0	0.2062	0.02	Q	|	|	|	V |
21+ 5	0.2063	0.02	Q	|	|	|	V |
21+10	0.2065	0.03	Q	|	|	|	V |
21+15	0.2067	0.03	Q	|	|	|	V|
21+20	0.2069	0.03	Q	|	|	|	V|
21+25	0.2071	0.02	Q	|	|	|	V|
21+30	0.2072	0.02	Q	|	|	|	V|
21+35	0.2074	0.02	Q	|	|	|	V|
21+40	0.2076	0.03	Q	|	|	|	V|
21+45	0.2078	0.03	Q	|	|	|	V|
21+50	0.2080	0.03	Q	|	|	|	V|
21+55	0.2081	0.02	Q	|	|	|	V|
22+ 0	0.2083	0.02	Q	|	|	|	V|
22+ 5	0.2085	0.02	Q	|	|	|	V|
22+10	0.2087	0.03	Q	|	|	|	V|
22+15	0.2089	0.03	Q	|	|	|	V|
22+20	0.2090	0.03	Q	|	|	|	V|

22+25	0.2092	0.02	Q	|	|	|	V|
22+30	0.2093	0.02	Q	|	|	|	V|
22+35	0.2095	0.02	Q	|	|	|	V|
22+40	0.2096	0.02	Q	|	|	|	V|
22+45	0.2098	0.02	Q	|	|	|	V|
22+50	0.2099	0.02	Q	|	|	|	V|
22+55	0.2100	0.02	Q	|	|	|	V|
23+ 0	0.2102	0.02	Q	|	|	|	V|
23+ 5	0.2103	0.02	Q	|	|	|	V|
23+10	0.2105	0.02	Q	|	|	|	V|
23+15	0.2106	0.02	Q	|	|	|	V|
23+20	0.2108	0.02	Q	|	|	|	V|
23+25	0.2109	0.02	Q	|	|	|	V|
23+30	0.2110	0.02	Q	|	|	|	V|
23+35	0.2112	0.02	Q	|	|	|	V|
23+40	0.2113	0.02	Q	|	|	|	V|
23+45	0.2115	0.02	Q	|	|	|	V|
23+50	0.2116	0.02	Q	|	|	|	V|
23+55	0.2117	0.02	Q	|	|	|	V|
24+ 0	0.2119	0.02	Q	|	|	|	V|
24+ 5	0.2120	0.01	Q	|	|	|	V|
24+10	0.2120	0.00	Q	|	|	|	V|
24+15	0.2120	0.00	Q	|	|	|	V|
24+20	0.2120	0.00	Q	|	|	|	V|


Project Location
NOTES:
1. Isohyetals from NOAA Atlas 2, Volume XI - California, 1973.
RCFC & WCD
HYDROLOGY MANUAL
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
2-YEAR — 24-HOUR PRECIPITATION
PLATE E-5.5


Project Location
NOTES:
1. Isohyetals from NOAA Atlas 2, Volume XI - California, 1973.
RCFC & WCD
HYDROLOGY MANUAL
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
100-YEAR — 24-HOUR PRECIPITATION
PLATE E-5.6

Appendix 8: Source Control

Pollutant Sources/Source Control Checklist

STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

How to use this worksheet (also see instructions in Section G of the WQMP Template):

1. Review Column 1 and identify which of these potential sources of stormwater pollutants apply to your site. Check each box that applies.
2. Review Column 2 and incorporate all of the corresponding applicable BMPs in your WQMP Exhibit.
3. Review Columns 3 and 4 and incorporate all of the corresponding applicable permanent controls and operational BMPs in your WQMP. Use the format shown in Table G.1on page 23 of this WQMP Template. Describe your specific BMPs in an accompanying narrative, and explain any special conditions or situations that required omitting BMPs or substituting alternative BMPs for those shown here.

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ A. **On-site storm drain inlets**	❑ **Locations of inlets.**	❑ **Mark all inlets with the words "Only Rain Down the Storm Drain" or similar. Catch Basin Markers may be available from the Riverside County Flood Control and Water Conservation District, call 951.955.1200 to verify.**	❑ **Maintain and periodically repaint or replace inlet markings.** ❑ **Provide stormwater pollution prevention information to new site owners, lessees, or operators.** ❑ **See applicable operational BMPs in Fact Sheet SC-44, "Drainage System Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com** ❑ **Include the following in lease agreements: "Tenant shall not allow anyone to discharge anything to storm drains or to store or deposit materials so as to create a potential discharge to storm drains."**
❑ B. **Interior floor drains and elevator shaft sump pumps**		❑ **State that interior floor drains and elevator shaft sump pumps will be plumbed to sanitary sewer.**	❑ **Inspect and maintain drains to prevent blockages and overflow.**
❑ C. **Interior parking garages**		❑ **State that parking garage floor drains will be plumbed to the sanitary sewer.**	❑ **Inspect and maintain drains to prevent blockages and overflow.**

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ D1. **Need for future indoor & structural pest control**		❑ **Note building design features that discourage entry of pests.**	❑ **Provide Integrated Pest Management information to owners, lessees, and operators.**
❑ D2. **Landscape/ Outdoor Pesticide Use**	❑ **Show locations of native trees or areas of shrubs and ground cover to be undisturbed and retained.** ❑ **Show self-retaining landscape areas, if any.** ❑ **Show stormwater treatment and hydrograph modification management BMPs. (See instructions in Chapter 3, Step 5 and guidance in Chapter 5.)**	**State that final landscape plans will accomplish all of the following.** ❑ **Preserve existing native trees, shrubs, and ground cover to the maximum extent possible.** ❑ **Design landscaping to minimize irrigation and runoff, to promote surface infiltration where appropriate, and to minimize the use of fertilizers and pesticides that can contribute to stormwater pollution.** ❑ **Where landscaped areas are used to retain or detain stormwater, specify plants that are tolerant of saturated soil conditions.** ❑ **Consider using pest-resistant plants, especially adjacent to hardscape.** **To insure successful establishment, select plants appropriate to site soils, slopes, climate, sun, wind, rain, land use, air movement, ecological consistency, and plant interactions.**	❑ **Maintain landscaping using minimum or no pesticides.** ❑ **See applicable operational BMPs in "What you should know for…..Landscape and Gardening"** at http://rcflood.org/stormwater/**Error! Hyperlink reference not valid.** ❑ **Provide IPM information to new owners, lessees and operators.**

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ E. **Pools, spas, ponds, decorative fountains, and other water features.**	❑ **Show location of water feature and a sanitary sewer cleanout in an accessible area within 10 feet. (Exception: Public pools must be plumbed according to County Department of Environmental Health Guidelines.)**	**If the Co-Permittee requires pools to be plumbed to the sanitary sewer, place a note on the plans and state in the narrative that this connection will be made according to local requirements.**	❑ **See applicable operational BMPs in** "Guidelines for Maintaining Your Swimming Pool, Jacuzzi and Garden Fountain" at http://rcflood.org/stormwater/
❑ F. **Food service**	❑ **For restaurants, grocery stores, and other food service operations, show location (indoors or in a covered area outdoors) of a floor sink or other area for cleaning floor mats, containers, and equipment.** ❑ **On the drawing, show a note that this drain will be connected to a grease interceptor before discharging to the sanitary sewer.**	❑ **Describe the location and features of the designated cleaning area.** ❑ **Describe the items to be cleaned in this facility and how it has been sized to insure that the largest items can be accommodated.**	❑ **See the brochure, "**The Food Service Industry Best Management Practices for: Restaurants, Grocery Stores, Delicatessens and Bakeries" at http://rcflood.org/stormwater/ **Provide this brochure to new site owners, lessees, and operators.**
❑ G. **Refuse areas**	❑ **Show where site refuse and recycled materials will be handled and stored for pickup. See local municipal requirements for sizes and other details of refuse areas.** ❑ **If dumpsters or other receptacles are outdoors, show how the designated area will be covered, graded, and paved to prevent run-on and show locations of berms to prevent runoff from the area.** ❑ **Any drains from dumpsters, compactors, and tallow bin areas shall be connected to a grease removal device before discharge to sanitary sewer.**	❑ **State how site refuse will be handled and provide supporting detail to what is shown on plans.** ❑ **State that signs will be posted on or near dumpsters with the words "Do not dump hazardous materials here" or similar.**	❑ **State how the following will be implemented:** **Provide adequate number of receptacles. Inspect receptacles regularly; repair or replace leaky receptacles. Keep receptacles covered. Prohibit/prevent dumping of liquid or hazardous wastes. Post "no hazardous materials" signs. Inspect and pick up litter daily and clean up spills immediately. Keep spill control materials available on-site. See Fact Sheet SC-34, "Waste Handling and Disposal" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com**

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ H. **Industrial processes.**	❑ **Show process area.**	❑ **If industrial processes are to be located on site, state: "All process activities to be performed indoors. No processes to drain to exterior or to storm drain system."**	❑ **See Fact Sheet SC-10, "Non-Stormwater Discharges" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com** See the brochure "Industrial & Commercial Facilities Best Management Practices for: Industrial, Commercial Facilities" at http://rcflood.org/stormwater/

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ I. **Outdoor storage of equipment or materials. (See rows J and K for source control measures for vehicle cleaning, repair, and maintenance.)**	❑ **Show any outdoor storage areas, including how materials will be covered. Show how areas will be graded and bermed to prevent run-on or run-off from area.** ❑ **Storage of non-hazardous liquids shall be covered by a roof and/or drain to the sanitary sewer system, and be contained by berms, dikes, liners, or vaults.** ❑ **Storage of hazardous materials and wastes must be in compliance with the local hazardous materials ordinance and a Hazardous Materials Management Plan for the site.**	**Include a detailed description of materials to be stored, storage areas, and structural features to prevent pollutants from entering storm drains.** **Where appropriate, reference documentation of compliance with the requirements of Hazardous Materials Programs for:** ▪ **Hazardous Waste Generation** ▪ **Hazardous Materials Release Response and Inventory** ▪ **California Accidental Release (CalARP)** ▪ **Aboveground Storage Tank** ▪ **Uniform Fire Code Article 80 Section 103(b) & (c) 1991** ▪ **Underground Storage Tank** **www.cchealth.org/groups/hazmat/**	❑ **See the Fact Sheets SC-31, "Outdoor Liquid Container Storage" and SC-33, "Outdoor Storage of Raw Materials " in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com**

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ J. **Vehicle and Equipment Cleaning**	❑ **Show on drawings as appropriate:** **(1) Commercial/industrial facilities having vehicle/equipment cleaning needs shall either provide a covered, bermed area for washing activities or discourage vehicle/equipment washing by removing hose bibs and installing signs prohibiting such uses.** **(2) Multi-dwelling complexes shall have a paved, bermed, and covered car wash area (unless car washing is prohibited on-site and hoses are provided with an automatic shut-off to discourage such use).** **(3) Washing areas for cars, vehicles, and equipment shall be paved, designed to prevent run-on to or runoff from the area, and plumbed to drain to the sanitary sewer.** **(4) Commercial car wash facilities shall be designed such that no runoff from the facility is discharged to the storm drain system. Wastewater from the facility shall discharge to the sanitary sewer, or a wastewater reclamation system shall be installed.**	❑ **If a car wash area is not provided, describe any measures taken to discourage on-site car washing and explain how these will be enforced.**	**Describe operational measures to implement the following (if applicable):** ❑ **Washwater from vehicle and equipment washing operations shall not be discharged to the storm drain system.** Refer to "Outdoor Cleaning Activities and Professional Mobile Service Providers" for many of the Potential Sources of Runoff Pollutants categories below. Brochure can be found at http://rcflood.org/stormwater/ ❑ **Car dealerships and similar may rinse cars with water only.**

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ K. **Vehicle/Equipment Repair and Maintenance**	❑ **Accommodate all vehicle equipment repair and maintenance indoors. Or designate an outdoor work area and design the area to prevent run-on and runoff of stormwater.** ❑ **Show secondary containment for exterior work areas where motor oil, brake fluid, gasoline, diesel fuel, radiator fluid, acid-containing batteries or other hazardous materials or hazardous wastes are used or stored. Drains shall not be installed within the secondary containment areas.** ❑ **Add a note on the plans that states either (1) there are no floor drains, or (2) floor drains are connected to wastewater pretreatment systems prior to discharge to the sanitary sewer and an industrial waste discharge permit will be obtained.**	❑ **State that no vehicle repair or maintenance will be done outdoors, or else describe the required features of the outdoor work area.** ❑ **State that there are no floor drains or if there are floor drains, note the agency from which an industrial waste discharge permit will be obtained and that the design meets that agency's requirements.** ❑ **State that there are no tanks, containers or sinks to be used for parts cleaning or rinsing or, if there are, note the agency from which an industrial waste discharge permit will be obtained and that the design meets that agency's requirements.**	**In the Stormwater Control Plan, note that all of the following restrictions apply to use the site:** ❑ **No person shall dispose of, nor permit the disposal, directly or indirectly of vehicle fluids, hazardous materials, or rinsewater from parts cleaning into storm drains.** ❑ **No vehicle fluid removal shall be performed outside a building, nor on asphalt or ground surfaces, whether inside or outside a building, except in such a manner as to ensure that any spilled fluid will be in an area of secondary containment. Leaking vehicle fluids shall be contained or drained from the vehicle immediately.** ❑ **No person shall leave unattended drip parts or other open containers containing vehicle fluid, unless such containers are in use or in an area of secondary containment.** Refer to "Automotive Maintenance & Car Care Best Management Practices for Auto Body Shops, Auto Repair Shops, Car Dealerships, Gas Stations and Fleet Service Operations". Brochure can be found at http://rcflood.org/stormwater/ Refer to Outdoor Cleaning Activities and Professional Mobile Service Providers for many of the Potential Sources of Runoff Pollutants categories below. Brochure can be found at http://rcflood.org/stormwater/

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ L. **Fuel Dispensing Areas**	❑ **Fueling areas[6] shall have impermeable floors (i.e., portland cement concrete or equivalent smooth impervious surface) that are: a) graded at the minimum slope necessary to prevent ponding; and b) separated from the rest of the site by a grade break that prevents run-on of stormwater to the maximum extent practicable.** ❑ **Fueling areas shall be covered by a canopy that extends a minimum of ten feet in each direction from each pump. [Alternative: The fueling area must be covered and the cover's minimum dimensions must be equal to or greater than the area within the grade break or fuel dispensing area[1].] The canopy [or cover] shall not drain onto the fueling area.**		❑ **The property owner shall dry sweep the fueling area routinely.** ❑ **See the Fact Sheet SD-30 , "Fueling Areas" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com**

[6] **The fueling area shall be defined as the area extending a minimum of 6.5 feet from the corner of each fuel dispenser or the length at which the hose and nozzle assembly may be operated plus a minimum of one foot, whichever is greater.**

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ M. **Loading Docks**	❑ **Show a preliminary design for the loading dock area, including roofing and drainage. Loading docks shall be covered and/or graded to minimize run-on to and runoff from the loading area. Roof downspouts shall be positioned to direct stormwater away from the loading area. Water from loading dock areas shall be drained to the sanitary sewer, or diverted and collected for ultimate discharge to the sanitary sewer.** ❑ **Loading dock areas draining directly to the sanitary sewer shall be equipped with a spill control valve or equivalent device, which shall be kept closed during periods of operation.** ❑ **Provide a roof overhang over the loading area or install door skirts (cowling) at each bay that enclose the end of the trailer.**		❑ **Move loaded and unloaded items indoors as soon as possible.** ❑ **See Fact Sheet SC-30, "Outdoor Loading and Unloading," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com**

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ N. **Fire Sprinkler Test Water**		❑ **Provide a means to drain fire sprinkler test water to the sanitary sewer.**	❑ **See the note in Fact Sheet SC-41, "Building and Grounds Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com**
O. **Miscellaneous Drain or Wash Water or Other Sources** ❑ **Boiler drain lines** ❑ **Condensate drain lines** ❑ **Rooftop equipment** ❑ **Drainage sumps** ❑ **Roofing, gutters, and trim.** ❑ **Other sources**		❑ **Boiler drain lines shall be directly or indirectly connected to the sanitary sewer system and may not discharge to the storm drain system.** ❑ **Condensate drain lines may discharge to landscaped areas if the flow is small enough that runoff will not occur. Condensate drain lines may not discharge to the storm drain system.** ❑ **Rooftop equipment with potential to produce pollutants shall be roofed and/or have secondary containment.** ❑ **Any drainage sumps on-site shall feature a sediment sump to reduce the quantity of sediment in pumped water.** ❑ **Avoid roofing, gutters, and trim made of copper or other unprotected metals that may leach into runoff.** **Include controls for other sources as specified by local reviewer.**	

STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
☑ P. **Plazas, sidewalks, and parking lots.**			☑ **Sweep plazas, sidewalks, and parking lots regularly to prevent accumulation of litter and debris. Collect debris from pressure washing to prevent entry into the storm drain system. Collect washwater containing any cleaning agent or degreaser and discharge to the sanitary sewer not to a storm drain.**

Appendix 9: O&M

Operation and Maintenance Plan and Documentation of Finance, Maintenance and Recording Mechanisms

Operation and Maintenance Plan will be done with the Final WQMP and will be based on the final design of the park and associated BMPs.

Appendix 10: Educational Materials

BMP Fact Sheets, Maintenance Guidelines and Other End-User BMP Information

Educational Materials will be provided with the Final WQMP and will be based on the final design of the park and associated BMPs.

Evans Park Pump Track Site Preliminary Drainage Study

Menifee, California



Prepared November 3, 2021

Prepared By:
CValdo Corporation

CVALDO CORPORATION

2255 Avenida De La Playa, Suite 5
La Jolla, CA 92037

Mikayla Lopez, EIT
Mike Cairns, PE

Table of Contents

Purpose of Study 1

Rational Method Hydrologic Modeling 2

Unit Hydrograph Hydrologic Modeling 4

Figures

Figure 1 Vicinity Map

Tables

Table 1 Results of Rational Method Hydrologic Analysis

Appendices

Appendix A Rational Method Hydrology Workmap

Appendix B Rational Method Hydrologic Calculations

Appendix C Unit Hydrograph Workmap

Appendix D Unit Hydrograph Calculations

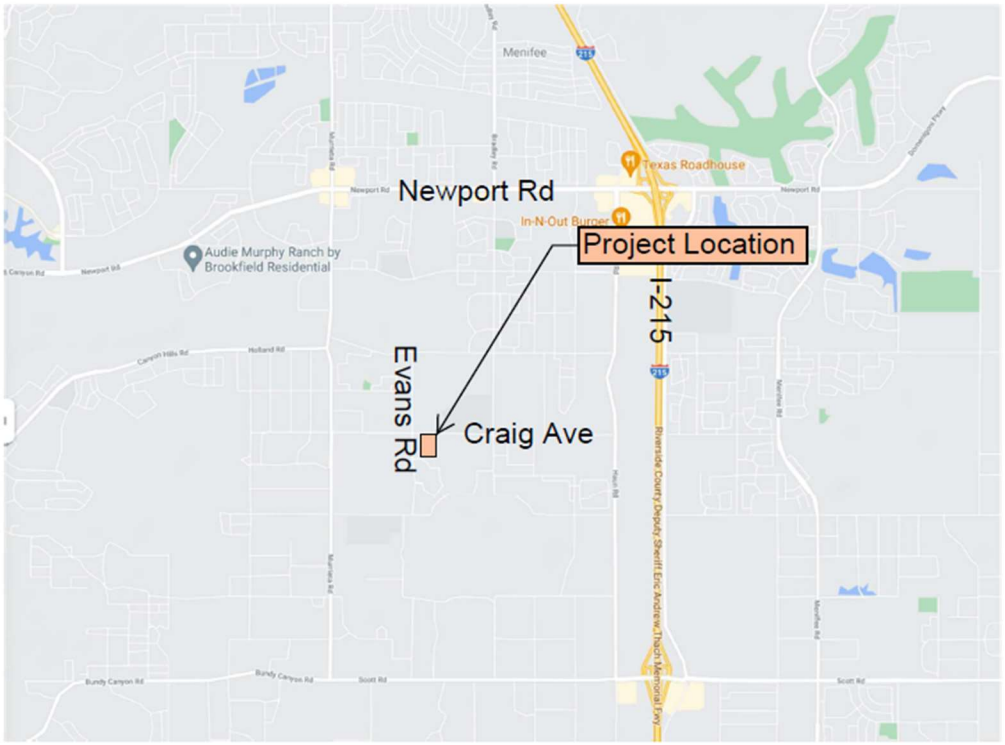
Appendix E Preliminary Site Plan

Appendix F Excerpt from City of Menifee Zoning Map

Purpose of Study

This study presents the preliminary hydrologic analysis for the Evans Park Pump Track project. The study is intended to support the project environmental document and permitting process. The project is located in the city of Menifee, California (see Figure 1 - Vicinity Map below). The 6.5-acre project site is located southeast of the intersection of Evans Road and Craig Avenue. The purpose of this study is to determine the onsite and offsite tributary peak flow rates for the 10- and 100-year storm events, and to establish approximate onsite detention basin sizing should the project be required to mitigate increased runoff for up to the 10-year 24-hour storm event. Note that this increased runoff mitigation may be required considering that discharge from the site ultimately reaches existing natural channels, which could be susceptible to hydromodification impacts, northeasterly of the site.

Figure 1 - Vicinity Map



Rational Method Hydrologic Modeling

CivilDesign Corporation's rational method modeling software was used in preparing the rational method hydrologic analysis. The hydrologic models were prepared utilizing the methodology contained in the Riverside County Flood Control and Water Conservation District (RCFCWCD) Hydrology Manual (April 1978). A hydrologic workmap is presented in Appendix A and calculations are presented in Appendix B. Note that since the major flow paths and node link network do not change in the developed condition, the same hydrologic workmap is utilized for both existing and developed conditions.

Ground surface elevations were obtained from 4-foot contour interval topographic mapping from RCFCWCD dated 08-15-2012. The hydrologic soil groups were obtained from the Natural Resources Conservation Service website. Offsite areas are predominately soil group D, with only a small percentage of soil group A, and therefore Soil Group D was utilized for the calculations. Onsite soils consist of approximately 43% group C and 57% group D.

Runoff coefficients for offsite areas assumed ultimate (built-out) condition land use based on the current City of Menifee Zoning Map (see map excerpt in Appendix F). Runoff coefficients for onsite areas reflect undeveloped land use for the existing condition. In the developed condition the runoff coefficient reflects site ground cover that will be similar to that in the existing condition with the exception of a new paved parking lot and pump track.

Onsite hydrologic analyses were prepared for the existing and developed condition, while the offsite analysis assumed the built-out watershed condition only. Peak flow rates were calculated where offsite runoff enters the site at the southeasterly corner (hydrologic node 104) and where combined onsite and offsite runoff could exit the site along the northerly site boundary (node 105). Note that it appears that in the existing condition runoff ponds at the northerly site boundary (south of Craig Avenue), and either flows northerly across Craig Avenue or easterly to a low point on the neighboring

property, eventually ponding and flowing northerly across Craig Avenue. During final design it may be determined that runoff from the site should be collected and conveyed offsite via a below ground storm drain system. In this case runoff could either discharge to the open channel along the westerly property limits or northerly and then westerly within the Craig Avenue right-of-way to join the existing box culvert that conveys flows northerly across Craig Avenue. Hydrologic nodes and major flow paths are identified on the hydrologic workmap presented in Appendix A. A preliminary site plan provided by Helix Environmental is presented in Appendix E.

Results of the rational method hydrologic modeling are presented in Table 1 below. Onsite drainage systems should be designed to convey the 100-year peak flow rate without adversely impacting site or adjacent improvements. Design for the 10-year peak flow rate may be utilized with approval of the City, provided that conveyance of flows in excess of the 10-year event (up to the 100-year event) do not cause adverse impacts. Due to the relatively small percentage of the site that will be paved as part of development of the site, the 100-year peak flow rate as calculated at the site discharge location (node 105) increases by only approximately 13% (3 cfs) over the existing condition. Table 1 below summarizes the rational method analysis results.

Table 1 - Results of Rational Method Hydrologic Analysis

Location	Node	Existing 10-yr Peak Flow Rate (cfs)	Developed 10-yr Peak Flow Rate (cfs)	Existing 100-yr Peak Flow Rate (cfs)	Developed 100-yr Peak Flow Rate (cfs)
Southeast Boundary	104	5.2	5.2	8.1	8.1
Northwest Boundary	105	13.3	15.4	21.2	24.2

Unit Hydrograph Hydrologic Modeling

Unit hydrograph modeling was performed to establish approximate detention basin sizing should the project be required (at the final design phase) to mitigate for increased runoff due to development. When required, increased runoff mitigation is typically required for the 2-, 5-, and 10-year, 1-, 3-, 6-, and 24-hour storm events. Where downstream offsite drainage systems are extremely sensitive to increased runoff impacts, mitigation may also be required for the 100-year event. For purposes of this analysis, we are assuming 10-year mitigation would be sufficient. A reasonable approximation of increased runoff basin sizing for preliminary engineering can be achieved by comparing the runoff volume for the 10-year, 24-hour storm event for existing versus developed conditions, and sizing the basin for that volume difference. This analysis is performed using unit hydrograph hydrologic modeling.

CivilDesign Corporation's unit hydrograph modeling software was used in preparing the unit hydrograph analysis. The hydrologic models were prepared utilizing the methodology contained in the Riverside County Flood Control and Water Conservation District (RCFCWCD) Hydrology Manual (April 1978). A hydrologic workmap is presented in Appendix C and calculations are presented in Appendix D. Note that the same hydrologic workmap is used for the existing and developed conditions. Results of the preliminary unit hydrograph calculations show that the project detention basin would have to accommodate a volume of approximately 3,997 cubic feet to satisfy the increased runoff mitigation requirements (2-, 5-, and 10-year, 1-, 3-, 6-, and 24-hour storm events).

It is worth noting that the project Santa Ana Water Quality Management Plan (WQMP) requires hydromodification mitigation for the 2-year, 24-hour storm event, as well as providing infiltration or treatment for the water quality volume (85% storm event runoff). A reasonable approximation of basin sizing for WQMP preliminary engineering can be achieved by comparing the runoff volume for the 2-year, 24-hour storm event for

existing versus developed conditions, and sizing the basin for that volume difference plus the water quality volume.

In cases where increased runoff mitigation (2-, 5-, and 10-year, 1-, 3-, 6-, and 24-hour storms) is required in addition to the WQMP hydromodification and treatment requirements, the basin must be sized to satisfy all requirements. This process typically involves setting the basin footprint to accommodate the water quality volume (footprint varies based on utilizing infiltration vs. treatment) and then adjusting the basin depth to ensure mitigation is achieved for each of the increased runoff storm events. A conservative assumption for preliminary engineering is to add the water quality volume to the volume difference between 10-year, 24-hour storm event for existing versus developed conditions. Assuming a water quality volume of 1,393 cubic feet (see Evans Park Preliminary WQMP), the project detention basin would have to accommodate a volume of approximately 5,390 cubic feet (3,997 cubic feet of increased runoff detention volume plus 1,393 cubic feet of water quality volume). Determination of the project increased runoff / hydromodification requirements by the City during the final design phase will dictate the actual basin volume requirements.

APPENDIX A

RATIONAL METHOD HYDROLOGY WORKMAP



CVALDO CORPORATION
CIVIL ENGINEERING
2255 AVENIDA DE LA PLAYA, SUITE 5
LA JOLLA, CA 92037
(P) 858-866-0128

N

0 100' 200'

1 INCH = 50 FT

Note: Drawing will plot to scale if plotted on arch. E sheet

EVANS PARK PUMP TRACK SITE
RATIONAL METHOD HYDROLOGY WORKMAP

LEGEND

SUBAREA ACREAGE	(9.1 AC)
NODE NUMBER	[100]
RUNOFF FLOW PATH	- - - -
WATERSHED BOUNDARY	———

APPENDIX B

RATIONAL METHOD HYDROLOGIC CALCULATIONS

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 11/03/21 File:south10ex.out

Evans Park Pump Track Site Preliminary Hydrologic Analysis
10-year Existing Condition
Job 21-003
11/3/21

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 4011

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 10.00 Antecedent Moisture Condition = 2

Standard intensity-duration curves data (Plate D-4.1)
For the [Sun City] area used.
10 year storm 10 minute intensity = 2.250(In/Hr)
10 year storm 60 minute intensity = 0.870(In/Hr)
100 year storm 10 minute intensity = 3.360(In/Hr)
100 year storm 60 minute intensity = 1.300(In/Hr)

Storm event year = 10.0
Calculated rainfall intensity data:
1 hour intensity = 0.870(In/Hr)
Slope of intensity duration curve = 0.5300

++
Process from Point/Station 101.000 to Point/Station 102.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 197.000(Ft.)
Top (of initial area) elevation = 1504.000(Ft.)
Bottom (of initial area) elevation = 1496.000(Ft.)
Difference in elevation = 8.000(Ft.)
Slope = 0.04061 s(percent)= 4.06
TC = k(0.390)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 6.125 min.
Rainfall intensity = 2.916(In/Hr) for a 10.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.840

```
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
Initial subarea runoff =      0.353(CFS)
Total initial stream area =        0.144(Ac.)
Pervious area fraction = 0.500


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      102.000 to Point/Station      103.000
**** IMPROVED CHANNEL TRAVEL TIME ****
________________________________________________________________________
Upstream point elevation =  1496.000(Ft.)
Downstream point elevation =  1492.000(Ft.)
Channel length thru subarea  =   406.000(Ft.)
Channel base width      =    0.000(Ft.)
Slope or 'Z' of left channel bank =   1.000
Slope or 'Z' of right channel bank =   1.000
Estimated mean flow rate at midpoint of channel =      1.882(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    5.000(Ft.)
Flow(q) thru subarea =      1.882(CFS)
Depth of flow =   0.698(Ft.), Average velocity =   3.867(Ft/s)
Channel flow top width =    1.395(Ft.)
Flow Velocity =    3.87(Ft/s)
Travel time  =    1.75 min.
Time of concentration =    7.87 min.

Sub-Channel No. 1 Critical depth =      0.738(Ft.)
  '     '       '     Critical flow top width =      1.477(Ft.)
  '     '       '     Critical flow velocity=    3.453(Ft/s)
  '     '       '     Critical flow area =      0.545(Sq.Ft)

 Adding area flow to channel
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.833
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
Rainfall intensity =      2.552(In/Hr) for a    10.0 year storm
Subarea runoff =      2.999(CFS) for      1.410(Ac.)
Total runoff =      3.352(CFS)      Total area =       1.554(Ac.)
Depth of flow =   0.866(Ft.), Average velocity =   4.467(Ft/s)

Sub-Channel No. 1 Critical depth =      0.930(Ft.)
  '     '       '     Critical flow top width =      1.859(Ft.)
  '     '       '     Critical flow velocity=    3.878(Ft/s)
  '     '       '     Critical flow area =      0.864(Sq.Ft)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      103.000 to Point/Station      104.000
**** IMPROVED CHANNEL TRAVEL TIME ****
______________________________________________________________________________
Upstream point elevation =  1492.000(Ft.)
Downstream point elevation =  1483.000(Ft.)
Channel length thru subarea  =   758.000(Ft.)
Channel base width      =    0.000(Ft.)
Slope or 'Z' of left channel bank =   1.000
Slope or 'Z' of right channel bank =   1.000
Estimated mean flow rate at midpoint of channel =      4.323(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    5.000(Ft.)
Flow(q) thru subarea =      4.323(CFS)
Depth of flow =   0.920(Ft.), Average velocity =   5.106(Ft/s)
Channel flow top width =    1.840(Ft.)
Flow Velocity =    5.11(Ft/s)
Travel time  =    2.47 min.
Time of concentration =   10.35 min.

Sub-Channel No. 1 Critical depth =      1.031(Ft.)
  '     '       '     Critical flow top width =      2.063(Ft.)
  '     '       '     Critical flow velocity=    4.065(Ft/s)
  '     '       '     Critical flow area =      1.063(Sq.Ft)

 Adding area flow to channel
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.825
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
Rainfall intensity =      2.208(In/Hr) for a    10.0 year storm
Subarea runoff =      1.857(CFS) for      1.020(Ac.)
Total runoff =      5.209(CFS)      Total area =       2.574(Ac.)
Depth of flow =   0.987(Ft.), Average velocity =   5.350(Ft/s)

Sub-Channel No. 1 Critical depth =      1.109(Ft.)
  '     '       '     Critical flow top width =      2.219(Ft.)
  '     '       '     Critical flow velocity=    4.232(Ft/s)
  '     '       '     Critical flow area =      1.231(Sq.Ft)



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      104.000 to Point/Station      105.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
______________________________________________________________________________
Top of natural channel elevation =   1483.000(Ft.)
End of natural channel elevation =   1481.000(Ft.)
Length of natural channel  =   783.000(Ft.)
Estimated mean flow rate at midpoint of channel =     11.816(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
```

```
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   1.32(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
      Normal channel slope =  0.0026
Corrected/adjusted channel slope =  0.0026
Travel time =    9.90 min.     TC =   20.25  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.803
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.430
Decimal fraction soil group D = 0.570
RI index for soil(AMC 2)  =  87.71
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.547(In/Hr) for a    10.0 year storm
Subarea runoff =      8.113(CFS) for      6.530(Ac.)
Total runoff =     13.322(CFS)      Total area =       9.104(Ac.)
End of computations, total study area =            9.10 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.859
Area averaged RI index number =  84.1
```

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 11/03/21 File:south10dev.out

Evans Park Pump Track Site Preliminary Hydrologic Analysis
10-year Developed Condition
Job 21-003
11/3/21

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 4011

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 10.00 Antecedent Moisture Condition = 2

Standard intensity-duration curves data (Plate D-4.1)
For the [Sun City] area used.
10 year storm 10 minute intensity = 2.250(In/Hr)
10 year storm 60 minute intensity = 0.870(In/Hr)
100 year storm 10 minute intensity = 3.360(In/Hr)
100 year storm 60 minute intensity = 1.300(In/Hr)

Storm event year = 10.0
Calculated rainfall intensity data:
1 hour intensity = 0.870(In/Hr)
Slope of intensity duration curve = 0.5300

++
Process from Point/Station 101.000 to Point/Station 102.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 197.000(Ft.)
Top (of initial area) elevation = 1504.000(Ft.)
Bottom (of initial area) elevation = 1496.000(Ft.)
Difference in elevation = 8.000(Ft.)
Slope = 0.04061 s(percent)= 4.06
TC = k(0.390)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 6.125 min.
Rainfall intensity = 2.916(In/Hr) for a 10.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.840

```
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
Initial subarea runoff =      0.353(CFS)
Total initial stream area =        0.144(Ac.)
Pervious area fraction = 0.500


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      102.000 to Point/Station      103.000
**** IMPROVED CHANNEL TRAVEL TIME ****
________________________________________________________________________
Upstream point elevation =  1496.000(Ft.)
Downstream point elevation =  1492.000(Ft.)
Channel length thru subarea  =   406.000(Ft.)
Channel base width      =    0.000(Ft.)
Slope or 'Z' of left channel bank =   1.000
Slope or 'Z' of right channel bank =   1.000
Estimated mean flow rate at midpoint of channel =      1.882(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    5.000(Ft.)
Flow(q) thru subarea =      1.882(CFS)
Depth of flow =   0.698(Ft.), Average velocity =   3.867(Ft/s)
Channel flow top width =    1.395(Ft.)
Flow Velocity =    3.87(Ft/s)
Travel time  =    1.75 min.
Time of concentration =    7.87 min.

Sub-Channel No. 1 Critical depth =      0.738(Ft.)
  '     '       '     Critical flow top width =      1.477(Ft.)
  '     '       '     Critical flow velocity=    3.453(Ft/s)
  '     '       '     Critical flow area =      0.545(Sq.Ft)

 Adding area flow to channel
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.833
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
Rainfall intensity =      2.552(In/Hr) for a    10.0 year storm
Subarea runoff =      2.999(CFS) for      1.410(Ac.)
Total runoff =      3.352(CFS)      Total area =       1.554(Ac.)
Depth of flow =   0.866(Ft.), Average velocity =   4.467(Ft/s)

Sub-Channel No. 1 Critical depth =      0.930(Ft.)
  '     '       '     Critical flow top width =      1.859(Ft.)
  '     '       '     Critical flow velocity=    3.878(Ft/s)
  '     '       '     Critical flow area =      0.864(Sq.Ft)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      103.000 to Point/Station      104.000
**** IMPROVED CHANNEL TRAVEL TIME ****
________________________________________________________________________
Upstream point elevation =  1492.000(Ft.)
Downstream point elevation =  1483.000(Ft.)
Channel length thru subarea  =   758.000(Ft.)
Channel base width      =    0.000(Ft.)
Slope or 'Z' of left channel bank =   1.000
Slope or 'Z' of right channel bank =   1.000
Estimated mean flow rate at midpoint of channel =      4.323(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    5.000(Ft.)
Flow(q) thru subarea =      4.323(CFS)
Depth of flow =   0.920(Ft.), Average velocity =   5.106(Ft/s)
Channel flow top width =    1.840(Ft.)
Flow Velocity =    5.11(Ft/s)
Travel time  =    2.47 min.
Time of concentration =   10.35 min.

Sub-Channel No. 1 Critical depth =      1.031(Ft.)
  '     '       '     Critical flow top width =      2.063(Ft.)
  '     '       '     Critical flow velocity=    4.065(Ft/s)
  '     '       '     Critical flow area =      1.063(Sq.Ft)

 Adding area flow to channel
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.825
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
Rainfall intensity =      2.208(In/Hr) for a    10.0 year storm
Subarea runoff =      1.857(CFS) for      1.020(Ac.)
Total runoff =      5.209(CFS)      Total area =       2.574(Ac.)
Depth of flow =   0.987(Ft.), Average velocity =   5.350(Ft/s)

Sub-Channel No. 1 Critical depth =      1.109(Ft.)
  '     '       '     Critical flow top width =      2.219(Ft.)
  '     '       '     Critical flow velocity=    4.232(Ft/s)
  '     '       '     Critical flow area =      1.231(Sq.Ft)



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      104.000 to Point/Station      105.000
**** IMPROVED CHANNEL TRAVEL TIME ****
________________________________________________________________________
Upstream point elevation =  1483.000(Ft.)
Downstream point elevation =  1481.000(Ft.)
Channel length thru subarea  =   783.000(Ft.)
Channel base width      =    0.000(Ft.)
Slope or 'Z' of left channel bank =   1.000
Slope or 'Z' of right channel bank =   1.000
Estimated mean flow rate at midpoint of channel =     10.312(CFS)
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```
Manning's 'N'    = 0.015
Maximum depth of channel  =    5.000(Ft.)
Flow(q) thru subarea =     10.312(CFS)
Depth of flow =   1.700(Ft.), Average velocity =   3.566(Ft/s)
Channel flow top width =    3.401(Ft.)
Flow Velocity =    3.57(Ft/s)
Travel time  =    3.66 min.
Time of concentration =   14.01 min.

Sub-Channel No. 1 Critical depth =      1.453(Ft.)
  '     '       '     Critical flow top width =      2.906(Ft.)
  '     '       '     Critical flow velocity=    4.884(Ft/s)
  '     '       '     Critical flow area =      2.112(Sq.Ft)

 Adding area flow to channel
USER INPUT of soil data for subarea
Runoff Coefficient = 0.827
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.430
Decimal fraction soil group D = 0.570
RI index for soil(AMC 2)  =  87.71
Pervious area fraction =  0.900; Impervious fraction =  0.100
Rainfall intensity =      1.881(In/Hr) for a    10.0 year storm
Subarea runoff =     10.155(CFS) for      6.530(Ac.)
Total runoff =     15.364(CFS)      Total area =       9.104(Ac.)
Depth of flow =   1.975(Ft.), Average velocity =   3.940(Ft/s)

Sub-Channel No. 1 Critical depth =      1.711(Ft.)
  '     '       '     Critical flow top width =      3.422(Ft.)
  '     '       '     Critical flow velocity=    5.248(Ft/s)
  '     '       '     Critical flow area =      2.927(Sq.Ft)

End of computations, total study area =            9.10 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.787
Area averaged RI index number =  84.1
```

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 11/03/21 File:south100ex.out

Evans Park Pump Track Site Preliminary Hydrologic Analysis
100-year Existing Condition
Job 21-003
11/3/21

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 4011

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 2

Standard intensity-duration curves data (Plate D-4.1)
For the [Sun City] area used.
10 year storm 10 minute intensity = 2.250(In/Hr)
10 year storm 60 minute intensity = 0.870(In/Hr)
100 year storm 10 minute intensity = 3.360(In/Hr)
100 year storm 60 minute intensity = 1.300(In/Hr)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.300(In/Hr)
Slope of intensity duration curve = 0.5300

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Process from Point/Station 101.000 to Point/Station 102.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 197.000(Ft.)
Top (of initial area) elevation = 1504.000(Ft.)
Bottom (of initial area) elevation = 1496.000(Ft.)
Difference in elevation = 8.000(Ft.)
Slope = 0.04061 s(percent)= 4.06
TC = k(0.390)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 6.125 min.
Rainfall intensity = 4.357(In/Hr) for a 100.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.858

```
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
Initial subarea runoff =      0.539(CFS)
Total initial stream area =        0.144(Ac.)
Pervious area fraction = 0.500


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      102.000 to Point/Station      103.000
**** IMPROVED CHANNEL TRAVEL TIME ****
________________________________________________________________________
Upstream point elevation =  1496.000(Ft.)
Downstream point elevation =  1492.000(Ft.)
Channel length thru subarea  =   406.000(Ft.)
Channel base width      =    0.000(Ft.)
Slope or 'Z' of left channel bank =   1.000
Slope or 'Z' of right channel bank =   1.000
Estimated mean flow rate at midpoint of channel =      2.903(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    5.000(Ft.)
Flow(q) thru subarea =      2.903(CFS)
Depth of flow =   0.821(Ft.), Average velocity =   4.310(Ft/s)
Channel flow top width =    1.641(Ft.)
Flow Velocity =    4.31(Ft/s)
Travel time  =    1.57 min.
Time of concentration =    7.70 min.

Sub-Channel No. 1 Critical depth =      0.879(Ft.)
  '     '       '     Critical flow top width =      1.758(Ft.)
  '     '       '     Critical flow velocity=    3.758(Ft/s)
  '     '       '     Critical flow area =      0.772(Sq.Ft)

 Adding area flow to channel
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.854
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
Rainfall intensity =      3.861(In/Hr) for a   100.0 year storm
Subarea runoff =      4.646(CFS) for      1.410(Ac.)
Total runoff =      5.185(CFS)      Total area =       1.554(Ac.)
Depth of flow =   1.020(Ft.), Average velocity =   4.982(Ft/s)

Sub-Channel No. 1 Critical depth =      1.109(Ft.)
  '     '       '     Critical flow top width =      2.219(Ft.)
  '     '       '     Critical flow velocity=    4.213(Ft/s)
  '     '       '     Critical flow area =      1.231(Sq.Ft)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      103.000 to Point/Station      104.000
**** IMPROVED CHANNEL TRAVEL TIME ****
______________________________________________________________________________
Upstream point elevation =  1492.000(Ft.)
Downstream point elevation =  1483.000(Ft.)
Channel length thru subarea  =   758.000(Ft.)
Channel base width      =    0.000(Ft.)
Slope or 'Z' of left channel bank =   1.000
Slope or 'Z' of right channel bank =   1.000
Estimated mean flow rate at midpoint of channel =      6.675(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    5.000(Ft.)
Flow(q) thru subarea =      6.675(CFS)
Depth of flow =   1.083(Ft.), Average velocity =   5.692(Ft/s)
Channel flow top width =    2.166(Ft.)
Flow Velocity =    5.69(Ft/s)
Travel time  =    2.22 min.
Time of concentration =    9.91 min.

Sub-Channel No. 1 Critical depth =      1.227(Ft.)
  '     '       '     Critical flow top width =      2.453(Ft.)
  '     '       '     Critical flow velocity=    4.437(Ft/s)
  '     '       '     Critical flow area =      1.504(Sq.Ft)

 Adding area flow to channel
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.848
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
Rainfall intensity =      3.375(In/Hr) for a   100.0 year storm
Subarea runoff =      2.918(CFS) for      1.020(Ac.)
Total runoff =      8.103(CFS)      Total area =       2.574(Ac.)
Depth of flow =   1.165(Ft.), Average velocity =   5.974(Ft/s)

Sub-Channel No. 1 Critical depth =      1.328(Ft.)
  '     '       '     Critical flow top width =      2.656(Ft.)
  '     '       '     Critical flow velocity=    4.594(Ft/s)
  '     '       '     Critical flow area =      1.764(Sq.Ft)



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      104.000 to Point/Station      105.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
______________________________________________________________________________
Top of natural channel elevation =   1483.000(Ft.)
End of natural channel elevation =   1481.000(Ft.)
Length of natural channel  =   783.000(Ft.)
Estimated mean flow rate at midpoint of channel =     18.382(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
```

```
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   1.48(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
      Normal channel slope =  0.0026
Corrected/adjusted channel slope =  0.0026
Travel time =    8.82 min.     TC =   18.73  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.835
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.430
Decimal fraction soil group D = 0.570
RI index for soil(AMC 2)  =  87.71
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.409(In/Hr) for a   100.0 year storm
Subarea runoff =     13.141(CFS) for      6.530(Ac.)
Total runoff =     21.245(CFS)      Total area =       9.104(Ac.)
End of computations, total study area =            9.10 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.859
Area averaged RI index number =  84.1
```

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 11/03/21 File:south100dev.out

Evans Park Pump Track Site Preliminary Hydrologic Analysis
100-year Developed Condition
Job 21-003
11/3/21

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 4011

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 2

Standard intensity-duration curves data (Plate D-4.1)
For the [Sun City] area used.
10 year storm 10 minute intensity = 2.250(In/Hr)
10 year storm 60 minute intensity = 0.870(In/Hr)
100 year storm 10 minute intensity = 3.360(In/Hr)
100 year storm 60 minute intensity = 1.300(In/Hr)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.300(In/Hr)
Slope of intensity duration curve = 0.5300

++

Process from Point/Station 101.000 to Point/Station 102.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 197.000(Ft.)
Top (of initial area) elevation = 1504.000(Ft.)
Bottom (of initial area) elevation = 1496.000(Ft.)
Difference in elevation = 8.000(Ft.)
Slope = 0.04061 s(percent)= 4.06
TC = k(0.390)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 6.125 min.
Rainfall intensity = 4.357(In/Hr) for a 100.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.858

```
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
Initial subarea runoff =      0.539(CFS)
Total initial stream area =        0.144(Ac.)
Pervious area fraction = 0.500


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      102.000 to Point/Station      103.000
**** IMPROVED CHANNEL TRAVEL TIME ****
________________________________________________________________________
Upstream point elevation =  1496.000(Ft.)
Downstream point elevation =  1492.000(Ft.)
Channel length thru subarea  =   406.000(Ft.)
Channel base width      =    0.000(Ft.)
Slope or 'Z' of left channel bank =   1.000
Slope or 'Z' of right channel bank =   1.000
Estimated mean flow rate at midpoint of channel =      2.903(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    5.000(Ft.)
Flow(q) thru subarea =      2.903(CFS)
Depth of flow =   0.821(Ft.), Average velocity =   4.310(Ft/s)
Channel flow top width =    1.641(Ft.)
Flow Velocity =    4.31(Ft/s)
Travel time  =    1.57 min.
Time of concentration =    7.70 min.

Sub-Channel No. 1 Critical depth =      0.879(Ft.)
  '     '       '     Critical flow top width =      1.758(Ft.)
  '     '       '     Critical flow velocity=    3.758(Ft/s)
  '     '       '     Critical flow area =      0.772(Sq.Ft)

 Adding area flow to channel
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.854
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
Rainfall intensity =      3.861(In/Hr) for a   100.0 year storm
Subarea runoff =      4.646(CFS) for      1.410(Ac.)
Total runoff =      5.185(CFS)      Total area =       1.554(Ac.)
Depth of flow =   1.020(Ft.), Average velocity =   4.982(Ft/s)

Sub-Channel No. 1 Critical depth =      1.109(Ft.)
  '     '       '     Critical flow top width =      2.219(Ft.)
  '     '       '     Critical flow velocity=    4.213(Ft/s)
  '     '       '     Critical flow area =      1.231(Sq.Ft)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      103.000 to Point/Station      104.000
**** IMPROVED CHANNEL TRAVEL TIME ****
______________________________________________________________________________
Upstream point elevation =  1492.000(Ft.)
Downstream point elevation =  1483.000(Ft.)
Channel length thru subarea  =   758.000(Ft.)
Channel base width      =    0.000(Ft.)
Slope or 'Z' of left channel bank =   1.000
Slope or 'Z' of right channel bank =   1.000
Estimated mean flow rate at midpoint of channel =      6.675(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    5.000(Ft.)
Flow(q) thru subarea =      6.675(CFS)
Depth of flow =   1.083(Ft.), Average velocity =   5.692(Ft/s)
Channel flow top width =    2.166(Ft.)
Flow Velocity =    5.69(Ft/s)
Travel time  =    2.22 min.
Time of concentration =    9.91 min.

Sub-Channel No. 1 Critical depth =      1.227(Ft.)
  '     '       '     Critical flow top width =      2.453(Ft.)
  '     '       '     Critical flow velocity=    4.437(Ft/s)
  '     '       '     Critical flow area =      1.504(Sq.Ft)

 Adding area flow to channel
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.848
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
Rainfall intensity =      3.375(In/Hr) for a   100.0 year storm
Subarea runoff =      2.918(CFS) for      1.020(Ac.)
Total runoff =      8.103(CFS)      Total area =       2.574(Ac.)
Depth of flow =   1.165(Ft.), Average velocity =   5.974(Ft/s)

Sub-Channel No. 1 Critical depth =      1.328(Ft.)
  '     '       '     Critical flow top width =      2.656(Ft.)
  '     '       '     Critical flow velocity=    4.594(Ft/s)
  '     '       '     Critical flow area =      1.764(Sq.Ft)



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      104.000 to Point/Station      105.000
**** IMPROVED CHANNEL TRAVEL TIME ****
______________________________________________________________________________
Upstream point elevation =  1483.000(Ft.)
Downstream point elevation =  1481.000(Ft.)
Channel length thru subarea  =   783.000(Ft.)
Channel base width      =    0.000(Ft.)
Slope or 'Z' of left channel bank =   1.000
Slope or 'Z' of right channel bank =   1.000
Estimated mean flow rate at midpoint of channel =     16.205(CFS)
```

```
Manning's 'N'    = 0.015
Maximum depth of channel  =    5.000(Ft.)
Flow(q) thru subarea =     16.205(CFS)
Depth of flow =   2.015(Ft.), Average velocity =   3.993(Ft/s)
Channel flow top width =    4.029(Ft.)
Flow Velocity =    3.99(Ft/s)
Travel time  =    3.27 min.
Time of concentration =   13.18 min.

Sub-Channel No. 1 Critical depth =      1.750(Ft.)
  '     '       '     Critical flow top width =      3.500(Ft.)
  '     '       '     Critical flow velocity=    5.292(Ft/s)
  '     '       '     Critical flow area =      3.063(Sq.Ft)

 Adding area flow to channel
USER INPUT of soil data for subarea
Runoff Coefficient = 0.851
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.430
Decimal fraction soil group D = 0.570
RI index for soil(AMC 2)  =  87.71
Pervious area fraction =  0.900; Impervious fraction =  0.100
Rainfall intensity =      2.902(In/Hr) for a   100.0 year storm
Subarea runoff =     16.129(CFS) for      6.530(Ac.)
Total runoff =     24.232(CFS)      Total area =       9.104(Ac.)
Depth of flow =   2.343(Ft.), Average velocity =   4.416(Ft/s)

Sub-Channel No. 1 Critical depth =      2.047(Ft.)
  '     '       '     Critical flow top width =      4.094(Ft.)
  '     '       '     Critical flow velocity=    5.784(Ft/s)
  '     '       '     Critical flow area =      4.190(Sq.Ft)

End of computations, total study area =            9.10 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.787
Area averaged RI index number =  84.1
```

APPENDIX C

UNIT HYDROGRAPH WORKMAP



CVALDO CORPORATION
CIVIL ENGINEERING
2255 AVENIDA DE LA PLAYA, SUITE 5
LA JOLLA, CA 92037
(P) 858-866-0128

N

0 40' 80'

1 INCH = 20 FT

Note: Drawing will plot to scale if plotted on arch. E sheet

EVANS PARK PUMP TRACK SITE
UNIT HYDROGRAPH HYDROLOGY WORKMAP

LEGEND

WATERSHED CENTROID

NODE NUMBER 100

RUNOFF FLOW PATH

WATERSHED BOUNDARY

APPENDIX D
UNIT HYDROGRAPH CALCULATIONS

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2008, Version 8.1
Study date 11/03/21 File: southex2410.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 4011

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Evans Park Pump Track Site 10-year, 24-hour Storm Event
Existing Condition
Job 21-003
11/3/21

Drainage Area = 6.53(Ac.) = 0.010 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 6.53(Ac.) = 0.010 Sq. Mi.
Length along longest watercourse = 783.00(Ft.)
Length along longest watercourse measured to centroid = 389.00(Ft.)
Length along longest watercourse = 0.148 Mi.
Length along longest watercourse measured to centroid = 0.074 Mi.
Difference in elevation = 2.00(Ft.)
Slope along watercourse = 13.4866 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.079 Hr.
Lag time = 4.74 Min.
25% of lag time = 1.18 Min.
40% of lag time = 1.89 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
6.53	1.90	12.41

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]

6.53 5.00 32.65

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 1.900(In)
Area Averaged 100-Year Rainfall = 5.000(In)

Point rain (area averaged) = 3.175(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 3.175(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
1.230	81.00	0.000
5.300	90.00	0.000

Total Area Entered = 6.53(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
81.0	81.0	0.233	0.000	0.233	0.188	0.044
90.0	90.0	0.130	0.000	0.130	0.812	0.106
					Sum (F) =	0.149

Area averaged mean soil loss (F) (In/Hr) = 0.149
Minimum soil loss rate ((In/Hr)) = 0.075
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	105.575	20.904	1.376
2	0.167	211.149	48.719	3.206
3	0.250	316.724	14.852	0.977
4	0.333	422.298	6.772	0.446
5	0.417	527.873	3.770	0.248
6	0.500	633.447	2.406	0.158
7	0.583	739.022	1.436	0.094
8	0.667	844.596	1.143	0.075
		Sum =	100.000 Sum=	6.581

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.025	(0.265)	0.023	0.003
2	0.17	0.07	0.025	(0.264)	0.023	0.003
3	0.25	0.07	0.025	(0.263)	0.023	0.003
4	0.33	0.10	0.038	(0.262)	0.034	0.004

5	0.42	0.10	0.038	(0.261)	0.034	0.004
6	0.50	0.10	0.038	(0.260)	0.034	0.004
7	0.58	0.10	0.038	(0.259)	0.034	0.004
8	0.67	0.10	0.038	(0.258)	0.034	0.004
9	0.75	0.10	0.038	(0.257)	0.034	0.004
10	0.83	0.13	0.051	(0.256)	0.046	0.005
11	0.92	0.13	0.051	(0.255)	0.046	0.005
12	1.00	0.13	0.051	(0.254)	0.046	0.005
13	1.08	0.10	0.038	(0.253)	0.034	0.004
14	1.17	0.10	0.038	(0.252)	0.034	0.004
15	1.25	0.10	0.038	(0.251)	0.034	0.004
16	1.33	0.10	0.038	(0.250)	0.034	0.004
17	1.42	0.10	0.038	(0.249)	0.034	0.004
18	1.50	0.10	0.038	(0.248)	0.034	0.004
19	1.58	0.10	0.038	(0.247)	0.034	0.004
20	1.67	0.10	0.038	(0.246)	0.034	0.004
21	1.75	0.10	0.038	(0.245)	0.034	0.004
22	1.83	0.13	0.051	(0.244)	0.046	0.005
23	1.92	0.13	0.051	(0.243)	0.046	0.005
24	2.00	0.13	0.051	(0.242)	0.046	0.005
25	2.08	0.13	0.051	(0.241)	0.046	0.005
26	2.17	0.13	0.051	(0.240)	0.046	0.005
27	2.25	0.13	0.051	(0.239)	0.046	0.005
28	2.33	0.13	0.051	(0.238)	0.046	0.005
29	2.42	0.13	0.051	(0.237)	0.046	0.005
30	2.50	0.13	0.051	(0.236)	0.046	0.005
31	2.58	0.17	0.064	(0.235)	0.057	0.006
32	2.67	0.17	0.064	(0.234)	0.057	0.006
33	2.75	0.17	0.064	(0.233)	0.057	0.006
34	2.83	0.17	0.064	(0.232)	0.057	0.006
35	2.92	0.17	0.064	(0.231)	0.057	0.006
36	3.00	0.17	0.064	(0.230)	0.057	0.006
37	3.08	0.17	0.064	(0.229)	0.057	0.006
38	3.17	0.17	0.064	(0.228)	0.057	0.006
39	3.25	0.17	0.064	(0.227)	0.057	0.006
40	3.33	0.17	0.064	(0.226)	0.057	0.006
41	3.42	0.17	0.064	(0.225)	0.057	0.006
42	3.50	0.17	0.064	(0.224)	0.057	0.006
43	3.58	0.17	0.064	(0.223)	0.057	0.006
44	3.67	0.17	0.064	(0.223)	0.057	0.006
45	3.75	0.17	0.064	(0.222)	0.057	0.006
46	3.83	0.20	0.076	(0.221)	0.069	0.008
47	3.92	0.20	0.076	(0.220)	0.069	0.008
48	4.00	0.20	0.076	(0.219)	0.069	0.008
49	4.08	0.20	0.076	(0.218)	0.069	0.008
50	4.17	0.20	0.076	(0.217)	0.069	0.008
51	4.25	0.20	0.076	(0.216)	0.069	0.008
52	4.33	0.23	0.089	(0.215)	0.080	0.009
53	4.42	0.23	0.089	(0.214)	0.080	0.009
54	4.50	0.23	0.089	(0.213)	0.080	0.009
55	4.58	0.23	0.089	(0.212)	0.080	0.009
56	4.67	0.23	0.089	(0.211)	0.080	0.009
57	4.75	0.23	0.089	(0.211)	0.080	0.009
58	4.83	0.27	0.102	(0.210)	0.091	0.010
59	4.92	0.27	0.102	(0.209)	0.091	0.010
60	5.00	0.27	0.102	(0.208)	0.091	0.010
61	5.08	0.20	0.076	(0.207)	0.069	0.008

62	5.17	0.20	0.076	(0.206)	0.069	0.008
63	5.25	0.20	0.076	(0.205)	0.069	0.008
64	5.33	0.23	0.089	(0.204)	0.080	0.009
65	5.42	0.23	0.089	(0.203)	0.080	0.009
66	5.50	0.23	0.089	(0.202)	0.080	0.009
67	5.58	0.27	0.102	(0.202)	0.091	0.010
68	5.67	0.27	0.102	(0.201)	0.091	0.010
69	5.75	0.27	0.102	(0.200)	0.091	0.010
70	5.83	0.27	0.102	(0.199)	0.091	0.010
71	5.92	0.27	0.102	(0.198)	0.091	0.010
72	6.00	0.27	0.102	(0.197)	0.091	0.010
73	6.08	0.30	0.114	(0.196)	0.103	0.011
74	6.17	0.30	0.114	(0.195)	0.103	0.011
75	6.25	0.30	0.114	(0.194)	0.103	0.011
76	6.33	0.30	0.114	(0.194)	0.103	0.011
77	6.42	0.30	0.114	(0.193)	0.103	0.011
78	6.50	0.30	0.114	(0.192)	0.103	0.011
79	6.58	0.33	0.127	(0.191)	0.114	0.013
80	6.67	0.33	0.127	(0.190)	0.114	0.013
81	6.75	0.33	0.127	(0.189)	0.114	0.013
82	6.83	0.33	0.127	(0.188)	0.114	0.013
83	6.92	0.33	0.127	(0.188)	0.114	0.013
84	7.00	0.33	0.127	(0.187)	0.114	0.013
85	7.08	0.33	0.127	(0.186)	0.114	0.013
86	7.17	0.33	0.127	(0.185)	0.114	0.013
87	7.25	0.33	0.127	(0.184)	0.114	0.013
88	7.33	0.37	0.140	(0.183)	0.126	0.014
89	7.42	0.37	0.140	(0.183)	0.126	0.014
90	7.50	0.37	0.140	(0.182)	0.126	0.014
91	7.58	0.40	0.152	(0.181)	0.137	0.015
92	7.67	0.40	0.152	(0.180)	0.137	0.015
93	7.75	0.40	0.152	(0.179)	0.137	0.015
94	7.83	0.43	0.165	(0.178)	0.149	0.017
95	7.92	0.43	0.165	(0.178)	0.149	0.017
96	8.00	0.43	0.165	(0.177)	0.149	0.017
97	8.08	0.50	0.191	(0.176)	0.171	0.019
98	8.17	0.50	0.191	(0.175)	0.171	0.019
99	8.25	0.50	0.191	(0.174)	0.171	0.019
100	8.33	0.50	0.191	(0.173)	0.171	0.019
101	8.42	0.50	0.191	(0.173)	0.171	0.019
102	8.50	0.50	0.191	(0.172)	0.171	0.019
103	8.58	0.53	0.203	0.171	(0.183)	0.032
104	8.67	0.53	0.203	0.170	(0.183)	0.033
105	8.75	0.53	0.203	0.169	(0.183)	0.034
106	8.83	0.57	0.216	0.169	(0.194)	0.047
107	8.92	0.57	0.216	0.168	(0.194)	0.048
108	9.00	0.57	0.216	0.167	(0.194)	0.049
109	9.08	0.63	0.241	0.166	(0.217)	0.075
110	9.17	0.63	0.241	0.165	(0.217)	0.076
111	9.25	0.63	0.241	0.165	(0.217)	0.077
112	9.33	0.67	0.254	0.164	(0.229)	0.090
113	9.42	0.67	0.254	0.163	(0.229)	0.091
114	9.50	0.67	0.254	0.162	(0.229)	0.092
115	9.58	0.70	0.267	0.162	(0.240)	0.105
116	9.67	0.70	0.267	0.161	(0.240)	0.106
117	9.75	0.70	0.267	0.160	(0.240)	0.107
118	9.83	0.73	0.279	0.159	(0.251)	0.120

119	9.92	0.73	0.279	0.158	(	0.251)	0.121
120	10.00	0.73	0.279	0.158	(	0.251)	0.122
121	10.08	0.50	0.191	0.157	(	0.171)	0.034
122	10.17	0.50	0.191	0.156	(	0.171)	0.034
123	10.25	0.50	0.191	0.155	(	0.171)	0.035
124	10.33	0.50	0.191	0.155	(	0.171)	0.036
125	10.42	0.50	0.191	0.154	(	0.171)	0.037
126	10.50	0.50	0.191	0.153	(	0.171)	0.037
127	10.58	0.67	0.254	0.152	(	0.229)	0.102
128	10.67	0.67	0.254	0.152	(	0.229)	0.102
129	10.75	0.67	0.254	0.151	(	0.229)	0.103
130	10.83	0.67	0.254	0.150	(	0.229)	0.104
131	10.92	0.67	0.254	0.149	(	0.229)	0.105
132	11.00	0.67	0.254	0.149	(	0.229)	0.105
133	11.08	0.63	0.241	0.148	(	0.217)	0.093
134	11.17	0.63	0.241	0.147	(	0.217)	0.094
135	11.25	0.63	0.241	0.147	(	0.217)	0.095
136	11.33	0.63	0.241	0.146	(	0.217)	0.096
137	11.42	0.63	0.241	0.145	(	0.217)	0.096
138	11.50	0.63	0.241	0.144	(	0.217)	0.097
139	11.58	0.57	0.216	0.144	(	0.194)	0.072
140	11.67	0.57	0.216	0.143	(	0.194)	0.073
141	11.75	0.57	0.216	0.142	(	0.194)	0.074
142	11.83	0.60	0.229	0.142	(	0.206)	0.087
143	11.92	0.60	0.229	0.141	(	0.206)	0.088
144	12.00	0.60	0.229	0.140	(	0.206)	0.089
145	12.08	0.83	0.318	0.139	(	0.286)	0.178
146	12.17	0.83	0.318	0.139	(	0.286)	0.179
147	12.25	0.83	0.318	0.138	(	0.286)	0.180
148	12.33	0.87	0.330	0.137	(	0.297)	0.193
149	12.42	0.87	0.330	0.137	(	0.297)	0.194
150	12.50	0.87	0.330	0.136	(	0.297)	0.194
151	12.58	0.93	0.356	0.135	(	0.320)	0.220
152	12.67	0.93	0.356	0.135	(	0.320)	0.221
153	12.75	0.93	0.356	0.134	(	0.320)	0.222
154	12.83	0.97	0.368	0.133	(	0.332)	0.235
155	12.92	0.97	0.368	0.133	(	0.332)	0.236
156	13.00	0.97	0.368	0.132	(	0.332)	0.236
157	13.08	1.13	0.432	0.131	(	0.389)	0.301
158	13.17	1.13	0.432	0.131	(	0.389)	0.301
159	13.25	1.13	0.432	0.130	(	0.389)	0.302
160	13.33	1.13	0.432	0.129	(	0.389)	0.303
161	13.42	1.13	0.432	0.129	(	0.389)	0.303
162	13.50	1.13	0.432	0.128	(	0.389)	0.304
163	13.58	0.77	0.292	0.127	(	0.263)	0.165
164	13.67	0.77	0.292	0.127	(	0.263)	0.166
165	13.75	0.77	0.292	0.126	(	0.263)	0.166
166	13.83	0.77	0.292	0.125	(	0.263)	0.167
167	13.92	0.77	0.292	0.125	(	0.263)	0.167
168	14.00	0.77	0.292	0.124	(	0.263)	0.168
169	14.08	0.90	0.343	0.123	(	0.309)	0.220
170	14.17	0.90	0.343	0.123	(	0.309)	0.220
171	14.25	0.90	0.343	0.122	(	0.309)	0.221
172	14.33	0.87	0.330	0.122	(	0.297)	0.209
173	14.42	0.87	0.330	0.121	(	0.297)	0.209
174	14.50	0.87	0.330	0.120	(	0.297)	0.210
175	14.58	0.87	0.330	0.120	(	0.297)	0.211

176	14.67	0.87	0.330	0.119	(0.297)	0.211
177	14.75	0.87	0.330	0.118	(0.297)	0.212
178	14.83	0.83	0.318	0.118	(0.286)	0.200
179	14.92	0.83	0.318	0.117	(0.286)	0.200
180	15.00	0.83	0.318	0.117	(0.286)	0.201
181	15.08	0.80	0.305	0.116	(0.274)	0.189
182	15.17	0.80	0.305	0.115	(0.274)	0.189
183	15.25	0.80	0.305	0.115	(0.274)	0.190
184	15.33	0.77	0.292	0.114	(0.263)	0.178
185	15.42	0.77	0.292	0.114	(0.263)	0.178
186	15.50	0.77	0.292	0.113	(0.263)	0.179
187	15.58	0.63	0.241	0.113	(0.217)	0.129
188	15.67	0.63	0.241	0.112	(0.217)	0.129
189	15.75	0.63	0.241	0.111	(0.217)	0.130
190	15.83	0.63	0.241	0.111	(0.217)	0.131
191	15.92	0.63	0.241	0.110	(0.217)	0.131
192	16.00	0.63	0.241	0.110	(0.217)	0.132
193	16.08	0.13	0.051	(0.109)	0.046	0.005
194	16.17	0.13	0.051	(0.109)	0.046	0.005
195	16.25	0.13	0.051	(0.108)	0.046	0.005
196	16.33	0.13	0.051	(0.107)	0.046	0.005
197	16.42	0.13	0.051	(0.107)	0.046	0.005
198	16.50	0.13	0.051	(0.106)	0.046	0.005
199	16.58	0.10	0.038	(0.106)	0.034	0.004
200	16.67	0.10	0.038	(0.105)	0.034	0.004
201	16.75	0.10	0.038	(0.105)	0.034	0.004
202	16.83	0.10	0.038	(0.104)	0.034	0.004
203	16.92	0.10	0.038	(0.104)	0.034	0.004
204	17.00	0.10	0.038	(0.103)	0.034	0.004
205	17.08	0.17	0.064	(0.103)	0.057	0.006
206	17.17	0.17	0.064	(0.102)	0.057	0.006
207	17.25	0.17	0.064	(0.102)	0.057	0.006
208	17.33	0.17	0.064	(0.101)	0.057	0.006
209	17.42	0.17	0.064	(0.101)	0.057	0.006
210	17.50	0.17	0.064	(0.100)	0.057	0.006
211	17.58	0.17	0.064	(0.100)	0.057	0.006
212	17.67	0.17	0.064	(0.099)	0.057	0.006
213	17.75	0.17	0.064	(0.099)	0.057	0.006
214	17.83	0.13	0.051	(0.098)	0.046	0.005
215	17.92	0.13	0.051	(0.098)	0.046	0.005
216	18.00	0.13	0.051	(0.097)	0.046	0.005
217	18.08	0.13	0.051	(0.097)	0.046	0.005
218	18.17	0.13	0.051	(0.096)	0.046	0.005
219	18.25	0.13	0.051	(0.096)	0.046	0.005
220	18.33	0.13	0.051	(0.095)	0.046	0.005
221	18.42	0.13	0.051	(0.095)	0.046	0.005
222	18.50	0.13	0.051	(0.094)	0.046	0.005
223	18.58	0.10	0.038	(0.094)	0.034	0.004
224	18.67	0.10	0.038	(0.093)	0.034	0.004
225	18.75	0.10	0.038	(0.093)	0.034	0.004
226	18.83	0.07	0.025	(0.093)	0.023	0.003
227	18.92	0.07	0.025	(0.092)	0.023	0.003
228	19.00	0.07	0.025	(0.092)	0.023	0.003
229	19.08	0.10	0.038	(0.091)	0.034	0.004
230	19.17	0.10	0.038	(0.091)	0.034	0.004
231	19.25	0.10	0.038	(0.090)	0.034	0.004
232	19.33	0.13	0.051	(0.090)	0.046	0.005

233	19.42	0.13	0.051	(0.090)	0.046	0.005
234	19.50	0.13	0.051	(0.089)	0.046	0.005
235	19.58	0.10	0.038	(0.089)	0.034	0.004
236	19.67	0.10	0.038	(0.088)	0.034	0.004
237	19.75	0.10	0.038	(0.088)	0.034	0.004
238	19.83	0.07	0.025	(0.087)	0.023	0.003
239	19.92	0.07	0.025	(0.087)	0.023	0.003
240	20.00	0.07	0.025	(0.087)	0.023	0.003
241	20.08	0.10	0.038	(0.086)	0.034	0.004
242	20.17	0.10	0.038	(0.086)	0.034	0.004
243	20.25	0.10	0.038	(0.086)	0.034	0.004
244	20.33	0.10	0.038	(0.085)	0.034	0.004
245	20.42	0.10	0.038	(0.085)	0.034	0.004
246	20.50	0.10	0.038	(0.084)	0.034	0.004
247	20.58	0.10	0.038	(0.084)	0.034	0.004
248	20.67	0.10	0.038	(0.084)	0.034	0.004
249	20.75	0.10	0.038	(0.083)	0.034	0.004
250	20.83	0.07	0.025	(0.083)	0.023	0.003
251	20.92	0.07	0.025	(0.083)	0.023	0.003
252	21.00	0.07	0.025	(0.082)	0.023	0.003
253	21.08	0.10	0.038	(0.082)	0.034	0.004
254	21.17	0.10	0.038	(0.082)	0.034	0.004
255	21.25	0.10	0.038	(0.081)	0.034	0.004
256	21.33	0.07	0.025	(0.081)	0.023	0.003
257	21.42	0.07	0.025	(0.081)	0.023	0.003
258	21.50	0.07	0.025	(0.081)	0.023	0.003
259	21.58	0.10	0.038	(0.080)	0.034	0.004
260	21.67	0.10	0.038	(0.080)	0.034	0.004
261	21.75	0.10	0.038	(0.080)	0.034	0.004
262	21.83	0.07	0.025	(0.079)	0.023	0.003
263	21.92	0.07	0.025	(0.079)	0.023	0.003
264	22.00	0.07	0.025	(0.079)	0.023	0.003
265	22.08	0.10	0.038	(0.079)	0.034	0.004
266	22.17	0.10	0.038	(0.078)	0.034	0.004
267	22.25	0.10	0.038	(0.078)	0.034	0.004
268	22.33	0.07	0.025	(0.078)	0.023	0.003
269	22.42	0.07	0.025	(0.078)	0.023	0.003
270	22.50	0.07	0.025	(0.077)	0.023	0.003
271	22.58	0.07	0.025	(0.077)	0.023	0.003
272	22.67	0.07	0.025	(0.077)	0.023	0.003
273	22.75	0.07	0.025	(0.077)	0.023	0.003
274	22.83	0.07	0.025	(0.077)	0.023	0.003
275	22.92	0.07	0.025	(0.076)	0.023	0.003
276	23.00	0.07	0.025	(0.076)	0.023	0.003
277	23.08	0.07	0.025	(0.076)	0.023	0.003
278	23.17	0.07	0.025	(0.076)	0.023	0.003
279	23.25	0.07	0.025	(0.076)	0.023	0.003
280	23.33	0.07	0.025	(0.075)	0.023	0.003
281	23.42	0.07	0.025	(0.075)	0.023	0.003
282	23.50	0.07	0.025	(0.075)	0.023	0.003
283	23.58	0.07	0.025	(0.075)	0.023	0.003
284	23.67	0.07	0.025	(0.075)	0.023	0.003
285	23.75	0.07	0.025	(0.075)	0.023	0.003
286	23.83	0.07	0.025	(0.075)	0.023	0.003
287	23.92	0.07	0.025	(0.075)	0.023	0.003
288	24.00	0.07	0.025	(0.075)	0.023	0.003

(Loss Rate Not Used)

Sum = 100.0 Sum = 14.3

Flood volume = Effective rainfall 1.19(In)
times area 6.5(Ac.)/[(In)/(Ft.)] = 0.6(Ac.Ft)
Total soil loss = 1.99(In)
Total soil loss = 1.080(Ac.Ft)
Total rainfall = 3.18(In)
Flood volume = 28211.0 Cubic Feet
Total soil loss = 47056.6 Cubic Feet

Peak flow rate of this hydrograph = 1.984(CFS)

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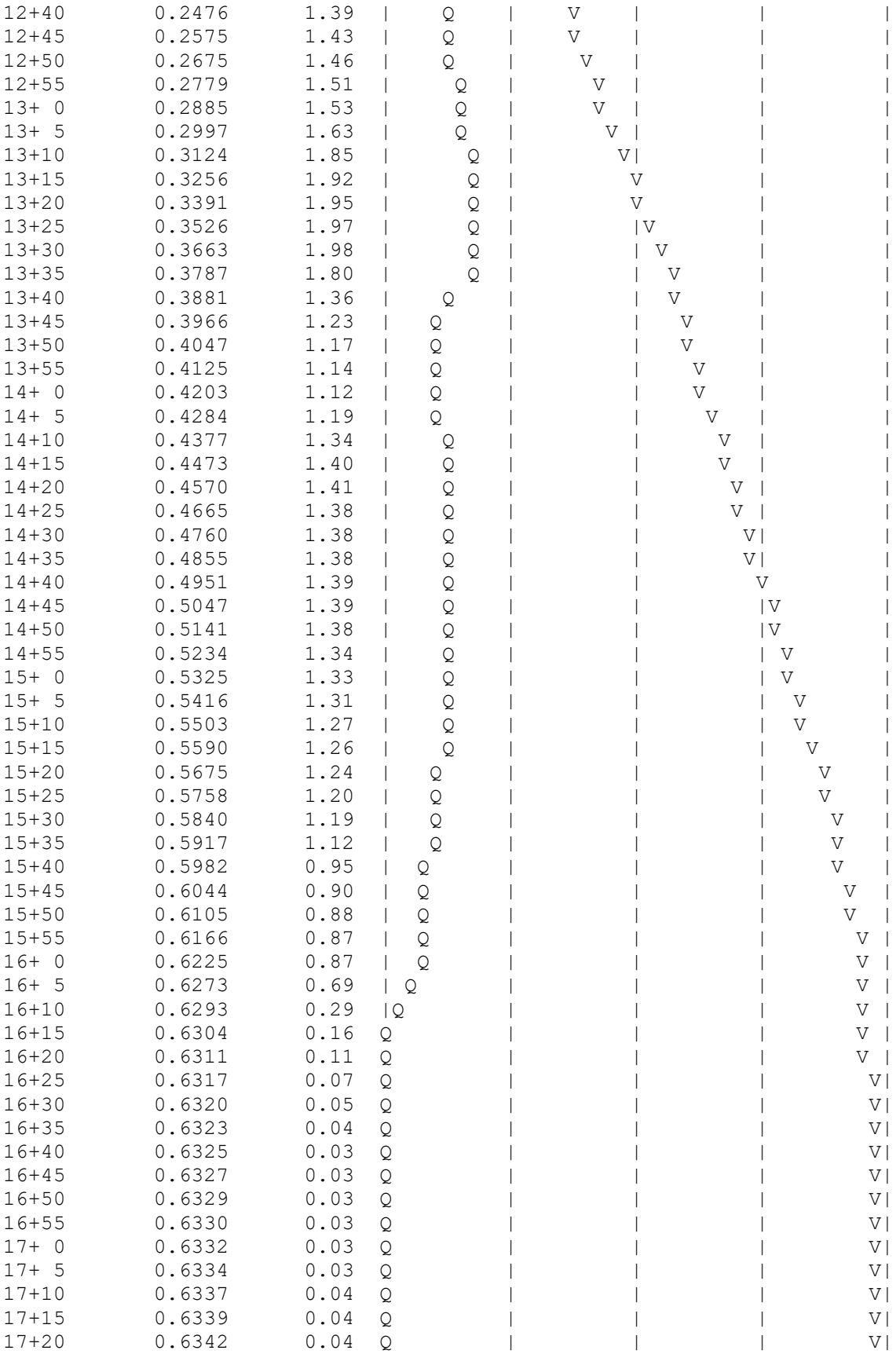
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0000	0.00	Q				
0+10	0.0001	0.01	Q				
0+15	0.0002	0.01	Q				
0+20	0.0003	0.02	Q				
0+25	0.0005	0.02	Q				
0+30	0.0006	0.02	Q				
0+35	0.0008	0.02	Q				
0+40	0.0010	0.02	Q				
0+45	0.0011	0.02	Q				
0+50	0.0013	0.03	Q				
0+55	0.0015	0.03	Q				
1+ 0	0.0018	0.03	Q				
1+ 5	0.0020	0.03	Q				
1+10	0.0022	0.03	Q				
1+15	0.0023	0.03	Q				
1+20	0.0025	0.03	Q				
1+25	0.0027	0.03	Q				
1+30	0.0029	0.03	Q				
1+35	0.0030	0.03	Q				
1+40	0.0032	0.03	Q				
1+45	0.0034	0.03	Q				
1+50	0.0036	0.03	Q				
1+55	0.0038	0.03	Q				
2+ 0	0.0040	0.03	Q				
2+ 5	0.0042	0.03	Q				
2+10	0.0045	0.03	Q				
2+15	0.0047	0.03	Q				
2+20	0.0049	0.03	Q				
2+25	0.0051	0.03	Q				
2+30	0.0054	0.03	Q				
2+35	0.0056	0.04	Q				
2+40	0.0059	0.04	Q				
2+45	0.0062	0.04	Q				
2+50	0.0064	0.04	Q				
2+55	0.0067	0.04	Q				
3+ 0	0.0070	0.04	Q				
3+ 5	0.0073	0.04	Q				

3+10	0.0076	0.04	Q				
3+15	0.0079	0.04	Q				
3+20	0.0082	0.04	Q				
3+25	0.0085	0.04	Q				
3+30	0.0087	0.04	Q				
3+35	0.0090	0.04	Q				
3+40	0.0093	0.04	Q				
3+45	0.0096	0.04	Q				
3+50	0.0099	0.04	Q				
3+55	0.0102	0.05	Q				
4+ 0	0.0106	0.05	Q				
4+ 5	0.0109	0.05	Q				
4+10	0.0113	0.05	Q				
4+15	0.0116	0.05	Q				
4+20	0.0120	0.05	Q				
4+25	0.0123	0.06	Q				
4+30	0.0127	0.06	Q				
4+35	0.0131	0.06	Q				
4+40	0.0135	0.06	Q				
4+45	0.0139	0.06	Q				
4+50	0.0144	0.06	Q				
4+55	0.0148	0.06	Q				
5+ 0	0.0153	0.07	Q				
5+ 5	0.0157	0.06	Q				
5+10	0.0161	0.05	Q				
5+15	0.0164	0.05	QV				
5+20	0.0168	0.05	QV				
5+25	0.0172	0.06	QV				
5+30	0.0176	0.06	QV				
5+35	0.0180	0.06	QV				
5+40	0.0184	0.06	QV				
5+45	0.0189	0.07	QV				
5+50	0.0193	0.07	QV				
5+55	0.0198	0.07	QV				
6+ 0	0.0203	0.07	QV				
6+ 5	0.0207	0.07	QV				
6+10	0.0212	0.07	QV				
6+15	0.0217	0.07	QV				
6+20	0.0222	0.07	QV				
6+25	0.0228	0.07	QV				
6+30	0.0233	0.08	QV				
6+35	0.0238	0.08	QV				
6+40	0.0244	0.08	QV				
6+45	0.0249	0.08	QV				
6+50	0.0255	0.08	QV				
6+55	0.0261	0.08	QV				
7+ 0	0.0267	0.08	QV				
7+ 5	0.0272	0.08	QV				
7+10	0.0278	0.08	QV				
7+15	0.0284	0.08	QV				
7+20	0.0290	0.09	QV				
7+25	0.0296	0.09	QV				
7+30	0.0302	0.09	QV				
7+35	0.0309	0.09	QV				
7+40	0.0315	0.10	QV				
7+45	0.0322	0.10	QV				
7+50	0.0329	0.10	Q V				

