MD ACOUSTICS
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March 30, 2021

Mr. Joesph Karaki
Karaki WS
4887 E. Las Palmas Ave., Ste 707
Anaheim, CA 92807

Subject: Gas Station & Convenience Store – Lighting Study, County of Riverside, CA
Updated 3/30/2021

Dear Mr. Karaki:

MD Acoustics, LLC (MD) has completed a lighting survey for the proposed Gas Station & Convenience Store Project located at 28771 Central Avenue (Hwy 74) in an unincorporated area of the County of Riverside within the Sphere of Influence of the City of Lake Elsinore, California. The Project proposes to develop the approximately 1.44-acre project site with a 3,516 square foot convenience market with 12 pump gas station. This letter report evaluates the existing light levels (foot-candles) to the preliminary lighting plan (prepared by LSI, 1/13/2021) and to the County's lighting general development standards (Title 8, Chapter 8.80). Appendix A contains lighting definitions.

1.0 Assessment Overview

MD conducted a site visit on 1/7/21 to evaluate the existing light conditions at the project site. MD utilized a LX1330B digital illuminance/light meter that can measure from 0 to 200,000 lux (0 to 18,580 foot-candles). The existing light conditions are compared to the preliminary photometric lighting plan as well as the requirements outlined by the County's Outdoor lighting code, Chapter 8.80.

Per the City of Lake Elsinore North Central Sphere Specific Plan Land Use Plan the site has a current land use classification of Business Professional. Land uses surrounding the site include vacant land to the west, a single-family residential use to and commercial uses to the north, multi-family residential uses to the south (across Highway 74), and single-family residential uses to the east (across Highway 74)

2.0 County of Riverside Lighting Requirements

Chapter 8.80 Outdoor Lighting outlines the following as it relates to minimum lighting requirements:

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All outdoor luminaries in shall be located, adequately shielded, and directed such that no direct light falls outside the parcel of origin, or onto the public right-of-way. Outdoor luminaries shall not blink, flash or rotate.

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A. Luminaries used or otherwise required by law enforcement or other emergency personnel.

B. Luminaries used to illuminate publicly-owned property, including but not limited to, parks, recreation areas, schools, street, street signs and sidewalks.
C. Luminaries used to illuminate authorized public and private monuments.
D. Luminaries authorized by a provision of state or federal law as long as that lighting conforms to the requirements of the state of federal law.
E. Luminaries used for holiday decorations.
F. Luminaries producing light directly by the combustion of fossil fuels (such as kerosene lanterns, and gas lamps).
G. Neon luminaries.
H. Luminaries used to illuminate agricultural activities, operations or facilities as defined in Section 5 of Riverside County Ordinance No. 625.

B. Security Lighting. Security lighting triggered by motion or noise shall be allowed subject to all the provisions this chapter.

Therefore, the project at minimum must provide sufficient lighting to suffice the exterior requirement while providing adequate shielding still.

3.0 Evaluation and Findings

Some land uses are considered more sensitive to light than others, such as hotels, residential neighborhoods, and nursing homes. Although light may be observed by humans at 0.1 foot-candles, it would not make a substantial difference, especially if lighting is already present within the area of introduction. For example, approximately 37.1 foot-candles would be generally acceptable for a reading area.

Thus, a significant impact would occur if sensitive land uses (such as residences) were exposed to a substantial increase in sources of light, if that level of light was not previously present. Similarly, mobile source lighting impacts would be significant if residential or other light sensitive uses are introduced to new light sources along roadways and driveways.

MD measured the lighting levels in foot-candles (in 50-foot increments) along the perimeter of the project site (see Exhibit A) which takes into account the light from vehicles along Highway 74 (Central Avenue) and existing street lights. The existing light levels measured between 0 to 0.9 foot-candles.

The project will utilize nighttime lighting for operational and security purposes (per the County's ordinance). The preliminary lighting plan (Exhibit B) shows that the project's lighting levels at the perimeter will range between 0 to 4.5 foot-candles at the project site's property line. By the time the light reaches into Central Avenue the foot-candle drops down to 0.2.

At the west boundary of the project site there is an area towards the north of the western property line where the level is 4.2 foot-candles. The level quickly drops to 0.2 foot-candles within 50-feet of the property line. Currently the land to the west is vacant and is zoned rural community (Estate Density Residential).

The nearest residences are located 250 feet to the project site's southern property line (across the street from Central Avenue). The foot-candle readings at the nearest residences would be 0.

The greatest potential lighting change will be along the west boundary towards the north and the southeastern perimeter where a 4.2 and 2.5 to 3 foot-candle increase will occur, respectively. Furthermore, the photometric design has been laid out to comply with the County's exterior light ordinance.

Glare would be kept to a minimum as the proposed project setback from Highway 74 and building materials (painted stucco or stone veneer) would not contribute to substantial amounts of daytime glare as the majority of the building front faces in a southern direction with the gas canopy blocking the line of sight to the setting sun.

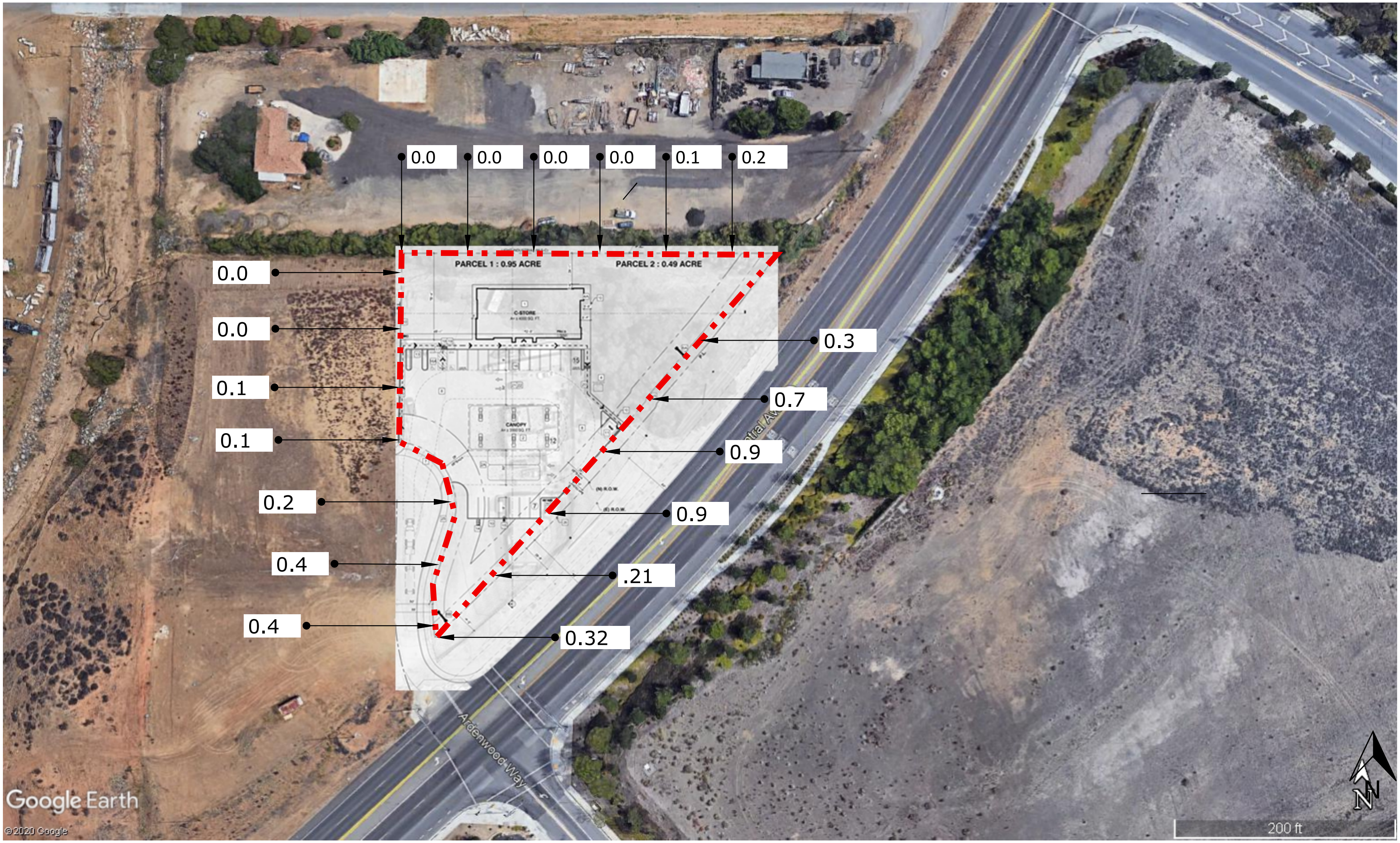
3.0 Conclusions

MD is pleased to provide this evaluation. If you have any questions regarding this analysis, please don't hesitate to call us at (805) 426-4477.

Sincerely,
MD Acoustics, LLC

Mike Dickerson, INCE
Principal

Exhibit A



EXISITING LIGHTING LEVELS - GAS STATION & CONVENIENCE STORE
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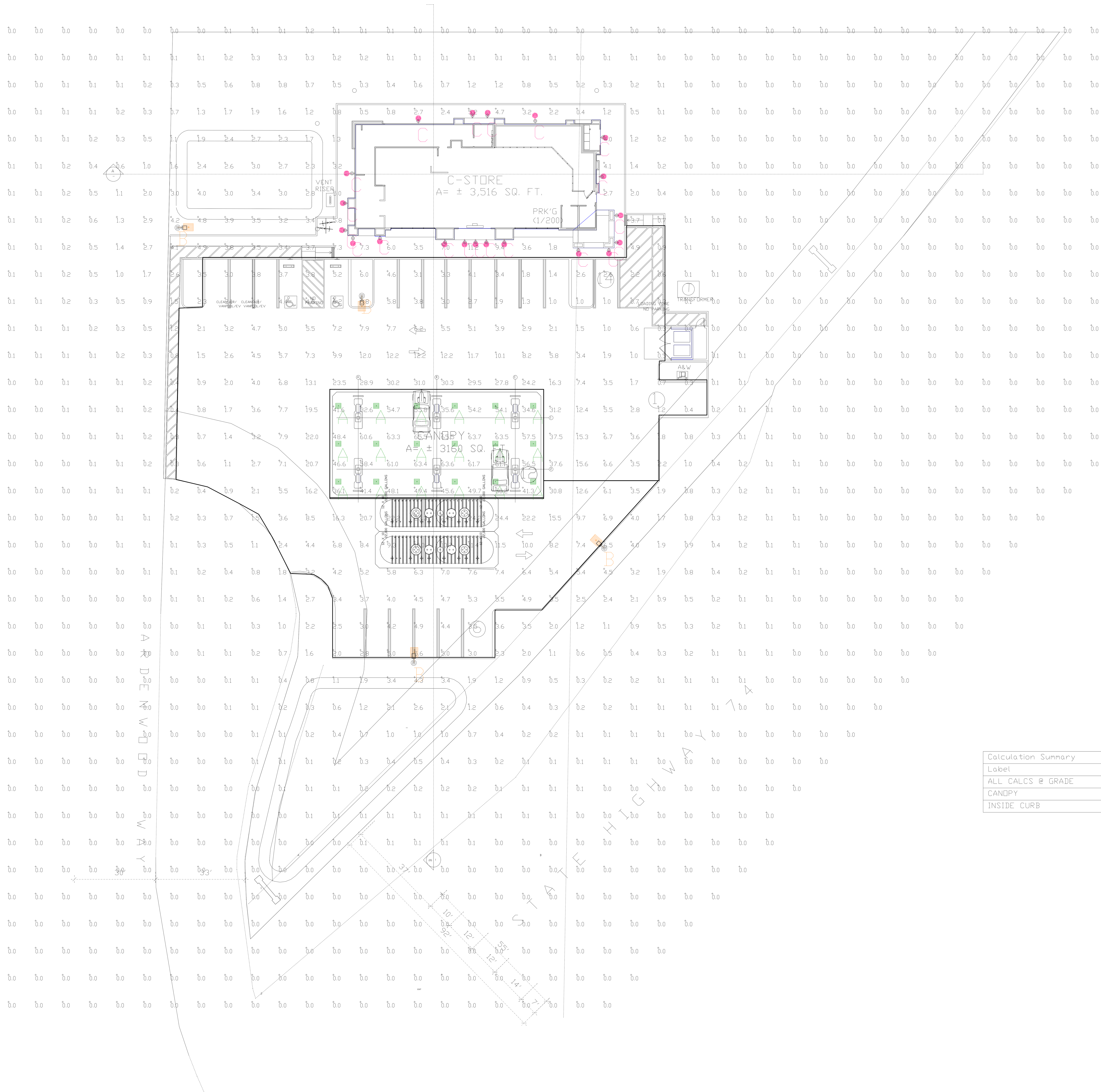

Calculation Summary							
Label	CalcType	Units	Avg	Max	Min	Avg/Min	Max/Min
ALL CALCS @ GRADE	Illuminance	Fc	2.73	65.5	0.0	N.A.	N.A.
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INSIDE CURB	Illuminance	Fc	7.65	37.6	0.3	25.50	125.33

Total Project Watts_1
Total Watts = 2647.998

Based on the information provided, all dimensions and luminaire locations shown represent recommended positions. The engineer and/or architect must determine the applicability of the layout to existing or future field conditions.

This lighting plan represents illumination levels calculated from laboratory data taken under controlled conditions in accordance with The Illuminating Engineering Society (IES) approved methods. Actual performance of any manufacturer's luminaires may vary due to changes in electrical voltage, tolerance in lamps/LED's and other variable field conditions. Calculations do not include obstructions such as buildings, curbs, landscaping, or any other architectural elements unless noted. Fixture nomenclature noted does not include mounting hardware or poles. This drawing is for photometric evaluation purposes only and should not be used as a construction document or as a final document for ordering product.

Luminaire Schedule									
Symbol	Qty	Label	Arrangement	Description	LLD	UDF	LLF	Arr. Lum. Lumens	Arr. Watts
	18	A	SINGLE	SCV-LED-15L-SC-50-15' MH	1.000	1.000	1.000	14963	102
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	20	C	SINGLE	AD-15L-40-GWT-12' MH	1.000	1.000	1.000	1388	10.9

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LIGHTING PROPOSAL LO-153095

76 STATION
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BY:AHK | DATE:1/13/21 | REV: | SHEET 1 OF 1

SCALE: 1"=20' 0 20

Appendix A
Glossary of Lighting Terms

Glossary of Terms

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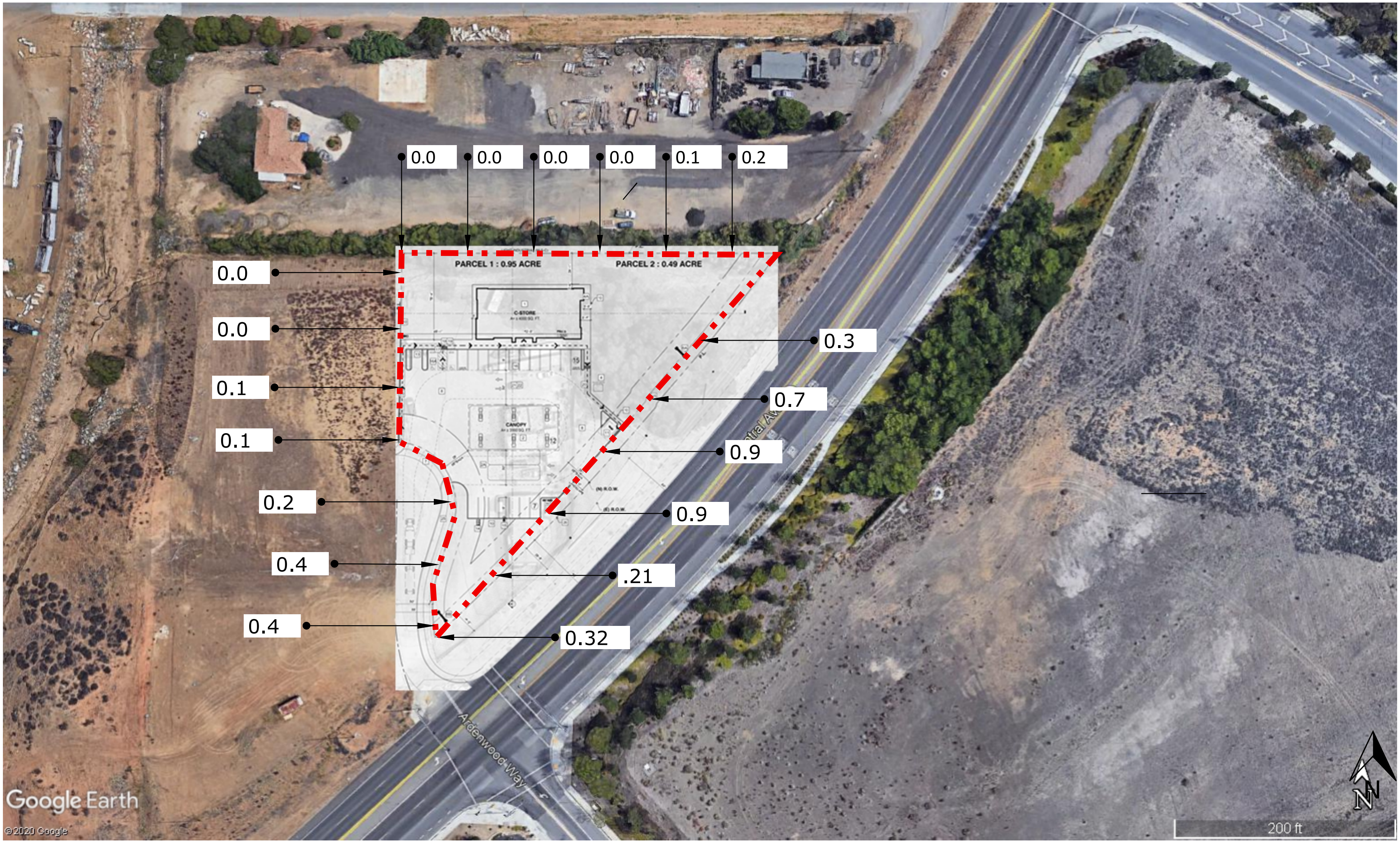

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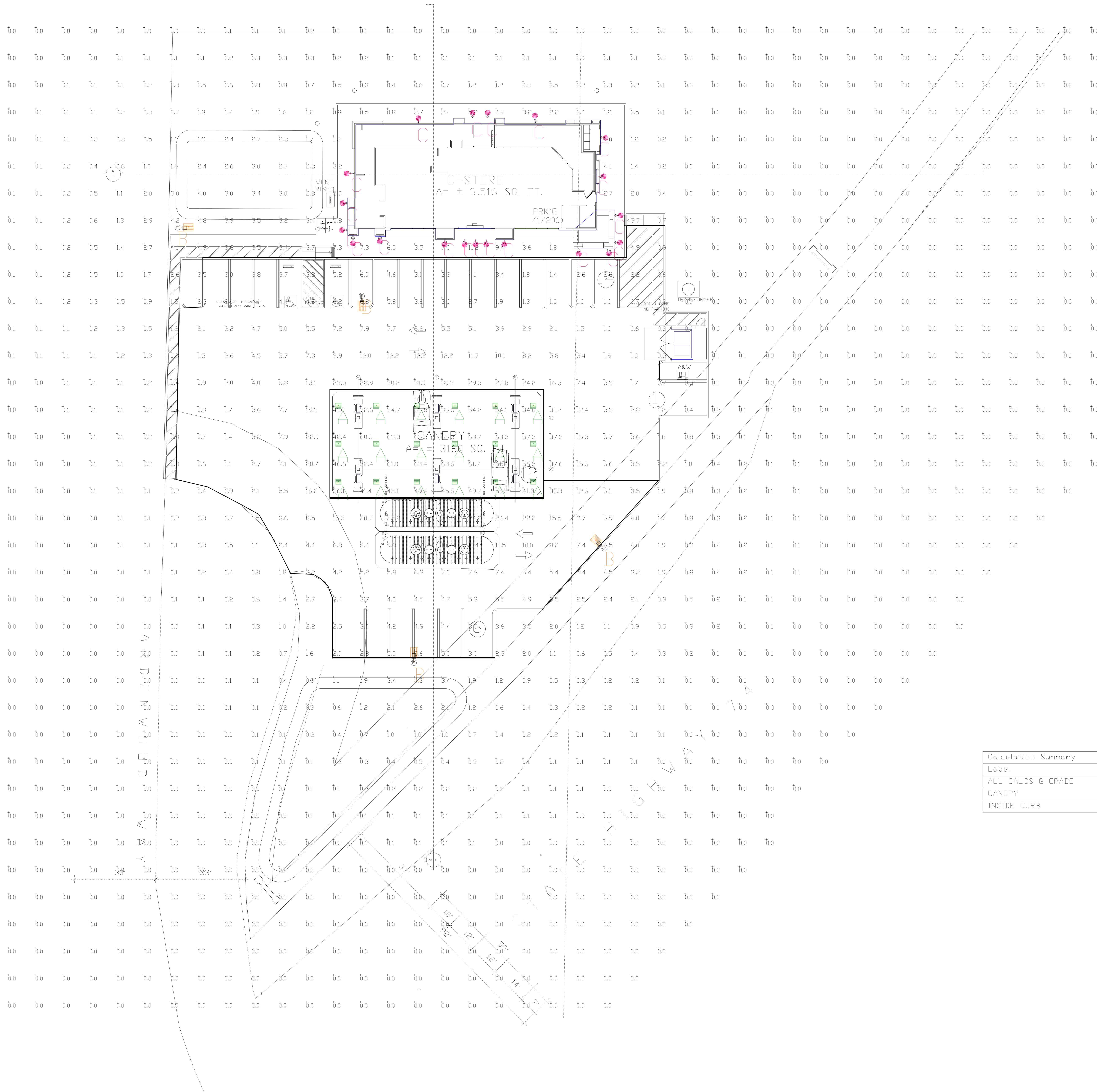

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Western Riverside County Multiple Species Habitat Conservation Plan Consistency Analysis

Commercial Retail – 76 Station
Central Avenue (Hwy 74) and Eighth Street

Permittee Name:
Joseph Karaki
Karaki WS
4887 E. La Palma Ave | Suite 707
Anaheim, CA 92807

Applicant Name:
Joseph Karaki
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Prepared by:
Jericho Systems, Inc
47 N. 1st Street, Suite 1
Redlands, CA 92373
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March 2021

Contents

List of Supporting Appendices

1 EXECUTIVE SUMMARY

Jericho Systems, Inc. (Jericho) is pleased to provide this Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP) Consistency Analysis prepared for the commercial development (Project) located in Lake Elsinore, California (Figures 1, 2, and 3). The approximately 1.9 -acre Project site is made up of two parcels: APN 347-130-029 (1.12 acre) and 347-130-028 (0.49 acre) located within Elsinore Area Plan of the Western Riverside MSHCP.

The City of Lake Elsinore is signatory to the MSHCP Implementing Agreement and thereby a permittee responsible for meeting the terms and conditions outlined in the MSHCP and the Biological Opinion issued for the MSHCP. Therefore, the City of Lake Elsinore has the responsibility to ensure the projects they approve are consistent the MSHCP and will not preclude the overall conservation goals and reserve design from being accomplished.

The MSHCP is a criteria-based plan and identification of planning units on which to base the Criteria is necessary for such a criteria-based plan. The MSHCP Conservation Area is comprised of a variety of existing and proposed Cores, Extensions of Existing Cores, Linkages, Constrained Linkages and Non-contiguous Habitat Blocks. The MSHCP coverage area is divided into Area Plans (AP) based on the Riverside County's General Plan Area Plan boundaries. Each of the AP's has: established conservation criteria, species specific surveys that may be required based on on-site Habitat Assessment, and resources and areas identified for conservation. In each Area Plan text, applicable Cores and Linkages are identified.

There are 146 species covered by the MSHCP. Surveys are not required for 106 of these covered species. The remaining 40 covered species may require focused surveys for proposed development projects include 4 birds, 3 mammals, 3 amphibians, 3 crustaceans, 14 Narrow Endemic Plants, and 13 other sensitive plants within the Criteria Area. The need to conduct focused surveys for all but six of these 40 species is determined by the presence of suitable habitat within designated 'survey areas' mapped for each of the species. The remaining six species that require focused surveys throughout the entire MSHCP area are associated with riparian/riverine areas and vernal pools and include least Bell's vireo, southwestern willow flycatcher, western yellow-billed cuckoo, Riverside fairy shrimp, Santa Rosa Plateau fairy shrimp, and vernal pool fairy shrimp.

The MSHCP requires that a project comply with the MSHCP policies identified in Section 6 of the MSHCP. The Project site is not located within a 'Cell group' or in a 'Criteria Cell'. The Project site is not in an amphibian, criteria area species, mammal, or narrow endemic plant species survey area. However, a portion of APN 347-130-028 is within a burrowing owl survey area. Therefore, a habitat suitability assessment for burrowing owl (MSHCP section 6.3.2) and a Riparian/Riverine/Vernal Pool Area assessment (MSHCP section 6.1.2) were required and conducted.

The Project site consists of vacant, undeveloped land that has been subject to a variety of anthropogenic disturbances. The entire site is mapped by the RCA MSHCP Vegetation (2012) layer as developed/disturbed land, and the site survey confirmed these findings for all but the northeast corner, which consists of a mix of salt cedar, eucalyptus and willow scrub. The acreage is as follows 0.11 acre of eucalyptus trees (*Eucalyptus* ssp) approximately 35 feet in height, with a range in diameter at breast height (DBH) of 6 inches to 18 inches and a mid-story densely covered in 0.03 acre of salt cedar (*Tamarix ramossima*) with a DBH of 8 inches and 0.27 acre of black willow shrubs

(*Salix gooddingii*) with a DBH of 6 inches. The vegetation here is used as cover for a homeless encampment that supports approximately 10 transients. This area is heavily littered and disturbed. Many of the bushes and trees on site have had trunks/branches sawed off and used for cover in the homeless encampment.

The willow and salt cedar thickets grow as a result of a roadside swale originating from HWY74 and N. Frontage road located along the northeastern boundary of the site. Street runoff enters the Project site in the northern portion of APN 347-130-028 and continues westerly along the property boundary between the Project site and the parcel north of the Project site. This swale collects street runoff and is not a natural or jurisdictional feature subject to Sections 1600 of the Fish and Game Code (FGC) or Sections 404/401 of the federal Clean Water Act (CWA). There is no bed or bank associated with this swale indicating a flow of water. The water runoff from HWY 74 travels west, back flows to the southeast and percolates in the well-drained soils. There is no evidence that the swale connects to the blue line stream located off-site to the west.

This roadside swale is a result of man-made roadside water diversion from HWY 74 and is not considered jurisdictional or riverine/riparian. Although the patch of willows growing in the mid-story of the swale are riparian by definition, it is not the intent of the MSHCP to conserve small patches of riparian species growing as a direct result of man-made features. The willows occur as a direct result of roadside runoff. If the run off was redirected, these willows would not exist.

Riparian Birds covered under the MSHCP such as the Least Bell's vireo (*Vireo bellii pusillus*) [LBVI], Southwestern willow flycatcher (*Empidonax trallii extimus*) [SWWF] and Yellow-billed cuckoo (*Coccyzus americanus*) [YBCU] are found only in well-developed riparian habitat. The habitat structure on site is not what is required by these species. Furthermore, the disturbance levels preclude their occurrence.

No vernal pool habitat exist on site. None of the mapped soils on site are listed on the USDA-NRCS National Hydric Soils List to indicate the potential for vernal pools. The soils onsite are well drained and the duration, timing, and frequency of inundation on site provide no indication or validation of vernal pool ecology. Water does not accumulate on the surface for seasonal periods (more than 3 weeks) of inundation. Clay soils are not mapped on site. The site as a whole lacks the water retention capabilities necessary to support vernal pool habitat. Therefore, the biological functions and values of vernal pool habitat do not exist on site.

The area on site requiring burrowing owl surveys is densely vegetated in a three-story canopy cover structure that includes eucalyptus trees, salt cedar, willows, and non-native grasses and weeds. The habitat composition and structure is not suitable for burrowing owl. No further investigation is warranted.

2 INTRODUCTION

The purpose of this Consistency Analysis (Analysis) report is to summarize the biological data for the proposed commercial development (Project) and to document project's consistency with the goals and objectives of the Western Riverside County MSHCP. The proposed Project consists of the development of a proposed gas station consisting of a 3,516 square foot (sf) convenience store, 3,160 sf fueling canopy with six multi-product dispensers, and two underground storage tanks.

2.1 Project Area

The 1.9-acre Project site is made up of two parcels, located on Assessor's Parcel Number (APN): 347-130-029 and 347-130-028 in the City of Lake Elsinore, Riverside County, California, on the northwest corner of Central Avenue (Hwy 74) and Ardenwood Way. The Site is identified on the *Lake Elsinore* US Geological Survey's (USGS) 7.5-minute topographic map in Section 30 of Township 5 South, Range 4 West (Figures 1, 2 and 3). The site is bounded on the north by 8th Street, on the south by Ardenwood Way, on the west by vacant land, and on the east by Central Avenue (Hwy 74).

2.2 Project Description

The proposed Project consists of the development of a proposed gas station consisting of a 3,516 square foot (sf) convenience store, 3,160 sf fueling canopy with six multi-product dispensers, and two underground storage tanks (Figure 4)

2.3 Covered Roads

The Project proposes no new roads.

2.4 General Setting

According to the EPA Regional map, the Project site is located in the Inland Valleys (85k) ecoregion. An ecoregion is a regional area that has similar ecosystems in terms of type, quality, and quantity of environmental resources. The Inland Valleys ecoregion is influenced less by marine processes, and more by alluvial processes. The ecoregion consists of alluvial fans and basin floors at the base of the San Bernardino and San Gabriel mountains and the San Jacinto and Perris Valleys in the south. The region was historically composed of Riversidean coastal sage scrub, valley grasslands, and riparian woodlands. The ecoregion is now heavily urbanized with some remaining agriculture.

Hydrologically, the Project site is located within the Lake Mathews hydrologic area, in the 14,217-acre hydrologic sub-area (HSA 801.35) within the Temescal Wash watershed (HUC 180702030601).

The City of Lake Elsinore is located in southwestern Riverside County at the foothills of the Cleveland National Forest. Topographically, Lake Elsinore is located on the east side of the Santa Ana mountains. Air quality is relatively poor, as characteristic of the region due to temperature inversions, convergence zones, and accumulation of air pollutants. Air pollutants of greatest concern are carbon monoxide, PM2.5, ozone, and PM10. The general climate of Lake Elsinore includes hot summers (99°F average maximum in August) and mild winters (38°F average minimum in February) with cool ocean breezes and sparse winter rainfall, averaging 12.09 inches of precipitation per year.

Soils on the Project site area consist of Cortina cobbly loamy sand, 2-9% slopes (CmC), Lodo rocky loam, 25-50% slopes (LpF2), and Arbuckle gravelly loam, 2-9% slopes – dry, MLRA 19 (AIC), (Figure 6). Soils in the Arbuckle series are well-drained remnants of alluvial fans derived from numerous types of rock. Soils in the Cortina series are well-drained soils made from alluvium derived from metasedimentary rock. The Lodo series consists of shallow, somewhat excessively drained soils that formed in material weathered from hard shale and fine grained sandstone. Terrace escarpments are landforms (terraces) made from alluvium derived from mixed sources. (Figure 5)

3 RESERVE ASSEMBLY ANALYSIS

The site is not located or mapped within any criteria cells or cell groups, reserve assembly or Public or Quasi-Public lands. Therefore, this analysis is not applicable.

4 VEGETATION MAPPING

According to the Riverside Conservation Authority (RCA) MSHCP GIS Vegetation (2012) layer, the Project site is mapped as Developed/Disturbed Land. Field survey confirmed this mapping with the exception of the northeast corner of the site, which site supports an over-story canopy 0.11 acre of eucalyptus trees (Eucalyptus ssp) approximately 35 feet in height, with a range in diameter at breast height (DBH) of 6 inches to 18 inches and a mid-story densely covered in 0.03 acre of salt cedar (Tamarix ramossima) with a DBH of 8 inches and 0.27 acre of black willow shrubs (Salix gooddingii) with a DBH of 6 inches. The average height of the mid-story is approximately 12 feet. The dense understory in the northeast corner primarily consists of short-podded mustard (*Hischfeldia incana*), tocalote *(Centaurea melitensis*), and non-native grasses (*Bromus* ssp.). A few native plants are found scattered along the eastern and western edges of the Project site including California buckwheat (*Erioginum faciculatum*), encilia (*Encilia farinosa)* and telegraph weed (*Heterotheca grandiflora*). The remainder of the Project site is bare and compacted due to blading.

5 PROTECTION OF SPECIES ASSOCIATED WITH RIPARIAN/RIVERINE AREAS AND VERNAL POOLS (SECTION 6.1.2)

According to Section 6.1.2 of the MSHCP:

> *"Riparian/Riverine Areas are lands which contain Habitat dominated by trees, shrubs, persistent emergents, or emergent mosses and lichens, which occur close to or which depend upon soil moisture from a nearby fresh water source; or areas with fresh water flow during all or a portion of the year.*
>
> *"Vernal pools are 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. Obligate hydrophytes and facultative wetlands plant species are normally dominant during the wetter portion of the growing season, while upland species (annuals) may be dominant during the drier portion of the growing season. The determination that an area exhibits vernal pool characteristics, and the definition of the watershed supporting vernal pool hydrology, must be made on a case-by-case basis. Such determinationsshould consider the length of the time the area exhibits upland and wetland characteristics and the manner in which the area fits into the overall ecological system as a wetland. Evidence concerning the persistence of an area's wetness can be obtained from its history, vegetation, soils, and drainage characteristics, uses to which it has been subjected, and weather and hydrologic records.*
>
> *"Fairy Shrimp. For Riverside, vernal pool and Santa Rosa fairy shrimp, mapping of stock ponds, ephemeral pools and other features shall also be undertaken as determined appropriate by a qualified biologist.*
>
> *"With the exception of wetlands created for the purpose of providing wetlands Habitat or resulting from human actions to create open waters or from the alteration of natural stream courses, areas demonstrating characteristics as described above which are artificially created are not included in these definitions."*

5.1 Riparian/Riverine

As defined under Section 6.1.2 of the MSHCP, *Protection of Species Associated with Riparian/Riverine Areas and Vernal Pools*, riparian/riverine areas are areas dominated by trees, shrubs, persistent emergent plants, or emergent mosses and lichens which occur close to or are dependent upon nearby freshwater, or areas with freshwater flowing during all or a portion of the year. Conservation of these areas is intended to protect habitat that is essential to a number of listed or special-status water-dependent fish, amphibian, avian, and plant species.

Any unavoidable alteration or loss of riparian/riverine area related to a project requires the preparation of a Determination of Biologically Equivalent or Superior Preservation (DBESP) analysis to ensure the replacement of any lost functions and values of the habitat. This assessment is independent from considerations given to waters of the United States and waters of the State under the CWA, the California Porter-Cologne Water Quality Control Act, and CDFW jurisdictional streambed under the California Fish and Game Code.

5.1.1 Methods

Ms. Lawrey assessed the Project site for State and /or federal jurisdictional waters that are subject to Sections 404 and 401 of the federal Clean Water Act (CWA) regulated by the U.S. Army Corps of Engineers (USACE) and Regional Water Quality Control Board (RWQCB) respectively; and/or Section 1602 of the California Fish and Game Code (FCG) administered by the California Department of Fish and Wildlife (CDFW) and Riverine/Riparian and Vernal Pool habitat subject to Section 6.1.2 of the MSHCP.

Potential limits of jurisdictional waters, i.e. WoUS as regulated by the USACE and RWQCB, and streambed and associated riparian habitat as regulated by the CDFW were evaluated using the follow techniques.

Evaluation of CWA WoUS was based upon the Corps' regulations and technical guidance issued by the USACE including, among other sources described further below, (i) *USACE Wetlands Research Program Technical Report Y-87-1 (on-line edition), Wetlands Delineation Manual, Environmental Laboratory, 1987 (Wetland Delineation Manual)*, *USACE Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region, December 2008 (Arid West Supplement)* and *USACE A Guide to Ordinary High Water Mark (OHWM) Delineation Arid West Region of the United States, 2010.* The lateral extent of USACE jurisdiction was measured at the Ordinary High Watermark (OHWM), which is indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris.

Evaluation of FGC Section 1600 Streambed Waters followed guidance in the FGC in the *MESA Field Guide*, described above, pursuant to which CDFW claims jurisdiction beyond traditional stream banks and the outer edge of riparian. Under MESA, the term stream is defined broadly to include "a body of water that flows perennially or episodically and that is defined by the area in which water currently flows, or has flowed, over a given course during the historic regime [i.e., 'circa 1800 to the present'], and where the width of its course can reasonably be identified by physical or biological indicators." Specifically, CDFW jurisdiction was delineated by measuring the elevations of land that confine a stream to a definite course when its waters rise to their highest level and to the extent of associated riparian vegetation. Here the extent of associated riparian vegetation was used to mark the lateral extent of the jurisdictional areas. Other data recorded included bank height and morphology, substrate type, and vegetation within and adjacent to the low flow streambed.

A variety of reference materials relevant to the project site were reviewed during the course of this delineation, including historical and current aerial imagery, Federal Emergency Management Agency (FEMA) flood insurance rate maps (FIRM), National Oceanic & Atmospheric Administration (NOAA) climate data, USFWS National Wetland Inventory (NWI) and EPA Water Program "My Waters" data layers and United States Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS) web soil survey. The data provided in the Web Soil Survey provides a standard basis for the soil textures and types that are assigned a hydric indicator status of "hydric" or "non-hydric" by the National Technical Committee for Hydric Soils.

The methods used to determine any riparian/riverine or vernal pool areas were based on the above techniques as well as soils evaluations and vegetation classifications. This is because an area may be characterized as riparian based on its vegetative composition but does not meet the criteria of being federal or state jurisdictional water.

5.1.2 Existing Conditions and Results

A roadside swale originating from HWY74 and N. Frontage road located along the northeastern boundary of the site, enters the Project site in the northern portion of APN 347-130-028 and continues westerly along the property boundary between the Project site and the parcel north of the Project site. This swale collects street runoff and is not a natural or jurisdictional feature subject to Sections 1600 of the FGC or 404/401 of the federal CWA. There is no bed or bank associated with this swale indicating a flow of water. The water runoff from HWY 74 travels west, back flows to the southeast and percolates in the well-drained soils. There is no evidence that the swale connects to the blue line stream located off-site to the west.

This roadside swale is a result of man-made roadside water diversion from HWY 74 and is not considered jurisdictional or riverine/riparian. Although the patch of willows growing in the mid-story of the swale are riparian by definition, it is not the intent of the MSHCP to conserve small patches of riparian species growing as a direct result of man-made features. The willows occur as a direct result of roadside runoff. If the run off was redirected, these willows would not exist.

5.1.3 Impacts

Based on the Project's Site Plan (Figure 4), 0.41 acre will be permanently impacted by grading and construction.

5.1.4 Mitigation

No mitigation or permitting is required because the swale is artificially created and artificially created are not included in the definitions of a Riverine/Riparian Area. Further investigation is not warranted.

5.2 Vernal Pools

Vernal pools are seasonally inundated, ponded areas that only form in regions where specialized soil and climatic conditions exist. During fall and winter rains typical of Mediterranean climates, water collects in shallow depressions where downward percolation of water is prevented by the presence of a hard pan or clay pan layer (duripan) below the soil surface. Later in the spring when rains decrease and the weather warms, the water evaporates and the pools generally disappear by May. The shallow depressions remain relatively dry until late fall and early winter with the advent of greater precipitation and cooler temperatures.

Vernal pools provide unusual "flood and drought" habitat conditions to which certain plant and wildlife species have specifically adapted as well as invertebrate species such as fairy shrimp.

One of the factors for determining the suitability of the habitat for fairy shrimp would be demonstrable evidence of seasonal ponding in an area of topographic depression that is not subject to flowing waters. These astatic pools are typically characterized as vernal pools. More specifically, vernal pools are seasonal wetlands that occur in depression areas without a continual source of water. They have wetland indicators of all 3 parameters (soils, vegetation, and hydrology) during the wetter portion of the growing season but normally lack wetland indicators of hydrology and/or vegetation during the drier portion of the growing season. Obligate hydrophytes and facultative wetlands plant species are normally dominant during the wetter portion of the growing season. The determination that an area exhibits vernal pool characteristics and the definition of the watershed supporting vernal pool hydrology is made on a case-by-case basis. Such determinations should consider the length of time the area exhibits upland and wetland characteristics and the manner in which the area fits into the overall ecological system as a wetland. The seasonal hydrology of vernal pools provides for a unique environment, which supports plants and invertebrates specifically adapted to a regime of winter inundation, followed by an extended period when the pool soils are dry.

The MSHCP lists two general classes of soils known to be associated with special-status plant species; clay soils and Traver-Domino Willow association soils. The specific clay soils known to be associated with special-status species within the MSHCP plan area include Bosanko, Auld, Altamont, and Porterville series soils, whereas Traver-Domino Willows association includes saline-alkali soils largely located along floodplain areas of the San Jacinto River and Salt Creek. Without the appropriate soils to create the impermeable restrictive layer, none of the special-status species associated with vernal pools can occur on the project site.

5.2.1 Methods

Methods included a review of recent and historic aerial photographs (1996-2018) of the Project site and its immediate vicinity, a review of soils data, and a site visit on January 16, 2021 by Jericho biologist Shay Lawrey. Ms. Lawrey carefully assessed the site for depressions, inundation, presence of hydrophytic vegetation, staining, cracked soil, ponding, and indicators of active surface flow and corresponding physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris.

5.2.2 Existing Conditions and Results

Aerial imagery did not provide visual evidence of an astatic or vernal pool conditions on or in the vicinity of the Project site.

Soils on the Project site area consist of Cortina cobbly loamy sand, 2-9% slopes (CmC), Lodo rocky loam, 25-50% slopes (LpF2), and Arbuckle gravelly loam, 2-9% slopes – dry, MLRA 19 (AlC), (Figure 6). Soils in the Arbuckle series are well-drained remnants of alluvial fans derived from numerous types of rock. Soils in the Cortina series are well-drained soils made from alluvium derived from metasedimentary rock. The Lodo series consists of shallow, somewhat excessively drained soils that formed in material weathered from hard shale and fine grained sandstone. Terrace escarpments are landforms (terraces) made from alluvium derived from mixed sources.

No ponding was observed on-site. Soils are well drained and no mud/soil cracks or any other indicators of pooling was observed on site.

From this review of historic aerial photographs and observations during the field investigation, it is concluded that no vernal pools or suitable fairy shrimp habitat exist on site. Further, no special-status plant and/or wildlife species associated with vernal pools were observed during the field visit. Additionally, the routine disturbances on-site, and well drained soils also preclude vernal pools from existing on-site.

5.2.3 Impacts

There are no impacts to vernal pools because none exist on site, and the soil type on site does not support the potential for vernal pools.

5.2.4 Mitigation

No mitigation is required because no vernal pools exist on site.

5.3 Fairy Shrimp

Fairy shrimp can be found in non-vernal pool features such as stock ponds, ephemeral pools, road ruts, human- made depressions, or other depressions that may pond water. No habitat features suitable for fairy shrimp exist on site.

Therefore, evaluations for the presence of fairy shrimp were warranted or required. No further discussion on fairy shrimp is made in this report.

5.4 Riparian Birds

Riparian Birds covered under the MSHCP such as the Least Bell's vireo (*Vireo bellii pusillus*) [LBVI], Southwestern willow flycatcher (*Empidonax trallii extimus*) [SWWF] and Yellow-billed cuckoo (*Coccyzus americanus*) [YBCU] are found only in well-developed riparian habitat. No habitat features suitable for these species exist on site. However, due to the presence of a willow scrub thicket the following evaluations were made for MSHCP compliance.

5.4.1 Southwestern willow flycatcher

The SWWF is a small passerine bird measuring approximately 5.7 inches in length. It has a grayish-green back and wings, whitish throat, a light gray-olive breast, and pale yellowish belly. It has two visible white wing bars and a faint or absent eye ring. The call consists of a repeated "whit" and their song is a sneezy "fitz-bew." (60 FR 10694). The SWWF is currently one of the four recognized subspecies of the willow flycatcher. This flycatcher is a neotropical migrant that breeds in the southwestern United States from mid-April to early-September. In the fall, it migrates south to its wintering grounds in portions of South America, Central America and Mexico. (60 FR 10694)

The SWWF breeds in dense riparian habitats along rivers, streams, and other wetlands at elevations ranging from sea level to 8,500 feet (Sogge 1997). Occupied habitat is generally dominated by shrubs and trees 13 to 23 feet or more in height, which provide dense lower and mid-story vegetation approximately 10 to 13 feet aboveground. This dense vegetation is often interspersed with open water, small openings, or sparse vegetation, creating a mosaic that is not uniformly dense (62 FR 39129). Plant species closely associated with the flycatcher include willows (Salix spp.), boxelder (*Acer negungo*), seepwillow (*Baccharis* spp.), with an overstory of cottonwood (*Populus fremontii*) (62 FR 39129).

The SWWF has not been documented on site or within a one mile radius. The small willow scrub thicket onsite is highly degraded and occupied by transients. The habitat formed as a result of street run off and does not have the size or structure preferred by this species. They are found in habitat areas with a well-developed overstory, mid-story, understory, consisting of willow, mule fat and cottonwood, near water, with a minimum patch size of four (4) acres. This species requires a habitat structure of a 20-30-foot upper canopy, 15-12 foot mid-story and a lower story of 5-3 feet. This species is not found in salt cedar or eucalyptus. Although there is a willow component it is not the size or structure where this species is found. These conditions are absent from the site. The acreage and structure of 0.11 acre of eucalyptus trees approximately 35 feet in height, with a range in diameter at breast height (DBH) of 6 inches to 18 inches and a mid-story densely covered in 0.03 acre of salt cedar with a DBH of 8 inches and 0.27 acre of black willow shrubs with a DBH of 6 inches is not the type of habitat is not the type or structure that this species is found.

Nor are they found in high disturbance areas which is the case on site due to the transient encampments and cutting of the vegetation. The specific requirement for this species is the presence of water. These are not the conditions on site.

Therefore, SWWF has no potential to occur on site and /or in the Project vicinity. Further investigation is not warranted.

5.4.2 Least Bell's vireo

The LBVI is a small, olive-gray migratory songbird that nests and forages almost exclusively in riparian woodland habitats. Bell's vireos as a group are highly territorial and are almost exclusively insectivorous. LBVI generally begin to arrive from their wintering range in southern Baja California and establish breeding territories by mid-March to late-March. A large majority of breeding vireos depart their breeding grounds by the third week of September and only a very few have been found wintering in the United States.

Their nesting habitat typically consists of well-developed overstory, understory, and low densities of aquatic and herbaceous cover with an overstory of 15-20 feet, mid-story of 6-10 feet and a lower story of 3 feet. The midstory frequently contains dense sub-shrub or shrub thickets. The overstory usually contains black willow, cottonwood and Sycamore. These thickets are often dominated by plants such as narrow-leaf willow, mulefat, young individuals of other willow species such as arroyo willow or black willow, and one or more herbaceous species. Although LBVI use a variety of riparian plant species for nesting, it appears that the structure of the vegetation is more important than other factors such as species composition or the age of the stand. Vireos forage in riparian habitats up to 984 feet from the nest and use both high and low scrub layers as foraging substrate.

The LBVI has not been documented on site or within a 1- mile radius. The small willow scrub thicket onsite is highly degraded and occupied by transients. The habitat formed as a result of street run off and does not have the structure or patch size preferred by this species. The acreage and structure of 0.11 acre of eucalyptus trees, approximately 35 feet in height, with a range in diameter at breast height (DBH) of 6 inches to 18 inches and a mid-story densely covered in 0.03 acre of salt cedar with a DBH of 8 inches and 0.27 acre of black willow shrubs, with a DBH of 6 inches is not the type of habitat that this species is found. This species is not found in salt cedar or eucalyptus.

Nor are they found in high disturbance areas. Although there is a willow component, it is not the size or structure where this species is found. They are located in well-developed overstory, mid-story, understory, and low densities of aquatic and herbaceous cover with a minimum patch size of two (2) acres, which is not the case for this site.

Therefore, LBVI has no potential to occur on site and /or in the Project vicinity. Further investigation is not warranted.

5.4.3 Yellow-billed cuckoo

The YBCU is a medium sized bird, with a long and slim profile. Its legs are short and bluish-gray, and its tail is gray-brown above and black below with three striking pairs of large white dots visible in flight. Its body is brown above with white under parts. The undersides of its pointed wings are rufous. Adult birds have a long-curved bill which is blue-black above and yellow at the base of the mandibles. Juveniles have a completely blue-black bill.

Though the YBCU will occupy a variety of marginal habitats, particularly at the edges of their range, YBCU in the West are overwhelmingly associated with relatively expansive stands of mature cottonwood willow forests with a minimum patch size of 40 acres. Upper canopy height ranges from 15-75 feet, canopy cover from 20-90 percent, and understory cover from 30-90 percent. Willows and open water are required and the habitat will vary from dense willow-cottonwood forests to marshy bottomlands with scattered willow thickets. According to the California Department of Fish and Wildlife (1980), remnant patches of suitable habitat in sizes sufficient to support breeding yellow-billed cuckoos are scarce.

The YBCU has not been documented on site or within a 1- mile radius. The small willow scrub thicket onsite is highly degraded and occupied by transients. The habitat formed as a result of street run off and does not have the structure or size preferred by this species. They are found in habitat areas with a well-developed overstory, mid-story, understory, consisting of willow and cottonwood, near water, with a minimum patch size of forty (40) acres. This species requires a habitat structure of a 30-75-foot upper canopy, 18-20 foot mid-story and a lower story of 5-3 feet. This species is not found in salt cedar or eucalyptus. Although there is a willow component, it is not the size or structure where this species is found. These conditions are absent from the site. The acreage and structure of 0.11 acre of eucalyptus trees approximately 35 feet in height, with a range in diameter at breast height (DBH) of 6 inches to 18 inches and a mid-story densely covered in 0.03 acre of salt cedar with a DBH of 8 inches and 0.27 acre of black willow shrubs with a DBH of 6 inches is not the type of habitat or structure that this species is found. Nor are they found in high disturbance areas which is the case on site due to the transient encampments and cutting of the vegetation. This species is very sensitive to disturbance and is only found in pristine environments. The specific requirement for this species is the presence of water which is absent from the site.

Therefore, YBCU has no potential to occur on site and /or in the Project vicinity. Further investigation is not warranted.

6 PROTECTION OF NARROW ENDEMIC PLANT SPECIES (SECTION 6.1.3)

The MSHCP identifies the potential presence for a number of endemic plant species.

The MSHCP states that in general, habitat suitability assessments may be undertaken year-round, with the exception of vernal pool species for which habitat suitability assessments must be conducted during the rainy season. Species found in vernal pools and associated Habitats include the following Narrow Endemic Plant Species: San Diego ambrosia (Ambrosia pumila), spreading navarretia (*Navarretia fossalis*), California Orcutt grass (*Orcuttia californica*), and Wright's trichocoronis (*Trichocoronis wrightii* var. *wrightii*). Species found in vernal pools and associated Habitats include the following Criteria Area Survey plant species: San Jacinto Valley crownscale (*Atriplex coronator* var. *notatior*), Parish's brittlescale (*Atriplex parishii*), Davidson's saltscale (*Atriplex serenana* var. *davidsonii*), thread-leaved brodiaea (*Brodiaea filifolia*), Coulter's goldfields (*Lasthenia glabrata* ssp. *coulteri*), little mousetail (*Myosurus minimus*), and prostrate navarretia (*Navarretia prostrata*) (MSHCP, Section 6.1.3)

The Project site does not fall within a Narrow Endemic Plant Species Survey Area (NEPSSA). No further analysis or discussion is needed or warranted.

6.1 Impacts

There are no impacts to the narrow endemic plants because the soils and vegetation communities do not support potential for Narrow Endemic Plant Species.

7 ADDITIONAL SURVEY NEEDS AND PROCEDURES (SECTION 6.3.2)

The Project site is not mapped in a Criteria Cell or survey area for plants, mammals or amphibians. However, a portion of APN 347-130-028 is within burrowing owl survey area. A burrowing owl habitat suitability assessment was conducted, and no suitable habitat was observed, and there was no evidence of burrowing owl.

7.1 Criteria Area Plant Species

The Proposed Project Site does not fall within a mapped survey area for Criteria Area Plant Species. No surveys or further discussion is warranted.

7.2 Amphibians

The Proposed Project Site does not fall within a mapped survey area for Amphibian. No surveys or further discussion is warranted.

7.3 Burrowing Owl

A portion of the the Project site is within a mapped survey area for burrowing owl, in accordance with MSHCP Figure 6-4 and a recent review of the RCA MSHCP Information GIS map.

Burrowing owl is currently designated as a California Species of Special Concern. The burrowing owl is a grassland specialist distributed throughout western North America where it occupies open areas with short vegetation and bare ground within shrub, desert, and grassland environments. Burrowing owls use a wide variety of arid and semi-arid environments with level to gently-sloping areas characterized by open vegetation and bare ground. The western burrowing owl (*A.c. hypugaea*), which occurs throughout the western United States including California, rarely digs its own burrows and is instead dependent upon the presence of burrowing mammals (i.e., California ground squirrels [*Otospermophilus beecheyi*], coyotes, and badgers [*Taxidea taxus*]) whose burrows are often used for roosting and nesting. The presence or absence of colonial mammal burrows is often a major factor that limits the presence or absence of burrowing owls. Where mammal burrows are scarce, burrowing owls have been found occupying man-made cavities, such as buried and non-functioning drain pipes, stand-pipes, and dry culverts. They also require low growth or open vegetation allowing line-of-sight observation of the surrounding habitat to forage and watch for predators. In California, the burrowing owl breeding season extends from the beginning of February through the end of August.

Under the MSHCP burrowing owl is considered an adequately conserved covered species that may still require focused surveys in certain areas as designated in Figure 6-4 of the MSHCP. The survey for burrowing owl requires a systematic survey of all areas that provide suitable habitat plus a 150-meter (approximately 500 feet) zone of influence on all sides of suitable habitat, where applicable.

7.3.1 Methods

The RCA Mapping Information System identified that APN 347-130-028 (0.49 acre), located in the Project's northeastern portion is within a survey area required for the western burrowing owl (*Athene cunicularia hypugaea*) [BUOW]) (Figure 5).

On January 16, 2021, Ms. Lawrey conducted a burrowing owl habitat suitability assessment in accordance with the Western Riverside County MSHCP, which follows the 1993 "*Burrowing Owl Survey Protocol and Mitigation Guidelines*" prepared by the California Burrowing Owl Consortium.

Step 1 of the survey protocol is the habitat suitability assessment. If suitable habitat is present, this protocol requires four (4) surveys between April 15 and July 15 with the first site survey counting as one survey period. Burrowing owl habitat generally includes, but is not limited to, short or sparse vegetation (at least at some time of year), presence of burrows, burrow surrogates or presence of fossorial mammal dens, well-drained soils, and abundant and available prey.

BUOW are known to occur locally within suitable habitat areas, with the closest occurrence being 3.6 miles northeast from the Project site along Highway 74 near Ethanac Road and Eugene Street in 1999.

Natural and non-natural substrates were examined for potential burrow sites. The site was searched for molted feathers, whitewash, cast pellets and/or prey remains. Disturbance characteristics and all other animal sign encountered within the survey area were recorded. Date time and weather conditions were logged. A hand-held, global positioning system (GPS) unit was used to survey to identify survey area boundaries. Representative photographs of the survey area were taken, and Google Earth Pro was accessed to provide recent aerial photographs of the Project site and surrounding area.

7.3.2 Existing Conditions and Results

The area on site requiring BUOW surveys is densely vegetated in a three story canopy cover structure that includes eucalyptus trees, salt cedar and willows, and non-native grasses and weeds. The habitat composition and structure is not suitable for BUOW. No burrows, feathers, whitewash, castings, prey remains or BUOW individuals were observed on site or in the survey buffer area which was surveyed by binoculars. (The adjacent properties are private property and access was not granted to survey). Based on the survey results BUOW are absent, the habitat within the required survey area is unsuitable and therefore, further investigation is not recommended or warranted

7.3.3 Impacts

No impacts can be identified in that no BUOW or BUOW sign was observed on the Project site.

7.3.4 Mitigation

Burrowing owl were not present, and there was not suitable habitat found in the survey, therefore, no mitigation is required.

7.4 Mammals

The Proposed Project Site does not fall within a mapped survey area for Mammals. No surveys or further discussion is warranted.

8 INFORMATION ON OTHER SPECIES

8.1 Delhi Sands Flower Loving Fly

The Project site does not fall within the Delhi soils mapped within the MSHCP baseline data. No further discussion is warranted.

8.2 Species Not Adequately Conserved

MSHCP Table 9-3 identifies 28 species where requirements must be met for those to be considered not adequately conserved. None of the species listed in the MSHCP Table 9-3 occur on or near the Project site. Therefore, there is no further action required.

9 GUIDELINES PERTAINING TO THE URBAN/WILDLANDS INTERFACE (SECTION 6.1.4)

The MSHCP Section 6.1.4 Guidelines are intended to address indirect effects associated with locating Development in proximity to the MSHCP Conservation Area, where applicable. The Project Site is not located in proximity to an MSHCP Conservation Area.

The Project Site is not located in proximity to an MSHCP Conservation Area, therefore the analysis for this criterion does not apply.

10 BEST MANAGEMENT PRACTICES (VOLUME I, APPENDIX C)

This section of the report is designed to describe and comment as to the necessity of implementation of the BMPs identified in Volume 1, Appendix C. The BMPs and their applicability to the Project are identified in Table 2.

Table 2
MSHCP Best Management Practices Applicability (Volume 1, Appendix C)

BMP No.	BMP	Applicable Yes or No	Comment
1	A condition shall be placed on grading permits requiring a qualified biologist to conduct a training session for project personnel prior to grading. The training shall include a description of the species of concern and its habitats, the general provisions of the Endangered Species Act (Act) and the MSHCP, the need to adhere to the provisions of the Act and the MSHCP, the penalties associated with violating the provisions of the Act, the general measures that are being implemented to conserve the species of concern as they relate to the project, and the access routes to and project site boundaries within which the project activities must be accomplished.	No	There are no sensitive species within or near the Project site.
2	Water pollution and erosion control plans shall be developed and implemented in accordance with RWQCB requirements.	Yes	The site will include grading and paving.
3	The footprint of disturbance shall be minimized to the maximum extent feasible. Access to sites shall be via pre-existing access routes to the greatest extent possible.	No	The site is in an urban area and the remnants of vacant habitat do not provide suitable habitat for species.
4	The upstream and downstream limits of projects disturbance plus lateral limits of disturbance on either side of the stream shall be clearly defined and marked in the field and reviewed by the biologist prior to initiation of work.	No	No natural stream resources occur on site
5	Projects should be designed to avoid the placement of equipment and personnel within the stream channel or on sand and gravel bars, banks, and adjacent upland habitats used by target species of concern.	No	No natural stream resources occur on site
6	Projects that cannot be conducted without placing equipment or personnel in sensitive habitats should be timed to avoid the breeding season of riparian identified in MSHCP Global Species Objective No. 7.	No	No natural stream resources occur on site
7	When stream flows must be diverted, the diversions shall be conducted using sandbags or other methods requiring minimal instream impacts. Silt fencing of other sediment trapping materials shall be installed at the downstream end of construction activity to minimize the transport of sediments offsite. Settling ponds where sediment is collected shall be cleaned out in a manner that prevents the sediment from reentering the stream. Care shall be exercised when removing silt fences, as feasible, to prevent debris or sediment from returning to the stream.	No	No natural stream resources occur on site
8	Equipment storage, fueling, and staging areas shall be located on upland sites with minimal risks of direct drainage into riparian areas or other sensitive habitats. These designated areas shall be located in such a manner as to prevent any runoff from entering sensitive habitat. Necessary precautions shall be taken to prevent the release of cement or other toxic substances into surface waters. Project related spills of hazardous materials shall be reported to appropriate entities including but not limited to applicable jurisdictional city, FWS, and CDFG, RWQCB and shall be cleaned up immediately and contaminated soils removed to approved disposal areas	No	No natural stream resources occur on site

BMP No.	BMP	Applicable Yes or No	Comment
9	Erodible fill material shall not be deposited into water courses. Brush, loose soils, or other similar debris material shall not be stockpiled within the stream channel or on its banks.	No	No natural stream resources occur on site
10	The qualified project biologist shall monitor construction activities for the duration of the project to ensure that practicable measures are being employed to avoid incidental disturbance of habitat and species of concern outside the project footprint.	No	There are no sensitive species or habitat on the Project site.
11	The removal of native vegetation shall be avoided and minimized to the maximum extent practicable. Temporary impacts shall be returned to pre-existing contours and revegetated with appropriate native species.	No	Vegetation on-site is ruderal.
12	Exotic species that prey upon or displace target species of concern should be permanently removed from the site to the extent feasible.	Yes	Vegetation on-site is ruderal.
13	To avoid attracting predators of the species of concern, the project site shall be kept as clean of debris as possible. All food related trash items shall be enclosed in sealed containers and regularly removed from the site(s).	No	There are no sensitive species on site or adjacent to the site.
14	Construction employees shall strictly limit their activities, vehicles, equipment, and construction materials to the proposed project footprint and designated staging areas and routes of travel. The construction area(s) shall be the minimal area necessary to complete the project and shall be specified in the construction plans. Construction limits will be fenced with orange snow screen. Exclusion fencing should be maintained until the completion of all construction activities. Employees shall be instructed that their activities are restricted to the construction areas.	No	There are no sensitive species on site or adjacent to the site.
15	The Permittee shall have the right to access and inspect any sites of approved projects including any restoration/enhancement area for compliance with project approval conditions including these BMPs.	No	No restoration areas are required.

11 REFERENCES

USFWS (United States Fish and Wildlife Service). 2000. *Southwestern Willow Flycatcher Protocol Revision 2000.* Sacramento, California: USFWS. https://www.fws.gov/pacific/ecoservices/endangered/recovery/documents/SWWFlycatcher.2000.protocol.pdf

USFWS. 2001. *Least Bell's Vireo Survey Guidelines*. January 19, 2001. Sacramento, California: USFWS. https://www.fws.gov/cno/es/Recovery_Permitting/birds/least_bells_vireo/LeastBellsVireo_SurveyGuidelines_20010119.pdf

USFWS. 2015. *A Natural History Summary and Survey Protocol for the Western Distinct Population Segment of the Yellow-Billed Cuckoo.* Prepared by M. Halterman, M.J. Johnson, J.A. Holmes, and S.A. Laymon. Sacramento, California: USFWS. April 2015. https://www.fws.gov/southwest/es/Documents/R2ES/YBCU_SurveyProtocol_FINAL_DRAFT_22Apr2015.pdf

12 SUPPORTING APPENDICES

The following supporting reports are attached:

Figure 1 - Regional Overview Site Vicinity
Figure 2 - Site Location – Topo Base
Figure 3 - Site Location- Aerial Base
Figure 4 – Site Plan
Figure 5 – Soils
Figure 6 – Vegetation Map
Figure 7 CNDDB Results

Appendix A – Photos
Appendix B – Biological Resources Assessment, February 2021

Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

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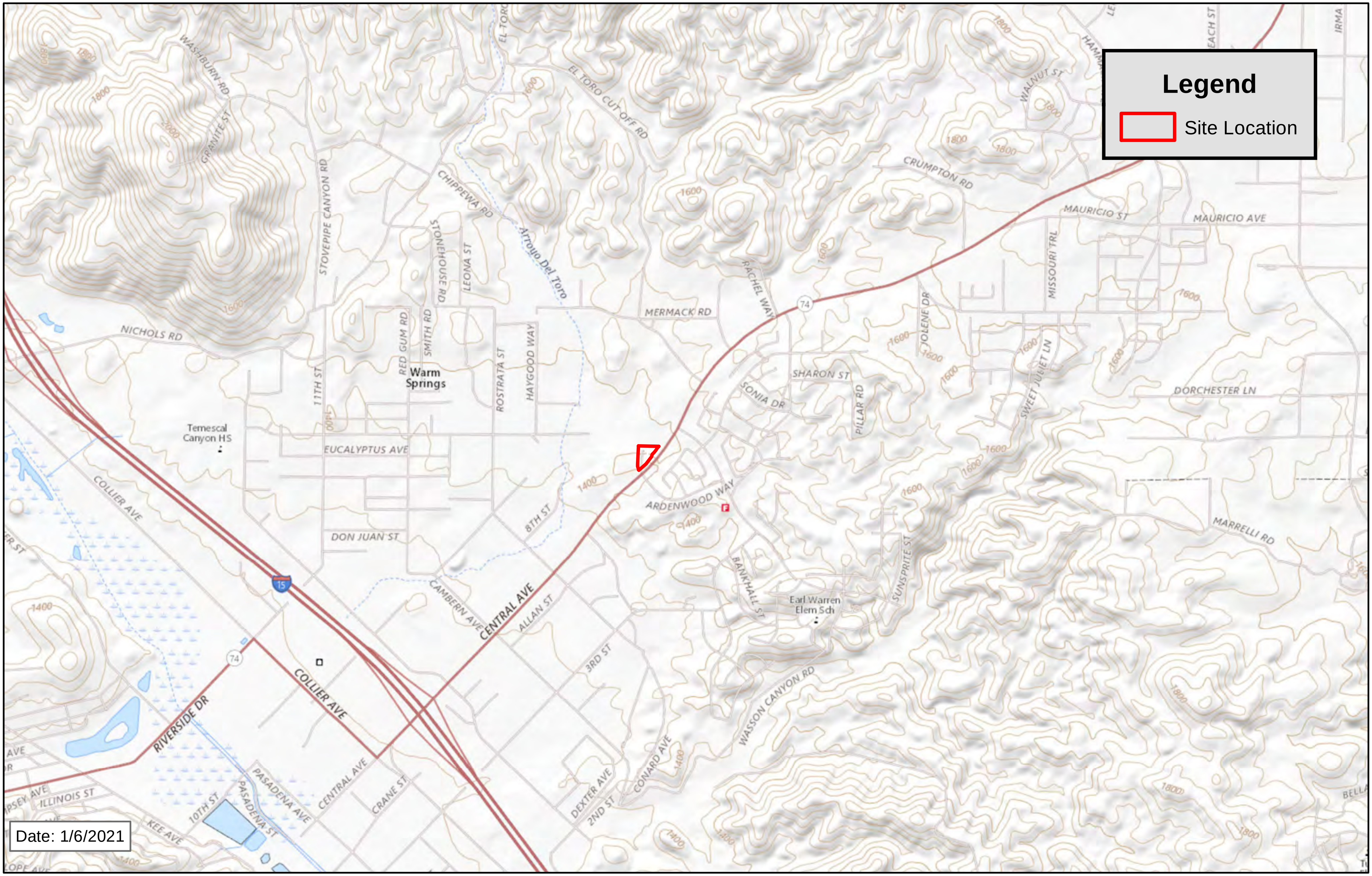
Figure 1 - Regional Overview Site Vicinity	76 Gas Station - 74 Highway Lake Elsinore, CA



0 0.15 0.3 0.6 0.9 1.2 Miles

1 inch = 2,000 feet

Imagery Date: 8/6/2017

Service Layer Credits: USGS The National Map: National Boundaries Dataset, 3DEP Elevation Program, Geographic Names Information System, National Hydrography Dataset, National Land Cover Database, National Structures Dataset, and National Transportation Dataset; USGS Global Ecosystems; U.S. Census Bureau TIGER/Line data; USFS Road Data; Natural Earth Data; U.S. Department of State Humanitarian Information Unit; and NOAA National Centers for Environmental Information, U.S. Coastal Relief Model. Data refreshed October 2018.

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N

Figure 2 Site Location	76 Gas Station - 74 Highway Lake Elsinore, CA

0 0.0325 0.065 0.13 0.195 0.26 Miles

1 inch = 417 feet

Imagery Date: 7/19/2019

Service Layer Credits: Esri, HERE, Garmin, (c) OpenStreetMap contributors
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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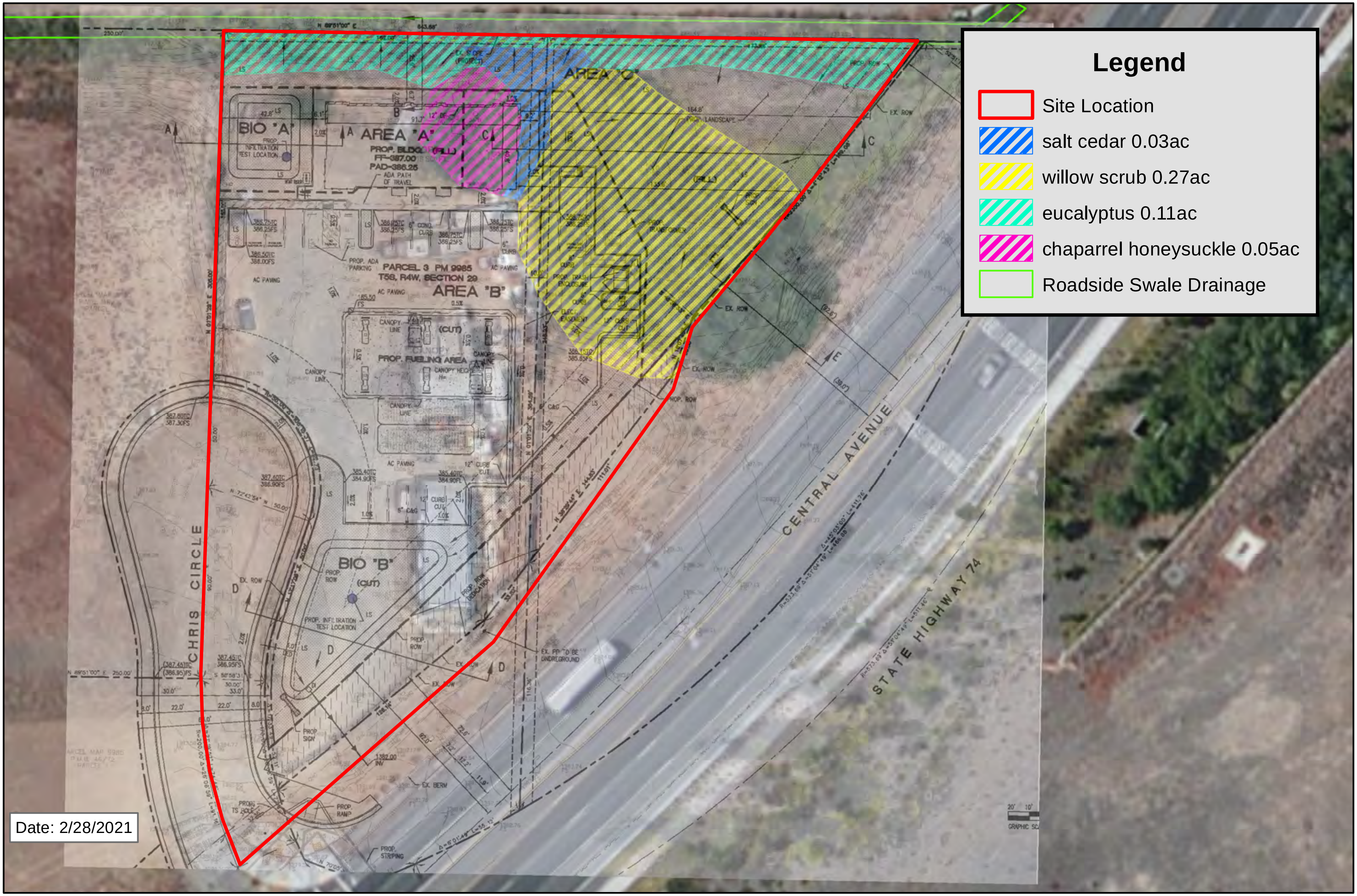
N

Figure 3 Site Location	76 Gas Station - 74 Highway Lake Elsinore, CA



0 0.00475 0.0095 0.019 0.0285 0.038 Miles

1 inch = 58 feet

Imagery Date: 7/19/2019

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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Figure 4 Site Plan	76 Gas Station - 74 Highway Lake Elsinore, CA

0 0.005 0.01 0.02 0.03 0.04 Miles

1 inch = 83 feet

Imagery Date: 7/19/2019

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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Figure 5 Soils	76 Gas Station - 74 Highway Lake Elsinore, CA

0 0.0075 0.015 0.03 0.045 0.06 Miles

1 inch = 108 feet

Imagery Date: 7/19/2019

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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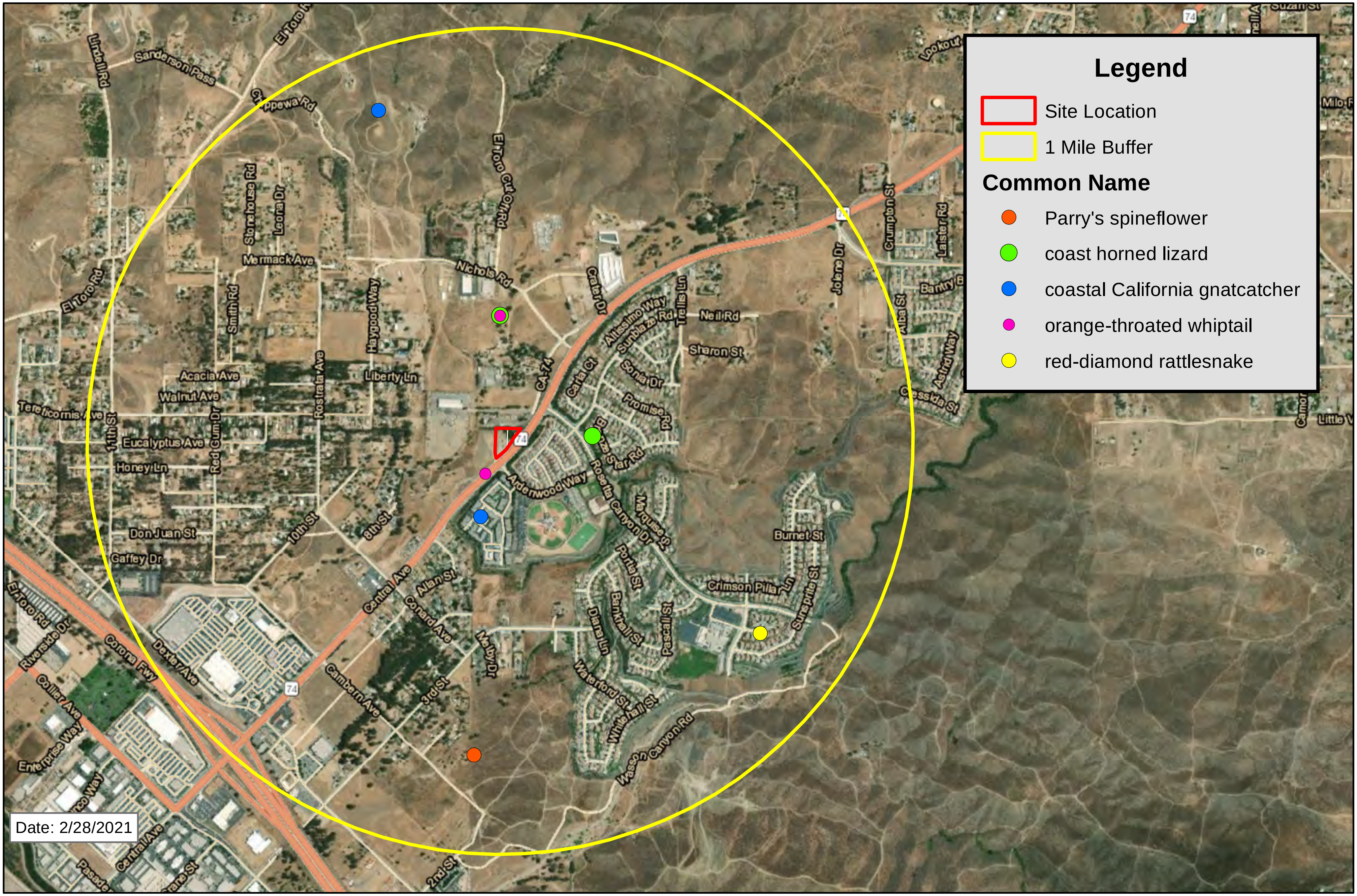
Figure 6 Vegetation	76 Gas Station - 74 Highway Lake Elsinore, CA



0 0.125 0.25 0.5 0.75 1 Miles

1 inch = 1,619 feet

Imagery Date: 7/19/2019

Service Layer Credits: Esri, HERE, Garmin, (c) OpenStreetMap contributors
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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Figure 7 CNDDB	76 Gas Station - 74 Highway Lake Elsinore, CA

Appendix A – Photos

0 0.0075 0.015 0.03 0.045 0.06 Miles

1 inch = 108 feet

Imagery Date: 7/19/2019

Service Layer Credits: Esri, HERE, Garmin, (c) OpenStreetMap contributors
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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Photo Map	76 Gas Station - 74 Highway Lake Elsinore, CA

Appendix A – Site Photos

Photo 1 – Facing north east from the most southern point of the Project.

Photo 2 – Facing west, start of encampment.

	Photo 3 – Looking west, northern encampment.
	Photo 4 – Facing east toward HWY74.

	Photo 5 – Facing west, between the two encampments.
	Photo 6 – Facing east.

	Photo 7 – Facing south from the northwest portion of the Project.
	Photo 8 – Facing west from the most northwestern point of the Project.

Appendix B – Biological Resources Assessment, February 2021

JÉRICHO SYSTEMS INC.
Progress & Preservation
47 1st Street, Suite 1
Redlands, CA 92373-4601
(909) 915-5900

February 23, 2021
(Revised May 1, 2021)

Joseph Karaki, President
Karaki WS
4887 E. La Palma Ave, Suite 707
Anaheim, CA 92807

RE: Biological Resources Assessment, Jurisdictional Delineation
Commercial Retail (76 Station) – APN: 347-130-029 & 347-130-028
Central Avenue (Hwy 74) and Eighth Street
City of Lake Elsinore, Riverside County, California

Dear Mr. Karaki:

Jericho Systems, Inc. (Jericho) is pleased to provide this Biological Resources Assessment and Jurisdictional Delineation for the above-referenced Project.

The results of Jericho's field survey are intended to provide sufficient baseline information to the County of Riverside, City of Lake Elsinore, and, if required, to federal and State regulatory agencies, including U.S. Fish and Wildlife Service (USFWS) and California Department of Fish and Wildlife (CDFW), respectively, to determine if impacts will occur, quantify those impacts and to identify mitigation measures to offset any impacts.

The Project site is located within the Western Riverside County Multiple Species Habitat Plan (MSHCP) area and as such, is subject to the conditions and conservation requirements identified in the MSHCP. Riverside County adopted the MSHCP on June 17, 2003. The City of Lake Elsinore is signatory to the MSHCP Implementing Agreement and thereby a permittee responsible for meeting the terms and conditions outlined in the MSHCP and the Biological Opinion issued for the MSHCP. Therefore, the City of Lake Elsinore has the responsibility to ensure the projects they approve are consistent the MSHCP and will not preclude the overall conservation goals and reserve design from being accomplished.

The MSHCP is a criteria-based plan and identification of planning units on which to base the Criteria is necessary for such a criteria-based plan. The MSHCP Conservation Area is comprised of a variety of existing and proposed Cores, Extensions of Existing Cores, Linkages, Constrained Linkages and Non-contiguous Habitat Blocks. The MSHCP coverage area is divided into Area Plans (AP) based on the Riverside County's General Plan Area Plan boundaries. Each of the AP's has: established conservation criteria, species specific surveys that may be required based on on-site Habitat Assessment, and resources and areas identified for conservation. In each Area Plan text, applicable Cores and Linkages are identified.

There are 146 species covered by the MSHCP. Surveys are not required for 106 of these covered species. The remaining 40 covered species may require focused surveys for proposed development projects include 4 birds, 3 mammals, 3 amphibians, 3 crustaceans, 14 Narrow Endemic Plants, and 13 other sensitive plants within the Criteria Area. The need to conduct focused surveys for all but six of these 40 species is determined by the presence of suitable habitat within designated 'survey areas' mapped for each of the species. The remaining six species that require focused surveys throughout the entire MSHCP area are associated with riparian/riverine areas and vernal pools and include least Bell's vireo, southwestern willow flycatcher, western yellow-billed cuckoo, Riverside fairy shrimp, Santa Rosa Plateau fairy shrimp, and vernal pool fairy shrimp.

The MSHCP requires that a project comply with the MSHCP policies identified in Section 6 of the MSHCP. For this Project site, a habitat suitability assessment for burrowing owl (MSHCP section 6.3.2) and MSHCP Riparian/Riverine resources (MSHCP section 6.1.2) was required and conducted.

The Project site was also evaluated for the presence jurisdictional waters, subject to the federal Clean Water Act (CWA), Porter-Cologne (Porter-Cologne) and California Fish and Game Code (FGC) regulations. Jurisdictional resources subject to the CWA regulations include non-wetland waters and wetland waters of the U.S. (WoUS) whereas jurisdictional resources subject to Porter-Cologne include non-wetland waters and waters of the State (WoS). The California FGC encompasses the resources that constitute a stream or river, including associated riparian vegetation and floodplain.

Evaluation of Riparian/Riverine resources followed guidance provided in the MSHCP Section 6.1.2. Potential federal jurisdiction followed the regulations set forth in 33CFR part 328 and the USACE guidance documents and evaluation of potential State jurisdiction followed guidance in the Fish and Game Code and A Review of Stream Processes and Forms in Dryland Watersheds (CDFW, 2010).

PROJECT LOCATION

The approximately 1.9-acre Project site is made up of two parcels: APN 347-130-029 (1.12 acre) and 347-130-028 (0.49 acre) and is located in the City of Lake Elsinore, Riverside County, California. The Project site is bounded on the north by 8th Street, on the south by Ardenwood Way and rural industrial land use, on the east by Hwy 74 (Central Avenue), and on the west by vacant land. The project site can be found on the *Lake Elsinore* U. S. Geological Survey (USGS) 7.5-minute topographic map within Section 29 of Township 5 South, Range 4 West (Figure 1-3).

PROJECT UNDERSTANDING

The Project proposes a gas station consisting of a 3,516 square foot (sf) convenience store, 3,160 sf fueling canopy with six multi-product dispensers, and two underground storage tanks. See Figure 4 for site layout.

METHODS

Prior to the field investigation, reference materials and databases relevant to the Project site were reviewed for the *Lake Elsinore* 7.5-minute USGS quadrangle. The sources reviewed included:

- California Natural Diversity Database (CNDDB) *Rarefind 5*);
- CNDDB Biogeographic Information and Observation System (BIOS);
- California Native Plant Society Electronic Inventory (CNPSEI) database;
- Calflora Database;
- USDA Natural Resources Conservation Service (NRCS) Web Soil Survey;

- USF-WS National Wetland Inventory;
- Environmental Protection Agency (EPA) Water Program "My Waters" data layers;
- RCA/MSHCP Information Map

On January 16, 2021, Jericho Principal Ecologist, Shay Lawrey conducted a field survey of the Project site with focus on potential habitat for listed species, sensitive species, migratory birds, burrowing owl and riverine/riparian/vernal pool resources. Ms. Lawrey is a qualified biologist with advanced degrees in Biology and 25 years of experience surveying for the sensitive species known to in California and riverine/riparian/vernal pool resources. Ms. Lawrey surveyed the Project site on a calm weather, overcast day, during peak animal activity, between 8:30 a.m. and 10:30 am.

Ms. Lawrey conducted the survey by walking transects spaced in approximately 15 meters (approximately 50 feet) intervals to provide 100 percent visual coverage of the ground surface. Wildlife species were detected during field surveys by sight, calls, tracks, scat, or other signs. In addition to species observed, expected wildlife usage of the site was determined according to known habitat preferences of local wildlife species and knowledge of their relative distributions in the area. Ms. Lawrey assessed the Project site for habitat type, structure, species composition/association, condition, and human disturbances. Attention was focused on identifying potential habitat for special status species known to occur locally and identifying potential jurisdictional waters and/or riverine/riparian/vernal pool resources within and/or adjacent to the Project site.

Riverside County also requires that any survey limitations be identified. No limitations affected the results and conclusions given herein. The buffer survey area located on adjacent private property was surveyed via binoculars to avoid trespass. Surveys were conducted during the appropriate season to observe the target species, in good weather conditions, by a qualified biologist who followed all pertinent protocols.

Stephen's kangaroo rat Habitat Assessment

The RCA Mapping Information System identified that the Project parcel is not in a Stephen's kangaroo rat (*Dipodomys stephensi*, [SKR]) fee area. Therefore, this analysis was not applicable.

Burrowing Owl Habitat Assessment

The RCA Mapping Information System identified that APN 347-130-028 (0.49 acre), located in the Project's northeastern portion is within a survey area required for the western burrowing owl (*Athene cunicularia hypugaea*) [BUOW]) (Figure 5).

The BUOW habitat suitability assessment was conducted in accordance with the Western Riverside County MSHCP, which follows the 1993 *"Burrowing Owl Survey Protocol and Mitigation Guidelines"* prepared by the California Burrowing Owl Consortium. Step 1 of the survey protocol is the habitat suitability assessment. If suitable habitat is present, this protocol requires four (4) surveys between April 15 and July 15 with the first site survey counting as one survey period.

Burrowing owl habitat generally includes, but is not limited to, short or sparse vegetation (at least at some time of year), presence of burrows, burrow surrogates or presence of fossorial mammal dens, well-drained soils, and abundant and available prey.

Per the literature review, the closest documented BUOW occurrence is approximately 3.8 miles northeast from the Project site along Highway 74 near Ethanac Road and Eugene Street. There are no BUOW occurrences documented in the Project area,

Natural and non-natural substrates were examined for potential burrow sites. The site was searched for molted feathers, whitewash, cast pellets and/or prey remains. Disturbance characteristics and all other animal sign encountered within the survey area were recorded. Date time and weather conditions were logged. A hand-held, global positioning system (GPS) unit was used to survey to identify survey area boundaries. Representative photographs of the survey area were taken, and Google Earth Pro was accessed to provide recent aerial photographs of the Project site and surrounding area.

Riverine/Riparian Areas and Jurisdictional Waters

The site was also assessed for State and /or federal jurisdictional waters that are subject to Sections 404 and 401 of the federal CWA regulated by the U.S. Army Corps of Engineers (USACE) and Regional Water Quality Control Board (RWQCB) respectively; and/or Section 1602 of the California Fish and Game Code (FCG) administered by the CDFW and Riverine/Riparian and Vernal Pool habitat subject to Section 6.1.2 of the MSHCP.

The methods used in this study to delineate the non-wetland WoUS at the Ordinary High Water Mark (OHWM) in variable, ephemeral, intermittent, or perennial non-wetland waters followed guidance described in *A Field Guide to the Identification of the Ordinary High Water Mark in the Arid West Region of the Western United States* (Lichvar and McColley 2008) and the *Updated Datasheet for the Identification of the Ordinary High Water Mark in the Arid West Region of the Western United States* ("Updated Datasheet", Curtis and Lichvar 2010).

The RWQCB maintains jurisdiction over all waters of the State, including wetlands. For the purposes of Porter-Cologne, the methods used to determine federal jurisdiction over non-wetland waters were also used to determine the extent of RWQCB jurisdiction over non-wetland waters within the property.

Evaluation of FGC Section 1600 Streambed Waters followed guidance in the Mapping Episodic Stream Activity (MESA) protocols *[MESA Field Guide*], pursuant to which CDFW claims jurisdiction beyond traditional stream banks and the outer edge of riparian. Under MESA, the term stream is defined broadly to include "a body of water that flows perennially or episodically and that is defined by the area in which water currently flows, or has flowed, over a given course during the historic regime [i.e., 'circa 1800 to the present'], and where the width of its course can reasonably be identified by physical or biological indicators."

The methods used to determine any riparian/riverine or vernal pool areas were based on the above techniques as well as soils evaluations and vegetation classifications. This is because an area may be characterized as riparian based on its vegetative composition but does not meet the criteria of being federal or state jurisdictional water.

RESULTS

Regional Setting

According to the U.S. EPA Regional map, the Project site is located in the Inland Valleys (85k) ecoregion. An ecoregion is a regional area that has similar ecosystems in terms of type, quality, and quantity of environmental resources. The Inland Valleys ecoregion is influenced less by marine processes, and more by alluvial processes. The ecoregion consists of alluvial fans and basin floors at the base of the San Bernardino and San Gabriel mountains and the San Jacinto and Perris Valleys in the south. Soil moisture is generally xeric, and historically, the region was composed of Riversidean coastal sage scrub, valley grasslands, and riparian woodlands. The ecoregion is now heavily urbanized with some remaining agriculture.

Hydrologically, the Project site is located within the Lake Mathews hydrologic area, in the 14,217-acre hydrologic sub-area (HSA 801.35) within the Temescal Wash watershed (HUC 180702030601) (Figure 6).

The City of Lake Elsinore is located in southwestern Riverside County at the foothills of the Cleveland National Forest. Topographically, Lake Elsinore is located on the east side of the Santa Ana mountains. The general climate of Lake Elsinore includes hot summers (99°F average maximum in August) and mild winters (38°F average minimum) with cool ocean breezes and sparse winter rainfall, averaging 12.09 inches of precipitation per year.

According to the database searches, 53 sensitive species (24 plants ,24 vertebrates, 5 invertebrates) and 3 sensitive habitats have been documented in the *Lake Elsinore* USGS quadrangle (Table 1). Figure 7 depicts the sensitive species within a one mile radius of the Project site.

Existing Site Conditions

Weather conditions during the survey were overcast with no wind. Survey hours of spanned from 8:30 a.m. to 10:30 a.m. with temperatures ranging from 65 degrees Fahrenheit (° F) to 70° F

The topography of the Project site is relatively flat, with elevation increasing in the northern portion of the parcel. Site elevation ranges from 1,414 feet to 1,389 feet above mean sea level (MSL).

The Project site is vacant and is surrounded by flat bladed disturbed land on the west, south, and north, and by Hwy 74 (Central Avenue) to the east. The site does not connect to native, undisturbed areas.

Soils on the Project site area consist of Cortina cobbly loamy sand, 2-9% slopes (CmC), Lodo rocky loam, 25-50% slopes (LpF2), and Arbuckle gravelly loam, 2-9% slopes – dry, MLRA 19 (AIC), (Figure 8). Soils in the Arbuckle series are well-drained remnants of alluvial fans derived from numerous types of rock. Soils in the Cortina series are well-drained soils made from alluvium derived from metasedimentary rock. The Lodo series consists of shallow, somewhat excessively drained soils that formed in material weathered from hard shale and fine grained sandstone. Terrace escarpments are landforms (terraces) made from alluvium derived from mixed sources.

The entire site is mapped by the RCA MSHCP Vegetation (2012) layer as developed/disturbed land, and the site survey confirmed these findings for all but the northeast corner, which consists of a mix of salt cedar, eucalyptus and willow scrub. The vegetation here is used as cover for a homeless encampment that supports approximately 10 transients. This area is heavily littered and disturbed. Many of the bushes and trees on site have had trunks/branches sawed off and used for cover in the homeless encampment.

Habitat

The northeast corner of the Project site supports an over-story canopy of eucalyptus trees (*Eucalyptus* ssp) approximately 35 feet in height, with a range in diameter at breast height (DBH) of 6 inches to 18 inches. The mid-story is densely covered in salt cedar (*Tamarix ramossima*) with a small thicket of black willow shrubs (*Salix gooddingii*). The average height of the mid-story is approximately 12 feet. The dense understory primarily consists of short-podded mustard (*Hischfeldia incana*), tocalote *(Centaurea melitensis*), and non-native grasses (*Bromus* ssp.). A few native plants are found scattered along the eastern and western edges of the Project site including California buckwheat (*Erioginum faciculatum*), encilia (*Encilia farinosa)* and telegraph weed (*Heterotheca grandiflora*). The remainder of the Project site is bare and compacted due to blading.

Although, the vegetation in the northeastern corner of the Project site is mostly non-native (salt cedar and eucalyptus) and heavily impacted by a homeless encampment, it provides potentially suitable habitat for nesting birds, including raptor species.

Wildlife

Wildlife observed at the time of survey included yellow-rumped warbler, black phoebe, white-crowned sparrow, common raven, American crow, lesser goldfinch, house finch, European starling and mourning dove.

MSHCP Surveys

The Regional Conservation Authority (RCA) Information Map identifies the following for both APN 347-130-029 and 347-130-028:

- The parcels are located in the Elsinore Area Plan of the MSHCP.
- APN 347-130-028 is located in an area that requires focused BUOW surveys be conducted if suitable habitat is present. APN 347-130-029 is not located in an BUOW survey area (Figure 4)
- The parcels are not located in or adjacent to a Criteria Cell
- The parcels are not in a criteria species survey area
- The parcels are not in a mammal survey area
- The parcels are not in a narrow endemic plant survey area
- The parcels are not in a cellgroup

Burrowing owl (BUOW)

BUOW are known to occur locally within suitable habitat areas, with the closest occurrence being 3.6 miles northeast from the Project site along Highway 74 near Ethanac Road and Eugene Street in 1999.

The BUOW is currently designated as a California Species of Special Concern. It is a grassland specialist distributed throughout western North America where it occupies open areas with short vegetation and bare ground within shrub, desert, and grassland environments. They use a wide variety of arid and semi-arid environments with level to gently-sloping areas characterized by open vegetation and bare ground. BUOWs rarely dig their own burrows and are instead dependent upon the presence of burrowing mammals (i.e., California ground squirrels [*Otospermophilus beecheyi*], coyotes, and badgers [*Taxidea taxus*]) whose burrows are often used for roosting and nesting. The presence or absence of colonial mammal burrows is often a major factor that limits the presence or absence of BUOWs. Where mammal burrows are scarce, burrowing owls have been found occupying man-made cavities, such as buried and non-functioning drain pipes, stand-pipes, and dry culverts. They also require low growth or open vegetation allowing line-of-sight observation of the surrounding habitat to forage and watch for predators. In California, the BUOW breeding season extends from the beginning of February through the end of August.

Under the MSHCP burrowing owl is considered an adequately conserved covered species that may still require focused surveys in certain areas as designated in Figure 6-4 of the MSHCP. The survey for burrowing owl requires a systematic survey of all areas that provide suitable habitat plus a 150-meter (approximately 500 feet) zone of influence on all sides of suitable habitat, where applicable.

The area on site requiring BUOW surveys is densely vegetated in a three story canopy cover structure that includes eucalyptus trees, salt cedar and willows, and non-native grasses and weeds. The habitat composition and structure is not suitable for BUOW. No burrows, feathers, whitewash, castings, prey remains or BUOW individuals were observed on site or in the survey buffer area which was surveyed by binoculars. (The adjacent properties are private property and access was not granted to survey). Based on the survey results BUOW are absent, the habitat within the required survey area is unsuitable and therefore, further investigation is not recommended or warranted

Heritage Trees

The City of Lake Elsinore's Palm Tree Preservation Program is limited to palm species within the city limits. Palm trees are not on site; therefore, the Project will not impact heritage trees.

Riverine/Riparian Areas and Jurisdictional Waters

A roadside swale originating from HWY74 and N. Frontage road located along the northeastern boundary of the site, enters the Project site in the northern portion of APN 347-130-028 and continues westerly along the property boundary between the Project site and the parcel north of the Project site (Figure 7). This swale collects street runoff and is not a natural or jurisdictional feature subject to Sections 1600 of the FGC or 404/401 of the federal CWA. There is no bed or bank associated with this swale indicating a flow of water. The water runoff from HWY 74 travels west, back flows to the southeast and percolates in the well-drained soils. There is no evidence that the swale connects to the blue line stream located off-site to the west.

This roadside is a result of man-made roadside water diversion from HWY 74 and is not considered jurisdictional or riverine/riparian. Although the patch of willows growing in the mid-story of the swale are riparian it is not the intent of the MSHCP to conserve small patches of riparian species growing as a direct result of man-made features. The willows occur as a direct result of roadside runoff. If the run off was redirected, these willows would not exist. For further clarification as defined under Section 6.1.2 of the MSHCP, *Protection of Species Associated with Riparian/Riverine*

Areas and Vernal Pools, riparian/riverine areas are areas dominated by trees, shrubs, persistent emergent plants, or emergent mosses and lichens which occur close to or are dependent upon nearby freshwater, or areas with freshwater flowing during all or a portion of the year. Conservation of these areas is intended to protect habitat that is essential to a number of listed or special-status water-dependent fish, amphibian, avian, and plant species.

Based on the Project's Site Plan (Figure 8), 0.41 acre will be permanently impacted by grading and construction.

Due to the presence of a willow scrub thicket the following three bird species must be addressed according to the MSHCP.

- Southwestern willow flycatcher (*Empidonax trallii extimus*) [SWWF]
- least Bell's vireo (*Vireo bellii pusillus*) [LBVI]
- yellow-billed cuckoo (*Coccyzus americanus*) [YBCU]

Southwestern willow flycatcher

The southwestern willow flycatcher (SWWF) is a State and federally listed species. In 1992, it was listed by the California Fish and Game Commission endangered, under the California Endangered Species Act (CESA) of 1970. It was federally listed as endangered on February 27, 1995, under the ESA (60 FR 10694). The USFWS designated critical habitat for the species on July 22, 1997. This habitat includes 18 units with a total of 599 miles of river in California, New Mexico, and Arizona. In California, critical habitat was designated along portions of the Santa Ana River, San Luis Rey River, San Diego River, Santa Margarita River, Tijuana River, and south fork of the Kern River (62 FR 39129). On May 11, 2001, the critical habitat designation from 1997 was struck down by the U.S. 10th Circuit Court of Appeals who required further economic analysis. A recovery plan was finalized by USFWS in March of 2003. Critical habitat designations for this species were re-proposed and finalized in June 2004 (USFWS, 2003c).

The species historical range included Arizona, California, Colorado, New Mexico, Texas, and Utah. Southwest Region (Region 2) Counties in California in which this population is known to or is believed to occur: Fresno, Imperial, Inyo, Kern, Los Angeles, Madera, Mono, Monterey, Orange, Riverside, San Benito, San Bernardino, San Diego, San Luis Obispo, Santa Barbara, Santa Cruz, Tulare, Tuolumne, Ventura.

The SWWF is a small passerine bird measuring approximately 5.7 inches in length. It has a grayish-green back and wings, whitish throat, a light gray-olive breast, and pale yellowish belly. It has two visible white wing bars and a faint or absent eye ring. The call consists of a repeated "whit" and their song is a sneezy "fitz-bew." (60 FR 10694). The SWWF is currently one of the four recognized subspecies of the willow flycatcher. This flycatcher is a neotropical migrant that breeds in the southwestern United States from mid-April to early-September. In the fall, it migrates south to its wintering grounds in portions of South America, Central America and Mexico. (60 FR 10694)

The SWWF breeds in dense riparian habitats along rivers, streams, and other wetlands at elevations ranging from sea level to 8,500 feet (Sogge 1997). Occupied habitat is generally dominated by shrubs and trees 13 to 23 feet or more in height, which provide dense lower and mid-story vegetation approximately 10 to 13 feet aboveground. This dense vegetation is often interspersed with open water, small openings, or sparse vegetation, creating a mosaic that is not uniformly dense (62 FR

39129). Plant species closely associated with the flycatcher include willows (Salix spp.), boxelder (*Acer negungo*), seepwillow (*Baccharis* spp.), with an overstory of cottonwood (*Populus fremontii*) (62 FR 39129).

The SWWF has not been documented on site or within a one mile radius. The small willow scrub thicket onsite is highly degraded and occupied by transients. The habitat formed as a result of street run off and does not have the size or structure preferred by this species. They are found in habitat areas with a well-developed overstory, mid-story, understory, consisting of willow, mule fat and cottonwood, near water, with a minimum patch size of four (4) acres. This species requires a habitat structure of a 20-30-foot upper canopy, 15-12 foot mid-story and a lower story of 5-3 feet. This species is not found in salt cedar or eucalyptus. Although there is a willow component it is not the size or structure where this species is found. These conditions are absent from the site. The acreage and structure of 0.11 acre of eucalyptus trees approximately 35 feet in height, with a range in diameter at breast height (DBH) of 6 inches to 18 inches and a mid-story densely covered in 0.03 acre of salt cedar with a DBH of 8 inches and 0.27 acre of black willow shrubs with a DBH of 6 inches is not the type of habitat is not the type or structure that this species is found.

Nor are they found in high disturbance areas which is the case on site due to the transient encampments and cutting of the vegetation. The specific requirement for this species is the presence of water. These are not the conditions on site.

Therefore, SWWF has no potential to occur on site and /or in the Project vicinity. Further investigation is not warranted.

Least Bell's vireo

Least Bell's vireo (LBVI) was first proposed for listing as endangered by the USFWS on May 3, 1985, (50 FR 18968) and was subsequently listed as federally endangered on May 2, 1986 (60 FR 10694). Critical habitat units were designated by the USFWS on February 2, 1994 (59 FR 4845) and included reaches of ten streams in six counties in southern California and the surrounding approximately 38,000 acres. The critical habitat units exist in the Santa Ynez River, Santa Clara River, Santa Ana River, Santa Margarita River, San Luis Rey River, Sweetwater River, San Diego River, Tijuana River, Coyote Creek, and Jumul-Dulzura Creek.

The species historical range included California; California/Nevada Region (Region 8)Counties in California in which this population is known to or is believed to occur includes: Imperial, Inyo, Kern, Los Angeles, Monterey, Orange, Riverside, Sacramento, San Benito, San Bernardino, San Diego, San Joaquin, San Luis Obispo, Santa Barbara, Santa Clara, Santa Cruz, Stanislaus, Tulare, Ventura, Yolo.

The LBVI is a small, olive-gray migratory songbird that nests and forages almost exclusively in riparian woodland habitats. Bell's vireos as a group are highly territorial and are almost exclusively insectivorous. LBVI generally begin to arrive from their wintering range in southern Baja California and establish breeding territories by mid-March to late-March. A large majority of breeding vireos depart their breeding grounds by the third week of September and only a very few have been found wintering in the United States.

Nests are usually placed in forks of branches between 2 and 5 feet from the ground. Females lay two to five eggs with both parents incubating the clutch for approximately 14 days and the young fledging after 10 to 12 days. The fledglings will remain in the parental territory for up to a month. LBVI leave the breeding grounds and migrate south mid to late September.

Their nesting habitat typically consists of well-developed overstory, understory, and low densities of aquatic and herbaceous cover. The understory frequently contains dense sub-shrub or shrub thickets. The overstory usually contains black willow, cottonwood and Sycamore. These thickets are often dominated by plants such as narrow-leaf willow, mulefat, young individuals of other willow species such as arroyo willow or black willow, and one or more herbaceous species. Although LBVI use a variety of riparian plant species for nesting, it appears that the structure of the vegetation is more important than other factors such as species composition or the age of the stand. Vireos forage in riparian habitats up to 984 feet from the nest and use both high and low scrub layers as foraging substrate.

The LBVI has not been documented on site or within a 1- mile radius. The small willow scrub thicket onsite is highly degraded and occupied by transients. The habitat formed as a result of street run off and does not have the structure or patch size preferred by this species. The acreage and structure of 0.11 acre of eucalyptus trees, approximately 35 feet in height, with a range in diameter at breast height (DBH) of 6 inches to 18 inches and a mid-story densely covered in 0.03 acre of salt cedar with a DBH of 8 inches and 0.27 acre of black willow shrubs, with a DBH of 6 inches is not the type of habitat that this species is found. This species is not found in salt cedar or eucalyptus.

Nor are they found in high disturbance areas. Although there is a willow component, it is not the size or structure where this species is found. They are located in well-developed overstory, mid-story, understory, and low densities of aquatic and herbaceous cover with a minimum patch size of two (2) acres, which is not the case for this site.

Therefore, LBVI has no potential to occur on site and /or in the Project vicinity. Further investigation is not warranted.

Yellow-billed cuckoo

The YBCU is listed as endangered in the state of California and was federally listed as threatened in 2014. Designation of critical habitat for the western distinct population segment of the Yellow-Billed Cuckoo (*Coccyzus americanus*) was made by the USFWS in 2014 (50 CFR Part 17). In 1971 it was listed by the California Department of Fish and Game as Rare. By 1977 it had become "one of the rarest birds" in the state. A 1977 survey of historical sites and suitable habitat at six widely scattered rivers turned up 54 birds in the Sacramento Valley (Tehama, Putte, Glenn, Colusa, and Sutter counties), 9 on the South Fork of the Kern River near Weldon, 3 along the Santa Ana River, Riverside County, 4 in Owens Valley, Inyo County, 6 on the Armargosa River south of Tecopa, Inyo and San Bernardino County, and 65 on both sides of the Colorado River from the Nevada state line to the Mexican border (Gaines 1977). By 1986 the entire breeding population in California had dropped to 31-42 pairs (Laymon and Halterman 1987).

The YBCU was once common in riparian habitat throughout the western United States. In California the YBCU has declined from a "fairly common breeding species" throughout most of the state to a current population of less than 50 pairs (Gaines and Laymon 1984; Laymon and Halterman 1991). The geographical breeding range of the YBCU in the western United States North America includes suitable habitat within the low- to moderate-elevation areas, including the upper and middle

Rio Grande, the Colorado River Basin, the Sacramento and San Joaquin River systems, the Columbia River system, and the Fraser River.

The species historical range included Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Texas, Utah, Washington, Wyoming. The California/Nevada Region (Region 8) Counties in California in which this population is known to or is believed to occur include: Alameda, Butte, Colusa, Contra Costa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Kern, Lake, Lassen, Madera, Marin, Mendocino, Modoc, Mono, Plumas, Sacramento, San Francisco, San Joaquin, San Luis Obispo, San Mateo, Santa Clara, Shasta, Sierra, Siskiyou, Solano, Sonoma, Stanislaus, Sutter, Tehama, Trinity, Tulare, Tuolumne, Yolo, and Yuma.

The YBCU is a medium sized bird, with a long and slim profile. Its legs are short and bluish-gray, and its tail is gray-brown above and black below with three striking pairs of large white dots visible in flight. Its body is brown above with white under parts. The undersides of its pointed wings are rufous. Adult birds have a long-curved bill which is blue-black above and yellow at the base of the mandibles. Juveniles have a completely blue-black bill.

Though the YBCU will occupy a variety of marginal habitats, particularly at the edges of their range, YBCU in the West are overwhelmingly associated with relatively expansive stands of mature cottonwood willow forests. Canopy height ranged from 5-25 m, canopy cover from 20-90 percent, and understory cover from 30-90 percent. Willows and open water are required and the habitat will vary from dense willow-cottonwood forests to marshy bottomlands with scattered willow thickets. Today, five of the remaining eight populations in California are in immediate danger of extinction, including 2 sites in Owens Valley, the Armargosa River near Tecopa, the Mojave River and the Santa Ana River. These populations only harbor 1-2 individuals in some years and none in others, making them highly vulnerable to extirpation from both stochastic and systemic processes. According to the California Department of Fish and Wildlife (1980), remnant patches of suitable habitat in sizes sufficient to support breeding yellow-billed cuckoos are scarce.

The YBCU has not been documented on site or within a 1- mile radius. The small willow scrub thicket onsite is highly degraded and occupied by transients. The habitat formed as a result of street run off and does not have the structure or size preferred by this species. They are found in habitat areas with a well-developed overstory, mid-story, understory, consisting of willow and cottonwood, near water, with a minimum patch size of forty (40) acres. This species requires a habitat structure of a 30-75-foot upper canopy, 18-20 foot mid-story and a lower story of 5-3 feet. This species is not found in salt cedar or eucalyptus. Although there is a willow component, it is not the size or structure where this species is found. These conditions are absent from the site. The acreage and structure of 0.11 acre of eucalyptus trees approximately 35 feet in height, with a range in diameter at breast height (DBH) of 6 inches to 18 inches and a mid-story densely covered in 0.03 acre of salt cedar with a DBH of 8 inches and 0.27 acre of black willow shrubs with a DBH of 6 inches is not the type of habitat or structure that this species is found. Nor are they found in high disturbance areas which is the case on site due to the transient encampments and cutting of the vegetation. This species is very sensitive to disturbance and is only found in pristine environments. The specific requirement for this species is the presence of water which is absent from the site.

Therefore, YBCU has no potential to occur on site and /or in the Project vicinity. Further investigation is not warranted.

Vernal Pools

No vernal pool resources occur on site. The soils are well drained and no evidence of pooling/ponding is present. Further historical imagery provides no evidence of past ponding or pooling.

CONCLUSIONS AND RECOMMENDATIONS

The Project site is currently vacant and has been subject to human disturbances. Parcel APN 347-130-028, the northeastern corner of the Project site has two occupied homeless encampments with trash littering the entire area and an old Porta Potty. Soils on site have been bladed, and many of the eucalyptus trees on site have had trunks/branches sawed off.

The Project site is within an MSHCP required survey area for BUOW. Based on the survey results BUOW are absent from the Project site and survey buffer. The habitat type, structure and composition is not suitable for BUOW and there is no potential for them to occur here. Therefore, no further action relative to BUOW is required.

The small patch of willow scrub located in the northest corner of the Project site is not suitable to support LBVI, SWWF or YBCU. Therefore, protocol surveys are not warranted. These migratory songbirds nest and forage almost exclusively in riparian woodland habitats with nesting habitat typically consisting of well-developed overstory, understory, and low densities of aquatic and herbaceous cover. The understory frequently contains dense sub-shrub or shrub thickets. These thickets are often dominated by plants such as narrow-leaf willow, mulefat, young individuals of other willow species such as arroyo willow or black willow, and one or more herbaceous species. These conditions do not occur on site. Although these song birds use a variety of riparian plant species for nesting, it appears that the structure of the vegetation is more important than other factors such as species composition or the age of the stand. Territories for these three species range in size from 0.5 to 7.5 acres, with an average size of approximately 2 acres. The willow scrub on site is 0.27 acre in size and does not meet the habitat structure requirements of these three species. Further, the consistent presence of transients in the willow thicket presents a major disturbance that is not conducive to bird nesting in general.

The eucalyptus and salt cedar vegetation growing in the northeast corner of the property does however, provide potentially suitable nesting habitat for birds, including raptor species. Therefore, the following is recommended to avoid potential impacts to nesting birds and/or raptors:

> <u>Recommendation:</u> Bird nesting season generally extends from February 1 through September 15 in southern California and specifically, April 15 through August 31 for migratory passerine birds. In general, Projects should be constructed outside of this time to avoid impacts to nesting birds. If a Project cannot be constructed outside of nesting season, the project site shall be surveyed for nesting birds by a qualified avian biologist prior to initiating the construction activities. If active nests are found during the pre-construction nesting bird surveys, a Nesting Bird Plan (NBP) will be prepared and implemented. At a minimum, the NBP will include guidelines for addressing active nests, establishing buffers, monitoring, and reporting. The NBP will include a copy of maps showing the location of all nests and an appropriate buffer zone around each nest sufficient to protect the nest from direct and indirect impact. The size and location of all buffer zones, if required, shall be determined by the

biologist, and shall be based on the nesting species, its sensitivity to disturbance, and expected types of disturbance. The nests and buffer zones shall be field checked weekly by a qualified biological monitor. The approved buffer zone shall be marked in the field, within which no vegetation clearing or ground disturbance shall commence until the qualified biologist has determined the young birds have successfully fledged or that the nest has otherwise become inactive.

Should you have any questions or require further information, please contact me at (909) 915-5900 or shay@jericho-systems.com should you have any questions or require further information.

Sincerely,

Shay Lawrey, President

Attachments:

A. *Site Photographs*
B. *Species Occurrence Table*
C. *Figures*

0 0.0075 0.015 0.03 0.045 0.06 Miles

1 inch = 108 feet

Imagery Date: 7/19/2019

Service Layer Credits: Esri, HERE, Garmin, (c) OpenStreetMap contributors
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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Progress & Preservation

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Photo Map	76 Gas Station - 74 Highway Lake Elsinore, CA

Attachment A – Site Photographs

	Photo 1 – Facing north east from the most southern point of the Project.
	Photo 2 – Facing west, start of encampment.

	Photo 3 – Looking west, northern encampment.
	Photo 4 – Facing east toward HWY74,.

	Photo 5 – Facing west; between the two encampments.
	Photo 6 – Facing east.

	Photo 7 – Facing south from northwest portion of project.
	Photo 8 – Facing west from most northwestern point of project.

Attachment B - Species Occurrence Table

Scientific Name	Common Name	Federal Status State Status Other Status	Habitats	Potential To Occur
Plants				
Allium munzii	Munz's onion	Endangered Threatened G1 S1 1B.1	Chaparral, coastal scrub, cismontane woodland, pinyon and juniper woodland, valley and foothill grassland. Heavy clay soils; grows in grasslands & openings within shrublands or woodlands. 375-1040 m.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.
Ambrosia pumila	San Diego ambrosia	Endangered None G1 S1 1B.1	Chaparral, coastal scrub, valley and foothill grassland. Sandy loam or clay soil; sometimes alkaline. In valleys; persists where disturbance has been superficial. Sometimes on margins or near vernal pools. 3-580 m.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.
Atriplex coronata var. *notatior*	San Jacinto Valley crownscale	Endangered None G4T1 S1 1B.1	Playas, valley and foothill grassland, vernal pools. Alkaline areas in the San Jacinto River Valley. 35-460 m.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.
Brodiaea filifolia	thread-leaved brodiaea	Threatened Endangered G2 S2 1B.1	Usually associated with annual grassland and vernal pools; often surrounded by shrubland habitats. Occurs in openings on clay soils. 15-1030 m.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.
Calochortus plummerae	Plummer's mariposa-lily	None None G4 S4 4.2	Coastal scrub, chaparral, valley and foothill grassland, cismontane woodland, lower montane coniferous forest. Occurs on rocky and sandy sites, usually of granitic or alluvial material. Can be very common after fire. 60-2500 m.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.
Carex buxbaumii	Buxbaum's sedge	None None G5 S3 4.2	Bogs and fens, meadows and seeps, marshes and swamps. Mesic sites. 3-3300 m.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.
Caulanthus simulans	Payson's jewelflower	None None G4 S4 4.2 USFS: Sensitive	Chaparral, coastal scrub. Frequently in burned areas, or in disturbed sites such as streambeds; also on rocky, steep slopes. Sandy, granitic soils. 90-2200 m.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.
Centromadia pungens ssp. *laevis*	smooth tarplant	None None G3G4T2 S2 1B.1	Wetland Valley and foothill grassland, chenopod scrub, meadows and seeps, playas, riparian woodland. Alkali meadow, alkali scrub; also in disturbed places. 5-1170 m.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.

Attachment B - Species Occurrence Table

Scientific Name	Common Name	Federal Status State Status Other Status	Habitats	Potential To Occur
Chorizanthe leptotheca	Peninsular spineflower	None None G3 S3 4.2	Chaparral, coastal scrub, lower montane coniferous forest. On granitic soils, in alluvial fans. 300-1900 m.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.
Chorizanthe parryi var. *parryi*	Parry's spineflower	None None G3T2 S2 1B.1 BLM: Sensitive USFS: Sensitive	Coastal scrub, chaparral, cismontane woodland, valley and foothill grassland. Dry slopes and flats; sometimes at interface of 2 vegetation types, such as chaparral and oak woodland. Dry, sandy soils. 90-1220 m.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.
Chorizanthe polygonoides var. *longispina*	long-spined spineflower	None None G5T3 S3 1B.2 BLM: Sensitive	Chaparral, coastal scrub, meadows and seeps, valley and foothill grassland, vernal pools. Gabbroic clay. 30-1630 m.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.
Convolvulus simulans	small-flowered morning-glory	None None G4 S4 4.2	Chaparral, coastal scrub, valley and foothill grassland. Wet clay, serpentine ridges. 30-700 m.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.
Dodecahema leptoceras	slender-horned spineflower	Endangered Endangered G1 S1 1B.1	Chaparral, cismontane woodland, coastal scrub (alluvial fan sage scrub). Flood deposited terraces and washes; associates include Encelia, Dalea, Lepidospartum, etc. Sandy soils. 200-765 m.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.
Dudleya multicaulis	many-stemmed dudleya	None None G2 S2 1B.2 USFS: Sensitive	Chaparral, coastal scrub, valley and foothill grassland. In heavy, often clayey soils or grassy slopes. 1-910 m.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.
Harpagonella palmeri	Palmer's grapplinghook	None None G4 S3 4.2	Chaparral, coastal scrub, valley and foothill grassland. Clay soils; open grassy areas within shrubland. 20-955 m.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.

Attachment B - Species Occurrence Table

Scientific Name	Common Name	Federal Status State Status Other Status	Habitats	Potential To Occur
Hordeum intercedens	vernal barley	None None G3G4 S3S4 3.2	Valley and foothill grassland, vernal pools, coastal dunes, coastal scrub. Vernal pools, dry, saline streambeds, alkaline flats. 5-1000 m.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.
Juglans californica	southern California black walnut	None None G4 S4 4.2	Chaparral, coastal scrub, cismontane woodland, riparian woodland. Slopes, canyons, alluvial habitats. 50-900 m.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.
Lasthenia glabrata ssp. *coulteri*	Coulter's goldfields	None None G4T2 S2 1B.1 BLM: Sensitive	Coastal salt marshes, playas, vernal pools. Usually found on alkaline soils in playas, sinks, and grasslands. 1-1375 m.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.
Lepechinia cardiophylla	heart-leaved pitcher sage	None None G3 S2S3 1B.2 USFS: Sensitive	Closed-cone coniferous forest, chaparral, cismontane woodland. 115-1345 m.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.
Myosurus minimus ssp. *apus*	little mousetail	None None G5T2Q S2 3.1	Vernal pools, valley and foothill grassland. Alkaline soils. 20-640 m.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.
Navarretia fossalis	spreading navarretia	Threatened None G2 S2 1B.1	San Diego hardpan and San Diego claypan vernal pools; in swales & vernal pools, often surrouded by other habitat types. 15-850 m.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.
Orcuttia californica	California Orcutt grass	Endangered Endangered G1 S1 1B.1	Wetland Vernal pools. 10-660 m.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.
Romneya coulteri	Coulter's matilija poppy	None None G4 S4	Desert wash Coastal scrub, chaparral. In washes and on slopes; also after burns. 20-1200 m.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.

Attachment B - Species Occurrence Table

Scientific Name	Common Name	Federal Status State Status Other Status	Habitats	Potential To Occur
		4.2		
Tortula californica	California screw moss	None None G2G3 S2? 1B.2 BLM: Sensitive	Chenopod scrub, valley and foothill grassland. Moss growing on sandy soil. 45-750 m.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.
Birds				
Accipiter cooperii	Cooper's hawk	None None G5 S4 CDFW: Watch List IUCN: Least Concern	Woodland, chiefly of open, interrupted or marginal type. Nest sites mainly in riparian growths of deciduous trees, as in canyon bottoms on river flood-plains; also, live oaks.	Marginally suitable habitat occurs on site. Potential to occur is **moderate**.
Aimophila ruficeps canescens	southern California rufous-crowned sparrow	None None G5T3 S3 CDFW: Watch List	Resident in Southern California coastal sage scrub and sparse mixed chaparral. Frequents relatively steep, often rocky hillsides with grass and forb patches.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.
Artemisiospiza belli belli	Bell's sage sparrow	None None G5T2T3 S3 CDFW: Watch List USFWS: Birds of Conservation Concern	Nests in chaparral dominated by fairly dense stands of chamise. Found in coastal sage scrub in south of range. Nest located on the ground beneath a shrub or in a shrub 6-18 inches above ground. Territories about 50 yds apart.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.
Athene cunicularia	burrowing owl	None None G4 S3 BLM: Sensitive CDFW: Species of Special Concern	Open, dry annual or perennial grasslands, deserts, and scrublands characterized by low-growing vegetation. Subterranean nester, dependent upon burrowing mammals, most notably, the California ground squirrel.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.

Attachment B - Species Occurrence Table

Scientific Name	Common Name	Federal Status State Status Other Status	Habitats	Potential To Occur
		IUCN: Least Concern USFWS: Birds of Conservation Concern		
Charadrius alexandrinus nivosus	western snowy plover	Threatened None G3T3 S2S3 CDFW: Species of Special ConcernNABCI: Red Watch List USFWS: Birds of Conservation Concern	Sandy beaches, salt pond levees & shores of large alkali lakes. Needs sandy, gravelly or friable soils for nesting.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.
Elanus leucurus	white-tailed kite	None None G5 S3S4 BLM: Sensitive CDFW: Fully Protected IUCN: Least Concern	Open grasslands, meadows, or marshes for foraging close to isolated, dense-topped trees for nesting and perching.	Marginally suitable habitat for this species occurs on site. Potential to occur is **moderate**.
Empidonax traillii extimus	southwestern willow flycatcher	Endangered Endangered G5T2 S1 NABCI: Red Watch List	Riparian woodlands with multiple canopy layers in Southern California.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The dense canopy layers of riparian vegetation this species requires is not on site. The habitat requirements for this species are not on site. Potential to occur is **low**.
Eremophila alpestris actia	California horned lark	None None G5T4Q S4 CDFW: Watch List IUCN: Least Concern	Short-grass prairie, "bald" hills, mountain meadows, open coastal plains, fallow grain fields, alkali flats.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.

Attachment B - Species Occurrence Table

Scientific Name	Common Name	Federal Status State Status Other Status	Habitats	Potential To Occur
Icteria virens	yellow-breasted chat	None None G5 S3 CDFW: Species of Special ConcernIUCN: Least Concern	Summer resident; inhabits riparian thickets of willow and other brushy tangles near watercourses. Nests in low, dense riparian, consisting of willow, blackberry, wild grape; forages and nests within 10 ft of ground.	The willows on site are not in great enough quality and quantity to provide suitable habitat for this species. Potential to occur is **low**.
Lanius ludovicianus	loggerhead shrike	None None G4 S4 CDFW: Species of Special Concern IUCN: Least Concern USFWS: Birds of Conservation Concern	Broken woodlands, savannah, pinyon-juniper, Joshua tree, and riparian woodlands, desert oases, scrub & washes. Prefers open country for hunting, with perches for scanning, and fairly dense shrubs and brush for nesting.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.
Plegadis chihi	white-faced ibis	None None G5 S3S4 CDFW: Watch List IUCN: Least Concern	Shallow freshwater marsh. Dense tule thickets for nesting, interspersed with areas of shallow water for foraging.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.
Polioptila californica californica	coastal California gnatcatcher	Threatened None G4G5T2Q S2 CDFW: Species of Special Concern NABCI: Yellow Watch List	Obligate, permanent resident of coastal sage scrub below 2500 ft in Southern California. Low, coastal sage scrub in arid washes, on mesas and slopes. Not all areas classified as coastal sage scrub are occupied.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.

Attachment B - Species Occurrence Table

Scientific Name	Common Name	Federal Status State Status Other Status	Habitats	Potential To Occur
Vireo bellii pusillus	least Bell's vireo	Endangered Endangered G5T2 S2 IUCN: Near Threatened NABCI: Yellow Watch List	Summer resident of Southern California in low riparian in vicinity of water or in dry river bottoms; below 2000 ft. Nests placed along margins of bushes or on twigs projecting into pathways, usually willow, Baccharis, mesquite.	The willows on site are not in great enough quality and quantity to provide suitable habitat for this species. Potential to occur is **low**.
Mammals				
Chaetodipus fallax fallax	northwestern San Diego pocket mouse	None None G5T3T4 S3S4 CDFW: Species of Special Concern	Coastal scrub, chaparral, grasslands, sagebrush, etc. in western San Diego County. Sandy, herbaceous areas, usually in association with rocks or coarse gravel.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.
Dipodomys merriami parvus	San Bernardino kangaroo rat	Endangered Candidate Endangered G5T1 S1 CDFW: Species of Special Concern	Alluvial scrub vegetation on sandy loam substrates characteristic of alluvial fans and flood plains. Needs early to intermediate seral stages.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.
Dipodomys stephensi	Stephens' kangaroo rat	Endangered Threatened G2 S2 IUCN: Endangered	Primarily annual & perennial grasslands, but also occurs in coastal scrub & sagebrush with sparse canopy cover. Prefers buckwheat, chamise, brome grass and filaree. Will burrow into firm soil.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.
Lepus californicus bennettii	San Diego black-tailed jackrabbit	None None G5T3T4 S3S4 CDFW: Species of Special Concern	Intermediate canopy stages of shrub habitats & open shrub / herbaceous & tree / herbaceous edges. Coastal sage scrub habitats in Southern California.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.
Reptiles				

Attachment B - Species Occurrence Table

Scientific Name	Common Name	Federal Status State Status Other Status	Habitats	Potential To Occur
Arizona elegans occidentalis	California glossy snake	None None G5T2 S2 CDFW: Species of Special Concern	Patchily distributed from the eastern portion of San Francisco Bay, southern San Joaquin Valley, and the Coast, Transverse, and Peninsular ranges, south to Baja California. Generalist reported from a range of scrub and grassland habitats, often with loose or sandy soils.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.
Aspidoscelis hyperythra	orange-throated whiptail	None None G5 S2S3 CDFW: Watch List IUCN: Least Concern USFS: Sensitive	Inhabits low-elevation coastal scrub, chaparral, and valley-foothill hardwood habitats. Prefers washes and other sandy areas with patches of brush and rocks. Perennial plants necessary for its major food: termites.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.
Crotalus ruber	red-diamond rattlesnake	None None G4 S3 CDFW: Species of Special Concern USFS: Sensitive	Chaparral, woodland, grassland, & desert areas from coastal San Diego County to the eastern slopes of the mountains. Occurs in rocky areas and dense vegetation. Needs rodent burrows, cracks in rocks or surface cover objects.	The microhabitat conditions required for this species are not on site. Potential to occur is **low**.
Phrynosoma blainvillii	coast horned lizard	None None G3G4 S3S4 BLM: Sensitive CDFW: Species of Special Concern IUCN: Least Concern	Frequents a wide variety of habitats, most common in lowlands along sandy washes with scattered low bushes. Open areas for sunning, bushes for cover, patches of loose soil for burial, and abundant supply of ants and other insects.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.
Salvadora hexalepis virgultea	coast patch-nosed snake	None None G5T4 S2S3	Brushy or shrubby vegetation in coastal Southern California. Require small mammal burrows for refuge and overwintering sites.	Small mammal burrows were not detected on site. Potential to occur is **low**.

Attachment B - Species Occurrence Table

Scientific Name	Common Name	Federal Status State Status Other Status	Habitats	Potential To Occur
		CDFW: Species of Special Concern		
Amphibians				
Spea hammondii	western spadefoot	None None G3 S3 BLM: Sensitive CDFW: Species of Special Concern IUCN: Near Threatened	Occurs primarily in grassland habitats, but can be found in valley-foothill hardwood woodlands. Vernal pools are essential for breeding and egg-laying.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.
Crustaceans				
Branchinecta lynchi	vernal pool fairy shrimp	Threatened None G3 S3 IUCN: Vulnerable	Endemic to the grasslands of the Central Valley, Central Coast mountains, and South Coast mountains, in astatic rain-filled pools. Inhabit small, clear-water sandstone-depression pools and grassed swale, earth slump, or basalt-flow depression pools.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.
Streptocephalus woottoni	Riverside fairy shrimp	Endangered None G1G2 S1S2 IUCN: Endangered	Endemic to Western Riverside, Orange, and San Diego counties in areas of tectonic swales/earth slump basins in grassland and coastal sage scrub. Inhabit seasonally astatic pools filled by winter/spring rains. Hatch in warm water later in the season.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.
Insects				
Bombus crotchii	Crotch bumble bee	None Candidate Endangered G3G4 S1S2	Coastal California east to the Sierra-Cascade crest and south into Mexico. Food plant genera include Antirrhinum, Phacelia, Clarkia, Dendromecon, Eschscholzia, and Eriogonum.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.
Cicindela senilis frosti	senile tiger beetle	None None G2G3T1T3 S1	Mud shore/flats Wetland Inhabits marine shoreline, from Central California coast south to salt marshes of San Diego. Also found at Lake Elsinore Inhabits dark-colored mud in the lower zone and dried salt pans in the upper zone.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.

Attachment B - Species Occurrence Table

Scientific Name	Common Name	Federal Status State Status Other Status	Habitats	Potential To Occur
Euphydryas editha quino	quino checkerspot butterfly	Endangered None G5T1T2 S1S2	Sunny openings within chaparral & coastal sage shrublands in parts of Riverside & San Diego counties. Hills and mesas near the coast. Need high densities of food plants Plantago erecta, P. insularis, and Orthocarpus purpurescens.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.
Habitats				
Southern Coast Live Oak Riparian Forest		None None G4 S4	Riparian forest	This habitat is not on site
Southern Cottonwood Willow Riparian Forest		None None G3 S3.2	Riparian forest	This habitat is not on site
Southern Sycamore Alder Riparian Woodland		None None G4 S4	Riparian woodland	This habitat is not on site

Attachment B - Species Occurrence Table

Coding and Terms

E = Endangered T = Threatened C = Candidate FP = Fully Protected SSC = Species of Special Concern R = Rare

State Species of Special Concern: An administrative designation given to vertebrate species that appear to be vulnerable to extinction because of declining populations, limited acreages, and/or continuing threats. Raptor and owls are protected under section 3502.5 of the California Fish and Game code: "It is unlawful to take, possess or destroy any birds in the orders Falconiformes or Strigiformes or to take, possess or destroy the nest or eggs of any such bird."

State Fully Protected: The classification of Fully Protected was the State's initial effort in the 1960's to identify and provide additional protection to those animals that were rare or faced possible extinction. Lists were created for fish, mammals, amphibians and reptiles. Fully Protected species may not be taken or possessed at any time and no licenses or permits may be issued for their take except for collecting these species for necessary scientific research and relocation of the bird species for the protection of livestock.

Global Rankings (Species or Natural Community Level):

G1 = Critically Imperiled – At very high risk of extinction due to extreme rarity (often 5 or fewer populations), very steep declines, or other factors.
G2 = Imperiled – At high risk of extinction due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors.
G3 = Vulnerable – At moderate risk of extinction due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors.
G4 = Apparently Secure – Uncommon but not rare; some cause for long-term concern due to declines or other factors.
G5 = Secure – Common; widespread and abundant.

Subspecies Level: Taxa which are subspecies or varieties receive a taxon rank (T-rank) attached to their G-rank. Where the G-rank reflects the condition of the entire species, the T-rank reflects the global situation of just the subspecies. For example: the Point Reyes mountain beaver, *Aplodontia rufa* ssp. *phaea* is ranked G5T2. The G-rank refers to the whole species range i.e., *Aplodontia rufa.* The T-rank refers only to the global condition of ssp. *phaea*.

State Ranking:

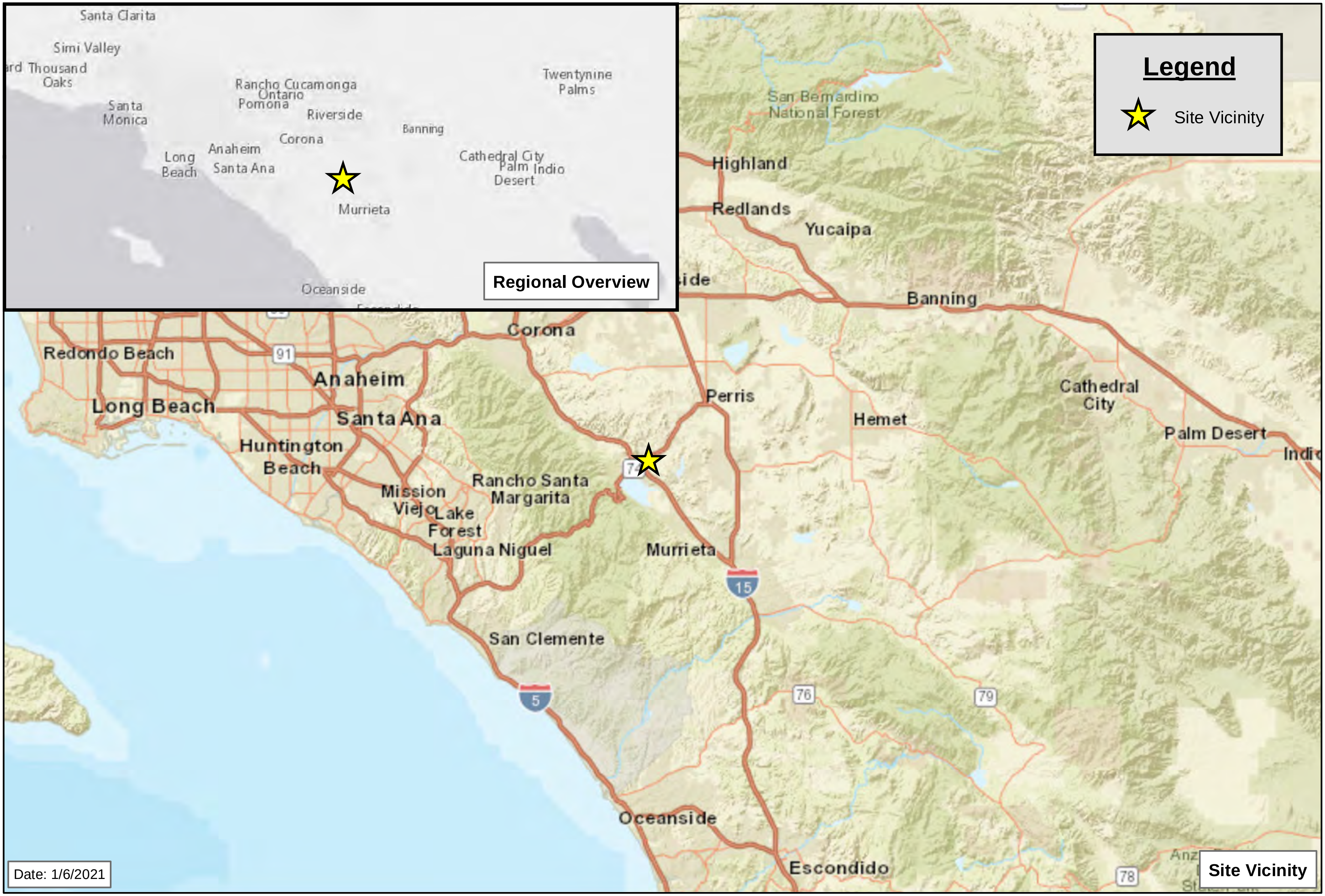
S1 = Critically Imperiled – Critically imperiled in the State because of extreme rarity (often 5 or fewer populations) or because of factor(s) such as very steep declines making it especially vulnerable to extirpation from the State.
S2 = Imperiled – Imperiled in the State because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the State.
S3 = Vulnerable – Vulnerable in the State due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation from the State.
S4 = Apparently Secure – Uncommon but not rare in the State; some cause for long-term concern due to declines or other factors.
S5 = Secure – Common, widespread, and abundant in the State.

California Rare Plant Rankings (CNPS List):

1A = Plants presumed extirpated in California and either rare or extinct elsewhere.
1B = Plants rare, threatened, or endangered in California and elsewhere.
2A = Plants presumed extirpated in California, but common elsewhere.
2B = Plants rare, threatened, or endangered in California, but more common elsewhere.
3 = Plants about which more information is needed; a review list.
4 = Plants of limited distribution; a watch list.

Threat Ranks:

.1 = Seriously threatened in California (over 80% of occurrences threatened / high degree and immediacy of threat)
.2 = Moderately threatened in California (20-80% occurrences threatened / moderate degree and immediacy of threat)
.3 = Not very threatened in California (less than 20% of occurrences threatened / low degree and immediacy of threat or no current threats known)



0 5 10 20 30 40 Miles

Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

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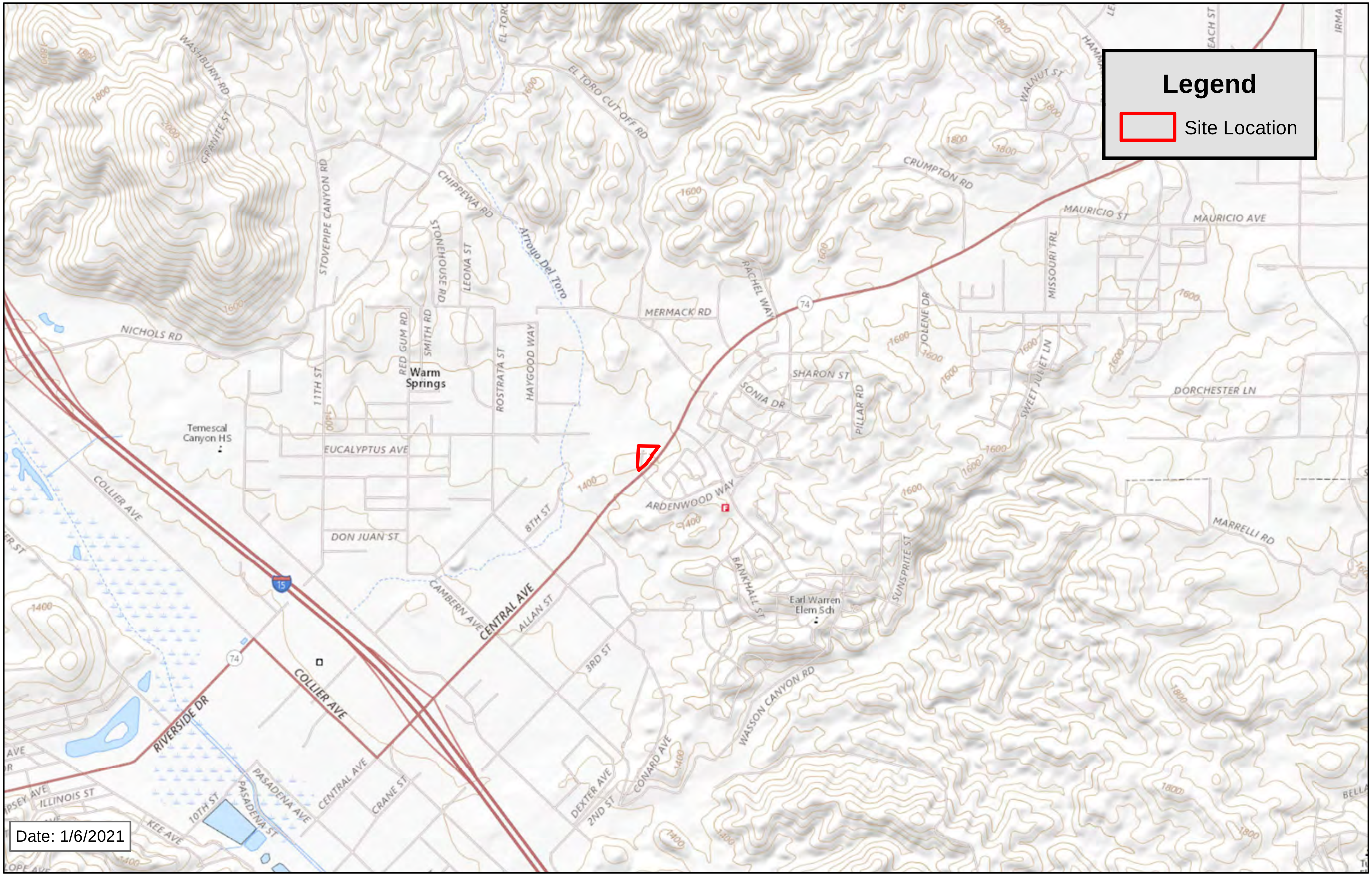
Figure 1 - Regional Overview Site Vicinity	76 Gas Station - 74 Highway Lake Elsinore, CA



0	0.15	0.3	0.6	0.9	1.2 Miles

1 inch = 2,000 feet

Imagery Date: 8/6/2017

Service Layer Credits: USGS The National Map: National Boundaries Dataset, 3DEP Elevation Program, Geographic Names Information System, National Hydrography Dataset, National Land Cover Database, National Structures Dataset, and National Transportation Dataset; USGS Global Ecosystems; U.S. Census Bureau TIGER/Line data; USFS Road Data; Natural Earth Data; U.S. Department of State Humanitarian Information Unit; and NOAA National Centers for Environmental Information, U.S. Coastal Relief Model. Data refreshed October 2018.

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Figure 2
Site Location

76 Gas Station - 74 Highway
Lake Elsinore, CA

0 0.0325 0.065 0.13 0.195 0.26 Miles

1 inch = 417 feet

Imagery Date: 7/19/2019

Service Layer Credits: Esri, HERE, Garmin, (c) OpenStreetMap contributors
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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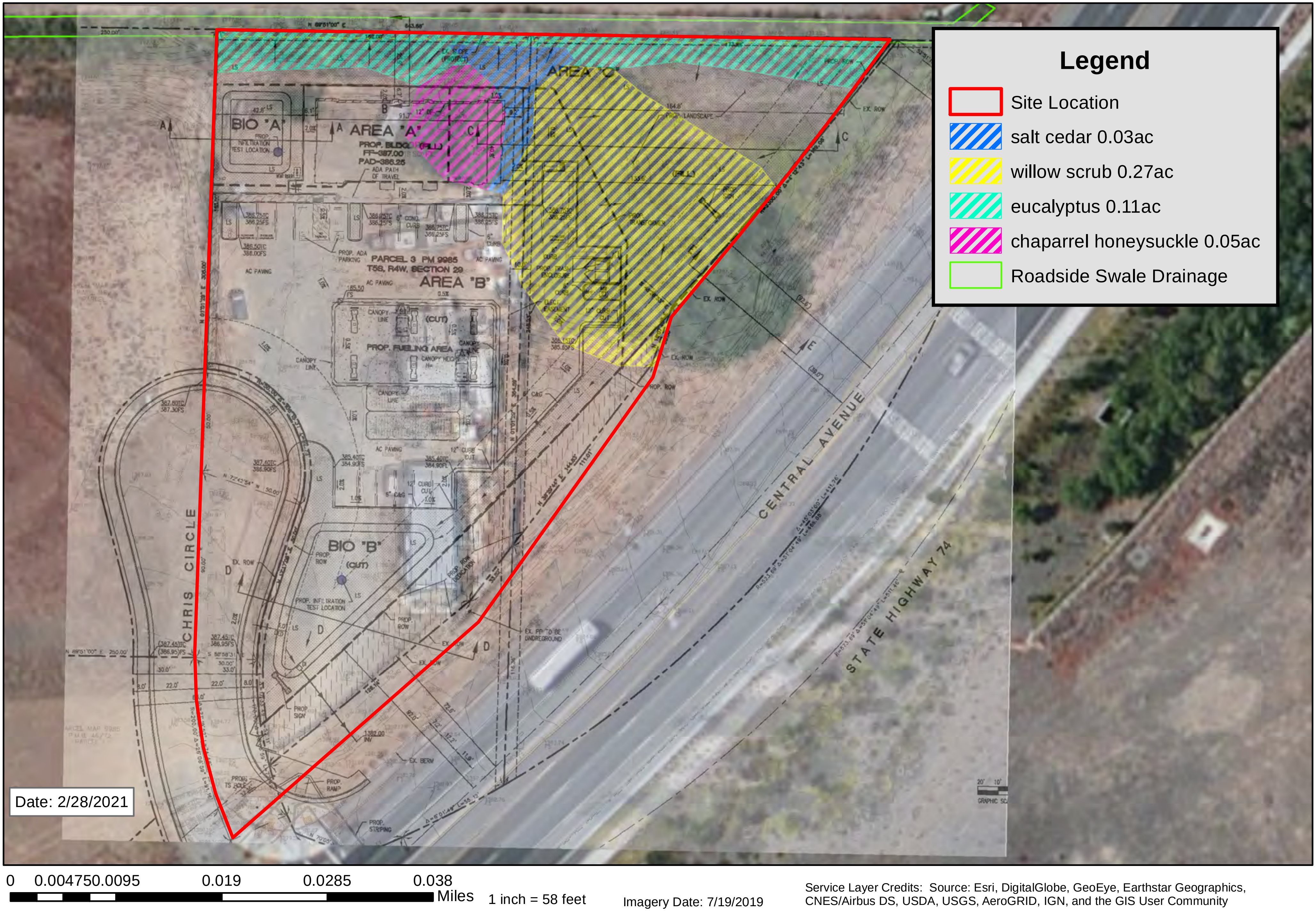
Figure 3 Site Location	76 Gas Station - 74 Highway Lake Elsinore, CA



1 inch = 58 feet

Imagery Date: 7/19/2019

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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Figure 4 Site Plan	76 Gas Station - 74 Highway Lake Elsinore, CA

0 0.0175 0.035 0.07 0.105 0.14 Miles

1 inch = 216 feet

Imagery Date: 7/19/2019

Service Layer Credits: Esri, HERE, Garmin, (c) OpenStreetMap contributors
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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Figure 5 MSHCP	76 Gas Station - 74 Highway Lake Elsinore, CA

1 inch = 104 feet

Imagery Date: 7/19/2019

Service Layer Credits: Esri, HERE, Garmin, (c) OpenStreetMap contributors
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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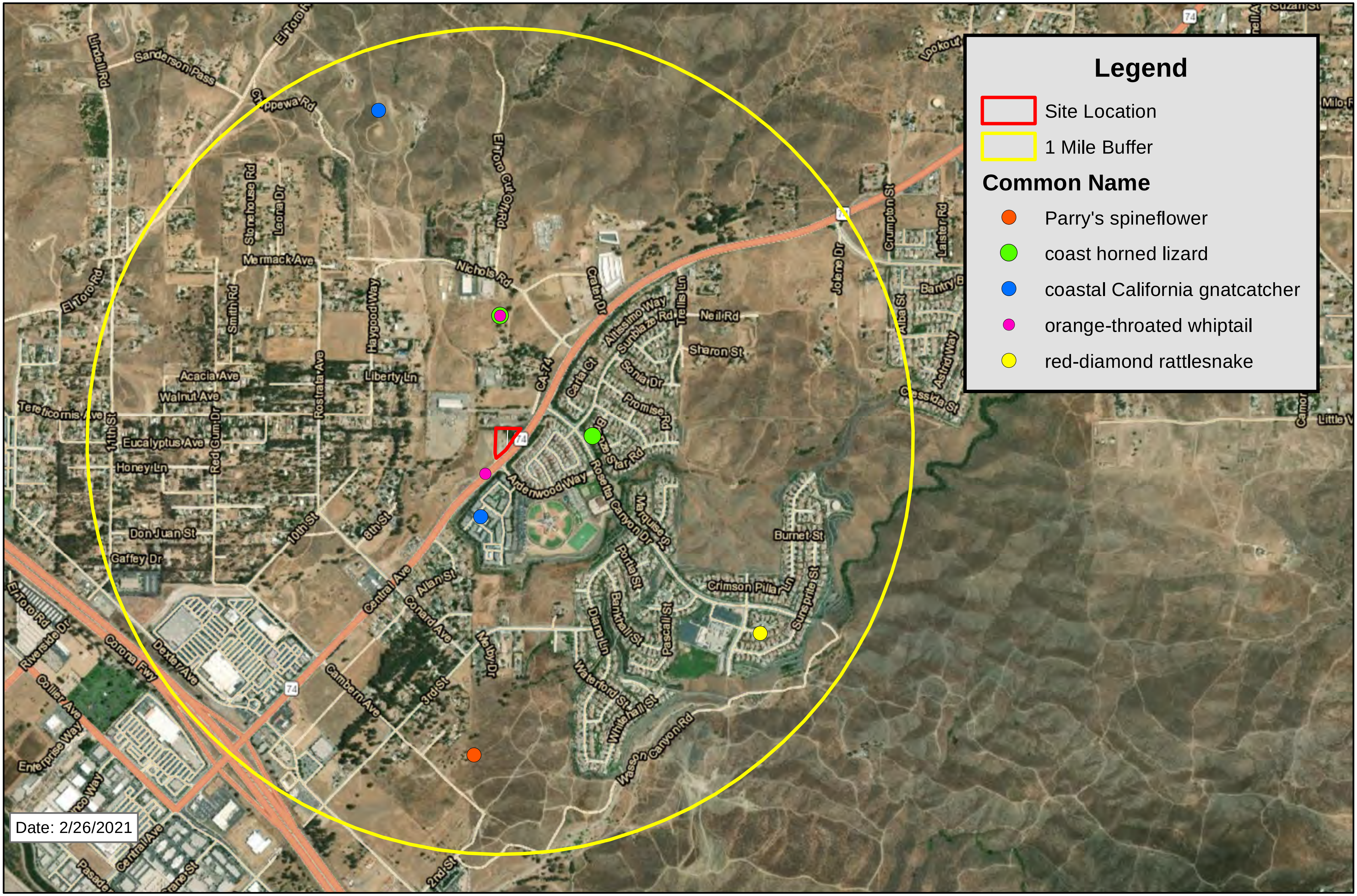
Figure 6 Blueline Waters	76 Gas Station - 74 Highway Lake Elsinore, CA



0 0.125 0.25 0.5 0.75 1 Miles

1 inch = 1,619 feet

Imagery Date: 7/19/2019

Service Layer Credits: Esri, HERE, Garmin, (c) OpenStreetMap contributors
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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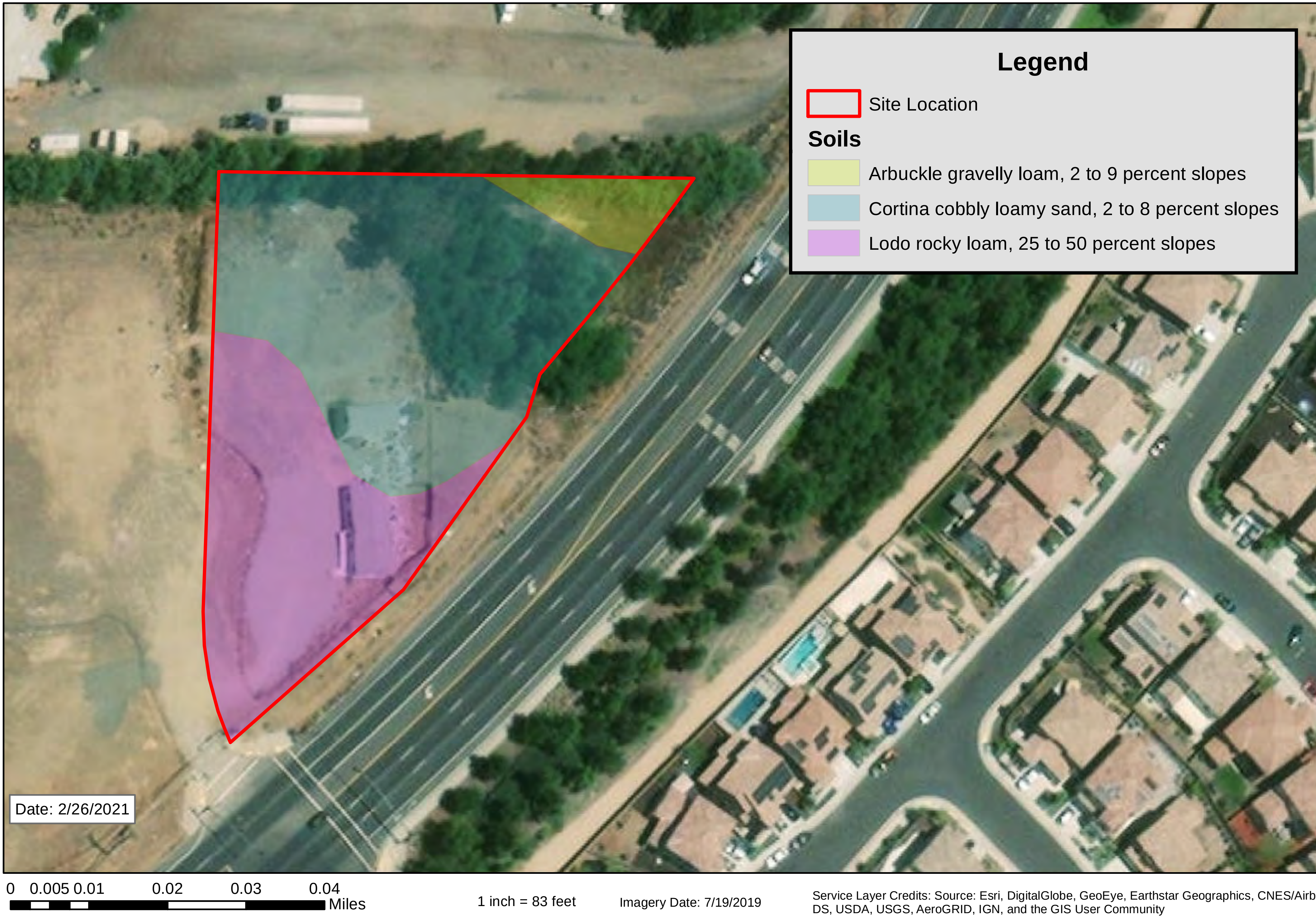
Figure 7 CNDDB	76 Gas Station - 74 Highway Lake Elsinore, CA



1 inch = 83 feet

Imagery Date: 7/19/2019

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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Figure 8 Soils	76 Gas Station - 74 Highway Lake Elsinore, CA

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47 1st Street, Suite 1
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(909) 915-5900

February 23, 2021
(Revised May 1, 2021)

Joseph Karaki, President
Karaki WS
4887 E. La Palma Ave, Suite 707
Anaheim, CA 92807

RE: Biological Resources Assessment, Jurisdictional Delineation
Commercial Retail (76 Station) – APN: 347-130-029 & 347-130-028
Central Avenue (Hwy 74) and Eighth Street
City of Lake Elsinore, Riverside County, California

Dear Mr. Karaki:

Jericho Systems, Inc. (Jericho) is pleased to provide this Biological Resources Assessment and Jurisdictional Delineation for the above-referenced Project.

The results of Jericho's field survey are intended to provide sufficient baseline information to the County of Riverside, City of Lake Elsinore, and, if required, to federal and State regulatory agencies, including U.S. Fish and Wildlife Service (USFWS) and California Department of Fish and Wildlife (CDFW), respectively, to determine if impacts will occur, quantify those impacts and to identify mitigation measures to offset any impacts.

The Project site is located within the Western Riverside County Multiple Species Habitat Plan (MSHCP) area and as such, is subject to the conditions and conservation requirements identified in the MSHCP. Riverside County adopted the MSHCP on June 17, 2003. The City of Lake Elsinore is signatory to the MSHCP Implementing Agreement and thereby a permittee responsible for meeting the terms and conditions outlined in the MSHCP and the Biological Opinion issued for the MSHCP. Therefore, the City of Lake Elsinore has the responsibility to ensure the projects they approve are consistent the MSHCP and will not preclude the overall conservation goals and reserve design from being accomplished.

The MSHCP is a criteria-based plan and identification of planning units on which to base the Criteria is necessary for such a criteria-based plan. The MSHCP Conservation Area is comprised of a variety of existing and proposed Cores, Extensions of Existing Cores, Linkages, Constrained Linkages and Non-contiguous Habitat Blocks. The MSHCP coverage area is divided into Area Plans (AP) based on the Riverside County's General Plan Area Plan boundaries. Each of the AP's has: established conservation criteria, species specific surveys that may be required based on on-site Habitat Assessment, and resources and areas identified for conservation. In each Area Plan text, applicable Cores and Linkages are identified.

There are 146 species covered by the MSHCP. Surveys are not required for 106 of these covered species. The remaining 40 covered species may require focused surveys for proposed development projects include 4 birds, 3 mammals, 3 amphibians, 3 crustaceans, 14 Narrow Endemic Plants, and 13 other sensitive plants within the Criteria Area. The need to conduct focused surveys for all but six of these 40 species is determined by the presence of suitable habitat within designated 'survey areas' mapped for each of the species. The remaining six species that require focused surveys throughout the entire MSHCP area are associated with riparian/riverine areas and vernal pools and include least Bell's vireo, southwestern willow flycatcher, western yellow-billed cuckoo, Riverside fairy shrimp, Santa Rosa Plateau fairy shrimp, and vernal pool fairy shrimp.

The MSHCP requires that a project comply with the MSHCP policies identified in Section 6 of the MSHCP. For this Project site, a habitat suitability assessment for burrowing owl (MSHCP section 6.3.2) and MSHCP Riparian/Riverine resources (MSHCP section 6.1.2) was required and conducted.

The Project site was also evaluated for the presence jurisdictional waters, subject to the federal Clean Water Act (CWA), Porter-Cologne (Porter-Cologne) and California Fish and Game Code (FGC) regulations. Jurisdictional resources subject to the CWA regulations include non-wetland waters and wetland waters of the U.S. (WoUS) whereas jurisdictional resources subject to Porter-Cologne include non-wetland waters and waters of the State (WoS). The California FGC encompasses the resources that constitute a stream or river, including associated riparian vegetation and floodplain.

Evaluation of Riparian/Riverine resources followed guidance provided in the MSHCP Section 6.1.2. Potential federal jurisdiction followed the regulations set forth in 33CFR part 328 and the USACE guidance documents and evaluation of potential State jurisdiction followed guidance in the Fish and Game Code and A Review of Stream Processes and Forms in Dryland Watersheds (CDFW, 2010).

PROJECT LOCATION

The approximately 1.9-acre Project site is made up of two parcels: APN 347-130-029 (1.12 acre) and 347-130-028 (0.49 acre) and is located in the City of Lake Elsinore, Riverside County, California. The Project site is bounded on the north by 8th Street, on the south by Ardenwood Way and rural industrial land use, on the east by Hwy 74 (Central Avenue), and on the west by vacant land. The project site can be found on the *Lake Elsinore* U. S. Geological Survey (USGS) 7.5-minute topographic map within Section 29 of Township 5 South, Range 4 West (Figure 1-3).

PROJECT UNDERSTANDING

The Project proposes a gas station consisting of a 3,516 square foot (sf) convenience store, 3,160 sf fueling canopy with six multi-product dispensers, and two underground storage tanks. See Figure 4 for site layout.

METHODS

Prior to the field investigation, reference materials and databases relevant to the Project site were reviewed for the *Lake Elsinore* 7.5-minute USGS quadrangle. The sources reviewed included:

- California Natural Diversity Database (CNDDB) *Rarefind 5*);
- CNDDB Biogeographic Information and Observation System (BIOS);
- California Native Plant Society Electronic Inventory (CNPSEI) database;
- Calflora Database;
- USDA Natural Resources Conservation Service (NRCS) Web Soil Survey;

- USF-WS National Wetland Inventory;
- Environmental Protection Agency (EPA) Water Program "My Waters" data layers;
- RCA/MSHCP Information Map

On January 16, 2021, Jericho Principal Ecologist, Shay Lawrey conducted a field survey of the Project site with focus on potential habitat for listed species, sensitive species, migratory birds, burrowing owl and riverine/riparian/vernal pool resources. Ms. Lawrey is a qualified biologist with advanced degrees in Biology and 25 years of experience surveying for the sensitive species known to in California and riverine/riparian/vernal pool resources. Ms. Lawrey surveyed the Project site on a calm weather, overcast day, during peak animal activity, between 8:30 a.m. and 10:30 am.

Ms. Lawrey conducted the survey by walking transects spaced in approximately 15 meters (approximately 50 feet) intervals to provide 100 percent visual coverage of the ground surface. Wildlife species were detected during field surveys by sight, calls, tracks, scat, or other signs. In addition to species observed, expected wildlife usage of the site was determined according to known habitat preferences of local wildlife species and knowledge of their relative distributions in the area. Ms. Lawrey assessed the Project site for habitat type, structure, species composition/association, condition, and human disturbances. Attention was focused on identifying potential habitat for special status species known to occur locally and identifying potential jurisdictional waters and/or riverine/riparian/vernal pool resources within and/or adjacent to the Project site.

Riverside County also requires that any survey limitations be identified. No limitations affected the results and conclusions given herein. The buffer survey area located on adjacent private property was surveyed via binoculars to avoid trespass. Surveys were conducted during the appropriate season to observe the target species, in good weather conditions, by a qualified biologist who followed all pertinent protocols.

Stephen's kangaroo rat Habitat Assessment

The RCA Mapping Information System identified that the Project parcel is not in a Stephen's kangaroo rat (*Dipodomys stephensi*, [SKR]) fee area. Therefore, this analysis was not applicable.

Burrowing Owl Habitat Assessment

The RCA Mapping Information System identified that APN 347-130-028 (0.49 acre), located in the Project's northeastern portion is within a survey area required for the western burrowing owl (*Athene cunicularia hypugaea*) [BUOW]) (Figure 5).

The BUOW habitat suitability assessment was conducted in accordance with the Western Riverside County MSHCP, which follows the 1993 *"Burrowing Owl Survey Protocol and Mitigation Guidelines"* prepared by the California Burrowing Owl Consortium. Step 1 of the survey protocol is the habitat suitability assessment. If suitable habitat is present, this protocol requires four (4) surveys between April 15 and July 15 with the first site survey counting as one survey period.

Burrowing owl habitat generally includes, but is not limited to, short or sparse vegetation (at least at some time of year), presence of burrows, burrow surrogates or presence of fossorial mammal dens, well-drained soils, and abundant and available prey.

Per the literature review, the closest documented BUOW occurrence is approximately 3.8 miles northeast from the Project site along Highway 74 near Ethanac Road and Eugene Street. There are no BUOW occurrences documented in the Project area,

Natural and non-natural substrates were examined for potential burrow sites. The site was searched for molted feathers, whitewash, cast pellets and/or prey remains. Disturbance characteristics and all other animal sign encountered within the survey area were recorded. Date time and weather conditions were logged. A hand-held, global positioning system (GPS) unit was used to survey to identify survey area boundaries. Representative photographs of the survey area were taken, and Google Earth Pro was accessed to provide recent aerial photographs of the Project site and surrounding area.

Riverine/Riparian Areas and Jurisdictional Waters

The site was also assessed for State and /or federal jurisdictional waters that are subject to Sections 404 and 401 of the federal CWA regulated by the U.S. Army Corps of Engineers (USACE) and Regional Water Quality Control Board (RWQCB) respectively; and/or Section 1602 of the California Fish and Game Code (FCG) administered by the CDFW and Riverine/Riparian and Vernal Pool habitat subject to Section 6.1.2 of the MSHCP.

The methods used in this study to delineate the non-wetland WoUS at the Ordinary High Water Mark (OHWM) in variable, ephemeral, intermittent, or perennial non-wetland waters followed guidance described in *A Field Guide to the Identification of the Ordinary High Water Mark in the Arid West Region of the Western United States* (Lichvar and McColley 2008) and the *Updated Datasheet for the Identification of the Ordinary High Water Mark in the Arid West Region of the Western United States* ("Updated Datasheet", Curtis and Lichvar 2010).

The RWQCB maintains jurisdiction over all waters of the State, including wetlands. For the purposes of Porter-Cologne, the methods used to determine federal jurisdiction over non-wetland waters were also used to determine the extent of RWQCB jurisdiction over non-wetland waters within the property.

Evaluation of FGC Section 1600 Streambed Waters followed guidance in the Mapping Episodic Stream Activity (MESA) protocols *[MESA Field Guide*], pursuant to which CDFW claims jurisdiction beyond traditional stream banks and the outer edge of riparian. Under MESA, the term stream is defined broadly to include "a body of water that flows perennially or episodically and that is defined by the area in which water currently flows, or has flowed, over a given course during the historic regime [i.e., 'circa 1800 to the present'], and where the width of its course can reasonably be identified by physical or biological indicators."

The methods used to determine any riparian/riverine or vernal pool areas were based on the above techniques as well as soils evaluations and vegetation classifications. This is because an area may be characterized as riparian based on its vegetative composition but does not meet the criteria of being federal or state jurisdictional water.

RESULTS

Regional Setting

According to the U.S. EPA Regional map, the Project site is located in the Inland Valleys (85k) ecoregion. An ecoregion is a regional area that has similar ecosystems in terms of type, quality, and quantity of environmental resources. The Inland Valleys ecoregion is influenced less by marine processes, and more by alluvial processes. The ecoregion consists of alluvial fans and basin floors at the base of the San Bernardino and San Gabriel mountains and the San Jacinto and Perris Valleys in the south. Soil moisture is generally xeric, and historically, the region was composed of Riversidean coastal sage scrub, valley grasslands, and riparian woodlands. The ecoregion is now heavily urbanized with some remaining agriculture.

Hydrologically, the Project site is located within the Lake Mathews hydrologic area, in the 14,217-acre hydrologic sub-area (HSA 801.35) within the Temescal Wash watershed (HUC 180702030601) (Figure 6).

The City of Lake Elsinore is located in southwestern Riverside County at the foothills of the Cleveland National Forest. Topographically, Lake Elsinore is located on the east side of the Santa Ana mountains. The general climate of Lake Elsinore includes hot summers (99°F average maximum in August) and mild winters (38°F average minimum) with cool ocean breezes and sparse winter rainfall, averaging 12.09 inches of precipitation per year.

According to the database searches, 53 sensitive species (24 plants ,24 vertebrates, 5 invertebrates) and 3 sensitive habitats have been documented in the *Lake Elsinore* USGS quadrangle (Table 1). Figure 7 depicts the sensitive species within a one mile radius of the Project site.

Existing Site Conditions

Weather conditions during the survey were overcast with no wind. Survey hours of spanned from 8:30 a.m. to 10:30 a.m. with temperatures ranging from 65 degrees Fahrenheit (° F) to 70° F

The topography of the Project site is relatively flat, with elevation increasing in the northern portion of the parcel. Site elevation ranges from 1,414 feet to 1,389 feet above mean sea level (MSL).

The Project site is vacant and is surrounded by flat bladed disturbed land on the west, south, and north, and by Hwy 74 (Central Avenue) to the east. The site does not connect to native, undisturbed areas.

Soils on the Project site area consist of Cortina cobbly loamy sand, 2-9% slopes (CmC), Lodo rocky loam, 25-50% slopes (LpF2), and Arbuckle gravelly loam, 2-9% slopes – dry, MLRA 19 (AIC), (Figure 8). Soils in the Arbuckle series are well-drained remnants of alluvial fans derived from numerous types of rock. Soils in the Cortina series are well-drained soils made from alluvium derived from metasedimentary rock. The Lodo series consists of shallow, somewhat excessively drained soils that formed in material weathered from hard shale and fine grained sandstone. Terrace escarpments are landforms (terraces) made from alluvium derived from mixed sources.

The entire site is mapped by the RCA MSHCP Vegetation (2012) layer as developed/disturbed land, and the site survey confirmed these findings for all but the northeast corner, which consists of a mix of salt cedar, eucalyptus and willow scrub. The vegetation here is used as cover for a homeless encampment that supports approximately 10 transients. This area is heavily littered and disturbed. Many of the bushes and trees on site have had trunks/branches sawed off and used for cover in the homeless encampment.

Habitat

The northeast corner of the Project site supports an over-story canopy of eucalyptus trees (*Eucalyptus* ssp) approximately 35 feet in height, with a range in diameter at breast height (DBH) of 6 inches to 18 inches. The mid-story is densely covered in salt cedar (*Tamarix ramossima*) with a small thicket of black willow shrubs (*Salix gooddingii*). The average height of the mid-story is approximately 12 feet. The dense understory primarily consists of short-podded mustard (*Hischfeldia incana*), tocalote *(Centaurea melitensis*), and non-native grasses (*Bromus* ssp.). A few native plants are found scattered along the eastern and western edges of the Project site including California buckwheat (*Erioginum faciculatum*), encilia (*Encilia farinosa)* and telegraph weed (*Heterotheca grandiflora*). The remainder of the Project site is bare and compacted due to blading.

Although, the vegetation in the northeastern corner of the Project site is mostly non-native (salt cedar and eucalyptus) and heavily impacted by a homeless encampment, it provides potentially suitable habitat for nesting birds, including raptor species.

Wildlife

Wildlife observed at the time of survey included yellow-rumped warbler, black phoebe, white-crowned sparrow, common raven, American crow, lesser goldfinch, house finch, European starling and mourning dove.

MSHCP Surveys

The Regional Conservation Authority (RCA) Information Map identifies the following for both APN 347-130-029 and 347-130-028:

- The parcels are located in the Elsinore Area Plan of the MSHCP.
- APN 347-130-028 is located in an area that requires focused BUOW surveys be conducted if suitable habitat is present. APN 347-130-029 is not located in an BUOW survey area (Figure 4)
- The parcels are not located in or adjacent to a Criteria Cell
- The parcels are not in a criteria species survey area
- The parcels are not in a mammal survey area
- The parcels are not in a narrow endemic plant survey area
- The parcels are not in a cellgroup

Burrowing owl (BUOW)

BUOW are known to occur locally within suitable habitat areas, with the closest occurrence being 3.6 miles northeast from the Project site along Highway 74 near Ethanac Road and Eugene Street in 1999.

The BUOW is currently designated as a California Species of Special Concern. It is a grassland specialist distributed throughout western North America where it occupies open areas with short vegetation and bare ground within shrub, desert, and grassland environments. They use a wide variety of arid and semi-arid environments with level to gently-sloping areas characterized by open vegetation and bare ground. BUOWs rarely dig their own burrows and are instead dependent upon the presence of burrowing mammals (i.e., California ground squirrels [*Otospermophilus beecheyi*], coyotes, and badgers [*Taxidea taxus*]) whose burrows are often used for roosting and nesting. The presence or absence of colonial mammal burrows is often a major factor that limits the presence or absence of BUOWs. Where mammal burrows are scarce, burrowing owls have been found occupying man-made cavities, such as buried and non-functioning drain pipes, stand-pipes, and dry culverts. They also require low growth or open vegetation allowing line-of-sight observation of the surrounding habitat to forage and watch for predators. In California, the BUOW breeding season extends from the beginning of February through the end of August.

Under the MSHCP burrowing owl is considered an adequately conserved covered species that may still require focused surveys in certain areas as designated in Figure 6-4 of the MSHCP. The survey for burrowing owl requires a systematic survey of all areas that provide suitable habitat plus a 150-meter (approximately 500 feet) zone of influence on all sides of suitable habitat, where applicable.

The area on site requiring BUOW surveys is densely vegetated in a three story canopy cover structure that includes eucalyptus trees, salt cedar and willows, and non-native grasses and weeds. The habitat composition and structure is not suitable for BUOW. No burrows, feathers, whitewash, castings, prey remains or BUOW individuals were observed on site or in the survey buffer area which was surveyed by binoculars. (The adjacent properties are private property and access was not granted to survey). Based on the survey results BUOW are absent, the habitat within the required survey area is unsuitable and therefore, further investigation is not recommended or warranted

Heritage Trees

The City of Lake Elsinore's Palm Tree Preservation Program is limited to palm species within the city limits. Palm trees are not on site; therefore, the Project will not impact heritage trees.

Riverine/Riparian Areas and Jurisdictional Waters

A roadside swale originating from HWY74 and N. Frontage road located along the northeastern boundary of the site, enters the Project site in the northern portion of APN 347-130-028 and continues westerly along the property boundary between the Project site and the parcel north of the Project site (Figure 7). This swale collects street runoff and is not a natural or jurisdictional feature subject to Sections 1600 of the FGC or 404/401 of the federal CWA. There is no bed or bank associated with this swale indicating a flow of water. The water runoff from HWY 74 travels west, back flows to the southeast and percolates in the well-drained soils. There is no evidence that the swale connects to the blue line stream located off-site to the west.

This roadside is a result of man-made roadside water diversion from HWY 74 and is not considered jurisdictional or riverine/riparian. Although the patch of willows growing in the mid-story of the swale are riparian it is not the intent of the MSHCP to conserve small patches of riparian species growing as a direct result of man-made features. The willows occur as a direct result of roadside runoff. If the run off was redirected, these willows would not exist. For further clarification as defined under Section 6.1.2 of the MSHCP, *Protection of Species Associated with Riparian/Riverine*

Areas and Vernal Pools, riparian/riverine areas are areas dominated by trees, shrubs, persistent emergent plants, or emergent mosses and lichens which occur close to or are dependent upon nearby freshwater, or areas with freshwater flowing during all or a portion of the year. Conservation of these areas is intended to protect habitat that is essential to a number of listed or special-status water-dependent fish, amphibian, avian, and plant species.

Based on the Project's Site Plan (Figure 8), 0.41 acre will be permanently impacted by grading and construction.

Due to the presence of a willow scrub thicket the following three bird species must be addressed according to the MSHCP.

- Southwestern willow flycatcher (*Empidonax trallii extimus*) [SWWF]
- least Bell's vireo (*Vireo bellii pusillus*) [LBVI]
- yellow-billed cuckoo (*Coccyzus americanus*) [YBCU]

Southwestern willow flycatcher

The southwestern willow flycatcher (SWWF) is a State and federally listed species. In 1992, it was listed by the California Fish and Game Commission endangered, under the California Endangered Species Act (CESA) of 1970. It was federally listed as endangered on February 27, 1995, under the ESA (60 FR 10694). The USFWS designated critical habitat for the species on July 22, 1997. This habitat includes 18 units with a total of 599 miles of river in California, New Mexico, and Arizona. In California, critical habitat was designated along portions of the Santa Ana River, San Luis Rey River, San Diego River, Santa Margarita River, Tijuana River, and south fork of the Kern River (62 FR 39129). On May 11, 2001, the critical habitat designation from 1997 was struck down by the U.S. 10th Circuit Court of Appeals who required further economic analysis. A recovery plan was finalized by USFWS in March of 2003. Critical habitat designations for this species were re-proposed and finalized in June 2004 (USFWS, 2003c).

The species historical range included Arizona, California, Colorado, New Mexico, Texas, and Utah. Southwest Region (Region 2) Counties in California in which this population is known to or is believed to occur: Fresno, Imperial, Inyo, Kern, Los Angeles, Madera, Mono, Monterey, Orange, Riverside, San Benito, San Bernardino, San Diego, San Luis Obispo, Santa Barbara, Santa Cruz, Tulare, Tuolumne, Ventura.

The SWWF is a small passerine bird measuring approximately 5.7 inches in length. It has a grayish-green back and wings, whitish throat, a light gray-olive breast, and pale yellowish belly. It has two visible white wing bars and a faint or absent eye ring. The call consists of a repeated "whit" and their song is a sneezy "fitz-bew." (60 FR 10694). The SWWF is currently one of the four recognized subspecies of the willow flycatcher. This flycatcher is a neotropical migrant that breeds in the southwestern United States from mid-April to early-September. In the fall, it migrates south to its wintering grounds in portions of South America, Central America and Mexico. (60 FR 10694)

The SWWF breeds in dense riparian habitats along rivers, streams, and other wetlands at elevations ranging from sea level to 8,500 feet (Sogge 1997). Occupied habitat is generally dominated by shrubs and trees 13 to 23 feet or more in height, which provide dense lower and mid-story vegetation approximately 10 to 13 feet aboveground. This dense vegetation is often interspersed with open water, small openings, or sparse vegetation, creating a mosaic that is not uniformly dense (62 FR

39129). Plant species closely associated with the flycatcher include willows (Salix spp.), boxelder (*Acer negungo*), seepwillow (*Baccharis* spp.), with an overstory of cottonwood (*Populus fremontii*) (62 FR 39129).

The SWWF has not been documented on site or within a one mile radius. The small willow scrub thicket onsite is highly degraded and occupied by transients. The habitat formed as a result of street run off and does not have the size or structure preferred by this species. They are found in habitat areas with a well-developed overstory, mid-story, understory, consisting of willow, mule fat and cottonwood, near water, with a minimum patch size of four (4) acres. This species requires a habitat structure of a 20-30-foot upper canopy, 15-12 foot mid-story and a lower story of 5-3 feet. This species is not found in salt cedar or eucalyptus. Although there is a willow component it is not the size or structure where this species is found. These conditions are absent from the site. The acreage and structure of 0.11 acre of eucalyptus trees approximately 35 feet in height, with a range in diameter at breast height (DBH) of 6 inches to 18 inches and a mid-story densely covered in 0.03 acre of salt cedar with a DBH of 8 inches and 0.27 acre of black willow shrubs with a DBH of 6 inches is not the type of habitat is not the type or structure that this species is found.

Nor are they found in high disturbance areas which is the case on site due to the transient encampments and cutting of the vegetation. The specific requirement for this species is the presence of water. These are not the conditions on site.

Therefore, SWWF has no potential to occur on site and /or in the Project vicinity. Further investigation is not warranted.

Least Bell's vireo

Least Bell's vireo (LBVI) was first proposed for listing as endangered by the USFWS on May 3, 1985, (50 FR 18968) and was subsequently listed as federally endangered on May 2, 1986 (60 FR 10694). Critical habitat units were designated by the USFWS on February 2, 1994 (59 FR 4845) and included reaches of ten streams in six counties in southern California and the surrounding approximately 38,000 acres. The critical habitat units exist in the Santa Ynez River, Santa Clara River, Santa Ana River, Santa Margarita River, San Luis Rey River, Sweetwater River, San Diego River, Tijuana River, Coyote Creek, and Jumul-Dulzura Creek.

The species historical range included California; California/Nevada Region (Region 8)Counties in California in which this population is known to or is believed to occur includes: Imperial, Inyo, Kern, Los Angeles, Monterey, Orange, Riverside, Sacramento, San Benito, San Bernardino, San Diego, San Joaquin, San Luis Obispo, Santa Barbara, Santa Clara, Santa Cruz, Stanislaus, Tulare, Ventura, Yolo.

The LBVI is a small, olive-gray migratory songbird that nests and forages almost exclusively in riparian woodland habitats. Bell's vireos as a group are highly territorial and are almost exclusively insectivorous. LBVI generally begin to arrive from their wintering range in southern Baja California and establish breeding territories by mid-March to late-March. A large majority of breeding vireos depart their breeding grounds by the third week of September and only a very few have been found wintering in the United States.

Nests are usually placed in forks of branches between 2 and 5 feet from the ground. Females lay two to five eggs with both parents incubating the clutch for approximately 14 days and the young fledging after 10 to 12 days. The fledglings will remain in the parental territory for up to a month. LBVI leave the breeding grounds and migrate south mid to late September.

Their nesting habitat typically consists of well-developed overstory, understory, and low densities of aquatic and herbaceous cover. The understory frequently contains dense sub-shrub or shrub thickets. The overstory usually contains black willow, cottonwood and Sycamore. These thickets are often dominated by plants such as narrow-leaf willow, mulefat, young individuals of other willow species such as arroyo willow or black willow, and one or more herbaceous species. Although LBVI use a variety of riparian plant species for nesting, it appears that the structure of the vegetation is more important than other factors such as species composition or the age of the stand. Vireos forage in riparian habitats up to 984 feet from the nest and use both high and low scrub layers as foraging substrate.

The LBVI has not been documented on site or within a 1- mile radius. The small willow scrub thicket onsite is highly degraded and occupied by transients. The habitat formed as a result of street run off and does not have the structure or patch size preferred by this species. The acreage and structure of 0.11 acre of eucalyptus trees, approximately 35 feet in height, with a range in diameter at breast height (DBH) of 6 inches to 18 inches and a mid-story densely covered in 0.03 acre of salt cedar with a DBH of 8 inches and 0.27 acre of black willow shrubs, with a DBH of 6 inches is not the type of habitat that this species is found. This species is not found in salt cedar or eucalyptus.

Nor are they found in high disturbance areas. Although there is a willow component, it is not the size or structure where this species is found. They are located in well-developed overstory, mid-story, understory, and low densities of aquatic and herbaceous cover with a minimum patch size of two (2) acres, which is not the case for this site.

Therefore, LBVI has no potential to occur on site and /or in the Project vicinity. Further investigation is not warranted.

Yellow-billed cuckoo

The YBCU is listed as endangered in the state of California and was federally listed as threatened in 2014. Designation of critical habitat for the western distinct population segment of the Yellow-Billed Cuckoo (*Coccyzus americanus*) was made by the USFWS in 2014 (50 CFR Part 17). In 1971 it was listed by the California Department of Fish and Game as Rare. By 1977 it had become "one of the rarest birds" in the state. A 1977 survey of historical sites and suitable habitat at six widely scattered rivers turned up 54 birds in the Sacramento Valley (Tehama, Putte, Glenn, Colusa, and Sutter counties), 9 on the South Fork of the Kern River near Weldon, 3 along the Santa Ana River, Riverside County, 4 in Owens Valley, Inyo County, 6 on the Armargosa River south of Tecopa, Inyo and San Bernardino County, and 65 on both sides of the Colorado River from the Nevada state line to the Mexican border (Gaines 1977). By 1986 the entire breeding population in California had dropped to 31-42 pairs (Laymon and Halterman 1987).

The YBCU was once common in riparian habitat throughout the western United States. In California the YBCU has declined from a "fairly common breeding species" throughout most of the state to a current population of less than 50 pairs (Gaines and Laymon 1984; Laymon and Halterman 1991). The geographical breeding range of the YBCU in the western United States North America includes suitable habitat within the low- to moderate-elevation areas, including the upper and middle

Rio Grande, the Colorado River Basin, the Sacramento and San Joaquin River systems, the Columbia River system, and the Fraser River.

The species historical range included Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Texas, Utah, Washington, Wyoming. The California/Nevada Region (Region 8) Counties in California in which this population is known to or is believed to occur include: Alameda, Butte, Colusa, Contra Costa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Kern, Lake, Lassen, Madera, Marin, Mendocino, Modoc, Mono, Plumas, Sacramento, San Francisco, San Joaquin, San Luis Obispo, San Mateo, Santa Clara, Shasta, Sierra, Siskiyou, Solano, Sonoma, Stanislaus, Sutter, Tehama, Trinity, Tulare, Tuolumne, Yolo, and Yuma.

The YBCU is a medium sized bird, with a long and slim profile. Its legs are short and bluish-gray, and its tail is gray-brown above and black below with three striking pairs of large white dots visible in flight. Its body is brown above with white under parts. The undersides of its pointed wings are rufous. Adult birds have a long-curved bill which is blue-black above and yellow at the base of the mandibles. Juveniles have a completely blue-black bill.

Though the YBCU will occupy a variety of marginal habitats, particularly at the edges of their range, YBCU in the West are overwhelmingly associated with relatively expansive stands of mature cottonwood willow forests. Canopy height ranged from 5-25 m, canopy cover from 20-90 percent, and understory cover from 30-90 percent. Willows and open water are required and the habitat will vary from dense willow-cottonwood forests to marshy bottomlands with scattered willow thickets. Today, five of the remaining eight populations in California are in immediate danger of extinction, including 2 sites in Owens Valley, the Armargosa River near Tecopa, the Mojave River and the Santa Ana River. These populations only harbor 1-2 individuals in some years and none in others, making them highly vulnerable to extirpation from both stochastic and systemic processes. According to the California Department of Fish and Wildlife (1980), remnant patches of suitable habitat in sizes sufficient to support breeding yellow-billed cuckoos are scarce.

The YBCU has not been documented on site or within a 1- mile radius. The small willow scrub thicket onsite is highly degraded and occupied by transients. The habitat formed as a result of street run off and does not have the structure or size preferred by this species. They are found in habitat areas with a well-developed overstory, mid-story, understory, consisting of willow and cottonwood, near water, with a minimum patch size of forty (40) acres. This species requires a habitat structure of a 30-75-foot upper canopy, 18-20 foot mid-story and a lower story of 5-3 feet. This species is not found in salt cedar or eucalyptus. Although there is a willow component, it is not the size or structure where this species is found. These conditions are absent from the site. The acreage and structure of 0.11 acre of eucalyptus trees approximately 35 feet in height, with a range in diameter at breast height (DBH) of 6 inches to 18 inches and a mid-story densely covered in 0.03 acre of salt cedar with a DBH of 8 inches and 0.27 acre of black willow shrubs with a DBH of 6 inches is not the type of habitat or structure that this species is found. Nor are they found in high disturbance areas which is the case on site due to the transient encampments and cutting of the vegetation. This species is very sensitive to disturbance and is only found in pristine environments. The specific requirement for this species is the presence of water which is absent from the site.

Therefore, YBCU has no potential to occur on site and /or in the Project vicinity. Further investigation is not warranted.

Vernal Pools

No vernal pool resources occur on site. The soils are well drained and no evidence of pooling/ponding is present. Further historical imagery provides no evidence of past ponding or pooling.

CONCLUSIONS AND RECOMMENDATIONS

The Project site is currently vacant and has been subject to human disturbances. Parcel APN 347-130-028, the northeastern corner of the Project site has two occupied homeless encampments with trash littering the entire area and an old Porta Potty. Soils on site have been bladed, and many of the eucalyptus trees on site have had trunks/branches sawed off.

The Project site is within an MSHCP required survey area for BUOW. Based on the survey results BUOW are absent from the Project site and survey buffer. The habitat type, structure and composition is not suitable for BUOW and there is no potential for them to occur here. Therefore, no further action relative to BUOW is required.

The small patch of willow scrub located in the northest corner of the Project site is not suitable to support LBVI, SWWF or YBCU. Therefore, protocol surveys are not warranted. These migratory songbirds nest and forage almost exclusively in riparian woodland habitats with nesting habitat typically consisting of well-developed overstory, understory, and low densities of aquatic and herbaceous cover. The understory frequently contains dense sub-shrub or shrub thickets. These thickets are often dominated by plants such as narrow-leaf willow, mulefat, young individuals of other willow species such as arroyo willow or black willow, and one or more herbaceous species. These conditions do not occur on site. Although these song birds use a variety of riparian plant species for nesting, it appears that the structure of the vegetation is more important than other factors such as species composition or the age of the stand. Territories for these three species range in size from 0.5 to 7.5 acres, with an average size of approximately 2 acres. The willow scrub on site is 0.27 acre in size and does not meet the habitat structure requirements of these three species. Further, the consistent presence of transients in the willow thicket presents a major disturbance that is not conducive to bird nesting in general.

The eucalyptus and salt cedar vegetation growing in the northeast corner of the property does however, provide potentially suitable nesting habitat for birds, including raptor species. Therefore, the following is recommended to avoid potential impacts to nesting birds and/or raptors:

> Recommendation: Bird nesting season generally extends from February 1 through September 15 in southern California and specifically, April 15 through August 31 for migratory passerine birds. In general, Projects should be constructed outside of this time to avoid impacts to nesting birds. If a Project cannot be constructed outside of nesting season, the project site shall be surveyed for nesting birds by a qualified avian biologist prior to initiating the construction activities. If active nests are found during the pre-construction nesting bird surveys, a Nesting Bird Plan (NBP) will be prepared and implemented. At a minimum, the NBP will include guidelines for addressing active nests, establishing buffers, monitoring, and reporting. The NBP will include a copy of maps showing the location of all nests and an appropriate buffer zone around each nest sufficient to protect the nest from direct and indirect impact. The size and location of all buffer zones, if required, shall be determined by the

biologist, and shall be based on the nesting species, its sensitivity to disturbance, and expected types of disturbance. The nests and buffer zones shall be field checked weekly by a qualified biological monitor. The approved buffer zone shall be marked in the field, within which no vegetation clearing or ground disturbance shall commence until the qualified biologist has determined the young birds have successfully fledged or that the nest has otherwise become inactive.

Should you have any questions or require further information, please contact me at (909) 915-5900 or shay@jericho-systems.com should you have any questions or require further information.

Sincerely,

Shay Lawrey, President

Attachments:

A. *Site Photographs*
B. *Species Occurrence Table*
C. *Figures*

0 0.0075 0.015 0.03 0.045 0.06 Miles

1 inch = 108 feet

Imagery Date: 7/19/2019

Service Layer Credits: Esri, HERE, Garmin, (c) OpenStreetMap contributors
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

JÉRICHO SYSTEMS INC.
Progress & Preservation

Photo Map	76 Gas Station - 74 Highway Lake Elsinore, CA

Attachment A – Site Photographs

	Photo 1 – Facing north east from the most southern point of the Project.
	Photo 2 – Facing west, start of encampment.

	Photo 3 – Looking west, northern encampment.
	Photo 4 – Facing east toward HWY74,.

	Photo 5 – Facing west; between the two encampments.
	Photo 6 – Facing east.

	Photo 7 – Facing south from northwest portion of project.
	Photo 8 – Facing west from most northwestern point of project.

Attachment B - Species Occurrence Table

Scientific Name	Common Name	Federal Status State Status Other Status	Habitats	Potential To Occur
Plants				
Allium munzii	Munz's onion	Endangered Threatened G1 S1 1B.1	Chaparral, coastal scrub, cismontane woodland, pinyon and juniper woodland, valley and foothill grassland. Heavy clay soils; grows in grasslands & openings within shrublands or woodlands. 375-1040 m.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.
Ambrosia pumila	San Diego ambrosia	Endangered None G1 S1 1B.1	Chaparral, coastal scrub, valley and foothill grassland. Sandy loam or clay soil; sometimes alkaline. In valleys; persists where disturbance has been superficial. Sometimes on margins or near vernal pools. 3-580 m.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.
Atriplex coronata var. *notatior*	San Jacinto Valley crownscale	Endangered None G4T1 S1 1B.1	Playas, valley and foothill grassland, vernal pools. Alkaline areas in the San Jacinto River Valley. 35-460 m.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.
Brodiaea filifolia	thread-leaved brodiaea	Threatened Endangered G2 S2 1B.1	Usually associated with annual grassland and vernal pools; often surrounded by shrubland habitats. Occurs in openings on clay soils. 15-1030 m.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.
Calochortus plummerae	Plummer's mariposa-lily	None None G4 S4 4.2	Coastal scrub, chaparral, valley and foothill grassland, cismontane woodland, lower montane coniferous forest. Occurs on rocky and sandy sites, usually of granitic or alluvial material. Can be very common after fire. 60-2500 m.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.
Carex buxbaumii	Buxbaum's sedge	None None G5 S3 4.2	Bogs and fens, meadows and seeps, marshes and swamps. Mesic sites. 3-3300 m.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.
Caulanthus simulans	Payson's jewelflower	None None G4 S4 4.2 USFS: Sensitive	Chaparral, coastal scrub. Frequently in burned areas, or in disturbed sites such as streambeds; also on rocky, steep slopes. Sandy, granitic soils. 90-2200 m.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.
Centromadia pungens ssp. *laevis*	smooth tarplant	None None G3G4T2 S2 1B.1	Wetland Valley and foothill grassland, chenopod scrub, meadows and seeps, playas, riparian woodland. Alkali meadow, alkali scrub; also in disturbed places. 5-1170 m.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.

Attachment B - Species Occurrence Table

Scientific Name	Common Name	Federal Status State Status Other Status	Habitats	Potential To Occur
Chorizanthe leptotheca	Peninsular spineflower	None None G3 S3 4.2	Chaparral, coastal scrub, lower montane coniferous forest. On granitic soils, in alluvial fans. 300-1900 m.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.
Chorizanthe parryi var. *parryi*	Parry's spineflower	None None G3T2 S2 1B.1 BLM: Sensitive USFS: Sensitive	Coastal scrub, chaparral, cismontane woodland, valley and foothill grassland. Dry slopes and flats; sometimes at interface of 2 vegetation types, such as chaparral and oak woodland. Dry, sandy soils. 90-1220 m.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.
Chorizanthe polygonoides var. *longispina*	long-spined spineflower	None None G5T3 S3 1B.2 BLM: Sensitive	Chaparral, coastal scrub, meadows and seeps, valley and foothill grassland, vernal pools. Gabbroic clay. 30-1630 m.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.
Convolvulus simulans	small-flowered morning-glory	None None G4 S4 4.2	Chaparral, coastal scrub, valley and foothill grassland. Wet clay, serpentine ridges. 30-700 m.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.
Dodecahema leptoceras	slender-horned spineflower	Endangered Endangered G1 S1 1B.1	Chaparral, cismontane woodland, coastal scrub (alluvial fan sage scrub). Flood deposited terraces and washes; associates include Encelia, Dalea, Lepidospartum, etc. Sandy soils. 200-765 m.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.
Dudleya multicaulis	many-stemmed dudleya	None None G2 S2 1B.2 USFS: Sensitive	Chaparral, coastal scrub, valley and foothill grassland. In heavy, often clayey soils or grassy slopes. 1-910 m.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.
Harpagonella palmeri	Palmer's grapplinghook	None None G4 S3 4.2	Chaparral, coastal scrub, valley and foothill grassland. Clay soils; open grassy areas within shrubland. 20-955 m.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.

Attachment B - Species Occurrence Table

Scientific Name	Common Name	Federal Status State Status Other Status	Habitats	Potential To Occur
Hordeum intercedens	vernal barley	None None G3G4 S3S4 3.2	Valley and foothill grassland, vernal pools, coastal dunes, coastal scrub. Vernal pools, dry, saline streambeds, alkaline flats. 5-1000 m.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.
Juglans californica	southern California black walnut	None None G4 S4 4.2	Chaparral, coastal scrub, cismontane woodland, riparian woodland. Slopes, canyons, alluvial habitats. 50-900 m.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.
Lasthenia glabrata ssp. *coulteri*	Coulter's goldfields	None None G4T2 S2 1B.1 BLM: Sensitive	Coastal salt marshes, playas, vernal pools. Usually found on alkaline soils in playas, sinks, and grasslands. 1-1375 m.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.
Lepechinia cardiophylla	heart-leaved pitcher sage	None None G3 S2S3 1B.2 USFS: Sensitive	Closed-cone coniferous forest, chaparral, cismontane woodland. 115-1345 m.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.
Myosurus minimus ssp. *apus*	little mousetail	None None G5T2Q S2 3.1	Vernal pools, valley and foothill grassland. Alkaline soils. 20-640 m.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.
Navarretia fossalis	spreading navarretia	Threatened None G2 S2 1B.1	San Diego hardpan and San Diego claypan vernal pools; in swales & vernal pools, often surrouded by other habitat types. 15-850 m.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.
Orcuttia californica	California Orcutt grass	Endangered Endangered G1 S1 1B.1	Wetland Vernal pools. 10-660 m.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.
Romneya coulteri	Coulter's matilija poppy	None None G4 S4	Desert wash Coastal scrub, chaparral. In washes and on slopes; also after burns. 20-1200 m.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.

Attachment B - Species Occurrence Table

Scientific Name	Common Name	Federal Status State Status Other Status	Habitats	Potential To Occur
		4.2		
Tortula californica	California screw moss	None None G2G3 S2? 1B.2 BLM: Sensitive	Chenopod scrub, valley and foothill grassland. Moss growing on sandy soil. 45-750 m.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.
Birds				
Accipiter cooperii	Cooper's hawk	None None G5 S4 CDFW: Watch List IUCN: Least Concern	Woodland, chiefly of open, interrupted or marginal type. Nest sites mainly in riparian growths of deciduous trees, as in canyon bottoms on river flood-plains; also, live oaks.	Marginally suitable habitat occurs on site. Potential to occur is **moderate**.
Aimophila ruficeps canescens	southern California rufous-crowned sparrow	None None G5T3 S3 CDFW: Watch List	Resident in Southern California coastal sage scrub and sparse mixed chaparral. Frequents relatively steep, often rocky hillsides with grass and forb patches.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.
Artemisiospiza belli belli	Bell's sage sparrow	None None G5T2T3 S3 CDFW: Watch List USFWS: Birds of Conservation Concern	Nests in chaparral dominated by fairly dense stands of chamise. Found in coastal sage scrub in south of range. Nest located on the ground beneath a shrub or in a shrub 6-18 inches above ground. Territories about 50 yds apart.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.
Athene cunicularia	burrowing owl	None None G4 S3 BLM: Sensitive CDFW: Species of Special Concern	Open, dry annual or perennial grasslands, deserts, and scrublands characterized by low-growing vegetation. Subterranean nester, dependent upon burrowing mammals, most notably, the California ground squirrel.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.

Attachment B - Species Occurrence Table

Scientific Name	Common Name	Federal Status State Status Other Status	Habitats	Potential To Occur
		IUCN: Least Concern USFWS: Birds of Conservation Concern		
Charadrius alexandrinus nivosus	western snowy plover	Threatened None G3T3 S2S3 CDFW: Species of Special ConcernNABCI: Red Watch List USFWS: Birds of Conservation Concern	Sandy beaches, salt pond levees & shores of large alkali lakes. Needs sandy, gravelly or friable soils for nesting.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.
Elanus leucurus	white-tailed kite	None None G5 S3S4 BLM: Sensitive CDFW: Fully Protected IUCN: Least Concern	Open grasslands, meadows, or marshes for foraging close to isolated, dense-topped trees for nesting and perching.	Marginally suitable habitat for this species occurs on site. Potential to occur is **moderate**.
Empidonax traillii extimus	southwestern willow flycatcher	Endangered Endangered G5T2 S1 NABCI: Red Watch List	Riparian woodlands with multiple canopy layers in Southern California.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The dense canopy layers of riparian vegetation this species requires is not on site. The habitat requirements for this species are not on site. Potential to occur is **low**.
Eremophila alpestris actia	California horned lark	None None G5T4Q S4 CDFW: Watch List IUCN: Least Concern	Short-grass prairie, "bald" hills, mountain meadows, open coastal plains, fallow grain fields, alkali flats.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.

Attachment B - Species Occurrence Table

Scientific Name	Common Name	Federal Status State Status Other Status	Habitats	Potential To Occur
Icteria virens	yellow-breasted chat	None None G5 S3 CDFW: Species of Special ConcernIUCN: Least Concern	Summer resident; inhabits riparian thickets of willow and other brushy tangles near watercourses. Nests in low, dense riparian, consisting of willow, blackberry, wild grape; forages and nests within 10 ft of ground.	The willows on site are not in great enough quality and quantity to provide suitable habitat for this species. Potential to occur is **low**.
Lanius ludovicianus	loggerhead shrike	None None G4 S4 CDFW: Species of Special Concern IUCN: Least Concern USFWS: Birds of Conservation Concern	Broken woodlands, savannah, pinyon-juniper, Joshua tree, and riparian woodlands, desert oases, scrub & washes. Prefers open country for hunting, with perches for scanning, and fairly dense shrubs and brush for nesting.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.
Plegadis chihi	white-faced ibis	None None G5 S3S4 CDFW: Watch List IUCN: Least Concern	Shallow freshwater marsh. Dense tule thickets for nesting, interspersed with areas of shallow water for foraging.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.
Polioptila californica californica	coastal California gnatcatcher	Threatened None G4G5T2Q S2 CDFW: Species of Special Concern NABCI: Yellow Watch List	Obligate, permanent resident of coastal sage scrub below 2500 ft in Southern California. Low, coastal sage scrub in arid washes, on mesas and slopes. Not all areas classified as coastal sage scrub are occupied.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.

Attachment B - Species Occurrence Table

Scientific Name	Common Name	Federal Status State Status Other Status	Habitats	Potential To Occur
Vireo bellii pusillus	least Bell's vireo	Endangered Endangered G5T2 S2 IUCN: Near Threatened NABCI: Yellow Watch List	Summer resident of Southern California in low riparian in vicinity of water or in dry river bottoms; below 2000 ft. Nests placed along margins of bushes or on twigs projecting into pathways, usually willow, Baccharis, mesquite.	The willows on site are not in great enough quality and quantity to provide suitable habitat for this species. Potential to occur is **low**.
Mammals				
Chaetodipus fallax fallax	northwestern San Diego pocket mouse	None None G5T3T4 S3S4 CDFW: Species of Special Concern	Coastal scrub, chaparral, grasslands, sagebrush, etc. in western San Diego County. Sandy, herbaceous areas, usually in association with rocks or coarse gravel.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.
Dipodomys merriami parvus	San Bernardino kangaroo rat	Endangered Candidate Endangered G5T1 S1 CDFW: Species of Special Concern	Alluvial scrub vegetation on sandy loam substrates characteristic of alluvial fans and flood plains. Needs early to intermediate seral stages.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.
Dipodomys stephensi	Stephens' kangaroo rat	Endangered Threatened G2 S2 IUCN: Endangered	Primarily annual & perennial grasslands, but also occurs in coastal scrub & sagebrush with sparse canopy cover. Prefers buckwheat, chamise, brome grass and filaree. Will burrow into firm soil.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.
Lepus californicus bennettii	San Diego black-tailed jackrabbit	None None G5T3T4 S3S4 CDFW: Species of Special Concern	Intermediate canopy stages of shrub habitats & open shrub / herbaceous & tree / herbaceous edges. Coastal sage scrub habitats in Southern California.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.
Reptiles				

Attachment B - Species Occurrence Table

Scientific Name	Common Name	Federal Status State Status Other Status	Habitats	Potential To Occur
Arizona elegans occidentalis	California glossy snake	None None G5T2 S2 CDFW: Species of Special Concern	Patchily distributed from the eastern portion of San Francisco Bay, southern San Joaquin Valley, and the Coast, Transverse, and Peninsular ranges, south to Baja California. Generalist reported from a range of scrub and grassland habitats, often with loose or sandy soils.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.
Aspidoscelis hyperythra	orange-throated whiptail	None None G5 S2S3 CDFW: Watch List IUCN: Least Concern USFS: Sensitive	Inhabits low-elevation coastal scrub, chaparral, and valley-foothill hardwood habitats. Prefers washes and other sandy areas with patches of brush and rocks. Perennial plants necessary for its major food: termites.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.
Crotalus ruber	red-diamond rattlesnake	None None G4 S3 CDFW: Species of Special Concern USFS: Sensitive	Chaparral, woodland, grassland, & desert areas from coastal San Diego County to the eastern slopes of the mountains. Occurs in rocky areas and dense vegetation. Needs rodent burrows, cracks in rocks or surface cover objects.	The microhabitat conditions required for this species are not on site. Potential to occur is **low**.
Phrynosoma blainvillii	coast horned lizard	None None G3G4 S3S4 BLM: Sensitive CDFW: Species of Special Concern IUCN: Least Concern	Frequents a wide variety of habitats, most common in lowlands along sandy washes with scattered low bushes. Open areas for sunning, bushes for cover, patches of loose soil for burial, and abundant supply of ants and other insects.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.
Salvadora hexalepis virgultea	coast patch-nosed snake	None None G5T4 S2S3	Brushy or shrubby vegetation in coastal Southern California. Require small mammal burrows for refuge and overwintering sites.	Small mammal burrows were not detected on site. Potential to occur is **low**.

Attachment B - Species Occurrence Table

Scientific Name	Common Name	Federal Status State Status Other Status	Habitats	Potential To Occur
		CDFW: Species of Special Concern		
Amphibians				
Spea hammondii	western spadefoot	None None G3 S3 BLM: Sensitive CDFW: Species of Special Concern IUCN: Near Threatened	Occurs primarily in grassland habitats, but can be found in valley-foothill hardwood woodlands. Vernal pools are essential for breeding and egg-laying.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.
Crustaceans				
Branchinecta lynchi	vernal pool fairy shrimp	Threatened None G3 S3 IUCN: Vulnerable	Endemic to the grasslands of the Central Valley, Central Coast mountains, and South Coast mountains, in astatic rain-filled pools. Inhabit small, clear-water sandstone-depression pools and grassed swale, earth slump, or basalt-flow depression pools.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.
Streptocephalus woottoni	Riverside fairy shrimp	Endangered None G1G2 S1S2 IUCN: Endangered	Endemic to Western Riverside, Orange, and San Diego counties in areas of tectonic swales/earth slump basins in grassland and coastal sage scrub. Inhabit seasonally astatic pools filled by winter/spring rains. Hatch in warm water later in the season.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.
Insects				
Bombus crotchii	Crotch bumble bee	None Candidate Endangered G3G4 S1S2	Coastal California east to the Sierra-Cascade crest and south into Mexico. Food plant genera include Antirrhinum, Phacelia, Clarkia, Dendromecon, Eschscholzia, and Eriogonum.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.
Cicindela senilis frosti	senile tiger beetle	None None G2G3T1T3 S1	Mud shore/flats Wetland Inhabits marine shoreline, from Central California coast south to salt marshes of San Diego. Also found at Lake Elsinore Inhabits dark-colored mud in the lower zone and dried salt pans in the upper zone.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.

Attachment B - Species Occurrence Table

Scientific Name	Common Name	Federal Status State Status Other Status	Habitats	Potential To Occur
Euphydryas editha quino	quino checkerspot butterfly	Endangered None G5T1T2 S1S2	Sunny openings within chaparral & coastal sage shrublands in parts of Riverside & San Diego counties. Hills and mesas near the coast. Need high densities of food plants Plantago erecta, P. insularis, and Orthocarpus purpurescens.	Habitat on site consists of dense, annual, primarily invasive species with stands of gum trees. The habitat requirements for this species are not on site. Potential to occur is **low**.
Habitats				
Southern Coast Live Oak Riparian Forest		None None G4 S4	Riparian forest	This habitat is not on site
Southern Cottonwood Willow Riparian Forest		None None G3 S3.2	Riparian forest	This habitat is not on site
Southern Sycamore Alder Riparian Woodland		None None G4 S4	Riparian woodland	This habitat is not on site

Attachment B - Species Occurrence Table

Coding and Terms

E = Endangered T = Threatened C = Candidate FP = Fully Protected SSC = Species of Special Concern R = Rare

State Species of Special Concern: An administrative designation given to vertebrate species that appear to be vulnerable to extinction because of declining populations, limited acreages, and/or continuing threats. Raptor and owls are protected under section 3502.5 of the California Fish and Game code: "It is unlawful to take, possess or destroy any birds in the orders Falconiformes or Strigiformes or to take, possess or destroy the nest or eggs of any such bird."

State Fully Protected: The classification of Fully Protected was the State's initial effort in the 1960's to identify and provide additional protection to those animals that were rare or faced possible extinction. Lists were created for fish, mammals, amphibians and reptiles. Fully Protected species may not be taken or possessed at any time and no licenses or permits may be issued for their take except for collecting these species for necessary scientific research and relocation of the bird species for the protection of livestock.

Global Rankings (Species or Natural Community Level):

G1 = Critically Imperiled – At very high risk of extinction due to extreme rarity (often 5 or fewer populations), very steep declines, or other factors.
G2 = Imperiled – At high risk of extinction due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors.
G3 = Vulnerable – At moderate risk of extinction due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors.
G4 = Apparently Secure – Uncommon but not rare; some cause for long-term concern due to declines or other factors.
G5 = Secure – Common; widespread and abundant.

Subspecies Level: Taxa which are subspecies or varieties receive a taxon rank (T-rank) attached to their G-rank. Where the G-rank reflects the condition of the entire species, the T-rank reflects the global situation of just the subspecies. For example: the Point Reyes mountain beaver, *Aplodontia rufa* ssp. *phaea* is ranked G5T2. The G-rank refers to the whole species range i.e., *Aplodontia rufa.* The T-rank refers only to the global condition of ssp. *phaea*.

State Ranking:

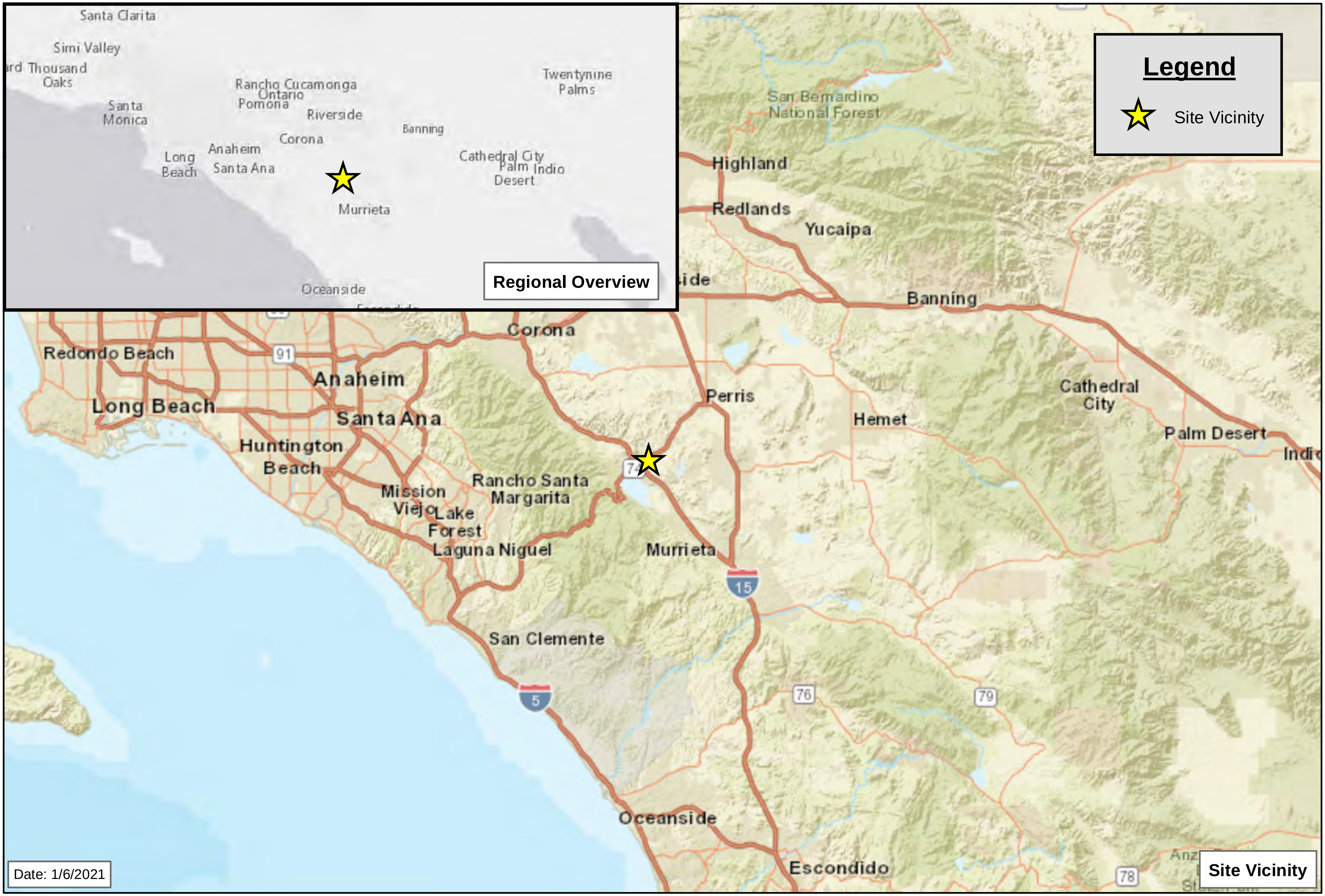
S1 = Critically Imperiled – Critically imperiled in the State because of extreme rarity (often 5 or fewer populations) or because of factor(s) such as very steep declines making it especially vulnerable to extirpation from the State.
S2 = Imperiled – Imperiled in the State because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the State.
S3 = Vulnerable – Vulnerable in the State due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation from the State.
S4 = Apparently Secure – Uncommon but not rare in the State; some cause for long-term concern due to declines or other factors.
S5 = Secure – Common, widespread, and abundant in the State.

California Rare Plant Rankings (CNPS List):

1A = Plants presumed extirpated in California and either rare or extinct elsewhere.
1B = Plants rare, threatened, or endangered in California and elsewhere.
2A = Plants presumed extirpated in California, but common elsewhere.
2B = Plants rare, threatened, or endangered in California, but more common elsewhere.
3 = Plants about which more information is needed; a review list.
4 = Plants of limited distribution; a watch list.

Threat Ranks:

.1 = Seriously threatened in California (over 80% of occurrences threatened / high degree and immediacy of threat)
.2 = Moderately threatened in California (20-80% occurrences threatened / moderate degree and immediacy of threat)
.3 = Not very threatened in California (less than 20% of occurrences threatened / low degree and immediacy of threat or no current threats known)



0 5 10 20 30 40 Miles

Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

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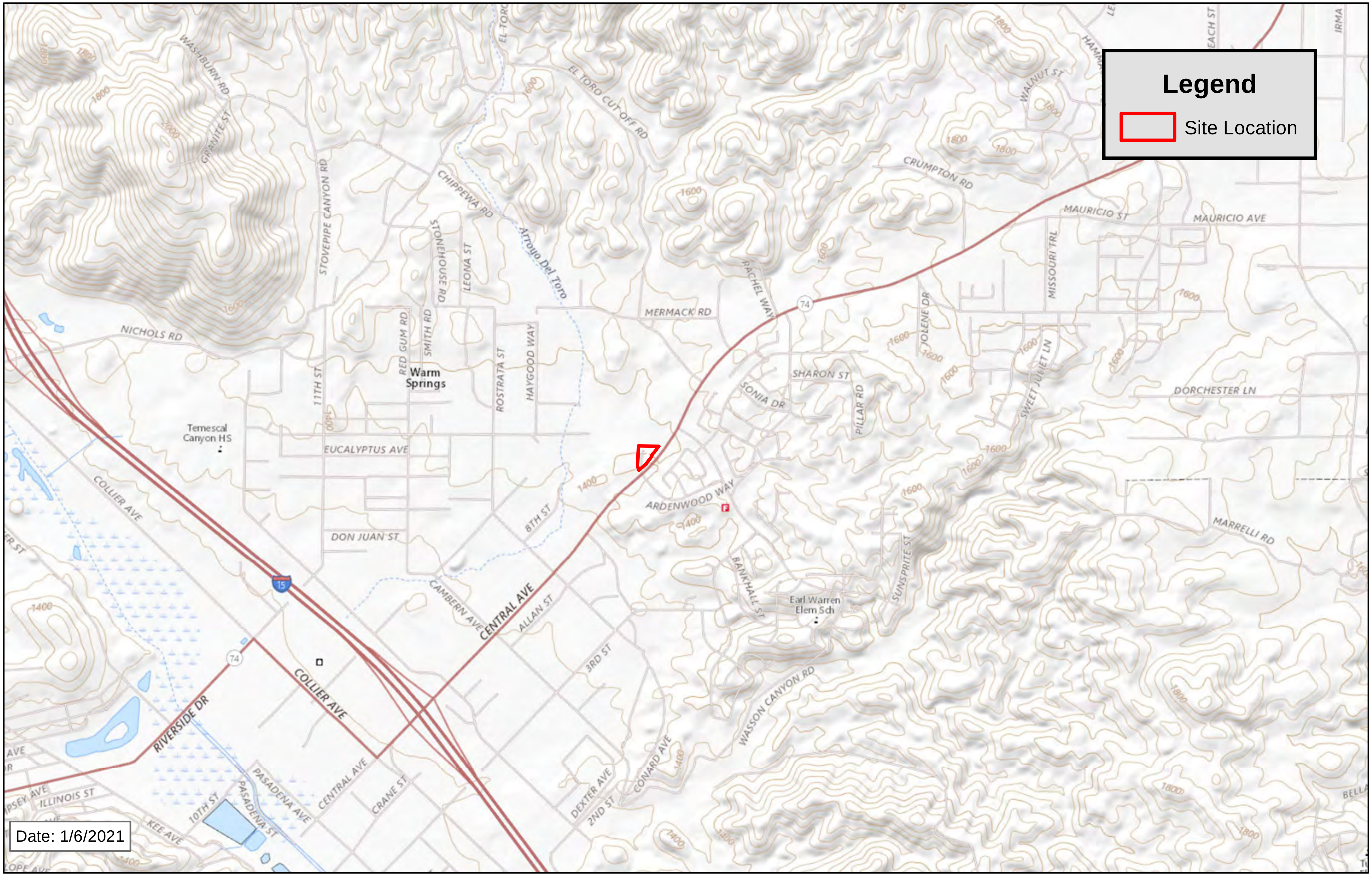
Figure 1 - Regional Overview Site Vicinity	76 Gas Station - 74 Highway Lake Elsinore, CA



0	0.15	0.3	0.6	0.9	1.2 Miles

1 inch = 2,000 feet

Imagery Date: 8/6/2017

Service Layer Credits: USGS The National Map: National Boundaries Dataset, 3DEP Elevation Program, Geographic Names Information System, National Hydrography Dataset, National Land Cover Database, National Structures Dataset, and National Transportation Dataset; USGS Global Ecosystems; U.S. Census Bureau TIGER/Line data; USFS Road Data; Natural Earth Data; U.S. Department of State Humanitarian Information Unit; and NOAA National Centers for Environmental Information, U.S. Coastal Relief Model. Data refreshed October 2018.

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Figure 2 Site Location	76 Gas Station - 74 Highway Lake Elsinore, CA

0 0.0325 0.065 0.13 0.195 0.26 Miles

1 inch = 417 feet

Imagery Date: 7/19/2019

Service Layer Credits: Esri, HERE, Garmin, (c) OpenStreetMap contributors
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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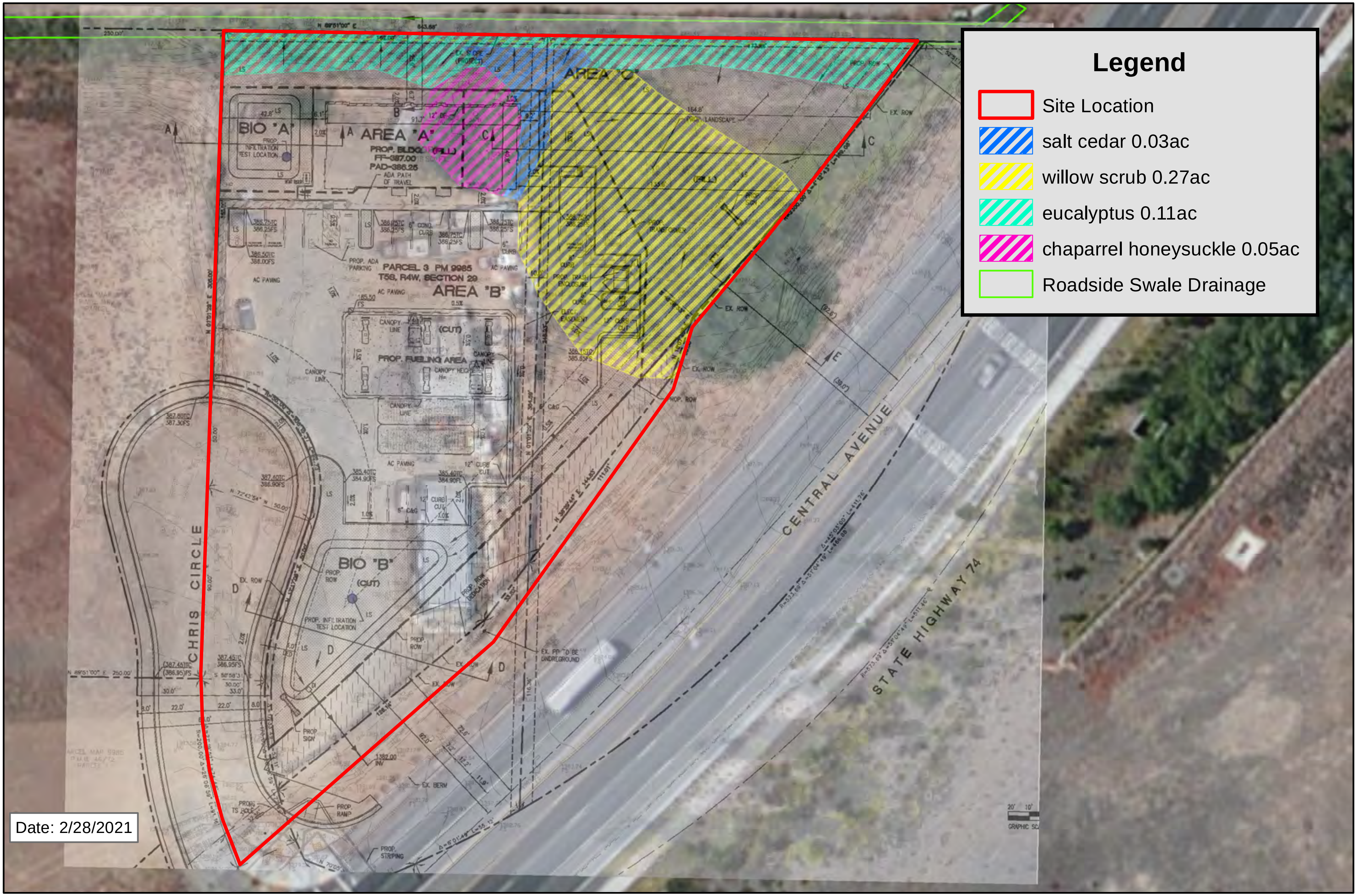
Figure 3 Site Location	76 Gas Station - 74 Highway Lake Elsinore, CA



0 0.00475 0.0095 0.019 0.0285 0.038 Miles

1 inch = 58 feet

Imagery Date: 7/19/2019

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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Figure 4 Site Plan	76 Gas Station - 74 Highway Lake Elsinore, CA

0 0.0175 0.035 0.07 0.105 0.14 Miles

1 inch = 216 feet

Imagery Date: 7/19/2019

Service Layer Credits: Esri, HERE, Garmin, (c) OpenStreetMap contributors
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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Figure 5 MSHCP	76 Gas Station - 74 Highway Lake Elsinore, CA

0 0.0075 0.015 0.03 0.045 0.06 Miles

1 inch = 104 feet

Imagery Date: 7/19/2019

Service Layer Credits: Esri, HERE, Garmin, (c) OpenStreetMap contributors
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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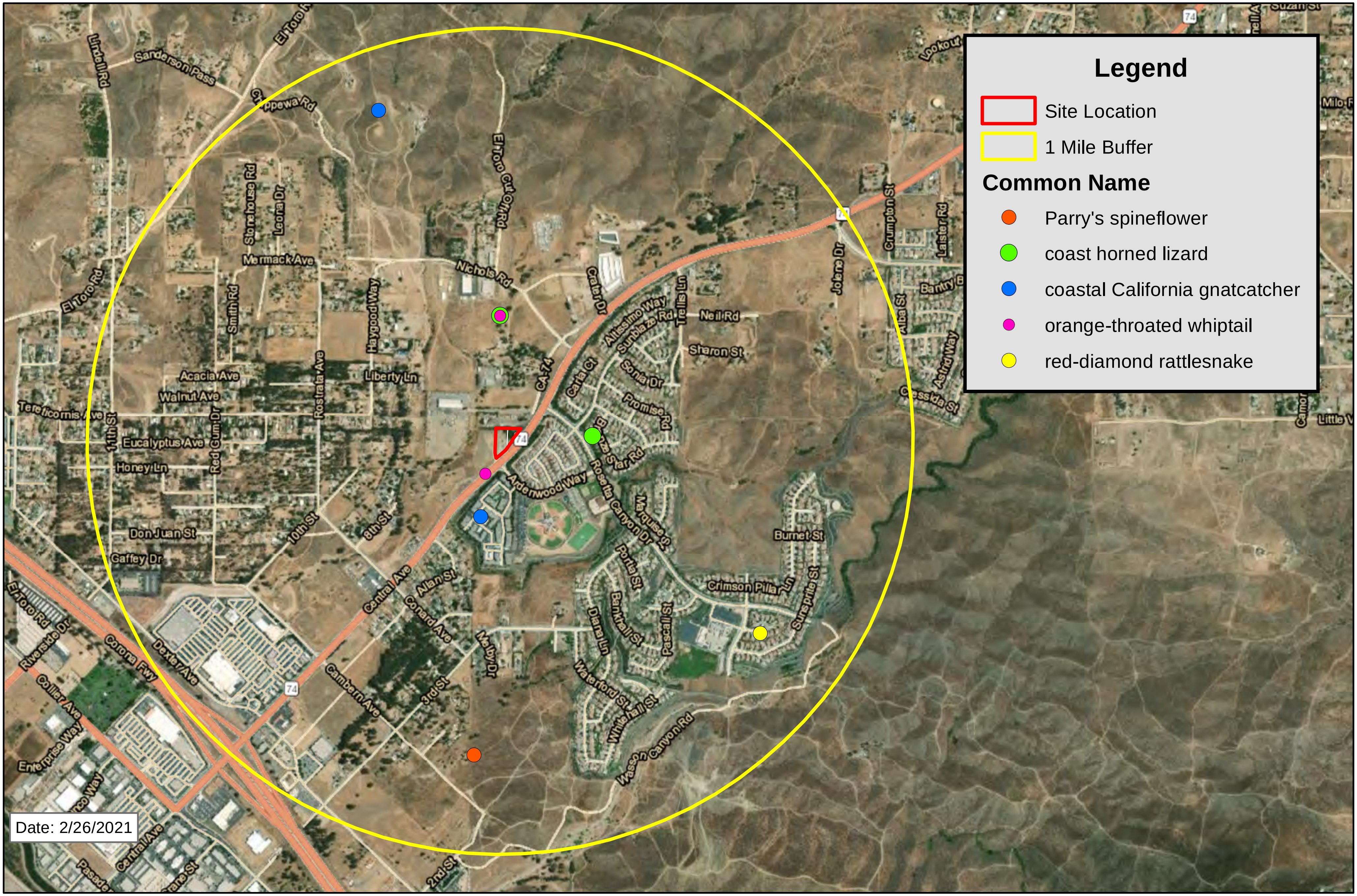
Figure 6 Blueline Waters	76 Gas Station - 74 Highway Lake Elsinore, CA



0 0.125 0.25 0.5 0.75 1 Miles

1 inch = 1,619 feet

Imagery Date: 7/19/2019

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Figure 7 CNDDB	76 Gas Station - 74 Highway Lake Elsinore, CA

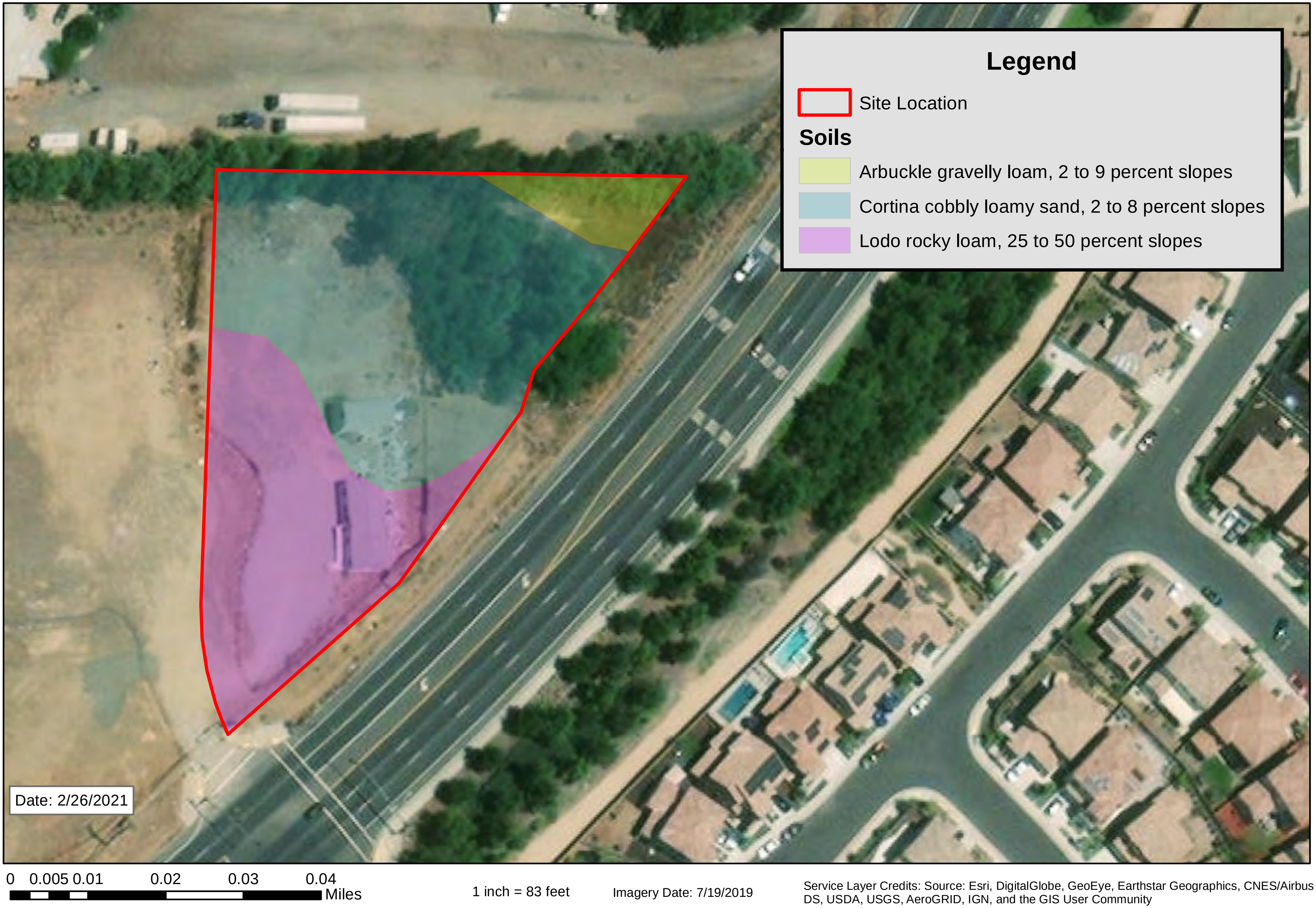

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Figure 8 Soils	76 Gas Station - 74 Highway Lake Elsinore, CA

Phase I Cultural Resources Assessment Report for the 28771 Highway 74 Project, APNs 347-130-028 and 347-130-029, Lake Elsinore, Riverside County, California

February 2021

Conditional Use Permit No. 200043

Lake Elsinore, California USGS 7.5' Quad, Township 5 South, Range 4 West, Section 29

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Key Words: 1.44 acres, negative survey, *Lake Elsinore, California* 7.5-minute Topographic Map

NATIONAL ARCHAEOLOGICAL DATABASE INFORMATION

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Submitted to: County of Riverside

Report Date: February 2021

Report Title: Phase I Cultural Resources Assessment Report for the 28771 Highway 74 Project, APNs 347-130-028 and 347-130-029, Lake Elsinore, Riverside County, California

Type of Study: Phase I Cultural Resources Assessment

New Sites: none

Updated Sites: P-33-000641/RIV-641

USGS Quad: *Lake Elsinore, California* 7.5-minute Topographic Map

Area: approximately 1.44 acres

Keywords: negative survey, *Lake Elsinore, California* 7.5-minute Topographic Map

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MANAGEMENT SUMMARY

This report provides the results of a Phase I cultural resources assessment completed by Red Tail Environmental (Red Tail) for the proposed 28771 Highway 74 Project (Project). The Project consists of the development of two parcels for a gas station that will include a convenience market, a fueling canopy with six multi-product dispensers, and two underground storage tanks in Riverside County, California. This study was performed in compliance with the California Environmental Quality Act and the County of Riverside (County) Planning Department – Cultural Resources Review Requirements. The County of Riverside is the lead agency.

This Phase I cultural resources assessment was conducted to identify all cultural resources and historic properties within the Project area and to determine project-related effects on these resources. The study consisted of a review of relevant site records and reports on file with the Eastern Information Center (EIC) of the California Historical Resources Information System (CHRIS) within a 1-mile (mi.) search radius, a pedestrian survey of the Project area by an archaeologist, and a review of the Sacred Lands File (SLF) held by the Native American Heritage Commission (NAHC). This report includes the results of the study, as well as a brief historic background sketch for the area, and recommendations for future work.