7+55	0.0336	0.11	Q V	|	|	|	|
8+ 0	0.0344	0.11	Q V	|	|	|	|
8+ 5	0.0351	0.11	Q V	|	|	|	|
8+10	0.0360	0.12	Q V	|	|	|	|
8+15	0.0368	0.12	Q V	|	|	|	|
8+20	0.0377	0.12	Q V	|	|	|	|
8+25	0.0385	0.12	Q V	|	|	|	|
8+30	0.0394	0.13	Q V	|	|	|	|
8+35	0.0404	0.14	Q V	|	|	|	|
8+40	0.0417	0.19	Q V	|	|	|	|
8+45	0.0431	0.20	Q V	|	|	|	|
8+50	0.0446	0.23	Q V	|	|	|	|
8+55	0.0466	0.28	|QV	|	|	|	|
9+ 0	0.0486	0.30	|Q V	|	|	|	|
9+ 5	0.0510	0.35	|Q V	|	|	|	|
9+10	0.0540	0.44	|Q V	|	|	|	|
9+15	0.0573	0.47	|Q V	|	|	|	|
9+20	0.0607	0.50	| QV	|	|	|	|
9+25	0.0646	0.56	| QV	|	|	|	|
9+30	0.0686	0.58	| Q V	|	|	|	|
9+35	0.0728	0.61	| Q V	|	|	|	|
9+40	0.0773	0.66	| Q V	|	|	|	|
9+45	0.0820	0.68	| Q V	|	|	|	|
9+50	0.0869	0.71	| Q V	|	|	|	|
9+55	0.0921	0.76	| Q V	|	|	|	|
10+ 0	0.0975	0.78	| Q V	|	|	|	|
10+ 5	0.1021	0.67	| Q V	|	|	|	|
10+10	0.1048	0.39	|Q V	|	|	|	|
10+15	0.1070	0.31	|Q V	|	|	|	|
10+20	0.1089	0.28	|Q V	|	|	|	|
10+25	0.1107	0.26	|Q V	|	|	|	|
10+30	0.1124	0.25	|Q V	|	|	|	|
10+35	0.1148	0.34	|Q V	|	|	|	|
10+40	0.1185	0.54	| Q V	|	|	|	|
10+45	0.1227	0.61	| Q V	|	|	|	|
10+50	0.1271	0.64	| Q V	|	|	|	|
10+55	0.1316	0.66	| Q V |	|	|	|
11+ 0	0.1363	0.68	| Q V |	|	|	|
11+ 5	0.1409	0.67	| Q V |	|	|	|
11+10	0.1453	0.64	| Q V |	|	|	|
11+15	0.1496	0.63	| Q V|	|	|	|
11+20	0.1540	0.63	| Q V|	|	|	|
11+25	0.1583	0.63	| Q V|	|	|	|
11+30	0.1627	0.63	| Q V	|	|	|	|
11+35	0.1668	0.60	| Q V	|	|	|	|
11+40	0.1704	0.52	| Q V	|	|	|	|
11+45	0.1739	0.50	| Q V	|	|	|	|
11+50	0.1775	0.52	| Q V	|	|	|	|
11+55	0.1813	0.55	| Q |V	|	|	|	|
12+ 0	0.1852	0.57	| Q |V	|	|	|	|
12+ 5	0.1900	0.70	| Q |V	|	|	|	|
12+10	0.1968	0.99	| Q | V	|	|	|	|
12+15	0.2043	1.08	| Q | V	|	|	|	|
12+20	0.2122	1.15	| Q | V	|	|	|	|
12+25	0.2205	1.21	| Q | V	|	|	|	|
12+30	0.2291	1.24	| Q | V	|	|	|	|
12+35	0.2380	1.30	| Q | V	|	|	|	|



17+25	0.6345	0.04	Q	|	|	|	V|
17+30	0.6348	0.04	Q	|	|	|	V|
17+35	0.6351	0.04	Q	|	|	|	V|
17+40	0.6354	0.04	Q	|	|	|	V|
17+45	0.6356	0.04	Q	|	|	|	V|
17+50	0.6359	0.04	Q	|	|	|	V|
17+55	0.6362	0.04	Q	|	|	|	V|
18+ 0	0.6364	0.03	Q	|	|	|	V|
18+ 5	0.6366	0.03	Q	|	|	|	V|
18+10	0.6369	0.03	Q	|	|	|	V|
18+15	0.6371	0.03	Q	|	|	|	V|
18+20	0.6373	0.03	Q	|	|	|	V|
18+25	0.6376	0.03	Q	|	|	|	V|
18+30	0.6378	0.03	Q	|	|	|	V|
18+35	0.6380	0.03	Q	|	|	|	V|
18+40	0.6382	0.03	Q	|	|	|	V|
18+45	0.6384	0.03	Q	|	|	|	V|
18+50	0.6386	0.02	Q	|	|	|	V|
18+55	0.6387	0.02	Q	|	|	|	V|
19+ 0	0.6388	0.02	Q	|	|	|	V|
19+ 5	0.6390	0.02	Q	|	|	|	V|
19+10	0.6391	0.02	Q	|	|	|	V|
19+15	0.6393	0.02	Q	|	|	|	V|
19+20	0.6395	0.03	Q	|	|	|	V|
19+25	0.6397	0.03	Q	|	|	|	V|
19+30	0.6399	0.03	Q	|	|	|	V|
19+35	0.6401	0.03	Q	|	|	|	V|
19+40	0.6403	0.03	Q	|	|	|	V|
19+45	0.6405	0.03	Q	|	|	|	V|
19+50	0.6406	0.02	Q	|	|	|	V|
19+55	0.6408	0.02	Q	|	|	|	V|
20+ 0	0.6409	0.02	Q	|	|	|	V|
20+ 5	0.6410	0.02	Q	|	|	|	V|
20+10	0.6412	0.02	Q	|	|	|	V|
20+15	0.6414	0.02	Q	|	|	|	V|
20+20	0.6415	0.02	Q	|	|	|	V|
20+25	0.6417	0.02	Q	|	|	|	V|
20+30	0.6419	0.02	Q	|	|	|	V|
20+35	0.6420	0.02	Q	|	|	|	V|
20+40	0.6422	0.03	Q	|	|	|	V|
20+45	0.6424	0.03	Q	|	|	|	V|
20+50	0.6425	0.02	Q	|	|	|	V|
20+55	0.6427	0.02	Q	|	|	|	V|
21+ 0	0.6428	0.02	Q	|	|	|	V|
21+ 5	0.6429	0.02	Q	|	|	|	V|
21+10	0.6431	0.02	Q	|	|	|	V|
21+15	0.6433	0.02	Q	|	|	|	V|
21+20	0.6434	0.02	Q	|	|	|	V|
21+25	0.6435	0.02	Q	|	|	|	V|
21+30	0.6437	0.02	Q	|	|	|	V|
21+35	0.6438	0.02	Q	|	|	|	V|
21+40	0.6439	0.02	Q	|	|	|	V|
21+45	0.6441	0.02	Q	|	|	|	V|
21+50	0.6443	0.02	Q	|	|	|	V|
21+55	0.6444	0.02	Q	|	|	|	V|
22+ 0	0.6445	0.02	Q	|	|	|	V|
22+ 5	0.6447	0.02	Q	|	|	|	V|

22+10	0.6448	0.02	Q	|	|	|	V|
22+15	0.6450	0.02	Q	|	|	|	V|
22+20	0.6451	0.02	Q	|	|	|	V|
22+25	0.6453	0.02	Q	|	|	|	V|
22+30	0.6454	0.02	Q	|	|	|	V|
22+35	0.6455	0.02	Q	|	|	|	V|
22+40	0.6456	0.02	Q	|	|	|	V|
22+45	0.6457	0.02	Q	|	|	|	V|
22+50	0.6459	0.02	Q	|	|	|	V|
22+55	0.6460	0.02	Q	|	|	|	V|
23+ 0	0.6461	0.02	Q	|	|	|	V|
23+ 5	0.6462	0.02	Q	|	|	|	V|
23+10	0.6463	0.02	Q	|	|	|	V|
23+15	0.6464	0.02	Q	|	|	|	V|
23+20	0.6465	0.02	Q	|	|	|	V|
23+25	0.6467	0.02	Q	|	|	|	V|
23+30	0.6468	0.02	Q	|	|	|	V|
23+35	0.6469	0.02	Q	|	|	|	V|
23+40	0.6470	0.02	Q	|	|	|	V|
23+45	0.6471	0.02	Q	|	|	|	V|
23+50	0.6472	0.02	Q	|	|	|	V|
23+55	0.6474	0.02	Q	|	|	|	V|
24+ 0	0.6475	0.02	Q	|	|	|	V|
24+ 5	0.6476	0.01	Q	|	|	|	V|
24+10	0.6476	0.01	Q	|	|	|	V|
24+15	0.6476	0.00	Q	|	|	|	V|
24+20	0.6476	0.00	Q	|	|	|	V|
24+25	0.6476	0.00	Q	|	|	|	V|
24+30	0.6476	0.00	Q	|	|	|	V|
24+35	0.6476	0.00	Q	|	|	|	V|

U n i t H y d r o g r a p h A n a l y s i s

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Study date 11/03/21 File: southdev2410.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 4011

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Evans Park Pump Track Site 10-year, 24-hour Storm Event
Developed Condition
Job 21-003
11/3/21

Drainage Area = 6.53(Ac.) = 0.010 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 6.53(Ac.) = 0.010 Sq. Mi.
Length along longest watercourse = 783.00(Ft.)
Length along longest watercourse measured to centroid = 389.00(Ft.)
Length along longest watercourse = 0.148 Mi.
Length along longest watercourse measured to centroid = 0.074 Mi.
Difference in elevation = 2.00(Ft.)
Slope along watercourse = 13.4866 Ft./Mi.
Average Manning's 'N' = 0.020
Lag time = 0.053 Hr.
Lag time = 3.16 Min.
25% of lag time = 0.79 Min.
40% of lag time = 1.26 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
6.53	1.90	12.41

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]

6.53 5.00 32.65

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 1.900(In)
Area Averaged 100-Year Rainfall = 5.000(In)

Point rain (area averaged) = 3.175(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 3.175(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
1.230	81.00	0.000
4.690	90.00	0.000
0.610	100.00	1.000

Total Area Entered = 6.53(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
81.0	81.0	0.233	0.000	0.233	0.188	0.044
90.0	90.0	0.130	0.000	0.130	0.718	0.093
100.0	100.0	0.000	1.000	0.000	0.093	0.000
					Sum (F) =	0.137

Area averaged mean soil loss (F) (In/Hr) = 0.137
Minimum soil loss rate ((In/Hr)) = 0.069
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.820

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	158.362	35.139	2.312
2	0.167	316.724	46.390	3.053
3	0.250	475.085	10.717	0.705
4	0.333	633.447	4.630	0.305
5	0.417	791.809	2.247	0.148
6	0.500	950.171	0.877	0.058
		Sum =	100.000 Sum=	6.581

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.025	(0.243)	0.021	0.005
2	0.17	0.07	0.025	(0.242)	0.021	0.005
3	0.25	0.07	0.025	(0.241)	0.021	0.005
4	0.33	0.10	0.038	(0.240)	0.031	0.007

5	0.42	0.10	0.038	(0.239)	0.031	0.007
6	0.50	0.10	0.038	(0.239)	0.031	0.007
7	0.58	0.10	0.038	(0.238)	0.031	0.007
8	0.67	0.10	0.038	(0.237)	0.031	0.007
9	0.75	0.10	0.038	(0.236)	0.031	0.007
10	0.83	0.13	0.051	(0.235)	0.042	0.009
11	0.92	0.13	0.051	(0.234)	0.042	0.009
12	1.00	0.13	0.051	(0.233)	0.042	0.009
13	1.08	0.10	0.038	(0.232)	0.031	0.007
14	1.17	0.10	0.038	(0.231)	0.031	0.007
15	1.25	0.10	0.038	(0.230)	0.031	0.007
16	1.33	0.10	0.038	(0.229)	0.031	0.007
17	1.42	0.10	0.038	(0.228)	0.031	0.007
18	1.50	0.10	0.038	(0.227)	0.031	0.007
19	1.58	0.10	0.038	(0.227)	0.031	0.007
20	1.67	0.10	0.038	(0.226)	0.031	0.007
21	1.75	0.10	0.038	(0.225)	0.031	0.007
22	1.83	0.13	0.051	(0.224)	0.042	0.009
23	1.92	0.13	0.051	(0.223)	0.042	0.009
24	2.00	0.13	0.051	(0.222)	0.042	0.009
25	2.08	0.13	0.051	(0.221)	0.042	0.009
26	2.17	0.13	0.051	(0.220)	0.042	0.009
27	2.25	0.13	0.051	(0.219)	0.042	0.009
28	2.33	0.13	0.051	(0.218)	0.042	0.009
29	2.42	0.13	0.051	(0.218)	0.042	0.009
30	2.50	0.13	0.051	(0.217)	0.042	0.009
31	2.58	0.17	0.064	(0.216)	0.052	0.011
32	2.67	0.17	0.064	(0.215)	0.052	0.011
33	2.75	0.17	0.064	(0.214)	0.052	0.011
34	2.83	0.17	0.064	(0.213)	0.052	0.011
35	2.92	0.17	0.064	(0.212)	0.052	0.011
36	3.00	0.17	0.064	(0.211)	0.052	0.011
37	3.08	0.17	0.064	(0.210)	0.052	0.011
38	3.17	0.17	0.064	(0.210)	0.052	0.011
39	3.25	0.17	0.064	(0.209)	0.052	0.011
40	3.33	0.17	0.064	(0.208)	0.052	0.011
41	3.42	0.17	0.064	(0.207)	0.052	0.011
42	3.50	0.17	0.064	(0.206)	0.052	0.011
43	3.58	0.17	0.064	(0.205)	0.052	0.011
44	3.67	0.17	0.064	(0.204)	0.052	0.011
45	3.75	0.17	0.064	(0.204)	0.052	0.011
46	3.83	0.20	0.076	(0.203)	0.062	0.014
47	3.92	0.20	0.076	(0.202)	0.062	0.014
48	4.00	0.20	0.076	(0.201)	0.062	0.014
49	4.08	0.20	0.076	(0.200)	0.062	0.014
50	4.17	0.20	0.076	(0.199)	0.062	0.014
51	4.25	0.20	0.076	(0.198)	0.062	0.014
52	4.33	0.23	0.089	(0.198)	0.073	0.016
53	4.42	0.23	0.089	(0.197)	0.073	0.016
54	4.50	0.23	0.089	(0.196)	0.073	0.016
55	4.58	0.23	0.089	(0.195)	0.073	0.016
56	4.67	0.23	0.089	(0.194)	0.073	0.016
57	4.75	0.23	0.089	(0.193)	0.073	0.016
58	4.83	0.27	0.102	(0.193)	0.083	0.018
59	4.92	0.27	0.102	(0.192)	0.083	0.018
60	5.00	0.27	0.102	(0.191)	0.083	0.018
61	5.08	0.20	0.076	(0.190)	0.062	0.014

62	5.17	0.20	0.076	(0.189)	0.062	0.014
63	5.25	0.20	0.076	(0.188)	0.062	0.014
64	5.33	0.23	0.089	(0.188)	0.073	0.016
65	5.42	0.23	0.089	(0.187)	0.073	0.016
66	5.50	0.23	0.089	(0.186)	0.073	0.016
67	5.58	0.27	0.102	(0.185)	0.083	0.018
68	5.67	0.27	0.102	(0.184)	0.083	0.018
69	5.75	0.27	0.102	(0.184)	0.083	0.018
70	5.83	0.27	0.102	(0.183)	0.083	0.018
71	5.92	0.27	0.102	(0.182)	0.083	0.018
72	6.00	0.27	0.102	(0.181)	0.083	0.018
73	6.08	0.30	0.114	(0.180)	0.094	0.021
74	6.17	0.30	0.114	(0.179)	0.094	0.021
75	6.25	0.30	0.114	(0.179)	0.094	0.021
76	6.33	0.30	0.114	(0.178)	0.094	0.021
77	6.42	0.30	0.114	(0.177)	0.094	0.021
78	6.50	0.30	0.114	(0.176)	0.094	0.021
79	6.58	0.33	0.127	(0.175)	0.104	0.023
80	6.67	0.33	0.127	(0.175)	0.104	0.023
81	6.75	0.33	0.127	(0.174)	0.104	0.023
82	6.83	0.33	0.127	(0.173)	0.104	0.023
83	6.92	0.33	0.127	(0.172)	0.104	0.023
84	7.00	0.33	0.127	(0.172)	0.104	0.023
85	7.08	0.33	0.127	(0.171)	0.104	0.023
86	7.17	0.33	0.127	(0.170)	0.104	0.023
87	7.25	0.33	0.127	(0.169)	0.104	0.023
88	7.33	0.37	0.140	(0.168)	0.115	0.025
89	7.42	0.37	0.140	(0.168)	0.115	0.025
90	7.50	0.37	0.140	(0.167)	0.115	0.025
91	7.58	0.40	0.152	(0.166)	0.125	0.027
92	7.67	0.40	0.152	(0.165)	0.125	0.027
93	7.75	0.40	0.152	(0.165)	0.125	0.027
94	7.83	0.43	0.165	(0.164)	0.135	0.030
95	7.92	0.43	0.165	(0.163)	0.135	0.030
96	8.00	0.43	0.165	(0.162)	0.135	0.030
97	8.08	0.50	0.191	(0.162)	0.156	0.034
98	8.17	0.50	0.191	(0.161)	0.156	0.034
99	8.25	0.50	0.191	(0.160)	0.156	0.034
100	8.33	0.50	0.191	(0.159)	0.156	0.034
101	8.42	0.50	0.191	(0.159)	0.156	0.034
102	8.50	0.50	0.191	(0.158)	0.156	0.034
103	8.58	0.53	0.203	0.157	(0.167)	0.046
104	8.67	0.53	0.203	0.156	(0.167)	0.047
105	8.75	0.53	0.203	0.156	(0.167)	0.048
106	8.83	0.57	0.216	0.155	(0.177)	0.061
107	8.92	0.57	0.216	0.154	(0.177)	0.062
108	9.00	0.57	0.216	0.153	(0.177)	0.062
109	9.08	0.63	0.241	0.153	(0.198)	0.089
110	9.17	0.63	0.241	0.152	(0.198)	0.089
111	9.25	0.63	0.241	0.151	(0.198)	0.090
112	9.33	0.67	0.254	0.151	(0.208)	0.103
113	9.42	0.67	0.254	0.150	(0.208)	0.104
114	9.50	0.67	0.254	0.149	(0.208)	0.105
115	9.58	0.70	0.267	0.148	(0.219)	0.118
116	9.67	0.70	0.267	0.148	(0.219)	0.119
117	9.75	0.70	0.267	0.147	(0.219)	0.120
118	9.83	0.73	0.279	0.146	(0.229)	0.133

119	9.92	0.73	0.279	0.146	(	0.229)	0.134
120	10.00	0.73	0.279	0.145	(	0.229)	0.135
121	10.08	0.50	0.191	0.144	(	0.156)	0.046
122	10.17	0.50	0.191	0.143	(	0.156)	0.047
123	10.25	0.50	0.191	0.143	(	0.156)	0.048
124	10.33	0.50	0.191	0.142	(	0.156)	0.048
125	10.42	0.50	0.191	0.141	(	0.156)	0.049
126	10.50	0.50	0.191	0.141	(	0.156)	0.050
127	10.58	0.67	0.254	0.140	(	0.208)	0.114
128	10.67	0.67	0.254	0.139	(	0.208)	0.115
129	10.75	0.67	0.254	0.139	(	0.208)	0.115
130	10.83	0.67	0.254	0.138	(	0.208)	0.116
131	10.92	0.67	0.254	0.137	(	0.208)	0.117
132	11.00	0.67	0.254	0.137	(	0.208)	0.117
133	11.08	0.63	0.241	0.136	(	0.198)	0.105
134	11.17	0.63	0.241	0.135	(	0.198)	0.106
135	11.25	0.63	0.241	0.135	(	0.198)	0.107
136	11.33	0.63	0.241	0.134	(	0.198)	0.107
137	11.42	0.63	0.241	0.133	(	0.198)	0.108
138	11.50	0.63	0.241	0.133	(	0.198)	0.109
139	11.58	0.57	0.216	0.132	(	0.177)	0.084
140	11.67	0.57	0.216	0.131	(	0.177)	0.085
141	11.75	0.57	0.216	0.131	(	0.177)	0.085
142	11.83	0.60	0.229	0.130	(	0.187)	0.099
143	11.92	0.60	0.229	0.129	(	0.187)	0.099
144	12.00	0.60	0.229	0.129	(	0.187)	0.100
145	12.08	0.83	0.318	0.128	(	0.260)	0.189
146	12.17	0.83	0.318	0.127	(	0.260)	0.190
147	12.25	0.83	0.318	0.127	(	0.260)	0.191
148	12.33	0.87	0.330	0.126	(	0.271)	0.204
149	12.42	0.87	0.330	0.126	(	0.271)	0.205
150	12.50	0.87	0.330	0.125	(	0.271)	0.205
151	12.58	0.93	0.356	0.124	(	0.292)	0.231
152	12.67	0.93	0.356	0.124	(	0.292)	0.232
153	12.75	0.93	0.356	0.123	(	0.292)	0.233
154	12.83	0.97	0.368	0.122	(	0.302)	0.246
155	12.92	0.97	0.368	0.122	(	0.302)	0.247
156	13.00	0.97	0.368	0.121	(	0.302)	0.247
157	13.08	1.13	0.432	0.121	(	0.354)	0.311
158	13.17	1.13	0.432	0.120	(	0.354)	0.312
159	13.25	1.13	0.432	0.119	(	0.354)	0.313
160	13.33	1.13	0.432	0.119	(	0.354)	0.313
161	13.42	1.13	0.432	0.118	(	0.354)	0.314
162	13.50	1.13	0.432	0.117	(	0.354)	0.314
163	13.58	0.77	0.292	0.117	(	0.240)	0.175
164	13.67	0.77	0.292	0.116	(	0.240)	0.176
165	13.75	0.77	0.292	0.116	(	0.240)	0.176
166	13.83	0.77	0.292	0.115	(	0.240)	0.177
167	13.92	0.77	0.292	0.115	(	0.240)	0.178
168	14.00	0.77	0.292	0.114	(	0.240)	0.178
169	14.08	0.90	0.343	0.113	(	0.281)	0.230
170	14.17	0.90	0.343	0.113	(	0.281)	0.230
171	14.25	0.90	0.343	0.112	(	0.281)	0.231
172	14.33	0.87	0.330	0.112	(	0.271)	0.219
173	14.42	0.87	0.330	0.111	(	0.271)	0.219
174	14.50	0.87	0.330	0.110	(	0.271)	0.220
175	14.58	0.87	0.330	0.110	(	0.271)	0.220

176	14.67	0.87	0.330	0.109	(0.271)	0.221
177	14.75	0.87	0.330	0.109	(0.271)	0.221
178	14.83	0.83	0.318	0.108	(0.260)	0.209
179	14.92	0.83	0.318	0.108	(0.260)	0.210
180	15.00	0.83	0.318	0.107	(0.260)	0.210
181	15.08	0.80	0.305	0.107	(0.250)	0.198
182	15.17	0.80	0.305	0.106	(0.250)	0.199
183	15.25	0.80	0.305	0.106	(0.250)	0.199
184	15.33	0.77	0.292	0.105	(0.240)	0.187
185	15.42	0.77	0.292	0.104	(0.240)	0.188
186	15.50	0.77	0.292	0.104	(0.240)	0.188
187	15.58	0.63	0.241	0.103	(0.198)	0.138
188	15.67	0.63	0.241	0.103	(0.198)	0.138
189	15.75	0.63	0.241	0.102	(0.198)	0.139
190	15.83	0.63	0.241	0.102	(0.198)	0.140
191	15.92	0.63	0.241	0.101	(0.198)	0.140
192	16.00	0.63	0.241	0.101	(0.198)	0.141
193	16.08	0.13	0.051	(0.100)	0.042	0.009
194	16.17	0.13	0.051	(0.100)	0.042	0.009
195	16.25	0.13	0.051	(0.099)	0.042	0.009
196	16.33	0.13	0.051	(0.099)	0.042	0.009
197	16.42	0.13	0.051	(0.098)	0.042	0.009
198	16.50	0.13	0.051	(0.098)	0.042	0.009
199	16.58	0.10	0.038	(0.097)	0.031	0.007
200	16.67	0.10	0.038	(0.097)	0.031	0.007
201	16.75	0.10	0.038	(0.096)	0.031	0.007
202	16.83	0.10	0.038	(0.096)	0.031	0.007
203	16.92	0.10	0.038	(0.095)	0.031	0.007
204	17.00	0.10	0.038	(0.095)	0.031	0.007
205	17.08	0.17	0.064	(0.094)	0.052	0.011
206	17.17	0.17	0.064	(0.094)	0.052	0.011
207	17.25	0.17	0.064	(0.093)	0.052	0.011
208	17.33	0.17	0.064	(0.093)	0.052	0.011
209	17.42	0.17	0.064	(0.092)	0.052	0.011
210	17.50	0.17	0.064	(0.092)	0.052	0.011
211	17.58	0.17	0.064	(0.091)	0.052	0.011
212	17.67	0.17	0.064	(0.091)	0.052	0.011
213	17.75	0.17	0.064	(0.091)	0.052	0.011
214	17.83	0.13	0.051	(0.090)	0.042	0.009
215	17.92	0.13	0.051	(0.090)	0.042	0.009
216	18.00	0.13	0.051	(0.089)	0.042	0.009
217	18.08	0.13	0.051	(0.089)	0.042	0.009
218	18.17	0.13	0.051	(0.088)	0.042	0.009
219	18.25	0.13	0.051	(0.088)	0.042	0.009
220	18.33	0.13	0.051	(0.087)	0.042	0.009
221	18.42	0.13	0.051	(0.087)	0.042	0.009
222	18.50	0.13	0.051	(0.087)	0.042	0.009
223	18.58	0.10	0.038	(0.086)	0.031	0.007
224	18.67	0.10	0.038	(0.086)	0.031	0.007
225	18.75	0.10	0.038	(0.085)	0.031	0.007
226	18.83	0.07	0.025	(0.085)	0.021	0.005
227	18.92	0.07	0.025	(0.085)	0.021	0.005
228	19.00	0.07	0.025	(0.084)	0.021	0.005
229	19.08	0.10	0.038	(0.084)	0.031	0.007
230	19.17	0.10	0.038	(0.083)	0.031	0.007
231	19.25	0.10	0.038	(0.083)	0.031	0.007
232	19.33	0.13	0.051	(0.083)	0.042	0.009

233	19.42	0.13	0.051	(0.082)	0.042	0.009
234	19.50	0.13	0.051	(0.082)	0.042	0.009
235	19.58	0.10	0.038	(0.081)	0.031	0.007
236	19.67	0.10	0.038	(0.081)	0.031	0.007
237	19.75	0.10	0.038	(0.081)	0.031	0.007
238	19.83	0.07	0.025	(0.080)	0.021	0.005
239	19.92	0.07	0.025	(0.080)	0.021	0.005
240	20.00	0.07	0.025	(0.080)	0.021	0.005
241	20.08	0.10	0.038	(0.079)	0.031	0.007
242	20.17	0.10	0.038	(0.079)	0.031	0.007
243	20.25	0.10	0.038	(0.079)	0.031	0.007
244	20.33	0.10	0.038	(0.078)	0.031	0.007
245	20.42	0.10	0.038	(0.078)	0.031	0.007
246	20.50	0.10	0.038	(0.078)	0.031	0.007
247	20.58	0.10	0.038	(0.077)	0.031	0.007
248	20.67	0.10	0.038	(0.077)	0.031	0.007
249	20.75	0.10	0.038	(0.077)	0.031	0.007
250	20.83	0.07	0.025	(0.076)	0.021	0.005
251	20.92	0.07	0.025	(0.076)	0.021	0.005
252	21.00	0.07	0.025	(0.076)	0.021	0.005
253	21.08	0.10	0.038	(0.075)	0.031	0.007
254	21.17	0.10	0.038	(0.075)	0.031	0.007
255	21.25	0.10	0.038	(0.075)	0.031	0.007
256	21.33	0.07	0.025	(0.075)	0.021	0.005
257	21.42	0.07	0.025	(0.074)	0.021	0.005
258	21.50	0.07	0.025	(0.074)	0.021	0.005
259	21.58	0.10	0.038	(0.074)	0.031	0.007
260	21.67	0.10	0.038	(0.073)	0.031	0.007
261	21.75	0.10	0.038	(0.073)	0.031	0.007
262	21.83	0.07	0.025	(0.073)	0.021	0.005
263	21.92	0.07	0.025	(0.073)	0.021	0.005
264	22.00	0.07	0.025	(0.072)	0.021	0.005
265	22.08	0.10	0.038	(0.072)	0.031	0.007
266	22.17	0.10	0.038	(0.072)	0.031	0.007
267	22.25	0.10	0.038	(0.072)	0.031	0.007
268	22.33	0.07	0.025	(0.072)	0.021	0.005
269	22.42	0.07	0.025	(0.071)	0.021	0.005
270	22.50	0.07	0.025	(0.071)	0.021	0.005
271	22.58	0.07	0.025	(0.071)	0.021	0.005
272	22.67	0.07	0.025	(0.071)	0.021	0.005
273	22.75	0.07	0.025	(0.070)	0.021	0.005
274	22.83	0.07	0.025	(0.070)	0.021	0.005
275	22.92	0.07	0.025	(0.070)	0.021	0.005
276	23.00	0.07	0.025	(0.070)	0.021	0.005
277	23.08	0.07	0.025	(0.070)	0.021	0.005
278	23.17	0.07	0.025	(0.070)	0.021	0.005
279	23.25	0.07	0.025	(0.069)	0.021	0.005
280	23.33	0.07	0.025	(0.069)	0.021	0.005
281	23.42	0.07	0.025	(0.069)	0.021	0.005
282	23.50	0.07	0.025	(0.069)	0.021	0.005
283	23.58	0.07	0.025	(0.069)	0.021	0.005
284	23.67	0.07	0.025	(0.069)	0.021	0.005
285	23.75	0.07	0.025	(0.069)	0.021	0.005
286	23.83	0.07	0.025	(0.069)	0.021	0.005
287	23.92	0.07	0.025	(0.069)	0.021	0.005
288	24.00	0.07	0.025	(0.069)	0.021	0.005

(Loss Rate Not Used)

Sum = 100.0 Sum = 16.3

Flood volume = Effective rainfall 1.36(In)
times area 6.5(Ac.)/[(In)/(Ft.)] = 0.7(Ac.Ft)
Total soil loss = 1.82(In)
Total soil loss = 0.989(Ac.Ft)
Total rainfall = 3.18(In)
Flood volume = 32207.5 Cubic Feet
Total soil loss = 43060.1 Cubic Feet

Peak flow rate of this hydrograph = 2.066(CFS)

++

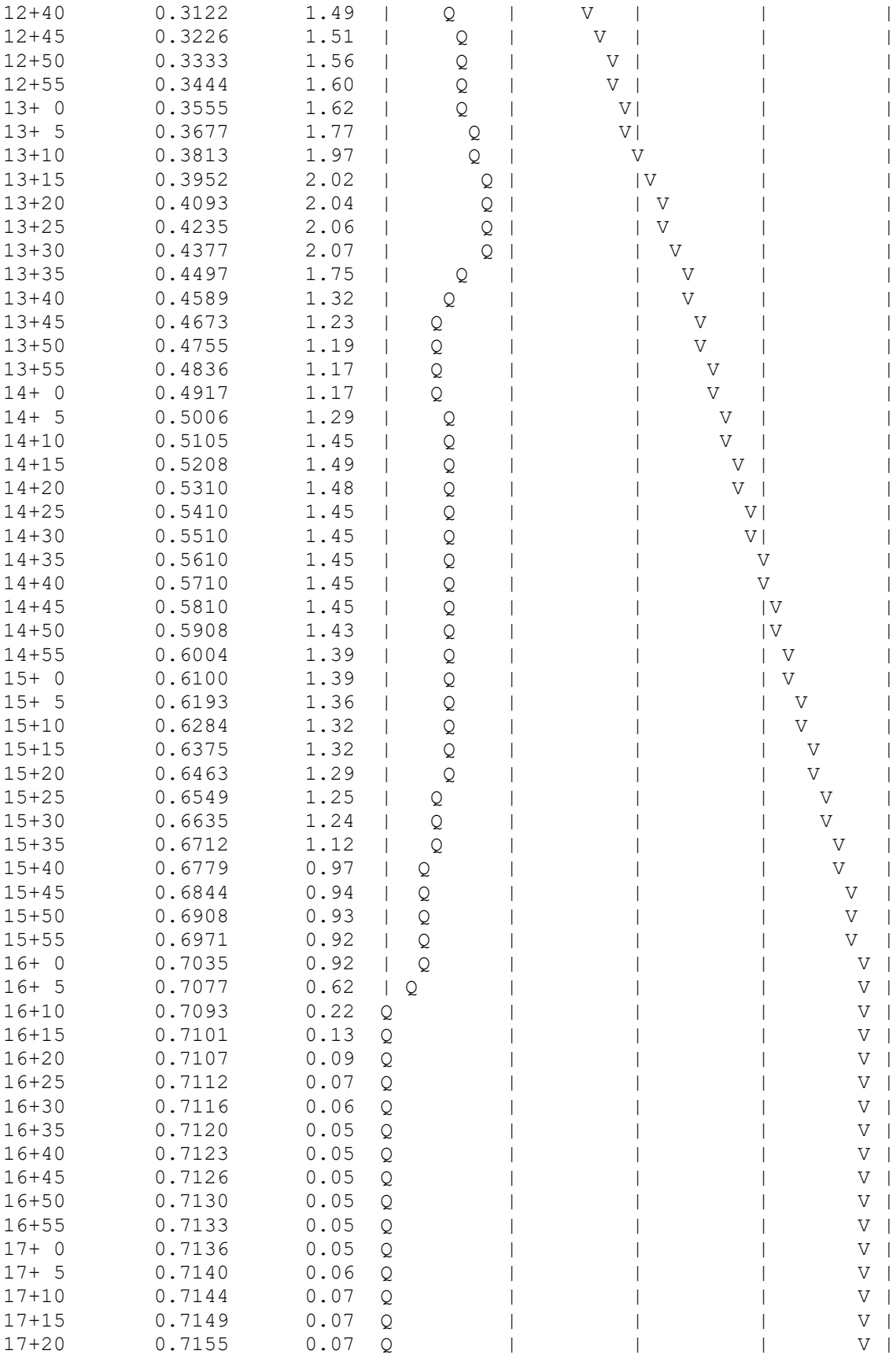
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0001	0.01	Q				
0+10	0.0002	0.02	Q				
0+15	0.0004	0.03	Q				
0+20	0.0007	0.03	Q				
0+25	0.0010	0.04	Q				
0+30	0.0013	0.04	Q				
0+35	0.0016	0.04	Q				
0+40	0.0019	0.05	Q				
0+45	0.0022	0.05	Q				
0+50	0.0025	0.05	Q				
0+55	0.0029	0.06	Q				
1+ 0	0.0033	0.06	Q				
1+ 5	0.0037	0.05	Q				
1+10	0.0040	0.05	Q				
1+15	0.0044	0.05	Q				
1+20	0.0047	0.05	Q				
1+25	0.0050	0.05	Q				
1+30	0.0053	0.05	Q				
1+35	0.0056	0.05	Q				
1+40	0.0059	0.05	Q				
1+45	0.0062	0.05	Q				
1+50	0.0066	0.05	Q				
1+55	0.0070	0.06	Q				
2+ 0	0.0074	0.06	Q				
2+ 5	0.0078	0.06	Q				
2+10	0.0082	0.06	Q				
2+15	0.0086	0.06	Q				
2+20	0.0090	0.06	Q				
2+25	0.0095	0.06	Q				
2+30	0.0099	0.06	Q				
2+35	0.0103	0.07	Q				
2+40	0.0108	0.07	Q				
2+45	0.0113	0.07	Q				
2+50	0.0118	0.07	Q				
2+55	0.0124	0.08	Q				
3+ 0	0.0129	0.08	Q				
3+ 5	0.0134	0.08	Q				

3+10	0.0139	0.08	Q				
3+15	0.0144	0.08	Q				
3+20	0.0150	0.08	Q				
3+25	0.0155	0.08	Q				
3+30	0.0160	0.08	Q				
3+35	0.0165	0.08	Q				
3+40	0.0170	0.08	Q				
3+45	0.0175	0.08	Q				
3+50	0.0181	0.08	Q				
3+55	0.0187	0.09	QV				
4+ 0	0.0193	0.09	QV				
4+ 5	0.0199	0.09	QV				
4+10	0.0206	0.09	QV				
4+15	0.0212	0.09	QV				
4+20	0.0218	0.10	QV				
4+25	0.0225	0.10	QV				
4+30	0.0233	0.10	QV				
4+35	0.0240	0.10	QV				
4+40	0.0247	0.11	QV				
4+45	0.0254	0.11	QV				
4+50	0.0262	0.11	QV				
4+55	0.0270	0.12	QV				
5+ 0	0.0278	0.12	QV				
5+ 5	0.0286	0.11	QV				
5+10	0.0292	0.10	QV				
5+15	0.0299	0.09	QV				
5+20	0.0305	0.10	QV				
5+25	0.0313	0.10	QV				
5+30	0.0320	0.10	QV				
5+35	0.0327	0.11	QV				
5+40	0.0335	0.12	QV				
5+45	0.0344	0.12	QV				
5+50	0.0352	0.12	QV				
5+55	0.0360	0.12	QV				
6+ 0	0.0368	0.12	QV				
6+ 5	0.0377	0.13	Q V				
6+10	0.0386	0.13	Q V				
6+15	0.0395	0.13	Q V				
6+20	0.0405	0.14	Q V				
6+25	0.0414	0.14	Q V				
6+30	0.0423	0.14	Q V				
6+35	0.0433	0.14	Q V				
6+40	0.0443	0.15	Q V				
6+45	0.0454	0.15	Q V				
6+50	0.0464	0.15	Q V				
6+55	0.0474	0.15	Q V				
7+ 0	0.0485	0.15	Q V				
7+ 5	0.0495	0.15	Q V				
7+10	0.0505	0.15	Q V				
7+15	0.0516	0.15	Q V				
7+20	0.0527	0.16	Q V				
7+25	0.0538	0.16	Q V				
7+30	0.0549	0.16	Q V				
7+35	0.0561	0.17	Q V				
7+40	0.0573	0.18	Q V				
7+45	0.0585	0.18	Q V				
7+50	0.0598	0.19	Q V				

7+55	0.0611	0.19	Q V	|	|	|	|
8+ 0	0.0625	0.19	Q V	|	|	|	|
8+ 5	0.0639	0.21	Q V	|	|	|	|
8+10	0.0654	0.22	Q V	|	|	|	|
8+15	0.0670	0.22	Q V	|	|	|	|
8+20	0.0685	0.22	Q V	|	|	|	|
8+25	0.0701	0.23	Q V	|	|	|	|
8+30	0.0716	0.23	Q V	|	|	|	|
8+35	0.0734	0.25	|Q V	|	|	|	|
8+40	0.0754	0.29	|Q V	|	|	|	|
8+45	0.0774	0.30	|Q V	|	|	|	|
8+50	0.0798	0.34	|Q V	|	|	|	|
8+55	0.0825	0.39	|Q V	|	|	|	|
9+ 0	0.0852	0.40	|Q V	|	|	|	|
9+ 5	0.0884	0.47	|Q V	|	|	|	|
9+10	0.0922	0.55	| Q V	|	|	|	|
9+15	0.0962	0.58	| Q V	|	|	|	|
9+20	0.1004	0.62	| Q V	|	|	|	|
9+25	0.1050	0.66	| Q V	|	|	|	|
9+30	0.1097	0.68	| Q V	|	|	|	|
9+35	0.1146	0.72	| Q V	|	|	|	|
9+40	0.1199	0.76	| Q V	|	|	|	|
9+45	0.1253	0.78	| Q V	|	|	|	|
9+50	0.1309	0.82	| Q V	|	|	|	|
9+55	0.1368	0.86	| Q V	|	|	|	|
10+ 0	0.1428	0.88	| Q V	|	|	|	|
10+ 5	0.1475	0.68	| Q V	|	|	|	|
10+10	0.1503	0.41	|Q V |	|	|	|	|
10+15	0.1528	0.36	|Q V |	|	|	|	|
10+20	0.1551	0.33	|Q V |	|	|	|	|
10+25	0.1573	0.32	|Q V |	|	|	|	|
10+30	0.1595	0.32	|Q V |	|	|	|	|
10+35	0.1628	0.48	|Q V |	|	|	|	|
10+40	0.1675	0.67	| Q V|	|	|	|	|
10+45	0.1724	0.72	| Q V|	|	|	|	|
10+50	0.1776	0.75	| Q V|	|	|	|	|
10+55	0.1828	0.76	| Q V|	|	|	|	|
11+ 0	0.1881	0.77	| Q V	|	|	|	|
11+ 5	0.1932	0.74	| Q V	|	|	|	|
11+10	0.1981	0.71	| Q V	|	|	|	|
11+15	0.2030	0.71	| Q V	|	|	|	|
11+20	0.2078	0.71	| Q |V	|	|	|	|
11+25	0.2127	0.71	| Q |V	|	|	|	|
11+30	0.2176	0.71	| Q |V	|	|	|	|
11+35	0.2221	0.66	| Q | V	|	|	|	|
11+40	0.2262	0.58	| Q | V	|	|	|	|
11+45	0.2301	0.57	| Q | V	|	|	|	|
11+50	0.2342	0.60	| Q | V	|	|	|	|
11+55	0.2386	0.64	| Q | V	|	|	|	|
12+ 0	0.2430	0.65	| Q | V	|	|	|	|
12+ 5	0.2490	0.86	| Q | V	|	|	|	|
12+10	0.2568	1.14	| Q | V	|	|	|	|
12+15	0.2651	1.21	| Q | V	|	|	|	|
12+20	0.2739	1.27	| Q | V	|	|	|	|
12+25	0.2830	1.32	| Q | V	|	|	|	|
12+30	0.2922	1.34	| Q | V	|	|	|	|
12+35	0.3019	1.41	| Q | V	|	|	|	|



17+25	0.7160	0.08	Q	|	|	|	V |
17+30	0.7165	0.08	Q	|	|	|	V |
17+35	0.7170	0.08	Q	|	|	|	V |
17+40	0.7175	0.08	Q	|	|	|	V |
17+45	0.7181	0.08	Q	|	|	|	V |
17+50	0.7185	0.07	Q	|	|	|	V |
17+55	0.7190	0.06	Q	|	|	|	V |
18+ 0	0.7194	0.06	Q	|	|	|	V |
18+ 5	0.7198	0.06	Q	|	|	|	V |
18+10	0.7202	0.06	Q	|	|	|	V |
18+15	0.7206	0.06	Q	|	|	|	V |
18+20	0.7211	0.06	Q	|	|	|	V|
18+25	0.7215	0.06	Q	|	|	|	V|
18+30	0.7219	0.06	Q	|	|	|	V|
18+35	0.7223	0.05	Q	|	|	|	V|
18+40	0.7226	0.05	Q	|	|	|	V|
18+45	0.7229	0.05	Q	|	|	|	V|
18+50	0.7232	0.04	Q	|	|	|	V|
18+55	0.7234	0.03	Q	|	|	|	V|
19+ 0	0.7236	0.03	Q	|	|	|	V|
19+ 5	0.7239	0.04	Q	|	|	|	V|
19+10	0.7242	0.04	Q	|	|	|	V|
19+15	0.7245	0.04	Q	|	|	|	V|
19+20	0.7248	0.05	Q	|	|	|	V|
19+25	0.7252	0.06	Q	|	|	|	V|
19+30	0.7256	0.06	Q	|	|	|	V|
19+35	0.7260	0.05	Q	|	|	|	V|
19+40	0.7263	0.05	Q	|	|	|	V|
19+45	0.7266	0.05	Q	|	|	|	V|
19+50	0.7269	0.04	Q	|	|	|	V|
19+55	0.7271	0.03	Q	|	|	|	V|
20+ 0	0.7274	0.03	Q	|	|	|	V|
20+ 5	0.7276	0.04	Q	|	|	|	V|
20+10	0.7279	0.04	Q	|	|	|	V|
20+15	0.7282	0.04	Q	|	|	|	V|
20+20	0.7285	0.04	Q	|	|	|	V|
20+25	0.7288	0.05	Q	|	|	|	V|
20+30	0.7291	0.05	Q	|	|	|	V|
20+35	0.7294	0.05	Q	|	|	|	V|
20+40	0.7298	0.05	Q	|	|	|	V|
20+45	0.7301	0.05	Q	|	|	|	V|
20+50	0.7303	0.04	Q	|	|	|	V|
20+55	0.7306	0.03	Q	|	|	|	V|
21+ 0	0.7308	0.03	Q	|	|	|	V|
21+ 5	0.7310	0.04	Q	|	|	|	V|
21+10	0.7313	0.04	Q	|	|	|	V|
21+15	0.7316	0.04	Q	|	|	|	V|
21+20	0.7319	0.04	Q	|	|	|	V|
21+25	0.7321	0.03	Q	|	|	|	V|
21+30	0.7323	0.03	Q	|	|	|	V|
21+35	0.7326	0.04	Q	|	|	|	V|
21+40	0.7329	0.04	Q	|	|	|	V|
21+45	0.7332	0.04	Q	|	|	|	V|
21+50	0.7335	0.04	Q	|	|	|	V|
21+55	0.7337	0.03	Q	|	|	|	V|
22+ 0	0.7339	0.03	Q	|	|	|	V|
22+ 5	0.7341	0.04	Q	|	|	|	V|

22+10	0.7344	0.04	Q	|	|	|	V|
22+15	0.7347	0.04	Q	|	|	|	V|
22+20	0.7350	0.04	Q	|	|	|	V|
22+25	0.7352	0.03	Q	|	|	|	V|
22+30	0.7354	0.03	Q	|	|	|	V|
22+35	0.7357	0.03	Q	|	|	|	V|
22+40	0.7359	0.03	Q	|	|	|	V|
22+45	0.7361	0.03	Q	|	|	|	V|
22+50	0.7363	0.03	Q	|	|	|	V|
22+55	0.7365	0.03	Q	|	|	|	V|
23+ 0	0.7367	0.03	Q	|	|	|	V|
23+ 5	0.7369	0.03	Q	|	|	|	V|
23+10	0.7371	0.03	Q	|	|	|	V|
23+15	0.7373	0.03	Q	|	|	|	V|
23+20	0.7375	0.03	Q	|	|	|	V|
23+25	0.7377	0.03	Q	|	|	|	V|
23+30	0.7379	0.03	Q	|	|	|	V|
23+35	0.7381	0.03	Q	|	|	|	V|
23+40	0.7384	0.03	Q	|	|	|	V|
23+45	0.7386	0.03	Q	|	|	|	V|
23+50	0.7388	0.03	Q	|	|	|	V|
23+55	0.7390	0.03	Q	|	|	|	V|
24+ 0	0.7392	0.03	Q	|	|	|	V|
24+ 5	0.7393	0.02	Q	|	|	|	V|
24+10	0.7394	0.01	Q	|	|	|	V|
24+15	0.7394	0.00	Q	|	|	|	V|
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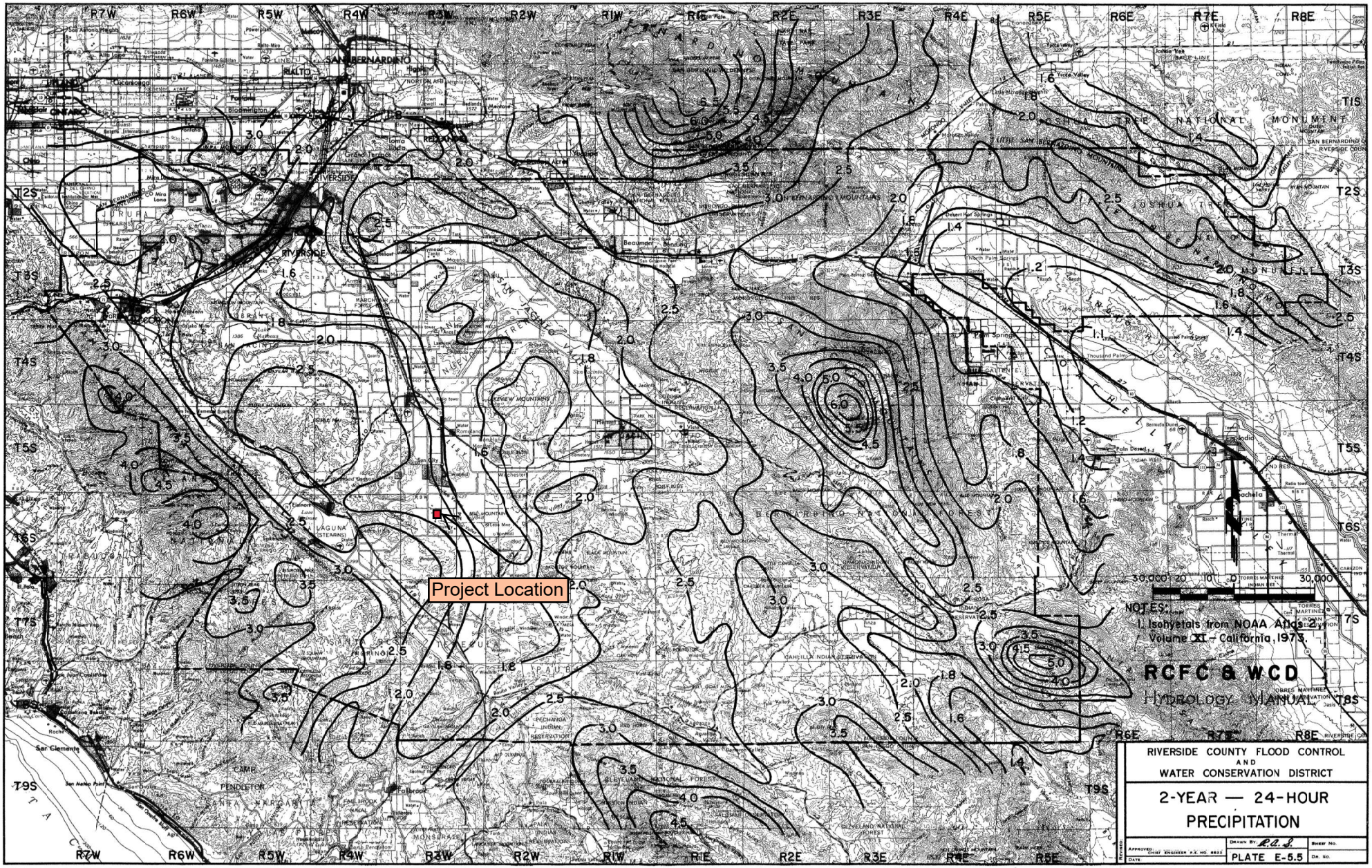
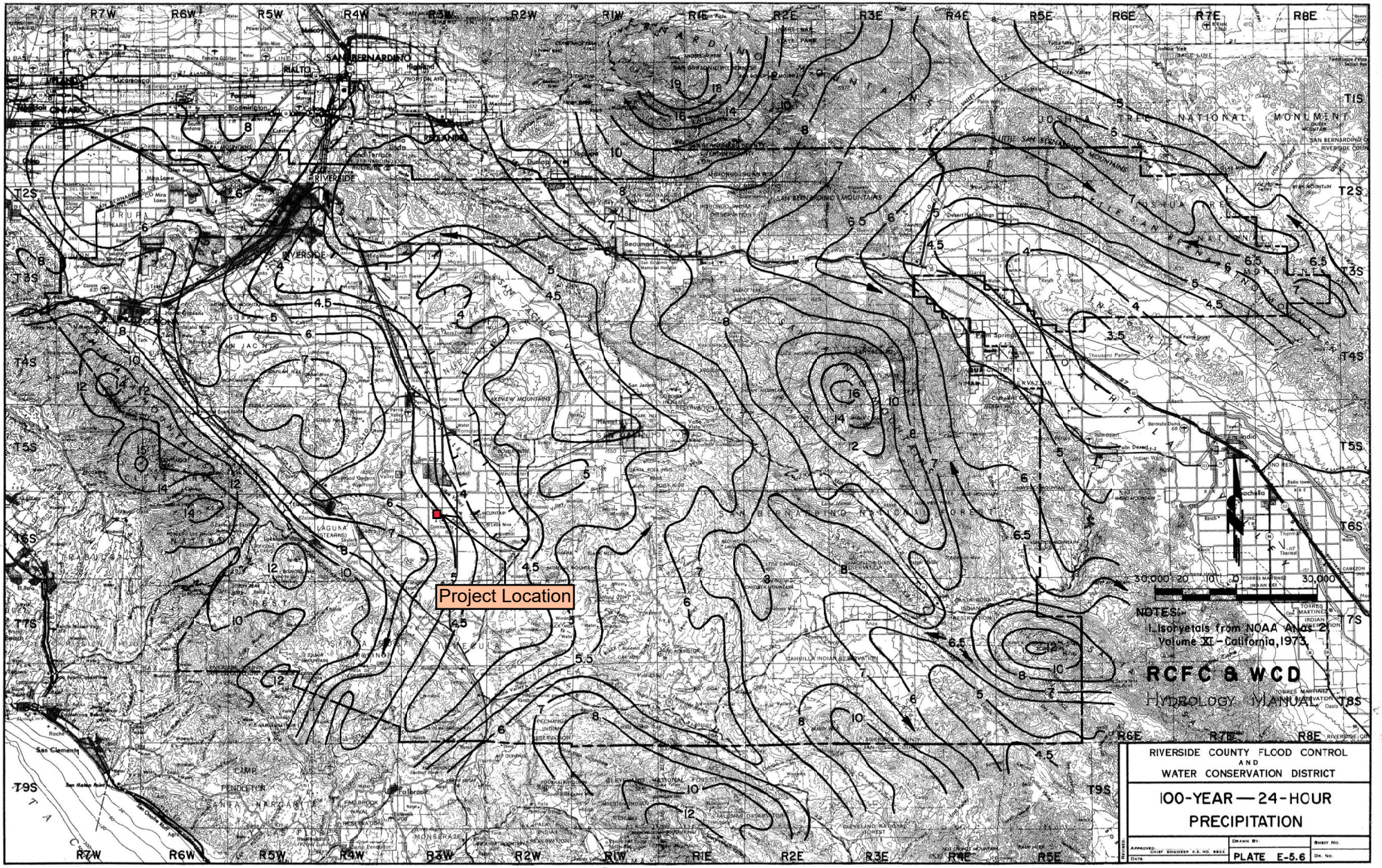
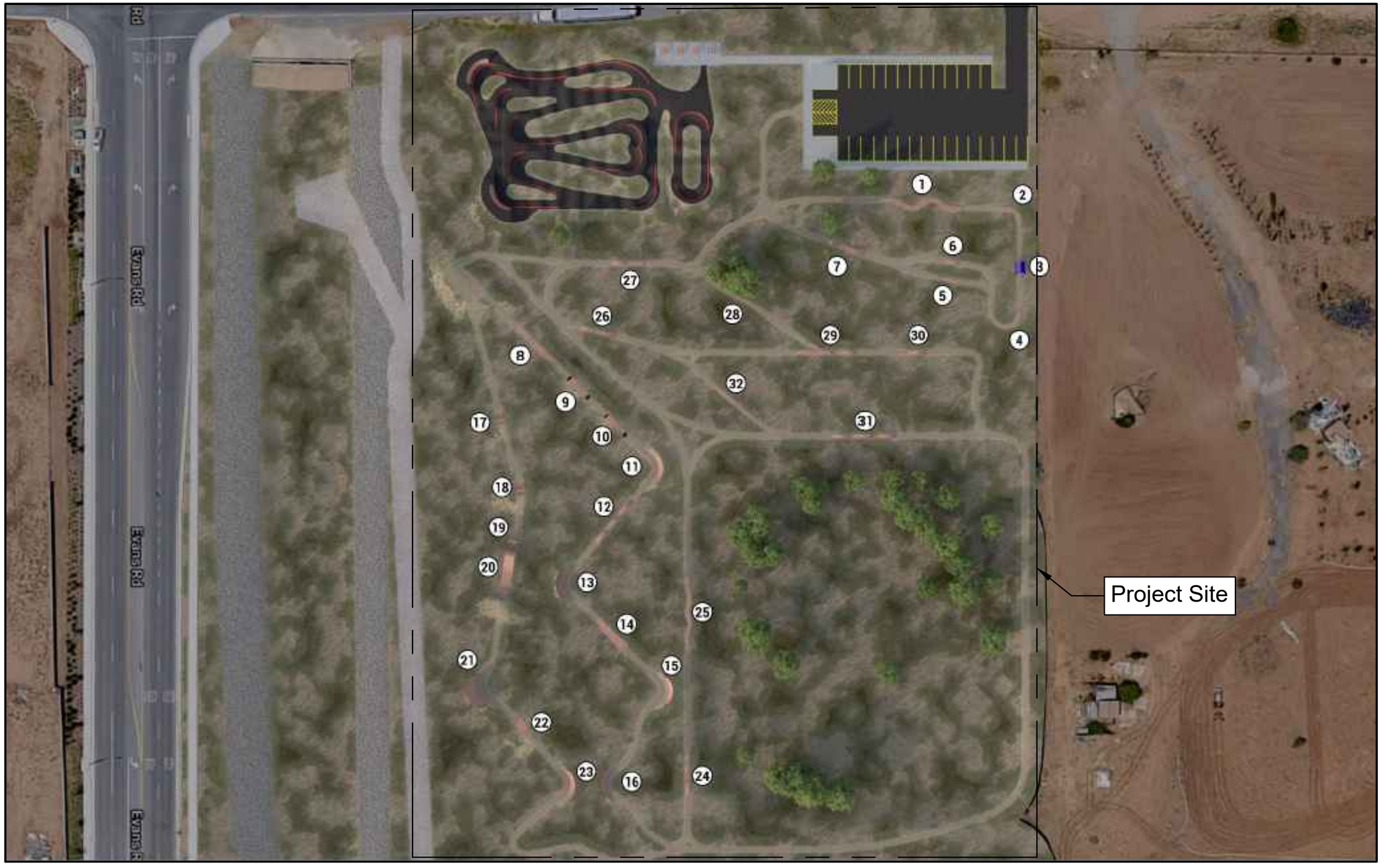
24+25	0.7394	0.00	Q	|	|	|	V|


Project Location
NOTES:
1. Isohyetals from NOAA Atlas 2, Volume XI - California, 1973.
RCFC & WCD
HYDROLOGY MANUAL
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
2-YEAR — 24-HOUR PRECIPITATION
PLATE E-5.5


Project Location
NOTES:
1. Isohyetals from NOAA Atlas 2, Volume XI - California, 1973.
RCFC & WCD
HYDROLOGY MANUAL
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
100-YEAR — 24-HOUR PRECIPITATION
PLATE E-5.6

APPENDIX E
PRELIMINARY SITE PLAN


Evans Rd
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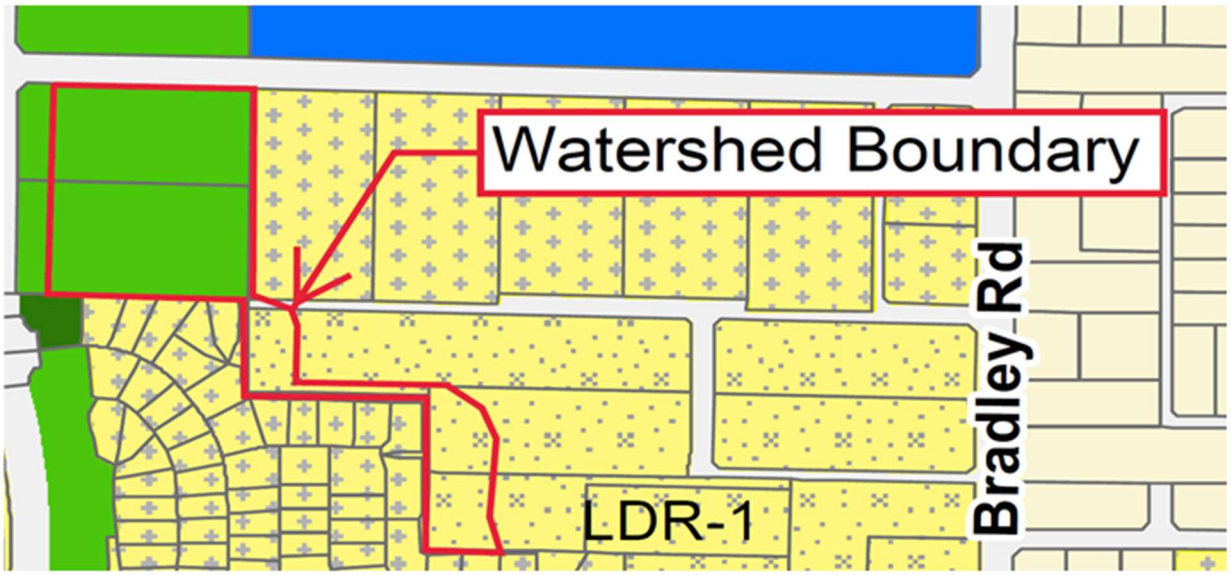
Project Site

APPENDIX F

EXCERPT FROM CITY OF MENIFEE ZONING MAP



Low Density Residential-1 (LDR-1) [10,000 SF]

Low Density Residential-2 (LDR-2) [7,200 SF]

Open Space-Recreation (OS-R)

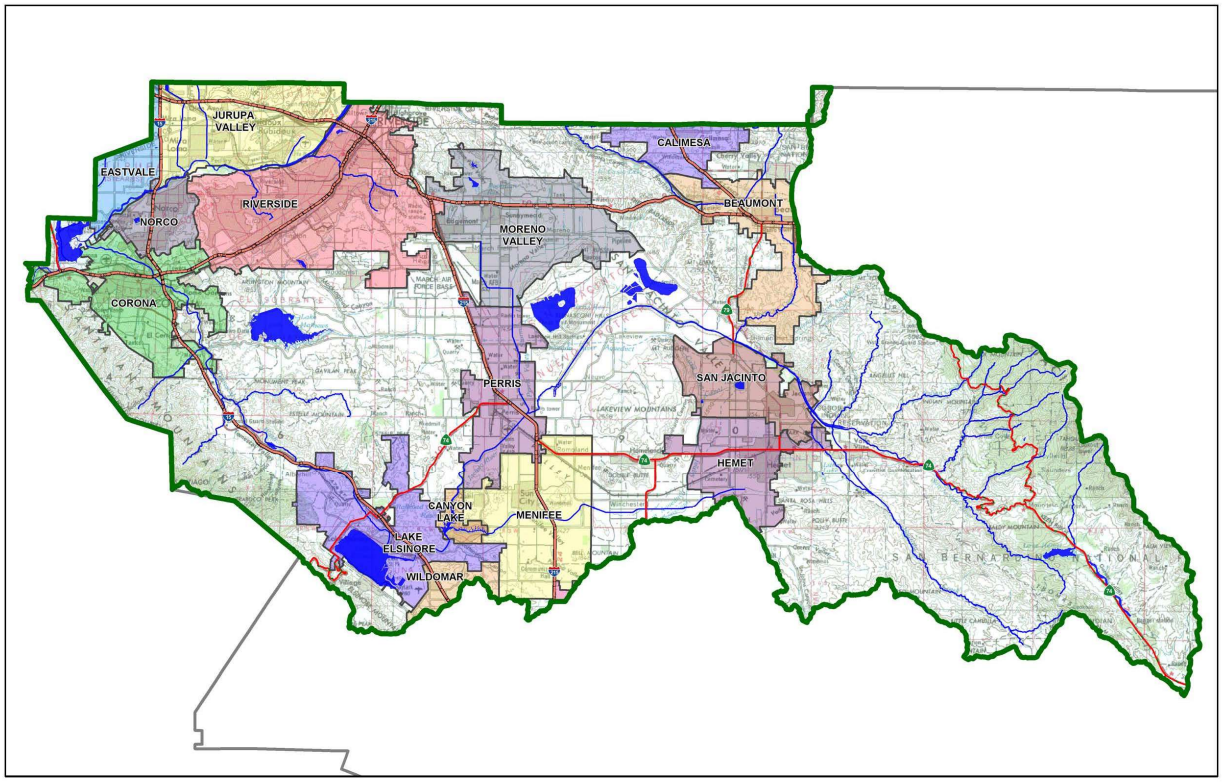
Project Specific Water Quality Management Plan

*A Template for Projects located within the **Santa Ana Watershed** Region of Riverside County*

Project Title: Evans Park Pump Track Site

Development No: Insert text here

Design Review/Case No: Insert text here



Contact Information:

Prepared for: City of Menifee

Prepared by: CValdo Corporation

☒ **Preliminary**
☐ **Final**

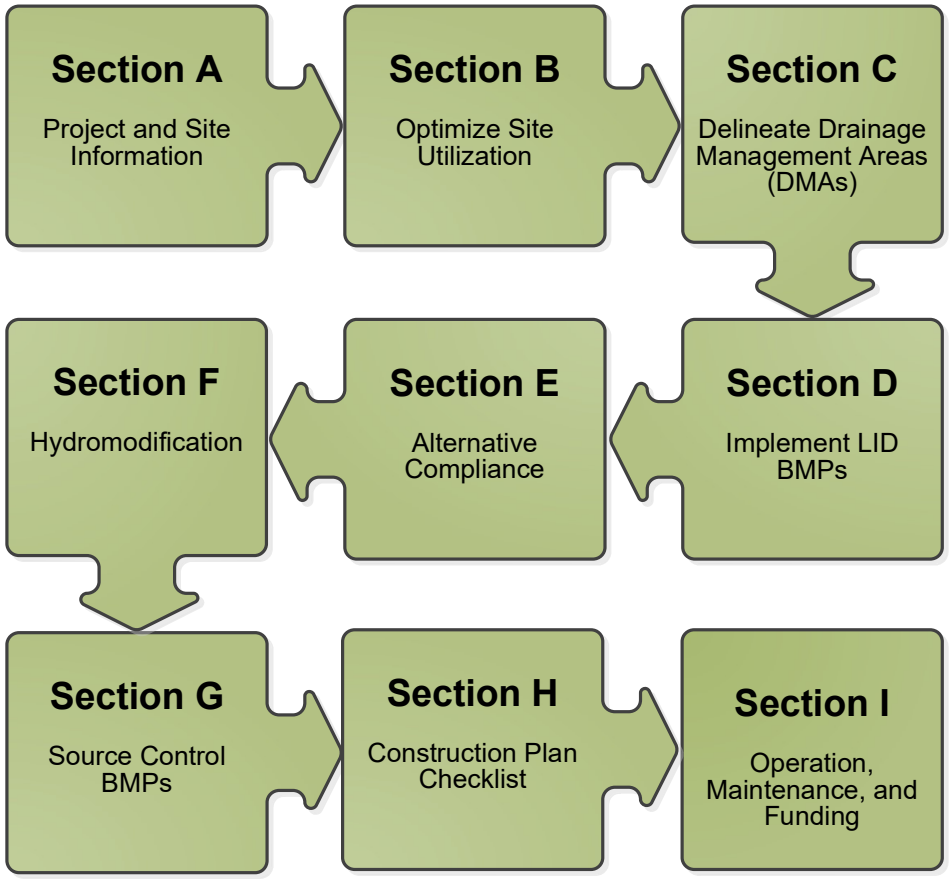
Original Date Prepared: November 3, 2021

Revision Date(s): N/A

Prepared for Compliance with
Regional Board Order No. **R8-2010-0033**

A Brief Introduction

This Project-Specific WQMP Template for the **Santa Ana Region** has been prepared to help guide you in documenting compliance for your project. Because this document has been designed to specifically document compliance, you will need to utilize the WQMP Guidance Document as your "how-to" manual to help guide you through this process. Both the Template and Guidance Document go hand-in-hand, and will help facilitate a well prepared Project-Specific WQMP. Below is a flowchart for the layout of this Template that will provide the steps required to document compliance.



OWNER'S CERTIFICATION

This Project-Specific Water Quality Management Plan (WQMP) has been prepared for The City of Menifee by CValdo Corporation for the Evans Park project.

This WQMP is intended to comply with the requirements of The City of Menifee for Municipal Code Section 15.01 which includes the requirement for the preparation and implementation of a Project-Specific WQMP.

The undersigned, while owning the property/project described in the preceding paragraph, shall be responsible for the implementation and funding of this WQMP and will ensure that this WQMP is amended as appropriate to reflect up-to-date conditions on the site. In addition, the property owner accepts responsibility for interim operation and maintenance of Stormwater BMPs until such time as this responsibility is formally transferred to a subsequent owner. This WQMP will be reviewed with the facility operator, facility supervisors, employees, tenants, maintenance and service contractors, or any other party (or parties) having responsibility for implementing portions of this WQMP. At least one copy of this WQMP will be maintained at the project site or project office in perpetuity. The undersigned is authorized to certify and to approve implementation of this WQMP. The undersigned is aware that implementation of this WQMP is enforceable under the City of Menifee Water Quality Ordinance (Municipal Code Section 15.01).

"I, the undersigned, certify under penalty of law that the provisions of this WQMP have been reviewed and accepted and that the WQMP will be transferred to future successors in interest."

Owner's Signature	Date
Owner's Printed Name	Owner's Title/Position

PREPARER'S CERTIFICATION

"The selection, sizing and design of stormwater treatment and other stormwater quality and quantity control measures in this plan meet the requirements of Regional Water Quality Control Board Order No. **R8-2010-0033** and any subsequent amendments thereto."

Preparer's Signature	Date
Preparer's Printed Name	Preparer's Title/Position

Preparer's Licensure:

Table of Contents

Section A: Project and Site Information 6

A.1 Maps and Site Plans 6
A.2 Identify Receiving Waters 7
A.3 Additional Permits/Approvals required for the Project: 7

Section B: Optimize Site Utilization (LID Principles) 8

Section C: Delineate Drainage Management Areas (DMAs) 9

Section D: Implement LID BMPs 11

D.1 Infiltration Applicability 11
D.2 Harvest and Use Assessment 12
D.3 Bioretention and Biotreatment Assessment 14
D.4 Feasibility Assessment Summaries 15
D.5 LID BMP Sizing 16

Section E: Alternative Compliance (LID Waiver Program) 17

E.1 Identify Pollutants of Concern 18
E.2 Stormwater Credits 19
E.3 Sizing Criteria 19
E.4 Treatment Control BMP Selection 20

Section F: Hydromodification 21

F.1 Hydrologic Conditions of Concern (HCOC) Analysis 21
F.2 HCOC Mitigation 22

Section G: Source Control BMPs 23

Section H: Construction Plan Checklist 25

Section I: Operation, Maintenance and Funding 26

List of Tables

Table A.1 Identification of Receiving Waters 7
Table A.2 Other Applicable Permits 7
Table C.1 DMA Classifications 9
Table C.2 Type 'A', Self-Treating Areas 9
Table C.3 Type 'B', Self-Retaining Areas 9
Table C.4 Type 'C', Areas that Drain to Self-Retaining Areas 10
Table C.5 Type 'D', Areas Draining to BMPs 10
Table D.1 Infiltration Feasibility 11
Table D.2 LID Prioritization Summary Matrix 15
Table D.3 DCV Calculations for LID BMPs 16
Table E.1 Potential Pollutants by Land Use Type 18
Table E.2 Water Quality Credits 19
Table E.3 Treatment Control BMP Sizing 19
Table E.4 Treatment Control BMP Selection 20
Table F.1 Hydrologic Conditions of Concern Summary 21
Table G.1 Permanent and Operational Source Control Measures 23
Table H.1 Construction Plan Cross-reference 25

List of Appendices

Appendix 1: Maps and Site Plans

Appendix 2: Construction Plans

Appendix 3: Soils Information

Appendix 4: Historical Site Conditions

Appendix 5: LID Infeasibility

Appendix 6: BMP Design Details

Appendix 7: Hydromodification

Appendix 8: Source Control

Appendix 9: O&M

Appendix 10: Educational Materials

Section A: Project and Site Information

PROJECT INFORMATION			
Type of Project:	Park Site		
Planning Area:	City of Menifee		
Community Name:	City of Menifee		
Development Name:	Evans Park		
PROJECT LOCATION			
Latitude & Longitude (DMS): 33°39'44.9"N, 117°11'45.5"W			
Project Watershed and Sub-Watershed: Santa Ana Watershed, San Jacinto River Sub-Watershed			
APN(s): 360190001, 360190002			
Map Book and Page No.: Insert text here			
PROJECT CHARACTERISTICS			
Proposed or Potential Land Use(s)	Park		
Proposed or Potential SIC Code(s)	7999		
Area of Impervious Project Footprint (SF)	*26,583		
Total Area of proposed Impervious Surfaces within the Project Limits (SF)/or Replacement	*26,583		
Does the project consist of offsite road improvements?	☐ Y	☒ N	
Does the project propose to construct unpaved roads?	☐ Y	☒ N	
Is the project part of a larger common plan of development (phased project)?	☐ Y	☒ N	
EXISTING SITE CHARACTERISTICS			
Total area of existing Impervious Surfaces within the project limits (SF)	0		
Is the project located within any MSHCP Criteria Cell?	☐ Y	☒ N	
If so, identify the Cell number:	N/A		
Are there any natural hydrologic features on the project site?	☒ Y	☐ N	
Is a Geotechnical Report attached?	☐ Y	☒ N	
If no Geotech. Report, list the NRCS soils type(s) present on the site (A, B, C and/or D)	C & D		
What is the Water Quality Design Storm Depth for the project?	0.59"		

A.1 Maps and Site Plans

When completing your Project-Specific WQMP, include a map of the local vicinity and existing site. In addition, include all grading, drainage, landscape/plant palette and other pertinent construction plans in Appendix 2. At a **minimum**, your WQMP Site Plan should include the following:

- Drainage Management Areas
- Proposed Structural BMPs
- Drainage Path
- Drainage Infrastructure, Inlets, Overflows
- Source Control BMPs
- Buildings, Roof Lines, Downspouts
- Impervious Surfaces
- Standard Labeling

Use your discretion on whether or not you may need to create multiple sheets or can appropriately accommodate these features on one or two sheets. Keep in mind that the Co-Permittee plan reviewer must be able to easily analyze your project utilizing this template and its associated site plans and maps.

*Can be reduced with the use of pervious pavement

A.2 Identify Receiving Waters

Using Table A.1 below, list in order of upstream to downstream, the receiving waters that the project site is tributary to. Continue to fill each row with the Receiving Water's 303(d) listed impairments (if any), designated beneficial uses, and proximity, if any, to a RARE beneficial use. Include a map of the receiving waters in Appendix 1.

Table A.1 Identification of Receiving Waters

Receiving Waters	EPA Approved 303(d) List Impairments	Designated Beneficial Uses	Proximity to RARE Beneficial Use
Evans Road Channel	N/A	N/A	N/A
Bradley Road Channel	N/A	N/A	N/A
Salt Creek Channel	N/A	N/A	N/A
Canyon Lake	Nutrients	MUN, AGR, GWR, REC1, REC2, COMM, WARM, WILD	N/A
San Jacinto River Reach 1	None	MUN, AGR, GWR, REC1, REC2, WARM, WILD, RARE	6 miles
Lake Elsinore	DDT (Dichlorodiphenyltrichloroethane), Nutrients, Organic Enrichment/Low Dissolved Oxygen, PCBs (Polychlorinated biphenyls), Toxicity	REC1, REC2, COMM, WARM, WILD, RARE, excepted from MUN	8 miles

A.3 Additional Permits/Approvals required for the Project:

Table A.2 Other Applicable Permits

Agency	Permit Required	
State Department of Fish and Game, 1602 Streambed Alteration Agreement	☒ Y	☐ N
State Water Resources Control Board, Clean Water Act (CWA) Section 401 Water Quality Cert.	☒ Y	☐ N
US Army Corps of Engineers, CWA Section 404 Permit	☒ Y	☐ N
US Fish and Wildlife, Endangered Species Act Section 7 Biological Opinion	☒ Y	☐ N
Statewide Construction General Permit Coverage	☒ Y	☐ N
Statewide Industrial General Permit Coverage	☐ Y	☒ N
Western Riverside MSHCP Consistency Approval (e.g., JPR, DBESP)	☒ Y	☐ N
Other *(please list in the space below as required)*	☐ Y	☒ N

If yes is answered to any of the questions above, the Co-Permittee may require proof of approval/coverage from those agencies as applicable including documentation of any associated requirements that may affect this Project-Specific WQMP.

Section B: Optimize Site Utilization (LID Principles)

Review of the information collected in Section 'A' will aid in identifying the principal constraints on site design and selection of LID BMPs as well as opportunities to reduce imperviousness and incorporate LID Principles into the site and landscape design. For example, **constraints** might include impermeable soils, high groundwater, groundwater pollution or contaminated soils, steep slopes, geotechnical instability, high-intensity land use, heavy pedestrian or vehicular traffic, utility locations or safety concerns. **Opportunities** might include existing natural areas, low areas, oddly configured or otherwise unbuildable parcels, easements and landscape amenities including open space and buffers (which can double as locations for bioretention BMPs), and differences in elevation (which can provide hydraulic head). Prepare a brief narrative for each of the site optimization strategies described below. This narrative will help you as you proceed with your LID design and explain your design decisions to others.

The 2010 Santa Ana MS4 Permit further requires that LID Retention BMPs (Infiltration Only or Harvest and Use) be used unless it can be shown that those BMPs are infeasible. Therefore, it is important that your narrative identify and justify if there are any constraints that would prevent the use of those categories of LID BMPs. Similarly, you should also note opportunities that exist which will be utilized during project design. Upon completion of identifying Constraints and Opportunities, include these on your WQMP Site plan in Appendix 1.

Site Optimization

The following questions are based upon Section 3.2 of the WQMP Guidance Document. Review of the WQMP Guidance Document will help you determine how best to optimize your site and subsequently identify opportunities and/or constraints, and document compliance.

Did you identify and preserve existing drainage patterns? If so, how? If not, why?

Yes. There will be minimal unnecessary site disturbance. Most of the site will remain in its natural condition. The existing basin in the southeast corner will be undisturbed.

Did you identify and protect existing vegetation? If so, how? If not, why?

Yes. The site is to be developed as a park. Large portions of the site will be kept in a natural condition preserving native plants.

Did you identify and preserve natural infiltration capacity? If so, how? If not, why?

Yes. It is anticipated that the existing infiltration capacity of the site will be low. However much of the site will remain in a natural condition which will allow continued infiltration.

Did you identify and minimize impervious area? If so, how? If not, why?

Yes. Approximately 90% of the site will remain in a natural condition. In addition pervious pavement may be incorporated in the final design of the onsite parking area.

Did you identify and disperse runoff to adjacent pervious areas? If so, how? If not, why?

Yes. Runoff from the paved areas will flow into a water quality basin where infiltration may occur.

Section C: Delineate Drainage Management Areas (DMAs)

Utilizing the procedure in Section 3.3 of the WQMP Guidance Document which discusses the methods of delineating and mapping your project site into individual DMAs, complete Table C.1 below to appropriately categorize the types of classification (e.g., Type A, Type B, etc.) per DMA for your project site. Upon completion of this table, this information will then be used to populate and tabulate the corresponding tables for their respective DMA classifications.

Table C.1 DMA Classifications

DMA Name or ID	Surface Type(s)[1]	Area (Sq. Ft.)	DMA Type
DMA 1	Concrete or Asphalt;	31,757	Type D
DMA 2	Natural (C Soil); Natural (D Soil)	252,530	Type A

[1]*Reference Table 2-1 in the WQMP Guidance Document to populate this column*

Table C.2 Type 'A', Self-Treating Areas

DMA Name or ID	Area (Sq. Ft.)	Stabilization Type	Irrigation Type (if any)
DMA 2	252,530	Natural/existing vegetation	None

Table C.3 Type 'B', Self-Retaining Areas

Self-Retaining Area				**Type 'C' DMAs that are draining to the Self-Retaining Area**		
DMA Name/ ID	Post-project surface type	Area (square feet) [A]	Storm Depth (inches) [B]	DMA Name / ID	[C] from Table C.4 = [C]	Required Retention Depth (inches) [D]
N/A						

$$[D] = [B] + \frac{[B] \cdot [C]}{[A]}$$

Table C.4 Type 'C', Areas that Drain to Self-Retaining Areas

DMA					Receiving Self-Retaining DMA		
DMA Name/ ID	Area (square feet)	Post-project surface type	Runoff factor	Product		Area (square feet)	Ratio
	[A]		[B]	[C] = [A] x [B]	DMA name /ID	[D]	[C]/[D]
N/A							

Table C.5 Type 'D', Areas Draining to BMPs

DMA Name or ID	BMP Name or ID
DMA 1	Basin 1

Note: More than one drainage management area can drain to a single LID BMP, however, one drainage management area may not drain to more than one BMP.

Section D: Implement LID BMPs

D.1 Infiltration Applicability

Is there an approved downstream 'Highest and Best Use' for stormwater runoff (see discussion in Chapter 2.4.4 of the WQMP Guidance Document for further details)? ☐ Y ☒ N

(It is noted that Lake Elsinore is evaporating faster than natural precipitation can recharge it. However no revision to LID requirements in the watershed has been approved.) If yes has been checked, Infiltration BMPs shall not be used for the site. If no, continue working through this section to implement your LID BMPs. It is recommended that you contact your Co-Permittee to verify whether or not your project discharges to an approved downstream 'Highest and Best Use' feature.