The record search of the SLF held by the NAHC was negative and contact information for twenty-seven Native American groups and individuals were included by the NAHC for additional information. Red Tail sent the 27 individuals and groups letters requesting any additional information relevant to the project on February 8, 2021. To date, three responses have been received. On February 8, 2021 Joyce Stanfield Perry, President, Juaneño Band of Mission Indians, Acjachemen Nation, responded that they yield recommendations and monitoring responsibilities to the Pechanga Band of Luiseno Indians. On February 8, 2021 Jill McCormick, Quechan Historic Preservation Officer responded that they have no comments on the project and defer to more local tribes. On February 9, 2021 Cami Mojado, San Luis Rey Band of Mission Indians responded that they defer to Pechanga or other tribes that may be closer to the Project. No additional responses have been received to date.

The record search from the EIC was requested on January 21, 2021 and received on February 12, 2021. The record search revealed that 56 cultural resource studies had been conducted within 1-mile of the Project Area, with two studies intersecting portions of the Project Area. The records search also indicated that seventeen (17) previously recorded cultural resources were located within 1-mile of the Project. One resource, P-33-000641/CA-RIV-641, was previously recorded within the Project Area. The resource, originally recorded in 1973 by J. Humbert and S. Hammond, consisted of a single bedrock outcrop containing four milling slicks. No surficial artifacts were present at the time of original recordation. The resource was later updated in 1978 (recorder unknown), noting that the outcrop was no longer present, most likely due to being removed for the widening of State Route 74. No further updates to the resource have occurred since 1978.

An archaeological survey was completed by Red Tail on February 3, 2021. The project area is located on the northwest side of State Route 74/ Central Avenue upon a gently sloping alluvial terrace with a southerly aspect. The western parcel, APN 347-130-029, had been previously graded and was mostly devoid of vegetation. The eastern parcel, APN 347-130-028, did not appear to have been previously graded or disturbed except for the southern edge which had been benched, presumably for slope retention. The southern border of the east parcel also contained a low-lying concrete retaining wall/curb which appeared to be modern in construction style. The north and northeastern portions of the Project Area contained a small east-west-trending drainage containing a mix of riparian vegetation, including mulefat and willow, and ornamental vegetation, including eucalyptus trees. Ground visibility within the north and northeastern portions of the Project Area were moderate (approximately 25 to 50 percent) to low (less than 25 percent) due to vegetation. Visibility within the central and southern portions of the east parcel and the entirety of the west parcel were moderate to good (75 percent and higher). The project area was transected in 10-meter intervals. The archaeological survey was negative and no evidence of cultural resources was identified. No evidence of resource P-33-000641/CA-RIV-641 was observed.

As no cultural resources were identified implementation of the project will not cause an adverse effect. However, due to the presence of the drainage within the northern portions of the Project Area, a bed rock milling feature previously recorded within the Project area, presumable destroyed by the construction of Highway 74 and several prehistoric resources located within one mile of the Project, archaeological monitoring is recommended.

1. INTRODUCTION AND SETTING

PURPOSE OF STUDY

This Phase I cultural resources assessment was conducted in compliance with the California Environmental Quality Act (CEQA), which requires that before approving discretionary projects the lead agency must identify and examine the significant adverse environmental effects which may result from that project. A project that may cause a substantial adverse change in the significance of a historical resource is a project that may have a significant effect on the environment (Sections 15064.5(b) and 21084). A substantial adverse change is defined as demolition, destruction, relocation, or alteration activities which would impair historical significance (Sections 15064.5(b)(1) and 5020.1). Any historical resources listed in or eligible to be listed in the California Register of Historical Resources (CRHR), including archaeological resources, is considered to be historically or culturally significant. Resources which are listed in a local historic register or deemed significant in a historical resource survey as provided under Section 5024.1(g) are presumed historically or culturally significant unless "the preponderance of evidence" demonstrates they are not. Finally, a resource that is not listed in, or determined to be eligible for listing in, the CRHR, not included in a local register of historic resources, or not deemed significant in a historical resource survey may nonetheless be historically significant, pursuant to Section 21084.1.

This study was also conducted in compliance with the County of Riverside General Plan, Municipal Code, and County of Riverside Planning Department – Cultural Resources Review Requirements. The County of Riverside's General Plan follows both federal and state laws and guidelines for the definition of significance and sensitivity of cultural resources. Cultural resources are defined as objects, buildings, structures, sites, areas, places, records, or manuscripts, and may also include places that have historic or traditional associations or are important for traditional cultural uses. The County of Riverside has enacted the following general plan policies in the Open Space and Conservation Element to ensure that cultural resources are appropriately considered:

- OS 19.1 Cultural resources (both prehistoric and historic) are a valued part of the history of the County of Riverside.
- OS 19.2 The County of Riverside shall establish a cultural resources program in consultation with Tribes and the professional cultural resources consulting committee. Such a program shall, at a minimum, address each of the following: application processing requirements, information database(s), confidentiality of site locations, content and review of technical studies, professional consultant qualification and requirements, site monitoring, examples of preservation and mitigation techniques and methods, and the descendant community consultation requirements of local, state, and federal law.
- OS 19.3 Review proposed development for the possibility of cultural resources and for compliance with the cultural resources program.
- OS 19.4 To the extent feasible, designate as open space and allocate resources and/or tax credits to prioritize the protection of cultural resources preserved in place or left in an undisturbed state.
- OS 19.5 Exercise sensitivity and respect for human remains from both prehistoric and historic time periods and comply with all applicable laws concerning such remains.

The County of Riverside's Municipal Code Section 15.72.050., Establishing Historic Preservation Districts, provides details regarding how to establish a historic preservation district in the county of Riverside and the approval process for its establishment.

Relevant to this Phase I cultural resources assessment the County of Riverside Planning Department – Cultural Resources Review Requirements includes a Level of Significance Checklist and a Phase I Archaeological Survey Report Outline.

PROJECT DESCRIPTION

The Project proposes to develop portions of Parcels 347-130-028 and 347-130-029 for a gasoline station with a convenience store. The Project will include a 3,516 square foot convenience market (Building A), and a 3,160 square foot canopied fueling station containing six multi-product dispensers (Building B). The two underground storage tanks will be installed directly south of the fueling canopy. Building A will contain a quick service restaurant. Parking provided is 20 parking spaces, including two accessible and two electric charging vehicle stalls. The Zoning for the property is Scenic Highway Commercial C-P-S, and it is located within the Highway 74 Community Plan.

PROJECT LOCATION

The Project site is located at 28771 Highway 74 (Central Avenue), Lake Elsinore, CA 92532, within unincorporated Riverside County, California. The Project is in parcel numbers APN 347-130-028 and 347-130-029 and is bounded to the east and south by Central Avenue, on the north by El Toro Cutoff Road and Nichols Road, and west by Haygood Way and Rostrata Street. The Project is shown on the *Lake Elsinore, California* USGS 7.5-minute quadrangle within Township 5 South, Range 4 West, Section 29 (Figures 1-3). The Project site consists of 1.44 acres.

PROJECT PERSONNEL

Red Tail Principal Investigator Shelby Castells, M.A., RPA served as the primary author of this report and managed the study. Her personnel qualifications are included in Appendix A. Red Tail Senior Archaeologist Spencer Bietz conducted the archaeological survey and contributed to the report.

SETTING

The Project area is located within western Riverside County within a suburban area with elevations within the parcel ranging from 1,389 to 1,395 feet above mean sea level (amsl). Modern climate conditions within the Project area consist of a Mediterranean climate, with average rainfall of nine to ten inches per year, generally from January through March. The project area is located within the foothills of the western and southern portions of the Santa Ana Mountain Range, which belongs to the Peninsular Ranges Geomorphic Province. The Peninsular Ranges make up the majority of western Riverside County and contains a series of mountain ranges separated by northwest trending valleys (California Department of Conservation, California Geological Survey, 2002). The Project area is located northeast of Lake Elsinore, the largest natural freshwater lake in Southern California, which is situated at the lowest point within the San Jacinto River watershed. Although the lake is a terminal lake within the partially closed San Jacinto Basin, overflow funnels through Temescal Wash on its northeastern shore to flow through Temescal Canyon to Temescal Creek, which in turn joins with the Santa Ana River, ending at the Pacific Ocean. Portions of the Project area have been previously developed for a single-family residence. Vegetation within the Project Area consists of a mix of riparian vegetation, including willow and mulefat, and non-native vegetation including Russian thistle, eucalyptus trees, and annual grasses.

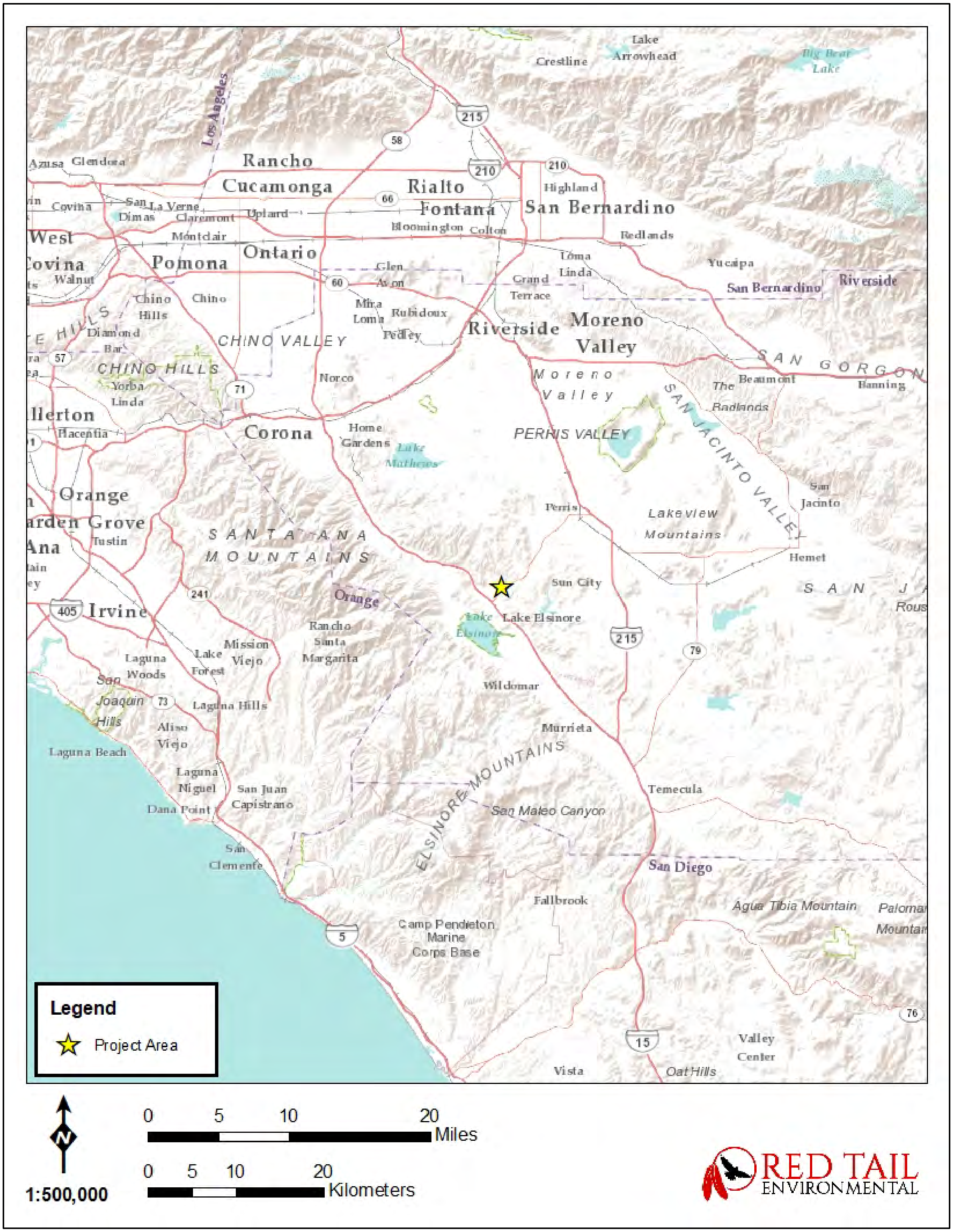

Figure 1. Project Vicinity Map.

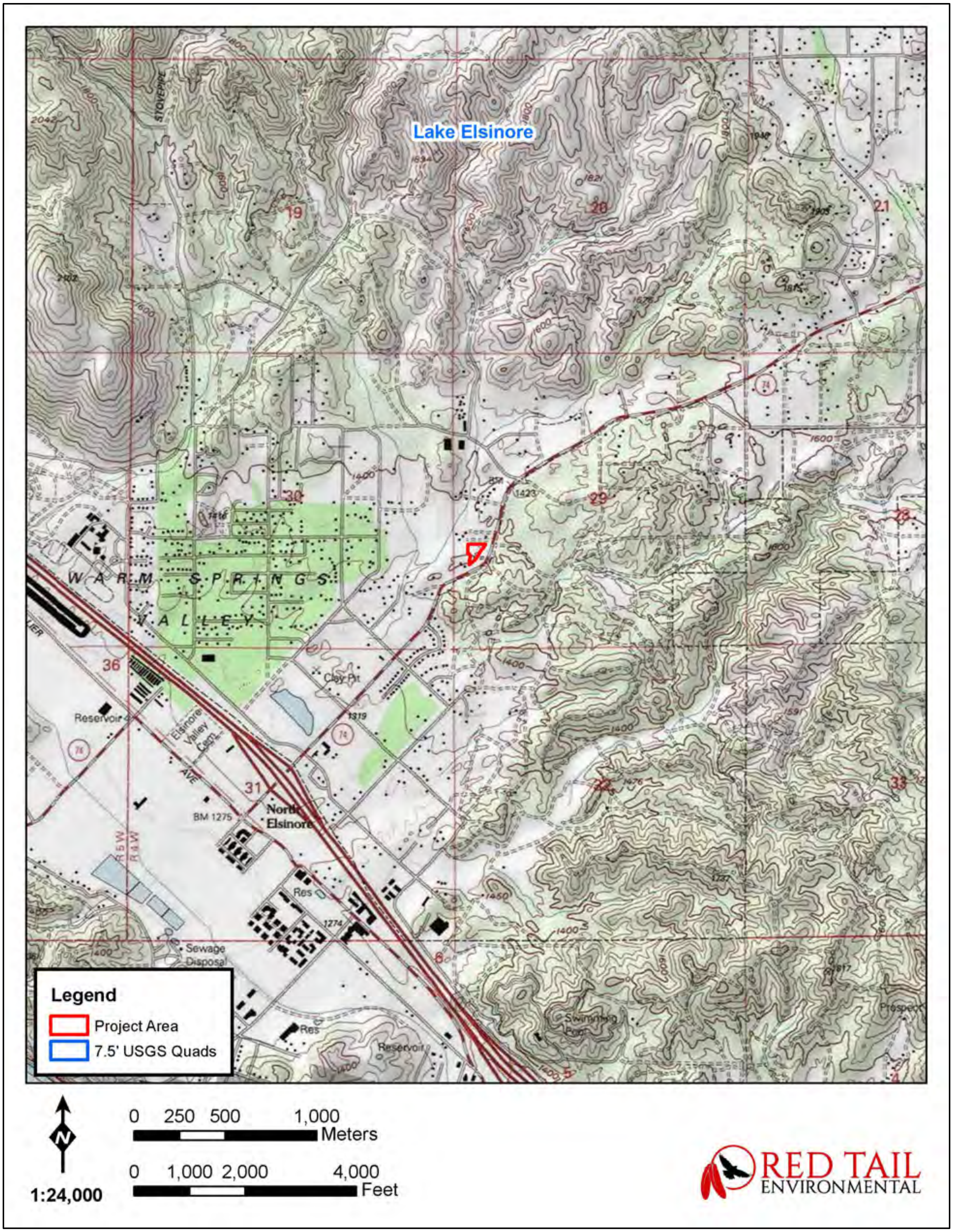

Figure 2. Project Area, shown on the USGS 7.5’ *Lake Elsinore, California* Quad Map.

Figure 3. Project Area, aerial photograph.

2. PREHISTORIC CONTEXT

The cultural setting of the Project area can be divided into the prehistoric, ethnohistoric, and historic periods, as discussed below.

PREHISTORIC ARCHAEOLOGY

While no single chronology is agreed upon, archaeologists generally concur that human occupation within Southern California spans at least the last 14,000 years. It was believed that people first came to North and South America over the Bering Land Bridge, however recent studies have identified that this ice-free corridor was not passable until 13,000 years ago and an alternate coastal route has been proposed. The Pacific Northwest coast was deglaciated by approximately 14,000 B.C. and travel along the Pacific Coast in boats would have been possible during this period. A widespread kelp forest could have created a "kelp highway" with enough resources to support people entering North America (Erlandson et al. 2007, Masters and Aiello 2007, Gallegos 2017). Erlandson (2007:56) contends that "it seems most likely that the peopling of the Americas included both coastal and interior migrations of peoples from northeastern Asia and Beringia, with an earlier migration possibly following the northern Pacific coast".

In Riverside County and the surrounding area, there is no consensus on times or terms in which human occupation started. It is unknown if the first people arrived in Riverside County via the coast or from the pluvial lakes within the Great Basin to the east, as both locations contain archaeological sites with early dates (Gallegos 2017). In addition, the inland valleys of Southern California, have been less intensively studied than the desert and coastal regions and therefore a variety of cultural periods have been suggested but generally researchers have not reached a consensus on the start or phases of prehistoric occupation of the area (Horne and McDougall 2007). Overall, three general cultural periods are recognized: the Paleo-Indian Period, the Archaic Period and the Late Prehistoric Period.

Paleo-Indian Period / San Dieguito Period (ca. 12,000 to 8,000 YBP)

As in most of North America, the Paleo-Indian Period is the earliest recognized period of California prehistory and coincides with the end of the late Pleistocene, circa 11,000 to 13,000 YBP (years before present). The environment was cool and moist, with deep pluvial lakes in the desert and basin lands (Moratto 1984). However, by the end of the late Pleistocene, the climate became warmer, causing glaciers to melt and sea levels to rise. Inland lakes began to recede and evaporate and there was a great deal of erosion in the coastal areas. The warmer climate also resulted in major vegetation changes and the extinction of Pleistocene megafauna (Moratto 1984, Martin 1967, Martin 1973, Fagan 1991).

Paleo-Indian sites have been identified across most of North American, often referred to as the Clovis Complex. The Clovis Complex is defined by the use of large fluted projectile points and other large bifacial stone tools. Within Southern California and the Colorado Desert the Clovis Complex is referred to as the Western Stemmed Point Tradition (WSPT) and was characterized by leaf shaped and large stemmed projectile points, scrapers and other stone tools. Archaeological evidence of the WSPT has been found across the western interior of North America with small regional variations (Gallegos 2017, Sutton 2016, Warren 1968). Similar archaeological remains are also known as the Lake Mohave Complex (Warren 1968). Overall, ground stone use was infrequent in San Dieguito archaeological remains, leading to the belief that the San Dieguito were highly mobile groups and their subsistence practices focused on the hunting of large game.

Several isolated fluted points have been recorded in Southern California, but none have been recorded near the project area in associated with radiocarbon dates or in association with Pleistocene fauna (Rondeau et al. 2007). In Riverside County, only one isolated fluted point has been identified on the surface of a site in the Pinto Basin in the central part of the county (Campbell and Campbell 1935, Dillon 2002:113). Fluted points have been dated outside of California to 13,500 years before the present. The earliest known archaeological sites near the Project area, with reliable dates, are from the Channel Islands. The Arlington Springs site on Santa Rosa Island dates to 13,300 years ago, and the Daisy Cave site on San Miguel Island dates to 12,300-11,120 years ago (Lightfoot and Parrish 2009). Daisy Cave mentioned above, is one of the largest, early Holocene archaeological deposits that has been excavated. The study identified over 18 types of fish, multiple shellfish, marine mammals, and birds remains, showing that people relied on a wide assortment of marine resources as early as 8000 B.C., rather than subsisting on large mammal hunting (Erlandson, et al., 2007). Over 25 shell midden sites that date to between 12,000 and 8,000 years ago have been recorded on the Channel Islands. On the mainland, a site near San Luis Obispo dates to 10,300-9,650 years ago and a several sites on Cedros Island in Baja California date to 12,000 years ago (Lightfoot and Parrish 2009). Other early sites in the vicinity of the Project area consist of the C.W. Harris Site (SDI-149), in San Diego County, with radiocarbon dates ranging from 9,030 YBP to 8,540 YBP (Byrd and Raab 2007, Gallegos 2017) and within Orange County, there are sites dating from 9,000 to 10,000 years ago (Macko 1998a:4, Mason and Peterson 1994:55–57) and the Elsinore site (CA-RIV-2798-B), has deposits dating as early as 8,580 YBP (Grenda 1997:260). As, no archaeological sites dating to the Paleoindian Period have been identified within the vicinity of the Project Area. It is unknown if the lack of Paleoindian Period sites relates to a lack of archaeological data or is evidence that the vicinity of the Project Area was a less sustainable area than the interior desert or the coastal regions. During this period the desert interior may have been more suitable to prehistoric occupation than the interior valleys of southern California and it is more likely that Paleoindian populations in southern California were centered on the coastal or interior desert regions or around the few large, reliable, drought-resistant water sources present within the inland valley areas (Horne and McDougall 2007).

When Paleo megafauna began to become extinct, Paleo-Indian peoples had to focus on different subsistence strategies (Erlandson et al., 2007). Recent studies along the Southern California coast have focused on the diversity of subsistence strategies during this period, acknowledging the use of smaller animals and plant foods as staples, with limited evidence for big game hunting. Byrd and Raab argue that an environmental change from 10,000 to 8,000 cal. B.C. caused warming and drying conditions which shrunk the interior lakes and streams in Southern California's deserts and spurred the change from a reliance on large game hunting to a focus on a variety of subsistence strategies (Byrd and Raab 2007). Archaeological research across Southern California has shown the use of shellfish, marine mammals, and fish declined proportionately with distance from the coast. Less is known about plant use in interior sites aside from the fact that an increase of milling tools is present suggesting that plant resources were heavily relied upon during this early period (Erlandson et al., 2007).

Archaic Period / Millingstone Horizon (ca. 9500/8000 to 1500 YBP)

The Archaic Period within the vicinity of the Project area was defined by a lengthy time period with little change within the archaeological record. In contrast to the Paleoindian Period the archaeological record within the Archaic Period consisted of a tool kit that focused on collection and processing of small plant seeds and hunting of a variety of medium and small game animals (Byrd and Raab 2007, Hale 2009, Rogers 1945, Warren 1968). Across Southern California this period is often referred to as the Millingstone Horizon, and is often divided into the Early, Middle, and Late Archaic Period. In addition to the Early, Middle, and Late Archaic Period, it was also referred to as the Encinitas Tradition by Warren (1968), the La Jolla Tradition, in San Diego County, and the Greven Knoll Pattern (SWCA 2018, Sutton 2010, Sutton 2011). Sutton created the Greven Knoll Pattern nomenclature as a redefined interpretation of the Encinitas Tradition, and used it to refer to all expressions of the inland Milling Stone Horizon in Southern California north of San Diego County (Sutton 2010).

There is a discrepancy on the start of the Millingstone Horizon, while Lightfoot and Parrish (2009) argues that early milling stone assemblages show that by 9,000 years ago milling tools were in use and that seeds and nuts must have been a dominate food source, other archaeologists argue that the Millingstone Horizon is generally attribute to the Middle to Late Holocene Period and has been identified across much of central and southern California by ca. 8,000 to 7,000 YBP (Byrd and Raab 2007, Hale 2009, Moratto 1984).

Interior archaeological sites from this period were thought to have been left by seasonally mobile groups with small settlements, based on the availability of food resources. There is little archaeological evidence for group size and type and use of habitation structures within Riverside County for the middle Holocene. The Millingstone Horizon or Archaic Period tool kit at inland sites focused on collection and processing of small plant seeds and hunting of a variety of medium and small game animals; while along the coast there was a reliance on marine resources (Byrd and Raab 2007, Hale 2009, Rogers 1945, Warren 1968). Artifacts from this period consist of grinding implements (manos and metates), atlatl or dart projectile points, quarry-based tools, as well as lithic choppers and scrapers that indicate the focus was on collection and processing of small plant seeds and hunting of a variety of medium and small game animals (Byrd & Raab 2007, Hale 2009, Rogers 1945, Warren 1968).

Mortuary practices consist of flexed inhumations which are often accompanied by grave goods of milling stones and other artifacts. This seems to represent a more sedentary lifestyle with a subsistence economy based upon the use of a broad variety of terrestrial resources than identified during the Paleoindian Period. Research indicates that residential bases or camps were moved in a seasonal round (de Barros 1996, Mason 1997, Koerper 2002), with some sites occupied year-round, with portions of the village population leaving at certain times of the year to exploit seasonally available resources.

During this lengthy period very little technological changes are identified within the archaeological record until approximately 5,000 years ago when there was an increase in sedimentation along the coast. This transformed the estuaries into shallow wetlands, closed several of the lagoons, transformed the coastal areas into sand and mudflats, and limited the kelp forests, causing the coastal region to have a lower level of subsistence resources than in the past. During this time the deserts became more arid, and there was an increase in use of the inland valleys within the vicinity of the Project Area (Byrd and Raab 2007, Gallegos 2007, Masters and Aiello 2007).

Early Archaic Period (ca. 9500/8000 to 7000 YBP)

Horne and McDougall (2007) report that there is little archaeological evidence within Riverside County during this period. However, several sites within the region date to the Early Archaic Period. The first consists of a single human burial dating to 7380 ± 300 B.P., which was capped by several large highly shaped metates. The second was a small temporary camp dated by obsidian hydration data and stratigraphic information to the Early Archaic Period (Horne and McDougall 2007:19). An additional site within Riverside County, SDI-6069, within the San Jacinto Valley area was identified in an alluvial fan just above the floor of the San Jacinto Valley. The site contains several different cultural occupations, and the lowest level contained radiocarbon dates from 7940 to 8370 B.P., while radiocarbon from the upper component of the site dated to 2230 B.P., within the Late Archaic Period (Horne and McDougall 2007:19). An additional site, SDI-2798/H, known as the Lake Elsinore site, contained one radiocarbon date from 8400 ± 60 B.P. Additional radiocarbon dates show habitation of the site during the Middle Archaic Period as well (Horne and McDougall 2007:19).

Artifacts associated with these Early Archaic Period sites include flaked stone tools and ground stone tools. Data recovery excavation within SDI-6069 identified a larger variety of artifact types including an extensive variety of flaked and ground stone tools, marine and terrestrial faunal remains, and bone and shell tools and ornaments. Crescents have also been found sparsely during this period.

Overall evidence of Early Archaic Period habitations in the vicinity of the Project area are scarce, identifying that during this period the region around the Project area was likely too arid to support sedentary residential occupation, and the few sites dating to this time period with evidence of a larger habitation area were found near large inland water sources (Horne and McDougall 2007:19).

Middle Archaic Period (ca. 7000 to 4000 YBP)

During the Middle Archaic Period environmental conditions changed as the deserts became more arid and the coastal estuaries became less productive for shellfish and other food sources, causing a depopulation along the coastal zone, and settlements shifted to inland river valleys with an intensification of terrestrial game and plant resources (Byrd and Raab 2007, Gallegos 2007, Masters and Aiello 2007). Gallegos states that during this period to adapt to the changing environmental condition people changed their settlement patterns by increasing their use of plant and terrestrial animal use, which is evidence in the archaeological record through an increase in habitation areas near oak and grassland resources and away from the coastal zone (Gallegos 2007). Therefore, the inland valleys of western Riverside County became a more hospitable environment and there is a significantly larger number of archaeological sites dating to this period within the vicinity of the Project area (Horne and McDougall 2007).

The archaeological record dating to the Middle Archaic Period has identified several intensively used residential bases, and numerous temporary camps. Diagnostic artifacts include Pinto and Silver Lake projectile points and other large leaf-shaped projectile points, choppers, crescents, large drills, manos and metates inhumations, and a variety of flaked and groundstone tools. Additional non-utilitarian items include beads, pendants, charmstones, discoidals, spherical stones, and cogged stones (Horne and McDougall 2007). During this period, it is largely unknown if occupations of inland and coastal sites represent seasonal movement by the same groups of people, or if coastal sites represent a more permanent occupation, while inland groups followed a more mobile subsistence round.

Late Archaic Period (ca. 4000 to 1500 YBP)

The Late Archaic Period corresponds to a period of increased moisture in Southern California, followed by another dry period. This period is also referred to as the Intermediate Period by Wallace (1955) and the Campbell Tradition (Warren 1968). Horne and McDougall (2007) report that archaeological site types during this period range from residential bases with large diverse artifact assemblages, abundant faunal remains and cultural features to temporary bases, camps and task specific activity areas. More intensely used archaeological sites from the Late Archaic Period are often found adjacent to permanent water sources while smaller or temporary sites are found on upland benches or adjacent to alluvial fans (2007:23). In contrast to the Early and Middle Archaic Periods, archaeological sites from the Late Archaic Period show a longer and more frequent reuse suggesting an increase in sedentism. Generally, the artifact assemblage is similar to the Early and Middle Archaic Period, focusing on large projectile points, used for spears and atlatls, and ground stone items. However, projectile points became more refined, such as notched points, points with concave bases, and small stemmed points. Greater use of the mortar and pestle suggest that acorns became a more important food source. There was also an increase in broad leaf-shaped blades, bone and antler tools and use of asphaltum and steatite (Horne and McDougall 2007:24). In general, through the Archaic Period the archaeological evidence and artifact assemblages remain similar, but become more elaborate over time, possibly implying an increase in sedentism, an increase in subsistence efficiency, and/or an increase in sociopolitical complexity (Horne and McDougall 2007:24).

Little is known about the transition from the Archaic Period to the Late Prehistoric Period. Laylander reports that there is a relative scarcity of dates within archaeological sites from the period between 1300 B.C. to

A.D. 200, but it is unknown if this represents a decline in population during the end of the Archaic Period, or a bias in research data (Laylander 2014a).

During the end of the Late Archaic Period several researchers have identified an intermediate period, however it is largely unknown if this period is representative of the cultural change between the Milling Stone Period and the Late Prehistoric Period over time, adaptation to changing environmental conditions, or a distinct culture (Horne and McDougall 2007, SWCA 2018). This intermediate period roughly corresponds to the Medieval Warm Period which caused drought and warmer temperatures across the western United States. Archaeological evidence during this period supports a greater reliance on acorns as a food staple. Other changes include an influx of archaeological sites at reliable water sources such as the Colorado River and Lake Cahuilla.

Late Holocene Period /Late Prehistoric Period (1500 to 150 YBP)

There are differing opinions between researchers as to whether the shift to the Late Prehistoric Period was caused by new technologies developed by people already living in the area, spurred by changing environmental conditions, or if it was brought in by a migration of people into Southern California. Archaeological and anthropological evidence suggests that at approximately 1500 to 1,350 YBP, Takic speaking (speakers of Uto-Aztecan languages) groups from the Great Basin region moved into Riverside County, marking the transition to the Late Prehistoric Period, known as the Shoshonean Wedge (Byrd and Raab 2007, Gallegos 2017). An analysis of the Takic expansion by Sutton (2009) indicates that inland southern California was occupied by "proto-Yuman" populations before 1,000 YBP. The comprehensive, multi-phase model offered by Sutton (2009) uses linguistic, ethnographic, archaeological, and biological data to propose that Takic speaking groups moved south and east from the Los Angeles Basin. They then diffused south into Orange County and northern San Diego County, inland up the San Luis Rey River into the Palomar Mountain area and north into interior southern California around 1,250 YBP. In addition, during this period Lake Cahuilla began to receded, and the large populations of people living along the lake shores transitioned into the Colorado River basin to the east or the inland valleys to the west. The Late Prehistoric Period is identified as a continuation of the cultural practices that were present during the initial Euro-American exploration of Southern California and that were recorded during the Ethno-Historic Period (Byrd and Raab 2007).

The Late Prehistoric Period is defined by the introduction of the bow and arrow after approximately A.D. 500 and by A.D. 1000 ceramic vessels begin to appear at some sites (Meighan 1954, Warren 1961). Also, during this time mortuary practices changed from inhumations to cremations. It is thought that this practice came from the north or east, and it is unknown if the transition from inhumations to cremations was adopted for religious or population reasons, or to control the spread of disease (Byrd and Raab 2007, Lightfoot and Parrish 2009, Gallegos 2017). Other hallmarks of the Late Prehistoric Period include an increase in the reliance on plant food sources, small projectile points, increase use of mortars and pestles, the use of obsidian from the Obsidian Butte source and overall an increase in the complexity and diversity of material cultural (SWCA 2018).

Many of the Late Prehistoric Period archaeological sites are located inland and contain bedrock milling features, thought to relate to acorn or other seed processing. People lived in larger coastal and lower valley villages, that were located near permanent water sources. These villages acted as ceremonial and political centers, and may have been occupied, at least partially, year-round. Smaller villages and residential areas were inhabited seasonally and were located near subsistence resources or were used for specialized activities, especially in inland areas (Byrd and Raab 2007, Lightfoot and Parrish 2009). This may have led to an increase in community size, longer stays at the major residences and different societal organization.

Archaeological remains have identified over four dozen plant types were used in Southern California during this period (Byrd and Raab 2007). Grass seeds had the highest frequencies of use with a gradual increase in acorn usage (Hale 2009). Little is known about plant cultivation during the Late Holocene. There is evidence that a high number of plants that follow fires were used, but no major research projects have focused on proto-agriculture. Early Spanish accounts identify that the Native Americans were practicing cultivation of certain plants through burning and water diversion (Gallegos 2017). Agriculture was in use along the Colorado River, east of the Project Area as early as A.D. 700 (Schaefer and Laylander 2007).

Changes in lithic artifacts show a greater number of small, finely chipped projectile points, usually stemless with convex or concave bases, suggesting an increased utilization of the bow and arrow rather than the atlatl and dart for hunting. Common lithic materials for formed tools, primarily projectile points include chert, jasper, agate, silicified wood, rhyolite, wonderstone, quartz, obsidian from Obsidian Butte, and Santiago Peak metavolcanics (Shackley 2004, Lightfoot and Parrish 2009). Other items include steatite cooking vessels and containers, the increased presence of smaller bone and shell circular fishhooks, perforated stones, arrow shaft straighteners made of steatite, a variety of bone tools, and personal ornaments made from shell, bone, and stone. There is also an increased use of asphalt for waterproofing and as an adhesive (SWCA 2018).

During the Late Prehistoric Period villages acted as ceremonial and political centers, and may have been occupied, at least partially, year-round. Smaller residential areas were inhabited seasonally and were located near subsistence resources or were used for specialized activities, especially in inland areas (Byrd and Raab 2007, Lightfoot 2009). This may have led to an increase in community size, longer stays at the major residences and different societal organization. Most of the rock art in Riverside County, as in the rest of Southern California has been attributed to the Late Prehistoric Period. Ceramic use included a variety of vessel types as well as clay smoking pipes. While ceramic use is present in the Lake Cahuilla region as early as 800 YBP and there were at least five ceramic types present in the desert (Shackley 2004), it is not present in the vicinity of the Project area until circa 350 YBP (Horne and McDougall 2007, Schaefer and Laylander 2007). Ceramic types consisted of brownwares, graywares, and buffwares.

ETHNOHISTORIC PERIOD

The Late Prehistoric period essentially ended with the Spanish colonization and establishment of the missions. Disease and forced relocation, which reduced the populations considerably among the coastal settlements, did much to destroy the cultural pattern established at that period (Bean and Shipek 1978). The Late Prehistoric culture pattern appears to have lasted longer among the inland groups. Even after the missions were secularized in 1834, some inland groups were able to maintain most of their traditional orientation until the arrival of the settlers from 1859-1879, when most of the groups were displaced or dispersed (Bean and Shipek 1978). During the Ethnohistoric period, the Project area was a shared-use area and home to two closely related Takic-speaking groups: the Cahuilla and the Luiseño/Juaneño. Settlement patterns for both groups were essentially very similar with settlements typically located within valley bottoms, along streams, or along coastal strands near mountain ranges. Villages were often located in sheltered areas near good water supplies, in a defensive location, or on the side of warm thermal zone slopes.

Within the region, the diverse ecological zones provided a wide array of subsistence products. Principal game animals included deer, rabbit, jackrabbit, woodrat, mice, ground squirrels, antelope, valley and mountain quail, doves, ducks, and other birds. Coastal game included sea mammals, fish, mollusks, and crustaceans. Fresh-water game included trout and other local fish (Bean and Shipek 1978, Kroeber 1925). Of high importance were acorns, and village locations were typically located near water sources for use in acorn leeching. Grass seeds were the next most ample resource, in addition to manzanita, sunflower, chia, sage, lemonade berry, prickly pear, and pine nuts. Fire was used as a crop management technique as well as for community rabbit drives. Tools for the acquisition, storage, or preparation of food were highly varied and constructed from locally derived materials, with a few items acquired via trade from specific localities (Bean 1978). Hunting activities used either individual or group participation, using bows and arrows for larger game or curved throwing sticks, slings, traps, or pit type deadfalls for smaller animals. Cremations were used in each group rather than inhumations. While culturally the groups shared similarities with may parts of their culture the Cahuilla differed from the Luiseño/Juaneño in that their religion was more like the Mohave tribes of the eastern deserts than the Chingichngish cult of the Luiseño/Juaneño. Overall, the archaeological record between the three groups is very similar.

Cahuilla

The Cahuilla traditional use area included the San Bernardino Mountains, Orocopia Mountains, and the Chocolate Mountains to the east, the Salton Sea and Borrego Springs to the south, the eastern slopes of Palomar Mountain and Lake Mathews to the west, and the Santa Ana River to the north (Bean 1978, Kroeber 1908). The Cahuilla traditionally inhabited areas from the desert and valley floors to the mountain areas, which included drastically different environmental areas and resources. The Project area is located along the western boundary of what would have been the Cahuilla traditional use area. Living inland, the Cahuilla had minimal contact with the Spaniards and were not as influenced to the extent that the coastal groups were, although the Asistencia at San Bernardino in 1819 did have several Cahuilla within their register.

Subsistence practices were similar to the Luiseño, with a focus on hunting medium and small game, such as rabbits, with bow and arrow. At least six kinds of acorns, mesquite, screw beans, piñon nuts, cacti, variety of seeds, wild fruits and berries and succulents were collected. Granaries were used to store items such as acorns and mesquite beans. Additional plants were used for medicine and construction materials. Within the desert region the Cahuilla practiced proto-agriculture with the cultivation of corn, beans, squashes, and melons (Bean 1978).

Baskets were used for a variety of purposes and forms primarily for food production and storage. Ceramic pottery, was generally a redware with five main vessel types: small mouthed jars, cooking pots, open bowls, dishes, and pipes (Bean 1978).

The Cahuilla were organized into two major groups of patrilineal, totemic clans: the Wildcats and the Coyotes (Bean 1978, Gifford 1918). Within the clans, either an entire clan, or family groups had ownership over important resources, such as mesquite or agave areas. Members of the clan could split into smaller family groups during certain times of the year and come together for resource collection or defense. The acorn collecting season caused the most dispersal outside of villages and family groups left for several weeks to collect at various acorn groves (Bean 1978). Within Cahuilla villages structures ranged from brush shelters to dome shaped and rectangular houses.

In the mid-1800s the Cahuilla began to be more directly affected by European-American migrants moving into the area in response to the California Gold Rush. In addition, a smallpox epidemic in 1863 took a large toll on the native population (Hooper 1920:340).

Luiseño/Juaneño

The traditional use area of the Luiseño encompassed about 1,500 square miles and extended in a north-northeasterly direction from Agua Hedondia Lagoon, to Aliso Creek and, to the east, included what are today known as Oceanside, Vista, San Marcos, Escondido, Palomar Mountain, the Gujieto, a portion of Valle de San Jose, north to Soboba and Temescal (Bean and Shipek 1978, Sparkman 1908, White 1962). The Luiseño was designated based on their associate with the Mission San Luis Rey, while the Juaneño are associated with the Mission San Juan Capistrano, however Bean and Shipek (1978) state that the Luiseño and Juaneño are ethnologically and linguistically similar and that the distinction is based on the influence of the mission system. The Project area is adjacent to the northern boundary of the Luiseño/Juaneño traditional territory.

While the Luiseño along with the Cahuilla were Takic-speaking, and had similar social structures Bean and Shipek (1978) argue that the Luiseño social structure was more rigid due to their greater population density. The Luiseño lived in sedentary and autonomous villages located near reliable water sources and high resource areas. Each village contained named places associated with food products, raw materials, or sacred beings (Bean and Shipek 1978) Named places were owned by either an individual, a family, a chief, or the collective group. Group economic activities were restricted to areas owned by the village, whereas familial gatherings were limited to family-owned areas, unless given express permission to hold such gatherings in areas other than their own (Bean and Shipek 1978). The concept of private property was important, and trespassing upon private areas was punished severely. A Luiseño ritual and ceremonial specialist maintained the knowledge of the various ceremonies and passed on the knowledge to only one heir. Such ceremonies included funerals and clothes burning ceremonies. The decimation of the population after European contact, without doubt, caused the loss of some spiritual specialists. Additionally, the reservation system interrupted the social organization and settlement patterns (Bean and Shipek 1978, Shipek 1986).

Settlements were typically located within valley bottoms, along streams, or along coastal strands near mountain ranges. Villages were often located in sheltered areas near good water supplies, in a defensive location, or on the side of warm thermal zone slopes. Each village contained named places associated with food products, raw materials, or sacred beings (Bean and Shipek 1978). Named places were owned by either an individual, a family, a chief, or the collective group. Group economic activities were restricted to areas owned by the village as a whole, whereas familial gatherings were limited to family-owned areas, unless given express permission to hold such gatherings in areas other than their own (Bean and Shipek 1978). The concept of private property was important to the Luiseño, and trespassing upon private areas was punished severely. Private property also included houses, capital equipment, treasure goods and ritual equipment, trade and ceremonial beads, eagle nests, songs, and other nonmaterial possessions. Privately owned property was either inherited patrilineally or transferred to another owner (Sparkman 1908, Bean and Shipek 1978).

The diverse ecological zones within the Luiseño territory provided a wide array of subsistence products. Principal game animals included deer, rabbit, jackrabbit, woodrat, mice, ground squirrels, antelope, valley and mountain quail, doves, ducks, and other birds. (Gifford 1918, Sparkman 1908, Bean and Shipek 1978). The most important gathered resource were acorns, and village locations were typically located near water sources for use in acorn leeching. Grass seeds were the next most abundant resource, in addition to manzanita, sunflower, chia, sage, lemonade berry, prickly pear, and pine nuts. Fire was used as a crop management technique as well as for community rabbit drives. Tools for the acquisition, storage, or preparation of food were highly varied and constructed from locally derived materials, with a few items acquired via trade from specific localities (steatite bowls from Santa Catalina Island, obsidian blanks or tools from either eastern or northern neighbors) (Bean and Shipek 1978). Hunting activities used either individual or group participation, using bows and arrows for larger game or curved throwing sticks, slings, traps, or pit type deadfalls for smaller animals.

3. HISTORIC CONTEXT

Riverside County history can be divided into three periods: the Spanish, Mexican and American periods.

SPANISH PERIOD (1769-1822)

Along the coast of California, Spanish explorers began making expeditions between the mid-1500s and 1700s. In 1769, the King of Spain directed the Franciscan Order to direct religious and colonization matters in assigned territories of the Americas. Captain Gaspar de Portolá, 64 soldiers, missionaries, Baja (lower) California Native Americans, and Mexican civilians, established the Presidio of San Diego, a fortified military outpost, as the first Spanish settlement in Alta California. In July of 1769, while Portolá was exploring southern California, Franciscan Fr. Junípero Serra founded Mission San Diego de Alcalá at Presidio Hill, the first of the 21 missions that would be established in Alta California by the Spanish and the Franciscan Order between 1769 and 1823. In 1771 the Mission San Gabriel Archangel was established and in 1776 Mission San Juan Capistrano was established. The mission of San Luis Rey de Francia was established in 1798 four miles up the San Luis Rey river from the coast and in 1816, an outpost of San Luis Rey was established at Pala, 20 miles upriver. An additional outpost, the San Bernardino estancia was established in 1819.

A Spanish expedition led by Pedro Fages in 1772 was the first European group to travel in the vicinity of the Project area. Looking for deserters from the military post in San Diego, Fages crossed into the San Bernardino Valley from the southeast, crossing the Santa Ana River, then heading north through the Cajon Pass and into the Mojave Desert (Hampson et al. 1988). In 1774, Juan Bautista de Anza led an expedition into California and traversed the San Jacinto Valley, camping in the San Jacinto River Valley for water, and then heading west away from the river through Bernasconi Pass near present-day Lakeview. He went on through Moreno Valley near March Air Reserve Base, then headed into the Santa Ana River Valley near the present site of the City of Riverside. His expedition opened an overland travel route from Sonora in the Mexican interior to Monterey in California. In 1797 Spanish Padre Juan Santiago, explored the vicinity of the Project area, heading east from Mission San Juan Capistrano.

MEXICAN PERIOD (1821-1846)

After years of sporadic rebellion and warfare, New Spain (Mexico and the California territory) won independence from Spain in 1821 marking the beginning of the Mexican Period. As the ports in California were opened to foreign ships the population near the coast grew. However, the inland valleys remained largely vacant of European settlers except for use as grazing lands for cattle. During the Mexican Period the cattle industry grew in importance to become the leading industry in the region and the central focus of the Califoriño culture. The Mexican Government continued the land grant system first began by Spain and granted several land grants as part of the ranch system. The Project area is near the eastern boundary of the land grant for the Rancho La Laguna. Rancho La Laguna was first granted in 1844 (City of Lake Elsinore 2011).

The Mexican government secularized the California missions in 1833, and much of the mission lands were included in the land grants. The Native Americans which had been captured as part of the mission system became eligible for Mexican citizenship, however this period continued the physical and cultural decline of the Native American population (Heizer 1978). At their peak, the 21 California missions controlled approximately 74,000 neophytes (Bolton 1917). By 1834, the year before secularization took the institution from the missionaries, only 17,000 natives remained within their domain (Heizer 1978, Monroy 1990).

AMERICAN PERIOD (1848-PRESENT)

The signing of the Treaty of Guadalupe Hidalgo in 1848, ended the Mexican American War and marks the beginning of the American period, when California became a territory of the United States. California became the 31st state in 1850 and within three years the population of California had increased to more than 300,000.

Cattle continued to dominate the southern California economy through the 1850s as a source of hides but for the more than 90,000 new residents lured to California by the Gold Rush beginning in 1848, cattle were now an important source of meat and other supplies. Cattle were at first driven along major trails or roads such as the Gila Trail or Southern Overland Trail, then were transported by trains where available. The cattle boom ended for southern California as neighbor states and territories drove herds to northern California at reduced prices (Cleland 2005). During this period Rancho La Laguna changed hands several times, and an adobe house was constructed within the land grant which became the first postal service in the vicinity (City of Lake Elsinore 2011).

In Southern California, the floods of 1861-1862 followed by drought in 1863 and 1864 decimated the cattle industry and the large rancho owners who were “land rich and cash poor” began to sell off portions of their grants to satisfy debts (Guinn 1907). It was at this time that the new residents, mainly farmers, began experimental plantings to determine what their newly acquired land was best suited for within the vicinity of the Project area. In 1866 California Legislature passed an act that authorized payment of 250 for every 5000 mulberry trees that were at least two years old and 300 for every 100,000 cocoons produced. Tens of millions mulberry trees were planted, and the State treasury went almost bankrupt paying the incentives. By the end of the 1860’s, the silk craze had waned and the State canceled the payments for tree planting and cocoons (Guinn 1907). After several other agricultural experiments, it was found that oranges were the most suitable crop for the area. Although the first orange trees in Riverside County were planted in 1871, the citrus industry really took off two years later when Eliza Tibbets received two Brazilian navel orange trees sent to her by a friend at the Department of Agriculture in Washington. The trees thrived in the Southern California climate and the navel orange industry grew rapidly. The citrus industry expanded in the region and spurred irrigation projects further expanding usable land and encouraging additional development.

On March 11, 1893, Riverside County was formed from an approximately 6,500 square miles of San Diego County and 560 square miles of San Bernardino County (Holmes 1912). Riverside County was formed primarily over political and tax issues between residents in San Bernardino and Riverside, and the displeasure of residents in the Temecula Valley area being too great a distance from the County seat in San Diego.

History of the Lake Elsinore Area

The Lake Elsinore region began its development in 1883 with the emergence of the railroad, which brought a steady flow of settlers and prospectors into the area. By 1884, the community of Lake Elsinore had been created and the newly developing town had established a school and post office (Hudson 1978). In 1888, the community was officially recognized as the City of Lake Elsinore and continued to expand during the following years due to a mining boom encompassing the areas surrounding Elsinore and the nearby town of Perris (City of Lake Elsinore 2011). The expansion of the city was slowed considerably during the Great Depression, at which time the only new expansion for the City was the completion of a new post office in 1932 (Hudson 1978). During the Great Depression and the following economic recovery, The Good Hope Mine was the most prosperous mine, producing over $2 million worth of gold. Additional materials mined during this time included tin ore, clay, coal, and asbestos (Hudson 1978). As Lake Elsinore grew from the mining boom, new streams of revenue from tourism also propelled the City's progress and development. Tourists flocked to the area by way of the Ortega highway, which opened in 1932, as well as the airport. Tourism in the area attracted boaters, auto racing enthusiasts, and vacationers staying in the nearby lakefront resorts (Hudson 1978). The Crescent Bathhouse, one of Lake Elsinore's earliest attractions, was constructed in 1923 and was known as a hotspot for Hollywood starts including Will Rodgers. On July 30, 1975, the Crescent Bathhouse was declared a National Historic Place (Hudson 1978).

4. RESEARCH DESIGN

The Phase I cultural resource study was a systematic, intensive, non-sampling, non-collecting survey. The primary objectives with respect to prehistoric and historic archaeological resources are straightforward: to identify and document all of the resources that are detectable through surface observations. For the research design, the field requirements are (1) that survey coverage include all portions of the study area that can safely be covered and that offer some realistic prospects for containing identifiable resources (excluding, for instance, areas with very steep slopes, flooded areas, areas with no ground surface visibility, or areas where modern construction has destroyed or buried the natural ground surface), and (2) that the spatial extent and general character of any identified resources be documented according to the prevailing professional standards.

5. METHODS

Methods used to assess the presence or absence of cultural resources within the Project area included a search of existing records, archival research, and an intensive pedestrian archaeological field survey.

ARCHIVAL RESEARCH

The records search at the EIC was requested on January 21, 2021 and received on February 12, 2021, the results are included in confidential Appendix B. The search included the Project area and a radius of one-mi. around it. It included a review of all records for historic and prehistoric archaeological sites, as well as a review of all known cultural resource reports within a 1-mi. radius of the Project area, in addition to a review of the NRHP.

A record search of the Sacred Lands File held by the NAHC was requested on January 21, 2021 (Appendix C). The record search of the SLF held by the NAHC was negative and contact information for twenty-seven Native American groups and individuals were included by the NAHC for additional information. Red Tail sent the 27 individuals and groups letters requesting any additional information relevant to the project on February 8, 2021.

Historic aerial photographs and maps, provided by historicaerials.com and USGS Historical Topographic Map Explorer, of the Project area were examined.

FIELD SURVEY

The field survey was conducted on February 3, 2021 by Red Tail archaeologist Spencer Bietz. Field methods consisted of a pedestrian survey of the Project area by the archaeologist in transects spaced at 10-m intervals. The survey transects were aligned in cardinal directions in order to survey the maximum amount of visible area. Special attention was given to visible soils in areas devoid of vegetation or disturbed soils from bioturbation.

The Project area was photographed, and all visible soils were examined for cultural resources. Due to overlying riparian vegetation, ground visibility was poor within the northern and northeastern portions of the project area with less than 25 percent visibility. Several areas were devoid of vegetation and visibility was high in these areas.

Upon discovery of an artifact or feature, the archaeologist would additionally scout the immediate vicinity to determine whether the item was isolated, associated with only a few other items, or part of a larger site deposit. Any isolates and sites were recorded during the transects. Archaeological isolates were distinguished from sites on the basis that isolates consist of three or fewer artifacts within a 50-m radius. All site and isolate locations were recorded in Universal Transverse Mercator (UTM) coordinates using handheld GPS units with sub-meter accuracy. Sites would be plotted on proposed Project maps using NAD 83 UTM feet coordinates. Site information would be recorded on State of California Department of Parks and Recreation (DPR) 523 series forms. While the process of site documentation varies slightly depending on what kinds of artifacts and features were identified, at all sites the spatial boundaries would be delineated, site maps would be drawn, artifacts would be plotted, artifact inventories would be completed, and material types would be noted. All DPR Forms and confidential information included in Confidential Appendix D. All notes and photographs from the study are curated at Red Tail's office.

6. RESULTS

ARCHIVAL RESEARCH RESULTS

EIC Record Search Results

A record search of the Project area and a one-mile record search radius was requested on January 21, 2021 and received on February 12, 2021. The EIC record search results indicated that a total of 56 cultural resources studies have been completed within the 1-mi. record search radius (Table 1). Two of the previously conducted studies intersect the APE.

Table 1. Previously Conducted Studies within 1-Mile of the Project Area

Report Number	Report Date	Report Author(s)	Report Title	Relation to Project Area
RI-00420	1978	Robert M. Laidlaw	Environmental Impact Evaluation: Archaeological Assessment of 33 Acres Near Elsinore, Riverside County, California (Tentative Tract Map 11283)	Outside Project Area
RI-00425	1978	Richard Lando	Environmental Impact Evaluation: Archaeological Assessment of 33 Acres Near Elsinore, Riverside County, California (Tentative Tract Map 11283)	Intersects Project Area
RI-00769	1980	Larry L. Bowles and Jean A. Salpas	An Archaeological Assessment of Tentative Tract 14478 Near Lake Elsinore, Riverside County	Outside Project Area
RI-00928	1980	James D. Swenson	Environmental Impact Evaluation: Archaeological Assessment of Tentative Parcel 15186, East of Warm Springs Valley, Riverside County, California	Outside Project Area
RI-00929	1980	James D. Swenson	Environmental Impact Evaluation: An Archaeological Assessment of Tentative Parcel 15184, East of Warm Springs Valley, Riverside, California	Outside Project Area
RI-00930	1980	James D. Swenson	Environmental Impact Evaluation: An Archaeological Assessment of Tentative Parcel 15185, East of Warm Springs Valley, Riverside County, California	Outside Project Area
RI-00931	1980	James D. Swenson	Environmental Impact Evaluation: An Archaeological Assessment of Tentative Parcel 15187, East of Warm Springs Valley, Riverside County, California	Outside Project Area
RI-01013	1978	Stephen R. Hammond	Cultural Resources Survey of Two Materials Sources, Murrieta Creek and the Joe Deleo, Jr. Property, Riverside County, California	Outside Project Area
RI-01705	1981	Schroth, Adella	Archaeological Assessment of Ramsgate Project, Elsinore, Riverside County, California	Outside Project Area
RI-01837	1984	Stephen Bouscaren and Daniel McCarthy	An Archaeological Assessment of the Proposed Devers-Valley 500 KV Transmission Line and Corridor and the Proposed Valley-Auld-Skylark 115 KV T/L Corridor, Riverside County, California	Outside Project Area
RI-02027	1986	Brock, James	Archaeological Assessment of the Eda Grant Project Areas, City of Lake Elsinore	Outside Project Area
RI-02311	1987	Whitney-Desautels, Nancy	Archaeological Assessment Form: North Elsinore Mobile Home Park	Outside Project Area
RI-02312	1988	Parr, Robert E.	An Archaeological Assessment of 20 Acres of Land (Assessor's Parcel 347-28-10) Located Near Lake Elsinore In Riverside County, California	Outside Project Area
RI-02351	1987	Drover, C.E.	An Archaeological Assessment of the Biddle Property Feasibility Study Temescal Canyon, Riverside County, California	Outside Project Area
RI-02411	1988	Blodgett, Leslie M.	Archaeological Resources Assessment - Archival Record Search and Field Survey of the 40 Acre T-Frame Property in Lake Elsinore, Riverside County California	Outside Project Area
RI-02626	1989	De Munck, Victor	An Archaeological Assessment of the Elsinore Outlet Channel Tributaries Located in the Lake Elsinore Area of Riverside County, California.	Outside Project Area
RI-02627	1989	Brown, Joan C.	Cultural Resources Reconnaissance for the Pacific West Outlet Center, Lake Elsinore, Riverside County, California.	Outside Project Area
RI-02672	1989	Scientific Resource Surveys	Archaeological Survey Report North Lake Elsinore Hills, County of Riverside, California.	Outside Project Area

Report Number	Report Date	Report Author(s)	Report Title	Relation to Project Area
RI-02702	1990	Scientific Resource Surveys	Archaeological Survey Report Elsinore Bluffs Project County of Riverside, California.	Outside Project Area
RI-02703	1990	Scientific Resource Surveys	Archaeological Survey Report Tentative Tract 25487 County of Riverside, California.	Outside Project Area
RI-02839	1990	White, Robert S.	An Archaeological Assessment of Tt 25831, A 50+ Acre Parcel Located Near Warm Springs Valley, Lake Elsinore, Riverside County, California	Outside Project Area
RI-03257	1990	White, Robert S.	An Archaeological Assessment of a 7.76-Acre Parcel Located at 18938 Nichols Road in the Warm Springs Area of Lake Elsinore, Riverside County	Outside Project Area
RI-03295	1991	Keller, Jean	An Archaeological Assessment of Environmental Assessment 35577, 9.31 Acres of Land Near Elsinore, Riverside County, California, USGS Lake Elsinore, California Quadrangle, 7.5' Series	Outside Project Area
RI-03311	1990	Evans, Stuart A.	Cultural Resources Reconnaissance of Project Number 533-0769-78, 27 Acres in Elsinore, Riverside County, California	Outside Project Area
RI-03376	1989	Wade, Sue A. and Susan Hector	A Cultural Resource Survey of the Proposed Rancho-Temecula Effluent Pipeline from Temecula to Warm Springs in the Elsinore Valley with Additional Consideration of the Surface Water Discharge into Temescal Wash	Outside Project Area
RI-03875	1990	Crownover, Scott, Jane Rosenthal, Jason Marmor, and Beth Padon	Cultural Resource Assessment, North Peak Project, Riverside County, California	Outside Project Area
RI-04144	1998	Love, Bruce and Bai "Tom" Tang	Cultural Resources Report: Temescal Valley Regional Interceptor, Santa Ana Watershed Project Authority, Riverside County, California	Outside Project Area
RI-04403	1993	Romani, John	Archaeological Survey Report for the Proposed Widening of Route 74 From Seventh Street to the I-15 Freeway, Riverside County, Ca.	Outside Project Area
RI-04421	1990	LSA Associates, Inc.	Appendix B-Cultural Resources. In: Measure A Program Project Alternatives Analysis-Environmental Component, Technical Appendix Volume I	Outside Project Area
RI-04686	2002	Maxon, Patrick O.	Cultural Resources Inventory of a 50-Acre Parcel for the Clurman Company Project, City of Lake Elsinore, Riverside County, California	Outside Project Area
RI-04875	2004	Brady, Jon L. and John L. R. Whitehouse	Archaeological Survey Report for the Lake Elsinore Square Project, Riverside County, California	Outside Project Area
RI-05038	2005	Mckenna et al.	Letter Report: El Torro Road Pipeline Replacement Project, Lake Elsinore, Riverside County, California	Outside Project Area
RI-05321	2004	Goodwin, Riordan	Cultural Resource Assessment, Central Avenue Parcels (APNS 377- 120-007 And -008) City of Lake Elsinore, Riverside County, California	Outside Project Area
RI-05324	2002	Mclean, Deborah	First Supplemental Historic Property Survey Report-Negative Findings	Outside Project Area
RI-05680	2004	Lorna, Billat	Letter Report: Proposed Cellular Tower Project in Riverside County, California, Site Name/Number: CA-7294/ Collier	Outside Project Area
RI-06228	2004	Tang, Bai, Michael Hogan, Casey Tibbet, and Josh Smallwood	Historical/Archaeological Resources Survey Report, in and Near the City of Lake Elsinore, Riverside County, California	Outside Project Area
RI-06888	2006	Lerch, Michael K. and Gray, Marlesa A.	Cultural Resources Assessment of the Valley-Ivyglen Transmission Line Project, Riverside County, California	Intersects Project Area
RI-06987	2006	Glenn, Brian K.	Letter Report: Due Diligence Cultural Resources Assessment Letter Report for Approximately 4.27-acre Central and Dexter Project Area, City of Lake Ellsinore, County of Riverside, California	Outside Project Area
RI-07342	2007	Iverson, Dave	Letter Report: Cultural Resources Study for the Caliber Commercial Project (Crossroads), City of Lake Elsinore, Riverside County, California	Outside Project Area
RI-07664	2005	Smith, B.	A Cultural Resources Survey for the Central Self Storage Project	Outside Project Area

Report Number	Report Date	Report Author(s)	Report Title	Relation to Project Area
RI-07784	2008	Bonner, Wayne H. and Marnie Aislin-Kay	Letter Report: Cultural Resource Records Search and Site Visit Results For Sprint Nextel Telecommunications Candidate Rv80xc105b (Centex Water Tank), 222 Crimson Pillar Lane, Lake Elsinore, Riverside County, California	Outside Project Area
RI-08485	2009	Kurt Heidelberg	Archaeological Survey for Southern California Edison's Service Pole Installations in Temecula, Murrieta, and Lake Elsinore, Riverside County, California	Outside Project Area
RI-08810	2011	Wayne H. Bonner	Letter Report: Cultural Resources Records Search and Site Visit Results for T-Mobile USA Candidate IE24308-B	Outside Project Area
RI-09105	2014	-	Tractor Supply CO. Project (Commercial Design Review No. 2014-01& Conditional Use Permit No. 2014-01) Initial Study for Mitigated Negative Declaration No. 2014-01	Outside Project Area
RI-09188	2013	Don C. Perez	Cultural Resources Survey CLV2711 39423 Ardenwood Way Lake Elsinore, Riverside County, California 92532 EBI Project No. 61132304	Outside Project Area
RI-09253	2014	Matthew Gonzalez	Lake Elsinore Walmart Project, City of Lake Elsinore, Riverside County, California Phase I Cultural Resources Study	Outside Project Area
RI-09377	2014	Roberta Thomas	Cultural Resource Monitoring Report for the Arroyo del Toro Channel Project, Lake Elsinore, Riverside County, California	Outside Project Area
RI-09521	2014	David Brunzell	Cultural Resources Assessment of the Hammack Project, Lake Elsinore, Riverside County, California (BCR Consulting Project No. TRF 1417)	Outside Project Area
RI-09522	2010	David Brunzell	Phase I Cultural Resources Assessment Assessor Parcel Numbers 347-130-007-3 and 347-130-006-2 Unincorporated Riverside County, California	Outside Project Area
RI-09548	2016	Elisa Bechtel, M Litt, and Riordan Goodwin	Cultural Resources Assessment Central Plaza Project Assessor's Parcel Numbers 377-080-014, 031, 032, 033, & 034 City of Lake Elsinore, Riverside County, California	Outside Project Area
RI-09615	2014	Gregory Greenberg	Cultural Resources Survey, CLV2711 39423 Ardenwood Way Lake Elsinore, Riverside County, California 92532 SE 1/4 SW 1/4 S29 T05S R04W	Outside Project Area
RI-09746	2013	Jason Andrew Miller	Cultural Resources Survey Report Addendum Valley-Ivy Glenn 115kV Transmission Line Project Southern California Edison Riverside County, California	Outside Project Area
RI-10111	2017	David Brunzell	Cultural Resources Assessment Third Street Storm Drain Project Lake Elsinore Riverside County California	Outside Project Area
RI-10371	2018	Mary Robbins-Wade	Cultural Resources Survey for the Honda Lake Elsinore Project, Cultural Resources Inventory	Outside Project Area
RI-10403	2018	Jillian L. Hahnlen and Brian F. Smith	A Phase I and II Cultural Resources Assessment for the Nichols Ranch Specific Plan Project	Outside Project Area
RI-10410	2018	Sarah A. Williams	Cultural Resource Records Search and Site Visit Results for AT&T Mobility, LLC Candidate CLV2711 (Rosetta Canyon Park), 39423 Ardenwood Way, Lake Elsinore, Riverside County, California (EBI Project #6118001366)	Outside Project Area

The EIC records search also indicated that seventeen (17) previously recorded resources were located within one mile of the Project Area (Table 2). One previously recorded resource, P-33-000641/CA-RIV-641, was identified within the Project Area limits. The resource consists of a prehistoric site containing four grinding slicks upon 3 granite boulders and was originally recorded in 1973 by J. Humbert and S. Hammond. At the time of original recordation, no artifacts or midden were observed upon the surface surrounding the boulders. Additionally, Humbert and Hammond noted that the resource appeared to be likely heavily disturbed or destroyed from proposed future construction for the re-alignment of Highway 74. A follow-up survey in 1978, (recorders unknown) notes that the site was unable to be relocated. No additional updates to the resource have occurred since 1978.

Table 2. Previously Recorded Cultural Resources within 1-Mi. of the APE

Primary Number	Trinomial	Period	Contents	Recorder Date	Evaluation	Relation to the Project Area
P-33-000640	CA-RIV-640	Prehistoric	AP2 Lithic Scatter, AP4 Bedrock Milling Feature	J. Humbert, S. Hammond (1973) Unknown Author (1992)	Unknown	Outside Project Area
P-33-000641	CA-RIV-641	Prehistoric	AP4 Bedrock Milling Feature	J. Humbert, S. Hammond (1973)	Unknown	Within Project Area
P-33-002288	CA-RIV-2288	Prehistoric	AP4 Bedrock Milling Feature	A. Schroth (1981)	Unknown	Outside Project Area
P-33-003832	CA-RIV-3832H	Historic	AH7 Railroad Grade, HP19 Bridge	D. Leonard (2014) R. Hoffman (2011) J. Goodman (2006) J. Goodman, N. Reseburg, W. Jones (2006) K. Blevins, A. Hoover (2005) R. Goodwin (2001) CRM Tech (1996) B. Love (1995) K. Swope, D. Peirce (1990) D. McCarthy (1990)	Unknown	Outside Project Area
P-33-004316	CA-RIV-4316	Prehistoric	AP2 Lithic Scatter, AP4 Bedrock Milling Feature	Crownover, Pallette, Duffield, Holz (1990)	Unknown	Outside Project Area
P-33-008120	CA-RIV-6032	Prehistoric	AP2 Lithic Scatter	R. Cerreto (1997)	Unknown	Outside Project Area
P-33-008912	-	Prehistoric	AP16 Ground Stone Isolate	A. Duffield, S. Crownover, J. Marmor (1990)	Unknown	Outside Project Area
P-33-011216	-	Prehistoric	AP16 Lithic Isolate	L. Blodgett (1989)	Unknown	Outside Project Area
P-33-015359	CA-RIV-8115	Historic	AH2 Foundations/Structure Pads, AH4 Privies/Dumps/Trash Scatters	J. Goodman, D. Cogan, N. Reseburg (2006)	Unknown	Outside Project Area
P-33-015420	CA-RIV-8132H	Historic	HP40 Cemetery	T. Formica (2007)	3S	Outside Project Area
P-33-016218	CA-RIV-8367	Historic	AH4 Privies/Dumps/Trash Scatters	S. O'Neil (2007)	Unknown	Outside Project Area
P-33-017019	-	Historic	HP3 Multiple Family Property	A. Craft, J. Patterson (2007)	6Z	Outside Project Area
P-33-017020	CA-RIV-8861	Historic	AH4 Privies/Dumps/Trash Scatters	A. Craft, J. Patterson (2007)	Unknown	Outside Project Area
P-33-017023	CA-RIV-8863	Historic	AH4 Privies/Dumps/Trash Scatters	A. Craft, J. Patterson (2007)	Unknown	Outside Project Area
P-33-017576	-	Prehistoric	AP16 Ground Stone Isolate	R. Lichtenstein, C. Cisneros (2007)	Unknown	Outside Project Area
P-33-026719	CA-RIV-12591	Historic	AH2 Foundations/Structure Pads	R. Goodwin (2017)	6Z	Outside Project Area
P-33-028017	-	Historic	HP2 Single Family Property	E. Bechtel (2016)	6Z	Outside Project Area

NAHC Record Search Results

A record search of the SLF held by the NAHC was requested on January 21, 2021. The NAHC responded on February 8, 2021 that the record search of the SLF was negative. The NAHC also provided a list of 27 Native American individuals and organizations which may have additional information on the Project area. All correspondence pertaining to the NAHC, is included in Appendix C.

Red Tail sent the 27 individuals and groups letters requesting any additional information relevant to the project on February 8, 2021. To date, three responses have been received. On February 8, 2021 Joyce Stanfield Perry, President, Juaneño Band of Mission Indians, Acjachemen Nation, responded that they yield recommendations and monitoring responsibilities to the Pechanga Band of Luiseno Indians. On February

8, 2021 Jill McCormick, Quechan Historic Preservation Officer responded that they have no comments on the project and defer to more local tribes. On February 9, 2021 Cami Mojado, San Luis Rey Band of Mission Indians responded that they defer to Pechanga or other tribes that may be closer to the Project. No additional responses have been received to date.

To date, no additional responses have been received to date.

Historic Map and Aerial Photograph Research Results

In addition to historical documents requested from the EIC, Red Tail reviewed historic United States Geologic Survey (USGS) topographic maps and aerial photographs. Historical topographic maps were reviewed using USGS Historical Topographic Map Explorer, and aerial imagery was accessed via HistoricalAerials.com, part of NETROnline.com.

The project area is visible on topographic maps dating as early as 1953. Topographic maps from 1953, 1954, and 1970 display areas surrounding the project area as being largely undeveloped. Central Avenue/Highway 74 is fully developed and Conrad Avenue and 8th Street are also present within their modern-day alignments as unpaved roads. One structure is depicted at the north terminus of 8th Street within the three maps. Topographic maps from 1975, 1982, and 1985 depict the surrounding area as remaining mostly undeveloped although several new structures are plotted along Conrad Avenue and 8th Street. Starting in the 1988 topographic map, one structure is plotted as existing within the Project Area and is visible at the same location in the 2000 topographic map. Within the series of maps spanning 1975 and 2000, numerous new commercial and residential developments occur within the surrounding area. Conrad Avenue and 8th Street are upgraded and paved, and several new streets are created. Topographic maps from 2012, 2015, and 2018 show minor additional development within the area surrounding the project location with depicted structures and infrastructure such as streets and highways existing within modern-day locations. The structure depicted as existing within the project area is not plotted in the 2012, 2015, and 2018 topographic maps, however this appears to be due to a change in overall map styling and labelling rather than demolishment of the structure.

Aerial imagery for the project area and surrounding vicinity are available as early as 1967. Imagery from 1967 and 1978 show the project area and the surrounding vicinity as being largely undeveloped except for Central Avenue (existing as a paved thruway), Conrad Avenue and 8th Street (existing as unpaved roads) in addition to several other unpaved roads that connect to Central Avenue. Imagery from 1980, 1994, 2002, 2005, 2009, 2010, 2012, 2014, and 2016 depict several structures as existing within the project area. Development within the surrounding area accelerates during this span of time, with several unpaved roads, including 8th Street and Conrad Avenue, being upgraded and paved, the development of a commercial facility and a single family residence to the north of the project area, and numerous new residential and commercial structures. Aerial imagery from 2005 show additional development surrounding the project area including large grading operations occurring to the north and east. Aerial imagery from 2009, 2010, 2012, 2014, and 2016 show several additional developments within the surrounding vicinity, including the construction of the Ridgestone Apartments and the Rosetta Canyon Sports Park, both located northeast of the project area.

FIELD SURVEY RESULTS

The project area bisects a low-rolling alluvial terrace that is aligned northeast-southwest and is bordered by a small seasonal drainage to the north and by Central Avenue to the south and east. The parcel immediately west of the project area has been previously graded but now appears to lie fallow, displaying evidence of on-going opportunistic dumping activities. The south and eastern edges of the project area border an improved storm drain system that appears to be associated with the development along Central Avenue.

The western parcel, APN 347-130-029, had been previously graded and was mostly devoid of vegetation (Figure 4). The eastern parcel, APN 347-130-028, did not appear to have been previously graded or disturbed except for the southern edge which had been benched, presumably for slope retention (Figure 5). The southern border of the east parcel also contained a low-lying concrete retaining wall/curb which appeared to be modern in construction style (Figure 6). The north and northeastern portions of the Project Area contained a small east-west-trending drainage containing a mix of riparian vegetation, including mulefat and willow, and ornamental vegetation, including eucalyptus trees (Figures 7,8). Ground visibility within the north and northeastern portions of the Project Area were moderate (approximately 25 to 50 percent) to low (less than 25 percent) due to vegetation. Visibility within the central and southern portions of the east parcel and the entirety of the west parcel were moderate to good (75 percent and higher).

The field survey was unable to relocate resource P-33-000641/CA-RIV-641. The resource location provided through the EIC suggested that the resource was present within the southern portion of parcel 347-130-028. No indications of bedrock outcrops were visible during the survey effort. Inspections of the northern and northeastern portions of the Project Area also did not indicate the presence of intact bedrock outcrops. No previously unrecorded cultural resources were identified during the survey effort, and no indications of potential intact subsurface deposits were observed.

Figure 4. Overview of west parcel APN 347-130-029, facing north.

Figure 5. Overview of east parcel APN 347-130-028, facing west.

Figure 6. Overview of modern retaining wall/curb along southeast border of Project Area, facing northeast.

Figure 7. Overview of drainage within northeast corner of Project Area, facing west.

Figure 8. Overview of drainage within northern portion of Project Area, facing west.

7. RECOMMENDATIONS AND CONCLUSIONS

The archaeological survey was negative and no cultural resources were identified within the project area. However, one cultural resource P-33-000641/CA-RIV-641, was previously recorded within the Project Area. The resource, originally recorded in 1973, consisted of a single bedrock outcrop containing four milling slicks. No surficial artifacts were present at the time of original recordation. The resource was later updated in 1978 (recorder unknown), noting that the outcrop was no longer present, most likely due to being removed for the widening of State Route 74. No further updates to the resource have occurred since 1978.

While the archeological survey was negative, a prehistoric archaeological resource was previously recorded within the Project Area, and additional prehistoric archaeological resources that have been recorded within the record search radius, it is recommended that the following County's Conditions of Approval be followed: 15 Series Human Remains; 15 Series Unanticipated Resources; and 60 Series Cultural Resources Monitoring Program (CRMP) – Project Archaeologist / Archaeological Monitor be followed, as described below.

County Conditions of Approval

15 Series Human Remains

If human remains are found on this site, the developer/permit holder or any successor in interest shall comply with State Health and Safety Code Section 7050.5. Pursuant to State Health and Safety Code Section 7050.5, if human remains are encountered, no further disturbance shall occur until the Riverside County Coroner has made the necessary findings as to origin. Further, pursuant to Public Resources Code Section 5097.98 (b), remains shall be left in place and free from disturbance until a final decision as to the treatment and their disposition has been made. If the Riverside County Coroner determines the remains to be Native American, the Native American Heritage Commission shall be contacted by the Coroner within the period specified by law (24 hours). Subsequently, the Native American Heritage Commission shall identify the "Most Likely Descendant". The Most Likely Descendant shall then make recommendations and engage in consultation with the property owner concerning the treatment of the remains as provided in Public Resources Code Section 5097.98.

15 Series Unanticipated Resources

The developer/permit holder or any successor in interest shall comply with the following for the life of this permit. If during ground disturbance activities, unanticipated cultural resources* are discovered, the following procedures shall be followed: All ground disturbance activities within 100 feet of the discovered cultural resource shall be halted and the applicant shall call the County Archaeologist immediately upon discovery of the cultural resource. A meeting shall be convened between the developer, the project archaeologist**, the Native American tribal representative, and the County Archaeologist to discuss the significance of the find. At the meeting with the aforementioned parties, a decision is to be made, with the concurrence of the County Archaeologist, as to the appropriate treatment (documentation, recovery, avoidance, etc) for the cultural resource. Resource evaluations shall be limited to nondestructive analysis.
Further ground disturbance shall not resume within the area of the discovery until the appropriate treatment has been accomplished.

* A cultural resource site is defined, for this condition, as being a feature and/or three or more artifacts in close association with each other. Tribal Cultural Resources are also considered cultural resources.

** If not already employed by the project developer, a County approved archaeologist and a Native American Monitor from the consulting tribe(s) shall be employed by the project developer to assess the significance of the cultural resource, attend the meeting described above, and continue monitoring of all future site grading activities as necessary.

60 Series CRMP - Project Archaeologist / Archaeological Monitor

Prior to issuance of grading permits: The applicant/developer shall provide evidence to the County of Riverside Planning Department that a County certified professional archaeologist (Project Archaeologist) has been contracted to implement a Cultural Resource Monitoring Plan. A CRMP shall be developed in coordination with the consulting tribe(s) that addresses the details of all activities and provides procedures that must be followed in order to reduce the impacts to cultural, tribal cultural and historic resources to a level that is less than significant as well as address potential impacts to undiscovered buried archaeological resources associated with this project. A fully executed copy of the contract and a digitally-signed copy of the Monitoring Plan shall be provided to the County Archaeologist to ensure compliance with this condition of approval.

Working directly under the Project Archaeologist, an adequate number of qualified Archaeological Monitors shall be present to ensure that all earth moving activities are observed and shall be on-site during all grading activities for areas to be monitored including off-site improvements. Inspections will vary based on the rate of excavation, the materials excavated, and the presence and abundance of artifacts and features. The Professional Archaeologist may submit a detailed letter to the County of Riverside during grading requesting a modification to the monitoring program if circumstances are encountered that reduce the need for monitoring.

8. CERTIFICATION

CERTIFICATION: I hereby certify that the statements furnished above and in the attached exhibits present the data and information required for this archaeological report, and that the facts, statements, and information presented are true and correct to the best of my knowledge and belief.

DATE: February 16, 2010 SIGNED: Shelby G. Castells

PRINTED NAME: Shelby Castells, M.A., RPA

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APPENDICES

APPENDIX A: PERSONNEL QUALIFICATIONS

Shelby Castells, M.A., RPA
Director of Archaeology

Professional Profile

Ms. Castells is the Director of Archaeology for Red Tail Environmental and acts as the Project Manager and Principal Investigator for all cultural resource studies. She has over fourteen years of experience in archaeology and cultural resource management in Southern California. She has been the Principal Investigator and Project Manager for numerous survey, monitoring, testing, and data recovery projects within the counties of San Diego, Imperial, Orange, Riverside, San Bernardino, and Kern. Ms. Castells has extensive experience providing regulatory compliance for CEQA, NEPA, NHPA, NAGPRA, and local guidelines and regulations. Ms. Castells is a Registered Professional Archaeologist, and exceeds the Secretary of the Interior Professional Qualifications Standards for Archaeology. Her interests focus on historical archaeology and the regional history and prehistory of Southern California.

Education

M.A., Anthropology, San Diego State University
B.A., Anthropology, University of California, San Diego

Registrations

Register of Professional Archaeologists (3748180)
San Diego County CEQA Consultant List for Archaeological Resources
Orange County's Reference List for Certified Archaeologists
Riverside County Cultural Resources Consultants List

Selected Archaeological Experience

City of San Diego Cultural and Paleontological Resources On-Call As-Needed Environmental Consulting Agreement (R-309919/H146284), San Diego, CA
Principal Investigator / Project Manager | San Diego County, CA
Provides cultural resources and paleontological support of the City of San Diego's utilities undergrounding program. Conducts cultural resources inventories including record searches and archaeological surveys to identify project areas which may contain cultural resources in support of multiple MNDs and a programmatic EIR. Recommends mitigation measures including resource testing and evaluation, avoidance, and construction monitoring. Works with the City and contractors to fulfill mitigation measures including construction monitoring, resource identification, recordation, and evaluation. City of San Diego, Transportation and Storm Water Department is the lead agency.

University of California, San Diego, Hillcrest Campus Long Range Development Plan EIR Project
Principal Investigator / Project Manager | San Diego, CA
Conducted a cultural resources survey and prepared a technical report in support of the project's EIR. Identified a cultural resource with human remains within the project area. Recommended mitigation measures for the resource to avoid adverse effects. Assisted UCSD with their AB-52 tribal consultation, including organizing, scheduling, facilitating, and reporting on tribal consultation meetings. UCSD was the lead agency.

SANDAG Bayshore Bikeway – Segment 8B Project
Principal Investigator / Project Manager | San Diego and National Cities
Conducted a cultural resource study for the Project including: delineating and mapping the area of potential effect, conducting a record search and an archaeological survey of the APE, preparing the Historic Property Survey Report,

Archaeological Survey Report, Finding of Effect document, and Department of Parks and Recreation Archaeological Site Forms for a railroad line eligible for and listed in the San Diego Register of Historical Resources and for a historic district that was eligible for the National Register of Historic Places. Created mitigation measures to avoid an adverse impact to these historic properties during implementation of the Project. Conducted AB-52 consultation on behalf of SANDAG. Assisted in SHPO consultation.

Heritage Road Bridge Replacement Project
Principal Investigator / Project Manager | City of Chula Vista, CA
Conducted a cultural resource study for the Project including: delineating and mapping the area of potential effect (APE), conducting a record search and an archaeological survey of the APE, preparing the Historic Property Survey Report and the Archaeology Survey Report, and creating mitigation measures. City of Chula Vista and Caltrans were the lead agencies.

North County Transit District Advanced Train Control and Positive Train Control Antennas at Five Locations for the Elvira to Morena Double Track Project
Principal Investigator / Project Manager | San Diego, CA
Conducted a cultural resources survey of the five areas of potential effect and prepared the associated Archaeological Resources Management Reports. Prepared the Federal Communications Commission's Form 620, public outreach and Tower Construction Notification System for each antenna. Consulted with the California State Historic Preservation. Federal Communication Commission was the lead agency.

Harbor View Hotel Project,
Principal Investigator / Project Manager | San Diego, CA
Prepared an archaeological assessment of the Project area and a construction monitoring plan in compliance with the City of San Diego's Mitigation Monitoring requirements. Managed the archaeological monitoring of the Project's construction during the initial ground disturbance and grading of the Project area. Identified, documented, and evaluated for significance under CEQA, to the CRHR, and to the City of San Diego Historical Resources Register a feature containing the remains of a historic boat. Documented the boat feature on DPR 523 forms. Provided a technical report with the results of the monitoring, testing, evaluation and data recovery, including an artifact analysis and historic research. City of San Diego was the lead agency.

Machado Smith Excavation, Old Town San Diego State of California Historic Park
Principal Investigator / Project Manager | San Diego, CA
Prepared a work plan and California State Parks permit application for the excavation in order to identify the location of two 19th century structures, evaluate the archaeological remains for eligibility to the CRHR and significance under CEQA, and to assist in the recreation of the buildings in Old Town San Diego State of California Historic Park. Directed excavations including mechanical trenching and hand excavations. Excavated 19th century features. Directed laboratory work associated with the excavations, cataloged the artifacts, performed the artifact analysis, and prepared the artifact collection for curation. Evaluated the cultural resource for eligibility to the NRHP and CRHR, and for significance under CEQA. Prepared a technical report providing the results of the excavation, artifact analysis, evaluation of the resources to the CRHR, provided mitigation measures, and guidance to the building recreation process. Prepared DPR 523 forms for the cultural resource. California State Parks was the lead agency.

San Diego County Administration Center Parking Garage, Cedar and Ketter Project
Principal Investigator / Project Manager | San Diego, CA
Prepared an archaeological assessment of the project area and a construction monitoring plan in compliance with CEQA and the City of San Diego's Mitigation Monitoring requirements. Managed the archaeological monitoring of the project's construction during the initial ground disturbance and grading of the Project area. Identified, documented, and evaluated

for significance under CEQA, to the CRHR, and to the City of San Diego Historical Resources Register a historic well. Performed a data recovery on the well feature. Provided a technical report with the results of the monitoring, testing, evaluation and data recovery, including an artifact analysis and historic research. Documented cultural resources on DPR 523 forms. Prepared the artifact collection, artifact analysis, and historic research to be incorporated into a display to be placed in the parking garage and the County Administration Center. City of San Diego was the lead agency.

Archaeological Survey for the County of San Diego Fuel Reduction Parcel Preparation Program in Julian, Whispering Pines, and Along State Route 78/79
Principal Investigator / Project Manager | San Diego County, CA
Conducted a cultural resources survey of the project area in compliance with CEQA and San Diego County Guidelines. Prepared a technical report and created avoidance measures in consultation with the County of San Diego to avoid all impacts to cultural resources and prepared a technical report. Documented cultural resources on DPR 523 Forms. San Diego County was the lead agency.

Pacifica Vista Self Storage Project
Principal Investigator / Project Manager | Vista, CA
Conducted a cultural resource survey of the project area and prepared technical report in compliance with CEQA and City of Vista Guidelines. Identified two cultural resources within the Project area, evaluated one cultural resource and created avoidance measures to avoid the second resource. Documented cultural resources on DPR 523 Forms. City of Vista was the lead agency.

Broadway Earthen Channel Repairs Project
Principal Investigator / Project Manager | El Cajon, CA
Conducted a cultural resource survey of the project area and prepared a technical report in support of the project's environmental documents. The project is subject to CEQA-Plus and was conducted in compliance with City of EL Cajon, County of San Diego and Section 106 of the NHPA requirements. Identified, documented, and evaluated a cultural resource within the project area. City of El Cajon, County of San Diego, and California Clean Water State Revolving Fund Program were the lead agencies.

Rancho Del Rio Biological Mitigation Parcel Project
Principal Investigator / Project Manager | San Diego, CA
Conducted a cultural resource survey of the project area and prepared a technical report in compliance with the City of San Diego CEQA Guidelines. Identified a cultural resource within the project area and documented the resource on DPR 523 Forms recommended avoidance measures or evaluation of the resource to the CRHR and City Register. City of San Diego was the lead agency.

India and Date Project at 1703 India Street for H.G. Fenton
Principal Investigator / Project Manager | San Diego, CA
Prepared an archaeological assessment of the Project area and a construction monitoring plan in compliance with the City of San Diego's Mitigation Monitoring requirements. Conducted a pre-testing program within the Project area using mechanically excavated trenches to identify possible archaeological deposits. Identified a layer of fill soil that did not need to be monitored. Managed the archaeological monitoring of the Project's construction during the initial ground disturbance and grading of the Project area. Identified, documented, and evaluated for significance under CEQA, to the CRHR, and to the City of San Diego Historical Resources Register two historic trash scatters. Performed evaluation testing on the archaeological deposits. Documented cultural resources on DPR 523 forms. Provided a technical report with the results of the monitoring, testing, and evaluation, including an artifact analysis and historic research. City of San Diego was the lead agency.

Spencer Bietz, B.A.
Senior Archaeologist / GIS Specialist

Professional Profile

Mr. Spencer Bietz is the Archaeological Field Director at Red Tail Environmental and has worked as a qualified archaeologist in California for the past 15 years. Mr. Bietz has completed a wide variety of cultural resource management projects and is a qualified archaeological monitor for the City of San Diego and County of San Diego. Mr. Bietz has worked on cultural resource projects throughout San Diego, Imperial, Orange, Riverside, San Bernardino, Inyo, Kern, Mono, Los Angeles, and Tulare Counties in California. Mr. Bietz has participated in projects for federal agencies such as the Bureau of Land Management and U.S. Forest Service; state agencies, including California State Parks and Caltrans; local governments, including the City and County of San Diego; and private clients. As an archaeologist and paleontologist, Mr. Bietz has experience with construction monitoring, geotechnical sampling, GIS mapping and data management, technical writing, soil screening, field survey and site recordation, resource evaluation, and artifact cataloging and preparation for curation. Mr. Bietz's personal research interests include historical archaeology and the regional history and prehistory of Southern California, GIS data management, modeling, and cartography.

Education

Certificate of Performance as Geographic Information Systems Specialist, San Diego Mesa College
B.A., Anthropology with Concentration in Archaeology, University of California, San Diego

Selected Archaeology Experience

City of San Diego Cultural and Paleontological Resources On-Call As-Needed Environmental Consulting Agreement (R-309919/H146284), San Diego, CA
Senior Archaeologist | San Diego County, CA
Conducts cultural resources inventories including record searches and archaeological surveys to identify project areas which may contain cultural resources in support of multiple MNDs and a programmatic EIR. Recommends mitigation measures including resource testing and evaluation, avoidance, and construction monitoring. Performs archaeological construction monitoring, resource identification, recordation, and evaluation. Also acts as the GIS Specialist to produce report maps and record resources identified during construction monitoring. City of San Diego, Transportation and Storm Water Department is the lead agency.

Archaeological Survey and Monitoring for the Tenaja Fire State and Campground and the Upper San Juan Campground Contract Areas, Trabuco Ranger District
Field Archaeologist | Cleveland National Forest, CA (2018-ongoing)
Conducted cultural resource monitoring and documentation of planned structure demolition within the Upper San Juan Campground Contract Area. Will be performing archaeological monitoring during ground disturbance in 2019. Contributed to technical report and created cartographic figures and digital GIS database. United States Forest Service is the lead agency.

Archaeological and Native American Monitoring for UU525 Block 4J1 Project
Field Director/Archaeological Monitor | San Diego, CA (2018-ongoing)
Field Director and archaeological monitor for the archaeological monitoring for the utility undergrounding project. Worked with construction crews to provide updated schedules. Reviewed notes, created monitoring schedule and archaeological discovery database. Created cartographic figures and digital GIS database. Collected, cleaned, and cataloged artifacts recovered during cultural resource monitoring efforts. City of San Diego is the lead agency.

Ives Residential at 1874 Spindrift Project
Field Director | San Diego, CA (2018-ongoing)
Conducted extended Phase I testing of the project area. Identified, recorded, and evaluated a prehistoric archaeological deposit. Contributed to data recovery technical report and created cartographic figures and GIS digital database. City of San Diego is the lead agency.

Mission Bay Geo-Archaeological Testing
Cultural Resource Monitor | San Diego, CA (2018)
Contributed as the primary cultural resource monitor, assisting in the collection of subsurface core samples for geo-archaeological analysis. Performed subsurface geotechnical bore sampling, photo documentation, sample documentation, GIS map creation and data management, and technical writing. City of San Diego was lead agency.

Crown Point Sewer and Water Group Monitoring, San Diego, California
Cultural Resource Monitor | San Diego, California (2016-2018)
Contributed as a cultural resource monitor during the excavation of trenches and manhole vaults in the community of Crown Point in Pacific Beach, California. City of San Diego was the lead agency.

Pio Pico North Development Project
Field Director | Carlsbad, CA (2016-2017)
Contributed as field director for subsurface testing of multiple resources within a parcel proposed for residential development. Assisted in the creation of the testing protocol and with technical report writing, and directed the excavation of more than 50 mechanically-excavated trenches and 20 TEUs. Additional activities included site recordation and evaluation, historical archival research, recordation and evaluation of a historic-era linear feature (water pipeline), artifact cataloging, shell speciation, GIS data creation and management, and figure creation.

Administration of Courts (AOC) California, San Diego County Courthouse Monitoring
Lead Cultural Resource Monitor | San Diego, CA (2014)
Contributed as the primary cultural resource monitor, assisting in the recording of cultural deposits and features during footing excavation. Oversaw the recording of cultural discoveries, photo documentation, artifact collection, testing of historic features, and site recordation using Trimble GeoXH devices. Assisted in GIS map creation and data management, and artifact preparation.

San Diego Gas and Electric Cultural Resources On-Call, San Diego County, California
Field Archaeologist | Cultural Resource Monitor | San Diego, CA (2014)
Contributed as a field archaeologist assisting in a variety of projects including cultural resource monitoring, deteriorated pole survey, FiRM infrastructure survey, resource testing and evaluation, technical report and summary letter writing, GIS data creation and management, and figure creation.

Sunrise Powerlink Monitoring, San Diego County, California
Cultural Resource Monitor | San Diego, CA (2008-2009)
Contributed as a cultural resource monitor accompanying survey and geo-technical testing crews in the survey and placement of proposed electrical tower locations and their respective access areas along the Sunrise Powerlink. Assisted in site recording, photo documentation, and the identification and marking of sensitive cultural areas for future avoidance by work crews. Additional tasks included writing and compiling of tower cultural data for the final summary report.

APPENDIX B: *CONFIDENTIAL* EIC RECORD SEARCH

(Provided Separately)

APPENDIX C: NAHC CORRESPONDENCE

RED TAIL
ENVIRONMENTAL

January 21, 2021

California Native American Heritage Commission
1550 Harbor Blvd, Suite 100
West Sacramento, CA 95691
nahc@nahc.ca.gov

Re: 28771 Highway 74 Project, APNs 347-130-028 and 347-130-029, Riverside County, California

Dear NAHC,

Red Tail Environmental (Red Tail) is conducting an archaeological study of the proposed 28771 Highway 74 Project (project), located on Assessor Parcel Number (APNs) 347-130-028 and 347-130-029, Highway 74, Lake Elsinore, Riverside County, California. Red Tail is currently conducting a record search with the Eastern Information Center. I am writing to request a record search of the Sacred Lands File to determine if you have registered any cultural resources, tribal cultural resources, traditional cultural properties, or areas of heritage sensitivity within the proposed project area. The project area is shown on the USGS 7.5' *Lake Elsinore, California* topographic quadrangle map within Township 5 South, Range 4 West, Section 29. The proposed project intends to develop portions of the two parcels for a gas station complex which will include a convenience store, a fueling canopy with six multi-product dispensers, and two underground storage tanks.

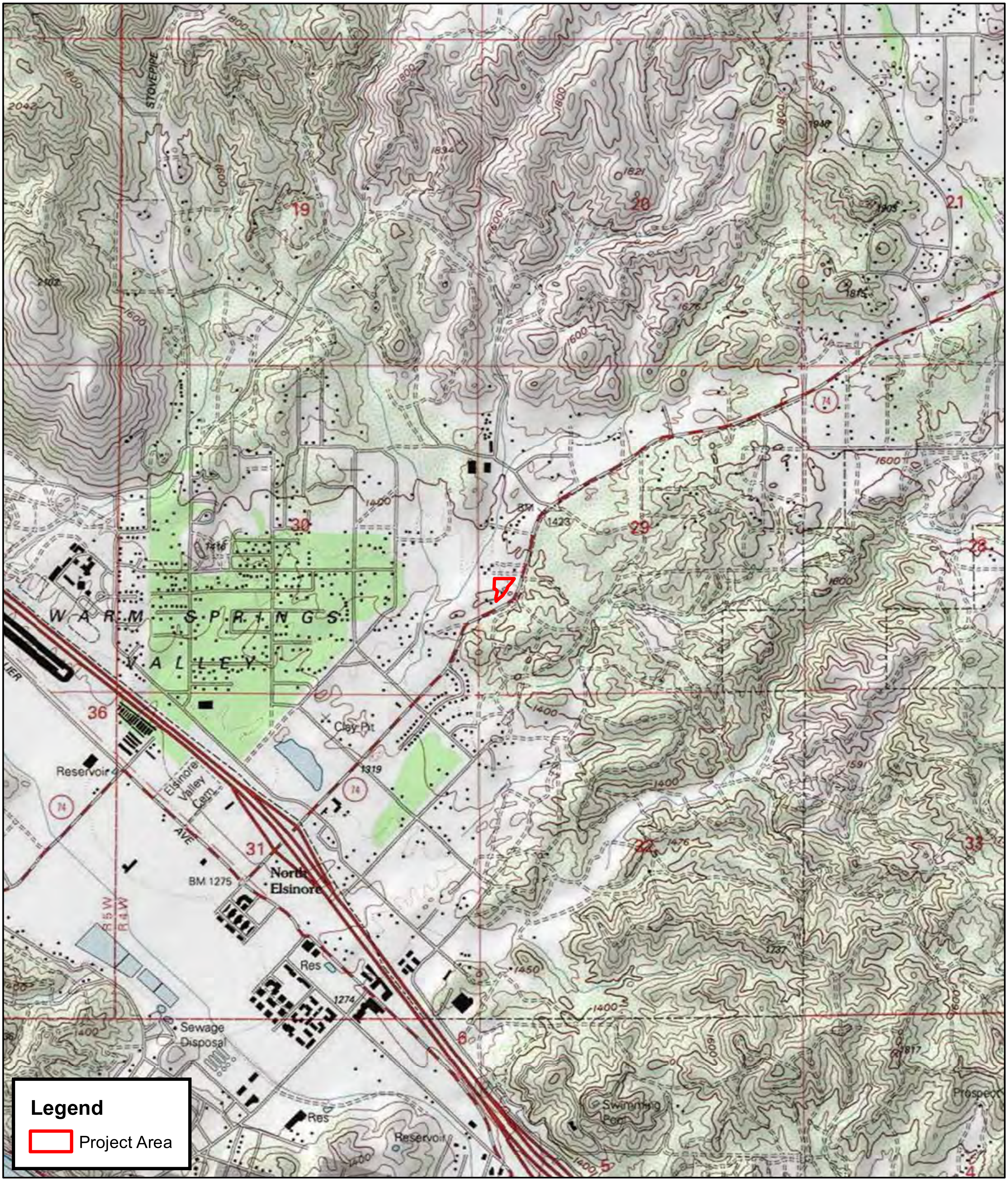
Our investigation will include direct contact with local tribal entities. Please include a list of the appropriate individuals to contact related to this project. Please submit your response via email to Shelby@redtailenvironmental.com.

Sincerely,

Shelby G. Castells

Shelby Castells, M.A., RPA
Director of Archaeology

Attachments: Project Area Map



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RED TAIL ENVIRONMENTAL

NATIVE AMERICAN HERITAGE COMMISSION

NAHC HEADQUARTERS
1550 Harbor Boulevard
Suite 100
West Sacramento,
California 95691
(916) 373-3710
nahc@nahc.ca.gov
NAHC.ca.gov

February 4, 2021

Shelby Castells
Red Tail Environmental

Via Email to: Shelby@redtailenvironmental.com

Re: 28771 Highway 74 Project, Riverside County

Dear Ms. Castells:

A record search of the Native American Heritage Commission (NAHC) Sacred Lands File (SLF) was completed for the information you have submitted for the above referenced project. The results were negative. However, the absence of specific site information in the SLF does not indicate the absence of cultural resources in any project area. Other sources of cultural resources should also be contacted for information regarding known and recorded sites.

Attached is a list of Native American tribes who may also have knowledge of cultural resources in the project area. This list should provide a starting place in locating areas of potential adverse impact within the proposed project area. I suggest you contact all of those indicated; if they cannot supply information, they might recommend others with specific knowledge. By contacting all those listed, your organization will be better able to respond to claims of failure to consult with the appropriate tribe. If a response has not been received within two weeks of notification, the Commission requests that you follow-up with a telephone call or email to ensure that the project information has been received.

If you receive notification of change of addresses and phone numbers from tribes, please notify me. With your assistance, we can assure that our lists contain current information.

If you have any questions or need additional information, please contact me at my email address: Andrew.Green@nahc.ca.gov.

Sincerely,

Andrew Green

Andrew Green
Cultural Resources Analyst

Attachment

Native American Heritage Commission
Native American Contact List
Riverside County
2/4/2021

Agua Caliente Band of Cahuilla Indians
Patricia Garcia-Plotkin, Director
5401 Dinah Shore Drive — Cahuilla
Palm Springs, CA, 92264
Phone: (760) 699 - 6907
Fax: (760) 699-6924
ACBCI-THPO@aguacaliente.net

Agua Caliente Band of Cahuilla Indians
Jeff Grubbe, Chairperson
5401 Dinah Shore Drive — Cahuilla
Palm Springs, CA, 92264
Phone: (760) 699 - 6800
Fax: (760) 699-6919

Augustine Band of Cahuilla Mission Indians
Amanda Vance, Chairperson
P.O. Box 846 — Cahuilla
Coachella, CA, 92236
Phone: (760) 398 - 4722
Fax: (760) 369-7161
hhaines@augustinetribe.com

Cabazon Band of Mission Indians
Doug Welmas, Chairperson
84-245 Indio Springs Parkway — Cahuilla
Indio, CA, 92203
Phone: (760) 342 - 2593
Fax: (760) 347-7880
jstapp@cabazonindians-nsn.gov

Cahuilla Band of Indians
Daniel Salgado, Chairperson
52701 U.S. Highway 371 — Cahuilla
Anza, CA, 92539
Phone: (951) 763 - 5549
Fax: (951) 763-2808
Chairman@cahuilla.net

Juaneno Band of Mission Indians Acjachemen Nation - Belardes
Matias Belardes, Chairperson
32161 Avenida Los Amigos — Juaneno
San Juan Capisttrano, CA, 92675
Phone: (949) 293 - 8522
kaamalam@gmail.com

Juaneno Band of Mission Indians Acjachemen Nation - Belardes
Joyce Perry, Tribal Manager
4955 Paseo Segovia — Juaneno
Irvine, CA, 92603
Phone: (949) 293 - 8522
kaamalam@gmail.com

La Jolla Band of Luiseno Indians
Fred Nelson, Chairperson
22000 Highway 76 — Luiseno
Pauma Valley, CA, 92061
Phone: (760) 742 - 3771

Los Coyotes Band of Cahuilla and Cupeño Indians
Shane Chapparosa, Chairperson
P.O. Box 189 — Cahuilla
Warner Springs, CA, 92086-0189
Phone: (760) 782 - 0711
Fax: (760) 782-0712

Morongo Band of Mission Indians
Denisa Torres, Cultural Resources Manager
12700 Pumarra Road — Cahuilla
Banning, CA, 92220 — Serrano
Phone: (951) 849 - 8807
Fax: (951) 922-8146
dtorres@morongo-nsn.gov

This list is current only as of the date of this document. Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resource Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources assessment for the proposed 28771 Highway 74 Project, Riverside County.

Morongo Band of Mission Indians
Robert Martin, Chairperson
12700 Pumarra Road
Banning, CA, 92220
Phone: (951) 849 - 8807
Fax: (951) 922-8146
dtorres@morongo-nsn.gov
Cahuilla
Serrano

Pala Band of Mission Indians
Shasta Gaughen, Tribal Historic Preservation Officer
PMB 50, 35008 Pala Temecula Rd.
Pala, CA, 92059
Phone: (760) 891 - 3515
Fax: (760) 742-3189
sgaughen@palatribe.com
Cupeno
Luiseno

Pauma Band of Luiseno Indians
Temet Aguilar, Chairperson
P.O. Box 369
Pauma Valley, CA, 92061
Phone: (760) 742 - 1289
Fax: (760) 742-3422
bennaecalac@aol.com
Luiseno

Pechanga Band of Luiseno Indians
Mark Macarro, Chairperson
P.O. Box 1477
Temecula, CA, 92593
Phone: (951) 770 - 6000
Fax: (951) 695-1778
epreston@pechanga-nsn.gov
Luiseno

Pechanga Band of Luiseno Indians
Paul Macarro, Cultural Resources Coordinator
P.O. Box 1477
Temecula, CA, 92593
Phone: (951) 770 - 6306
Fax: (951) 506-9491
pmacarro@pechanga-nsn.gov
Luiseno

Quechan Tribe of the Fort Yuma Reservation
Manfred Scott, Acting Chairman
Kw'ts'an Cultural Committee
P.O. Box 1899
Yuma, AZ, 85366
Phone: (928) 750 - 2516
scottmanfred@yahoo.com
Quechan

Quechan Tribe of the Fort Yuma Reservation
Jill McCormick, Historic Preservation Officer
P.O. Box 1899
Yuma, AZ, 85366
Phone: (760) 572 - 2423
historicpreservation@quechantribe.com
Quechan

Ramona Band of Cahuilla
John Gomez, Environmental Coordinator
P. O. Box 391670
Anza, CA, 92539
Phone: (951) 763 - 4105
Fax: (951) 763-4325
jgomez@ramona-nsn.gov
Cahuilla

Ramona Band of Cahuilla
Joseph Hamilton, Chairperson
P.O. Box 391670
Anza, CA, 92539
Phone: (951) 763 - 4105
Fax: (951) 763-4325
admin@ramona-nsn.gov
Cahuilla

Rincon Band of Luiseno Indians
Cheryl Madrigal, Tribal Historic Preservation Officer
One Government Center Lane
Valley Center, CA, 92082
Phone: (760) 297 - 2635
crd@rincon-nsn.gov
Luiseno

Rincon Band of Luiseno Indians
Bo Mazzetti, Chairperson
One Government Center Lane
Valley Center, CA, 92082
Phone: (760) 749 - 1051
Fax: (760) 749-5144
bomazzetti@aol.com
Luiseno

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This list is only applicable for contacting local Native Americans with regard to cultural resources assessment for the proposed 28771 Highway 74 Project, Riverside County.

Native American Heritage Commission
Native American Contact List
Riverside County
2/4/2021

San Luis Rey Band of Mission Indians
1889 Sunset Drive — Luiseno
Vista, CA, 92081
Phone: (760) 724 - 8505
Fax: (760) 724-2172
cjmojado@slrmissionindians.org

San Luis Rey Band of Mission Indians
San Luis Rey, Tribal Council
1889 Sunset Drive — Luiseno
Vista, CA, 92081
Phone: (760) 724 - 8505
Fax: (760) 724-2172
cjmojado@slrmissionindians.org

Santa Rosa Band of Cahuilla Indians
Lovina Redner, Tribal Chair
P.O. Box 391820 — Cahuilla
Anza, CA, 92539
Phone: (951) 659 - 2700
Fax: (951) 659-2228
lsaul@santarosa-nsn.gov

Soboba Band of Luiseno Indians
Scott Cozart, Chairperson
P. O. Box 487 — Cahuilla
San Jacinto, CA, 92583 — Luiseno
Phone: (951) 654 - 2765
Fax: (951) 654-4198
jontiveros@soboba-nsn.gov

Soboba Band of Luiseno Indians
Joseph Ontiveros, Cultural Resource Department
P.O. BOX 487 — Cahuilla
San Jacinto, CA, 92581 — Luiseno
Phone: (951) 663 - 5279
Fax: (951) 654-4198
jontiveros@soboba-nsn.gov

Torres-Martinez Desert Cahuilla Indians
Michael Mirelez, Cultural Resource Coordinator
P.O. Box 1160 — Cahuilla
Thermal, CA, 92274
Phone: (760) 399 - 0022
Fax: (760) 397-8146
mmirelez@tmdci.org

This list is current only as of the date of this document. Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resource Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources assessment for the proposed 28771 Highway 74 Project, Riverside County.

February 8, 2021

Ms. Amanda Vance
Chairperson
Augustine Band of Cahuilla Mission Indians
PO Box 846, Coachella, CA, 92236
760-398-4722
hhaines@augustinetribe.com

Re: 28771 Highway 74 Project, APNs 347-130-028 and 347-130-029, Riverside County, California

Dear Ms. Vance,

Red Tail Environmental (Red Tail) is conducting an archaeological study of the 28771 Highway 74 Project (project), located on Assessor Parcel Number (APNs) 347-130-028 and 347-130-029, Highway 74, Lake Elsinore, Riverside County, California. The project area is shown on the United States Geologic Survey (USGS) 7.5' *Lake Elsinore, California* topographic quadrangle within Section 29 of Township 5 South, Range 4 West. The Project is being undertaken in compliance with the California Environmental Quality Act (CEQA) and the County of Riverside is overseeing the project as lead agency. The project intends to develop portions of the two parcels for a gas station complex which will include a convenience store, a fueling canopy with six multi-product dispensers, and two underground storage tanks.

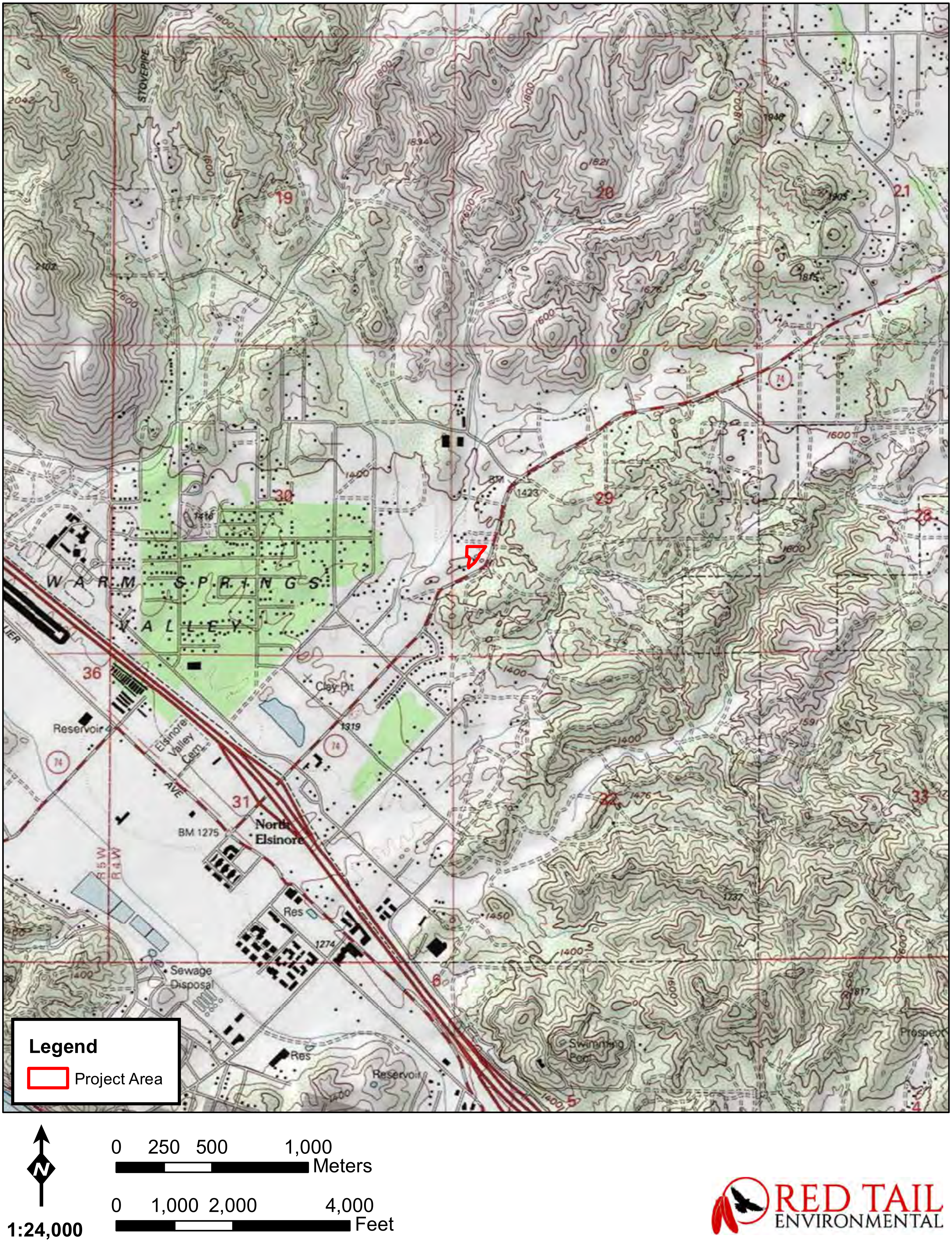
A record search of the Sacred Lands File with the California Native American Heritage Commission was negative. Red Tail is conducting a record search at the Eastern Information Center and a pedestrian survey of the Project Area.

We are contacting you to request additional information regarding the Project area, if you are aware of any issues of cultural concern regarding the area shown on the enclosed map. In particular, we would like to know if you have knowledge of any Traditional Cultural Properties, Sacred Sites, Tribal Cultural Resources, resource collecting areas, or any other areas of concern of which you would wish us to be aware. If you have any questions or concerns regarding the proposed Project, please contact me at the address or phone number listed below, or via email at Shelby@redtailenvironmental.com. We appreciate any input you may have on this project.

Sincerely,

Shelby G. Castells

Shelby Castells, M.A., RPA
Director of Archaeology
Attachments: Figure 1. Project Location Map



WARM SPRINGS VALLEY
North Elsinore
Clay Pit
Reservoir
Elsinore Valley Cem
Sewage Disposal
Res
Reservoir
Swimming Pool
Prospect
STOVEPIPE
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BM 1275
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RED TAIL ENVIRONMENTAL

February 8, 2021

Mr. Bo Mazzetti
Chairperson
Rincon Band of Luiseno Indians
One Government Center Land, Valley Center, CA, 92082
760-749-1051
bomazzetti@aol.com

Re: 28771 Highway 74 Project, APNs 347-130-028 and 347-130-029, Riverside County, California

Dear Mr. Mazzetti,

Red Tail Environmental (Red Tail) is conducting an archaeological study of the 28771 Highway 74 Project (project), located on Assessor Parcel Number (APNs) 347-130-028 and 347-130-029, Highway 74, Lake Elsinore, Riverside County, California. The project area is shown on the United States Geologic Survey (USGS) 7.5' *Lake Elsinore, California* topographic quadrangle within Section 29 of Township 5 South, Range 4 West. The Project is being undertaken in compliance with the California Environmental Quality Act (CEQA) and the County of Riverside is overseeing the project as lead agency. The project intends to develop portions of the two parcels for a gas station complex which will include a convenience store, a fueling canopy with six multi-product dispensers, and two underground storage tanks.