Geotechnical Report

A Geotechnical Report or Phase I Environmental Site Assessment may be required by the Copermittee to confirm present and past site characteristics that may affect the use of Infiltration BMPs. In addition, the Co-Permittee, at their discretion, may not require a geotechnical report for small projects as described in Chapter 2 of the WQMP Guidance Document. If a geotechnical report has been prepared, include it in Appendix 3. In addition, if a Phase I Environmental Site Assessment has been prepared, include it in Appendix 4.

Is this project classified as a small project consistent with the requirements of Chapter 2 of the WQMP Guidance Document? ☒ Y ☐ N

Infiltration Feasibility

Table D.1 below is meant to provide a simple means of assessing which DMAs on your site support Infiltration BMPs and is discussed in the WQMP Guidance Document in Chapter 2.4.5. Check the appropriate box for each question and then list affected DMAs as applicable. If additional space is needed, add a row below the corresponding answer.

Table D.1 Infiltration Feasibility

*(Table D.1 is not being used as a soils report has not been prepared for this Preliminary WQMP)

Does the project site…	YES	NO
…have any DMAs with a seasonal high groundwater mark shallower than 10 feet?	*	*
If Yes, list affected DMAs:	*	*
…have any DMAs located within 100 feet of a water supply well?	*	*
If Yes, list affected DMAs:	*	*
…have any areas identified by the geotechnical report as posing a public safety risk where infiltration of stormwater could have a negative impact?	*	*
If Yes, list affected DMAs:	*	*
…have measured in-situ infiltration rates of less than 1.6 inches / hour?	*	*
If Yes, list affected DMAs:	*	*
…have significant cut and/or fill conditions that would preclude in-situ testing of infiltration rates at the final infiltration surface?	*	*
If Yes, list affected DMAs:	*	*
…geotechnical report identify other site-specific factors that would preclude effective and safe infiltration?	*	*
Describe here:	*	*

If you answered "Yes" to any of the questions above for any DMA, Infiltration BMPs should not be used for those DMAs and you should proceed to the assessment for Harvest and Use below.

D.2 Harvest and Use Assessment

Please check what applies*:*

☐ Reclaimed water will be used for the non-potable water demands for the project.

☐Downstream water rights may be impacted by Harvest and Use as approved by the Regional Board (verify with the Copermittee).

☐The Design Capture Volume will be addressed using Infiltration Only BMPs. In such a case, Harvest and Use BMPs are still encouraged, but it would not be required if the Design Capture Volume will be infiltrated or evapotranspired.

If any of the above boxes have been checked, Harvest and Use BMPs need not be assessed for the site. If neither of the above criteria applies, follow the steps below to assess the feasibility of irrigation use, toilet use and other non-potable uses (e.g., industrial use).

Irrigation Use Feasibility

Complete the following steps to determine the feasibility of harvesting stormwater runoff for Irrigation Use BMPs on your site:

Step 1: Identify the total area of irrigated landscape on the site, and the type of landscaping used.

Total Area of Irrigated Landscape: 0 acres

Type of Landscaping (Conservation Design or Active Turf): Conservation design

Step 2: Identify the planned total of all impervious areas on the proposed project from which runoff might be feasibly captured and stored for irrigation use. Depending on the configuration of buildings and other impervious areas on the site, you may consider the site as a whole, or parts of the site, to evaluate reasonable scenarios for capturing and storing runoff and directing the stored runoff to the potential use(s) identified in Step 1 above.

Total Area of Impervious Surfaces: 0.73 acres

Step 3: Cross reference the Design Storm depth for the project site (see Exhibit A of the WQMP Guidance Document) with the left column of Table 2-3 in Chapter 2 to determine the minimum area of Effective Irrigated Area per Tributary Impervious Area (EIATIA).

Enter your EIATIA factor: 0.79

Step 4: Multiply the unit value obtained from Step 3 by the total of impervious areas from Step 2 to develop the minimum irrigated area that would be required.

Minimum required irrigated area: 0.58 acres

Step 5: Determine if harvesting stormwater runoff for irrigation use is feasible for the project by comparing the total area of irrigated landscape (Step 1) to the minimum required irrigated area (Step 4).

Minimum required irrigated area (Step 4)	Available Irrigated Landscape (Step 1)
0.58 acres	0 acres

Toilet Use Feasibility

Complete the following steps to determine the feasibility of harvesting stormwater runoff for toilet flushing uses on your site:

Step 1: Identify the projected total number of daily toilet users during the wet season, and account for any periodic shut downs or other lapses in occupancy:

Projected Number of Daily Toilet Users: 50 - estimated for Preliminary WQMP

Project Type: Commercial/Park

Step 2: Identify the planned total of all impervious areas on the proposed project from which runoff might be feasibly captured and stored for toilet use. Depending on the configuration of buildings and other impervious areas on the site, you may consider the site as a whole, or parts of the site, to evaluate reasonable scenarios for capturing and storing runoff and directing the stored runoff to the potential use(s) identified in Step 1 above.

Total Area of Impervious Surfaces: 0.73 acres

Step 3: Enter the Design Storm depth for the project site (see Exhibit A) into the left column of Table 2-1 in Chapter 2 to determine the minimum number or toilet users per tributary impervious acre (TUTIA).

Enter your TUTIA factor: 132

Step 4: Multiply the unit value obtained from Step 3 by the total of impervious areas from Step 2 to develop the minimum number of toilet users that would be required.

Minimum number of toilet users: 96

Step 5: Determine if harvesting stormwater runoff for toilet flushing use is feasible for the project by comparing the Number of Daily Toilet Users (Step 1) to the minimum required number of toilet users (Step 4).

Minimum required Toilet Users (Step 4)	Projected number of toilet users (Step 1)
96	50

Other Non-Potable Use Feasibility

Are there other non-potable uses for stormwater runoff on the site (e.g. industrial use)? See Chapter 2 of the Guidance for further information. If yes, describe below. If no, write N/A.

N/A

Step 1: Identify the projected average daily non-potable demand, in gallons per day, during the wet season and accounting for any periodic shut downs or other lapses in occupancy or operation.

Average Daily Demand: Projected Average Daily Use (gpd)

Step 2: Identify the planned total of all impervious areas on the proposed project from which runoff might be feasibly captured and stored for the identified non-potable use. Depending on the configuration of buildings and other impervious areas on the site, you may consider the site as a whole, or parts of the site, to evaluate reasonable scenarios for capturing and storing runoff and directing the stored runoff to the potential use(s) identified in Step 1 above.

Total Area of Impervious Surfaces: Insert Area (Acres)

Step 3: Enter the Design Storm depth for the project site (see Exhibit A) into the left column of Table 2-3 in Chapter 2 to determine the minimum demand for non-potable uses per tributary impervious acre.

Enter the factor from Table 2-3: Enter Value

Step 4: Multiply the unit value obtained from Step 4 by the total of impervious areas from Step 3 to develop the minimum number of gallons per day of non-potable use that would be required.

Minimum required use: Minimum use required (gpd)

Step 5: Determine if harvesting stormwater runoff for other non-potable use is feasible for the project by comparing the Number of Daily Toilet Users (Step 1) to the minimum required number of toilet users (Step 4).

Minimum required non-potable use (Step 4)	**Projected average daily use (Step 1)**
Minimum use required (gpd)	Projected Average Daily Use (gpd)

If Irrigation, Toilet and Other Use feasibility anticipated demands are less than the applicable minimum values, Harvest and Use BMPs are not required and you should proceed to utilize LID Bioretention and Biotreatment, unless a site-specific analysis has been completed that demonstrates technical infeasibility as noted in D.3 below.

D.3 Bioretention and Biotreatment Assessment

Other LID Bioretention and Biotreatment BMPs as described in Chapter 2.4.7 of the WQMP Guidance Document are feasible on nearly all development sites with sufficient advance planning.

Select one of the following:

☒ LID Bioretention/Biotreatment BMPs will be used for some or all DMAs of the project as noted below in Section D.4 (note the requirements of Section 3.4.2 in the WQMP Guidance Document).

☐ A site-specific analysis demonstrating the technical infeasibility of all LID BMPs has been performed and is included in Appendix 5. If you plan to submit an analysis demonstrating the technical infeasibility of LID BMPs, request a pre-submittal meeting with the Copermittee to discuss this option. Proceed to Section E to document your alternative compliance measures.

D.4 Feasibility Assessment Summaries

From the Infiltration, Harvest and Use, Bioretention and Biotreatment Sections above, complete Table D.2 below to summarize which LID BMPs are technically feasible, and which are not, based upon the established hierarchy.

Table D.2 LID Prioritization Summary Matrix

DMA Name/ID	LID BMP Hierarchy				No LID (Alternative Compliance)
	1. Infiltration	2. Harvest and use	3. Bioretention	4. Biotreatment	
DMA 1	☐	☐	☒	☐	☐
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐

For those DMAs where LID BMPs are not feasible, provide a brief narrative below summarizing why they are not feasible, include your technical infeasibility criteria in Appendix 5, and proceed to Section E below to document Alternative Compliance measures for those DMAs. Recall that each proposed DMA must pass through the LID BMP hierarchy before alternative compliance measures may be considered.

Insert narrative description here.

D.5 LID BMP Sizing

Each LID BMP must be designed to ensure that the Design Capture Volume will be addressed by the selected BMPs. First**,** calculate the Design Capture Volume for each LID BMP using the V_{BMP} worksheet in Appendix F of the LID BMP Design Handbook. Second**,** design the LID BMP to meet the required V_{BMP} using a method approved by the Copermittee. Utilize the worksheets found in the LID BMP Design Handbook or consult with your Copermittee to assist you in correctly sizing your LID BMPs. Complete Table D.3 below to document the Design Capture Volume and the Proposed Volume for each LID BMP. Provide the completed design procedure sheets for each LID BMP in Appendix 6. You may add additional rows to the table below as needed.

Table D.3 DCV Calculations for LID BMPs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Basin 1*		
	[A]		[B]	[C]	[A] x [C]			
DMA 1	*31,757*	*Concrete or Asphalt*	*1*	*0.89*	*28,327.2*	*Design Storm Depth (in)*	*Design Capture Volume,* $\mathbf{V_{BMP}}$ *(cubic feet)*	*Proposed Volume on Plans (cubic feet)*
	31,757				28,327.2	0.59	1,392.8	***1,392.8***

[B], [C] is obtained as described in Section 2.3.1 of the WQMP Guidance Document

[E] is obtained from Exhibit A in the WQMP Guidance Document

[G] is obtained from a design procedure sheet, such as in LID BMP Design Handbook and placed in Appendix 6

Section E: Alternative Compliance (LID Waiver Program)

LID BMPs are expected to be feasible on virtually all projects. Where LID BMPs have been demonstrated to be infeasible as documented in Section D, other Treatment Control BMPs must be used (subject to LID waiver approval by the Copermittee). Check one of the following Boxes:

☒ LID Principles and LID BMPs have been incorporated into the site design to fully address all Drainage Management Areas. No alternative compliance measures are required for this project and thus this Section is not required to be completed.

- *Or* -

☐ The following Drainage Management Areas are unable to be addressed using LID BMPs. A site-specific analysis demonstrating technical infeasibility of LID BMPs has been approved by the Co-Permittee and included in Appendix 5. Additionally, no downstream regional and/or sub-regional LID BMPs exist or are available for use by the project. The following alternative compliance measures on the following pages are being implemented to ensure that any pollutant loads expected to be discharged by not incorporating LID BMPs, are fully mitigated.

List DMAs here.

E.1 Identify Pollutants of Concern

Utilizing Table A.1 from Section A above which noted your project's receiving waters and their associated EPA approved 303(d) listed impairments, cross reference this information with that of your selected Priority Development Project Category in Table E.1 below. If the identified General Pollutant Categories are the same as those listed for your receiving waters, then these will be your Pollutants of Concern and the appropriate box or boxes will be checked on the last row. The purpose of this is to document compliance and to help you appropriately plan for mitigating your Pollutants of Concern in lieu of implementing LID BMPs.

Table E.1 Potential Pollutants by Land Use Type

Priority Development Project Categories and/or Project Features (check those that apply)	General Pollutant Categories							
	Bacterial Indicators	Metals	Nutrients	Pesticides	Toxic Organic Compounds	Sediments	Trash & Debris	Oil & Grease
☐ Detached Residential Development	P	N	P	P	N	P	P	P
☐ Attached Residential Development	P	N	P	P	N	P	P	P(2)
☐ Commercial/Industrial Development	P(3)	P	P(1)	P(1)	P(5)	P(1)	P	P
☐ Automotive Repair Shops	N	P	N	N	P(4, 5)	N	P	P
☐ Restaurants (>5,000 ft^2)	P	N	N	N	N	N	P	P
☐ Hillside Development (>5,000 ft^2)	P	N	P	P	N	P	P	P
☐ Parking Lots (>5,000 ft^2)	P(6)	P	P(1)	P(1)	P(4)	P(1)	P	P
☐ Retail Gasoline Outlets	N	P	N	N	P	N	P	P
Project Priority Pollutant(s) of Concern	☐	☐	☐	☐	☐	☐	☐	☐

P = Potential

N = Not Potential

(1) A potential Pollutant if non-native landscaping exists or is proposed onsite; otherwise not expected

(2) A potential Pollutant if the project includes uncovered parking areas; otherwise not expected

(3) A potential Pollutant is land use involving animal waste

(4) Specifically petroleum hydrocarbons

(5) Specifically solvents

(6) Bacterial indicators are routinely detected in pavement runoff

E.2 Stormwater Credits

Projects that cannot implement LID BMPs but nevertheless implement smart growth principles are potentially eligible for Stormwater Credits. Utilize Table 3-8 within the WQMP Guidance Document to identify your Project Category and its associated Water Quality Credit. If not applicable, write N/A.

Table E.2 Water Quality Credits

Qualifying Project Categories	Credit Percentage[2]
Total Credit Percentage[1]	

[1]*Cannot Exceed 50%*
[2]*Obtain corresponding data from Table 3-8 in the WQMP Guidance Document*

E.3 Sizing Criteria

After you appropriately considered Stormwater Credits for your project, utilize Table E.3 below to appropriately size them to the DCV, or Design Flow Rate, as applicable. Please reference Chapter 3.5.2 of the WQMP Guidance Document for further information.

Table E.3 Treatment Control BMP Sizing

DMA Type/ID	**DMA Area (square feet)**	**Post-Project Surface Type**	**Effective Impervious Fraction, I_f**	**DMA Runoff Factor**	**DMA Area x Runoff Factor**		***Enter BMP Name / Identifier Here***		
	[A]		[B]	[C]	[A] x [C]				
						Design Storm Depth (in)	*Minimum Design Capture Volume or Design Flow Rate (cubic feet or cfs)*	*Total Storm Water Credit % Reduction*	*Proposed Volume or Flow on Plans (cubic feet or cfs)*
	A_T = Σ[A]				Σ= [D]	[E]	$[F] = \frac{[D]x[E]}{[G]}$	[F] X (1-[H])	[I]

[B], [C] is obtained as described in Section 2.3.1 from the WQMP Guidance Document
[E] is obtained from Exhibit A in the WQMP Guidance Document
[G] is for Flow-Based Treatment Control BMPs [G] = 43,560, for Volume-Based Control Treatment BMPs, [G] = 12
[H] is from the Total Credit Percentage as Calculated from Table E.2 above
[I] as obtained from a design procedure sheet from the BMP manufacturer and should be included in Appendix 6

E.4 Treatment Control BMP Selection

Treatment Control BMPs typically provide proprietary treatment mechanisms to treat potential pollutants in runoff, but do not sustain significant biological processes. Treatment Control BMPs must have a removal efficiency of a medium or high effectiveness as quantified below:

- **High**: equal to or greater than 80% removal efficiency
- **Medium**: between 40% and 80% removal efficiency

Such removal efficiency documentation (e.g., studies, reports, etc.) as further discussed in Chapter 3.5.2 of the WQMP Guidance Document, must be included in Appendix 6. In addition, ensure that proposed Treatment Control BMPs are properly identified on the WQMP Site Plan in Appendix 1.

Table E.4 Treatment Control BMP Selection

Selected Treatment Control BMP Name or ID[1]	Priority Pollutant(s) of Concern to Mitigate[2]	Removal Efficiency Percentage[3]

[1] Treatment Control BMPs must not be constructed within Receiving Waters. In addition, a proposed Treatment Control BMP may be listed more than once if they possess more than one qualifying pollutant removal efficiency.

[2] Cross Reference Table E.1 above to populate this column.

[3] As documented in a Co-Permittee Approved Study and provided in Appendix 6.

Section F: Hydromodification

F.1 Hydrologic Conditions of Concern (HCOC) Analysis

Once you have determined that the LID design is adequate to address water quality requirements, you will need to assess if the proposed LID Design may still create a HCOC. Review Chapters 2 and 3 (including Figure 3-7) of the WQMP Guidance Document to determine if your project must mitigate for Hydromodification impacts. If your project meets one of the following criteria which will be indicated by the check boxes below, you do not need to address Hydromodification at this time. However, if the project does not qualify for Exemptions 1, 2 or 3, then additional measures must be added to the design to comply with HCOC criteria. This is discussed in further detail below in Section F.2.

HCOC EXEMPTION 1: The Priority Development Project disturbs less than one acre. The Copermittee has the discretion to require a Project-Specific WQMP to address HCOCs on projects less than one acre on a case by case basis. The disturbed area calculation should include all disturbances associated with larger common plans of development.

Does the project qualify for this HCOC Exemption? ☐ Y ☒ N

If Yes, HCOC criteria do not apply.

HCOC EXEMPTION 2: The volume and time of concentration[1] of storm water runoff for the post-development condition is not significantly different from the pre-development condition for a 2-year return frequency storm (a difference of 5% or less is considered insignificant) using one of the following methods to calculate:

- Riverside County Hydrology Manual
- Technical Release 55 (TR-55): Urban Hydrology for Small Watersheds (NRCS 1986), or derivatives thereof, such as the Santa Barbara Urban Hydrograph Method
- Other methods acceptable to the Co-Permittee

Does the project qualify for this HCOC Exemption? ☐ Y ☒ N

If Yes, report results in Table F.1 below and provide your substantiated hydrologic analysis in Appendix 7.

Table F.1 Hydrologic Conditions of Concern Summary

	2 year – 24 hour		
	Pre-condition	**Post-condition**	**% Difference**
Time of Concentration	INSERT VALUE	INSERT VALUE	INSERT VALUE
Volume (Cubic Feet)	INSERT VALUE	INSERT VALUE	INSERT VALUE

[1] Time of concentration is defined as the time after the beginning of the rainfall when all portions of the drainage basin are contributing to flow at the outlet.

HCOC EXEMPTION 3: All downstream conveyance channels to an adequate sump (for example, Prado Dam, Lake Elsinore, Canyon Lake, Santa Ana River, or other lake, reservoir or naturally erosion resistant feature) that will receive runoff from the project are engineered and regularly maintained to ensure design flow capacity; no sensitive stream habitat areas will be adversely affected; or are not identified on the Co-Permittees Hydromodification Sensitivity Maps.

Does the project qualify for this HCOC Exemption? ☐ Y ☒ N

If Yes, HCOC criteria do not apply and note below which adequate sump applies to this HCOC qualifier:

INSERT TEXT HERE

F.2 HCOC Mitigation*

If none of the above HCOC Exemption Criteria are applicable, HCOC criteria is considered mitigated if they meet one of the following conditions:

a. Additional LID BMPS are implemented onsite or offsite to mitigate potential erosion or habitat impacts as a result of HCOCs. This can be conducted by an evaluation of site-specific conditions utilizing accepted professional methodologies published by entities such as the California Stormwater Quality Association (CASQA), the Southern California Coastal Water Research Project (SCCRWP), or other Co-Permittee approved methodologies for site-specific HCOC analysis.

b. The project is developed consistent with an approved Watershed Action Plan that addresses HCOC in Receiving Waters.

c. Mimicking the pre-development hydrograph with the post-development hydrograph, for a 2-year return frequency storm. Generally, the hydrologic conditions of concern are not significant, if the post-development hydrograph is no more than 10% greater than pre-development hydrograph. In cases where excess volume cannot be infiltrated or captured and reused, discharge from the site must be limited to a flow rate no greater than 110% of the pre-development 2-year peak flow.

   *The unit hydrograph calculations in Appendix 7 demonstrate that the post-development hydrograph is less than 10% greater than the pre-development hydrograph with no detention basin routing required.

Be sure to include all pertinent documentation used in your analysis of the items a, b or c in Appendix 7.

Section G: Source Control BMPs

Source control BMPs include permanent, structural features that may be required in your project plans — such as roofs over and berms around trash and recycling areas — and Operational BMPs, such as regular sweeping and "housekeeping", that must be implemented by the site's occupant or user. The MEP standard typically requires both types of BMPs. In general, Operational BMPs cannot be substituted for a feasible and effective permanent BMP. Using the Pollutant Sources/Source Control Checklist in Appendix 8, review the following procedure to specify Source Control BMPs for your site:

1. ***Identify Pollutant Sources*:** Review Column 1 in the Pollutant Sources/Source Control Checklist. Check off the potential sources of Pollutants that apply to your site.

2. ***Note Locations on Project-Specific WQMP Exhibit*:** Note the corresponding requirements listed in Column 2 of the Pollutant Sources/Source Control Checklist. Show the location of each Pollutant source and each permanent Source Control BMP in your Project-Specific WQMP Exhibit located in Appendix 1.

3. ***Prepare a Table and Narrative*:** Check off the corresponding requirements listed in Column 3 in the Pollutant Sources/Source Control Checklist. In the left column of Table G.1 below, list each potential source of runoff Pollutants on your site (from those that you checked in the Pollutant Sources/Source Control Checklist). In the middle column, list the corresponding permanent, Structural Source Control BMPs (from Columns 2 and 3 of the Pollutant Sources/Source Control Checklist) used to prevent Pollutants from entering runoff. **Add additional narrative** in this column that explains any special features, materials or methods of construction that will be used to implement these permanent, Structural Source Control BMPs.

4. ***Identify Operational Source Control BMPs:*** To complete your table, refer once again to the Pollutant Sources/Source Control Checklist. List in the right column of your table the Operational BMPs that should be implemented as long as the anticipated activities continue at the site. Copermittee stormwater ordinances require that applicable Source Control BMPs be implemented; the same BMPs may also be required as a condition of a use permit or other revocable Discretionary Approval for use of the site.

Table G.1 Permanent and Operational Source Control Measures

Potential Sources of Runoff pollutants	Permanent Structural Source Control BMPs	Operational Source Control BMPs
On-site storm drain inlets	Stencil inlets	Inlet cleaning and repaint stenciling when necessary
Landscape/outdoor pesticide use	Design landscaping to minimize runoff and preserve existing native ground cover when possible	Avoid use of pesticides to the maximum extent practicable
Refuse areas	Signage restricting hazardous materials. Provide covers for all receptacles.	Provide adequate number of receptacles. Inspect receptacles regularly; repair or replace leaky receptacles. Keep receptacles covered. Prohibit/prevent

		dumping of liquid or hazardous wastes. Post “no hazardous materials” signs. Inspect and pick up litter daily and clean up spills immediately. Keep spill control materials available on-site.
Plazas, sidewalks, and parking lots		Sweep plazas, sidewalks, and parking lots regularly to prevent accumulation of litter and debris. Collect debris from pressure washing to prevent entry into the storm drain system. Collect washwater containing any cleaning agent or degreaser and discharge to the sanitary sewer not to a storm drain.

Section H: Construction Plan Checklist

Populate Table H.1 below to assist the plan checker in an expeditious review of your project. The first two columns will contain information that was prepared in previous steps, while the last column will be populated with the corresponding plan sheets. This table is to be completed with the submittal of your final Project-Specific WQMP.

Table will be completed at Final WQMP phase.

Table H.1 Construction Plan Cross-reference

BMP No. or ID	BMP Identifier and Description	Corresponding Plan Sheet(s)

Note that the updated table — or Construction Plan WQMP Checklist — is **only a reference tool** to facilitate an easy comparison of the construction plans to your Project-Specific WQMP. Co-Permittee staff can advise you regarding the process required to propose changes to the approved Project-Specific WQMP.

Section I: Operation, Maintenance and Funding

The Copermittee will periodically verify that Stormwater BMPs on your site are maintained and continue to operate as designed. To make this possible, your Copermittee will require that you include in Appendix 9 of this Project-Specific WQMP:

1. A means to finance and implement facility maintenance in perpetuity, including replacement cost.
2. Acceptance of responsibility for maintenance from the time the BMPs are constructed until responsibility for operation and maintenance is legally transferred. A warranty covering a period following construction may also be required.
3. An outline of general maintenance requirements for the Stormwater BMPs you have selected.
4. Figures delineating and designating pervious and impervious areas, location, and type of Stormwater BMP, and tables of pervious and impervious areas served by each facility. Geo-locating the BMPs using a coordinate system of latitude and longitude is recommended to help facilitate a future statewide database system.
5. A separate list and location of self-retaining areas or areas addressed by LID Principles that do not require specialized O&M or inspections but will require typical landscape maintenance as noted in Chapter 5, pages 85-86, in the WQMP Guidance. Include a brief description of typical landscape maintenance for these areas.

Your local Co-Permittee will also require that you prepare and submit a detailed Stormwater BMP Operation and Maintenance Plan that sets forth a maintenance schedule for each of the Stormwater BMPs built on your site. An agreement assigning responsibility for maintenance and providing for inspections and certification may also be required.

Details of these requirements and instructions for preparing a Stormwater BMP Operation and Maintenance Plan are in Chapter 5 of the WQMP Guidance Document.

Maintenance Mechanism: The City of Menifee is anticipated to maintain the park.

Will the proposed BMPs be maintained by a Home Owners' Association (HOA) or Property Owners Association (POA)?

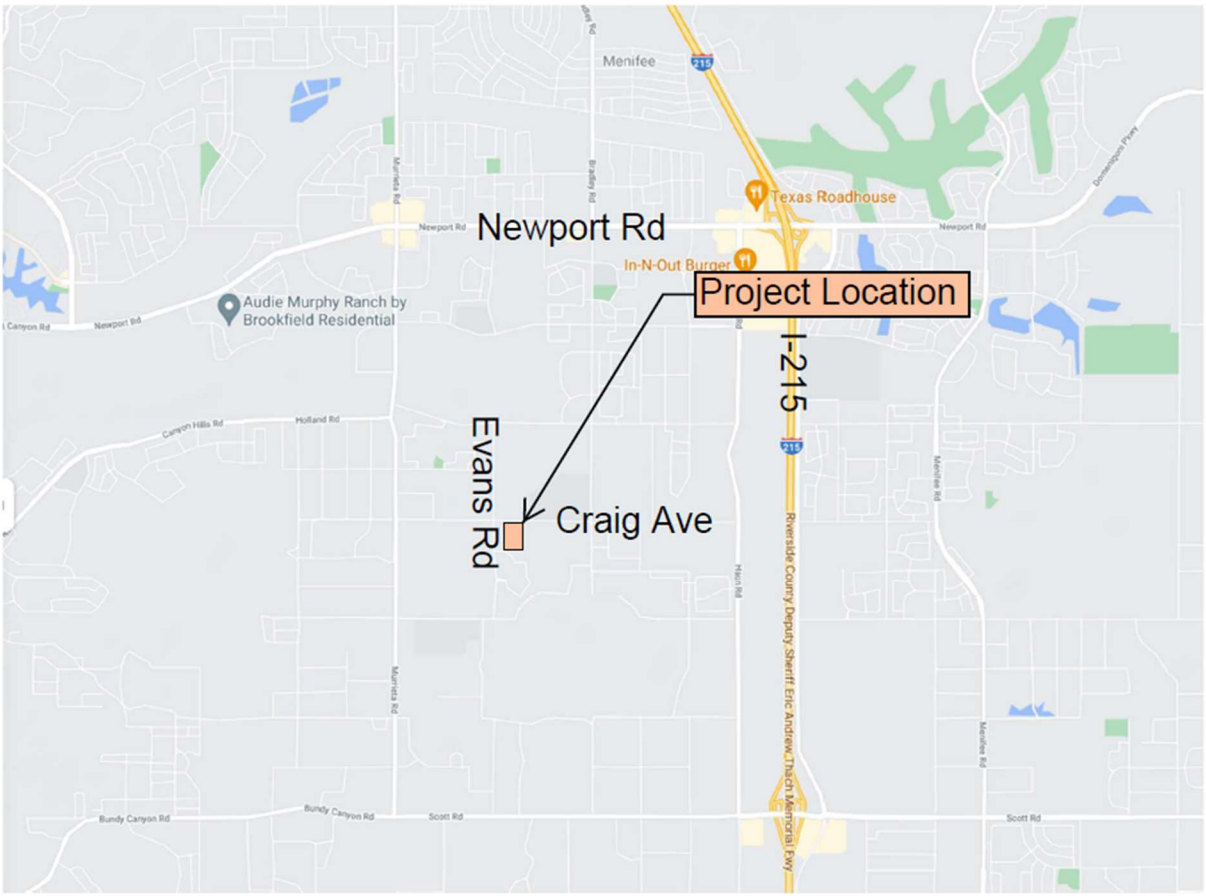
☐ Y ☒ N

Include your Operation and Maintenance Plan and Maintenance Mechanism in Appendix 9. Additionally, include all pertinent forms of educational materials for those personnel that will be maintaining the proposed BMPs within this Project-Specific WQMP in Appendix 10.

Appendix 1: Maps and Site Plans

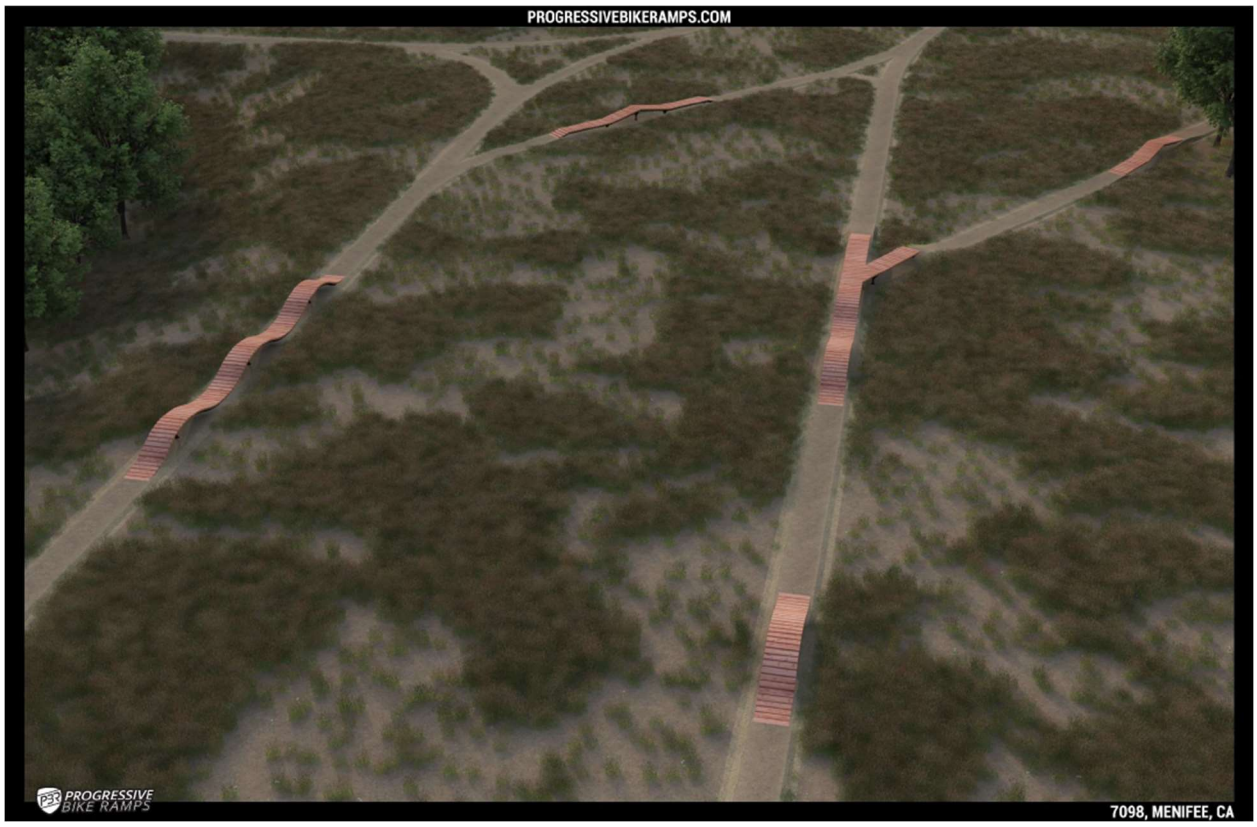
Location Map, WQMP Site Plan and Receiving Waters Map

Vicinity Map



Conceptual Site Plan






PROGRESSIVEBIKERAMPS.COM
PROGRESSIVE BIKE RAMPS
7098, MENIFEE, CA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DMA 1

DMA 1

DMA 2

775

1480

795

EVANS PARK PUMP TRACK SITE
WQMP SITE PLAN

LEGEND

DRAINAGE MANAGEMENT AREA — DMA 0

RUNOFF FLOW PATH

WATERSHED BOUNDARY

N

0 40’ 80’

1 INCH = 20 FT

Note: Drawing will plot to scale if plotted on arch. E sheet

CVALDO CORPORATION
CIVIL ENGINEERING
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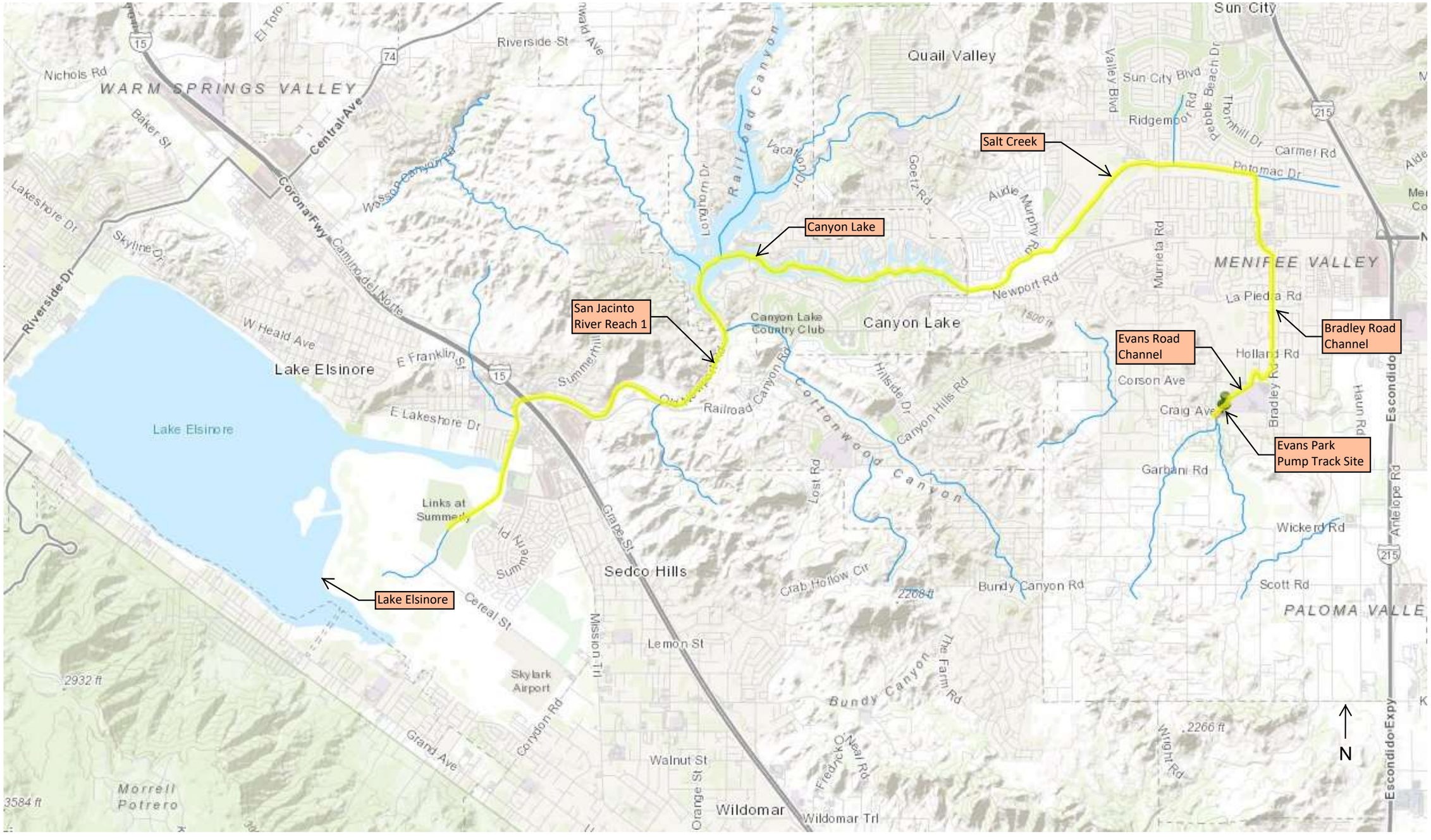
LA JOLLA, CA 92037
(P) 858-866-0128

Receiving Waters Map



Appendix 2: Construction Plans

Grading and Drainage Plans

Construction drawings will be provided with the Final WQMP.

Appendix 3: Soils Information

Geotechnical Study and Other Infiltration Testing Data

Geotechnical Report to be provided with Final WQMP.

Appendix 4: Historical Site Conditions

Phase I Environmental Site Assessment or Other Information on Past Site Use

No phase 1 ESA or other historical site use information available.

Appendix 5: LID Infeasibility

LID Technical Infeasibility Analysis

N/A

Appendix 6: BMP Design Details

BMP Sizing, Design Details and other Supporting Documentation

VBMP calculations and Bioretention Basin sizing calculations are preliminary. Final analysis will be done with the Final WQMP and will be based on the final design of the park and associated BMPs.

R 07 W | R 06 W | R 05 W | R 04 W | R 03 W | R 02 W | R 01 W | R 01 E | R 02 E | R 03 E | R 04 E | R 05 E

T 01 S
T 02 S
T 03 S
T 04 S
T 05 S
T 06 S
T 07 S
T 08 S

06	05	04	03	02	01
07	08	09	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

0.85 MiraLoma
0.61 RiversideNorth
0.54 RiversideSouth
0.88 PradoDam
0.50 LakeMathews
0.51 Woodcrest
0.68 PigeonPass
0.66 MorenoEast
0.68 PerrisReservoir
0.85 Beaumont
0.70 SanJacintoNWS
0.87 VistaGrandeGS
1.18 Idyllwild
0.90 HurkeyCreek
0.65 Anza
0.58 SunCity
0.68 Winchester
0.70 ElsinoreNWS
1.11 ElCarisoStation
0.77 WildomarLaCresta
0.52 SkinnerLake
0.77 SantaRosaPlateau
1.00 TemeculaNWS
0.64 AguangaValley

Project Location

Santa Ana River Watershed
Santa Margarita Watershed

JURUPA VALLEY | EASTVALE | NORCO | CORONA | RIVERSIDE | MORENO VALLEY | CALIMESA | BEAUMONT | SAN JACINTO | PERRIS | CANYON LAKE | LAKE ELSINORE | MENIFEE | HEMET | WILDOMAR | MURRIETA | TEMECULA

N

Rain Gage Locations

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

Isohyetal Map for the 85th Percentile 24 hour Storm Event

July 2011

Santa Ana Watershed - BMP Design Volume, V_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	Cvaldo Corporation	Date	11/3/2021
Designed by	Mikayla Lopez	Case No	
Company Project Number/Name	Evans Park Pump Track Site		

BMP Identification

BMP NAME / ID: Basin 1

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85} = 0.59 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
DMA 1	*31757*	*Concrete or Asphalt*	*1*	*0.89*	*28327.2*			
	31757		***Total***		**28327.2**	**0.59**	***1392.8***	***1,392.80***

Notes:

Appendix 7: Hydromodification

Supporting Detail Relating to Hydrologic Conditions of Concern



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N

0 40' 80'

1 INCH = 20 FT

Note: Drawing will plot to scale if plotted on arch. E sheet

EVANS PARK PUMP TRACK SITE
UNIT HYDROGRAPH HYDROLOGY WORKMAP

LEGEND

WATERSHED CENTROID

NODE NUMBER 100

RUNOFF FLOW PATH

WATERSHED BOUNDARY

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2008, Version 8.1
Study date 11/02/21 File: southex2242.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 4011

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Evans Park Pump Track Site 2-year, 24-hour Storm Event
Existing Condition
Job 21-003
11/2/21

Drainage Area = 6.53(Ac.) = 0.010 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 6.53(Ac.) = 0.010 Sq. Mi.
Length along longest watercourse = 783.00(Ft.)
Length along longest watercourse measured to centroid = 389.00(Ft.)
Length along longest watercourse = 0.148 Mi.
Length along longest watercourse measured to centroid = 0.074 Mi.
Difference in elevation = 2.00(Ft.)
Slope along watercourse = 13.4866 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.079 Hr.
Lag time = 4.74 Min.
25% of lag time = 1.18 Min.
40% of lag time = 1.89 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
6.53	1.90	12.41

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]

6.53 5.00 32.65

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 1.900(In)
Area Averaged 100-Year Rainfall = 5.000(In)

Point rain (area averaged) = 1.900(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.900(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
1.230	81.00	0.000
5.300	90.00	0.000

Total Area Entered = 6.53(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
81.0	81.0	0.233	0.000	0.233	0.188	0.044
90.0	90.0	0.130	0.000	0.130	0.812	0.106
					Sum (F) =	0.149

Area averaged mean soil loss (F) (In/Hr) = 0.149
Minimum soil loss rate ((In/Hr)) = 0.075
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	105.575	20.904	1.376
2	0.167	211.149	48.719	3.206
3	0.250	316.724	14.852	0.977
4	0.333	422.298	6.772	0.446
5	0.417	527.873	3.770	0.248
6	0.500	633.447	2.406	0.158
7	0.583	739.022	1.436	0.094
8	0.667	844.596	1.143	0.075
		Sum =	100.000 Sum=	6.581

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.015	(0.265)	0.014	0.002
2	0.17	0.07	0.015	(0.264)	0.014	0.002
3	0.25	0.07	0.015	(0.263)	0.014	0.002
4	0.33	0.10	0.023	(0.262)	0.021	0.002

5	0.42	0.10	0.023	(0.261)	0.021	0.002
6	0.50	0.10	0.023	(0.260)	0.021	0.002
7	0.58	0.10	0.023	(0.259)	0.021	0.002
8	0.67	0.10	0.023	(0.258)	0.021	0.002
9	0.75	0.10	0.023	(0.257)	0.021	0.002
10	0.83	0.13	0.030	(0.256)	0.027	0.003
11	0.92	0.13	0.030	(0.255)	0.027	0.003
12	1.00	0.13	0.030	(0.254)	0.027	0.003
13	1.08	0.10	0.023	(0.253)	0.021	0.002
14	1.17	0.10	0.023	(0.252)	0.021	0.002
15	1.25	0.10	0.023	(0.251)	0.021	0.002
16	1.33	0.10	0.023	(0.250)	0.021	0.002
17	1.42	0.10	0.023	(0.249)	0.021	0.002
18	1.50	0.10	0.023	(0.248)	0.021	0.002
19	1.58	0.10	0.023	(0.247)	0.021	0.002
20	1.67	0.10	0.023	(0.246)	0.021	0.002
21	1.75	0.10	0.023	(0.245)	0.021	0.002
22	1.83	0.13	0.030	(0.244)	0.027	0.003
23	1.92	0.13	0.030	(0.243)	0.027	0.003
24	2.00	0.13	0.030	(0.242)	0.027	0.003
25	2.08	0.13	0.030	(0.241)	0.027	0.003
26	2.17	0.13	0.030	(0.240)	0.027	0.003
27	2.25	0.13	0.030	(0.239)	0.027	0.003
28	2.33	0.13	0.030	(0.238)	0.027	0.003
29	2.42	0.13	0.030	(0.237)	0.027	0.003
30	2.50	0.13	0.030	(0.236)	0.027	0.003
31	2.58	0.17	0.038	(0.235)	0.034	0.004
32	2.67	0.17	0.038	(0.234)	0.034	0.004
33	2.75	0.17	0.038	(0.233)	0.034	0.004
34	2.83	0.17	0.038	(0.232)	0.034	0.004
35	2.92	0.17	0.038	(0.231)	0.034	0.004
36	3.00	0.17	0.038	(0.230)	0.034	0.004
37	3.08	0.17	0.038	(0.229)	0.034	0.004
38	3.17	0.17	0.038	(0.228)	0.034	0.004
39	3.25	0.17	0.038	(0.227)	0.034	0.004
40	3.33	0.17	0.038	(0.226)	0.034	0.004
41	3.42	0.17	0.038	(0.225)	0.034	0.004
42	3.50	0.17	0.038	(0.224)	0.034	0.004
43	3.58	0.17	0.038	(0.223)	0.034	0.004
44	3.67	0.17	0.038	(0.223)	0.034	0.004
45	3.75	0.17	0.038	(0.222)	0.034	0.004
46	3.83	0.20	0.046	(0.221)	0.041	0.005
47	3.92	0.20	0.046	(0.220)	0.041	0.005
48	4.00	0.20	0.046	(0.219)	0.041	0.005
49	4.08	0.20	0.046	(0.218)	0.041	0.005
50	4.17	0.20	0.046	(0.217)	0.041	0.005
51	4.25	0.20	0.046	(0.216)	0.041	0.005
52	4.33	0.23	0.053	(0.215)	0.048	0.005
53	4.42	0.23	0.053	(0.214)	0.048	0.005
54	4.50	0.23	0.053	(0.213)	0.048	0.005
55	4.58	0.23	0.053	(0.212)	0.048	0.005
56	4.67	0.23	0.053	(0.211)	0.048	0.005
57	4.75	0.23	0.053	(0.211)	0.048	0.005
58	4.83	0.27	0.061	(0.210)	0.055	0.006
59	4.92	0.27	0.061	(0.209)	0.055	0.006
60	5.00	0.27	0.061	(0.208)	0.055	0.006
61	5.08	0.20	0.046	(0.207)	0.041	0.005

62	5.17	0.20	0.046	(0.206)	0.041	0.005
63	5.25	0.20	0.046	(0.205)	0.041	0.005
64	5.33	0.23	0.053	(0.204)	0.048	0.005
65	5.42	0.23	0.053	(0.203)	0.048	0.005
66	5.50	0.23	0.053	(0.202)	0.048	0.005
67	5.58	0.27	0.061	(0.202)	0.055	0.006
68	5.67	0.27	0.061	(0.201)	0.055	0.006
69	5.75	0.27	0.061	(0.200)	0.055	0.006
70	5.83	0.27	0.061	(0.199)	0.055	0.006
71	5.92	0.27	0.061	(0.198)	0.055	0.006
72	6.00	0.27	0.061	(0.197)	0.055	0.006
73	6.08	0.30	0.068	(0.196)	0.062	0.007
74	6.17	0.30	0.068	(0.195)	0.062	0.007
75	6.25	0.30	0.068	(0.194)	0.062	0.007
76	6.33	0.30	0.068	(0.194)	0.062	0.007
77	6.42	0.30	0.068	(0.193)	0.062	0.007
78	6.50	0.30	0.068	(0.192)	0.062	0.007
79	6.58	0.33	0.076	(0.191)	0.068	0.008
80	6.67	0.33	0.076	(0.190)	0.068	0.008
81	6.75	0.33	0.076	(0.189)	0.068	0.008
82	6.83	0.33	0.076	(0.188)	0.068	0.008
83	6.92	0.33	0.076	(0.188)	0.068	0.008
84	7.00	0.33	0.076	(0.187)	0.068	0.008
85	7.08	0.33	0.076	(0.186)	0.068	0.008
86	7.17	0.33	0.076	(0.185)	0.068	0.008
87	7.25	0.33	0.076	(0.184)	0.068	0.008
88	7.33	0.37	0.084	(0.183)	0.075	0.008
89	7.42	0.37	0.084	(0.183)	0.075	0.008
90	7.50	0.37	0.084	(0.182)	0.075	0.008
91	7.58	0.40	0.091	(0.181)	0.082	0.009
92	7.67	0.40	0.091	(0.180)	0.082	0.009
93	7.75	0.40	0.091	(0.179)	0.082	0.009
94	7.83	0.43	0.099	(0.178)	0.089	0.010
95	7.92	0.43	0.099	(0.178)	0.089	0.010
96	8.00	0.43	0.099	(0.177)	0.089	0.010
97	8.08	0.50	0.114	(0.176)	0.103	0.011
98	8.17	0.50	0.114	(0.175)	0.103	0.011
99	8.25	0.50	0.114	(0.174)	0.103	0.011
100	8.33	0.50	0.114	(0.173)	0.103	0.011
101	8.42	0.50	0.114	(0.173)	0.103	0.011
102	8.50	0.50	0.114	(0.172)	0.103	0.011
103	8.58	0.53	0.122	(0.171)	0.109	0.012
104	8.67	0.53	0.122	(0.170)	0.109	0.012
105	8.75	0.53	0.122	(0.169)	0.109	0.012
106	8.83	0.57	0.129	(0.169)	0.116	0.013
107	8.92	0.57	0.129	(0.168)	0.116	0.013
108	9.00	0.57	0.129	(0.167)	0.116	0.013
109	9.08	0.63	0.144	(0.166)	0.130	0.014
110	9.17	0.63	0.144	(0.165)	0.130	0.014
111	9.25	0.63	0.144	(0.165)	0.130	0.014
112	9.33	0.67	0.152	(0.164)	0.137	0.015
113	9.42	0.67	0.152	(0.163)	0.137	0.015
114	9.50	0.67	0.152	(0.162)	0.137	0.015
115	9.58	0.70	0.160	(0.162)	0.144	0.016
116	9.67	0.70	0.160	(0.161)	0.144	0.016
117	9.75	0.70	0.160	(0.160)	0.144	0.016
118	9.83	0.73	0.167	(0.159)	0.150	0.017

119	9.92	0.73	0.167	(0.158)	0.150	0.017
120	10.00	0.73	0.167	(0.158)	0.150	0.017
121	10.08	0.50	0.114	(0.157)	0.103	0.011
122	10.17	0.50	0.114	(0.156)	0.103	0.011
123	10.25	0.50	0.114	(0.155)	0.103	0.011
124	10.33	0.50	0.114	(0.155)	0.103	0.011
125	10.42	0.50	0.114	(0.154)	0.103	0.011
126	10.50	0.50	0.114	(0.153)	0.103	0.011
127	10.58	0.67	0.152	(0.152)	0.137	0.015
128	10.67	0.67	0.152	(0.152)	0.137	0.015
129	10.75	0.67	0.152	(0.151)	0.137	0.015
130	10.83	0.67	0.152	(0.150)	0.137	0.015
131	10.92	0.67	0.152	(0.149)	0.137	0.015
132	11.00	0.67	0.152	(0.149)	0.137	0.015
133	11.08	0.63	0.144	(0.148)	0.130	0.014
134	11.17	0.63	0.144	(0.147)	0.130	0.014
135	11.25	0.63	0.144	(0.147)	0.130	0.014
136	11.33	0.63	0.144	(0.146)	0.130	0.014
137	11.42	0.63	0.144	(0.145)	0.130	0.014
138	11.50	0.63	0.144	(0.144)	0.130	0.014
139	11.58	0.57	0.129	(0.144)	0.116	0.013
140	11.67	0.57	0.129	(0.143)	0.116	0.013
141	11.75	0.57	0.129	(0.142)	0.116	0.013
142	11.83	0.60	0.137	(0.142)	0.123	0.014
143	11.92	0.60	0.137	(0.141)	0.123	0.014
144	12.00	0.60	0.137	(0.140)	0.123	0.014
145	12.08	0.83	0.190	0.139	(0.171)	0.051
146	12.17	0.83	0.190	0.139	(0.171)	0.051
147	12.25	0.83	0.190	0.138	(0.171)	0.052
148	12.33	0.87	0.198	0.137	(0.178)	0.060
149	12.42	0.87	0.198	0.137	(0.178)	0.061
150	12.50	0.87	0.198	0.136	(0.178)	0.062
151	12.58	0.93	0.213	0.135	(0.192)	0.078
152	12.67	0.93	0.213	0.135	(0.192)	0.078
153	12.75	0.93	0.213	0.134	(0.192)	0.079
154	12.83	0.97	0.220	0.133	(0.198)	0.087
155	12.92	0.97	0.220	0.133	(0.198)	0.088
156	13.00	0.97	0.220	0.132	(0.198)	0.089
157	13.08	1.13	0.258	0.131	(0.233)	0.127
158	13.17	1.13	0.258	0.131	(0.233)	0.128
159	13.25	1.13	0.258	0.130	(0.233)	0.129
160	13.33	1.13	0.258	0.129	(0.233)	0.129
161	13.42	1.13	0.258	0.129	(0.233)	0.130
162	13.50	1.13	0.258	0.128	(0.233)	0.130
163	13.58	0.77	0.175	0.127	(0.157)	0.048
164	13.67	0.77	0.175	0.127	(0.157)	0.048
165	13.75	0.77	0.175	0.126	(0.157)	0.049
166	13.83	0.77	0.175	0.125	(0.157)	0.049
167	13.92	0.77	0.175	0.125	(0.157)	0.050
168	14.00	0.77	0.175	0.124	(0.157)	0.051
169	14.08	0.90	0.205	0.123	(0.185)	0.082
170	14.17	0.90	0.205	0.123	(0.185)	0.082
171	14.25	0.90	0.205	0.122	(0.185)	0.083
172	14.33	0.87	0.198	0.122	(0.178)	0.076
173	14.42	0.87	0.198	0.121	(0.178)	0.077
174	14.50	0.87	0.198	0.120	(0.178)	0.077
175	14.58	0.87	0.198	0.120	(0.178)	0.078

176	14.67	0.87	0.198	0.119	(0.178)	0.079
177	14.75	0.87	0.198	0.118	(0.178)	0.079
178	14.83	0.83	0.190	0.118	(0.171)	0.072
179	14.92	0.83	0.190	0.117	(0.171)	0.073
180	15.00	0.83	0.190	0.117	(0.171)	0.073
181	15.08	0.80	0.182	0.116	(0.164)	0.066
182	15.17	0.80	0.182	0.115	(0.164)	0.067
183	15.25	0.80	0.182	0.115	(0.164)	0.068
184	15.33	0.77	0.175	0.114	(0.157)	0.061
185	15.42	0.77	0.175	0.114	(0.157)	0.061
186	15.50	0.77	0.175	0.113	(0.157)	0.062
187	15.58	0.63	0.144	0.113	(0.130)	0.032
188	15.67	0.63	0.144	0.112	(0.130)	0.032
189	15.75	0.63	0.144	0.111	(0.130)	0.033
190	15.83	0.63	0.144	0.111	(0.130)	0.034
191	15.92	0.63	0.144	0.110	(0.130)	0.034
192	16.00	0.63	0.144	0.110	(0.130)	0.035
193	16.08	0.13	0.030	(0.109)	0.027	0.003
194	16.17	0.13	0.030	(0.109)	0.027	0.003
195	16.25	0.13	0.030	(0.108)	0.027	0.003
196	16.33	0.13	0.030	(0.107)	0.027	0.003
197	16.42	0.13	0.030	(0.107)	0.027	0.003
198	16.50	0.13	0.030	(0.106)	0.027	0.003
199	16.58	0.10	0.023	(0.106)	0.021	0.002
200	16.67	0.10	0.023	(0.105)	0.021	0.002
201	16.75	0.10	0.023	(0.105)	0.021	0.002
202	16.83	0.10	0.023	(0.104)	0.021	0.002
203	16.92	0.10	0.023	(0.104)	0.021	0.002
204	17.00	0.10	0.023	(0.103)	0.021	0.002
205	17.08	0.17	0.038	(0.103)	0.034	0.004
206	17.17	0.17	0.038	(0.102)	0.034	0.004
207	17.25	0.17	0.038	(0.102)	0.034	0.004
208	17.33	0.17	0.038	(0.101)	0.034	0.004
209	17.42	0.17	0.038	(0.101)	0.034	0.004
210	17.50	0.17	0.038	(0.100)	0.034	0.004
211	17.58	0.17	0.038	(0.100)	0.034	0.004
212	17.67	0.17	0.038	(0.099)	0.034	0.004
213	17.75	0.17	0.038	(0.099)	0.034	0.004
214	17.83	0.13	0.030	(0.098)	0.027	0.003
215	17.92	0.13	0.030	(0.098)	0.027	0.003
216	18.00	0.13	0.030	(0.097)	0.027	0.003
217	18.08	0.13	0.030	(0.097)	0.027	0.003
218	18.17	0.13	0.030	(0.096)	0.027	0.003
219	18.25	0.13	0.030	(0.096)	0.027	0.003
220	18.33	0.13	0.030	(0.095)	0.027	0.003
221	18.42	0.13	0.030	(0.095)	0.027	0.003
222	18.50	0.13	0.030	(0.094)	0.027	0.003
223	18.58	0.10	0.023	(0.094)	0.021	0.002
224	18.67	0.10	0.023	(0.093)	0.021	0.002
225	18.75	0.10	0.023	(0.093)	0.021	0.002
226	18.83	0.07	0.015	(0.093)	0.014	0.002
227	18.92	0.07	0.015	(0.092)	0.014	0.002
228	19.00	0.07	0.015	(0.092)	0.014	0.002
229	19.08	0.10	0.023	(0.091)	0.021	0.002
230	19.17	0.10	0.023	(0.091)	0.021	0.002
231	19.25	0.10	0.023	(0.090)	0.021	0.002
232	19.33	0.13	0.030	(0.090)	0.027	0.003

233	19.42	0.13	0.030	(0.090)	0.027	0.003
234	19.50	0.13	0.030	(0.089)	0.027	0.003
235	19.58	0.10	0.023	(0.089)	0.021	0.002
236	19.67	0.10	0.023	(0.088)	0.021	0.002
237	19.75	0.10	0.023	(0.088)	0.021	0.002
238	19.83	0.07	0.015	(0.087)	0.014	0.002
239	19.92	0.07	0.015	(0.087)	0.014	0.002
240	20.00	0.07	0.015	(0.087)	0.014	0.002
241	20.08	0.10	0.023	(0.086)	0.021	0.002
242	20.17	0.10	0.023	(0.086)	0.021	0.002
243	20.25	0.10	0.023	(0.086)	0.021	0.002
244	20.33	0.10	0.023	(0.085)	0.021	0.002
245	20.42	0.10	0.023	(0.085)	0.021	0.002
246	20.50	0.10	0.023	(0.084)	0.021	0.002
247	20.58	0.10	0.023	(0.084)	0.021	0.002
248	20.67	0.10	0.023	(0.084)	0.021	0.002
249	20.75	0.10	0.023	(0.083)	0.021	0.002
250	20.83	0.07	0.015	(0.083)	0.014	0.002
251	20.92	0.07	0.015	(0.083)	0.014	0.002
252	21.00	0.07	0.015	(0.082)	0.014	0.002
253	21.08	0.10	0.023	(0.082)	0.021	0.002
254	21.17	0.10	0.023	(0.082)	0.021	0.002
255	21.25	0.10	0.023	(0.081)	0.021	0.002
256	21.33	0.07	0.015	(0.081)	0.014	0.002
257	21.42	0.07	0.015	(0.081)	0.014	0.002
258	21.50	0.07	0.015	(0.081)	0.014	0.002
259	21.58	0.10	0.023	(0.080)	0.021	0.002
260	21.67	0.10	0.023	(0.080)	0.021	0.002
261	21.75	0.10	0.023	(0.080)	0.021	0.002
262	21.83	0.07	0.015	(0.079)	0.014	0.002
263	21.92	0.07	0.015	(0.079)	0.014	0.002
264	22.00	0.07	0.015	(0.079)	0.014	0.002
265	22.08	0.10	0.023	(0.079)	0.021	0.002
266	22.17	0.10	0.023	(0.078)	0.021	0.002
267	22.25	0.10	0.023	(0.078)	0.021	0.002
268	22.33	0.07	0.015	(0.078)	0.014	0.002
269	22.42	0.07	0.015	(0.078)	0.014	0.002
270	22.50	0.07	0.015	(0.077)	0.014	0.002
271	22.58	0.07	0.015	(0.077)	0.014	0.002
272	22.67	0.07	0.015	(0.077)	0.014	0.002
273	22.75	0.07	0.015	(0.077)	0.014	0.002
274	22.83	0.07	0.015	(0.077)	0.014	0.002
275	22.92	0.07	0.015	(0.076)	0.014	0.002
276	23.00	0.07	0.015	(0.076)	0.014	0.002
277	23.08	0.07	0.015	(0.076)	0.014	0.002
278	23.17	0.07	0.015	(0.076)	0.014	0.002
279	23.25	0.07	0.015	(0.076)	0.014	0.002
280	23.33	0.07	0.015	(0.075)	0.014	0.002
281	23.42	0.07	0.015	(0.075)	0.014	0.002
282	23.50	0.07	0.015	(0.075)	0.014	0.002
283	23.58	0.07	0.015	(0.075)	0.014	0.002
284	23.67	0.07	0.015	(0.075)	0.014	0.002
285	23.75	0.07	0.015	(0.075)	0.014	0.002
286	23.83	0.07	0.015	(0.075)	0.014	0.002
287	23.92	0.07	0.015	(0.075)	0.014	0.002
288	24.00	0.07	0.015	(0.075)	0.014	0.002

(Loss Rate Not Used)

Sum = 100.0 Sum = 4.8

Flood volume = Effective rainfall 0.40(In)
times area 6.5(Ac.)/[(In)/(Ft.)] = 0.2(Ac.Ft)
Total soil loss = 1.50(In)
Total soil loss = 0.818(Ac.Ft)
Total rainfall = 1.90(In)
Flood volume = 9405.7 Cubic Feet
Total soil loss = 35631.2 Cubic Feet

Peak flow rate of this hydrograph = 0.847(CFS)

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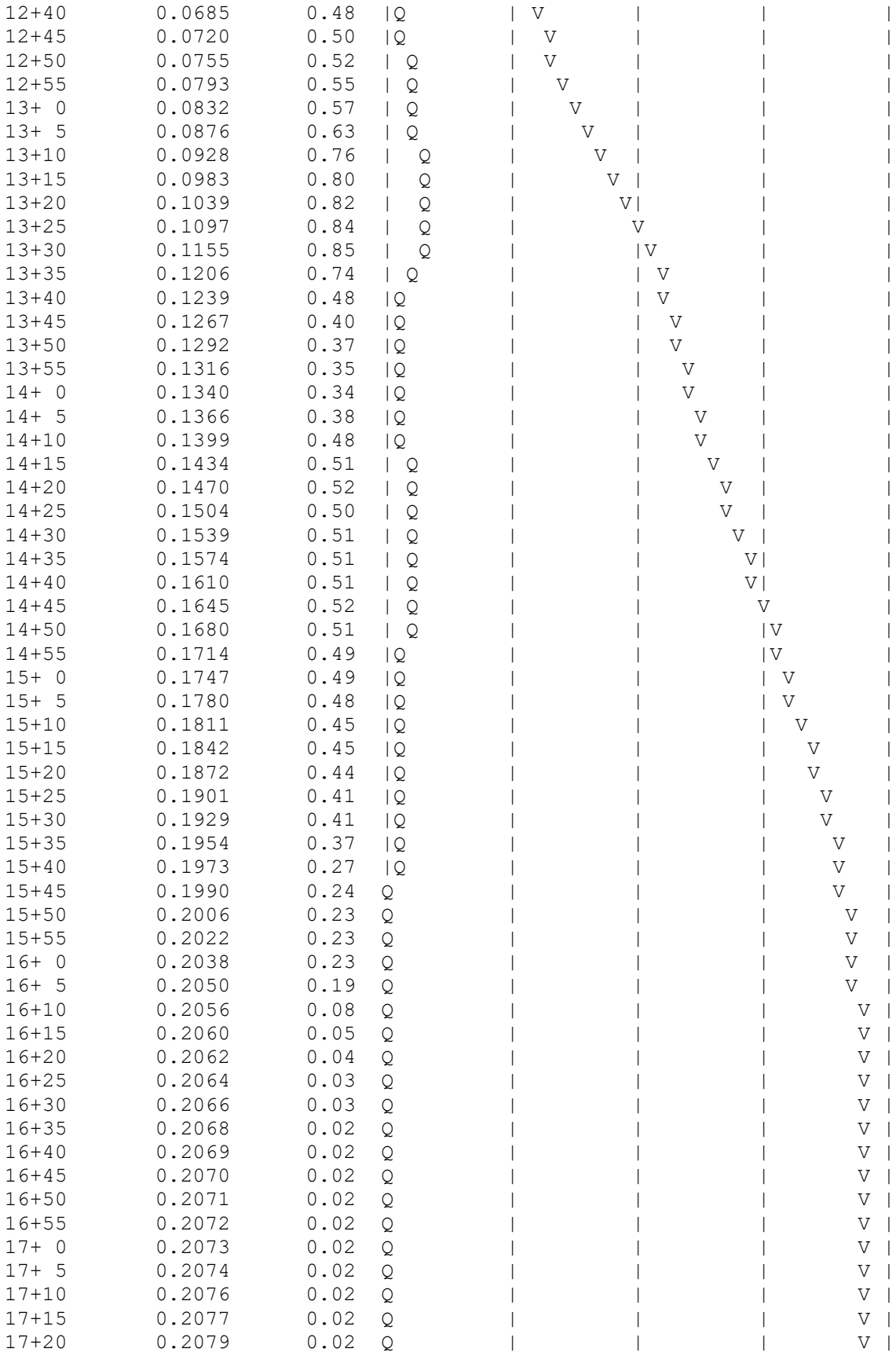
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0000	0.00	Q				
0+10	0.0001	0.01	Q				
0+15	0.0001	0.01	Q				
0+20	0.0002	0.01	Q				
0+25	0.0003	0.01	Q				
0+30	0.0004	0.01	Q				
0+35	0.0005	0.01	Q				
0+40	0.0006	0.01	Q				
0+45	0.0007	0.01	Q				
0+50	0.0008	0.02	Q				
0+55	0.0009	0.02	Q				
1+ 0	0.0011	0.02	Q				
1+ 5	0.0012	0.02	Q				
1+10	0.0013	0.02	Q				
1+15	0.0014	0.02	Q				
1+20	0.0015	0.02	Q				
1+25	0.0016	0.02	Q				
1+30	0.0017	0.02	Q				
1+35	0.0018	0.02	Q				
1+40	0.0019	0.02	Q				
1+45	0.0020	0.02	Q				
1+50	0.0021	0.02	Q				
1+55	0.0023	0.02	Q				
2+ 0	0.0024	0.02	Q				
2+ 5	0.0025	0.02	Q				
2+10	0.0027	0.02	Q				
2+15	0.0028	0.02	Q				
2+20	0.0029	0.02	Q				
2+25	0.0031	0.02	Q				
2+30	0.0032	0.02	Q				
2+35	0.0034	0.02	Q				
2+40	0.0035	0.02	Q				
2+45	0.0037	0.02	Q				
2+50	0.0039	0.02	Q				
2+55	0.0040	0.02	Q				
3+ 0	0.0042	0.02	Q				
3+ 5	0.0044	0.02	Q				

3+10	0.0045	0.03	Q				
3+15	0.0047	0.03	Q				
3+20	0.0049	0.03	Q				
3+25	0.0051	0.03	Q				
3+30	0.0052	0.03	Q				
3+35	0.0054	0.03	QV				
3+40	0.0056	0.03	QV				
3+45	0.0058	0.03	QV				
3+50	0.0059	0.03	QV				
3+55	0.0061	0.03	QV				
4+ 0	0.0063	0.03	QV				
4+ 5	0.0065	0.03	QV				
4+10	0.0067	0.03	QV				
4+15	0.0069	0.03	QV				
4+20	0.0072	0.03	QV				
4+25	0.0074	0.03	QV				
4+30	0.0076	0.03	QV				
4+35	0.0079	0.03	QV				
4+40	0.0081	0.03	QV				
4+45	0.0083	0.03	QV				
4+50	0.0086	0.04	QV				
4+55	0.0089	0.04	QV				
5+ 0	0.0091	0.04	QV				
5+ 5	0.0094	0.04	QV				
5+10	0.0096	0.03	QV				
5+15	0.0098	0.03	QV				
5+20	0.0100	0.03	QV				
5+25	0.0103	0.03	QV				
5+30	0.0105	0.03	QV				
5+35	0.0108	0.04	QV				
5+40	0.0110	0.04	Q V				
5+45	0.0113	0.04	Q V				
5+50	0.0116	0.04	Q V				
5+55	0.0118	0.04	Q V				
6+ 0	0.0121	0.04	Q V				
6+ 5	0.0124	0.04	Q V				
6+10	0.0127	0.04	Q V				
6+15	0.0130	0.04	Q V				
6+20	0.0133	0.04	Q V				
6+25	0.0136	0.04	Q V				
6+30	0.0139	0.04	Q V				
6+35	0.0142	0.05	Q V				
6+40	0.0146	0.05	Q V				
6+45	0.0149	0.05	Q V				
6+50	0.0153	0.05	Q V				
6+55	0.0156	0.05	Q V				
7+ 0	0.0159	0.05	Q V				
7+ 5	0.0163	0.05	Q V				
7+10	0.0166	0.05	Q V				
7+15	0.0170	0.05	Q V				
7+20	0.0173	0.05	Q V				
7+25	0.0177	0.05	Q V				
7+30	0.0181	0.05	Q V				
7+35	0.0185	0.06	Q V				
7+40	0.0189	0.06	Q V				
7+45	0.0193	0.06	Q V				
7+50	0.0197	0.06	Q V				

7+55	0.0201	0.06	Q V	|	|	|	|
8+ 0	0.0206	0.06	Q V	|	|	|	|
8+ 5	0.0210	0.07	Q V	|	|	|	|
8+10	0.0215	0.07	Q V	|	|	|	|
8+15	0.0220	0.07	Q V	|	|	|	|
8+20	0.0225	0.07	Q V	|	|	|	|
8+25	0.0230	0.07	Q V	|	|	|	|
8+30	0.0236	0.07	Q V	|	|	|	|
8+35	0.0241	0.08	Q V	|	|	|	|
8+40	0.0246	0.08	Q V	|	|	|	|
8+45	0.0252	0.08	Q V	|	|	|	|
8+50	0.0257	0.08	Q V	|	|	|	|
8+55	0.0263	0.08	Q V	|	|	|	|
9+ 0	0.0269	0.08	Q V	|	|	|	|
9+ 5	0.0275	0.09	Q V	|	|	|	|
9+10	0.0281	0.09	Q V	|	|	|	|
9+15	0.0288	0.09	Q V	|	|	|	|
9+20	0.0294	0.10	Q V	|	|	|	|
9+25	0.0301	0.10	Q V	|	|	|	|
9+30	0.0308	0.10	Q V	|	|	|	|
9+35	0.0315	0.10	Q V	|	|	|	|
9+40	0.0322	0.10	Q V	|	|	|	|
9+45	0.0329	0.10	Q V	|	|	|	|
9+50	0.0336	0.11	Q V	|	|	|	|
9+55	0.0344	0.11	Q V	|	|	|	|
10+ 0	0.0351	0.11	Q V	|	|	|	|
10+ 5	0.0358	0.10	Q V	|	|	|	|
10+10	0.0364	0.09	Q V	|	|	|	|
10+15	0.0370	0.08	Q V	|	|	|	|
10+20	0.0375	0.08	Q V	|	|	|	|
10+25	0.0380	0.08	Q V	|	|	|	|
10+30	0.0385	0.08	Q V	|	|	|	|
10+35	0.0391	0.08	Q V	|	|	|	|
10+40	0.0397	0.09	Q V	|	|	|	|
10+45	0.0404	0.10	Q V	|	|	|	|
10+50	0.0411	0.10	Q V	|	|	|	|
10+55	0.0418	0.10	Q V	|	|	|	|
11+ 0	0.0424	0.10	Q V	|	|	|	|
11+ 5	0.0431	0.10	Q V	|	|	|	|
11+10	0.0438	0.10	Q V	|	|	|	|
11+15	0.0444	0.10	Q V	|	|	|	|
11+20	0.0451	0.10	Q V	|	|	|	|
11+25	0.0458	0.10	Q V	|	|	|	|
11+30	0.0464	0.10	Q V	|	|	|	|
11+35	0.0471	0.09	Q V	|	|	|	|
11+40	0.0477	0.09	Q V	|	|	|	|
11+45	0.0483	0.09	Q V	|	|	|	|
11+50	0.0489	0.09	Q V	|	|	|	|
11+55	0.0495	0.09	Q V	|	|	|	|
12+ 0	0.0501	0.09	Q V	|	|	|	|
12+ 5	0.0511	0.14	Q V	|	|	|	|
12+10	0.0529	0.26	|Q V	|	|	|	|
12+15	0.0549	0.30	|Q V	|	|	|	|
12+20	0.0572	0.33	|Q V	|	|	|	|
12+25	0.0597	0.37	|Q |V	|	|	|	|
12+30	0.0624	0.39	|Q |V	|	|	|	|
12+35	0.0653	0.42	|Q | V	|	|	|	|



17+25	0.2081	0.02	Q	|	|	|	V |
17+30	0.2082	0.02	Q	|	|	|	V |
17+35	0.2084	0.02	Q	|	|	|	V |
17+40	0.2086	0.03	Q	|	|	|	V |
17+45	0.2088	0.03	Q	|	|	|	V |
17+50	0.2089	0.02	Q	|	|	|	V |
17+55	0.2091	0.02	Q	|	|	|	V |
18+ 0	0.2092	0.02	Q	|	|	|	V |
18+ 5	0.2093	0.02	Q	|	|	|	V |
18+10	0.2095	0.02	Q	|	|	|	V |
18+15	0.2096	0.02	Q	|	|	|	V |
18+20	0.2098	0.02	Q	|	|	|	V |
18+25	0.2099	0.02	Q	|	|	|	V |
18+30	0.2100	0.02	Q	|	|	|	V |
18+35	0.2102	0.02	Q	|	|	|	V |
18+40	0.2103	0.02	Q	|	|	|	V |
18+45	0.2104	0.02	Q	|	|	|	V |
18+50	0.2105	0.01	Q	|	|	|	V |
18+55	0.2106	0.01	Q	|	|	|	V|
19+ 0	0.2107	0.01	Q	|	|	|	V|
19+ 5	0.2107	0.01	Q	|	|	|	V|
19+10	0.2108	0.01	Q	|	|	|	V|
19+15	0.2109	0.01	Q	|	|	|	V|
19+20	0.2110	0.02	Q	|	|	|	V|
19+25	0.2112	0.02	Q	|	|	|	V|
19+30	0.2113	0.02	Q	|	|	|	V|
19+35	0.2114	0.02	Q	|	|	|	V|
19+40	0.2115	0.02	Q	|	|	|	V|
19+45	0.2116	0.02	Q	|	|	|	V|
19+50	0.2117	0.01	Q	|	|	|	V|
19+55	0.2118	0.01	Q	|	|	|	V|
20+ 0	0.2119	0.01	Q	|	|	|	V|
20+ 5	0.2120	0.01	Q	|	|	|	V|
20+10	0.2121	0.01	Q	|	|	|	V|
20+15	0.2122	0.01	Q	|	|	|	V|
20+20	0.2123	0.01	Q	|	|	|	V|
20+25	0.2124	0.01	Q	|	|	|	V|
20+30	0.2125	0.01	Q	|	|	|	V|
20+35	0.2126	0.01	Q	|	|	|	V|
20+40	0.2127	0.02	Q	|	|	|	V|
20+45	0.2128	0.02	Q	|	|	|	V|
20+50	0.2129	0.01	Q	|	|	|	V|
20+55	0.2130	0.01	Q	|	|	|	V|
21+ 0	0.2130	0.01	Q	|	|	|	V|
21+ 5	0.2131	0.01	Q	|	|	|	V|
21+10	0.2132	0.01	Q	|	|	|	V|
21+15	0.2133	0.01	Q	|	|	|	V|
21+20	0.2134	0.01	Q	|	|	|	V|
21+25	0.2135	0.01	Q	|	|	|	V|
21+30	0.2135	0.01	Q	|	|	|	V|
21+35	0.2136	0.01	Q	|	|	|	V|
21+40	0.2137	0.01	Q	|	|	|	V|
21+45	0.2138	0.01	Q	|	|	|	V|
21+50	0.2139	0.01	Q	|	|	|	V|
21+55	0.2140	0.01	Q	|	|	|	V|
22+ 0	0.2141	0.01	Q	|	|	|	V|
22+ 5	0.2141	0.01	Q	|	|	|	V|

22+10	0.2142	0.01	Q	|	|	|	V|
22+15	0.2143	0.01	Q	|	|	|	V|
22+20	0.2144	0.01	Q	|	|	|	V|
22+25	0.2145	0.01	Q	|	|	|	V|
22+30	0.2146	0.01	Q	|	|	|	V|
22+35	0.2147	0.01	Q	|	|	|	V|
22+40	0.2147	0.01	Q	|	|	|	V|
22+45	0.2148	0.01	Q	|	|	|	V|
22+50	0.2149	0.01	Q	|	|	|	V|
22+55	0.2149	0.01	Q	|	|	|	V|
23+ 0	0.2150	0.01	Q	|	|	|	V|
23+ 5	0.2151	0.01	Q	|	|	|	V|
23+10	0.2151	0.01	Q	|	|	|	V|
23+15	0.2152	0.01	Q	|	|	|	V|
23+20	0.2153	0.01	Q	|	|	|	V|
23+25	0.2153	0.01	Q	|	|	|	V|
23+30	0.2154	0.01	Q	|	|	|	V|
23+35	0.2155	0.01	Q	|	|	|	V|
23+40	0.2156	0.01	Q	|	|	|	V|
23+45	0.2156	0.01	Q	|	|	|	V|
23+50	0.2157	0.01	Q	|	|	|	V|
23+55	0.2158	0.01	Q	|	|	|	V|
24+ 0	0.2158	0.01	Q	|	|	|	V|
24+ 5	0.2159	0.01	Q	|	|	|	V|
24+10	0.2159	0.00	Q	|	|	|	V|
24+15	0.2159	0.00	Q	|	|	|	V|
24+20	0.2159	0.00	Q	|	|	|	V|
24+25	0.2159	0.00	Q	|	|	|	V|
24+30	0.2159	0.00	Q	|	|	|	V|
24+35	0.2159	0.00	Q	|	|	|	V|

U n i t H y d r o g r a p h A n a l y s i s

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Study date 11/02/21 File: southdev2242.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 4011

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Evans Park Pump Track Site 2-year, 24-hour Storm Event
Developed Condition
Job 21-003
11/2/21

Drainage Area = 6.53(Ac.) = 0.010 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 6.53(Ac.) = 0.010 Sq. Mi.
Length along longest watercourse = 783.00(Ft.)
Length along longest watercourse measured to centroid = 389.00(Ft.)
Length along longest watercourse = 0.148 Mi.
Length along longest watercourse measured to centroid = 0.074 Mi.
Difference in elevation = 2.00(Ft.)
Slope along watercourse = 13.4866 Ft./Mi.
Average Manning's 'N' = 0.020
Lag time = 0.053 Hr.
Lag time = 3.16 Min.
25% of lag time = 0.79 Min.
40% of lag time = 1.26 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
6.53	1.90	12.41

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]

6.53 5.00 32.65

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 1.900(In)
Area Averaged 100-Year Rainfall = 5.000(In)

Point rain (area averaged) = 1.900(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.900(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
1.230	81.00	0.000
4.690	90.00	0.000
0.610	100.00	1.000

Total Area Entered = 6.53(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
81.0	81.0	0.233	0.000	0.233	0.188	0.044
90.0	90.0	0.130	0.000	0.130	0.718	0.093
100.0	100.0	0.000	1.000	0.000	0.093	0.000
					Sum (F) =	0.137

Area averaged mean soil loss (F) (In/Hr) = 0.137
Minimum soil loss rate ((In/Hr)) = 0.069
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.820

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	158.362	35.139	2.312
2	0.167	316.724	46.390	3.053
3	0.250	475.085	10.717	0.705
4	0.333	633.447	4.630	0.305
5	0.417	791.809	2.247	0.148
6	0.500	950.171	0.877	0.058
		Sum =	100.000 Sum=	6.581

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.015	(0.243)	0.012	0.003
2	0.17	0.07	0.015	(0.242)	0.012	0.003
3	0.25	0.07	0.015	(0.241)	0.012	0.003
4	0.33	0.10	0.023	(0.240)	0.019	0.004