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Director of Archaeology
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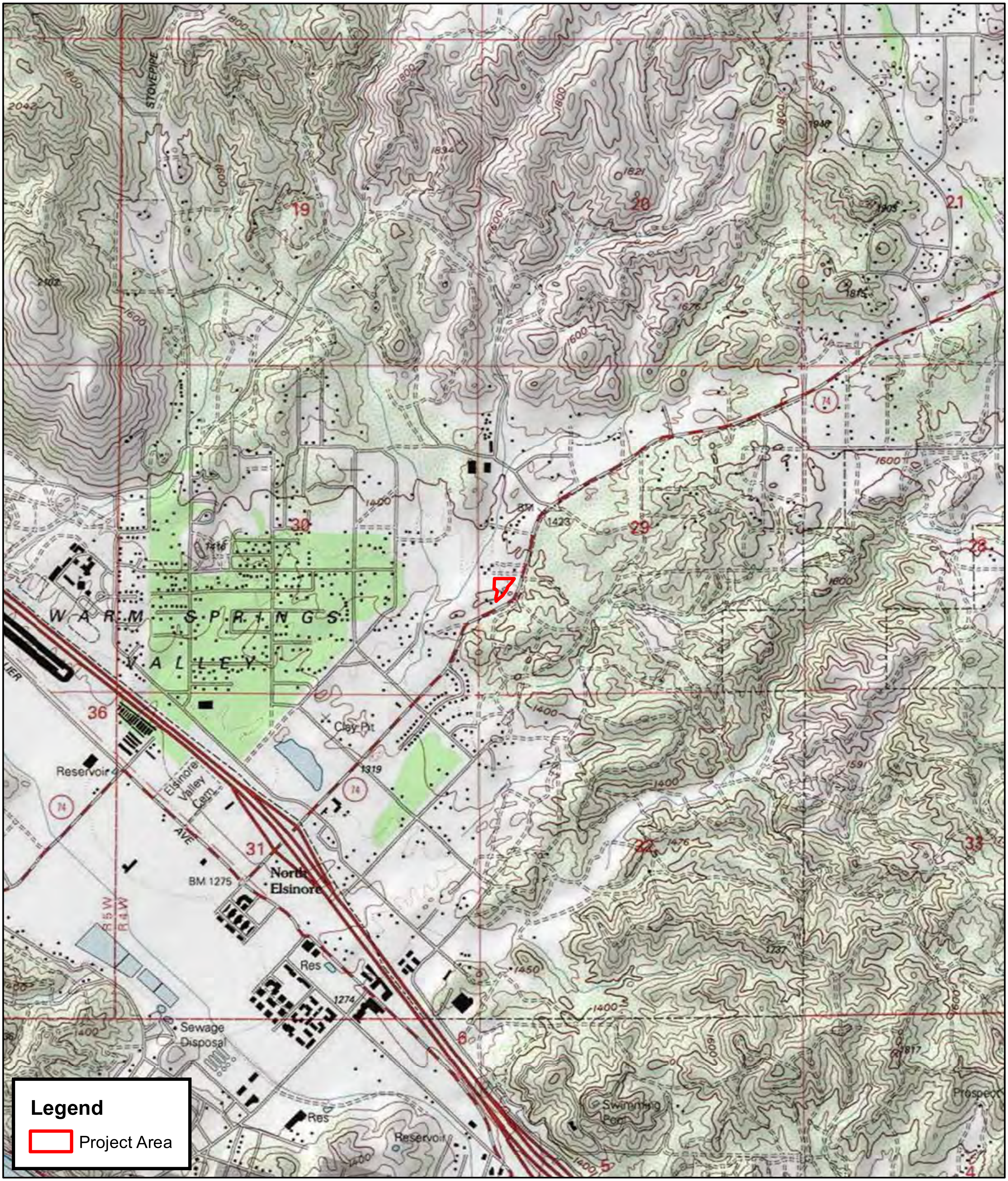

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February 8, 2021

Ms. Cheryl Madrigal
Tribal Historic Preservation Officer
Rincon Band of Luiseno Indians
One Government Center Land, Valley Center, CA, 92082
760-297-2635
crd@rincon-nsn.gov

Re: 28771 Highway 74 Project, APNs 347-130-028 and 347-130-029, Riverside County, California

Dear Ms. Madrigal,

Red Tail Environmental (Red Tail) is conducting an archaeological study of the 28771 Highway 74 Project (project), located on Assessor Parcel Number (APNs) 347-130-028 and 347-130-029, Highway 74, Lake Elsinore, Riverside County, California. The project area is shown on the United States Geologic Survey (USGS) 7.5' *Lake Elsinore, California* topographic quadrangle within Section 29 of Township 5 South, Range 4 West. The Project is being undertaken in compliance with the California Environmental Quality Act (CEQA) and the County of Riverside is overseeing the project as lead agency. The project intends to develop portions of the two parcels for a gas station complex which will include a convenience store, a fueling canopy with six multi-product dispensers, and two underground storage tanks.

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Shelby G. Castells

Shelby Castells, M.A., RPA
Director of Archaeology
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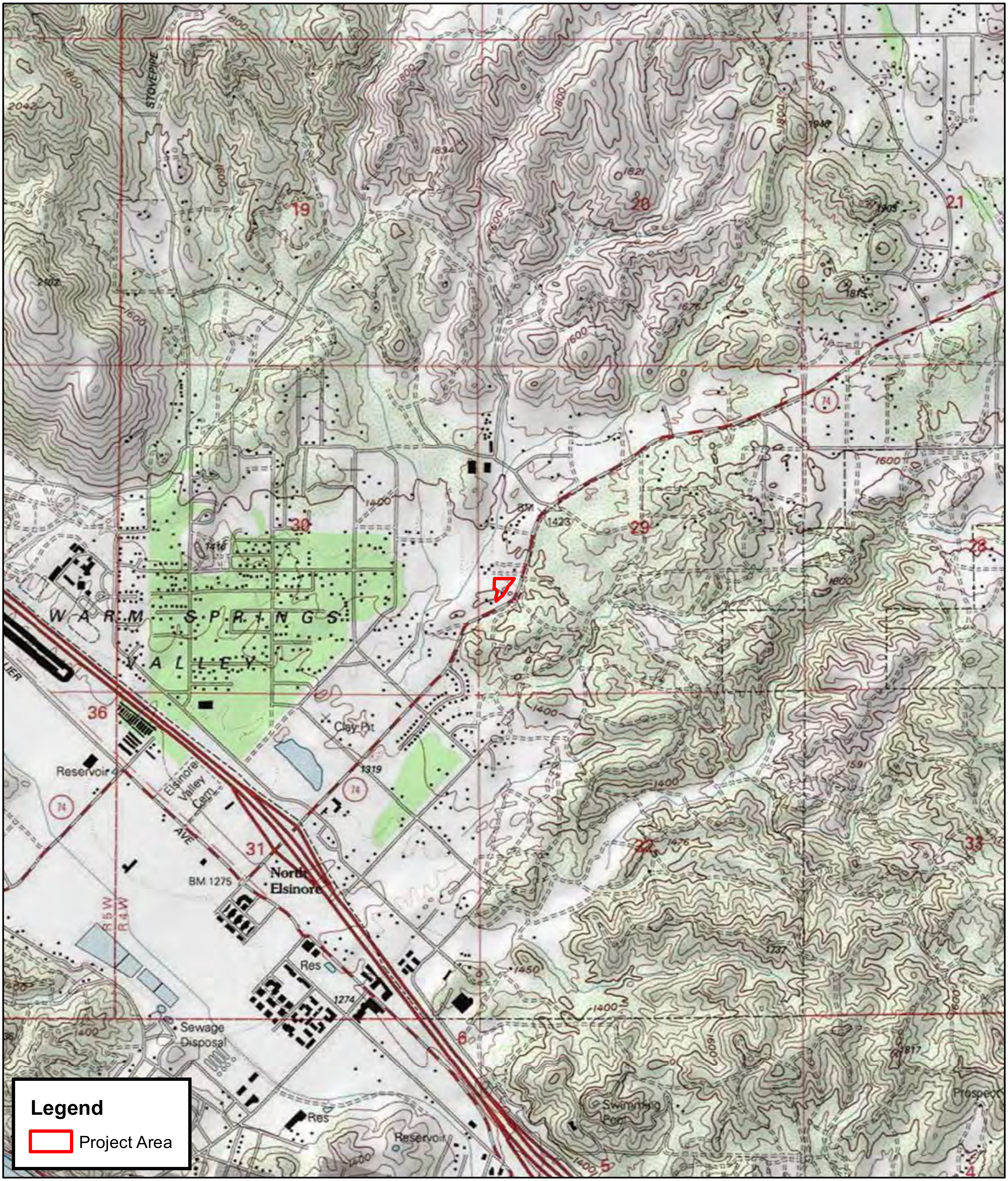

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RED TAIL
ENVIRONMENTAL

RED TAIL
ENVIRONMENTAL

February 8, 2021

Mr. Daniel Salgado
Chairperson
Cahuilla Band of Indians
52701 US Highway 371, Anza, CA, 92539
951-763-5549
chairman@cahuilla.net

Re: 28771 Highway 74 Project, APNs 347-130-028 and 347-130-029, Riverside County, California

Dear Mr. Salgado,

Red Tail Environmental (Red Tail) is conducting an archaeological study of the 28771 Highway 74 Project (project), located on Assessor Parcel Number (APNs) 347-130-028 and 347-130-029, Highway 74, Lake Elsinore, Riverside County, California. The project area is shown on the United States Geologic Survey (USGS) 7.5' *Lake Elsinore, California* topographic quadrangle within Section 29 of Township 5 South, Range 4 West. The Project is being undertaken in compliance with the California Environmental Quality Act (CEQA) and the County of Riverside is overseeing the project as lead agency. The project intends to develop portions of the two parcels for a gas station complex which will include a convenience store, a fueling canopy with six multi-product dispensers, and two underground storage tanks.

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Sincerely,

Shelby G. Castells

Shelby Castells, M.A., RPA
Director of Archaeology
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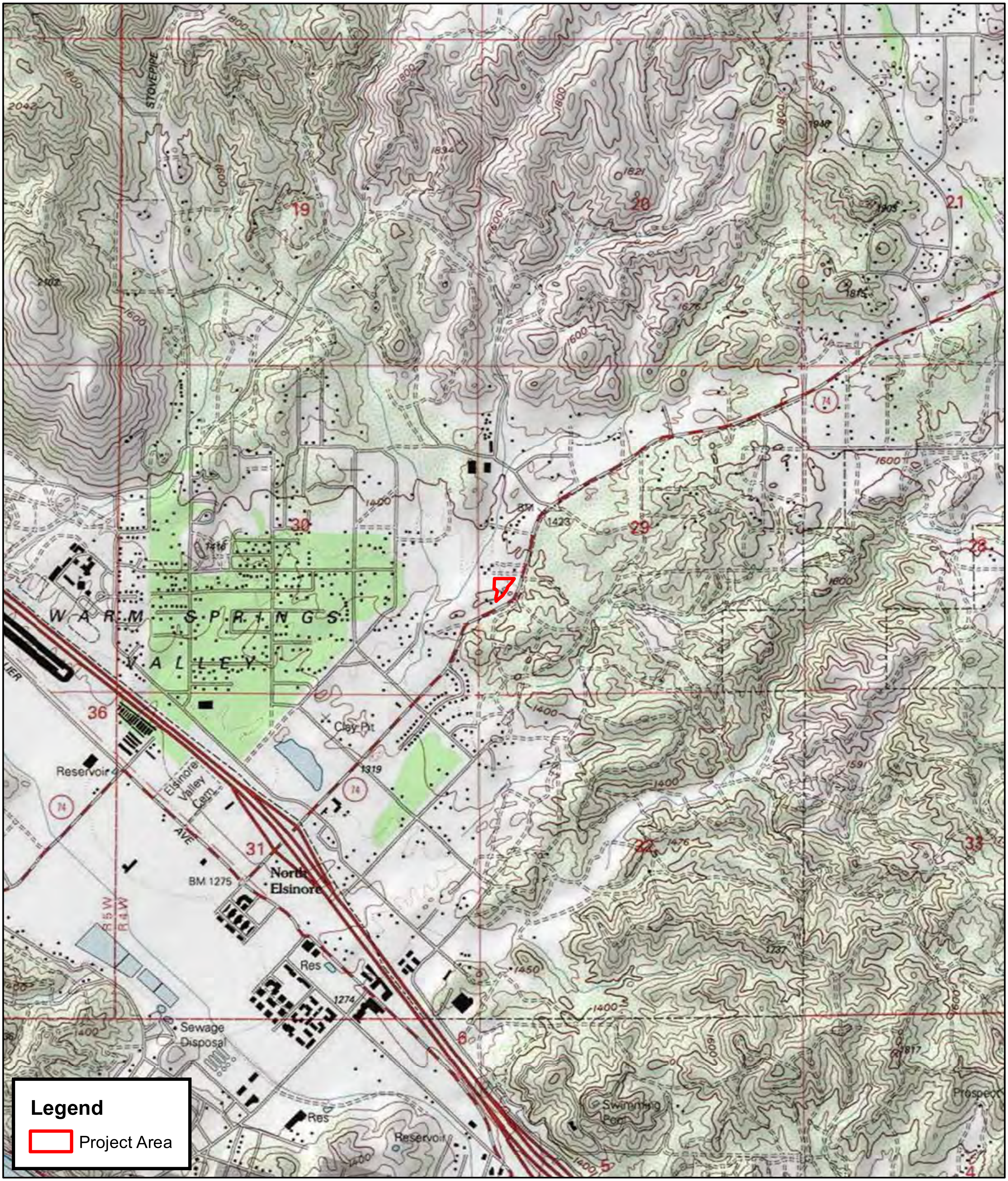

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RED TAIL ENVIRONMENTAL

RED TAIL ENVIRONMENTAL

February 8, 2021

Ms. Denisa Torres
Cultural Resources Manager
Morongo Band of Mission Indians
12700 Pumarra Road, Banning, CA, 92220
951-849-8807
dtorres@morongo-nsn.gov

Re: 28771 Highway 74 Project, APNs 347-130-028 and 347-130-029, Riverside County, California

Dear Ms. Torres,

Red Tail Environmental (Red Tail) is conducting an archaeological study of the 28771 Highway 74 Project (project), located on Assessor Parcel Number (APNs) 347-130-028 and 347-130-029, Highway 74, Lake Elsinore, Riverside County, California. The project area is shown on the United States Geologic Survey (USGS) 7.5' *Lake Elsinore, California* topographic quadrangle within Section 29 of Township 5 South, Range 4 West. The Project is being undertaken in compliance with the California Environmental Quality Act (CEQA) and the County of Riverside is overseeing the project as lead agency. The project intends to develop portions of the two parcels for a gas station complex which will include a convenience store, a fueling canopy with six multi-product dispensers, and two underground storage tanks.

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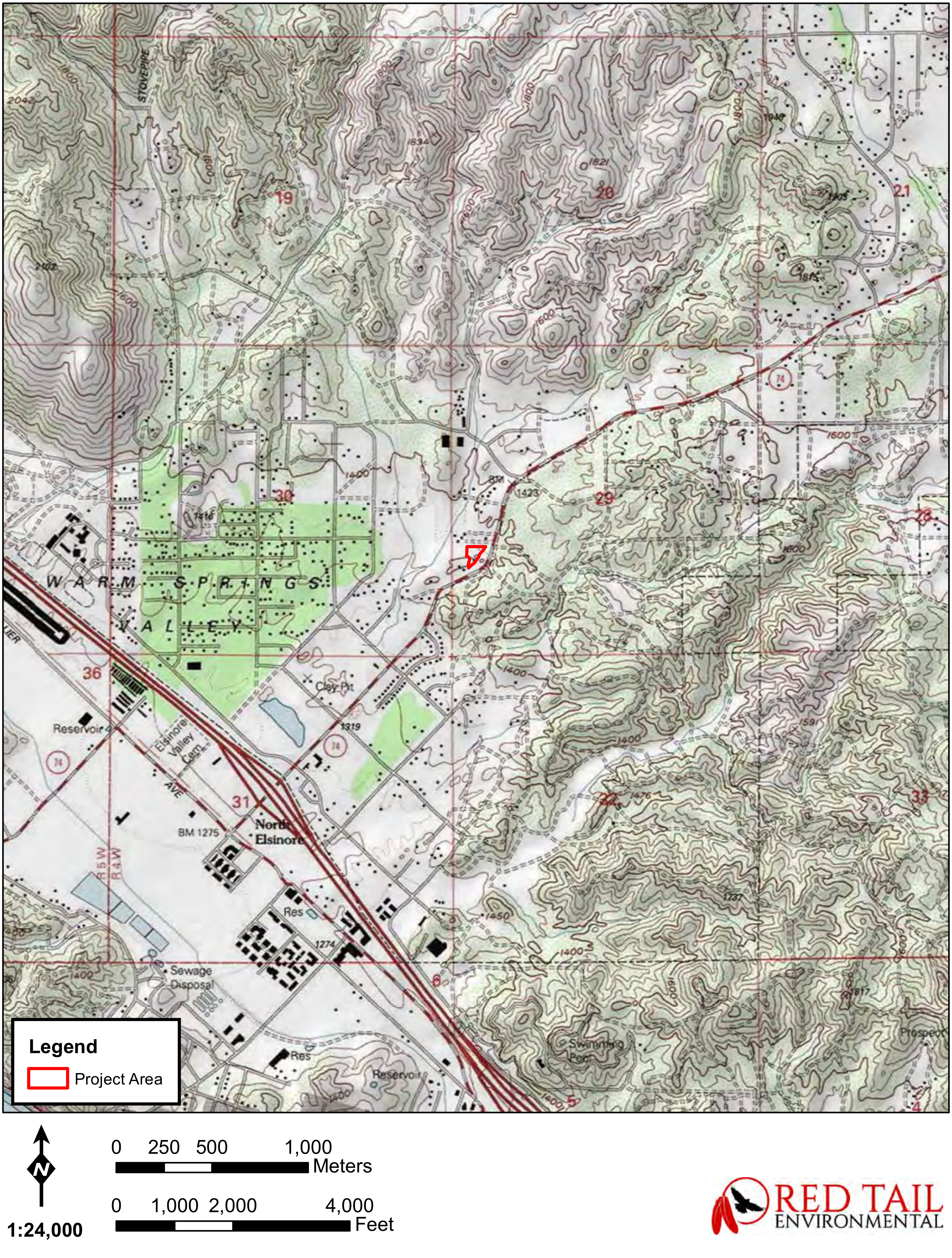

STOVEPIPE
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WARM SPRINGS VALLEY
Clay Pit
Reservoir
Elsinore Valley Cem
AVE
BM 1275
North Elsinore
R5W R4W
Res
Sewage Disposal
Swimming Pool
Prospect
Reservoir
Legend
Project Area

RED TAIL
ENVIRONMENTAL

February 8, 2021

Mr. Doug Welmas
Chairperson
Cabazon Band of Mission Indians
84-245 Indio Springs Parkway, Indio, CA, 92203
760-342-2593
jstapp@cabazonindians-nsn.gov

Re: 28771 Highway 74 Project, APNs 347-130-028 and 347-130-029, Riverside County, California

Dear Mr. Welmas,

Red Tail Environmental (Red Tail) is conducting an archaeological study of the 28771 Highway 74 Project (project), located on Assessor Parcel Number (APNs) 347-130-028 and 347-130-029, Highway 74, Lake Elsinore, Riverside County, California. The project area is shown on the United States Geologic Survey (USGS) 7.5' *Lake Elsinore, California* topographic quadrangle within Section 29 of Township 5 South, Range 4 West. The Project is being undertaken in compliance with the California Environmental Quality Act (CEQA) and the County of Riverside is overseeing the project as lead agency. The project intends to develop portions of the two parcels for a gas station complex which will include a convenience store, a fueling canopy with six multi-product dispensers, and two underground storage tanks.

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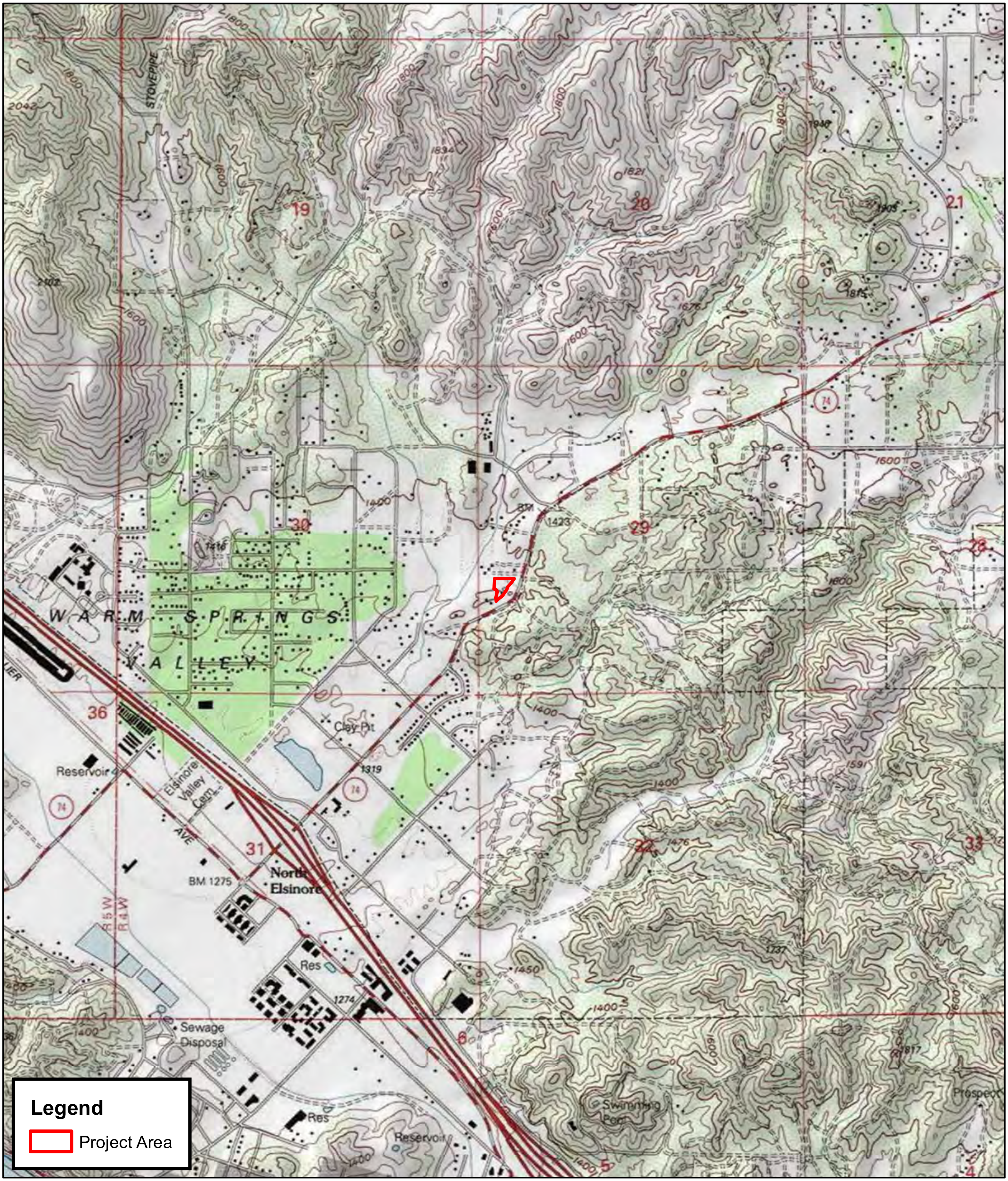

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RED TAIL ENVIRONMENTAL

February 8, 2021

Mr. Fred Nelson
Chairperson
La Jolla Band of Luiseno Indians
22000 Highway 76, Pauma Valley, CA, 92061
760-742-3771

Re: 28771 Highway 74 Project, APNs 347-130-028 and 347-130-029, Riverside County, California

Dear Mr. Nelson,

Red Tail Environmental (Red Tail) is conducting an archaeological study of the 28771 Highway 74 Project (project), located on Assessor Parcel Number (APNs) 347-130-028 and 347-130-029, Highway 74, Lake Elsinore, Riverside County, California. The project area is shown on the United States Geologic Survey (USGS) 7.5' *Lake Elsinore, California* topographic quadrangle within Section 29 of Township 5 South, Range 4 West. The Project is being undertaken in compliance with the California Environmental Quality Act (CEQA) and the County of Riverside is overseeing the project as lead agency. The project intends to develop portions of the two parcels for a gas station complex which will include a convenience store, a fueling canopy with six multi-product dispensers, and two underground storage tanks.

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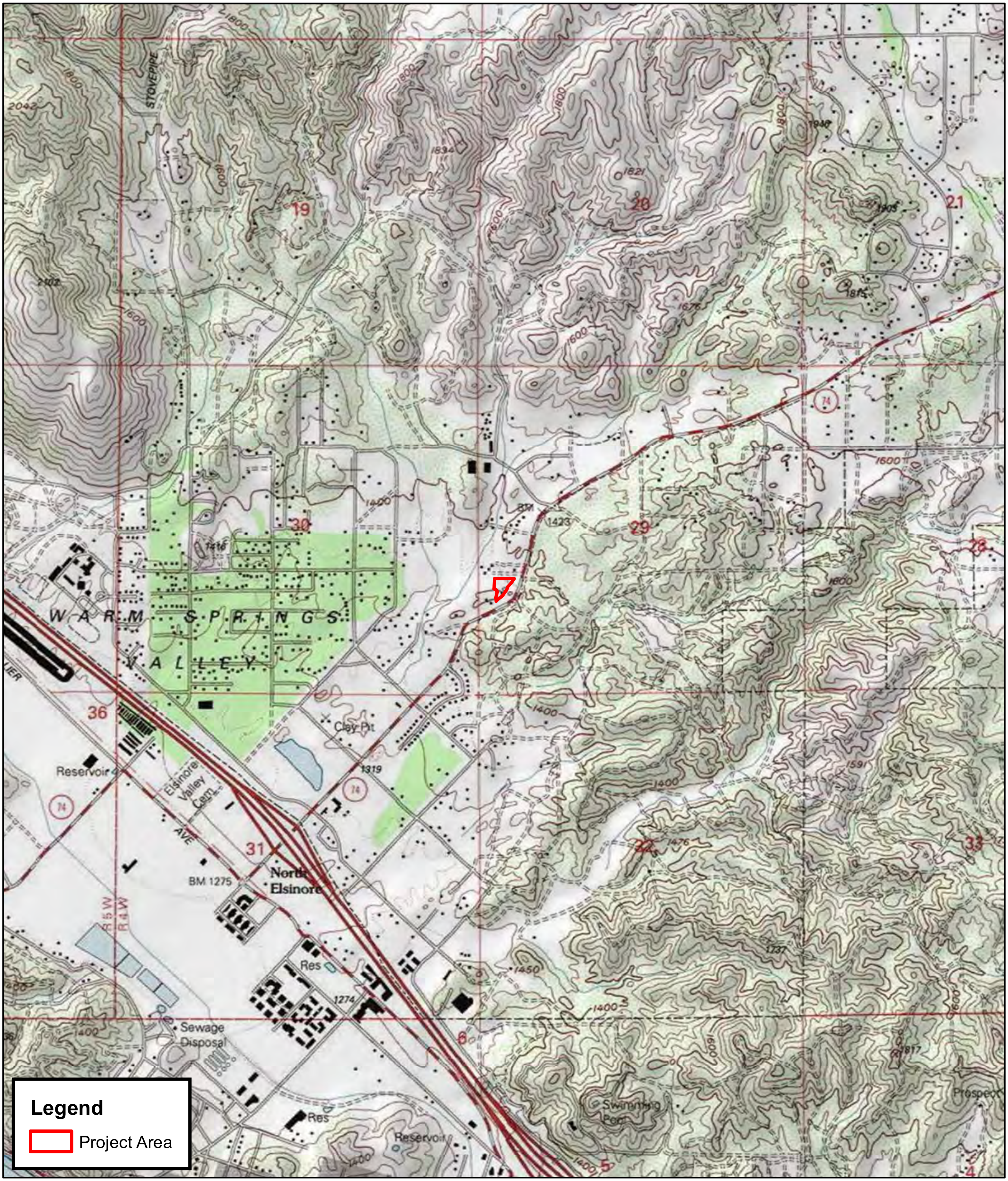

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RED TAIL ENVIRONMENTAL

RED TAIL
ENVIRONMENTAL

February 8, 2021

Mr. John Gomez
Environmental Coordinator
Ramona Band of Cahuilla
PO Box 391670, Anza, CA, 92539
951-763-4105
jgomez@ramona-nsn.gov

Re: 28771 Highway 74 Project, APNs 347-130-028 and 347-130-029, Riverside County, California

Dear Mr. Gomez,

Red Tail Environmental (Red Tail) is conducting an archaeological study of the 28771 Highway 74 Project (project), located on Assessor Parcel Number (APNs) 347-130-028 and 347-130-029, Highway 74, Lake Elsinore, Riverside County, California. The project area is shown on the United States Geologic Survey (USGS) 7.5' *Lake Elsinore, California* topographic quadrangle within Section 29 of Township 5 South, Range 4 West. The Project is being undertaken in compliance with the California Environmental Quality Act (CEQA) and the County of Riverside is overseeing the project as lead agency. The project intends to develop portions of the two parcels for a gas station complex which will include a convenience store, a fueling canopy with six multi-product dispensers, and two underground storage tanks.

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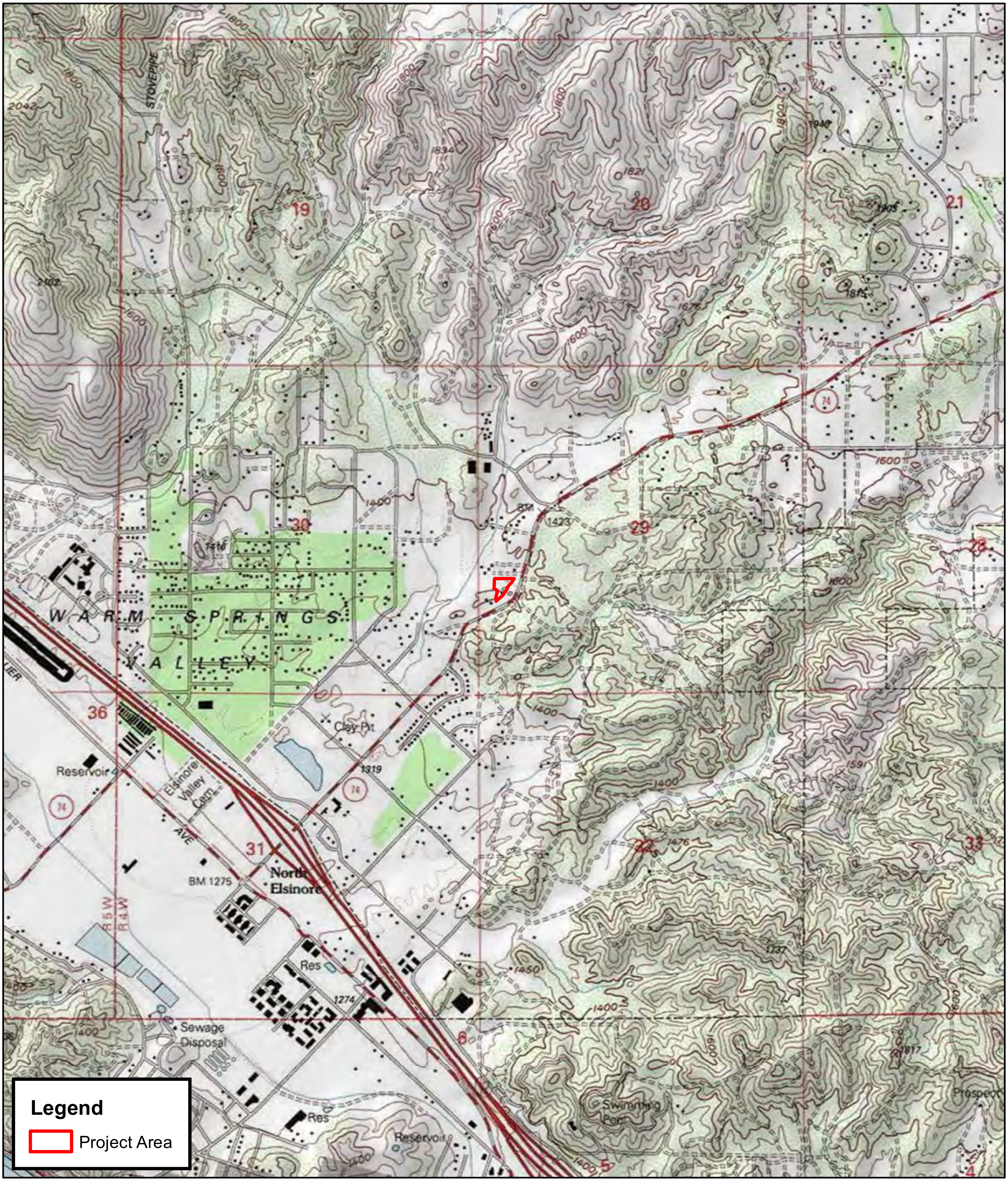

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RED TAIL ENVIRONMENTAL

February 8, 2021

Mr. Jeff Grubbe
Chairperson
Agua Caliente Band of Cahuilla Indians
5401 Dinah Shore Drive, Palm Springs, CA, 92264
760-699-6800

Re: 28771 Highway 74 Project, APNs 347-130-028 and 347-130-029, Riverside County, California

Dear Mr. Grubbe,

Red Tail Environmental (Red Tail) is conducting an archaeological study of the 28771 Highway 74 Project (project), located on Assessor Parcel Number (APNs) 347-130-028 and 347-130-029, Highway 74, Lake Elsinore, Riverside County, California. The project area is shown on the United States Geologic Survey (USGS) 7.5' *Lake Elsinore, California* topographic quadrangle within Section 29 of Township 5 South, Range 4 West. The Project is being undertaken in compliance with the California Environmental Quality Act (CEQA) and the County of Riverside is overseeing the project as lead agency. The project intends to develop portions of the two parcels for a gas station complex which will include a convenience store, a fueling canopy with six multi-product dispensers, and two underground storage tanks.

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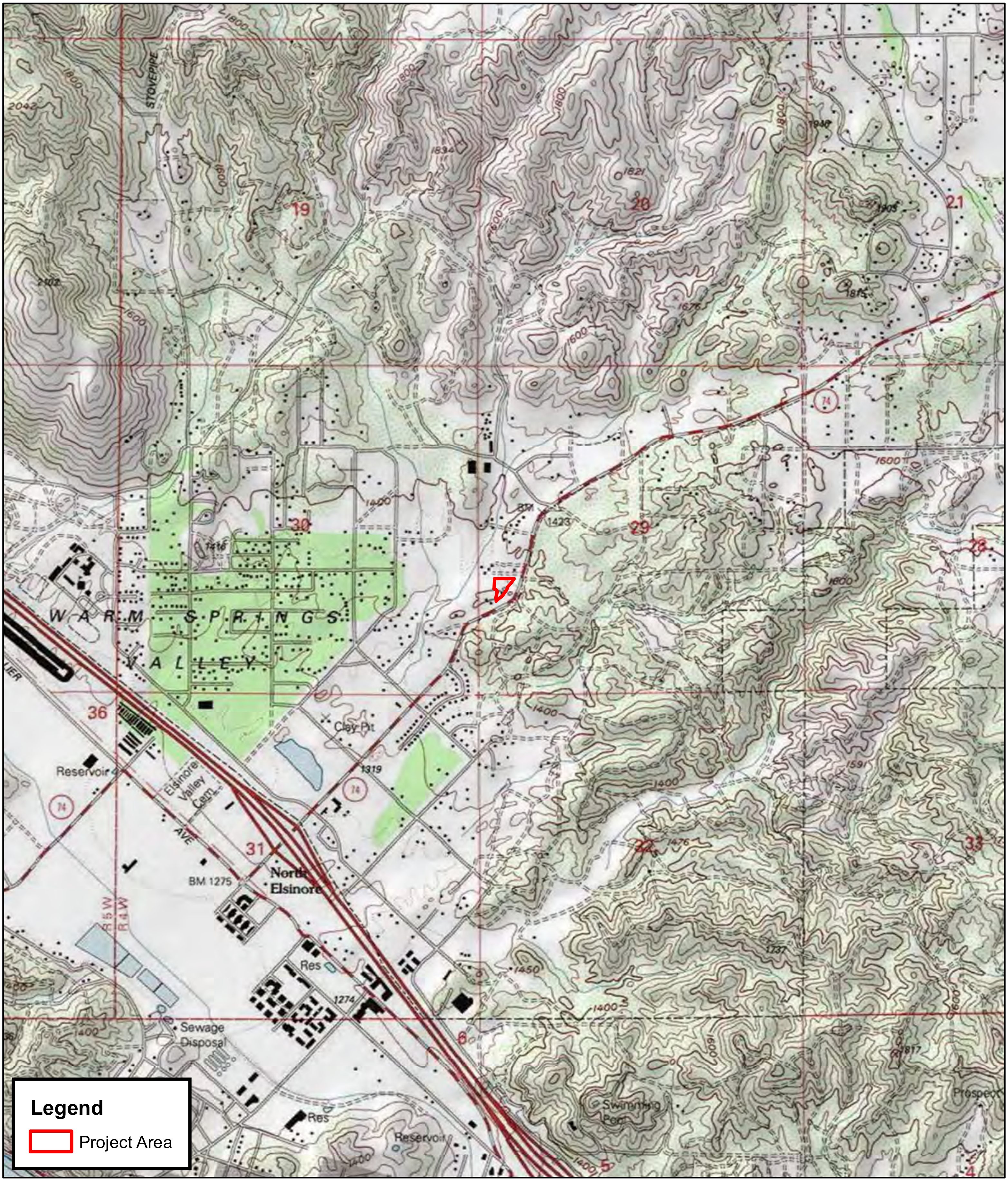

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RED TAIL ENVIRONMENTAL

RED TAIL
ENVIRONMENTAL

February 8, 2021

Mr. Joeseph Hamilton
Chairperson
Ramona Band of Cahuilla
PO Box 391670, Anza, CA, 92539
951-763-4105
admin@ramona-nsn.gov

Re: 28771 Highway 74 Project, APNs 347-130-028 and 347-130-029, Riverside County, California

Dear Mr. Hamilton,

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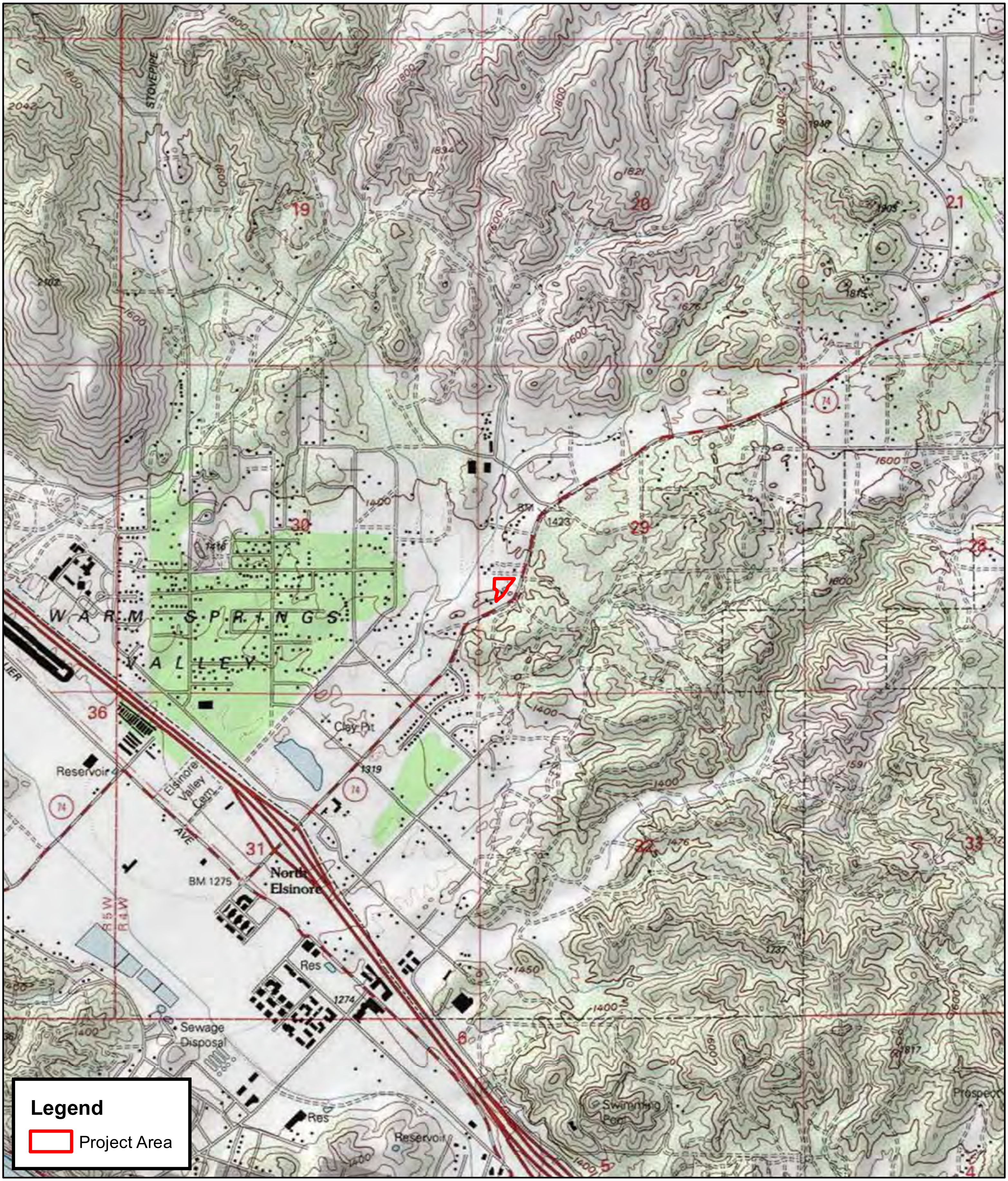

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RED TAIL ENVIRONMENTAL

RED TAIL ENVIRONMENTAL

February 8, 2021

Ms. Jill McCormick
Historic Preservation Officer
Quechan Tribe of the Fort Yuma Reservation
PO Box 1899, Yuma, AZ, 85366
760-572-2423
historicpreservation@quechantribe.com

Re: 28771 Highway 74 Project, APNs 347-130-028 and 347-130-029, Riverside County, California

Dear Ms. McCormick,

Red Tail Environmental (Red Tail) is conducting an archaeological study of the 28771 Highway 74 Project (project), located on Assessor Parcel Number (APNs) 347-130-028 and 347-130-029, Highway 74, Lake Elsinore, Riverside County, California. The project area is shown on the United States Geologic Survey (USGS) 7.5' *Lake Elsinore, California* topographic quadrangle within Section 29 of Township 5 South, Range 4 West. The Project is being undertaken in compliance with the California Environmental Quality Act (CEQA) and the County of Riverside is overseeing the project as lead agency. The project intends to develop portions of the two parcels for a gas station complex which will include a convenience store, a fueling canopy with six multi-product dispensers, and two underground storage tanks.

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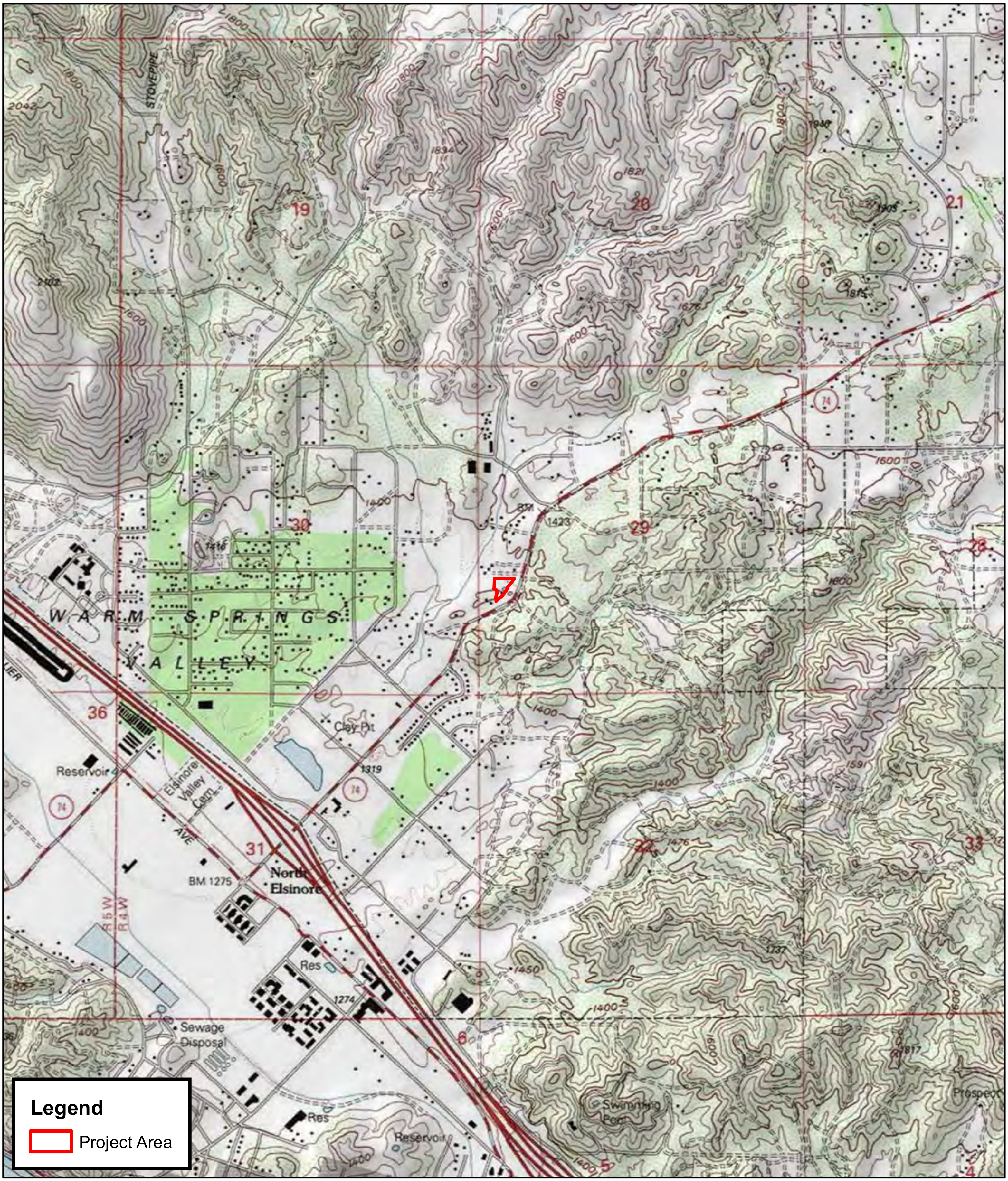

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RED TAIL ENVIRONMENTAL

February 8, 2021

Mr. Joseph Ontiveros
Cultural Resource Department
Soboba Band of Luiseno Indians
PO Box 487, San Jacinto, CA, 92583
951-663-5279
jontiveros@soboba-nsn.gov

Re: 28771 Highway 74 Project, APNs 347-130-028 and 347-130-029, Riverside County, California

Dear Mr. Ontiveros,

Red Tail Environmental (Red Tail) is conducting an archaeological study of the 28771 Highway 74 Project (project), located on Assessor Parcel Number (APNs) 347-130-028 and 347-130-029, Highway 74, Lake Elsinore, Riverside County, California. The project area is shown on the United States Geologic Survey (USGS) 7.5' *Lake Elsinore, California* topographic quadrangle within Section 29 of Township 5 South, Range 4 West. The Project is being undertaken in compliance with the California Environmental Quality Act (CEQA) and the County of Riverside is overseeing the project as lead agency. The project intends to develop portions of the two parcels for a gas station complex which will include a convenience store, a fueling canopy with six multi-product dispensers, and two underground storage tanks.

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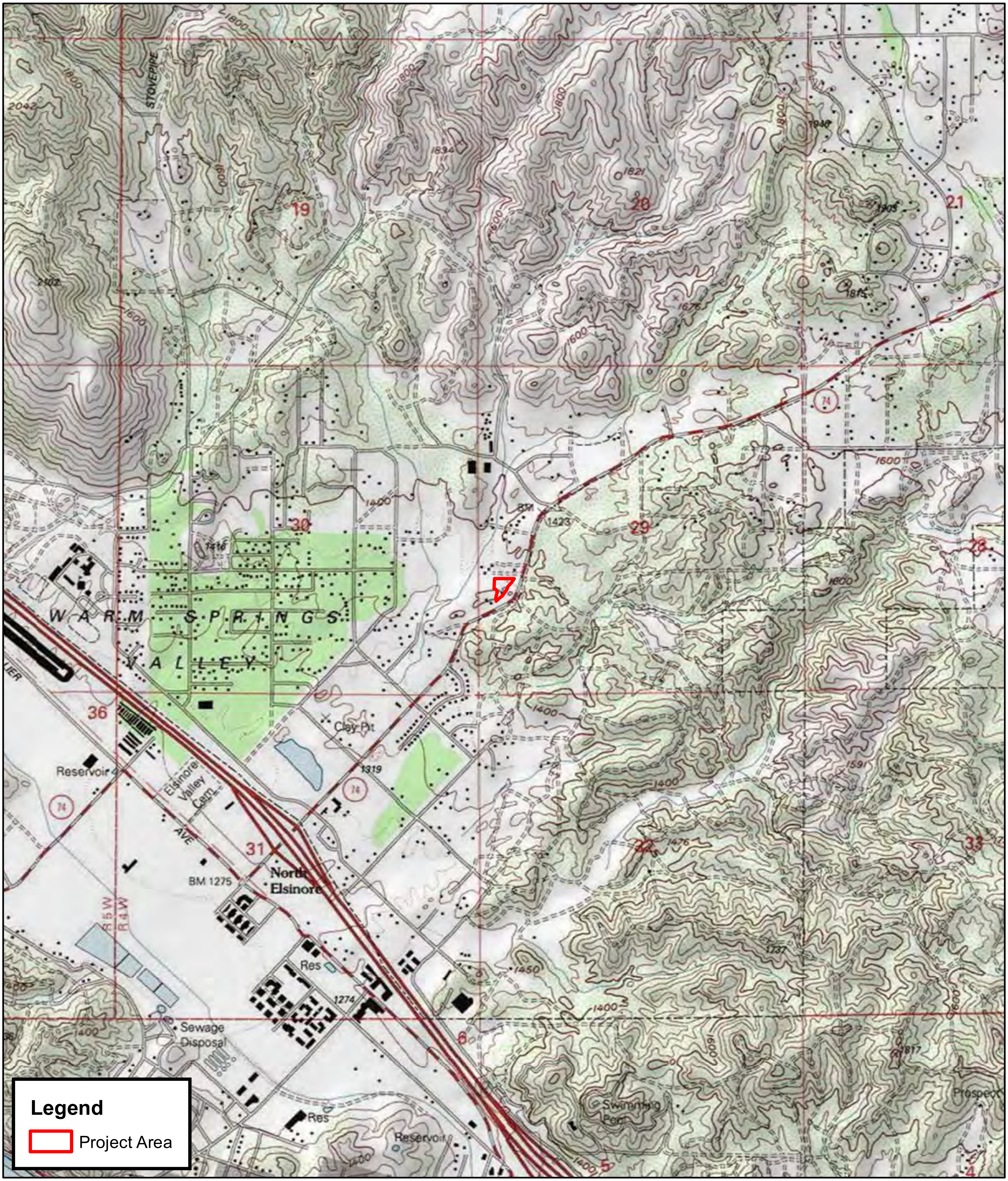

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RED TAIL ENVIRONMENTAL

February 8, 2021

Ms. Joyce Perry
Tribal Manager
Juaneno Band of Mission Indians Acjachemen Nation - Belardes
4955 Paseo Segovia, Irvine, CA, 92603
949-293-8522
kaamalam@gmail.com

Re: 28771 Highway 74 Project, APNs 347-130-028 and 347-130-029, Riverside County, California

Dear Ms. Perry,

Red Tail Environmental (Red Tail) is conducting an archaeological study of the 28771 Highway 74 Project (project), located on Assessor Parcel Number (APNs) 347-130-028 and 347-130-029, Highway 74, Lake Elsinore, Riverside County, California. The project area is shown on the United States Geologic Survey (USGS) 7.5' *Lake Elsinore, California* topographic quadrangle within Section 29 of Township 5 South, Range 4 West. The Project is being undertaken in compliance with the California Environmental Quality Act (CEQA) and the County of Riverside is overseeing the project as lead agency. The project intends to develop portions of the two parcels for a gas station complex which will include a convenience store, a fueling canopy with six multi-product dispensers, and two underground storage tanks.

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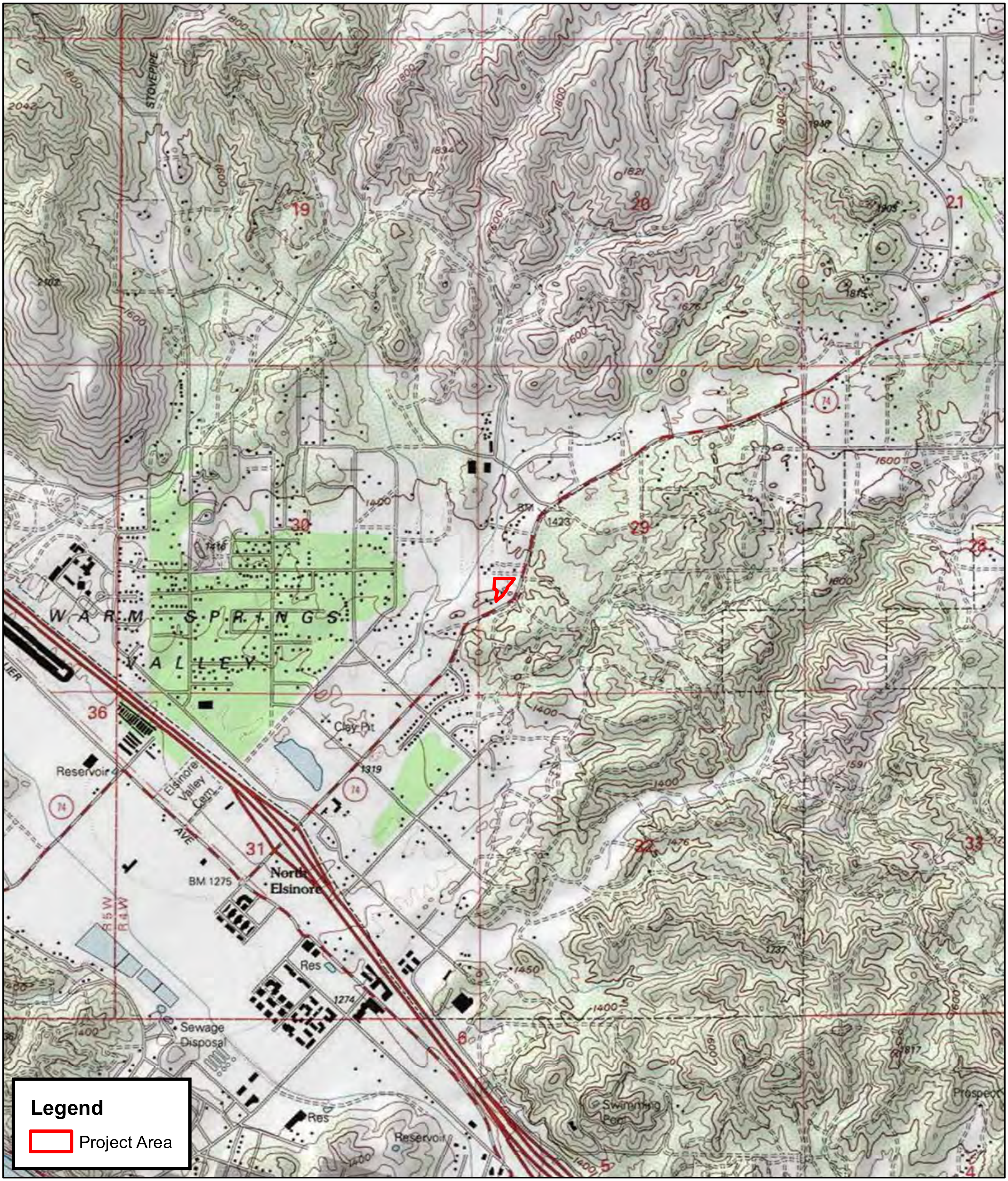

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RED TAIL ENVIRONMENTAL

February 8, 2021

Ms. Lovina Redner
Tribal Chair
Santa Rosa Band of Cahuilla Indians
PO Box 391820, Anza, CA, 92539
951-659-2700
lsaul@santarosacahuilla-nsn.gov

Re: 28771 Highway 74 Project, APNs 347-130-028 and 347-130-029, Riverside County, California

Dear Ms. Redner,

Red Tail Environmental (Red Tail) is conducting an archaeological study of the 28771 Highway 74 Project (project), located on Assessor Parcel Number (APNs) 347-130-028 and 347-130-029, Highway 74, Lake Elsinore, Riverside County, California. The project area is shown on the United States Geologic Survey (USGS) 7.5' *Lake Elsinore, California* topographic quadrangle within Section 29 of Township 5 South, Range 4 West. The Project is being undertaken in compliance with the California Environmental Quality Act (CEQA) and the County of Riverside is overseeing the project as lead agency. The project intends to develop portions of the two parcels for a gas station complex which will include a convenience store, a fueling canopy with six multi-product dispensers, and two underground storage tanks.

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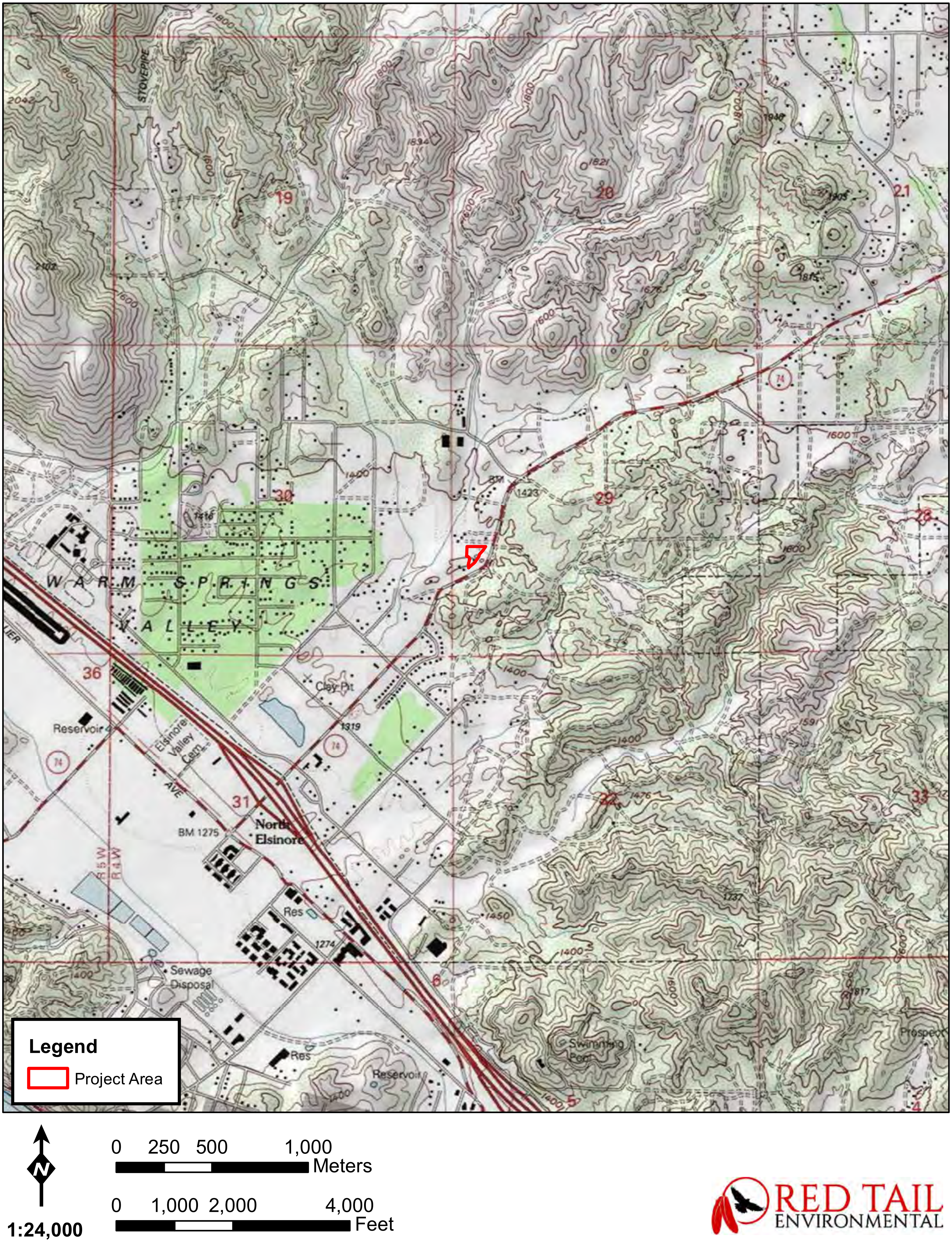

RED TAIL ENVIRONMENTAL

February 8, 2021

Mr. Matias Belardes
Chairperson
Juaneno Band of Mission Indians Acjachemen Nation - Belardes
32161 Avenida Los Amigos, San Juan Capistrano, CA, 92675
949-293-8522
kaamalam@gmail.com

Re: 28771 Highway 74 Project, APNs 347-130-028 and 347-130-029, Riverside County, California

Dear Mr. Belardes,

Red Tail Environmental (Red Tail) is conducting an archaeological study of the 28771 Highway 74 Project (project), located on Assessor Parcel Number (APNs) 347-130-028 and 347-130-029, Highway 74, Lake Elsinore, Riverside County, California. The project area is shown on the United States Geologic Survey (USGS) 7.5' *Lake Elsinore, California* topographic quadrangle within Section 29 of Township 5 South, Range 4 West. The Project is being undertaken in compliance with the California Environmental Quality Act (CEQA) and the County of Riverside is overseeing the project as lead agency. The project intends to develop portions of the two parcels for a gas station complex which will include a convenience store, a fueling canopy with six multi-product dispensers, and two underground storage tanks.

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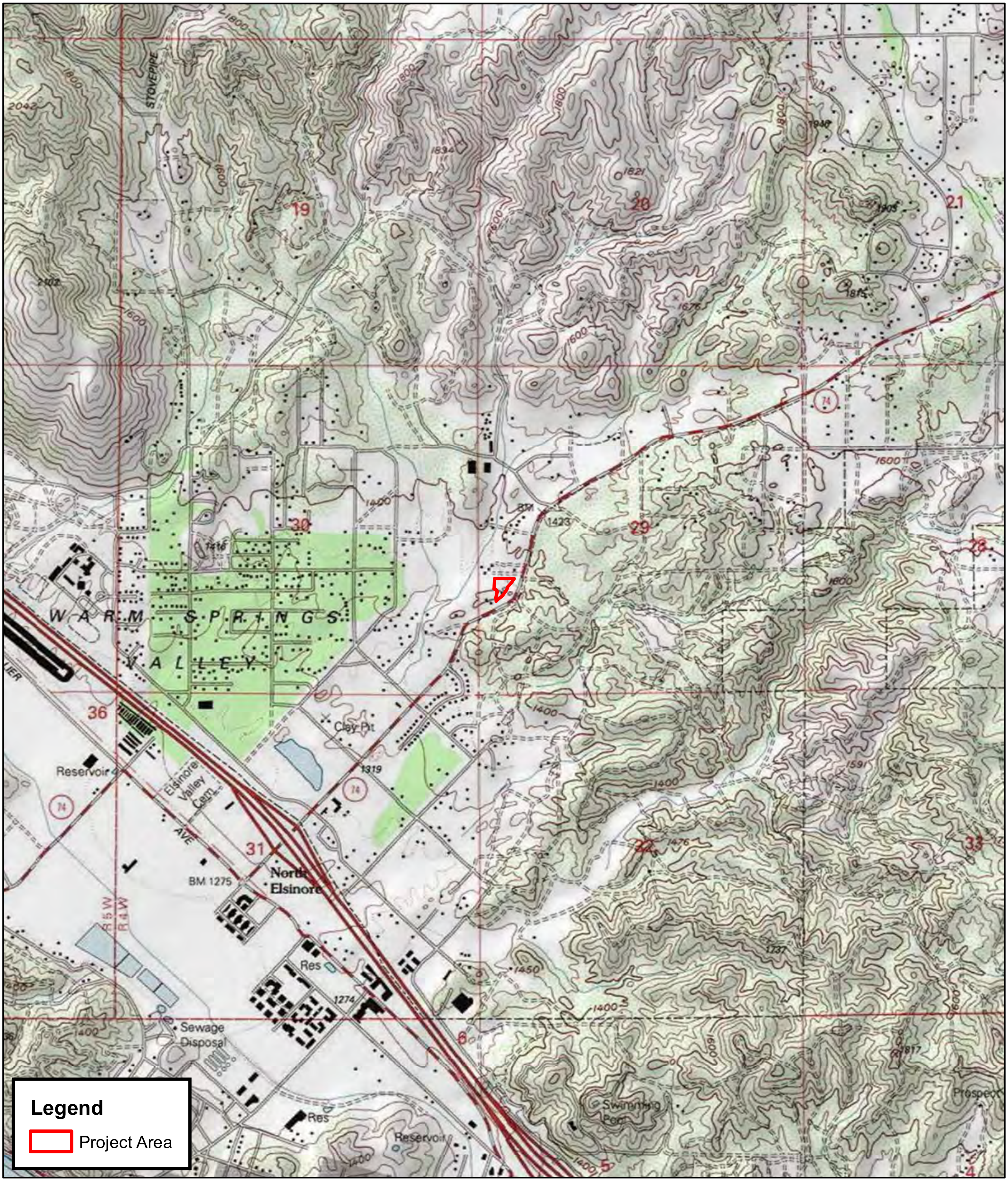

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RED TAIL ENVIRONMENTAL

RED TAIL
ENVIRONMENTAL

February 8, 2021

Mr. Mark Macarro
Chairperson
Pechanga Band of Luiseno Indians
PO Box 1477, Temecula, CA, 92593
951-770-6000
epreston@pechanga-nsn.gov

Re: 28771 Highway 74 Project, APNs 347-130-028 and 347-130-029, Riverside County, California

Dear Mr. Macarro,

Red Tail Environmental (Red Tail) is conducting an archaeological study of the 28771 Highway 74 Project (project), located on Assessor Parcel Number (APNs) 347-130-028 and 347-130-029, Highway 74, Lake Elsinore, Riverside County, California. The project area is shown on the United States Geologic Survey (USGS) 7.5' *Lake Elsinore, California* topographic quadrangle within Section 29 of Township 5 South, Range 4 West. The Project is being undertaken in compliance with the California Environmental Quality Act (CEQA) and the County of Riverside is overseeing the project as lead agency. The project intends to develop portions of the two parcels for a gas station complex which will include a convenience store, a fueling canopy with six multi-product dispensers, and two underground storage tanks.

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Director of Archaeology
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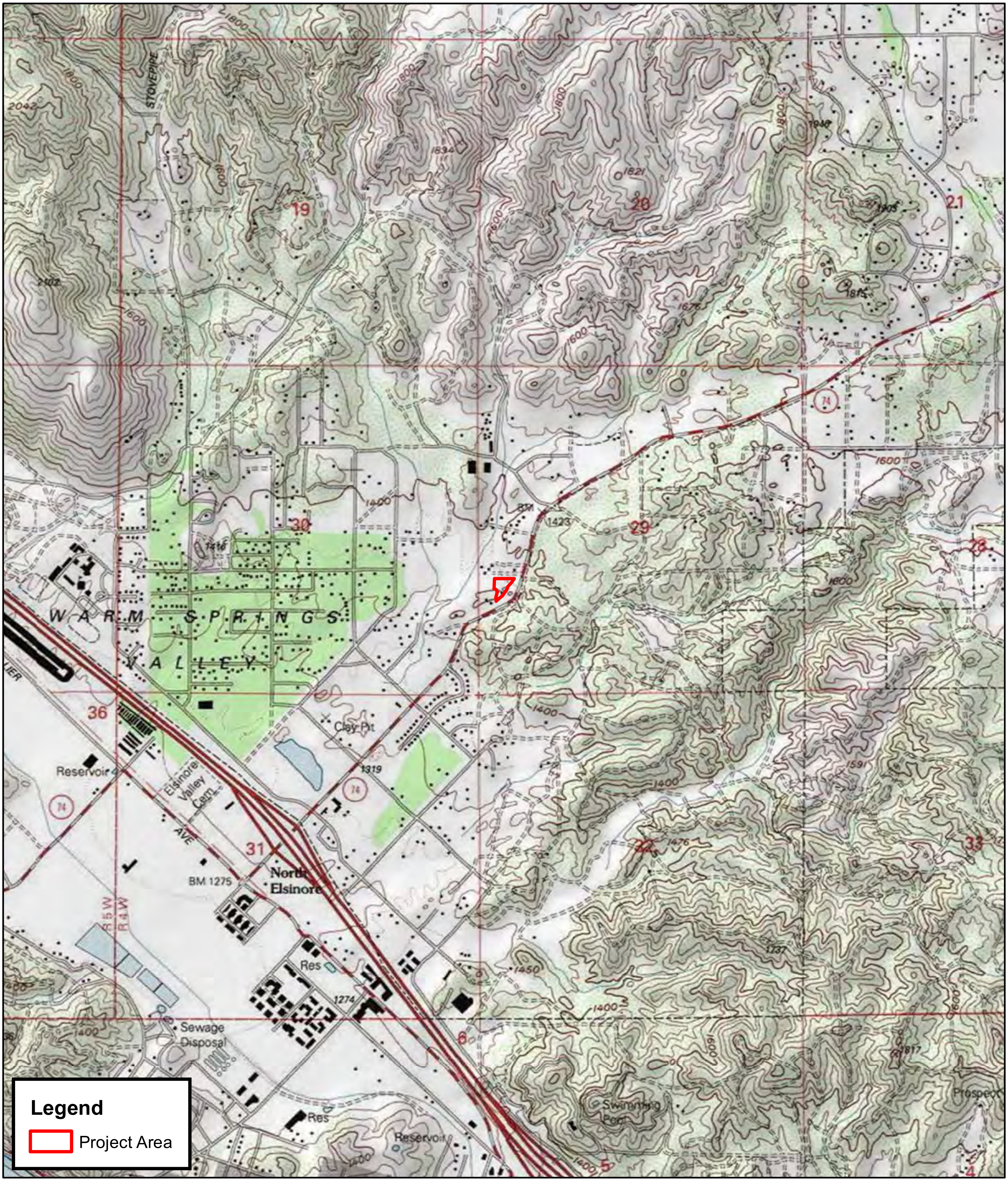

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RED TAIL ENVIRONMENTAL

February 8, 2021

Mr. Michael Mirelez
Cultural Resource Coordinator
Torres-Martinez Desert Cahuilla Indians
PO Box 1160, Thermal, CA, 92274
760-399-0022
mmirelez@tmdci.org

Re: 28771 Highway 74 Project, APNs 347-130-028 and 347-130-029, Riverside County, California

Dear Mr. Mirelez,

Red Tail Environmental (Red Tail) is conducting an archaeological study of the 28771 Highway 74 Project (project), located on Assessor Parcel Number (APNs) 347-130-028 and 347-130-029, Highway 74, Lake Elsinore, Riverside County, California. The project area is shown on the United States Geologic Survey (USGS) 7.5' *Lake Elsinore, California* topographic quadrangle within Section 29 of Township 5 South, Range 4 West. The Project is being undertaken in compliance with the California Environmental Quality Act (CEQA) and the County of Riverside is overseeing the project as lead agency. The project intends to develop portions of the two parcels for a gas station complex which will include a convenience store, a fueling canopy with six multi-product dispensers, and two underground storage tanks.

A record search of the Sacred Lands File with the California Native American Heritage Commission was negative. Red Tail is conducting a record search at the Eastern Information Center and a pedestrian survey of the Project Area.

We are contacting you to request additional information regarding the Project area, if you are aware of any issues of cultural concern regarding the area shown on the enclosed map. In particular, we would like to know if you have knowledge of any Traditional Cultural Properties, Sacred Sites, Tribal Cultural Resources, resource collecting areas, or any other areas of concern of which you would wish us to be aware. If you have any questions or concerns regarding the proposed Project, please contact me at the address or phone number listed below, or via email at Shelby@redtailenvironmental.com. We appreciate any input you may have on this project.

Sincerely,

Shelby G. Castells

Shelby Castells, M.A., RPA
Director of Archaeology
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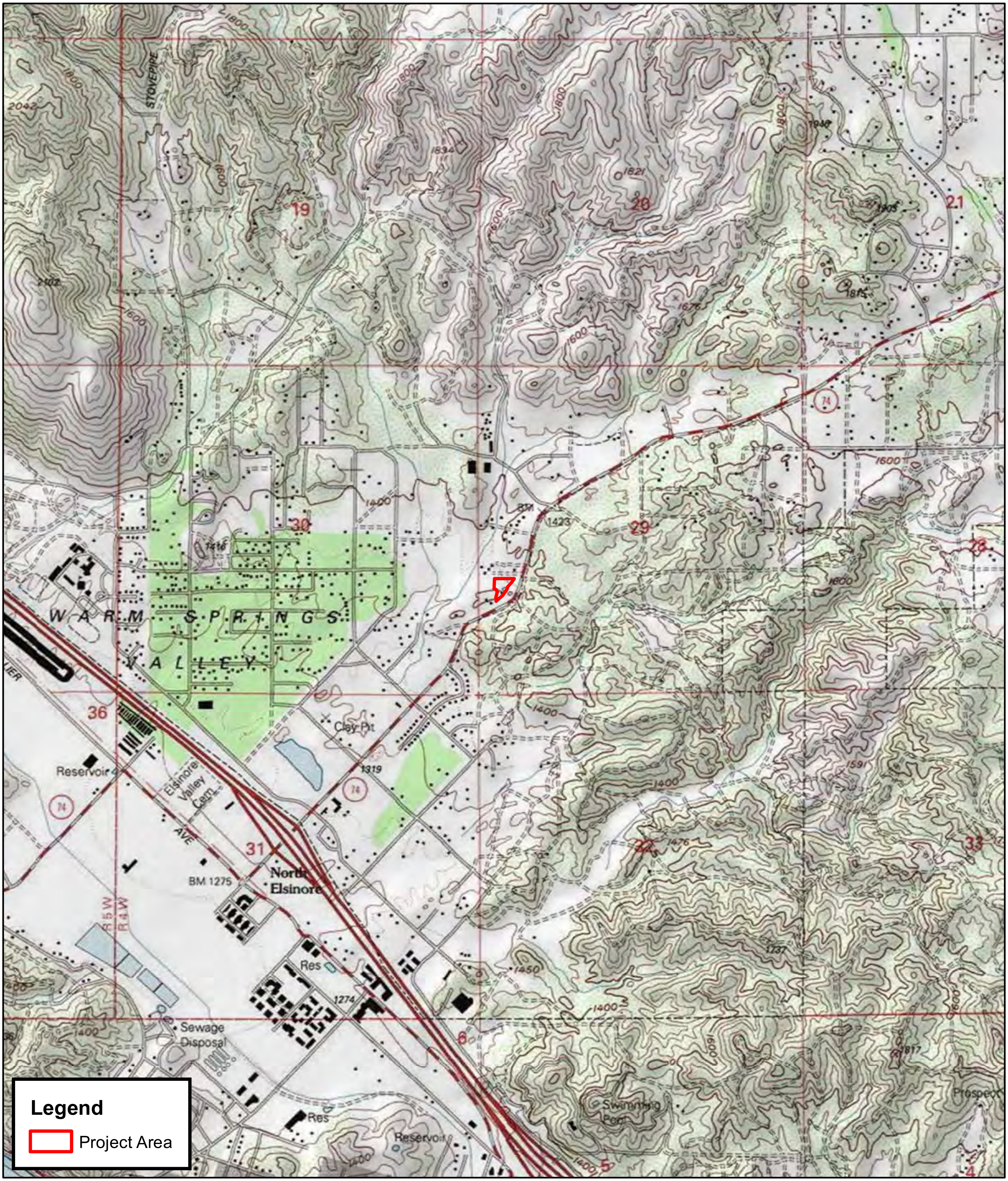

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RED TAIL ENVIRONMENTAL

RED TAIL
ENVIRONMENTAL

February 8, 2021

Mr. Manfred Scott
Acting Chairman, Kw'ts'an Cultural Committee
Quechan Tribe of the Fort Yuma Reservation
PO Box 1899, Yuma, AZ, 85366
928-750-2516
scottmanfred@yahoo.com

Re: 28771 Highway 74 Project, APNs 347-130-028 and 347-130-029, Riverside County, California

Dear Mr. Scott,

Red Tail Environmental (Red Tail) is conducting an archaeological study of the 28771 Highway 74 Project (project), located on Assessor Parcel Number (APNs) 347-130-028 and 347-130-029, Highway 74, Lake Elsinore, Riverside County, California. The project area is shown on the United States Geologic Survey (USGS) 7.5' *Lake Elsinore, California* topographic quadrangle within Section 29 of Township 5 South, Range 4 West. The Project is being undertaken in compliance with the California Environmental Quality Act (CEQA) and the County of Riverside is overseeing the project as lead agency. The project intends to develop portions of the two parcels for a gas station complex which will include a convenience store, a fueling canopy with six multi-product dispensers, and two underground storage tanks.

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Director of Archaeology
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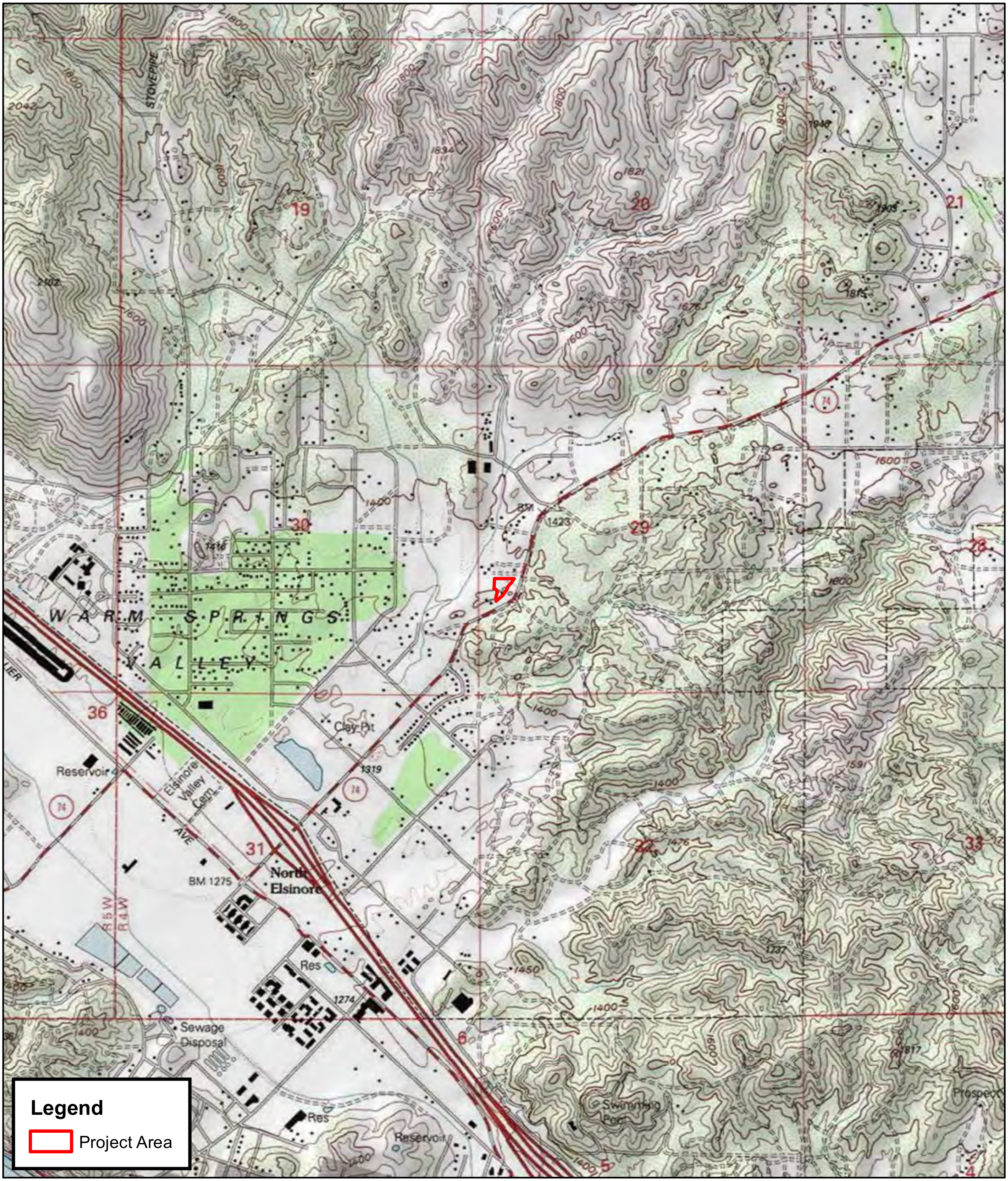

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RED TAIL ENVIRONMENTAL

RED TAIL
ENVIRONMENTAL

February 8, 2021

Ms. Patricia Garcia-Plotkin
Director
Agua Caliente Band of Cahuilla Indians
5401 Dinah Shore Drive, Palm Springs, CA, 92264
760-699-6907
ACBCI-THPO@aguacaliente.net

Re: 28771 Highway 74 Project, APNs 347-130-028 and 347-130-029, Riverside County, California

Dear Ms. Garcia-Plotkin,

Red Tail Environmental (Red Tail) is conducting an archaeological study of the 28771 Highway 74 Project (project), located on Assessor Parcel Number (APNs) 347-130-028 and 347-130-029, Highway 74, Lake Elsinore, Riverside County, California. The project area is shown on the United States Geologic Survey (USGS) 7.5' *Lake Elsinore, California* topographic quadrangle within Section 29 of Township 5 South, Range 4 West. The Project is being undertaken in compliance with the California Environmental Quality Act (CEQA) and the County of Riverside is overseeing the project as lead agency. The project intends to develop portions of the two parcels for a gas station complex which will include a convenience store, a fueling canopy with six multi-product dispensers, and two underground storage tanks.

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Shelby G. Castells

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Director of Archaeology
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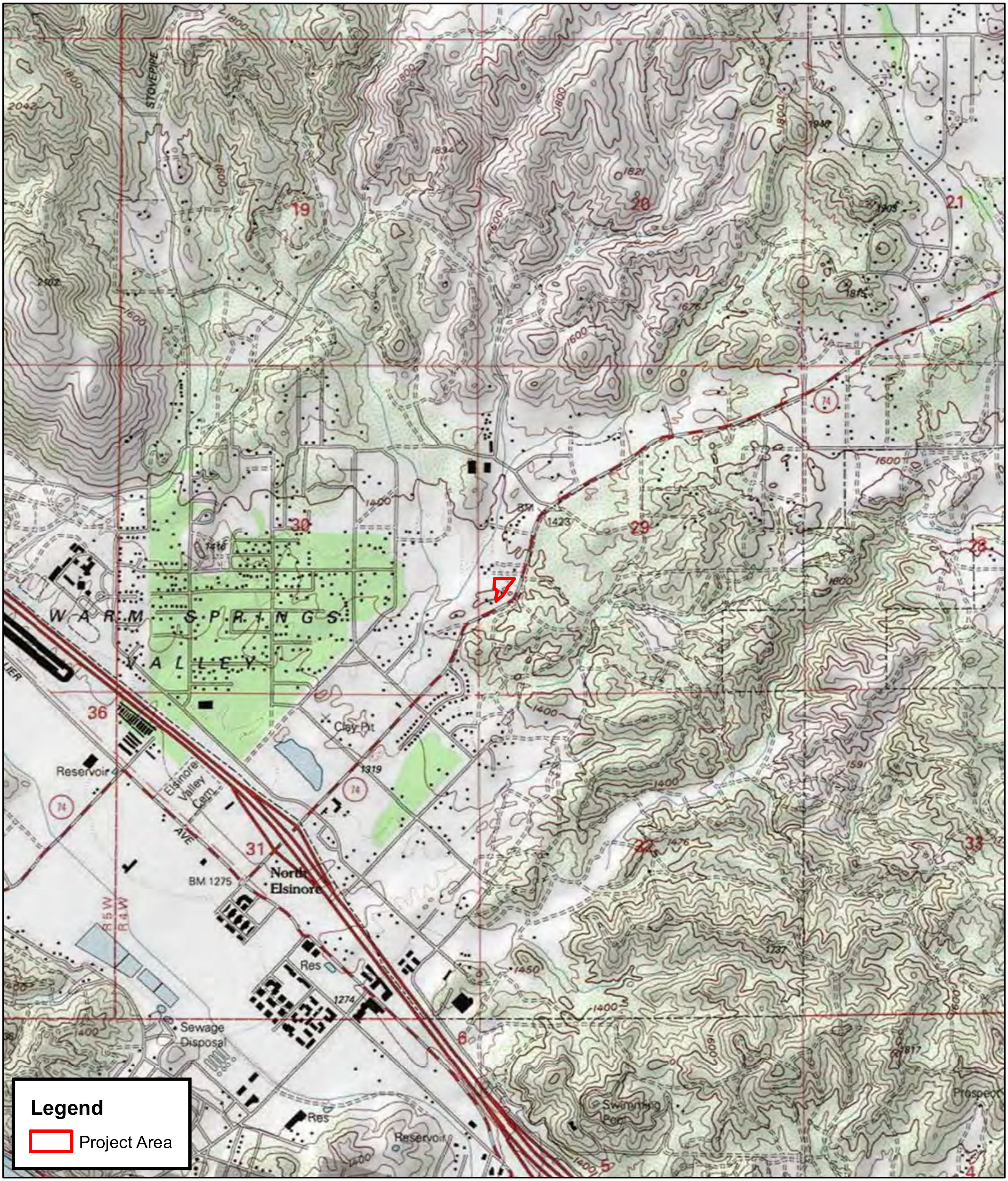

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RED TAIL ENVIRONMENTAL

February 8, 2021

Mr. Paul Macarro
Cultural Resources Coordinator
Pechanga Band of Luiseno Indians
PO Box 1477, Temecula, CA, 92593
951-770-6306
pmacarro@pechanga-nsn.gov

Re: 28771 Highway 74 Project, APNs 347-130-028 and 347-130-029, Riverside County, California

Dear Mr. Macarro,

Red Tail Environmental (Red Tail) is conducting an archaeological study of the 28771 Highway 74 Project (project), located on Assessor Parcel Number (APNs) 347-130-028 and 347-130-029, Highway 74, Lake Elsinore, Riverside County, California. The project area is shown on the United States Geologic Survey (USGS) 7.5' *Lake Elsinore, California* topographic quadrangle within Section 29 of Township 5 South, Range 4 West. The Project is being undertaken in compliance with the California Environmental Quality Act (CEQA) and the County of Riverside is overseeing the project as lead agency. The project intends to develop portions of the two parcels for a gas station complex which will include a convenience store, a fueling canopy with six multi-product dispensers, and two underground storage tanks.

A record search of the Sacred Lands File with the California Native American Heritage Commission was negative. Red Tail is conducting a record search at the Eastern Information Center and a pedestrian survey of the Project Area.

We are contacting you to request additional information regarding the Project area, if you are aware of any issues of cultural concern regarding the area shown on the enclosed map. In particular, we would like to know if you have knowledge of any Traditional Cultural Properties, Sacred Sites, Tribal Cultural Resources, resource collecting areas, or any other areas of concern of which you would wish us to be aware. If you have any questions or concerns regarding the proposed Project, please contact me at the address or phone number listed below, or via email at Shelby@redtailenvironmental.com. We appreciate any input you may have on this project.

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Director of Archaeology
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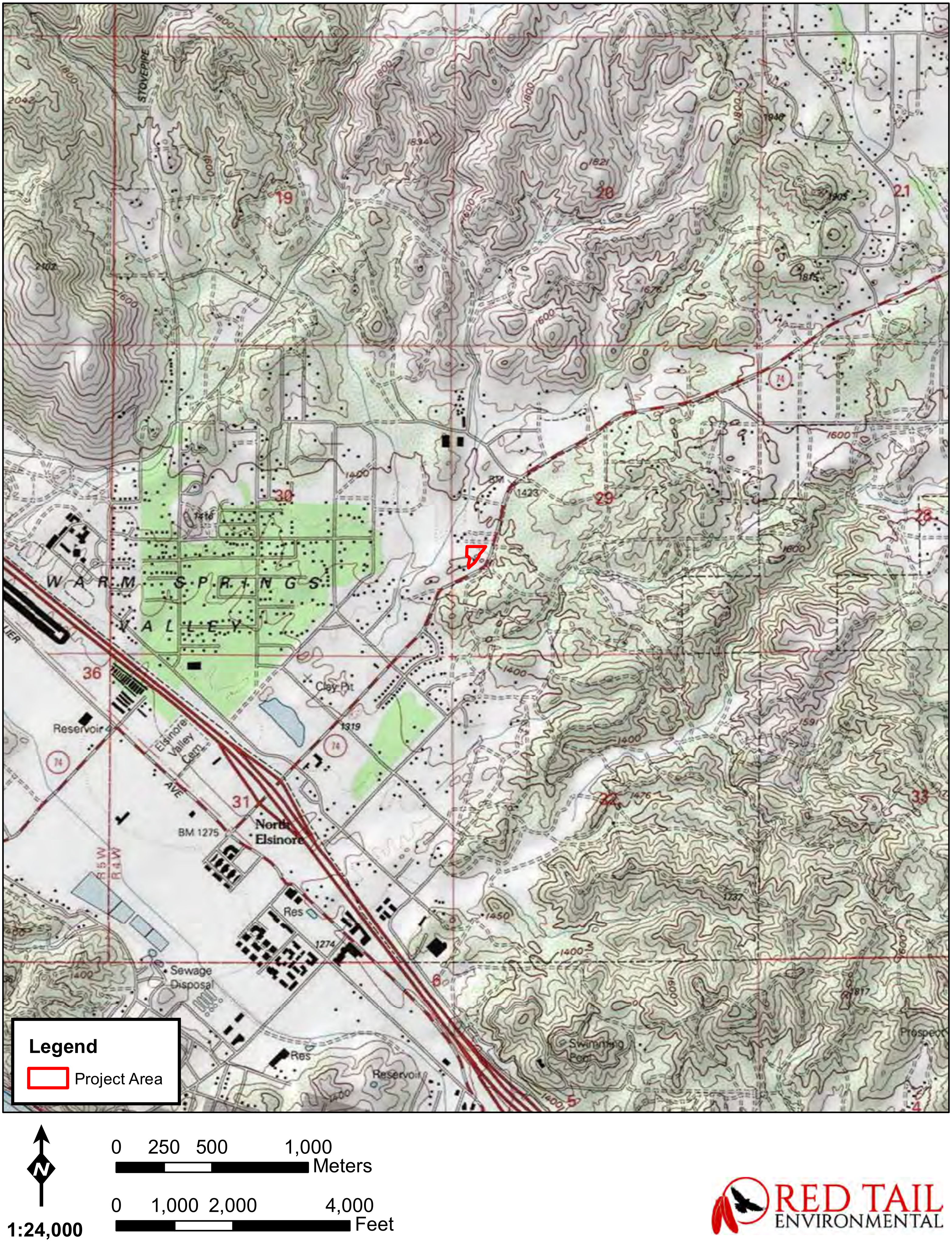

RED TAIL ENVIRONMENTAL

February 8, 2021

Mr. Robert Martin
Chairperson
Morongo Band of Mission Indians
12700 Pumarra Road, Banning, CA, 92220
951-849-8807
dtorres@morongo-nsn.gov

Re: 28771 Highway 74 Project, APNs 347-130-028 and 347-130-029, Riverside County, California

Dear Mr. Martin,

Red Tail Environmental (Red Tail) is conducting an archaeological study of the 28771 Highway 74 Project (project), located on Assessor Parcel Number (APNs) 347-130-028 and 347-130-029, Highway 74, Lake Elsinore, Riverside County, California. The project area is shown on the United States Geologic Survey (USGS) 7.5' *Lake Elsinore, California* topographic quadrangle within Section 29 of Township 5 South, Range 4 West. The Project is being undertaken in compliance with the California Environmental Quality Act (CEQA) and the County of Riverside is overseeing the project as lead agency. The project intends to develop portions of the two parcels for a gas station complex which will include a convenience store, a fueling canopy with six multi-product dispensers, and two underground storage tanks.

A record search of the Sacred Lands File with the California Native American Heritage Commission was negative. Red Tail is conducting a record search at the Eastern Information Center and a pedestrian survey of the Project Area.

We are contacting you to request additional information regarding the Project area, if you are aware of any issues of cultural concern regarding the area shown on the enclosed map. In particular, we would like to know if you have knowledge of any Traditional Cultural Properties, Sacred Sites, Tribal Cultural Resources, resource collecting areas, or any other areas of concern of which you would wish us to be aware. If you have any questions or concerns regarding the proposed Project, please contact me at the address or phone number listed below, or via email at Shelby@redtailenvironmental.com. We appreciate any input you may have on this project.

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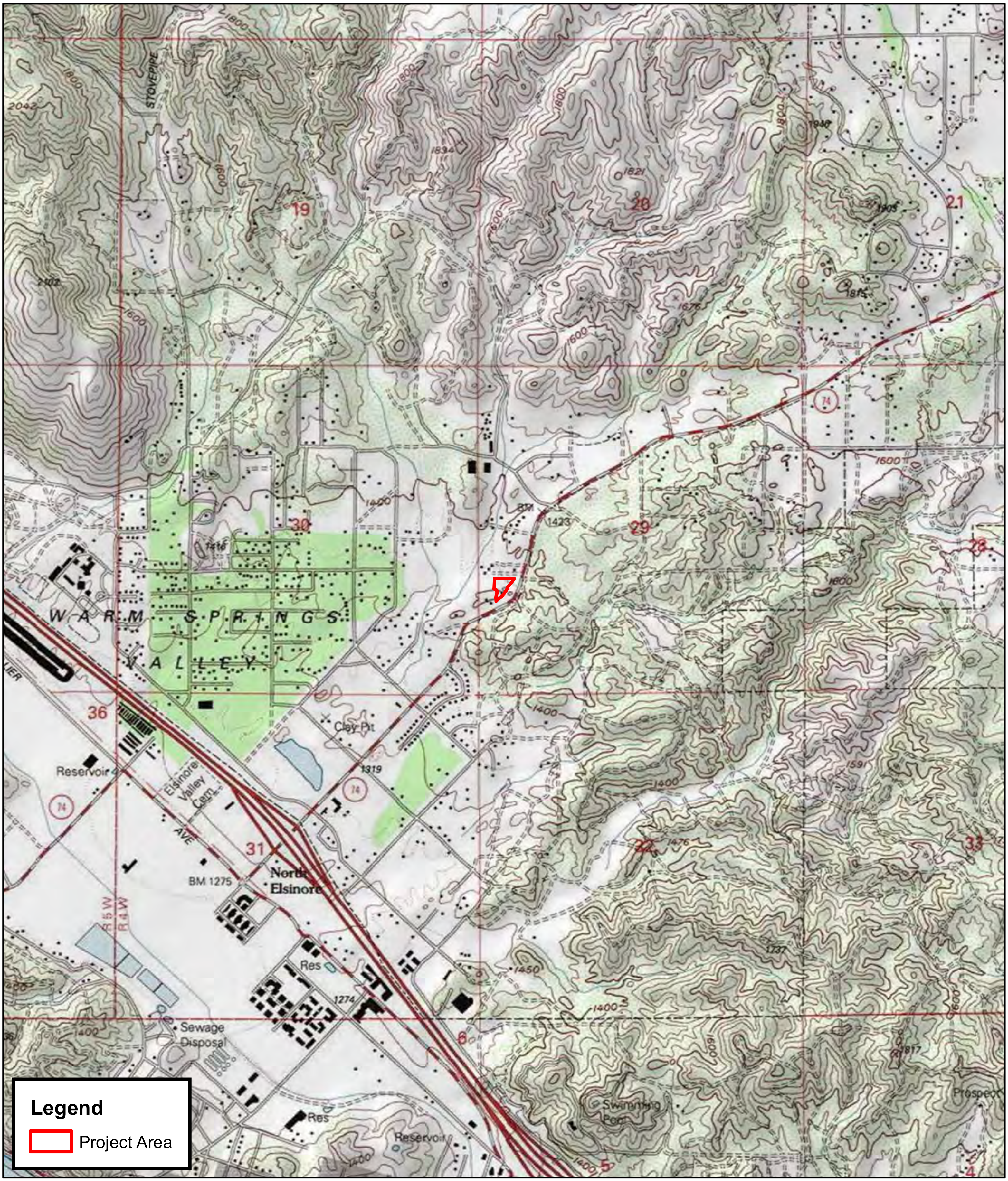

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RED TAIL
ENVIRONMENTAL

February 8, 2021

San Luis Rey Tribal Council
San Luis Rey Band of Mission Indians
1889 Sunset Drive, Vista, CA, 92081
760-724-8505
cjmojado@slrmissionindians.org

Re: 28771 Highway 74 Project, APNs 347-130-028 and 347-130-029, Riverside County, California

Dear San Luis Rey Tribal Council ,

Red Tail Environmental (Red Tail) is conducting an archaeological study of the 28771 Highway 74 Project (project), located on Assessor Parcel Number (APNs) 347-130-028 and 347-130-029, Highway 74, Lake Elsinore, Riverside County, California. The project area is shown on the United States Geologic Survey (USGS) 7.5' *Lake Elsinore, California* topographic quadrangle within Section 29 of Township 5 South, Range 4 West. The Project is being undertaken in compliance with the California Environmental Quality Act (CEQA) and the County of Riverside is overseeing the project as lead agency. The project intends to develop portions of the two parcels for a gas station complex which will include a convenience store, a fueling canopy with six multi-product dispensers, and two underground storage tanks.

A record search of the Sacred Lands File with the California Native American Heritage Commission was negative. Red Tail is conducting a record search at the Eastern Information Center and a pedestrian survey of the Project Area.

We are contacting you to request additional information regarding the Project area, if you are aware of any issues of cultural concern regarding the area shown on the enclosed map. In particular, we would like to know if you have knowledge of any Traditional Cultural Properties, Sacred Sites, Tribal Cultural Resources, resource collecting areas, or any other areas of concern of which you would wish us to be aware. If you have any questions or concerns regarding the proposed Project, please contact me at the address or phone number listed below, or via email at Shelby@redtailenvironmental.com. We appreciate any input you may have on this project.

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Director of Archaeology
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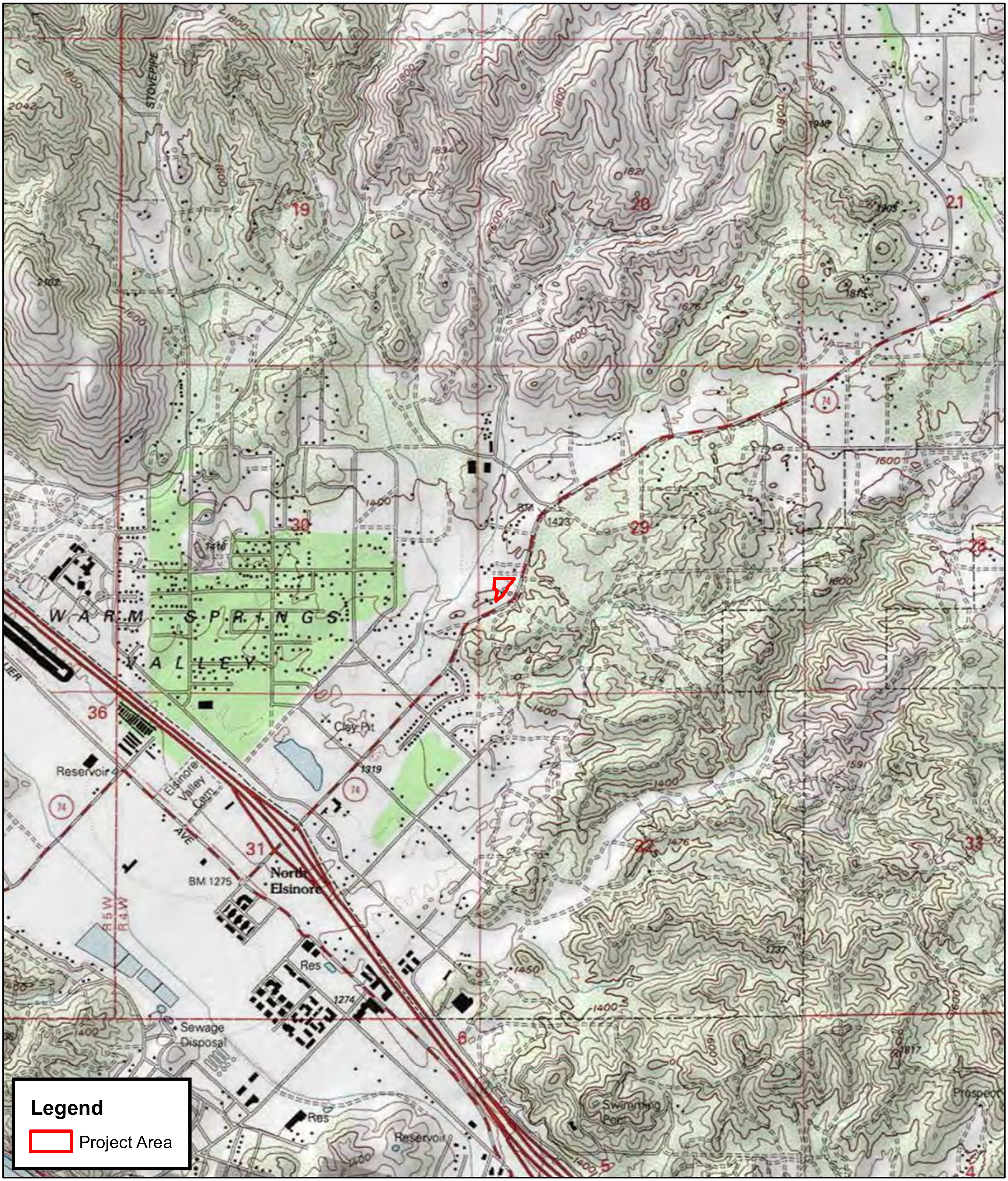

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RED TAIL ENVIRONMENTAL

RED TAIL ENVIRONMENTAL

February 8, 2021

Mr. Shane Chapparosa
Chairperson
Los Coyotes Band of Cahuilla and Cupeño Indians
PO Box 189, Warner Springs, CA, 92086-0189
760-782-0711

Re: 28771 Highway 74 Project, APNs 347-130-028 and 347-130-029, Riverside County, California

Dear Mr. Chapparosa,

Red Tail Environmental (Red Tail) is conducting an archaeological study of the 28771 Highway 74 Project (project), located on Assessor Parcel Number (APNs) 347-130-028 and 347-130-029, Highway 74, Lake Elsinore, Riverside County, California. The project area is shown on the United States Geologic Survey (USGS) 7.5' *Lake Elsinore, California* topographic quadrangle within Section 29 of Township 5 South, Range 4 West. The Project is being undertaken in compliance with the California Environmental Quality Act (CEQA) and the County of Riverside is overseeing the project as lead agency. The project intends to develop portions of the two parcels for a gas station complex which will include a convenience store, a fueling canopy with six multi-product dispensers, and two underground storage tanks.

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Shelby Castells, M.A., RPA
Director of Archaeology
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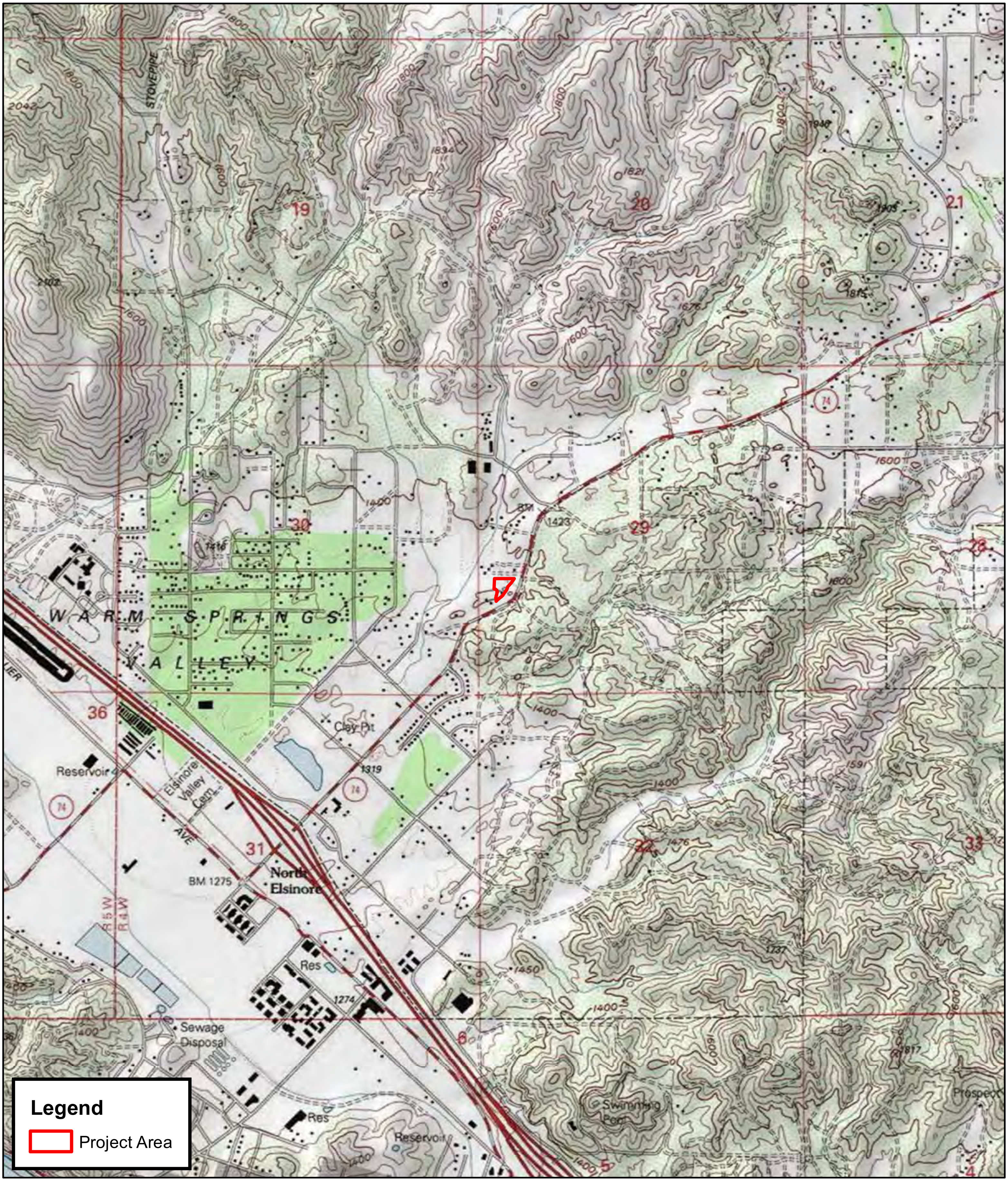

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RED TAIL ENVIRONMENTAL

RED TAIL
ENVIRONMENTAL

February 8, 2021

Mr. Scott Cozart
Chairperson
Soboba Band of Luiseno Indians
PO Box 487, San Jacinto, CA, 92583
951-654-2765
jontiveros@soboba-nsn.gov

Re: 28771 Highway 74 Project, APNs 347-130-028 and 347-130-029, Riverside County, California

Dear Mr. Cozart,

Red Tail Environmental (Red Tail) is conducting an archaeological study of the 28771 Highway 74 Project (project), located on Assessor Parcel Number (APNs) 347-130-028 and 347-130-029, Highway 74, Lake Elsinore, Riverside County, California. The project area is shown on the United States Geologic Survey (USGS) 7.5' *Lake Elsinore, California* topographic quadrangle within Section 29 of Township 5 South, Range 4 West. The Project is being undertaken in compliance with the California Environmental Quality Act (CEQA) and the County of Riverside is overseeing the project as lead agency. The project intends to develop portions of the two parcels for a gas station complex which will include a convenience store, a fueling canopy with six multi-product dispensers, and two underground storage tanks.

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Shelby Castells, M.A., RPA
Director of Archaeology
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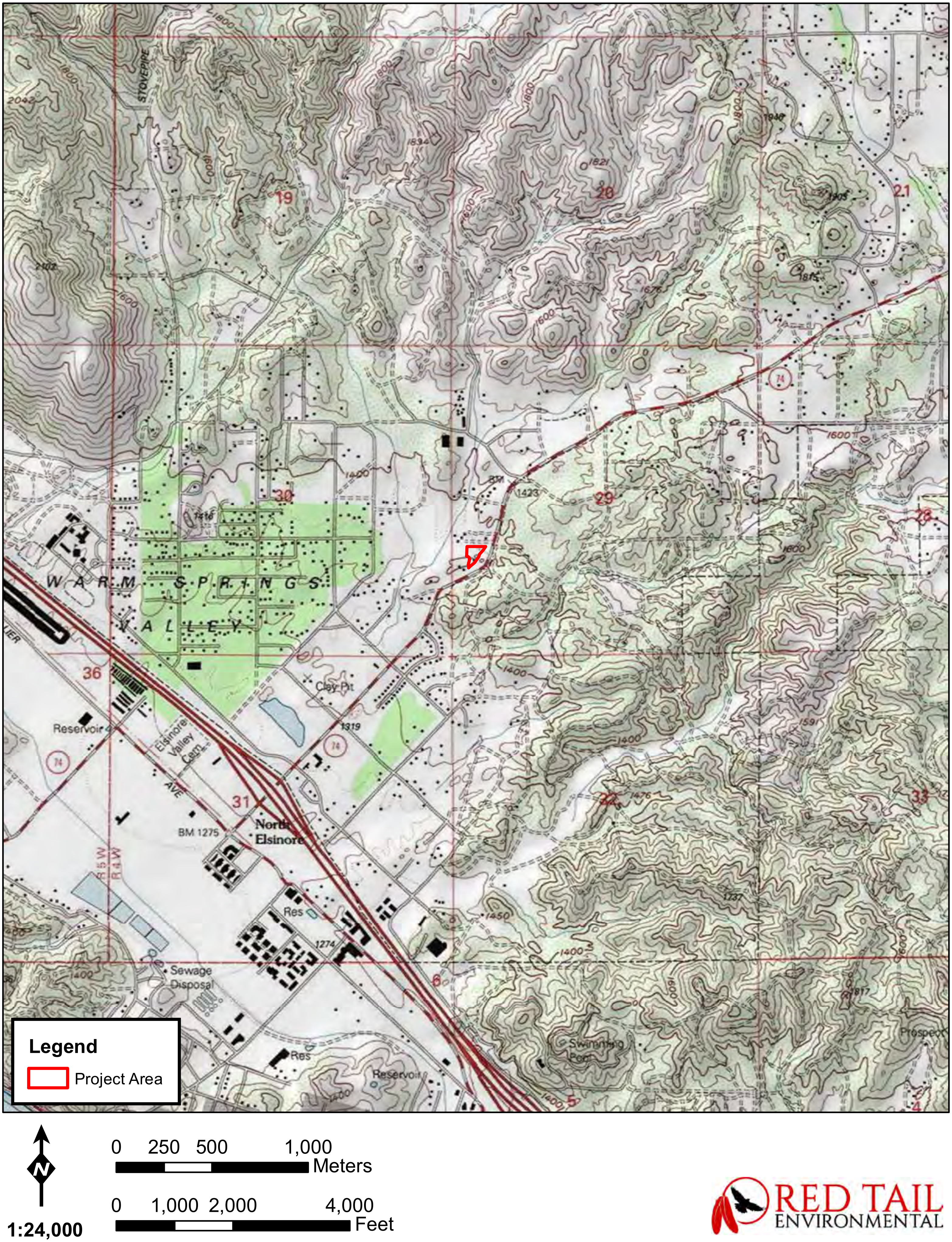

RED TAIL ENVIRONMENTAL

February 8, 2021

Ms. Shasta Gaughen
Tribal Historic Preservation Officer
Pala Band of Mission Indians
PMB 50, 35008 Pala Temecula Road, Pala, CA, 92059
760-891-3515
sgaughen@palatribe.com

Re: 28771 Highway 74 Project, APNs 347-130-028 and 347-130-029, Riverside County, California

Dear Ms. Gaughen,

Red Tail Environmental (Red Tail) is conducting an archaeological study of the 28771 Highway 74 Project (project), located on Assessor Parcel Number (APNs) 347-130-028 and 347-130-029, Highway 74, Lake Elsinore, Riverside County, California. The project area is shown on the United States Geologic Survey (USGS) 7.5' *Lake Elsinore, California* topographic quadrangle within Section 29 of Township 5 South, Range 4 West. The Project is being undertaken in compliance with the California Environmental Quality Act (CEQA) and the County of Riverside is overseeing the project as lead agency. The project intends to develop portions of the two parcels for a gas station complex which will include a convenience store, a fueling canopy with six multi-product dispensers, and two underground storage tanks.

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Director of Archaeology
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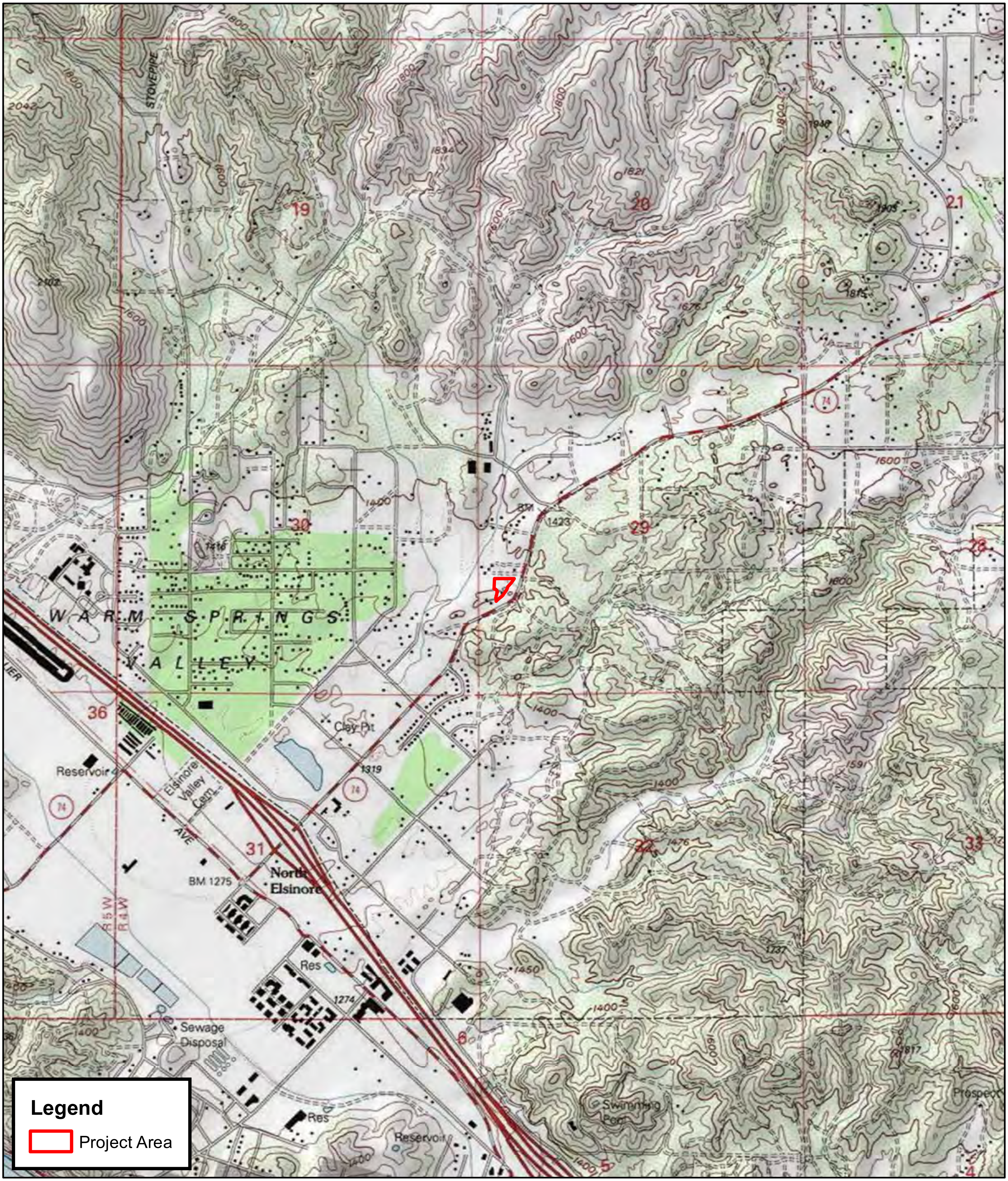

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RED TAIL ENVIRONMENTAL

RED TAIL
ENVIRONMENTAL

February 8, 2021

Mr. Temet Aguilar
Chairperson
Pauma Band of Luiseno Indians
PO Box 369, Pauma Valley, CA, 92061
760-742-1289
bennaecalac@aol.com

Re: 28771 Highway 74 Project, APNs 347-130-028 and 347-130-029, Riverside County, California

Dear Mr. Aguilar,

Red Tail Environmental (Red Tail) is conducting an archaeological study of the 28771 Highway 74 Project (project), located on Assessor Parcel Number (APNs) 347-130-028 and 347-130-029, Highway 74, Lake Elsinore, Riverside County, California. The project area is shown on the United States Geologic Survey (USGS) 7.5' *Lake Elsinore, California* topographic quadrangle within Section 29 of Township 5 South, Range 4 West. The Project is being undertaken in compliance with the California Environmental Quality Act (CEQA) and the County of Riverside is overseeing the project as lead agency. The project intends to develop portions of the two parcels for a gas station complex which will include a convenience store, a fueling canopy with six multi-product dispensers, and two underground storage tanks.

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Shelby G. Castells

Shelby Castells, M.A., RPA
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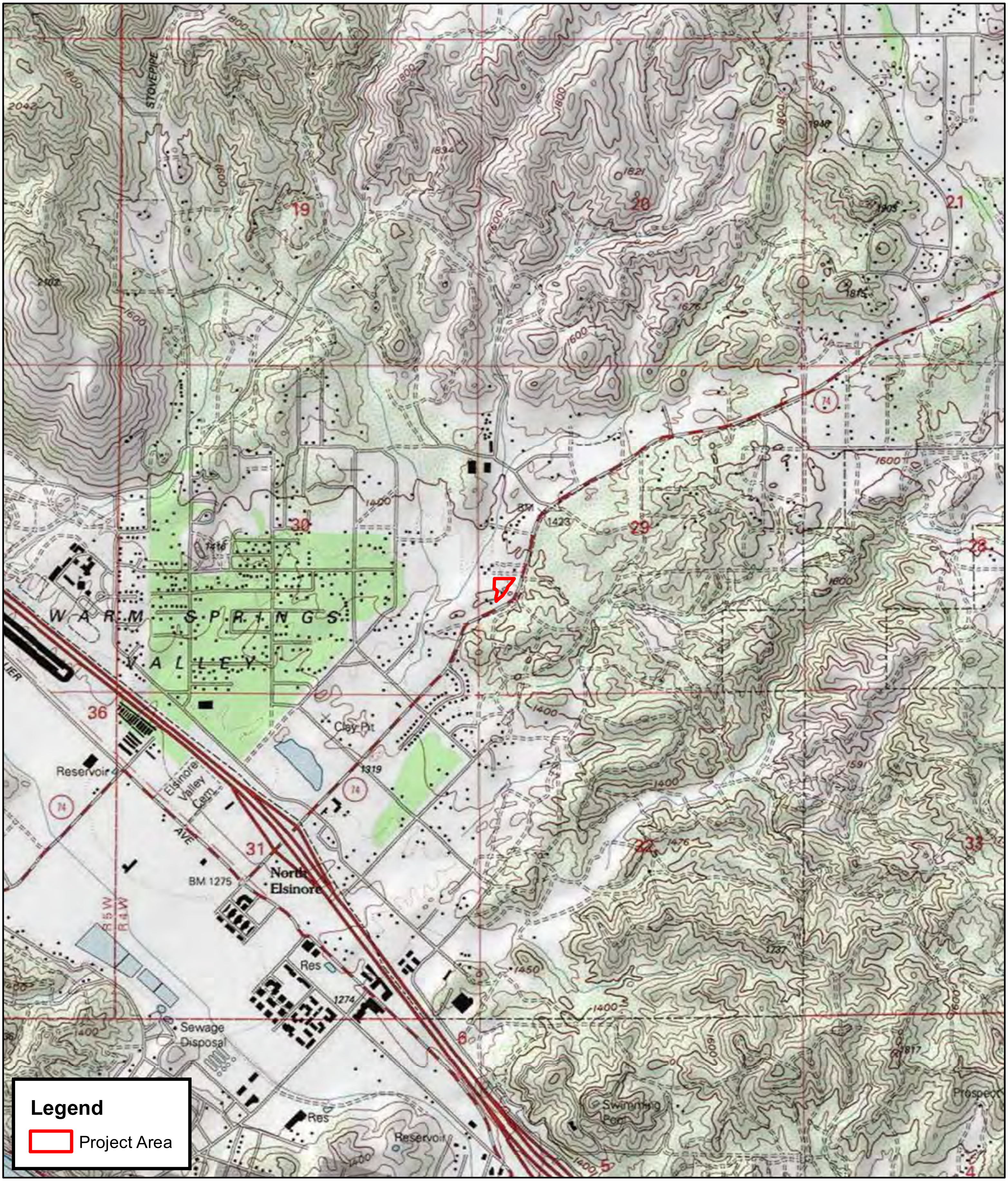

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RED TAIL ENVIRONMENTAL

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Powered by Google

Shelby Castells <shelby@redtailenvironmental.com>

28771 Highway 74 Project Information Request Letter

2 messages

Shelby Castells <shelby@redtailenvironmental.com> Mon, Feb 8, 2021 at 10:36 AM
To: kaamalam@gmail.com

Dear Ms. Perry,
Attached is an information request letter for the 28771 Highway 74 Project, Riverside County. Please let me know if you have any questions or need additional information.
Regards,
Shelby

--
Shelby Castells, M.A., RPA
Director of Archaeology
Red Tail Environmental
Native American Owned DBE
www.redtailenvironmental.com
Office: 760.294.3100
Cell: 714.478.9448
1529 Simpson Way
Escondido, CA 92029

RED TAIL ENVIRONMENTAL

28771 Highway 74 Project NAHC Contact Letter_SChapparosa.pdf
2257K

Joyce Perry <kaamalam@gmail.com> Mon, Feb 8, 2021 at 10:50 AM
To: Shelby Castells <shelby@redtailenvironmental.com>
Cc: Ebru Ozdil <eozdil@pechanga-nsn.gov>, Lisa Woodward <lwoodward@pechanga-nsn.gov>, Paul Macarro <pmacarro@pechanga-nsn.gov>

Good Morning Ms. Castells,

I am writing on behalf of the Juaneno Band of Mission Indians, Acachemen Nation- Belardes in response to your 28771 Highway 74 Project Information Request Letter. While we view Lake Elsinore as a part of our traditional cultural territory, we yield all recommendations and monitoring responsibilities to the Pechanga Band of Luiseno Indians. Thank you.

Húu'uni 'óomaqati yáamaqati.
Teach peace
Joyce Stanfield Perry
Payomkawichum Kaamalam - President
Juaneño Band of Mission Indians, Acjachemen Nation
Tribal Manager, Cultural Resource Director

[Quoted text hidden]

RED TAIL ENVIRONMENTAL
Powered by Google

Shelby Castells <shelby@redtailenvironmental.com>

historicpreservation@quechantribe.com

2 messages

Shelby Castells <shelby@redtailenvironmental.com> Mon, Feb 8, 2021 at 10:42 AM
To: historicpreservation@quechantribe.com

Dear Ms. McCormick,
Attached is an information request letter for the 28771 Highway 74 Project, Riverside County. Please let me know if you have any questions or need additional information.
Regards,
Shelby

--
Shelby Castells, M.A., RPA
Director of Archaeology
Red Tail Environmental
Native American Owned DBE
www.redtailenvironmental.com
Office: 760.294.3100
Cell: 714.478.9448
1529 Simpson Way
Escondido, CA 92029

RED TAIL ENVIRONMENTAL

28771 Highway 74 Project NAHC Contact Letter_JMcCormick.pdf
2257K

Quechan Historic Preservation Officer <historicpreservation@quechantribe.com> Mon, Feb 8, 2021 at 11:04 AM
To: Shelby Castells <shelby@redtailenvironmental.com>

This email is to inform you that we have no comments on this project. We defer to the more local Tribes and support their decisions on the project.

[Quoted text hidden]

February 9, 2021 11:30 am, voice mail from Cami Mojado, San Luis Rey Band of Mission Indians

Regarding the 28771 Highway 74 Project, they are not interested in the project as it is outside of their area. San Luis Rey Band defers to Pechanga or other tribes that may be closer to the Project Area.

APPENDIX D: *CONFIDENTIAL* RECORD SEARCH RESULTS

(Provided Separately)

December 19, 2022

Mr. Joseph Karaki - President
Karaki WS
4887 E. Las Palmas Ave., Ste 707
Anaheim, CA 92807

Subject: Gas Station & Convenience Store – CEQA Energy Review, County of Riverside, CA

Dear Mr. Karaki:

MD Acoustics, LLC (MD) has completed a CEQA energy review for the proposed Gas Station & Convenience Store project located at 28771 Central Avenue (Hwy 74) in an unincorporated area of the County of Riverside within the Sphere of Influence of the City of Lake Elsinore, California. The Project proposes to develop the approximately 1.44-acre project site with a 4,000 square foot convenience market with 12 pump gas station.

1.0 Existing Energy Conditions

Overview

California's estimated annual energy use as of 2019 included:

- Approximately 277,704 gigawatt hours of electricity; [1]
- Approximately 2,154,030 million cubic feet of natural gas per year[2];and
- Approximately 23.2 billion gallons of transportation fuel (for the year 2015)[3].

As of 2018, the year of most recent data currently available by the United States Energy Information Administration (EIA), energy use in California by demand sector was:

- Approximately 39.1 percent transportation;
- Approximately23.5 percent industrial;
- Approximately 18.3 percent residential; and
- Approximately 19.2 percent commercial.[4]

California's electricity in-state generation system generates approximately 200,475 gigawatt-hours each year. In 2019, California produced approximately 72 percent of the electricity it uses; the rest was imported

[1]California Energy Commission. Energy Almanac. Total Electric Generation. [Online] 2020. https://www.energy.ca.gov/data-reports/energy-almanac/california-electricity-data/2019-total-system-electric-generation.
[2]Natural Gas Consumption by End Use. U.S. Energy Information Administration. [Online] August 31, 20020. https://www.eia.gov/dnav/ng/ng_cons_sum_dcu_SCA_a.htm.
[3]California Energy Commission. Revised Transportation Energy Demand Forecast 2018-2030. [Online] April 19, 2018. https://www.energy.ca.gov/assessments/
[4]U.S. Energy Information Administration. California Energy Consumption by by End-Use Sector. California State Profile and Energy Estimates.[Online] January 16, 2020 https://www.eia.gov/state/?sid=CA#tabs-2

from the Pacific Northwest (approximately 9 percent) and the U.S. Southwest (approximately 19 percent). Natural gas is the main source for electricity generation at approximately 42.97 percent of the total in-state electric generation system power as shown in Table 1.

Table 1: Total Electricity System Power (California 2019)

Fuel Type	California In-State Generation (GWh)	Percent of California In-State Generation	Northwest Imports (GWh)	Southwest Imports (GWh)	Total Imports (GWh)	Percent of Imports	California Power Mix (GWh)	Percent California Power Mix
Coal	248	0.12%	219	7,765	7,985	10.34%	8,233	2.96%
Natural Gas	86,136	42.97%	62	8,859	8,921	11.55%	95,057	34.23%
Nuclear	16,163	8.06%	39	8,743	8,782	11.37%	24,945	8.98%
Oil	36	0.02%	0	0	0	0.00%	36	0.01%
Other (Petroleum Coke/Waste Heat)	411	0.20%	0	11	11	0.01%	422	0.15%
Large Hydro	33,145	16.53%	6,387	1,071	7,458	9.66%	40,603	14.62%
Unspecified Sources of Power	0	0.00%	6,609	13,767	20,376	26.38%	20,376	7.34%
Renewables	64,336	32.09%	10,615	13,081	23,696	30.68%	88,032	31.70%
Biomass	5,851	2.92%	903	33	936	1.21%	6,787	2.44%
Geothermal	10,943	5.46%	99	2,218	2,318	3.00%	13,260	4.77%
Somall Hydro	5,349	2.67%	292	4	296	0.38%	5,646	2.03%
Solar	28,513	14.22%	282	5,295	5,577	7.22%	34,090	12.28%
Wind	13,680	6.82%	9,038	5,531	14,569	18.87%	28,249	10.17%
Total	200,475	100.00%	23,930	53,299	77,229	100.00%	277,704	100.00%

Notes:
[1] Source: California Energy Commission. 2019 Total System electric Generation. https://www.energy.ca.gov/data-reports/energy-almanac/california-electricity-data/2019-total-system-electric-generation

A summary of and context for energy consumption and energy demands within the State is presented in "U.S. Energy Information Administration, California State Profile and Energy Estimates, Quick Facts" excerpted below:

- California was the seventh-largest producer of crude oil among the 50 states in 2018, and, as of January 2019, it ranked third in oil refining capacity.
- California is the largest consumer of jet fuel among the 50 states and accounted for one-fifth of the nation's jet fuel consumption in 2018.
- California's total energy consumption is the second-highest in the nation, but, in 2018, the State's per capita energy consumption ranked the fourth-lowest, due in part to its mild climate and its energy efficiency programs.
- In 2018, California ranked first in the nation as a producer of electricity from solar, geothermal, and biomass resources and fourth in the nation in conventional hydroelectric power generation.
- In 2018, large- and small-scale solar PV and solar thermal installations provided 19% of California's net electricity generation[5].

5 State Profile and Energy Estimates. Independent Statistics and Analysis. [Online] [Cited: January 16, 2020.] http://www.eia.gov/state/?sid=CA#tabs2.

As indicated above, California is one of the nation's leading energy-producing states, and California per capita energy use is among the nation's most efficient. Given the nature of the proposed project, the remainder of this discussion will focus on the three sources of energy that are most relevant to the project—namely, electricity and natural gas for building uses, and transportation fuel for vehicle trips associated with the proposed project.

Electricity

Electricity would be provided to the project by Southern California Edison (SCE). SCE provides electric power to more than 15 million persons, within a service area encompassing approximately 50,000 square miles.[6] SCE derives electricity from varied energy resources including: fossil fuels, hydroelectric generators, nuclear power plants, geothermal power plants, solar power generation, and wind farms. SCE also purchases from independent power producers and utilities, including out-of-state suppliers.[7] Table 2 identifies SCE's specific proportional shares of electricity sources in 2019.

Table 2: SCE 2019 Power Content Mix

Energy Resources	2019 SCE Power Mix
Eligible Renewable	35%
Biomass & Waste	1%
Geothermal	6%
Eligible Hydroelectric	1%
Solar	16%
Wind	12%
Coal	0%
Large Hydroelectric	8%
Natural Gas	16%
Nuclear	8%
Other	0%
Unspecified Sources of power*	33%
Total	100%

Notes:
[1]https://www.sce.com/sites/default/files/inline-files/SCE_2019PowerContentLabel.pdf
*Unspecified sources of power means electricity from transactions that are not traceable to specific generation sources.

Natural Gas

Natural gas would be provided to the project by Southern California Gas (SoCalGas). The following summary of natural gas resources and service providers, delivery systems, and associated regulation is excerpted from information provided by the California Public Utilities Commission (CPUC).

The CPUC regulates natural gas utility service for approximately 11 million customers that receive natural gas from Pacific Gas and Electric (PG&E), Southern California Gas (SoCalGas), San Diego Gas & Electric (SDG&E), Southwest Gas, and several smaller investor-owned natural gas utilities. The CPUC also regulates

[6] https://www.sce.com/about-us/who-we-are/leadership/our-service-territory
[7] California Energy Commission. Utility Energy Supply plans from 2015. https://www.energy.ca.gov/almanac/electricity_data/supply_forms.html

independent storage operators Lodi Gas Storage, Wild Goose Storage, Central Valley Storage and Gill Ranch Storage.

The vast majority of California's natural gas customers are residential and small commercial customers, referred to as "core" customers. Larger volume gas customers, like electric generators and industrial customers, are called "noncore" customers. Although very small in number relative to core customers, noncore customers consume about 65% of the natural gas delivered by the state's natural gas utilities, while core customers consume about 35%.

The PUC regulates the California utilities' natural gas rates and natural gas services, including in-state transportation over the utilities' transmission and distribution pipeline systems, storage, procurement, metering and billing.

Most of the natural gas used in California comes from out-of-state natural gas basins. In 2017, for example, California utility customers received 38% of their natural gas supply from basins located in the U.S. Southwest, 27% from Canada, 27% from the U.S. Rocky Mountain area, and 8% from production located in California."[8]

Transportation Energy Resources

The project would attract additional vehicle trips with resulting consumption of energy resources, predominantly gasoline and diesel fuel. Gasoline (and other vehicle fuels) are commercially-provided commodities and would be available to the project patrons and employees via commercial outlets.

The most recent data available shows the transportation sector emits 40 percent of the total greenhouse gases in the state and about 84 percent of smog-forming oxides of nitrogen (NOx).[9,10] About 28 percent of total United States energy consumption in 2019 was for transporting people and goods from one place to another. In 2019, petroleum comprised about 91 percent of all transportation energy use, excluding fuel consumed for aviation and most marine vessels.[11] In 2020, about 123.49 billion gallons (or about 2.94 billion barrels) of finished motor gasoline were consumed in the United States, an average of about 337 million gallons (or about 8.03 million barrels) per day.[12]

2.0 Regulatory Background

Federal and state agencies regulate energy use and consumption through various means and programs. On the federal level, the United States Department of Transportation, the United States Department of Energy, and the United States Environmental Protection Agency are three federal agencies with substantial influence over energy policies and programs. On the state level, the PUC and the California Energy

[8] California Public Utilities Commission. Natural Gas and California. http://www.cpuc.ca.gov/natural_gas/
[9] CARB. California Greenhouse Gas Emissions Inventory 2000-2018 -2020 Edition. https://www.arb.ca.gov/cc/inventory/data/data.htm
[10] CARB. 2016 SIP Emission Projection Data. https://www.arb.ca.gov/app/emsinv/2017/emseic1_query.php?F_DIV=-4&F_YR=2012&F_SEASON=A&SP=SIP105ADJ&F_AREA=CA
[11] US Energy Information Administration. Use of Energy in the United States Explained: Energy Use for Transportation. https://www.eia.gov/energyexplained/?page=us_energy_transportation
[12] https://www.eia.gov/tools/faqs/faq.php?id=23&t=10

Commissions (CEC) are two agencies with authority over different aspects of energy. Relevant federal and state energy-related laws and plans are summarized below.

Federal Regulations

Corporate Average Fuel Economy (CAFE) Standards

First established by the U.S. Congress in 1975, the Corporate Average Fuel Economy (CAFE) standards reduce energy consumption by increasing the fuel economy of cars and light trucks. The National Highway Traffic Safety Administration (NHTSA) and U.S. Environmental Protection Agency (USEPA) jointly administer the CAFE standards. The U.S. Congress has specified that CAFE standards must be set at the “maximum feasible level” with consideration given for: (1) technological feasibility; (2) economic practicality; (3) effect of other standards on fuel economy; and (4) need for the nation to conserve energy.[13]

Issued by NHTSA and EPA in March 2020 (published on April 30, 2020 and effective after June 29, 2020), the Safer Affordable Fuel-Efficient Vehicles Rule would maintain the CAFE and CO2 standards applicable in model year 2020 for model years 2021 through 2026. The estimated CAFE and CO2 standards for model year 2020 are 43.7 mpg and 204 grams of CO2 per mile for passenger cars and 31.3 mpg and 284 grams of CO2 per mile for light trucks, projecting an overall industry average of 37 mpg, as compared to 46.7 mpg under the standards issued in 2012.[14]

Intermodal Surface transportation Efficiency Act of 1991 (ISTEA)

The Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) promoted the development of inter-modal transportation systems to maximize mobility as well as address national and local interests in air quality and energy. ISTEA contained factors that Metropolitan Planning Organizations (MPOs) were to address in developing transportation plans and programs, including some energy-related factors. To meet the new ISTEA requirements, MPOs adopted explicit policies defining the social, economic, energy, and environmental values guiding transportation decisions.

The Transportation Equity Act of the 21st Century (TEA-21)

The Transportation Equity Act for the 21st Century (TEA-21) was signed into law in 1998 and builds upon the initiatives established in the ISTEA legislation, discussed above. TEA-21 authorizes highway, highway safety, transit, and other efficient surface transportation programs. TEA-21 continues the program structure established for highways and transit under ISTEA, such as flexibility in the use of funds, emphasis on measures to improve the environment, and focus on a strong planning process as the foundation of good transportation decisions. TEA-21 also provides for investment in research and its application to maximize the performance of the transportation system through, for example, deployment of Intelligent Transportation Systems, to help improve operations and management of transportation systems and vehicle safety.

[13] https://www.nhtsa.gov/lawsregulations/corporate-average-fuel-economy.
[14] National Highway Traffic Safety Administration (NHTSA) and U.S. Environmental Protection Agency (USEPA), 2018. Federal Register / Vol. 83, No. 165 / Friday, August 24, 2018 / Proposed Rules, The Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule for Model Years 2021–2026 Passenger Cars and Light Trucks 2018. Available at: https://www.epa.gov/regulations-emissions-vehicles-and-engines/safer-affordable-fuel-efficient-safe-vehicles-final-rule.

State Regulations

Integrated Energy Policy Report (IEPR)

Senate Bill 1389 requires the California Energy Commission (CEC) to prepare a biennial integrated energy policy report that assesses major energy trends and issues facing the State's electricity, natural gas, and transportation fuel sectors and provides policy recommendations to conserve resources; protect the environment; ensure reliable, secure, and diverse energy supplies; enhance the state's economy; and protect public health and safety. The Energy Commission prepares these assessments and associated policy recommendations every two years, with updates in alternate years, as part of the Integrated Energy Policy Report.

The 2019 Integrated Energy Policy Report (2019 IEPR) was adopted February 20, 2020, and continues to work towards improving electricity, natural gas, and transportation fuel energy use in California. The 2019 IEPR focuses on a variety of topics such as decarbonizing buildings, integrating renewables, energy efficiency, energy equity, integrating renewable energy, updates on Southern California electricity reliability, climate adaptation activities for the energy sector, natural gas assessment, transportation energy demand forecast, and the California Energy Demand Forecast.[15]

State of California Energy Plan

The CEC is responsible for preparing the State Energy Plan, which identifies emerging trends related to energy supply, demand, conservation, public health and safety, and the maintenance of a healthy economy. The Plan calls for the state to assist in the transformation of the transportation system to improve air quality, reduce congestion, and increase the efficient use of fuel supplies with the least environmental and energy costs. To further this policy, the plan identifies a number of strategies, including assistance to public agencies and fleet operators and encouragement of urban designs that reduce vehicle miles traveled and accommodate pedestrian and bicycle access.

California Building Standards Code (Title 24)

California Building Energy Efficiency Standards (Title 24, Part 6)

The California Building Energy Efficiency Standards for Residential and Nonresidential Buildings (California Code of Regulations, Title 24, Part 6) were adopted to ensure that building construction and system design and installation achieve energy efficiency and preserve outdoor and indoor environmental quality. The current California Building Energy Efficiency Standards (Title 24 standards) are the 2019 Title 24 standards, which became effective on January 1, 2020. The 2019 Title 24 standards include efficiency improvements to the lighting and efficiency improvements to the non-residential standards include alignment with the American Society of Heating and Air-Conditioning Engineers.

[15] California Energy Commission. Final 2019 Integrated Energy Policy Report. February 20, 2020. https://www.energy.ca.gov/data-reports/reports/integrated-energy-policy-report/2019-integrated-energy-policy-report

All buildings for which an application for a building permit is submitted on or after January 1, 2020 must follow the 2019 standards. The 2016 residential standards were estimated to be approximately 28 percent more efficient than the 2013 standards, whereas the 2019 residential standards are estimated to be approximately 7 percent more efficient than the 2016 standards. Furthermore, once rooftop solar electricity generation is factored in, 2019 residential standards are estimated to be approximately 53 percent more efficient than the 2016 standards. Under the 2019 standards, nonresidential buildings are estimated to be approximately 30 percent more efficient than the 2016 standards. Energy efficient buildings require less electricity; therefore, increased energy efficiency reduces fossil fuel consumption and decreases greenhouse gas emissions.

California Building Energy Efficiency Standards (Title 24, Part 11)

The 2019 California Green Building Standards Code (California Code of Regulations, Title 24, Part 11), commonly referred to as the CALGreen Code, went into effect on January 1, 2020. The 2019 CALGreen Code includes mandatory measures for non-residential development related to site development; energy efficiency; water efficiency and conservation; material conservation and resource efficiency; and environmental quality.

The Department of Housing and Community Development (HCD) updated CALGreen through the 2019 Triennial Code Adoption Cycle. HCD modified the best management practices for stormwater pollution prevention adding Section 5.106.2; added sections 5.106.4.1.3 and 5.106.4.1.5 in regard to bicycle parking; amended section 5.106.5.3.5 allowing future charging spaces to qualify as designated parking for clean air vehicles; updated section 5.303.3.3 in regard to showerhead flow rates; amended section 5.304.1 for outdoor potable water use in landscape areas and repealed sections 5.304.2 and 5.304.3; and updated Section 5.504.5.3 in regard to the use of MERV filters in mechanically ventilated buildings.

Senate Bill 350

Senate Bill 350 (SB 350) was signed into law 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 (RPS) eligible resources, including solar, wind, biomass, geothermal, and others. In addition, SB 350 requires the state to double statewide energy efficiency savings in electricity and natural gas end uses by 2030. To help ensure these goals are met and the greenhouse gas emission reductions are realized, large utilities will be required to develop and submit Integrated Resource Plans (IRPs). These IRPs will detail how each entity will meet their customers resource needs, reduce greenhouse gas emissions and ramp up the deployment of clean energy resources.

Assembly Bill 32

In 2006 the California State Legislature adopted Assembly Bill 32 (AB 32), the California Global Warming Solutions Act of 2006. AB 32 requires CARB, to adopt rules and regulations that would achieve GHG emissions equivalent to statewide levels in 1990 by 2020 through an enforceable statewide emission cap which will be phased in starting in 2012. Emission reductions shall include carbon sequestration projects that would remove carbon from the atmosphere and best management practices that are technologically feasible and cost effective.

Assembly Bill 1493/Pavley Regulations

California Assembly Bill 1493 enacted on July 22, 2002, required CARB to develop and adopt regulations that reduce GHGs emitted by passenger vehicles and light duty trucks. In 2005, the CARB submitted a "waiver" request to the EPA from a portion of the federal Clean Air Act in order to allow the State to set more stringent tailpipe emission standards for CO_2 and other GHG emissions from passenger vehicles and light duty trucks. On December 19, 2007 the EPA announced that it denied the "waiver" request. On January 21, 2009, CARB submitted a letter to the EPA administrator regarding the State's request to reconsider the waiver denial. The EPA approved the waiver on June 30, 2009.

Executive Order S-1-07/Low Carbon Fuel Standard

Executive Order S-1-07 was issued in 2007 and proclaims that the transportation sector is the main source of GHG emissions in the State, since it generates more than 40 percent of the State's GHG emissions. It establishes a goal to reduce the carbon intensity of transportation fuels sold in the State by at least ten percent by 2020. This Order also directs CARB to determine whether this Low Carbon Fuel Standard (LCFS) could be adopted as a discrete early-action measure as part of the effort to meet the mandates in AB 32.

On April 23, 2009 CARB approved the proposed regulation to implement the low carbon fuel standard and began implementation on January 1, 2011. The low carbon fuel standard is anticipated to reduce GHG emissions by about 16 MMT per year by 2020. CARB approved some amendments to the LCFS in December 2011, which were implemented on January 1, 2013. In September 2015, the Board approved the re-adoption of the LCFS, which became effective on January 1, 2016, to address procedural deficiencies in the way the original regulation was adopted. In 2018, the Board approved amendments to the regulation, which included strengthening and smoothing the carbon intensity benchmarks through 2030 in-line with California's 2030 GHG emission reduction target enacted through SB 32, adding new crediting opportunities to promote zero emission vehicle adoption, alternative jet fuel, carbon capture and sequestration, and advanced technologies to achieve deep decarbonization in the transportation sector.

The LCFS is designed to encourage the use of cleaner low-carbon transportation fuels in California, encourage the production of those fuels, and therefore, reduce GHG emissions and decrease petroleum dependence in the transportation sector. Separate standards are established for gasoline and diesel fuels and the alternative fuels that can replace each. The standards are "back-loaded", with more reductions required in the last five years, than during the first five years. This schedule allows for the development of advanced fuels that are lower in carbon than today's fuels and the market penetration of plug-in hybrid electric vehicles, battery electric vehicles, fuel cell vehicles, and flexible fuel vehicles. It is anticipated that compliance with the low carbon fuel standard will be based on a combination of both lower carbon fuels and more efficient vehicles.

Reformulated gasoline mixed with corn-derived ethanol at ten percent by volume and low sulfur diesel fuel represent the baseline fuels. Lower carbon fuels may be ethanol, biodiesel, renewable diesel, or blends of these fuels with gasoline or diesel as appropriate. Compressed natural gas and liquefied natural gas also may be low carbon fuels. Hydrogen and electricity, when used in fuel cells or electric vehicles are also considered as low carbon fuels for the low carbon fuel standard.

Executive Order N-79-20.

Executive Order N-79-20 was signed into law on September 23, 2020 and mandates 100 percent of in-state sales of new passenger cars and trucks be zero-emission by 2035; 100 percent of medium- and heavy-duty vehicles in the state be zero-emission vehicles by 2045 for all operations where feasible and by 2035 for drayage trucks; and to transition to 100 percent zero-emission off-road vehicles and equipment by 2035 where feasible.

California Air Resources Board

CARB's Advanced Clean Cars Program

Closely associated with the Pavley regulations, the Advanced Clean Cars emissions control program was approved by CARB in 2012. The program combines the control of smog, soot, and GHGs with requirements for greater numbers of zero-emission vehicles for model years 2015–2025. The components of the Advanced Clean Cars program include the Low-Emission Vehicle (LEV) regulations that reduce criteria pollutants and GHG emissions from light- and medium-duty vehicles, and the Zero-Emission Vehicle (ZEV) regulation, which requires manufacturers to produce an increasing number of pure ZEVs (meaning battery electric and fuel cell electric vehicles), with provisions to also produce plug-in hybrid electric vehicles (PHEV) in the 2018 through 2025 model years.[16]

Airborne Toxic Control Measure to Limit Diesel-Fueled Commercial Motor Vehicle Idling

The Airborne Toxic Control Measure to Limit Diesel-Fueled Commercial Motor Vehicle Idling (Title 13, California Code of Regulations, Division 3, Chapter 10, Section 2435) was adopted to reduce public exposure to diesel particulate matter and other air contaminants by limiting the idling of diesel-fueled commercial motor vehicles. This section applies to diesel-fueled commercial motor vehicles with gross vehicular weight ratings of greater than 10,000 pounds that are or must be licensed for operation on highways. Reducing idling of diesel-fueled commercial motor vehicles reduces the amount of petroleum-based fuel used by the vehicle.

Regulation to Reduce Emissions of Diesel Particulate Matter, Oxides of Nitrogen, and other Criteria Pollutants, form In-Use Heavy-Duty Diesel-Fueled Vehicles

The Regulation to Reduce Emissions of Diesel Particulate Matter, Oxides of Nitrogen and other Criteria Pollutants, from In-Use Heavy-Duty Diesel-Fueled Vehicles (Title 13, California Code of Regulations, Division 3, Chapter 1, Section 2025) was adopted to reduce emissions of diesel particulate matter, oxides of nitrogen (NO_X) and other criteria pollutants from in-use diesel-fueled vehicles. This regulation is phased, with full implementation by 2023. The regulation aims to reduce emissions by requiring the installation of diesel soot filters and encouraging the retirement, replacement, or repower of older, dirtier engines with newer emission-controlled models. The newer emission controlled models would use petroleum-based fuel in a more efficient manner.

[16] California Air Resources Board, California's Advanced Clean Cars Program, January 18, 2017. www.arb.ca.gov/msprog/acc/acc.htm.

Sustainable Communities Strategy

The Sustainable Communities and Climate Protection Act of 2008, or Senate Bill 375 (SB 375), coordinates land use planning, regional transportation plans, and funding priorities to help California meet the GHG reduction mandates established in AB 32.

Senate Bill 375 (SB 375) was adopted September 2008 and aligns regional transportation planning efforts, regional GHG emission reduction targets, and land use and housing allocation. SB 375 requires Metropolitan Planning Organizations (MPO) to adopt a sustainable communities strategy (SCS) or alternate planning strategy (APS) that will prescribe land use allocation in that MPOs Regional Transportation Plan (RTP). CARB, in consultation with each MPO, will provide each affected region with reduction targets for GHGs emitted by passenger cars and light trucks in the region for the years 2020 and 2035. These reduction targets will be updated every eight years but can be updated every four years if advancements in emissions technologies affect the reduction strategies to achieve the targets. CARB is also charged with reviewing each MPO's sustainable communities strategy or alternate planning strategy for consistency with its assigned targets.

3.0 Evaluation Criteria and Methodology

Evaluation Criteria

CEQA Energy Questions

In compliance with Appendix G of the State CEQA Guidelines, this report analyzes the project's anticipated energy use to determine if the project would:

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

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

In addition, Appendix F of the State CEQA Guidelines states that the means of achieving the goal of energy conservation includes the following:

- Decreasing overall per capita energy consumption;
- Decreasing reliance on fossil fuels such as coal, natural gas and oil; and
- Increasing reliance on renewable energy sources.

Methodology

Information from the CalEEMod 2016.3.2 Daily and Annual Outputs contained in the Central Avenue Gas Station Air Quality and Greenhouse Gas Impact Study (air quality and greenhouse gas analysis) prepared for the proposed project by MD (December 19, 2022), was utilized for this analysis. The CalEEMod outputs detail project related construction equipment, transportation energy demands, and facility energy demands.

4.0 Energy Review

Construction Energy Demand

The construction schedule is anticipated to begin in the beginning of August 2021 and take approximately six months to complete and be completed in one phase. Staging of construction vehicles and equipment will occur on-site.

Construction Equipment Electricity Usage Estimates

As stated previously, electrical service will be provided by the SCE. The focus within this section is the energy implications of the construction process, specifically the power cost from on-site electricity consumption during construction of the proposed project. Based on the 2017 National Construction Estimator, Richard Pray (2017)[17], the typical power cost per 1,000 square feet of building construction per month is estimated to be $2.32. The project plans to develop the site with a 4,000 square foot convenience market with a gasoline service station with 12 fueling pumps over the course of approximately six months. Based on Table 3, the total power cost of the on-site electricity usage during the construction of the proposed project is estimated to be approximately $55.68. Furthermore, as of April 13, 2020, SCE's general service rate schedule (GS-1) is approximately $0.09 per kWh of electricity.[18] As shown in Table 3, the total electricity usage from Project construction related activities is estimated to be approximately 619 kWh.

Table 3: Project Construction Power Cost and Electricity Usage

Power Cost (per 1,000 square foot of building per month of construction)	Total Building Size (1,000 Square Foot)	Construction Duration (months)	Total Project Construction Power Cost
$2.32	4.000	6	$55.68

Cost per kWh	Total Project Construction Electricity Usage (kWh)
$0.09	619

*Assumes the project will be under the GS-1 General Service rate under SCE.

Construction Equipment Fuel Estimates

Fuel consumed by construction equipment would be the primary energy resource expended over the course of project construction. Fuel consumed by construction equipment was evaluated with the following assumptions:

- Construction schedule of approximately 6 months

[17] Pray, Richard. 2017 National Construction Estimator. Carlsbad : Craftsman Book Company, 2017.
[18] Southern California Edison (SCE). Rates & Pricing Choices: General Service/Industrial Rates. https://library.sce.com/content/dam/sce-doclib/public/regulatory/historical/electric/2020/schedules/general-service-&-industrial-rates/ELECTRIC_SCHEDULES_GS-1_2020.pdf

- All construction equipment was assumed to run on diesel fuel
- Typical daily use of 8 hours, with some equipment operating from ~6-7 hours
- Aggregate fuel consumption rate for all equipment was estimated at 18.5 hp-hr/day (from CARB's 2017 Emissions Factors Tables and fuel consumption rate factors as shown in Table D-21 of the Moyer Guidelines: (https://www.arb.ca.gov/msprog/moyer/guidelines/2017gl/2017_gl_appendix_d.pdf).
- Diesel fuel would be the responsibility of the equipment operators/contractors and would be sources within the region.
- Project construction represents a "single-event" for diesel fuel demand and would not require on-going or permanent commitment of diesel fuel resources during long term operation.

Using the CalEEMod data input from the air quality and greenhouse gas analysis (MD Acoustics 2020), the project's construction phase would consume electricity and fossil fuels as a single energy demand, that is, once construction is completed their use would cease. CARB's 2013 Emissions Factors Tables show that on average aggregate fuel consumption (gasoline and diesel fuel) would be approximately 18.5 hp-hr-gal. Table 4 shows the results of the analysis of construction equipment.

Table 4: Construction Equipment Fuel Consumption Estimates

Phase	Number of Days	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor	HP hrs/day	Total Fuel Consumption (gal diesel fuel)[1]
Site Preparation	2	Tractors/Loaders/Backhoes	1	8	97	0.37	287	31
Grading	4	Graders	1	6	187	0.41	460	99
	4	Rubber Tired Dozers	1	6	247	0.4	593	128
	4	Tractors/Loaders/Backhoes	1	7	97	0.37	251	54
Building Construction	120	Cranes	2	6	231	0.29	804	5,214
	120	Forklifts	2	6	89	0.2	214	1,386
	120	Generator Sets	1	8	84	0.74	497	3,226
	120	Tractors/Loaders/Backhoes	2	6	97	0.37	431	2,794
	120	Welders	3	8	46	0.45	497	3,222
Paving	10	Cement and Mortar Mixers	1	6	9	0.56	30	16
	10	Pavers	1	6	130	0.42	328	177
	10	Paving Equipment	1	8	132	0.36	380	205
	10	Rollers	1	7	80	0.38	213	115
	10	Tractors/Loaders/Backhoes	1	8	97	0.37	287	155
Architectural Coating	10	Air Compressors	1	6	78	0.48	225	121
CONSTRUCTION FUEL DEMAND (gallons of diesel fuel)								**16,945**

Notes:
[1]Using Carl Moyer Guidelines Table D-21 Fuel consumption rate factors (bhp-hr/gal) for engines less than 750 hp.
(Source: https://www.arb.ca.gov/msprog/moyer/guidelines/2017gl/2017_gl_appendix_d.pdf)

As presented in Table 4, project construction activities would consume an estimated 16,945 gallons of diesel fuel. As stated previously, project construction would represent a "single-event" diesel fuel demand and would not require on-going or permanent commitment of diesel fuel resources for this purpose.

Construction Worker Fuel Estimates

It is assumed that all construction worker trips are from light duty autos (LDA) along area roadways. With respect to estimated VMT, the construction worker trips would generate an estimated 49,216 VMT. Data regarding project related construction worker trips were based on CalEEMod 2016.3.2 model defaults.

Vehicle fuel efficiencies for construction workers were estimated in the air quality and greenhouse gas analysis (MD Acoustics 2020) using information generated using CARB's EMFAC model (see Appendix A for details). An aggregate fuel efficiency of 30.13 miles per gallon (mpg) was used to calculate vehicle miles traveled for construction worker trips. Table 5 shows that an estimated 1,633 gallons of fuel would be consumed for construction worker trips.

Table 5: Construction Worker Fuel Consumption Estimates

Phase	Number of Days	Worker Trips/Day	Trip Length (miles)	Vehicle Miles Traveled	Average Vehicle Fuel Economy (mpg)	Estimated Fuel Consumption (gallons)
Site Preparation	2	8	14.7	235	30.13	8
Grading	4	8	14.7	470	30.13	16
Building Construction	120	26	14.7	45,864	30.13	1,522
Paving	10	13	14.7	1,911	30.13	63
Architectural Coating	10	5	14.7	735	30.13	24
Total Construction Worker Fuel Consumption						**1,633**

Notes:
[1]Assumptions for the worker trip length and vehicle miles traveled are consistent with CalEEMod 2016.3.2 defaults.

Construction Vendor/Hauling Fuel Estimates

Tables 6 and 7 show the estimated fuel consumption for vendor and hauling during building construction and architectural coating. With respect to estimated VMT, the vendor and hauling trips would generate an estimated 8,280 VMT. Data regarding project related construction worker trips were based on CalEEMod 2016.3.2 model defaults.

For the architectural coatings it is assumed that the contractors would be responsible for bringing coatings and equipment with them in their light duty vehicles. Therefore, vendors delivering construction material or hauling debris from the site during grading would use medium to heavy duty vehicles with an average fuel consumption of 8.93 mpg for medium heavy duty trucks and 6.51 mpg for heavy heavy duty trucks (see Appendix A for details). Tables 6 and 7 show that an estimated 927 gallons of fuel would be consumed for vendor and hauling trips.

<Table 6, next page>

Table 6: Construction Vendor Fuel Consumption Estimates (MHD Trucks)[1]

Phase	Number of Days	Vendor Trips/Day	Trip Length (miles)	Vehicle Miles Traveled	Average Vehicle Fuel Economy (mpg)	Estimated Fuel Consumption (gallons)
Site Preparation	2	0	6.9	0	8.93	0
Grading	4	0	6.9	0	8.93	0
Building Construction	120	10	6.9	8,280	8.93	927
Paving	10	0	6.9	0	8.93	0
Architectural Coating	10	0	6.9	0	8.93	0
Total Vendor Fuel Consumption						**927**

Notes:
[1] Assumptions for the vendor trip length and vehicle miles traveled are consistent with CalEEMod 2016.3.2 defaults.

Table 7: Construction Hauling Fuel Consumption Estimates (HHD Trucks)[1]

Phase	Number of Days	Hauling Trips/Day	Trip Length (miles)	Vehicle Miles Traveled	Average Vehicle Fuel Economy (mpg)	Estimated Fuel Consumption (gallons)
Site Preparation	2	0	20	0	6.51	0
Grading	4	0	20	0	6.51	0
Building Construction	120	0	20	0	6.51	0
Paving	10	0	20	0	6.51	0
Architectural Coating	10	0	20	0	6.51	0
Total Construction Hauling Fuel Consumption						**0**

Notes:
[1]Assumptions for the hauling trip length and vehicle miles traveled are consistent with CalEEMod 2016.3.2 defaults.

Construction Energy Efficiency/Conservation Measures

Construction equipment used over the approximately six-month construction phase would conform to CARB regulations and California emissions standards and is evidence of related fuel efficiencies. Construction of the proposed commercial development would require the typical use of energy resources. 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 inefficient wasteful, or unnecessary consumption of fuel.

CARB has adopted the Airborne Toxic Control Measure to limit heavy-duty diesel motor vehicle idling in order to reduce public exposure to diesel particulate matter and other Toxic Air Contaminants.

Additionally, as required by California Code of Regulations Title 13, Motor Vehicles, section 2449(d)(3) Idling, limits idling times of construction vehicles to no more than five minutes, thereby minimizing or eliminating unnecessary and wasteful consumption of fuel due to unproductive idling of construction equipment. Enforcement of idling limitations is realized through periodic site inspections conducted by City building officials, and/or in response to citizen complaints. Compliance with these measures would result in a more efficient use of construction-related energy and would minimize or eliminate wasteful or unnecessary consumption of energy. Idling restrictions and the use of newer engines and equipment would result in less fuel combustion and energy consumption.

Furthermore, the project has been designed in compliance with California's Energy Efficiency Standards and 2019 CALGreen Standards. These measures include, but are not limited to the use of water conserving plumbing, installation of bicycle racks, the use of LED lighting, and water-efficient irrigation systems.

Operation Energy Demand

Energy consumption in support of or related to project operations would include transportation energy demands (energy consumed by employee and patron vehicles accessing the project site) and facilities energy demands (energy consumed by building operations and site maintenance activities).

Transportation Fuel Consumption

The largest source of operational energy use would be vehicle operation of customers. The site is located is in an urbanized area just east of Highway 74 between Rosetta Canyon Drive and Ardenwood Way. Furthermore, there are existing transit services, provided by RTA, approximately 0.13-mile walking distance of the proposed Project site. The nearest transit service is Riverside Transit Route 22, with a stop along Highway 74 just north of Rosetta Canyon Drive.

Using the CalEEMod output from the air quality and greenhouse gas analysis (MD Acoustics 2020), it is assumed that an average trip for autos were assumed to be 16.6 miles, light trucks were assumed to travel an average of 8.4 miles, and 3- 4-axle trucks were assumed to travel an average of 6.9 miles[19]. As the proposed project is a convenience market with gasoline service station, it was assumed that vehicles would operate 365 days per year. Table 8 shows the worst-case estimated annual fuel consumption for all classes of vehicles from autos to heavy-heavy trucks.[20]

The proposed project would generate approximately 1,217 trips per day. The vehicle fleet mix was used from the CalEEMod output from the air quality and greenhouse gas analysis (MD Acoustics 2020). Table 8 shows that an estimated 264,540 gallons of fuel would be consumed per year for the operation of the proposed project.

<Table 8, next page>

[19] CalEEMod default distance for H-W (home-work) or C-W (commercial-work) is 16.6 miles; 6.9 miles for H-O (home-other) or C-O (commercial-other).
[20] Average fuel economy based on aggregate mileage calculated in EMFAC 2017 for opening year (2022). See Appendix A for EMFAC output.

Table 8: Estimated Vehicle Operations Fuel Consumption

Vehicle Type	Vehicle Mix	Number of Vehicles	Average Trip (miles)[1]	Daily VMT	Average Fuel Economy (mpg)	Total Gallons per Day	Total Annual Fuel Consumption (gallons)
Light Auto	Automobile	664	16.6	11,022	30.95	356.14	129,990
Light Truck	Automobile	45	8.4	378	26.47	14.28	5,212
Light Truck	Automobile	227	8.4	1,907	24.72	77.14	28,155
Medium Truck	Automobile	140	6.9	966	5.97	161.81	59,060
Light Heavy Truck	2-Axle Truck	19	6.9	131	13.53	9.69	3,537
Light Heavy Truck 10,000 lbs +	2-Axle Truck	6	6.9	41	13.88	2.98	1,089
Medium Heavy Truck	3-Axle Truck	21	6.9	145	9.22	15.72	5,736
Heavy Heavy Truck	4-Axle Truck	85	6.9	587	6.74	87.02	31,761
Total		1,217	--	15,177	16.44	724.77	--
Total Annual Fuel Consumption							**264,540**

Notes:
[1]Based on the size of the site and relative location, trips were assumed to be local rather than regional.

Trip generation and VMT generated by the proposed project are consistent with other similar commercial uses of similar scale and configuration as reflected respectively in the Institute of Transportation Engineers (ITE) Trip Generation Manual (20th Edition, 2017). That is, the proposed project does not propose uses or operations that would inherently result in excessive and wasteful vehicle trips and VMT, nor associated excess and wasteful vehicle energy consumption. Furthermore, the state of California consumed approximately 4.2 billion gallons of diesel and 15.1 billion gallons of gasoline in 2015.[21,22] In addition, per EMFAC2017, the County of Riverside is estimated to have an annual fuel consumption of approximately 904,493 thousand gallons in the year 2022.[23] Therefore, the increase in fuel consumption from the proposed project is insignificant in comparison to the State's demand. Therefore, project transportation energy consumption would not be considered inefficient, wasteful, or otherwise unnecessary.

Facility Energy Demands (Electricity and Natural Gas)

Building operation and site maintenance (including landscape maintenance) would result in the consumption of electricity (provided by SCE) and natural gas (provided by Southern California Gas Company). Operation of the proposed project would involve the use of energy for heating, cooling and equipment operation. These facilities would comply with all applicable California Energy Efficiency Standards and 2019 CALGreen Standards.

The annual natural gas and electricity demands were provided per the CalEEMod output from the air quality and greenhouse gas analysis (MD Acoustics 2020) and are provided in Table 9.

[21] https://www.energy.ca.gov/data-reports/energy-almanac/transportation-energy/california-gasoline-data-facts-and-statistics
[22] https://www.energy.ca.gov/data-reports/energy-almanac/transportation-energy/diesel-fuel-data-facts-and-statistics
[23] https://arb.ca.gov/emfac/emissions-inventory/92bccfb9b61dec8923cc5a7c26aadaf58ed0ef68

Table 9: Project Mitigated Annual Operational Energy Demand Summary[1]

Electricity Demand	kWh/year
Gasoline/Service Station	78,680
Parking Lot	4,760
Total	83,440

Notes:
[1]Taken from the CalEEMod 2016.3.2 annual output in the Central Avenue Gas Station Air Quality and Greenhouse Gas Impact Study prepared for the proposed project by MD Acoustics (December 19, 2022).

As shown in Table 9, the estimated electricity demand for the proposed project is approximately 83,440 kWh per year. In 2021, the non-residential sector of the County of Riverside consumed approximately 8,257 million kWh of electricity.[24] Therefore, the increase in electricity demand from the proposed project is insignificant compared to the County's 2021 non-residential sector demand.

Energy use in buildings is divided into energy consumed by the built environment and energy consumed by uses that are independent of the construction of the building such as in plug-in appliances. In California, the California Building Standards Code Title 24 governs energy consumed by the built environment (including HVAC systems, water heaters, electric stoves, ovens, etc.), mechanical systems, and some types of fixed lighting. Non-building energy use, or "plug-in" energy use can be further subdivided by specific end-use (refrigeration, cooking, appliances, etc.).

Furthermore, the proposed project energy demands in total would be comparable to other commercial projects of similar scale and configuration. Therefore, the project facilities' energy demands and energy consumption would not be considered inefficient, wasteful, or otherwise unnecessary.

Renewable Energy and Energy Efficiency Plan Consistency

Regarding federal transportation regulations, the project site is located in an already developed area. Access to/from the project site is from existing roads. These roads are already in place so the project would not interfere with, nor otherwise obstruct intermodal transportation plans or projects that may be proposed pursuant to the ISTEA because SCAG is not planning for intermodal facilities in the project area.

Regarding the State's Energy Plan and compliance with Title 24 CCR energy efficiency standards, the applicant is required to comply with the California Green Building Standard Code requirements for energy efficient buildings and appliances as well as utility energy efficiency programs implemented by the SCE.

Regarding the State's Renewable Energy Portfolio Standards, the project would be required to meet or exceed the energy standards established in the California Green Building Standards Code, Title 24, Part 11 (CALGreen). CalGreen Standards require that new buildings reduce water consumption, employ building commissioning to increase building system efficiencies, divert construction waste from landfills, and install low pollutant-emitting finish materials.

[24] California Energy Commission, Electricity Consumption by County. https://ecdms.energy.ca.gov/elecbycounty.aspx

5.0 Conclusions

As supported by the preceding analyses, neither construction nor operation of the Project would result in wasteful, inefficient, or unnecessary consumption of energy, or wasteful use of energy resources. The proposed project does not include any 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 and is a commercial project that is not proposing any additional features that would require a larger energy demand than other commercial projects of similar scale and configuration. As the proposed project is consistent with the existing General Plan land use designation, the energy demands of the project are anticipated to be accommodated within the context of available resources and energy delivery systems. The project would therefore not cause or result in the need for additional energy producing or transmission facilities. The project would not engage in wasteful or inefficient uses of energy and aims to achieve energy conservations goals within the State of California.

The Project has been designed in compliance with California's Energy Efficiency Standards and 2019 CALGreen Standards. These measures include, but are not limited to the use of water conserving plumbing, installation of bicycle racks, the use of LED lighting, and water-efficient irrigation systems. The Project would not conflict with or obstruct a state or local plan for renewable energy or energy efficiency; therefore, impacts would be less than significant.

MD is pleased to provide this CEQA Energy review. If you have any questions regarding this analysis, please don't hesitate to call us at (805) 426-4477.

Sincerely,
MD Acoustics, LLC

Mike Dickerson, INCE
Principal

Appendix A

CARB EMFAC 2017

Source: EMFAC2017 (v1.0.3) Emissions Inventory
Region Type: Air Basin
Region: South Coast
Calendar Year: 2021
Season: Annual
Vehicle Classification: EMFAC2007 Categories
Units: miles/day for VMT, trips/day for Trips, tons/day for Emissions, 1000 gallons/day for Fuel Consumption

Region	Calendar Y	Vehicle Cat	Model Year	Speed	Fuel	Population	Trips	Fuel Consumption	Fuel Consumption	Total Fuel Consumption	VMT	Total VMT	Miles Per Gallon	Vehicle Class
South Coast	2021	HHDT	Aggregate	Aggregate	Gasoline	81.3725634	1628.102	1.889707176	1889.707176	1776086.603	7629.442554	11553449.42	6.51	HHD
South Coast	2021	HHDT	Aggregate	Aggregate	Diesel	96726.9495	974405.7	1774.196896	1774196.896		11545819.98			
South Coast	2021	LDA	Aggregate	Aggregate	Gasoline	6276233.77	29647186	8195.759914	8195759.914	8241884.504	246181276.2	248366515	30.13	LDA
South Coast	2021	LDA	Aggregate	Aggregate	Diesel	53709.9025	254840.1	46.1245898	46124.5898		2185238.836			
South Coast	2021	LDA	Aggregate	Aggregate	Electricity	105013.549	525424.1	0	0		4192834.836			
South Coast	2021	LDT1	Aggregate	Aggregate	Gasoline	695145.897	3200417	1009.571346	1009571.346	1009999.543	26066042.38	26075562.75	25.82	LDT1
South Coast	2021	LDT1	Aggregate	Aggregate	Diesel	406.399031	1419.826	0.42819713	428.1971296		9520.378718			
South Coast	2021	LDT1	Aggregate	Aggregate	Electricity	3691.83415	18421.42	0	0		147589.5362			
South Coast	2021	LDT2	Aggregate	Aggregate	Gasoline	2144804.15	10052342	3441.716707	3441716.707	3457561.278	81991235.59	82539629.16	23.87	LDT2
South Coast	2021	LDT2	Aggregate	Aggregate	Diesel	12472.425	61718.11	15.84457068	15844.57068		548393.5724			
South Coast	2021	LDT2	Aggregate	Aggregate	Electricity	16651.9689	84424.2	0	0		552985.8715			
South Coast	2021	LHDT1	Aggregate	Aggregate	Gasoline	172430.216	2568953	598.0686059	598068.6059	809349.9359	6230805.225	10720475.04	13.25	LHDT1
South Coast	2021	LHDT1	Aggregate	Aggregate	Diesel	109610.028	1378756	211.28133	211281.33		4489669.812			
South Coast	2021	LHDT2	Aggregate	Aggregate	Gasoline	28913.8178	430772.8	111.7961286	111796.1286	201931.6877	1014315.328	2744944.158	13.59	LHDT2
South Coast	2021	LHDT2	Aggregate	Aggregate	Diesel	43242.2337	543932.9	90.13555911	90135.55911		1730628.83			
South Coast	2021	MCY	Aggregate	Aggregate	Gasoline	279209.361	558418.7	53.89538804	53895.38804	53895.38804	1958676.919	1958676.919	36.34	MCY
South Coast	2021	MDV	Aggregate	Aggregate	Gasoline	1520877.3	7026646	2808.57758	2808577.58	2854598.975	54421172.7	55643285	19.49	MDV
South Coast	2021	MDV	Aggregate	Aggregate	Diesel	29603.6659	145604.8	46.02139556	46021.39556		1222112.304			
South Coast	2021	MDV	Aggregate	Aggregate	Electricity	7250.17223	37174.04	0	0		249429.9943			
South Coast	2021	MH	Aggregate	Aggregate	Gasoline	34556.2813	3457.01	64.51935527	64519.35527	75563.3084	327720.8034	443086.5288	5.86	MH
South Coast	2021	MH	Aggregate	Aggregate	Diesel	11829.1715	1182.917	11.04395313	11043.95313		115365.7253			
South Coast	2021	MHDT	Aggregate	Aggregate	Gasoline	24683.6081	493869.6	264.5056072	264505.6072	991967.8223	1325210.138	8860357.635	8.93	MHDT
South Coast	2021	MHDT	Aggregate	Aggregate	Diesel	119075.286	1192855	727.4622151	727462.2151		7535147.497			
South Coast	2021	OBUS	Aggregate	Aggregate	Gasoline	5845.39061	116954.6	49.57947234	49579.47234	87256.58216	246477.18	555364.3745	6.36	OBUS
South Coast	2021	OBUS	Aggregate	Aggregate	Diesel	4131.13499	40389.68	37.67710982	37677.10982		308887.1946			
South Coast	2021	SBUS	Aggregate	Aggregate	Gasoline	2414.92674	9659.707	10.85210767	10852.10767	37379.67328	98099.38663	297576.5962	7.96	SBUS
South Coast	2021	SBUS	Aggregate	Aggregate	Diesel	6314.06403	72863.42	26.52756561	26527.56561		199477.2096			
South Coast	2021	UBUS	Aggregate	Aggregate	Gasoline	943.967838	3775.871	18.45610299	18456.10299	18702.89919	88729.36464	90207.45032	4.82	UBUS
South Coast	2021	UBUS	Aggregate	Aggregate	Diesel	14.1414183	56.56567	0.246796198	246.7961984		1478.085683			
South Coast	2021	UBUS	Aggregate	Aggregate	Electricity	12.1169389	48.46776	0			1072.906717			

Source: https://arb.ca.gov/emfac/emissions-inventory

Calendar Year: 2022
Season: Annual
Vehicle Classification: EMFAC2007 Categories
Units: miles/day for VMT, trips/day for Trips, tons/day for Emissions, 1000 gallons/day for Fuel Consumption

Region	Calendar Year	Vehicle Ca	Model Year	Speed	Fuel	Population	Trips	Fuel Consumption	Fuel Consumption	Total Fuel Consumption	VMT	Total VMT	Miles Per Gallon	Vehicle Class
South Coast AQMD	2022	HHDT	Aggregate	Aggregate	Gasoline	77.82251	1557.073	1.914672095	1914.672095	1984478.157	7970.981	13381402.09	**6.74**	HHD
South Coast AQMD	2022	HHDT	Aggregate	Aggregate	Diesel	108362	1118617	1982.563485	1982563.485		13373431			
South Coast AQMD	2022	LDA	Aggregate	Aggregate	Gasoline	6542832	30915701	8178.144259	8178144.259	8226568.36	2.52E+08	254602375.4	**30.95**	LDA
South Coast AQMD	2022	LDA	Aggregate	Aggregate	Diesel	58937.5	279973.4	48.42410045	48424.10045		2358230			
South Coast AQMD	2022	LDA	Aggregate	Aggregate	Electricity	127532.6	637025.4	0	0		5177709			
South Coast AQMD	2022	LDT1	Aggregate	Aggregate	Gasoline	736905.6	3399512	1031.447408	1031447.408	1031847.287	27300896	27309932.68	**26.47**	LDT1
South Coast AQMD	2022	LDT1	Aggregate	Aggregate	Diesel	387.1571	1348.408	0.39987912	399.8791198		9037.122			
South Coast AQMD	2022	LDT1	Aggregate	Aggregate	Electricity	5339.042	26794.47	0	0		221507.4			
South Coast AQMD	2022	LDT2	Aggregate	Aggregate	Gasoline	2246303	10535910	3436.155557	3436155.557	3453207.618	84740129	85348125.78	**24.72**	LDT2
South Coast AQMD	2022	LDT2	Aggregate	Aggregate	Diesel	14234.59	70193.22	17.05206088	17052.06088		607996.5			
South Coast AQMD	2022	LDT2	Aggregate	Aggregate	Electricity	22589.96	114302.6	0	0		734756.1			
South Coast AQMD	2022	LHDT1	Aggregate	Aggregate	Gasoline	175903.1	2620694	598.0685493	598068.5493	821513.5103	6298251	11115258.37	**13.53**	LHDT1
South Coast AQMD	2022	LHDT1	Aggregate	Aggregate	Diesel	119380.7	1501659	223.444961	223444.961		4817007			
South Coast AQMD	2022	LHDT2	Aggregate	Aggregate	Gasoline	30009.92	447103.1	113.5150695	113515.0695	209067.0531	1040649	2902289.397	**13.88**	LHDT2
South Coast AQMD	2022	LHDT2	Aggregate	Aggregate	Diesel	47335.63	595422.7	95.55198358	95551.98358		1861640			
South Coast AQMD	2022	MCY	Aggregate	Aggregate	Gasoline	295960.1	591920.2	56.92214589	56922.14589	56922.14589	2072370	2072370.126	**36.41**	MCY
South Coast AQMD	2022	MDV	Aggregate	Aggregate	Gasoline	1579640	7302407	2793.799561	2793799.561	2842944.316	55888916	57233722.8	**20.13**	MDV
South Coast AQMD	2022	MDV	Aggregate	Aggregate	Diesel	33348.92	163526.3	49.14475473	49144.75473		1344806			
South Coast AQMD	2022	MDV	Aggregate	Aggregate	Electricity	11658.48	59625.3	0	0		391944.3			
South Coast AQMD	2022	MH	Aggregate	Aggregate	Gasoline	35097.75	3511.179	64.70410395	64704.10395	76270.38211	333282.4	455641.5746	**5.97**	MH
South Coast AQMD	2022	MH	Aggregate	Aggregate	Diesel	12758.81	1275.881	11.56627815	11566.27815		122359.2			
South Coast AQMD	2022	MHDT	Aggregate	Aggregate	Gasoline	25445.41	509111.8	269.2842176	269284.2176	1009568.488	1367743	9307083.084	**9.22**	MHDT
South Coast AQMD	2022	MHDT	Aggregate	Aggregate	Diesel	123310	1231988	740.28427	740284.27		7939340			
South Coast AQMD	2022	OBUS	Aggregate	Aggregate	Gasoline	5959.443	119236.5	49.67589796	49675.89796	88138.04214	250653.5	576603.5972	**6.54**	OBUS
South Coast AQMD	2022	OBUS	Aggregate	Aggregate	Diesel	4274.499	41607.39	38.46214418	38462.14418		325950.1			
South Coast AQMD	2022	SBUS	Aggregate	Aggregate	Gasoline	2630.829	10523.32	11.7605267	11760.5267	39328.1885	107369.8	316915.9173	**8.06**	SBUS
South Coast AQMD	2022	SBUS	Aggregate	Aggregate	Diesel	6631.313	76524.43	27.5676618	27567.6618		209546.1			
South Coast AQMD	2022	UBUS	Aggregate	Aggregate	Gasoline	952.146	3808.584	18.40085629	18400.85629	18647.65249	89256	90734.08386	**4.87**	UBUS
South Coast AQMD	2022	UBUS	Aggregate	Aggregate	Diesel	14.14142	56.56567	0.246796198	246.7961984		1478.086			
South Coast AQMD	2022	UBUS	Aggregate	Aggregate	Electricity	17.11694	68.46776	0			1343.185			

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December 19, 2022

Mr. Joseph Karaki - President
Karaki WS
4887 E. Las Palmas Ave., Ste 707
Anaheim, CA 92807

Subject: Gas Station & Convenience Store – CEQA Energy Review, County of Riverside, CA

Dear Mr. Karaki:

MD Acoustics, LLC (MD) has completed a CEQA energy review for the proposed Gas Station & Convenience Store project located at 28771 Central Avenue (Hwy 74) in an unincorporated area of the County of Riverside within the Sphere of Influence of the City of Lake Elsinore, California. The Project proposes to develop the approximately 1.44-acre project site with a 4,000 square foot convenience market with 12 pump gas station.

1.0 Existing Energy Conditions

Overview

California's estimated annual energy use as of 2019 included:

- Approximately 277,704 gigawatt hours of electricity; [1]
- Approximately 2,154,030 million cubic feet of natural gas per year[2];and
- Approximately 23.2 billion gallons of transportation fuel (for the year 2015)[3].

As of 2018, the year of most recent data currently available by the United States Energy Information Administration (EIA), energy use in California by demand sector was:

- Approximately 39.1 percent transportation;
- Approximately23.5 percent industrial;
- Approximately 18.3 percent residential; and
- Approximately 19.2 percent commercial.[4]

California's electricity in-state generation system generates approximately 200,475 gigawatt-hours each year. In 2019, California produced approximately 72 percent of the electricity it uses; the rest was imported

[1]California Energy Commission. Energy Almanac. Total Electric Generation. [Online] 2020. https://www.energy.ca.gov/data-reports/energy-almanac/california-electricity-data/2019-total-system-electric-generation.
[2]Natural Gas Consumption by End Use. U.S. Energy Information Administration. [Online] August 31, 20020. https://www.eia.gov/dnav/ng/ng_cons_sum_dcu_SCA_a.htm.
[3]California Energy Commission. Revised Transportation Energy Demand Forecast 2018-2030. [Online] April 19, 2018. https://www.energy.ca.gov/assessments/
[4]U.S. Energy Information Administration. California Energy Consumption by by End-Use Sector. California State Profile and Energy Estimates.[Online] January 16, 2020 https://www.eia.gov/state/?sid=CA#tabs-2

from the Pacific Northwest (approximately 9 percent) and the U.S. Southwest (approximately 19 percent). Natural gas is the main source for electricity generation at approximately 42.97 percent of the total in-state electric generation system power as shown in Table 1.

Table 1: Total Electricity System Power (California 2019)

Fuel Type	California In-State Generation (GWh)	Percent of California In-State Generation	Northwest Imports (GWh)	Southwest Imports (GWh)	Total Imports (GWh)	Percent of Imports	California Power Mix (GWh)	Percent California Power Mix
Coal	248	0.12%	219	7,765	7,985	10.34%	8,233	2.96%
Natural Gas	86,136	42.97%	62	8,859	8,921	11.55%	95,057	34.23%
Nuclear	16,163	8.06%	39	8,743	8,782	11.37%	24,945	8.98%
Oil	36	0.02%	0	0	0	0.00%	36	0.01%
Other (Petroleum Coke/Waste Heat)	411	0.20%	0	11	11	0.01%	422	0.15%
Large Hydro	33,145	16.53%	6,387	1,071	7,458	9.66%	40,603	14.62%
Unspecified Sources of Power	0	0.00%	6,609	13,767	20,376	26.38%	20,376	7.34%
Renewables	64,336	32.09%	10,615	13,081	23,696	30.68%	88,032	31.70%
Biomass	5,851	2.92%	903	33	936	1.21%	6,787	2.44%
Geothermal	10,943	5.46%	99	2,218	2,318	3.00%	13,260	4.77%
Somall Hydro	5,349	2.67%	292	4	296	0.38%	5,646	2.03%
Solar	28,513	14.22%	282	5,295	5,577	7.22%	34,090	12.28%
Wind	13,680	6.82%	9,038	5,531	14,569	18.87%	28,249	10.17%
Total	200,475	100.00%	23,930	53,299	77,229	100.00%	277,704	100.00%

Notes:
[1] Source: California Energy Commission. 2019 Total System electric Generation. https://www.energy.ca.gov/data-reports/energy-almanac/california-electricity-data/2019-total-system-electric-generation

A summary of and context for energy consumption and energy demands within the State is presented in "U.S. Energy Information Administration, California State Profile and Energy Estimates, Quick Facts" excerpted below:

- California was the seventh-largest producer of crude oil among the 50 states in 2018, and, as of January 2019, it ranked third in oil refining capacity.
- California is the largest consumer of jet fuel among the 50 states and accounted for one-fifth of the nation's jet fuel consumption in 2018.
- California's total energy consumption is the second-highest in the nation, but, in 2018, the State's per capita energy consumption ranked the fourth-lowest, due in part to its mild climate and its energy efficiency programs.
- In 2018, California ranked first in the nation as a producer of electricity from solar, geothermal, and biomass resources and fourth in the nation in conventional hydroelectric power generation.
- In 2018, large- and small-scale solar PV and solar thermal installations provided 19% of California's net electricity generation[5].

5 State Profile and Energy Estimates. Independent Statistics and Analysis. [Online] [Cited: January 16, 2020.] http://www.eia.gov/state/?sid=CA#tabs2.

As indicated above, California is one of the nation's leading energy-producing states, and California per capita energy use is among the nation's most efficient. Given the nature of the proposed project, the remainder of this discussion will focus on the three sources of energy that are most relevant to the project—namely, electricity and natural gas for building uses, and transportation fuel for vehicle trips associated with the proposed project.

Electricity

Electricity would be provided to the project by Southern California Edison (SCE). SCE provides electric power to more than 15 million persons, within a service area encompassing approximately 50,000 square miles.[6] SCE derives electricity from varied energy resources including: fossil fuels, hydroelectric generators, nuclear power plants, geothermal power plants, solar power generation, and wind farms. SCE also purchases from independent power producers and utilities, including out-of-state suppliers.[7] Table 2 identifies SCE's specific proportional shares of electricity sources in 2019.

Table 2: SCE 2019 Power Content Mix

Energy Resources	2019 SCE Power Mix
Eligible Renewable	35%
Biomass & Waste	1%
Geothermal	6%
Eligible Hydroelectric	1%
Solar	16%
Wind	12%
Coal	0%
Large Hydroelectric	8%
Natural Gas	16%
Nuclear	8%
Other	0%
Unspecified Sources of power*	33%
Total	100%

Notes:
[1]https://www.sce.com/sites/default/files/inline-files/SCE_2019PowerContentLabel.pdf
*Unspecified sources of power means electricity from transactions that are not traceable to specific generation sources.

Natural Gas

Natural gas would be provided to the project by Southern California Gas (SoCalGas). The following summary of natural gas resources and service providers, delivery systems, and associated regulation is excerpted from information provided by the California Public Utilities Commission (CPUC).

The CPUC regulates natural gas utility service for approximately 11 million customers that receive natural gas from Pacific Gas and Electric (PG&E), Southern California Gas (SoCalGas), San Diego Gas & Electric (SDG&E), Southwest Gas, and several smaller investor-owned natural gas utilities. The CPUC also regulates

[6] https://www.sce.com/about-us/who-we-are/leadership/our-service-territory
[7] California Energy Commission. Utility Energy Supply plans from 2015. https://www.energy.ca.gov/almanac/electricity_data/supply_forms.html

independent storage operators Lodi Gas Storage, Wild Goose Storage, Central Valley Storage and Gill Ranch Storage.

The vast majority of California's natural gas customers are residential and small commercial customers, referred to as "core" customers. Larger volume gas customers, like electric generators and industrial customers, are called "noncore" customers. Although very small in number relative to core customers, noncore customers consume about 65% of the natural gas delivered by the state's natural gas utilities, while core customers consume about 35%.

The PUC regulates the California utilities' natural gas rates and natural gas services, including in-state transportation over the utilities' transmission and distribution pipeline systems, storage, procurement, metering and billing.

Most of the natural gas used in California comes from out-of-state natural gas basins. In 2017, for example, California utility customers received 38% of their natural gas supply from basins located in the U.S. Southwest, 27% from Canada, 27% from the U.S. Rocky Mountain area, and 8% from production located in California."[8]

Transportation Energy Resources

The project would attract additional vehicle trips with resulting consumption of energy resources, predominantly gasoline and diesel fuel. Gasoline (and other vehicle fuels) are commercially-provided commodities and would be available to the project patrons and employees via commercial outlets.

The most recent data available shows the transportation sector emits 40 percent of the total greenhouse gases in the state and about 84 percent of smog-forming oxides of nitrogen (NOx).[9,10] About 28 percent of total United States energy consumption in 2019 was for transporting people and goods from one place to another. In 2019, petroleum comprised about 91 percent of all transportation energy use, excluding fuel consumed for aviation and most marine vessels.[11] In 2020, about 123.49 billion gallons (or about 2.94 billion barrels) of finished motor gasoline were consumed in the United States, an average of about 337 million gallons (or about 8.03 million barrels) per day.[12]

2.0 Regulatory Background

Federal and state agencies regulate energy use and consumption through various means and programs. On the federal level, the United States Department of Transportation, the United States Department of Energy, and the United States Environmental Protection Agency are three federal agencies with substantial influence over energy policies and programs. On the state level, the PUC and the California Energy

[8] California Public Utilities Commission. Natural Gas and California. http://www.cpuc.ca.gov/natural_gas/
[9] CARB. California Greenhouse Gas Emissions Inventory 2000-2018 -2020 Edition. https://www.arb.ca.gov/cc/inventory/data/data.htm
[10] CARB. 2016 SIP Emission Projection Data. https://www.arb.ca.gov/app/emsinv/2017/emseic1_query.php?F_DIV=-4&F_YR=2012&F_SEASON=A&SP=SIP105ADJ&F_AREA=CA
[11] US Energy Information Administration. Use of Energy in the United States Explained: Energy Use for Transportation. https://www.eia.gov/energyexplained/?page=us_energy_transportation
[12] https://www.eia.gov/tools/faqs/faq.php?id=23&t=10

Commissions (CEC) are two agencies with authority over different aspects of energy. Relevant federal and state energy-related laws and plans are summarized below.

Federal Regulations

Corporate Average Fuel Economy (CAFE) Standards

First established by the U.S. Congress in 1975, the Corporate Average Fuel Economy (CAFE) standards reduce energy consumption by increasing the fuel economy of cars and light trucks. The National Highway Traffic Safety Administration (NHTSA) and U.S. Environmental Protection Agency (USEPA) jointly administer the CAFE standards. The U.S. Congress has specified that CAFE standards must be set at the "maximum feasible level" with consideration given for: (1) technological feasibility; (2) economic practicality; (3) effect of other standards on fuel economy; and (4) need for the nation to conserve energy.[13]

Issued by NHTSA and EPA in March 2020 (published on April 30, 2020 and effective after June 29, 2020), the Safer Affordable Fuel-Efficient Vehicles Rule would maintain the CAFE and CO2 standards applicable in model year 2020 for model years 2021 through 2026. The estimated CAFE and CO2 standards for model year 2020 are 43.7 mpg and 204 grams of CO2 per mile for passenger cars and 31.3 mpg and 284 grams of CO2 per mile for light trucks, projecting an overall industry average of 37 mpg, as compared to 46.7 mpg under the standards issued in 2012.[14]

Intermodal Surface transportation Efficiency Act of 1991 (ISTEA)

The Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) promoted the development of inter-modal transportation systems to maximize mobility as well as address national and local interests in air quality and energy. ISTEA contained factors that Metropolitan Planning Organizations (MPOs) were to address in developing transportation plans and programs, including some energy-related factors. To meet the new ISTEA requirements, MPOs adopted explicit policies defining the social, economic, energy, and environmental values guiding transportation decisions.

The Transportation Equity Act of the 21st Century (TEA-21)

The Transportation Equity Act for the 21st Century (TEA-21) was signed into law in 1998 and builds upon the initiatives established in the ISTEA legislation, discussed above. TEA-21 authorizes highway, highway safety, transit, and other efficient surface transportation programs. TEA-21 continues the program structure established for highways and transit under ISTEA, such as flexibility in the use of funds, emphasis on measures to improve the environment, and focus on a strong planning process as the foundation of good transportation decisions. TEA-21 also provides for investment in research and its application to maximize the performance of the transportation system through, for example, deployment of Intelligent Transportation Systems, to help improve operations and management of transportation systems and vehicle safety.

[13] https://www.nhtsa.gov/lawsregulations/corporate-average-fuel-economy.
[14] National Highway Traffic Safety Administration (NHTSA) and U.S. Environmental Protection Agency (USEPA), 2018. Federal Register / Vol. 83, No. 165 / Friday, August 24, 2018 / Proposed Rules, The Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule for Model Years 2021–2026 Passenger Cars and Light Trucks 2018. Available at: https://www.epa.gov/regulations-emissions-vehicles-and-engines/safer-affordable-fuel-efficient-safe-vehicles-final-rule.

State Regulations

Integrated Energy Policy Report (IEPR)

Senate Bill 1389 requires the California Energy Commission (CEC) to prepare a biennial integrated energy policy report that assesses major energy trends and issues facing the State's electricity, natural gas, and transportation fuel sectors and provides policy recommendations to conserve resources; protect the environment; ensure reliable, secure, and diverse energy supplies; enhance the state's economy; and protect public health and safety. The Energy Commission prepares these assessments and associated policy recommendations every two years, with updates in alternate years, as part of the Integrated Energy Policy Report.

The 2019 Integrated Energy Policy Report (2019 IEPR) was adopted February 20, 2020, and continues to work towards improving electricity, natural gas, and transportation fuel energy use in California. The 2019 IEPR focuses on a variety of topics such as decarbonizing buildings, integrating renewables, energy efficiency, energy equity, integrating renewable energy, updates on Southern California electricity reliability, climate adaptation activities for the energy sector, natural gas assessment, transportation energy demand forecast, and the California Energy Demand Forecast.[15]

State of California Energy Plan

The CEC is responsible for preparing the State Energy Plan, which identifies emerging trends related to energy supply, demand, conservation, public health and safety, and the maintenance of a healthy economy. The Plan calls for the state to assist in the transformation of the transportation system to improve air quality, reduce congestion, and increase the efficient use of fuel supplies with the least environmental and energy costs. To further this policy, the plan identifies a number of strategies, including assistance to public agencies and fleet operators and encouragement of urban designs that reduce vehicle miles traveled and accommodate pedestrian and bicycle access.

California Building Standards Code (Title 24)

California Building Energy Efficiency Standards (Title 24, Part 6)

The California Building Energy Efficiency Standards for Residential and Nonresidential Buildings (California Code of Regulations, Title 24, Part 6) were adopted to ensure that building construction and system design and installation achieve energy efficiency and preserve outdoor and indoor environmental quality. The current California Building Energy Efficiency Standards (Title 24 standards) are the 2019 Title 24 standards, which became effective on January 1, 2020. The 2019 Title 24 standards include efficiency improvements to the lighting and efficiency improvements to the non-residential standards include alignment with the American Society of Heating and Air-Conditioning Engineers.

[15] California Energy Commission. Final 2019 Integrated Energy Policy Report. February 20, 2020. https://www.energy.ca.gov/data-reports/reports/integrated-energy-policy-report/2019-integrated-energy-policy-report

All buildings for which an application for a building permit is submitted on or after January 1, 2020 must follow the 2019 standards. The 2016 residential standards were estimated to be approximately 28 percent more efficient than the 2013 standards, whereas the 2019 residential standards are estimated to be approximately 7 percent more efficient than the 2016 standards. Furthermore, once rooftop solar electricity generation is factored in, 2019 residential standards are estimated to be approximately 53 percent more efficient than the 2016 standards. Under the 2019 standards, nonresidential buildings are estimated to be approximately 30 percent more efficient than the 2016 standards. Energy efficient buildings require less electricity; therefore, increased energy efficiency reduces fossil fuel consumption and decreases greenhouse gas emissions.

California Building Energy Efficiency Standards (Title 24, Part 11)

The 2019 California Green Building Standards Code (California Code of Regulations, Title 24, Part 11), commonly referred to as the CALGreen Code, went into effect on January 1, 2020. The 2019 CALGreen Code includes mandatory measures for non-residential development related to site development; energy efficiency; water efficiency and conservation; material conservation and resource efficiency; and environmental quality.

The Department of Housing and Community Development (HCD) updated CALGreen through the 2019 Triennial Code Adoption Cycle. HCD modified the best management practices for stormwater pollution prevention adding Section 5.106.2; added sections 5.106.4.1.3 and 5.106.4.1.5 in regard to bicycle parking; amended section 5.106.5.3.5 allowing future charging spaces to qualify as designated parking for clean air vehicles; updated section 5.303.3.3 in regard to showerhead flow rates; amended section 5.304.1 for outdoor potable water use in landscape areas and repealed sections 5.304.2 and 5.304.3; and updated Section 5.504.5.3 in regard to the use of MERV filters in mechanically ventilated buildings.

Senate Bill 350

Senate Bill 350 (SB 350) was signed into law 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 (RPS) eligible resources, including solar, wind, biomass, geothermal, and others. In addition, SB 350 requires the state to double statewide energy efficiency savings in electricity and natural gas end uses by 2030. To help ensure these goals are met and the greenhouse gas emission reductions are realized, large utilities will be required to develop and submit Integrated Resource Plans (IRPs). These IRPs will detail how each entity will meet their customers resource needs, reduce greenhouse gas emissions and ramp up the deployment of clean energy resources.

Assembly Bill 32

In 2006 the California State Legislature adopted Assembly Bill 32 (AB 32), the California Global Warming Solutions Act of 2006. AB 32 requires CARB, to adopt rules and regulations that would achieve GHG emissions equivalent to statewide levels in 1990 by 2020 through an enforceable statewide emission cap which will be phased in starting in 2012. Emission reductions shall include carbon sequestration projects that would remove carbon from the atmosphere and best management practices that are technologically feasible and cost effective.

Assembly Bill 1493/Pavley Regulations

California Assembly Bill 1493 enacted on July 22, 2002, required CARB to develop and adopt regulations that reduce GHGs emitted by passenger vehicles and light duty trucks. In 2005, the CARB submitted a “waiver” request to the EPA from a portion of the federal Clean Air Act in order to allow the State to set more stringent tailpipe emission standards for CO_2 and other GHG emissions from passenger vehicles and light duty trucks. On December 19, 2007 the EPA announced that it denied the “waiver” request. On January 21, 2009, CARB submitted a letter to the EPA administrator regarding the State’s request to reconsider the waiver denial. The EPA approved the waiver on June 30, 2009.

Executive Order S-1-07/Low Carbon Fuel Standard

Executive Order S-1-07 was issued in 2007 and proclaims that the transportation sector is the main source of GHG emissions in the State, since it generates more than 40 percent of the State’s GHG emissions. It establishes a goal to reduce the carbon intensity of transportation fuels sold in the State by at least ten percent by 2020. This Order also directs CARB to determine whether this Low Carbon Fuel Standard (LCFS) could be adopted as a discrete early-action measure as part of the effort to meet the mandates in AB 32.

On April 23, 2009 CARB approved the proposed regulation to implement the low carbon fuel standard and began implementation on January 1, 2011. The low carbon fuel standard is anticipated to reduce GHG emissions by about 16 MMT per year by 2020. CARB approved some amendments to the LCFS in December 2011, which were implemented on January 1, 2013. In September 2015, the Board approved the re-adoption of the LCFS, which became effective on January 1, 2016, to address procedural deficiencies in the way the original regulation was adopted. In 2018, the Board approved amendments to the regulation, which included strengthening and smoothing the carbon intensity benchmarks through 2030 in-line with California's 2030 GHG emission reduction target enacted through SB 32, adding new crediting opportunities to promote zero emission vehicle adoption, alternative jet fuel, carbon capture and sequestration, and advanced technologies to achieve deep decarbonization in the transportation sector.

The LCFS is designed to encourage the use of cleaner low-carbon transportation fuels in California, encourage the production of those fuels, and therefore, reduce GHG emissions and decrease petroleum dependence in the transportation sector. Separate standards are established for gasoline and diesel fuels and the alternative fuels that can replace each. The standards are “back-loaded”, with more reductions required in the last five years, than during the first five years. This schedule allows for the development of advanced fuels that are lower in carbon than today’s fuels and the market penetration of plug-in hybrid electric vehicles, battery electric vehicles, fuel cell vehicles, and flexible fuel vehicles. It is anticipated that compliance with the low carbon fuel standard will be based on a combination of both lower carbon fuels and more efficient vehicles.

Reformulated gasoline mixed with corn-derived ethanol at ten percent by volume and low sulfur diesel fuel represent the baseline fuels. Lower carbon fuels may be ethanol, biodiesel, renewable diesel, or blends of these fuels with gasoline or diesel as appropriate. Compressed natural gas and liquefied natural gas also may be low carbon fuels. Hydrogen and electricity, when used in fuel cells or electric vehicles are also considered as low carbon fuels for the low carbon fuel standard.

Executive Order N-79-20.

Executive Order N-79-20 was signed into law on September 23, 2020 and mandates 100 percent of in-state sales of new passenger cars and trucks be zero-emission by 2035; 100 percent of medium- and heavy-duty vehicles in the state be zero-emission vehicles by 2045 for all operations where feasible and by 2035 for drayage trucks; and to transition to 100 percent zero-emission off-road vehicles and equipment by 2035 where feasible.

California Air Resources Board

CARB's Advanced Clean Cars Program

Closely associated with the Pavley regulations, the Advanced Clean Cars emissions control program was approved by CARB in 2012. The program combines the control of smog, soot, and GHGs with requirements for greater numbers of zero-emission vehicles for model years 2015–2025. The components of the Advanced Clean Cars program include the Low-Emission Vehicle (LEV) regulations that reduce criteria pollutants and GHG emissions from light- and medium-duty vehicles, and the Zero-Emission Vehicle (ZEV) regulation, which requires manufacturers to produce an increasing number of pure ZEVs (meaning battery electric and fuel cell electric vehicles), with provisions to also produce plug-in hybrid electric vehicles (PHEV) in the 2018 through 2025 model years.[16]

Airborne Toxic Control Measure to Limit Diesel-Fueled Commercial Motor Vehicle Idling

The Airborne Toxic Control Measure to Limit Diesel-Fueled Commercial Motor Vehicle Idling (Title 13, California Code of Regulations, Division 3, Chapter 10, Section 2435) was adopted to reduce public exposure to diesel particulate matter and other air contaminants by limiting the idling of diesel-fueled commercial motor vehicles. This section applies to diesel-fueled commercial motor vehicles with gross vehicular weight ratings of greater than 10,000 pounds that are or must be licensed for operation on highways. Reducing idling of diesel-fueled commercial motor vehicles reduces the amount of petroleum-based fuel used by the vehicle.

Regulation to Reduce Emissions of Diesel Particulate Matter, Oxides of Nitrogen, and other Criteria Pollutants, form In-Use Heavy-Duty Diesel-Fueled Vehicles

The Regulation to Reduce Emissions of Diesel Particulate Matter, Oxides of Nitrogen and other Criteria Pollutants, from In-Use Heavy-Duty Diesel-Fueled Vehicles (Title 13, California Code of Regulations, Division 3, Chapter 1, Section 2025) was adopted to reduce emissions of diesel particulate matter, oxides of nitrogen (NO_X) and other criteria pollutants from in-use diesel-fueled vehicles. This regulation is phased, with full implementation by 2023. The regulation aims to reduce emissions by requiring the installation of diesel soot filters and encouraging the retirement, replacement, or repower of older, dirtier engines with newer emission-controlled models. The newer emission controlled models would use petroleum-based fuel in a more efficient manner.

[16] California Air Resources Board, California's Advanced Clean Cars Program, January 18, 2017. www.arb.ca.gov/msprog/acc/acc.htm.

Sustainable Communities Strategy

The Sustainable Communities and Climate Protection Act of 2008, or Senate Bill 375 (SB 375), coordinates land use planning, regional transportation plans, and funding priorities to help California meet the GHG reduction mandates established in AB 32.

Senate Bill 375 (SB 375) was adopted September 2008 and aligns regional transportation planning efforts, regional GHG emission reduction targets, and land use and housing allocation. SB 375 requires Metropolitan Planning Organizations (MPO) to adopt a sustainable communities strategy (SCS) or alternate planning strategy (APS) that will prescribe land use allocation in that MPOs Regional Transportation Plan (RTP). CARB, in consultation with each MPO, will provide each affected region with reduction targets for GHGs emitted by passenger cars and light trucks in the region for the years 2020 and 2035. These reduction targets will be updated every eight years but can be updated every four years if advancements in emissions technologies affect the reduction strategies to achieve the targets. CARB is also charged with reviewing each MPO's sustainable communities strategy or alternate planning strategy for consistency with its assigned targets.

3.0 Evaluation Criteria and Methodology

Evaluation Criteria

CEQA Energy Questions

In compliance with Appendix G of the State CEQA Guidelines, this report analyzes the project's anticipated energy use to determine if the project would:

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

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

In addition, Appendix F of the State CEQA Guidelines states that the means of achieving the goal of energy conservation includes the following:

- Decreasing overall per capita energy consumption;
- Decreasing reliance on fossil fuels such as coal, natural gas and oil; and
- Increasing reliance on renewable energy sources.

Methodology

Information from the CalEEMod 2016.3.2 Daily and Annual Outputs contained in the Central Avenue Gas Station Air Quality and Greenhouse Gas Impact Study (air quality and greenhouse gas analysis) prepared for the proposed project by MD (December 19, 2022), was utilized for this analysis. The CalEEMod outputs detail project related construction equipment, transportation energy demands, and facility energy demands.

4.0 Energy Review

Construction Energy Demand

The construction schedule is anticipated to begin in the beginning of August 2021 and take approximately six months to complete and be completed in one phase. Staging of construction vehicles and equipment will occur on-site.

Construction Equipment Electricity Usage Estimates

As stated previously, electrical service will be provided by the SCE. The focus within this section is the energy implications of the construction process, specifically the power cost from on-site electricity consumption during construction of the proposed project. Based on the 2017 National Construction Estimator, Richard Pray (2017)[17], the typical power cost per 1,000 square feet of building construction per month is estimated to be $2.32. The project plans to develop the site with a 4,000 square foot convenience market with a gasoline service station with 12 fueling pumps over the course of approximately six months. Based on Table 3, the total power cost of the on-site electricity usage during the construction of the proposed project is estimated to be approximately $55.68. Furthermore, as of April 13, 2020, SCE's general service rate schedule (GS-1) is approximately $0.09 per kWh of electricity.[18] As shown in Table 3, the total electricity usage from Project construction related activities is estimated to be approximately 619 kWh.

Table 3: Project Construction Power Cost and Electricity Usage

Power Cost (per 1,000 square foot of building per month of construction)	Total Building Size (1,000 Square Foot)	Construction Duration (months)	Total Project Construction Power Cost
$2.32	4.000	6	$55.68

Cost per kWh	Total Project Construction Electricity Usage (kWh)
$0.09	619

*Assumes the project will be under the GS-1 General Service rate under SCE.

Construction Equipment Fuel Estimates

Fuel consumed by construction equipment would be the primary energy resource expended over the course of project construction. Fuel consumed by construction equipment was evaluated with the following assumptions:

- Construction schedule of approximately 6 months

[17] Pray, Richard. 2017 National Construction Estimator. Carlsbad : Craftsman Book Company, 2017.
[18] Southern California Edison (SCE). Rates & Pricing Choices: General Service/Industrial Rates. https://library.sce.com/content/dam/sce-doclib/public/regulatory/historical/electric/2020/schedules/general-service-&-industrial-rates/ELECTRIC_SCHEDULES_GS-1_2020.pdf

- All construction equipment was assumed to run on diesel fuel
- Typical daily use of 8 hours, with some equipment operating from ~6-7 hours
- Aggregate fuel consumption rate for all equipment was estimated at 18.5 hp-hr/day (from CARB's 2017 Emissions Factors Tables and fuel consumption rate factors as shown in Table D-21 of the Moyer Guidelines: (https://www.arb.ca.gov/msprog/moyer/guidelines/2017gl/2017_gl_appendix_d.pdf).
- Diesel fuel would be the responsibility of the equipment operators/contractors and would be sources within the region.
- Project construction represents a "single-event" for diesel fuel demand and would not require on-going or permanent commitment of diesel fuel resources during long term operation.

Using the CalEEMod data input from the air quality and greenhouse gas analysis (MD Acoustics 2020), the project's construction phase would consume electricity and fossil fuels as a single energy demand, that is, once construction is completed their use would cease. CARB's 2013 Emissions Factors Tables show that on average aggregate fuel consumption (gasoline and diesel fuel) would be approximately 18.5 hp-hr-gal. Table 4 shows the results of the analysis of construction equipment.

Table 4: Construction Equipment Fuel Consumption Estimates

Phase	Number of Days	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor	HP hrs/day	Total Fuel Consumption (gal diesel fuel)[1]
Site Preparation	2	Tractors/Loaders/Backhoes	1	8	97	0.37	287	31
Grading	4	Graders	1	6	187	0.41	460	99
	4	Rubber Tired Dozers	1	6	247	0.4	593	128
	4	Tractors/Loaders/Backhoes	1	7	97	0.37	251	54
Building Construction	120	Cranes	2	6	231	0.29	804	5,214
	120	Forklifts	2	6	89	0.2	214	1,386
	120	Generator Sets	1	8	84	0.74	497	3,226
	120	Tractors/Loaders/Backhoes	2	6	97	0.37	431	2,794
	120	Welders	3	8	46	0.45	497	3,222
Paving	10	Cement and Mortar Mixers	1	6	9	0.56	30	16
	10	Pavers	1	6	130	0.42	328	177
	10	Paving Equipment	1	8	132	0.36	380	205
	10	Rollers	1	7	80	0.38	213	115
	10	Tractors/Loaders/Backhoes	1	8	97	0.37	287	155
Architectural Coating	10	Air Compressors	1	6	78	0.48	225	121
CONSTRUCTION FUEL DEMAND (gallons of diesel fuel)								**16,945**

Notes:
[1]Using Carl Moyer Guidelines Table D-21 Fuel consumption rate factors (bhp-hr/gal) for engines less than 750 hp.
(Source: https://www.arb.ca.gov/msprog/moyer/guidelines/2017gl/2017_gl_appendix_d.pdf)

As presented in Table 4, project construction activities would consume an estimated 16,945 gallons of diesel fuel. As stated previously, project construction would represent a "single-event" diesel fuel demand and would not require on-going or permanent commitment of diesel fuel resources for this purpose.

Construction Worker Fuel Estimates

It is assumed that all construction worker trips are from light duty autos (LDA) along area roadways. With respect to estimated VMT, the construction worker trips would generate an estimated 49,216 VMT. Data regarding project related construction worker trips were based on CalEEMod 2016.3.2 model defaults.

Vehicle fuel efficiencies for construction workers were estimated in the air quality and greenhouse gas analysis (MD Acoustics 2020) using information generated using CARB's EMFAC model (see Appendix A for details). An aggregate fuel efficiency of 30.13 miles per gallon (mpg) was used to calculate vehicle miles traveled for construction worker trips. Table 5 shows that an estimated 1,633 gallons of fuel would be consumed for construction worker trips.

Table 5: Construction Worker Fuel Consumption Estimates

Phase	Number of Days	Worker Trips/Day	Trip Length (miles)	Vehicle Miles Traveled	Average Vehicle Fuel Economy (mpg)	Estimated Fuel Consumption (gallons)
Site Preparation	2	8	14.7	235	30.13	8
Grading	4	8	14.7	470	30.13	16
Building Construction	120	26	14.7	45,864	30.13	1,522
Paving	10	13	14.7	1,911	30.13	63
Architectural Coating	10	5	14.7	735	30.13	24
Total Construction Worker Fuel Consumption						**1,633**

Notes:
[1]Assumptions for the worker trip length and vehicle miles traveled are consistent with CalEEMod 2016.3.2 defaults.

Construction Vendor/Hauling Fuel Estimates

Tables 6 and 7 show the estimated fuel consumption for vendor and hauling during building construction and architectural coating. With respect to estimated VMT, the vendor and hauling trips would generate an estimated 8,280 VMT. Data regarding project related construction worker trips were based on CalEEMod 2016.3.2 model defaults.

For the architectural coatings it is assumed that the contractors would be responsible for bringing coatings and equipment with them in their light duty vehicles. Therefore, vendors delivering construction material or hauling debris from the site during grading would use medium to heavy duty vehicles with an average fuel consumption of 8.93 mpg for medium heavy duty trucks and 6.51 mpg for heavy heavy duty trucks (see Appendix A for details). Tables 6 and 7 show that an estimated 927 gallons of fuel would be consumed for vendor and hauling trips.

<Table 6, next page>

Table 6: Construction Vendor Fuel Consumption Estimates (MHD Trucks)[1]

Phase	Number of Days	Vendor Trips/Day	Trip Length (miles)	Vehicle Miles Traveled	Average Vehicle Fuel Economy (mpg)	Estimated Fuel Consumption (gallons)
Site Preparation	2	0	6.9	0	8.93	0
Grading	4	0	6.9	0	8.93	0
Building Construction	120	10	6.9	8,280	8.93	927
Paving	10	0	6.9	0	8.93	0
Architectural Coating	10	0	6.9	0	8.93	0
Total Vendor Fuel Consumption						**927**

Notes:
[1] Assumptions for the vendor trip length and vehicle miles traveled are consistent with CalEEMod 2016.3.2 defaults.

Table 7: Construction Hauling Fuel Consumption Estimates (HHD Trucks)[1]

Phase	Number of Days	Hauling Trips/Day	Trip Length (miles)	Vehicle Miles Traveled	Average Vehicle Fuel Economy (mpg)	Estimated Fuel Consumption (gallons)
Site Preparation	2	0	20	0	6.51	0
Grading	4	0	20	0	6.51	0
Building Construction	120	0	20	0	6.51	0
Paving	10	0	20	0	6.51	0
Architectural Coating	10	0	20	0	6.51	0
Total Construction Hauling Fuel Consumption						**0**

Notes:
[1]Assumptions for the hauling trip length and vehicle miles traveled are consistent with CalEEMod 2016.3.2 defaults.

Construction Energy Efficiency/Conservation Measures

Construction equipment used over the approximately six-month construction phase would conform to CARB regulations and California emissions standards and is evidence of related fuel efficiencies. Construction of the proposed commercial development would require the typical use of energy resources. 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 inefficient wasteful, or unnecessary consumption of fuel.

CARB has adopted the Airborne Toxic Control Measure to limit heavy-duty diesel motor vehicle idling in order to reduce public exposure to diesel particulate matter and other Toxic Air Contaminants.

Additionally, as required by California Code of Regulations Title 13, Motor Vehicles, section 2449(d)(3) Idling, limits idling times of construction vehicles to no more than five minutes, thereby minimizing or eliminating unnecessary and wasteful consumption of fuel due to unproductive idling of construction equipment. Enforcement of idling limitations is realized through periodic site inspections conducted by City building officials, and/or in response to citizen complaints. Compliance with these measures would result in a more efficient use of construction-related energy and would minimize or eliminate wasteful or unnecessary consumption of energy. Idling restrictions and the use of newer engines and equipment would result in less fuel combustion and energy consumption.

Furthermore, the project has been designed in compliance with California's Energy Efficiency Standards and 2019 CALGreen Standards. These measures include, but are not limited to the use of water conserving plumbing, installation of bicycle racks, the use of LED lighting, and water-efficient irrigation systems.

Operation Energy Demand

Energy consumption in support of or related to project operations would include transportation energy demands (energy consumed by employee and patron vehicles accessing the project site) and facilities energy demands (energy consumed by building operations and site maintenance activities).

Transportation Fuel Consumption

The largest source of operational energy use would be vehicle operation of customers. The site is located is in an urbanized area just east of Highway 74 between Rosetta Canyon Drive and Ardenwood Way. Furthermore, there are existing transit services, provided by RTA, approximately 0.13-mile walking distance of the proposed Project site. The nearest transit service is Riverside Transit Route 22, with a stop along Highway 74 just north of Rosetta Canyon Drive.

Using the CalEEMod output from the air quality and greenhouse gas analysis (MD Acoustics 2020), it is assumed that an average trip for autos were assumed to be 16.6 miles, light trucks were assumed to travel an average of 8.4 miles, and 3- 4-axle trucks were assumed to travel an average of 6.9 miles[19]. As the proposed project is a convenience market with gasoline service station, it was assumed that vehicles would operate 365 days per year. Table 8 shows the worst-case estimated annual fuel consumption for all classes of vehicles from autos to heavy-heavy trucks.[20]

The proposed project would generate approximately 1,217 trips per day. The vehicle fleet mix was used from the CalEEMod output from the air quality and greenhouse gas analysis (MD Acoustics 2020). Table 8 shows that an estimated 264,540 gallons of fuel would be consumed per year for the operation of the proposed project.

<Table 8, next page>

[19] CalEEMod default distance for H-W (home-work) or C-W (commercial-work) is 16.6 miles; 6.9 miles for H-O (home-other) or C-O (commercial-other).
[20] Average fuel economy based on aggregate mileage calculated in EMFAC 2017 for opening year (2022). See Appendix A for EMFAC output.

Table 8: Estimated Vehicle Operations Fuel Consumption

Vehicle Type	Vehicle Mix	Number of Vehicles	Average Trip (miles)[1]	Daily VMT	Average Fuel Economy (mpg)	Total Gallons per Day	Total Annual Fuel Consumption (gallons)
Light Auto	Automobile	664	16.6	11,022	30.95	356.14	129,990
Light Truck	Automobile	45	8.4	378	26.47	14.28	5,212
Light Truck	Automobile	227	8.4	1,907	24.72	77.14	28,155
Medium Truck	Automobile	140	6.9	966	5.97	161.81	59,060
Light Heavy Truck	2-Axle Truck	19	6.9	131	13.53	9.69	3,537
Light Heavy Truck 10,000 lbs +	2-Axle Truck	6	6.9	41	13.88	2.98	1,089
Medium Heavy Truck	3-Axle Truck	21	6.9	145	9.22	15.72	5,736
Heavy Heavy Truck	4-Axle Truck	85	6.9	587	6.74	87.02	31,761
Total		1,217	--	15,177	16.44	724.77	--
Total Annual Fuel Consumption							**264,540**

Notes:
[1]Based on the size of the site and relative location, trips were assumed to be local rather than regional.

Trip generation and VMT generated by the proposed project are consistent with other similar commercial uses of similar scale and configuration as reflected respectively in the Institute of Transportation Engineers (ITE) Trip Generation Manual (20th Edition, 2017). That is, the proposed project does not propose uses or operations that would inherently result in excessive and wasteful vehicle trips and VMT, nor associated excess and wasteful vehicle energy consumption. Furthermore, the state of California consumed approximately 4.2 billion gallons of diesel and 15.1 billion gallons of gasoline in 2015.[21,22] In addition, per EMFAC2017, the County of Riverside is estimated to have an annual fuel consumption of approximately 904,493 thousand gallons in the year 2022.[23] Therefore, the increase in fuel consumption from the proposed project is insignificant in comparison to the State's demand. Therefore, project transportation energy consumption would not be considered inefficient, wasteful, or otherwise unnecessary.

Facility Energy Demands (Electricity and Natural Gas)

Building operation and site maintenance (including landscape maintenance) would result in the consumption of electricity (provided by SCE) and natural gas (provided by Southern California Gas Company). Operation of the proposed project would involve the use of energy for heating, cooling and equipment operation. These facilities would comply with all applicable California Energy Efficiency Standards and 2019 CALGreen Standards.

The annual natural gas and electricity demands were provided per the CalEEMod output from the air quality and greenhouse gas analysis (MD Acoustics 2020) and are provided in Table 9.

[21] https://www.energy.ca.gov/data-reports/energy-almanac/transportation-energy/california-gasoline-data-facts-and-statistics
[22] https://www.energy.ca.gov/data-reports/energy-almanac/transportation-energy/diesel-fuel-data-facts-and-statistics
[23] https://arb.ca.gov/emfac/emissions-inventory/92bccfb9b61dec8923cc5a7c26aadaf58ed0ef68

Table 9: Project Mitigated Annual Operational Energy Demand Summary[1]

Electricity Demand	kWh/year
Gasoline/Service Station	78,680
Parking Lot	4,760
Total	83,440

Notes:
[1]Taken from the CalEEMod 2016.3.2 annual output in the Central Avenue Gas Station Air Quality and Greenhouse Gas Impact Study prepared for the proposed project by MD Acoustics (December 19, 2022).

As shown in Table 9, the estimated electricity demand for the proposed project is approximately 83,440 kWh per year. In 2021, the non-residential sector of the County of Riverside consumed approximately 8,257 million kWh of electricity.[24] Therefore, the increase in electricity demand from the proposed project is insignificant compared to the County's 2021 non-residential sector demand.

Energy use in buildings is divided into energy consumed by the built environment and energy consumed by uses that are independent of the construction of the building such as in plug-in appliances. In California, the California Building Standards Code Title 24 governs energy consumed by the built environment (including HVAC systems, water heaters, electric stoves, ovens, etc.), mechanical systems, and some types of fixed lighting. Non-building energy use, or "plug-in" energy use can be further subdivided by specific end-use (refrigeration, cooking, appliances, etc.).

Furthermore, the proposed project energy demands in total would be comparable to other commercial projects of similar scale and configuration. Therefore, the project facilities' energy demands and energy consumption would not be considered inefficient, wasteful, or otherwise unnecessary.

Renewable Energy and Energy Efficiency Plan Consistency

Regarding federal transportation regulations, the project site is located in an already developed area. Access to/from the project site is from existing roads. These roads are already in place so the project would not interfere with, nor otherwise obstruct intermodal transportation plans or projects that may be proposed pursuant to the ISTEA because SCAG is not planning for intermodal facilities in the project area.

Regarding the State's Energy Plan and compliance with Title 24 CCR energy efficiency standards, the applicant is required to comply with the California Green Building Standard Code requirements for energy efficient buildings and appliances as well as utility energy efficiency programs implemented by the SCE.

Regarding the State's Renewable Energy Portfolio Standards, the project would be required to meet or exceed the energy standards established in the California Green Building Standards Code, Title 24, Part 11 (CALGreen). CalGreen Standards require that new buildings reduce water consumption, employ building commissioning to increase building system efficiencies, divert construction waste from landfills, and install low pollutant-emitting finish materials.

[24] California Energy Commission, Electricity Consumption by County. https://ecdms.energy.ca.gov/elecbycounty.aspx

5.0 Conclusions

As supported by the preceding analyses, neither construction nor operation of the Project would result in wasteful, inefficient, or unnecessary consumption of energy, or wasteful use of energy resources. The proposed project does not include any 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 and is a commercial project that is not proposing any additional features that would require a larger energy demand than other commercial projects of similar scale and configuration. As the proposed project is consistent with the existing General Plan land use designation, the energy demands of the project are anticipated to be accommodated within the context of available resources and energy delivery systems. The project would therefore not cause or result in the need for additional energy producing or transmission facilities. The project would not engage in wasteful or inefficient uses of energy and aims to achieve energy conservations goals within the State of California.

The Project has been designed in compliance with California's Energy Efficiency Standards and 2019 CALGreen Standards. These measures include, but are not limited to the use of water conserving plumbing, installation of bicycle racks, the use of LED lighting, and water-efficient irrigation systems. The Project would not conflict with or obstruct a state or local plan for renewable energy or energy efficiency; therefore, impacts would be less than significant.

MD is pleased to provide this CEQA Energy review. If you have any questions regarding this analysis, please don't hesitate to call us at (805) 426-4477.

Sincerely,
MD Acoustics, LLC

Mike Dickerson, INCE
Principal

Appendix A

CARB EMFAC 2017

Source: EMFAC2017 (v1.0.3) Emissions Inventory
Region Type: Air Basin
Region: South Coast
Calendar Year: 2021
Season: Annual
Vehicle Classification: EMFAC2007 Categories
Units: miles/day for VMT, trips/day for Trips, tons/day for Emissions, 1000 gallons/day for Fuel Consumption

Region	Calendar Y	Vehicle Cat	Model Year	Speed	Fuel	Population	Trips	Fuel Consumption	Fuel Consumption	Total Fuel Consumption	VMT	Total VMT	Miles Per Gallon	Vehicle Class
South Coast	2021	HHDT	Aggregate	Aggregate	Gasoline	81.3725634	1628.102	1.889707176	1889.707176	1776086.603	7629.442554	11553449.42	6.51	HHD
South Coast	2021	HHDT	Aggregate	Aggregate	Diesel	96726.9495	974405.7	1774.196896	1774196.896		11545819.98			
South Coast	2021	LDA	Aggregate	Aggregate	Gasoline	6276233.77	29647186	8195.759914	8195759.914	8241884.504	246181276.2	248366515	30.13	LDA
South Coast	2021	LDA	Aggregate	Aggregate	Diesel	53709.9025	254840.1	46.1245898	46124.5898		2185238.836			
South Coast	2021	LDA	Aggregate	Aggregate	Electricity	105013.549	525424.1	0	0		4192834.836			
South Coast	2021	LDT1	Aggregate	Aggregate	Gasoline	695145.897	3200417	1009.571346	1009571.346	1009999.543	26066042.38	26075562.75	25.82	LDT1
South Coast	2021	LDT1	Aggregate	Aggregate	Diesel	406.399031	1419.826	0.42819713	428.1971296		9520.378718			
South Coast	2021	LDT1	Aggregate	Aggregate	Electricity	3691.83415	18421.42	0	0		147589.5362			
South Coast	2021	LDT2	Aggregate	Aggregate	Gasoline	2144804.15	10052342	3441.716707	3441716.707	3457561.278	81991235.59	82539629.16	23.87	LDT2
South Coast	2021	LDT2	Aggregate	Aggregate	Diesel	12472.425	61718.11	15.84457068	15844.57068		548393.5724			
South Coast	2021	LDT2	Aggregate	Aggregate	Electricity	16651.9689	84424.2	0	0		552985.8715			
South Coast	2021	LHDT1	Aggregate	Aggregate	Gasoline	172430.216	2568953	598.0686059	598068.6059	809349.9359	6230805.225	10720475.04	13.25	LHDT1
South Coast	2021	LHDT1	Aggregate	Aggregate	Diesel	109610.028	1378756	211.28133	211281.33		4489669.812			
South Coast	2021	LHDT2	Aggregate	Aggregate	Gasoline	28913.8178	430772.8	111.7961286	111796.1286	201931.6877	1014315.328	2744944.158	13.59	LHDT2
South Coast	2021	LHDT2	Aggregate	Aggregate	Diesel	43242.2337	543932.9	90.13555911	90135.55911		1730628.83			
South Coast	2021	MCY	Aggregate	Aggregate	Gasoline	279209.361	558418.7	53.89538804	53895.38804	53895.38804	1958676.919	1958676.919	36.34	MCY
South Coast	2021	MDV	Aggregate	Aggregate	Gasoline	1520877.3	7026646	2808.57758	2808577.58	2854598.975	54421172.7	55643285	19.49	MDV
South Coast	2021	MDV	Aggregate	Aggregate	Diesel	29603.6659	145604.8	46.02139556	46021.39556		1222112.304			
South Coast	2021	MDV	Aggregate	Aggregate	Electricity	7250.17223	37174.04	0	0		249429.9943			
South Coast	2021	MH	Aggregate	Aggregate	Gasoline	34556.2813	3457.01	64.51935527	64519.35527	75563.3084	327720.8034	443086.5288	5.86	MH
South Coast	2021	MH	Aggregate	Aggregate	Diesel	11829.1715	1182.917	11.04395313	11043.95313		115365.7253			
South Coast	2021	MHDT	Aggregate	Aggregate	Gasoline	24683.6081	493869.6	264.5056072	264505.6072	991967.8223	1325210.138	8860357.635	8.93	MHDT
South Coast	2021	MHDT	Aggregate	Aggregate	Diesel	119075.286	1192855	727.4622151	727462.2151		7535147.497			
South Coast	2021	OBUS	Aggregate	Aggregate	Gasoline	5845.39061	116954.6	49.57947234	49579.47234	87256.58216	246477.18	555364.3745	6.36	OBUS
South Coast	2021	OBUS	Aggregate	Aggregate	Diesel	4131.13499	40389.68	37.67710982	37677.10982		308887.1946			
South Coast	2021	SBUS	Aggregate	Aggregate	Gasoline	2414.92674	9659.707	10.85210767	10852.10767	37379.67328	98099.38663	297576.5962	7.96	SBUS
South Coast	2021	SBUS	Aggregate	Aggregate	Diesel	6314.06403	72863.42	26.52756561	26527.56561		199477.2096			
South Coast	2021	UBUS	Aggregate	Aggregate	Gasoline	943.967838	3775.871	18.45610299	18456.10299	18702.89919	88729.36464	90207.45032	4.82	UBUS
South Coast	2021	UBUS	Aggregate	Aggregate	Diesel	14.1414183	56.56567	0.246796198	246.7961984		1478.085683			
South Coast	2021	UBUS	Aggregate	Aggregate	Electricity	12.1169389	48.46776	0			1072.906717			

Source: https://arb.ca.gov/emfac/emissions-inventory

Calendar Year: 2022
Season: Annual
Vehicle Classification: EMFAC2007 Categories
Units: miles/day for VMT, trips/day for Trips, tons/day for Emissions, 1000 gallons/day for Fuel Consumption

Region	Calendar Year	Vehicle Ca	Model Year	Speed	Fuel	Population	Trips	Fuel Consumption	Fuel Consumption	Total Fuel Consumption	VMT	Total VMT	Miles Per Gallon	Vehicle Class
South Coast AQMD	2022	HHDT	Aggregate	Aggregate	Gasoline	77.82251	1557.073	1.914672095	1914.672095	1984478.157	7970.981	13381402.09	**6.74**	HHD
South Coast AQMD	2022	HHDT	Aggregate	Aggregate	Diesel	108362	1118617	1982.563485	1982563.485		13373431			
South Coast AQMD	2022	LDA	Aggregate	Aggregate	Gasoline	6542832	30915701	8178.144259	8178144.259	8226568.36	2.52E+08	254602375.4	**30.95**	LDA
South Coast AQMD	2022	LDA	Aggregate	Aggregate	Diesel	58937.5	279973.4	48.42410045	48424.10045		2358230			
South Coast AQMD	2022	LDA	Aggregate	Aggregate	Electricity	127532.6	637025.4	0	0		5177709			
South Coast AQMD	2022	LDT1	Aggregate	Aggregate	Gasoline	736905.6	3399512	1031.447408	1031447.408	1031847.287	27300896	27309932.68	**26.47**	LDT1
South Coast AQMD	2022	LDT1	Aggregate	Aggregate	Diesel	387.1571	1348.408	0.39987912	399.8791198		9037.122			
South Coast AQMD	2022	LDT1	Aggregate	Aggregate	Electricity	5339.042	26794.47	0	0		221507.4			
South Coast AQMD	2022	LDT2	Aggregate	Aggregate	Gasoline	2246303	10535910	3436.155557	3436155.557	3453207.618	84740129	85348125.78	**24.72**	LDT2
South Coast AQMD	2022	LDT2	Aggregate	Aggregate	Diesel	14234.59	70193.22	17.05206088	17052.06088		607996.5			
South Coast AQMD	2022	LDT2	Aggregate	Aggregate	Electricity	22589.96	114302.6	0	0		734756.1			
South Coast AQMD	2022	LHDT1	Aggregate	Aggregate	Gasoline	175903.1	2620694	598.0685493	598068.5493	821513.5103	6298251	11115258.37	**13.53**	LHDT1
South Coast AQMD	2022	LHDT1	Aggregate	Aggregate	Diesel	119380.7	1501659	223.444961	223444.961		4817007			
South Coast AQMD	2022	LHDT2	Aggregate	Aggregate	Gasoline	30009.92	447103.1	113.5150695	113515.0695	209067.0531	1040649	2902289.397	**13.88**	LHDT2
South Coast AQMD	2022	LHDT2	Aggregate	Aggregate	Diesel	47335.63	595422.7	95.55198358	95551.98358		1861640			
South Coast AQMD	2022	MCY	Aggregate	Aggregate	Gasoline	295960.1	591920.2	56.92214589	56922.14589	56922.14589	2072370	2072370.126	**36.41**	MCY
South Coast AQMD	2022	MDV	Aggregate	Aggregate	Gasoline	1579640	7302407	2793.799561	2793799.561	2842944.316	55888916	57233722.8	**20.13**	MDV
South Coast AQMD	2022	MDV	Aggregate	Aggregate	Diesel	33348.92	163526.3	49.14475473	49144.75473		1344806			
South Coast AQMD	2022	MDV	Aggregate	Aggregate	Electricity	11658.48	59625.3	0	0		391944.3			
South Coast AQMD	2022	MH	Aggregate	Aggregate	Gasoline	35097.75	3511.179	64.70410395	64704.10395	76270.38211	333282.4	455641.5746	**5.97**	MH
South Coast AQMD	2022	MH	Aggregate	Aggregate	Diesel	12758.81	1275.881	11.56627815	11566.27815		122359.2			
South Coast AQMD	2022	MHDT	Aggregate	Aggregate	Gasoline	25445.41	509111.8	269.2842176	269284.2176	1009568.488	1367743	9307083.084	**9.22**	MHDT
South Coast AQMD	2022	MHDT	Aggregate	Aggregate	Diesel	123310	1231988	740.28427	740284.27		7939340			
South Coast AQMD	2022	OBUS	Aggregate	Aggregate	Gasoline	5959.443	119236.5	49.67589796	49675.89796	88138.04214	250653.5	576603.5972	**6.54**	OBUS
South Coast AQMD	2022	OBUS	Aggregate	Aggregate	Diesel	4274.499	41607.39	38.46214418	38462.14418		325950.1			
South Coast AQMD	2022	SBUS	Aggregate	Aggregate	Gasoline	2630.829	10523.32	11.7605267	11760.5267	39328.1885	107369.8	316915.9173	**8.06**	SBUS
South Coast AQMD	2022	SBUS	Aggregate	Aggregate	Diesel	6631.313	76524.43	27.5676618	27567.6618		209546.1			
South Coast AQMD	2022	UBUS	Aggregate	Aggregate	Gasoline	952.146	3808.584	18.40085629	18400.85629	18647.65249	89256	90734.08386	**4.87**	UBUS
South Coast AQMD	2022	UBUS	Aggregate	Aggregate	Diesel	14.14142	56.56567	0.246796198	246.7961984		1478.086			
South Coast AQMD	2022	UBUS	Aggregate	Aggregate	Electricity	17.11694	68.46776	0			1343.185			

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Job No. 21-215H
April 26, 2021

Joseph Karaki
Karaki Western States
4887 E. La Palma, Suite 707
Anaheim, CA 92807

Subject: **Revised Work Plan for a Supplemental Site Assessment, Proposed Gasoline Service Station, 28771 Central Ave , Lake Elsinore, County of Riverside, California**

Dear Mr. Karaki:

In accordance with your request, presented herein is a work plan to conduct a supplemental site assessment. The objective of this assessment is to identify the vertical and horizontal extent of soil contamination in the region of the former structures in the now vacant lot.