5	0.42	0.10	0.023	(0.239)	0.019	0.004
6	0.50	0.10	0.023	(0.239)	0.019	0.004
7	0.58	0.10	0.023	(0.238)	0.019	0.004
8	0.67	0.10	0.023	(0.237)	0.019	0.004
9	0.75	0.10	0.023	(0.236)	0.019	0.004
10	0.83	0.13	0.030	(0.235)	0.025	0.005
11	0.92	0.13	0.030	(0.234)	0.025	0.005
12	1.00	0.13	0.030	(0.233)	0.025	0.005
13	1.08	0.10	0.023	(0.232)	0.019	0.004
14	1.17	0.10	0.023	(0.231)	0.019	0.004
15	1.25	0.10	0.023	(0.230)	0.019	0.004
16	1.33	0.10	0.023	(0.229)	0.019	0.004
17	1.42	0.10	0.023	(0.228)	0.019	0.004
18	1.50	0.10	0.023	(0.227)	0.019	0.004
19	1.58	0.10	0.023	(0.227)	0.019	0.004
20	1.67	0.10	0.023	(0.226)	0.019	0.004
21	1.75	0.10	0.023	(0.225)	0.019	0.004
22	1.83	0.13	0.030	(0.224)	0.025	0.005
23	1.92	0.13	0.030	(0.223)	0.025	0.005
24	2.00	0.13	0.030	(0.222)	0.025	0.005
25	2.08	0.13	0.030	(0.221)	0.025	0.005
26	2.17	0.13	0.030	(0.220)	0.025	0.005
27	2.25	0.13	0.030	(0.219)	0.025	0.005
28	2.33	0.13	0.030	(0.218)	0.025	0.005
29	2.42	0.13	0.030	(0.218)	0.025	0.005
30	2.50	0.13	0.030	(0.217)	0.025	0.005
31	2.58	0.17	0.038	(0.216)	0.031	0.007
32	2.67	0.17	0.038	(0.215)	0.031	0.007
33	2.75	0.17	0.038	(0.214)	0.031	0.007
34	2.83	0.17	0.038	(0.213)	0.031	0.007
35	2.92	0.17	0.038	(0.212)	0.031	0.007
36	3.00	0.17	0.038	(0.211)	0.031	0.007
37	3.08	0.17	0.038	(0.210)	0.031	0.007
38	3.17	0.17	0.038	(0.210)	0.031	0.007
39	3.25	0.17	0.038	(0.209)	0.031	0.007
40	3.33	0.17	0.038	(0.208)	0.031	0.007
41	3.42	0.17	0.038	(0.207)	0.031	0.007
42	3.50	0.17	0.038	(0.206)	0.031	0.007
43	3.58	0.17	0.038	(0.205)	0.031	0.007
44	3.67	0.17	0.038	(0.204)	0.031	0.007
45	3.75	0.17	0.038	(0.204)	0.031	0.007
46	3.83	0.20	0.046	(0.203)	0.037	0.008
47	3.92	0.20	0.046	(0.202)	0.037	0.008
48	4.00	0.20	0.046	(0.201)	0.037	0.008
49	4.08	0.20	0.046	(0.200)	0.037	0.008
50	4.17	0.20	0.046	(0.199)	0.037	0.008
51	4.25	0.20	0.046	(0.198)	0.037	0.008
52	4.33	0.23	0.053	(0.198)	0.044	0.010
53	4.42	0.23	0.053	(0.197)	0.044	0.010
54	4.50	0.23	0.053	(0.196)	0.044	0.010
55	4.58	0.23	0.053	(0.195)	0.044	0.010
56	4.67	0.23	0.053	(0.194)	0.044	0.010
57	4.75	0.23	0.053	(0.193)	0.044	0.010
58	4.83	0.27	0.061	(0.193)	0.050	0.011
59	4.92	0.27	0.061	(0.192)	0.050	0.011
60	5.00	0.27	0.061	(0.191)	0.050	0.011
61	5.08	0.20	0.046	(0.190)	0.037	0.008

62	5.17	0.20	0.046	(0.189)	0.037	0.008
63	5.25	0.20	0.046	(0.188)	0.037	0.008
64	5.33	0.23	0.053	(0.188)	0.044	0.010
65	5.42	0.23	0.053	(0.187)	0.044	0.010
66	5.50	0.23	0.053	(0.186)	0.044	0.010
67	5.58	0.27	0.061	(0.185)	0.050	0.011
68	5.67	0.27	0.061	(0.184)	0.050	0.011
69	5.75	0.27	0.061	(0.184)	0.050	0.011
70	5.83	0.27	0.061	(0.183)	0.050	0.011
71	5.92	0.27	0.061	(0.182)	0.050	0.011
72	6.00	0.27	0.061	(0.181)	0.050	0.011
73	6.08	0.30	0.068	(0.180)	0.056	0.012
74	6.17	0.30	0.068	(0.179)	0.056	0.012
75	6.25	0.30	0.068	(0.179)	0.056	0.012
76	6.33	0.30	0.068	(0.178)	0.056	0.012
77	6.42	0.30	0.068	(0.177)	0.056	0.012
78	6.50	0.30	0.068	(0.176)	0.056	0.012
79	6.58	0.33	0.076	(0.175)	0.062	0.014
80	6.67	0.33	0.076	(0.175)	0.062	0.014
81	6.75	0.33	0.076	(0.174)	0.062	0.014
82	6.83	0.33	0.076	(0.173)	0.062	0.014
83	6.92	0.33	0.076	(0.172)	0.062	0.014
84	7.00	0.33	0.076	(0.172)	0.062	0.014
85	7.08	0.33	0.076	(0.171)	0.062	0.014
86	7.17	0.33	0.076	(0.170)	0.062	0.014
87	7.25	0.33	0.076	(0.169)	0.062	0.014
88	7.33	0.37	0.084	(0.168)	0.069	0.015
89	7.42	0.37	0.084	(0.168)	0.069	0.015
90	7.50	0.37	0.084	(0.167)	0.069	0.015
91	7.58	0.40	0.091	(0.166)	0.075	0.016
92	7.67	0.40	0.091	(0.165)	0.075	0.016
93	7.75	0.40	0.091	(0.165)	0.075	0.016
94	7.83	0.43	0.099	(0.164)	0.081	0.018
95	7.92	0.43	0.099	(0.163)	0.081	0.018
96	8.00	0.43	0.099	(0.162)	0.081	0.018
97	8.08	0.50	0.114	(0.162)	0.093	0.021
98	8.17	0.50	0.114	(0.161)	0.093	0.021
99	8.25	0.50	0.114	(0.160)	0.093	0.021
100	8.33	0.50	0.114	(0.159)	0.093	0.021
101	8.42	0.50	0.114	(0.159)	0.093	0.021
102	8.50	0.50	0.114	(0.158)	0.093	0.021
103	8.58	0.53	0.122	(0.157)	0.100	0.022
104	8.67	0.53	0.122	(0.156)	0.100	0.022
105	8.75	0.53	0.122	(0.156)	0.100	0.022
106	8.83	0.57	0.129	(0.155)	0.106	0.023
107	8.92	0.57	0.129	(0.154)	0.106	0.023
108	9.00	0.57	0.129	(0.153)	0.106	0.023
109	9.08	0.63	0.144	(0.153)	0.118	0.026
110	9.17	0.63	0.144	(0.152)	0.118	0.026
111	9.25	0.63	0.144	(0.151)	0.118	0.026
112	9.33	0.67	0.152	(0.151)	0.125	0.027
113	9.42	0.67	0.152	(0.150)	0.125	0.027
114	9.50	0.67	0.152	(0.149)	0.125	0.027
115	9.58	0.70	0.160	(0.148)	0.131	0.029
116	9.67	0.70	0.160	(0.148)	0.131	0.029
117	9.75	0.70	0.160	(0.147)	0.131	0.029
118	9.83	0.73	0.167	(0.146)	0.137	0.030

119	9.92	0.73	0.167	(0.146)	0.137	0.030
120	10.00	0.73	0.167	(0.145)	0.137	0.030
121	10.08	0.50	0.114	(0.144)	0.093	0.021
122	10.17	0.50	0.114	(0.143)	0.093	0.021
123	10.25	0.50	0.114	(0.143)	0.093	0.021
124	10.33	0.50	0.114	(0.142)	0.093	0.021
125	10.42	0.50	0.114	(0.141)	0.093	0.021
126	10.50	0.50	0.114	(0.141)	0.093	0.021
127	10.58	0.67	0.152	(0.140)	0.125	0.027
128	10.67	0.67	0.152	(0.139)	0.125	0.027
129	10.75	0.67	0.152	(0.139)	0.125	0.027
130	10.83	0.67	0.152	(0.138)	0.125	0.027
131	10.92	0.67	0.152	(0.137)	0.125	0.027
132	11.00	0.67	0.152	(0.137)	0.125	0.027
133	11.08	0.63	0.144	(0.136)	0.118	0.026
134	11.17	0.63	0.144	(0.135)	0.118	0.026
135	11.25	0.63	0.144	(0.135)	0.118	0.026
136	11.33	0.63	0.144	(0.134)	0.118	0.026
137	11.42	0.63	0.144	(0.133)	0.118	0.026
138	11.50	0.63	0.144	(0.133)	0.118	0.026
139	11.58	0.57	0.129	(0.132)	0.106	0.023
140	11.67	0.57	0.129	(0.131)	0.106	0.023
141	11.75	0.57	0.129	(0.131)	0.106	0.023
142	11.83	0.60	0.137	(0.130)	0.112	0.025
143	11.92	0.60	0.137	(0.129)	0.112	0.025
144	12.00	0.60	0.137	(0.129)	0.112	0.025
145	12.08	0.83	0.190	0.128	(0.156)	0.062
146	12.17	0.83	0.190	0.127	(0.156)	0.063
147	12.25	0.83	0.190	0.127	(0.156)	0.063
148	12.33	0.87	0.198	0.126	(0.162)	0.071
149	12.42	0.87	0.198	0.126	(0.162)	0.072
150	12.50	0.87	0.198	0.125	(0.162)	0.073
151	12.58	0.93	0.213	0.124	(0.174)	0.089
152	12.67	0.93	0.213	0.124	(0.174)	0.089
153	12.75	0.93	0.213	0.123	(0.174)	0.090
154	12.83	0.97	0.220	0.122	(0.181)	0.098
155	12.92	0.97	0.220	0.122	(0.181)	0.099
156	13.00	0.97	0.220	0.121	(0.181)	0.099
157	13.08	1.13	0.258	0.121	(0.212)	0.138
158	13.17	1.13	0.258	0.120	(0.212)	0.138
159	13.25	1.13	0.258	0.119	(0.212)	0.139
160	13.33	1.13	0.258	0.119	(0.212)	0.140
161	13.42	1.13	0.258	0.118	(0.212)	0.140
162	13.50	1.13	0.258	0.117	(0.212)	0.141
163	13.58	0.77	0.175	0.117	(0.143)	0.058
164	13.67	0.77	0.175	0.116	(0.143)	0.058
165	13.75	0.77	0.175	0.116	(0.143)	0.059
166	13.83	0.77	0.175	0.115	(0.143)	0.060
167	13.92	0.77	0.175	0.115	(0.143)	0.060
168	14.00	0.77	0.175	0.114	(0.143)	0.061
169	14.08	0.90	0.205	0.113	(0.168)	0.092
170	14.17	0.90	0.205	0.113	(0.168)	0.092
171	14.25	0.90	0.205	0.112	(0.168)	0.093
172	14.33	0.87	0.198	0.112	(0.162)	0.086
173	14.42	0.87	0.198	0.111	(0.162)	0.087
174	14.50	0.87	0.198	0.110	(0.162)	0.087
175	14.58	0.87	0.198	0.110	(0.162)	0.088

176	14.67	0.87	0.198	0.109	(0.162)	0.088
177	14.75	0.87	0.198	0.109	(0.162)	0.089
178	14.83	0.83	0.190	0.108	(0.156)	0.082
179	14.92	0.83	0.190	0.108	(0.156)	0.082
180	15.00	0.83	0.190	0.107	(0.156)	0.083
181	15.08	0.80	0.182	0.107	(0.150)	0.076
182	15.17	0.80	0.182	0.106	(0.150)	0.076
183	15.25	0.80	0.182	0.106	(0.150)	0.077
184	15.33	0.77	0.175	0.105	(0.143)	0.070
185	15.42	0.77	0.175	0.104	(0.143)	0.070
186	15.50	0.77	0.175	0.104	(0.143)	0.071
187	15.58	0.63	0.144	0.103	(0.118)	0.041
188	15.67	0.63	0.144	0.103	(0.118)	0.042
189	15.75	0.63	0.144	0.102	(0.118)	0.042
190	15.83	0.63	0.144	0.102	(0.118)	0.043
191	15.92	0.63	0.144	0.101	(0.118)	0.043
192	16.00	0.63	0.144	0.101	(0.118)	0.044
193	16.08	0.13	0.030	(0.100)	0.025	0.005
194	16.17	0.13	0.030	(0.100)	0.025	0.005
195	16.25	0.13	0.030	(0.099)	0.025	0.005
196	16.33	0.13	0.030	(0.099)	0.025	0.005
197	16.42	0.13	0.030	(0.098)	0.025	0.005
198	16.50	0.13	0.030	(0.098)	0.025	0.005
199	16.58	0.10	0.023	(0.097)	0.019	0.004
200	16.67	0.10	0.023	(0.097)	0.019	0.004
201	16.75	0.10	0.023	(0.096)	0.019	0.004
202	16.83	0.10	0.023	(0.096)	0.019	0.004
203	16.92	0.10	0.023	(0.095)	0.019	0.004
204	17.00	0.10	0.023	(0.095)	0.019	0.004
205	17.08	0.17	0.038	(0.094)	0.031	0.007
206	17.17	0.17	0.038	(0.094)	0.031	0.007
207	17.25	0.17	0.038	(0.093)	0.031	0.007
208	17.33	0.17	0.038	(0.093)	0.031	0.007
209	17.42	0.17	0.038	(0.092)	0.031	0.007
210	17.50	0.17	0.038	(0.092)	0.031	0.007
211	17.58	0.17	0.038	(0.091)	0.031	0.007
212	17.67	0.17	0.038	(0.091)	0.031	0.007
213	17.75	0.17	0.038	(0.091)	0.031	0.007
214	17.83	0.13	0.030	(0.090)	0.025	0.005
215	17.92	0.13	0.030	(0.090)	0.025	0.005
216	18.00	0.13	0.030	(0.089)	0.025	0.005
217	18.08	0.13	0.030	(0.089)	0.025	0.005
218	18.17	0.13	0.030	(0.088)	0.025	0.005
219	18.25	0.13	0.030	(0.088)	0.025	0.005
220	18.33	0.13	0.030	(0.087)	0.025	0.005
221	18.42	0.13	0.030	(0.087)	0.025	0.005
222	18.50	0.13	0.030	(0.087)	0.025	0.005
223	18.58	0.10	0.023	(0.086)	0.019	0.004
224	18.67	0.10	0.023	(0.086)	0.019	0.004
225	18.75	0.10	0.023	(0.085)	0.019	0.004
226	18.83	0.07	0.015	(0.085)	0.012	0.003
227	18.92	0.07	0.015	(0.085)	0.012	0.003
228	19.00	0.07	0.015	(0.084)	0.012	0.003
229	19.08	0.10	0.023	(0.084)	0.019	0.004
230	19.17	0.10	0.023	(0.083)	0.019	0.004
231	19.25	0.10	0.023	(0.083)	0.019	0.004
232	19.33	0.13	0.030	(0.083)	0.025	0.005

233	19.42	0.13	0.030	(0.082)	0.025	0.005
234	19.50	0.13	0.030	(0.082)	0.025	0.005
235	19.58	0.10	0.023	(0.081)	0.019	0.004
236	19.67	0.10	0.023	(0.081)	0.019	0.004
237	19.75	0.10	0.023	(0.081)	0.019	0.004
238	19.83	0.07	0.015	(0.080)	0.012	0.003
239	19.92	0.07	0.015	(0.080)	0.012	0.003
240	20.00	0.07	0.015	(0.080)	0.012	0.003
241	20.08	0.10	0.023	(0.079)	0.019	0.004
242	20.17	0.10	0.023	(0.079)	0.019	0.004
243	20.25	0.10	0.023	(0.079)	0.019	0.004
244	20.33	0.10	0.023	(0.078)	0.019	0.004
245	20.42	0.10	0.023	(0.078)	0.019	0.004
246	20.50	0.10	0.023	(0.078)	0.019	0.004
247	20.58	0.10	0.023	(0.077)	0.019	0.004
248	20.67	0.10	0.023	(0.077)	0.019	0.004
249	20.75	0.10	0.023	(0.077)	0.019	0.004
250	20.83	0.07	0.015	(0.076)	0.012	0.003
251	20.92	0.07	0.015	(0.076)	0.012	0.003
252	21.00	0.07	0.015	(0.076)	0.012	0.003
253	21.08	0.10	0.023	(0.075)	0.019	0.004
254	21.17	0.10	0.023	(0.075)	0.019	0.004
255	21.25	0.10	0.023	(0.075)	0.019	0.004
256	21.33	0.07	0.015	(0.075)	0.012	0.003
257	21.42	0.07	0.015	(0.074)	0.012	0.003
258	21.50	0.07	0.015	(0.074)	0.012	0.003
259	21.58	0.10	0.023	(0.074)	0.019	0.004
260	21.67	0.10	0.023	(0.073)	0.019	0.004
261	21.75	0.10	0.023	(0.073)	0.019	0.004
262	21.83	0.07	0.015	(0.073)	0.012	0.003
263	21.92	0.07	0.015	(0.073)	0.012	0.003
264	22.00	0.07	0.015	(0.072)	0.012	0.003
265	22.08	0.10	0.023	(0.072)	0.019	0.004
266	22.17	0.10	0.023	(0.072)	0.019	0.004
267	22.25	0.10	0.023	(0.072)	0.019	0.004
268	22.33	0.07	0.015	(0.072)	0.012	0.003
269	22.42	0.07	0.015	(0.071)	0.012	0.003
270	22.50	0.07	0.015	(0.071)	0.012	0.003
271	22.58	0.07	0.015	(0.071)	0.012	0.003
272	22.67	0.07	0.015	(0.071)	0.012	0.003
273	22.75	0.07	0.015	(0.070)	0.012	0.003
274	22.83	0.07	0.015	(0.070)	0.012	0.003
275	22.92	0.07	0.015	(0.070)	0.012	0.003
276	23.00	0.07	0.015	(0.070)	0.012	0.003
277	23.08	0.07	0.015	(0.070)	0.012	0.003
278	23.17	0.07	0.015	(0.070)	0.012	0.003
279	23.25	0.07	0.015	(0.069)	0.012	0.003
280	23.33	0.07	0.015	(0.069)	0.012	0.003
281	23.42	0.07	0.015	(0.069)	0.012	0.003
282	23.50	0.07	0.015	(0.069)	0.012	0.003
283	23.58	0.07	0.015	(0.069)	0.012	0.003
284	23.67	0.07	0.015	(0.069)	0.012	0.003
285	23.75	0.07	0.015	(0.069)	0.012	0.003
286	23.83	0.07	0.015	(0.069)	0.012	0.003
287	23.92	0.07	0.015	(0.069)	0.012	0.003
288	24.00	0.07	0.015	(0.069)	0.012	0.003

(Loss Rate Not Used)

Sum = 100.0 Sum = 6.3

Flood volume = Effective rainfall 0.53(In)
times area 6.5(Ac.)/[(In)/(Ft.)] = 0.3(Ac.Ft)
Total soil loss = 1.37(In)
Total soil loss = 0.747(Ac.Ft)
Total rainfall = 1.90(In)
Flood volume = 12483.9 Cubic Feet
Total soil loss = 32552.9 Cubic Feet

Peak flow rate of this hydrograph = 0.924(CFS)

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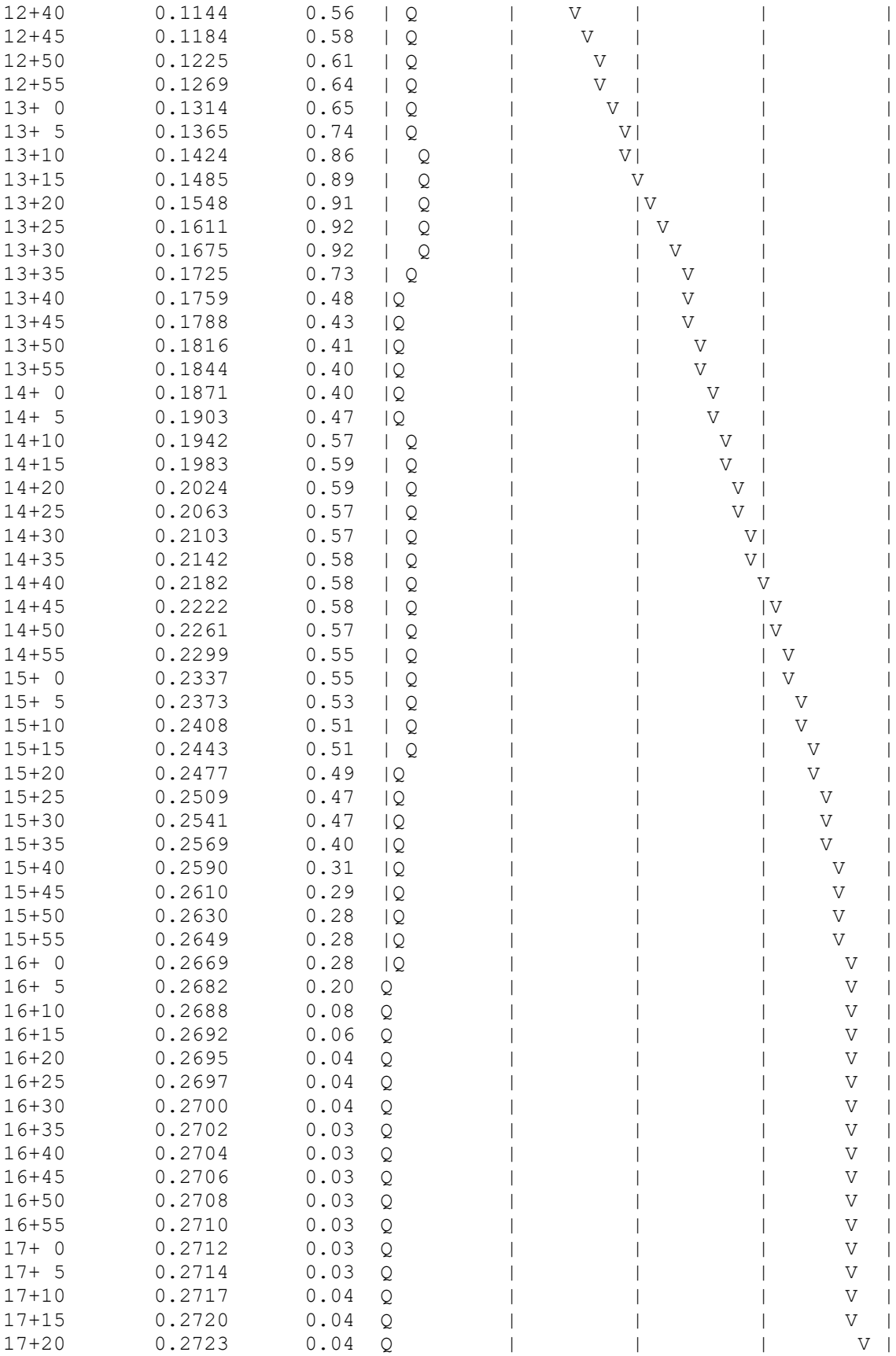
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0000	0.01	Q				
0+10	0.0001	0.01	Q				
0+15	0.0003	0.02	Q				
0+20	0.0004	0.02	Q				
0+25	0.0006	0.03	Q				
0+30	0.0008	0.03	Q				
0+35	0.0009	0.03	Q				
0+40	0.0011	0.03	Q				
0+45	0.0013	0.03	Q				
0+50	0.0015	0.03	Q				
0+55	0.0018	0.03	Q				
1+ 0	0.0020	0.04	Q				
1+ 5	0.0022	0.03	Q				
1+10	0.0024	0.03	Q				
1+15	0.0026	0.03	Q				
1+20	0.0028	0.03	Q				
1+25	0.0030	0.03	Q				
1+30	0.0032	0.03	Q				
1+35	0.0034	0.03	Q				
1+40	0.0035	0.03	Q				
1+45	0.0037	0.03	Q				
1+50	0.0039	0.03	Q				
1+55	0.0042	0.03	Q				
2+ 0	0.0044	0.04	Q				
2+ 5	0.0047	0.04	Q				
2+10	0.0049	0.04	Q				
2+15	0.0052	0.04	Q				
2+20	0.0054	0.04	Q				
2+25	0.0057	0.04	Q				
2+30	0.0059	0.04	Q				
2+35	0.0062	0.04	Q				
2+40	0.0065	0.04	Q				
2+45	0.0068	0.04	Q				
2+50	0.0071	0.04	Q				
2+55	0.0074	0.04	QV				
3+ 0	0.0077	0.05	QV				
3+ 5	0.0080	0.05	QV				

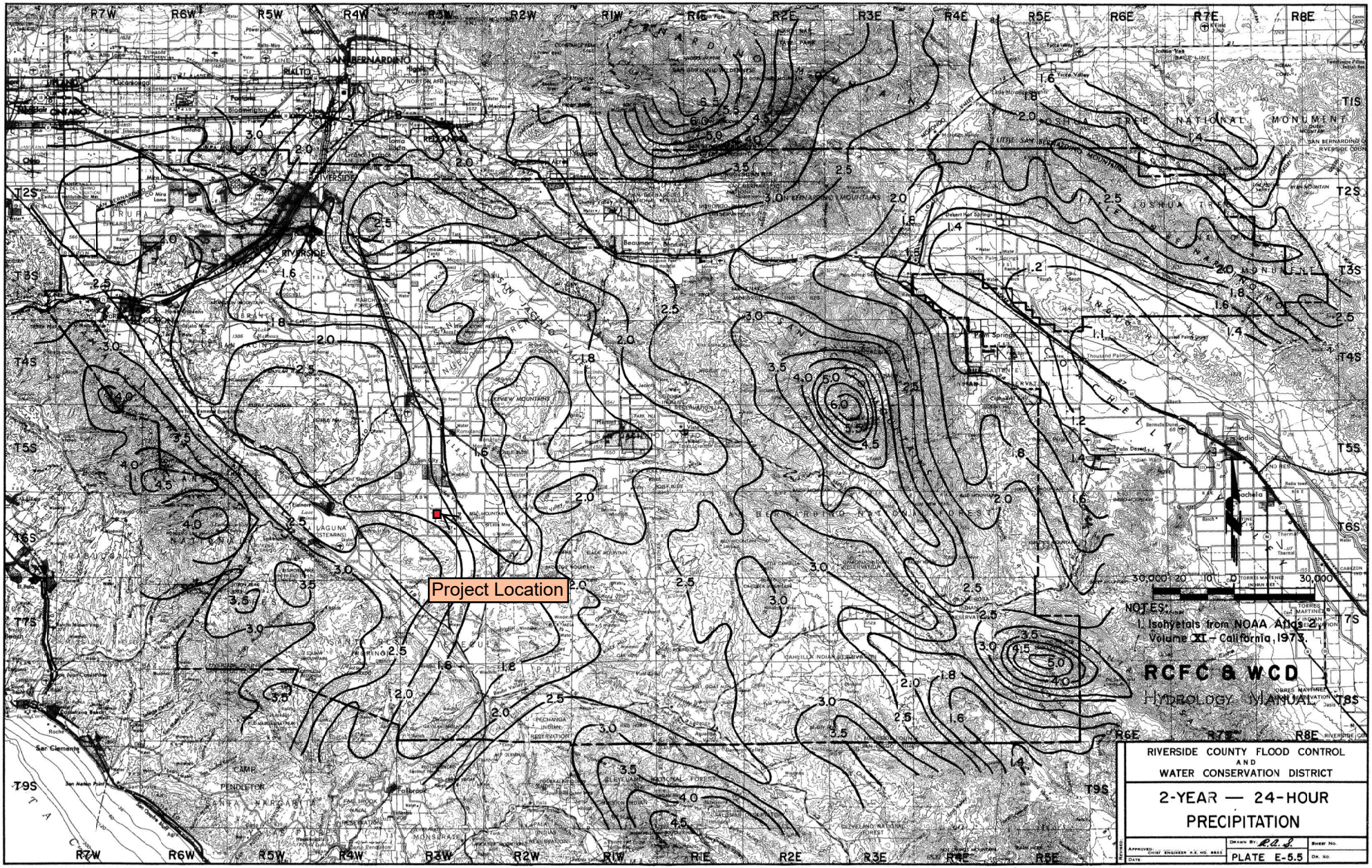
3+10	0.0083	0.05	QV				
3+15	0.0086	0.05	QV				
3+20	0.0089	0.05	QV				
3+25	0.0093	0.05	QV				
3+30	0.0096	0.05	QV				
3+35	0.0099	0.05	QV				
3+40	0.0102	0.05	QV				
3+45	0.0105	0.05	QV				
3+50	0.0108	0.05	QV				
3+55	0.0112	0.05	QV				
4+ 0	0.0116	0.05	QV				
4+ 5	0.0119	0.05	QV				
4+10	0.0123	0.05	QV				
4+15	0.0127	0.05	QV				
4+20	0.0131	0.06	QV				
4+25	0.0135	0.06	QV				
4+30	0.0139	0.06	QV				
4+35	0.0144	0.06	Q V				
4+40	0.0148	0.06	Q V				
4+45	0.0152	0.06	Q V				
4+50	0.0157	0.07	Q V				
4+55	0.0162	0.07	Q V				
5+ 0	0.0167	0.07	Q V				
5+ 5	0.0171	0.07	Q V				
5+10	0.0175	0.06	Q V				
5+15	0.0179	0.06	Q V				
5+20	0.0183	0.06	Q V				
5+25	0.0187	0.06	Q V				
5+30	0.0191	0.06	Q V				
5+35	0.0196	0.07	Q V				
5+40	0.0201	0.07	Q V				
5+45	0.0206	0.07	Q V				
5+50	0.0211	0.07	Q V				
5+55	0.0216	0.07	Q V				
6+ 0	0.0220	0.07	Q V				
6+ 5	0.0226	0.08	Q V				
6+10	0.0231	0.08	Q V				
6+15	0.0237	0.08	Q V				
6+20	0.0242	0.08	Q V				
6+25	0.0248	0.08	Q V				
6+30	0.0253	0.08	Q V				
6+35	0.0259	0.08	Q V				
6+40	0.0265	0.09	Q V				
6+45	0.0271	0.09	Q V				
6+50	0.0278	0.09	Q V				
6+55	0.0284	0.09	Q V				
7+ 0	0.0290	0.09	Q V				
7+ 5	0.0296	0.09	Q V				
7+10	0.0302	0.09	Q V				
7+15	0.0309	0.09	Q V				
7+20	0.0315	0.09	Q V				
7+25	0.0322	0.10	Q V				
7+30	0.0329	0.10	Q V				
7+35	0.0336	0.10	Q V				
7+40	0.0343	0.11	Q V				
7+45	0.0350	0.11	Q V				
7+50	0.0358	0.11	Q V				

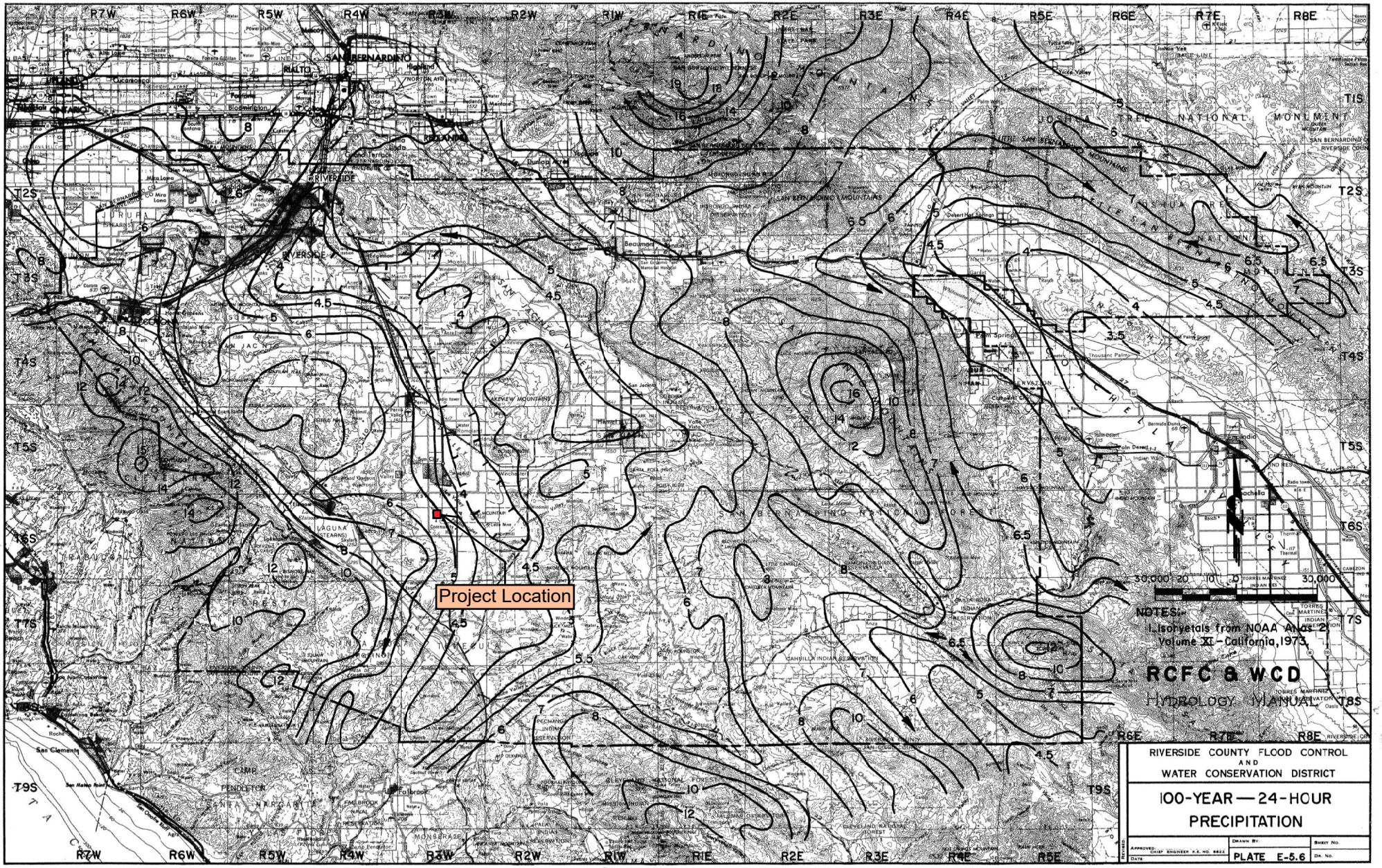
7+55	0.0366	0.12	Q	V	|	|	|
8+ 0	0.0374	0.12	Q	V	|	|	|
8+ 5	0.0382	0.12	Q	V	|	|	|
8+10	0.0391	0.13	Q	V	|	|	|
8+15	0.0401	0.13	Q	V	|	|	|
8+20	0.0410	0.13	Q	V	|	|	|
8+25	0.0419	0.13	Q	V	|	|	|
8+30	0.0428	0.14	Q	V	|	|	|
8+35	0.0438	0.14	Q	V	|	|	|
8+40	0.0448	0.14	Q	V	|	|	|
8+45	0.0458	0.14	Q	V	|	|	|
8+50	0.0468	0.15	Q	V	|	|	|
8+55	0.0478	0.15	Q	V	|	|	|
9+ 0	0.0489	0.15	Q	V	|	|	|
9+ 5	0.0500	0.16	Q	V	|	|	|
9+10	0.0511	0.17	Q	V	|	|	|
9+15	0.0523	0.17	Q	V	|	|	|
9+20	0.0535	0.17	Q	V	|	|	|
9+25	0.0547	0.18	Q	V	|	|	|
9+30	0.0560	0.18	Q	V	|	|	|
9+35	0.0572	0.18	Q	V	|	|	|
9+40	0.0585	0.19	Q	V	|	|	|
9+45	0.0598	0.19	Q	V	|	|	|
9+50	0.0611	0.19	Q	V	|	|	|
9+55	0.0625	0.20	Q	V	|	|	|
10+ 0	0.0638	0.20	Q	V	|	|	|
10+ 5	0.0651	0.18	Q	V	|	|	|
10+10	0.0661	0.15	Q	V	|	|	|
10+15	0.0670	0.14	Q	V	|	|	|
10+20	0.0680	0.14	Q	V	|	|	|
10+25	0.0689	0.14	Q	V	|	|	|
10+30	0.0698	0.14	Q	V	|	|	|
10+35	0.0709	0.15	Q	V	|	|	|
10+40	0.0721	0.17	Q	V	|	|	|
10+45	0.0733	0.18	Q	V	|	|	|
10+50	0.0745	0.18	Q	V	|	|	|
10+55	0.0757	0.18	Q	V	|	|	|
11+ 0	0.0770	0.18	Q	V	|	|	|
11+ 5	0.0782	0.18	Q	V	|	|	|
11+10	0.0794	0.17	Q	| V	|	|	|
11+15	0.0806	0.17	Q	| V	|	|	|
11+20	0.0818	0.17	Q	| V	|	|	|
11+25	0.0829	0.17	Q	| V	|	|	|
11+30	0.0841	0.17	Q	| V	|	|	|
11+35	0.0852	0.16	Q	| V	|	|	|
11+40	0.0863	0.16	Q	| V	|	|	|
11+45	0.0874	0.15	Q	| V	|	|	|
11+50	0.0885	0.16	Q	| V	|	|	|
11+55	0.0896	0.16	Q	| V	|	|	|
12+ 0	0.0907	0.16	Q	| V	|	|	|
12+ 5	0.0924	0.25	Q	| V	|	|	|
12+10	0.0949	0.36	| Q	| V	|	|	|
12+15	0.0976	0.39	| Q	| V	|	|	|
12+20	0.1006	0.43	| Q	| V	|	|	|
12+25	0.1037	0.46	| Q	| V	|	|	|
12+30	0.1070	0.47	| Q	| V	|	|	|
12+35	0.1105	0.51	| Q	| V	|	|	|



17+25	0.2726	0.04	Q	|	|	|	V |
17+30	0.2729	0.05	Q	|	|	|	V |
17+35	0.2732	0.05	Q	|	|	|	V |
17+40	0.2735	0.05	Q	|	|	|	V |
17+45	0.2738	0.05	Q	|	|	|	V |
17+50	0.2741	0.04	Q	|	|	|	V |
17+55	0.2744	0.04	Q	|	|	|	V |
18+ 0	0.2746	0.04	Q	|	|	|	V |
18+ 5	0.2749	0.04	Q	|	|	|	V |
18+10	0.2751	0.04	Q	|	|	|	V |
18+15	0.2754	0.04	Q	|	|	|	V |
18+20	0.2756	0.04	Q	|	|	|	V |
18+25	0.2759	0.04	Q	|	|	|	V |
18+30	0.2761	0.04	Q	|	|	|	V |
18+35	0.2763	0.03	Q	|	|	|	V |
18+40	0.2765	0.03	Q	|	|	|	V |
18+45	0.2767	0.03	Q	|	|	|	V |
18+50	0.2769	0.02	Q	|	|	|	V |
18+55	0.2770	0.02	Q	|	|	|	V |
19+ 0	0.2772	0.02	Q	|	|	|	V |
19+ 5	0.2773	0.02	Q	|	|	|	V |
19+10	0.2775	0.03	Q	|	|	|	V |
19+15	0.2777	0.03	Q	|	|	|	V |
19+20	0.2779	0.03	Q	|	|	|	V |
19+25	0.2781	0.03	Q	|	|	|	V |
19+30	0.2784	0.04	Q	|	|	|	V |
19+35	0.2786	0.03	Q	|	|	|	V |
19+40	0.2788	0.03	Q	|	|	|	V |
19+45	0.2790	0.03	Q	|	|	|	V |
19+50	0.2791	0.02	Q	|	|	|	V |
19+55	0.2793	0.02	Q	|	|	|	V |
20+ 0	0.2794	0.02	Q	|	|	|	V |
20+ 5	0.2795	0.02	Q	|	|	|	V|
20+10	0.2797	0.03	Q	|	|	|	V|
20+15	0.2799	0.03	Q	|	|	|	V|
20+20	0.2801	0.03	Q	|	|	|	V|
20+25	0.2803	0.03	Q	|	|	|	V|
20+30	0.2805	0.03	Q	|	|	|	V|
20+35	0.2806	0.03	Q	|	|	|	V|
20+40	0.2808	0.03	Q	|	|	|	V|
20+45	0.2810	0.03	Q	|	|	|	V|
20+50	0.2812	0.02	Q	|	|	|	V|
20+55	0.2813	0.02	Q	|	|	|	V|
21+ 0	0.2814	0.02	Q	|	|	|	V|
21+ 5	0.2816	0.02	Q	|	|	|	V|
21+10	0.2818	0.03	Q	|	|	|	V|
21+15	0.2820	0.03	Q	|	|	|	V|
21+20	0.2821	0.02	Q	|	|	|	V|
21+25	0.2822	0.02	Q	|	|	|	V|
21+30	0.2824	0.02	Q	|	|	|	V|
21+35	0.2825	0.02	Q	|	|	|	V|
21+40	0.2827	0.03	Q	|	|	|	V|
21+45	0.2829	0.03	Q	|	|	|	V|
21+50	0.2830	0.02	Q	|	|	|	V|
21+55	0.2832	0.02	Q	|	|	|	V|
22+ 0	0.2833	0.02	Q	|	|	|	V|
22+ 5	0.2835	0.02	Q	|	|	|	V|

22+10	0.2836	0.03	Q	|	|	|	V|
22+15	0.2838	0.03	Q	|	|	|	V|
22+20	0.2840	0.02	Q	|	|	|	V|
22+25	0.2841	0.02	Q	|	|	|	V|
22+30	0.2842	0.02	Q	|	|	|	V|
22+35	0.2844	0.02	Q	|	|	|	V|
22+40	0.2845	0.02	Q	|	|	|	V|
22+45	0.2846	0.02	Q	|	|	|	V|
22+50	0.2847	0.02	Q	|	|	|	V|
22+55	0.2849	0.02	Q	|	|	|	V|
23+ 0	0.2850	0.02	Q	|	|	|	V|
23+ 5	0.2851	0.02	Q	|	|	|	V|
23+10	0.2852	0.02	Q	|	|	|	V|
23+15	0.2854	0.02	Q	|	|	|	V|
23+20	0.2855	0.02	Q	|	|	|	V|
23+25	0.2856	0.02	Q	|	|	|	V|
23+30	0.2857	0.02	Q	|	|	|	V|
23+35	0.2859	0.02	Q	|	|	|	V|
23+40	0.2860	0.02	Q	|	|	|	V|
23+45	0.2861	0.02	Q	|	|	|	V|
23+50	0.2862	0.02	Q	|	|	|	V|
23+55	0.2863	0.02	Q	|	|	|	V|
24+ 0	0.2865	0.02	Q	|	|	|	V|
24+ 5	0.2866	0.01	Q	|	|	|	V|
24+10	0.2866	0.00	Q	|	|	|	V|
24+15	0.2866	0.00	Q	|	|	|	V|
24+20	0.2866	0.00	Q	|	|	|	V|
24+25	0.2866	0.00	Q	|	|	|	V|


Project Location
NOTES:
1. Isohyetals from NOAA Atlas 2, Volume XI - California, 1973.
RCFC & WCD
HYDROLOGY MANUAL
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
2-YEAR — 24-HOUR PRECIPITATION
PLATE E-5.5


Project Location
NOTES:
1. Isohyetals from NOAA Atlas 2, Volume XI - California, 1973.
RCFC & WCD
HYDROLOGY MANUAL
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
100-YEAR — 24-HOUR PRECIPITATION
PLATE E-5.6

Appendix 8: Source Control

Pollutant Sources/Source Control Checklist

STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

How to use this worksheet (also see instructions in Section G of the WQMP Template):

1. Review Column 1 and identify which of these potential sources of stormwater pollutants apply to your site. Check each box that applies.
2. Review Column 2 and incorporate all of the corresponding applicable BMPs in your WQMP Exhibit.
3. Review Columns 3 and 4 and incorporate all of the corresponding applicable permanent controls and operational BMPs in your WQMP. Use the format shown in Table G.1on page 23 of this WQMP Template. Describe your specific BMPs in an accompanying narrative, and explain any special conditions or situations that required omitting BMPs or substituting alternative BMPs for those shown here.

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ A. **On-site storm drain inlets**	❑ **Locations of inlets.**	❑ **Mark all inlets with the words "Only Rain Down the Storm Drain" or similar. Catch Basin Markers may be available from the Riverside County Flood Control and Water Conservation District, call 951.955.1200 to verify.**	❑ **Maintain and periodically repaint or replace inlet markings.** ❑ **Provide stormwater pollution prevention information to new site owners, lessees, or operators.** ❑ **See applicable operational BMPs in Fact Sheet SC-44, "Drainage System Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com** ❑ **Include the following in lease agreements: "Tenant shall not allow anyone to discharge anything to storm drains or to store or deposit materials so as to create a potential discharge to storm drains."**
❑ B. **Interior floor drains and elevator shaft sump pumps**		❑ **State that interior floor drains and elevator shaft sump pumps will be plumbed to sanitary sewer.**	❑ **Inspect and maintain drains to prevent blockages and overflow.**
❑ C. **Interior parking garages**		❑ **State that parking garage floor drains will be plumbed to the sanitary sewer.**	❑ **Inspect and maintain drains to prevent blockages and overflow.**

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ D1. **Need for future indoor & structural pest control**		❑ **Note building design features that discourage entry of pests.**	❑ **Provide Integrated Pest Management information to owners, lessees, and operators.**
❑ D2. **Landscape/ Outdoor Pesticide Use**	❑ **Show locations of native trees or areas of shrubs and ground cover to be undisturbed and retained.** ❑ **Show self-retaining landscape areas, if any.** ❑ **Show stormwater treatment and hydrograph modification management BMPs. (See instructions in Chapter 3, Step 5 and guidance in Chapter 5.)**	**State that final landscape plans will accomplish all of the following.** ❑ **Preserve existing native trees, shrubs, and ground cover to the maximum extent possible.** ❑ **Design landscaping to minimize irrigation and runoff, to promote surface infiltration where appropriate, and to minimize the use of fertilizers and pesticides that can contribute to stormwater pollution.** ❑ **Where landscaped areas are used to retain or detain stormwater, specify plants that are tolerant of saturated soil conditions.** ❑ **Consider using pest-resistant plants, especially adjacent to hardscape.** **To insure successful establishment, select plants appropriate to site soils, slopes, climate, sun, wind, rain, land use, air movement, ecological consistency, and plant interactions.**	❑ **Maintain landscaping using minimum or no pesticides.** ❑ **See applicable operational BMPs in "What you should know for…..Landscape and Gardening"** at http://rcflood.org/stormwater/**Error! Hyperlink reference not valid.** ❑ **Provide IPM information to new owners, lessees and operators.**

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ E. **Pools, spas, ponds, decorative fountains, and other water features.**	❑ **Show location of water feature and a sanitary sewer cleanout in an accessible area within 10 feet. (Exception: Public pools must be plumbed according to County Department of Environmental Health Guidelines.)**	**If the Co-Permittee requires pools to be plumbed to the sanitary sewer, place a note on the plans and state in the narrative that this connection will be made according to local requirements.**	❑ **See applicable operational BMPs in** "Guidelines for Maintaining Your Swimming Pool, Jacuzzi and Garden Fountain" at http://rcflood.org/stormwater/
❑ F. **Food service**	❑ **For restaurants, grocery stores, and other food service operations, show location (indoors or in a covered area outdoors) of a floor sink or other area for cleaning floor mats, containers, and equipment.** ❑ **On the drawing, show a note that this drain will be connected to a grease interceptor before discharging to the sanitary sewer.**	❑ **Describe the location and features of the designated cleaning area.** ❑ **Describe the items to be cleaned in this facility and how it has been sized to insure that the largest items can be accommodated.**	❑ **See the brochure, "**The Food Service Industry Best Management Practices for: Restaurants, Grocery Stores, Delicatessens and Bakeries" at http://rcflood.org/stormwater/ **Provide this brochure to new site owners, lessees, and operators.**
❑ G. **Refuse areas**	❑ **Show where site refuse and recycled materials will be handled and stored for pickup. See local municipal requirements for sizes and other details of refuse areas.** ❑ **If dumpsters or other receptacles are outdoors, show how the designated area will be covered, graded, and paved to prevent run-on and show locations of berms to prevent runoff from the area.** ❑ **Any drains from dumpsters, compactors, and tallow bin areas shall be connected to a grease removal device before discharge to sanitary sewer.**	❑ **State how site refuse will be handled and provide supporting detail to what is shown on plans.** ❑ **State that signs will be posted on or near dumpsters with the words "Do not dump hazardous materials here" or similar.**	❑ **State how the following will be implemented:** **Provide adequate number of receptacles. Inspect receptacles regularly; repair or replace leaky receptacles. Keep receptacles covered. Prohibit/prevent dumping of liquid or hazardous wastes. Post "no hazardous materials" signs. Inspect and pick up litter daily and clean up spills immediately. Keep spill control materials available on-site. See Fact Sheet SC-34, "Waste Handling and Disposal" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com**

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ H. **Industrial processes.**	❑ **Show process area.**	❑ **If industrial processes are to be located on site, state: "All process activities to be performed indoors. No processes to drain to exterior or to storm drain system."**	❑ **See Fact Sheet SC-10, "Non-Stormwater Discharges" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com** See the brochure "Industrial & Commercial Facilities Best Management Practices for: Industrial, Commercial Facilities" at http://rcflood.org/stormwater/

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ I. **Outdoor storage of equipment or materials. (See rows J and K for source control measures for vehicle cleaning, repair, and maintenance.)**	❑ **Show any outdoor storage areas, including how materials will be covered. Show how areas will be graded and bermed to prevent run-on or run-off from area.** ❑ **Storage of non-hazardous liquids shall be covered by a roof and/or drain to the sanitary sewer system, and be contained by berms, dikes, liners, or vaults.** ❑ **Storage of hazardous materials and wastes must be in compliance with the local hazardous materials ordinance and a Hazardous Materials Management Plan for the site.**	**Include a detailed description of materials to be stored, storage areas, and structural features to prevent pollutants from entering storm drains.** **Where appropriate, reference documentation of compliance with the requirements of Hazardous Materials Programs for:** ▪ **Hazardous Waste Generation** ▪ **Hazardous Materials Release Response and Inventory** ▪ **California Accidental Release (CalARP)** ▪ **Aboveground Storage Tank** ▪ **Uniform Fire Code Article 80 Section 103(b) & (c) 1991** ▪ **Underground Storage Tank** **www.cchealth.org/groups/hazmat/**	❑ **See the Fact Sheets SC-31, "Outdoor Liquid Container Storage" and SC-33, "Outdoor Storage of Raw Materials " in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com**

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ J. **Vehicle and Equipment Cleaning**	❑ **Show on drawings as appropriate:** **(1) Commercial/industrial facilities having vehicle/equipment cleaning needs shall either provide a covered, bermed area for washing activities or discourage vehicle/equipment washing by removing hose bibs and installing signs prohibiting such uses.** **(2) Multi-dwelling complexes shall have a paved, bermed, and covered car wash area (unless car washing is prohibited on-site and hoses are provided with an automatic shut-off to discourage such use).** **(3) Washing areas for cars, vehicles, and equipment shall be paved, designed to prevent run-on to or runoff from the area, and plumbed to drain to the sanitary sewer.** **(4) Commercial car wash facilities shall be designed such that no runoff from the facility is discharged to the storm drain system. Wastewater from the facility shall discharge to the sanitary sewer, or a wastewater reclamation system shall be installed.**	❑ **If a car wash area is not provided, describe any measures taken to discourage on-site car washing and explain how these will be enforced.**	**Describe operational measures to implement the following (if applicable):** ❑ **Washwater from vehicle and equipment washing operations shall not be discharged to the storm drain system.** Refer to "Outdoor Cleaning Activities and Professional Mobile Service Providers" for many of the Potential Sources of Runoff Pollutants categories below. Brochure can be found at http://rcflood.org/stormwater/ ❑ **Car dealerships and similar may rinse cars with water only.**

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ K. **Vehicle/Equipment Repair and Maintenance**	❑ **Accommodate all vehicle equipment repair and maintenance indoors. Or designate an outdoor work area and design the area to prevent run-on and runoff of stormwater.** ❑ **Show secondary containment for exterior work areas where motor oil, brake fluid, gasoline, diesel fuel, radiator fluid, acid-containing batteries or other hazardous materials or hazardous wastes are used or stored. Drains shall not be installed within the secondary containment areas.** ❑ **Add a note on the plans that states either (1) there are no floor drains, or (2) floor drains are connected to wastewater pretreatment systems prior to discharge to the sanitary sewer and an industrial waste discharge permit will be obtained.**	❑ **State that no vehicle repair or maintenance will be done outdoors, or else describe the required features of the outdoor work area.** ❑ **State that there are no floor drains or if there are floor drains, note the agency from which an industrial waste discharge permit will be obtained and that the design meets that agency's requirements.** ❑ **State that there are no tanks, containers or sinks to be used for parts cleaning or rinsing or, if there are, note the agency from which an industrial waste discharge permit will be obtained and that the design meets that agency's requirements.**	**In the Stormwater Control Plan, note that all of the following restrictions apply to use the site:** ❑ **No person shall dispose of, nor permit the disposal, directly or indirectly of vehicle fluids, hazardous materials, or rinsewater from parts cleaning into storm drains.** ❑ **No vehicle fluid removal shall be performed outside a building, nor on asphalt or ground surfaces, whether inside or outside a building, except in such a manner as to ensure that any spilled fluid will be in an area of secondary containment. Leaking vehicle fluids shall be contained or drained from the vehicle immediately.** ❑ **No person shall leave unattended drip parts or other open containers containing vehicle fluid, unless such containers are in use or in an area of secondary containment.** Refer to "Automotive Maintenance & Car Care Best Management Practices for Auto Body Shops, Auto Repair Shops, Car Dealerships, Gas Stations and Fleet Service Operations". Brochure can be found at http://rcflood.org/stormwater/ Refer to Outdoor Cleaning Activities and Professional Mobile Service Providers for many of the Potential Sources of Runoff Pollutants categories below. Brochure can be found at http://rcflood.org/stormwater/

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ L. **Fuel Dispensing Areas**	❑ **Fueling areas[6] shall have impermeable floors (i.e., portland cement concrete or equivalent smooth impervious surface) that are: a) graded at the minimum slope necessary to prevent ponding; and b) separated from the rest of the site by a grade break that prevents run-on of stormwater to the maximum extent practicable.** ❑ **Fueling areas shall be covered by a canopy that extends a minimum of ten feet in each direction from each pump. [Alternative: The fueling area must be covered and the cover's minimum dimensions must be equal to or greater than the area within the grade break or fuel dispensing area[1].] The canopy [or cover] shall not drain onto the fueling area.**		❑ **The property owner shall dry sweep the fueling area routinely.** ❑ **See the Fact Sheet SD-30 , "Fueling Areas" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com**

[6] **The fueling area shall be defined as the area extending a minimum of 6.5 feet from the corner of each fuel dispenser or the length at which the hose and nozzle assembly may be operated plus a minimum of one foot, whichever is greater.**

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1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ M. **Loading Docks**	❑ **Show a preliminary design for the loading dock area, including roofing and drainage. Loading docks shall be covered and/or graded to minimize run-on to and runoff from the loading area. Roof downspouts shall be positioned to direct stormwater away from the loading area. Water from loading dock areas shall be drained to the sanitary sewer, or diverted and collected for ultimate discharge to the sanitary sewer.** ❑ **Loading dock areas draining directly to the sanitary sewer shall be equipped with a spill control valve or equivalent device, which shall be kept closed during periods of operation.** ❑ **Provide a roof overhang over the loading area or install door skirts (cowling) at each bay that enclose the end of the trailer.**		❑ **Move loaded and unloaded items indoors as soon as possible.** ❑ **See Fact Sheet SC-30, "Outdoor Loading and Unloading," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com**

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ N. **Fire Sprinkler Test Water**		❑ **Provide a means to drain fire sprinkler test water to the sanitary sewer.**	❑ **See the note in Fact Sheet SC-41, "Building and Grounds Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com**
O. **Miscellaneous Drain or Wash Water or Other Sources** ❑ **Boiler drain lines** ❑ **Condensate drain lines** ❑ **Rooftop equipment** ❑ **Drainage sumps** ❑ **Roofing, gutters, and trim.** ❑ **Other sources**		❑ **Boiler drain lines shall be directly or indirectly connected to the sanitary sewer system and may not discharge to the storm drain system.** ❑ **Condensate drain lines may discharge to landscaped areas if the flow is small enough that runoff will not occur. Condensate drain lines may not discharge to the storm drain system.** ❑ **Rooftop equipment with potential to produce pollutants shall be roofed and/or have secondary containment.** ❑ **Any drainage sumps on-site shall feature a sediment sump to reduce the quantity of sediment in pumped water.** ❑ **Avoid roofing, gutters, and trim made of copper or other unprotected metals that may leach into runoff.** **Include controls for other sources as specified by local reviewer.**	

STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
☑ P. **Plazas, sidewalks, and parking lots.**			☑ **Sweep plazas, sidewalks, and parking lots regularly to prevent accumulation of litter and debris. Collect debris from pressure washing to prevent entry into the storm drain system. Collect washwater containing any cleaning agent or degreaser and discharge to the sanitary sewer not to a storm drain.**

Appendix 9: O&M

Operation and Maintenance Plan and Documentation of Finance, Maintenance and Recording Mechanisms

Operation and Maintenance Plan will be done with the Final WQMP and will be based on the final design of the park and associated BMPs.

Appendix 10: Educational Materials

BMP Fact Sheets, Maintenance Guidelines and Other End-User BMP Information

Educational Materials will be provided with the Final WQMP and will be based on the final design of the park and associated BMPs.

IS/MND Appendix G

Noise and Vibration Technical Report

HELIX Environmental Planning

Evans Park Project

Noise and Vibration Technical Report

November 2021 | 02121.00002.001

Prepared for:

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TABLE OF CONTENTS

Section **Page**

EXECUTIVE SUMMARY ES-1

1.0 INTRODUCTION 1

1.1 Purpose of the ReporT 1
1.2 Project Location 1
1.3 Project Description 1
1.3.1 Southern Phase 1
1.3.2 Northern Phase 2
1.4 Noise and Sound Level Descriptors and Terminology 2
1.4.1 Descriptors 2
1.4.2 Terminology 3
1.5 Noise-Sensitive Land Uses 4
1.6 Regulatory Framework 4
1.6.1 California Noise Control Act 4
1.6.2 City of Menifee General Plan, Noise Element 5
1.6.3 City of Menifee Municipal Code 5

2.0 ENVIRONMENTAL SETTING 7

2.1 Surrounding Land Uses 7

3.0 ANALYSIS, METHODOLOGY, AND ASSUMPTIONS 7

3.1 Methodology 7
3.1.1 Noise Modeling Software 7
3.2 Assumptions 7
3.2.1 Construction 7
3.2.2 Operations 7
3.3 Guidelines for the Determination of Significance 8

4.0 IMPACTS 8

4.1 Issue 1: Excessive Noise Levels 8
4.1.1 Construction Noise 8
4.1.2 Operational On-site Noise 9
4.1.3 Operational Traffic Noise 10
4.1.4 Significance of Impacts 10
4.1.5 Mitigation Framework 10
4.1.6 Significance After Mitigation 10
4.2 Issue 2: Excessive Vibration 10
4.2.1 Construction Vibration 10
4.2.2 Operational Vibration 11
4.2.3 Significance of Impacts 11
4.2.4 Mitigation Framework 11
4.2.5 Significance After Mitigation 11

TABLE OF CONTENTS (cont.)

Section **Page**

4.3 Issue 3: Airport Noise Exposure 11
4.3.1 Aircraft Noise 11
4.3.2 Significance of Impacts 11
4.3.3 Mitigation Framework 11
4.3.4 Significance After Mitigation 11

5.0 LIST OF PREPARERS 12

6.0 REFERENCES 13

LIST OF FIGURES

No. **Title** **Follows Page**

1 Regional Location 2
2 Aerial Photograph of Project Location 2
3 Southern Phase Site Plan 2

LIST OF TABLES

No. **Title** **Page**

1 Stationary Noise Standards 5

ACRONYMS AND ABBREVIATIONS

ADT	average daily traffic
APN	Assessor's Parcel Number
Caltrans	California Department of Transportation
CEQA	California Environmental Quality Act
City	City of Menifee
CNEL	Community Noise Equivalent Level
dB	decibel
dBA	A-weighted decibels
Hz	Hertz
kHz	kilohertz
L_{DN}	Day-Night level
L_{EQ}	equivalent sound level
L_{MAX}	maximum noise level
mPa	micro-Pascals
mph	miles per hour
NSLU	noise-sensitive land use
PA	public address
PPV	peak particle velocity
RCNM	Roadway Construction Noise Model
SPL	sound pressure level
STC	Sound Transmission Class
S_{WL}	sound power level
TS	Traffic Study
USDOT	U.S. Department of Transportation

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EXECUTIVE SUMMARY

This report presents an assessment of potential noise and vibration impacts associated with the proposed Evans Park Project (project). The project is located northeast and southeast of the intersection of Craig Avenue and Evans Road in the City of Menifee (City). The project would develop a community park on 22.73 acres. The project would be constructed in two phases. The southern phase, anticipated to be completed in 2022, would consist of an approximately six-acre bicycle trails park located south of Craig Avenue. The northern phase, anticipated to be completed after 2025, located within the 13.56 acres north of Craig Avenue, would include a mixture of active- and passive-use spaces.

Anticipated construction activities would generate elevated noise levels in the immediate vicinity. However, in consideration of the distance to the nearest noise sensitive land uses (NSLUs) and an existing sound wall separating residences west of Evans Road from the road and project site, construction noise would not exceed the daytime exterior noise standard from the City's General Plan Noise Element.

Operational noise generated within the project would be typical of existing noise sources in the surrounding residential neighborhoods and high school. Special events would be held at the bicycle trails park approximately 5 to 6 times per year and may include the use of a portable public address (PA) speaker system. Noise from a portable speaker system is not anticipated to exceed the City General Plan exterior noise standards at the nearest NSLUs. Adherence to the City Municipal Code regulated park operating hours, open space trail use, and special event permitting would ensure the project would not result in increases in ambient noise levels exceeding City standards.

The project would result in offsite traffic. However, the addition of project traffic to existing traffic on area roadways would not result in a doubling of traffic and the increase in ambient noise level would be less than the threshold for a detectable increase in outdoor environments.

Construction of the project would not result in the generation of significant levels of ground-borne vibrations. Once operational, the project would not be a significant source of ground-borne vibrations.

There is no airport located in the project vicinity and persons living or working in the project area would not be exposed to significant levels of noise from airports.

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1.0 INTRODUCTION

1.1 PURPOSE OF THE REPORT

This report analyzes potential noise and vibration impacts associated with the proposed Evans Park Project (project). The analysis includes a description of existing conditions in the project vicinity and an assessment of potential impacts associated with project implementation. Analysis within this report addresses the relevant issues listed in Appendix G of the California Environmental Quality Act (CEQA) Guidelines.

1.2 PROJECT LOCATION

The project site is northeast and southeast of the intersection of Craig Avenue and Evans Road in the City of Menifee, County of Riverside, California (see Figure 1, *Regional Location*, and Figure 2, *Aerial Photograph of Project Location*). The project site is comprised of seven parcels (Assessor's Parcel Numbers [APNs] 360-170-002, 360-170-003, 360-170-004, 360-170-005, 360 170-006, 360-190-001, 360-190,002) totaling 22.73 acres.

1.3 PROJECT DESCRIPTION

In 2016, the City adopted the Park, Trails, and Open Space Master Plan (Master Plan; RJM 2016). The Master Plan identified current and future City park needs including Evans Park. Evans Park is a conceptual 20-acre site that is intended for use by residents of the City of Menifee.

The project would be constructed in two separate phases. The first phase would develop portions of the 9.17-acre site south of Craig Avenue and is currently funded and designed. The second phase would develop portions of the 13.56 acres of the site north of Craig Avenue and is in the conceptual phase. Once complete, Evans Park would provide approximately 20 acres of recreational and open space facilities.

1.3.1 Southern Phase

For the southern (first) phase, the City proposes to build an approximately six-acre bicycle trails park near the southeast corner of Evans Road and Craig Avenue. The bicycle trails park would include a parking lot at the northeast corner with an entrance off Craig Avenue and a prefabricated restroom. The bicycle trails park would be divided into two separate sections: a smaller paved tight circuit area called a "Pump Track," and the larger dirt trail portion of the track, which would have some wooden slat sections (see Figure 3, *Southern Phase Site Plan*).

Parking would be provided via a 12,000 square foot gravel parking lot in the northeast portion of the site, accessible from Craig Avenue and accommodate approximately 45 vehicles. The parking lot would have a gravel surface at the opening of the southern phase and would be paved approximately one year after the bicycle trails park becomes operational. The bicycle trails park would operate from dawn until dusk until the installation of light standards is complete approximately one-year after the opening. After the lighting is installed, the bicycle trails park would operate until 9:00 p.m. Special events would be held at the bicycle trails park approximately four to five times a year and would include the use of a portable PA speaker system.

It is anticipated that construction on the southern phase would commence in winter 2021 to spring 2022 with an opening date of late spring to early summer 2022. Once the southern phase becomes operational, regular maintenance would occur such as trash clean up and restroom servicing. The tracks themselves would be subject to maintenance after heavy rains and one to two times a year, however, no regular reshaping of the dirt trails is expected to occur.

1.3.2 Northern Phase

The northern (second) phase, within the 13.56 acres north of Craig Avenue, would include a mixture of active- and passive-use spaces. Concepts for development in the northern phase include a multi-use ball field, splash pad, picnic areas, and trails. Access would be via Evans Road with an internal drive to access the facilities. Ornamental landscaping would be provided throughout, however the existing wetland habitat in the southeastern portion would be retained in its natural state. It is anticipated that construction of the northern phase would commence in the year 2025.

The framework established in the City's Park Development and Design Guidelines (2015) provides a foundation for understanding the standards that would be expected for development of the northern phase. The City's Park Development Guidelines (City 2015) states that in general community parks should, "Provide a wide range of facilities that supplement those of the neighborhood parks, and which are determined by the needs and preferences of the community. Recreation centers, athletic fields, multipurpose courts, picnic facilities, play areas, parking areas, and comfort stations, landscaping and turf areas are standard amenities. When possible and desirable, swimming pools and tennis courts may be provided."

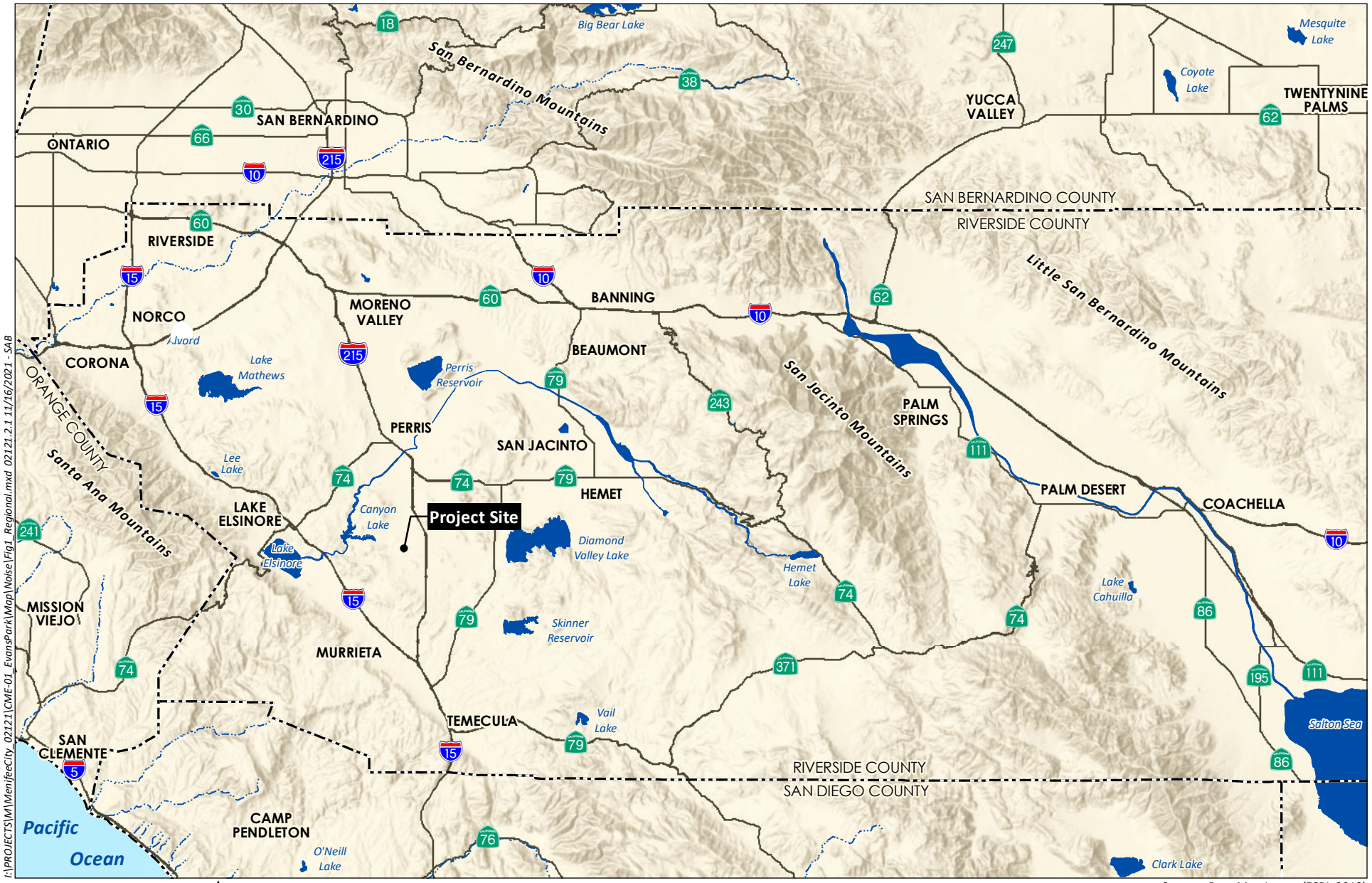
Because the northern phase is conceptual in nature and not expected to be developed in the immediate future, this report addresses noise and vibration impacts from the northern phase at a program-level of analysis.

1.4 NOISE AND SOUND LEVEL DESCRIPTORS AND TERMINOLOGY

1.4.1 Descriptors

All noise level or sound level values presented herein are expressed in terms of decibels (dB), with A-weighting (dBA) to approximate the hearing sensitivity of humans. Time-averaged noise levels are expressed by the symbol L_{EQ}, with a specified duration. The Community Noise Equivalent Level (CNEL) is a 24-hour average, where noise levels during the evening hours of 7:00 p.m. to 10:00 p.m. have an added 5 dBA weighting, and noise levels during the nighttime hours of 10:00 p.m. to 7:00 a.m. have an added 10 dBA weighting. This is similar to the Day Night sound level (L_{DN}), which is a 24-hour average with an added 10 dBA weighting on the same nighttime hours but no added weighting on the evening hours. Sound levels expressed in CNEL are always based on dBA. These metrics are used to express noise levels for both measurement and municipal regulations, as well as for land use guidelines and enforcement of noise ordinances.

Evans Park



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0 10 Miles

Source: Base Map Layers (ESRI, 2013)

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Regional Location

Figure 1



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0 400 Feet

Source: Aerial (County of Riverside, 2020)

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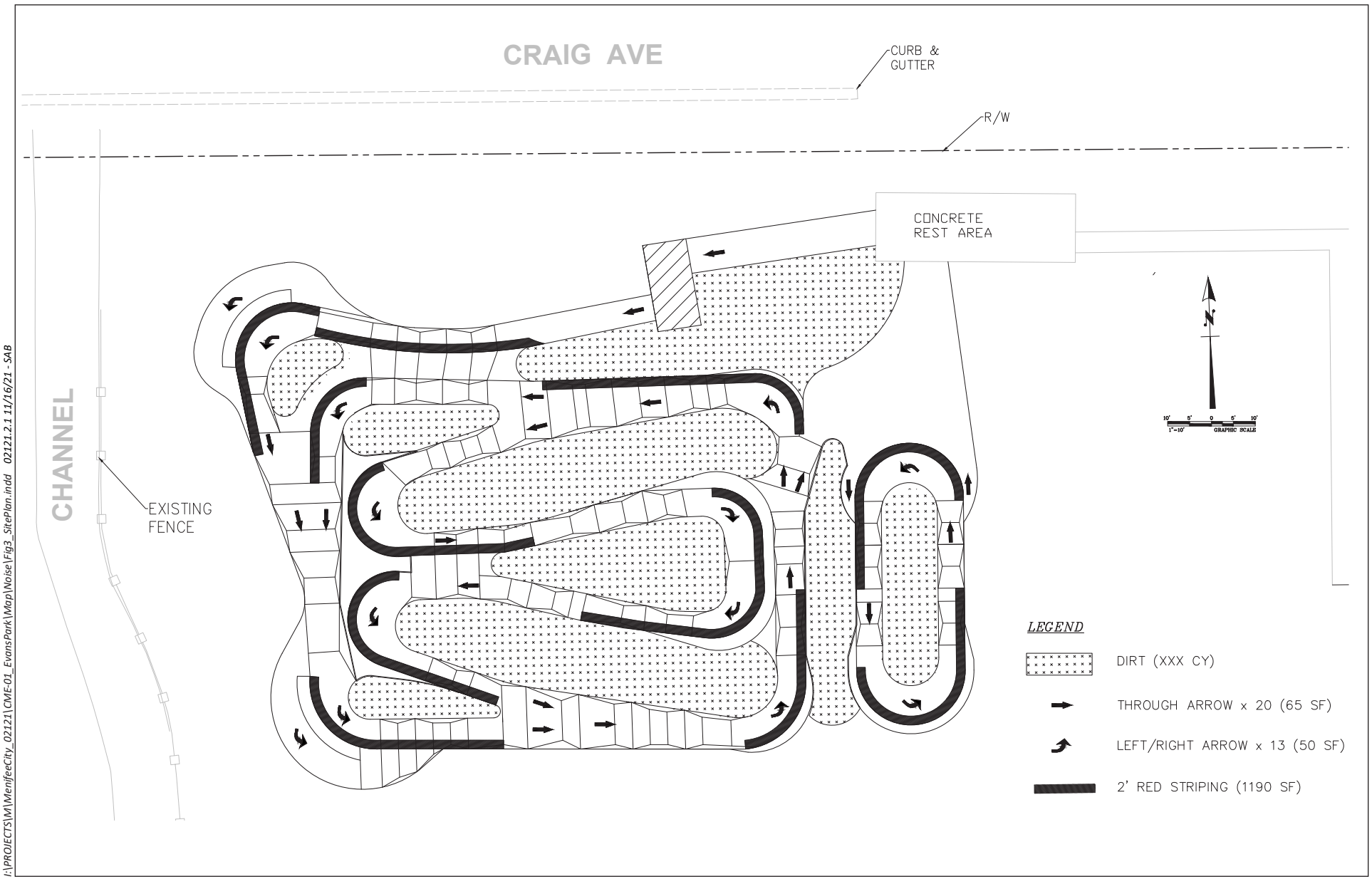
Aerial Photograph of Project Location

Figure 2



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Source: KOA 2021

HELIX Environmental Planning

Southern Phase Site Plan

Figure 3

1.4.2 Terminology

1.4.2.1 Sound, Noise, and Acoustics

Sound can be described as the mechanical energy of a vibrating object transmitted by pressure waves through a liquid or gaseous medium (e.g., air) to a hearing organ, such as a human ear. Noise is defined as loud, unexpected, or annoying sound.

In the science of acoustics, the fundamental model consists of a sound (or noise) source, a receiver, and the propagation path between the two. The loudness of the noise source and obstructions or atmospheric factors affecting the propagation path to the receiver determines the sound level and characteristics of the noise perceived by the receiver. The field of acoustics deals primarily with the propagation and control of sound.

1.4.2.2 Frequency

Continuous sound can be described by frequency (pitch) and amplitude (loudness). A low-frequency sound is perceived as low in pitch. Frequency is expressed in terms of cycles per second, or Hertz (Hz) (e.g., a frequency of 250 cycles per second is referred to as 250 Hz). High frequencies are sometimes more conveniently expressed in kilohertz (kHz), or thousands of Hertz. The audible frequency range for humans is generally between 20 Hz and 20,000 Hz.

Sound Pressure Levels and Decibels

The amplitude of pressure waves generated by a sound source determines the loudness of that source. Sound pressure amplitude is measured in micro-Pascals (mPa). One mPa is approximately one hundred billionth (0.00000000001) of normal atmospheric pressure. Sound pressure amplitudes for different kinds of noise environments can range from less than 100 to 100,000,000 mPa. Because of this wide range of values, sound is rarely expressed in terms of mPa. Instead, a logarithmic scale is used to describe sound pressure level (SPL) in terms of dBA. The threshold of hearing for the human ear is about 0 dBA, which corresponds to 20 mPa.

1.4.2.3 Addition of Decibels

Because decibels are logarithmic units, SPL cannot be added or subtracted through standard arithmetic. Under the decibel scale, a doubling of sound energy corresponds to a 3 dBA increase. In other words, when two identical sources are each producing sound of the same loudness, the resulting sound level at a given distance would be 3 dBA higher than from one source under the same conditions. For example, if one automobile produces an SPL of 70 dB when it passes an observer, two cars passing simultaneously would not produce 140 dBA—rather, they would combine to produce 73 dBA. Under the decibel scale, three sources of equal loudness together produce a sound level 5 dBA louder than one source.

Under controlled conditions in an acoustical laboratory, the trained, healthy human ear is able to discern 1 dBA changes in sound levels, when exposed to steady, single-frequency (“pure-tone”) signals in the mid-frequency (1,000 Hz to 8,000 Hz) range. In typical noisy environments, changes in noise of 1 to 2 dBA are generally not perceptible. It is widely accepted, however, that people begin to detect sound level increases of 3 dB in typical noisy environments. Further, a 5 dBA increase is generally perceived as a distinctly noticeable increase, and a 10 dBA increase is generally perceived as a doubling of loudness.

No known studies have directly correlated the ability of a healthy human ear to discern specific levels of change in traffic noise over a 24-hour period. Many ordinances, however, specify a change of 3 CNEL as the significant impact threshold. This is based on the concept of a doubling in noise energy resulting in a 3 dBA change in noise, which is the amount of change in noise necessary for the increase to be perceptible to the average healthy human ear.

1.4.2.4 Vibration Terminology and Descriptors

Vibration is measured in feet (ft) or inches (in). Acceleration is measured by comparing acceleration to that of the Earth's gravity, and this unit is "G." These units of acceleration or velocity are relative to time in seconds and are noted as in/sec^2 for acceleration and in/sec for velocity. Displacement is not relative to time and is only shown as inches.

Vibration effects can be described by its peak and root mean square (RMS) amplitudes. Building damage is often discussed in terms of peak velocity, or peak particle velocity (PPV). The PPV is defined as the maximum instantaneous positive or negative peak of the vibration signal. PPV is related to the stresses that are experienced by buildings; it is often used in monitoring of blasting vibration and to discuss construction vibration.

The RMS amplitude is useful for assessing human annoyance. Because the net average of a vibration signal is zero, the RMS amplitude is used to describe the "smoothed" vibration amplitude. The RMS of a signal is the average of the squared amplitude of the signal. The RMS amplitude is always less than the PPV and is always positive. The RMS average is typically calculated over a one-second period.

Although it is not universally accepted, decibel notation is in common use for vibration. Decibel notation serves to compress the range of numbers required to describe vibration. Vibration velocity level in decibels is defined as: $L_V=20 \times LOG10(V/V_{ref})$, where "Lv" is the velocity level in decibels, "V" is the RMS velocity amplitude, and "V_{ref}" is the reference velocity amplitude. The reference must be specified whenever a quantity is expressed in terms of decibels. All railroad vibration levels in this report are referenced to 1×10^{-6} in/sec with the notation VdB.

1.5 NOISE-SENSITIVE LAND USES

Noise-sensitive land uses (NSLUs) are land uses that may be subject to stress and/or interference from excessive noise, including residences, hospitals, schools, hotels, resorts, libraries, sensitive wildlife habitat, or similar facilities where quiet is an important attribute of the environment. Noise receptors are individual locations that may be affected by noise. The closest NSLUs to the project site are single-family residences adjacent to the project's south boundary. Additional single-family residences are located across Evans Road, to the west of both the project southern and northern phases. The Paloma Valley High School athletic fields are located east of the project northern phase, with closest school buildings approximately 800 feet east of the project site.

1.6 REGULATORY FRAMEWORK

1.6.1 California Noise Control Act

The California Noise Control Act is a section within the California Health and Safety Code that describes excessive noise as a serious hazard to the public health and welfare and that exposure to certain levels

of noise can result in physiological, psychological, and economic damage. It also finds that there is a continuous and increasing bombardment of noise in the urban, suburban, and rural areas. The California Noise Control Act declares that the State of California has a responsibility to protect the health and welfare of its citizens by the control, prevention, and abatement of noise. It is the policy of the State to provide an environment for all Californians free from noise that jeopardizes their health or welfare.

1.6.2 City of Menifee General Plan, Noise Element

The primary function of the City General Plan Noise Element is to ensure that considerations of noise are incorporated into the land use planning and decision-making process. The Noise Element is directly related to both the land use and circulation elements. It identifies the major noise sources in the city and contains goals and policies to protect citizens from excessive noise exposure. These goals and policies are consistent with applicable state and local noise standards and guidelines to control noise exposure and to promote land use compatibility with the noise environment. The following goals and policies would be applicable to the project (City 2013):

Goal N-1: Noise-sensitive land uses are protected from excessive noise and vibration exposure.

Policies:

> N-1.1: Assess the compatibility of proposed land uses with the noise environment when preparing, revising, or reviewing development project applications.
>
> N-1.7: Mitigate exterior and interior noises to the levels listed in the Table N-1 [reproduced here as Table 1, *Stationary Noise Standards*] to the extent feasible, for stationary sources adjacent to sensitive receptors:

Table 1
STATIONARY NOISE STANDARDS

Land Use	Interior Standards	Exterior Standards
Residential 10:00 p.m. – 7:00 a.m.	40 dBA L_{EQ} (10 minute)	45 dBA L_{EQ} (10 minute)
Residential 7:00 a.m. – 10:00 p.m.	55 dBA L_{EQ} (10 minute)	65 dBA L_{EQ} (10 minute)

Source: City of Menifee General Plan Noise Element Table N-1
dBA = A-weighted decibel; L_{EQ} = average sound level

1.6.3 City of Menifee Municipal Code

The following City Municipal Code sections would be applicable to the project:

Section 8.01.010:

> Any construction within the city located within 0.25 mile [1,320 feet] from an occupied residence shall be permitted Monday through Saturday, except nationally recognized holidays, 6:30 a.m. to 7:00 p.m. There shall be no construction permitted on Sunday or nationally recognized holidays unless approval is obtained from the City Building Official or City Engineer.