The background, objective and scope of work for this preliminary environmental site assessment will include the professional environmental consulting services described below.

SITE DESCRIPTION

The site is a vacant lot. The site located on the S.E. corner of Central Ave & Ardenwood Way, in the City of Lake Elsinore, Riverside County, California.

BACKGROUND INFORMATION

The site is an existing vacant lot, but based on our Phase 1 assessment, previous structures once existed on the subject property. From speaking to the representatives involved in the transaction of the property, a mobile home, portable office, tool shed, and barn once existed on the lot. The city had required the demolition of the existing structures prior to the sale of the property.

OBJECTIVES

- Based on the data collected at the site, the extent of soil and groundwater contamination should be defined at the site.
- Identify the presence and estimated limits of soil contamination by soil sampling and chemical analysis.
- Evaluate the chemical test data, soil conditions to estimate the extent of contamination, determine potential impact, and make recommendation for remediation, if necessary.

PROPOSED SCOPE OF WORK

The scope of work recommended for this site assessment is as follows:

- Drilling and Soil Sampling of 3 soil borings within the potential contaminated areas
- Soil Sampling @ 5 feet intervals
- Conducting laboratory analyses of soil
- Borings shall be extended to a deepest detectable contamination, 40 feet maximum below grade.
- Chemical analyses by a state certified laboratory at 5 feet intervals.
- Preparation of a formal report containing the findings, conclusions.

FIELD INVESTIGATIONS

Soil borings and Soil Sampling

Soil borings will be drilled to a maximum depth of 15 feet below the ground level. The soil borings will be accomplished with a hollow stem auger. Upon reaching each sampling interval, soil samples will be collected using brass liners placed inside the sampler. To prevent the possibility of cross contamination, the sampling tool and brass sampler liner will be washed between sample collections with a detergent and double rinsed in tap water.

Field screening of soil samples for petroleum hydrocarbon contamination at periodic intervals during field operations using a photoionization detector (PID) or organic vapor analyzer (OVA)

CHEMICAL LABORATORY ANALYSIS

Selected soil samples will be analyzed utilizing the following methods:

- TPH (Gas/ Diesel) per EPA method 8015M
- Volatile Organics per EPA method 8260B
- CAM17 Metals

All proposed sample analyses will be performed by a State of California, Department of Health Services, Certified Hazardous Waste Testing Laboratory.

REPORTING

The findings of our field work, results of laboratory analyses, and conclusions and recommendations will be presented in a formal report. The report will be submitted to the Riverside County Health Care Agency for review.

CLOSURE

The work plan for an environmental site assessment has been prepared using accepted general environmental engineering principles and practices. The work plan is subject to approval by the Riverside County Health Care Agency.

This opportunity to be of service is appreciated. If you have questions regarding this work plan, please contact this office at your earliest convenience.

Respectfully submitted,

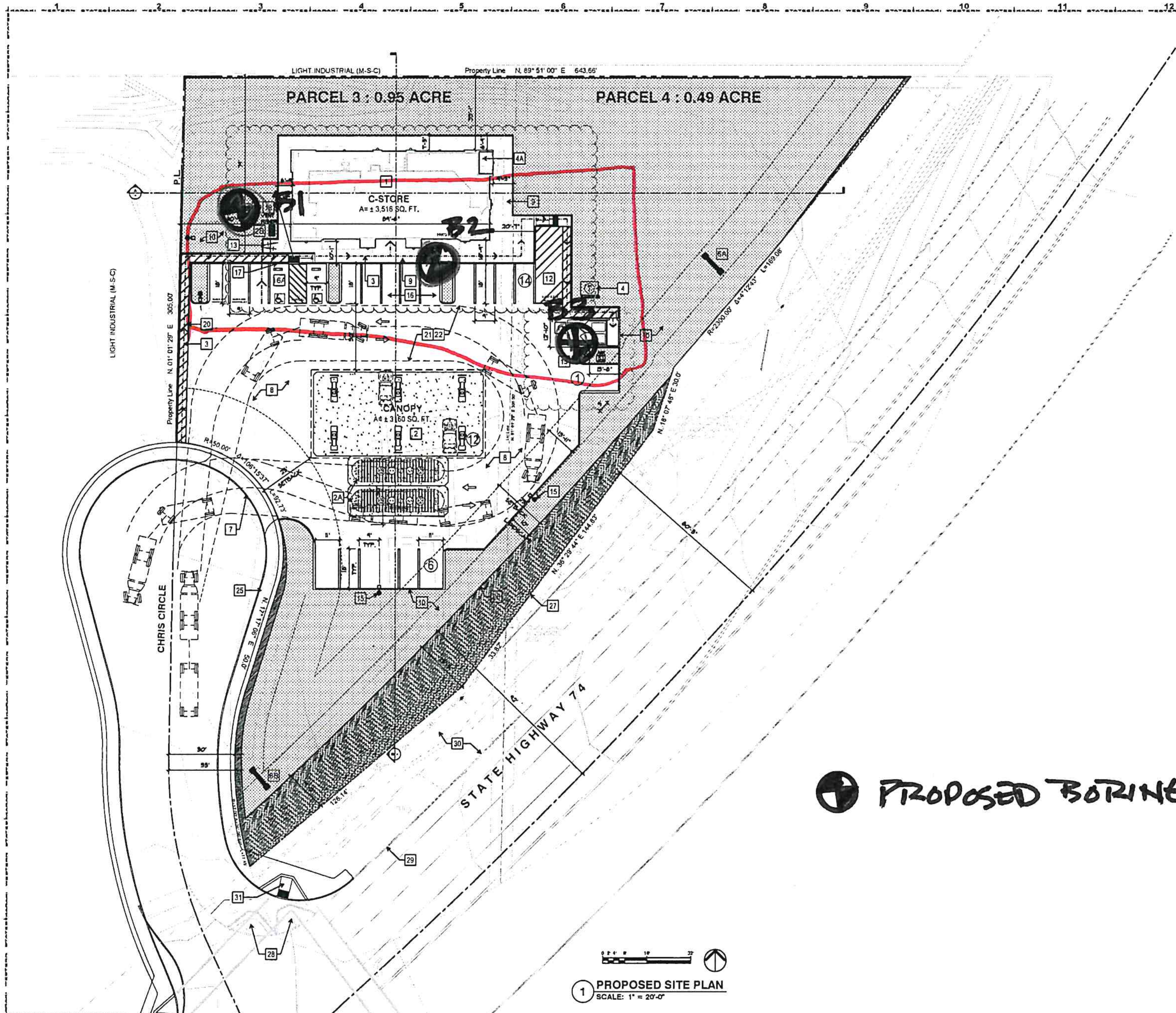
Geo Environ Eng. Consultants, Inc.

REGISTERED PROFESSIONAL ENGINEER
ESMAIL RASTEGARI
No. 43332
Exp. 03/30/2022
CIVIL
STATE OF CALIFORNIA

Jabed Masud, MSCE
Principal

Esmail Rastegari, P.E.
Principal

JM/ER/gm



PROPOSED BORING

1 PROPOSED SITE PLAN
SCALE: 1" = 20'-0"

LEGEND

- ① NO. OF PARKING SPACES
- ACCESSIBLE PARKING
- PROPERTY LINE
- PROPOSED PARCEL SUBDIVISION
- ADA PATH OF TRAVEL
- CONCRETE PAVING AREA
- DECORATIVE PAVING AREA
- LANDSCAPED AREA
- DIRECTIONAL ARROW
- R.O.W. DEDICATION
- AREA LIGHTS
- WALL MOUNTED DECORATIVE AREA LIGHTS
- (E) FIRE HYDRANT
- (E) SEWER MANHOLE
- (E) SEWER CLEANOUT
- (E) POWER POLE
- WM (E) WATER METER
- (E) WATER POINT
- (E) SIGN

SITE KEY NOTES

1. C-STORE
2. GAS STATION CANOPY AND FUEL DISPENSERS
2A. UNDERGROUND STORAGE TANKS
2B. VENT RISER WITH CARBON VAPOR CANISTER, PAINT BLACK & LANDSCAPE SCREENING.
3. ACCESSIBLE PATH OF TRAVEL
4. TRANSFORMER
4A. MAIN SWITCHGEAR
6A. MONUMENT SIGN (UNDER SEPARATE PERMIT)
6B. GAS PRICE SIGN (UNDER SEPARATE PERMIT)
7. (N) DRIVEWAY AS PER R.C. STD 207A
8. ASPHALT PAVING
9. CONCRETE PAVING
10. (N) LANDSCAPE WITH 6" CONCRETE CURB
11. TRASH ENCLOSURE (PER R.C. STANDARDS)
12. LOADING/UNLOADING ZONE
13. CLASS-2 BIKE PARKING RACK (5-BIKE CAPACITY)
14. AIR & WATER UNIT
15. AREA LIGHTS
16. PARKING STRIPING AS PER R.C. STANDARDS (WITH WHEELSTOP WHERE REQUIRED)
16A. ACCESSIBLE PARKING STRIPING (WITH WHEELSTOP WHERE REQUIRED)
17. ACCESSIBLE PARKING SIGN
18. ACCESSIBLE ACCESSIBLE RAMP
19. ACCESSIBLE TRUNCATED DOME PAVER
20. ACCESSIBLE PATH STRIPING (2% MAX CROSS SLOPE)
21. FIRE TRUCK PATH OF TRAVEL
22. FUEL TANKER/TRASH TRUCK PATH OF TRAVEL
23. RETAINING WALL PER CIVIL
24. 6" CMU WALL FENCE
25. (N) SIDEWALK
26. (N) RIGHT OF WAY
27. (E) RIGHT OF WAY
28. (E) CURB RAMP TO BE REMOVED TO ACCOMMODATE NEW RIGHT OF WAY, SEE CIVIL DRAWINGS
29. (E) CURB & GUTTER
30. (E) BERM
31. (N) CURB RAMP - SEE CIVIL DRAWINGS

KARAK WS

WESTERN STATES ENGINEERING
A DESIGN-BUILD COMPANY
4887 E. LA PALMA STE. 7
ANAHEIM, CA 928
TEL: (714)694-9300 FAX: (714)693-
www.westerneng.com

CONSULTANT/ SEALS

REGISTERED PROFESSIONAL ENGINEER · STATE OF CALIFORNIA · C053050 · CIVIL

SUBMITTAL
NO. DESCRIPTION BY DATE
1
2
3
4

REVISIONS
NO. DESCRIPTION BY DATE

OWNER NAME & ADDRESS
DAHER OIL INC.
19851 ESPERANZA RD
YORBA LINDA CA 92886

PROJECT NAME & ADDRESS
GAS STATION & CONVENIENCE STORE
28771 CENTRAL AVE. (74 HWY)
LAKE ELSINORE, CA 92532

NOTE TO CONTRACTOR

CONFIDENTIALITY STATEMENT

DESIGNED BY: WS
DRAWN BY: WS
CHECKED BY: JK
PLOT DATE: 2.5.2021
SCALE: AS SHOWN
SHEET TITLE
PROPOSED SITE PLAN

SHEET NUMBER
AS-1.0
JOB No: E99319
PAR/CUP No: CUP 20004

GEO ENVIRON
J.N. 21-215H.2

GEO ENVIRON
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERING CONSULTANTS, INC.
4071 E. La Palma Ave., Ste. B, Anaheim, Ca 92807 • (714) 632-3190 • Fax (714) 632-3191

Job No. 21-215H.3
June 15, 2021

Mr. Joseph Karaki
Western State Eng. & Construction, Inc.
4887 E. La Palma Street, Ste # 707
Anaheim, Ca 92807

Subject: **Supplemental Environmental Site Assessment, Vacant Property, 28771 Central Ave, Lake Elsinore, RSCO, California**

Reference:

1) Geo Environ, 12/28/20, "Phase I Report, Vacant Property, 28771 Central Ave, Lake Elsinore, RSCO, California
2) Geo Environ, 5/15/21, "Phase 2 Report, Vacant Property, 28771 Central Ave, Lake Elsinore, RSCO, California

Gentlemen:

In accordance with your request, we have performed a supplemental environmental site assessment on the subject site. The objective of this assessment is to address and discuss the findings of the lab results for the soil sampling that was done at the site.

BACKGROUND HISTORY

The subject property is a vacant land that is 1.12 acres in size, located on the north west corner of Central Ave (74 Hwy) & Ardenwood Way, Lake Elsinore, California. Surrounding the site is vacant land, commercial building, and multi-family buildings.

The site is underlain with 1.5 feet of top soil consisting of a medium brown, silty sand. Below the top soil, a weathered bedrock was encountered.

A phase I Environmental Site Assessment for the subject property was completed on December 28, 2020. The assessment was performed at the request of Karaki Western States. The subject property was evaluated for indications of environmental management activities, and the possible presence of hazardous substances that may have been manufactured, stored, used, or disposed on and/ or near the subject property. The subject property visit was conducted by Mr. Fahad Masud on December 28, 2020.

A phase 2 Environmental Site Assessment for the subject property was completed on May 15, 2021. The Trench pits were excavated to a maximum depth of 5 feet from the existing grade. The soil excavations were accomplished with a backhoe. Upon reaching each sampling interval, soil samples were collected using glass jars.

Field screening of soil samples for petroleum hydrocarbon contamination at periodic intervals during field operations using a photoionization detector (PID) or organic vapor analyzer (OVA)
Initial lab testing was conducted on 5/6/21 & 5/12/21. In the initial testing for the sampling done for TP-2, Arsenic was detected at 21.0, 10.8 and 22.5 mg/kg. Two samples being above the accepted background concentration of 12 mg/kg. The laboratory recommended additional analysis, STLC, for Arsenic, Barium, Copper, Lead, Nickel, Chromium and Vanadium. Additional analyses were performed, as per the lab, to further investigate the potential for exposure of these metals.

During our review of aerial photographs obtained for the nature of the Phase 1 assessment, structures can be seen on the subject property dated back to 2006. Those structures have currently been demolished, but information regarding the nature of the business that may have transpired at the property are unknown. Additional analysis, STLC were conduced on June 12, 2021, and Laboratory results are attached herein.

RESULTS

Element Analyzed	Sample Result	PQL	DF	TTLC Limit	STLC Limit	EPA Method Used
Arsenic	0.133	0.05	1	500	5.0	6010B
Barium	8.30	0.5	1	10,000	100	6010B
Chromium	ND	0.05	1	2,500	650/5.0@	6010B
Copper	0.146	0.1	1	2,500	25	6010B
Lead	0.057	0.05	1	1,000	5.0	6010B
Nickel	0.538	0.25	1	2,000	20	6010B
Vanadium	0.440	0.5	1	2,400	24	6010B

DISCUSSION OF RESULTS & POTENTIAL SOURCES

During the initial testing, the discovery of levels of arsenic led to additional analysis, STLC. The STLC analysis is conducted by extracting the sample and using a 10:1 ratio of citric acid solution to sample. This procedure is also used to simulate a landfill environment and to determine how much of a regulated compound will leach out into the environment. The citric acid extraction solution used for the STLC extraction is much more aggressive than the acetic acid extraction solution used for TCLP. This extraction is used to determine whether certain leachable compounds are present in large enough amounts in a given material that the material need to be dealt with as hazardous waste. During our STLC analysis, it was determined that all elements analyzed, including Arsenic, were found to be considerable lower than the STLC limit. In regards to arsenic, the sample result found 0.1333 mg/L whereas the STLC limit is 5.0 mg/L.

During our phase 1 investigation, our findings found a residential structure had existed on the subject property but was demolished. It is our belief, that the arsenic detected is naturally occurring due to the low levels found in both of our analysis. In the initial testing for the sampling done for TP-2, Arsenic was detected at 21.0, 10.8 and 22.5 mg/kg (or 21.0 ug/g, 10.8 ug/g, 22.5ug/g). Arsenic is widely distributed in the Earth's crust, which contains about 3.4 ppm arsenic (Wedepohl 1991). It is mostly found in nature minerals, such as realgar (As_4S_4), orpiment (As_2S_3), and arsenolite (As_2O_3), and only found in its elemental form to a small extent. There are over 150 arsenic-bearing minerals (Budavari et al. 2001; Carapella 1992). Arsenic concentrations in soils from various countries can range from 0.1 to 50 μg/g and can vary widely among geographic regions. Typical arsenic concentrations for uncontaminated soils range from 1 to 40 μg/g, with the lowest concentrations in sandy soils and soils derived from granites. Higher arsenic concentrations are found in alluvial soils and soils with high organic content (Mandal and Suzuki 2002). Arsenic in soil may originate from the parent materials that form the soil, industrial wastes, or use of arsenical pesticides. Geological processes that may lead to high arsenic concentrations in rock and subsequently the surrounding soil include hydrothermic activity and pegmatite formation (Peters et al. 1999). In the first case, thermal activity results in the dissolution and transport of metals, including the metalloid arsenic, which are precipitated in fractures in rocks. In the second process, cooling magmas may concentrate metals that are injected into rocks, crystallizing as pegmatites. Areas of volcanic activity include large areas of California, Hawaii, Alaska, Iceland, and New Zealand.

The U.S. Geological Survey reports the mean and range of arsenic in soil and other surficial materials as 7.2 and <0.1–97 μg/g, respectively (USGS 1984). It is assumed that the arsenic encountered is naturally occluding as arsenic is known to be found near fractured bedrock, but the limits of arsenic found are below the detection limits are considered non hazardous waste site.

No structures are planned to be built within the area of concern and will not pose any hazardous or risk of human life. Therefore, no further assessment or remediation is necessary.

CLOSURE & LIMITATIONS

This evaluation was performed in accordance with generally accepted engineering practices. The conclusions and recommendations contained in this report were based on the data collected during the course of the project and the interpretation of such data as dictated by our experience and background and our current understanding and interpretation of environmental regulatory agency regulations, guidelines and policy. Hence, our conclusions and recommendations are professional opinions; no other warranty is offered or implied. This report is limited to the areas of the site specifically described, does not include other areas of the property.

This opportunity to be service is appreciated. If you have questions regarding this plan, please contact this office at your earliest convenience.

Respectfully submitted,

Geo Environ Eng. Consultants, Inc.

Fahad Masud, PE
Vice President

Jabed Masud, MSCE
President

FM/JM/gm

Supplementary Laboratory Result

Enviro – Chem, Inc.
1214 E. Lexington Avenue, Pomona, CA 91766 Tel (909) 590-5905 Fax (909) 590-5907

LABORATORY REPORT

CUSTOMER: **Geo Environ Consultants, Inc**
4071 E. La Palma Ave. Ste. B, Anaheim, CA 92807
Tel(714)606-2598 E-Mail: Mjmas@sbcglobal.net
PROJECT: **Proposed Gas Station**
LOCATION: **28771 Highway 74, Lake Elsinore**
MATRIX: SOIL
SAMPLING DATE: 05/04/21
REPORT TO: MR. JABED MASUD
DATE RECEIVED: 05/05/21
DATE ANALYZED: 06/09-11/21
DATE REPORTED: 06/11/21

SAMPLE I.D.: **TP-2 (-1.0)** LAB I.D.: 210505-68

SOLUBLE THRESHOLD LIMIT CONCENTRATION (STLC) ANALYSIS
UNIT: mg/L IN THE STLC LEACHATE

ELEMENT ANALYZED	SAMPLE RESULT	PQL	DF	TTLC LIMIT	STLC LIMIT	EPA METHOD USED
Arsenic (As)	0.133	0.05	1	500	5.0	6010B
Barium (Ba)	8.30	0.5	1	10,000	100	6010B
Chromium (Cr)	ND	0.05	1	2,500	560/5.0@	6010B
Copper (Cu)	0.146	0.1	1	2,500	25	6010B
Lead (Pb)	0.057	0.05	1	1,000	5.0	6010B
Nickel (Ni)	0.538	0.25	1	2,000	20	6010B
Vanadium (V)	0.440	0.5	1	2,400	24	6010B

COMMENTS
DF = Dilution Factor
PQL = Practical Quantitation Limit
Actual Detection Limit = PQL X DF
ND = Below the actual detection limit or non-detected
TTLC = Total Threshold Limit Concentration
STLC = Soluble Threshold Limit Concentration
@ = Must meet the TCLP limit/chromium (5.0 mg/L in TCLP leachate)
** = TCLP Chromium/TTLC-Chromium VI recommended (if marked)
*** = The concentration exceeds the STLC Limit, and the sample is defined as hazardous waste as per CAL-TITLE 22 (if marked)

Data Reviewed and Approved by: ____________
CAL-DHS ELAP CERTIFICATE No.: 1555

HYDROLOGY REPORT

FOR

28771 Central Avenue Gas Station

28771 CENTRAL AVENUE
LAKE ELSINORE, CALIFORNIA

March 10, 2021

PREPARED UNDER THE DIRECT SUPERVISION OF:

________________________________DATE__________
Kamal B. Mchantaf RCE 51050

PURPOSE

The purpose of this hydrology study is to determine the post-development peak drainage flow and volume at the subject area for the 10- and 100-year return period storm events. The study is based on the Rational Method as outlined in the Riverside County Hydrology Manual 1978.

DESCRIPTION / METHODOLOGY

The project site in consideration is located at 28771 Central Avenuein the City of Lake Elsinore, Riverside, CA. The property has a total area of 1.324 acre. Most of the project site is undeveloped save of a small portion which has two (2) building structures. Runoff from the project site drains towards a bioretention area on the northwest, the north, and southwest portions. The north portion of the project site is considered a FEMA floodplain and thus development in this area shall be limited.

The proposed development will include a six (6) pump gas station and a convenience store. Parking areas will be provided and landscape areas. The gas station will include two (2) underground tanks that have a capacity of 22,000 gallons each.

The pre-development of the project site consists of one (1) catchment while the post-development has two (2) catchments. The values for the rainfall was provided by the NOAA (Attachment A). The soil in the project site was determined to be soil type A, C and D as per the USDA NRCS Soil Map (Attachment B). The calculations for the runoff and unit hydrograph are shown in Attachment C and the pre- and post-development hydrology maps are shown in Attachment D. The table below summarizes the 24-hr rainfall for the various storm events.

Table 1: Pre-development Peak Flow Rate and Storm Runoff Volume Summary

Drainage ID / Storm Return Period	**Area (acre)**	**1-Hr**		**3-Hr**		**6-Hr**		**24-Hr**	
		Q (cfs)	**V (cf)**	**Q (cfs)**	**V (cf)**	**Q (cfs)**	**V (cf)**	**Q (cfs)**	**V (cf)**
Area A (2-Yr)	1.324	-	1367	0.843	1728	0.810	2136	0.214	2604
Area A (5-Yr)	1.324	-	2331	1.234	2755	1.177	3502	0.390	5202
Area A (10-Yr)	1.324	2.564	3061	1.530	4027	1.455	4670	0.524	7577

Table 2: Post-development Peak Flow Rate and Storm Runoff Volume Summary

Drainage ID / Storm Return Period	**Area (acre)**	**1-Hr**		**3-Hr**		**6-Hr**		**24-Hr**	
		Q (cfs)	**V (cf)**	**Q (cfs)**	**V (cf)**	**Q (cfs)**	**V (cf)**	**Q (cfs)**	**V (cf)**
Area A (2-Yr)	0.582	0.457	349	0.242	462	0.227	591	0.034	903
Area B (2-Yr)	0.742	0.830	748	0.476	1252	0.462	1923	0.117	3683

Area A (5-Yr)	0.582	0.747	627	0.413	734	0.386	913	0.064	1118
Area B (5-Yr)	0.742	1.238	1289	0.698	1686	0.671	2813	0.215	4879
Area A (10-Yr)	0.582	0.967	895	0.543	1031	0.507	1250	0.123	1605
Area B (10-Yr)	0.742	1.547	1698	0.867	2245	0.830	3166	0.289	6082

Table 3: 100-Year 24-Hr Storm Runoff Volume Comparison

Storm Event	**Pre-dev**	**Post-dev**		**Volume Difference**
	Area A	**Area A**	**Area B**	
$V_{10\text{-YR 24-HR}}$	7577	1605	6082	110

CONCLUSION:

Two (2) bioretention basins are proposed with ponding depth of 0.5 ft, soil media depth of 1.5 ft and gravel depth of 1.0 ft. The basins have volume capacities of 1,624 cf for Area A and 3,173 cf for Area B. The volume is more than adequate to contain the increase in the 100-Yr 24-Hr storm volumes from the development.

VICINITY MAP

ATTACHMENT A

NOAA Atlas 14, Volume 6, Version 2
Location name: Lake Elsinore, California, USA*
Latitude: 33.698°, Longitude: -117.3335°
Elevation: 1327.17 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.084** (0.071-0.102)	**0.115** (0.096-0.139)	**0.156** (0.130-0.189)	**0.191** (0.158-0.233)	**0.239** (0.191-0.303)	**0.278** (0.217-0.359)	**0.318** (0.242-0.422)	**0.361** (0.267-0.493)	**0.420** (0.297-0.600)	**0.468** (0.319-0.694)
10-min	**0.121** (0.101-0.146)	**0.165** (0.138-0.199)	**0.224** (0.187-0.271)	**0.273** (0.226-0.334)	**0.343** (0.274-0.434)	**0.398** (0.311-0.515)	**0.456** (0.347-0.605)	**0.517** (0.382-0.707)	**0.603** (0.426-0.861)	**0.671** (0.458-0.994)
15-min	**0.146** (0.123-0.176)	**0.199** (0.167-0.240)	**0.271** (0.226-0.328)	**0.331** (0.274-0.404)	**0.415** (0.331-0.525)	**0.482** (0.376-0.623)	**0.551** (0.420-0.732)	**0.625** (0.462-0.855)	**0.729** (0.515-1.04)	**0.812** (0.554-1.20)
30-min	**0.226** (0.189-0.272)	**0.307** (0.257-0.371)	**0.418** (0.349-0.506)	**0.510** (0.422-0.623)	**0.640** (0.511-0.810)	**0.743** (0.581-0.962)	**0.851** (0.648-1.13)	**0.965** (0.713-1.32)	**1.13** (0.795-1.61)	**1.25** (0.854-1.86)
60-min	**0.355** (0.297-0.428)	**0.483** (0.404-0.583)	**0.657** (0.548-0.795)	**0.802** (0.664-0.980)	**1.01** (0.804-1.27)	**1.17** (0.913-1.51)	**1.34** (1.02-1.78)	**1.52** (1.12-2.07)	**1.77** (1.25-2.53)	**1.97** (1.34-2.92)
2-hr	**0.544** (0.456-0.656)	**0.710** (0.594-0.857)	**0.934** (0.780-1.13)	**1.12** (0.929-1.37)	**1.39** (1.11-1.76)	**1.60** (1.25-2.07)	**1.82** (1.39-2.42)	**2.06** (1.52-2.82)	**2.39** (1.69-3.41)	**2.66** (1.81-3.94)
3-hr	**0.680** (0.570-0.820)	**0.877** (0.734-1.06)	**1.15** (0.955-1.39)	**1.37** (1.13-1.67)	**1.69** (1.35-2.13)	**1.94** (1.51-2.50)	**2.20** (1.67-2.92)	**2.48** (1.83-3.38)	**2.86** (2.03-4.09)	**3.18** (2.17-4.70)
6-hr	**0.978** (0.820-1.18)	**1.27** (1.06-1.53)	**1.65** (1.38-2.00)	**1.97** (1.63-2.41)	**2.41** (1.93-3.05)	**2.76** (2.16-3.57)	**3.12** (2.38-4.14)	**3.50** (2.59-4.79)	**4.02** (2.85-5.75)	**4.44** (3.03-6.58)
12-hr	**1.27** (1.07-1.53)	**1.73** (1.45-2.08)	**2.32** (1.93-2.80)	**2.79** (2.31-3.41)	**3.43** (2.74-4.34)	**3.92** (3.06-5.06)	**4.41** (3.35-5.85)	**4.91** (3.62-6.71)	**5.58** (3.94-7.96)	**6.09** (4.15-9.02)
24-hr	**1.67** (1.48-1.93)	**2.43** (2.15-2.81)	**3.39** (2.98-3.92)	**4.14** (3.62-4.83)	**5.13** (4.34-6.18)	**5.86** (4.86-7.21)	**6.58** (5.33-8.29)	**7.31** (5.76-9.46)	**8.26** (6.26-11.1)	**8.98** (6.58-12.5)
2-day	**1.99** (1.76-2.30)	**3.01** (2.66-3.48)	**4.29** (3.78-4.97)	**5.31** (4.64-6.20)	**6.64** (5.62-8.01)	**7.63** (6.33-9.39)	**8.62** (6.98-10.9)	**9.61** (7.57-12.4)	**10.9** (8.26-14.7)	**11.9** (8.71-16.6)
3-day	**2.16** (1.91-2.50)	**3.32** (2.93-3.83)	**4.79** (4.21-5.54)	**5.96** (5.20-6.95)	**7.51** (6.35-9.05)	**8.67** (7.19-10.7)	**9.83** (7.96-12.4)	**11.0** (8.68-14.2)	**12.6** (9.51-16.9)	**13.7** (10.1-19.1)
4-day	**2.34** (2.07-2.70)	**3.61** (3.18-4.17)	**5.24** (4.61-6.07)	**6.55** (5.72-7.65)	**8.30** (7.02-10.0)	**9.62** (7.98-11.8)	**10.9** (8.87-13.8)	**12.3** (9.70-15.9)	**14.1** (10.7-19.0)	**15.5** (11.3-21.6)
7-day	**2.66** (2.35-3.07)	**4.09** (3.61-4.72)	**5.97** (5.26-6.91)	**7.51** (6.56-8.77)	**9.61** (8.13-11.6)	**11.2** (9.32-13.8)	**12.9** (10.5-16.3)	**14.6** (11.5-18.9)	**17.0** (12.9-22.9)	**18.8** (13.8-26.2)
10-day	**2.82** (2.49-3.25)	**4.31** (3.80-4.98)	**6.30** (5.55-7.30)	**7.96** (6.96-9.30)	**10.3** (8.69-12.4)	**12.1** (10.0-14.9)	**14.0** (11.3-17.6)	**15.9** (12.6-20.6)	**18.7** (14.1-25.2)	**20.9** (15.3-29.0)
20-day	**3.37** (2.98-3.89)	**5.11** (4.51-5.91)	**7.51** (6.61-8.70)	**9.56** (8.35-11.2)	**12.5** (10.6-15.1)	**14.9** (12.3-18.3)	**17.4** (14.1-21.9)	**20.1** (15.8-26.0)	**24.0** (18.2-32.3)	**27.1** (19.9-37.8)
30-day	**3.98** (3.52-4.60)	**5.95** (5.25-6.88)	**8.71** (7.67-10.1)	**11.1** (9.71-13.0)	**14.6** (12.4-17.6)	**17.5** (14.5-21.5)	**20.6** (16.7-25.9)	**24.0** (18.9-31.0)	**28.9** (21.9-38.9)	**33.0** (24.1-45.9)
45-day	**4.70** (4.15-5.42)	**6.86** (6.06-7.93)	**9.95** (8.76-11.5)	**12.7** (11.1-14.8)	**16.7** (14.1-20.1)	**20.1** (16.7-24.7)	**23.8** (19.3-29.9)	**27.9** (22.0-36.1)	**33.9** (25.7-45.7)	**39.0** (28.6-54.3)
60-day	**5.44** (4.81-6.28)	**7.77** (6.86-8.98)	**11.1** (9.80-12.9)	**14.1** (12.3-16.5)	**18.6** (15.7-22.4)	**22.4** (18.6-27.6)	**26.6** (21.6-33.5)	**31.3** (24.7-40.5)	**38.3** (29.0-51.6)	**44.3** (32.5-61.8)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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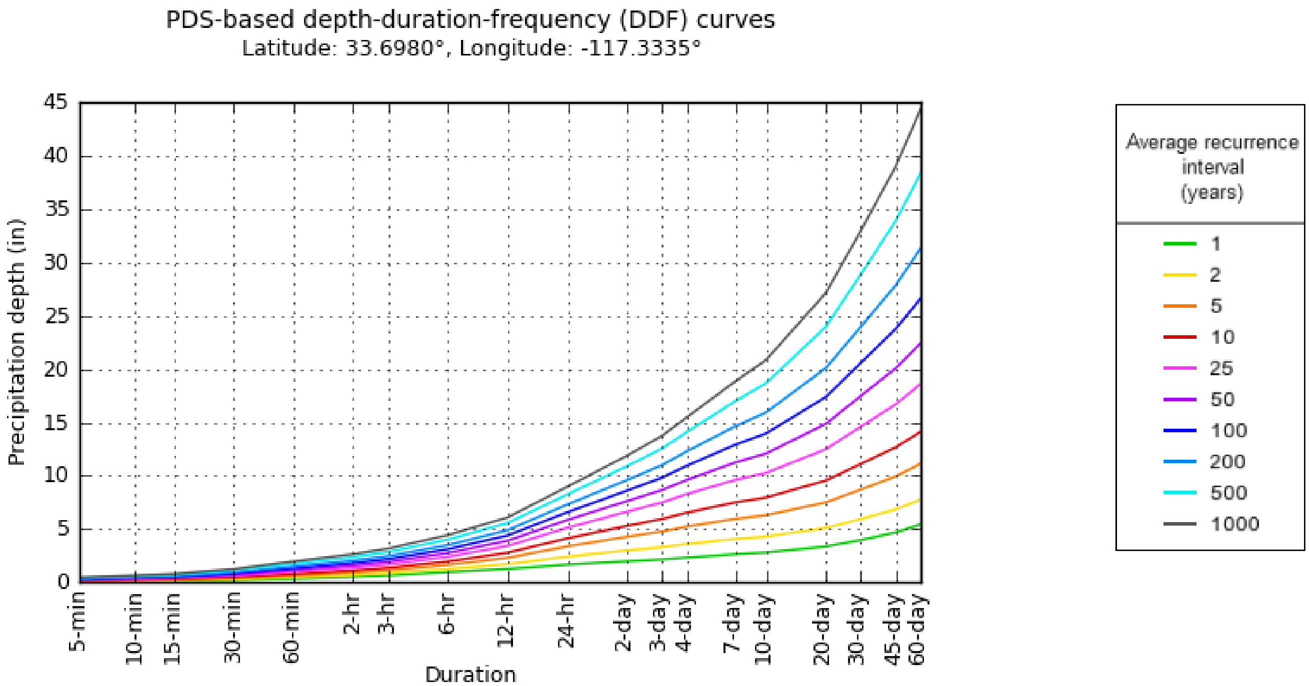
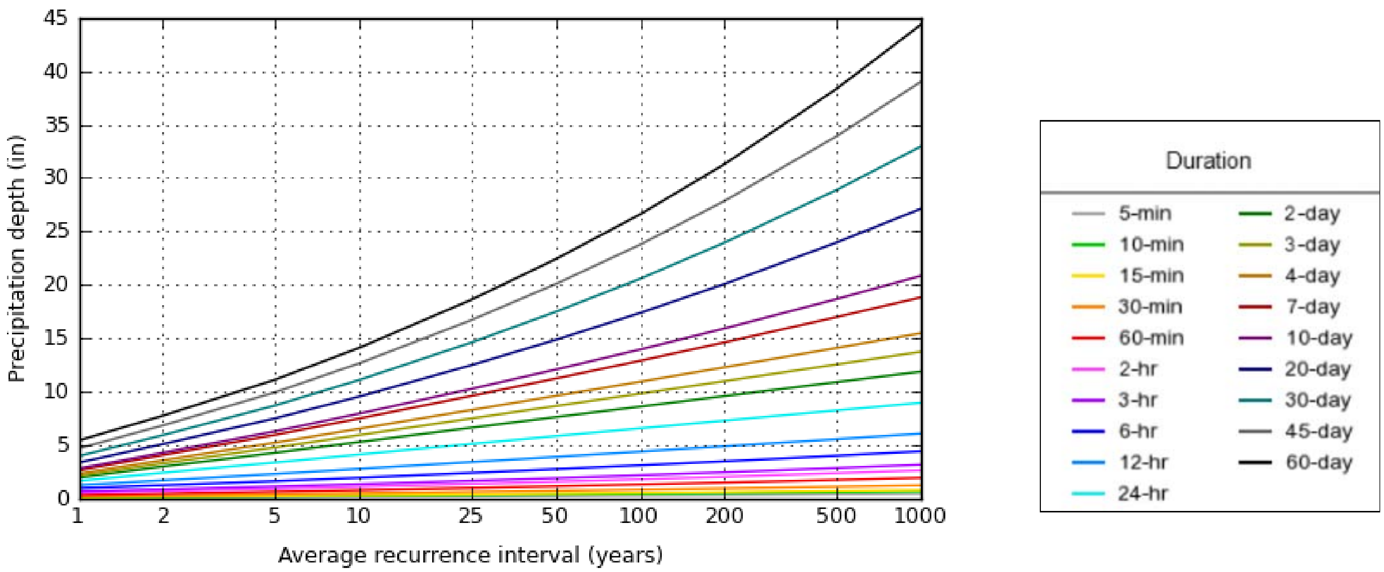
PF graphical





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Created (GMT): Mon Jan 27 06:15:28 2020

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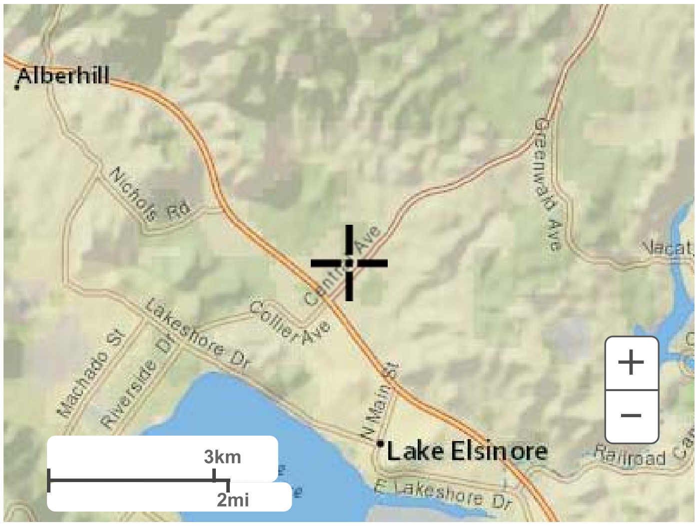
Maps & aerials

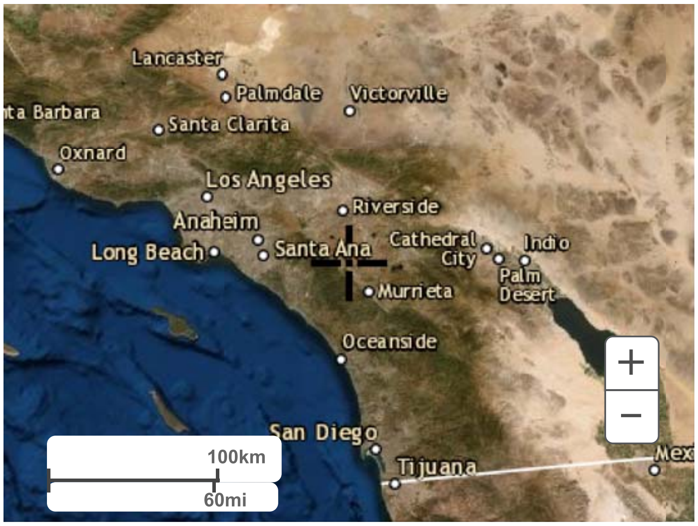
Small scale terrain



Large scale terrain

Large scale map

Large scale aerial



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US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

ATTACHMENT B

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for

Western Riverside Area, California

September 19, 2020

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Soil Map

Map Scale: 1:861 if printed on A landscape (11" x 8.5") sheet.

Meters: 0, 10, 20, 40, 60

Feet: 0, 40, 80, 160, 240

N

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Western Riverside Area, California
Survey Area Data: Version 13, May 27, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Apr 17, 2018—Jun 28, 2018

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
AlC	Arbuckle gravelly loam, 2 to 9 percent slopes, dry, MLRA 19	0.1	4.0%
CmC	Cortina cobbly loamy sand, 2 to 8 percent slopes	0.9	64.0%
LpF2	Lodo rocky loam, 25 to 50 percent slopes, eroded	0.4	31.9%
Totals for Area of Interest		**1.4**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Western Riverside Area, California

AlC—Arbuckle gravelly loam, 2 to 9 percent slopes, dry, MLRA 19

Map Unit Setting

National map unit symbol: 2w8cx
Elevation: 690 to 1,470 feet
Mean annual precipitation: 11 to 18 inches
Mean annual air temperature: 64 to 65 degrees F
Frost-free period: 325 to 359 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Arbuckle and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Arbuckle

Setting

Landform: Fan remnants
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from igneous, metamorphic and sedimentary rock

Typical profile

Ap - 0 to 6 inches: gravelly loam
A - 6 to 12 inches: gravelly very fine sandy loam
Bw - 12 to 26 inches: gravelly loam
Bt1 - 26 to 30 inches: gravelly clay loam
Bt2 - 30 to 45 inches: gravelly clay loam
C - 45 to 68 inches: very gravelly sandy loam

Properties and qualities

Slope: 2 to 9 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.2 to 0.5 mmhos/cm)
Available water capacity: Moderate (about 6.7 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: R019XD029CA
Hydric soil rating: No

Minor Components

Perkins

Percent of map unit: 5 percent
Hydric soil rating: No

Garretson

Percent of map unit: 5 percent
Hydric soil rating: No

Cortina

Percent of map unit: 5 percent
Hydric soil rating: No

CmC—Cortina cobbly loamy sand, 2 to 8 percent slopes

Map Unit Setting

National map unit symbol: hcsh
Elevation: 30 to 2,400 feet
Mean annual precipitation: 12 to 40 inches
Mean annual air temperature: 61 to 63 degrees F
Frost-free period: 240 to 270 days
Farmland classification: Not prime farmland

Map Unit Composition

Cortina and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cortina

Setting

Landform: Alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from metasedimentary rock

Typical profile

H1 - 0 to 23 inches: cobbly loamy sand
H2 - 23 to 38 inches: stratified very cobbly loamy sand to very cobbly loam
H3 - 38 to 60 inches: stratified very gravelly sand to very gravelly loamy sand

Properties and qualities

Slope: 2 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches

Frequency of flooding: Rare
Frequency of ponding: None
Available water capacity: Very low (about 2.9 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: A
Ecological site: R019XD069CA - SANDY ALLUVIAL (1975)
Hydric soil rating: No

Minor Components

Riverwash
Percent of map unit: 10 percent
Landform: Channels
Hydric soil rating: Yes

Garretson
Percent of map unit: 5 percent
Hydric soil rating: No

LpF2—Lodo rocky loam, 25 to 50 percent slopes, eroded

Map Unit Setting
National map unit symbol: hcws
Elevation: 300 to 3,500 feet
Mean annual precipitation: 12 to 35 inches
Mean annual air temperature: 59 to 64 degrees F
Frost-free period: 230 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition
Lodo and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lodo

Setting
Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Metamorphosed residuum weathered from sandstone

Typical profile
H1 - 0 to 8 inches: gravelly loam
H2 - 8 to 19 inches: unweathered bedrock

Properties and qualities

Slope: 25 to 50 percent
Depth to restrictive feature: 8 to 20 inches to lithic bedrock
Drainage class: Somewhat excessively drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Very low (about 1.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D
Ecological site: R019XD060CA - SHALLOW LOAMY (1975)
Hydric soil rating: No

Minor Components

Escondido

Percent of map unit: 5 percent
Hydric soil rating: No

Tumescal

Percent of map unit: 5 percent
Hydric soil rating: No

Vallecitos

Percent of map unit: 5 percent
Hydric soil rating: No

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ATTACHMENT C

U n i t   H y d r o g r a p h   A n a l y s i s

Study date 09/23/20 File: APRE2YR12.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

28771 Central Avenue Gas Station
Area A
Pre-development
1-Hr 2-Yr Storm Event

Drainage Area = 1.32(Ac.) = 0.002 Sq. Mi.
Length along longest watercourse = 408.00(Ft.)
Length along longest watercourse measured to centroid = 87.50(Ft.)
Length along longest watercourse = 0.077 Mi.
Length along longest watercourse measured to centroid = 0.017 Mi.
Difference in elevation = 16.34(Ft.)
Slope along watercourse = 211.4588 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.021 Hr.
Lag time = 1.24 Min.
25% of lag time = 0.31 Min.
40% of lag time = 0.50 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
1.32	0.48	0.64

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
1.32	1.34	1.77

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 0.483(In)
Area Averaged 100-Year Rainfall = 1.340(In)

Point rain (area averaged) = 0.483(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 0.483(In)

Sub-Area Data:

Area(Ac.) Runoff Index Impervious %
1.324 83.00 0.059
Total Area Entered = 1.32(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
83.0	83.0	0.210	0.059	0.199	1.000	0.199

Sum (F) = 0.199
Area averaged mean soil loss (F) (In/Hr) = 0.199
Minimum soil loss rate ((In/Hr)) = 0.099
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.853

Slope of intensity-duration curve for a 1 hour storm =0.4800

U n i t H y d r o g r a p h
DESERT S-Curve

Unit Hydrograph Data

	Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	402.223	65.137	0.869
2	0.167	804.446	34.863	0.465
			Sum = 100.000	Sum= 1.334

Storm Event 3 Effective Rainfall = 0.092(In)

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	4.40	0.048	0.199	0.041	0.01
2	0.17	4.50	0.050	0.199	0.042	0.01
3	0.25	5.40	0.059	0.199	0.051	0.01
4	0.33	5.40	0.059	0.199	0.051	0.01
5	0.42	5.70	0.063	0.199	0.054	0.01
6	0.50	6.40	0.070	0.199	0.060	0.01
7	0.58	7.90	0.087	0.199	0.074	0.01
8	0.67	9.10	0.100	0.199	0.086	0.01
9	0.75	12.80	0.141	0.199	0.120	0.02
10	0.83	25.60	0.282	0.199	---	0.08
11	0.92	7.90	0.087	0.199	0.074	0.01
12	1.00	4.90	0.054	0.199	0.046	0.01
Sum =		100.0			Sum =	0.2

Flood volume = Effective rainfall 0.02(In)
times area 1.3(Ac.)/[(In)/(Ft.)] = 0.0(Ac.Ft)
Total soil loss = 0.07(In)
Total soil loss = 0.008(Ac.Ft)
Total rainfall = 0.09(In)
Flood volume = 81.5 Cubic Feet
Total soil loss = 359.5 Cubic Feet

Storm Event 2 Effective Rainfall = 0.174(In)

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	4.40	0.092	0.199	0.078	0.01
2	0.17	4.50	0.094	0.199	0.080	0.01

3	0.25	5.40	0.113	0.199	0.096	0.02
4	0.33	5.40	0.113	0.199	0.096	0.02
5	0.42	5.70	0.119	0.199	0.101	0.02
6	0.50	6.40	0.134	0.199	0.114	0.02
7	0.58	7.90	0.165	0.199	0.141	0.02
8	0.67	9.10	0.190	0.199	0.162	0.03
9	0.75	12.80	0.267	0.199	---	0.07
10	0.83	25.60	0.534	0.199	---	0.34
11	0.92	7.90	0.165	0.199	0.141	0.02
12	1.00	4.90	0.102	0.199	0.087	0.02
Sum =		100.0			Sum =	0.6

Flood volume = Effective rainfall 0.05(In)
times area 1.3(Ac.)/[(In)/(Ft.)] = 0.0(Ac.Ft)
Total soil loss = 0.12(In)
Total soil loss = 0.014(Ac.Ft)
Total rainfall = 0.17(In)
Flood volume = 237.3 Cubic Feet
Total soil loss = 598.3 Cubic Feet

Storm Event 1 Effective Rainfall = 0.483(In)

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	4.40	0.255	0.199	---	0.06
2	0.17	4.50	0.261	0.199	---	0.06
3	0.25	5.40	0.313	0.199	---	0.11
4	0.33	5.40	0.313	0.199	---	0.11
5	0.42	5.70	0.330	0.199	---	0.13
6	0.50	6.40	0.371	0.199	---	0.17
7	0.58	7.90	0.458	0.199	---	0.26
8	0.67	9.10	0.527	0.199	---	0.33
9	0.75	12.80	0.742	0.199	---	0.54
10	0.83	25.60	1.484	0.199	---	1.29
11	0.92	7.90	0.458	0.199	---	0.26
12	1.00	4.90	0.284	0.199	---	0.09
Sum =		100.0			Sum =	3.4

Flood volume = Effective rainfall 0.28(In)
times area 1.3(Ac.)/[(In)/(Ft.)] = 0.0(Ac.Ft)
Total soil loss = 0.20(In)
Total soil loss = 0.022(Ac.Ft)
Total rainfall = 0.48(In)
Flood volume = 1366.5 Cubic Feet
Total soil loss = 954.8 Cubic Feet

Peak flow rate of this hydrograph =

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 09/23/20 File: APRE2YR15.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

28771 Central Avenue Gas Station
Area A
Pre-development
1-Hr 5-Year Storm Event

Drainage Area = 1.32(Ac.) = 0.002 Sq. Mi.
Length along longest watercourse = 408.00(Ft.)
Length along longest watercourse measured to centroid = 87.50(Ft.)
Length along longest watercourse = 0.077 Mi.
Length along longest watercourse measured to centroid = 0.017 Mi.
Difference in elevation = 16.34(Ft.)
Slope along watercourse = 211.4588 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.021 Hr.
Lag time = 1.24 Min.
25% of lag time = 0.31 Min.
40% of lag time = 0.50 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
1.32	0.48	0.64

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
1.32	1.34	1.77

STORM EVENT (YEAR) = 5.00
Area Averaged 2-Year Rainfall = 0.483(In)
Area Averaged 100-Year Rainfall = 1.340(In)

Point rain (area averaged) = 0.684(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 0.684(In)

Sub-Area Data:

Area(Ac.) Runoff Index Impervious %
1.324 83.00 0.059
Total Area Entered = 1.32(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
83.0	83.0	0.210	0.059	0.199	1.000	0.199

Sum (F) = 0.199
Area averaged mean soil loss (F) (In/Hr) = 0.199
Minimum soil loss rate ((In/Hr)) = 0.099
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.853

Slope of intensity-duration curve for a 1 hour storm =0.4800

U n i t H y d r o g r a p h
DESERT S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	402.223	65.137	0.869
2	0.167	804.446	34.863	0.465
			Sum = 100.000	Sum= 1.334

Storm Event 3 Effective Rainfall = 0.130(In)

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Loss rate(In./Hr) Low	Effective (In/Hr)
1	0.08	4.40	0.069	0.199	0.059	0.01
2	0.17	4.50	0.070	0.199	0.060	0.01
3	0.25	5.40	0.084	0.199	0.072	0.01
4	0.33	5.40	0.084	0.199	0.072	0.01
5	0.42	5.70	0.089	0.199	0.076	0.01
6	0.50	6.40	0.100	0.199	0.085	0.01
7	0.58	7.90	0.123	0.199	0.105	0.02
8	0.67	9.10	0.142	0.199	0.121	0.02
9	0.75	12.80	0.200	0.199	---	0.00
10	0.83	25.60	0.399	0.199	---	0.20
11	0.92	7.90	0.123	0.199	0.105	0.02
12	1.00	4.90	0.076	0.199	0.065	0.01
Sum =		100.0			Sum =	0.3

Flood volume = Effective rainfall 0.03(In)
times area 1.3(Ac.)/[(In)/(Ft.)] = 0.0(Ac.Ft)
Total soil loss = 0.10(In)
Total soil loss = 0.011(Ac.Ft)
Total rainfall = 0.13(In)
Flood volume = 137.1 Cubic Feet
Total soil loss = 487.3 Cubic Feet

Storm Event 2 Effective Rainfall = 0.246(In)

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Loss rate(In./Hr) Low	Effective (In/Hr)
1	0.08	4.40	0.130	0.199	0.111	0.02
2	0.17	4.50	0.133	0.199	0.113	0.02

3	0.25	5.40	0.159	0.199	0.136	0.02
4	0.33	5.40	0.159	0.199	0.136	0.02
5	0.42	5.70	0.168	0.199	0.144	0.02
6	0.50	6.40	0.189	0.199	0.161	0.03
7	0.58	7.90	0.233	0.199	---	0.03
8	0.67	9.10	0.269	0.199	---	0.07
9	0.75	12.80	0.378	0.199	---	0.18
10	0.83	25.60	0.756	0.199	---	0.56
11	0.92	7.90	0.233	0.199	---	0.03
12	1.00	4.90	0.145	0.199	0.123	0.02
Sum =		100.0			Sum =	1.0

Flood volume = Effective rainfall 0.09(In)
times area 1.3(Ac.)/[(In)/(Ft.)] = 0.0(Ac.Ft)
Total soil loss = 0.16(In)
Total soil loss = 0.018(Ac.Ft)
Total rainfall = 0.25(In)
Flood volume = 414.7 Cubic Feet
Total soil loss = 768.2 Cubic Feet

Storm Event 1 Effective Rainfall = 0.684(In)

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Loss rate(In./Hr) Low	Effective (In/Hr)
1	0.08	4.40	0.361	0.199	---	0.16
2	0.17	4.50	0.369	0.199	---	0.17
3	0.25	5.40	0.443	0.199	---	0.24
4	0.33	5.40	0.443	0.199	---	0.24
5	0.42	5.70	0.468	0.199	---	0.27
6	0.50	6.40	0.525	0.199	---	0.33
7	0.58	7.90	0.648	0.199	---	0.45
8	0.67	9.10	0.747	0.199	---	0.55
9	0.75	12.80	1.050	0.199	---	0.85
10	0.83	25.60	2.100	0.199	---	1.90
11	0.92	7.90	0.648	0.199	---	0.45
12	1.00	4.90	0.402	0.199	---	0.20
Sum =		100.0			Sum =	5.8

Flood volume = Effective rainfall 0.49(In)
times area 1.3(Ac.)/[(In)/(Ft.)] = 0.1(Ac.Ft)
Total soil loss = 0.20(In)
Total soil loss = 0.022(Ac.Ft)
Total rainfall = 0.68(In)
Flood volume = 2331.3 Cubic Feet
Total soil loss = 954.8 Cubic Feet

Peak flow rate of this

U n i t   H y d r o g r a p h   A n a l y s i s

Study date 09/23/20 File: APRE2YR110.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

28771 Central Avenue Gas Station
Area A
Pre-development
1-Hr 10-Yr Storm Event

Drainage Area = 1.32(Ac.) = 0.002 Sq. Mi.
Length along longest watercourse = 408.00(Ft.)
Length along longest watercourse measured to centroid = 87.50(Ft.)
Length along longest watercourse = 0.077 Mi.
Length along longest watercourse measured to centroid = 0.017 Mi.
Difference in elevation = 16.34(Ft.)
Slope along watercourse = 211.4588 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.021 Hr.
Lag time = 1.24 Min.
25% of lag time = 0.31 Min.
40% of lag time = 0.50 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
1.32	0.48	0.64

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
1.32	1.34	1.77

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 0.483(In)
Area Averaged 100-Year Rainfall = 1.340(In)

Point rain (area averaged) = 0.836(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 0.836(In)

Sub-Area Data:

Area(Ac.) Runoff Index Impervious %
1.324 83.00 0.059
Total Area Entered = 1.32(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
83.0	83.0	0.210	0.059	0.199	1.000	0.199

Sum (F) = 0.199
Area averaged mean soil loss (F) (In/Hr) = 0.199
Minimum soil loss rate ((In/Hr)) = 0.099
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.853

Slope of intensity-duration curve for a 1 hour storm =0.4800

U n i t H y d r o g r a p h
DESERT S-Curve

Unit Hydrograph Data

	Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	402.223	65.137	0.869
2	0.167	804.446	34.863	0.465
			Sum = 100.000	Sum= 1.334

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	4.40	0.441	0.199	---	0.24
2	0.17	4.50	0.451	0.199	---	0.25
3	0.25	5.40	0.541	0.199	---	0.34
4	0.33	5.40	0.541	0.199	---	0.34
5	0.42	5.70	0.572	0.199	---	0.37
6	0.50	6.40	0.642	0.199	---	0.44
7	0.58	7.90	0.792	0.199	---	0.59
8	0.67	9.10	0.912	0.199	---	0.71
9	0.75	12.80	1.283	0.199	---	1.08
10	0.83	25.60	2.567	0.199	---	2.37
11	0.92	7.90	0.792	0.199	---	0.59
12	1.00	4.90	0.491	0.199	---	0.29
Sum =		100.0			Sum =	7.6

Flood volume = Effective rainfall 0.64(In)
times area 1.3(Ac.)/[(In)/(Ft.)] = 0.1(Ac.Ft)
Total soil loss = 0.20(In)
Total soil loss = 0.022(Ac.Ft)
Total rainfall = 0.84(In)
Flood volume = 3061.1 Cubic Feet
Total soil loss = 954.8 Cubic Feet

Peak flow rate of this hydrograph = 2.564(CFS)

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1 - 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    0.0015    0.21  Q      |      |      |      |
 0+10    0.0037    0.33  |QV      |      |      |      |
 0+15    0.0066    0.42  |Q V     |      |      |      |
 0+20    0.0098    0.46  |Q   V   |      |      |      |
 0+25    0.0131    0.48  |Q    V  |      |      |      |
 0+30    0.0169    0.56  | Q     V|      |      |      |
 0+35    0.0219    0.72  | Q      | V    |      |      |
 0+40    0.0281    0.90  |  Q     |   V  |      |      |
 0+45    0.0369    1.28  |    Q   |      V      |      |
 0+50    0.0545    2.56  |        Q      |      |V     |
 0+55    0.0657    1.62  |     Q  |      |      |    V |
 1+ 0    0.0693    0.53  | Q      |      |      |     V|
 1+ 5    0.0703    0.14  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

Study date 09/23/20 File: APRE2YR32.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

28771 Central Avenue Gas Station
Area A
Pre-development
3-Hr 2-Yr Storm Event

Drainage Area = 1.32(Ac.) = 0.002 Sq. Mi.
Length along longest watercourse = 408.00(Ft.)
Length along longest watercourse measured to centroid = 87.50(Ft.)
Length along longest watercourse = 0.077 Mi.
Length along longest watercourse measured to centroid = 0.017 Mi.
Difference in elevation = 16.34(Ft.)
Slope along watercourse = 211.4588 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.021 Hr.
Lag time = 1.24 Min.
25% of lag time = 0.31 Min.
40% of lag time = 0.50 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
1.32	0.88	1.16

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
1.32	2.20	2.91

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 0.877(In)
Area Averaged 100-Year Rainfall = 2.200(In)

Point rain (area averaged) = 0.877(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 0.877(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
1.324	83.00	0.059

Total Area Entered = 1.32(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
83.0	83.0	0.210	0.059	0.199	1.000	0.199

Sum (F) = 0.199

Area averaged mean soil loss (F) (In/Hr) = 0.199

Minimum soil loss rate ((In/Hr)) = 0.099

(for 24 hour storm duration)

Soil low loss rate (decimal) = 0.853

U n i t H y d r o g r a p h

DESERT S-Curve

Unit Hydrograph Data

	Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	402.223	65.137	0.869
2	0.167	804.446	34.863	0.465
			Sum = 100.000	Sum= 1.334

Storm Event 3 Effective Rainfall = 0.167(In)

	Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Loss rate(In./Hr) Low	Effective (In/Hr)
1	0.08	1.30	0.026	0.199	0.022	0.00
2	0.17	1.30	0.026	0.199	0.022	0.00
3	0.25	1.10	0.022	0.199	0.019	0.00
4	0.33	1.50	0.030	0.199	0.026	0.00
5	0.42	1.50	0.030	0.199	0.026	0.00
6	0.50	1.80	0.036	0.199	0.031	0.01
7	0.58	1.50	0.030	0.199	0.026	0.00
8	0.67	1.80	0.036	0.199	0.031	0.01
9	0.75	1.80	0.036	0.199	0.031	0.01
10	0.83	1.50	0.030	0.199	0.026	0.00
11	0.92	1.60	0.032	0.199	0.027	0.00
12	1.00	1.80	0.036	0.199	0.031	0.01
13	1.08	2.20	0.044	0.199	0.038	0.01
14	1.17	2.20	0.044	0.199	0.038	0.01
15	1.25	2.20	0.044	0.199	0.038	0.01
16	1.33	2.00	0.040	0.199	0.034	0.01
17	1.42	2.60	0.052	0.199	0.044	0.01
18	1.50	2.70	0.054	0.199	0.046	0.01
19	1.58	2.40	0.048	0.199	0.041	0.01
20	1.67	2.70	0.054	0.199	0.046	0.01
21	1.75	3.30	0.066	0.199	0.056	0.01
22	1.83	3.10	0.062	0.199	0.053	0.01
23	1.92	2.90	0.058	0.199	0.049	0.01
24	2.00	3.00	0.060	0.199	0.051	0.01
25	2.08	3.10	0.062	0.199	0.053	0.01
26	2.17	4.20	0.084	0.199	0.072	0.01
27	2.25	5.00	0.100	0.199	0.085	0.01
28	2.33	3.50	0.070	0.199	0.060	0.01
29	2.42	6.80	0.136	0.199	0.116	0.02

30	2.50	7.30	0.146	0.199	0.125	0.02
31	2.58	8.20	0.164	0.199	0.140	0.02
32	2.67	5.90	0.118	0.199	0.101	0.02
33	2.75	2.00	0.040	0.199	0.034	0.01
34	2.83	1.80	0.036	0.199	0.031	0.01
35	2.92	1.80	0.036	0.199	0.031	0.01
36	3.00	0.60	0.012	0.199	0.010	0.00
Sum =		100.0			Sum =	0.3

Flood volume = Effective rainfall 0.02(In)
times area 1.3(Ac.)/[(In)/(Ft.)] = 0.0(Ac.Ft)
Total soil loss = 0.14(In)
Total soil loss = 0.016(Ac.Ft)
Total rainfall = 0.17(In)
Flood volume = 117.6 Cubic Feet
Total soil loss = 683.3 Cubic Feet

Storm Event 2 Effective Rainfall = 0.316(In)

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	1.30	0.049	0.199	0.042	0.01
2	0.17	1.30	0.049	0.199	0.042	0.01
3	0.25	1.10	0.042	0.199	0.036	0.01
4	0.33	1.50	0.057	0.199	0.048	0.01
5	0.42	1.50	0.057	0.199	0.048	0.01
6	0.50	1.80	0.068	0.199	0.058	0.01
7	0.58	1.50	0.057	0.199	0.048	0.01
8	0.67	1.80	0.068	0.199	0.058	0.01
9	0.75	1.80	0.068	0.199	0.058	0.01
10	0.83	1.50	0.057	0.199	0.048	0.01
11	0.92	1.60	0.061	0.199	0.052	0.01
12	1.00	1.80	0.068	0.199	0.058	0.01
13	1.08	2.20	0.083	0.199	0.071	0.01
14	1.17	2.20	0.083	0.199	0.071	0.01
15	1.25	2.20	0.083	0.199	0.071	0.01
16	1.33	2.00	0.076	0.199	0.065	0.01
17	1.42	2.60	0.099	0.199	0.084	0.01
18	1.50	2.70	0.102	0.199	0.087	0.02
19	1.58	2.40	0.091	0.199	0.078	0.01
20	1.67	2.70	0.102	0.199	0.087	0.02
21	1.75	3.30	0.125	0.199	0.107	0.02
22	1.83	3.10	0.117	0.199	0.100	0.02
23	1.92	2.90	0.110	0.199	0.094	0.02
24	2.00	3.00	0.114	0.199	0.097	0.02
25	2.08	3.10	0.117	0.199	0.100	0.02
26	2.17	4.20	0.159	0.199	0.136	0.02
27	2.25	5.00	0.189	0.199	0.162	0.03
28	2.33	3.50	0.133	0.199	0.113	0.02
29	2.42	6.80	0.258	0.199	---	0.06
30	2.50	7.30	0.277	0.199	---	0.08
31	2.58	8.20	0.311	0.199	---	0.11
32	2.67	5.90	0.224	0.199	---	0.02
33	2.75	2.00	0.076	0.199	0.065	0.01
34	2.83	1.80	0.068	0.199	0.058	0.01
35	2.92	1.80	0.068	0.199	0.058	0.01
36	3.00	0.60	0.023	0.199	0.019	0.00
Sum =		100.0			Sum =	0.7

Flood volume = Effective rainfall 0.06(In)
times area 1.3(Ac.)/[(In)/(Ft.)] = 0.0(Ac.Ft)
Total soil loss = 0.26(In)
Total soil loss = 0.029(Ac.Ft)
Total rainfall = 0.32(In)
Flood volume = 269.6 Cubic Feet
Total soil loss = 1247.8 Cubic Feet

Storm Event 1 Effective Rainfall = 0.877(In)

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	1.30	0.137	0.199	0.117	0.02
2	0.17	1.30	0.137	0.199	0.117	0.02
3	0.25	1.10	0.116	0.199	0.099	0.02
4	0.33	1.50	0.158	0.199	0.135	0.02
5	0.42	1.50	0.158	0.199	0.135	0.02
6	0.50	1.80	0.189	0.199	0.162	0.03
7	0.58	1.50	0.158	0.199	0.135	0.02
8	0.67	1.80	0.189	0.199	0.162	0.03
9	0.75	1.80	0.189	0.199	0.162	0.03
10	0.83	1.50	0.158	0.199	0.135	0.02
11	0.92	1.60	0.168	0.199	0.144	0.02
12	1.00	1.80	0.189	0.199	0.162	0.03
13	1.08	2.20	0.232	0.199	---	0.03
14	1.17	2.20	0.232	0.199	---	0.03
15	1.25	2.20	0.232	0.199	---	0.03
16	1.33	2.00	0.210	0.199	---	0.01
17	1.42	2.60	0.274	0.199	---	0.07
18	1.50	2.70	0.284	0.199	---	0.09
19	1.58	2.40	0.253	0.199	---	0.05
20	1.67	2.70	0.284	0.199	---	0.09
21	1.75	3.30	0.347	0.199	---	0.15
22	1.83	3.10	0.326	0.199	---	0.13
23	1.92	2.90	0.305	0.199	---	0.11
24	2.00	3.00	0.316	0.199	---	0.12
25	2.08	3.10	0.326	0.199	---	0.13
26	2.17	4.20	0.442	0.199	---	0.24
27	2.25	5.00	0.526	0.199	---	0.33
28	2.33	3.50	0.368	0.199	---	0.17
29	2.42	6.80	0.716	0.199	---	0.52
30	2.50	7.30	0.768	0.199	---	0.57
31	2.58	8.20	0.863	0.199	---	0.66
32	2.67	5.90	0.621	0.199	---	0.42
33	2.75	2.00	0.210	0.199	---	0.01
34	2.83	1.80	0.189	0.199	0.162	0.03
35	2.92	1.80	0.189	0.199	0.162	0.03
36	3.00	0.60	0.063	0.199	0.054	0.01
Sum =		100.0			Sum =	4.3

Flood volume = Effective rainfall 0.36(In)
times area 1.3(Ac.)/[(In)/(Ft.)] = 0.0(Ac.Ft)
Total soil loss = 0.52(In)
Total soil loss = 0.057(Ac.Ft)
Total rainfall = 0.88(In)
Flood volume = 1727.7 Cubic Feet
Total soil loss = 2487.2 Cubic Feet

Peak flow rate of this hydrograph = 0.843(CFS)

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TOTAL OF: 3 3 - H O U R S T O R M E V E N T S
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     0.00  Q       |        |        |        |
```

```
0+20    0.0001   0.01  Q       |       |       |       |
0+25    0.0002   0.01  Q       |       |       |       |
0+30    0.0002   0.01  Q       |       |       |       |
0+35    0.0003   0.01  Q       |       |       |       |
0+40    0.0003   0.01  Q       |       |       |       |
0+45    0.0004   0.01  Q       |       |       |       |
0+50    0.0004   0.01  Q       |       |       |       |
0+55    0.0004   0.01  Q       |       |       |       |
1+ 0    0.0005   0.01  Q       |       |       |       |
1+ 5    0.0005   0.01  Q       |       |       |       |
1+10    0.0006   0.01  Q       |       |       |       |
1+15    0.0007   0.01  Q       |       |       |       |
1+20    0.0007   0.01  Q       |       |       |       |
1+25    0.0008   0.01  Q       |       |       |       |
1+30    0.0008   0.01  Q       |       |       |       |
1+35    0.0009   0.01  Q       |       |       |       |
1+40    0.0010   0.01  Q       |       |       |       |
1+45    0.0011   0.01  Q       |       |       |       |
1+50    0.0012   0.01  Q       |       |       |       |
1+55    0.0012   0.01  QV      |       |       |       |
2+ 0    0.0013   0.01  QV      |       |       |       |
2+ 5    0.0014   0.01  QV      |       |       |       |
2+10    0.0015   0.01  QV      |       |       |       |
2+15    0.0016   0.02  QV      |       |       |       |
2+20    0.0017   0.02  QV      |       |       |       |
2+25    0.0019   0.02  QV      |       |       |       |
2+30    0.0021   0.03  QV      |       |       |       |
2+35    0.0023   0.03  QV      |       |       |       |
2+40    0.0025   0.03  Q V     |       |       |       |
2+45    0.0026   0.01  Q V     |       |       |       |
2+50    0.0026   0.01  Q V     |       |       |       |
2+55    0.0027   0.01  Q V     |       |       |       |
3+ 0    0.0027   0.00  Q V     |       |       |       |
3+ 5    0.0027   0.01  Q V     |       |       |       |
3+10    0.0028   0.01  Q V     |       |       |       |
3+15    0.0029   0.01  Q V     |       |       |       |
3+20    0.0029   0.01  Q V     |       |       |       |
3+25    0.0030   0.01  Q V     |       |       |       |
3+30    0.0031   0.01  Q V     |       |       |       |
3+35    0.0032   0.01  Q V     |       |       |       |
3+40    0.0033   0.01  Q V     |       |       |       |
3+45    0.0034   0.01  Q V     |       |       |       |
3+50    0.0034   0.01  Q V     |       |       |       |
3+55    0.0035   0.01  Q V     |       |       |       |
4+ 0    0.0036   0.01  Q V     |       |       |       |
4+ 5    0.0037   0.02  Q  V    |       |       |       |
4+10    0.0038   0.02  Q  V    |       |       |       |
4+15    0.0039   0.02  Q  V    |       |       |       |
4+20    0.0040   0.02  Q  V    |       |       |       |
4+25    0.0042   0.02  Q  V    |       |       |       |
4+30    0.0043   0.02  Q  V    |       |       |       |
4+35    0.0044   0.02  Q  V    |       |       |       |
4+40    0.0046   0.02  Q  V    |       |       |       |
4+45    0.0047   0.02  Q  V    |       |       |       |
4+50    0.0049   0.02  Q   V   |       |       |       |
4+55    0.0050   0.02  Q   V   |       |       |       |
5+ 0    0.0052   0.02  Q   V   |       |       |       |
5+ 5    0.0053   0.02  Q   V   |       |       |       |
5+10    0.0055   0.03  Q   V   |       |       |       |
5+15    0.0058   0.04  Q   V   |       |       |       |
5+20    0.0060   0.03  Q   V   |       |       |       |
5+25    0.0064   0.06  Q    V  |       |       |       |
5+30    0.0071   0.10  Q    V  |       |       |       |
5+35    0.0080   0.13  Q     V |       |       |       |
5+40    0.0085   0.07  Q     V |       |       |       |
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5+45	0.0086	0.02	Q	V	|	|	|	|
5+50	0.0087	0.01	Q	V	|	|	|	|
5+55	0.0088	0.01	Q	V	|	|	|	|
6+ 0	0.0089	0.01	Q	V	|	|	|	|
6+ 5	0.0090	0.02	Q	V	|	|	|	|
6+10	0.0092	0.03	Q	V	|	|	|	|
6+15	0.0093	0.02	Q	V	|	|	|	|
6+20	0.0095	0.03	Q	V	|	|	|	|
6+25	0.0097	0.03	Q	V	|	|	|	|
6+30	0.0100	0.03	Q	V	|	|	|	|
6+35	0.0102	0.03	Q	V	|	|	|	|
6+40	0.0105	0.03	Q	V	|	|	|	|
6+45	0.0107	0.04	Q	V	|	|	|	|
6+50	0.0109	0.03	Q	V	|	|	|	|
6+55	0.0112	0.03	Q	V	|	|	|	|
7+ 0	0.0114	0.04	Q	V	|	|	|	|
7+ 5	0.0117	0.04	Q	V	|	|	|	|
7+10	0.0120	0.04	Q	V	|	|	|	|
7+15	0.0123	0.04	Q	V		|	|	|
7+20	0.0125	0.03	Q	V		|	|	|
7+25	0.0130	0.07	Q	V		|	|	|
7+30	0.0137	0.11	Q		|V	|	|	|

U n i t   H y d r o g r a p h   A n a l y s i s

Study date 09/23/20 File: APRE2YR35.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

28771 Central Avenue Gas Station
Area A
Pre-development
3-Hr 5-Yr Storm Event

Drainage Area = 1.32(Ac.) = 0.002 Sq. Mi.
Length along longest watercourse = 408.00(Ft.)
Length along longest watercourse measured to centroid = 87.50(Ft.)
Length along longest watercourse = 0.077 Mi.
Length along longest watercourse measured to centroid = 0.017 Mi.
Difference in elevation = 16.34(Ft.)
Slope along watercourse = 211.4588 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.021 Hr.
Lag time = 1.24 Min.
25% of lag time = 0.31 Min.
40% of lag time = 0.50 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
1.32	0.88	1.16

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
1.32	2.20	2.91

STORM EVENT (YEAR) = 5.00
Area Averaged 2-Year Rainfall = 0.877(In)
Area Averaged 100-Year Rainfall = 2.200(In)

Point rain (area averaged) = 1.187(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.187(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
1.324	83.00	0.059

Total Area Entered = 1.32(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
83.0	83.0	0.210	0.059	0.199	1.000	0.199

Sum (F) = 0.199

Area averaged mean soil loss (F) (In/Hr) = 0.199

Minimum soil loss rate ((In/Hr)) = 0.099

(for 24 hour storm duration)

Soil low loss rate (decimal) = 0.853

U n i t H y d r o g r a p h

DESERT S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	402.223	65.137	0.869
2	0.167	804.446	34.863	0.465
			Sum = 100.000	Sum= 1.334

Storm Event 3 Effective Rainfall = 0.226(In)

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Loss rate(In./Hr) Low	Effective (In/Hr)
1	0.08	1.30	0.035	0.199	0.030	0.01
2	0.17	1.30	0.035	0.199	0.030	0.01
3	0.25	1.10	0.030	0.199	0.025	0.00
4	0.33	1.50	0.041	0.199	0.035	0.01
5	0.42	1.50	0.041	0.199	0.035	0.01
6	0.50	1.80	0.049	0.199	0.042	0.01
7	0.58	1.50	0.041	0.199	0.035	0.01
8	0.67	1.80	0.049	0.199	0.042	0.01
9	0.75	1.80	0.049	0.199	0.042	0.01
10	0.83	1.50	0.041	0.199	0.035	0.01
11	0.92	1.60	0.043	0.199	0.037	0.01
12	1.00	1.80	0.049	0.199	0.042	0.01
13	1.08	2.20	0.060	0.199	0.051	0.01
14	1.17	2.20	0.060	0.199	0.051	0.01
15	1.25	2.20	0.060	0.199	0.051	0.01
16	1.33	2.00	0.054	0.199	0.046	0.01
17	1.42	2.60	0.070	0.199	0.060	0.01
18	1.50	2.70	0.073	0.199	0.062	0.01
19	1.58	2.40	0.065	0.199	0.055	0.01
20	1.67	2.70	0.073	0.199	0.062	0.01
21	1.75	3.30	0.089	0.199	0.076	0.01
22	1.83	3.10	0.084	0.199	0.072	0.01
23	1.92	2.90	0.078	0.199	0.067	0.01
24	2.00	3.00	0.081	0.199	0.069	0.01
25	2.08	3.10	0.084	0.199	0.072	0.01
26	2.17	4.20	0.114	0.199	0.097	0.02
27	2.25	5.00	0.135	0.199	0.115	0.02
28	2.33	3.50	0.095	0.199	0.081	0.01
29	2.42	6.80	0.184	0.199	0.157	0.03

30	2.50	7.30	0.198	0.199	0.169	0.03
31	2.58	8.20	0.222	0.199	---	0.02
32	2.67	5.90	0.160	0.199	0.136	0.02
33	2.75	2.00	0.054	0.199	0.046	0.01
34	2.83	1.80	0.049	0.199	0.042	0.01
35	2.92	1.80	0.049	0.199	0.042	0.01
36	3.00	0.60	0.016	0.199	0.014	0.00
Sum =		100.0			Sum =	0.4

Flood volume = Effective rainfall 0.03(In)
times area 1.3(Ac.)/[(In)/(Ft.)] = 0.0(Ac.Ft)
Total soil loss = 0.19(In)
Total soil loss = 0.021(Ac.Ft)
Total rainfall = 0.23(In)
Flood volume = 155.4 Cubic Feet
Total soil loss = 928.4 Cubic Feet

Storm Event 2 Effective Rainfall = 0.427(In)

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	1.30	0.067	0.199	0.057	0.01
2	0.17	1.30	0.067	0.199	0.057	0.01
3	0.25	1.10	0.056	0.199	0.048	0.01
4	0.33	1.50	0.077	0.199	0.066	0.01
5	0.42	1.50	0.077	0.199	0.066	0.01
6	0.50	1.80	0.092	0.199	0.079	0.01
7	0.58	1.50	0.077	0.199	0.066	0.01
8	0.67	1.80	0.092	0.199	0.079	0.01
9	0.75	1.80	0.092	0.199	0.079	0.01
10	0.83	1.50	0.077	0.199	0.066	0.01
11	0.92	1.60	0.082	0.199	0.070	0.01
12	1.00	1.80	0.092	0.199	0.079	0.01
13	1.08	2.20	0.113	0.199	0.096	0.02
14	1.17	2.20	0.113	0.199	0.096	0.02
15	1.25	2.20	0.113	0.199	0.096	0.02
16	1.33	2.00	0.103	0.199	0.087	0.02
17	1.42	2.60	0.133	0.199	0.114	0.02
18	1.50	2.70	0.138	0.199	0.118	0.02
19	1.58	2.40	0.123	0.199	0.105	0.02
20	1.67	2.70	0.138	0.199	0.118	0.02
21	1.75	3.30	0.169	0.199	0.144	0.02
22	1.83	3.10	0.159	0.199	0.136	0.02
23	1.92	2.90	0.149	0.199	0.127	0.02
24	2.00	3.00	0.154	0.199	0.131	0.02
25	2.08	3.10	0.159	0.199	0.136	0.02
26	2.17	4.20	0.215	0.199	---	0.02
27	2.25	5.00	0.256	0.199	---	0.06
28	2.33	3.50	0.179	0.199	0.153	0.03
29	2.42	6.80	0.349	0.199	---	0.15
30	2.50	7.30	0.374	0.199	---	0.18
31	2.58	8.20	0.420	0.199	---	0.22
32	2.67	5.90	0.303	0.199	---	0.10
33	2.75	2.00	0.103	0.199	0.087	0.02
34	2.83	1.80	0.092	0.199	0.079	0.01
35	2.92	1.80	0.092	0.199	0.079	0.01
36	3.00	0.60	0.031	0.199	0.026	0.00
Sum =		100.0			Sum =	1.2

Flood volume = Effective rainfall 0.10(In)
times area 1.3(Ac.)/[(In)/(Ft.)] = 0.0(Ac.Ft)
Total soil loss = 0.33(In)
Total soil loss = 0.036(Ac.Ft)
Total rainfall = 0.43(In)
Flood volume = 479.3 Cubic Feet
Total soil loss = 1574.2 Cubic Feet

Storm Event 1   Effective Rainfall =   1.187(In)

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Loss rate(In./Hr) Low	Effective (In/Hr)
1	0.08	1.30	0.185	0.199	0.158	0.03
2	0.17	1.30	0.185	0.199	0.158	0.03
3	0.25	1.10	0.157	0.199	0.134	0.02
4	0.33	1.50	0.214	0.199	---	0.01
5	0.42	1.50	0.214	0.199	---	0.01
6	0.50	1.80	0.256	0.199	---	0.06
7	0.58	1.50	0.214	0.199	---	0.01
8	0.67	1.80	0.256	0.199	---	0.06
9	0.75	1.80	0.256	0.199	---	0.06
10	0.83	1.50	0.214	0.199	---	0.01
11	0.92	1.60	0.228	0.199	---	0.03
12	1.00	1.80	0.256	0.199	---	0.06
13	1.08	2.20	0.313	0.199	---	0.11
14	1.17	2.20	0.313	0.199	---	0.11
15	1.25	2.20	0.313	0.199	---	0.11
16	1.33	2.00	0.285	0.199	---	0.09
17	1.42	2.60	0.370	0.199	---	0.17
18	1.50	2.70	0.385	0.199	---	0.19
19	1.58	2.40	0.342	0.199	---	0.14
20	1.67	2.70	0.385	0.199	---	0.19
21	1.75	3.30	0.470	0.199	---	0.27
22	1.83	3.10	0.442	0.199	---	0.24
23	1.92	2.90	0.413	0.199	---	0.21
24	2.00	3.00	0.427	0.199	---	0.23
25	2.08	3.10	0.442	0.199	---	0.24
26	2.17	4.20	0.598	0.199	---	0.40
27	2.25	5.00	0.712	0.199	---	0.51
28	2.33	3.50	0.498	0.199	---	0.30
29	2.42	6.80	0.968	0.199	---	0.77
30	2.50	7.30	1.040	0.199	---	0.84
31	2.58	8.20	1.168	0.199	---	0.97
32	2.67	5.90	0.840	0.199	---	0.64
33	2.75	2.00	0.285	0.199	---	0.09
34	2.83	1.80	0.256	0.199	---	0.06
35	2.92	1.80	0.256	0.199	---	0.06
36	3.00	0.60	0.085	0.199	0.073	0.01
Sum =		100.0			Sum =	7.4

Flood volume = Effective rainfall   0.61(In)
times area   1.3(Ac.)/[(In)/(Ft.)] =   0.1(Ac.Ft)
Total soil loss =   0.57(In)
Total soil loss =   0.063(Ac.Ft)
Total rainfall =   1.19(In)
Flood volume =   2948.9 Cubic Feet
Total soil loss =   2755.4 Cubic Feet

Peak flow rate of this hydrograph =   1.234(CFS)

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TOTAL OF: 3   3 - H O U R   S T O R M   E V E N T S

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   0.0003   0.01  Q       |       |       |       |
0+40   0.0004   0.01  Q       |       |       |       |
0+45   0.0005   0.01  Q       |       |       |       |
0+50   0.0005   0.01  Q       |       |       |       |
0+55   0.0006   0.01  Q       |       |       |       |
1+ 0   0.0007   0.01  Q       |       |       |       |
1+ 5   0.0007   0.01  Q       |       |       |       |
1+10   0.0008   0.01  Q       |       |       |       |
1+15   0.0009   0.01  Q       |       |       |       |
1+20   0.0010   0.01  Q       |       |       |       |
1+25   0.0011   0.01  Q       |       |       |       |
1+30   0.0011   0.01  Q       |       |       |       |
1+35   0.0012   0.01  Q       |       |       |       |
1+40   0.0013   0.01  Q       |       |       |       |
1+45   0.0014   0.02  Q       |       |       |       |
1+50   0.0016   0.02  Q       |       |       |       |
1+55   0.0017   0.02  Q       |       |       |       |
2+ 0   0.0018   0.02  Q       |       |       |       |
2+ 5   0.0019   0.02  Q       |       |       |       |
2+10   0.0020   0.02  Q       |       |       |       |
2+15   0.0022   0.03  QV      |       |       |       |
2+20   0.0024   0.02  QV      |       |       |       |
2+25   0.0026   0.03  QV      |       |       |       |
2+30   0.0028   0.04  QV      |       |       |       |
2+35   0.0031   0.03  QV      |       |       |       |
2+40   0.0033   0.03  QV      |       |       |       |
2+45   0.0034   0.02  QV      |       |       |       |
2+50   0.0035   0.01  QV      |       |       |       |
2+55   0.0035   0.01  QV      |       |       |       |
3+ 0   0.0036   0.01  QV      |       |       |       |
3+ 5   0.0036   0.01  QV      |       |       |       |
3+10   0.0037   0.01  QV      |       |       |       |
3+15   0.0038   0.01  QV      |       |       |       |
3+20   0.0039   0.01  QV      |       |       |       |
3+25   0.0040   0.02  QV      |       |       |       |
3+30   0.0041   0.02  QV      |       |       |       |
3+35   0.0042   0.02  Q V     |       |       |       |
3+40   0.0043   0.02  Q V     |       |       |       |
3+45   0.0045   0.02  Q V     |       |       |       |
3+50   0.0046   0.02  Q V     |       |       |       |
3+55   0.0047   0.02  Q V     |       |       |       |
4+ 0   0.0048   0.02  Q V     |       |       |       |
4+ 5   0.0049   0.02  Q V     |       |       |       |
4+10   0.0051   0.02  Q V     |       |       |       |
4+15   0.0052   0.02  Q V     |       |       |       |
4+20   0.0054   0.02  Q V     |       |       |       |
4+25   0.0056   0.02  Q V     |       |       |       |
4+30   0.0057   0.03  Q V     |       |       |       |
4+35   0.0059   0.03  Q V     |       |       |       |
4+40   0.0061   0.03  Q V     |       |       |       |
4+45   0.0063   0.03  Q  V    |       |       |       |
4+50   0.0065   0.03  Q  V    |       |       |       |
4+55   0.0067   0.03  Q  V    |       |       |       |
5+ 0   0.0069   0.03  Q  V    |       |       |       |
5+ 5   0.0071   0.03  Q  V    |       |       |       |
5+10   0.0073   0.03  Q  V    |       |       |       |
5+15   0.0077   0.06  Q  V    |       |       |       |
5+20   0.0081   0.05  Q  V    |       |       |       |
5+25   0.0090   0.14  Q   V   |       |       |       |
5+30   0.0106   0.22  Q    V  |       |       |       |
5+35   0.0125   0.27  |Q    V |       |       |       |
5+40   0.0138   0.19  Q     V |       |       |       |
```

5+45 0.0142 0.06 Q V | | | |
5+50 0.0144 0.02 Q V | | | |
5+55 0.0145 0.02 Q V | | | |
6+ 0 0.0145 0.01 Q V | | | |
6+ 5 0.0147 0.02 Q V | | | |
6+10 0.0150 0.04 Q V | | | |
6+15 0.0152 0.03 Q V | | | |
6+20 0.0153 0.02 Q V | | | |
6+25 0.0155 0.02 Q V | | | |
6+30 0.0159 0.06 Q V | | | |
6+35 0.0162 0.04 Q V | | | |
6+40 0.0165 0.06 Q V | | | |
6+45 0.0171 0.08 Q V | | | |
6+50 0.0174 0.04 Q V | | | |
6+55 0.0176 0.03 Q V | | | |
7+ 0 0.0180 0.06 Q V | | | |
7+ 5 0.0189 0.13 Q V| | | |
7+10 0.0199 0.15 Q V| | | |
7+15 0.0210 0.15 Q V | | |
7+20 0.0219 0.13 Q V | | |
7+25 0.0232 0.19 Q |V | | |
7+30 0.0248 0.24 Q | V |

U n i t   H y d r o g r a p h   A n a l y s i s

Study date 09/23/20 File: APRE2YR310.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

28771 Central Avenue Gas Station
Area A
Pre-development
3-Hr 10-Yr Storm Event

Drainage Area = 1.32(Ac.) = 0.002 Sq. Mi.
Length along longest watercourse = 408.00(Ft.)
Length along longest watercourse measured to centroid = 87.50(Ft.)
Length along longest watercourse = 0.077 Mi.
Length along longest watercourse measured to centroid = 0.017 Mi.
Difference in elevation = 16.34(Ft.)
Slope along watercourse = 211.4588 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.021 Hr.
Lag time = 1.24 Min.
25% of lag time = 0.31 Min.
40% of lag time = 0.50 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
1.32	0.88	1.16

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
1.32	2.20	2.91

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 0.877(In)
Area Averaged 100-Year Rainfall = 2.200(In)

Point rain (area averaged) = 1.421(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.421(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
1.324	83.00	0.059

Total Area Entered = 1.32(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
83.0	83.0	0.210	0.059	0.199	1.000	0.199

Sum (F) = 0.199

Area averaged mean soil loss (F) (In/Hr) = 0.199
Minimum soil loss rate ((In/Hr)) = 0.099
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.853

U n i t H y d r o g r a p h
DESERT S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	402.223	65.137	0.869
2	0.167	804.446	34.863	0.465
			Sum = 100.000	Sum= 1.334

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	1.30	0.222	0.199	---	0.02
2	0.17	1.30	0.222	0.199	---	0.02
3	0.25	1.10	0.188	0.199	0.160	0.03
4	0.33	1.50	0.256	0.199	---	0.06
5	0.42	1.50	0.256	0.199	---	0.06
6	0.50	1.80	0.307	0.199	---	0.11
7	0.58	1.50	0.256	0.199	---	0.06
8	0.67	1.80	0.307	0.199	---	0.11
9	0.75	1.80	0.307	0.199	---	0.11
10	0.83	1.50	0.256	0.199	---	0.06
11	0.92	1.60	0.273	0.199	---	0.07
12	1.00	1.80	0.307	0.199	---	0.11
13	1.08	2.20	0.375	0.199	---	0.18
14	1.17	2.20	0.375	0.199	---	0.18
15	1.25	2.20	0.375	0.199	---	0.18
16	1.33	2.00	0.341	0.199	---	0.14
17	1.42	2.60	0.443	0.199	---	0.24
18	1.50	2.70	0.460	0.199	---	0.26
19	1.58	2.40	0.409	0.199	---	0.21
20	1.67	2.70	0.460	0.199	---	0.26
21	1.75	3.30	0.563	0.199	---	0.36
22	1.83	3.10	0.529	0.199	---	0.33
23	1.92	2.90	0.495	0.199	---	0.30
24	2.00	3.00	0.512	0.199	---	0.31
25	2.08	3.10	0.529	0.199	---	0.33
26	2.17	4.20	0.716	0.199	---	0.52
27	2.25	5.00	0.853	0.199	---	0.65
28	2.33	3.50	0.597	0.199	---	0.40
29	2.42	6.80	1.160	0.199	---	0.96
30	2.50	7.30	1.245	0.199	---	1.05
31	2.58	8.20	1.399	0.199	---	1.20
32	2.67	5.90	1.006	0.199	---	0.81
33	2.75	2.00	0.341	0.199	---	0.14