Section 13.01.150:

> Park users shall not produce loud and unreasonable noise, including, playing music, using amplification equipment or playing a musical instrument, which disturbs, injures or endangers the health or peace of others after the designated park hours of operation set forth in Section 13.01.250.

Section 13.01.180:

> (A) The City Manager may designate operations for horseback riding, bicycle riding, hiking trails, trailheads, and restrooms in the open space area. The City Manager may also designate closed areas where entry is prohibited in the interest of public convenience or safety or for the preservation and protection of natural or cultural resources. No person may leave a designated trail in any open space area on foot, bicycle, horseback or otherwise other than at designated entry or exit points, except for law enforcement, lifesaving, or emergency purposes or for open space area management. No person shall enter on foot, bicycle, horseback or otherwise any open space area or any trail or road that the City Manager has authorized be posted as a closed area.

Section 13.01.250:

> (A) Hours of operation. All unlighted parks owned by the City of Menifee or to be hereafter owned by the City of Menifee, shall be closed from 30 minutes after sunset of one day and 30 minutes before sunrise of the next day except for those uses noted under division (C) (Exceptions) below. All lighted sports fields shall be closed from 10:00 p.m. of one day and 30 minutes before sunrise of the next day. The City Manager or his/her designee may administratively modify use hours as needed for specific facilities and amenities within parks for the benefit of public health, safety or general well-being; without reestablishment by ordinance or Code amendment.
>
> (B) Closed parks. Subject to the exceptions as indicated in division (C) below, it shall be unlawful for any person and/or vehicle to be present in or use any closed park as indicated in division (A) above.
>
> (C) Exceptions. The park hours listed above shall not apply to persons:
>
> > (1) Attending events sponsored by the City Manager/Community Services Department or the events or activities conducted pursuant to a written permit issued by the City Manager;
> >
> > (2) Engaged in city business;
> >
> > (3) Engaged in an authorized city program or activity; or
> >
> > (4) Engaged in an activity at a city park or community center for which a city facility reservation permit authorizing use during non-daylight hours has been obtained from the City Manager/Community Services Department.

2.0 ENVIRONMENTAL SETTING

2.1 SURROUNDING LAND USES

Surrounding land uses include: Single-Family Residential Neighborhoods to the west (across Evans Road) and to the south; the Paloma Valley High Schools to the east (North of Craig Avenue); and Vacant Land Zoned Low Density Residential to the north and east (south of Craig Avenue; see Figure 2).

3.0 ANALYSIS, METHODOLOGY, AND ASSUMPTIONS

3.1 METHODOLOGY

3.1.1 Noise Modeling Software

Project construction noise was analyzed using the Roadway Construction Noise Model (RCNM; USDOT 2008), which utilizes measured sound levels from standard construction equipment.

3.2 ASSUMPTIONS

3.2.1 Construction

Construction of the southern phase would require the use of equipment for the installation of the pump track, bicycle trails, driveways, and parking lots. The most prominent noise-generating standard construction equipment anticipated to be used on the site includes excavators, front-end loaders, backhoes, scrapers, dozers, rollers, and pavers. Construction of the northern phase would require similar standard construction equipment.

3.2.2 Operations

On-site noise sources from long-term operation of the project (southern and northern phases) would be typical of the use of a community park: parking lots, human verbal interaction, landscape maintenance equipment, and organized sporting events. Operation of the southern phase would include bicycle noise in the dirt or on the wooden slat section of the track. Special events would be held at the bicycle trails park (southern phase) approximately four to five times a year and would include the use of a portable PA speaker system.

Off-site noise would be the result of project-generated traffic on surrounding roads. The project trip generation provided in the Evans Park Traffic Study (TS; Urban Crossroad 2021) shows that the project southern phase would generate 300 average daily trips (ADT) and 24 afternoon (PM) peak hour trips; and full project buildout (southern and northern phases) would generate 944 ADT and 76 PM peak hour trips.

3.3 GUIDELINES FOR THE DETERMINATION OF SIGNIFICANCE

Based on Appendix G of the CEQA Guidelines, implementation of the project would result in a significant adverse impact if it would:

Threshold 1: *Generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the City of Menifee General Plan.*

Per the City General Plan, impacts would be significant if the project would generate exterior noise levels at the property line of residential uses exceeding: 65 dBA from 7:00 a.m. to 10:00 p.m. and 45 dBA from 10:00 p.m. to 7:00 a.m.

For traffic-related noise, impacts are considered significant if noise levels at nearby NSLUs would increase by 3 CNEL or more.

Threshold 2: *Generate excessive ground-borne vibration or ground-borne noise levels.*

Excessive ground-borne vibration would occur if construction-related ground-borne vibration exceeds the "strongly perceptible" vibration annoyance potential criteria for human receptors of 0.1 inch per second PPV or the damage potential criteria to relatively old residential structures 0.5 inch per second PPV for continuous/frequent intermittent construction sources (such as impact pile drivers, vibratory pile drivers, and vibratory compaction equipment), as specific by Caltrans (2020).

Threshold 3: *For a project located within the vicinity of a private airstrip or an airport land use plan, or where such a plan has not been adopted, within two miles of a public use airport or private airstrip, expose people residing or working in the project area to excessive noise.*

Excessive noise exposure is defined as noise levels that exceed the standards in the City General Plan Noise Element for the associated land use.

4.0 IMPACTS

4.1 ISSUE 1: EXCESSIVE NOISE LEVELS

Would the project generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the City of Menifee General Plan?

4.1.1 Construction Noise

Construction of the project southern would require the use of equipment. Standard equipment used on the site is assumed to include excavators, front-end loaders, backhoes, scrapers, dozers, rollers, and pavers. Blasting or the use of pile drivers is not anticipated to be required. The loudest construction equipment anticipated to be use would be a scraper which generates typical noise levels of 79.6 dBA L_{EQ} at a distance of 50 feet (USDOT 2008). At the nearest NSLU to the southern phase pump track construction area (single-family residences approximately 300 feet east), the resulting noise would be 64.0 dBA L_{EQ}. At the nearest NSLU to anticipated northern phase facility construction areas (single-family residences approximately 130 feet east), the resulting noise would be 71.3 dBA L_{EQ}. These modeled

noise estimates do not consider intervening terrain or structures. The residential neighborhoods along the west side of Evans Road are separated from the roadway by an approximately 8-foot-high sound wall. According to the Federal Highway Administration's *Noise Barrier Design Handbook*, a properly designed noise barrier should attain a 10 dBA reduction in traffic noise for the first row of houses behind the barrier (USDOT 2021).

In accordance with the City Municipal Code 8.01.010. Construction projects located within 0.25 mile (1,320 feet) of an inhabited dwelling are permitted Monday through Saturday from 6:30 a.m. to 7:00 p.m., except on nationally recognized holidays. Furthermore, in accordance with the City General Plan Policy N-1.7, the daytime exterior noise standard for residential uses is 65 dBA L_{EQ}. Accounting for a reduction in noise from the existing sound walls, the highest anticipated project construction noise would be 61.3 dBA L_{EQ} and would not exceed the City's General Plan residential exterior noise standard at the nearest NSLUs.

4.1.2 Operational On-site Noise

Section 13.01.250 of the City Municipal Code defines the standard closure hours for City-owned parks as from 30 minutes after sunset of one day and 30 minutes before sunrise of the following day, and all lighted sports fields shall be closed from 10:00 p.m. of one day and 30 minutes before sunrise of the next day.

Operational on-site noise from normal use of the project (vehicles entering and existing parking lots, people engaged in conversation, music from personal devices, children and pets playing, operation of landscape equipment) would be similar to typical daytime noise from existing suburban residential neighborhoods and the high school in the project vicinity. These noise sources would occur during the park operating hours and are not anticipated to result in a substantial permanent increase in ambient noise levels.

Organized special events, such as those anticipated approximately four to five times a year for the bicycle trails park (southern phase), may use a portable PA speaker system. The PA system would be set up in the northeastern portion of the pump track (see Figure 3), as close as 400 feet from residential lots across Evans Road to the west. A typical portable PA system can produce noise levels as high as 85 dBA L_{EQ} at a distance of 5 feet. Accounting for a standard 6 dBA reduction in noise level for every doubling of distance, the resulting noise at the closest NSLUs (400 feet to the west) would be approximately 47 dBA, not accounting for intervening terrain or structure such as the existing 8-foot-high sound wall, and would not exceed the City's General Plan residential daytime exterior noise standard of 65 dBA L_{EQ} at the nearest NSLUs. In addition, organized events which include amplified sound would require a permit or approval from the City.

For City parks, section 13.01.150 for the City Municipal Code prohibits loud and unreasonable noise, including, playing music, using amplification equipment or playing a musical instrument, which disturbs, injures or endangers the health or peace of others after the designated park hours of operation, with exceptions for permitted events.

Therefore, considering the types of noise typical of a community park, the City Municipal Code regulations of park operating hours, special event permitting requirements, and the existing sound wall between the project site and houses west of Evans Road, long-term operation would not result in a permanent increase in ambient noise levels above standards contained in the City General Plan.

4.1.3 Operational Traffic Noise

A 3 dBA increase in ambient noise level represents a doubling of noise energy and the detectable increase threshold for noise in typical outdoor environments. Therefore, a 3 dBA increase in traffic noise levels would require an approximate doubling of traffic volumes. According to the TIS intersection analysis, the existing traffic volumes along Craig Avenue fronting the project site (east of Evans Road) is 3,900 ADT, and 2,000 ADT on Evans Road north of Craig Avenue . According to the project trip distribution analysis, full buildout of the project would add 350 ADT to Craig Avenue and 550 ADT to Evans Road. Therefore, the project would not double traffic volumes on area roads and the increase in ambient traffic noise as a result of full project buildout would be less than 3 dBA.

4.1.4 Significance of Impacts

Implementation of the project would not generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project, and the impact would be less than significant.

4.1.5 Mitigation Framework

Impacts would be less than significant; therefore, no mitigation measures are required.

4.1.6 Significance After Mitigation

Impacts related to increase in ambient noise levels would be less than significant. No mitigation measures are required.

4.2 ISSUE 2: EXCESSIVE VIBRATION

Would the project generate excessive ground-borne vibration or ground borne noise levels?

4.2.1 Construction Vibration

A possible source of vibration during general project construction activities would be a vibratory roller, which may be used for compaction of aggregate and asphalt for the project driveways and parking lots. The closest structures would be single family residences, approximately 75 feet west of potential driveway construction locations on Evans Road. A large vibratory roller creates approximately 0.210 inch per second PPV at a distance of 25 feet (Caltrans 2020). A 0.210 inch per second PPV vibration level would equal 0.063 inch per second PPV at a distance of 75 feet.[1] This would be substantially lower than the structural damage impact to older structures of 0.5 inch per second PPV and the “strongly perceptible” impact for humans of 0.1 inch per second PPV. Additionally, off-site exposure to such ground-borne vibration would be temporary as it would be limited to the short-term construction period. Temporary vibration impacts associated with project southern phase or northern phase construction would be less than significant.

[1] Equipment PPV = Reference PPV * $(25/D)^n$ (inches per second), where Reference PPV is PPV at 25 feet, D is distance from equipment to the receiver in feet, and n = 1.1 (the value related to the attenuation rate through the ground); formula from Caltrans 2020.

4.2.2 Operational Vibration

As a community park development, the project would not generate excessive ground-borne vibration during operations; therefore, no impacts would occur.

4.2.3 Significance of Impacts

Implementation of the project would not expose persons to substantial ground-borne vibrations, and the impact would be less than significant.

4.2.4 Mitigation Framework

Impacts would be less than significant; therefore, no mitigation measures are required.

4.2.5 Significance After Mitigation

Impacts related to vibrations would be less than significant. No mitigation measures are required.

4.3 ISSUE 3: AIRPORT NOISE EXPOSURE

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

4.3.1 Aircraft Noise

The closest private airstrip to the project site is the Skylark airstrip, approximately 6.3 miles to the west. The closest public airports to the project siter are the Perris Valley Airport, approximately 6.6 miles north, and the French Valley Airport, approximately 6.8 miles to the southeast. Therefore, the project is not located in the vicinity of a public airport or private airstrip and would not expose persons living or working in the project vicinity to excessive noise from airports.

4.3.2 Significance of Impacts

Implementation of the project would not expose people residing or working in the project area to excessive noise from nearby airports, and the impact would be less than significant.

4.3.3 Mitigation Framework

Impacts would be less than significant; therefore, no mitigation measures are required.

4.3.4 Significance After Mitigation

Impacts related to airport noise would be less than significant. No mitigation measures are required.

5.0 LIST OF PREPARERS

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IS/MND Appendix H

Traffic Analysis

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Evans Park

TRAFFIC STUDY

CITY OF MENIFEE

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TABLE OF CONTENTS

TABLE OF CONTENTS I
APPENDICES III
LIST OF EXHIBITS IV
LIST OF TABLES VI
LIST OF ABBREVIATED TERMS VIII
1 INTRODUCTION 1
1.1 Project Overview 1
1.2 Summary of Findings 2
1.3 Analysis Scenarios 5
1.4 Study Area 6
1.5 Deficiencies 8
1.6 Recommendations 9
1.7 Vehicle Miles Traveled (VMT) Analysis 12
2 METHODOLOGIES 13
2.1 Level of Service 13
2.2 Intersection Capacity Analysis 13
2.3 Traffic Signal Warrant Analysis Methodology 14
2.4 Minimum Level of Service (LOS) 15
2.5 Deficiency Criteria 15
3 AREA CONDITIONS 17
3.1 Existing Circulation Network 17
3.2 General Plan Circulation Element 17
3.3 Bicycle & Pedestrian Facilities 21
3.4 Transit Service 21
3.5 Existing Traffic Counts 21
3.6 Existing (2021) Intersection Operations Analysis 26
3.7 Existing (2021) Traffic Signal Warrants Analysis 26
4 PROJECTED FUTURE TRAFFIC 27
4.1 Project Trip Generation 27
4.2 Project Trip Distribution 27
4.3 Modal Split 31
4.4 Project Trip Assignment 31
4.5 Background Traffic 31
4.6 Cumulative Development Traffic 34
4.7 Traffic Conditions 38
5 EXISTING PLUS PROJECT TRAFFIC CONDITIONS 39
5.1 Roadway Improvements 39
5.2 Existing plus Project (Phase 1) Traffic Volume Forecasts 39
5.3 Existing plus Project (Project Buildout) Traffic Volume Forecasts 39
5.4 Intersection Operations Analysis 42
5.5 Traffic Signal Warrants Analysis 42
6 OPENING YEAR CUMULATIVE (2025) TRAFFIC CONDITIONS 43
6.1 Roadway Improvements 45

6.2 Opening Year Cumulative (2025) Without Project Traffic Volume Forecasts 45
6.3 Opening Year Cumulative (2025) With Project Traffic Volume Forecasts 45
6.4 Intersection Operations Analysis 48
6.5 Traffic Signal Warrants Analysis 49
7 LOCAL AND REGIONAL FUNDING MECHANISMS 51
7.1 RIVERSIDE COUNTY TRANSPORTATION UNIFORM MITIGATION FEE (TUMF) 51
7.2 CITY OF MENIFEE DEVELOPMENT IMPACT FEE (DIF) PROGRAM 51
7.3 SCOTT ROAD AND BRIDGE BENEFIT DISTRICT (RBBD) 51
7.4 MEASURE A 51
8 VEHICLE MILES TRAVELED (VMT) 53
8.1 Project Screening 53
8.2 Conclusion 55
9 REFERENCES 57

APPENDICES

APPENDIX 1.1: APPROVED TRAFFIC STUDY SCOPING AGREEMENT
APPENDIX 1.2: SITE ADJACENT QUEUING WORKSHEETS
APPENDIX 3.1: EXISTING TRAFFIC COUNTS
APPENDIX 3.2: EXISTING (2021) CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS
APPENDIX 3.3: EXISTING (2021) CONDITIONS TRAFFIC SIGNAL WARRANT ANALYSIS WORKSHEETS
APPENDIX 5.1: E+P WITH PROJECT (PHASE 1) CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS
APPENDIX 5.2: E+P WITH PROJECT (PROJECT BUILDOUT) CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS
APPENDIX 5.3: E+P WITH PROJECT (PHASE 1) CONDITIONS TRAFFIC SIGNAL WARRANT ANALYSIS WORKSHEETS
APPENDIX 5.4: E+P WITH PROJECT (PROJECT BUILDOUT) CONDITIONS TRAFFIC SIGNAL WARRANT ANALYSIS WORKSHEETS
APPENDIX 6.1: OPENING YEAR CUMULATIVE (2025) WITHOUT PROJECT CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS
APPENDIX 6.2: OPENING YEAR CUMULATIVE (2025) WITH PROJECT CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS
APPENDIX 6.3: OPENING YEAR CUMULATIVE (2025) WITHOUT PROJECT CONDITIONS TRAFFIC SIGNAL WARRANT ANALYSIS WORKSHEETS
APPENDIX 6.4: OPENING YEAR CUMULATIVE (2025) WITH PROJECT CONDITIONS TRAFFIC SIGNAL WARRANT ANALYSIS WORKSHEETS
APPENDIX 8.1: WRCOG SCREENING ASSESSMENT

LIST OF EXHIBITS

EXHIBIT 1-1: LOCATION MAP 3
EXHIBIT 1-2: SITE MAP 4
EXHIBIT 1-3: STUDY AREA 7
TABLE 1-2: SUMMARY OF LOS 8
EXHIBIT 1-4: SITE ADJACENT ROADWAY AND SITE ACCESS RECOMMENDATIONS 10
EXHIBIT 3-1: EXISTING NUMBER OF THROUGH LANES AND INTERSECTION CONTROLS 18
EXHIBIT 3-2: CITY OF MENIFEE GENERAL PLAN ROADWAY NETWORK 19
EXHIBIT 3-3: CITY OF MENIFEE GENERAL PLAN ROADWAY CROSS-SECTIONS 20
EXHIBIT 3-4: CITY OF MENIFEE BICYCLE FACILITIES 22
EXHIBIT 3-5: EXISTING PEDESTRIAN FACILITIES 23
EXHIBIT 3-6: EXISTING TRANSIT ROUTES 24
EXHIBIT 3-7: EXISTING (2021) TRAFFIC VOLUMES 25
EXHIBIT 4-1: PROJECT (PHASE 1) TRIP DISTRIBUTION 29
EXHIBIT 4-2: PROJECT (PHASE 2) TRIP DISTRIBUTION 30
EXHIBIT 4-3: PROJECT ONLY (PHASE 1) TRAFFIC VOLUMES 32
EXHIBIT 4-4: PROJECT ONLY (PROJECT BUILDOUT) TRAFFIC VOLUMES 33
EXHIBIT 4-5: CUMULATIVE DEVELOPMENT LOCATION MAP 35
EXHIBIT 4-6: CUMULATIVE ONLY TRAFFIC VOLUMES 36
EXHIBIT 5-1: EXISTING PLUS PROJECT (PHASE 1) TRAFFIC VOLUMES 40
EXHIBIT 5-2: EXISTING PLUS PROJECT (PROJECT BUILDOUT) TRAFFIC VOLUMES 41
EXHIBIT 6-1: OPENING YEAR CUMULATIVE (2025) WITHOUT PROJECT TRAFFIC VOLUMES 46
EXHIBIT 6-2: OPENING YEAR CUMULATIVE (2025) WITH PROJECT TRAFFIC VOLUMES 47

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LIST OF TABLES

TABLE 1-1: INTERSECTION ANALYSIS LOCATIONS 6
TABLE 2-1: UNSIGNALIZED INTERSECTION LOS THRESHOLDS 13
TABLE 2-2: TRAFFIC SIGNAL WARRANT ANALYSIS LOCATIONS 14
TABLE 2-3: THRESHOLDS OF SIGNIFICANT IMPACT 15
TABLE 3-1: INTERSECTION ANALYSIS FOR EXISTING (2021) CONDITIONS 26
TABLE 4-1: PROJECT TRIP GENERATION RATES 27
TABLE 4-2: PROJECT TRIP GENERATION SUMMARY 27
TABLE 4-3: CUMULATIVE DEVELOPMENT LAND USE SUMMARY 34
TABLE 5-1: INTERSECTION ANALYSIS FOR EXISTING PLUS PROJECT CONDITIONS 42
TABLE 6-1: INTERSECTION ANALYSIS FOR OPENING YEAR CUMULATIVE (2025) CONDITIONS 48

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LIST OF ABBREVIATED TERMS

(1)	Reference
ADT	Average Daily Traffic
CA MUTCD	California Manual on Uniform Traffic Control Devices
Caltrans	California Department of Transportation
CEQA	California Environmental Quality Act
CMP	Congestion Management Program
DIF	Development Impact Fee
HCM	Highway Capacity Manual
ITE	Institute of Transportation Engineers
LOS	Level of Service
NCHRP	National Cooperative Highway Research Program
OD	Origination-Destination
OPR	Office of Planning and Research
PHF	Peak Hour Factor
Project	Evans Park
RCTC	Riverside County Transportation Commission
RTA	Riverside Transit Agency
SB 743	Senate Bill 743
RivTAM	Riverside Transportation Analysis Model
SHS	State Highway System
TA	Traffic Analysis
TAZ	Traffic Analysis Zone
TPA	Transit Priority Area
V/C	Volume to Capacity
VMT	Vehicle Miles Traveled

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1 INTRODUCTION

This report presents the results of the Traffic Analysis (TA) for the proposed Evans Park development ("Project"), which is located east of Evans Road and on either side of Craig Avenue in the City of Menifee, as shown on Exhibit 1-1.

The purpose of this TA is to evaluate the potential deficiencies related to traffic, identify circulation system deficiencies that may result from the development of the proposed Project, and to recommend improvements to resolve identified deficiencies in order to achieve acceptable operational conditions at study area intersections and ensure consistency with the City's General Plan. This TA has been prepared in accordance with the City of Menifee's Traffic Impact Analysis (TIA) (January 2019) and through consultation with City of Menifee staff during the scoping process. (1) The Project traffic study scoping agreement is provided in Appendix 1.1 of this TA, which has been approved by the City of Menifee.

1.1 PROJECT OVERVIEW

The proposed Project consists of a 6-acre pump track in Phase 1 (2022) and a 12.88-acre sports park with ball fields in Phase 2 or Project Buildout (2025). Phase 1 is located on the southeast corner of Evans Road and Craig Avenue, while Phase 2 is located on the northeast corner. The proposed planning areas for the proposed Project are shown on Exhibit 1-2. As indicated on Exhibit 1-2, access to the Project site will be provided to Evans Road and Craig Avenue via 3 driveways (1 driveway for Phase 1 on Craig Avenue and 2 driveways for Phase 2 on Evans Road). Exhibit 1-2 depicts the location of the proposed Project in relation to the existing roadway network and the study area intersections.

In order to develop the traffic characteristics of the proposed project, trip-generation statistics published in the San Diego Municipal Code Land Development Trip Generation Manual (May 2003) for the Parks (developed with sports fields) land use. (2) The trip generation rate from the San Diego Municipal Code is more conservative than any published trip generation rate for public parks from the Institute of Transportation Engineers latest Trip Generation Manual (10th Edition, 2017). (3) The Project is anticipated to generate a net total of 944 two-way trips per day with 38 AM peak hour trips and 76 PM peak hour trips. The assumptions and methods used to estimate the Project's trip generation characteristics are discussed in greater detail in Section 4.1 *Project Trip Generation* of this report.

1.2 SUMMARY OF FINDINGS

OPERATIONS ANALYSIS FINDINGS

The Project is to construct the following improvements as design features in conjunction with development of the site for Phase 1 (2022):

- Project to construct Evans Road at its ultimate half-section width as a Secondary (104-foot right-of-way) from Craig Avenue to the southern boundary of Phase 1 consistent with the City's standards.
- Project to construct Craig Avenue at its ultimate half-section-width as a Collector (74-foot right-of-way) from Evans Road to the eastern Project boundary of Phase 1 consistent with the City's standards.
- Project to construct access to the site via Driveway 3 on Craig Avenue.

The Project is to construct the following improvements as design features in conjunction with development of the site for Phase 2 (2025):

- Project to construct Evans Road at its ultimate width as a Secondary (104-foot right-of-way) from Corson Avenue to Craig Avenue consistent with the City's standards.
- Project to construct Driveway 1 to align with Briarlea Road and Driveway 2 for site access.

Additional details and intersection lane geometrics are provided in Section 1.6 *Recommendations* of this report.

The proposed Project is not anticipated to require the construction of any off-site improvements, however, the Project Applicant would be required to pay requisite fees and/or fair share contributions consistent with the City's requirements (see Section 7 *Local and Regional Funding Mechanisms*).

VEHICLE MILES TRAVELED (VMT) FINDINGS

The City Guidelines provide details on appropriate screening criteria that can be used to identify when a proposed land use project is anticipated to result in a less than significant impact without conducting a more detailed project level analysis. Based on our review of applicable Vehicle Miles Traveled (VMT) screening thresholds, the Project meets the project type screening criteria and would therefore be presumed to result in a less than significant VMT impact; no additional VMT analysis is required. Detailed VMT screening can be found in Section 8 *Vehicle Miles Traveled Analysis* of this TA.

EXHIBIT 1-1: LOCATION MAP

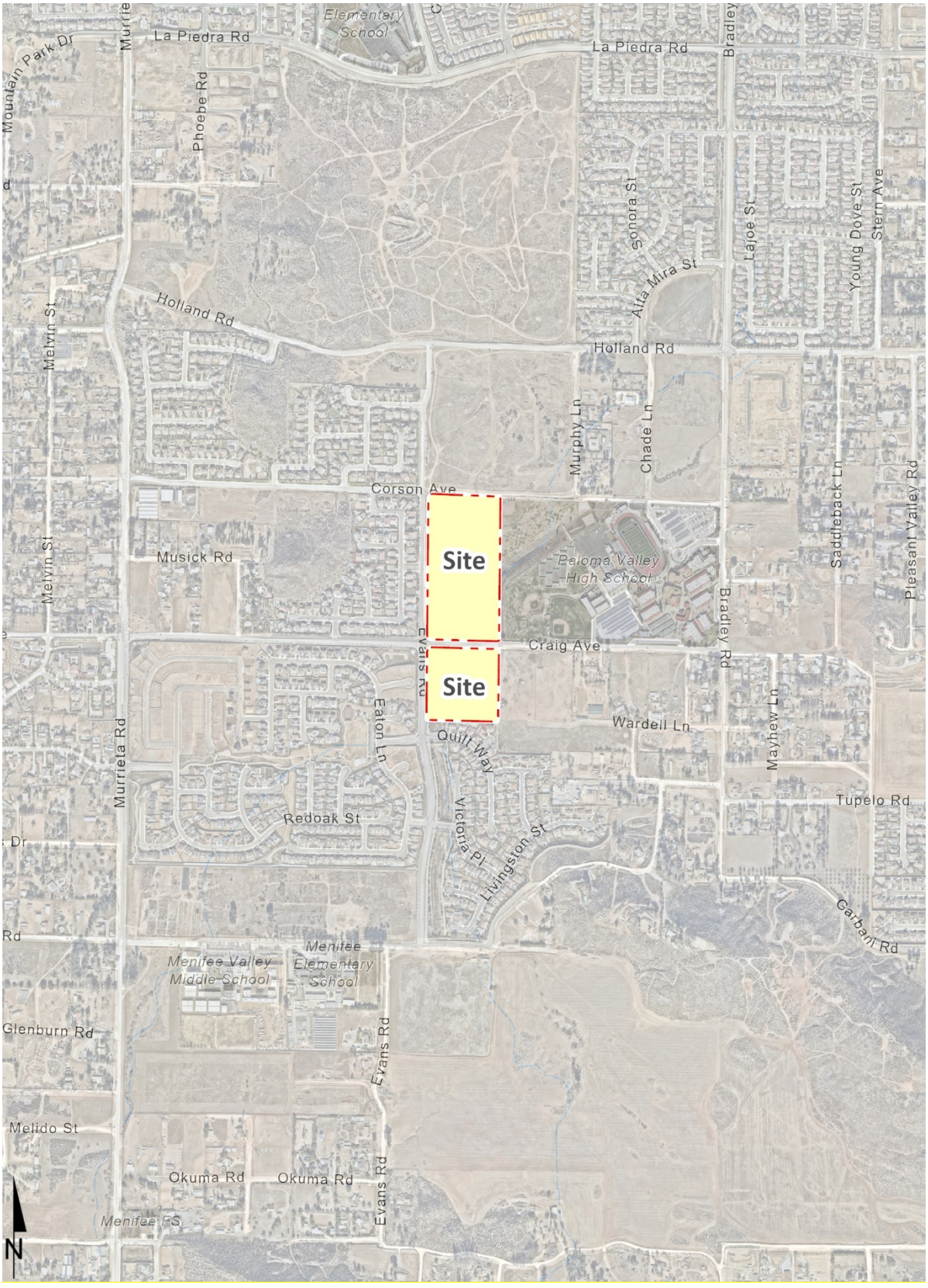
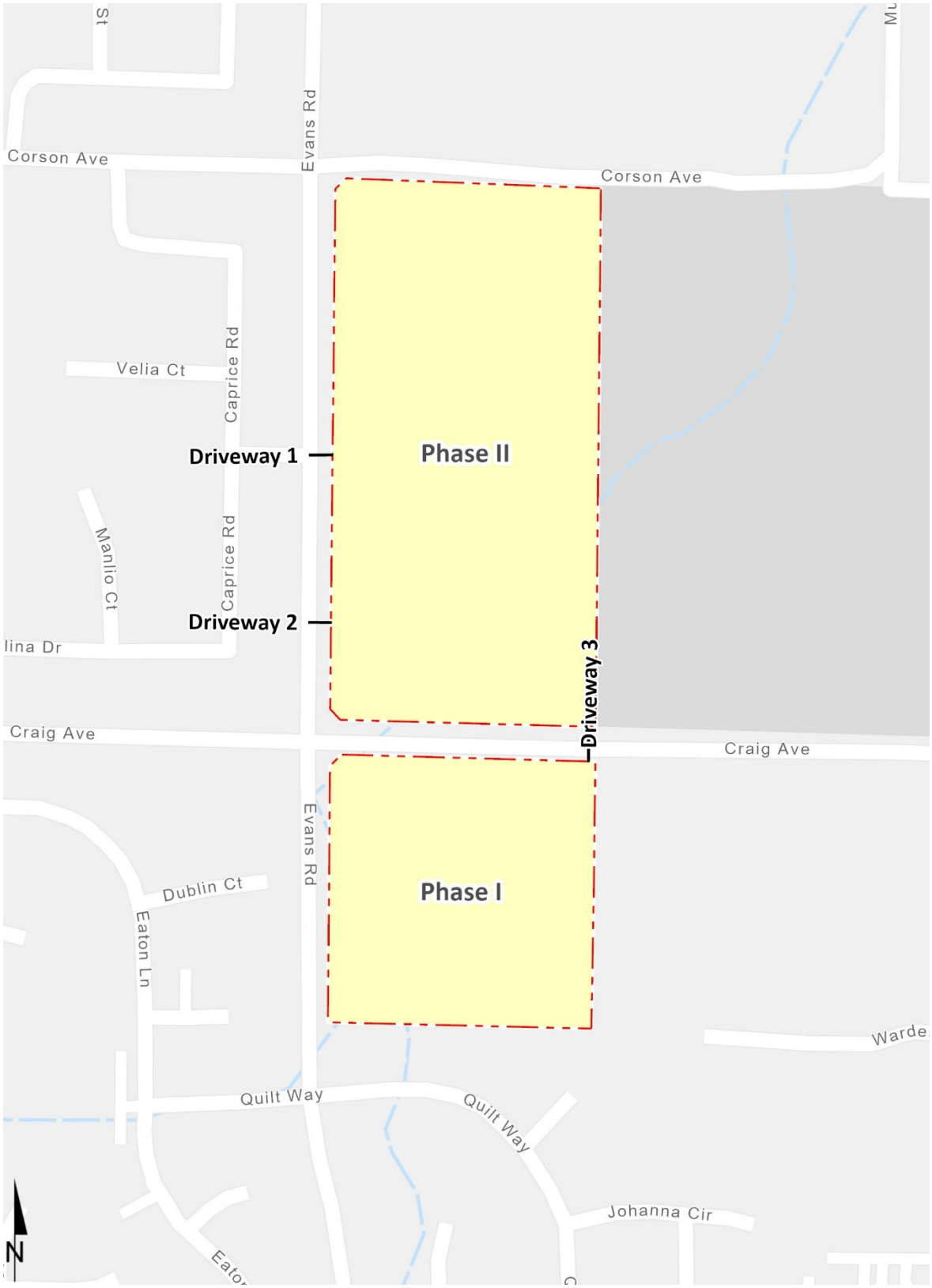


EXHIBIT 1-2: SITE MAP



1.3 ANALYSIS SCENARIOS

For the purposes of this traffic study, potential deficiencies to traffic and circulation have been assessed for each of the following conditions:

- Existing (2021)
- Existing plus Project (Phase 1)
- Existing plus Project (Project Buildout, where Project Buildout includes Phase 1 + Phase 2)
- Opening Year Cumulative (2025) Without Project
- Opening Year Cumulative (2025) With Project (Project Buildout)

1.3.1 EXISTING (2021) CONDITIONS

Information for Existing (2021) conditions is disclosed to represent the baseline traffic conditions as they existed at the time this report was prepared.

1.3.2 EXISTING PLUS PROJECT CONDITIONS

The Existing plus Project (Phase 1 + Phase 2 or Project Buildout) conditions analysis determines traffic deficiencies that would occur on the existing roadway system with the addition of Project traffic. Project Buildout conditions consist of Phase 1 and Phase 2 traffic combined.

1.3.3 OPENING YEAR CUMULATIVE (2025) CONDITIONS

The Opening Year Cumulative (2025) conditions analysis determines the potential near-term cumulative circulation system deficiencies. To account for background traffic growth, traffic associated with other known cumulative development projects in conjunction with an ambient growth from Existing (2021) conditions of 8.24% is included for Opening Year Cumulative (2025) traffic conditions. This comprehensive list was compiled from information provided by the City of Menifee and is consistent with other recent studies in the study area. It should be noted that Opening Year Cumulative traffic conditions has been evaluated for Project Buildout conditions only.

1.4 STUDY AREA

To ensure that this TA satisfies the City of Menifee's traffic study requirements, Urban Crossroads, Inc. prepared a Project traffic study scoping package for review by City of Menifee staff prior to the preparation of this report. This agreement provides an outline of the Project study area, trip generation, trip distribution, and analysis methodology. The agreement approved by the City of Menifee is included in Appendix 1.1 of this TA.

1.4.1 INTERSECTIONS

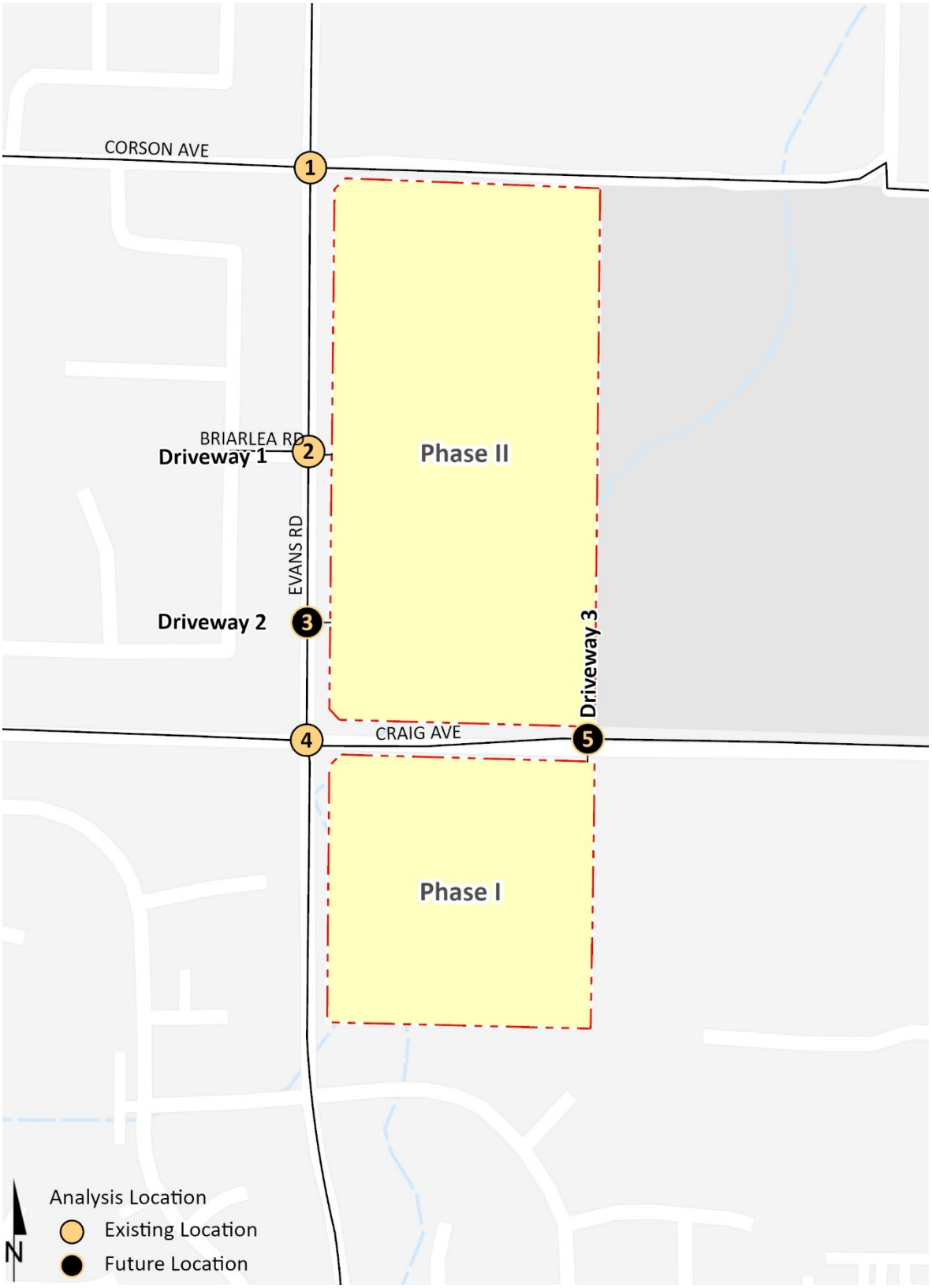
The 5 study area intersections shown on Exhibit 1-3 and listed in Table 1-1 were selected for evaluation in this TA based on consultation with City of Menifee staff. The study area includes intersections where the Project is anticipated to contribute 50 or more peak hour trips per the City of Menifee's traffic study guidelines. (1) The "50 peak hour trip" criteria represent a minimum number of trips at which a typical intersection would have the potential to be substantively affected by a given development proposal. The 50 peak hour trip criterion is a traffic engineering rule of thumb that is accepted and widely used within Riverside County for estimating a potential area of influence (i.e., study area).

The intent of a CMP is to more directly link land use, transportation, and air quality, thereby prompting reasonable growth management programs that will effectively utilize new transportation funds, alleviate traffic congestion and related deficiencies, and improve air quality. Counties within California have developed CMPs with varying methods and strategies to meet the intent of the CMP legislation.

TABLE 1-1: INTERSECTION ANALYSIS LOCATIONS

ID	Intersection Location	Jurisdiction	CMP?
1	Evans Rd. & Corson Av.	City of Menifee	No
2	Evans Rd. & Briarlea Rd./Driveway 1	City of Menifee	No
3	Evans Rd. & Driveway 2 – Future Intersection	City of Menifee	No
4	Evans Rd. & Craig Av.	City of Menifee	No
5	Craig Av. & Driveway 3 – Future Intersection	City of Menifee	No

EXHIBIT 1-3: STUDY AREA



1.5 DEFICIENCIES

This section provides a summary of intersection deficiencies by analysis scenario. Section 2 *Methodologies* provides information on the methodologies used in the analysis and Section 5 *Existing plus Project Traffic Conditions* and Section 6 *Opening Year Cumulative (2025) Traffic Conditions* includes the detailed analysis. A summary of LOS results for all analysis scenarios is presented on Table 1-2. It should be noted, the study area intersections along Evans Road and Craig Avenue are anticipated to operate at acceptable LOS with the implementation of the Project design features, as discussed in Section 1.6 *Recommendations.*

TABLE 1-2: SUMMARY OF LOS

#	Intersection	Existing		E+P (Phase 1)		E+P (Project Buildout)		2023 Without Project		2023 With Project	
		AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
1	Evans Rd. & Corson Av.										
2	Evans Rd. & Briarlea Rd./Driveway 1										
3	Evans Rd. & Driveway 2	N/A	N/A	N/A	N/A			N/A	N/A		
4	Evans Rd. & Craig Av.										
5	Driveway 3 & Craig Av.	N/A	N/A					N/A	N/A		

= A - C = D/E = F

1.5.1 EXISTING (2021) CONDITIONS

The following study area intersection is currently operating at an unacceptable LOS during the peak hours under Existing (2021) conditions:

- Evans Road & Craig Avenue (#4) – LOS E AM peak hour only

1.5.2 EXISTING PLUS PROJECT CONDITIONS

The following study area intersection is anticipated to continue to operate at an unacceptable LOS during the peak hours under Existing plus Project (Phase 1) conditions consistent with Existing traffic conditions:

- Evans Road & Craig Avenue (#4) – LOS E AM peak hour only

However, with the implementation of the site adjacent roadway improvements, all of the study area intersections are anticipated to operate at an acceptable LOS under Project Buildout conditions. As such, no additional improvements have been recommended.

1.5.3 Opening Year Cumulative (2025) Conditions

The following study area intersection is anticipated to operate at an unacceptable LOS during the peak hours under Opening Year Cumulative (2025) Without Project:

- Evans Road & Craig Avenue (#4) – LOS F AM peak hour only

However, the study area intersections are anticipated to operate at an acceptable LOS during the peak hours under Opening Year Cumulative (2025) With Project conditions with the implementation of site adjacent roadway improvements by the Project.

1.6 Recommendations

1.6.1 Site Adjacent and Site Access Recommendations

The following recommendations are based on the minimum improvements needed to accommodate site access and maintain acceptable peak hour operations. The site adjacent recommendations are shown on Exhibits 1-4.

Phase 1 (2022)

Recommendation 1 – Driveway 3 & Craig Avenue (#5) – The following improvements are necessary to accommodate site access:

- Project to install a stop sign for northbound traffic on Driveway 3.
- Project to construct a westbound left turn lane with a minimum of 100-feet of storage.

***Recommendation 2* – Evans Road** – The following improvements are necessary to accommodate site access:

- Project to construct Evans Road at its ultimate width as a Secondary (104-foot right-of-way) from Craig Avenue to the southern boundary of Phase 1 consistent with the City's standards.

***Recommendation 3* – Craig Avenue**– The following improvements are necessary to accommodate site access:

- Project to construct Craig Avenue at its ultimate full-width as a Collector (74-foot right-of-way) from Evans Road to the eastern Project boundary of Phase 1 consistent with the City's standards.

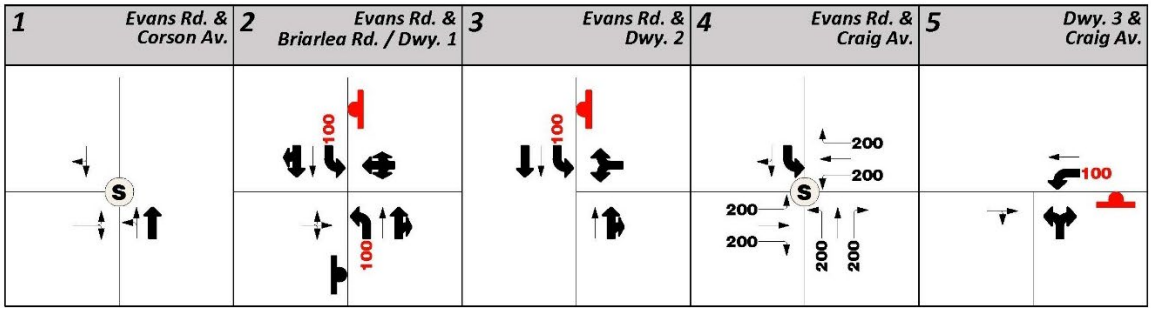
Phase 2

Recommendation 4 – Evans Road & Briarlea Road/Driveway 1 (#2) – The following improvements are necessary to accommodate site access:

- Project to install a stop sign for westbound traffic on Driveway 1. Driveway is to align with the existing Briarlea Road.
- Project to construct a southbound left turn lane with a minimum of 100-feet of storage.

EXHIBIT 1-4: SITE ADJACENT ROADWAY AND SITE ACCESS RECOMMENDATIONS





Recommendation 5 – Evans Road & Driveway 2 (#3) – The following improvements are necessary to accommodate site access:

- Project to install a stop sign for westbound traffic on Driveway 2.
- Project to construct a southbound left turn lane with a minimum of 100-feet of storage.

***Recommendation 6* – Evans Road** – The following improvements are necessary to accommodate site access:

- Project to construct Evans Road at its ultimate width as a Secondary (104-foot right-of-way) from Corson Avenue to Craig Avenue consistent with the City's standards.

On-site traffic signing and striping should be implemented agreeable with the provisions of the California Manual on Uniform Traffic Control Devices (CA MUTCD) and in conjunction with detailed construction plans for the Project site.

Sight distance at each project access point should be reviewed with respect to standard Caltrans and City of Menifee sight distance standards at the time of preparation of final grading, landscape, and street improvement plans.

1.6.2 QUEUING ANALYSIS

A queuing analysis has been performed for the Project driveways for Opening Year Cumulative (2025) With Project traffic conditions. The traffic modeling and signal timing optimization software package SimTraffic has been utilized to assess the queues. SimTraffic is designed to model networks of signalized and unsignalized intersections, with the primary purpose of checking and fine-tuning signal operations. SimTraffic uses the input parameters from Synchro to generate random simulations. These random simulations generated by SimTraffic have been utilized to determine the 95th percentile queue lengths observed for each applicable turn lane. A SimTraffic simulation has been recorded up to 5 times, during the weekday AM and weekday PM peak hours, and has been seeded for 15-minute periods with 60-minute recording intervals. Queuing analysis worksheets for the weekday AM and PM peak hours are provided in Appendix 1.2 of this report.

1.6.3 OFF-SITE RECOMMENDATIONS

There are no off-site improvements recommended for the Project, however, the Project Applicant would be required to pay fair share fees consistent with the City's requirements (see Section 7 *Local and Regional Funding Mechanisms)*.

1.7 VEHICLE MILES TRAVELED (VMT) ANALYSIS

The City Guidelines provides details on appropriate screening criteria that can be used to identify when a proposed land use project is anticipated to result in a less than significant impact without conducting a more detailed project level analysis. Based on our review of applicable Vehicle Miles Traveled (VMT) screening thresholds, the Project meets the project type screening criteria and would therefore be presumed to result in a less than significant VMT impact; no additional VMT analysis is required. Detailed VMT screening can be found in Section 8 *Vehicle Miles Traveled Analysis* of this TA.

2 METHODOLOGIES

This section of the report presents the methodologies used to perform the traffic analyses summarized in this report. The methodologies described are generally consistent with the City of Menifee's traffic study guidelines. (1)

2.1 LEVEL OF SERVICE

Traffic operations of roadway facilities are described using the term "Level of Service" (LOS). LOS is a qualitative description of traffic flow based on several factors such as speed, travel time, delay, and freedom to maneuver. Six levels are typically defined ranging from LOS A, representing completely free-flow conditions, to LOS F, representing breakdown in flow resulting in stop-and-go conditions. LOS E represents operations at or near capacity, an unstable level where vehicles are operating with the minimum spacing for maintaining uniform flow.

2.2 INTERSECTION CAPACITY ANALYSIS

The definitions of LOS for interrupted traffic flow (flow restrained by the existence of traffic signals and other traffic control devices) differ slightly depending on the type of traffic control. The LOS is typically dependent on the quality of traffic flow at the intersections along a roadway. The Highway Capacity Manual (HCM) methodology expresses the LOS at an intersection in terms of delay time for the various intersection approaches. (4) The HCM uses different procedures depending on the type of intersection control.

2.2.1 UNSIGNALIZED INTERSECTIONS

The City of Menifee require the operations of unsignalized intersections be evaluated using the methodology described the HCM. (4) The LOS rating is based on the weighted average control delay expressed in seconds per vehicle (see Table 2-1).

TABLE 2-1: UNSIGNALIZED INTERSECTION LOS THRESHOLDS

Description	Average Control Delay Per Vehicle (Seconds)	Level of Service, V/C ≤ 1.0	Level of Service, V/C > 1.0
Little or no delays.	0 to 10.00	A	F
Short traffic delays.	10.01 to 15.00	B	F
Average traffic delays.	15.01 to 25.00	C	F
Long traffic delays.	25.01 to 35.00	D	F
Very long traffic delays.	35.01 to 50.00	E	F
Extreme traffic delays with intersection capacity exceeded.	> 50.00	F	F

Source: HCM, 6th Edition

At two-way or side-street stop-controlled intersections, LOS is calculated for each controlled movement and for the left turn movement from the major street, as well as for the intersection as a whole. For approaches composed of a single lane, the delay is computed as the average of all movements in that lane. Per the HCM, the highest delay and associated LOS on the minor

approach is reported for two-way stop-controlled intersections. For all-way stop controlled intersections, LOS is computed for the intersection as a whole and the average delay is reported (similar to signalized intersections).

2.3 TRAFFIC SIGNAL WARRANT ANALYSIS METHODOLOGY

The term "signal warrants" refers to the list of established criteria used by the Caltrans and other public agencies to quantitatively justify or ascertain the potential need for installation of a traffic signal at an otherwise unsignalized intersection. This TA uses the signal warrant criteria presented in the latest edition of the Caltrans California Manual on Uniform Traffic Control Devices *(CA MUTCD)*. (5)

The signal warrant criteria for Existing conditions are based upon several factors, including volume of vehicular and pedestrian traffic, frequency of accidents, and location of school areas. The Caltrans CA MUTCD indicates that the installation of a traffic signal should be considered if one or more of the signal warrants are met. (5) Specifically, this TA utilizes the Peak Hour Volume-based Warrant 3 as the appropriate representative traffic signal warrant analysis for existing study area intersections for all analysis scenarios. Warrant 3 is appropriate to use for this TA because it provides specialized warrant criteria for intersections with rural characteristics (e.g., located in communities with populations of less than 10,000 persons or with adjacent major streets operating above 40 miles per hour). For the purposes of this study, the speed limit was the basis for determining whether Urban or Rural warrants were used for a given intersection.

Traffic signal warrant analyses were performed for the following unsignalized study area intersection shown in Table 2-2:

TABLE 2-2: TRAFFIC SIGNAL WARRANT ANALYSIS LOCATIONS

ID	Intersection Location	Jurisdiction
1	Evans Road & Corson Avenue	City of Menifee
2	Evans Road & Briarlea Road/Driveway 1	City of Menifee
3	Evans Road & Driveway 2	City of Menifee
4	Evans Road & Craig Avenue	City of Menifee
5	Driveway 3 & Craig Avenue	City of Menifee

The Existing conditions traffic signal warrant analysis is presented in the subsequent section, Section 3 *Area Conditions* of this report. The traffic signal warrant analyses for future conditions are presented in Section 5 *Existing plus Project Traffic Conditions* and Section 6 *Opening Year Cumulative (2025) Traffic Conditions* of this report.

It is important to note that a signal warrant defines the minimum condition under which the installation of a traffic signal might be warranted. Meeting this threshold condition does not require that a traffic control signal be installed at a particular location, but rather, that other traffic factors and conditions be evaluated in order to determine whether the signal is truly justified. It should also be noted that signal warrants do not necessarily correlate with LOS. An

intersection may satisfy a signal warrant condition and operate at or above acceptable LOS or operate below acceptable LOS and not meet a signal warrant.

2.4 MINIMUM LEVEL OF SERVICE (LOS)

The City's General Plan recommends a LOS standard of LOS D. Intersections which are forecast to operate at unsatisfactory conditions (i.e., at LOS worse than LOS D for city intersections) shall be identified as cumulatively deficient intersections. Therefore, any intersection operating at LOS E or F will be considered deficient for the purposes of this analysis. (1)

2.5 DEFICIENCY CRITERIA

For the study area intersections, determination of direct project-related deficiencies will be based on a comparison of without and with project levels of service for each analysis year. A project-related deficiency occurs if project traffic increases the average delay at an intersection by more than the thresholds identified on Table 2-3. The thresholds for LOS A, B, and C do not apply to projects consistent with the General Plan.

TABLE 2-3: THRESHOLDS OF SIGNIFICANT IMPACT

Pre-Project LOS	Significant Impact Threshold[1]
A/B	10.0 Seconds
C	8.0 Seconds
D	5.0 Seconds
E	2.0 Seconds
F	1.0 Second

Source: Fontana Traffic Study Guidelines, October 2020

[1] Increase in delay

Cumulative traffic impacts are deficiencies that are not directly caused by the Project, but occur as a result of regional growth combined with that or other nearby cumulative development projects. Cumulative impacts utilize the same thresholds of significant impacts as shown on Table 2-3. The Project's contribution to a particular cumulative transportation deficiency is deemed cumulatively considerable if the Project adds significant traffic to the forecasted deficiency (Per Table 2-3). A Project's contribution to a cumulatively considerable impact can be reduced to less than significant if the Project is required to implement or fund its fair share of improvements designed to alleviate the potential cumulative impact. If full funding of future cumulative improvements is not reasonably assured, a temporary unmitigated cumulative impact may occur until the needed improvement is fully funded and constructed.

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3 AREA CONDITIONS

This section provides a summary of the existing circulation network, the City of Menifee General Plan Circulation Network, and a review of existing peak hour intersection operations and traffic signal warrant analyses.

3.1 EXISTING CIRCULATION NETWORK

Pursuant to the scoping agreement with City of Menifee staff (Appendix 1.1), the study area includes a total of 5 existing and future intersections as shown previously on Exhibit 1-2. Exhibit 3-1 illustrates the study area intersections located near the proposed Project and identifies the number of through traffic lanes for existing roadways and intersection traffic controls.

3.2 GENERAL PLAN CIRCULATION ELEMENT

As noted previously, the Project site is located within the City of Menifee. The roadway classifications and planned (ultimate) roadway cross-sections of the major roadways within the study area, as identified on City of Menifee General Plan Circulation Element, are described subsequently. Exhibit 3-2 shows the City of Menifee General Plan Circulation Element and Exhibit 3-3 illustrates the City of Menifee General Plan roadway cross-sections.

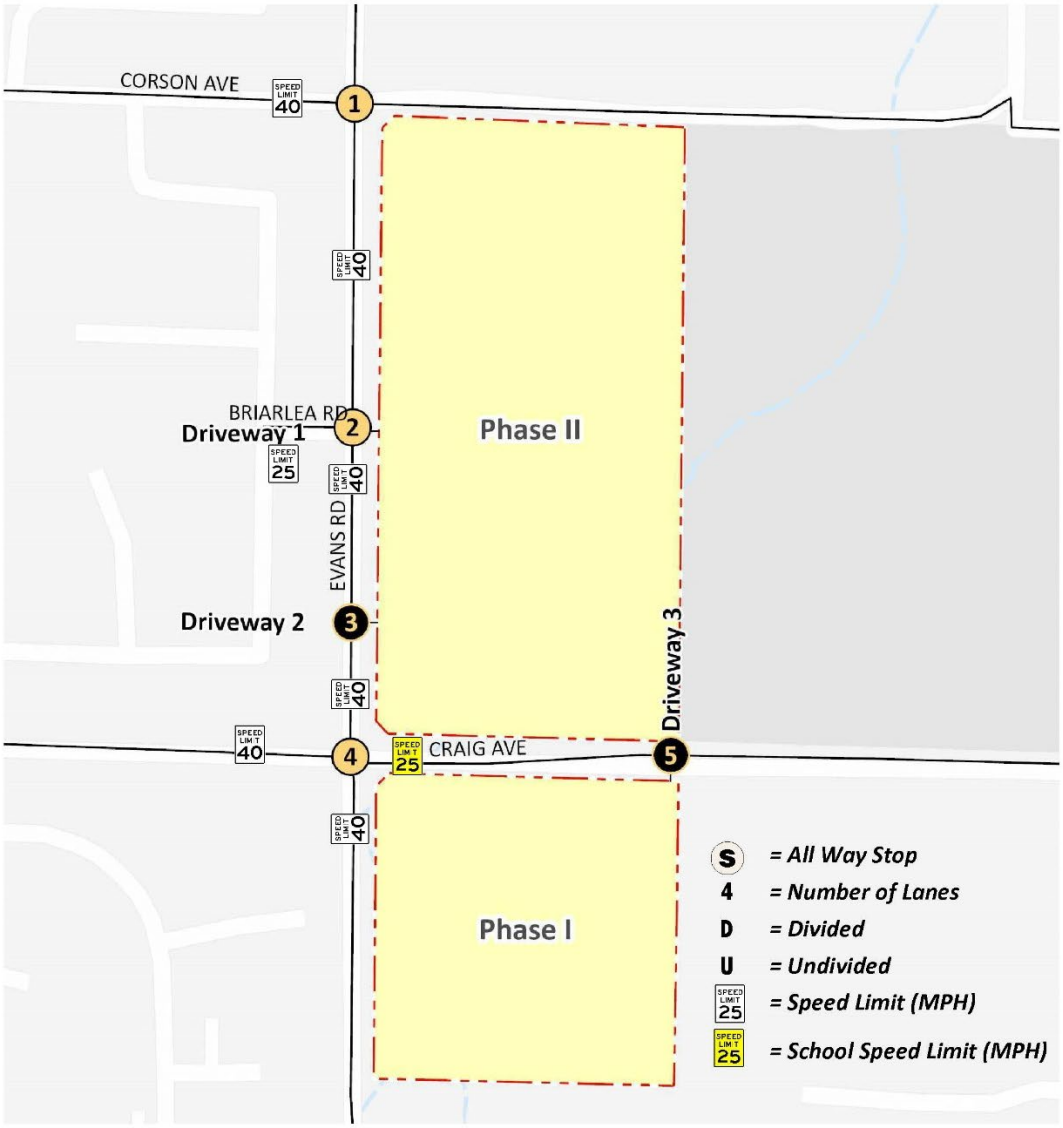
Secondary Streets are four-lane roadways and may include a painted median. These roadways typically have a 100-foot right-of-way and a 72-foot curb-to-curb measurement. These roadways typically direct traffic through major development areas and a lesser capacity than Major Roadways. The following study area roadways within the City of Menifee are classified as a Secondary Street:

- Evans Road

Collector Streets are two-lane roadways and provide on-street parking on both sides. These roadways typically have a 74-foot right-of-way and a 44-foot curb-to-curb measurement. These roadways provide connections to secondary streets, arterials, and freeways, with most traffic being through-traffic or intra-city traffic. The following study area roadways within the City of Menifee are classified as a Collector Street:

- Craig Avenue

EXHIBIT 3-1: EXISTING NUMBER OF THROUGH LANES AND INTERSECTION CONTROLS



1 Evans Rd. & Corson Av.	2 Evans Rd. & Briarlea Rd. / Dwy. 1	3 Evans Rd. & Dwy. 2	4 Evans Rd. & Craig Av.	5 Dwy. 3 & Craig Av.
2U / 2U / S / 2U / 2U	2U / 2U / S / 2U / 2U	Future Intersection	2U / 2U / S / 2D / 4D	Future Intersection

EXHIBIT 3-2: CITY OF MENIFEE GENERAL PLAN ROADWAY NETWORK

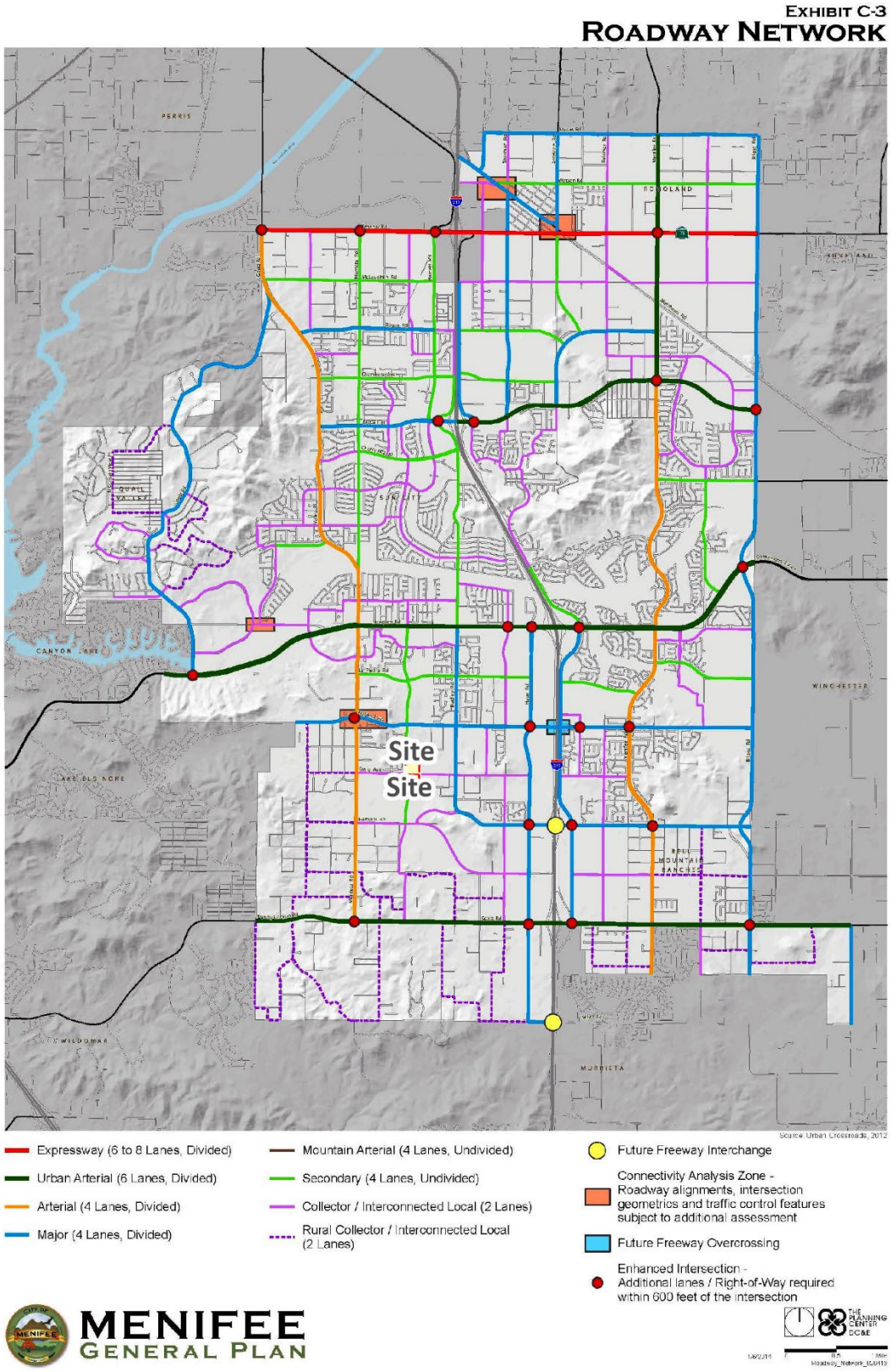
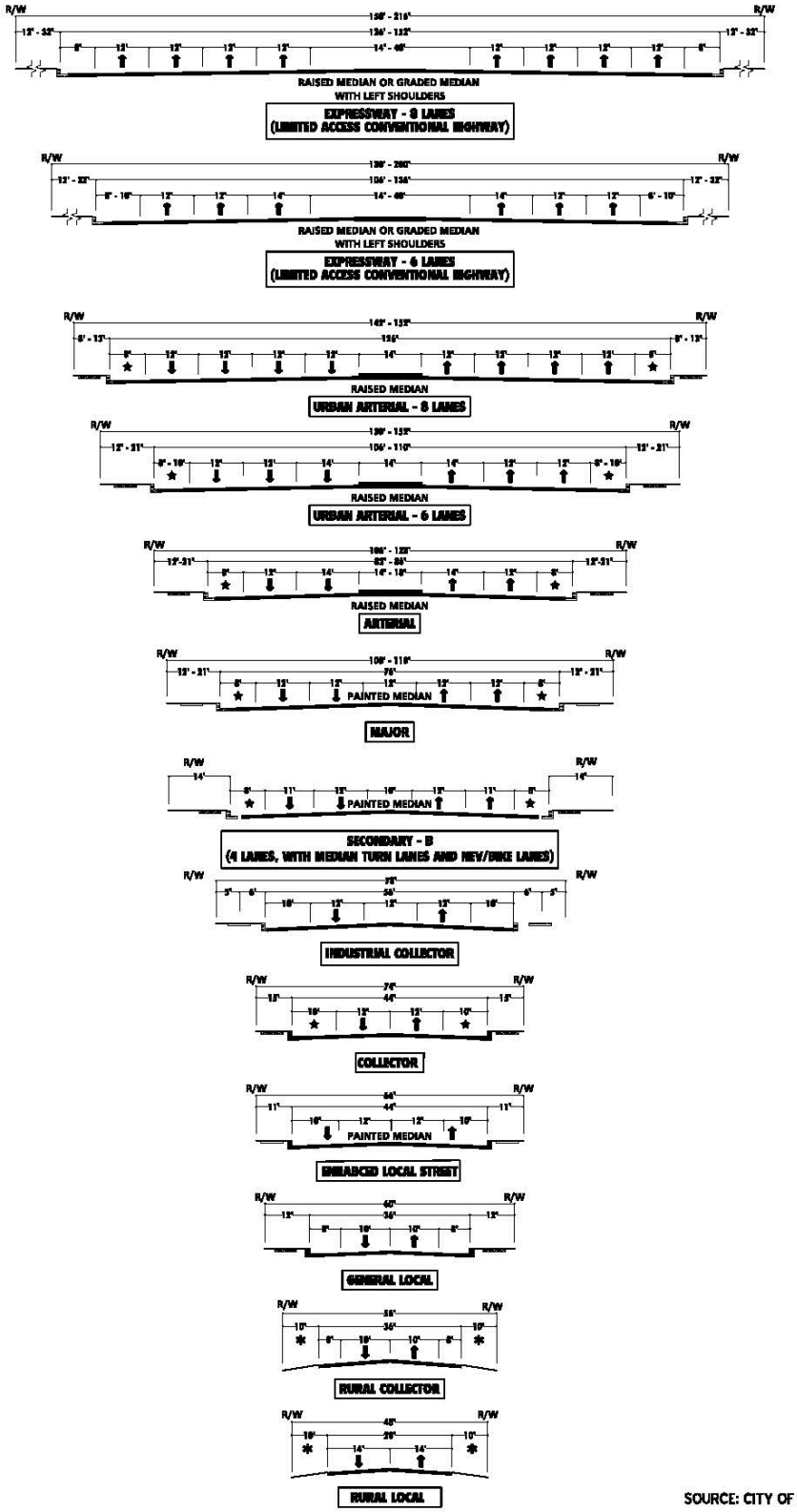


EXHIBIT 3-3: CITY OF MENIFEE GENERAL PLAN ROADWAY CROSS-SECTIONS



SOURCE: CITY OF MENIFEE GENERAL PLAN

3.3 BICYCLE & PEDESTRIAN FACILITIES

The City of Menifee bike and community pedestrian network are shown on Exhibit 3-4. There are proposed Class III bike facilities along Craig Avenue. There is a proposed Class II bike facility along Evans Road. Exhibit 3-5 illustrates the existing pedestrian facilities, including sidewalks and crosswalks. As shown on Exhibit 3-5, there is sidewalk along the west side of Evans Road and along portions of Craig Avenue.

3.4 TRANSIT SERVICE

The study area is not currently served by transit services. There is potential future on-road transit service along Craig Avenue. The transit services are illustrated on Exhibit 3-6. Transit service is reviewed and updated by Riverside Transit Agency (RTA) periodically to address ridership, budget, and community demand needs. Changes in land use can affect these periodic adjustments which may lead to either enhanced or reduced service where appropriate.

3.5 EXISTING TRAFFIC COUNTS

The intersection LOS analysis is based on the traffic volumes observed during the peak hour conditions using traffic count data collected in August 2021. The following peak hours were selected for analysis:

- Weekday AM Peak Hour (peak hour between 7:00 AM and 9:00 AM)
- Weekday PM Peak Hour (peak hour between 4:00 PM and 6:00 PM)

There were no observations made in the field that would indicate atypical traffic conditions on the count dates, such as construction activity or detour routes, and near-by schools were in session and operating on normal schedules.

Existing weekday ADT volumes on arterial highways throughout the study area are shown on Exhibit 3-7. Where actual 24-hour tube count data was not available, Existing ADT volumes were based upon factored intersection peak hour counts collected by Urban Crossroads, Inc. using the following formula for each intersection leg:

Weekday PM Peak Hour (Approach Volume + Exit Volume) x 14.69 = Leg Volume

A comparison of the PM peak hour and daily traffic volumes of various roadway segments within the study area indicated that the peak-to-daily relationship is approximately 6.81 percent. As such, the above equation utilizing a factor of 14.69 estimates the ADT volumes on the study area roadway segments assuming a peak-to-daily relationship of approximately 6.81 percent (i.e., 1/0.0681 = 14.69) and was assumed to sufficiently estimate ADT volumes for planning-level analyses. Existing weekday AM and weekday PM peak hour intersection volumes are shown on Exhibit 3-7.

EXHIBIT 3-4: CITY OF MENIFEE BICYCLE FACILITIES

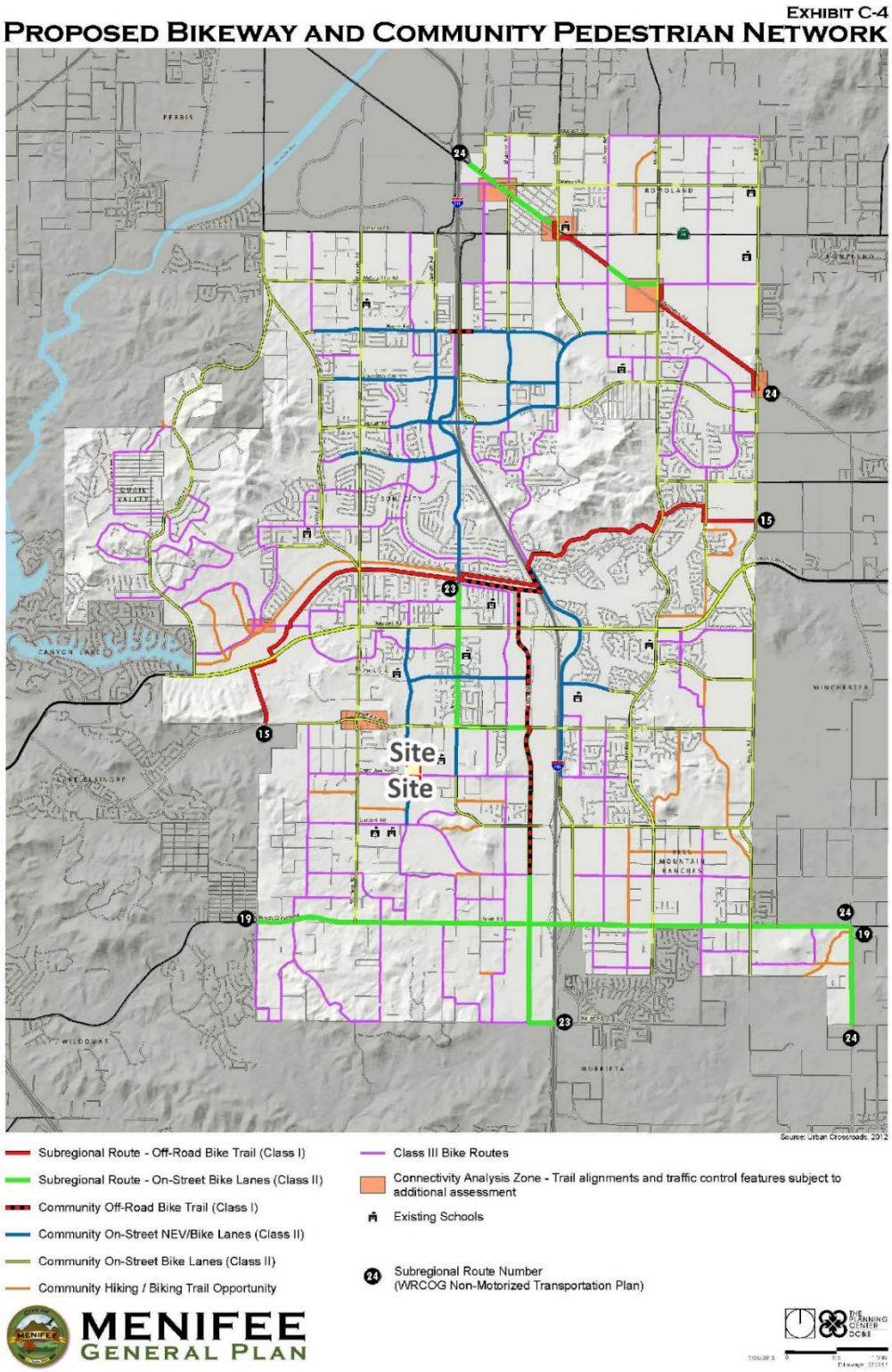


EXHIBIT 3-5: EXISTING PEDESTRIAN FACILITIES



EXHIBIT 3-6: EXISTING TRANSIT ROUTES

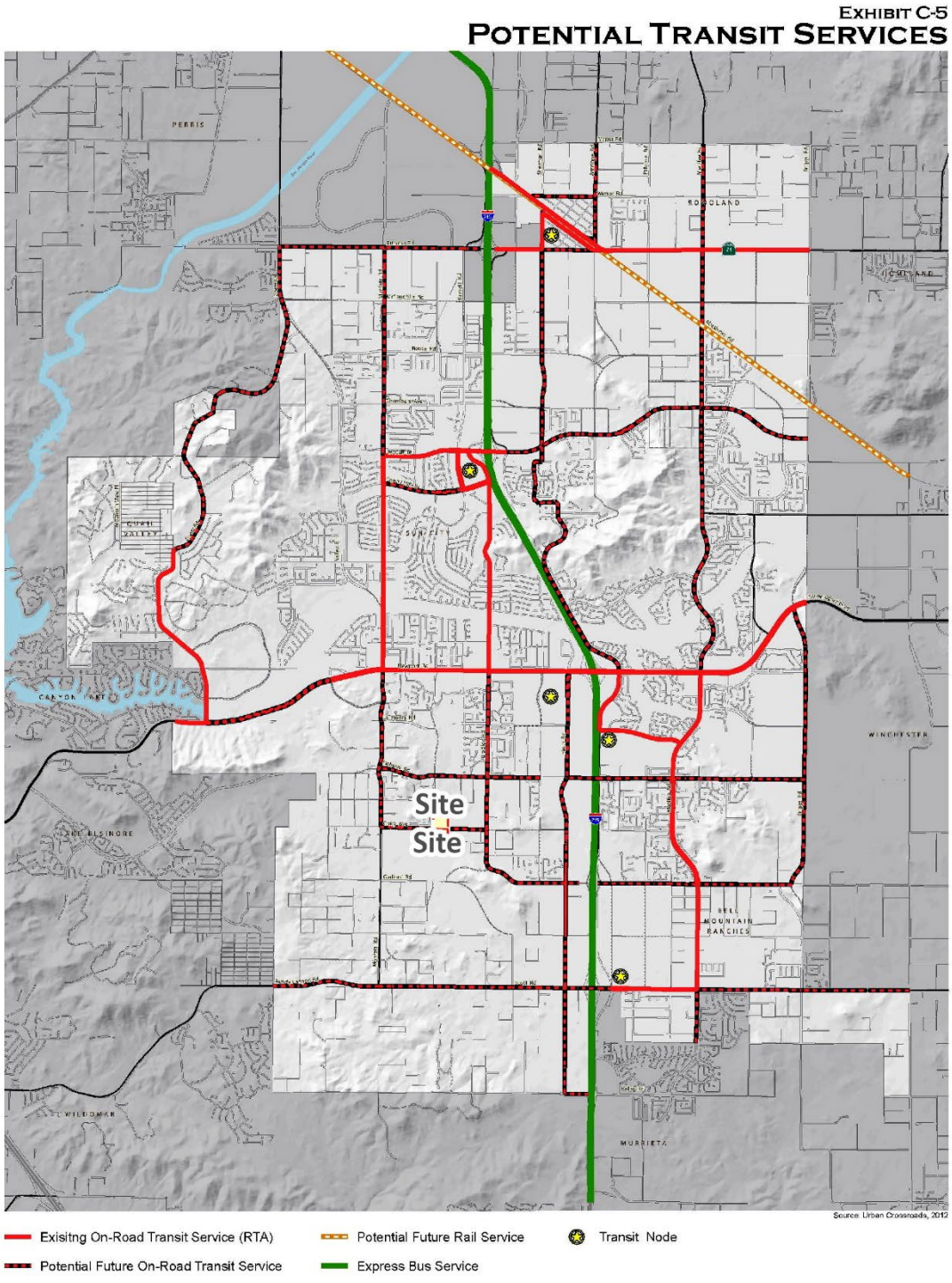
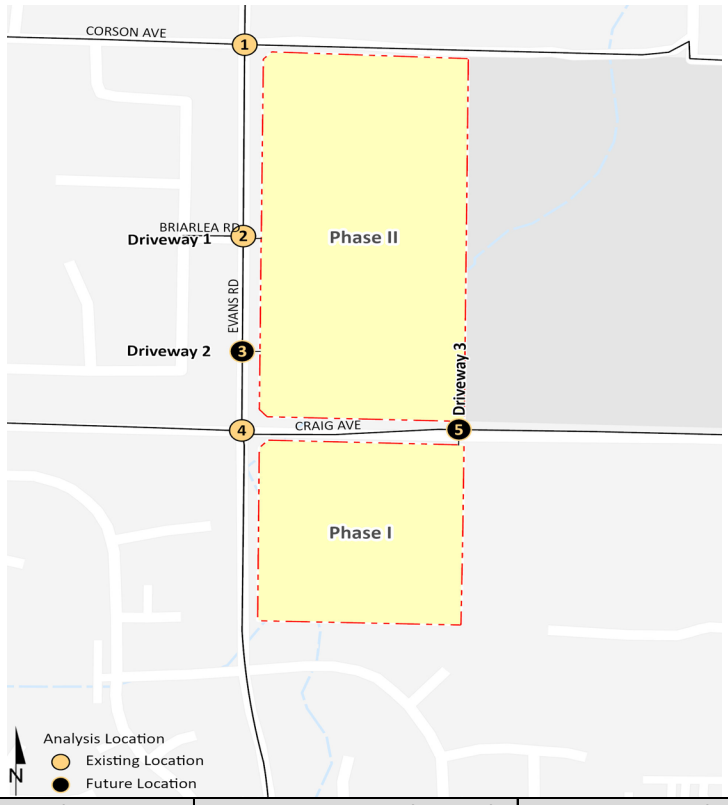


EXHIBIT 3-7: EXISTING (2021) TRAFFIC VOLUMES



1 Evans Rd. & Corson Av.

2,150

	↲ 45(18) ↓ 408(69)	
14(13) ↳		
37(7) ↲	↰ 61(17) ↑ 283(48)	

800 *2,050*

2 Evans Rd. & Briarlea Rd./Driveway 1

2,050

	↲ 20(8) ↓ 425(68)	
7(5) ↳		
3(8) ↲	↰ 7(0) ↑ 337(60)	

300 *2,000*

3 Evans Rd. & Driveway 2

2,000

↓ 428(76)	
	↑ 344(60)

2,000

4 Evans Rd. & Craig Av.

2,000 *3,900*

↲ 24(14) ↓ 256(42) ↳ 148(20)	↱ 170(28) ← 235(75) ↰ 177(45)	
37(5) ↳	↰ ↑ ↱	
186(52) →	57(8) 137(27) 97(45)	
52(22) ↲		

2,600 *2,800*

5 Driveway 3 & Craig Av.

3,900

	← 582(148)
431(117) →	

3,900

##(##) AM(PM) Peak Hour Intersection Volumes

Average Daily Trips

3.6 EXISTING (2021) INTERSECTION OPERATIONS ANALYSIS

Existing peak hour traffic operations have been evaluated for the study area intersections based on the analysis methodologies presented in Section 2.2 *Intersection Capacity Analysis* of this report. The intersection operations analysis results are summarized in Table 3-1 which indicates that the study area intersections are currently operating at an acceptable LOS during the peak hours, with the exception of the following intersections:

- Evans Road & Craig Avenue (#4) – LOS E AM peak hour only

TABLE 3-1: INTERSECTION ANALYSIS FOR EXISTING (2021) CONDITIONS

#	Intersection	Traffic Control[2]	Delay[1] (Secs.)		Level of Service	
			AM	PM	AM	PM
1	Evans Rd. & Corson Av.	AWS	12.8	7.5	B	A
2	Evans Rd. & Briarlea Rd./Driveway 1	CSS	15.1	9.1	C	A
3	Evans Rd. & Driveway 2	CSS	Future Intersection			
4	Evans Rd. & Craig Av.	AWS	**38.0**	8.4	**E**	A
5	Driveway 3 & Craig Av.	CSS	Future Intersection			

BOLD = LOS does not meet the applicable jurisdictional requirements (i.e., unacceptable LOS).