```
34   2.83     1.80     0.307       0.199     ---        0.11
35   2.92     1.80     0.307       0.199     ---        0.11
36   3.00     0.60     0.102       0.199    0.087       0.02
  Sum =     100.0                        Sum =    10.1
            Flood volume = Effective rainfall     0.84(In)
             times area      1.3(Ac.)/[(In)/(Ft.)] =      0.1(Ac.Ft)
            Total soil loss =     0.58(In)
            Total soil loss =    0.064(Ac.Ft)
            Total rainfall =     1.42(In)
            Flood volume =      4026.6 Cubic Feet
            Total soil loss =      2804.3 Cubic Feet
            ----------------------------------------------------------------------
             Peak flow rate of this hydrograph =     1.530(CFS)
            ----------------------------------------------------------------------
            ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                  3 - 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     0.0004     0.03  Q       |       |       |       |
  0+15     0.0006     0.03  Q       |       |       |       |
  0+20     0.0010     0.06  Q       |       |       |       |
  0+25     0.0015     0.08  Q       |       |       |       |
  0+30     0.0024     0.12  QV      |       |       |       |
  0+35     0.0031     0.10  QV      |       |       |       |
  0+40     0.0039     0.12  QV      |       |       |       |
  0+45     0.0049     0.14  Q V     |       |       |       |
  0+50     0.0056     0.10  Q V     |       |       |       |
  0+55     0.0062     0.09  Q V     |       |       |       |
  1+ 0     0.0071     0.13  Q  V    |       |       |       |
  1+ 5     0.0085     0.20  Q  V    |       |       |       |
  1+10     0.0101     0.24  Q   V   |       |       |       |
  1+15     0.0118     0.24  Q    V  |       |       |       |
  1+20     0.0132     0.21  Q    V  |       |       |       |
  1+25     0.0151     0.28  |Q    V |       |       |       |
  1+30     0.0174     0.34  |Q     V|       |       |       |
  1+35     0.0195     0.31  |Q      V|      |       |       |
  1+40     0.0218     0.33  |Q       V|     |       |       |
  1+45     0.0248     0.44  |Q        V     |       |       |
  1+50     0.0280     0.46  |Q        | V     |       |       |
  1+55     0.0308     0.41  |Q        |  V    |       |       |
  2+ 0     0.0336     0.41  |Q        |  V    |       |       |
  2+ 5     0.0366     0.43  |Q        |   V   |       |       |
  2+10     0.0407     0.60  | Q       |     V |       |       |
  2+15     0.0463     0.81  |  Q      |       V       |       |
  2+20     0.0508     0.65  | Q       |       |V      |       |
  2+25     0.0578     1.02  |   Q     |       |    V  |       |
  2+30     0.0672     1.36  |    Q    |       |       V|      |
  2+35     0.0777     1.53  |     Q   |       |       | V     |
  2+40     0.0864     1.26  |    Q    |       |       |     V |
  2+45     0.0899     0.50  |Q        |       |       |      V|
  2+50     0.0910     0.16  Q       |       |       |      V|
  2+55     0.0920     0.14  Q       |       |       |      V|
  3+ 0     0.0924     0.06  Q       |       |       |      V|
  3+ 5     0.0924     0.01  Q       |       |       |      V|
-----------------------------------------------------------------------
```

U n i t   H y d r o g r a p h   A n a l y s i s

Study date 09/23/20 File: APRE2YR62.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

28771 Central Avenue Gas Station
Area A
Pre-development
6-Hr 2-Yr Storm Event

Drainage Area = 1.32(Ac.) = 0.002 Sq. Mi.
Length along longest watercourse = 408.00(Ft.)
Length along longest watercourse measured to centroid = 87.50(Ft.)
Length along longest watercourse = 0.077 Mi.
Length along longest watercourse measured to centroid = 0.017 Mi.
Difference in elevation = 16.34(Ft.)
Slope along watercourse = 211.4588 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.021 Hr.
Lag time = 1.24 Min.
25% of lag time = 0.31 Min.
40% of lag time = 0.50 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
1.32	1.27	1.68

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
1.32	3.12	4.13

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 1.270(In)
Area Averaged 100-Year Rainfall = 3.120(In)

Point rain (area averaged) = 1.270(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.270(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
1.324	83.00	0.059

Total Area Entered = 1.32(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
83.0	83.0	0.210	0.059	0.199	1.000	0.199

Sum (F) = 0.199

Area averaged mean soil loss (F) (In/Hr) = 0.199

Minimum soil loss rate ((In/Hr)) = 0.099

(for 24 hour storm duration)

Soil low loss rate (decimal) = 0.853

U n i t H y d r o g r a p h

DESERT S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	402.223	65.137	0.869
2	0.167	804.446	34.863	0.465
			Sum = 100.000	Sum= 1.334

Storm Event 3 Effective Rainfall = 0.241(In)

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.50	0.014	0.199	0.012	0.00
2	0.17	0.60	0.017	0.199	0.015	0.00
3	0.25	0.60	0.017	0.199	0.015	0.00
4	0.33	0.60	0.017	0.199	0.015	0.00
5	0.42	0.60	0.017	0.199	0.015	0.00
6	0.50	0.70	0.020	0.199	0.017	0.00
7	0.58	0.70	0.020	0.199	0.017	0.00
8	0.67	0.70	0.020	0.199	0.017	0.00
9	0.75	0.70	0.020	0.199	0.017	0.00
10	0.83	0.70	0.020	0.199	0.017	0.00
11	0.92	0.70	0.020	0.199	0.017	0.00
12	1.00	0.80	0.023	0.199	0.020	0.00
13	1.08	0.80	0.023	0.199	0.020	0.00
14	1.17	0.80	0.023	0.199	0.020	0.00
15	1.25	0.80	0.023	0.199	0.020	0.00
16	1.33	0.80	0.023	0.199	0.020	0.00
17	1.42	0.80	0.023	0.199	0.020	0.00
18	1.50	0.80	0.023	0.199	0.020	0.00
19	1.58	0.80	0.023	0.199	0.020	0.00
20	1.67	0.80	0.023	0.199	0.020	0.00
21	1.75	0.80	0.023	0.199	0.020	0.00
22	1.83	0.80	0.023	0.199	0.020	0.00
23	1.92	0.80	0.023	0.199	0.020	0.00
24	2.00	0.90	0.026	0.199	0.022	0.00
25	2.08	0.80	0.023	0.199	0.020	0.00
26	2.17	0.90	0.026	0.199	0.022	0.00
27	2.25	0.90	0.026	0.199	0.022	0.00
28	2.33	0.90	0.026	0.199	0.022	0.00
29	2.42	0.90	0.026	0.199	0.022	0.00

30	2.50	0.90	0.026	0.199	0.022	0.00
31	2.58	0.90	0.026	0.199	0.022	0.00
32	2.67	0.90	0.026	0.199	0.022	0.00
33	2.75	1.00	0.029	0.199	0.025	0.00
34	2.83	1.00	0.029	0.199	0.025	0.00
35	2.92	1.00	0.029	0.199	0.025	0.00
36	3.00	1.00	0.029	0.199	0.025	0.00
37	3.08	1.00	0.029	0.199	0.025	0.00
38	3.17	1.10	0.032	0.199	0.027	0.00
39	3.25	1.10	0.032	0.199	0.027	0.00
40	3.33	1.10	0.032	0.199	0.027	0.00
41	3.42	1.20	0.035	0.199	0.030	0.01
42	3.50	1.30	0.038	0.199	0.032	0.01
43	3.58	1.40	0.041	0.199	0.035	0.01
44	3.67	1.40	0.041	0.199	0.035	0.01
45	3.75	1.50	0.043	0.199	0.037	0.01
46	3.83	1.50	0.043	0.199	0.037	0.01
47	3.92	1.60	0.046	0.199	0.040	0.01
48	4.00	1.60	0.046	0.199	0.040	0.01
49	4.08	1.70	0.049	0.199	0.042	0.01
50	4.17	1.80	0.052	0.199	0.044	0.01
51	4.25	1.90	0.055	0.199	0.047	0.01
52	4.33	2.00	0.058	0.199	0.049	0.01
53	4.42	2.10	0.061	0.199	0.052	0.01
54	4.50	2.10	0.061	0.199	0.052	0.01
55	4.58	2.20	0.064	0.199	0.054	0.01
56	4.67	2.30	0.067	0.199	0.057	0.01
57	4.75	2.40	0.069	0.199	0.059	0.01
58	4.83	2.40	0.069	0.199	0.059	0.01
59	4.92	2.50	0.072	0.199	0.062	0.01
60	5.00	2.60	0.075	0.199	0.064	0.01
61	5.08	3.10	0.090	0.199	0.077	0.01
62	5.17	3.60	0.104	0.199	0.089	0.02
63	5.25	3.90	0.113	0.199	0.096	0.02
64	5.33	4.20	0.122	0.199	0.104	0.02
65	5.42	4.70	0.136	0.199	0.116	0.02
66	5.50	5.60	0.162	0.199	0.138	0.02
67	5.58	1.90	0.055	0.199	0.047	0.01
68	5.67	0.90	0.026	0.199	0.022	0.00
69	5.75	0.60	0.017	0.199	0.015	0.00
70	5.83	0.50	0.014	0.199	0.012	0.00
71	5.92	0.30	0.009	0.199	0.007	0.00
72	6.00	0.20	0.006	0.199	0.005	0.00
	Sum =	100.0			Sum =	0.4

Flood volume = Effective rainfall 0.04(In)
times area 1.3(Ac.)/[(In)/(Ft.)] = 0.0(Ac.Ft)
Total soil loss = 0.21(In)
Total soil loss = 0.023(Ac.Ft)
Total rainfall = 0.24(In)
Flood volume = 170.2 Cubic Feet
Total soil loss = 989.5 Cubic Feet

Storm Event 2 Effective Rainfall = 0.457(In)

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.50	0.027	0.199	0.023	0.00
2	0.17	0.60	0.033	0.199	0.028	0.00
3	0.25	0.60	0.033	0.199	0.028	0.00
4	0.33	0.60	0.033	0.199	0.028	0.00
5	0.42	0.60	0.033	0.199	0.028	0.00
6	0.50	0.70	0.038	0.199	0.033	0.01
7	0.58	0.70	0.038	0.199	0.033	0.01
8	0.67	0.70	0.038	0.199	0.033	0.01

9	0.75	0.70	0.038	0.199	0.033	0.01
10	0.83	0.70	0.038	0.199	0.033	0.01
11	0.92	0.70	0.038	0.199	0.033	0.01
12	1.00	0.80	0.044	0.199	0.037	0.01
13	1.08	0.80	0.044	0.199	0.037	0.01
14	1.17	0.80	0.044	0.199	0.037	0.01
15	1.25	0.80	0.044	0.199	0.037	0.01
16	1.33	0.80	0.044	0.199	0.037	0.01
17	1.42	0.80	0.044	0.199	0.037	0.01
18	1.50	0.80	0.044	0.199	0.037	0.01
19	1.58	0.80	0.044	0.199	0.037	0.01
20	1.67	0.80	0.044	0.199	0.037	0.01
21	1.75	0.80	0.044	0.199	0.037	0.01
22	1.83	0.80	0.044	0.199	0.037	0.01
23	1.92	0.80	0.044	0.199	0.037	0.01
24	2.00	0.90	0.049	0.199	0.042	0.01
25	2.08	0.80	0.044	0.199	0.037	0.01
26	2.17	0.90	0.049	0.199	0.042	0.01
27	2.25	0.90	0.049	0.199	0.042	0.01
28	2.33	0.90	0.049	0.199	0.042	0.01
29	2.42	0.90	0.049	0.199	0.042	0.01
30	2.50	0.90	0.049	0.199	0.042	0.01
31	2.58	0.90	0.049	0.199	0.042	0.01
32	2.67	0.90	0.049	0.199	0.042	0.01
33	2.75	1.00	0.055	0.199	0.047	0.01
34	2.83	1.00	0.055	0.199	0.047	0.01
35	2.92	1.00	0.055	0.199	0.047	0.01
36	3.00	1.00	0.055	0.199	0.047	0.01
37	3.08	1.00	0.055	0.199	0.047	0.01
38	3.17	1.10	0.060	0.199	0.051	0.01
39	3.25	1.10	0.060	0.199	0.051	0.01
40	3.33	1.10	0.060	0.199	0.051	0.01
41	3.42	1.20	0.066	0.199	0.056	0.01
42	3.50	1.30	0.071	0.199	0.061	0.01
43	3.58	1.40	0.077	0.199	0.066	0.01
44	3.67	1.40	0.077	0.199	0.066	0.01
45	3.75	1.50	0.082	0.199	0.070	0.01
46	3.83	1.50	0.082	0.199	0.070	0.01
47	3.92	1.60	0.088	0.199	0.075	0.01
48	4.00	1.60	0.088	0.199	0.075	0.01
49	4.08	1.70	0.093	0.199	0.080	0.01
50	4.17	1.80	0.099	0.199	0.084	0.01
51	4.25	1.90	0.104	0.199	0.089	0.02
52	4.33	2.00	0.110	0.199	0.094	0.02
53	4.42	2.10	0.115	0.199	0.098	0.02
54	4.50	2.10	0.115	0.199	0.098	0.02
55	4.58	2.20	0.121	0.199	0.103	0.02
56	4.67	2.30	0.126	0.199	0.108	0.02
57	4.75	2.40	0.132	0.199	0.112	0.02
58	4.83	2.40	0.132	0.199	0.112	0.02
59	4.92	2.50	0.137	0.199	0.117	0.02
60	5.00	2.60	0.143	0.199	0.122	0.02
61	5.08	3.10	0.170	0.199	0.145	0.02
62	5.17	3.60	0.198	0.199	0.169	0.03
63	5.25	3.90	0.214	0.199	---	0.02
64	5.33	4.20	0.230	0.199	---	0.03
65	5.42	4.70	0.258	0.199	---	0.06
66	5.50	5.60	0.307	0.199	---	0.11
67	5.58	1.90	0.104	0.199	0.089	0.02
68	5.67	0.90	0.049	0.199	0.042	0.01
69	5.75	0.60	0.033	0.199	0.028	0.00
70	5.83	0.50	0.027	0.199	0.023	0.00
71	5.92	0.30	0.016	0.199	0.014	0.00
72	6.00	0.20	0.011	0.199	0.009	0.00
	Sum =	100.0			Sum =	0.9

Flood volume = Effective rainfall 0.07(In)
times area 1.3(Ac.)/[(In)/(Ft.)] = 0.0(Ac.Ft)
Total soil loss = 0.38(In)
Total soil loss = 0.042(Ac.Ft)
Total rainfall = 0.46(In)
Flood volume = 349.3 Cubic Feet
Total soil loss = 1848.1 Cubic Feet

Storm Event 1 Effective Rainfall = 1.270(In)

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Loss rate(In./Hr) Low	Effective (In/Hr)
1	0.08	0.50	0.076	0.199	0.065	0.01
2	0.17	0.60	0.091	0.199	0.078	0.01
3	0.25	0.60	0.091	0.199	0.078	0.01
4	0.33	0.60	0.091	0.199	0.078	0.01
5	0.42	0.60	0.091	0.199	0.078	0.01
6	0.50	0.70	0.107	0.199	0.091	0.02
7	0.58	0.70	0.107	0.199	0.091	0.02
8	0.67	0.70	0.107	0.199	0.091	0.02
9	0.75	0.70	0.107	0.199	0.091	0.02
10	0.83	0.70	0.107	0.199	0.091	0.02
11	0.92	0.70	0.107	0.199	0.091	0.02
12	1.00	0.80	0.122	0.199	0.104	0.02
13	1.08	0.80	0.122	0.199	0.104	0.02
14	1.17	0.80	0.122	0.199	0.104	0.02
15	1.25	0.80	0.122	0.199	0.104	0.02
16	1.33	0.80	0.122	0.199	0.104	0.02
17	1.42	0.80	0.122	0.199	0.104	0.02
18	1.50	0.80	0.122	0.199	0.104	0.02
19	1.58	0.80	0.122	0.199	0.104	0.02
20	1.67	0.80	0.122	0.199	0.104	0.02
21	1.75	0.80	0.122	0.199	0.104	0.02
22	1.83	0.80	0.122	0.199	0.104	0.02
23	1.92	0.80	0.122	0.199	0.104	0.02
24	2.00	0.90	0.137	0.199	0.117	0.02
25	2.08	0.80	0.122	0.199	0.104	0.02
26	2.17	0.90	0.137	0.199	0.117	0.02
27	2.25	0.90	0.137	0.199	0.117	0.02
28	2.33	0.90	0.137	0.199	0.117	0.02
29	2.42	0.90	0.137	0.199	0.117	0.02
30	2.50	0.90	0.137	0.199	0.117	0.02
31	2.58	0.90	0.137	0.199	0.117	0.02
32	2.67	0.90	0.137	0.199	0.117	0.02
33	2.75	1.00	0.152	0.199	0.130	0.02
34	2.83	1.00	0.152	0.199	0.130	0.02
35	2.92	1.00	0.152	0.199	0.130	0.02
36	3.00	1.00	0.152	0.199	0.130	0.02
37	3.08	1.00	0.152	0.199	0.130	0.02
38	3.17	1.10	0.168	0.199	0.143	0.02
39	3.25	1.10	0.168	0.199	0.143	0.02
40	3.33	1.10	0.168	0.199	0.143	0.02
41	3.42	1.20	0.183	0.199	0.156	0.03
42	3.50	1.30	0.198	0.199	0.169	0.03
43	3.58	1.40	0.213	0.199	---	0.01
44	3.67	1.40	0.213	0.199	---	0.01
45	3.75	1.50	0.229	0.199	---	0.03
46	3.83	1.50	0.229	0.199	---	0.03
47	3.92	1.60	0.244	0.199	---	0.05
48	4.00	1.60	0.244	0.199	---	0.05
49	4.08	1.70	0.259	0.199	---	0.06
50	4.17	1.80	0.274	0.199	---	0.08
51	4.25	1.90	0.290	0.199	---	0.09
52	4.33	2.00	0.305	0.199	---	0.11

53	4.42	2.10	0.320	0.199	---	0.12
54	4.50	2.10	0.320	0.199	---	0.12
55	4.58	2.20	0.335	0.199	---	0.14
56	4.67	2.30	0.351	0.199	---	0.15
57	4.75	2.40	0.366	0.199	---	0.17
58	4.83	2.40	0.366	0.199	---	0.17
59	4.92	2.50	0.381	0.199	---	0.18
60	5.00	2.60	0.396	0.199	---	0.20
61	5.08	3.10	0.472	0.199	---	0.27
62	5.17	3.60	0.549	0.199	---	0.35
63	5.25	3.90	0.594	0.199	---	0.40
64	5.33	4.20	0.640	0.199	---	0.44
65	5.42	4.70	0.716	0.199	---	0.52
66	5.50	5.60	0.853	0.199	---	0.65
67	5.58	1.90	0.290	0.199	---	0.09
68	5.67	0.90	0.137	0.199	0.117	0.02
69	5.75	0.60	0.091	0.199	0.078	0.01
70	5.83	0.50	0.076	0.199	0.065	0.01
71	5.92	0.30	0.046	0.199	0.039	0.01
72	6.00	0.20	0.030	0.199	0.026	0.00

Sum = 100.0 Sum = 5.3

Flood volume = Effective rainfall 0.44(In)
times area 1.3(Ac.)/[(In)/(Ft.)] = 0.0(Ac.Ft)
Total soil loss = 0.83(In)
Total soil loss = 0.091(Ac.Ft)
Total rainfall = 1.27(In)
Flood volume = 2135.7 Cubic Feet
Total soil loss = 3968.1 Cubic Feet

Peak flow rate of this hydrograph = 0.810(CFS)

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TOTAL OF: 3 6 - H O U R S T O R M E V E N T S

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	0.0000	0.00	Q	|	|	|	|
0+15	0.0001	0.00	Q	|	|	|	|
0+20	0.0001	0.00	Q	|	|	|	|
0+25	0.0001	0.00	Q	|	|	|	|
0+30	0.0001	0.00	Q	|	|	|	|
0+35	0.0002	0.00	Q	|	|	|	|
0+40	0.0002	0.00	Q	|	|	|	|
0+45	0.0002	0.00	Q	|	|	|	|
0+50	0.0002	0.00	Q	|	|	|	|
0+55	0.0003	0.00	Q	|	|	|	|
1+ 0	0.0003	0.00	Q	|	|	|	|
1+ 5	0.0003	0.00	Q	|	|	|	|
1+10	0.0004	0.00	Q	|	|	|	|
1+15	0.0004	0.00	Q	|	|	|	|
1+20	0.0004	0.00	Q	|	|	|	|
1+25	0.0005	0.00	Q	|	|	|	|
1+30	0.0005	0.00	Q	|	|	|	|
1+35	0.0005	0.00	Q	|	|	|	|
1+40	0.0005	0.00	Q	|	|	|	|
1+45	0.0006	0.00	Q	|	|	|	|
1+50	0.0006	0.00	Q	|	|	|	|
1+55	0.0006	0.00	Q	|	|	|	|
2+ 0	0.0007	0.00	Q	|	|	|	|
2+ 5	0.0007	0.00	Q	|	|	|	|

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2+10     0.0007     0.00  Q       |        |        |        |
2+15     0.0008     0.01  Q       |        |        |        |
2+20     0.0008     0.01  Q       |        |        |        |
2+25     0.0008     0.01  Q       |        |        |        |
2+30     0.0009     0.01  Q       |        |        |        |
2+35     0.0009     0.01  Q       |        |        |        |
2+40     0.0010     0.01  Q       |        |        |        |
2+45     0.0010     0.01  Q       |        |        |        |
2+50     0.0010     0.01  Q       |        |        |        |
2+55     0.0011     0.01  Q       |        |        |        |
3+ 0     0.0011     0.01  Q       |        |        |        |
3+ 5     0.0011     0.01  Q       |        |        |        |
3+10     0.0012     0.01  Q       |        |        |        |
3+15     0.0012     0.01  Q       |        |        |        |
3+20     0.0013     0.01  Q       |        |        |        |
3+25     0.0013     0.01  Q       |        |        |        |
3+30     0.0014     0.01  Q       |        |        |        |
3+35     0.0014     0.01  Q       |        |        |        |
3+40     0.0015     0.01  Q       |        |        |        |
3+45     0.0015     0.01  QV      |        |        |        |
3+50     0.0016     0.01  QV      |        |        |        |
3+55     0.0017     0.01  QV      |        |        |        |
4+ 0     0.0017     0.01  QV      |        |        |        |
4+ 5     0.0018     0.01  QV      |        |        |        |
4+10     0.0019     0.01  QV      |        |        |        |
4+15     0.0019     0.01  QV      |        |        |        |
4+20     0.0020     0.01  QV      |        |        |        |
4+25     0.0021     0.01  QV      |        |        |        |
4+30     0.0022     0.01  QV      |        |        |        |
4+35     0.0022     0.01  QV      |        |        |        |
4+40     0.0023     0.01  QV      |        |        |        |
4+45     0.0024     0.01  QV      |        |        |        |
4+50     0.0025     0.01  QV      |        |        |        |
4+55     0.0026     0.01  QV      |        |        |        |
5+ 0     0.0027     0.01  QV      |        |        |        |
5+ 5     0.0028     0.02  QV      |        |        |        |
5+10     0.0030     0.02  QV      |        |        |        |
5+15     0.0031     0.02  Q V     |        |        |        |
5+20     0.0033     0.02  Q V     |        |        |        |
5+25     0.0035     0.03  Q V     |        |        |        |
5+30     0.0037     0.03  Q V     |        |        |        |
5+35     0.0038     0.02  Q V     |        |        |        |
5+40     0.0038     0.01  Q V     |        |        |        |
5+45     0.0039     0.00  Q V     |        |        |        |
5+50     0.0039     0.00  Q V     |        |        |        |
5+55     0.0039     0.00  Q V     |        |        |        |
6+ 0     0.0039     0.00  Q V     |        |        |        |
6+ 5     0.0039     0.00  Q V     |        |        |        |
6+10     0.0040     0.01  Q V     |        |        |        |
6+15     0.0040     0.01  Q V     |        |        |        |
6+20     0.0041     0.01  Q V     |        |        |        |
6+25     0.0041     0.01  Q V     |        |        |        |
6+30     0.0042     0.01  Q V     |        |        |        |
6+35     0.0042     0.01  Q V     |        |        |        |
6+40     0.0043     0.01  Q V     |        |        |        |
6+45     0.0043     0.01  Q V     |        |        |        |
6+50     0.0044     0.01  Q V     |        |        |        |
6+55     0.0044     0.01  Q V     |        |        |        |
7+ 0     0.0045     0.01  Q V     |        |        |        |
7+ 5     0.0045     0.01  Q V     |        |        |        |
7+10     0.0046     0.01  Q  V    |        |        |        |
7+15     0.0046     0.01  Q  V    |        |        |        |
7+20     0.0047     0.01  Q  V    |        |        |        |
7+25     0.0048     0.01  Q  V    |        |        |        |
7+30     0.0048     0.01  Q  V    |        |        |        |
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 7+35     0.0049     0.01  Q  V      |        |        |        |
 7+40     0.0049     0.01  Q  V      |        |        |        |
 7+45     0.0050     0.01  Q  V      |        |        |        |
 7+50     0.0051     0.01  Q  V      |        |        |        |
 7+55     0.0051     0.01  Q  V      |        |        |        |
 8+ 0     0.0052     0.01  Q  V      |        |        |        |
 8+ 5     0.0052     0.01  Q  V      |        |        |        |
 8+10     0.0053     0.01  Q  V      |        |        |        |
 8+15     0.0054     0.01  Q  V      |        |        |        |
 8+20     0.0054     0.01  Q  V      |        |        |        |
 8+25     0.0055     0.01  Q  V      |        |        |        |
 8+30     0.0056     0.01  Q  V      |        |        |        |
 8+35     0.0056     0.01  Q  V      |        |        |        |
 8+40     0.0057     0.01  Q  V      |        |        |        |
 8+45     0.0058     0.01  Q  V      |        |        |        |
 8+50     0.0059     0.01  Q  V      |        |        |        |
 8+55     0.0059     0.01  Q  V      |        |        |        |
 9+ 0     0.0060     0.01  Q  V      |        |        |        |
 9+ 5     0.0061     0.01  Q  V      |        |        |        |
 9+10     0.0062     0.01  Q   V     |        |        |        |
 9+15     0.0062     0.01  Q   V     |        |        |        |
 9+20     0.0063     0.01  Q   V     |        |        |        |
 9+25     0.0064     0.01  Q   V     |        |        |        |
 9+30     0.0065     0.01  Q   V     |        |        |        |
 9+35     0.0066     0.01  Q   V     |        |        |        |
 9+40     0.0067     0.02  Q   V     |        |        |        |
 9+45     0.0068     0.02  Q   V     |        |        |        |
 9+50     0.0069     0.02  Q   V     |        |        |        |
 9+55     0.0070     0.02  Q   V     |        |        |        |
10+ 0     0.0072     0.02  Q   V     |        |        |        |
10+ 5     0.0073     0.02  Q   V     |        |        |        |
10+10     0.0074     0.02  Q   V     |        |        |        |
10+15     0.0076     0.02  Q   V     |        |        |        |
10+20     0.0077     0.02  Q    V    |        |        |        |
10+25     0.0079     0.02  Q    V    |        |        |        |
10+30     0.0080     0.02  Q    V    |        |        |        |
10+35     0.0082     0.02  Q    V    |        |        |        |
10+40     0.0083     0.02  Q    V    |        |        |        |
10+45     0.0085     0.03  Q    V    |        |        |        |
10+50     0.0087     0.03  Q    V    |        |        |        |
10+55     0.0089     0.03  Q    V    |        |        |        |
11+ 0     0.0091     0.03  Q    V    |        |        |        |
11+ 5     0.0093     0.03  Q     V   |        |        |        |
11+10     0.0095     0.04  Q     V   |        |        |        |
11+15     0.0097     0.03  Q     V   |        |        |        |
11+20     0.0100     0.03  Q     V   |        |        |        |
11+25     0.0104     0.07  Q     V   |        |        |        |
11+30     0.0112     0.12  Q      V  |        |        |        |
11+35     0.0117     0.06  Q      V  |        |        |        |
11+40     0.0118     0.01  Q      V  |        |        |        |
11+45     0.0118     0.01  Q      V  |        |        |        |
11+50     0.0119     0.01  Q      V  |        |        |        |
11+55     0.0119     0.00  Q      V  |        |        |        |
12+ 0     0.0119     0.00  Q      V  |        |        |        |
12+ 5     0.0120     0.01  Q      V  |        |        |        |
12+10     0.0121     0.02  Q      V  |        |        |        |
12+15     0.0122     0.02  Q       V |        |        |        |
12+20     0.0123     0.02  Q       V |        |        |        |
12+25     0.0125     0.02  Q       V |        |        |        |
12+30     0.0126     0.02  Q       V |        |        |        |
12+35     0.0128     0.02  Q       V |        |        |        |
12+40     0.0129     0.02  Q       V |        |        |        |
12+45     0.0130     0.02  Q       V |        |        |        |
12+50     0.0132     0.02  Q       V |        |        |        |
12+55     0.0133     0.02  Q       V |        |        |        |
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13+ 0    0.0135    0.02  Q      V |         |         |         |
13+ 5    0.0137    0.02  Q      V |         |         |         |
13+10    0.0138    0.02  Q       V|         |         |         |
13+15    0.0140    0.02  Q       V|         |         |         |
13+20    0.0141    0.02  Q       V|         |         |         |
13+25    0.0143    0.02  Q       V|         |         |         |
13+30    0.0145    0.02  Q       V|         |         |         |
13+35    0.0146    0.02  Q       V|         |         |         |
13+40    0.0148    0.02  Q       V|         |         |         |
13+45    0.0150    0.02  Q       V|         |         |         |
13+50    0.0151    0.02  Q       V|         |         |         |
13+55    0.0153    0.02  Q        V         |         |         |
14+ 0    0.0155    0.03  Q        V         |         |         |
14+ 5    0.0156    0.02  Q        V         |         |         |
14+10    0.0158    0.03  Q        V         |         |         |
14+15    0.0160    0.03  Q        V         |         |         |
14+20    0.0162    0.03  Q        V         |         |         |
14+25    0.0164    0.03  Q        V         |         |         |
14+30    0.0166    0.03  Q        V         |         |         |
14+35    0.0167    0.03  Q        V         |         |         |
14+40    0.0169    0.03  Q        |V        |         |         |
14+45    0.0171    0.03  Q        |V        |         |         |
14+50    0.0173    0.03  Q        |V        |         |         |
14+55    0.0175    0.03  Q        |V        |         |         |
15+ 0    0.0178    0.03  Q        |V        |         |         |
15+ 5    0.0180    0.03  Q        |V        |         |         |
15+10    0.0182    0.03  Q        |V        |         |         |
15+15    0.0184    0.03  Q        | V       |         |         |
15+20    0.0186    0.03  Q        | V       |         |         |
15+25    0.0189    0.03  Q        | V       |         |         |
15+30    0.0191    0.04  Q        | V       |         |         |
15+35    0.0193    0.03  Q        | V       |         |         |
15+40    0.0194    0.02  Q        | V       |         |         |
15+45    0.0197    0.03  Q        | V       |         |         |
15+50    0.0199    0.04  Q        |  V      |         |         |
15+55    0.0203    0.05  Q        |  V      |         |         |
16+ 0    0.0207    0.06  Q        |  V      |         |         |
16+ 5    0.0212    0.07  Q        |  V      |         |         |
16+10    0.0219    0.09  Q        |   V     |         |         |
16+15    0.0227    0.11  Q        |   V     |         |         |
16+20    0.0236    0.13  Q        |    V    |         |         |
16+25    0.0247    0.15  Q        |     V   |         |         |
16+30    0.0258    0.16  Q        |     V   |         |         |
16+35    0.0270    0.18  Q        |      V  |         |         |
16+40    0.0283    0.20  Q        |       V |         |         |
16+45    0.0298    0.22  Q        |        V|         |         |
16+50    0.0314    0.22  Q        |         V         |         |
16+55    0.0330    0.24  Q        |         |V        |         |
17+ 0    0.0348    0.26  |Q       |         | V       |         |
17+ 5    0.0370    0.33  |Q       |         |   V     |         |
17+10    0.0400    0.43  |Q       |         |     V   |         |
17+15    0.0435    0.51  | Q      |         |       V |         |
17+20    0.0474    0.57  | Q
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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

Study date 09/23/20 File: APRE2YR65.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

28771 Central Avenue Gas Station
Area A
Pre-development
6-Hr 5-Year Storm Event

Drainage Area = 1.32(Ac.) = 0.002 Sq. Mi.
Length along longest watercourse = 408.00(Ft.)
Length along longest watercourse measured to centroid = 87.50(Ft.)
Length along longest watercourse = 0.077 Mi.
Length along longest watercourse measured to centroid = 0.017 Mi.
Difference in elevation = 16.34(Ft.)
Slope along watercourse = 211.4588 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.021 Hr.
Lag time = 1.24 Min.
25% of lag time = 0.31 Min.
40% of lag time = 0.50 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
1.32	1.27	1.68

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
1.32	3.12	4.13

STORM EVENT (YEAR) = 5.00
Area Averaged 2-Year Rainfall = 1.270(In)
Area Averaged 100-Year Rainfall = 3.120(In)

Point rain (area averaged) = 1.703(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.703(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
1.324	83.00	0.059

Total Area Entered = 1.32(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
83.0	83.0	0.210	0.059	0.199	1.000	0.199

Sum (F) = 0.199

Area averaged mean soil loss (F) (In/Hr) = 0.199

Minimum soil loss rate ((In/Hr)) = 0.099

(for 24 hour storm duration)

Soil low loss rate (decimal) = 0.853

U n i t H y d r o g r a p h

DESERT S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	402.223	65.137	0.869
2	0.167	804.446	34.863	0.465
			Sum = 100.000	Sum= 1.334

Storm Event 3 Effective Rainfall = 0.324(In)

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Loss rate(In./Hr) Low	Effective (In/Hr)
1	0.08	0.50	0.019	0.199	0.017	0.00
2	0.17	0.60	0.023	0.199	0.020	0.00
3	0.25	0.60	0.023	0.199	0.020	0.00
4	0.33	0.60	0.023	0.199	0.020	0.00
5	0.42	0.60	0.023	0.199	0.020	0.00
6	0.50	0.70	0.027	0.199	0.023	0.00
7	0.58	0.70	0.027	0.199	0.023	0.00
8	0.67	0.70	0.027	0.199	0.023	0.00
9	0.75	0.70	0.027	0.199	0.023	0.00
10	0.83	0.70	0.027	0.199	0.023	0.00
11	0.92	0.70	0.027	0.199	0.023	0.00
12	1.00	0.80	0.031	0.199	0.027	0.00
13	1.08	0.80	0.031	0.199	0.027	0.00
14	1.17	0.80	0.031	0.199	0.027	0.00
15	1.25	0.80	0.031	0.199	0.027	0.00
16	1.33	0.80	0.031	0.199	0.027	0.00
17	1.42	0.80	0.031	0.199	0.027	0.00
18	1.50	0.80	0.031	0.199	0.027	0.00
19	1.58	0.80	0.031	0.199	0.027	0.00
20	1.67	0.80	0.031	0.199	0.027	0.00
21	1.75	0.80	0.031	0.199	0.027	0.00
22	1.83	0.80	0.031	0.199	0.027	0.00
23	1.92	0.80	0.031	0.199	0.027	0.00
24	2.00	0.90	0.035	0.199	0.030	0.01
25	2.08	0.80	0.031	0.199	0.027	0.00
26	2.17	0.90	0.035	0.199	0.030	0.01
27	2.25	0.90	0.035	0.199	0.030	0.01
28	2.33	0.90	0.035	0.199	0.030	0.01
29	2.42	0.90	0.035	0.199	0.030	0.01

30	2.50	0.90	0.035	0.199	0.030	0.01
31	2.58	0.90	0.035	0.199	0.030	0.01
32	2.67	0.90	0.035	0.199	0.030	0.01
33	2.75	1.00	0.039	0.199	0.033	0.01
34	2.83	1.00	0.039	0.199	0.033	0.01
35	2.92	1.00	0.039	0.199	0.033	0.01
36	3.00	1.00	0.039	0.199	0.033	0.01
37	3.08	1.00	0.039	0.199	0.033	0.01
38	3.17	1.10	0.043	0.199	0.036	0.01
39	3.25	1.10	0.043	0.199	0.036	0.01
40	3.33	1.10	0.043	0.199	0.036	0.01
41	3.42	1.20	0.047	0.199	0.040	0.01
42	3.50	1.30	0.050	0.199	0.043	0.01
43	3.58	1.40	0.054	0.199	0.046	0.01
44	3.67	1.40	0.054	0.199	0.046	0.01
45	3.75	1.50	0.058	0.199	0.050	0.01
46	3.83	1.50	0.058	0.199	0.050	0.01
47	3.92	1.60	0.062	0.199	0.053	0.01
48	4.00	1.60	0.062	0.199	0.053	0.01
49	4.08	1.70	0.066	0.199	0.056	0.01
50	4.17	1.80	0.070	0.199	0.060	0.01
51	4.25	1.90	0.074	0.199	0.063	0.01
52	4.33	2.00	0.078	0.199	0.066	0.01
53	4.42	2.10	0.082	0.199	0.070	0.01
54	4.50	2.10	0.082	0.199	0.070	0.01
55	4.58	2.20	0.085	0.199	0.073	0.01
56	4.67	2.30	0.089	0.199	0.076	0.01
57	4.75	2.40	0.093	0.199	0.080	0.01
58	4.83	2.40	0.093	0.199	0.080	0.01
59	4.92	2.50	0.097	0.199	0.083	0.01
60	5.00	2.60	0.101	0.199	0.086	0.01
61	5.08	3.10	0.120	0.199	0.103	0.02
62	5.17	3.60	0.140	0.199	0.119	0.02
63	5.25	3.90	0.151	0.199	0.129	0.02
64	5.33	4.20	0.163	0.199	0.139	0.02
65	5.42	4.70	0.183	0.199	0.156	0.03
66	5.50	5.60	0.217	0.199	---	0.02
67	5.58	1.90	0.074	0.199	0.063	0.01
68	5.67	0.90	0.035	0.199	0.030	0.01
69	5.75	0.60	0.023	0.199	0.020	0.00
70	5.83	0.50	0.019	0.199	0.017	0.00
71	5.92	0.30	0.012	0.199	0.010	0.00
72	6.00	0.20	0.008	0.199	0.007	0.00
Sum =		100.0			Sum =	0.6

Flood volume = Effective rainfall 0.05(In)
times area 1.3(Ac.)/[(In)/(Ft.)] = 0.0(Ac.Ft)
Total soil loss = 0.28(In)
Total soil loss = 0.031(Ac.Ft)
Total rainfall = 0.32(In)
Flood volume = 223.1 Cubic Feet
Total soil loss = 1332.3 Cubic Feet

Storm Event 2 Effective Rainfall = 0.613(In)

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.50	0.037	0.199	0.031	0.01
2	0.17	0.60	0.044	0.199	0.038	0.01
3	0.25	0.60	0.044	0.199	0.038	0.01
4	0.33	0.60	0.044	0.199	0.038	0.01
5	0.42	0.60	0.044	0.199	0.038	0.01
6	0.50	0.70	0.052	0.199	0.044	0.01
7	0.58	0.70	0.052	0.199	0.044	0.01
8	0.67	0.70	0.052	0.199	0.044	0.01

9	0.75	0.70	0.052	0.199	0.044	0.01
10	0.83	0.70	0.052	0.199	0.044	0.01
11	0.92	0.70	0.052	0.199	0.044	0.01
12	1.00	0.80	0.059	0.199	0.050	0.01
13	1.08	0.80	0.059	0.199	0.050	0.01
14	1.17	0.80	0.059	0.199	0.050	0.01
15	1.25	0.80	0.059	0.199	0.050	0.01
16	1.33	0.80	0.059	0.199	0.050	0.01
17	1.42	0.80	0.059	0.199	0.050	0.01
18	1.50	0.80	0.059	0.199	0.050	0.01
19	1.58	0.80	0.059	0.199	0.050	0.01
20	1.67	0.80	0.059	0.199	0.050	0.01
21	1.75	0.80	0.059	0.199	0.050	0.01
22	1.83	0.80	0.059	0.199	0.050	0.01
23	1.92	0.80	0.059	0.199	0.050	0.01
24	2.00	0.90	0.066	0.199	0.057	0.01
25	2.08	0.80	0.059	0.199	0.050	0.01
26	2.17	0.90	0.066	0.199	0.057	0.01
27	2.25	0.90	0.066	0.199	0.057	0.01
28	2.33	0.90	0.066	0.199	0.057	0.01
29	2.42	0.90	0.066	0.199	0.057	0.01
30	2.50	0.90	0.066	0.199	0.057	0.01
31	2.58	0.90	0.066	0.199	0.057	0.01
32	2.67	0.90	0.066	0.199	0.057	0.01
33	2.75	1.00	0.074	0.199	0.063	0.01
34	2.83	1.00	0.074	0.199	0.063	0.01
35	2.92	1.00	0.074	0.199	0.063	0.01
36	3.00	1.00	0.074	0.199	0.063	0.01
37	3.08	1.00	0.074	0.199	0.063	0.01
38	3.17	1.10	0.081	0.199	0.069	0.01
39	3.25	1.10	0.081	0.199	0.069	0.01
40	3.33	1.10	0.081	0.199	0.069	0.01
41	3.42	1.20	0.088	0.199	0.075	0.01
42	3.50	1.30	0.096	0.199	0.082	0.01
43	3.58	1.40	0.103	0.199	0.088	0.02
44	3.67	1.40	0.103	0.199	0.088	0.02
45	3.75	1.50	0.110	0.199	0.094	0.02
46	3.83	1.50	0.110	0.199	0.094	0.02
47	3.92	1.60	0.118	0.199	0.100	0.02
48	4.00	1.60	0.118	0.199	0.100	0.02
49	4.08	1.70	0.125	0.199	0.107	0.02
50	4.17	1.80	0.132	0.199	0.113	0.02
51	4.25	1.90	0.140	0.199	0.119	0.02
52	4.33	2.00	0.147	0.199	0.126	0.02
53	4.42	2.10	0.155	0.199	0.132	0.02
54	4.50	2.10	0.155	0.199	0.132	0.02
55	4.58	2.20	0.162	0.199	0.138	0.02
56	4.67	2.30	0.169	0.199	0.144	0.02
57	4.75	2.40	0.177	0.199	0.151	0.03
58	4.83	2.40	0.177	0.199	0.151	0.03
59	4.92	2.50	0.184	0.199	0.157	0.03
60	5.00	2.60	0.191	0.199	0.163	0.03
61	5.08	3.10	0.228	0.199	---	0.03
62	5.17	3.60	0.265	0.199	---	0.07
63	5.25	3.90	0.287	0.199	---	0.09
64	5.33	4.20	0.309	0.199	---	0.11
65	5.42	4.70	0.346	0.199	---	0.15
66	5.50	5.60	0.412	0.199	---	0.21
67	5.58	1.90	0.140	0.199	0.119	0.02
68	5.67	0.90	0.066	0.199	0.057	0.01
69	5.75	0.60	0.044	0.199	0.038	0.01
70	5.83	0.50	0.037	0.199	0.031	0.01
71	5.92	0.30	0.022	0.199	0.019	0.00
72	6.00	0.20	0.015	0.199	0.013	0.00
	Sum =	100.0			Sum =	1.5

Flood volume = Effective rainfall 0.12(In)
times area 1.3(Ac.)/[(In)/(Ft.)] = 0.0(Ac.Ft)
Total soil loss = 0.49(In)
Total soil loss = 0.054(Ac.Ft)
Total rainfall = 0.61(In)
Flood volume = 586.4 Cubic Feet
Total soil loss = 2360.7 Cubic Feet

Storm Event 1 Effective Rainfall = 1.703(In)

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Loss rate(In./Hr) Low	Effective (In/Hr)
1	0.08	0.50	0.102	0.199	0.087	0.02
2	0.17	0.60	0.123	0.199	0.105	0.02
3	0.25	0.60	0.123	0.199	0.105	0.02
4	0.33	0.60	0.123	0.199	0.105	0.02
5	0.42	0.60	0.123	0.199	0.105	0.02
6	0.50	0.70	0.143	0.199	0.122	0.02
7	0.58	0.70	0.143	0.199	0.122	0.02
8	0.67	0.70	0.143	0.199	0.122	0.02
9	0.75	0.70	0.143	0.199	0.122	0.02
10	0.83	0.70	0.143	0.199	0.122	0.02
11	0.92	0.70	0.143	0.199	0.122	0.02
12	1.00	0.80	0.164	0.199	0.140	0.02
13	1.08	0.80	0.164	0.199	0.140	0.02
14	1.17	0.80	0.164	0.199	0.140	0.02
15	1.25	0.80	0.164	0.199	0.140	0.02
16	1.33	0.80	0.164	0.199	0.140	0.02
17	1.42	0.80	0.164	0.199	0.140	0.02
18	1.50	0.80	0.164	0.199	0.140	0.02
19	1.58	0.80	0.164	0.199	0.140	0.02
20	1.67	0.80	0.164	0.199	0.140	0.02
21	1.75	0.80	0.164	0.199	0.140	0.02
22	1.83	0.80	0.164	0.199	0.140	0.02
23	1.92	0.80	0.164	0.199	0.140	0.02
24	2.00	0.90	0.184	0.199	0.157	0.03
25	2.08	0.80	0.164	0.199	0.140	0.02
26	2.17	0.90	0.184	0.199	0.157	0.03
27	2.25	0.90	0.184	0.199	0.157	0.03
28	2.33	0.90	0.184	0.199	0.157	0.03
29	2.42	0.90	0.184	0.199	0.157	0.03
30	2.50	0.90	0.184	0.199	0.157	0.03
31	2.58	0.90	0.184	0.199	0.157	0.03
32	2.67	0.90	0.184	0.199	0.157	0.03
33	2.75	1.00	0.204	0.199	---	0.01
34	2.83	1.00	0.204	0.199	---	0.01
35	2.92	1.00	0.204	0.199	---	0.01
36	3.00	1.00	0.204	0.199	---	0.01
37	3.08	1.00	0.204	0.199	---	0.01
38	3.17	1.10	0.225	0.199	---	0.03
39	3.25	1.10	0.225	0.199	---	0.03
40	3.33	1.10	0.225	0.199	---	0.03
41	3.42	1.20	0.245	0.199	---	0.05
42	3.50	1.30	0.266	0.199	---	0.07
43	3.58	1.40	0.286	0.199	---	0.09
44	3.67	1.40	0.286	0.199	---	0.09
45	3.75	1.50	0.307	0.199	---	0.11
46	3.83	1.50	0.307	0.199	---	0.11
47	3.92	1.60	0.327	0.199	---	0.13
48	4.00	1.60	0.327	0.199	---	0.13
49	4.08	1.70	0.347	0.199	---	0.15
50	4.17	1.80	0.368	0.199	---	0.17
51	4.25	1.90	0.388	0.199	---	0.19
52	4.33	2.00	0.409	0.199	---	0.21

53	4.42	2.10	0.429	0.199	---	0.23
54	4.50	2.10	0.429	0.199	---	0.23
55	4.58	2.20	0.450	0.199	---	0.25
56	4.67	2.30	0.470	0.199	---	0.27
57	4.75	2.40	0.491	0.199	---	0.29
58	4.83	2.40	0.491	0.199	---	0.29
59	4.92	2.50	0.511	0.199	---	0.31
60	5.00	2.60	0.531	0.199	---	0.33
61	5.08	3.10	0.634	0.199	---	0.43
62	5.17	3.60	0.736	0.199	---	0.54
63	5.25	3.90	0.797	0.199	---	0.60
64	5.33	4.20	0.858	0.199	---	0.66
65	5.42	4.70	0.961	0.199	---	0.76
66	5.50	5.60	1.145	0.199	---	0.95
67	5.58	1.90	0.388	0.199	---	0.19
68	5.67	0.90	0.184	0.199	0.157	0.03
69	5.75	0.60	0.123	0.199	0.105	0.02
70	5.83	0.50	0.102	0.199	0.087	0.02
71	5.92	0.30	0.061	0.199	0.052	0.01
72	6.00	0.20	0.041	0.199	0.035	0.01
Sum =		100.0			Sum =	8.7

Flood volume = Effective rainfall 0.73(In)
times area 1.3(Ac.)/[(In)/(Ft.)] = 0.1(Ac.Ft)
Total soil loss = 0.97(In)
Total soil loss = 0.108(Ac.Ft)
Total rainfall = 1.70(In)
Flood volume = 3501.7 Cubic Feet
Total soil loss = 4684.6 Cubic Feet

Peak flow rate of this hydrograph = 1.177(CFS)

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TOTAL OF: 3 6 - H O U R S T O R M E V E N T S
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	0.0000	0.00	Q	|	|	|	|
0+15	0.0001	0.00	Q	|	|	|	|
0+20	0.0001	0.00	Q	|	|	|	|
0+25	0.0001	0.00	Q	|	|	|	|
0+30	0.0002	0.01	Q	|	|	|	|
0+35	0.0002	0.01	Q	|	|	|	|
0+40	0.0002	0.01	Q	|	|	|	|
0+45	0.0003	0.01	Q	|	|	|	|
0+50	0.0003	0.01	Q	|	|	|	|
0+55	0.0004	0.01	Q	|	|	|	|
1+ 0	0.0004	0.01	Q	|	|	|	|
1+ 5	0.0004	0.01	Q	|	|	|	|
1+10	0.0005	0.01	Q	|	|	|	|
1+15	0.0005	0.01	Q	|	|	|	|
1+20	0.0006	0.01	Q	|	|	|	|
1+25	0.0006	0.01	Q	|	|	|	|
1+30	0.0007	0.01	Q	|	|	|	|
1+35	0.0007	0.01	Q	|	|	|	|
1+40	0.0007	0.01	Q	|	|	|	|
1+45	0.0008	0.01	Q	|	|	|	|
1+50	0.0008	0.01	Q	|	|	|	|
1+55	0.0009	0.01	Q	|	|	|	|
2+ 0	0.0009	0.01	Q	|	|	|	|
2+ 5	0.0009	0.01	Q	|	|	|	|

```
2+10    0.0010   0.01  Q      |      |      |      |
2+15    0.0010   0.01  Q      |      |      |      |
2+20    0.0011   0.01  Q      |      |      |      |
2+25    0.0011   0.01  Q      |      |      |      |
2+30    0.0012   0.01  Q      |      |      |      |
2+35    0.0012   0.01  Q      |      |      |      |
2+40    0.0013   0.01  Q      |      |      |      |
2+45    0.0013   0.01  Q      |      |      |      |
2+50    0.0014   0.01  Q      |      |      |      |
2+55    0.0014   0.01  Q      |      |      |      |
3+ 0    0.0015   0.01  Q      |      |      |      |
3+ 5    0.0015   0.01  Q      |      |      |      |
3+10    0.0016   0.01  Q      |      |      |      |
3+15    0.0017   0.01  Q      |      |      |      |
3+20    0.0017   0.01  Q      |      |      |      |
3+25    0.0018   0.01  Q      |      |      |      |
3+30    0.0018   0.01  Q      |      |      |      |
3+35    0.0019   0.01  Q      |      |      |      |
3+40    0.0020   0.01  Q      |      |      |      |
3+45    0.0021   0.01  Q      |      |      |      |
3+50    0.0021   0.01  Q      |      |      |      |
3+55    0.0022   0.01  Q      |      |      |      |
4+ 0    0.0023   0.01  Q      |      |      |      |
4+ 5    0.0024   0.01  Q      |      |      |      |
4+10    0.0025   0.01  QV     |      |      |      |
4+15    0.0026   0.01  QV     |      |      |      |
4+20    0.0027   0.01  QV     |      |      |      |
4+25    0.0028   0.02  QV     |      |      |      |
4+30    0.0029   0.02  QV     |      |      |      |
4+35    0.0030   0.02  QV     |      |      |      |
4+40    0.0031   0.02  QV     |      |      |      |
4+45    0.0033   0.02  QV     |      |      |      |
4+50    0.0034   0.02  QV     |      |      |      |
4+55    0.0035   0.02  QV     |      |      |      |
5+ 0    0.0036   0.02  QV     |      |      |      |
5+ 5    0.0038   0.02  QV     |      |      |      |
5+10    0.0040   0.03  QV     |      |      |      |
5+15    0.0042   0.03  QV     |      |      |      |
5+20    0.0044   0.03  QV     |      |      |      |
5+25    0.0046   0.03  QV     |      |      |      |
5+30    0.0048   0.03  QV     |      |      |      |
5+35    0.0050   0.02  Q V    |      |      |      |
5+40    0.0050   0.01  Q V    |      |      |      |
5+45    0.0051   0.01  Q V    |      |      |      |
5+50    0.0051   0.00  Q V    |      |      |      |
5+55    0.0051   0.00  Q V    |      |      |      |
6+ 0    0.0051   0.00  Q V    |      |      |      |
6+ 5    0.0051   0.00  Q V    |      |      |      |
6+10    0.0052   0.01  Q V    |      |      |      |
6+15    0.0053   0.01  Q V    |      |      |      |
6+20    0.0053   0.01  Q V    |      |      |      |
6+25    0.0054   0.01  Q V    |      |      |      |
6+30    0.0055   0.01  Q V    |      |      |      |
6+35    0.0055   0.01  Q V    |      |      |      |
6+40    0.0056   0.01  Q V    |      |      |      |
6+45    0.0057   0.01  Q V    |      |      |      |
6+50    0.0057   0.01  Q V    |      |      |      |
6+55    0.0058   0.01  Q V    |      |      |      |
7+ 0    0.0059   0.01  Q V    |      |      |      |
7+ 5    0.0060   0.01  Q V    |      |      |      |
7+10    0.0060   0.01  Q V    |      |      |      |
7+15    0.0061   0.01  Q V    |      |      |      |
7+20    0.0062   0.01  Q V    |      |      |      |
7+25    0.0063   0.01  Q V    |      |      |      |
7+30    0.0064   0.01  Q V    |      |      |      |
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 7+35      0.0064      0.01  Q V       |        |        |        |
 7+40      0.0065      0.01  Q V       |        |        |        |
 7+45      0.0066      0.01  Q V       |        |        |        |
 7+50      0.0067      0.01  Q V       |        |        |        |
 7+55      0.0067      0.01  Q V       |        |        |        |
 8+ 0      0.0068      0.01  Q V       |        |        |        |
 8+ 5      0.0069      0.01  Q V       |        |        |        |
 8+10      0.0070      0.01  Q V       |        |        |        |
 8+15      0.0071      0.01  Q V       |        |        |        |
 8+20      0.0072      0.01  Q V       |        |        |        |
 8+25      0.0073      0.01  Q V       |        |        |        |
 8+30      0.0074      0.01  Q V       |        |        |        |
 8+35      0.0075      0.01  Q  V      |        |        |        |
 8+40      0.0075      0.01  Q  V      |        |        |        |
 8+45      0.0076      0.01  Q  V      |        |        |        |
 8+50      0.0077      0.01  Q  V      |        |        |        |
 8+55      0.0078      0.01  Q  V      |        |        |        |
 9+ 0      0.0079      0.01  Q  V      |        |        |        |
 9+ 5      0.0080      0.01  Q  V      |        |        |        |
 9+10      0.0081      0.02  Q  V      |        |        |        |
 9+15      0.0082      0.02  Q  V      |        |        |        |
 9+20      0.0084      0.02  Q  V      |        |        |        |
 9+25      0.0085      0.02  Q  V      |        |        |        |
 9+30      0.0086      0.02  Q  V      |        |        |        |
 9+35      0.0087      0.02  Q  V      |        |        |        |
 9+40      0.0089      0.02  Q  V      |        |        |        |
 9+45      0.0090      0.02  Q  V      |        |        |        |
 9+50      0.0092      0.02  Q  V      |        |        |        |
 9+55      0.0093      0.02  Q  V      |        |        |        |
10+ 0      0.0095      0.02  Q  V      |        |        |        |
10+ 5      0.0096      0.02  Q  V      |        |        |        |
10+10      0.0098      0.03  Q  V      |        |        |        |
10+15      0.0100      0.03  Q   V     |        |        |        |
10+20      0.0102      0.03  Q   V     |        |        |        |
10+25      0.0104      0.03  Q   V     |        |        |        |
10+30      0.0106      0.03  Q   V     |        |        |        |
10+35      0.0108      0.03  Q   V     |        |        |        |
10+40      0.0111      0.03  Q   V     |        |        |        |
10+45      0.0113      0.03  Q   V     |        |        |        |
10+50      0.0115      0.03  Q   V     |        |        |        |
10+55      0.0118      0.04  Q   V     |        |        |        |
11+ 0      0.0120      0.04  Q   V     |        |        |        |
11+ 5      0.0123      0.04  Q   V     |        |        |        |
11+10      0.0128      0.07  Q    V    |        |        |        |
11+15      0.0135      0.11  Q    V    |        |        |        |
11+20      0.0145      0.14  Q    V    |        |        |        |
11+25      0.0157      0.18  Q     V   |        |        |        |
11+30      0.0175      0.25  |Q     V  |        |        |        |
11+35      0.0183      0.12  Q      V  |        |        |        |
11+40      0.0184      0.02  Q      V  |        |        |        |
11+45      0.0185      0.01  Q      V  |        |        |        |
11+50      0.0185      0.01  Q      V  |        |        |        |
11+55      0.0185      0.01  Q      V  |        |        |        |
12+ 0      0.0186      0.00  Q      V  |        |        |        |
12+ 5      0.0187      0.01  Q      V  |        |        |        |
12+10      0.0188      0.02  Q      V  |        |        |        |
12+15      0.0190      0.02  Q      V  |        |        |        |
12+20      0.0191      0.02  Q      V  |        |        |        |
12+25      0.0193      0.02  Q      V  |        |        |        |
12+30      0.0195      0.03  Q      V  |        |        |        |
12+35      0.0197      0.03  Q      V  |        |        |        |
12+40      0.0199      0.03  Q       V |        |        |        |
12+45      0.0201      0.03  Q       V |        |        |        |
12+50      0.0203      0.03  Q       V |        |        |        |
12+55      0.0205      0.03  Q       V |        |        |        |
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13+ 0 0.0207 0.03 Q V | | | |
13+ 5 0.0209 0.03 Q V | | | |
13+10 0.0211 0.03 Q V | | | |
13+15 0.0213 0.03 Q V | | | |
13+20 0.0216 0.03 Q V | | | |
13+25 0.0218 0.03 Q V | | | |
13+30 0.0220 0.03 Q V | | | |
13+35 0.0222 0.03 Q V | | | |
13+40 0.0224 0.03 Q V| | | |
13+45 0.0227 0.03 Q V| | | |
13+50 0.0229 0.03 Q V| | | |
13+55 0.0231 0.03 Q V| | | |
14+ 0 0.0233 0.03 Q V| | | |
14+ 5 0.0236 0.03 Q V| | | |
14+10 0.0238 0.03 Q V| | | |
14+15 0.0241 0.04 Q V| | | |
14+20 0.0243 0.04 Q V| | | |
14+25 0.0246 0.04 Q V| | | |
14+30 0.0248 0.04 Q V | | |
14+35 0.0251 0.04 Q V | | |
14+40 0.0253 0.04 Q V | | |
14+45 0.0254 0.02 Q V | | |
14+50 0.0255 0.01 Q V | | |
14+55 0.0255 0.01 Q V | | |
15+ 0 0.0256 0.01 Q V | | |
15+ 5 0.0256 0.01 Q V | | |
15+10 0.0258 0.03 Q V | | |
15+15 0.0260 0.03 Q V | | |
15+20 0.0263 0.03 Q V | | |
15+25 0.0267 0.05 Q V | | |
15+30 0.0272 0.08 Q V | | |
15+35 0.0279 0.11 Q |V | | |
15+40 0.0287 0.12 Q |V | | |
15+45 0.0297 0.13 Q |V | | |
15+50 0.0307 0.14 Q | V | | |
15+55 0.0318 0.16 Q | V | | |
16+ 0 0.0330 0.17 Q | V | | |
16+ 5 0.0343 0.19 Q | V | | |
16+10 0.0358 0.22 Q | V | | |
16+15 0.0374 0.24 Q | V | | |
16+20 0.0393 0.27 |Q | V | | |
16+25 0.0414 0.30 |Q | V | | |
16+30 0.0435 0.31 |Q | V | | |
16+35 0.0457 0.33 |Q | V | | |
16+40 0.0481 0.35 |Q | V| | |
16+45 0.0508 0.38 |Q | V | |
16+50 0.0534 0.39 |Q | |V | |
16+55 0.0563 0.41 |Q | | V | |
17+ 0 0.0592 0.43 |Q | | V | |
17+ 5 0.0629 0.53 | Q | | V | |
17+10 0.0675 0.67 | Q | | V | |
17+15 0.0728 0.77 | Q | | V| |
17+20 0.0787

U n i t   H y d r o g r a p h   A n a l y s i s

Study date 09/23/20 File: APRE2YR610.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

28771 Central Avenue Gas Station
Area A
Pre-development
6-Hr 10-Yr Storm Event

Drainage Area = 1.32(Ac.) = 0.002 Sq. Mi.
Length along longest watercourse = 408.00(Ft.)
Length along longest watercourse measured to centroid = 87.50(Ft.)
Length along longest watercourse = 0.077 Mi.
Length along longest watercourse measured to centroid = 0.017 Mi.
Difference in elevation = 16.34(Ft.)
Slope along watercourse = 211.4588 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.021 Hr.
Lag time = 1.24 Min.
25% of lag time = 0.31 Min.
40% of lag time = 0.50 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
1.32	1.27	1.68

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
1.32	3.12	4.13

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 1.270(In)
Area Averaged 100-Year Rainfall = 3.120(In)

Point rain (area averaged) = 2.031(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 2.031(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
1.324	83.00	0.059

Total Area Entered = 1.32(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
83.0	83.0	0.210	0.059	0.199	1.000	0.199

Sum (F) = 0.199

Area averaged mean soil loss (F) (In/Hr) = 0.199
Minimum soil loss rate ((In/Hr)) = 0.099
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.853

U n i t H y d r o g r a p h
DESERT S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	402.223	65.137	0.869
2	0.167	804.446	34.863	0.465
			Sum = 100.000	Sum= 1.334

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Loss rate(In./Hr) Low	Effective (In/Hr)
1	0.08	0.50	0.122	0.199	0.104	0.02
2	0.17	0.60	0.146	0.199	0.125	0.02
3	0.25	0.60	0.146	0.199	0.125	0.02
4	0.33	0.60	0.146	0.199	0.125	0.02
5	0.42	0.60	0.146	0.199	0.125	0.02
6	0.50	0.70	0.171	0.199	0.146	0.03
7	0.58	0.70	0.171	0.199	0.146	0.03
8	0.67	0.70	0.171	0.199	0.146	0.03
9	0.75	0.70	0.171	0.199	0.146	0.03
10	0.83	0.70	0.171	0.199	0.146	0.03
11	0.92	0.70	0.171	0.199	0.146	0.03
12	1.00	0.80	0.195	0.199	0.166	0.03
13	1.08	0.80	0.195	0.199	0.166	0.03
14	1.17	0.80	0.195	0.199	0.166	0.03
15	1.25	0.80	0.195	0.199	0.166	0.03
16	1.33	0.80	0.195	0.199	0.166	0.03
17	1.42	0.80	0.195	0.199	0.166	0.03
18	1.50	0.80	0.195	0.199	0.166	0.03
19	1.58	0.80	0.195	0.199	0.166	0.03
20	1.67	0.80	0.195	0.199	0.166	0.03
21	1.75	0.80	0.195	0.199	0.166	0.03
22	1.83	0.80	0.195	0.199	0.166	0.03
23	1.92	0.80	0.195	0.199	0.166	0.03
24	2.00	0.90	0.219	0.199	---	0.02
25	2.08	0.80	0.195	0.199	0.166	0.03
26	2.17	0.90	0.219	0.199	---	0.02
27	2.25	0.90	0.219	0.199	---	0.02
28	2.33	0.90	0.219	0.199	---	0.02
29	2.42	0.90	0.219	0.199	---	0.02
30	2.50	0.90	0.219	0.199	---	0.02
31	2.58	0.90	0.219	0.199	---	0.02
32	2.67	0.90	0.219	0.199	---	0.02
33	2.75	1.00	0.244	0.199	---	0.05
34	2.83	1.00	0.244	0.199	---	0.05
35	2.92	1.00	0.244	0.199	---	0.05
36	3.00	1.00	0.244	0.199	---	0.05

37	3.08	1.00	0.244	0.199	---	0.05
38	3.17	1.10	0.268	0.199	---	0.07
39	3.25	1.10	0.268	0.199	---	0.07
40	3.33	1.10	0.268	0.199	---	0.07
41	3.42	1.20	0.292	0.199	---	0.09
42	3.50	1.30	0.317	0.199	---	0.12
43	3.58	1.40	0.341	0.199	---	0.14
44	3.67	1.40	0.341	0.199	---	0.14
45	3.75	1.50	0.366	0.199	---	0.17
46	3.83	1.50	0.366	0.199	---	0.17
47	3.92	1.60	0.390	0.199	---	0.19
48	4.00	1.60	0.390	0.199	---	0.19
49	4.08	1.70	0.414	0.199	---	0.22
50	4.17	1.80	0.439	0.199	---	0.24
51	4.25	1.90	0.463	0.199	---	0.26
52	4.33	2.00	0.487	0.199	---	0.29
53	4.42	2.10	0.512	0.199	---	0.31
54	4.50	2.10	0.512	0.199	---	0.31
55	4.58	2.20	0.536	0.199	---	0.34
56	4.67	2.30	0.561	0.199	---	0.36
57	4.75	2.40	0.585	0.199	---	0.39
58	4.83	2.40	0.585	0.199	---	0.39
59	4.92	2.50	0.609	0.199	---	0.41
60	5.00	2.60	0.634	0.199	---	0.44
61	5.08	3.10	0.756	0.199	---	0.56
62	5.17	3.60	0.877	0.199	---	0.68
63	5.25	3.90	0.951	0.199	---	0.75
64	5.33	4.20	1.024	0.199	---	0.83
65	5.42	4.70	1.146	0.199	---	0.95
66	5.50	5.60	1.365	0.199	---	1.17
67	5.58	1.90	0.463	0.199	---	0.26
68	5.67	0.90	0.219	0.199	---	0.02
69	5.75	0.60	0.146	0.199	0.125	0.02
70	5.83	0.50	0.122	0.199	0.104	0.02
71	5.92	0.30	0.073	0.199	0.062	0.01
72	6.00	0.20	0.049	0.199	0.042	0.01
Sum =		100.0			Sum =	11.7

Flood volume = Effective rainfall 0.97(In)
times area 1.3(Ac.)/[(In)/(Ft.)] = 0.1(Ac.Ft)
Total soil loss = 1.06(In)
Total soil loss = 0.117(Ac.Ft)
Total rainfall = 2.03(In)
Flood volume = 4670.0 Cubic Feet
Total soil loss = 5091.6 Cubic Feet

Peak flow rate of this hydrograph = 1.455(CFS)

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6 - 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	0.0005	0.03	Q	|	|	|	|
0+20	0.0007	0.03	Q	|	|	|	|
0+25	0.0009	0.03	Q	|	|	|	|
0+30	0.0011	0.03	Q	|	|	|	|
0+35	0.0013	0.03	Q	|	|	|	|
0+40	0.0016	0.03	Q	|	|	|	|
0+45	0.0018	0.03	Q	|	|	|	|

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 0+50    0.0020    0.03  Q        |         |         |         |
 0+55    0.0023    0.03  Q        |         |         |         |
 1+ 0    0.0025    0.04  Q        |         |         |         |
 1+ 5    0.0028    0.04  QV       |         |         |         |
 1+10    0.0030    0.04  QV       |         |         |         |
 1+15    0.0033    0.04  QV       |         |         |         |
 1+20    0.0036    0.04  QV       |         |         |         |
 1+25    0.0038    0.04  QV       |         |         |         |
 1+30    0.0041    0.04  QV       |         |         |         |
 1+35    0.0043    0.04  QV       |         |         |         |
 1+40    0.0046    0.04  QV       |         |         |         |
 1+45    0.0049    0.04  QV       |         |         |         |
 1+50    0.0051    0.04  QV       |         |         |         |
 1+55    0.0054    0.04  Q V      |         |         |         |
 2+ 0    0.0056    0.03  Q V      |         |         |         |
 2+ 5    0.0059    0.03  Q V      |         |         |         |
 2+10    0.0061    0.03  Q V      |         |         |         |
 2+15    0.0063    0.03  Q V      |         |         |         |
 2+20    0.0065    0.03  Q V      |         |         |         |
 2+25    0.0066    0.03  Q V      |         |         |         |
 2+30    0.0068    0.03  Q V      |         |         |         |
 2+35    0.0070    0.03  Q V      |         |         |         |
 2+40    0.0072    0.03  Q V      |         |         |         |
 2+45    0.0075    0.05  Q V      |         |         |         |
 2+50    0.0080    0.06  Q V      |         |         |         |
 2+55    0.0084    0.06  Q  V     |         |         |         |
 3+ 0    0.0088    0.06  Q  V     |         |         |         |
 3+ 5    0.0092    0.06  Q  V     |         |         |         |
 3+10    0.0098    0.08  Q  V     |         |         |         |
 3+15    0.0104    0.09  Q  V     |         |         |         |
 3+20    0.0110    0.09  Q   V    |         |         |         |
 3+25    0.0118    0.11  Q   V    |         |         |         |
 3+30    0.0128    0.15  Q   V    |         |         |         |
 3+35    0.0141    0.18  Q    V   |         |         |         |
 3+40    0.0154    0.19  Q    V   |         |         |         |
 3+45    0.0168    0.21  Q     V  |         |         |         |
 3+50    0.0184    0.22  Q     V  |         |         |         |
 3+55    0.0201    0.24  Q      V |         |         |         |
 4+ 0    0.0218    0.26  |Q      V|         |         |         |
 4+ 5    0.0237    0.28  |Q      V|         |         |         |
 4+10    0.0258    0.31  |Q      V|         |         |         |
 4+15    0.0282    0.34  |Q       V         |         |         |
 4+20    0.0308    0.37  |Q       |V        |         |         |
 4+25    0.0336    0.41  |Q       | V       |         |         |
 4+30    0.0365    0.42  |Q       |  V      |         |         |
 4+35    0.0395    0.44  |Q       |   V     |         |         |
 4+40    0.0427    0.47  |Q       |    V    |         |         |
 4+45    0.0462    0.50  | Q      |      V  |         |         |
 4+50    0.0498    0.52  | Q      |       V |         |         |
 4+55    0.0535    0.54  | Q      |        V|         |         |
 5+ 0    0.0574    0.57  | Q      |         |V        |         |
 5+ 5    0.0621    0.69  | Q      |         |  V      |         |
 5+10    0.0680    0.85  |  Q     |         |    V    |         |
 5+15    0.0746    0.97  |  Q     |         |      V  |         |
 5+20    0.0820    1.07  |   Q    |         |         V         |
 5+25    0.0903    1.21  |   Q    |         |         |  V      |
 5+30    0.1003    1.45  |    Q   |         |         |      V  |
 5+35    0.1056    0.77  |  Q     |         |         |        V|
 5+40    0.1066    0.14  Q        |         |         |        V|
 5+45    0.1068    0.03  Q        |         |         |        V|
 5+50    0.1070    0.03  Q        |         |         |        V|
 5+55    0.1071    0.02  Q        |         |         |        V|
 6+ 0    0.1072    0.01  Q        |         |         |        V|
 6+ 5    0.1072    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 09/23/20 File: APRE2YR242.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

28771 Central Avenue Gas Station
Area A
Pre-development
24-Hr 2-Yr Storm Event

Drainage Area = 1.32(Ac.) = 0.002 Sq. Mi.
Length along longest watercourse = 408.00(Ft.)
Length along longest watercourse measured to centroid = 87.50(Ft.)
Length along longest watercourse = 0.077 Mi.
Length along longest watercourse measured to centroid = 0.017 Mi.
Difference in elevation = 16.34(Ft.)
Slope along watercourse = 211.4588 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.021 Hr.
Lag time = 1.24 Min.
25% of lag time = 0.31 Min.
40% of lag time = 0.50 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]
1.32	2.43	3.22

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
1.32	6.58	8.71

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 2.430(In)
Area Averaged 100-Year Rainfall = 6.580(In)

Point rain (area averaged) = 2.430(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 2.430(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
1.324	83.00	0.059

Total Area Entered = 1.32(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
83.0	83.0	0.210	0.059	0.199	1.000	0.199

Sum (F) = 0.199

Area averaged mean soil loss (F) (In/Hr) = 0.199
Minimum soil loss rate ((In/Hr)) = 0.099
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.853

U n i t H y d r o g r a p h
DESERT S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	402.223	65.137	0.869
2	0.167	804.446	34.863	0.465
			Sum = 100.000	Sum= 1.334

Storm Event 3 Effective Rainfall = 0.462(In)

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.004	0.352	0.003	0.00
2	0.17	0.07	0.004	0.351	0.003	0.00
3	0.25	0.07	0.004	0.349	0.003	0.00
4	0.33	0.10	0.006	0.348	0.005	0.00
5	0.42	0.10	0.006	0.347	0.005	0.00
6	0.50	0.10	0.006	0.345	0.005	0.00
7	0.58	0.10	0.006	0.344	0.005	0.00
8	0.67	0.10	0.006	0.343	0.005	0.00
9	0.75	0.10	0.006	0.341	0.005	0.00
10	0.83	0.13	0.007	0.340	0.006	0.00
11	0.92	0.13	0.007	0.339	0.006	0.00
12	1.00	0.13	0.007	0.337	0.006	0.00
13	1.08	0.10	0.006	0.336	0.005	0.00
14	1.17	0.10	0.006	0.335	0.005	0.00
15	1.25	0.10	0.006	0.333	0.005	0.00
16	1.33	0.10	0.006	0.332	0.005	0.00
17	1.42	0.10	0.006	0.331	0.005	0.00
18	1.50	0.10	0.006	0.329	0.005	0.00
19	1.58	0.10	0.006	0.328	0.005	0.00
20	1.67	0.10	0.006	0.327	0.005	0.00
21	1.75	0.10	0.006	0.325	0.005	0.00
22	1.83	0.13	0.007	0.324	0.006	0.00
23	1.92	0.13	0.007	0.323	0.006	0.00
24	2.00	0.13	0.007	0.322	0.006	0.00
25	2.08	0.13	0.007	0.320	0.006	0.00
26	2.17	0.13	0.007	0.319	0.006	0.00
27	2.25	0.13	0.007	0.318	0.006	0.00
28	2.33	0.13	0.007	0.316	0.006	0.00
29	2.42	0.13	0.007	0.315	0.006	0.00

30	2.50	0.13	0.007	0.314	0.006	0.00
31	2.58	0.17	0.009	0.312	0.008	0.00
32	2.67	0.17	0.009	0.311	0.008	0.00
33	2.75	0.17	0.009	0.310	0.008	0.00
34	2.83	0.17	0.009	0.309	0.008	0.00
35	2.92	0.17	0.009	0.307	0.008	0.00
36	3.00	0.17	0.009	0.306	0.008	0.00
37	3.08	0.17	0.009	0.305	0.008	0.00
38	3.17	0.17	0.009	0.304	0.008	0.00
39	3.25	0.17	0.009	0.302	0.008	0.00
40	3.33	0.17	0.009	0.301	0.008	0.00
41	3.42	0.17	0.009	0.300	0.008	0.00
42	3.50	0.17	0.009	0.299	0.008	0.00
43	3.58	0.17	0.009	0.297	0.008	0.00
44	3.67	0.17	0.009	0.296	0.008	0.00
45	3.75	0.17	0.009	0.295	0.008	0.00
46	3.83	0.20	0.011	0.294	0.009	0.00
47	3.92	0.20	0.011	0.292	0.009	0.00
48	4.00	0.20	0.011	0.291	0.009	0.00
49	4.08	0.20	0.011	0.290	0.009	0.00
50	4.17	0.20	0.011	0.289	0.009	0.00
51	4.25	0.20	0.011	0.287	0.009	0.00
52	4.33	0.23	0.013	0.286	0.011	0.00
53	4.42	0.23	0.013	0.285	0.011	0.00
54	4.50	0.23	0.013	0.284	0.011	0.00
55	4.58	0.23	0.013	0.282	0.011	0.00
56	4.67	0.23	0.013	0.281	0.011	0.00
57	4.75	0.23	0.013	0.280	0.011	0.00
58	4.83	0.27	0.015	0.279	0.013	0.00
59	4.92	0.27	0.015	0.278	0.013	0.00
60	5.00	0.27	0.015	0.276	0.013	0.00
61	5.08	0.20	0.011	0.275	0.009	0.00
62	5.17	0.20	0.011	0.274	0.009	0.00
63	5.25	0.20	0.011	0.273	0.009	0.00
64	5.33	0.23	0.013	0.272	0.011	0.00
65	5.42	0.23	0.013	0.270	0.011	0.00
66	5.50	0.23	0.013	0.269	0.011	0.00
67	5.58	0.27	0.015	0.268	0.013	0.00
68	5.67	0.27	0.015	0.267	0.013	0.00
69	5.75	0.27	0.015	0.266	0.013	0.00
70	5.83	0.27	0.015	0.265	0.013	0.00
71	5.92	0.27	0.015	0.263	0.013	0.00
72	6.00	0.27	0.015	0.262	0.013	0.00
73	6.08	0.30	0.017	0.261	0.014	0.00
74	6.17	0.30	0.017	0.260	0.014	0.00
75	6.25	0.30	0.017	0.259	0.014	0.00
76	6.33	0.30	0.017	0.258	0.014	0.00
77	6.42	0.30	0.017	0.256	0.014	0.00
78	6.50	0.30	0.017	0.255	0.014	0.00
79	6.58	0.33	0.018	0.254	0.016	0.00
80	6.67	0.33	0.018	0.253	0.016	0.00
81	6.75	0.33	0.018	0.252	0.016	0.00
82	6.83	0.33	0.018	0.251	0.016	0.00
83	6.92	0.33	0.018	0.250	0.016	0.00
84	7.00	0.33	0.018	0.248	0.016	0.00
85	7.08	0.33	0.018	0.247	0.016	0.00
86	7.17	0.33	0.018	0.246	0.016	0.00
87	7.25	0.33	0.018	0.245	0.016	0.00
88	7.33	0.37	0.020	0.244	0.017	0.00
89	7.42	0.37	0.020	0.243	0.017	0.00
90	7.50	0.37	0.020	0.242	0.017	0.00
91	7.58	0.40	0.022	0.241	0.019	0.00
92	7.67	0.40	0.022	0.240	0.019	0.00
93	7.75	0.40	0.022	0.238	0.019	0.00
94	7.83	0.43	0.024	0.237	0.020	0.00

95	7.92	0.43	0.024	0.236	0.020	0.00
96	8.00	0.43	0.024	0.235	0.020	0.00
97	8.08	0.50	0.028	0.234	0.024	0.00
98	8.17	0.50	0.028	0.233	0.024	0.00
99	8.25	0.50	0.028	0.232	0.024	0.00
100	8.33	0.50	0.028	0.231	0.024	0.00
101	8.42	0.50	0.028	0.230	0.024	0.00
102	8.50	0.50	0.028	0.229	0.024	0.00
103	8.58	0.53	0.030	0.228	0.025	0.00
104	8.67	0.53	0.030	0.226	0.025	0.00
105	8.75	0.53	0.030	0.225	0.025	0.00
106	8.83	0.57	0.031	0.224	0.027	0.00
107	8.92	0.57	0.031	0.223	0.027	0.00
108	9.00	0.57	0.031	0.222	0.027	0.00
109	9.08	0.63	0.035	0.221	0.030	0.01
110	9.17	0.63	0.035	0.220	0.030	0.01
111	9.25	0.63	0.035	0.219	0.030	0.01
112	9.33	0.67	0.037	0.218	0.032	0.01
113	9.42	0.67	0.037	0.217	0.032	0.01
114	9.50	0.67	0.037	0.216	0.032	0.01
115	9.58	0.70	0.039	0.215	0.033	0.01
116	9.67	0.70	0.039	0.214	0.033	0.01
117	9.75	0.70	0.039	0.213	0.033	0.01
118	9.83	0.73	0.041	0.212	0.035	0.01
119	9.92	0.73	0.041	0.211	0.035	0.01
120	10.00	0.73	0.041	0.210	0.035	0.01
121	10.08	0.50	0.028	0.209	0.024	0.00
122	10.17	0.50	0.028	0.208	0.024	0.00
123	10.25	0.50	0.028	0.207	0.024	0.00
124	10.33	0.50	0.028	0.206	0.024	0.00
125	10.42	0.50	0.028	0.205	0.024	0.00
126	10.50	0.50	0.028	0.204	0.024	0.00
127	10.58	0.67	0.037	0.203	0.032	0.01
128	10.67	0.67	0.037	0.202	0.032	0.01
129	10.75	0.67	0.037	0.201	0.032	0.01
130	10.83	0.67	0.037	0.200	0.032	0.01
131	10.92	0.67	0.037	0.199	0.032	0.01
132	11.00	0.67	0.037	0.198	0.032	0.01
133	11.08	0.63	0.035	0.197	0.030	0.01
134	11.17	0.63	0.035	0.196	0.030	0.01
135	11.25	0.63	0.035	0.195	0.030	0.01
136	11.33	0.63	0.035	0.194	0.030	0.01
137	11.42	0.63	0.035	0.193	0.030	0.01
138	11.50	0.63	0.035	0.192	0.030	0.01
139	11.58	0.57	0.031	0.191	0.027	0.00
140	11.67	0.57	0.031	0.190	0.027	0.00
141	11.75	0.57	0.031	0.189	0.027	0.00
142	11.83	0.60	0.033	0.188	0.028	0.00
143	11.92	0.60	0.033	0.187	0.028	0.00
144	12.00	0.60	0.033	0.186	0.028	0.00
145	12.08	0.83	0.046	0.185	0.039	0.01
146	12.17	0.83	0.046	0.185	0.039	0.01
147	12.25	0.83	0.046	0.184	0.039	0.01
148	12.33	0.87	0.048	0.183	0.041	0.01
149	12.42	0.87	0.048	0.182	0.041	0.01
150	12.50	0.87	0.048	0.181	0.041	0.01
151	12.58	0.93	0.052	0.180	0.044	0.01
152	12.67	0.93	0.052	0.179	0.044	0.01
153	12.75	0.93	0.052	0.178	0.044	0.01
154	12.83	0.97	0.054	0.177	0.046	0.01
155	12.92	0.97	0.054	0.176	0.046	0.01
156	13.00	0.97	0.054	0.175	0.046	0.01
157	13.08	1.13	0.063	0.175	0.054	0.01
158	13.17	1.13	0.063	0.174	0.054	0.01
159	13.25	1.13	0.063	0.173	0.054	0.01

160	13.33	1.13	0.063	0.172	0.054	0.01
161	13.42	1.13	0.063	0.171	0.054	0.01
162	13.50	1.13	0.063	0.170	0.054	0.01
163	13.58	0.77	0.042	0.169	0.036	0.01
164	13.67	0.77	0.042	0.168	0.036	0.01
165	13.75	0.77	0.042	0.168	0.036	0.01
166	13.83	0.77	0.042	0.167	0.036	0.01
167	13.92	0.77	0.042	0.166	0.036	0.01
168	14.00	0.77	0.042	0.165	0.036	0.01
169	14.08	0.90	0.050	0.164	0.043	0.01
170	14.17	0.90	0.050	0.163	0.043	0.01
171	14.25	0.90	0.050	0.163	0.043	0.01
172	14.33	0.87	0.048	0.162	0.041	0.01
173	14.42	0.87	0.048	0.161	0.041	0.01
174	14.50	0.87	0.048	0.160	0.041	0.01
175	14.58	0.87	0.048	0.159	0.041	0.01
176	14.67	0.87	0.048	0.158	0.041	0.01
177	14.75	0.87	0.048	0.158	0.041	0.01
178	14.83	0.83	0.046	0.157	0.039	0.01
179	14.92	0.83	0.046	0.156	0.039	0.01
180	15.00	0.83	0.046	0.155	0.039	0.01
181	15.08	0.80	0.044	0.154	0.038	0.01
182	15.17	0.80	0.044	0.154	0.038	0.01
183	15.25	0.80	0.044	0.153	0.038	0.01
184	15.33	0.77	0.042	0.152	0.036	0.01
185	15.42	0.77	0.042	0.151	0.036	0.01
186	15.50	0.77	0.042	0.150	0.036	0.01
187	15.58	0.63	0.035	0.150	0.030	0.01
188	15.67	0.63	0.035	0.149	0.030	0.01
189	15.75	0.63	0.035	0.148	0.030	0.01
190	15.83	0.63	0.035	0.147	0.030	0.01
191	15.92	0.63	0.035	0.147	0.030	0.01
192	16.00	0.63	0.035	0.146	0.030	0.01
193	16.08	0.13	0.007	0.145	0.006	0.00
194	16.17	0.13	0.007	0.144	0.006	0.00
195	16.25	0.13	0.007	0.144	0.006	0.00
196	16.33	0.13	0.007	0.143	0.006	0.00
197	16.42	0.13	0.007	0.142	0.006	0.00
198	16.50	0.13	0.007	0.141	0.006	0.00
199	16.58	0.10	0.006	0.141	0.005	0.00
200	16.67	0.10	0.006	0.140	0.005	0.00
201	16.75	0.10	0.006	0.139	0.005	0.00
202	16.83	0.10	0.006	0.139	0.005	0.00
203	16.92	0.10	0.006	0.138	0.005	0.00
204	17.00	0.10	0.006	0.137	0.005	0.00
205	17.08	0.17	0.009	0.137	0.008	0.00
206	17.17	0.17	0.009	0.136	0.008	0.00
207	17.25	0.17	0.009	0.135	0.008	0.00
208	17.33	0.17	0.009	0.134	0.008	0.00
209	17.42	0.17	0.009	0.134	0.008	0.00
210	17.50	0.17	0.009	0.133	0.008	0.00
211	17.58	0.17	0.009	0.132	0.008	0.00
212	17.67	0.17	0.009	0.132	0.008	0.00
213	17.75	0.17	0.009	0.131	0.008	0.00
214	17.83	0.13	0.007	0.131	0.006	0.00
215	17.92	0.13	0.007	0.130	0.006	0.00
216	18.00	0.13	0.007	0.129	0.006	0.00
217	18.08	0.13	0.007	0.129	0.006	0.00
218	18.17	0.13	0.007	0.128	0.006	0.00
219	18.25	0.13	0.007	0.127	0.006	0.00
220	18.33	0.13	0.007	0.127	0.006	0.00
221	18.42	0.13	0.007	0.126	0.006	0.00
222	18.50	0.13	0.007	0.125	0.006	0.00
223	18.58	0.10	0.006	0.125	0.005	0.00
224	18.67	0.10	0.006	0.124	0.005	0.00

225	18.75	0.10	0.006	0.124	0.005	0.00
226	18.83	0.07	0.004	0.123	0.003	0.00
227	18.92	0.07	0.004	0.122	0.003	0.00
228	19.00	0.07	0.004	0.122	0.003	0.00
229	19.08	0.10	0.006	0.121	0.005	0.00
230	19.17	0.10	0.006	0.121	0.005	0.00
231	19.25	0.10	0.006	0.120	0.005	0.00
232	19.33	0.13	0.007	0.120	0.006	0.00
233	19.42	0.13	0.007	0.119	0.006	0.00
234	19.50	0.13	0.007	0.119	0.006	0.00
235	19.58	0.10	0.006	0.118	0.005	0.00
236	19.67	0.10	0.006	0.117	0.005	0.00
237	19.75	0.10	0.006	0.117	0.005	0.00
238	19.83	0.07	0.004	0.116	0.003	0.00
239	19.92	0.07	0.004	0.116	0.003	0.00
240	20.00	0.07	0.004	0.115	0.003	0.00
241	20.08	0.10	0.006	0.115	0.005	0.00
242	20.17	0.10	0.006	0.114	0.005	0.00
243	20.25	0.10	0.006	0.114	0.005	0.00
244	20.33	0.10	0.006	0.113	0.005	0.00
245	20.42	0.10	0.006	0.113	0.005	0.00
246	20.50	0.10	0.006	0.112	0.005	0.00
247	20.58	0.10	0.006	0.112	0.005	0.00
248	20.67	0.10	0.006	0.111	0.005	0.00
249	20.75	0.10	0.006	0.111	0.005	0.00
250	20.83	0.07	0.004	0.111	0.003	0.00
251	20.92	0.07	0.004	0.110	0.003	0.00
252	21.00	0.07	0.004	0.110	0.003	0.00
253	21.08	0.10	0.006	0.109	0.005	0.00
254	21.17	0.10	0.006	0.109	0.005	0.00
255	21.25	0.10	0.006	0.108	0.005	0.00
256	21.33	0.07	0.004	0.108	0.003	0.00
257	21.42	0.07	0.004	0.108	0.003	0.00
258	21.50	0.07	0.004	0.107	0.003	0.00
259	21.58	0.10	0.006	0.107	0.005	0.00
260	21.67	0.10	0.006	0.106	0.005	0.00
261	21.75	0.10	0.006	0.106	0.005	0.00
262	21.83	0.07	0.004	0.106	0.003	0.00
263	21.92	0.07	0.004	0.105	0.003	0.00
264	22.00	0.07	0.004	0.105	0.003	0.00
265	22.08	0.10	0.006	0.105	0.005	0.00
266	22.17	0.10	0.006	0.104	0.005	0.00
267	22.25	0.10	0.006	0.104	0.005	0.00
268	22.33	0.07	0.004	0.104	0.003	0.00
269	22.42	0.07	0.004	0.103	0.003	0.00
270	22.50	0.07	0.004	0.103	0.003	0.00
271	22.58	0.07	0.004	0.103	0.003	0.00
272	22.67	0.07	0.004	0.102	0.003	0.00
273	22.75	0.07	0.004	0.102	0.003	0.00
274	22.83	0.07	0.004	0.102	0.003	0.00
275	22.92	0.07	0.004	0.102	0.003	0.00
276	23.00	0.07	0.004	0.101	0.003	0.00
277	23.08	0.07	0.004	0.101	0.003	0.00
278	23.17	0.07	0.004	0.101	0.003	0.00
279	23.25	0.07	0.004	0.101	0.003	0.00
280	23.33	0.07	0.004	0.100	0.003	0.00
281	23.42	0.07	0.004	0.100	0.003	0.00
282	23.50	0.07	0.004	0.100	0.003	0.00
283	23.58	0.07	0.004	0.100	0.003	0.00
284	23.67	0.07	0.004	0.100	0.003	0.00
285	23.75	0.07	0.004	0.100	0.003	0.00
286	23.83	0.07	0.004	0.099	0.003	0.00
287	23.92	0.07	0.004	0.099	0.003	0.00
288	24.00	0.07	0.004	0.099	0.003	0.00
	Sum =	100.0		Sum =	0.8	

Flood volume = Effective rainfall 0.07(In)
times area 1.3(Ac.)/[(In)/(Ft.)] = 0.0(Ac.Ft)
Total soil loss = 0.39(In)
Total soil loss = 0.043(Ac.Ft)
Total rainfall = 0.46(In)
Flood volume = 325.7 Cubic Feet
Total soil loss = 1893.2 Cubic Feet

Storm Event 2 Effective Rainfall = 0.875(In)

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.007	0.352	0.006	0.00
2	0.17	0.07	0.007	0.351	0.006	0.00
3	0.25	0.07	0.007	0.349	0.006	0.00
4	0.33	0.10	0.010	0.348	0.009	0.00
5	0.42	0.10	0.010	0.347	0.009	0.00
6	0.50	0.10	0.010	0.345	0.009	0.00
7	0.58	0.10	0.010	0.344	0.009	0.00
8	0.67	0.10	0.010	0.343	0.009	0.00
9	0.75	0.10	0.010	0.341	0.009	0.00
10	0.83	0.13	0.014	0.340	0.012	0.00
11	0.92	0.13	0.014	0.339	0.012	0.00
12	1.00	0.13	0.014	0.337	0.012	0.00
13	1.08	0.10	0.010	0.336	0.009	0.00
14	1.17	0.10	0.010	0.335	0.009	0.00
15	1.25	0.10	0.010	0.333	0.009	0.00
16	1.33	0.10	0.010	0.332	0.009	0.00
17	1.42	0.10	0.010	0.331	0.009	0.00
18	1.50	0.10	0.010	0.329	0.009	0.00
19	1.58	0.10	0.010	0.328	0.009	0.00
20	1.67	0.10	0.010	0.327	0.009	0.00
21	1.75	0.10	0.010	0.325	0.009	0.00
22	1.83	0.13	0.014	0.324	0.012	0.00
23	1.92	0.13	0.014	0.323	0.012	0.00
24	2.00	0.13	0.014	0.322	0.012	0.00
25	2.08	0.13	0.014	0.320	0.012	0.00
26	2.17	0.13	0.014	0.319	0.012	0.00
27	2.25	0.13	0.014	0.318	0.012	0.00
28	2.33	0.13	0.014	0.316	0.012	0.00
29	2.42	0.13	0.014	0.315	0.012	0.00
30	2.50	0.13	0.014	0.314	0.012	0.00
31	2.58	0.17	0.017	0.312	0.015	0.00
32	2.67	0.17	0.017	0.311	0.015	0.00
33	2.75	0.17	0.017	0.310	0.015	0.00
34	2.83	0.17	0.017	0.309	0.015	0.00
35	2.92	0.17	0.017	0.307	0.015	0.00
36	3.00	0.17	0.017	0.306	0.015	0.00
37	3.08	0.17	0.017	0.305	0.015	0.00
38	3.17	0.17	0.017	0.304	0.015	0.00
39	3.25	0.17	0.017	0.302	0.015	0.00
40	3.33	0.17	0.017	0.301	0.015	0.00
41	3.42	0.17	0.017	0.300	0.015	0.00
42	3.50	0.17	0.017	0.299	0.015	0.00
43	3.58	0.17	0.017	0.297	0.015	0.00
44	3.67	0.17	0.017	0.296	0.015	0.00
45	3.75	0.17	0.017	0.295	0.015	0.00
46	3.83	0.20	0.021	0.294	0.018	0.00
47	3.92	0.20	0.021	0.292	0.018	0.00
48	4.00	0.20	0.021	0.291	0.018	0.00
49	4.08	0.20	0.021	0.290	0.018	0.00
50	4.17	0.20	0.021	0.289	0.018	0.00
51	4.25	0.20	0.021	0.287	0.018	0.00
52	4.33	0.23	0.024	0.286	0.021	0.00

53	4.42	0.23	0.024	0.285	0.021	0.00
54	4.50	0.23	0.024	0.284	0.021	0.00
55	4.58	0.23	0.024	0.282	0.021	0.00
56	4.67	0.23	0.024	0.281	0.021	0.00
57	4.75	0.23	0.024	0.280	0.021	0.00
58	4.83	0.27	0.028	0.279	0.024	0.00
59	4.92	0.27	0.028	0.278	0.024	0.00
60	5.00	0.27	0.028	0.276	0.024	0.00
61	5.08	0.20	0.021	0.275	0.018	0.00
62	5.17	0.20	0.021	0.274	0.018	0.00
63	5.25	0.20	0.021	0.273	0.018	0.00
64	5.33	0.23	0.024	0.272	0.021	0.00
65	5.42	0.23	0.024	0.270	0.021	0.00
66	5.50	0.23	0.024	0.269	0.021	0.00
67	5.58	0.27	0.028	0.268	0.024	0.00
68	5.67	0.27	0.028	0.267	0.024	0.00
69	5.75	0.27	0.028	0.266	0.024	0.00
70	5.83	0.27	0.028	0.265	0.024	0.00
71	5.92	0.27	0.028	0.263	0.024	0.00
72	6.00	0.27	0.028	0.262	0.024	0.00
73	6.08	0.30	0.031	0.261	0.027	0.00
74	6.17	0.30	0.031	0.260	0.027	0.00
75	6.25	0.30	0.031	0.259	0.027	0.00
76	6.33	0.30	0.031	0.258	0.027	0.00
77	6.42	0.30	0.031	0.256	0.027	0.00
78	6.50	0.30	0.031	0.255	0.027	0.00
79	6.58	0.33	0.035	0.254	0.030	0.01
80	6.67	0.33	0.035	0.253	0.030	0.01
81	6.75	0.33	0.035	0.252	0.030	0.01
82	6.83	0.33	0.035	0.251	0.030	0.01
83	6.92	0.33	0.035	0.250	0.030	0.01
84	7.00	0.33	0.035	0.248	0.030	0.01
85	7.08	0.33	0.035	0.247	0.030	0.01
86	7.17	0.33	0.035	0.246	0.030	0.01
87	7.25	0.33	0.035	0.245	0.030	0.01
88	7.33	0.37	0.038	0.244	0.033	0.01
89	7.42	0.37	0.038	0.243	0.033	0.01
90	7.50	0.37	0.038	0.242	0.033	0.01
91	7.58	0.40	0.042	0.241	0.036	0.01
92	7.67	0.40	0.042	0.240	0.036	0.01
93	7.75	0.40	0.042	0.238	0.036	0.01
94	7.83	0.43	0.045	0.237	0.039	0.01
95	7.92	0.43	0.045	0.236	0.039	0.01
96	8.00	0.43	0.045	0.235	0.039	0.01
97	8.08	0.50	0.052	0.234	0.045	0.01
98	8.17	0.50	0.052	0.233	0.045	0.01
99	8.25	0.50	0.052	0.232	0.045	0.01
100	8.33	0.50	0.052	0.231	0.045	0.01
101	8.42	0.50	0.052	0.230	0.045	0.01
102	8.50	0.50	0.052	0.229	0.045	0.01
103	8.58	0.53	0.056	0.228	0.048	0.01
104	8.67	0.53	0.056	0.226	0.048	0.01
105	8.75	0.53	0.056	0.225	0.048	0.01
106	8.83	0.57	0.059	0.224	0.051	0.01
107	8.92	0.57	0.059	0.223	0.051	0.01
108	9.00	0.57	0.059	0.222	0.051	0.01
109	9.08	0.63	0.066	0.221	0.057	0.01
110	9.17	0.63	0.066	0.220	0.057	0.01
111	9.25	0.63	0.066	0.219	0.057	0.01
112	9.33	0.67	0.070	0.218	0.060	0.01
113	9.42	0.67	0.070	0.217	0.060	0.01
114	9.50	0.67	0.070	0.216	0.060	0.01
115	9.58	0.70	0.073	0.215	0.063	0.01
116	9.67	0.70	0.073	0.214	0.063	0.01
117	9.75	0.70	0.073	0.213	0.063	0.01

118	9.83	0.73	0.077	0.212	0.066	0.01
119	9.92	0.73	0.077	0.211	0.066	0.01
120	10.00	0.73	0.077	0.210	0.066	0.01
121	10.08	0.50	0.052	0.209	0.045	0.01
122	10.17	0.50	0.052	0.208	0.045	0.01
123	10.25	0.50	0.052	0.207	0.045	0.01
124	10.33	0.50	0.052	0.206	0.045	0.01
125	10.42	0.50	0.052	0.205	0.045	0.01
126	10.50	0.50	0.052	0.204	0.045	0.01
127	10.58	0.67	0.070	0.203	0.060	0.01
128	10.67	0.67	0.070	0.202	0.060	0.01
129	10.75	0.67	0.070	0.201	0.060	0.01
130	10.83	0.67	0.070	0.200	0.060	0.01
131	10.92	0.67	0.070	0.199	0.060	0.01
132	11.00	0.67	0.070	0.198	0.060	0.01
133	11.08	0.63	0.066	0.197	0.057	0.01
134	11.17	0.63	0.066	0.196	0.057	0.01
135	11.25	0.63	0.066	0.195	0.057	0.01
136	11.33	0.63	0.066	0.194	0.057	0.01
137	11.42	0.63	0.066	0.193	0.057	0.01
138	11.50	0.63	0.066	0.192	0.057	0.01
139	11.58	0.57	0.059	0.191	0.051	0.01
140	11.67	0.57	0.059	0.190	0.051	0.01
141	11.75	0.57	0.059	0.189	0.051	0.01
142	11.83	0.60	0.063	0.188	0.054	0.01
143	11.92	0.60	0.063	0.187	0.054	0.01
144	12.00	0.60	0.063	0.186	0.054	0.01
145	12.08	0.83	0.087	0.185	0.075	0.01
146	12.17	0.83	0.087	0.185	0.075	0.01
147	12.25	0.83	0.087	0.184	0.075	0.01
148	12.33	0.87	0.091	0.183	0.078	0.01
149	12.42	0.87	0.091	0.182	0.078	0.01
150	12.50	0.87	0.091	0.181	0.078	0.01
151	12.58	0.93	0.098	0.180	0.084	0.01
152	12.67	0.93	0.098	0.179	0.084	0.01
153	12.75	0.93	0.098	0.178	0.084	0.01
154	12.83	0.97	0.101	0.177	0.087	0.01
155	12.92	0.97	0.101	0.176	0.087	0.01
156	13.00	0.97	0.101	0.175	0.087	0.01
157	13.08	1.13	0.119	0.175	0.102	0.02
158	13.17	1.13	0.119	0.174	0.102	0.02
159	13.25	1.13	0.119	0.173	0.102	0.02
160	13.33	1.13	0.119	0.172	0.102	0.02
161	13.42	1.13	0.119	0.171	0.102	0.02
162	13.50	1.13	0.119	0.170	0.102	0.02
163	13.58	0.77	0.080	0.169	0.069	0.01
164	13.67	0.77	0.080	0.168	0.069	0.01
165	13.75	0.77	0.080	0.168	0.069	0.01
166	13.83	0.77	0.080	0.167	0.069	0.01
167	13.92	0.77	0.080	0.166	0.069	0.01
168	14.00	0.77	0.080	0.165	0.069	0.01
169	14.08	0.90	0.094	0.164	0.081	0.01
170	14.17	0.90	0.094	0.163	0.081	0.01
171	14.25	0.90	0.094	0.163	0.081	0.01
172	14.33	0.87	0.091	0.162	0.078	0.01
173	14.42	0.87	0.091	0.161	0.078	0.01
174	14.50	0.87	0.091	0.160	0.078	0.01
175	14.58	0.87	0.091	0.159	0.078	0.01
176	14.67	0.87	0.091	0.158	0.078	0.01
177	14.75	0.87	0.091	0.158	0.078	0.01
178	14.83	0.83	0.087	0.157	0.075	0.01
179	14.92	0.83	0.087	0.156	0.075	0.01
180	15.00	0.83	0.087	0.155	0.075	0.01
181	15.08	0.80	0.084	0.154	0.072	0.01
182	15.17	0.80	0.084	0.154	0.072	0.01

183	15.25	0.80	0.084	0.153	0.072	0.01
184	15.33	0.77	0.080	0.152	0.069	0.01
185	15.42	0.77	0.080	0.151	0.069	0.01
186	15.50	0.77	0.080	0.150	0.069	0.01
187	15.58	0.63	0.066	0.150	0.057	0.01
188	15.67	0.63	0.066	0.149	0.057	0.01
189	15.75	0.63	0.066	0.148	0.057	0.01
190	15.83	0.63	0.066	0.147	0.057	0.01
191	15.92	0.63	0.066	0.147	0.057	0.01
192	16.00	0.63	0.066	0.146	0.057	0.01
193	16.08	0.13	0.014	0.145	0.012	0.00
194	16.17	0.13	0.014	0.144	0.012	0.00
195	16.25	0.13	0.014	0.144	0.012	0.00
196	16.33	0.13	0.014	0.143	0.012	0.00
197	16.42	0.13	0.014	0.142	0.012	0.00
198	16.50	0.13	0.014	0.141	0.012	0.00
199	16.58	0.10	0.010	0.141	0.009	0.00
200	16.67	0.10	0.010	0.140	0.009	0.00
201	16.75	0.10	0.010	0.139	0.009	0.00
202	16.83	0.10	0.010	0.139	0.009	0.00
203	16.92	0.10	0.010	0.138	0.009	0.00
204	17.00	0.10	0.010	0.137	0.009	0.00
205	17.08	0.17	0.017	0.137	0.015	0.00
206	17.17	0.17	0.017	0.136	0.015	0.00
207	17.25	0.17	0.017	0.135	0.015	0.00
208	17.33	0.17	0.017	0.134	0.015	0.00
209	17.42	0.17	0.017	0.134	0.015	0.00
210	17.50	0.17	0.017	0.133	0.015	0.00
211	17.58	0.17	0.017	0.132	0.015	0.00
212	17.67	0.17	0.017	0.132	0.015	0.00
213	17.75	0.17	0.017	0.131	0.015	0.00
214	17.83	0.13	0.014	0.131	0.012	0.00
215	17.92	0.13	0.014	0.130	0.012	0.00
216	18.00	0.13	0.014	0.129	0.012	0.00
217	18.08	0.13	0.014	0.129	0.012	0.00
218	18.17	0.13	0.014	0.128	0.012	0.00
219	18.25	0.13	0.014	0.127	0.012	0.00
220	18.33	0.13	0.014	0.127	0.012	0.00
221	18.42	0.13	0.014	0.126	0.012	0.00
222	18.50	0.13	0.014	0.125	0.012	0.00
223	18.58	0.10	0.010	0.125	0.009	0.00
224	18.67	0.10	0.010	0.124	0.009	0.00
225	18.75	0.10	0.010	0.124	0.009	0.00
226	18.83	0.07	0.007	0.123	0.006	0.00
227	18.92	0.07	0.007	0.122	0.006	0.00
228	19.00	0.07	0.007	0.122	0.006	0.00
229	19.08	0.10	0.010	0.121	0.009	0.00
230	19.17	0.10	0.010	0.121	0.009	0.00
231	19.25	0.10	0.010	0.120	0.009	0.00
232	19.33	0.13	0.014	0.120	0.012	0.00
233	19.42	0.13	0.014	0.119	0.012	0.00
234	19.50	0.13	0.014	0.119	0.012	0.00
235	19.58	0.10	0.010	0.118	0.009	0.00
236	19.67	0.10	0.010	0.117	0.009	0.00
237	19.75	0.10	0.010	0.117	0.009	0.00
238	19.83	0.07	0.007	0.116	0.006	0.00
239	19.92	0.07	0.007	0.116	0.006	0.00
240	20.00	0.07	0.007	0.115	0.006	0.00
241	20.08	0.10	0.010	0.115	0.009	0.00
242	20.17	0.10	0.010	0.114	0.009	0.00
243	20.25	0.10	0.010	0.114	0.009	0.00
244	20.33	0.10	0.010	0.113	0.009	0.00
245	20.42	0.10	0.010	0.113	0.009	0.00
246	20.50	0.10	0.010	0.112	0.009	0.00
247	20.58	0.10	0.010	0.112	0.009	0.00

248	20.67	0.10	0.010	0.111	0.009	0.00
249	20.75	0.10	0.010	0.111	0.009	0.00
250	20.83	0.07	0.007	0.111	0.006	0.00
251	20.92	0.07	0.007	0.110	0.006	0.00
252	21.00	0.07	0.007	0.110	0.006	0.00
253	21.08	0.10	0.010	0.109	0.009	0.00
254	21.17	0.10	0.010	0.109	0.009	0.00
255	21.25	0.10	0.010	0.108	0.009	0.00
256	21.33	0.07	0.007	0.108	0.006	0.00
257	21.42	0.07	0.007	0.108	0.006	0.00
258	21.50	0.07	0.007	0.107	0.006	0.00
259	21.58	0.10	0.010	0.107	0.009	0.00
260	21.67	0.10	0.010	0.106	0.009	0.00
261	21.75	0.10	0.010	0.106	0.009	0.00
262	21.83	0.07	0.007	0.106	0.006	0.00
263	21.92	0.07	0.007	0.105	0.006	0.00
264	22.00	0.07	0.007	0.105	0.006	0.00
265	22.08	0.10	0.010	0.105	0.009	0.00
266	22.17	0.10	0.010	0.104	0.009	0.00
267	22.25	0.10	0.010	0.104	0.009	0.00
268	22.33	0.07	0.007	0.104	0.006	0.00
269	22.42	0.07	0.007	0.103	0.006	0.00
270	22.50	0.07	0.007	0.103	0.006	0.00
271	22.58	0.07	0.007	0.103	0.006	0.00
272	22.67	0.07	0.007	0.102	0.006	0.00
273	22.75	0.07	0.007	0.102	0.006	0.00
274	22.83	0.07	0.007	0.102	0.006	0.00
275	22.92	0.07	0.007	0.102	0.006	0.00
276	23.00	0.07	0.007	0.101	0.006	0.00
277	23.08	0.07	0.007	0.101	0.006	0.00
278	23.17	0.07	0.007	0.101	0.006	0.00
279	23.25	0.07	0.007	0.101	0.006	0.00
280	23.33	0.07	0.007	0.100	0.006	0.00
281	23.42	0.07	0.007	0.100	0.006	0.00
282	23.50	0.07	0.007	0.100	0.006	0.00
283	23.58	0.07	0.007	0.100	0.006	0.00
284	23.67	0.07	0.007	0.100	0.006	0.00
285	23.75	0.07	0.007	0.100	0.006	0.00
286	23.83	0.07	0.007	0.099	0.006	0.00
287	23.92	0.07	0.007	0.099	0.006	0.00
288	24.00	0.07	0.007	0.099	0.006	0.00
Sum =		100.0			Sum =	1.5

Flood volume = Effective rainfall 0.13(In)
times area 1.3(Ac.)/[(In)/(Ft.)] = 0.0(Ac.Ft)
Total soil loss = 0.75(In)
Total soil loss = 0.082(Ac.Ft)
Total rainfall = 0.87(In)
Flood volume = 617.2 Cubic Feet
Total soil loss = 3587.2 Cubic Feet

Storm Event 1 Effective Rainfall = 2.430(In)

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Loss rate(In./Hr) Low	Effective (In/Hr)
1	0.08	0.07	0.019	0.352	0.017	0.00
2	0.17	0.07	0.019	0.351	0.017	0.00
3	0.25	0.07	0.019	0.349	0.017	0.00
4	0.33	0.10	0.029	0.348	0.025	0.00
5	0.42	0.10	0.029	0.347	0.025	0.00
6	0.50	0.10	0.029	0.345	0.025	0.00
7	0.58	0.10	0.029	0.344	0.025	0.00
8	0.67	0.10	0.029	0.343	0.025	0.00
9	0.75	0.10	0.029	0.341	0.025	0.00
10	0.83	0.13	0.039	0.340	0.033	0.01

11	0.92	0.13	0.039	0.339	0.033	0.01
12	1.00	0.13	0.039	0.337	0.033	0.01
13	1.08	0.10	0.029	0.336	0.025	0.00
14	1.17	0.10	0.029	0.335	0.025	0.00
15	1.25	0.10	0.029	0.333	0.025	0.00
16	1.33	0.10	0.029	0.332	0.025	0.00
17	1.42	0.10	0.029	0.331	0.025	0.00
18	1.50	0.10	0.029	0.329	0.025	0.00
19	1.58	0.10	0.029	0.328	0.025	0.00
20	1.67	0.10	0.029	0.327	0.025	0.00
21	1.75	0.10	0.029	0.325	0.025	0.00
22	1.83	0.13	0.039	0.324	0.033	0.01
23	1.92	0.13	0.039	0.323	0.033	0.01
24	2.00	0.13	0.039	0.322	0.033	0.01
25	2.08	0.13	0.039	0.320	0.033	0.01
26	2.17	0.13	0.039	0.319	0.033	0.01
27	2.25	0.13	0.039	0.318	0.033	0.01
28	2.33	0.13	0.039	0.316	0.033	0.01
29	2.42	0.13	0.039	0.315	0.033	0.01
30	2.50	0.13	0.039	0.314	0.033	0.01
31	2.58	0.17	0.049	0.312	0.041	0.01
32	2.67	0.17	0.049	0.311	0.041	0.01
33	2.75	0.17	0.049	0.310	0.041	0.01
34	2.83	0.17	0.049	0.309	0.041	0.01
35	2.92	0.17	0.049	0.307	0.041	0.01
36	3.00	0.17	0.049	0.306	0.041	0.01
37	3.08	0.17	0.049	0.305	0.041	0.01
38	3.17	0.17	0.049	0.304	0.041	0.01
39	3.25	0.17	0.049	0.302	0.041	0.01
40	3.33	0.17	0.049	0.301	0.041	0.01
41	3.42	0.17	0.049	0.300	0.041	0.01
42	3.50	0.17	0.049	0.299	0.041	0.01
43	3.58	0.17	0.049	0.297	0.041	0.01
44	3.67	0.17	0.049	0.296	0.041	0.01
45	3.75	0.17	0.049	0.295	0.041	0.01
46	3.83	0.20	0.058	0.294	0.050	0.01
47	3.92	0.20	0.058	0.292	0.050	0.01
48	4.00	0.20	0.058	0.291	0.050	0.01
49	4.08	0.20	0.058	0.290	0.050	0.01
50	4.17	0.20	0.058	0.289	0.050	0.01
51	4.25	0.20	0.058	0.287	0.050	0.01
52	4.33	0.23	0.068	0.286	0.058	0.01
53	4.42	0.23	0.068	0.285	0.058	0.01
54	4.50	0.23	0.068	0.284	0.058	0.01
55	4.58	0.23	0.068	0.282	0.058	0.01
56	4.67	0.23	0.068	0.281	0.058	0.01
57	4.75	0.23	0.068	0.280	0.058	0.01
58	4.83	0.27	0.078	0.279	0.066	0.01
59	4.92	0.27	0.078	0.278	0.066	0.01
60	5.00	0.27	0.078	0.276	0.066	0.01
61	5.08	0.20	0.058	0.275	0.050	0.01
62	5.17	0.20	0.058	0.274	0.050	0.01
63	5.25	0.20	0.058	0.273	0.050	0.01
64	5.33	0.23	0.068	0.272	0.058	0.01
65	5.42	0.23	0.068	0.270	0.058	0.01
66	5.50	0.23	0.068	0.269	0.058	0.01
67	5.58	0.27	0.078	0.268	0.066	0.01
68	5.67	0.27	0.078	0.267	0.066	0.01
69	5.75	0.27	0.078	0.266	0.066	0.01
70	5.83	0.27	0.078	0.265	0.066	0.01
71	5.92	0.27	0.078	0.263	0.066	0.01
72	6.00	0.27	0.078	0.262	0.066	0.01
73	6.08	0.30	0.087	0.261	0.075	0.01
74	6.17	0.30	0.087	0.260	0.075	0.01
75	6.25	0.30	0.087	0.259	0.075	0.01

76	6.33	0.30	0.087	0.258	0.075	0.01
77	6.42	0.30	0.087	0.256	0.075	0.01
78	6.50	0.30	0.087	0.255	0.075	0.01
79	6.58	0.33	0.097	0.254	0.083	0.01
80	6.67	0.33	0.097	0.253	0.083	0.01
81	6.75	0.33	0.097	0.252	0.083	0.01
82	6.83	0.33	0.097	0.251	0.083	0.01
83	6.92	0.33	0.097	0.250	0.083	0.01
84	7.00	0.33	0.097	0.248	0.083	0.01
85	7.08	0.33	0.097	0.247	0.083	0.01
86	7.17	0.33	0.097	0.246	0.083	0.01
87	7.25	0.33	0.097	0.245	0.083	0.01
88	7.33	0.37	0.107	0.244	0.091	0.02
89	7.42	0.37	0.107	0.243	0.091	0.02
90	7.50	0.37	0.107	0.242	0.091	0.02
91	7.58	0.40	0.117	0.241	0.100	0.02
92	7.67	0.40	0.117	0.240	0.100	0.02
93	7.75	0.40	0.117	0.238	0.100	0.02
94	7.83	0.43	0.126	0.237	0.108	0.02
95	7.92	0.43	0.126	0.236	0.108	0.02
96	8.00	0.43	0.126	0.235	0.108	0.02
97	8.08	0.50	0.146	0.234	0.124	0.02
98	8.17	0.50	0.146	0.233	0.124	0.02
99	8.25	0.50	0.146	0.232	0.124	0.02
100	8.33	0.50	0.146	0.231	0.124	0.02
101	8.42	0.50	0.146	0.230	0.124	0.02
102	8.50	0.50	0.146	0.229	0.124	0.02
103	8.58	0.53	0.156	0.228	0.133	0.02
104	8.67	0.53	0.156	0.226	0.133	0.02
105	8.75	0.53	0.156	0.225	0.133	0.02
106	8.83	0.57	0.165	0.224	0.141	0.02
107	8.92	0.57	0.165	0.223	0.141	0.02
108	9.00	0.57	0.165	0.222	0.141	0.02
109	9.08	0.63	0.185	0.221	0.158	0.03
110	9.17	0.63	0.185	0.220	0.158	0.03
111	9.25	0.63	0.185	0.219	0.158	0.03
112	9.33	0.67	0.194	0.218	0.166	0.03
113	9.42	0.67	0.194	0.217	0.166	0.03
114	9.50	0.67	0.194	0.216	0.166	0.03
115	9.58	0.70	0.204	0.215	0.174	0.03
116	9.67	0.70	0.204	0.214	0.174	0.03
117	9.75	0.70	0.204	0.213	0.174	0.03
118	9.83	0.73	0.214	0.212	---	0.00
119	9.92	0.73	0.214	0.211	---	0.00
120	10.00	0.73	0.214	0.210	---	0.00
121	10.08	0.50	0.146	0.209	0.124	0.02
122	10.17	0.50	0.146	0.208	0.124	0.02
123	10.25	0.50	0.146	0.207	0.124	0.02
124	10.33	0.50	0.146	0.206	0.124	0.02
125	10.42	0.50	0.146	0.205	0.124	0.02
126	10.50	0.50	0.146	0.204	0.124	0.02
127	10.58	0.67	0.194	0.203	0.166	0.03
128	10.67	0.67	0.194	0.202	0.166	0.03
129	10.75	0.67	0.194	0.201	0.166	0.03
130	10.83	0.67	0.194	0.200	0.166	0.03
131	10.92	0.67	0.194	0.199	0.166	0.03
132	11.00	0.67	0.194	0.198	0.166	0.03
133	11.08	0.63	0.185	0.197	0.158	0.03
134	11.17	0.63	0.185	0.196	0.158	0.03
135	11.25	0.63	0.185	0.195	0.158	0.03
136	11.33	0.63	0.185	0.194	0.158	0.03
137	11.42	0.63	0.185	0.193	0.158	0.03
138	11.50	0.63	0.185	0.192	0.158	0.03
139	11.58	0.57	0.165	0.191	0.141	0.02
140	11.67	0.57	0.165	0.190	0.141	0.02

141	11.75	0.57	0.165	0.189	0.141	0.02
142	11.83	0.60	0.175	0.188	0.149	0.03
143	11.92	0.60	0.175	0.187	0.149	0.03
144	12.00	0.60	0.175	0.186	0.149	0.03
145	12.08	0.83	0.243	0.185	---	0.06
146	12.17	0.83	0.243	0.185	---	0.06
147	12.25	0.83	0.243	0.184	---	0.06
148	12.33	0.87	0.253	0.183	---	0.07
149	12.42	0.87	0.253	0.182	---	0.07
150	12.50	0.87	0.253	0.181	---	0.07
151	12.58	0.93	0.272	0.180	---	0.09
152	12.67	0.93	0.272	0.179	---	0.09
153	12.75	0.93	0.272	0.178	---	0.09
154	12.83	0.97	0.282	0.177	---	0.10
155	12.92	0.97	0.282	0.176	---	0.11
156	13.00	0.97	0.282	0.175	---	0.11
157	13.08	1.13	0.330	0.175	---	0.16
158	13.17	1.13	0.330	0.174	---	0.16
159	13.25	1.13	0.330	0.173	---	0.16
160	13.33	1.13	0.330	0.172	---	0.16
161	13.42	1.13	0.330	0.171	---	0.16
162	13.50	1.13	0.330	0.170	---	0.16
163	13.58	0.77	0.224	0.169	---	0.05
164	13.67	0.77	0.224	0.168	---	0.06
165	13.75	0.77	0.224	0.168	---	0.06
166	13.83	0.77	0.224	0.167	---	0.06
167	13.92	0.77	0.224	0.166	---	0.06
168	14.00	0.77	0.224	0.165	---	0.06
169	14.08	0.90	0.262	0.164	---	0.10
170	14.17	0.90	0.262	0.163	---	0.10
171	14.25	0.90	0.262	0.163	---	0.10
172	14.33	0.87	0.253	0.162	---	0.09
173	14.42	0.87	0.253	0.161	---	0.09
174	14.50	0.87	0.253	0.160	---	0.09
175	14.58	0.87	0.253	0.159	---	0.09
176	14.67	0.87	0.253	0.158	---	0.09
177	14.75	0.87	0.253	0.158	---	0.10
178	14.83	0.83	0.243	0.157	---	0.09
179	14.92	0.83	0.243	0.156	---	0.09
180	15.00	0.83	0.243	0.155	---	0.09
181	15.08	0.80	0.233	0.154	---	0.08
182	15.17	0.80	0.233	0.154	---	0.08
183	15.25	0.80	0.233	0.153	---	0.08
184	15.33	0.77	0.224	0.152	---	0.07
185	15.42	0.77	0.224	0.151	---	0.07
186	15.50	0.77	0.224	0.150	---	0.07
187	15.58	0.63	0.185	0.150	---	0.04
188	15.67	0.63	0.185	0.149	---	0.04
189	15.75	0.63	0.185	0.148	---	0.04
190	15.83	0.63	0.185	0.147	---	0.04
191	15.92	0.63	0.185	0.147	---	0.04
192	16.00	0.63	0.185	0.146	---	0.04
193	16.08	0.13	0.039	0.145	0.033	0.01
194	16.17	0.13	0.039	0.144	0.033	0.01
195	16.25	0.13	0.039	0.144	0.033	0.01
196	16.33	0.13	0.039	0.143	0.033	0.01
197	16.42	0.13	0.039	0.142	0.033	0.01
198	16.50	0.13	0.039	0.141	0.033	0.01
199	16.58	0.10	0.029	0.141	0.025	0.00
200	16.67	0.10	0.029	0.140	0.025	0.00
201	16.75	0.10	0.029	0.139	0.025	0.00
202	16.83	0.10	0.029	0.139	0.025	0.00
203	16.92	0.10	0.029	0.138	0.025	0.00
204	17.00	0.10	0.029	0.137	0.025	0.00
205	17.08	0.17	0.049	0.137	0.041	0.01

206	17.17	0.17	0.049	0.136	0.041	0.01
207	17.25	0.17	0.049	0.135	0.041	0.01
208	17.33	0.17	0.049	0.134	0.041	0.01
209	17.42	0.17	0.049	0.134	0.041	0.01
210	17.50	0.17	0.049	0.133	0.041	0.01
211	17.58	0.17	0.049	0.132	0.041	0.01
212	17.67	0.17	0.049	0.132	0.041	0.01
213	17.75	0.17	0.049	0.131	0.041	0.01
214	17.83	0.13	0.039	0.131	0.033	0.01
215	17.92	0.13	0.039	0.130	0.033	0.01
216	18.00	0.13	0.039	0.129	0.033	0.01
217	18.08	0.13	0.039	0.129	0.033	0.01
218	18.17	0.13	0.039	0.128	0.033	0.01
219	18.25	0.13	0.039	0.127	0.033	0.01
220	18.33	0.13	0.039	0.127	0.033	0.01
221	18.42	0.13	0.039	0.126	0.033	0.01
222	18.50	0.13	0.039	0.125	0.033	0.01
223	18.58	0.10	0.029	0.125	0.025	0.00
224	18.67	0.10	0.029	0.124	0.025	0.00
225	18.75	0.10	0.029	0.124	0.025	0.00
226	18.83	0.07	0.019	0.123	0.017	0.00
227	18.92	0.07	0.019	0.122	0.017	0.00
228	19.00	0.07	0.019	0.122	0.017	0.00
229	19.08	0.10	0.029	0.121	0.025	0.00
230	19.17	0.10	0.029	0.121	0.025	0.00
231	19.25	0.10	0.029	0.120	0.025	0.00
232	19.33	0.13	0.039	0.120	0.033	0.01
233	19.42	0.13	0.039	0.119	0.033	0.01
234	19.50	0.13	0.039	0.119	0.033	0.01
235	19.58	0.10	0.029	0.118	0.025	0.00
236	19.67	0.10	0.029	0.117	0.025	0.00
237	19.75	0.10	0.029	0.117	0.025	0.00
238	19.83	0.07	0.019	0.116	0.017	0.00
239	19.92	0.07	0.019	0.116	0.017	0.00
240	20.00	0.07	0.019	0.115	0.017	0.00
241	20.08	0.10	0.029	0.115	0.025	0.00
242	20.17	0.10	0.029	0.114	0.025	0.00
243	20.25	0.10	0.029	0.114	0.025	0.00
244	20.33	0.10	0.029	0.113	0.025	0.00
245	20.42	0.10	0.029	0.113	0.025	0.00
246	20.50	0.10	0.029	0.112	0.025	0.00
247	20.58	0.10	0.029	0.112	0.025	0.00
248	20.67	0.10	0.029	0.111	0.025	0.00
249	20.75	0.10	0.029	0.111	0.025	0.00
250	20.83	0.07	0.019	0.111	0.017	0.00
251	20.92	0.07	0.019	0.110	0.017	0.00
252	21.00	0.07	0.019	0.110	0.017	0.00
253	21.08	0.10	0.029	0.109	0.025	0.00
254	21.17	0.10	0.029	0.109	0.025	0.00
255	21.25	0.10	0.029	0.108	0.025	0.00
256	21.33	0.07	0.019	0.108	0.017	0.00
257	21.42	0.07	0.019	0.108	0.017	0.00
258	21.50	0.07	0.019	0.107	0.017	0.00
259	21.58	0.10	0.029	0.107	0.025	0.00
260	21.67	0.10	0.029	0.106	0.025	0.00
261	21.75	0.10	0.029	0.106	0.025	0.00
262	21.83	0.07	0.019	0.106	0.017	0.00
263	21.92	0.07	0.019	0.105	0.017	0.00
264	22.00	0.07	0.019	0.105	0.017	0.00
265	22.08	0.10	0.029	0.105	0.025	0.00
266	22.17	0.10	0.029	0.104	0.025	0.00
267	22.25	0.10	0.029	0.104	0.025	0.00
268	22.33	0.07	0.019	0.104	0.017	0.00
269	22.42	0.07	0.019	0.103	0.017	0.00
270	22.50	0.07	0.019	0.103	0.017	0.00

271	22.58	0.07	0.019	0.103	0.017	0.00
272	22.67	0.07	0.019	0.102	0.017	0.00
273	22.75	0.07	0.019	0.102	0.017	0.00
274	22.83	0.07	0.019	0.102	0.017	0.00
275	22.92	0.07	0.019	0.102	0.017	0.00
276	23.00	0.07	0.019	0.101	0.017	0.00
277	23.08	0.07	0.019	0.101	0.017	0.00
278	23.17	0.07	0.019	0.101	0.017	0.00
279	23.25	0.07	0.019	0.101	0.017	0.00
280	23.33	0.07	0.019	0.100	0.017	0.00
281	23.42	0.07	0.019	0.100	0.017	0.00
282	23.50	0.07	0.019	0.100	0.017	0.00
283	23.58	0.07	0.019	0.100	0.017	0.00
284	23.67	0.07	0.019	0.100	0.017	0.00
285	23.75	0.07	0.019	0.100	0.017	0.00
286	23.83	0.07	0.019	0.099	0.017	0.00
287	23.92	0.07	0.019	0.099	0.017	0.00
288	24.00	0.07	0.019	0.099	0.017	0.00
Sum =	100.0			Sum =	6.5	

Flood volume = Effective rainfall 0.54(In)
times area 1.3(Ac.)/[(In)/(Ft.)] = 0.1(Ac.Ft)
Total soil loss = 1.89(In)
Total soil loss = 0.208(Ac.Ft)
Total rainfall = 2.43(In)
Flood volume = 2604.3 Cubic Feet
Total soil loss = 9074.5 Cubic Feet

Peak flow rate of this hydrograph = 0.214(CFS)

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TOTAL OF: 3 24 - H O U R S T O R M E V E N T S
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	0.0000	0.00	Q	|	|	|	|
0+15	0.0000	0.00	Q	|	|	|	|
0+20	0.0000	0.00	Q	|	|	|	|
0+25	0.0000	0.00	Q	|	|	|	|
0+30	0.0000	0.00	Q	|	|	|	|
0+35	0.0000	0.00	Q	|	|	|	|
0+40	0.0000	0.00	Q	|	|	|	|
0+45	0.0001	0.00	Q	|	|	|	|
0+50	0.0001	0.00	Q	|	|	|	|
0+55	0.0001	0.00	Q	|	|	|	|
1+ 0	0.0001	0.00	Q	|	|	|	|
1+ 5	0.0001	0.00	Q	|	|	|	|
1+10	0.0001	0.00	Q	|	|	|	|
1+15	0.0001	0.00	Q	|	|	|	|
1+20	0.0001	0.00	Q	|	|	|	|
1+25	0.0001	0.00	Q	|	|	|	|
1+30	0.0001	0.00	Q	|	|	|	|
1+35	0.0001	0.00	Q	|	|	|	|
1+40	0.0001	0.00	Q	|	|	|	|
1+45	0.0002	0.00	Q	|	|	|	|
1+50	0.0002	0.00	Q	|	|	|	|
1+55	0.0002	0.00	Q	|	|	|	|
2+ 0	0.0002	0.00	Q	|	|	|	|
2+ 5	0.0002	0.00	Q	|	|	|	|
2+10	0.0002	0.00	Q	|	|	|	|
2+15	0.0002	0.00	Q	|	|	|	|