[1] Per the Highway Capacity Manual (6th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal or all-way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

[2] CSS = Cross-street Stop; AWS = All-way Stop

The intersection operations analysis worksheets are included in Appendix 3.2 of this TA.

3.7 EXISTING (2021) TRAFFIC SIGNAL WARRANTS ANALYSIS

Traffic signal warrants for Existing traffic conditions are based on existing peak hour intersection turning volumes. The following unsignalized study area intersection currently meets the peak hour volume-based traffic signal warrant under Existing (2021) traffic conditions (see Appendix 3.3):

- Evans Road & Craig Avenue (#4)

4 PROJECTED FUTURE TRAFFIC

The proposed Project consists of a 6-acre pump track in Phase 1 (2022) and a 12.88-acre sports park with ball fields in Phase 2 (2025). Access to the Project site will be provided via Evans Road and Craig Avenue.

4.1 PROJECT TRIP GENERATION

In order to develop the traffic characteristics of the proposed project, trip-generation statistics published in the San Diego Municipal Code Land Development Code Trip Generation Manual (May 2003) for the Parks (developed with sports fields) land use. The trip generation rate from the San Diego Municipal Code is more conservative than any published trip generation rate for public parks from the Institute of Transportation Engineers latest Trip Generation Manual (10th Edition, 2017). Table 4-1 presents the trip generation rates, which pursuant to discussions with City staff, has been utilized to calculate the trip generation associated with both Phase 1 and Phase 2 of the Project. Table 4-2 summarizes the resulting trip generation summary for the proposed Project. As shown in Table 4-2, the Project is anticipated to generate a net total of 944 two-way trips per day with 38 AM peak hour trips and 76 PM peak hour trips.

TABLE 4-1: PROJECT TRIP GENERATION RATES

Land Use	ITE LU Code	Units[1]	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	Daily
Project Trip Generation Rates									
Park (Developed; Sports Fields)	--[2]	AC	1.00	1.00	2.00	2.00	2.00	4.00	50.00

[1] AC = acres

[2] Trip Generation Source: San Diego Municipal Code Land Development Code Trip Generation Manual, May 2003.

TABLE 4-2: PROJECT TRIP GENERATION SUMMARY

Project	Quantity	Units[1]	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	Daily
Project Trip Generation:									
Phase 1: Pump Track	6.00	AC	6	6	12	12	12	24	300
Phase 2: Sports Park	12.88	AC	13	13	26	26	26	52	644
Project Buildout Total			**19**	**19**	**38**	**38**	**38**	**76**	**944**

[1] AC = acres

4.2 PROJECT TRIP DISTRIBUTION

The Project trip distribution and assignment process represents the directional orientation of traffic to and from the Project site. Trip distribution is the process of identifying the probable destinations, directions or traffic routes that will be utilized by Project traffic. The potential interaction between the planned land uses and surrounding regional access routes are considered, to identify the route where the Project traffic would distribute. Separate distributions have been evaluated for Phase 1 of the Project and for Project Buildout. The Project trip distribution patterns are graphically depicted on Exhibit 4-1.

EXHIBIT 4-1: PROJECT (PHASE 1) TRIP DISTRIBUTION

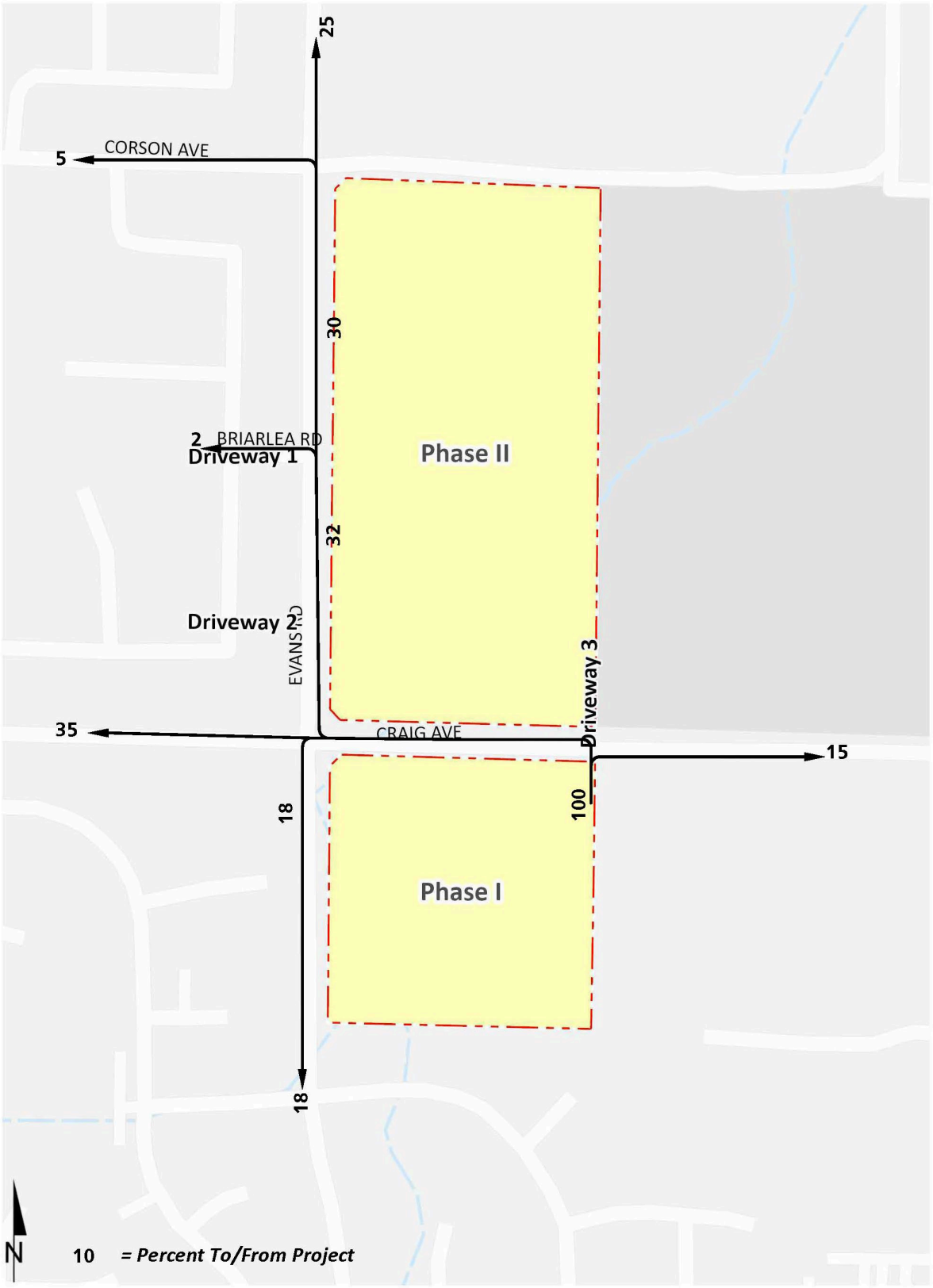
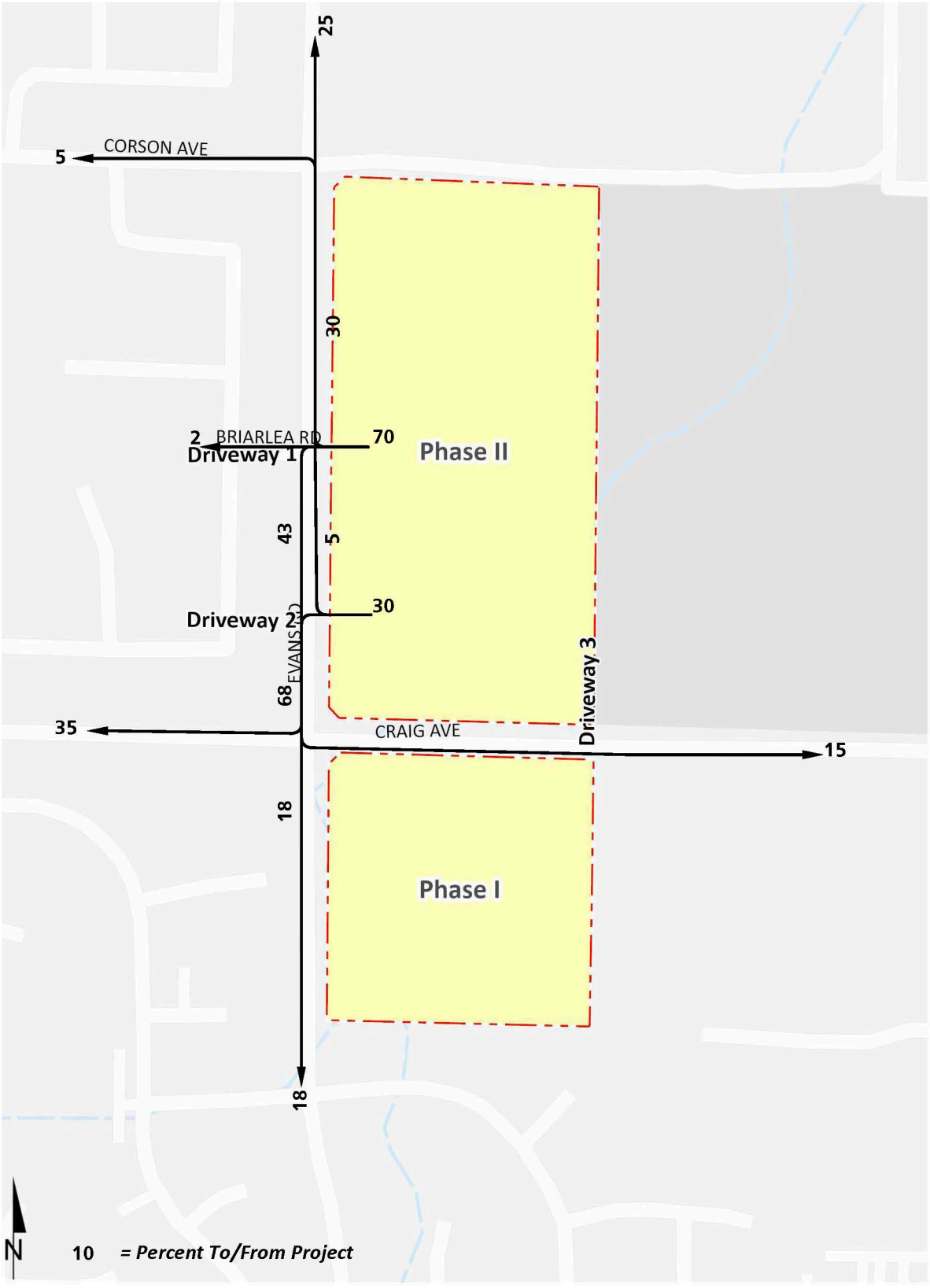


EXHIBIT 4-2: PROJECT (PHASE 2) TRIP DISTRIBUTION



4.3 MODAL SPLIT

The traffic reducing potential of public transit, walking, or bicycling have not been considered in this TA. Essentially, the traffic projections are "conservative" in that these alternative travel modes might be able to reduce the forecasted traffic volumes.

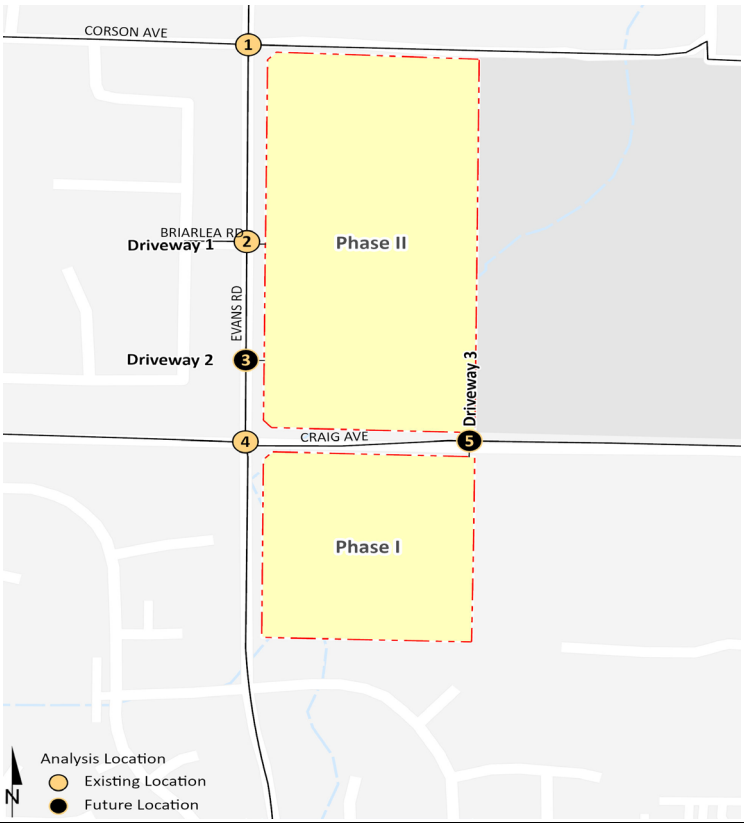
4.4 PROJECT TRIP ASSIGNMENT

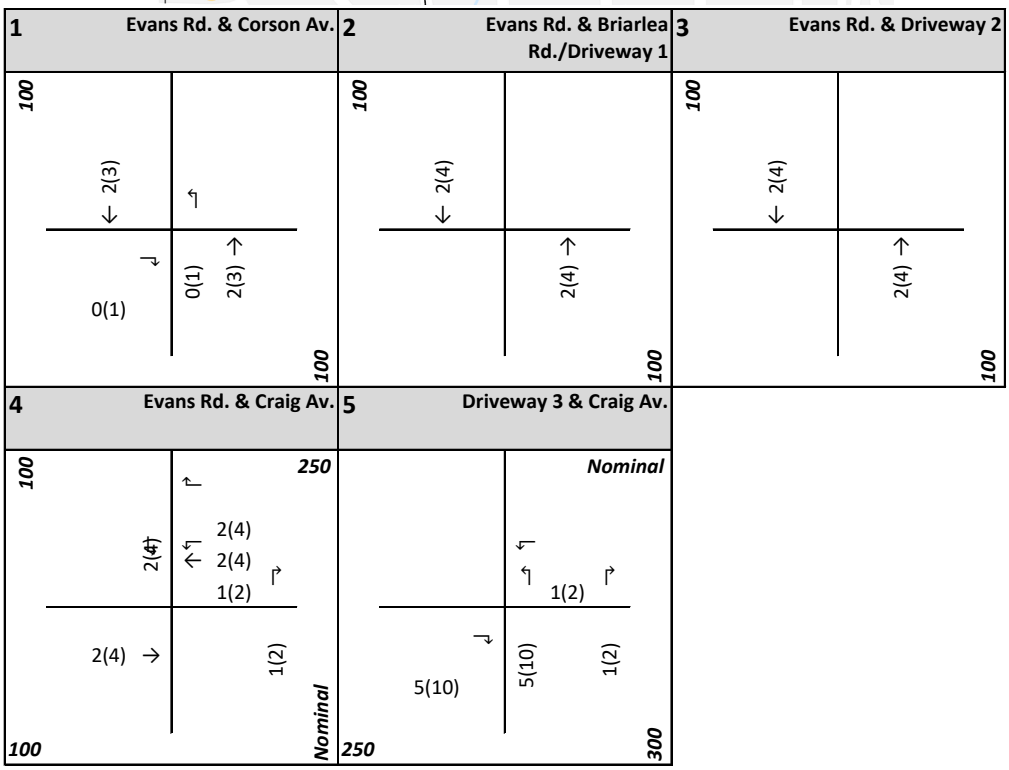
The assignment of traffic from the Project area to the adjoining roadway system is based upon the Project trip generation, trip distribution, and the arterial highway and local street system improvements that would be in place by the time of initial occupancy of the Project. Based on the identified Project traffic generation and trip distribution patterns, the Project only ADT and peak hour intersection turning movement volumes are shown on Exhibit 4-3 for Phase 1 and Exhibit 4-4 for Project Buildout.

4.5 BACKGROUND TRAFFIC

Future year traffic forecasts have been based upon background (ambient) growth at 2% per year for 2025 traffic conditions, consistent with other recent studies performed in the area. The total ambient growth is 8.24% for 2025 traffic conditions (compounded growth of 2 percent per year over 4 years or $1.02^{4\ years}$). The ambient growth factor is intended to approximate regional traffic growth. This ambient growth rate is added to existing traffic volumes to account for area-wide growth not reflected by cumulative development projects. Ambient growth has been added to daily and peak hour traffic volumes on surrounding roadways, in addition to traffic generated by the development of future projects that have been approved but not yet built and/or for which development applications have been filed and are under consideration by governing agencies. Opening Year Cumulative (2025) traffic volumes are provided in Section 6 of this TA. The traffic generated by the proposed Project was then manually added to the base volume to determine Opening Year Cumulative “With Project” forecasts.

EXHIBIT 4-3: PROJECT ONLY (PHASE 1) TRAFFIC VOLUMES

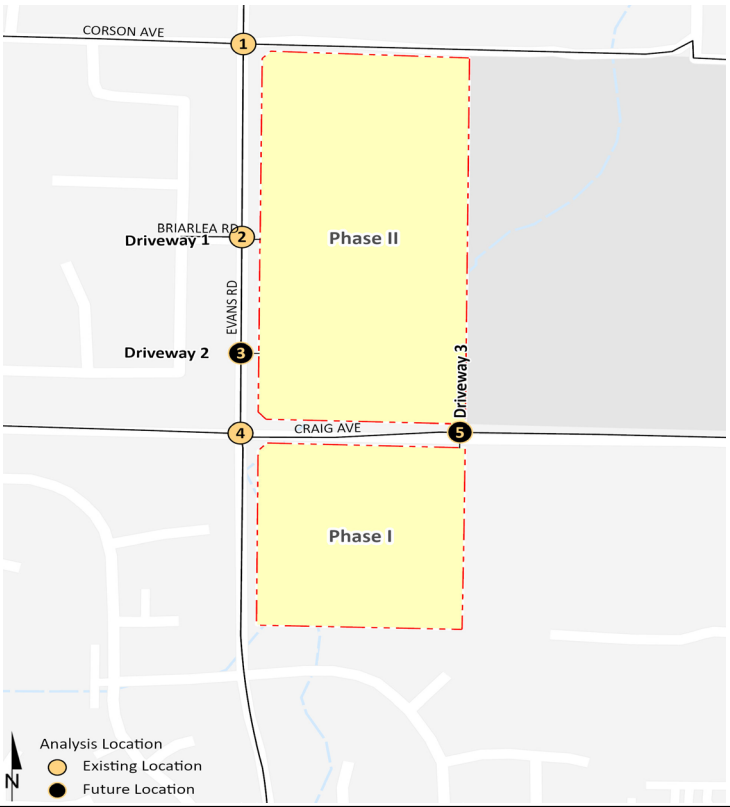




##(##) AM(PM) Peak Hour Intersection Volumes

Average Daily Trips

EXHIBIT 4-4: PROJECT ONLY (PROJECT BUILDOUT) TRAFFIC VOLUMES



1 Evans Rd. & Corson Av.

250 — 5(10) ↓ — 1(2) ↳ — 1(2) ↰ 5(10) ↑ — 300

Nominal

2 Evans Rd. & Briarlea Rd./Driveway 1

300 — 3(5) ↓ 3(7) ↳ — 0(1) → — 450

↱ 3(7)
← 0(1)
↰ 6(11)

3(5) → 6(11) ↱ — 400

3 Evans Rd. & Driveway 2

400 — 8(15) ↓ 1(1) ↳ — 200

↱ 1(1)
↰ 3(7)

8(15) → 3(7) ↱ — 550

4 Evans Rd. & Craig Av.

550 — 5(9) ↲ 2(5) ↓ 4(8) ↳ — 5(9) ↳ 2(4) → — 350

↱ 4(8)
← 2(4)
↰ 1(2)

2(5) → 1(2) ↱ — 150

350

5 Driveway 3 & Craig Av.

150

← 2(4)
↰ 1(2)

2(4) → 5(10) ↲ — 5(10) ↰ 1(2) ↱ — 300

350

##(##) AM(PM) Peak Hour Intersection Volumes

Average Daily Trips

4.6 CUMULATIVE DEVELOPMENT TRAFFIC

A cumulative project list was developed for the purposes of this analysis through consultation with planning and engineering staff from the City of Menifee. The cumulative project list includes known and foreseeable projects that are anticipated to contribute traffic to the study area intersections.

Where applicable, cumulative projects anticipated to contribute measurable traffic (i.e., 50 or more peak hour trips) to study area intersections have been manually added to the study area network to generate Opening Year Cumulative (2025) forecasts. In other words, this list of cumulative development projects has been reviewed to determine which projects would likely contribute measurable traffic through the study area intersections (e.g., those cumulative projects in close proximity to the proposed Project). For the purposes of this analysis, the cumulative projects that were determined to affect one or more of the study area intersections are shown on Exhibit 4-5, listed in Table 4-3, and have been considered for inclusion.

Although it is unlikely that all of these cumulative projects would be fully built and occupied by Years 2025, they have been included in an effort to conduct a conservative analysis and overstate as opposed to understate potential traffic deficiencies. Any other cumulative projects located beyond the cumulative study area that are not expected to contribute measurable traffic to study area intersections have not been included since the traffic would dissipate due to the distance from the Project site and study area intersections. Any additional traffic generated by other projects not on the cumulative projects list is likely accounted for through background ambient growth factors that have been applied to the peak hour volumes at study area intersections as discussed in Section 4.5 *Background Traffic*. Cumulative Only ADT and peak hour intersection turning movement volumes are shown on Exhibit 4-6.

TABLE 4-3: CUMULATIVE DEVELOPMENT LAND USE SUMMARY

No.	Project Number	Project Name	Land Use	Quantity[1]
M1	DEV 2019-053	Newport Pointe Commercial	Retail Commercial	84.211 TSF
M2	PP 2019-108	Rowland Tract	Residential	80 DU
M3	TR 28786	Lennar	Residential	72 DU
M4	TR 30142 (75% Completed)	KB Hidden Hlls (KB Homes) (75% Completed)	Residential	523 DU
M5	TR 30664	Gallery Estates (Pacific Communities)	Residential	34 DU
M6	TTM 31194	Golden Meadows (Richland Comm.)	Residential	474 DU
M7	TR 33511	Granite (Granite Investments)	Residential	71 DU
M8	TR28786, TR28791, TR28792, TR28793 & TR28794	Quartz Ranch (Lennar)	Residential	165 DU
M9	TR28794	Pacific Communities	Residential	65 DU
M10	TR37576	Meadow Run (Meritage Homes)	Residential	65 DU
M11	PP 2018-189	Newport Dental Professional Office (Baker)	Medical Office	5.417 TSF
M12	PLN20-0023 (CUP) & PLN20-0024 (PP)	Montessori School	Childcare Center	13.648 TSF
M13	CUP PLN20-0272, PP PLN20-0273, TPM PLN20-0274	Menifee Crossroads	Retail	54.100 TSF
			Office	7.000 TSF
			Hotel	100 RM

[1] TSF = Thousand Square Feet; DU = Dwelling Unit; RM = Rooms

EXHIBIT 4-5: CUMULATIVE DEVELOPMENT LOCATION MAP

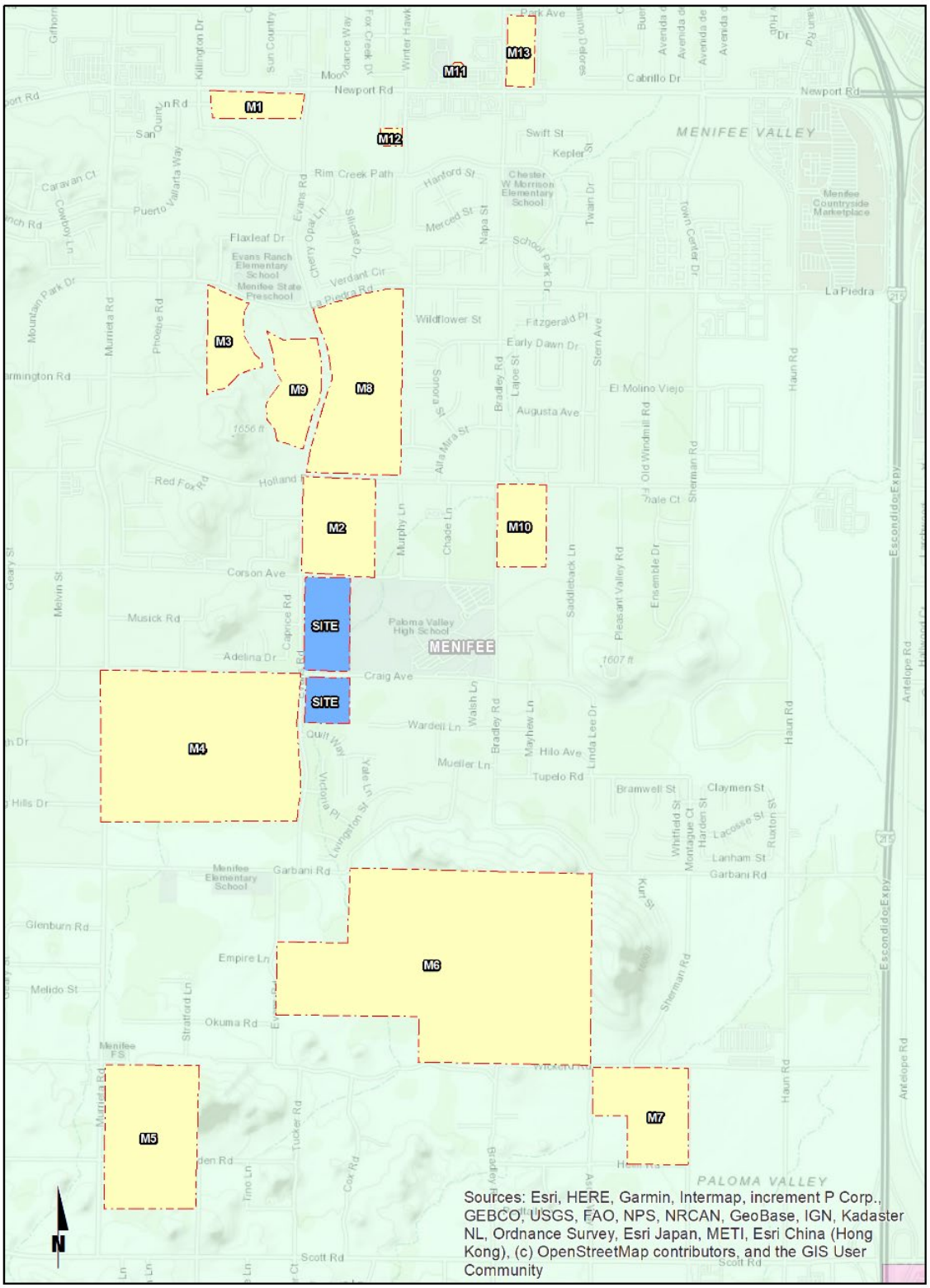
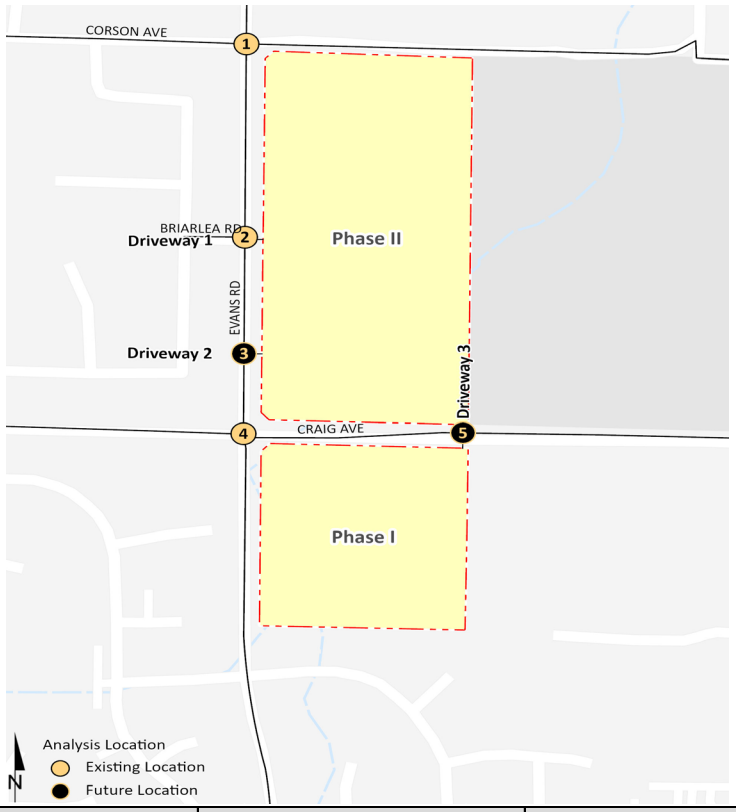
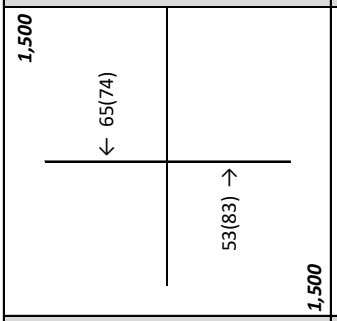


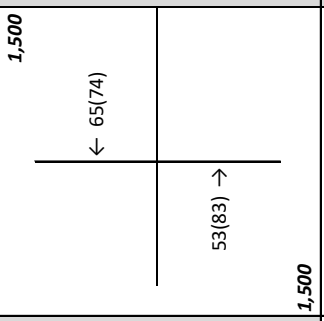
EXHIBIT 4-6: CUMULATIVE ONLY TRAFFIC VOLUMES



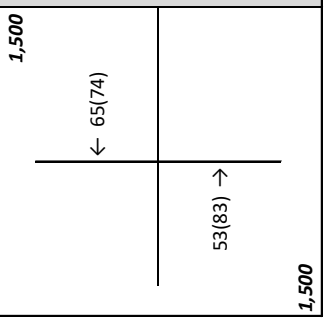
1 Evans Rd. & Corson Av.



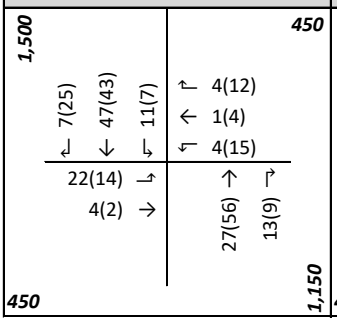
2 Evans Rd. & Briarlea Rd./Driveway 1



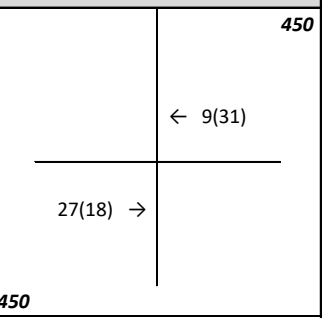
3 Evans Rd. & Driveway 2



4 Evans Rd. & Craig Av.



5 Driveway 3 & Craig Av.



##(##) AM(PM) Peak Hour Intersection Volumes

Average Daily Trips

4.7 TRAFFIC CONDITIONS

The "buildup" approach combines existing traffic counts with a background ambient growth factor to forecast the 2025 traffic conditions. An ambient growth factor of 2% per year, compounded annually, accounts for background (area-wide) traffic increases that occur over time up to the year 2025 from the year 2021. Traffic volumes generated by cumulative development projects are then added to assess the Opening Year Cumulative (2025). Lastly, Project traffic is added to assess "With Project" traffic conditions. The 2025 roadway network are similar to the existing conditions roadway network with the exception of intersections proposed to be developed by the Project. The traffic analysis includes the following traffic conditions, with the various traffic components:

- Opening Year Cumulative (2025) Without Project
    - Adjusted Existing 2021 counts
    - Ambient growth traffic (2.33%)
- Opening Year Cumulative (2025) With Project
    - Adjusted Existing 2021 counts
    - Ambient growth traffic (2.33%)
    - Project (Phase 1 and Phase 2) traffic

5 EXISTING PLUS PROJECT TRAFFIC CONDITIONS

This section discusses the methods used to develop Existing plus Project (E+P) Phase 1 and Project Buildout traffic forecasts, and the resulting intersection operations and traffic signal warrant. Project Buildout traffic forecasts consists of both Phase 1 and Phase 2 traffic combined.

5.1 ROADWAY IMPROVEMENTS

The lane configurations and traffic controls assumed to be in place for Existing plus Project (Phase 1) conditions are consistent with those shown previously on Exhibit 3-1, with the exception of the following:

- Project driveways and those facilities assumed to be constructed by the Project to provide site access are also assumed to be in place for Project (Phase 1) conditions (e.g., intersection and roadway improvements along the Project's Phase 1 frontage and driveways, including Craig Avenue and Evans Road).

The lane configurations and traffic controls assumed to be in place for Existing plus Project (Project Buildout) conditions are consistent with those shown previously on Exhibit 3-1, with the exception of the following:

- Project driveways and those facilities assumed to be constructed by the Project to provide site access are also assumed to be in place for Project (Phase 2) conditions (e.g., intersection and roadway improvements along the Project's Phase 2 frontage and driveways, including Evans Road).

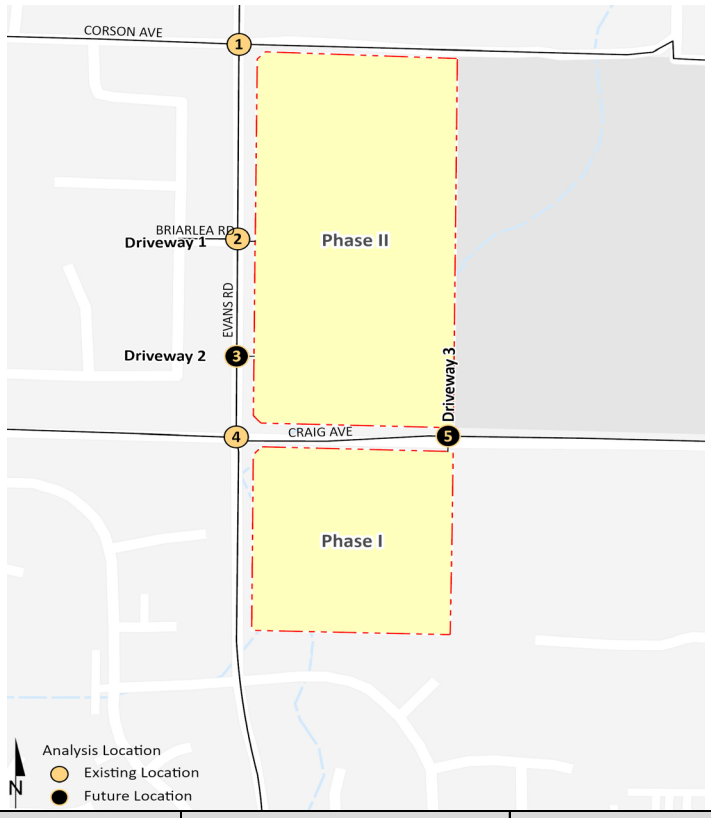
5.2 EXISTING PLUS PROJECT (PHASE 1) TRAFFIC VOLUME FORECASTS

This scenario includes Existing traffic volumes plus Project (Phase 1) traffic. The ADT and weekday AM and PM peak hour intersection turning movement volumes which can be expected for E+P traffic conditions are shown on Exhibit 5-1.

5.3 EXISTING PLUS PROJECT (PROJECT BUILDOUT) TRAFFIC VOLUME FORECASTS

This scenario includes Existing traffic volumes plus Project (Project Buildout) traffic. Project buildout traffic includes Phase 1 plus Phase 2 traffic. The ADT and weekday AM and PM peak hour intersection turning movement volumes which can be expected for E+P traffic conditions are shown on Exhibit 5-2.

EXHIBIT 5-1: EXISTING PLUS PROJECT (PHASE 1) TRAFFIC VOLUMES



1 Evans Rd. & Corson Av.

2,250 (EB) | 800 (WB) | 2,150 (NB)

EB		WB		NB	
45(18)	↲	14(13)	↳	↰ 61(18)	↑ 285(51)
410(72)	↓	37(8)	↴		

2 Evans Rd. & Briarlea Rd./Driveway 1

EB		WB		NB	
20(8)	↲	7(5)	↳	↰ 7(0)	↑ 339(64)
427(72)	↓	3(8)	↴		

3 Evans Rd. & Driveway 2

1,500 (EB) | 1,500 (NB)

EB		NB
430(80)	←	↑ 346(64)

4 Evans Rd. & Craig Av.

EB			WB			NB		
24(14)	↲		37(5)	↳		↰ 57(8)	↑ 137(27)	↱ 98(47)
256(42)	↓		188(56)	→				
150(24)		↳	52(22)	↴		↰ 178(47)	← 237(79)	↱ 172(32)

5 Driveway 3 & Craig Av.

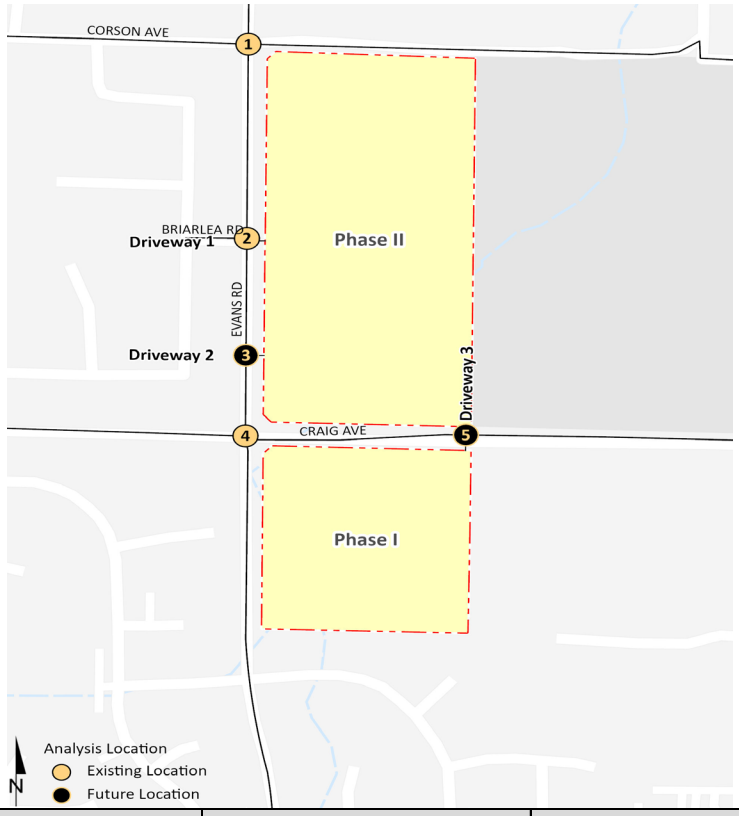
150 (NB) | 350 (SB) | 300 (NB)

SB			NB		
			↰ 5(10)		↱ 1(2)
431(117)	→			← 582(148)	
5(10)	↴			↰ 1(2)	

##(##) AM(PM) Peak Hour Intersection Volumes

Average Daily Trips

EXHIBIT 5-2: EXISTING PLUS PROJECT (PROJECT BUILDOUT) TRAFFIC VOLUMES



1 Evans Rd. & Corson Av.

2,400

	45(18) ↲	413(79) ↓
14(13) ↳		
38(9) ↲		

↰	↑	
62(19)	288(58)	

850 ***2,350***

2 Evans Rd. & Briarlea Rd./Driveway 1

	20(8) ↲	428(73) ↓
7(5) ↳		
0(1) →		
3(8) ↲		

↰	↑	↱
7(0)	340(65)	6(11)

	3(7) ↱	
	0(1) ←	
	6(11) ↰	

3 Evans Rd. & Driveway 2

2,100

	436(91) ←	1(1) ↳

	1(1) ↱	
	3(7) ↰	

↑	↱	
352(75)	3(7)	

2,100

4 Evans Rd. & Craig Av.

Nominal

	29(23) ↲	258(47) ↓
42(14) ↳		
188(56) →		
52(22) ↲		

↰	↑	↱
57(8)	139(32)	98(47)

	174(36) ↱	
	237(79) ←	
	178(47) ↰	

450

5 Driveway 3 & Craig Av.

		584(152) ←
433(121) →		
5(10) ↲		

↰		↱
5(10)		1(2)

	1(2) ↱	
	1(2) ←	

450

##(##) AM(PM) Peak Hour Intersection Volumes

Average Daily Trips

5.4 INTERSECTION OPERATIONS ANALYSIS

5.4.1 EXISTING PLUS PROJECT (PHASE 1) TRAFFIC CONDITIONS

Existing plus Project (Phase 1) peak hour traffic operations have been evaluated for the study area intersections based on the analysis methodologies presented in Section 2.2 *Intersection Capacity Analysis* of this report. The intersection analysis results are summarized in Table 5-1, which indicate that the following study area intersections are anticipated to operate at an unacceptable LOS during the peak hours under Existing plus Project (Phase 1):

- Evans Road & Craig Avenue (#4) – LOS E AM peak hour only

The intersection operations analysis worksheets for Existing plus Project (Phase 1) traffic conditions are included in Appendix 5.1 of this TA.

TABLE 5-1: INTERSECTION ANALYSIS FOR EXISTING PLUS PROJECT CONDITIONS

			Existing				E+P (Phase 1)				E+P (Project Buildout)[4]			
		Traffic	Delay[1] (Secs.)		LOS[3]		Delay[1] (Secs.)		LOS[3]		Delay[1] (Secs.)		LOS[3]	
#	Intersection	Control[2]	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
1	Evans Rd. & Corson Av.	AWS	12.8	7.5	B	A	12.9	7.5	B	A	13.1	7.8	B	A
2	Evans Rd. & Briarlea Rd./Driveway 1	CSS	15.1	9.1	C	A	15.1	9.2	C	A	14.4	9.4	B	A
3	Evans Rd. & Driveway 2	CSS	Future Intersection				Future Intersection				12.6	9.4	B	A
4	Evans Rd. & Craig Av.	AWS	**38.0**	8.4	**E**	A	**38.9**	8.5	**E**	A	20.6	8.6	C	A
5	Driveway 3 & Craig Av.	CSS	Future Intersection				19.3	10.1	C	B	19.4	10.1	C	B

BOLD = LOS does not meet the applicable jurisdictional requirements (i.e., unacceptable LOS).

[1] Per the Highway Capacity Manual (6th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal or all-way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

[2] CSS = Cross-street Stop; AWS = All-way Stop

[3] LOS = Level of Service

[4] Additional lanes are recommended in Project Buildout, which may cause a decrease in the delay when compared to Phase 1 or Without Project scenarios.

5.4.2 EXISTING PLUS PROJECT (PROJECT BUILDOUT) TRAFFIC CONDITIONS

As shown in Table 5-1, the study area intersections are all anticipated to operate at an acceptable LOS with the addition of Project (Phase 2) traffic. Evans Road & Craig Avenue (#4) is anticipated to improve operations to an acceptable LOS with the implementation of the Project design features, as discussed in Section 1.6 *Recommendations.* The intersection operations analysis worksheets for Existing plus Project (Project Buildout) traffic conditions are included in Appendix 5.2 of this TA.

5.5 TRAFFIC SIGNAL WARRANTS ANALYSIS

Traffic signal warrants have been performed (based on CA MUTCD) for Existing plus Project traffic conditions based on peak hour intersection turning movements volumes or planning level (ADT) volumes. There is no additional unsignalized study area intersections anticipated to meet a traffic signal warrant under Existing plus Project (Phase 1 and Project Buildout) traffic conditions, in addition to the intersections identified previously under Existing (2021) traffic conditions (see Appendix 5.3 for Phase 1 and Appendix 5.4 for Project Buildout). The installation of a traffic signal has not been recommended, as the intersection is anticipated to operate at acceptable LOS with the Project frontage improvements.

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6 OPENING YEAR CUMULATIVE (2025) TRAFFIC CONDITIONS

This section discusses the methods used to develop Opening Year Cumulative (2025) Without and With Project (Project Buildout) traffic forecasts, and the resulting intersection operations and traffic signal warrant analyses.

6.1 ROADWAY IMPROVEMENTS

The lane configurations and traffic controls assumed to be in place for Opening Year Cumulative (2025) conditions are consistent with those shown previously on Exhibit 3-1, with the exception of the following:

- Project driveways and those facilities assumed to be constructed by the Project to provide site access are also assumed to be in place for Project (Project Buildout) conditions (e.g., intersection and roadway improvements along the Project's Phase 1 frontage and driveways, including Craig Avenue).
- Project driveways and those facilities assumed to be constructed by the other cumulative development projects to provide site access are also assumed to be in place for Opening Year Cumulative (2025) traffic conditions (e.g., intersection and roadway improvements along the Project's Phase 2 frontage and driveways, including Evans Road).

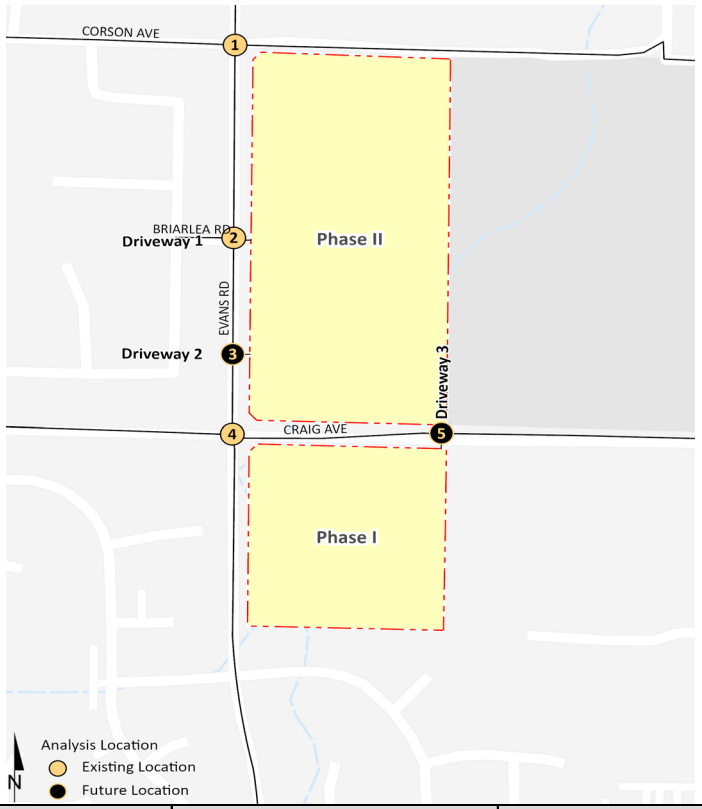
6.2 OPENING YEAR CUMULATIVE (2025) WITHOUT PROJECT TRAFFIC VOLUME FORECASTS

This scenario includes Existing traffic volumes plus an ambient growth factor of 8.24% plus traffic from pending and approved but not yet constructed known development projects in the area. The ADT and peak hour intersection turning movement volumes which can be expected for Opening Year Cumulative (2025) Without Project conditions are shown on Exhibit 6-1.

6.3 OPENING YEAR CUMULATIVE (2025) WITH PROJECT TRAFFIC VOLUME FORECASTS

This scenario includes Existing traffic volumes, an ambient growth factor of 8.24%, traffic from pending and approved but not yet constructed known development projects in the area and the addition of Project (Project Buildout) traffic. Project buildout traffic includes both Phase 1 plus Phase 2 traffic. The ADT and peak hour intersection turning movement volumes which can be expected for Opening Year Cumulative (2025) With Project (Project Buildout) conditions are shown on Exhibit 6-2.

EXHIBIT 6-1: OPENING YEAR CUMULATIVE (2025) WITHOUT PROJECT TRAFFIC VOLUMES



1 Evans Rd. & Corson Av.

2,350
↲ 49(19) ↓ 442(75)
15(14) ↳ | ↰ 66(18) ↑ 306(52)
40(8) ↲ | *2,250*
850

2 Evans Rd. & Briarlea Rd./Driveway 1

↲ 22(9) ↓ 460(74)
8(5) ↳ | ↰ 8(0) ↑ 365(65)
3(9) ↲

3 Evans Rd. & Driveway 2

2,400
↓ 463(82)
200
↑ 372(65)
2,550

4 Evans Rd. & Craig Av.

Nominal
↲ 26(15) ↓ 277(45) ↳ 160(22)
Nominal
↱ 184(30)
← 254(81)
↰ 192(49)
40(5) ↳ | ↰ 62(9) ↑ 148(29) ↱ 105(49)
201(56) →
56(24) ↲

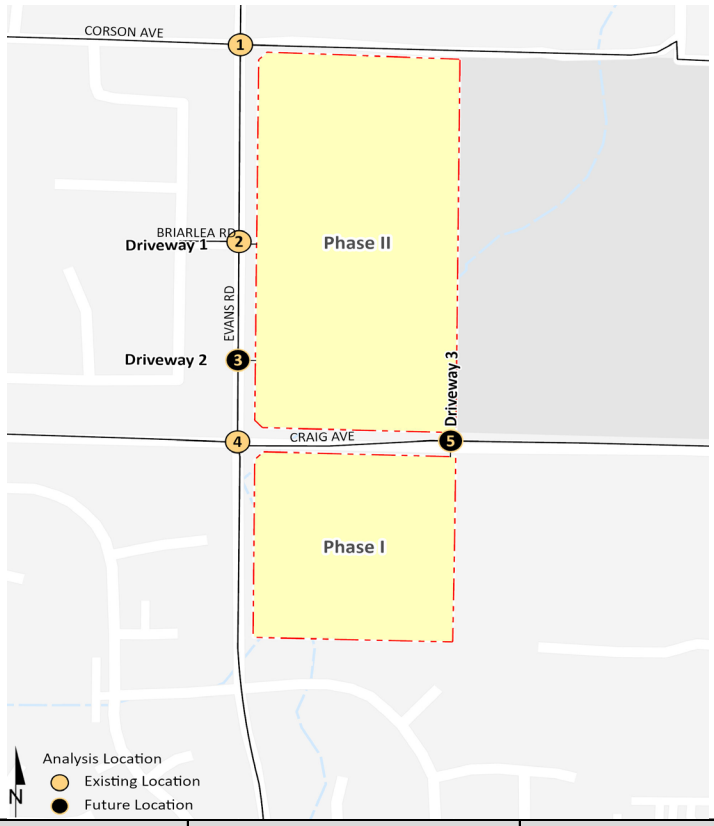
5 Driveway 3 & Craig Av.

3,950
← 630(160)
467(127) →
4,150 *300*

##(##) AM(PM) Peak Hour Intersection Volumes

Average Daily Trips

EXHIBIT 6-2: OPENING YEAR CUMULATIVE (2025) WITH PROJECT TRAFFIC VOLUMES



1 Evans Rd. & Corson Av.

2,600
49(19) ↲
447(85) ↓
15(14) ⇀
41(10) ↴
↰ 67(20)
↑ 311(62)
900
2,550

2 Evans Rd. & Briarlea Rd./Driveway 1

22(9) ↲
463(79) ↓
3(7) ↳
↱ 3(7)
← 0(1)
↰ 6(11)
8(5) ⇀
0(1) →
3(9) ↴
↰ 8(0)
↑ 368(70)
↱ 6(11)

3 Evans Rd. & Driveway 2

2,150
471(97) ←
1(1) ↳
↱ 1(1)
↰ 3(7)
↑ 380(80)
↱ 3(7)
2,150

4 Evans Rd. & Craig Av.

Nominal
31(24) ↲
279(50) ↓
164(30) ↳
↱ 188(38)
← 256(85)
↰ 193(51)
45(14) ⇀
203(60) →
56(24) ↴
↰ 62(9)
↑ 150(34)
↱ 106(51)

5 Driveway 3 & Craig Av.

4,050
← 632(164)
↰ 1(2)
469(131) →
5(10) ↴
↰ 5(10)
↱ 1(2)
4,250
300

##(##) AM(PM) Peak Hour Intersection Volumes

Average Daily Trips

6.4 INTERSECTION OPERATIONS ANALYSIS

6.4.1 OPENING YEAR CUMULATIVE (2025) WITHOUT PROJECT TRAFFIC CONDITIONS

Opening Year Cumulative (2025) peak hour traffic operations have been evaluated for the study area intersections based on the analysis methodologies presented in Section 2.2 *Intersection Capacity Analysis* of this report. The intersection analysis results are summarized in Table 6-1, which indicate that the following study area intersections are anticipated to operate at an unacceptable LOS during the peak hours under Opening Year Cumulative (2025) Without Project:

- Evans Road & Craig Avenue (#4) – LOS F AM peak hour only

The intersection operations analysis worksheets for Opening Year Cumulative Without Project traffic conditions are included in Appendix 6.1 of this TA.

6.4.2 OPENING YEAR CUMULATIVE (2025) WITH PROJECT TRAFFIC CONDITIONS

As shown in Table 6-1, the study area intersections are all anticipated to operate at an acceptable LOS with the addition of Project (Phase 2) traffic. Evans Road & Craig Avenue (#4) is anticipated to operate at an acceptable LOS with the implementation of the Project design features, as discussed in Section 1.6 *Recommendations.*

The intersection operations analysis worksheets for Opening Year Cumulative (2025) With Project traffic conditions are included in Appendix 6.2 of this TA.

TABLE 6-1: INTERSECTION ANALYSIS FOR OPENING YEAR CUMULATIVE (2025) CONDITIONS

#	Intersection	Traffic Control[2]	OYC (2025) NP				OYC (2025) WP (BO)			
			Delay[1] (Secs.)		LOS[3]		Delay[1] (Secs.)		LOS[3]	
			AM	PM	AM	PM	AM	PM	AM	PM
1	Evans Rd. & Corson Av.	AWS	14.3	7.6	B	A	14.6	7.7	B	A
2	Evans Rd. & Briarlea Rd./Driveway 1	CSS	16.3	9.2	C	A	15.5	9.3	C	A
3	Evans Rd. & Driveway 2	CSS	Future Intersection				13.2	9.3	B	A
4	Evans Rd. & Craig Av.	AWS	**52.1**	8.6	**F**	A	25.2	8.5	D	A
5	Driveway 3 & Craig Av.	CSS	Future Intersection				21.3	10.3	C	B

BOLD = LOS does not meet the applicable jurisdictional requirements (i.e., unacceptable LOS).

1 Per the Highway Capacity Manual (6th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal or all-way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

2 CSS = Cross-street Stop; AWS = All-way Stop

3 LOS = Level of Service

4 Additional lanes are recommended in Project Buildout, which may cause a decrease in the delay when compared to Phase 1 or Without Project scenarios.

6.5 TRAFFIC SIGNAL WARRANTS ANALYSIS

Traffic signal warrants have been performed (based on CA MUTCD) for Opening Year Cumulative (2025) traffic conditions based on peak hour intersection turning movements volumes or planning level (ADT) volumes. There is no additional unsignalized study area intersections anticipated to meet a traffic signal warrant under Opening Year Cumulative (2025) Without Project or With Project traffic conditions, in addition to the intersections identified previously under Existing (2021) conditions (see Appendices 6.3 and 6.4). The installation of a traffic signal has not been recommended, as the intersection is anticipated to operate at acceptable LOS with the Project frontage improvements.

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7 LOCAL AND REGIONAL FUNDING MECHANISMS

Transportation improvements within the City of Menifee are funded through a combination of improvements constructed by the Project, development impact fee programs or fair share contributions. Fee programs applicable to the Project are described below.

7.1 RIVERSIDE COUNTY TRANSPORTATION UNIFORM MITIGATION FEE (TUMF)

The Transportation Uniform Mitigation Fee (TUMF) program is administered by the Western Riverside Council of Governments (WRCOG) based upon a regional Nexus Study most recently updated in 2016 to address major changes in right of way acquisition and improvement cost factors. This regional program was put into place to ensure that development pays its fair share and that funding is in place for construction of facilities needed to maintain the requisite level of service and critical to mobility in the region. TUMF is a truly regional mitigation fee program and is imposed and implemented in every jurisdiction in Western Riverside County.

7.2 CITY OF MENIFEE DEVELOPMENT IMPACT FEE (DIF) PROGRAM

The Project will also be subject to City of Menifee's DIF program which includes a component for roads and signals. The City's DIF program has been updated in July 2020 and discusses the local (as opposed to regional) streets and signal improvements planned for the City through build-out of the existing City limits.

7.3 SCOTT ROAD AND BRIDGE BENEFIT DISTRICT (RBBD)

The City of Menifee is anticipated to experience substantial growth. Extensive improvements are necessitated by new development within the region. In particular, Riverside County recognized the effects of this growth on the vicinity of the study area when it formed the Southwest RBBD. The proposed Project lies within Zone B of the Scott Road RBBD. Zone B is generally bounded by the I-215 Freeway to the west, Sunset Avenue to the east, Holland Road to the south, and Baxter Road to the north. As discussed above, the facilities improvements that will be ultimately constructed as a result of the collection of these fees and assessments for Zone B include: future Garbani Road interchange at the I-215 Freeway, future Keller Road interchange at I-215 Freeway, Scott Road and I-215 Freeway interchange improvements, Garbani Road widening between I-215 Freeway and Bradley Road, Scott Road widening between I-215 Freeway and Sunset Avenue, and Garbani Road median between Bradley Road and Menifee Road.

7.4 MEASURE A

Measure A, Riverside County's half-cent sales tax for transportation, was adopted by voters in 1988 and extended in 2002. It will continue to fund transportation improvements through 2039. Measure A funds a wide variety of transportation projects and services throughout the County. RCTC is responsible for administering the program. Measure A dollars are spent in accordance with a voter-approved expenditure plan that was adopted as part of the 1988 election.

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8 VEHICLE MILES TRAVELED (VMT)

Changes to California Environmental Quality Act (CEQA) Guidelines were adopted in December 2018, which require all lead agencies to adopt VMT as a replacement for automobile delay-based LOS as the measure for identifying transportation impacts for land use projects. This statewide mandate went into effect July 1, 2020. To aid in this transition, the Governor's Office of Planning and Research (OPR) released a Technical Advisory on Evaluating Transportation Impacts in CEQA (December of 2018) (**Technical Advisory**). (6)

The City of Menifee City Council adopted analytical procedures, screening tools and impact thresholds for VMT, which are documented in the City of Menifee Traffic Impact Analysis Guidelines for Vehicle Miles Traveled (June 2020) (**City Guidelines**) (7). To aid in the project-level VMT screening process the City of Menifee utilizes the Western Riverside Council of Governments (WRCOG) VMT Screening Tool (**Screening Tool**). The web-based Screening Tool allows a user to select an assessor's parcel number (APN) to determine if a project's physical location meets one or more of the land use screening thresholds documented in the City Guidelines.

8.1 PROJECT SCREENING

The City Guidelines provides details on appropriate screening criteria that can be used to identify when a proposed land use project is anticipated to result in a less than significant impact without conducting a more detailed project level analysis. Screening criteria is broken into three types:

Step 1: Transit Priority Area (TPA) Screening

Step 2: Low VMT Area Screening

Step 3: Project Type Screening

A land use project need only to meet one of the above screening criteria to result in a less than significant impact.

8.1.1 STEP 1: TPA SCREENING

Consistent with guidance identified in the City Guidelines, projects located within a Transit Priority Area (TPA) (i.e., within ½ mile of an existing "major transit stop"[1] or an existing stop along a "high-quality transit corridor"[2]) may be presumed to have a less than significant impact absent substantial evidence to the contrary.

However, the presumption may not be appropriate if a project:

[1] Pub. Resources Code, § 21064.3 ("'Major transit stop' means a site containing an existing rail transit station, a ferry terminal served by either a bus or rail transit service, or the intersection of two or more major bus routes with a frequency of service interval of 15 minutes or less during the morning and afternoon peak commute periods.").

[2] Pub. Resources Code, § 21155 ("For purposes of this section, a high-quality transit corridor means a corridor with fixed route bus service with service intervals no longer than 15 minutes during peak commute hours.").

- Has a Floor Area Ratio (FAR) of less than 0.75;
- Includes more parking for use by residents, customers, or employees of the project than required by the jurisdiction (if the jurisdiction requires the project to supply parking);
- Is inconsistent with the applicable Sustainable Communities Strategy (as determined by the lead agency, with input from the Metropolitan Planning Organization); or
- Replaces affordable residential units with a smaller number of moderate- or high-income residential units.
- Based on the Screening Tool, the Project site is shown not to be located within a TPA. (See Attachment A).

TPA screening criteria is not met.

8.1.2 STEP 2: LOW VMT AREA SCREENING

City Guidelines state that "Residential and office projects located within a low VMT-generating area are presumed to have a less than significant impact absent substantial evidence to the contrary."[3] The City uses the WRCOG screening tool to determine low areas of VMT. The screening tool uses the sub-regional Riverside Transportation Analysis Model (RIVTAM) to measure VMT performance within individual traffic analysis zones (TAZ's) within the region. The Project's physical location based on parcel number is identified in the Screening Tool to determine project generated VMT as compared to the City's impact threshold (i.e., baseline project-generated VMT per service population exceeds the County of Riverside General Plan Buildout VMT per service population). The project area for the proposed Project was selected within the screening tool and the VMT per service population measure of VMT was reviewed. Based on the Screening Tool results, the Project is NOT located within a low VMT generating zone. The Project resides within TAZ 3,867, which was shown to generate 43.51 VMT per service population exceeding the City's impact threshold (i.e., County of Riverside General Plan Buildout VMT per service population) of 35.68 VMT per service population. (See Appendix 8.1)

Low VMT Area screening criteria is not met.

8.1.3 STEP 3: PROJECT TYPE SCREENING

City Guidelines identify local serving essential services such as local parks, day care centers, public schools, medical/dental office buildings, etc. are presumed to have a less than significant impact absent substantial evidence to the contrary. As described previously, the Project proposes the development of a smaller paved tight circuit area called a "Pump Track" and the larger dirt trail portion of the track within the 1st phase. Additionally, the 2nd phase of the Project proposes the development of a multi-use ball field, splash pad, picnic areas, and trails.

The City of Menifee's Parks Master Plan[4] describes a community park as a park that meets the recreational needs of several neighborhoods and may also preserve unique landscapes and open

[3] City Guidelines; Page 11

[4] City of Menifee Trails, Parks, Open Space and Recreation Master plan (February 2016)

spaces. These parks serve multiple uses and provide recreational facilities and accommodate group activities not provided in neighborhood parks. Geographic range of users is up to 3 miles or City-wide if park contains a recreation complex. In addition, the City's Parks Development Design Guidelines state that community parks typically serve 18,000 to 25,000 residents within approximately a one-and-a-half-mile radius. This Project meets the standards of a community park as it follows this stated description.

This Community Park will serve City of Menifee residents and the surrounding community and would reduce the distance that current local residents need to travel today for recreational services. Due to the proximity to existing residential areas, the need for auto travel to access the site will be eliminated or greatly reduced through the use of walking or biking. As the Project is local serving in nature and would have the net effect of reducing Citywide VMT, the Project is therefore presumed to have a less than significant impact to VMT.

Project Type screening criteria is met.

8.2 CONCLUSION

Based on our review of applicable VMT screening thresholds, the Project meets the project type screening criteria and would therefore be presumed to result in a less than significant VMT impact; no additional VMT analysis is required.

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9 REFERENCES

1. **City of Menifee Planning Department.** *Traffic Impact Analysis (TIA) Guidelines.* Menifee : s.n., January 2019.

2. **San Diego Municipal Code Land Development Code.** *Trip Generation Manual.* 2003.

3. **Institute of Transportation Engineers.** *Trip Generation Manual.* 10th Edition. 2017.

4. **Transportation Research Board.** *Highway Capacity Manual (HCM).* 6th Edition. s.l. : National Academy of Sciences, 2016.

5. **California Department of Transportation.** California Manual on Uniform Traffic Control Devices (MUTCD). [book auth.] California Department of Transportation. *California Manual on Uniform Traffic Control Devices (CAMUTCD).* 2017.

6. **Office of Planning and Research.** *Technical Advisory on Evaluating Transportation Impacts in CEQA.* State of California : s.n., December 2018.

7. **City of Menifee.** *Traffic Impact Analysis Guidelines for Vehicle Miles Traveled.* City of Menifee : s.n., June 2020.

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APPENDIX 1.1:

APPROVED TRAFFIC STUDY SCOPING AGREEMENT

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Attachment A: Project Scoping Form

This scoping form shall be completed and submitted to the City of Menifee to assist in identifying infrastructure improvements that may be required to support traffic from the proposed project.

Project Identification:

Case Number:	
Related Cases:	
SP No.	
EIR No.	
GPA No.	
CZ No.	
Project Name:	Evans Park
Project Address:	East of Evans Road, Either side of Craig Avenue
Project Opening Year:	Phase 1 = 2022; Project Buildout = 2025
Project Description:	6-acre Pump Track (Phase 1) and 12.88-acre Sports Park (Phase 2)

	Consultant:	**Developer:**
Name:	Urban Crossroads, Inc. - Charlene So	City of Menifee
Address:	1133 Camelback St, #8329	
	Newport Beach, CA 92658	
Telephone:	949-861-0177	
Fax/Email:	cso@urbanxroads.com	

Trip Generation Information:

Trip Generation Data Source: San Diego Municipal Code, Development Code Trip Generation

Current General Plan Land Use: 2.1-5 Residential, Recreation (OS-R)

Proposed General Plan Land Use: 2.1-5 Residential, Rural Mountainous

Current Zoning: Open Space (OS-R); Low Density Res-2 (LDR-2)

Proposed Zoning: Low Density Residential-2, Rural Mountainous

	Existing Trip Generation			Proposed Trip Generation		
	In	Out	Total	In	Out	Total
AM Trips				19	19	38
PM Trips				38	38	76

Trip Internalization: ☐ Yes ☑ No (_____% Trip Discount)

Pass-By Allowance: ☐ Yes ☑ No (_____% Trip Discount)

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 VMT assessment? ☒ Yes ☐ No

VMT screening justification (see Pages 24-26 of the guidelines): Project screens out for Project Type Screening. Project is local serving in nature and would have a net effect of reducing Citywide VMT.

VMT Analysis Scoping

For projects that are not screened, identify the following:

- Travel Demand Forecasting Model Used Not Applicable
- Attach WRCOG Screening VMT Assessment output or describe why it is not appropriate for use
- Attach proposed Model Land Use Inputs and Assumed Conversion Factors (attach)

Signatures

TIA Preparer: Charlene So City (Approved by): _____

URBAN CROSSROADS

urbanxroads.com

August 4, 2021

Mr. Rob Blough
City of Menifee
29714 Haun Road
Menifee, California 92586

SUBJECT: EVANS PARK FOCUSED TRAFFIC ANALYSIS – SCOPING AGREEMENT

Dear Mr. Rob Blough:

Urban Crossroads, Inc. is pleased to submit this scoping letter to City of Menifee regarding the Focused Traffic Analysis for the proposed Evans Park development ("Project"), which is located east of Evans Road and on either side of Craig Avenue in the City of Menifee (see Exhibit 1). It is our understanding that the Project is proposed to consist of a 6-acre pump track in Phase 1 (2022) and a 12.88-acre sports park with ball fields in Phase 2 (2025). This letter describes the draft proposed project trip generation, trip distribution, and analysis methodology, which have been used to establish the draft proposed project study area and analysis locations.

A preliminary site plan for the proposed Project is shown on Exhibit 2. It is anticipated that the Project would be developed in two phases with an Opening Year of 2022 for Phase 1 and Project Buildout in Year 2025. As indicated on Exhibit 2, access to the Project site will be provided to Evans Road for the Sports Park via two driveways and Craig Avenue for the Pump Track via a single driveway. All driveways will assume full access.

TRIP GENERATION

In order to develop the traffic characteristics of the proposed project, trip-generation statistics published in the San Diego Municipal Code Land Development Code Trip Generation Manual (May 2003) for the Parks (developed with sports fields) land use. The trip generation rate from the San Diego Municipal Code is more conservative than any published trip generation rate for public parks from the Institute of Transportation Engineers latest Trip Generation Manual (10th Edition, 2017). Table 1 presents the trip generation rates and the resulting trip generation summary for the proposed Project. As shown in Table 1, the Project is anticipated to generate a net total of 944 two-way trips per day with 38 AM peak hour trips and 76 PM peak hour trips.

TABLE 1: PROJECT TRIP GENERATION SUMMARY

Land Use	ITE LU Code	Units[1]	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	Daily
Project Trip Generation Rates									
Park (Developed; Sports Fields)	--[2]	AC	1.00	1.00	2.00	2.00	2.00	4.00	50.00

[1] AC = acres

[2] Trip Generation Source: San Diego Municipal Code Land Development Code Trip Generation Manual, May 2003.

Project	Quantity	Units[1]	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	Daily
Project Trip Generation:									
Phase 1: Pump Track	6.00	AC	6	6	12	12	12	24	300
Phase 2: Sports Park	12.88	AC	13	13	26	26	26	52	644
Project Total			**19**	**19**	**38**	**38**	**38**	**76**	**944**

[1] AC = acres

TRIP DISTRIBUTION

The Project trip distribution patterns are graphically depicted on Exhibit 3 for the proposed Pump Track (Phase 1) and on Exhibit 4 for the Sports Park (Phase 2). The intersections where the Project are anticipated to contribute 50 or more peak hour trips will be evaluated.

ANALYSIS SCENARIOS

Consistent with the City's TIA guidelines, intersection analysis will be provided for the following analysis scenarios:

- Existing (2021) Conditions
- Existing plus Project (Phase 1) Conditions
- Existing plus Project (Project Buildout) Conditions
- Opening Year Cumulative (2025) Without Project Conditions
- Opening Year Cumulative (2025) With Project Conditions (Project Buildout only)

All study area intersections will be analyzed using the HCM (6th Edition) methodology.

EXISTING COUNT DATA

Although the currently ongoing COVID-19 pandemic has affected some businesses, most business have reopened, and local schools are anticipated to be back to in-person instruction starting August 11, 2021. As such, Urban Crossroads is proposing that new traffic counts be conducted once schools are back in session on a typical weekday to establish the baseline for the purposes of this analysis.

STUDY AREA

The traffic impact study area was defined in conformance with the requirements of the City's Guidelines, which state that the minimum area to be studied shall include any intersection of "Collector" or higher classification street, with "Collector" or higher classification streets, at which the proposed project will add 50 or more peak hour trips. Exhibit 5 identifies the proposed study area intersections based on the aforementioned criteria. The study area intersections and roadway segments are listed below.

TABLE 2: STUDY AREA INTERSECTIONS

ID	Intersection Location	Jurisdiction
1	Evans Rd. & Corson Av.	City of Menifee
2	Evans Rd. & Briarlea Rd./Driveway 1	City of Menifee
3	Evans Rd. & Driveway 2 – Future Intersection	City of Menifee
4	Evans Rd. & Craig Av.	City of Menifee
5	Driveway 3 & Craig Av. – Future Intersection	City of Menifee

LEVEL OF SERVICE (LOS) CRITERIA

Per Policy C-1.2 of the City of Menifee General Plan, the following LOS will be utilized for study area intersections located within the City: Require development to achieve a peak hour Level of Service (LOS) D or better at intersections where LOS E may be permitted. Therefore, any intersection operating at LOS E or F will be considered deficient for the purposes of this analysis.

OPERATING REQUIREMENTS FOR GENERAL PLAN CONSISTENCY

To determine whether the addition of project traffic at a study intersection result in a significant project-related impact, the following thresholds of significance will be utilized:

- If an intersection is projected to operate at an acceptable level of service (i.e., LOS D or better) under Existing traffic conditions and the addition of project traffic, as measured by 50 or more peak hour trips, is expected to cause the intersection to operate at an unacceptable level of service (i.e., LOS E or F), the impact is considered significant.

- If an intersection is projected to operate at LOS E or LOS F under Existing, and the addition of project traffic, as measured by 50 or more peak hour trips, the impact is considered significant.

The proposed significance thresholds will be applied at study area intersections for the purposes of determining project-related deficiencies.

AMBIENT GROWTH

Consistent with other studies performed in the area, an ambient growth rate of 2% per year is proposed for the study area intersections to approximate background traffic growth not identified by nearby cumulative development projects.

FAIR SHARE CALCULATION METHODOLOGY

Improvements found to be included in the City of Menifee's Development Impact Fee (DIF) program and Western Riverside Council of Governments Transportation Uniform Mitigation Fee (TUMF), will be identified as such. For improvements that do not appear to be in either of the pre-existing fee programs, a fair share financial contribution based on the Project's fair share impact may be imposed in order to mitigate the Project's share of impacts in lieu of construction. The Project's fair share cost of improvements would be determined based on the following equation, which is the ratio of Project traffic to new traffic, where new traffic is total future traffic less existing baseline traffic:

Project Fair Share % = Project Traffic / (OYC Total Traffic – Existing Traffic)

SPECIAL ISSUES

The following special issue will also be addressed as part of the TIA:

- *Site Access Evaluation:* The turn pocket lengths will be determined through peak hour traffic simulations developed using Synchro and SimTraffic software in an effort to identify the required storage capacity for turn lanes at each Project driveway.
- *Traffic Signal Warrant:* A traffic signal warrant analysis will be prepared for all analysis scenarios for the unsignalized, full access study area intersections.

OPEN ITEMS – CUMULATIVE DEVELOPMENT PROJECTS

A preliminary list of cumulative projects and map are shown on Exhibit 6 and Table 2. We request that City staff provide an updated list of cumulative development projects for inclusion in the traffic study, and associated mitigation measures where appropriate for recently approved, but not yet constructed development.

VEHICLE MILES TRAVELED (VMT)

The Project screens out as it is a local service use based on the Project Type Screening. The VMT screening assessment has been provided under separate cover for review.

If you have any questions, please contact me directly at (949) 861-0177.

Respectfully submitted,

URBAN CROSSROADS, INC.

Charlene So

Charlene So, P.E.
Associate Principal

Table 2
(Page 1 of 3)

Summary of Cumulative Development Projects

No.	Project Name	Land Use	Quantity[1]
City of Menifee:			
M1	PM 2018-118 (Newport and Menifee Commercial)	Shopping Center	138.091 TSF
M2	PLN20-0067 TPM 37934	Shopping Center	5.07 AC
M3	PP 2015-164	Senior Adult Attached Housing	100 DU
		Apartments	238 DU
M4	PAR 2016-039/TR33511	Single Family Residential	71 DU
M5	Legado Specific Plan	Single Family Residential	1,061 DU
		Community Center	10 TSF
		Sprots Park	11.23 TSF
		Shopping Center	225 TSF
M6A	TR 32314	Single Family Residential	33 DU
M6B	Cimarron Ridge	Single Family Residential	756 DU
M7	TR 2016-285, SP 2016-286, GPA 2016-287, CZ 2016-288	Single Family Residential	305 DU
M8	TR 28859-1	Single Family Residential	161 DU
M9	Menifee North Shopping Center	Free-Standing Discount Superstore	200.000 TSF
		Bank with Drive-through Window	5.500 TSF
		Fast-food w/ Drive-Thru	6.700 TSF
		Shopping Center	10.000 TSF
		Gas Station & Market / Car Wash	16 VFP
M10	TR 29835	Single Family Residential	543 DU
	TR 31098	Single Family Residential	264 DU
M11	CUP 03549	Self-Storage Facility	152.893 TSF
		Grocery Store	45.000 TSF
		Pharmacy	14.600 TSF
		Shopping Center	11.500 TSF
		Restaurants	6.100 TSF
		Fast-food w/ Drive-Thru	3.500 TSF
		Gas Station & Market / Car Wash	16 VFP
M12	PP 19469R1	Senior Apartments	221 DU
M13	CUP 2017-042	Assisted Living	118 Rooms
M14	2015-211	Single Family Residential	75 DU
M15	TR 31582	Single Family Residential (50% Built)	140 DU

Table 2
(Page 2 of 3)

No.	Project Name	Land Use	Quantity[1]
M16	TR 32100	Single Family Residential	170 DU
	TR 32101	Single Family Residential	197 DU
	TR 32102	Single Family Residential	272 DU
M17	Nautical Cove Residential	Single Family Residential	235 DU
M18	Menifee Heights - TR32277	Single Family Residential	359 DU
		Active Parks	10.2 AC
M19	PP 2016-164	Fast-food w/ Drive-Thru	2.730 TSF
M20	SP 248 Newport Hub	Shopping Center (50% occupied)	229.70 TSF
		General Office	97.6 TSF
		General Light Industrial (50% occupied)	241.8 TSF
		Motel	100 ROOM
M21	Pechanga Commercial Site (PP 2010-123)	Shopping Center	208.160 TSF
M22	Menifee Town Center Specific Plan	Shopping Center	409.370 TSF
		Hotel	99 ROOM
		Single Family Residential	277 DU
		Condo/Townhomes / Apartments	548 DU
M23	Junction at Menifee	Shopping Center	526.800 TSF
	Menifee Shopping Center	Shopping Center	238.180 TSF
M24	DEV 2019-053	Gym	21.312 TSF
		Grocery Store	25.428 TSF
		Retail	8.000 TSF
		Fast-food	2.155 TSF
		Car Wash	2.700 TSF
		C-Store	3.000 TSF
		Oil/Lube	3.297 TSF
M25	CUP 2016-110	Fast-food w/ Drive-Thru	2.400 DU
M26	Newport & Menifee Retail	Shopping Center	138.091 TSF
M27	The Lakes (TR 30422 / SP 247 Amendment 1)	Single Family Residential (75% Built)82	327 DU
M28	CUP 2016-183	Assisted Living	45.246 TSF
		Mixed Office/Retail	10.368 TSF
M29	TM 28790	Single Family Residential	156 DU
M30	TR 28859	Single Family Residential (65% Built)	86 DU
M31	TR 2017-174; CUP 2017-173; PP 2017-175	Assisted Living	142 Rooms
		Memory Care	36 Rooms
		Office	21.722 TSF
M32	TTM 31456	Single Family Residential	177 DU
M33	GPA 2016-061; SPA -062; TR -063	Single Family Residential	54 DU
M34	TTM 2015-165	Single Family Residential	68 DU
M35	TR 32025	Single Family Residential	198 DU

Table 2
(Page 3 of 3)

No.	Project Name	Land Use	Quantity[1]
M36	CUP 2013-157	Tire Store	7.171 TSF
M37	PP 2016-239	Recreation Community Center	N/A
M38	TR 2016-038	Single Family Residential	18 DU
M39	PP 22628; EOT 2016-102	Mixed Commercial/Industrial	N/A
M40	PAR 2016-215	Gas Station & Market / Car Wash	4 VFP
		Fast-food w/ Drive-Thru	3.200 TSF
		Retail	2.000 TSF
M41	PP 2018-189	Medical-Dental Office	6.229 TSF
M42	PP 2016-124	Fast-food w/ Drive-Thru	6.200 TSF
		Retail	1.000 TSF
		Gas Station & Market / Car Wash	12 VFP
M43	Menifee Crossroads	Restaurant, Office, and Retail	102.400 TSF
M44	Goetz Marketplace	Fast-food w/ Drive-Thru	3.200 TSF
		Gas Station w/ Market & Car Wash	3.800 TSF
M45	Audie Murphy	Single Family Residential	1112 DU
M46	Quail Hills	Single Family Residential	145 DU

[1] TSF = Thousand Square Feet; DU = Dwelling Unit; AC = Acres; STU = Students; VFP = Vehicle Fueling Positions

EXHIBIT 1: LOCATION MAP

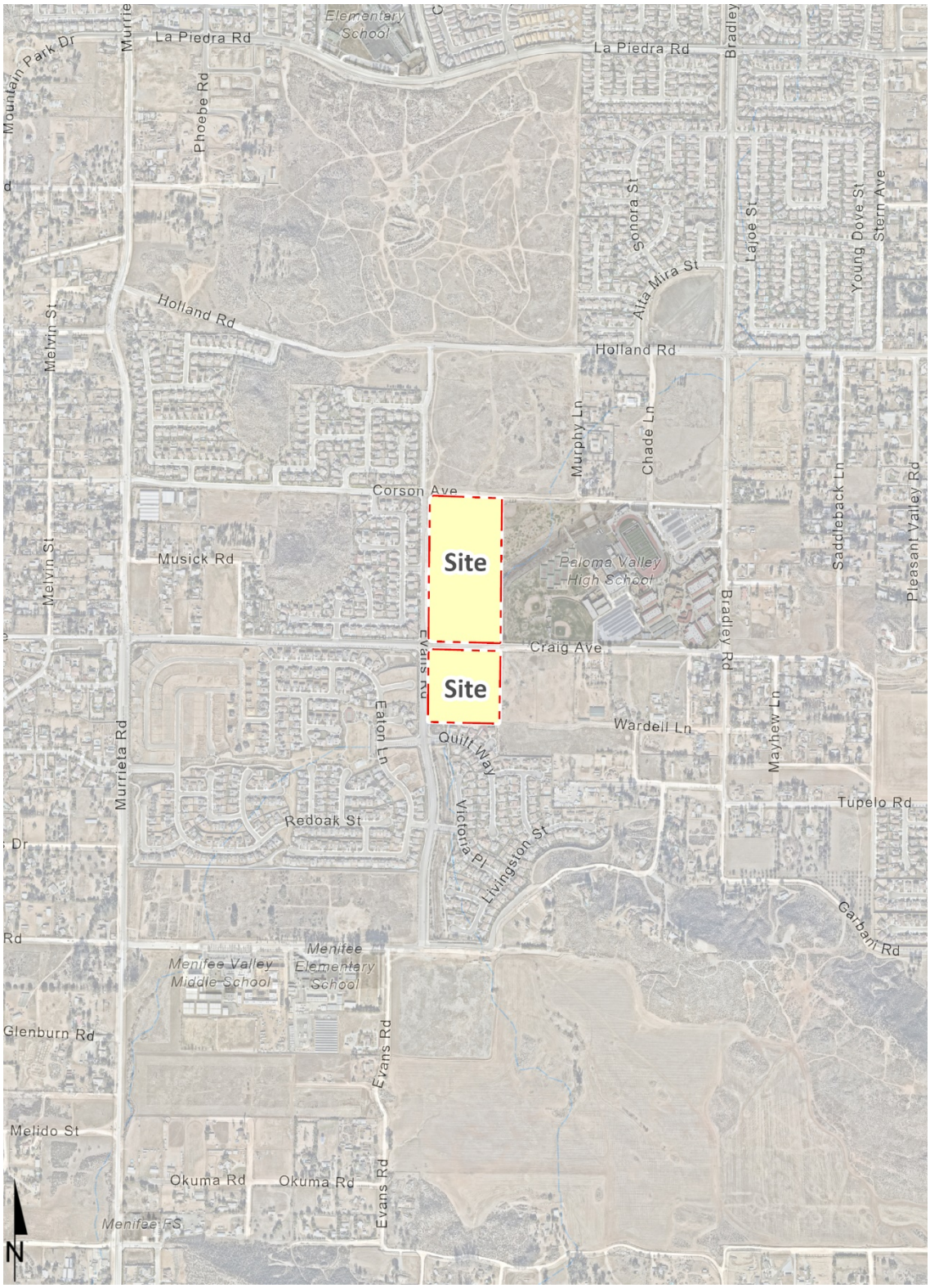


EXHIBIT 2: PRELIMINARY SITE PLAN



EXHIBIT 3: PROJECT (PHASE 1: PUMP TRACK) TRIP DISTRIBUTION

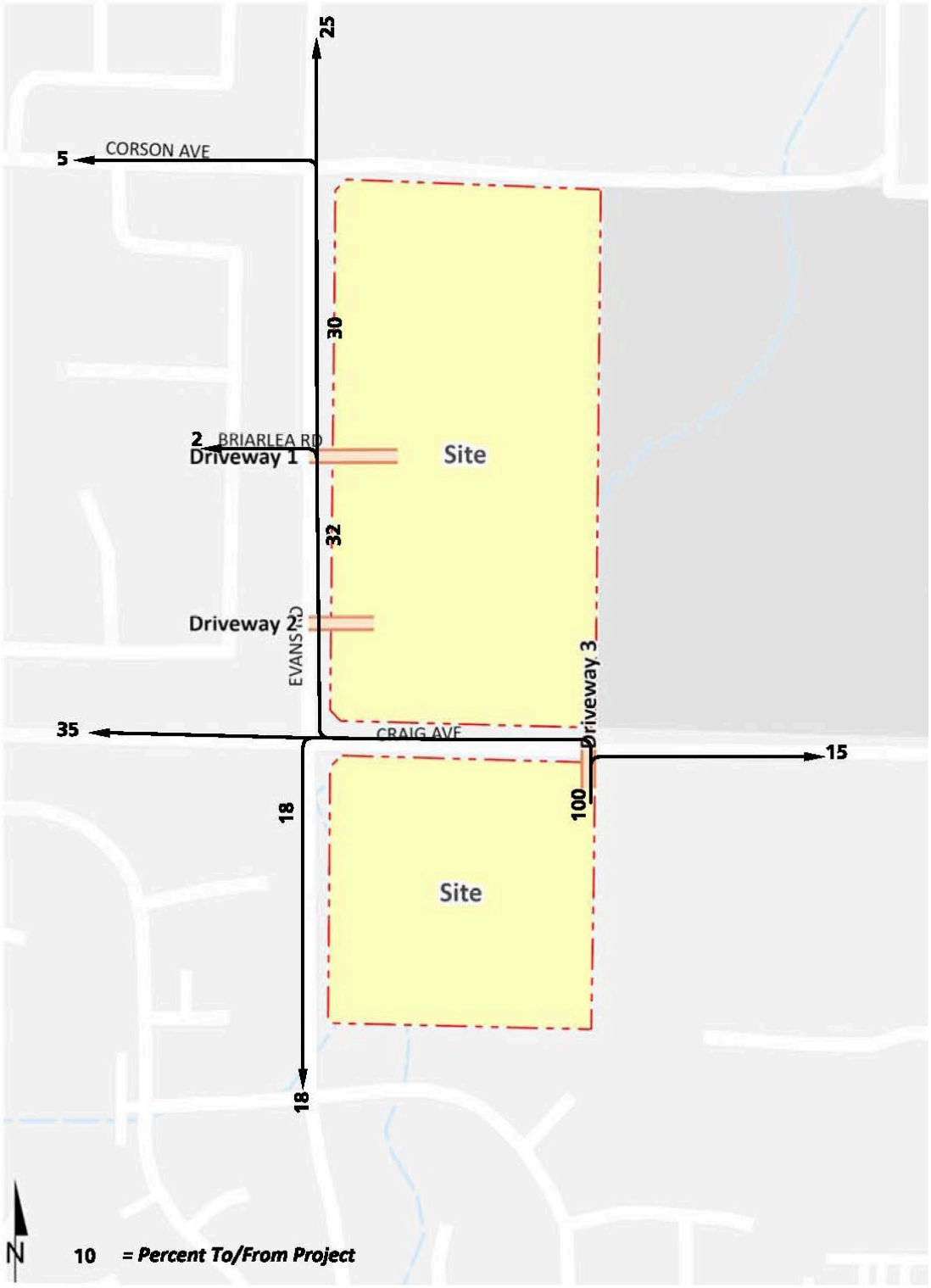


EXHIBIT 4: PROJECT (PHASE 2: SPORTS PARK) TRIP DISTRIBUTION

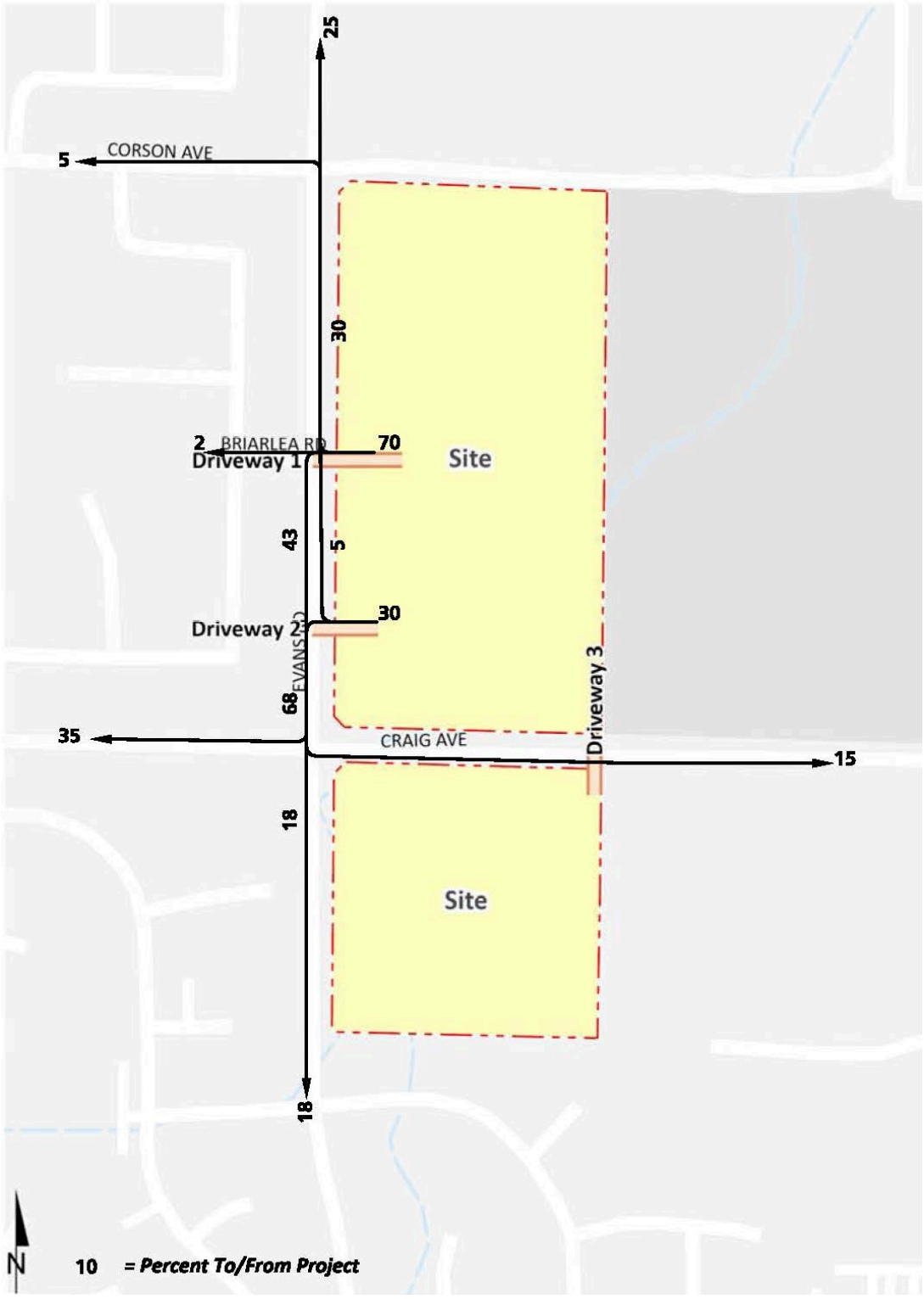
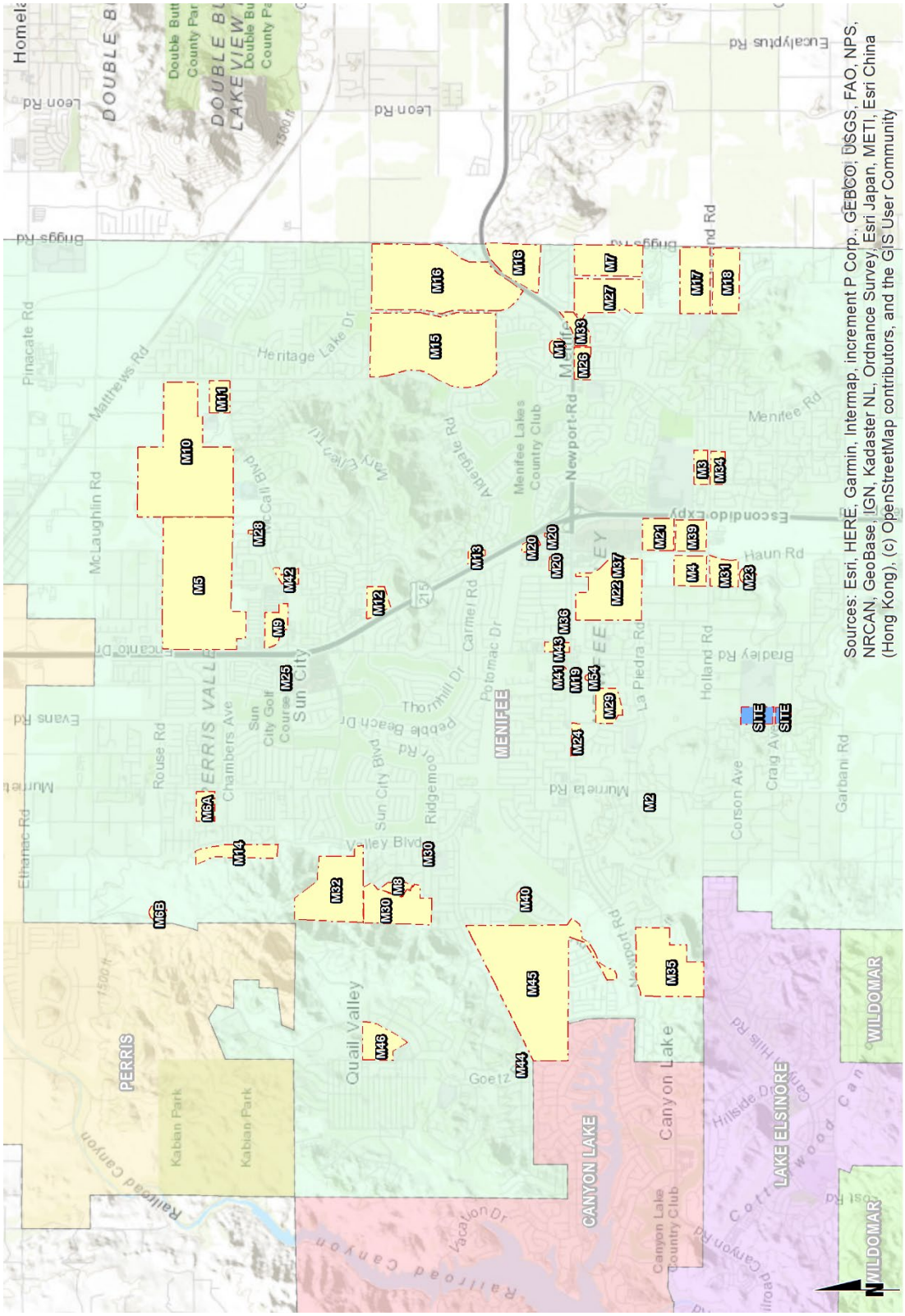


EXHIBIT 5: STUDY AREA



EXHIBIT 6: CUMULATIVE DEVELOPMENT LOCATION MAP



APPENDIX 1.2:

SITE ADJACENT QUEUING WORKSHEETS

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Intersection: 2: Evans Rd. & Briarlea Rd./Driveway 1

Movement	EB	WB	SB
Directions Served	LTR	LTR	L
Maximum Queue (ft)	31	35	15
Average Queue (ft)	13	13	1
95th Queue (ft)	37	37	10
Link Distance (ft)	509	470	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			100
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: Evans Rd. & Driveway 2

Movement	WB
Directions Served	LR
Maximum Queue (ft)	31
Average Queue (ft)	7
95th Queue (ft)	28
Link Distance (ft)	420
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 5: Driveway 3 & Craig Av.

Movement	NB
Directions Served	LR
Maximum Queue (ft)	31
Average Queue (ft)	9
95th Queue (ft)	32
Link Distance (ft)	408
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 0

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APPENDIX 3.1:

EXISTING TRAFFIC COUNTS

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INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE: Thu, Aug 12, 21

LOCATION: Menifee
NORTH & SOUTH: Evans
EAST & WEST: Corson

PROJECT #: SC3016
LOCATION #: 1
CONTROL: STOP ALL

NOTES:
Minor Construction AM WB

AM / PM / MD / OTHER / OTHER — ◄ W — ▲ N — S ▼ — E ►

☐ Add U-Turns to Left Turns

		NORTHBOUND (Evans)			SOUTHBOUND (Evans)			EASTBOUND (Corson)			WESTBOUND (Corson)			
	LANES:	NL 0	NT 1	NR X	SL X	ST 1	SR 0	EL 0	ET X	ER 0	WL X	WT X	WR X	TOTAL
AM	7:00 AM	1	29	0	0	40	1	6	0	3	0	0	0	80
	7:15 AM	27	73	0	0	84	2	4	0	18	0	0	0	208
	7:30 AM	18	64	0	0	103	11	2	0	4	0	0	0	202
	7:45 AM	14	79	0	0	106	23	6	0	4	0	0	0	232
	8:00 AM	2	67	0	0	114	9	2	0	11	0	0	0	205
	8:15 AM	6	82	0	0	65	5	5	0	4	0	0	0	167
	8:30 AM	3	54	0	0	15	2	3	0	3	0	0	0	80
	8:45 AM	4	6	0	0	15	3	3	0	1	0	0	0	32
	VOLUMES	75	454	0	0	542	56	31	0	48	0	0	0	1,209
	APPROACH %	14%	86%	0%	0%	90%	9%	39%	0%	60%	0%	0%	0%	
	APP/DEPART	530	/	486	599	/	591	80	/	0	0	/	132	0
	BEGIN PEAK HR		7:15 AM											
	VOLUMES	61	283	0	0	407	45	14	0	37	0	0	0	849
	APPROACH %	18%	82%	0%	0%	90%	10%	27%	0%	71%	0%	0%	0%	
	PEAK HR FACTOR		0.854			0.876			0.565			0.000		0.915
	APP/DEPART	345	/	297	452	/	445	52	/	0	0	/	107	0
PM	4:00 PM	2	10	0	0	16	4	5	0	1	0	0	0	38
	4:15 PM	3	11	0	0	18	4	5	0	0	0	0	0	41
	4:30 PM	2	14	0	0	10	4	3	0	1	0	0	0	34
	4:45 PM	3	18	0	0	20	9	3	0	2	0	0	0	55
	5:00 PM	5	13	0	0	12	3	4	0	1	0	0	0	38
	5:15 PM	6	5	0	0	18	4	3	0	3	0	0	0	39
	5:30 PM	3	12	0	0	19	2	3	0	1	0	0	0	40
	5:45 PM	3	18	0	0	16	3	3	0	3	0	0	0	46
	VOLUMES	27	101	0	0	129	33	29	0	12	0	0	0	331
	APPROACH %	21%	79%	0%	0%	80%	20%	71%	0%	29%	0%	0%	0%	
	APP/DEPART	128	/	130	162	/	141	41	/	0	0	/	60	0
	BEGIN PEAK HR		4:45 PM											
	VOLUMES	17	48	0	0	69	18	13	0	7	0	0	0	172
	APPROACH %	26%	74%	0%	0%	79%	21%	65%	0%	35%	0%	0%	0%	
	PEAK HR FACTOR		0.774			0.750			0.833			0.000		0.782
	APP/DEPART	65	/	61	87	/	76	20	/	0	0	/	35	0

U-TURNS

NB 0	SB 0	EB 0	WB 0	TTL
0	0	0	0	0
1	0	1	0	2
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	1	0	0	1
0	0	0	0	0
0	0	0	0	0
1	1	1	0	3
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0

RTOR

NRR X	SRR X	ERR X	WRR X
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
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0	0	0	0
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0	0	0	0
0	0	0	0

Evans
NORTH SIDE

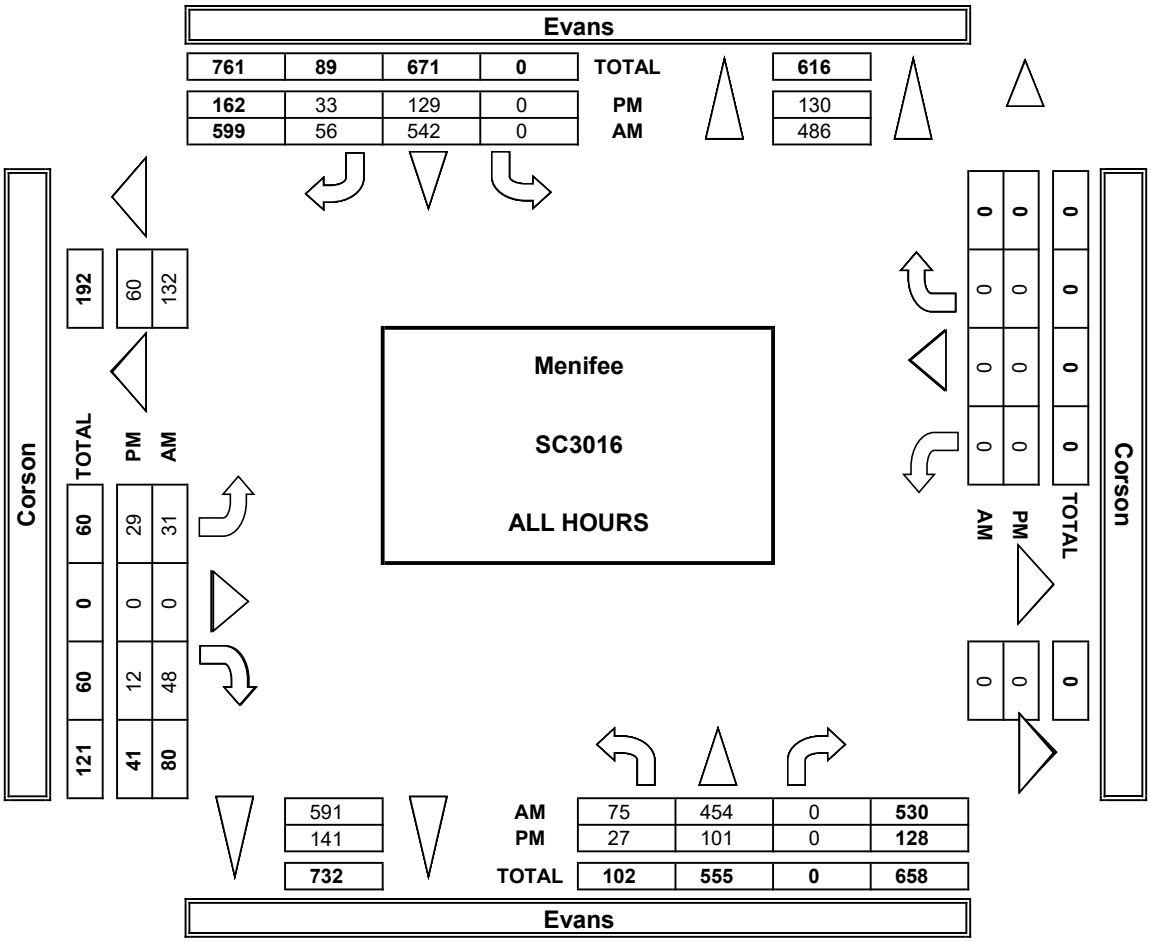
Corson WEST SIDE — EAST SIDE **Corson**

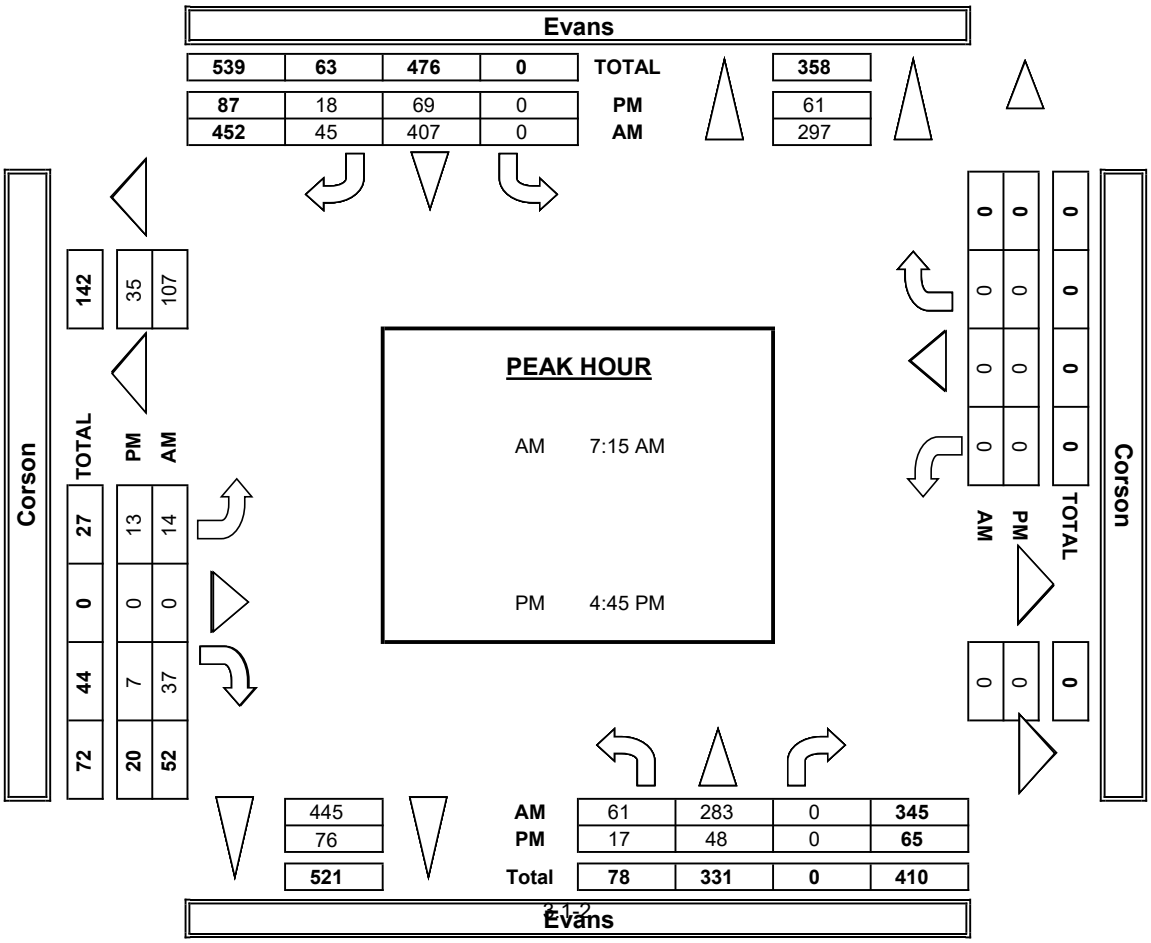
SOUTH SIDE
Evans

		ALL PED AND BIKE					PEDESTRIAN CROSSINGS					BICYCLE CROSSINGS				
		E SIDE	W SIDE	S SIDE	N SIDE	TOTAL	E SIDE	W SIDE	S SIDE	N SIDE	TOTAL	ES	WS	SS	NS	TOTAL
AM	7:00 AM	0	1	0	0	1	0	1	0	0	1	0	0	0	0	0
	7:15 AM	0	5	0	0	5	0	4	0	0	4	0	1	0	0	1
	7:30 AM	0	3	0	1	4	0	2	0	0	2	0	1	0	1	2
	7:45 AM	0	2	0	0	2	0	0	0	0	0	0	2	0	0	2
	8:00 AM	0	1	0	0	1	0	0	0	0	0	0	1	0	0	1
	8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	8:30 AM	0	3	0	0	3	0	3	0	0	3	0	0	0	0	0
	8:45 AM	0	1	0	0	1	0	1	0	0	1	0	0	0	0	0
	TOTAL	0	16	0	1	17	0	11	0	0	11	0	5	0	1	6
PM	4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

AimTD LLC

TURNING MOVEMENT COUNTS





INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE: Thu, Aug 12, 21

LOCATION: Menifee
NORTH & SOUTH: Evans
EAST & WEST: Briarlea

PROJECT #: SC3016
LOCATION #: 2
CONTROL: STOP E

NOTES:

AM / PM / MD / OTHER / OTHER — ◄ W — ▲ N — S ▼ — E ►

☐ Add U-Turns to Left Turns

		NORTHBOUND (Evans)			SOUTHBOUND (Evans)			EASTBOUND (Briarlea)			WESTBOUND (Briarlea)				U-TURNS					RTOR			
	LANES:	NL 0	NT 1	NR X	SL X	ST 1	SR 0	EL 0	ET X	ER 0	WL X	WT X	WR X	TOTAL	NB 0	SB 0	EB 0	WB 0	TTL	NRR X	SRR X	ERR X	WRR X
AM	7:00 AM	0	39	0	0	57	1	5	0	1	0	0	0	103	0	0	0	0	0	0	0	0	0
	7:15 AM	5	104	0	0	96	5	5	0	0	0	0	0	215	2	0	1	0	3	0	0	0	0
	7:30 AM	0	82	0	0	96	4	1	0	1	0	0	0	184	0	0	0	0	0	0	0	0	0
	7:45 AM	1	79	0	0	119	7	1	0	1	0	0	0	208	0	0	0	0	0	0	0	0	0
	8:00 AM	1	70	0	0	114	4	0	0	1	0	0	0	190	0	0	0	0	0	0	0	0	0
	8:15 AM	2	86	0	0	51	1	2	0	1	0	0	0	143	0	0	0	0	0	0	0	0	0
	8:30 AM	0	41	0	0	20	1	1	0	1	0	0	0	64	0	0	0	0	0	0	0	0	0
	8:45 AM	0	10	0	0	10	3	1	0	1	0	0	0	25	0	0	0	0	0	0	0	0	0
	VOLUMES	9	511	0	0	563	26	16	0	7	0	0	0	1,135	2	0	1	0	3	0	0	0	0
	APPROACH %	2%	98%	0%	0%	96%	4%	67%	0%	29%	0%	0%	0%										
	APP/DEPART	522	/	527	589	/	572	24	/	0	0	/	36	0									
	BEGIN PEAK HR		7:15 AM																				
	VOLUMES	7	335	0	0	425	20	7	0	3	0	0	0	800						0	0	0	0
	APPROACH %	2%	97%	0%	0%	96%	4%	64%	0%	27%	0%	0%	0%										
	PEAK HR FACTOR		0.775			0.883			0.458			0.000		0.917									
	APP/DEPART	344	/	342	445	/	430	11	/	0	0	/	28	0									
PM	4:00 PM	1	11	0	0	14	3	1	0	1	0	0	0	31	0	0	0	0	0	0	0	0	0
	4:15 PM	2	13	0	0	14	2	3	0	1	0	0	0	35	0	0	0	0	0	0	0	0	0
	4:30 PM	0	15	0	0	11	0	4	0	0	0	0	0	30	0	0	0	0	0	0	0	0	0
	4:45 PM	0	23	0	0	19	3	3	0	1	0	0	0	49	0	0	0	0	0	0	0	0	0
	5:00 PM	0	13	0	0	14	1	0	0	3	0	0	0	31	0	0	0	0	0	0	0	0	0
	5:15 PM	0	14	0	0	17	2	1	0	2	0	0	0	36	0	0	0	0	0	0	0	0	0
	5:30 PM	0	10	0	0	17	2	1	0	2	0	0	0	32	0	0	0	0	0	0	0	0	0
	5:45 PM	2	18	0	0	17	2	1	0	1	0	0	0	41	0	0	0	0	0	0	0	0	0
	VOLUMES	5	117	0	0	123	15	14	0	11	0	0	0	285	0	0	0	0	0	0	0	0	0
	APPROACH %	4%	96%	0%	0%	89%	11%	56%	0%	44%	0%	0%	0%										
	APP/DEPART	122	/	131	138	/	134	25	/	0	0	/	20	0									
	BEGIN PEAK HR		4:45 PM																				
	VOLUMES	0	60	0	0	67	8	5	0	8	0	0	0	148						0	0	0	0
	APPROACH %	0%	100%	0%	0%	89%	11%	38%	0%	62%	0%	0%	0%										
	PEAK HR FACTOR		0.652			0.852			0.813			0.000		0.755									
	APP/DEPART	60	/	65	75	/	75	13	/	0	0	/	8	0									

Evans

NORTH SIDE

Briarlea WEST SIDE EAST SIDE **Briarlea**

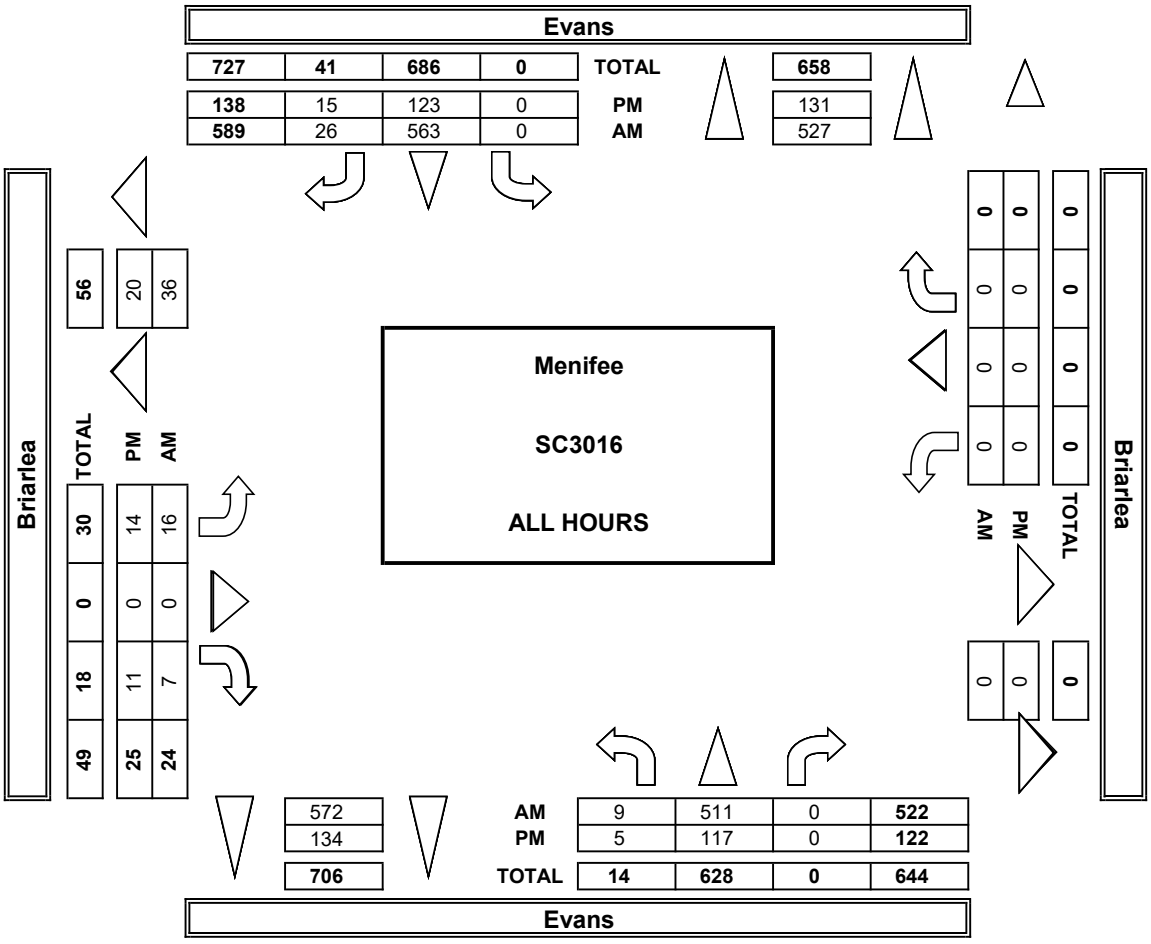
SOUTH SIDE

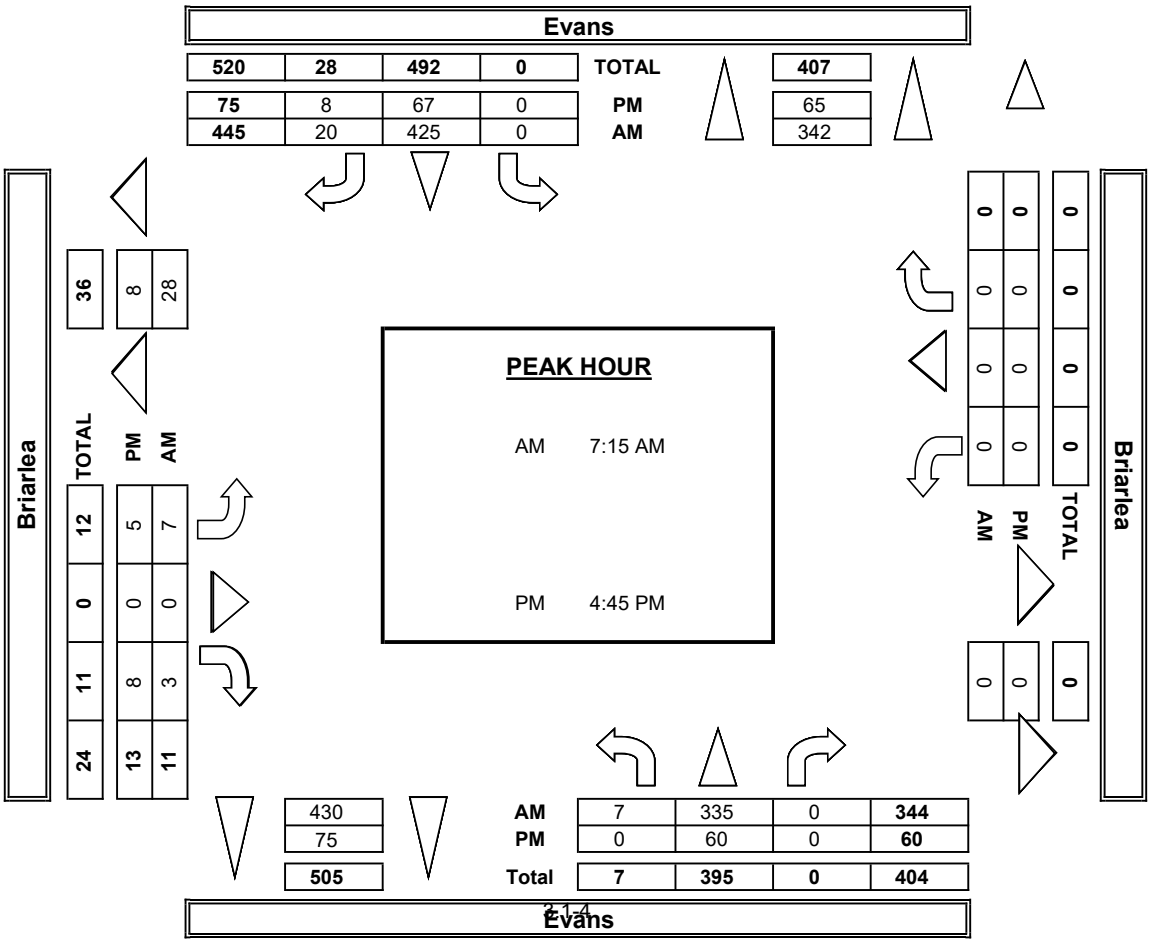
Evans

		ALL PED AND BIKE					PEDESTRIAN CROSSINGS					BICYCLE CROSSINGS				
		E SIDE	W SIDE	S SIDE	N SIDE	TOTAL	E SIDE	W SIDE	S SIDE	N SIDE	TOTAL	ES	WS	SS	NS	TOTAL
AM	7:00 AM	0	1	0	0	1	0	1	0	0	1	0	0	0	0	0
	7:15 AM	0	6	0	1	7	0	5	0	1	6	0	1	0	0	1
	7:30 AM	0	2	0	0	2	0	1	0	0	1	0	1	0	0	1
	7:45 AM	0	2	0	0	2	0	0	0	0	0	0	2	0	0	2
	8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	8:15 AM	0	2	0	0	2	0	2	0	0	2	0	0	0	0	0
	8:30 AM	0	4	0	0	4	0	4	0	0	4	0	0	0	0	0
	8:45 AM	0	1	0	0	1	0	1	0	0	1	0	0	0	0	0
	TOTAL	0	18	0	1	19	0	14	0	1	15	0	4	0	0	4
PM	4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:45 PM	0	1	0	0	1	0	1	0	0	1	0	0	0	0	0
	5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:15 PM	0	2	0	0	2	0	2	0	0	2	0	0	0	0	0
	5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:45 PM	0	2	0	0	2	0	1	0	0	1	0	1	0	0	1
	TOTAL	0	5	0	0	5	0	4	0	0	4	0	1	0	0	1

AimTD LLC

TURNING MOVEMENT COUNTS





T816

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE: Thu, Aug 12, 21

LOCATION: Menifee
NORTH & SOUTH: Evans
EAST & WEST: Craig

PROJECT #: SC3016
LOCATION #: 4
CONTROL: STOP ALL

NOTES:
Queue AM EB 7:33 - 7:45

AM / PM / MD / OTHER / OTHER — ▲ N / ◄ W / E ► / S ▼

☑ Add U-Turns to Left Turns

		NORTHBOUND (Evans)			SOUTHBOUND (Evans)			EASTBOUND (Craig)			WESTBOUND (Craig)			
	LANES:	NL 1	NT 1	NR 1	SL 0	ST 1	SR 0	EL 1	ET 1	ER 1	WL 1	WT 1	WR 1	TOTAL
AM	7:00 AM	7	15	14	22	10	1	3	54	3	8	40	9	186
	7:15 AM	9	27	26	55	18	5	15	77	2	27	78	61	400
	7:30 AM	4	20	15	48	41	5	10	77	11	33	84	50	398
	7:45 AM	13	30	16	30	82	9	9	17	18	47	62	57	390
	8:00 AM	31	60	40	12	111	5	3	15	21	70	11	2	381
	8:15 AM	36	84	60	3	78	2	7	7	26	54	9	1	367
	8:30 AM	22	46	70	2	13	2	1	7	5	7	5	1	181
	8:45 AM	0	8	8	2	10	3	0	10	2	6	6	3	58
	VOLUMES	122	290	249	174	363	32	48	264	88	252	295	184	2,361
	APPROACH %	18%	44%	38%	31%	64%	6%	12%	66%	22%	34%	40%	25%	
	APP/DEPART	661	/	521	569	/	703	400	/	687	731	/	450	0
	BEGIN PEAK HR		7:15 AM											
	VOLUMES	57	137	97	145	252	24	37	186	52	177	235	170	1,569
	APPROACH %	20%	47%	33%	34%	60%	6%	13%	68%	19%	30%	40%	29%	
	PEAK HR FACTOR		0.555			0.822			0.702			0.871		0.981
	APP/DEPART	291	/	343	421	/	481	275	/	428	582	/	317	0
PM	4:00 PM	2	7	1	2	6	3	1	5	0	5	12	9	53
	4:15 PM	7	7	9	2	12	3	2	10	2	22	15	4	95
	4:30 PM	3	8	8	1	7	2	0	9	3	16	12	5	74
	4:45 PM	3	11	10	6	8	5	2	19	6	16	18	5	109
	5:00 PM	2	8	10	4	9	2	0	13	6	8	31	9	102
	5:15 PM	3	2	16	4	14	2	1	8	8	15	14	7	94
	5:30 PM	0	6	9	6	10	5	2	12	2	6	12	7	77
	5:45 PM	2	7	11	7	11	1	0	11	4	12	15	12	93
	VOLUMES	22	56	74	32	77	23	8	87	31	100	129	58	697
	APPROACH %	14%	37%	49%	24%	58%	17%	6%	69%	25%	35%	45%	20%	
	APP/DEPART	152	/	122	132	/	208	126	/	193	287	/	174	0
	BEGIN PEAK HR		4:45 PM											
	VOLUMES	8	27	45	20	41	14	5	52	22	45	75	28	382
	APPROACH %	10%	34%	56%	27%	55%	19%	6%	66%	28%	30%	51%	19%	
	PEAK HR FACTOR		0.833			0.893			0.731			0.771		0.876
	APP/DEPART	80	/	60	75	/	108	79	/	117	148	/	97	0

U-TURNS

NB 0	SB 0	EB 0	WB 0	TTL
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	1	0	1
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	1	0	1
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0

RTOR

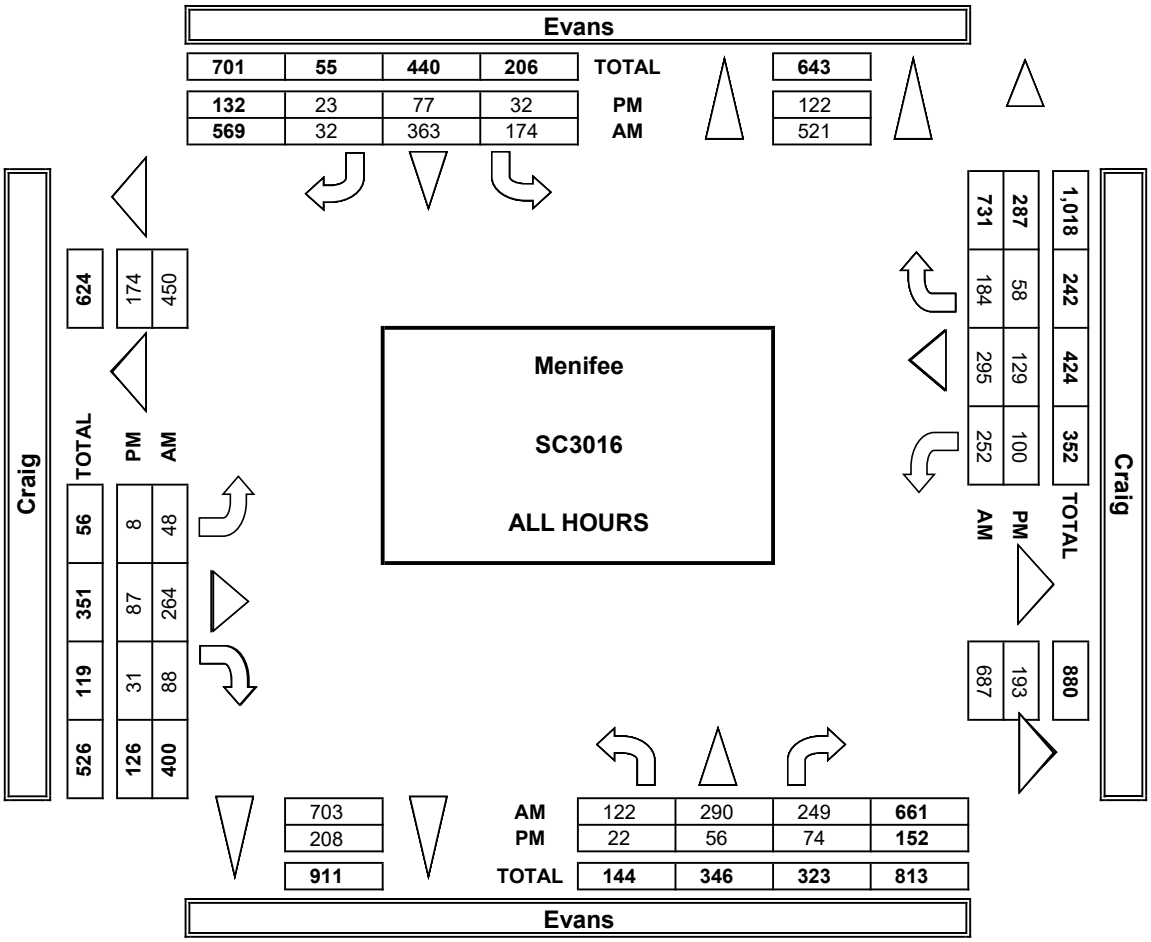
NRR X	SRR X	ERR X	WRR X
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0

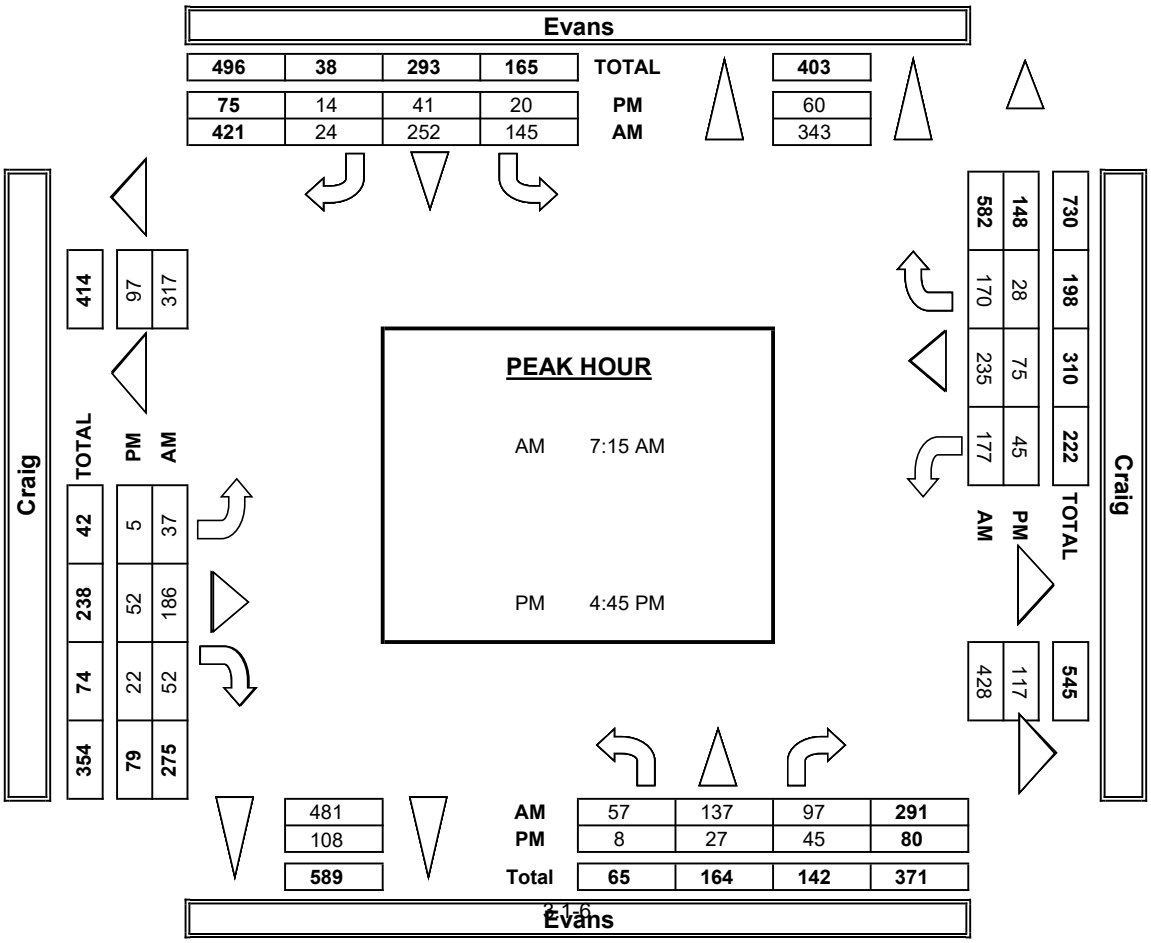
Evans
NORTH SIDE
Craig WEST SIDE EAST SIDE **Craig**
SOUTH SIDE
Evans

		ALL PED AND BIKE					PEDESTRIAN CROSSINGS					BICYCLE CROSSINGS				
		E SIDE	W SIDE	S SIDE	N SIDE	TOTAL	E SIDE	W SIDE	S SIDE	N SIDE	TOTAL	ES	WS	SS	NS	TOTAL
AM	7:00 AM	5	1	1	10	17	5	1	1	10	17	0	0	0	0	0
	7:15 AM	13	5	4	13	35	12	3	4	11	30	1	2	0	2	5
	7:30 AM	7	2	4	14	27	5	1	3	14	23	2	1	1	0	4
	7:45 AM	1	5	0	4	10	1	3	0	4	8	0	2	0	0	2
	8:00 AM	1	4	0	0	5	0	3	0	0	3	1	1	0	0	2
	8:15 AM	2	2	2	1	7	0	2	2	1	5	2	0	0	0	2
	8:30 AM	1	0	0	1	2	1	0	0	1	2	0	0	0	0	0
	8:45 AM	0	1	0	0	1	0	1	0	0	1	0	0	0	0	0
	TOTAL	30	20	11	43	104	24	14	10	41	89	6	6	1	2	15
PM	4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:45 PM	0	1	0	1	2	0	1	0	1	2	0	0	0	0	0
	5:00 PM	1	0	0	4	5	1	0	0	3	4	0	0	0	1	1
	5:15 PM	2	0	1	1	4	2	0	1	1	4	0	0	0	0	0
	5:30 PM	0	0	1	0	1	0	0	1	0	1	0	0	0	0	0
	5:45 PM	0	1	0	1	2	0	1	0	1	2	0	0	0	0	0
	TOTAL	3	2	2	7	14	3	2	2	6	13	0	0	0	1	1

AimTD LLC

TURNING MOVEMENT COUNTS





APPENDIX 3.2:

EXISTING (2021) CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS

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Intersection	
Intersection Delay, s/veh	12.8
Intersection LOS	B

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	14	37	61	283	408	45
Future Vol, veh/h	14	37	61	283	408	45
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	15	40	66	308	443	49
Number of Lanes	1	0	0	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	1	1	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	1
HCM Control Delay	9	11.9	14
HCM LOS	A	B	B

Lane	NBLn1	EBLn1	SBLn1
Vol Left, %	18%	27%	0%
Vol Thru, %	82%	0%	90%
Vol Right, %	0%	73%	10%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	344	51	453
LT Vol	61	14	0
Through Vol	283	0	408
RT Vol	0	37	45
Lane Flow Rate	374	55	492
Geometry Grp	1	1	1
Degree of Util (X)	0.48	0.083	0.605
Departure Headway (Hd)	4.623	5.402	4.423
Convergence, Y/N	Yes	Yes	Yes
Cap	778	659	817
Service Time	2.659	3.468	2.454
HCM Lane V/C Ratio	0.481	0.083	0.602
HCM Control Delay	11.9	9	14
HCM Lane LOS	B	A	B
HCM 95th-tile Q	2.6	0.3	4.2

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	7	3	7	337	425	20
Future Vol, veh/h	7	3	7	337	425	20
Conflicting Peds, #/hr	0	1	0	0	0	6
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	8	3	8	366	462	22

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	861	480	490	0	-	0
Stage 1	479	-	-	-	-	-
Stage 2	382	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	326	586	1073	-	-	-
Stage 1	623	-	-	-	-	-
Stage 2	690	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	319	582	1067	-	-	-
Mov Cap-2 Maneuver	319	-	-	-	-	-
Stage 1	614	-	-	-	-	-
Stage 2	686	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	15.1	0.2	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1067	-	369	-	-
HCM Lane V/C Ratio	0.007	-	0.029	-	-
HCM Control Delay (s)	8.4	0	15.1	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection	
Intersection Delay, s/veh	38
Intersection LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	37	186	52	177	235	170	57	137	97	148	256	24
Future Vol, veh/h	37	186	52	177	235	170	57	137	97	148	256	24
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	38	190	53	181	240	173	58	140	99	151	261	24
Number of Lanes	1	1	1	1	1	1	1	1	1	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	3	1	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	3	3	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	1	3	3
HCM Control Delay	19.2	20.1	14.7	90.1
HCM LOS	C	C	B	F

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1
Vol Left, %	100%	0%	0%	100%	0%	0%	100%	0%	0%	35%
Vol Thru, %	0%	100%	0%	0%	100%	0%	0%	100%	0%	60%
Vol Right, %	0%	0%	100%	0%	0%	100%	0%	0%	100%	6%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	57	137	97	37	186	52	177	235	170	428
LT Vol	57	0	0	37	0	0	177	0	0	148
Through Vol	0	137	0	0	186	0	0	235	0	256
RT Vol	0	0	97	0	0	52	0	0	170	24
Lane Flow Rate	58	140	99	38	190	53	181	240	173	437
Geometry Grp	7	7	7	8	8	8	8	8	8	8
Degree of Util (X)	0.147	0.335	0.218	0.103	0.497	0.128	0.454	0.575	0.383	1.057
Departure Headway (Hd)	9.454	8.935	8.208	10.365	9.839	9.104	9.528	9.007	8.277	8.714
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	382	405	440	348	368	396	381	403	437	419
Service Time	7.154	6.635	5.908	8.065	7.539	6.804	7.228	6.707	5.977	6.452
HCM Lane V/C Ratio	0.152	0.346	0.225	0.109	0.516	0.134	0.475	0.596	0.396	1.043
HCM Control Delay	13.8	16.1	13.2	14.3	21.9	13.1	19.9	23.2	16	90.1
HCM Lane LOS	B	C	B	B	C	B	C	C	C	F
HCM 95th-tile Q	0.5	1.4	0.8	0.3	2.7	0.4	2.3	3.5	1.8	14.3

Intersection	
Intersection Delay, s/veh	7.5
Intersection LOS	A

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	13	7	17	48	69	18
Future Vol, veh/h	13	7	17	48	69	18
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	17	9	22	62	88	23
Number of Lanes	1	0	0	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	1	1	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	1
HCM Control Delay	7.4	7.6	7.5
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	SBLn1
Vol Left, %	26%	65%	0%
Vol Thru, %	74%	0%	79%
Vol Right, %	0%	35%	21%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	65	20	87
LT Vol	17	13	0
Through Vol	48	0	69
RT Vol	0	7	18
Lane Flow Rate	83	26	112
Geometry Grp	1	1	1
Degree of Util (X)	0.095	0.03	0.121
Departure Headway (Hd)	4.115	4.187	3.917
Convergence, Y/N	Yes	Yes	Yes
Cap	869	844	914
Service Time	2.148	2.268	1.949
HCM Lane V/C Ratio	0.096	0.031	0.123
HCM Control Delay	7.6	7.4	7.5
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.3	0.1	0.4

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	5	8	0	60	68	8
Future Vol, veh/h	5	8	0	60	68	8
Conflicting Peds, #/hr	0	0	0	0	0	3
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	76	76	76	76	76	76
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	7	11	0	79	89	11

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	177	98	103	0	-	0
Stage 1	98	-	-	-	-	-
Stage 2	79	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	813	958	1489	-	-	-
Stage 1	926	-	-	-	-	-
Stage 2	944	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	808	955	1485	-	-	-
Mov Cap-2 Maneuver	808	-	-	-	-	-
Stage 1	923	-	-	-	-	-
Stage 2	941	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.1	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1485	-	893	-	-
HCM Lane V/C Ratio	-	-	0.019	-	-
HCM Control Delay (s)	0	-	9.1	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection	
Intersection Delay, s/veh	8.4
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	52	22	45	75	28	8	27	45	20	42	14
Future Vol, veh/h	5	52	22	45	75	28	8	27	45	20	42	14
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	6	59	25	51	85	32	9	31	51	23	48	16
Number of Lanes	1	1	1	1	1	1	1	1	1	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	3	1	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	3	3	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	1	3	3
HCM Control Delay	8.3	8.5	7.9	8.9
HCM LOS	A	A	A	A

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1
Vol Left, %	100%	0%	0%	100%	0%	0%	100%	0%	0%	26%
Vol Thru, %	0%	100%	0%	0%	100%	0%	0%	100%	0%	55%
Vol Right, %	0%	0%	100%	0%	0%	100%	0%	0%	100%	18%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	8	27	45	5	52	22	45	75	28	76
LT Vol	8	0	0	5	0	0	45	0	0	20
Through Vol	0	27	0	0	52	0	0	75	0	42
RT Vol	0	0	45	0	0	22	0	0	28	14
Lane Flow Rate	9	31	51	6	59	25	51	85	32	86
Geometry Grp	7	7	7	8	8	8	8	8	8	8
Degree of Util (X)	0.014	0.045	0.064	0.009	0.088	0.032	0.081	0.123	0.04	0.129
Departure Headway (Hd)	5.735	5.235	4.535	5.871	5.369	4.667	5.713	5.211	4.508	5.384
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	624	684	789	609	667	765	627	687	793	665
Service Time	3.469	2.969	2.269	3.612	3.11	2.407	3.449	2.948	2.245	3.123
HCM Lane V/C Ratio	0.014	0.045	0.065	0.01	0.088	0.033	0.081	0.124	0.04	0.129
HCM Control Delay	8.6	8.2	7.6	8.7	8.6	7.6	9	8.7	7.4	8.9
HCM Lane LOS	A	A	A	A	A	A	A	A	A	A
HCM 95th-tile Q	0	0.1	0.2	0	0.3	0.1	0.3	0.4	0.1	0.4

APPENDIX 3.3:

EXISTING (2021) CONDITIONS TRAFFIC SIGNAL WARRANT ANALYSIS WORKSHEETS

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Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

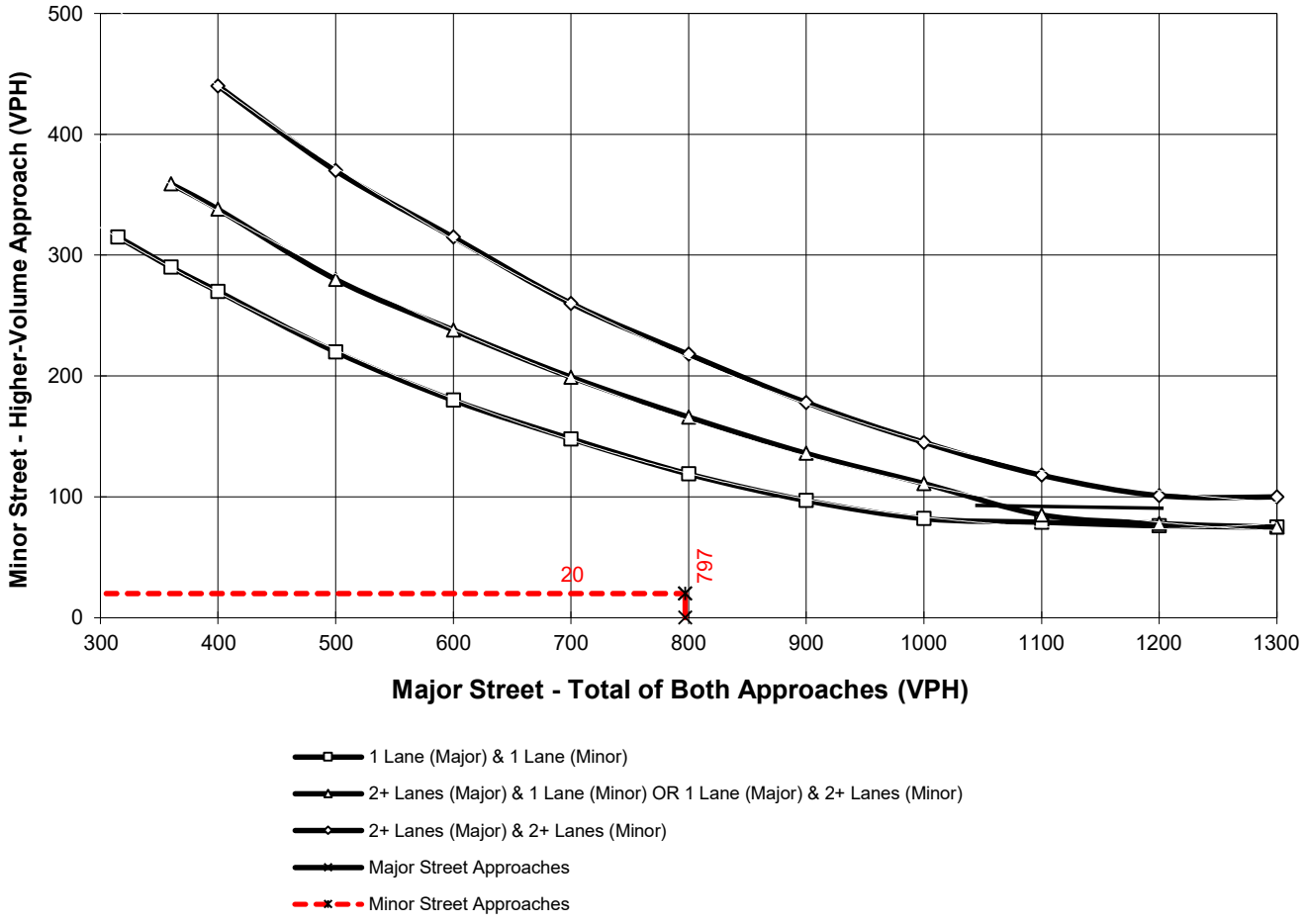
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 64 km/h OR ABOVE 40 mph ON MAJOR STREET)

Traffic Conditions = **Existing (2021) Conditions - Weekday AM Peak Hour**

Major Street Name = **Evans Road** — Total of Both Approaches (VPH) = **797**
Number of Approach Lanes Major Street = **1**

Minor Street Name = **Corson Avenue** — High Volume Approach (VPH) = **20**
Number of Approach Lanes Minor Street = **1**

SIGNAL WARRANT NOT SATISFIED



*Note: 100 vph applies as the lower threshold for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold for a minor-street approach with one lane

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

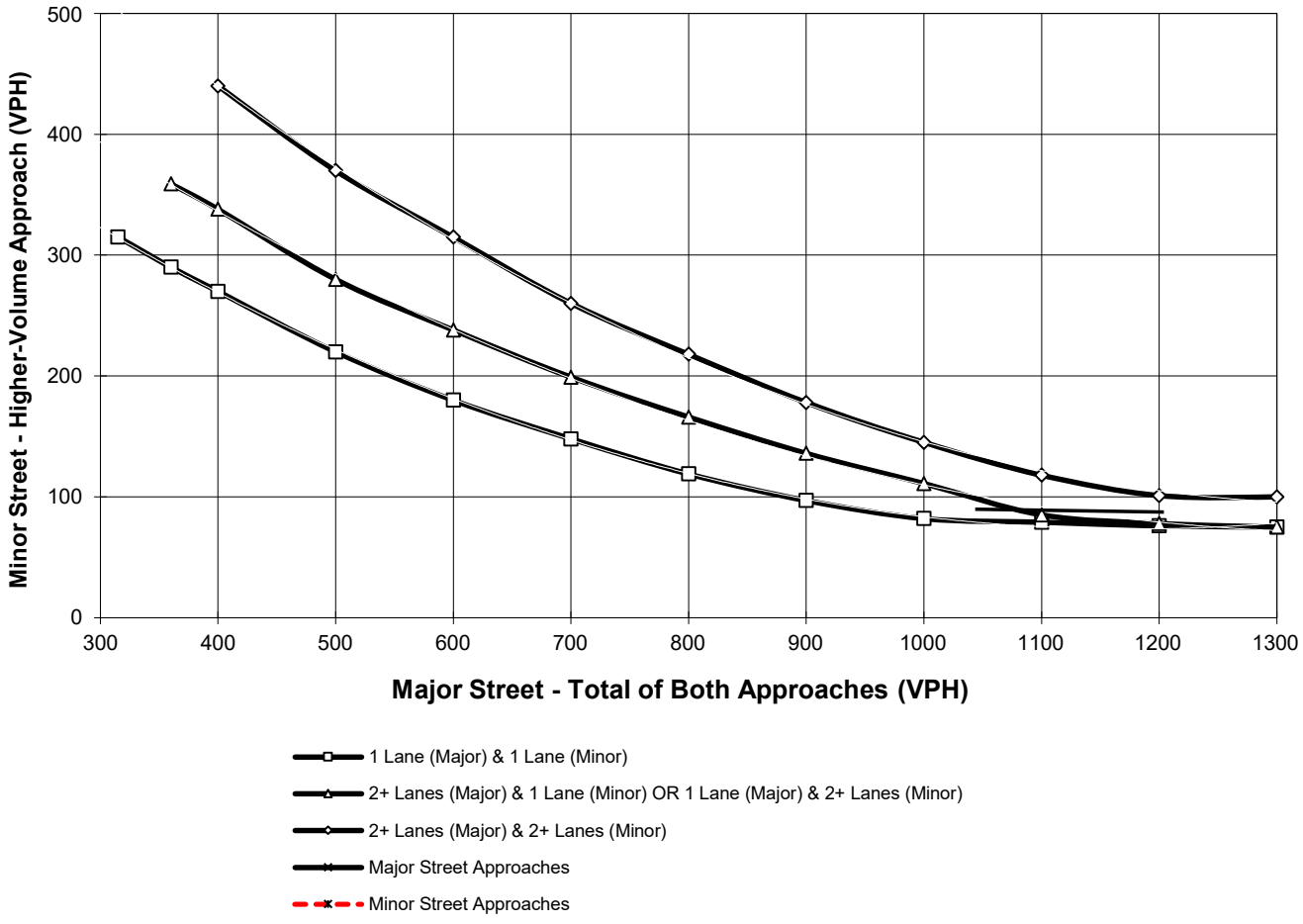
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 64 km/h OR ABOVE 40 mph ON MAJOR STREET)

Traffic Conditions = **Existing (2021) Conditions - Weekday PM Peak Hour**

Major Street Name = **Evans Road** Total of Both Approaches (VPH) = **136**
Number of Approach Lanes Major Street = **1**

Minor Street Name = **Briarlea Road** High Volume Approach (VPH) = **13**
Number of Approach Lanes Minor Street = **1**

SIGNAL WARRANT NOT SATISFIED



*Note: 100 vph applies as the lower threshold for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold for a minor-street approach with one lane

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

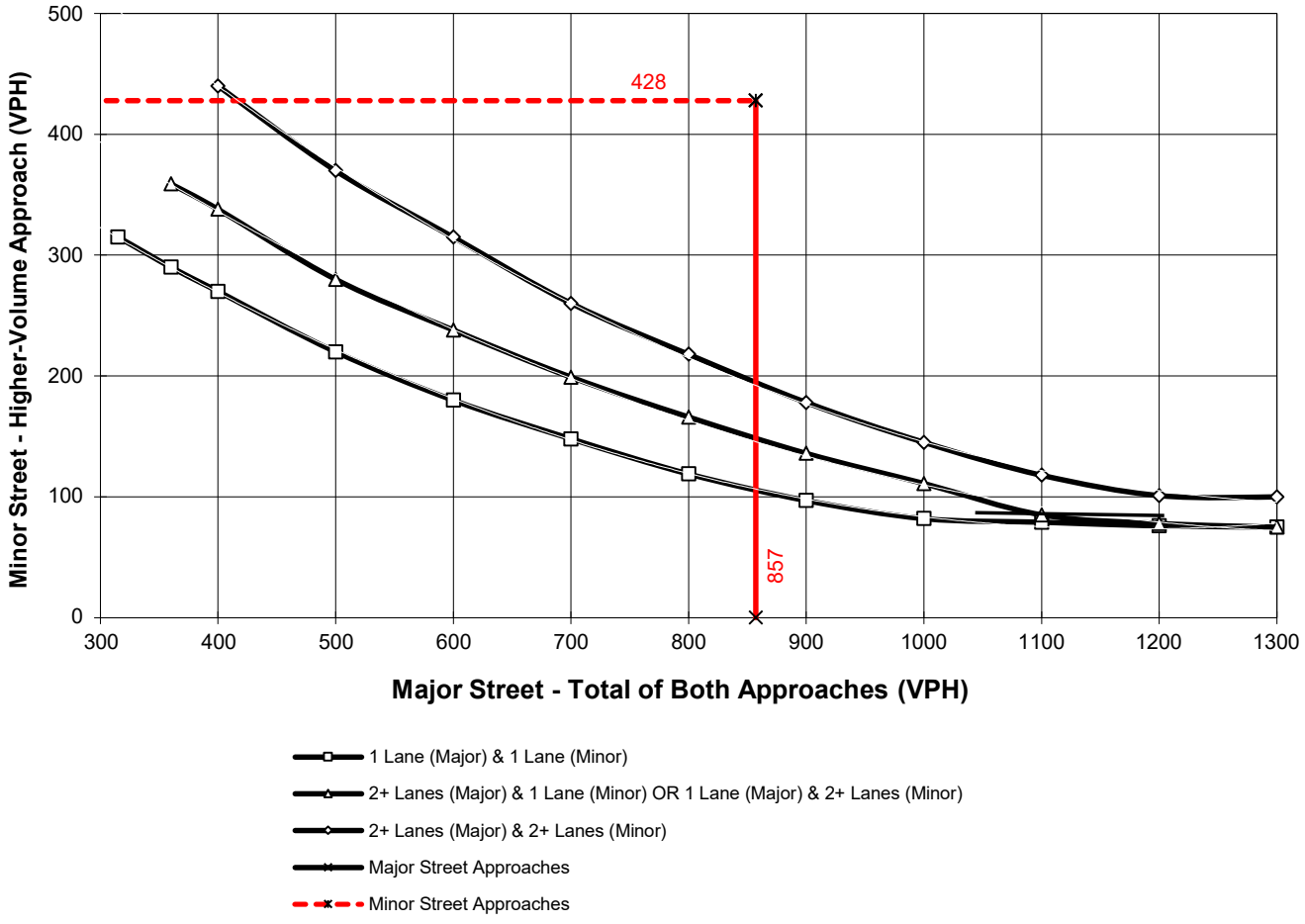
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 64 km/h OR ABOVE 40 mph ON MAJOR STREET)

Traffic Conditions = **Existing (2021) Conditions - Weekday AM Peak Hour**

Major Street Name = **Craig Avenue** — Total of Both Approaches (VPH) = **857**
Number of Approach Lanes Major Street = **1**

Minor Street Name = **Evans Road** — High Volume Approach (VPH) = **428**
Number of Approach Lanes Minor Street = **1**

WARRANTED FOR A SIGNAL



*Note: 100 vph applies as the lower threshold for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold for a minor-street approach with one lane

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APPENDIX 5.1:

E+P WITH PROJECT (PHASE 1) CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS

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Intersection	
Intersection Delay, s/veh	12.9
Intersection LOS	B

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	14	37	61	285	410	45
Future Vol, veh/h	14	37	61	285	410	45
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	15	40	66	310	446	49
Number of Lanes	1	0	0	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	1	1	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	1
HCM Control Delay	9	11.9	14.1
HCM LOS	A	B	B

Lane	NBLn1	EBLn1	SBLn1
Vol Left, %	18%	27%	0%
Vol Thru, %	82%	0%	90%
Vol Right, %	0%	73%	10%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	346	51	455
LT Vol	61	14	0
Through Vol	285	0	410
RT Vol	0	37	45
Lane Flow Rate	376	55	495
Geometry Grp	1	1	1
Degree of Util (X)	0.483	0.083	0.608
Departure Headway (Hd)	4.625	5.411	4.426
Convergence, Y/N	Yes	Yes	Yes
Cap	778	658	816
Service Time	2.661	3.478	2.457
HCM Lane V/C Ratio	0.483	0.084	0.607
HCM Control Delay	11.9	9	14.1
HCM Lane LOS	B	A	B
HCM 95th-tile Q	2.7	0.3	4.2

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	7	3	7	339	427	20
Future Vol, veh/h	7	3	7	339	427	20
Conflicting Peds, #/hr	0	1	0	0	0	6
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	8	3	8	368	464	22

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	865	482	492	0	-	0
Stage 1	481	-	-	-	-	-
Stage 2	384	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	324	584	1071	-	-	-
Stage 1	622	-	-	-	-	-
Stage 2	688	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	317	580	1065	-	-	-
Mov Cap-2 Maneuver	317	-	-	-	-	-
Stage 1	613	-	-	-	-	-
Stage 2	684	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	15.1	0.2	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1065	-	367	-	-
HCM Lane V/C Ratio	0.007	-	0.03	-	-
HCM Control Delay (s)	8.4	0	15.1	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection	
Intersection Delay, s/veh	38.9
Intersection LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	37	188	52	178	237	172	57	137	98	150	256	24
Future Vol, veh/h	37	188	52	178	237	172	57	137	98	150	256	24
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	38	192	53	182	242	176	58	140	100	153	261	24
Number of Lanes	1	1	1	1	1	1	1	1	1	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	3	1	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	3	3	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	1	3	3
HCM Control Delay	19.3	20.4	14.7	93.2
HCM LOS	C	C	B	F

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1
Vol Left, %	100%	0%	0%	100%	0%	0%	100%	0%	0%	35%
Vol Thru, %	0%	100%	0%	0%	100%	0%	0%	100%	0%	60%
Vol Right, %	0%	0%	100%	0%	0%	100%	0%	0%	100%	6%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	57	137	98	37	188	52	178	237	172	430
LT Vol	57	0	0	37	0	0	178	0	0	150
Through Vol	0	137	0	0	188	0	0	237	0	256
RT Vol	0	0	98	0	0	52	0	0	172	24
Lane Flow Rate	58	140	100	38	192	53	182	242	176	439
Geometry Grp	7	7	7	8	8	8	8	8	8	8
Degree of Util (X)	0.148	0.336	0.221	0.104	0.498	0.129	0.458	0.582	0.388	1.067
Departure Headway (Hd)	9.489	8.969	8.243	10.413	9.887	9.151	9.561	9.039	8.309	8.752
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	380	404	438	346	366	394	380	401	435	417
Service Time	7.189	6.669	5.943	8.113	7.587	6.851	7.261	6.739	6.009	6.481
HCM Lane V/C Ratio	0.153	0.347	0.228	0.11	0.525	0.135	0.479	0.603	0.405	1.053
HCM Control Delay	13.8	16.1	13.3	14.3	22	13.2	20.1	23.6	16.2	93.2
HCM Lane LOS	B	C	B	B	C	B	C	C	C	F
HCM 95th-tile Q	0.5	1.5	0.8	0.3	2.7	0.4	2.3	3.6	1.8	14.6

Intersection	
Int Delay, s/veh	0.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	431	5	1	582	5	1
Future Vol, veh/h	431	5	1	582	5	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	468	5	1	633	5	1

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	473	0	1106	471
Stage 1	-	-	-	-	471	-
Stage 2	-	-	-	-	635	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1089	-	233	593
Stage 1	-	-	-	-	628	-
Stage 2	-	-	-	-	528	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1089	-	233	593
Mov Cap-2 Maneuver	-	-	-	-	233	-
Stage 1	-	-	-	-	628	-
Stage 2	-	-	-	-	527	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	19.3
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	259	-	-	1089	-
HCM Lane V/C Ratio	0.025	-	-	0.001	-
HCM Control Delay (s)	19.3	-	-	8.3	-
HCM Lane LOS	C	-	-	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection	
Intersection Delay, s/veh	7.5
Intersection LOS	A

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	13	8	18	51	72	18
Future Vol, veh/h	13	8	18	51	72	18
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	17	10	23	65	92	23
Number of Lanes	1	0	0	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	1	1	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	1
HCM Control Delay	7.4	7.6	7.5
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	SBLn1
Vol Left, %	26%	62%	0%
Vol Thru, %	74%	0%	80%
Vol Right, %	0%	38%	20%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	69	21	90
LT Vol	18	13	0
Through Vol	51	0	72
RT Vol	0	8	18
Lane Flow Rate	88	27	115
Geometry Grp	1	1	1
Degree of Util (X)	0.101	0.031	0.126
Departure Headway (Hd)	4.12	4.179	3.928
Convergence, Y/N	Yes	Yes	Yes
Cap	868	845	910
Service Time	2.154	2.264	1.96
HCM Lane V/C Ratio	0.101	0.032	0.126
HCM Control Delay	7.6	7.4	7.5
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.3	0.1	0.4

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	5	8	0	64	72	8
Future Vol, veh/h	5	8	0	64	72	8
Conflicting Peds, #/hr	0	0	0	0	0	3
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	76	76	76	76	76	76
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	7	11	0	84	95	11

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	188	104	109	0	-	0
Stage 1	104	-	-	-	-	-
Stage 2	84	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	801	951	1481	-	-	-
Stage 1	920	-	-	-	-	-
Stage 2	939	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	796	948	1477	-	-	-
Mov Cap-2 Maneuver	796	-	-	-	-	-
Stage 1	917	-	-	-	-	-
Stage 2	936	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.2	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1477	-	883	-	-
HCM Lane V/C Ratio	-	-	0.019	-	-
HCM Control Delay (s)	0	-	9.2	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection	
Intersection Delay, s/veh	8.5
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	56	22	47	79	32	8	27	47	24	42	14
Future Vol, veh/h	5	56	22	47	79	32	8	27	47	24	42	14
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	6	64	25	53	90	36	9	31	53	27	48	16
Number of Lanes	1	1	1	1	1	1	1	1	1	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	3	1	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	3	3	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	1	3	3
HCM Control Delay	8.4	8.6	8	9.1
HCM LOS	A	A	A	A

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1
Vol Left, %	100%	0%	0%	100%	0%	0%	100%	0%	0%	30%
Vol Thru, %	0%	100%	0%	0%	100%	0%	0%	100%	0%	53%
Vol Right, %	0%	0%	100%	0%	0%	100%	0%	0%	100%	17%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	8	27	47	5	56	22	47	79	32	80
LT Vol	8	0	0	5	0	0	47	0	0	24
Through Vol	0	27	0	0	56	0	0	79	0	42
RT Vol	0	0	47	0	0	22	0	0	32	14
Lane Flow Rate	9	31	53	6	64	25	53	90	36	91
Geometry Grp	7	7	7	8	8	8	8	8	8	8
Degree of Util (X)	0.015	0.045	0.068	0.009	0.096	0.033	0.085	0.131	0.046	0.138
Departure Headway (Hd)	5.782	5.282	4.582	5.919	5.416	4.713	5.749	5.247	4.545	5.457
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	618	677	780	604	660	757	622	682	785	655
Service Time	3.522	3.022	2.322	3.666	3.164	2.46	3.491	2.989	2.287	3.202
HCM Lane V/C Ratio	0.015	0.046	0.068	0.01	0.097	0.033	0.085	0.132	0.046	0.139
HCM Control Delay	8.6	8.3	7.7	8.7	8.7	7.6	9	8.8	7.5	9.1
HCM Lane LOS	A	A	A	A	A	A	A	A	A	A
HCM 95th-tile Q	0	0.1	0.2	0	0.3	0.1	0.3	0.4	0.1	0.5

Intersection	
Int Delay, s/veh	0.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	117	10	2	148	10	2
Future Vol, veh/h	117	10	2	148	10	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	127	11	2	161	11	2

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	138	0	298	133
Stage 1	-	-	-	-	133	-
Stage 2	-	-	-	-	165	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1446	-	693	916
Stage 1	-	-	-	-	893	-
Stage 2	-	-	-	-	864	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1446	-	692	916
Mov Cap-2 Maneuver	-	-	-	-	692	-
Stage 1	-	-	-	-	893	-
Stage 2	-	-	-	-	863	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	10.1
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	721	-	-	1446	-
HCM Lane V/C Ratio	0.018	-	-	0.002	-
HCM Control Delay (s)	10.1	-	-	7.5	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0	-

APPENDIX 5.2:

E+P WITH PROJECT (BUILDOUT) CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS

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Intersection	
Intersection Delay, s/veh	13.1
Intersection LOS	B

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	14	38	62	288	413	45
Future Vol, veh/h	14	38	62	288	413	45
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	15	41	67	313	449	49
Number of Lanes	1	0	1	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	2
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	1	1	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	2	0	1
HCM Control Delay	9	11.2	15
HCM LOS	A	B	B

Lane	NBLn1	NBLn2	EBLn1	SBLn1
Vol Left, %	100%	0%	27%	0%
Vol Thru, %	0%	100%	0%	90%
Vol Right, %	0%	0%	73%	10%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	62	288	52	458
LT Vol	62	0	14	0
Through Vol	0	288	0	413
RT Vol	0	0	38	45
Lane Flow Rate	67	313	57	498
Geometry Grp	7	7	2	5
Degree of Util (X)	0.104	0.439	0.086	0.628
Departure Headway (Hd)	5.547	5.044	5.451	4.541
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	646	714	653	797
Service Time	3.286	2.782	3.517	2.573
HCM Lane V/C Ratio	0.104	0.438	0.087	0.625
HCM Control Delay	8.9	11.7	9	15
HCM Lane LOS	A	B	A	B
HCM 95th-tile Q	0.3	2.2	0.3	4.5

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	7	0	3	6	0	3	7	340	6	3	428	20
Future Vol, veh/h	7	0	3	6	0	3	7	340	6	3	428	20
Conflicting Peds, #/hr	0	0	1	0	0	0	0	0	0	0	0	6
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	8	0	3	7	0	3	8	370	7	3	465	22

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	689	881	251	630	889	189	493	0	0	377	0	0
Stage 1	488	488	-	390	390	-	-	-	-	-	-	-
Stage 2	201	393	-	240	499	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	332	284	749	366	281	821	1067	-	-	1178	-	-
Stage 1	530	548	-	606	606	-	-	-	-	-	-	-
Stage 2	782	604	-	742	542	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	326	279	744	361	276	821	1061	-	-	1178	-	-
Mov Cap-2 Maneuver	326	279	-	361	276	-	-	-	-	-	-	-
Stage 1	523	543	-	601	601	-	-	-	-	-	-	-
Stage 2	773	599	-	736	537	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	14.4	13.3	0.2	0.1
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1061	-	-	392	444	1178	-	-
HCM Lane V/C Ratio	0.007	-	-	0.028	0.022	0.003	-	-
HCM Control Delay (s)	8.4	-	-	14.4	13.3	8.1	-	-
HCM Lane LOS	A	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.1	0	-	-

Intersection	
Int Delay, s/veh	0.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	3	1	352	3	1	436
Future Vol, veh/h	3	1	352	3	1	436
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	1	383	3	1	474

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	624	193	0	0	386	0
Stage 1	385	-	-	-	-	-
Stage 2	239	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	417	816	-	-	1169	-
Stage 1	657	-	-	-	-	-
Stage 2	778	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	417	816	-	-	1169	-
Mov Cap-2 Maneuver	417	-	-	-	-	-
Stage 1	657	-	-	-	-	-
Stage 2	777	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.6	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	475	1169	-
HCM Lane V/C Ratio	-	-	0.009	0.001	-
HCM Control Delay (s)	-	-	12.6	8.1	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0	0	-

Intersection	
Intersection Delay, s/veh	20.6
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	42	188	52	178	237	174	57	139	98	152	258	29
Future Vol, veh/h	42	188	52	178	237	174	57	139	98	152	258	29
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	43	192	53	182	242	178	58	142	100	155	263	30
Number of Lanes	1	1	1	1	1	1	1	1	1	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	3	2	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	3	3	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	2	3	3
HCM Control Delay	18.9	19.9	16	25.6
HCM LOS	C	C	C	D

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Vol Left, %	100%	0%	0%	100%	0%	0%	100%	0%	0%	100%	0%
Vol Thru, %	0%	100%	0%	0%	100%	0%	0%	100%	0%	0%	90%
Vol Right, %	0%	0%	100%	0%	0%	100%	0%	0%	100%	0%	10%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	57	139	98	42	188	52	178	237	174	152	287
LT Vol	57	0	0	42	0	0	178	0	0	152	0
Through Vol	0	139	0	0	188	0	0	237	0	0	258
RT Vol	0	0	98	0	0	52	0	0	174	0	29
Lane Flow Rate	58	142	100	43	192	53	182	242	178	155	293
Geometry Grp	8	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.161	0.372	0.243	0.119	0.506	0.129	0.464	0.584	0.393	0.397	0.704
Departure Headway (Hd)	9.957	9.447	8.732	10.012	9.497	8.777	9.201	8.689	7.971	9.224	8.653
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	360	380	411	358	380	408	392	416	451	391	419
Service Time	7.722	7.211	6.497	7.78	7.265	6.544	6.959	6.447	5.729	6.98	6.41
HCM Lane V/C Ratio	0.161	0.374	0.243	0.12	0.505	0.13	0.464	0.582	0.395	0.396	0.699
HCM Control Delay	14.6	17.7	14.3	14.1	21.7	12.8	19.7	23	15.8	18	29.6
HCM Lane LOS	B	C	B	B	C	B	C	C	C	C	D
HCM 95th-tile Q	0.6	1.7	0.9	0.4	2.7	0.4	2.4	3.6	1.8	1.9	5.3

Intersection	
Int Delay, s/veh	0.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	433	5	1	584	5	1
Future Vol, veh/h	433	5	1	584	5	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	471	5	1	635	5	1

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	476	0	1111	474
Stage 1	-	-	-	-	474	-
Stage 2	-	-	-	-	637	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1086	-	231	590
Stage 1	-	-	-	-	626	-
Stage 2	-	-	-	-	527	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1086	-	231	590
Mov Cap-2 Maneuver	-	-	-	-	231	-
Stage 1	-	-	-	-	626	-
Stage 2	-	-	-	-	526	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	19.4
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	257	-	-	1086	-
HCM Lane V/C Ratio	0.025	-	-	0.001	-
HCM Control Delay (s)	19.4	-	-	8.3	-
HCM Lane LOS	C	-	-	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection	
Intersection Delay, s/veh	7.8
Intersection LOS	A

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	13	9	19	58	79	18
Future Vol, veh/h	13	9	19	58	79	18
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	17	12	24	74	101	23
Number of Lanes	1	0	1	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	2
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	1	1	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	2	0	1
HCM Control Delay	7.5	7.9	7.8
HCM LOS	A	A	A

Lane	NBLn1	NBLn2	EBLn1	SBLn1
Vol Left, %	100%	0%	59%	0%
Vol Thru, %	0%	100%	0%	81%
Vol Right, %	0%	0%	41%	19%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	19	58	22	97
LT Vol	19	0	13	0
Through Vol	0	58	0	79
RT Vol	0	0	9	18
Lane Flow Rate	24	74	28	124
Geometry Grp	7	7	2	5
Degree of Util (X)	0.035	0.096	0.034	0.14
Departure Headway (Hd)	5.146	4.645	4.311	4.044
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	695	770	835	880
Service Time	2.881	2.38	2.311	2.097
HCM Lane V/C Ratio	0.035	0.096	0.034	0.141
HCM Control Delay	8.1	7.9	7.5	7.8
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.1	0.3	0.1	0.5

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↰	↑↑↱		↰	↑↑↱	
Traffic Vol, veh/h	5	1	8	11	1	7	0	65	11	7	73	8
Future Vol, veh/h	5	1	8	11	1	7	0	65	11	7	73	8
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	3
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	76	76	76	76	76	76	76	76	76	76	76	76
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	7	1	11	14	1	9	0	86	14	9	96	11

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	167	223	57	160	221	50	110	0	0	100	0	0
Stage 1	123	123	-	93	93	-	-	-	-	-	-	-
Stage 2	44	100	-	67	128	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	781	675	997	790	676	1008	1478	-	-	1490	-	-
Stage 1	868	793	-	904	817	-	-	-	-	-	-	-
Stage 2	965	811	-	936	789	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	767	669	994	777	670	1008	1474	-	-	1490	-	-
Mov Cap-2 Maneuver	758	667	-	770	670	-	-	-	-	-	-	-
Stage 1	865	786	-	904	817	-	-	-	-	-	-	-
Stage 2	955	811	-	919	782	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.2	9.4	0	0.6
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1474	-	-	867	836	1490	-	-
HCM Lane V/C Ratio	-	-	-	0.021	0.03	0.006	-	-
HCM Control Delay (s)	0	-	-	9.2	9.4	7.4	-	-
HCM Lane LOS	A	-	-	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.1	0	-	-

Intersection	
Int Delay, s/veh	0.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	7	1	75	7	1	91
Future Vol, veh/h	7	1	75	7	1	91
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	1	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	8	1	82	8	1	99

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	138	45	0	0	90	0
Stage 1	86	-	-	-	-	-
Stage 2	52	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	841	1015	-	-	1503	-
Stage 1	927	-	-	-	-	-
Stage 2	964	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	840	1015	-	-	1503	-
Mov Cap-2 Maneuver	813	-	-	-	-	-
Stage 1	927	-	-	-	-	-
Stage 2	963	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.4	0	0.1
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	834	1503	-
HCM Lane V/C Ratio	-	-	0.01	0.001	-
HCM Control Delay (s)	-	-	9.4	7.4	-
HCM Lane LOS	-	-	A	A	-
HCM 95th %tile Q(veh)	-	-	0	0	-

Intersection	
Intersection Delay, s/veh	8.6
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	14	56	22	47	79	36	8	32	47	28	47	23
Future Vol, veh/h	14	56	22	47	79	36	8	32	47	28	47	23
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	16	64	25	53	90	41	9	36	53	32	53	26
Number of Lanes	1	1	1	1	1	1	1	1	1	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	3	2	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	3	3	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	2	3	3
HCM Control Delay	8.6	8.7	8.3	8.8
HCM LOS	A	A	A	A

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Vol Left, %	100%	0%	0%	100%	0%	0%	100%	0%	0%	100%	0%
Vol Thru, %	0%	100%	0%	0%	100%	0%	0%	100%	0%	0%	67%
Vol Right, %	0%	0%	100%	0%	0%	100%	0%	0%	100%	0%	33%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	8	32	47	14	56	22	47	79	36	28	70
LT Vol	8	0	0	14	0	0	47	0	0	28	0
Through Vol	0	32	0	0	56	0	0	79	0	0	47
RT Vol	0	0	47	0	0	22	0	0	36	0	23
Lane Flow Rate	9	36	53	16	64	25	53	90	41	32	80
Geometry Grp	8	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.015	0.056	0.072	0.026	0.097	0.033	0.087	0.133	0.053	0.053	0.116
Departure Headway (Hd)	6.033	5.533	4.832	5.989	5.487	4.785	5.835	5.334	4.632	5.987	5.257
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	591	644	737	595	650	743	612	670	769	596	679
Service Time	3.792	3.291	2.591	3.751	3.249	2.547	3.589	3.087	2.385	3.745	3.015
HCM Lane V/C Ratio	0.015	0.056	0.072	0.027	0.098	0.034	0.087	0.134	0.053	0.054	0.118
HCM Control Delay	8.9	8.6	8	8.9	8.8	7.7	9.1	8.9	7.6	9.1	8.7
HCM Lane LOS	A	A	A	A	A	A	A	A	A	A	A
HCM 95th-tile Q	0	0.2	0.2	0.1	0.3	0.1	0.3	0.5	0.2	0.2	0.4

Intersection	
Int Delay, s/veh	0.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	121	10	2	152	10	2
Future Vol, veh/h	121	10	2	152	10	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	132	11	2	165	11	2

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	143	0	307	138
Stage 1	-	-	-	-	138	-
Stage 2	-	-	-	-	169	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1440	-	685	910
Stage 1	-	-	-	-	889	-
Stage 2	-	-	-	-	861	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1440	-	684	910
Mov Cap-2 Maneuver	-	-	-	-	684	-
Stage 1	-	-	-	-	889	-
Stage 2	-	-	-	-	860	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	10.1
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	714	-	-	1440	-
HCM Lane V/C Ratio	0.018	-	-	0.002	-
HCM Control Delay (s)	10.1	-	-	7.5	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0	-

APPENDIX 5.3:

E+P WITH PROJECT (PHASE 1) CONDITIONS TRAFFIC SIGNAL WARRANT ANALYSIS WORKSHEETS

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Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

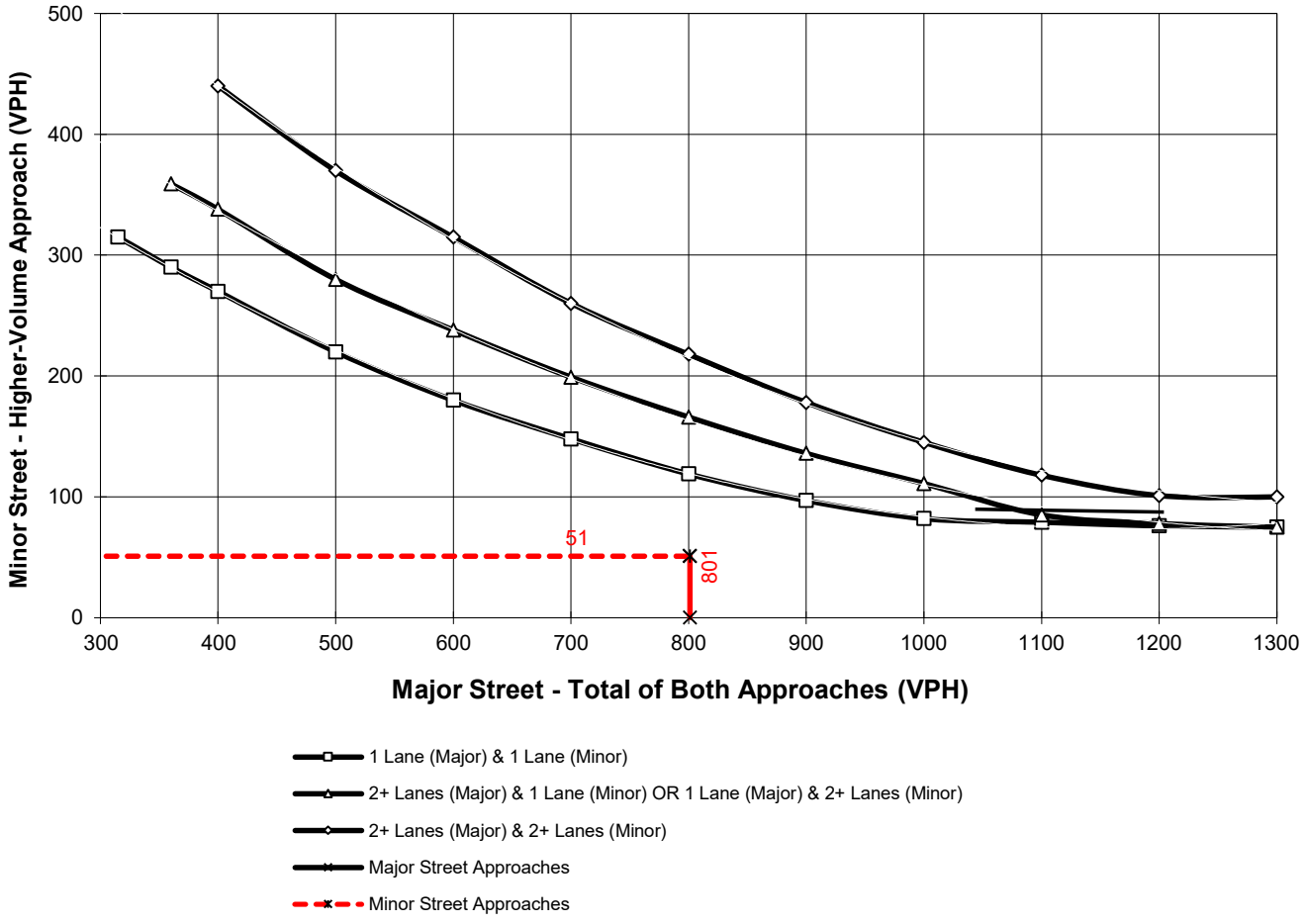
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 64 km/h OR ABOVE 40 mph ON MAJOR STREET)

Traffic Conditions = **Existing plus Project (Phase 1) Conditions - Weekday AM Peak Hour**

Major Street Name = **Evans Road** — Total of Both Approaches (VPH) = **801**
Number of Approach Lanes Major Street = **1**

Minor Street Name = **Corson Avenue** — High Volume Approach (VPH) = **51**
Number of Approach Lanes Minor Street = **1**

SIGNAL WARRANT NOT SATISFIED



*Note: 100 vph applies as the lower threshold for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold for a minor-street approach with one lane

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

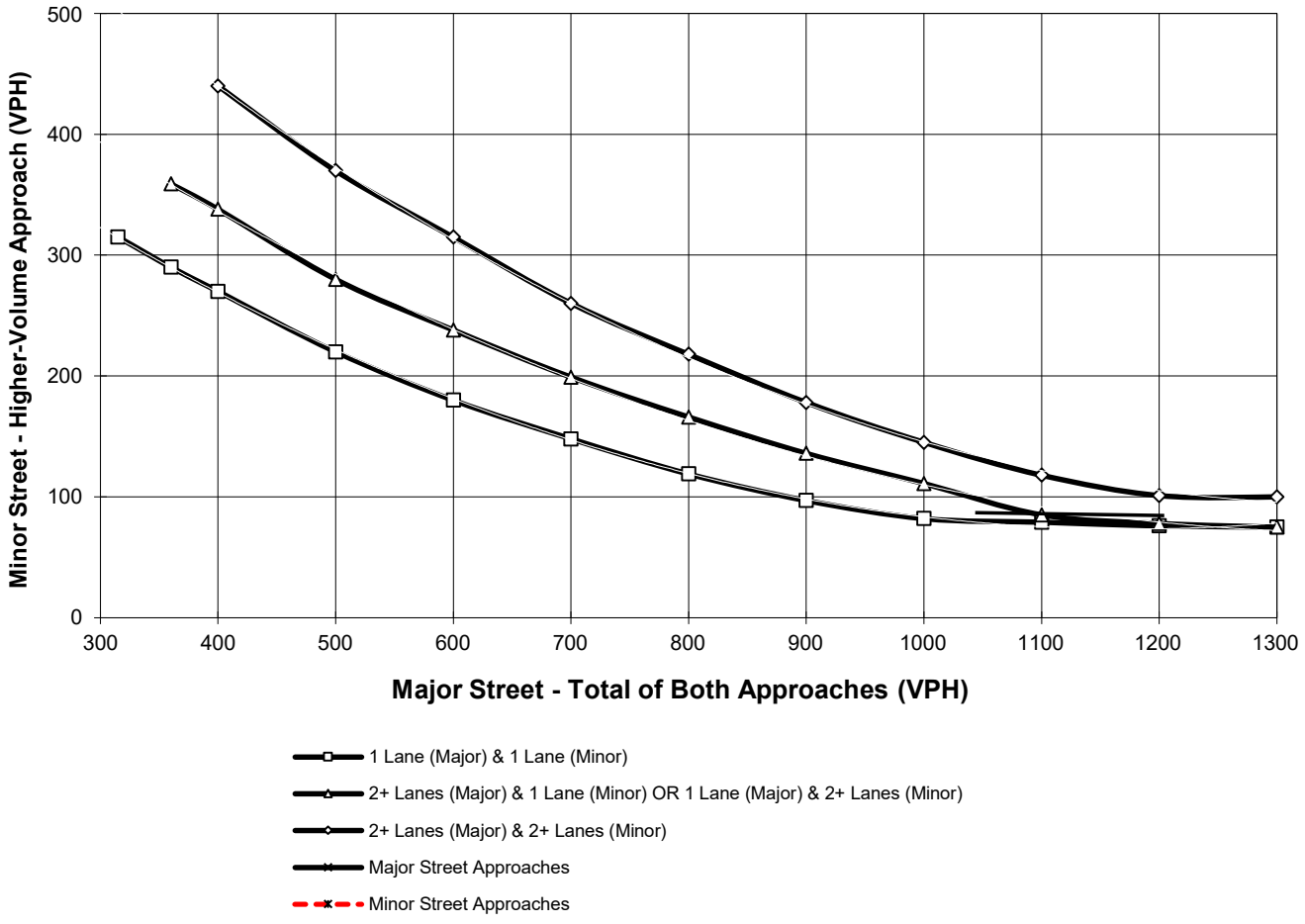
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 64 km/h OR ABOVE 40 mph ON MAJOR STREET)

Traffic Conditions = **Existing plus Project (Phase 1) Conditions - Weekday PM Peak Hour**

Major Street Name = **Evans Road** — Total of Both Approaches (VPH) = **144**
Number of Approach Lanes Major Street = **1**

Minor Street Name = **Briarlea Road** — High Volume Approach (VPH) = **13**
Number of Approach Lanes Minor Street = **1**

SIGNAL WARRANT NOT SATISFIED



*Note: 100 vph applies as the lower threshold for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold for a minor-street approach with one lane

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet
(Average Traffic Estimate Form)

DIST	CO	RTE	PM	TRAFFIC CONDITIONS	E+P Phase 1
				CALC CS	DATE 09/30/21
Jurisdiction: **City of Menifee**				CHK CS	DATE 09/30/21
Major Street: **Craig Avenue**				Critical Approach Speed (Major)	40 mph
Minor Street: **Driveway 3**				Critical Approach Speed (Minor)	25 mph

Major Street Approach Lanes = **1** lane Minor Street Approach Lanes **1** lane

Major Street Future ADT = **4,043** vpd Minor Street Future ADT = **151** vpd

Speed limit or critical speed on major street traffic > 64 km/h (40 mph); …….. [ ]

or **RURAL (R)**

In built up area of isolated community of < 10,000 population …….. [ ]

(Based on Estimated Average Daily Traffic - See Note)

URBAN / RURAL	Minimum Requirements EADT			
XX	Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
CONDITION A - Minimum Vehicular Volume	Urban	Rural	Urban	Rural
Satisfied / Not Satisfied: XX				
Number of lanes for moving traffic on each approach				
Major Street / Minor Street				
1 **4,043** / *1* **151**	8,000	5,600	2,400	1,680
2 + / *1*	9,600	6,720	2,400	1,680
2 + / *2* +	9,600	6,720	3,200	2,240
1 / *2* +	8,000	5,600	3,200	2,240
CONDITION B - Interruption of Continuous Traffic	Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Satisfied / Not Satisfied: XX				
Number of lanes for moving traffic on each approach				
Major Street / Minor Street	Urban	Rural	Urban	Rural
1 **4,043** / *1* **151**	12,000	8,400	1,200	850
2 + / *1*	14,400	10,080	1,200	850
2 + / *2* +	14,400	10,080	1,600	1,120
1 / *2* +	12,000	8,400	1,600	1,120
Combination of CONDITIONS A + B				
Satisfied / Not Satisfied: XX	2 CONDITIONS 80%		2 CONDITIONS 80%	
No one condition satisfied, but following conditions fulfilled 80% of more ….. A: 6% B: 13%				

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

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APPENDIX 5.4:

E+P WITH PROJECT (BUILDOUT) CONDITIONS TRAFFIC SIGNAL WARRANT ANALYSIS WORKSHEETS

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Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

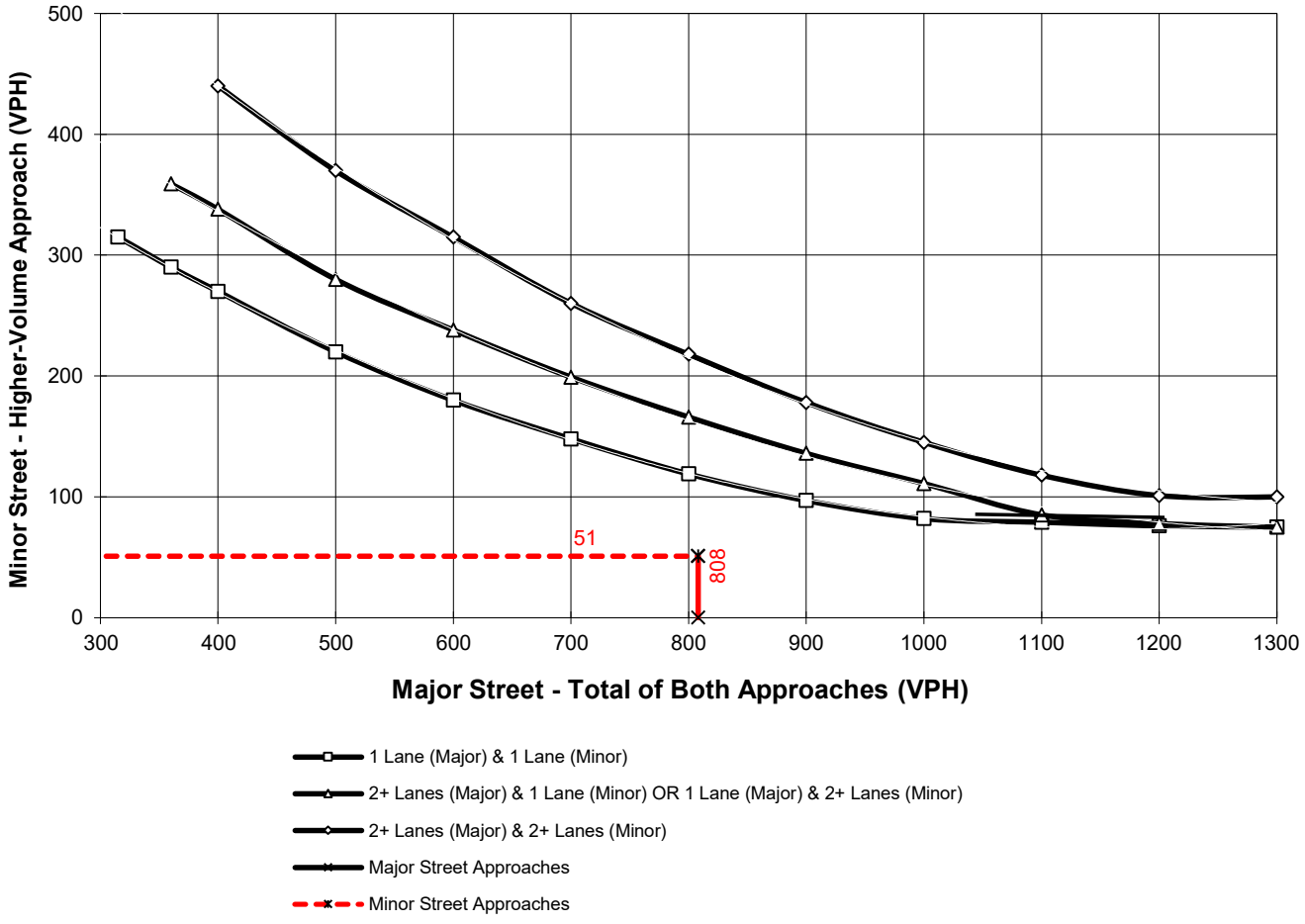
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 64 km/h OR ABOVE 40 mph ON MAJOR STREET)

Traffic Conditions = **Existing plus Project (Project Buildout) Conditions - Weekday AM Peak Hour**

Major Street Name = **Evans Road** — Total of Both Approaches (VPH) = **808**
Number of Approach Lanes Major Street = **2**

Minor Street Name = **Corson Avenue** — High Volume Approach (VPH) = **51**
Number of Approach Lanes Minor Street = **1**

SIGNAL WARRANT NOT SATISFIED



*Note: 100 vph applies as the lower threshold for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold for a minor-street approach with one lane

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

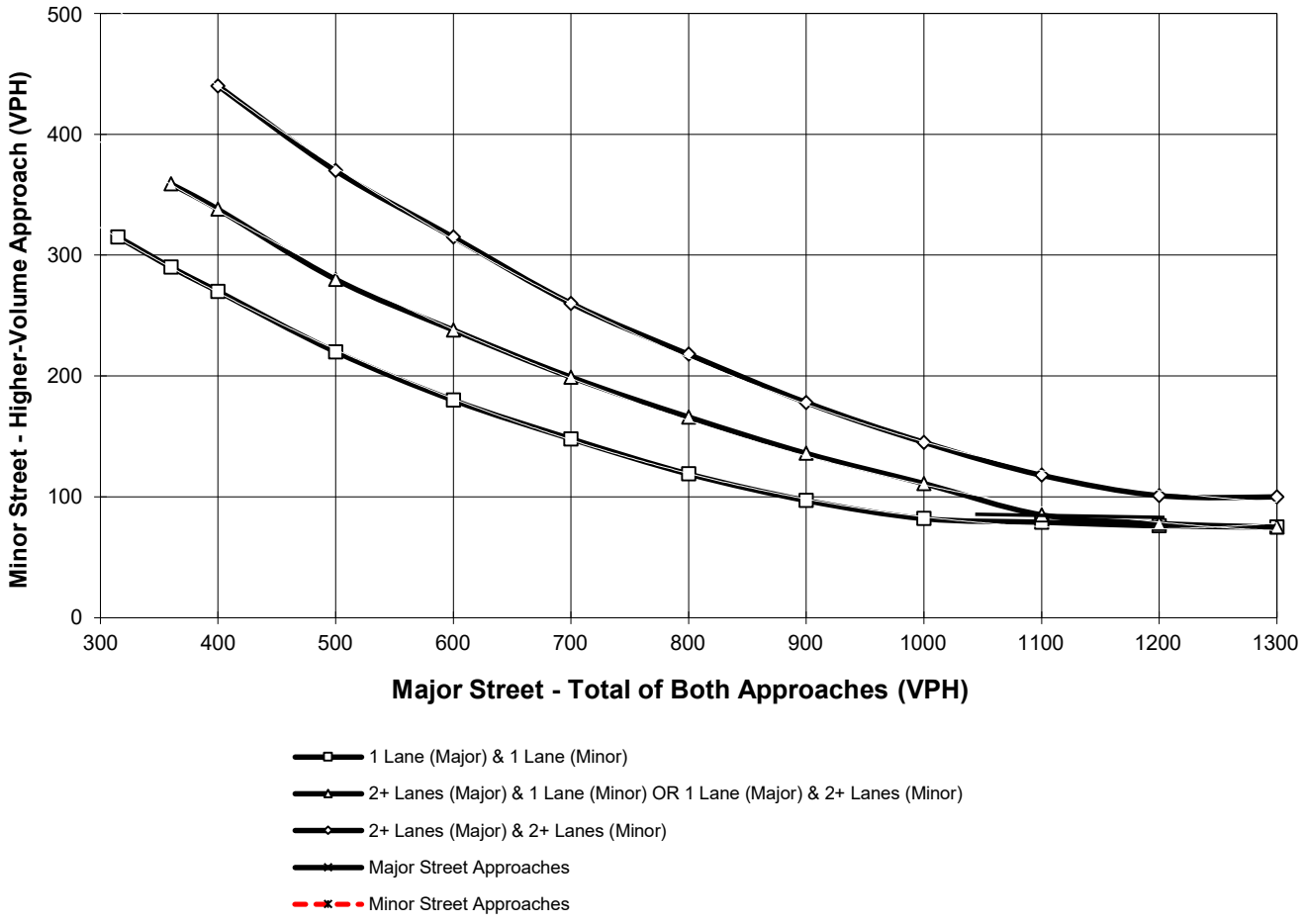
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 64 km/h OR ABOVE 40 mph ON MAJOR STREET)

Traffic Conditions = **Existing plus Project (Project Buildout) Conditions - Weekday PM Peak Hour**

Major Street Name = **Evans Road** Total of Both Approaches (VPH) = **164**
Number of Approach Lanes Major Street = **2**

Minor Street Name = **Briarlea Road/Driveway 1** High Volume Approach (VPH) = **33**
Number of Approach Lanes Minor Street = **1**

SIGNAL WARRANT NOT SATISFIED



*Note: 100 vph applies as the lower threshold for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold for a minor-street approach with one lane

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet
(Average Traffic Estimate Form)

DIST	CO	RTE	PM		TRAFFIC CONDITIONS		+P Project Buildou
				CALC	CS	DATE	09/30/21
Jurisdiction:	City of Menifee			CHK	CS	DATE	09/30/21
Major Street:	Evans Road				Critical Approach Speed (Major)		40 mph
Minor Street:	Driveway 2				Critical Approach Speed (Minor)		25 mph

Major Street Approach Lanes = **2** lane Minor Street Approach Lanes **1** lane

Major Street Future ADT = **2,466** vpd Minor Street Future ADT = **97** vpd

Speed limit or critical speed on major street traffic > 64 km/h (40 mph); …….. [ ]

or **RURAL (R)**

In built up area of isolated community of < 10,000 population …….. [ ]

(Based on Estimated Average Daily Traffic - See Note)

URBAN	RURAL	Minimum Requirements EADT			
XX					
CONDITION A - Minimum Vehicular Volume					
Satisfied	Not Satisfied	Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
	XX				
Number of lanes for moving traffic on each approach					
Major Street	Minor Street	Urban	Rural	Urban	Rural
1	*1*	8,000	5,600	2,400	1,680
2 + **2,466**	*1* **97**	9,600	6,720	2,400	1,680
2 +	*2* +	9,600	6,720	3,200	2,240
1	*2* +	8,000	5,600	3,200	2,240
CONDITION B - Interruption of Continuous Traffic					
Satisfied	Not Satisfied	Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
	XX				
Number of lanes for moving traffic on each approach					
Major Street	Minor Street	Urban	Rural	Urban	Rural
1	*1*	12,000	8,400	1,200	850
2 + **2,466**	*1* **97**	14,400	10,080	1,200	850
2 +	*2* +	14,400	10,080	1,600	1,120
1	*2* +	12,000	8,400	1,600	1,120
Combination of CONDITIONS A + B					
Satisfied	Not Satisfied				
	XX				
No one condition satisfied, but following conditions fulfilled 80% of more …..	**A** 4% **B** 8%	2 CONDITIONS 80%		2 CONDITIONS 80%	

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet
(Average Traffic Estimate Form)

DIST	CO	RTE	PM	TRAFFIC CONDITIONS	+P Project Buildou
				CALC CS	DATE 09/30/21
Jurisdiction: City of Menifee				CHK CS	DATE 09/30/21
Major Street: Craig Avenue				Critical Approach Speed (Major)	40 mph
Minor Street: Driveway 3				Critical Approach Speed (Minor)	25 mph

Major Street Approach Lanes = **1** lane

Minor Street Approach Lanes = **1** lane

Major Street Future ADT = **4,139** vpd

Minor Street Future ADT = **151** vpd

Speed limit or critical speed on major street traffic > 64 km/h (40 mph); ……..

or

In built up area of isolated community of < 10,000 population ……..

RURAL (R)

(Based on Estimated Average Daily Traffic - See Note)

URBAN	RURAL	Minimum Requirements EADT			
XX					
CONDITION A - Minimum Vehicular Volume					
Satisfied	Not Satisfied	Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
	XX				
Number of lanes for moving traffic on each approach					
Major Street	Minor Street	Urban	Rural	Urban	Rural
1 **4,139**	*1* **151**	8,000	5,600	2,400	1,680
2 +	*1*	9,600	6,720	2,400	1,680
2 +	*2* +	9,600	6,720	3,200	2,240
1	*2* +	8,000	5,600	3,200	2,240
CONDITION B - Interruption of Continuous Traffic					
Satisfied	Not Satisfied	Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
	XX				
Number of lanes for moving traffic on each approach					
Major Street	Minor Street	Urban	Rural	Urban	Rural
1 **4,139**	*1* **151**	12,000	8,400	1,200	850
2 +	*1*	14,400	10,080	1,200	850
2 +	*2* +	14,400	10,080	1,600	1,120
1	*2* +	12,000	8,400	1,600	1,120
Combination of CONDITIONS A + B					
Satisfied	Not Satisfied				
	XX				
No one condition satisfied, but following conditions fulfilled 80% of more …..	**A** 6% **B** 13%	2 CONDITIONS 80%		2 CONDITIONS 80%	

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

APPENDIX 6.1:

OPENING YEAR CUMULATIVE (2030) WITHOUT PROJECT CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS

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Intersection	
Intersection Delay, s/veh	14.3
Intersection LOS	B

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	15	40	66	306	442	49
Future Vol, veh/h	15	40	66	306	442	49
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	16	43	72	333	480	53
Number of Lanes	1	0	0	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	1	1	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	1
HCM Control Delay	9.2	12.9	16
HCM LOS	A	B	C

Lane	NBLn1	EBLn1	SBLn1
Vol Left, %	18%	27%	0%
Vol Thru, %	82%	0%	90%
Vol Right, %	0%	73%	10%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	372	55	491
LT Vol	66	15	0
Through Vol	306	0	442
RT Vol	0	40	49
Lane Flow Rate	404	60	534
Geometry Grp	1	1	1
Degree of Util (X)	0.526	0.092	0.664
Departure Headway (Hd)	4.687	5.55	4.476
Convergence, Y/N	Yes	Yes	Yes
Cap	768	640	806
Service Time	2.73	3.631	2.514
HCM Lane V/C Ratio	0.526	0.094	0.663
HCM Control Delay	12.9	9.2	16
HCM Lane LOS	B	A	C
HCM 95th-tile Q	3.1	0.3	5.1

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	8	3	8	365	460	22
Future Vol, veh/h	8	3	8	365	460	22
Conflicting Peds, #/hr	0	1	0	0	0	6
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	9	3	9	397	500	24

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	933	519	530	0	-	0
Stage 1	518	-	-	-	-	-
Stage 2	415	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	295	557	1037	-	-	-
Stage 1	598	-	-	-	-	-
Stage 2	666	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	288	553	1031	-	-	-
Mov Cap-2 Maneuver	288	-	-	-	-	-
Stage 1	588	-	-	-	-	-
Stage 2	662	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	16.3	0.2	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1031	-	331	-	-
HCM Lane V/C Ratio	0.008	-	0.036	-	-
HCM Control Delay (s)	8.5	0	16.3	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection	
Intersection Delay, s/veh	52.1
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	40	201	56	192	254	184	62	148	105	160	277	26
Future Vol, veh/h	40	201	56	192	254	184	62	148	105	160	277	26
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	41	205	57	196	259	188	63	151	107	163	283	27
Number of Lanes	1	1	1	1	1	1	1	1	1	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	3	1	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	3	3	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	1	3	3
HCM Control Delay	21.7	23.2	15.8	135.8
HCM LOS	C	C	C	F

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1
Vol Left, %	100%	0%	0%	100%	0%	0%	100%	0%	0%	35%
Vol Thru, %	0%	100%	0%	0%	100%	0%	0%	100%	0%	60%
Vol Right, %	0%	0%	100%	0%	0%	100%	0%	0%	100%	6%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	62	148	105	40	201	56	192	254	184	463
LT Vol	62	0	0	40	0	0	192	0	0	160
Through Vol	0	148	0	0	201	0	0	254	0	277
RT Vol	0	0	105	0	0	56	0	0	184	26
Lane Flow Rate	63	151	107	41	205	57	196	259	188	472
Geometry Grp	7	7	7	8	8	8	8	8	8	8
Degree of Util (X)	0.164	0.371	0.242	0.115	0.55	0.142	0.508	0.636	0.425	1.188
Departure Headway (Hd)	9.931	9.408	8.677	10.955	10.426	9.685	10.045	9.52	8.785	9.056
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	363	385	417	329	349	373	360	381	413	402
Service Time	7.631	7.108	6.377	8.655	8.126	7.385	7.745	7.22	6.485	6.824
HCM Lane V/C Ratio	0.174	0.392	0.257	0.125	0.587	0.153	0.544	0.68	0.455	1.174
HCM Control Delay	14.6	17.6	14.1	15.1	25.2	14	22.7	27.4	17.8	135.8
HCM Lane LOS	B	C	B	C	D	B	C	D	C	F
HCM 95th-tile Q	0.6	1.7	0.9	0.4	3.2	0.5	2.8	4.2	2.1	18.7

Intersection	
Intersection Delay, s/veh	7.6
Intersection LOS	A

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	14	8	18	52	75	19
Future Vol, veh/h	14	8	18	52	75	19
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	18	10	23	67	96	24
Number of Lanes	1	0	0	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	1	1	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	1
HCM Control Delay	7.4	7.6	7.6
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	SBLn1
Vol Left, %	26%	64%	0%
Vol Thru, %	74%	0%	80%
Vol Right, %	0%	36%	20%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	70	22	94
LT Vol	18	14	0
Through Vol	52	0	75
RT Vol	0	8	19
Lane Flow Rate	90	28	121
Geometry Grp	1	1	1
Degree of Util (X)	0.103	0.033	0.132
Departure Headway (Hd)	4.125	4.202	3.929
Convergence, Y/N	Yes	Yes	Yes
Cap	866	839	910
Service Time	2.162	2.293	1.965
HCM Lane V/C Ratio	0.104	0.033	0.133
HCM Control Delay	7.6	7.4	7.6
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.3	0.1	0.5

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	5	9	0	65	74	9
Future Vol, veh/h	5	9	0	65	74	9
Conflicting Peds, #/hr	0	0	0	0	0	3
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	76	76	76	76	76	76
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	7	12	0	86	97	12

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	192	106	112	0	-	0
Stage 1	106	-	-	-	-	-
Stage 2	86	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	797	948	1478	-	-	-
Stage 1	918	-	-	-	-	-
Stage 2	937	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	792	945	1474	-	-	-
Mov Cap-2 Maneuver	792	-	-	-	-	-
Stage 1	915	-	-	-	-	-
Stage 2	934	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.2	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1474	-	884	-	-
HCM Lane V/C Ratio	-	-	0.021	-	-
HCM Control Delay (s)	0	-	9.2	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection	
Intersection Delay, s/veh	8.6
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	56	24	49	81	30	9	29	49	22	45	15
Future Vol, veh/h	5	56	24	49	81	30	9	29	49	22	45	15
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	6	64	27	56	92	34	10	33	56	25	51	17
Number of Lanes	1	1	1	1	1	1	1	1	1	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	3	1	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	3	3	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	1	3	3
HCM Control Delay	8.5	8.6	8	9.1
HCM LOS	A	A	A	A

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1
Vol Left, %	100%	0%	0%	100%	0%	0%	100%	0%	0%	27%
Vol Thru, %	0%	100%	0%	0%	100%	0%	0%	100%	0%	55%
Vol Right, %	0%	0%	100%	0%	0%	100%	0%	0%	100%	18%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	9	29	49	5	56	24	49	81	30	82
LT Vol	9	0	0	5	0	0	49	0	0	22
Through Vol	0	29	0	0	56	0	0	81	0	45
RT Vol	0	0	49	0	0	24	0	0	30	15
Lane Flow Rate	10	33	56	6	64	27	56	92	34	93
Geometry Grp	7	7	7	8	8	8	8	8	8	8
Degree of Util (X)	0.016	0.048	0.071	0.009	0.096	0.036	0.089	0.135	0.043	0.141
Departure Headway (Hd)	5.798	5.298	4.598	5.946	5.444	4.741	5.777	5.275	4.572	5.461
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	617	675	777	601	657	752	620	679	781	655
Service Time	3.538	3.038	2.338	3.693	3.191	2.488	3.516	3.014	2.311	3.205
HCM Lane V/C Ratio	0.016	0.049	0.072	0.01	0.097	0.036	0.09	0.135	0.044	0.142
HCM Control Delay	8.6	8.3	7.7	8.7	8.8	7.7	9.1	8.8	7.5	9.1
HCM Lane LOS	A	A	A	A	A	A	A	A	A	A
HCM 95th-tile Q	0	0.2	0.2	0	0.3	0.1	0.3	0.5	0.1	0.5

APPENDIX 6.2:

OPENING YEAR CUMULATIVE (2030) WITH PROJECT CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS

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Intersection	
Intersection Delay, s/veh	14.6
Intersection LOS	B

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	15	41	67	311	447	49
Future Vol, veh/h	15	41	67	311	447	49
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	16	45	73	338	486	53
Number of Lanes	1	0	1	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	2
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	1	1	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	2	0	1
HCM Control Delay	9.3	11.9	17.2
HCM LOS	A	B	C

Lane	NBLn1	NBLn2	EBLn1	SBLn1
Vol Left, %	100%	0%	27%	0%
Vol Thru, %	0%	100%	0%	90%
Vol Right, %	0%	0%	73%	10%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	67	311	56	496
LT Vol	67	0	15	0
Through Vol	0	311	0	447
RT Vol	0	0	41	49
Lane Flow Rate	73	338	61	539
Geometry Grp	7	7	2	5
Degree of Util (X)	0.113	0.479	0.095	0.688
Departure Headway (Hd)	5.6	5.096	5.595	4.591
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	639	707	635	787
Service Time	3.344	2.84	3.672	2.627
HCM Lane V/C Ratio	0.114	0.478	0.096	0.685
HCM Control Delay	9.1	12.5	9.3	17.2
HCM Lane LOS	A	B	A	C
HCM 95th-tile Q	0.4	2.6	0.3	5.6

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	8	0	3	6	0	3	8	368	6	3	463	22
Future Vol, veh/h	8	0	3	6	0	3	8	368	6	3	463	22
Conflicting Peds, #/hr	0	0	1	0	0	0	0	0	0	0	0	6
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	9	0	3	7	0	3	9	400	7	3	503	24

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	745	952	271	681	961	204	533	0	0	407	0	0
Stage 1	527	527	-	422	422	-	-	-	-	-	-	-
Stage 2	218	425	-	259	539	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	302	258	727	336	255	803	1031	-	-	1148	-	-
Stage 1	502	527	-	580	587	-	-	-	-	-	-	-
Stage 2	764	585	-	723	520	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	297	253	722	331	250	803	1025	-	-	1148	-	-
Mov Cap-2 Maneuver	297	253	-	331	250	-	-	-	-	-	-	-
Stage 1	495	522	-	575	582	-	-	-	-	-	-	-
Stage 2	754	580	-	717	515	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	15.5	14	0.2	0.1
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1025	-	-	354	412	1148	-	-
HCM Lane V/C Ratio	0.008	-	-	0.034	0.024	0.003	-	-
HCM Control Delay (s)	8.5	-	-	15.5	14	8.1	-	-
HCM Lane LOS	A	-	-	C	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.1	0	-	-

Intersection	
Int Delay, s/veh	0.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	3	1	380	3	1	471
Future Vol, veh/h	3	1	380	3	1	471
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	1	413	3	1	512

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	673	208	0	0	416	0
Stage 1	415	-	-	-	-	-
Stage 2	258	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	389	798	-	-	1139	-
Stage 1	635	-	-	-	-	-
Stage 2	761	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	389	798	-	-	1139	-
Mov Cap-2 Maneuver	389	-	-	-	-	-
Stage 1	635	-	-	-	-	-
Stage 2	760	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	13.2	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	446	1139	-
HCM Lane V/C Ratio	-	-	0.01	0.001	-
HCM Control Delay (s)	-	-	13.2	8.2	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0	0	-

Intersection	
Intersection Delay, s/veh	25.2
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	45	203	56	193	256	188	62	150	106	164	279	31
Future Vol, veh/h	45	203	56	193	256	188	62	150	106	164	279	31
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	46	207	57	197	261	192	63	153	108	167	285	32
Number of Lanes	1	1	1	1	1	1	1	1	1	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	3	2	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	3	3	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	2	3	3
HCM Control Delay	22.3	23.9	17.9	33.6
HCM LOS	C	C	C	D

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Vol Left, %	100%	0%	0%	100%	0%	0%	100%	0%	0%	100%	0%
Vol Thru, %	0%	100%	0%	0%	100%	0%	0%	100%	0%	0%	90%
Vol Right, %	0%	0%	100%	0%	0%	100%	0%	0%	100%	0%	10%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	62	150	106	45	203	56	193	256	188	164	310
LT Vol	62	0	0	45	0	0	193	0	0	164	0
Through Vol	0	150	0	0	203	0	0	256	0	0	279
RT Vol	0	0	106	0	0	56	0	0	188	0	31
Lane Flow Rate	63	153	108	46	207	57	197	261	192	167	316
Geometry Grp	8	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.186	0.427	0.28	0.136	0.582	0.149	0.532	0.668	0.452	0.452	0.805
Departure Headway (Hd)	10.564	10.052	9.335	10.628	10.111	9.388	9.719	9.204	8.484	9.726	9.156
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	338	357	383	337	356	381	370	392	424	370	395
Service Time	8.36	7.847	7.13	8.421	7.904	7.18	7.499	6.984	6.264	7.504	6.934
HCM Lane V/C Ratio	0.186	0.429	0.282	0.136	0.581	0.15	0.532	0.666	0.453	0.451	0.8
HCM Control Delay	15.8	20.2	15.8	15.1	26.2	13.8	23.1	28.8	18.1	20.3	40.7
HCM Lane LOS	C	C	C	C	D	B	C	D	C	C	E
HCM 95th-tile Q	0.7	2.1	1.1	0.5	3.5	0.5	3	4.7	2.3	2.3	7.1

Intersection	
Int Delay, s/veh	0.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	469	5	1	632	5	1
Future Vol, veh/h	469	5	1	632	5	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	510	5	1	687	5	1

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	515	0	1202	513
Stage 1	-	-	-	-	513	-
Stage 2	-	-	-	-	689	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1051	-	204	561
Stage 1	-	-	-	-	601	-
Stage 2	-	-	-	-	498	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1051	-	204	561
Mov Cap-2 Maneuver	-	-	-	-	204	-
Stage 1	-	-	-	-	601	-
Stage 2	-	-	-	-	498	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	21.3
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	228	-	-	1051	-
HCM Lane V/C Ratio	0.029	-	-	0.001	-
HCM Control Delay (s)	21.3	-	-	8.4	-
HCM Lane LOS	C	-	-	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection	
Intersection Delay, s/veh	7.7
Intersection LOS	A

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	14	10	20	62	85	19
Future Vol, veh/h	14	10	20	62	85	19
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	15	11	22	67	92	21
Number of Lanes	1	0	1	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	2
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	1	1	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	2	0	1
HCM Control Delay	7.4	7.8	7.7
HCM LOS	A	A	A

Lane	NBLn1	NBLn2	EBLn1	SBLn1
Vol Left, %	100%	0%	58%	0%
Vol Thru, %	0%	100%	0%	82%
Vol Right, %	0%	0%	42%	18%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	20	62	24	104
LT Vol	20	0	14	0
Through Vol	0	62	0	85
RT Vol	0	0	10	19
Lane Flow Rate	22	67	26	113
Geometry Grp	7	7	2	5
Degree of Util (X)	0.031	0.087	0.031	0.127
Departure Headway (Hd)	5.136	4.635	4.258	4.035
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	697	772	846	884
Service Time	2.868	2.367	2.258	2.082
HCM Lane V/C Ratio	0.032	0.087	0.031	0.128
HCM Control Delay	8	7.8	7.4	7.7
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.1	0.3	0.1	0.4

Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	1	9	11	1	7	0	70	11	7	79	9
Future Vol, veh/h	5	1	9	11	1	7	0	70	11	7	79	9
Conflicting Peds, #/hr	0	0	1	0	0	0	0	0	0	0	0	6
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	1	10	12	1	8	0	76	12	8	86	10

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	152	201	55	143	200	44	102	0	0	88	0	0
Stage 1	113	113	-	82	82	-	-	-	-	-	-	-
Stage 2	39	88	-	61	118	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	801	694	1000	812	695	1017	1488	-	-	1506	-	-
Stage 1	880	801	-	917	826	-	-	-	-	-	-	-
Stage 2	971	821	-	943	797	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	787	686	993	799	687	1017	1479	-	-	1506	-	-
Mov Cap-2 Maneuver	787	686	-	799	687	-	-	-	-	-	-	-
Stage 1	875	792	-	917	826	-	-	-	-	-	-	-
Stage 2	962	821	-	927	788	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.1	9.3	0	0.5
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1479	-	-	889	860	1506	-	-
HCM Lane V/C Ratio	-	-	-	0.018	0.024	0.005	-	-
HCM Control Delay (s)	0	-	-	9.1	9.3	7.4	-	-
HCM Lane LOS	A	-	-	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.1	0	-	-

Intersection	
Int Delay, s/veh	0.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	7	1	80	7	1	97
Future Vol, veh/h	7	1	80	7	1	97
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	8	1	87	8	1	105

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	146	48	0	0	95	0
Stage 1	91	-	-	-	-	-
Stage 2	55	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	832	1011	-	-	1497	-
Stage 1	922	-	-	-	-	-
Stage 2	961	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	831	1011	-	-	1497	-
Mov Cap-2 Maneuver	831	-	-	-	-	-
Stage 1	922	-	-	-	-	-
Stage 2	960	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.3	0	0.1
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	850	1497	-
HCM Lane V/C Ratio	-	-	0.01	0.001	-
HCM Control Delay (s)	-	-	9.3	7.4	-
HCM Lane LOS	-	-	A	A	-
HCM 95th %tile Q(veh)	-	-	0	0	-

Intersection	
Intersection Delay, s/veh	8.5
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	14	60	24	51	85	38	9	34	51	30	50	24
Future Vol, veh/h	14	60	24	51	85	38	9	34	51	30	50	24
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	14	61	24	52	87	39	9	35	52	31	51	24
Number of Lanes	1	1	1	1	1	1	1	1	1	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	3	2	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	3	3	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	2	3	3
HCM Control Delay	8.5	8.6	8.2	8.7
HCM LOS	A	A	A	A

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Vol Left, %	100%	0%	0%	100%	0%	0%	100%	0%	0%	100%	0%
Vol Thru, %	0%	100%	0%	0%	100%	0%	0%	100%	0%	0%	68%
Vol Right, %	0%	0%	100%	0%	0%	100%	0%	0%	100%	0%	32%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	9	34	51	14	60	24	51	85	38	30	74
LT Vol	9	0	0	14	0	0	51	0	0	30	0
Through Vol	0	34	0	0	60	0	0	85	0	0	50
RT Vol	0	0	51	0	0	24	0	0	38	0	24
Lane Flow Rate	9	35	52	14	61	24	52	87	39	31	76
Geometry Grp	8	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.015	0.053	0.069	0.024	0.093	0.032	0.084	0.128	0.05	0.051	0.11
Departure Headway (Hd)	5.991	5.49	4.79	5.953	5.451	4.749	5.801	5.299	4.597	5.951	5.224
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	595	649	743	599	654	750	616	674	775	600	683
Service Time	3.748	3.248	2.548	3.709	3.207	2.505	3.552	3.05	2.348	3.706	2.979
HCM Lane V/C Ratio	0.015	0.054	0.07	0.023	0.093	0.032	0.084	0.129	0.05	0.052	0.111
HCM Control Delay	8.8	8.6	7.9	8.9	8.8	7.7	9.1	8.8	7.6	9	8.6
HCM Lane LOS	A	A	A	A	A	A	A	A	A	A	A
HCM 95th-tile Q	0	0.2	0.2	0.1	0.3	0.1	0.3	0.4	0.2	0.2	0.4

Intersection	
Int Delay, s/veh	0.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	131	10	2	164	10	2
Future Vol, veh/h	131	10	2	164	10	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	142	11	2	178	11	2

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	153	0	330	148
Stage 1	-	-	-	-	148	-
Stage 2	-	-	-	-	182	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1428	-	665	899
Stage 1	-	-	-	-	880	-
Stage 2	-	-	-	-	849	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1428	-	664	899
Mov Cap-2 Maneuver	-	-	-	-	664	-
Stage 1	-	-	-	-	880	-
Stage 2	-	-	-	-	848	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	10.3
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	694	-	-	1428	-
HCM Lane V/C Ratio	0.019	-	-	0.002	-
HCM Control Delay (s)	10.3	-	-	7.5	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0	-

APPENDIX 6.3:

OPENING YEAR CUMULATIVE (2030) WITHOUT PROJECT CONDITIONS TRAFFIC SIGNAL WARRANT ANALYSIS WORKSHEETS

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Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

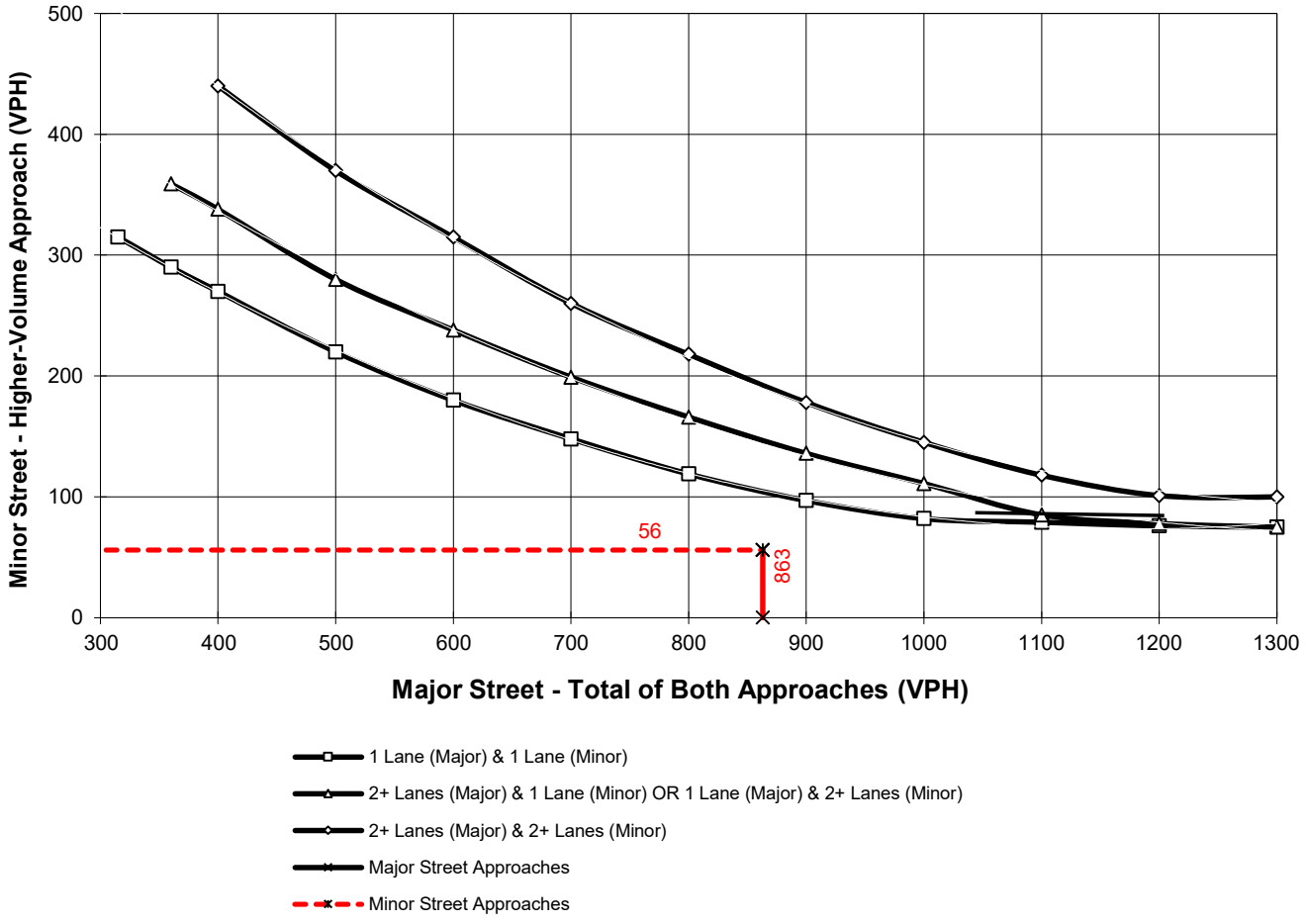
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 64 km/h OR ABOVE 40 mph ON MAJOR STREET)

Traffic Conditions = **OYC (NP) Conditions - Weekday AM Peak Hour**

Major Street Name = **Evans Road**
Total of Both Approaches (VPH) = **863**
Number of Approach Lanes Major Street = **1**

Minor Street Name = **Corson Avenue**
High Volume Approach (VPH) = **56**
Number of Approach Lanes Minor Street = **1**

SIGNAL WARRANT NOT SATISFIED



*Note: 100 vph applies as the lower threshold for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold for a minor-street approach with one lane

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

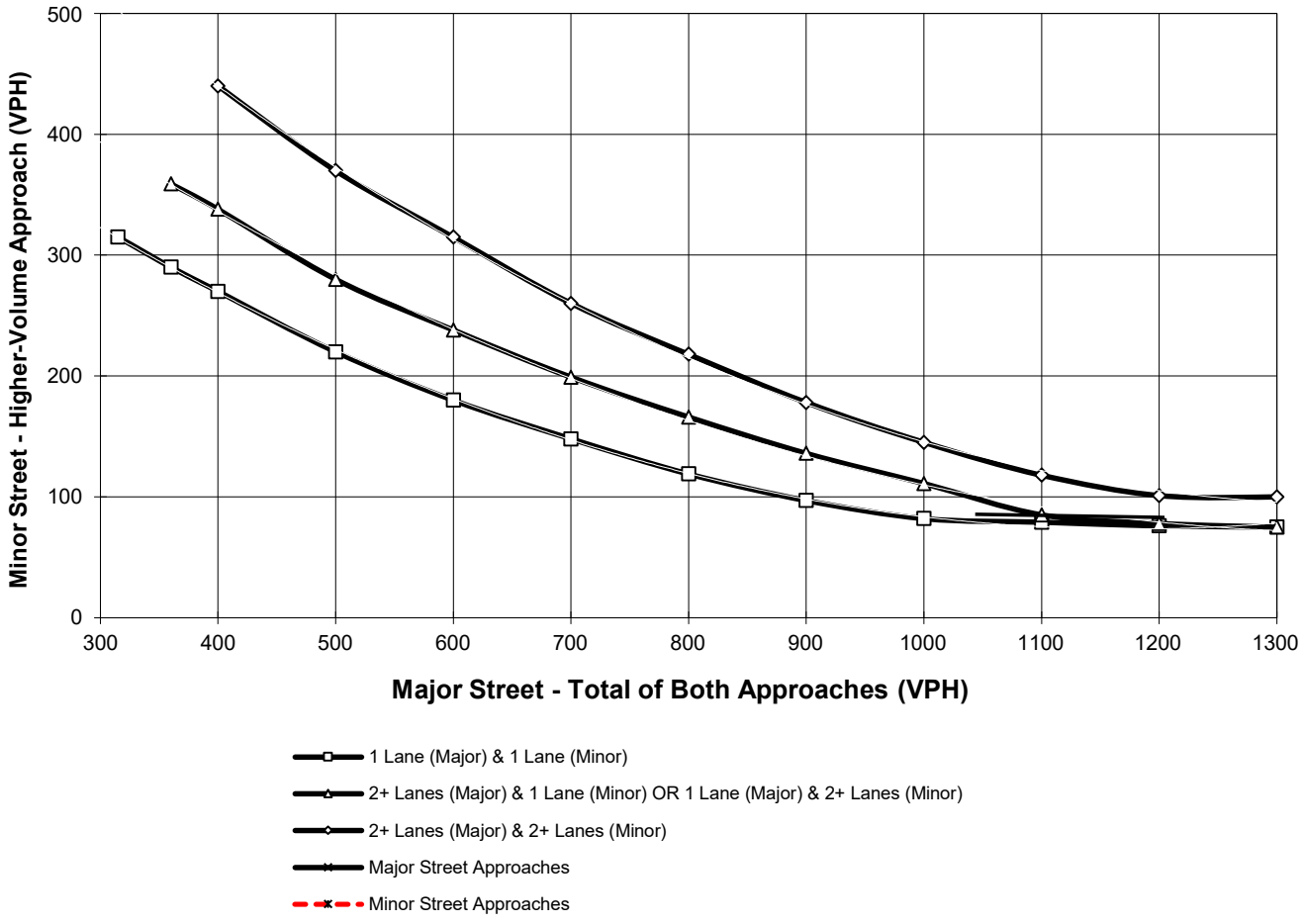
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 64 km/h OR ABOVE 40 mph ON MAJOR STREET)

Traffic Conditions = **OYC (NP) Conditions - Weekday PM Peak Hour**

Major Street Name = **Evans Road**
Total of Both Approaches (VPH) = **147**
Number of Approach Lanes Major Street = **1**

Minor Street Name = **Briarlea Road**
High Volume Approach (VPH) = **14**
Number of Approach Lanes Minor Street = **1**

SIGNAL WARRANT NOT SATISFIED



*Note: 100 vph applies as the lower threshold for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold for a minor-street approach with one lane

APPENDIX 6.4:

OPENING YEAR CUMULATIVE (2030) WITH PROJECT CONDITIONS TRAFFIC SIGNAL WARRANT ANALYSIS WORKSHEETS

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Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

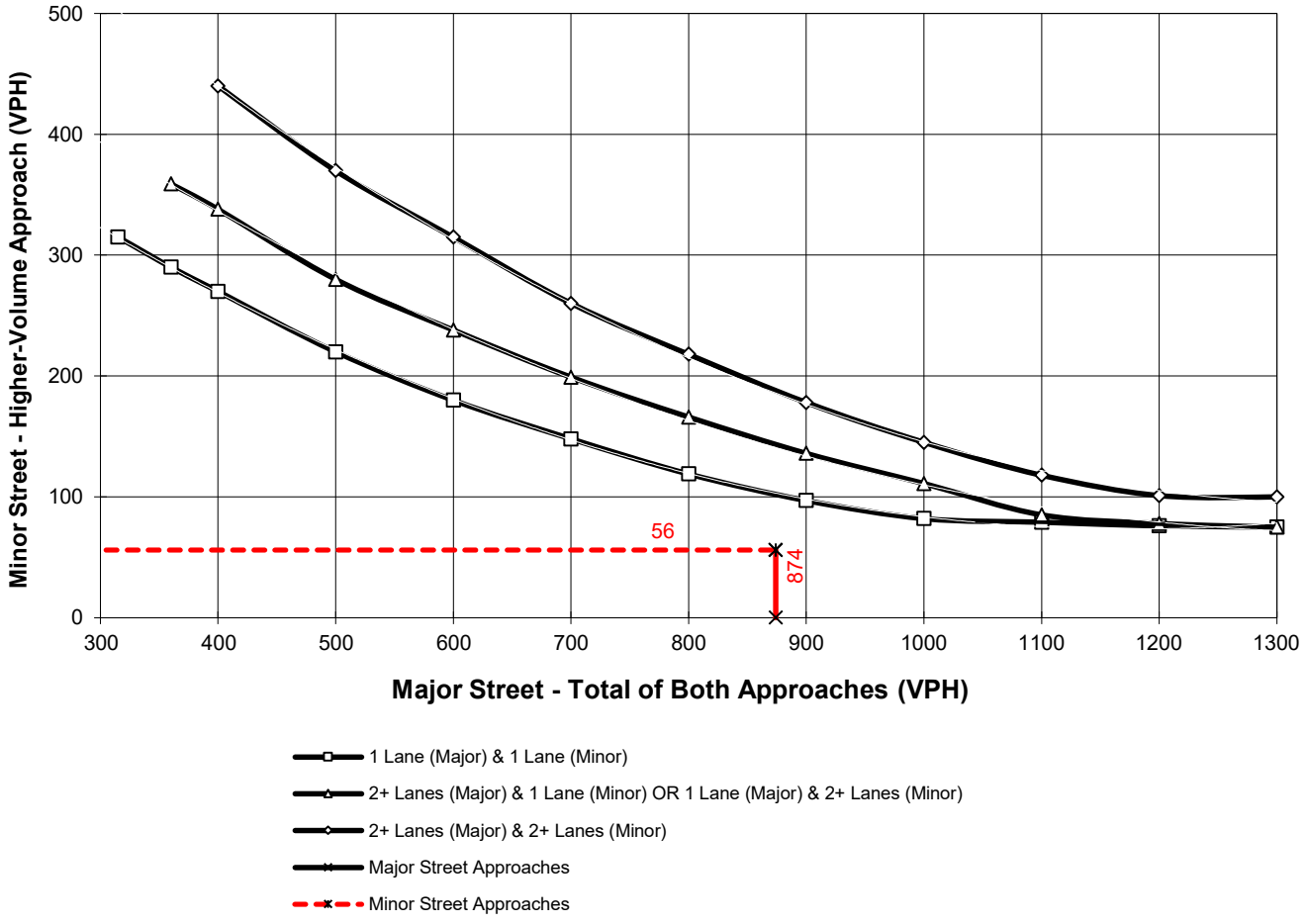
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 64 km/h OR ABOVE 40 mph ON MAJOR STREET)

Traffic Conditions = **OYC (2025) Without Project Conditions - Weekday AM Peak Hour**

Major Street Name = **Evans Road**
Total of Both Approaches (VPH) = **874**
Number of Approach Lanes Major Street = **2**

Minor Street Name = **Corson Avenue**
High Volume Approach (VPH) = **56**
Number of Approach Lanes Minor Street = **1**

SIGNAL WARRANT NOT SATISFIED



*Note: 100 vph applies as the lower threshold for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold for a minor-street approach with one lane

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

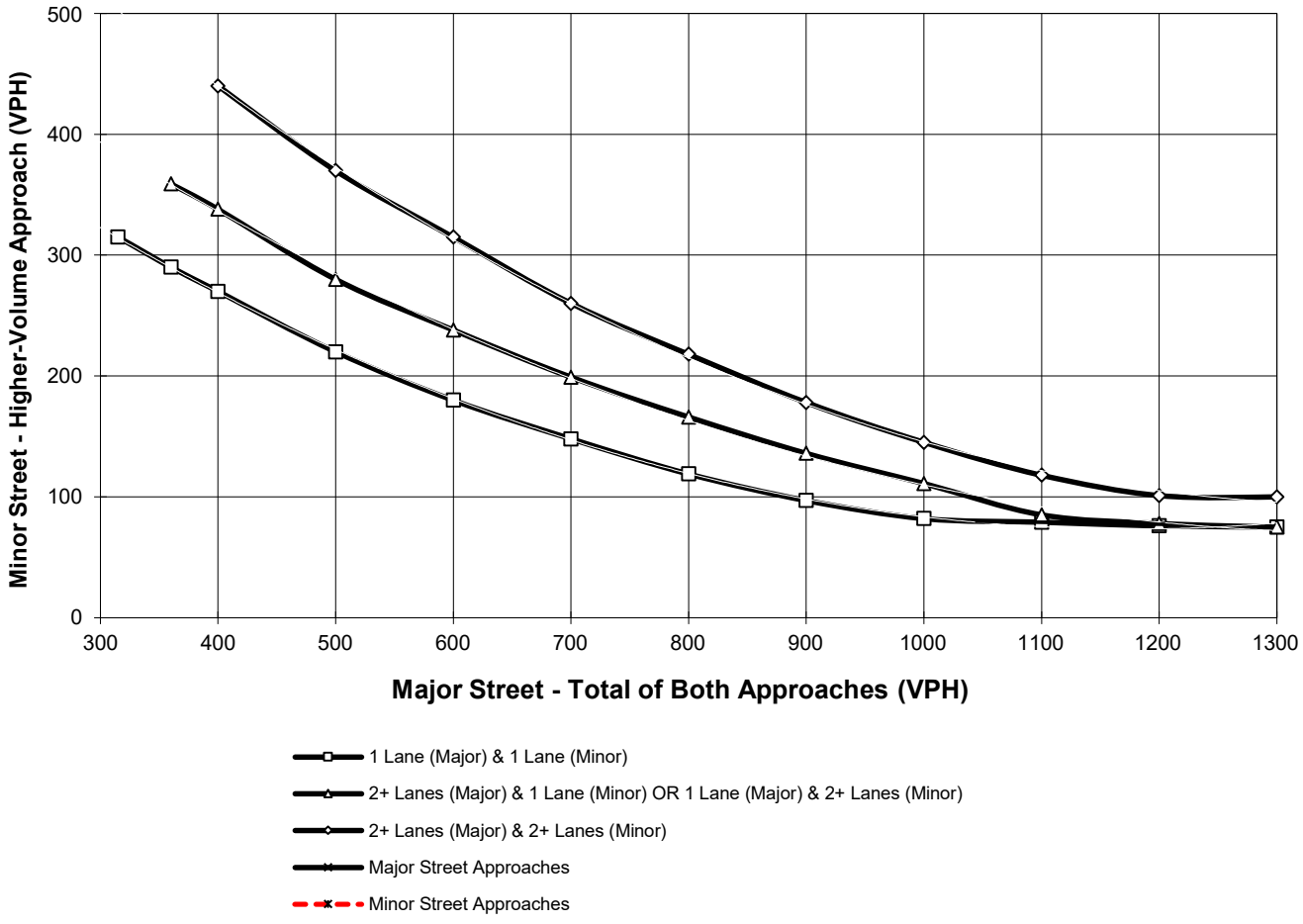
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 64 km/h OR ABOVE 40 mph ON MAJOR STREET)

Traffic Conditions = **OYC (2025) Without Project Conditions - Weekday PM Peak Hour**

Major Street Name = **Evans Road** Total of Both Approaches (VPH) = **175**
Number of Approach Lanes Major Street = **2**

Minor Street Name = **Briarlea Road/Driveway 1** High Volume Approach (VPH) = **34**
Number of Approach Lanes Minor Street = **1**

SIGNAL WARRANT NOT SATISFIED



*Note: 100 vph applies as the lower threshold for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold for a minor-street approach with one lane

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet
(Average Traffic Estimate Form)

DIST	CO	RTE	PM	TRAFFIC CONDITIONS		OYC WP (BO)	
				CALC	CS	DATE	09/30/21
Jurisdiction:	City of Menifee			CHK	CS	DATE	09/30/21
Major Street:	Evans Road			Critical Approach Speed (Major)		40	mph
Minor Street:	Driveway 2			Critical Approach Speed (Minor)		25	mph

Major Street Approach Lanes = **2** lane

Minor Street Approach Lanes = **1** lane

Major Street Future ADT = **2,631** vpd

Minor Street Future ADT = **97** vpd

Speed limit or critical speed on major street traffic > 64 km/h (40 mph); ……..

or

In built up area of isolated community of < 10,000 population ……..

RURAL (R)

(Based on Estimated Average Daily Traffic - See Note)

URBAN	RURAL	Minimum Requirements EADT			
XX					
CONDITION A - Minimum Vehicular Volume		Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Satisfied	Not Satisfied				
	XX				
Number of lanes for moving traffic on each approach					
Major Street	Minor Street	Urban	Rural	Urban	Rural
1	1	8,000	5,600	2,400	1,680
2 + **2,631**	1 **97**	9,600	6,720	2,400	1,680
2 +	2 +	9,600	6,720	3,200	2,240
1	2 +	8,000	5,600	3,200	2,240
CONDITION B - Interruption of Continuous Traffic		Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Satisfied	Not Satisfied				
	XX				
Number of lanes for moving traffic on each approach					
Major Street	Minor Street	Urban	Rural	Urban	Rural
1	1	12,000	8,400	1,200	850
2 + **2,631**	1 **97**	14,400	10,080	1,200	850
2 +	2 +	14,400	10,080	1,600	1,120
1	2 +	12,000	8,400	1,600	1,120
Combination of CONDITIONS A + B					
Satisfied	Not Satisfied				
	XX				
No one condition satisfied, but following conditions fulfilled 80% of more ….. A 4% B 8%		2 CONDITIONS 80%		2 CONDITIONS 80%	

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet
(Average Traffic Estimate Form)

DIST	CO	RTE	PM	TRAFFIC CONDITIONS		OYC WP (BO)	
				CALC	CS	DATE	09/30/21
Jurisdiction:	City of Menifee			CHK	CS	DATE	09/30/21
Major Street:	Craig Avenue			Critical Approach Speed (Major)		40	mph
Minor Street:	Driveway 3			Critical Approach Speed (Minor)		25	mph

Major Street Approach Lanes = **1** lane Minor Street Approach Lanes **1** lane

Major Street Future ADT = **4,460** vpd Minor Street Future ADT = **151** vpd

Speed limit or critical speed on major street traffic > 64 km/h (40 mph); …….. [ ]

or **RURAL (R)**

In built up area of isolated community of < 10,000 population …….. [ ]

(Based on Estimated Average Daily Traffic - See Note)

URBAN	RURAL	Minimum Requirements EADT			
XX					
CONDITION A - Minimum Vehicular Volume					
Satisfied	Not Satisfied	Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
	XX				
Number of lanes for moving traffic on each approach					
Major Street	Minor Street	Urban	Rural	Urban	Rural
1 **4,460**	*1* **151**	8,000	5,600	2,400	1,680
2 +	*1*	9,600	6,720	2,400	1,680
2 +	*2* +	9,600	6,720	3,200	2,240
1	*2* +	8,000	5,600	3,200	2,240
CONDITION B - Interruption of Continuous Traffic					
Satisfied	Not Satisfied	Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
	XX				
Number of lanes for moving traffic on each approach					
Major Street	Minor Street	Urban	Rural	Urban	Rural
1 **4,460**	*1* **151**	12,000	8,400	1,200	850
2 +	*1*	14,400	10,080	1,200	850
2 +	*2* +	14,400	10,080	1,600	1,120
1	*2* +	12,000	8,400	1,600	1,120
Combination of CONDITIONS A + B					
Satisfied	Not Satisfied				
	XX	2 CONDITIONS 80%		2 CONDITIONS 80%	
No one condition satisfied, but following conditions fulfilled 80% of more …..	**A** 6% **B** 13%				

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

APPENDIX 8.1:

WRCOG SCREENING ASSESSMENT

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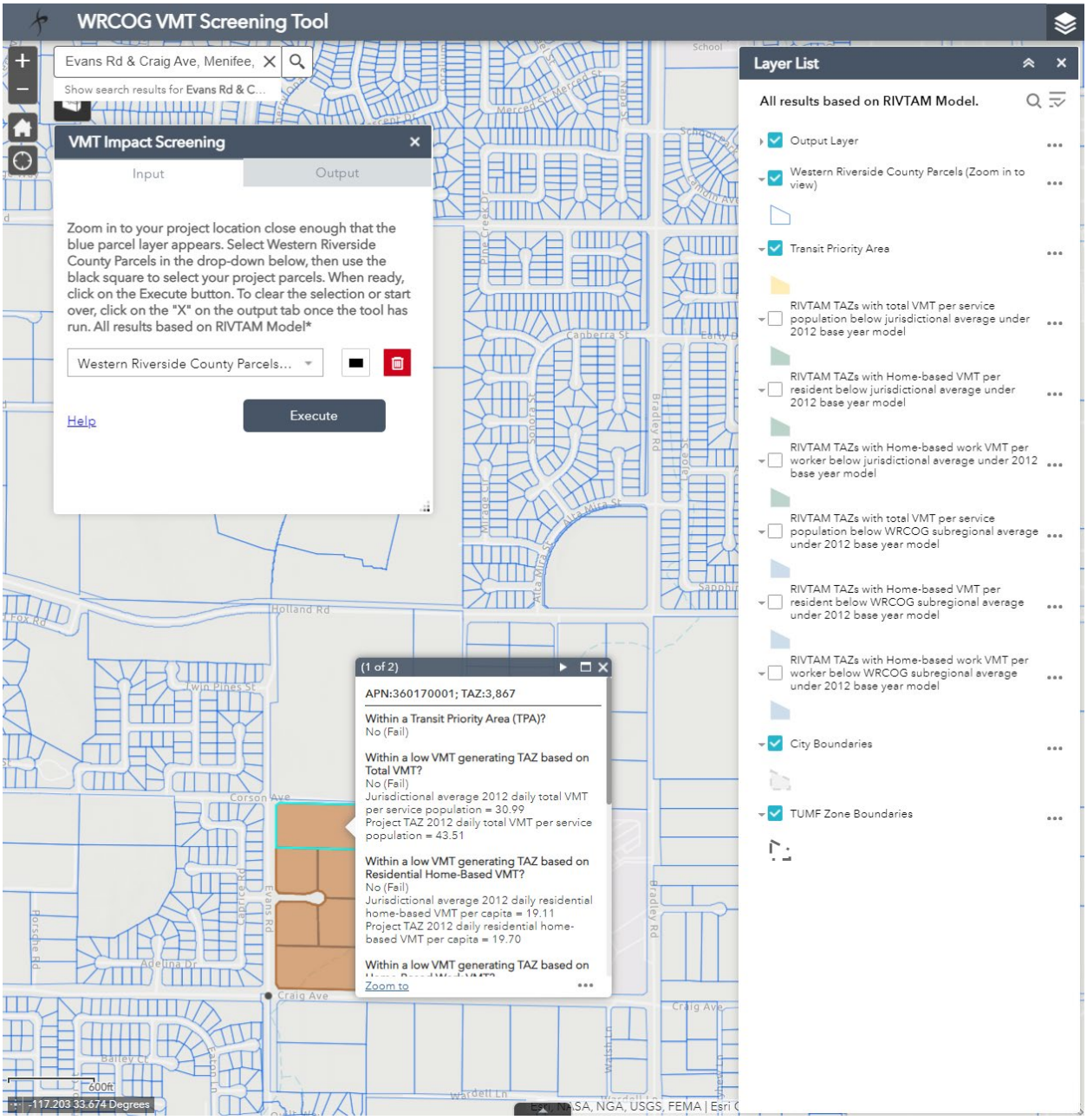
WRCOG VMT Screening Tool
Evans Rd & Craig Ave, Menifee,
Show search results for Evans Rd & C...
VMT Impact Screening
Input
Output
Zoom in to your project location close enough that the blue parcel layer appears. Select Western Riverside County Parcels in the drop-down below, then use the black square to select your project parcels. When ready, click on the Execute button. To clear the selection or start over, click on the "X" on the output tab once the tool has run. All results based on RIVTAM Model*
Western Riverside County Parcels...
Help
Execute
(1 of 2)
APN:360170001; TAZ:3,867
Within a Transit Priority Area (TPA)?
No (Fail)
Within a low VMT generating TAZ based on Total VMT?
No (Fail)
Jurisdictional average 2012 daily total VMT per service population = 30.99
Project TAZ 2012 daily total VMT per service population = 43.51
Within a low VMT generating TAZ based on Residential Home-Based VMT?
No (Fail)
Jurisdictional average 2012 daily residential home-based VMT per capita = 19.11
Project TAZ 2012 daily residential home-based VMT per capita = 19.70
Within a low VMT generating TAZ based on
Zoom to
Layer List
All results based on RIVTAM Model.
Output Layer
Western Riverside County Parcels (Zoom in to view)
Transit Priority Area
RIVTAM TAZs with total VMT per service population below jurisdictional average under 2012 base year model
RIVTAM TAZs with Home-based VMT per resident below jurisdictional average under 2012 base year model
RIVTAM TAZs with Home-based work VMT per worker below jurisdictional average under 2012 base year model
RIVTAM TAZs with total VMT per service population below WRCOG subregional average under 2012 base year model
RIVTAM TAZs with Home-based VMT per resident below WRCOG subregional average under 2012 base year model
RIVTAM TAZs with Home-based work VMT per worker below WRCOG subregional average under 2012 base year model
City Boundaries
TUMF Zone Boundaries
Holland Rd
Corson Ave
Craig Ave
Evans Rd
Bradley Rd
Capricle Rd
Porsche Rd
Twin Pines St
Wardell Ln
600ft
-117.203 33.674 Degrees

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