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2+20     0.0002    0.00  Q       |       |       |       |
2+25     0.0002    0.00  Q       |       |       |       |
2+30     0.0002    0.00  Q       |       |       |       |
2+35     0.0003    0.00  Q       |       |       |       |
2+40     0.0003    0.00  Q       |       |       |       |
2+45     0.0003    0.00  Q       |       |       |       |
2+50     0.0003    0.00  Q       |       |       |       |
2+55     0.0003    0.00  Q       |       |       |       |
3+ 0     0.0003    0.00  Q       |       |       |       |
3+ 5     0.0003    0.00  Q       |       |       |       |
3+10     0.0003    0.00  Q       |       |       |       |
3+15     0.0004    0.00  Q       |       |       |       |
3+20     0.0004    0.00  Q       |       |       |       |
3+25     0.0004    0.00  Q       |       |       |       |
3+30     0.0004    0.00  Q       |       |       |       |
3+35     0.0004    0.00  Q       |       |       |       |
3+40     0.0004    0.00  Q       |       |       |       |
3+45     0.0004    0.00  Q       |       |       |       |
3+50     0.0004    0.00  Q       |       |       |       |
3+55     0.0005    0.00  Q       |       |       |       |
4+ 0     0.0005    0.00  Q       |       |       |       |
4+ 5     0.0005    0.00  Q       |       |       |       |
4+10     0.0005    0.00  Q       |       |       |       |
4+15     0.0005    0.00  Q       |       |       |       |
4+20     0.0005    0.00  Q       |       |       |       |
4+25     0.0006    0.00  Q       |       |       |       |
4+30     0.0006    0.00  Q       |       |       |       |
4+35     0.0006    0.00  Q       |       |       |       |
4+40     0.0006    0.00  Q       |       |       |       |
4+45     0.0006    0.00  Q       |       |       |       |
4+50     0.0006    0.00  Q       |       |       |       |
4+55     0.0007    0.00  Q       |       |       |       |
5+ 0     0.0007    0.00  Q       |       |       |       |
5+ 5     0.0007    0.00  Q       |       |       |       |
5+10     0.0007    0.00  Q       |       |       |       |
5+15     0.0007    0.00  Q       |       |       |       |
5+20     0.0007    0.00  Q       |       |       |       |
5+25     0.0008    0.00  Q       |       |       |       |
5+30     0.0008    0.00  Q       |       |       |       |
5+35     0.0008    0.00  Q       |       |       |       |
5+40     0.0008    0.00  Q       |       |       |       |
5+45     0.0008    0.00  Q       |       |       |       |
5+50     0.0009    0.00  Q       |       |       |       |
5+55     0.0009    0.00  Q       |       |       |       |
6+ 0     0.0009    0.00  Q       |       |       |       |
6+ 5     0.0009    0.00  Q       |       |       |       |
6+10     0.0009    0.00  Q       |       |       |       |
6+15     0.0010    0.00  Q       |       |       |       |
6+20     0.0010    0.00  Q       |       |       |       |
6+25     0.0010    0.00  Q       |       |       |       |
6+30     0.0010    0.00  Q       |       |       |       |
6+35     0.0011    0.00  Q       |       |       |       |
6+40     0.0011    0.00  Q       |       |       |       |
6+45     0.0011    0.00  Q       |       |       |       |
6+50     0.0011    0.00  Q       |       |       |       |
6+55     0.0012    0.00  Q       |       |       |       |
7+ 0     0.0012    0.00  Q       |       |       |       |
7+ 5     0.0012    0.00  Q       |       |       |       |
7+10     0.0012    0.00  Q       |       |       |       |
7+15     0.0013    0.00  Q       |       |       |       |
7+20     0.0013    0.00  Q       |       |       |       |
7+25     0.0013    0.00  Q       |       |       |       |
7+30     0.0013    0.00  Q       |       |       |       |
7+35     0.0014    0.00  Q       |       |       |       |
7+40     0.0014    0.00  Q       |       |       |       |
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 7+45      0.0014     0.00  Q        |         |         |         |
 7+50      0.0015     0.00  Q        |         |         |         |
 7+55      0.0015     0.00  Q        |         |         |         |
 8+ 0      0.0015     0.00  Q        |         |         |         |
 8+ 5      0.0016     0.01  Q        |         |         |         |
 8+10      0.0016     0.01  Q        |         |         |         |
 8+15      0.0016     0.01  Q        |         |         |         |
 8+20      0.0017     0.01  Q        |         |         |         |
 8+25      0.0017     0.01  Q        |         |         |         |
 8+30      0.0017     0.01  Q        |         |         |         |
 8+35      0.0018     0.01  Q        |         |         |         |
 8+40      0.0018     0.01  Q        |         |         |         |
 8+45      0.0019     0.01  Q        |         |         |         |
 8+50      0.0019     0.01  Q        |         |         |         |
 8+55      0.0019     0.01  Q        |         |         |         |
 9+ 0      0.0020     0.01  Q        |         |         |         |
 9+ 5      0.0020     0.01  Q        |         |         |         |
 9+10      0.0021     0.01  QV       |         |         |         |
 9+15      0.0021     0.01  QV       |         |         |         |
 9+20      0.0022     0.01  QV       |         |         |         |
 9+25      0.0022     0.01  QV       |         |         |         |
 9+30      0.0023     0.01  QV       |         |         |         |
 9+35      0.0023     0.01  QV       |         |         |         |
 9+40      0.0024     0.01  QV       |         |         |         |
 9+45      0.0024     0.01  QV       |         |         |         |
 9+50      0.0025     0.01  QV       |         |         |         |
 9+55      0.0025     0.01  QV       |         |         |         |
10+ 0      0.0026     0.01  QV       |         |         |         |
10+ 5      0.0026     0.01  QV       |         |         |         |
10+10      0.0027     0.01  QV       |         |         |         |
10+15      0.0027     0.01  QV       |         |         |         |
10+20      0.0028     0.01  QV       |         |         |         |
10+25      0.0028     0.01  QV       |         |         |         |
10+30      0.0028     0.01  QV       |         |         |         |
10+35      0.0029     0.01  QV       |         |         |         |
10+40      0.0029     0.01  QV       |         |         |         |
10+45      0.0030     0.01  QV       |         |         |         |
10+50      0.0030     0.01  QV       |         |         |         |
10+55      0.0031     0.01  QV       |         |         |         |
11+ 0      0.0031     0.01  QV       |         |         |         |
11+ 5      0.0032     0.01  QV       |         |         |         |
11+10      0.0032     0.01  QV       |         |         |         |
11+15      0.0033     0.01  QV       |         |         |         |
11+20      0.0033     0.01  QV       |         |         |         |
11+25      0.0034     0.01  QV       |         |         |         |
11+30      0.0034     0.01  QV       |         |         |         |
11+35      0.0035     0.01  QV       |         |         |         |
11+40      0.0035     0.01  QV       |         |         |         |
11+45      0.0035     0.01  QV       |         |         |         |
11+50      0.0036     0.01  QV       |         |         |         |
11+55      0.0036     0.01  QV       |         |         |         |
12+ 0      0.0037     0.01  QV       |         |         |         |
12+ 5      0.0037     0.01  QV       |         |         |         |
12+10      0.0038     0.01  QV       |         |         |         |
12+15      0.0039     0.01  QV       |         |         |         |
12+20      0.0039     0.01  QV       |         |         |         |
12+25      0.0040     0.01  QV       |         |         |         |
12+30      0.0040     0.01  QV       |         |         |         |
12+35      0.0041     0.01  Q V      |         |         |         |
12+40      0.0042     0.01  Q V      |         |         |         |
12+45      0.0043     0.01  Q V      |         |         |         |
12+50      0.0043     0.01  Q V      |         |         |         |
12+55      0.0044     0.01  Q V      |         |         |         |
13+ 0      0.0045     0.01  Q V      |         |         |         |
13+ 5      0.0045     0.01  Q V      |         |         |         |
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13+10     0.0046     0.01  Q V      |         |         |         |
13+15     0.0047     0.01  Q V      |         |         |         |
13+20     0.0048     0.01  Q V      |         |         |         |
13+25     0.0049     0.01  Q V      |         |         |         |
13+30     0.0050     0.01  Q V      |         |         |         |
13+35     0.0050     0.01  Q V      |         |         |         |
13+40     0.0051     0.01  Q V      |         |         |         |
13+45     0.0052     0.01  Q V      |         |         |         |
13+50     0.0052     0.01  Q V      |         |         |         |
13+55     0.0053     0.01  Q V      |         |         |         |
14+ 0     0.0053     0.01  Q V      |         |         |         |
14+ 5     0.0054     0.01  Q V      |         |         |         |
14+10     0.0055     0.01  Q V      |         |         |         |
14+15     0.0055     0.01  Q V      |         |         |         |
14+20     0.0056     0.01  Q V      |         |         |         |
14+25     0.0057     0.01  Q V      |         |         |         |
14+30     0.0057     0.01  Q V      |         |         |         |
14+35     0.0058     0.01  Q V      |         |         |         |
14+40     0.0059     0.01  Q V      |         |         |         |
14+45     0.0059     0.01  Q V      |         |         |         |
14+50     0.0060     0.01  Q V      |         |         |         |
14+55     0.0060     0.01  Q V      |         |         |         |
15+ 0     0.0061     0.01  Q V      |         |         |         |
15+ 5     0.0062     0.01  Q  V     |         |         |         |
15+10     0.0062     0.01  Q  V     |         |         |         |
15+15     0.0063     0.01  Q  V     |         |         |         |
15+20     0.0063     0.01  Q  V     |         |         |         |
15+25     0.0064     0.01  Q  V     |         |         |         |
15+30     0.0065     0.01  Q  V     |         |         |         |
15+35     0.0065     0.01  Q  V     |         |         |         |
15+40     0.0066     0.01  Q  V     |         |         |         |
15+45     0.0066     0.01  Q  V     |         |         |         |
15+50     0.0066     0.01  Q  V     |         |         |         |
15+55     0.0067     0.01  Q  V     |         |         |         |
16+ 0     0.0067     0.01  Q  V     |         |         |         |
16+ 5     0.0068     0.00  Q  V     |         |         |         |
16+10     0.0068     0.00  Q  V     |         |         |         |
16+15     0.0068     0.00  Q  V     |         |         |         |
16+20     0.0068     0.00  Q  V     |         |         |         |
16+25     0.0068     0.00  Q  V     |         |         |         |
16+30     0.0068     0.00  Q  V     |         |         |         |
16+35     0.0068     0.00  Q  V     |         |         |         |
16+40     0.0068     0.00  Q  V     |         |         |         |
16+45     0.0068     0.00  Q  V     |         |         |         |
16+50     0.0068     0.00  Q  V     |         |         |         |
16+55     0.0069     0.00  Q  V     |         |         |         |
17+ 0     0.0069     0.00  Q  V     |         |         |         |
17+ 5     0.0069     0.00  Q  V     |         |         |         |
17+10     0.0069     0.00  Q  V     |         |         |         |
17+15     0.0069     0.00  Q  V     |         |         |         |
17+20     0.0069     0.00  Q  V     |         |         |         |
17+25     0.0069     0.00  Q  V     |         |         |         |
17+30     0.0069     0.00  Q  V     |         |         |         |
17+35     0.0069     0.00  Q  V     |         |         |         |
17+40     0.0070     0.00  Q  V     |         |         |         |
17+45     0.0070     0.00  Q  V     |         |         |         |
17+50     0.0070     0.00  Q  V     |         |         |         |
17+55     0.0070     0.00  Q  V     |         |         |         |
18+ 0     0.0070     0.00  Q  V     |         |         |         |
18+ 5     0.0070     0.00  Q  V     |         |         |         |
18+10     0.0070     0.00  Q  V     |         |         |         |
18+15     0.0070     0.00  Q  V     |         |         |         |
18+20     0.0070     0.00  Q  V     |         |         |         |
18+25     0.0071     0.00  Q  V     |         |         |         |
18+30     0.0071     0.00  Q  V     |         |         |         |
```

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18+35      0.0071      0.00  Q  V      |         |         |         |
18+40      0.0071      0.00  Q  V      |         |         |         |
18+45      0.0071      0.00  Q  V      |         |         |         |
18+50      0.0071      0.00  Q  V      |         |         |         |
18+55      0.0071      0.00  Q  V      |         |         |         |
19+ 0      0.0071      0.00  Q  V      |         |         |         |
19+ 5      0.0071      0.00  Q  V      |         |         |         |
19+10      0.0071      0.00  Q  V      |         |         |         |
19+15      0.0071      0.00  Q  V      |         |         |         |
19+20      0.0071      0.00  Q  V      |         |         |         |
19+25      0.0071      0.00  Q  V      |         |         |         |
19+30      0.0072      0.00  Q  V      |         |         |         |
19+35      0.0072      0.00  Q  V      |         |         |         |
19+40      0.0072      0.00  Q  V      |         |         |         |
19+45      0.0072      0.00  Q  V      |         |         |         |
19+50      0.0072      0.00  Q  V      |         |         |         |
19+55      0.0072      0.00  Q  V      |         |         |         |
20+ 0      0.0072      0.00  Q  V      |         |         |         |
20+ 5      0.0072      0.00  Q  V      |         |         |         |
20+10      0.0072      0.00  Q  V      |         |         |         |
20+15      0.0072      0.00  Q  V      |         |         |         |
20+20      0.0072      0.00  Q  V      |         |         |         |
20+25      0.0072      0.00  Q  V      |         |         |         |
20+30      0.0072      0.00  Q  V      |         |         |         |
20+35      0.0072      0.00  Q  V      |         |         |         |
20+40      0.0073      0.00  Q  V      |         |         |         |
20+45      0.0073      0.00  Q  V      |         |         |         |
20+50      0.0073      0.00  Q  V      |         |         |         |
20+55      0.0073      0.00  Q  V      |         |         |         |
21+ 0      0.0073      0.00  Q  V      |         |         |         |
21+ 5      0.0073      0.00  Q  V      |         |         |         |
21+10      0.0073      0.00  Q  V      |         |         |         |
21+15      0.0073      0.00  Q  V      |         |         |         |
21+20      0.0073      0.00  Q  V      |         |         |         |
21+25      0.0073      0.00  Q  V      |         |         |         |
21+30      0.0073      0.00  Q  V      |         |         |         |
21+35      0.0073      0.00  Q  V      |         |         |         |
21+40      0.0073      0.00  Q  V      |         |         |         |
21+45      0.0073      0.00  Q  V      |         |         |         |
21+50      0.0073      0.00  Q  V      |         |         |         |
21+55      0.0073      0.00  Q  V      |         |         |         |
22+ 0      0.0073      0.00  Q  V      |         |         |         |
22+ 5      0.0074      0.00  Q  V      |         |         |         |
22+10      0.0074      0.00  Q  V      |         |         |         |
22+15      0.0074      0.00  Q  V      |         |         |         |
22+20      0.0074      0.00  Q  V      |         |         |         |
22+25      0.0074      0.00  Q  V      |         |         |         |
22+30      0.0074      0.00  Q  V      |         |         |         |
22+35      0.0074      0.00  Q  V      |         |         |         |
22+40      0.0074      0.00  Q  V      |         |         |         |
22+45      0.0074      0.00  Q  V      |         |         |         |
22+50      0.0074      0.00  Q  V      |         |         |         |
22+55      0.0074      0.00  Q  V      |         |         |         |
23+ 0      0.0074      0.00  Q  V      |         |         |         |
23+ 5      0.0074      0.00  Q  V      |         |         |         |
23+10      0.0074      0.00  Q  V      |         |         |         |
23+15      0.0074      0.00  Q  V      |         |         |         |
23+20      0.0074      0.00  Q  V      |         |         |         |
23+25      0.0074      0.00  Q  V      |         |         |         |
23+30      0.0074      0.00  Q  V      |         |         |         |
23+35      0.0075      0.00  Q  V      |         |         |         |
23+40      0.0075      0.00  Q  V      |         |         |         |
23+45      0.0075      0.00  Q  V      |         |         |         |
23+50      0.0075      0.00  Q  V      |         |         |         |
23+55      0.0075      0.00  Q  V      |         |         |         |
```

24+ 0 0.0075 0.00 Q V | | | |
24+ 5 0.0075 0.00 Q V | | | |
24+10 0.0075 0.00 Q V | | | |
24+15 0.0075 0.00 Q V | | | |
24+20 0.0075 0.00 Q V | | | |
24+25 0.0075 0.00 Q V | | | |
24+30 0.0075 0.00 Q V | | | |
24+35 0.0076 0.00 Q V | | | |
24+40 0.0076 0.00 Q V | | | |
24+45 0.0076 0.00 Q V | | | |
24+50 0.0076 0.00 Q V | | | |
24+55 0.0076 0.00 Q V | | | |
25+ 0 0.0076 0.00 Q V | | | |
25+ 5 0.0077 0.00 Q V | | | |
25+10 0.0077 0.00 Q V | | | |
25+15 0.0077 0.00 Q V | | | |
25+20 0.0077 0.00 Q V | | | |
25+25 0.0077 0.00 Q V | | | |
25+30 0.0077 0.00 Q V | | | |
25+35 0.0077 0.00 Q V | | | |
25+40 0.0078 0.00 Q V | | | |
25+45 0.0078 0.00 Q V | | | |
25+50 0.0078 0.00 Q V | | | |
25+55 0.0078 0.00 Q V | | | |
26+ 0 0.0078 0.00 Q V | | | |
26+ 5 0.0078 0.00 Q V | | | |
26+10 0.0079 0.00 Q V | | | |
26+15 0.0079 0.00 Q V | | | |
26+20 0.0079 0.00 Q V | | | |
26+25 0.0079 0.00 Q V | | | |
26+30 0.0079 0.00 Q V | | | |
26+35 0.0080 0.00 Q V | | | |
26+40 0.0080 0.00 Q V | | | |
26+45 0.0080 0.00 Q V | | | |
26+50 0.0080 0.00 Q V | | | |
26+55 0.0081 0.00 Q V | | | |
27+ 0 0.0081 0.00 Q V | | | |
27+ 5 0.0081 0.00 Q V | | | |
27+10 0.0081 0.00 Q V | | | |
27+15 0.0081 0.00 Q V | | | |
27+20 0.0082 0.00 Q V | | | |
27+25 0.0082 0.00 Q V | | | |
27+30 0.0082 0.00 Q V | | | |
27+35 0.0082 0.00 Q V | | | |
27+40 0.0083 0.00 Q V | | | |
27+45 0.0083 0.00 Q V | | | |
27+50 0.0083 0.00 Q V | | | |
27+55 0.0083 0.00 Q V | | | |
28+ 0 0.0084 0.00 Q V | | | |
28+ 5 0.0084 0.00 Q V | | | |
28+10 0.0084 0.00 Q V | | | |
28+15 0.0085 0.00 Q V | | | |
28+20 0.0085 0.00 Q V | | | |
28+25 0.0085 0.00 Q V | | | |
28+30 0.0086 0.00 Q V | | | |
28+35 0.0086 0.00 Q V | | | |
28+40 0.0086 0.00 Q V | | | |
28+45 0.0087 0.00 Q V | | | |
28+50 0.0087 0.01 Q V | | | |
28+55 0.0087 0.01 Q V | | | |
29+ 0 0.0088 0.01 Q V | | | |
29+ 5 0.0088 0.00 Q V | | | |
29+10 0.0088 0.00 Q V | | | |
29+15 0.0089 0.00 Q V | | | |
29+20 0.0089 0.00 Q V | | | |

29+25	0.0089	0.00	Q V | | | |
29+30	0.0090	0.00	Q V | | | |
29+35	0.0090	0.01	Q V | | | |
29+40	0.0090	0.01	Q V | | | |
29+45	0.0091	0.01	Q V | | | |
29+50	0.0091	0.01	Q V | | | |
29+55	0.0091	0.01	Q V | | | |
30+ 0	0.0092	0.01	Q V | | | |
30+ 5	0.0092	0.01	Q V | | | |
30+10	0.0093	0.01	Q V | | | |
30+15	0.0093	0.01	Q V | | | |
30+20	0.0093	0.01	Q V | | | |
30+25	0.0094	0.01	Q V | | | |
30+30	0.0094	0.01	Q V | | | |
30+35	0.0095	0.01	Q V | | | |
30+40	0.0095	0.01	Q V | | | |
30+45	0.0096	0.01	Q V | | | |
30+50	0.0096	0.01	Q V | | | |
30+55	0.0097	0.01	Q V | | | |
31+ 0	0.0097	0.01	Q V | | | |
31+ 5	0.0098	0.01	Q V | | | |
31+10	0.0098	0.01	Q V | | | |
31+15	0.0099	0.01	Q V | | | |
31+20	0.0099	0.01	Q V | | | |
31+25	0.0100	0.01	Q V | | | |
31+30	0.0100	0.01	Q V | | | |
31+35	0.0101	0.01	Q V | | | |
31+40	0.0101	0.01	Q V | | | |
31+45	0.0102	0.01	Q V | | | |
31+50	0.0102	0.01	Q V | | | |
31+55	0.0103	0.01	Q V | | | |
32+ 0	0.0104	0.01	Q V | | | |
32+ 5	0.0104	0.01	Q V | | | |
32+10	0.0105	0.01	Q V | | | |
32+15	0.0106	0.01	Q V | | | |
32+20	0.0106	0.01	Q V | | | |
32+25	0.0107	0.01	Q V | | | |
32+30	0.0108	0.01	Q V | | | |
32+35	0.0109	0.01	Q V | | | |
32+40	0.0109	0.01	Q V | | | |
32+45	0.0110	0.01	Q V | | | |
32+50	0.0111	0.01	Q V | | | |
32+55	0.0112	0.01	Q V | | | |
33+ 0	0.0112	0.01	Q V | | | |
33+ 5	0.0113	0.01	Q V | | | |
33+10	0.0114	0.01	Q V | | | |
33+15	0.0115	0.01	Q V | | | |
33+20	0.0116	0.01	Q V | | | |
33+25	0.0117	0.01	Q V | | | |
33+30	0.0118	0.01	Q V | | | |
33+35	0.0119	0.01	Q V | | | |
33+40	0.0120	0.01	Q V | | | |
33+45	0.0121	0.01	Q V | | | |
33+50	0.0122	0.01	Q V | | | |
33+55	0.0123	0.02	Q V | | | |
34+ 0	0.0124	0.02	Q V | | | |
34+ 5	0.0125	0.01	Q V | | | |
34+10	0.0126	0.01	Q V | | | |
34+15	0.0126	0.01	Q V | | | |
34+20	0.0127	0.01	Q V | | | |
34+25	0.0128	0.01	Q V | | | |
34+30	0.0128	0.01	Q V | | | |
34+35	0.0129	0.01	Q V | | | |
34+40	0.0130	0.01	Q V | | | |
34+45	0.0131	0.01	Q V | | | |

34+50 0.0132 0.01 Q V | | | |
34+55 0.0133 0.01 Q V | | | |
35+ 0 0.0134 0.01 Q V | | | |
35+ 5 0.0135 0.01 Q V | | | |
35+10 0.0136 0.01 Q V | | | |
35+15 0.0137 0.01 Q V | | | |
35+20 0.0138 0.01 Q V | | | |
35+25 0.0138 0.01 Q V | | | |
35+30 0.0139 0.01 Q V | | | |
35+35 0.0140 0.01 Q V | | | |
35+40 0.0141 0.01 Q V | | | |
35+45 0.0142 0.01 Q V | | | |
35+50 0.0143 0.01 Q V | | | |
35+55 0.0143 0.01 Q V | | | |
36+ 0 0.0144 0.01 Q V | | | |
36+ 5 0.0145 0.02 Q V | | | |
36+10 0.0147 0.02 Q V | | | |
36+15 0.0148 0.02 Q V | | | |
36+20 0.0149 0.02 Q V | | | |
36+25 0.0150 0.02 Q V | | | |
36+30 0.0151 0.02 Q V | | | |
36+35 0.0153 0.02 Q V | | | |
36+40 0.0154 0.02 Q V | | | |
36+45 0.0155 0.02 Q V | | | |
36+50 0.0157 0.02 Q V | | | |
36+55 0.0158 0.02 Q V | | | |
37+ 0 0.0159 0.02 Q V | | | |
37+ 5 0.0161 0.02 Q V | | | |
37+10 0.0163 0.02 Q V | | | |
37+15 0.0164 0.02 Q V | | | |
37+20 0.0166 0.02 Q V | | | |
37+25 0.0167 0.02 Q V | | | |
37+30 0.0169 0.02 Q V | | | |
37+35 0.0170 0.02 Q V | | | |
37+40 0.0171 0.02 Q V | | | |
37+45 0.0172 0.02 Q V | | | |
37+50 0.0174 0.02 Q V | | | |
37+55 0.0175 0.02 Q V | | | |
38+ 0 0.0176 0.02 Q V | | | |
38+ 5 0.0177 0.02 Q V | | | |
38+10 0.0178 0.02 Q V | | | |
38+15 0.0179 0.02 Q V | | | |
38+20 0.0181 0.02 Q V | | | |
38+25 0.0182 0.02 Q V | | | |
38+30 0.0183 0.02 Q V | | | |
38+35 0.0184 0.02 Q V| | | |
38+40 0.0186 0.02 Q V| | | |
38+45 0.0187 0.02 Q V| | | |
38+50 0.0188 0.02 Q V| | | |
38+55 0.0189 0.02 Q V| | | |
39+ 0 0.0190 0.02 Q V| | | |
39+ 5 0.0192 0.02 Q V| | | |
39+10 0.0193 0.02 Q V| | | |
39+15 0.0194 0.02 Q V| | | |
39+20 0.0195 0.02 Q V| | | |
39+25 0.0196 0.02 Q V| | | |
39+30 0.0197 0.02 Q V| | | |
39+35 0.0198 0.01 Q V| | | |
39+40 0.0199 0.01 Q V| | | |
39+45 0.0200 0.01 Q V| | | |
39+50 0.0201 0.01 Q V| | | |
39+55 0.0202 0.01 Q V| | | |
40+ 0 0.0203 0.01 Q V| | | |
40+ 5 0.0203 0.01 Q V| | | |
40+10 0.0203 0.00 Q V| | | |

40+15 0.0203 0.00 Q V| | | |
40+20 0.0204 0.00 Q V| | | |
40+25 0.0204 0.00 Q V | | |
40+30 0.0204 0.00 Q V | | |
40+35 0.0204 0.00 Q V | | |
40+40 0.0204 0.00 Q V | | |
40+45 0.0204 0.00 Q V | | |
40+50 0.0205 0.00 Q V | | |
40+55 0.0205 0.00 Q V | | |
41+ 0 0.0205 0.00 Q V | | |
41+ 5 0.0205 0.00 Q V | | |
41+10 0.0205 0.00 Q V | | |
41+15 0.0205 0.00 Q V | | |
41+20 0.0206 0.00 Q V | | |
41+25 0.0206 0.00 Q V | | |
41+30 0.0206 0.00 Q V | | |
41+35 0.0206 0.00 Q V | | |
41+40 0.0207 0.00 Q V | | |
41+45 0.0207 0.00 Q V | | |
41+50 0.0207 0.00 Q V | | |
41+55 0.0207 0.00 Q V | | |
42+ 0 0.0207 0.00 Q V | | |
42+ 5 0.0208 0.00 Q V | | |
42+10 0.0208 0.00 Q V | | |
42+15 0.0208 0.00 Q V | | |
42+20 0.0208 0.00 Q V | | |
42+25 0.0208 0.00 Q V | | |
42+30 0.0209 0.00 Q V | | |
42+35 0.0209 0.00 Q V | | |
42+40 0.0209 0.00 Q V | | |
42+45 0.0209 0.00 Q V | | |
42+50 0.0209 0.00 Q V | | |
42+55 0.0209 0.00 Q V | | |
43+ 0 0.0209 0.00 Q V | | |
43+ 5 0.0209 0.00 Q V | | |
43+10 0.0210 0.00 Q V | | |
43+15 0.0210 0.00 Q V | | |
43+20 0.0210 0.00 Q V | | |
43+25 0.0210 0.00 Q V | | |
43+30 0.0210 0.00 Q V | | |
43+35 0.0210 0.00 Q V | | |
43+40 0.0211 0.00 Q V | | |
43+45 0.0211 0.00 Q V | | |
43+50 0.0211 0.00 Q V | | |
43+55 0.0211 0.00 Q V | | |
44+ 0 0.0211 0.00 Q V | | |
44+ 5 0.0211 0.00 Q V | | |
44+10 0.0211 0.00 Q V | | |
44+15 0.0211 0.00 Q V | | |
44+20 0.0212 0.00 Q V | | |
44+25 0.0212 0.00 Q V | | |
44+30 0.0212 0.00 Q V | | |
44+35 0.0212 0.00 Q V | | |
44+40 0.0212 0.00 Q V | | |
44+45 0.0212 0.00 Q V | | |
44+50 0.0212 0.00 Q V | | |
44+55 0.0213 0.00 Q V | | |
45+ 0 0.0213 0.00 Q V | | |
45+ 5 0.0213 0.00 Q V | | |
45+10 0.0213 0.00 Q V | | |
45+15 0.0213 0.00 Q V | | |
45+20 0.0213 0.00 Q V | | |
45+25 0.0213 0.00 Q V | | |
45+30 0.0213 0.00 Q V | | |
45+35 0.0213 0.00 Q V | | |

45+40	0.0214	0.00	Q V | | |
45+45	0.0214	0.00	Q V | | |
45+50	0.0214	0.00	Q V | | |
45+55	0.0214	0.00	Q V | | |
46+ 0	0.0214	0.00	Q V | | |
46+ 5	0.0214	0.00	Q V | | |
46+10	0.0214	0.00	Q V | | |
46+15	0.0214	0.00	Q V | | |
46+20	0.0215	0.00	Q V | | |
46+25	0.0215	0.00	Q V | | |
46+30	0.0215	0.00	Q V | | |
46+35	0.0215	0.00	Q V | | |
46+40	0.0215	0.00	Q V | | |
46+45	0.0215	0.00	Q V | | |
46+50	0.0215	0.00	Q V | | |
46+55	0.0215	0.00	Q V | | |
47+ 0	0.0215	0.00	Q V | | |
47+ 5	0.0215	0.00	Q V | | |
47+10	0.0215	0.00	Q V | | |
47+15	0.0216	0.00	Q V | | |
47+20	0.0216	0.00	Q V | | |
47+25	0.0216	0.00	Q V | | |
47+30	0.0216	0.00	Q V | | |
47+35	0.0216	0.00	Q V | | |
47+40	0.0216	0.00	Q V | | |
47+45	0.0216	0.00	Q V | | |
47+50	0.0216	0.00	Q V | | |
47+55	0.0216	0.00	Q V | | |
48+ 0	0.0216	0.00	Q V | | |
48+ 5	0.0217	0.00	Q V | | |
48+10	0.0217	0.00	Q V | | |
48+15	0.0217	0.00	Q V | | |
48+20	0.0217	0.01	Q V | | |
48+25	0.0218	0.01	Q V | | |
48+30	0.0218	0.01	Q V | | |
48+35	0.0219	0.01	Q V | | |
48+40	0.0219	0.01	Q V | | |
48+45	0.0219	0.01	Q V | | |
48+50	0.0220	0.01	Q V | | |
48+55	0.0220	0.01	Q V | | |
49+ 0	0.0221	0.01	Q V | | |
49+ 5	0.0221	0.01	Q V | | |
49+10	0.0222	0.01	Q V | | |
49+15	0.0222	0.01	Q V | | |
49+20	0.0223	0.01	Q V | | |
49+25	0.0223	0.01	Q V | | |
49+30	0.0223	0.01	Q V | | |
49+35	0.0224	0.01	Q V | | |
49+40	0.0224	0.01	Q |V | | |
49+45	0.0225	0.01	Q |V | | |
49+50	0.0225	0.01	Q |V | | |
49+55	0.0226	0.01	Q |V | | |
50+ 0	0.0226	0.01	Q |V | | |
50+ 5	0.0227	0.01	Q |V | | |
50+10	0.0227	0.01	Q |V | | |
50+15	0.0228	0.01	Q |V | | |
50+20	0.0228	0.01	Q |V | | |
50+25	0.0229	0.01	Q |V | | |
50+30	0.0229	0.01	Q |V | | |
50+35	0.0230	0.01	Q |V | | |
50+40	0.0230	0.01	Q |V | | |
50+45	0.0231	0.01	Q |V | | |
50+50	0.0232	0.01	Q |V | | |
50+55	0.0232	0.01	Q |V | | |
51+ 0	0.0233	0.01	Q |V | | |

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51+ 5    0.0234   0.01  Q     |V        |        |        |
51+10    0.0234   0.01  Q     |V        |        |        |
51+15    0.0235   0.01  Q     |V        |        |        |
51+20    0.0236   0.01  Q     |V        |        |        |
51+25    0.0236   0.01  Q     |V        |        |        |
51+30    0.0237   0.01  Q     |V        |        |        |
51+35    0.0238   0.01  Q     |V        |        |        |
51+40    0.0238   0.01  Q     |V        |        |        |
51+45    0.0239   0.01  Q     |V        |        |        |
51+50    0.0240   0.01  Q     |V        |        |        |
51+55    0.0241   0.01  Q     |V        |        |        |
52+ 0    0.0241   0.01  Q     |V        |        |        |
52+ 5    0.0242   0.01  Q     |V        |        |        |
52+10    0.0243   0.01  Q     |V        |        |        |
52+15    0.0244   0.01  Q     |V        |        |        |
52+20    0.0245   0.01  Q     | V       |        |        |
52+25    0.0245   0.01  Q     | V       |        |        |
52+30    0.0246   0.01  Q     | V       |        |        |
52+35    0.0247   0.01  Q     | V       |        |        |
52+40    0.0248   0.01  Q     | V       |        |        |
52+45    0.0249   0.01  Q     | V       |        |        |
52+50    0.0250   0.01  Q     | V       |        |        |
52+55    0.0251   0.02  Q     | V       |        |        |
53+ 0    0.0252   0.02  Q     | V       |        |        |
53+ 5    0.0253   0.01  Q     | V       |        |        |
53+10    0.0254   0.01  Q     | V       |        |        |
53+15    0.0255   0.01  Q     | V       |        |        |
53+20    0.0256   0.01  Q     | V       |        |        |
53+25    0.0257   0.01  Q     | V       |        |        |
53+30    0.0257   0.01  Q     | V       |        |        |
53+35    0.0258   0.01  Q     | V       |        |        |
53+40    0.0259   0.02  Q     | V       |        |        |
53+45    0.0261   0.02  Q     | V       |        |        |
53+50    0.0262   0.02  Q     | V       |        |        |
53+55    0.0263   0.02  Q     | V       |        |        |
54+ 0    0.0264   0.02  Q     | V       |        |        |
54+ 5    0.0265   0.02  Q     |  V      |        |        |
54+10    0.0266   0.02  Q     |  V      |        |        |
54+15    0.0267   0.02  Q     |  V      |        |        |
54+20    0.0268   0.02  Q     |  V      |        |        |
54+25    0.0270   0.02  Q     |  V      |        |        |
54+30    0.0271   0.02  Q     |  V      |        |        |
54+35    0.0272   0.02  Q     |  V      |        |        |
54+40    0.0273   0.02  Q     |  V      |        |        |
54+45    0.0275   0.02  Q     |  V      |        |        |
54+50    0.0276   0.02  Q     |  V      |        |        |
54+55    0.0277   0.02  Q     |  V      |        |        |
55+ 0    0.0279   0.02  Q     |  V      |        |        |
55+ 5    0.0280   0.02  Q     |  V      |        |        |
55+10    0.0281   0.02  Q     |  V      |        |        |
55+15    0.0282   0.02  Q     |  V      |        |        |
55+20    0.0284   0.02  Q     |  V      |        |        |
55+25    0.0285   0.02  Q     |   V     |        |        |
55+30    0.0287   0.02  Q     |   V     |        |        |
55+35    0.0288   0.02  Q     |   V     |        |        |
55+40    0.0290   0.02  Q     |   V     |        |        |
55+45    0.0291   0.02  Q     |   V     |        |        |
55+50    0.0293   0.02  Q     |   V     |        |        |
55+55    0.0295   0.02  Q     |   V     |        |        |
56+ 0    0.0297   0.02  Q     |   V     |        |        |
56+ 5    0.0298   0.03  Q     |   V     |        |        |
56+10    0.0300   0.03  Q     |   V     |        |        |
56+15    0.0302   0.03  Q     |   V     |        |        |
56+20    0.0304   0.03  Q     |   V     |        |        |
56+25    0.0306   0.03  Q     |    V    |        |        |
```

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56+30   0.0308   0.03  Q    |   V   |        |        |
56+35   0.0310   0.03  Q    |   V   |        |        |
56+40   0.0312   0.03  Q    |   V   |        |        |
56+45   0.0314   0.03  Q    |   V   |        |        |
56+50   0.0317   0.03  Q    |   V   |        |        |
56+55   0.0319   0.03  Q    |   V   |        |        |
57+ 0   0.0321   0.03  Q    |   V   |        |        |
57+ 5   0.0324   0.03  Q    |   V   |        |        |
57+10   0.0326   0.04  Q    |    V  |        |        |
57+15   0.0329   0.04  Q    |    V  |        |        |
57+20   0.0331   0.04  Q    |    V  |        |        |
57+25   0.0334   0.04  Q    |    V  |        |        |
57+30   0.0336   0.04  Q    |    V  |        |        |
57+35   0.0339   0.04  Q    |    V  |        |        |
57+40   0.0342   0.04  Q    |    V  |        |        |
57+45   0.0345   0.04  Q    |    V  |        |        |
57+50   0.0346   0.02  Q    |    V  |        |        |
57+55   0.0346   0.00  Q    |    V  |        |        |
58+ 0   0.0346   0.00  Q    |     V |        |        |
58+ 5   0.0348   0.02  Q    |     V |        |        |
58+10   0.0350   0.03  Q    |     V |        |        |
58+15   0.0352   0.03  Q    |     V |        |        |
58+20   0.0354   0.03  Q    |     V |        |        |
58+25   0.0356   0.03  Q    |     V |        |        |
58+30   0.0357   0.03  Q    |     V |        |        |
58+35   0.0360   0.03  Q    |     V |        |        |
58+40   0.0362   0.04  Q    |     V |        |        |
58+45   0.0365   0.04  Q    |     V |        |        |
58+50   0.0368   0.04  Q    |      V|        |        |
58+55   0.0370   0.04  Q    |      V|        |        |
59+ 0   0.0373   0.04  Q    |      V|        |        |
59+ 5   0.0376   0.04  Q    |      V|        |        |
59+10   0.0378   0.04  Q    |      V|        |        |
59+15   0.0381   0.04  Q    |      V|        |        |
59+20   0.0383   0.04  Q    |      V|        |        |
59+25   0.0385   0.04  Q    |      V|        |        |
59+30   0.0388   0.04  Q    |       V|       |        |
59+35   0.0390   0.03  Q    |       V|       |        |
59+40   0.0393   0.03  Q    |       V|       |        |
59+45   0.0395   0.03  Q    |       V|       |        |
59+50   0.0397   0.03  Q    |       V|       |        |
59+55   0.0399   0.03  Q    |       V|       |        |
60+ 0   0.0402   0.03  Q    |       V|       |        |
60+ 5   0.0406   0.06  Q    |       V|       |        |
60+10   0.0411   0.08  Q    |        V       |        |
60+15   0.0417   0.08  Q    |        V       |        |
60+20   0.0423   0.09  Q    |        V       |        |
60+25   0.0429   0.09  Q    |       |V       |        |
60+30   0.0436   0.10  Q    |       |V       |        |
60+35   0.0444   0.11  Q    |       |V       |        |
60+40   0.0452   0.12  Q    |       | V      |        |
60+45   0.0461   0.13  Q    |       | V      |        |
60+50   0.0470   0.13  Q    |       |  V     |        |
60+55   0.0480   0.14  Q    |       |  V     |        |
61+ 0   0.0490   0.14  Q    |       |  V     |        |
61+ 5   0.0502   0.19  Q    |       |  V     |        |
61+10   0.0517   0.21  Q    |       |   V    |        |
61+15   0.0531   0.21  Q    |       |    V   |        |
61+20   0.0546   0.21  Q    |       |    V   |        |
61+25   0.0561   0.21  Q    |       |     V  |        |
61+30   0.0575   0.21  Q    |       |      V |        |
61+35   0.0584   0.12  Q    |       |      V |        |
61+40   0.0589   0.07  Q    |       |      V |        |
61+45   0.0594   0.07  Q    |       |       V|        |
61+50   0.0599   0.08  Q    |       |       V|        |
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61+55    0.0604    0.08  Q           |         |        V|          |
62+ 0    0.0610    0.08  Q           |         |        V|          |
62+ 5    0.0617    0.11  Q           |         |         V          |
62+10    0.0626    0.13  Q           |         |         V          |
62+15    0.0636    0.13  Q           |         |         | V        |
62+20    0.0644    0.13  Q           |         |         | V        |
62+25    0.0653    0.12  Q           |         |         |  V       |
62+30    0.0661    0.12  Q           |         |         |  V       |
62+35    0.0670    0.12  Q           |         |         |  V       |
62+40    0.0678    0.13  Q           |         |         |   V      |
62+45    0.0687    0.13  Q           |         |         |   V      |
62+50    0.0695    0.12  Q           |         |         |    V     |
62+55    0.0703    0.12  Q           |         |         |    V     |
63+ 0    0.0711    0.12  Q           |         |         |    V     |
63+ 5    0.0719    0.11  Q           |         |         |     V    |
63+10    0.0726    0.11  Q           |         |         |     V    |
63+15    0.0734    0.11  Q           |         |         |      V   |
63+20    0.0740    0.10  Q           |         |         |      V   |
63+25    0.0747    0.10  Q           |         |         |      V   |
63+30    0.0754    0.10  Q           |         |         |       V  |
63+35    0.0758    0.06  Q           |         |         |       V  |
63+40    0.0762    0.05  Q           |         |         |       V  |
63+45    0.0765    0.05  Q           |         |         |       V  |
63+50    0.0768    0.05  Q           |         |         |       V  |
63+55    0.0772    0.05  Q           |         |         |       V  |
64+ 0    0.0775    0.05  Q           |         |         |       V  |
64+ 5    0.0777    0.02  Q           |         |         |       V  |
64+10    0.0777    0.01  Q           |         |         |        V |
64+15    0.0778    0.01  Q           |         |         |        V |
64+20    0.0778    0.01  Q           |         |         |        V |
64+25    0.0779    0.01  Q           |         |         |        V |
64+30    0.0779    0.01  Q           |         |         |        V |
64+35    0.0780    0.01  Q           |         |         |        V |
64+40    0.0780    0.01  Q           |         |         |        V |
64+45    0.0781    0.01  Q           |         |         |        V |
64+50    0.0781    0.01  Q           |         |         |        V |
64+55    0.0781    0.01  Q           |         |         |        V |
65+ 0    0.0782    0.01  Q           |         |         |       V  |
65+ 5    0.0782    0.01  Q           |         |         |       V  |
65+10    0.0783    0.01  Q           |         |         |        V |
65+15    0.0784    0.01  Q           |         |         |        V |
65+20    0.0784    0.01  Q           |         |         |        V |
65+25    0.0785    0.01  Q           |         |         |        V |
65+30    0.0786    0.01  Q           |         |         |        V |
65+35    0.0786    0.01  Q           |         |         |        V |
65+40    0.0787    0.01  Q           |         |         |        V |
65+45    0.0788    0.01  Q           |         |         |        V |
65+50    0.0788    0.01  Q           |         |         |        V |
65+55    0.0789    0.01  Q           |         |         |        V |
66+ 0    0.0789    0.01  Q           |         |         |       V  |
66+ 5    0.0790    0.01  Q           |         |         |       V  |
66+10    0.0790    0.01  Q           |         |         |        V |
66+15    0.0791    0.01  Q           |         |         |        V |
66+20    0.0791    0.01  Q           |         |         |        V |
66+25    0.0792    0.01  Q           |         |         |        V |
66+30    0.0792    0.01  Q           |         |         |        V |
66+35    0.0793    0.01  Q           |         |         |        V |
66+40    0.0793    0.01  Q           |         |         |        V |
66+45    0.0794    0.01  Q           |         |         |        V |
66+50    0.0794    0.00  Q           |         |         |         V|
66+55    0.0794    0.00  Q           |         |         |         V|
67+ 0    0.0795    0.00  Q           |         |         |         V|
67+ 5    0.0795    0.01  Q           |         |         |         V|
67+10    0.0795    0.01  Q           |         |         |         V|
67+15    0.0796    0.01  Q           |         |         |         V|
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67+20	0.0796	0.01	Q	|	|	|	V|
67+25	0.0797	0.01	Q	|	|	|	V|
67+30	0.0797	0.01	Q	|	|	|	V|
67+35	0.0798	0.01	Q	|	|	|	V|
67+40	0.0798	0.01	Q	|	|	|	V|
67+45	0.0798	0.01	Q	|	|	|	V|
67+50	0.0799	0.00	Q	|	|	|	V|
67+55	0.0799	0.00	Q	|	|	|	V|
68+ 0	0.0799	0.00	Q	|	|	|	V|
68+ 5	0.0800	0.01	Q	|	|	|	V|
68+10	0.0800	0.01	Q	|	|	|	V|
68+15	0.0800	0.01	Q	|	|	|	V|
68+20	0.0801	0.01	Q	|	|	|	V|
68+25	0.0801	0.01	Q	|	|	|	V|
68+30	0.0802	0.01	Q	|	|	|	V|
68+35	0.0802	0.01	Q	|	|	|	V|
68+40	0.0802	0.01	Q	|	|	|	V|
68+45	0.0803	0.01	Q	|	|	|	V|
68+50	0.0803	0.00	Q	|	|	|	V|
68+55	0.0803	0.00	Q	|	|	|	V|
69+ 0	0.0804	0.00	Q	|	|	|	V|
69+ 5	0.0804	0.01	Q	|	|	|	V|
69+10	0.0804	0.01	Q	|	|	|	V|
69+15	0.0805	0.01	Q	|	|	|	V|
69+20	0.0805	0.00	Q	|	|	|	V|
69+25	0.0805	0.00	Q	|	|	|	V|
69+30	0.0806	0.00	Q	|	|	|	V|
69+35	0.0806	0.01	Q	|	|	|	V|
69+40	0.0806	0.01	Q	|	|	|	V|
69+45	0.0807	0.01	Q	|	|	|	V|
69+50	0.0807	0.00	Q	|	|	|	V|
69+55	0.0807	0.00	Q	|	|	|	V|
70+ 0	0.0808	0.00	Q	|	|	|	V|
70+ 5	0.0808	0.01	Q	|	|	|	V|
70+10	0.0808	0.01	Q	|	|	|	V|
70+15	0.0809	0.01	Q	|	|	|	V|
70+20	0.0809	0.00	Q	|	|	|	V|
70+25	0.0809	0.00	Q	|	|	|	V|
70+30	0.0809	0.00	Q	|	|	|	V|
70+35	0.0810	0.00	Q	|	|	|	V|
70+40	0.0810	0.00	Q	|	|	|	V|
70+45	0.0810	0.00	Q	|	|	|	V|
70+50	0.0811	0.00	Q	|	|	|	V|
70+55	0.0811	0.00	Q	|	|	|	V|
71+ 0	0.0811	0.00	Q	|	|	|	V|
71+ 5	0.0811	0.00	Q	|	|	|	V|
71+10	0.0812	0.00	Q	|	|	|	V|
71+15	0.0812	0.00	Q	|	|	|	V|
71+20	0.0812	0.00	Q	|	|	|	V|
71+25	0.0812	0.00	Q	|	|	|	V|
71+30	0.0813	0.00	Q	|	|	|	V|
71+35	0.0813	0.00	Q	|	|	|	V|
71+40	0.0813	0.00	Q	|	|	|	V|
71+45	0.0813	0.00	Q	|	|	|	V|
71+50	0.0814	0.00	Q	|	|	|	V|
71+55	0.0814	0.00	Q	|	|	|	V|
72+ 0	0.0814	0.00	Q	|	|	|	V|
72+ 5	0.0814	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

Study date 09/23/20 File: APRE2YR245.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

28771 Central Avenue Gas Station
Area A
Pre-development
24-Hr 5-Year Storm Event

Drainage Area = 1.32(Ac.) = 0.002 Sq. Mi.
Length along longest watercourse = 408.00(Ft.)
Length along longest watercourse measured to centroid = 87.50(Ft.)
Length along longest watercourse = 0.077 Mi.
Length along longest watercourse measured to centroid = 0.017 Mi.
Difference in elevation = 16.34(Ft.)
Slope along watercourse = 211.4588 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.021 Hr.
Lag time = 1.24 Min.
25% of lag time = 0.31 Min.
40% of lag time = 0.50 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]
1.32	2.43	3.22

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
1.32	6.58	8.71

STORM EVENT (YEAR) = 5.00
Area Averaged 2-Year Rainfall = 2.430(In)
Area Averaged 100-Year Rainfall = 6.580(In)

Point rain (area averaged) = 3.402(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 3.402(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
1.324	83.00	0.059

Total Area Entered = 1.32(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
83.0	83.0	0.210	0.059	0.199	1.000	0.199

Sum (F) = 0.199

Area averaged mean soil loss (F) (In/Hr) = 0.199

Minimum soil loss rate ((In/Hr)) = 0.099

(for 24 hour storm duration)

Soil low loss rate (decimal) = 0.853

U n i t H y d r o g r a p h

DESERT S-Curve

Unit Hydrograph Data

	Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	402.223	65.137	0.869
2	0.167	804.446	34.863	0.465
			Sum = 100.000	Sum= 1.334

Storm Event 3 Effective Rainfall = 0.646(In)

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.005	0.352	0.004	0.00
2	0.17	0.07	0.005	0.351	0.004	0.00
3	0.25	0.07	0.005	0.349	0.004	0.00
4	0.33	0.10	0.008	0.348	0.007	0.00
5	0.42	0.10	0.008	0.347	0.007	0.00
6	0.50	0.10	0.008	0.345	0.007	0.00
7	0.58	0.10	0.008	0.344	0.007	0.00
8	0.67	0.10	0.008	0.343	0.007	0.00
9	0.75	0.10	0.008	0.341	0.007	0.00
10	0.83	0.13	0.010	0.340	0.009	0.00
11	0.92	0.13	0.010	0.339	0.009	0.00
12	1.00	0.13	0.010	0.337	0.009	0.00
13	1.08	0.10	0.008	0.336	0.007	0.00
14	1.17	0.10	0.008	0.335	0.007	0.00
15	1.25	0.10	0.008	0.333	0.007	0.00
16	1.33	0.10	0.008	0.332	0.007	0.00
17	1.42	0.10	0.008	0.331	0.007	0.00
18	1.50	0.10	0.008	0.329	0.007	0.00
19	1.58	0.10	0.008	0.328	0.007	0.00
20	1.67	0.10	0.008	0.327	0.007	0.00
21	1.75	0.10	0.008	0.325	0.007	0.00
22	1.83	0.13	0.010	0.324	0.009	0.00
23	1.92	0.13	0.010	0.323	0.009	0.00
24	2.00	0.13	0.010	0.322	0.009	0.00
25	2.08	0.13	0.010	0.320	0.009	0.00
26	2.17	0.13	0.010	0.319	0.009	0.00
27	2.25	0.13	0.010	0.318	0.009	0.00
28	2.33	0.13	0.010	0.316	0.009	0.00
29	2.42	0.13	0.010	0.315	0.009	0.00

30	2.50	0.13	0.010	0.314	0.009	0.00
31	2.58	0.17	0.013	0.312	0.011	0.00
32	2.67	0.17	0.013	0.311	0.011	0.00
33	2.75	0.17	0.013	0.310	0.011	0.00
34	2.83	0.17	0.013	0.309	0.011	0.00
35	2.92	0.17	0.013	0.307	0.011	0.00
36	3.00	0.17	0.013	0.306	0.011	0.00
37	3.08	0.17	0.013	0.305	0.011	0.00
38	3.17	0.17	0.013	0.304	0.011	0.00
39	3.25	0.17	0.013	0.302	0.011	0.00
40	3.33	0.17	0.013	0.301	0.011	0.00
41	3.42	0.17	0.013	0.300	0.011	0.00
42	3.50	0.17	0.013	0.299	0.011	0.00
43	3.58	0.17	0.013	0.297	0.011	0.00
44	3.67	0.17	0.013	0.296	0.011	0.00
45	3.75	0.17	0.013	0.295	0.011	0.00
46	3.83	0.20	0.016	0.294	0.013	0.00
47	3.92	0.20	0.016	0.292	0.013	0.00
48	4.00	0.20	0.016	0.291	0.013	0.00
49	4.08	0.20	0.016	0.290	0.013	0.00
50	4.17	0.20	0.016	0.289	0.013	0.00
51	4.25	0.20	0.016	0.287	0.013	0.00
52	4.33	0.23	0.018	0.286	0.015	0.00
53	4.42	0.23	0.018	0.285	0.015	0.00
54	4.50	0.23	0.018	0.284	0.015	0.00
55	4.58	0.23	0.018	0.282	0.015	0.00
56	4.67	0.23	0.018	0.281	0.015	0.00
57	4.75	0.23	0.018	0.280	0.015	0.00
58	4.83	0.27	0.021	0.279	0.018	0.00
59	4.92	0.27	0.021	0.278	0.018	0.00
60	5.00	0.27	0.021	0.276	0.018	0.00
61	5.08	0.20	0.016	0.275	0.013	0.00
62	5.17	0.20	0.016	0.274	0.013	0.00
63	5.25	0.20	0.016	0.273	0.013	0.00
64	5.33	0.23	0.018	0.272	0.015	0.00
65	5.42	0.23	0.018	0.270	0.015	0.00
66	5.50	0.23	0.018	0.269	0.015	0.00
67	5.58	0.27	0.021	0.268	0.018	0.00
68	5.67	0.27	0.021	0.267	0.018	0.00
69	5.75	0.27	0.021	0.266	0.018	0.00
70	5.83	0.27	0.021	0.265	0.018	0.00
71	5.92	0.27	0.021	0.263	0.018	0.00
72	6.00	0.27	0.021	0.262	0.018	0.00
73	6.08	0.30	0.023	0.261	0.020	0.00
74	6.17	0.30	0.023	0.260	0.020	0.00
75	6.25	0.30	0.023	0.259	0.020	0.00
76	6.33	0.30	0.023	0.258	0.020	0.00
77	6.42	0.30	0.023	0.256	0.020	0.00
78	6.50	0.30	0.023	0.255	0.020	0.00
79	6.58	0.33	0.026	0.254	0.022	0.00
80	6.67	0.33	0.026	0.253	0.022	0.00
81	6.75	0.33	0.026	0.252	0.022	0.00
82	6.83	0.33	0.026	0.251	0.022	0.00
83	6.92	0.33	0.026	0.250	0.022	0.00
84	7.00	0.33	0.026	0.248	0.022	0.00
85	7.08	0.33	0.026	0.247	0.022	0.00
86	7.17	0.33	0.026	0.246	0.022	0.00
87	7.25	0.33	0.026	0.245	0.022	0.00
88	7.33	0.37	0.028	0.244	0.024	0.00
89	7.42	0.37	0.028	0.243	0.024	0.00
90	7.50	0.37	0.028	0.242	0.024	0.00
91	7.58	0.40	0.031	0.241	0.026	0.00
92	7.67	0.40	0.031	0.240	0.026	0.00
93	7.75	0.40	0.031	0.238	0.026	0.00
94	7.83	0.43	0.034	0.237	0.029	0.00

95	7.92	0.43	0.034	0.236	0.029	0.00
96	8.00	0.43	0.034	0.235	0.029	0.00
97	8.08	0.50	0.039	0.234	0.033	0.01
98	8.17	0.50	0.039	0.233	0.033	0.01
99	8.25	0.50	0.039	0.232	0.033	0.01
100	8.33	0.50	0.039	0.231	0.033	0.01
101	8.42	0.50	0.039	0.230	0.033	0.01
102	8.50	0.50	0.039	0.229	0.033	0.01
103	8.58	0.53	0.041	0.228	0.035	0.01
104	8.67	0.53	0.041	0.226	0.035	0.01
105	8.75	0.53	0.041	0.225	0.035	0.01
106	8.83	0.57	0.044	0.224	0.038	0.01
107	8.92	0.57	0.044	0.223	0.038	0.01
108	9.00	0.57	0.044	0.222	0.038	0.01
109	9.08	0.63	0.049	0.221	0.042	0.01
110	9.17	0.63	0.049	0.220	0.042	0.01
111	9.25	0.63	0.049	0.219	0.042	0.01
112	9.33	0.67	0.052	0.218	0.044	0.01
113	9.42	0.67	0.052	0.217	0.044	0.01
114	9.50	0.67	0.052	0.216	0.044	0.01
115	9.58	0.70	0.054	0.215	0.046	0.01
116	9.67	0.70	0.054	0.214	0.046	0.01
117	9.75	0.70	0.054	0.213	0.046	0.01
118	9.83	0.73	0.057	0.212	0.049	0.01
119	9.92	0.73	0.057	0.211	0.049	0.01
120	10.00	0.73	0.057	0.210	0.049	0.01
121	10.08	0.50	0.039	0.209	0.033	0.01
122	10.17	0.50	0.039	0.208	0.033	0.01
123	10.25	0.50	0.039	0.207	0.033	0.01
124	10.33	0.50	0.039	0.206	0.033	0.01
125	10.42	0.50	0.039	0.205	0.033	0.01
126	10.50	0.50	0.039	0.204	0.033	0.01
127	10.58	0.67	0.052	0.203	0.044	0.01
128	10.67	0.67	0.052	0.202	0.044	0.01
129	10.75	0.67	0.052	0.201	0.044	0.01
130	10.83	0.67	0.052	0.200	0.044	0.01
131	10.92	0.67	0.052	0.199	0.044	0.01
132	11.00	0.67	0.052	0.198	0.044	0.01
133	11.08	0.63	0.049	0.197	0.042	0.01
134	11.17	0.63	0.049	0.196	0.042	0.01
135	11.25	0.63	0.049	0.195	0.042	0.01
136	11.33	0.63	0.049	0.194	0.042	0.01
137	11.42	0.63	0.049	0.193	0.042	0.01
138	11.50	0.63	0.049	0.192	0.042	0.01
139	11.58	0.57	0.044	0.191	0.038	0.01
140	11.67	0.57	0.044	0.190	0.038	0.01
141	11.75	0.57	0.044	0.189	0.038	0.01
142	11.83	0.60	0.047	0.188	0.040	0.01
143	11.92	0.60	0.047	0.187	0.040	0.01
144	12.00	0.60	0.047	0.186	0.040	0.01
145	12.08	0.83	0.065	0.185	0.055	0.01
146	12.17	0.83	0.065	0.185	0.055	0.01
147	12.25	0.83	0.065	0.184	0.055	0.01
148	12.33	0.87	0.067	0.183	0.057	0.01
149	12.42	0.87	0.067	0.182	0.057	0.01
150	12.50	0.87	0.067	0.181	0.057	0.01
151	12.58	0.93	0.072	0.180	0.062	0.01
152	12.67	0.93	0.072	0.179	0.062	0.01
153	12.75	0.93	0.072	0.178	0.062	0.01
154	12.83	0.97	0.075	0.177	0.064	0.01
155	12.92	0.97	0.075	0.176	0.064	0.01
156	13.00	0.97	0.075	0.175	0.064	0.01
157	13.08	1.13	0.088	0.175	0.075	0.01
158	13.17	1.13	0.088	0.174	0.075	0.01
159	13.25	1.13	0.088	0.173	0.075	0.01

160	13.33	1.13	0.088	0.172	0.075	0.01
161	13.42	1.13	0.088	0.171	0.075	0.01
162	13.50	1.13	0.088	0.170	0.075	0.01
163	13.58	0.77	0.059	0.169	0.051	0.01
164	13.67	0.77	0.059	0.168	0.051	0.01
165	13.75	0.77	0.059	0.168	0.051	0.01
166	13.83	0.77	0.059	0.167	0.051	0.01
167	13.92	0.77	0.059	0.166	0.051	0.01
168	14.00	0.77	0.059	0.165	0.051	0.01
169	14.08	0.90	0.070	0.164	0.060	0.01
170	14.17	0.90	0.070	0.163	0.060	0.01
171	14.25	0.90	0.070	0.163	0.060	0.01
172	14.33	0.87	0.067	0.162	0.057	0.01
173	14.42	0.87	0.067	0.161	0.057	0.01
174	14.50	0.87	0.067	0.160	0.057	0.01
175	14.58	0.87	0.067	0.159	0.057	0.01
176	14.67	0.87	0.067	0.158	0.057	0.01
177	14.75	0.87	0.067	0.158	0.057	0.01
178	14.83	0.83	0.065	0.157	0.055	0.01
179	14.92	0.83	0.065	0.156	0.055	0.01
180	15.00	0.83	0.065	0.155	0.055	0.01
181	15.08	0.80	0.062	0.154	0.053	0.01
182	15.17	0.80	0.062	0.154	0.053	0.01
183	15.25	0.80	0.062	0.153	0.053	0.01
184	15.33	0.77	0.059	0.152	0.051	0.01
185	15.42	0.77	0.059	0.151	0.051	0.01
186	15.50	0.77	0.059	0.150	0.051	0.01
187	15.58	0.63	0.049	0.150	0.042	0.01
188	15.67	0.63	0.049	0.149	0.042	0.01
189	15.75	0.63	0.049	0.148	0.042	0.01
190	15.83	0.63	0.049	0.147	0.042	0.01
191	15.92	0.63	0.049	0.147	0.042	0.01
192	16.00	0.63	0.049	0.146	0.042	0.01
193	16.08	0.13	0.010	0.145	0.009	0.00
194	16.17	0.13	0.010	0.144	0.009	0.00
195	16.25	0.13	0.010	0.144	0.009	0.00
196	16.33	0.13	0.010	0.143	0.009	0.00
197	16.42	0.13	0.010	0.142	0.009	0.00
198	16.50	0.13	0.010	0.141	0.009	0.00
199	16.58	0.10	0.008	0.141	0.007	0.00
200	16.67	0.10	0.008	0.140	0.007	0.00
201	16.75	0.10	0.008	0.139	0.007	0.00
202	16.83	0.10	0.008	0.139	0.007	0.00
203	16.92	0.10	0.008	0.138	0.007	0.00
204	17.00	0.10	0.008	0.137	0.007	0.00
205	17.08	0.17	0.013	0.137	0.011	0.00
206	17.17	0.17	0.013	0.136	0.011	0.00
207	17.25	0.17	0.013	0.135	0.011	0.00
208	17.33	0.17	0.013	0.134	0.011	0.00
209	17.42	0.17	0.013	0.134	0.011	0.00
210	17.50	0.17	0.013	0.133	0.011	0.00
211	17.58	0.17	0.013	0.132	0.011	0.00
212	17.67	0.17	0.013	0.132	0.011	0.00
213	17.75	0.17	0.013	0.131	0.011	0.00
214	17.83	0.13	0.010	0.131	0.009	0.00
215	17.92	0.13	0.010	0.130	0.009	0.00
216	18.00	0.13	0.010	0.129	0.009	0.00
217	18.08	0.13	0.010	0.129	0.009	0.00
218	18.17	0.13	0.010	0.128	0.009	0.00
219	18.25	0.13	0.010	0.127	0.009	0.00
220	18.33	0.13	0.010	0.127	0.009	0.00
221	18.42	0.13	0.010	0.126	0.009	0.00
222	18.50	0.13	0.010	0.125	0.009	0.00
223	18.58	0.10	0.008	0.125	0.007	0.00
224	18.67	0.10	0.008	0.124	0.007	0.00

225	18.75	0.10	0.008	0.124	0.007	0.00
226	18.83	0.07	0.005	0.123	0.004	0.00
227	18.92	0.07	0.005	0.122	0.004	0.00
228	19.00	0.07	0.005	0.122	0.004	0.00
229	19.08	0.10	0.008	0.121	0.007	0.00
230	19.17	0.10	0.008	0.121	0.007	0.00
231	19.25	0.10	0.008	0.120	0.007	0.00
232	19.33	0.13	0.010	0.120	0.009	0.00
233	19.42	0.13	0.010	0.119	0.009	0.00
234	19.50	0.13	0.010	0.119	0.009	0.00
235	19.58	0.10	0.008	0.118	0.007	0.00
236	19.67	0.10	0.008	0.117	0.007	0.00
237	19.75	0.10	0.008	0.117	0.007	0.00
238	19.83	0.07	0.005	0.116	0.004	0.00
239	19.92	0.07	0.005	0.116	0.004	0.00
240	20.00	0.07	0.005	0.115	0.004	0.00
241	20.08	0.10	0.008	0.115	0.007	0.00
242	20.17	0.10	0.008	0.114	0.007	0.00
243	20.25	0.10	0.008	0.114	0.007	0.00
244	20.33	0.10	0.008	0.113	0.007	0.00
245	20.42	0.10	0.008	0.113	0.007	0.00
246	20.50	0.10	0.008	0.112	0.007	0.00
247	20.58	0.10	0.008	0.112	0.007	0.00
248	20.67	0.10	0.008	0.111	0.007	0.00
249	20.75	0.10	0.008	0.111	0.007	0.00
250	20.83	0.07	0.005	0.111	0.004	0.00
251	20.92	0.07	0.005	0.110	0.004	0.00
252	21.00	0.07	0.005	0.110	0.004	0.00
253	21.08	0.10	0.008	0.109	0.007	0.00
254	21.17	0.10	0.008	0.109	0.007	0.00
255	21.25	0.10	0.008	0.108	0.007	0.00
256	21.33	0.07	0.005	0.108	0.004	0.00
257	21.42	0.07	0.005	0.108	0.004	0.00
258	21.50	0.07	0.005	0.107	0.004	0.00
259	21.58	0.10	0.008	0.107	0.007	0.00
260	21.67	0.10	0.008	0.106	0.007	0.00
261	21.75	0.10	0.008	0.106	0.007	0.00
262	21.83	0.07	0.005	0.106	0.004	0.00
263	21.92	0.07	0.005	0.105	0.004	0.00
264	22.00	0.07	0.005	0.105	0.004	0.00
265	22.08	0.10	0.008	0.105	0.007	0.00
266	22.17	0.10	0.008	0.104	0.007	0.00
267	22.25	0.10	0.008	0.104	0.007	0.00
268	22.33	0.07	0.005	0.104	0.004	0.00
269	22.42	0.07	0.005	0.103	0.004	0.00
270	22.50	0.07	0.005	0.103	0.004	0.00
271	22.58	0.07	0.005	0.103	0.004	0.00
272	22.67	0.07	0.005	0.102	0.004	0.00
273	22.75	0.07	0.005	0.102	0.004	0.00
274	22.83	0.07	0.005	0.102	0.004	0.00
275	22.92	0.07	0.005	0.102	0.004	0.00
276	23.00	0.07	0.005	0.101	0.004	0.00
277	23.08	0.07	0.005	0.101	0.004	0.00
278	23.17	0.07	0.005	0.101	0.004	0.00
279	23.25	0.07	0.005	0.101	0.004	0.00
280	23.33	0.07	0.005	0.100	0.004	0.00
281	23.42	0.07	0.005	0.100	0.004	0.00
282	23.50	0.07	0.005	0.100	0.004	0.00
283	23.58	0.07	0.005	0.100	0.004	0.00
284	23.67	0.07	0.005	0.100	0.004	0.00
285	23.75	0.07	0.005	0.100	0.004	0.00
286	23.83	0.07	0.005	0.099	0.004	0.00
287	23.92	0.07	0.005	0.099	0.004	0.00
288	24.00	0.07	0.005	0.099	0.004	0.00
Sum =		100.0		Sum =	1.1	

Flood volume = Effective rainfall 0.09(In)
times area 1.3(Ac.)/[(In)/(Ft.)] = 0.0(Ac.Ft)
Total soil loss = 0.55(In)
Total soil loss = 0.061(Ac.Ft)
Total rainfall = 0.65(In)
Flood volume = 456.0 Cubic Feet
Total soil loss = 2650.6 Cubic Feet

Storm Event 2 Effective Rainfall = 1.225(In)

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Loss rate(In./Hr) Low	Effective (In/Hr)
1	0.08	0.07	0.010	0.352	0.008	0.00
2	0.17	0.07	0.010	0.351	0.008	0.00
3	0.25	0.07	0.010	0.349	0.008	0.00
4	0.33	0.10	0.015	0.348	0.013	0.00
5	0.42	0.10	0.015	0.347	0.013	0.00
6	0.50	0.10	0.015	0.345	0.013	0.00
7	0.58	0.10	0.015	0.344	0.013	0.00
8	0.67	0.10	0.015	0.343	0.013	0.00
9	0.75	0.10	0.015	0.341	0.013	0.00
10	0.83	0.13	0.020	0.340	0.017	0.00
11	0.92	0.13	0.020	0.339	0.017	0.00
12	1.00	0.13	0.020	0.337	0.017	0.00
13	1.08	0.10	0.015	0.336	0.013	0.00
14	1.17	0.10	0.015	0.335	0.013	0.00
15	1.25	0.10	0.015	0.333	0.013	0.00
16	1.33	0.10	0.015	0.332	0.013	0.00
17	1.42	0.10	0.015	0.331	0.013	0.00
18	1.50	0.10	0.015	0.329	0.013	0.00
19	1.58	0.10	0.015	0.328	0.013	0.00
20	1.67	0.10	0.015	0.327	0.013	0.00
21	1.75	0.10	0.015	0.325	0.013	0.00
22	1.83	0.13	0.020	0.324	0.017	0.00
23	1.92	0.13	0.020	0.323	0.017	0.00
24	2.00	0.13	0.020	0.322	0.017	0.00
25	2.08	0.13	0.020	0.320	0.017	0.00
26	2.17	0.13	0.020	0.319	0.017	0.00
27	2.25	0.13	0.020	0.318	0.017	0.00
28	2.33	0.13	0.020	0.316	0.017	0.00
29	2.42	0.13	0.020	0.315	0.017	0.00
30	2.50	0.13	0.020	0.314	0.017	0.00
31	2.58	0.17	0.024	0.312	0.021	0.00
32	2.67	0.17	0.024	0.311	0.021	0.00
33	2.75	0.17	0.024	0.310	0.021	0.00
34	2.83	0.17	0.024	0.309	0.021	0.00
35	2.92	0.17	0.024	0.307	0.021	0.00
36	3.00	0.17	0.024	0.306	0.021	0.00
37	3.08	0.17	0.024	0.305	0.021	0.00
38	3.17	0.17	0.024	0.304	0.021	0.00
39	3.25	0.17	0.024	0.302	0.021	0.00
40	3.33	0.17	0.024	0.301	0.021	0.00
41	3.42	0.17	0.024	0.300	0.021	0.00
42	3.50	0.17	0.024	0.299	0.021	0.00
43	3.58	0.17	0.024	0.297	0.021	0.00
44	3.67	0.17	0.024	0.296	0.021	0.00
45	3.75	0.17	0.024	0.295	0.021	0.00
46	3.83	0.20	0.029	0.294	0.025	0.00
47	3.92	0.20	0.029	0.292	0.025	0.00
48	4.00	0.20	0.029	0.291	0.025	0.00
49	4.08	0.20	0.029	0.290	0.025	0.00
50	4.17	0.20	0.029	0.289	0.025	0.00
51	4.25	0.20	0.029	0.287	0.025	0.00
52	4.33	0.23	0.034	0.286	0.029	0.01

53	4.42	0.23	0.034	0.285	0.029	0.01
54	4.50	0.23	0.034	0.284	0.029	0.01
55	4.58	0.23	0.034	0.282	0.029	0.01
56	4.67	0.23	0.034	0.281	0.029	0.01
57	4.75	0.23	0.034	0.280	0.029	0.01
58	4.83	0.27	0.039	0.279	0.033	0.01
59	4.92	0.27	0.039	0.278	0.033	0.01
60	5.00	0.27	0.039	0.276	0.033	0.01
61	5.08	0.20	0.029	0.275	0.025	0.00
62	5.17	0.20	0.029	0.274	0.025	0.00
63	5.25	0.20	0.029	0.273	0.025	0.00
64	5.33	0.23	0.034	0.272	0.029	0.01
65	5.42	0.23	0.034	0.270	0.029	0.01
66	5.50	0.23	0.034	0.269	0.029	0.01
67	5.58	0.27	0.039	0.268	0.033	0.01
68	5.67	0.27	0.039	0.267	0.033	0.01
69	5.75	0.27	0.039	0.266	0.033	0.01
70	5.83	0.27	0.039	0.265	0.033	0.01
71	5.92	0.27	0.039	0.263	0.033	0.01
72	6.00	0.27	0.039	0.262	0.033	0.01
73	6.08	0.30	0.044	0.261	0.038	0.01
74	6.17	0.30	0.044	0.260	0.038	0.01
75	6.25	0.30	0.044	0.259	0.038	0.01
76	6.33	0.30	0.044	0.258	0.038	0.01
77	6.42	0.30	0.044	0.256	0.038	0.01
78	6.50	0.30	0.044	0.255	0.038	0.01
79	6.58	0.33	0.049	0.254	0.042	0.01
80	6.67	0.33	0.049	0.253	0.042	0.01
81	6.75	0.33	0.049	0.252	0.042	0.01
82	6.83	0.33	0.049	0.251	0.042	0.01
83	6.92	0.33	0.049	0.250	0.042	0.01
84	7.00	0.33	0.049	0.248	0.042	0.01
85	7.08	0.33	0.049	0.247	0.042	0.01
86	7.17	0.33	0.049	0.246	0.042	0.01
87	7.25	0.33	0.049	0.245	0.042	0.01
88	7.33	0.37	0.054	0.244	0.046	0.01
89	7.42	0.37	0.054	0.243	0.046	0.01
90	7.50	0.37	0.054	0.242	0.046	0.01
91	7.58	0.40	0.059	0.241	0.050	0.01
92	7.67	0.40	0.059	0.240	0.050	0.01
93	7.75	0.40	0.059	0.238	0.050	0.01
94	7.83	0.43	0.064	0.237	0.054	0.01
95	7.92	0.43	0.064	0.236	0.054	0.01
96	8.00	0.43	0.064	0.235	0.054	0.01
97	8.08	0.50	0.073	0.234	0.063	0.01
98	8.17	0.50	0.073	0.233	0.063	0.01
99	8.25	0.50	0.073	0.232	0.063	0.01
100	8.33	0.50	0.073	0.231	0.063	0.01
101	8.42	0.50	0.073	0.230	0.063	0.01
102	8.50	0.50	0.073	0.229	0.063	0.01
103	8.58	0.53	0.078	0.228	0.067	0.01
104	8.67	0.53	0.078	0.226	0.067	0.01
105	8.75	0.53	0.078	0.225	0.067	0.01
106	8.83	0.57	0.083	0.224	0.071	0.01
107	8.92	0.57	0.083	0.223	0.071	0.01
108	9.00	0.57	0.083	0.222	0.071	0.01
109	9.08	0.63	0.093	0.221	0.079	0.01
110	9.17	0.63	0.093	0.220	0.079	0.01
111	9.25	0.63	0.093	0.219	0.079	0.01
112	9.33	0.67	0.098	0.218	0.084	0.01
113	9.42	0.67	0.098	0.217	0.084	0.01
114	9.50	0.67	0.098	0.216	0.084	0.01
115	9.58	0.70	0.103	0.215	0.088	0.02
116	9.67	0.70	0.103	0.214	0.088	0.02
117	9.75	0.70	0.103	0.213	0.088	0.02

118	9.83	0.73	0.108	0.212	0.092	0.02
119	9.92	0.73	0.108	0.211	0.092	0.02
120	10.00	0.73	0.108	0.210	0.092	0.02
121	10.08	0.50	0.073	0.209	0.063	0.01
122	10.17	0.50	0.073	0.208	0.063	0.01
123	10.25	0.50	0.073	0.207	0.063	0.01
124	10.33	0.50	0.073	0.206	0.063	0.01
125	10.42	0.50	0.073	0.205	0.063	0.01
126	10.50	0.50	0.073	0.204	0.063	0.01
127	10.58	0.67	0.098	0.203	0.084	0.01
128	10.67	0.67	0.098	0.202	0.084	0.01
129	10.75	0.67	0.098	0.201	0.084	0.01
130	10.83	0.67	0.098	0.200	0.084	0.01
131	10.92	0.67	0.098	0.199	0.084	0.01
132	11.00	0.67	0.098	0.198	0.084	0.01
133	11.08	0.63	0.093	0.197	0.079	0.01
134	11.17	0.63	0.093	0.196	0.079	0.01
135	11.25	0.63	0.093	0.195	0.079	0.01
136	11.33	0.63	0.093	0.194	0.079	0.01
137	11.42	0.63	0.093	0.193	0.079	0.01
138	11.50	0.63	0.093	0.192	0.079	0.01
139	11.58	0.57	0.083	0.191	0.071	0.01
140	11.67	0.57	0.083	0.190	0.071	0.01
141	11.75	0.57	0.083	0.189	0.071	0.01
142	11.83	0.60	0.088	0.188	0.075	0.01
143	11.92	0.60	0.088	0.187	0.075	0.01
144	12.00	0.60	0.088	0.186	0.075	0.01
145	12.08	0.83	0.122	0.185	0.104	0.02
146	12.17	0.83	0.122	0.185	0.104	0.02
147	12.25	0.83	0.122	0.184	0.104	0.02
148	12.33	0.87	0.127	0.183	0.109	0.02
149	12.42	0.87	0.127	0.182	0.109	0.02
150	12.50	0.87	0.127	0.181	0.109	0.02
151	12.58	0.93	0.137	0.180	0.117	0.02
152	12.67	0.93	0.137	0.179	0.117	0.02
153	12.75	0.93	0.137	0.178	0.117	0.02
154	12.83	0.97	0.142	0.177	0.121	0.02
155	12.92	0.97	0.142	0.176	0.121	0.02
156	13.00	0.97	0.142	0.175	0.121	0.02
157	13.08	1.13	0.167	0.175	0.142	0.02
158	13.17	1.13	0.167	0.174	0.142	0.02
159	13.25	1.13	0.167	0.173	0.142	0.02
160	13.33	1.13	0.167	0.172	0.142	0.02
161	13.42	1.13	0.167	0.171	0.142	0.02
162	13.50	1.13	0.167	0.170	0.142	0.02
163	13.58	0.77	0.113	0.169	0.096	0.02
164	13.67	0.77	0.113	0.168	0.096	0.02
165	13.75	0.77	0.113	0.168	0.096	0.02
166	13.83	0.77	0.113	0.167	0.096	0.02
167	13.92	0.77	0.113	0.166	0.096	0.02
168	14.00	0.77	0.113	0.165	0.096	0.02
169	14.08	0.90	0.132	0.164	0.113	0.02
170	14.17	0.90	0.132	0.163	0.113	0.02
171	14.25	0.90	0.132	0.163	0.113	0.02
172	14.33	0.87	0.127	0.162	0.109	0.02
173	14.42	0.87	0.127	0.161	0.109	0.02
174	14.50	0.87	0.127	0.160	0.109	0.02
175	14.58	0.87	0.127	0.159	0.109	0.02
176	14.67	0.87	0.127	0.158	0.109	0.02
177	14.75	0.87	0.127	0.158	0.109	0.02
178	14.83	0.83	0.122	0.157	0.104	0.02
179	14.92	0.83	0.122	0.156	0.104	0.02
180	15.00	0.83	0.122	0.155	0.104	0.02
181	15.08	0.80	0.118	0.154	0.100	0.02
182	15.17	0.80	0.118	0.154	0.100	0.02

183	15.25	0.80	0.118	0.153	0.100	0.02
184	15.33	0.77	0.113	0.152	0.096	0.02
185	15.42	0.77	0.113	0.151	0.096	0.02
186	15.50	0.77	0.113	0.150	0.096	0.02
187	15.58	0.63	0.093	0.150	0.079	0.01
188	15.67	0.63	0.093	0.149	0.079	0.01
189	15.75	0.63	0.093	0.148	0.079	0.01
190	15.83	0.63	0.093	0.147	0.079	0.01
191	15.92	0.63	0.093	0.147	0.079	0.01
192	16.00	0.63	0.093	0.146	0.079	0.01
193	16.08	0.13	0.020	0.145	0.017	0.00
194	16.17	0.13	0.020	0.144	0.017	0.00
195	16.25	0.13	0.020	0.144	0.017	0.00
196	16.33	0.13	0.020	0.143	0.017	0.00
197	16.42	0.13	0.020	0.142	0.017	0.00
198	16.50	0.13	0.020	0.141	0.017	0.00
199	16.58	0.10	0.015	0.141	0.013	0.00
200	16.67	0.10	0.015	0.140	0.013	0.00
201	16.75	0.10	0.015	0.139	0.013	0.00
202	16.83	0.10	0.015	0.139	0.013	0.00
203	16.92	0.10	0.015	0.138	0.013	0.00
204	17.00	0.10	0.015	0.137	0.013	0.00
205	17.08	0.17	0.024	0.137	0.021	0.00
206	17.17	0.17	0.024	0.136	0.021	0.00
207	17.25	0.17	0.024	0.135	0.021	0.00
208	17.33	0.17	0.024	0.134	0.021	0.00
209	17.42	0.17	0.024	0.134	0.021	0.00
210	17.50	0.17	0.024	0.133	0.021	0.00
211	17.58	0.17	0.024	0.132	0.021	0.00
212	17.67	0.17	0.024	0.132	0.021	0.00
213	17.75	0.17	0.024	0.131	0.021	0.00
214	17.83	0.13	0.020	0.131	0.017	0.00
215	17.92	0.13	0.020	0.130	0.017	0.00
216	18.00	0.13	0.020	0.129	0.017	0.00
217	18.08	0.13	0.020	0.129	0.017	0.00
218	18.17	0.13	0.020	0.128	0.017	0.00
219	18.25	0.13	0.020	0.127	0.017	0.00
220	18.33	0.13	0.020	0.127	0.017	0.00
221	18.42	0.13	0.020	0.126	0.017	0.00
222	18.50	0.13	0.020	0.125	0.017	0.00
223	18.58	0.10	0.015	0.125	0.013	0.00
224	18.67	0.10	0.015	0.124	0.013	0.00
225	18.75	0.10	0.015	0.124	0.013	0.00
226	18.83	0.07	0.010	0.123	0.008	0.00
227	18.92	0.07	0.010	0.122	0.008	0.00
228	19.00	0.07	0.010	0.122	0.008	0.00
229	19.08	0.10	0.015	0.121	0.013	0.00
230	19.17	0.10	0.015	0.121	0.013	0.00
231	19.25	0.10	0.015	0.120	0.013	0.00
232	19.33	0.13	0.020	0.120	0.017	0.00
233	19.42	0.13	0.020	0.119	0.017	0.00
234	19.50	0.13	0.020	0.119	0.017	0.00
235	19.58	0.10	0.015	0.118	0.013	0.00
236	19.67	0.10	0.015	0.117	0.013	0.00
237	19.75	0.10	0.015	0.117	0.013	0.00
238	19.83	0.07	0.010	0.116	0.008	0.00
239	19.92	0.07	0.010	0.116	0.008	0.00
240	20.00	0.07	0.010	0.115	0.008	0.00
241	20.08	0.10	0.015	0.115	0.013	0.00
242	20.17	0.10	0.015	0.114	0.013	0.00
243	20.25	0.10	0.015	0.114	0.013	0.00
244	20.33	0.10	0.015	0.113	0.013	0.00
245	20.42	0.10	0.015	0.113	0.013	0.00
246	20.50	0.10	0.015	0.112	0.013	0.00
247	20.58	0.10	0.015	0.112	0.013	0.00

248	20.67	0.10	0.015	0.111	0.013	0.00
249	20.75	0.10	0.015	0.111	0.013	0.00
250	20.83	0.07	0.010	0.111	0.008	0.00
251	20.92	0.07	0.010	0.110	0.008	0.00
252	21.00	0.07	0.010	0.110	0.008	0.00
253	21.08	0.10	0.015	0.109	0.013	0.00
254	21.17	0.10	0.015	0.109	0.013	0.00
255	21.25	0.10	0.015	0.108	0.013	0.00
256	21.33	0.07	0.010	0.108	0.008	0.00
257	21.42	0.07	0.010	0.108	0.008	0.00
258	21.50	0.07	0.010	0.107	0.008	0.00
259	21.58	0.10	0.015	0.107	0.013	0.00
260	21.67	0.10	0.015	0.106	0.013	0.00
261	21.75	0.10	0.015	0.106	0.013	0.00
262	21.83	0.07	0.010	0.106	0.008	0.00
263	21.92	0.07	0.010	0.105	0.008	0.00
264	22.00	0.07	0.010	0.105	0.008	0.00
265	22.08	0.10	0.015	0.105	0.013	0.00
266	22.17	0.10	0.015	0.104	0.013	0.00
267	22.25	0.10	0.015	0.104	0.013	0.00
268	22.33	0.07	0.010	0.104	0.008	0.00
269	22.42	0.07	0.010	0.103	0.008	0.00
270	22.50	0.07	0.010	0.103	0.008	0.00
271	22.58	0.07	0.010	0.103	0.008	0.00
272	22.67	0.07	0.010	0.102	0.008	0.00
273	22.75	0.07	0.010	0.102	0.008	0.00
274	22.83	0.07	0.010	0.102	0.008	0.00
275	22.92	0.07	0.010	0.102	0.008	0.00
276	23.00	0.07	0.010	0.101	0.008	0.00
277	23.08	0.07	0.010	0.101	0.008	0.00
278	23.17	0.07	0.010	0.101	0.008	0.00
279	23.25	0.07	0.010	0.101	0.008	0.00
280	23.33	0.07	0.010	0.100	0.008	0.00
281	23.42	0.07	0.010	0.100	0.008	0.00
282	23.50	0.07	0.010	0.100	0.008	0.00
283	23.58	0.07	0.010	0.100	0.008	0.00
284	23.67	0.07	0.010	0.100	0.008	0.00
285	23.75	0.07	0.010	0.100	0.008	0.00
286	23.83	0.07	0.010	0.099	0.008	0.00
287	23.92	0.07	0.010	0.099	0.008	0.00
288	24.00	0.07	0.010	0.099	0.008	0.00
Sum =		100.0		Sum =	2.2	

Flood volume = Effective rainfall 0.18(In)
times area 1.3(Ac.)/[(In)/(Ft.)] = 0.0(Ac.Ft)
Total soil loss = 1.04(In)
Total soil loss = 0.115(Ac.Ft)
Total rainfall = 1.22(In)
Flood volume = 864.1 Cubic Feet
Total soil loss = 5022.1 Cubic Feet

Storm Event 1 Effective Rainfall = 3.402(In)

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Loss rate(In./Hr) Low	Effective (In/Hr)
1	0.08	0.07	0.027	0.352	0.023	0.00
2	0.17	0.07	0.027	0.351	0.023	0.00
3	0.25	0.07	0.027	0.349	0.023	0.00
4	0.33	0.10	0.041	0.348	0.035	0.01
5	0.42	0.10	0.041	0.347	0.035	0.01
6	0.50	0.10	0.041	0.345	0.035	0.01
7	0.58	0.10	0.041	0.344	0.035	0.01
8	0.67	0.10	0.041	0.343	0.035	0.01
9	0.75	0.10	0.041	0.341	0.035	0.01
10	0.83	0.13	0.054	0.340	0.046	0.01

11	0.92	0.13	0.054	0.339	0.046	0.01
12	1.00	0.13	0.054	0.337	0.046	0.01
13	1.08	0.10	0.041	0.336	0.035	0.01
14	1.17	0.10	0.041	0.335	0.035	0.01
15	1.25	0.10	0.041	0.333	0.035	0.01
16	1.33	0.10	0.041	0.332	0.035	0.01
17	1.42	0.10	0.041	0.331	0.035	0.01
18	1.50	0.10	0.041	0.329	0.035	0.01
19	1.58	0.10	0.041	0.328	0.035	0.01
20	1.67	0.10	0.041	0.327	0.035	0.01
21	1.75	0.10	0.041	0.325	0.035	0.01
22	1.83	0.13	0.054	0.324	0.046	0.01
23	1.92	0.13	0.054	0.323	0.046	0.01
24	2.00	0.13	0.054	0.322	0.046	0.01
25	2.08	0.13	0.054	0.320	0.046	0.01
26	2.17	0.13	0.054	0.319	0.046	0.01
27	2.25	0.13	0.054	0.318	0.046	0.01
28	2.33	0.13	0.054	0.316	0.046	0.01
29	2.42	0.13	0.054	0.315	0.046	0.01
30	2.50	0.13	0.054	0.314	0.046	0.01
31	2.58	0.17	0.068	0.312	0.058	0.01
32	2.67	0.17	0.068	0.311	0.058	0.01
33	2.75	0.17	0.068	0.310	0.058	0.01
34	2.83	0.17	0.068	0.309	0.058	0.01
35	2.92	0.17	0.068	0.307	0.058	0.01
36	3.00	0.17	0.068	0.306	0.058	0.01
37	3.08	0.17	0.068	0.305	0.058	0.01
38	3.17	0.17	0.068	0.304	0.058	0.01
39	3.25	0.17	0.068	0.302	0.058	0.01
40	3.33	0.17	0.068	0.301	0.058	0.01
41	3.42	0.17	0.068	0.300	0.058	0.01
42	3.50	0.17	0.068	0.299	0.058	0.01
43	3.58	0.17	0.068	0.297	0.058	0.01
44	3.67	0.17	0.068	0.296	0.058	0.01
45	3.75	0.17	0.068	0.295	0.058	0.01
46	3.83	0.20	0.082	0.294	0.070	0.01
47	3.92	0.20	0.082	0.292	0.070	0.01
48	4.00	0.20	0.082	0.291	0.070	0.01
49	4.08	0.20	0.082	0.290	0.070	0.01
50	4.17	0.20	0.082	0.289	0.070	0.01
51	4.25	0.20	0.082	0.287	0.070	0.01
52	4.33	0.23	0.095	0.286	0.081	0.01
53	4.42	0.23	0.095	0.285	0.081	0.01
54	4.50	0.23	0.095	0.284	0.081	0.01
55	4.58	0.23	0.095	0.282	0.081	0.01
56	4.67	0.23	0.095	0.281	0.081	0.01
57	4.75	0.23	0.095	0.280	0.081	0.01
58	4.83	0.27	0.109	0.279	0.093	0.02
59	4.92	0.27	0.109	0.278	0.093	0.02
60	5.00	0.27	0.109	0.276	0.093	0.02
61	5.08	0.20	0.082	0.275	0.070	0.01
62	5.17	0.20	0.082	0.274	0.070	0.01
63	5.25	0.20	0.082	0.273	0.070	0.01
64	5.33	0.23	0.095	0.272	0.081	0.01
65	5.42	0.23	0.095	0.270	0.081	0.01
66	5.50	0.23	0.095	0.269	0.081	0.01
67	5.58	0.27	0.109	0.268	0.093	0.02
68	5.67	0.27	0.109	0.267	0.093	0.02
69	5.75	0.27	0.109	0.266	0.093	0.02
70	5.83	0.27	0.109	0.265	0.093	0.02
71	5.92	0.27	0.109	0.263	0.093	0.02
72	6.00	0.27	0.109	0.262	0.093	0.02
73	6.08	0.30	0.122	0.261	0.104	0.02
74	6.17	0.30	0.122	0.260	0.104	0.02
75	6.25	0.30	0.122	0.259	0.104	0.02

76	6.33	0.30	0.122	0.258	0.104	0.02
77	6.42	0.30	0.122	0.256	0.104	0.02
78	6.50	0.30	0.122	0.255	0.104	0.02
79	6.58	0.33	0.136	0.254	0.116	0.02
80	6.67	0.33	0.136	0.253	0.116	0.02
81	6.75	0.33	0.136	0.252	0.116	0.02
82	6.83	0.33	0.136	0.251	0.116	0.02
83	6.92	0.33	0.136	0.250	0.116	0.02
84	7.00	0.33	0.136	0.248	0.116	0.02
85	7.08	0.33	0.136	0.247	0.116	0.02
86	7.17	0.33	0.136	0.246	0.116	0.02
87	7.25	0.33	0.136	0.245	0.116	0.02
88	7.33	0.37	0.150	0.244	0.128	0.02
89	7.42	0.37	0.150	0.243	0.128	0.02
90	7.50	0.37	0.150	0.242	0.128	0.02
91	7.58	0.40	0.163	0.241	0.139	0.02
92	7.67	0.40	0.163	0.240	0.139	0.02
93	7.75	0.40	0.163	0.238	0.139	0.02
94	7.83	0.43	0.177	0.237	0.151	0.03
95	7.92	0.43	0.177	0.236	0.151	0.03
96	8.00	0.43	0.177	0.235	0.151	0.03
97	8.08	0.50	0.204	0.234	0.174	0.03
98	8.17	0.50	0.204	0.233	0.174	0.03
99	8.25	0.50	0.204	0.232	0.174	0.03
100	8.33	0.50	0.204	0.231	0.174	0.03
101	8.42	0.50	0.204	0.230	0.174	0.03
102	8.50	0.50	0.204	0.229	0.174	0.03
103	8.58	0.53	0.218	0.228	0.186	0.03
104	8.67	0.53	0.218	0.226	0.186	0.03
105	8.75	0.53	0.218	0.225	0.186	0.03
106	8.83	0.57	0.231	0.224	---	0.01
107	8.92	0.57	0.231	0.223	---	0.01
108	9.00	0.57	0.231	0.222	---	0.01
109	9.08	0.63	0.259	0.221	---	0.04
110	9.17	0.63	0.259	0.220	---	0.04
111	9.25	0.63	0.259	0.219	---	0.04
112	9.33	0.67	0.272	0.218	---	0.05
113	9.42	0.67	0.272	0.217	---	0.06
114	9.50	0.67	0.272	0.216	---	0.06
115	9.58	0.70	0.286	0.215	---	0.07
116	9.67	0.70	0.286	0.214	---	0.07
117	9.75	0.70	0.286	0.213	---	0.07
118	9.83	0.73	0.299	0.212	---	0.09
119	9.92	0.73	0.299	0.211	---	0.09
120	10.00	0.73	0.299	0.210	---	0.09
121	10.08	0.50	0.204	0.209	0.174	0.03
122	10.17	0.50	0.204	0.208	0.174	0.03
123	10.25	0.50	0.204	0.207	0.174	0.03
124	10.33	0.50	0.204	0.206	0.174	0.03
125	10.42	0.50	0.204	0.205	0.174	0.03
126	10.50	0.50	0.204	0.204	---	0.00
127	10.58	0.67	0.272	0.203	---	0.07
128	10.67	0.67	0.272	0.202	---	0.07
129	10.75	0.67	0.272	0.201	---	0.07
130	10.83	0.67	0.272	0.200	---	0.07
131	10.92	0.67	0.272	0.199	---	0.07
132	11.00	0.67	0.272	0.198	---	0.07
133	11.08	0.63	0.259	0.197	---	0.06
134	11.17	0.63	0.259	0.196	---	0.06
135	11.25	0.63	0.259	0.195	---	0.06
136	11.33	0.63	0.259	0.194	---	0.06
137	11.42	0.63	0.259	0.193	---	0.07
138	11.50	0.63	0.259	0.192	---	0.07
139	11.58	0.57	0.231	0.191	---	0.04
140	11.67	0.57	0.231	0.190	---	0.04

141	11.75	0.57	0.231	0.189	---	0.04
142	11.83	0.60	0.245	0.188	---	0.06
143	11.92	0.60	0.245	0.187	---	0.06
144	12.00	0.60	0.245	0.186	---	0.06
145	12.08	0.83	0.340	0.185	---	0.15
146	12.17	0.83	0.340	0.185	---	0.16
147	12.25	0.83	0.340	0.184	---	0.16
148	12.33	0.87	0.354	0.183	---	0.17
149	12.42	0.87	0.354	0.182	---	0.17
150	12.50	0.87	0.354	0.181	---	0.17
151	12.58	0.93	0.381	0.180	---	0.20
152	12.67	0.93	0.381	0.179	---	0.20
153	12.75	0.93	0.381	0.178	---	0.20
154	12.83	0.97	0.395	0.177	---	0.22
155	12.92	0.97	0.395	0.176	---	0.22
156	13.00	0.97	0.395	0.175	---	0.22
157	13.08	1.13	0.463	0.175	---	0.29
158	13.17	1.13	0.463	0.174	---	0.29
159	13.25	1.13	0.463	0.173	---	0.29
160	13.33	1.13	0.463	0.172	---	0.29
161	13.42	1.13	0.463	0.171	---	0.29
162	13.50	1.13	0.463	0.170	---	0.29
163	13.58	0.77	0.313	0.169	---	0.14
164	13.67	0.77	0.313	0.168	---	0.14
165	13.75	0.77	0.313	0.168	---	0.15
166	13.83	0.77	0.313	0.167	---	0.15
167	13.92	0.77	0.313	0.166	---	0.15
168	14.00	0.77	0.313	0.165	---	0.15
169	14.08	0.90	0.367	0.164	---	0.20
170	14.17	0.90	0.367	0.163	---	0.20
171	14.25	0.90	0.367	0.163	---	0.20
172	14.33	0.87	0.354	0.162	---	0.19
173	14.42	0.87	0.354	0.161	---	0.19
174	14.50	0.87	0.354	0.160	---	0.19
175	14.58	0.87	0.354	0.159	---	0.19
176	14.67	0.87	0.354	0.158	---	0.20
177	14.75	0.87	0.354	0.158	---	0.20
178	14.83	0.83	0.340	0.157	---	0.18
179	14.92	0.83	0.340	0.156	---	0.18
180	15.00	0.83	0.340	0.155	---	0.19
181	15.08	0.80	0.327	0.154	---	0.17
182	15.17	0.80	0.327	0.154	---	0.17
183	15.25	0.80	0.327	0.153	---	0.17
184	15.33	0.77	0.313	0.152	---	0.16
185	15.42	0.77	0.313	0.151	---	0.16
186	15.50	0.77	0.313	0.150	---	0.16
187	15.58	0.63	0.259	0.150	---	0.11
188	15.67	0.63	0.259	0.149	---	0.11
189	15.75	0.63	0.259	0.148	---	0.11
190	15.83	0.63	0.259	0.147	---	0.11
191	15.92	0.63	0.259	0.147	---	0.11
192	16.00	0.63	0.259	0.146	---	0.11
193	16.08	0.13	0.054	0.145	0.046	0.01
194	16.17	0.13	0.054	0.144	0.046	0.01
195	16.25	0.13	0.054	0.144	0.046	0.01
196	16.33	0.13	0.054	0.143	0.046	0.01
197	16.42	0.13	0.054	0.142	0.046	0.01
198	16.50	0.13	0.054	0.141	0.046	0.01
199	16.58	0.10	0.041	0.141	0.035	0.01
200	16.67	0.10	0.041	0.140	0.035	0.01
201	16.75	0.10	0.041	0.139	0.035	0.01
202	16.83	0.10	0.041	0.139	0.035	0.01
203	16.92	0.10	0.041	0.138	0.035	0.01
204	17.00	0.10	0.041	0.137	0.035	0.01
205	17.08	0.17	0.068	0.137	0.058	0.01

206	17.17	0.17	0.068	0.136	0.058	0.01
207	17.25	0.17	0.068	0.135	0.058	0.01
208	17.33	0.17	0.068	0.134	0.058	0.01
209	17.42	0.17	0.068	0.134	0.058	0.01
210	17.50	0.17	0.068	0.133	0.058	0.01
211	17.58	0.17	0.068	0.132	0.058	0.01
212	17.67	0.17	0.068	0.132	0.058	0.01
213	17.75	0.17	0.068	0.131	0.058	0.01
214	17.83	0.13	0.054	0.131	0.046	0.01
215	17.92	0.13	0.054	0.130	0.046	0.01
216	18.00	0.13	0.054	0.129	0.046	0.01
217	18.08	0.13	0.054	0.129	0.046	0.01
218	18.17	0.13	0.054	0.128	0.046	0.01
219	18.25	0.13	0.054	0.127	0.046	0.01
220	18.33	0.13	0.054	0.127	0.046	0.01
221	18.42	0.13	0.054	0.126	0.046	0.01
222	18.50	0.13	0.054	0.125	0.046	0.01
223	18.58	0.10	0.041	0.125	0.035	0.01
224	18.67	0.10	0.041	0.124	0.035	0.01
225	18.75	0.10	0.041	0.124	0.035	0.01
226	18.83	0.07	0.027	0.123	0.023	0.00
227	18.92	0.07	0.027	0.122	0.023	0.00
228	19.00	0.07	0.027	0.122	0.023	0.00
229	19.08	0.10	0.041	0.121	0.035	0.01
230	19.17	0.10	0.041	0.121	0.035	0.01
231	19.25	0.10	0.041	0.120	0.035	0.01
232	19.33	0.13	0.054	0.120	0.046	0.01
233	19.42	0.13	0.054	0.119	0.046	0.01
234	19.50	0.13	0.054	0.119	0.046	0.01
235	19.58	0.10	0.041	0.118	0.035	0.01
236	19.67	0.10	0.041	0.117	0.035	0.01
237	19.75	0.10	0.041	0.117	0.035	0.01
238	19.83	0.07	0.027	0.116	0.023	0.00
239	19.92	0.07	0.027	0.116	0.023	0.00
240	20.00	0.07	0.027	0.115	0.023	0.00
241	20.08	0.10	0.041	0.115	0.035	0.01
242	20.17	0.10	0.041	0.114	0.035	0.01
243	20.25	0.10	0.041	0.114	0.035	0.01
244	20.33	0.10	0.041	0.113	0.035	0.01
245	20.42	0.10	0.041	0.113	0.035	0.01
246	20.50	0.10	0.041	0.112	0.035	0.01
247	20.58	0.10	0.041	0.112	0.035	0.01
248	20.67	0.10	0.041	0.111	0.035	0.01
249	20.75	0.10	0.041	0.111	0.035	0.01
250	20.83	0.07	0.027	0.111	0.023	0.00
251	20.92	0.07	0.027	0.110	0.023	0.00
252	21.00	0.07	0.027	0.110	0.023	0.00
253	21.08	0.10	0.041	0.109	0.035	0.01
254	21.17	0.10	0.041	0.109	0.035	0.01
255	21.25	0.10	0.041	0.108	0.035	0.01
256	21.33	0.07	0.027	0.108	0.023	0.00
257	21.42	0.07	0.027	0.108	0.023	0.00
258	21.50	0.07	0.027	0.107	0.023	0.00
259	21.58	0.10	0.041	0.107	0.035	0.01
260	21.67	0.10	0.041	0.106	0.035	0.01
261	21.75	0.10	0.041	0.106	0.035	0.01
262	21.83	0.07	0.027	0.106	0.023	0.00
263	21.92	0.07	0.027	0.105	0.023	0.00
264	22.00	0.07	0.027	0.105	0.023	0.00
265	22.08	0.10	0.041	0.105	0.035	0.01
266	22.17	0.10	0.041	0.104	0.035	0.01
267	22.25	0.10	0.041	0.104	0.035	0.01
268	22.33	0.07	0.027	0.104	0.023	0.00
269	22.42	0.07	0.027	0.103	0.023	0.00
270	22.50	0.07	0.027	0.103	0.023	0.00

271	22.58	0.07	0.027	0.103	0.023	0.00
272	22.67	0.07	0.027	0.102	0.023	0.00
273	22.75	0.07	0.027	0.102	0.023	0.00
274	22.83	0.07	0.027	0.102	0.023	0.00
275	22.92	0.07	0.027	0.102	0.023	0.00
276	23.00	0.07	0.027	0.101	0.023	0.00
277	23.08	0.07	0.027	0.101	0.023	0.00
278	23.17	0.07	0.027	0.101	0.023	0.00
279	23.25	0.07	0.027	0.101	0.023	0.00
280	23.33	0.07	0.027	0.100	0.023	0.00
281	23.42	0.07	0.027	0.100	0.023	0.00
282	23.50	0.07	0.027	0.100	0.023	0.00
283	23.58	0.07	0.027	0.100	0.023	0.00
284	23.67	0.07	0.027	0.100	0.023	0.00
285	23.75	0.07	0.027	0.100	0.023	0.00
286	23.83	0.07	0.027	0.099	0.023	0.00
287	23.92	0.07	0.027	0.099	0.023	0.00
288	24.00	0.07	0.027	0.099	0.023	0.00

Sum = 100.0 Sum = 13.0

Flood volume = Effective rainfall 1.08(In)
times area 1.3(Ac.)/[(In)/(Ft.)] = 0.1(Ac.Ft)
Total soil loss = 2.32(In)
Total soil loss = 0.256(Ac.Ft)
Total rainfall = 3.40(In)
Flood volume = 5202.2 Cubic Feet
Total soil loss = 11148.3 Cubic Feet

Peak flow rate of this hydrograph = 0.390(CFS)

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TOTAL OF: 3 24 - H O U R S T O R M E V E N T S
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	0.0000	0.00	Q	|	|	|	|
0+15	0.0000	0.00	Q	|	|	|	|
0+20	0.0000	0.00	Q	|	|	|	|
0+25	0.0000	0.00	Q	|	|	|	|
0+30	0.0000	0.00	Q	|	|	|	|
0+35	0.0001	0.00	Q	|	|	|	|
0+40	0.0001	0.00	Q	|	|	|	|
0+45	0.0001	0.00	Q	|	|	|	|
0+50	0.0001	0.00	Q	|	|	|	|
0+55	0.0001	0.00	Q	|	|	|	|
1+ 0	0.0001	0.00	Q	|	|	|	|
1+ 5	0.0001	0.00	Q	|	|	|	|
1+10	0.0001	0.00	Q	|	|	|	|
1+15	0.0002	0.00	Q	|	|	|	|
1+20	0.0002	0.00	Q	|	|	|	|
1+25	0.0002	0.00	Q	|	|	|	|
1+30	0.0002	0.00	Q	|	|	|	|
1+35	0.0002	0.00	Q	|	|	|	|
1+40	0.0002	0.00	Q	|	|	|	|
1+45	0.0002	0.00	Q	|	|	|	|
1+50	0.0002	0.00	Q	|	|	|	|
1+55	0.0002	0.00	Q	|	|	|	|
2+ 0	0.0003	0.00	Q	|	|	|	|
2+ 5	0.0003	0.00	Q	|	|	|	|
2+10	0.0003	0.00	Q	|	|	|	|
2+15	0.0003	0.00	Q	|	|	|	|

2+20	0.0003	0.00	Q	|	|	|	|
2+25	0.0003	0.00	Q	|	|	|	|
2+30	0.0003	0.00	Q	|	|	|	|
2+35	0.0004	0.00	Q	|	|	|	|
2+40	0.0004	0.00	Q	|	|	|	|
2+45	0.0004	0.00	Q	|	|	|	|
2+50	0.0004	0.00	Q	|	|	|	|
2+55	0.0004	0.00	Q	|	|	|	|
3+ 0	0.0004	0.00	Q	|	|	|	|
3+ 5	0.0005	0.00	Q	|	|	|	|
3+10	0.0005	0.00	Q	|	|	|	|
3+15	0.0005	0.00	Q	|	|	|	|
3+20	0.0005	0.00	Q	|	|	|	|
3+25	0.0005	0.00	Q	|	|	|	|
3+30	0.0005	0.00	Q	|	|	|	|
3+35	0.0006	0.00	Q	|	|	|	|
3+40	0.0006	0.00	Q	|	|	|	|
3+45	0.0006	0.00	Q	|	|	|	|
3+50	0.0006	0.00	Q	|	|	|	|
3+55	0.0006	0.00	Q	|	|	|	|
4+ 0	0.0007	0.00	Q	|	|	|	|
4+ 5	0.0007	0.00	Q	|	|	|	|
4+10	0.0007	0.00	Q	|	|	|	|
4+15	0.0007	0.00	Q	|	|	|	|
4+20	0.0007	0.00	Q	|	|	|	|
4+25	0.0008	0.00	Q	|	|	|	|
4+30	0.0008	0.00	Q	|	|	|	|
4+35	0.0008	0.00	Q	|	|	|	|
4+40	0.0008	0.00	Q	|	|	|	|
4+45	0.0009	0.00	Q	|	|	|	|
4+50	0.0009	0.00	Q	|	|	|	|
4+55	0.0009	0.00	Q	|	|	|	|
5+ 0	0.0010	0.00	Q	|	|	|	|
5+ 5	0.0010	0.00	Q	|	|	|	|
5+10	0.0010	0.00	Q	|	|	|	|
5+15	0.0010	0.00	Q	|	|	|	|
5+20	0.0010	0.00	Q	|	|	|	|
5+25	0.0011	0.00	Q	|	|	|	|
5+30	0.0011	0.00	Q	|	|	|	|
5+35	0.0011	0.00	Q	|	|	|	|
5+40	0.0011	0.00	Q	|	|	|	|
5+45	0.0012	0.00	Q	|	|	|	|
5+50	0.0012	0.00	Q	|	|	|	|
5+55	0.0012	0.00	Q	|	|	|	|
6+ 0	0.0013	0.00	Q	|	|	|	|
6+ 5	0.0013	0.00	Q	|	|	|	|
6+10	0.0013	0.00	Q	|	|	|	|
6+15	0.0014	0.00	Q	|	|	|	|
6+20	0.0014	0.00	Q	|	|	|	|
6+25	0.0014	0.00	Q	|	|	|	|
6+30	0.0014	0.00	Q	|	|	|	|
6+35	0.0015	0.00	Q	|	|	|	|
6+40	0.0015	0.01	Q	|	|	|	|
6+45	0.0015	0.01	Q	|	|	|	|
6+50	0.0016	0.01	Q	|	|	|	|
6+55	0.0016	0.01	Q	|	|	|	|
7+ 0	0.0017	0.01	Q	|	|	|	|
7+ 5	0.0017	0.01	Q	|	|	|	|
7+10	0.0017	0.01	Q	|	|	|	|
7+15	0.0018	0.01	Q	|	|	|	|
7+20	0.0018	0.01	Q	|	|	|	|
7+25	0.0018	0.01	Q	|	|	|	|
7+30	0.0019	0.01	Q	|	|	|	|
7+35	0.0019	0.01	Q	|	|	|	|
7+40	0.0020	0.01	Q	|	|	|	|

7+45	0.0020	0.01	Q	|	|	|	|
7+50	0.0020	0.01	Q	|	|	|	|
7+55	0.0021	0.01	Q	|	|	|	|
8+ 0	0.0021	0.01	Q	|	|	|	|
8+ 5	0.0022	0.01	Q	|	|	|	|
8+10	0.0022	0.01	Q	|	|	|	|
8+15	0.0023	0.01	Q	|	|	|	|
8+20	0.0023	0.01	Q	|	|	|	|
8+25	0.0024	0.01	Q	|	|	|	|
8+30	0.0024	0.01	Q	|	|	|	|
8+35	0.0025	0.01	Q	|	|	|	|
8+40	0.0026	0.01	Q	|	|	|	|
8+45	0.0026	0.01	Q	|	|	|	|
8+50	0.0027	0.01	Q	|	|	|	|
8+55	0.0027	0.01	Q	|	|	|	|
9+ 0	0.0028	0.01	Q	|	|	|	|
9+ 5	0.0028	0.01	Q	|	|	|	|
9+10	0.0029	0.01	Q	|	|	|	|
9+15	0.0030	0.01	Q	|	|	|	|
9+20	0.0031	0.01	Q	|	|	|	|
9+25	0.0031	0.01	Q	|	|	|	|
9+30	0.0032	0.01	Q	|	|	|	|
9+35	0.0033	0.01	Q	|	|	|	|
9+40	0.0033	0.01	Q	|	|	|	|
9+45	0.0034	0.01	Q	|	|	|	|
9+50	0.0035	0.01	Q	|	|	|	|
9+55	0.0036	0.01	Q	|	|	|	|
10+ 0	0.0036	0.01	Q	|	|	|	|
10+ 5	0.0037	0.01	Q	|	|	|	|
10+10	0.0038	0.01	QV	|	|	|	|
10+15	0.0038	0.01	QV	|	|	|	|
10+20	0.0039	0.01	QV	|	|	|	|
10+25	0.0039	0.01	QV	|	|	|	|
10+30	0.0040	0.01	QV	|	|	|	|
10+35	0.0040	0.01	QV	|	|	|	|
10+40	0.0041	0.01	QV	|	|	|	|
10+45	0.0042	0.01	QV	|	|	|	|
10+50	0.0042	0.01	QV	|	|	|	|
10+55	0.0043	0.01	QV	|	|	|	|
11+ 0	0.0044	0.01	QV	|	|	|	|
11+ 5	0.0044	0.01	QV	|	|	|	|
11+10	0.0045	0.01	QV	|	|	|	|
11+15	0.0046	0.01	QV	|	|	|	|
11+20	0.0046	0.01	QV	|	|	|	|
11+25	0.0047	0.01	QV	|	|	|	|
11+30	0.0048	0.01	QV	|	|	|	|
11+35	0.0048	0.01	QV	|	|	|	|
11+40	0.0049	0.01	QV	|	|	|	|
11+45	0.0050	0.01	QV	|	|	|	|
11+50	0.0050	0.01	QV	|	|	|	|
11+55	0.0051	0.01	QV	|	|	|	|
12+ 0	0.0051	0.01	QV	|	|	|	|
12+ 5	0.0052	0.01	QV	|	|	|	|
12+10	0.0053	0.01	QV	|	|	|	|
12+15	0.0054	0.01	QV	|	|	|	|
12+20	0.0055	0.01	QV	|	|	|	|
12+25	0.0056	0.01	QV	|	|	|	|
12+30	0.0057	0.01	QV	|	|	|	|
12+35	0.0058	0.01	QV	|	|	|	|
12+40	0.0059	0.01	QV	|	|	|	|
12+45	0.0060	0.01	QV	|	|	|	|
12+50	0.0061	0.01	QV	|	|	|	|
12+55	0.0062	0.01	QV	|	|	|	|
13+ 0	0.0063	0.01	QV	|	|	|	|
13+ 5	0.0064	0.02	QV	|	|	|	|

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13+10     0.0065    0.02  QV      |      |      |      |
13+15     0.0066    0.02  QV      |      |      |      |
13+20     0.0067    0.02  QV      |      |      |      |
13+25     0.0068    0.02  QV      |      |      |      |
13+30     0.0070    0.02  QV      |      |      |      |
13+35     0.0071    0.01  QV      |      |      |      |
13+40     0.0071    0.01  QV      |      |      |      |
13+45     0.0072    0.01  QV      |      |      |      |
13+50     0.0073    0.01  QV      |      |      |      |
13+55     0.0074    0.01  QV      |      |      |      |
14+ 0     0.0075    0.01  QV      |      |      |      |
14+ 5     0.0075    0.01  Q V     |      |      |      |
14+10     0.0076    0.01  Q V     |      |      |      |
14+15     0.0077    0.01  Q V     |      |      |      |
14+20     0.0078    0.01  Q V     |      |      |      |
14+25     0.0079    0.01  Q V     |      |      |      |
14+30     0.0080    0.01  Q V     |      |      |      |
14+35     0.0081    0.01  Q V     |      |      |      |
14+40     0.0082    0.01  Q V     |      |      |      |
14+45     0.0083    0.01  Q V     |      |      |      |
14+50     0.0084    0.01  Q V     |      |      |      |
14+55     0.0085    0.01  Q V     |      |      |      |
15+ 0     0.0085    0.01  Q V     |      |      |      |
15+ 5     0.0086    0.01  Q V     |      |      |      |
15+10     0.0087    0.01  Q V     |      |      |      |
15+15     0.0088    0.01  Q V     |      |      |      |
15+20     0.0089    0.01  Q V     |      |      |      |
15+25     0.0090    0.01  Q V     |      |      |      |
15+30     0.0090    0.01  Q V     |      |      |      |
15+35     0.0091    0.01  Q V     |      |      |      |
15+40     0.0092    0.01  Q V     |      |      |      |
15+45     0.0092    0.01  Q V     |      |      |      |
15+50     0.0093    0.01  Q V     |      |      |      |
15+55     0.0094    0.01  Q V     |      |      |      |
16+ 0     0.0094    0.01  Q V     |      |      |      |
16+ 5     0.0095    0.00  Q V     |      |      |      |
16+10     0.0095    0.00  Q V     |      |      |      |
16+15     0.0095    0.00  Q V     |      |      |      |
16+20     0.0095    0.00  Q V     |      |      |      |
16+25     0.0095    0.00  Q V     |      |      |      |
16+30     0.0095    0.00  Q V     |      |      |      |
16+35     0.0096    0.00  Q V     |      |      |      |
16+40     0.0096    0.00  Q V     |      |      |      |
16+45     0.0096    0.00  Q V     |      |      |      |
16+50     0.0096    0.00  Q V     |      |      |      |
16+55     0.0096    0.00  Q V     |      |      |      |
17+ 0     0.0096    0.00  Q V     |      |      |      |
17+ 5     0.0096    0.00  Q V     |      |      |      |
17+10     0.0096    0.00  Q V     |      |      |      |
17+15     0.0097    0.00  Q V     |      |      |      |
17+20     0.0097    0.00  Q V     |      |      |      |
17+25     0.0097    0.00  Q V     |      |      |      |
17+30     0.0097    0.00  Q V     |      |      |      |
17+35     0.0097    0.00  Q V     |      |      |      |
17+40     0.0097    0.00  Q V     |      |      |      |
17+45     0.0098    0.00  Q V     |      |      |      |
17+50     0.0098    0.00  Q V     |      |      |      |
17+55     0.0098    0.00  Q V     |      |      |      |
18+ 0     0.0098    0.00  Q V     |      |      |      |
18+ 5     0.0098    0.00  Q V     |      |      |      |
18+10     0.0098    0.00  Q V     |      |      |      |
18+15     0.0098    0.00  Q V     |      |      |      |
18+20     0.0099    0.00  Q V     |      |      |      |
18+25     0.0099    0.00  Q V     |      |      |      |
18+30     0.0099    0.00  Q V     |      |      |      |
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18+35     0.0099    0.00  Q V     |     |     |     |
18+40     0.0099    0.00  Q V     |     |     |     |
18+45     0.0099    0.00  Q V     |     |     |     |
18+50     0.0099    0.00  Q V     |     |     |     |
18+55     0.0099    0.00  Q V     |     |     |     |
19+ 0     0.0099    0.00  Q V     |     |     |     |
19+ 5     0.0100    0.00  Q V     |     |     |     |
19+10     0.0100    0.00  Q V     |     |     |     |
19+15     0.0100    0.00  Q V     |     |     |     |
19+20     0.0100    0.00  Q V     |     |     |     |
19+25     0.0100    0.00  Q V     |     |     |     |
19+30     0.0100    0.00  Q V     |     |     |     |
19+35     0.0100    0.00  Q V     |     |     |     |
19+40     0.0100    0.00  Q V     |     |     |     |
19+45     0.0100    0.00  Q V     |     |     |     |
19+50     0.0101    0.00  Q V     |     |     |     |
19+55     0.0101    0.00  Q V     |     |     |     |
20+ 0     0.0101    0.00  Q V     |     |     |     |
20+ 5     0.0101    0.00  Q V     |     |     |     |
20+10     0.0101    0.00  Q V     |     |     |     |
20+15     0.0101    0.00  Q V     |     |     |     |
20+20     0.0101    0.00  Q V     |     |     |     |
20+25     0.0101    0.00  Q V     |     |     |     |
20+30     0.0101    0.00  Q V     |     |     |     |
20+35     0.0101    0.00  Q V     |     |     |     |
20+40     0.0102    0.00  Q V     |     |     |     |
20+45     0.0102    0.00  Q V     |     |     |     |
20+50     0.0102    0.00  Q V     |     |     |     |
20+55     0.0102    0.00  Q V     |     |     |     |
21+ 0     0.0102    0.00  Q V     |     |     |     |
21+ 5     0.0102    0.00  Q V     |     |     |     |
21+10     0.0102    0.00  Q V     |     |     |     |
21+15     0.0102    0.00  Q V     |     |     |     |
21+20     0.0102    0.00  Q V     |     |     |     |
21+25     0.0102    0.00  Q V     |     |     |     |
21+30     0.0102    0.00  Q V     |     |     |     |
21+35     0.0102    0.00  Q V     |     |     |     |
21+40     0.0103    0.00  Q V     |     |     |     |
21+45     0.0103    0.00  Q V     |     |     |     |
21+50     0.0103    0.00  Q V     |     |     |     |
21+55     0.0103    0.00  Q V     |     |     |     |
22+ 0     0.0103    0.00  Q V     |     |     |     |
22+ 5     0.0103    0.00  Q V     |     |     |     |
22+10     0.0103    0.00  Q V     |     |     |     |
22+15     0.0103    0.00  Q V     |     |     |     |
22+20     0.0103    0.00  Q V     |     |     |     |
22+25     0.0103    0.00  Q V     |     |     |     |
22+30     0.0103    0.00  Q V     |     |     |     |
22+35     0.0103    0.00  Q V     |     |     |     |
22+40     0.0104    0.00  Q V     |     |     |     |
22+45     0.0104    0.00  Q V     |     |     |     |
22+50     0.0104    0.00  Q V     |     |     |     |
22+55     0.0104    0.00  Q V     |     |     |     |
23+ 0     0.0104    0.00  Q V     |     |     |     |
23+ 5     0.0104    0.00  Q V     |     |     |     |
23+10     0.0104    0.00  Q V     |     |     |     |
23+15     0.0104    0.00  Q V     |     |     |     |
23+20     0.0104    0.00  Q V     |     |     |     |
23+25     0.0104    0.00  Q V     |     |     |     |
23+30     0.0104    0.00  Q V     |     |     |     |
23+35     0.0104    0.00  Q V     |     |     |     |
23+40     0.0104    0.00  Q V     |     |     |     |
23+45     0.0104    0.00  Q V     |     |     |     |
23+50     0.0105    0.00  Q V     |     |     |     |
23+55     0.0105    0.00  Q V     |     |     |     |
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24+ 0 0.0105 0.00 Q V | | | |
24+ 5 0.0105 0.00 Q V | | | |
24+10 0.0105 0.00 Q V | | | |
24+15 0.0105 0.00 Q V | | | |
24+20 0.0105 0.00 Q V | | | |
24+25 0.0105 0.00 Q V | | | |
24+30 0.0106 0.00 Q V | | | |
24+35 0.0106 0.00 Q V | | | |
24+40 0.0106 0.00 Q V | | | |
24+45 0.0106 0.00 Q V | | | |
24+50 0.0106 0.00 Q V | | | |
24+55 0.0107 0.00 Q V | | | |
25+ 0 0.0107 0.00 Q V | | | |
25+ 5 0.0107 0.00 Q V | | | |
25+10 0.0107 0.00 Q V | | | |
25+15 0.0108 0.00 Q V | | | |
25+20 0.0108 0.00 Q V | | | |
25+25 0.0108 0.00 Q V | | | |
25+30 0.0108 0.00 Q V | | | |
25+35 0.0108 0.00 Q V | | | |
25+40 0.0109 0.00 Q V | | | |
25+45 0.0109 0.00 Q V | | | |
25+50 0.0109 0.00 Q V | | | |
25+55 0.0109 0.00 Q V | | | |
26+ 0 0.0110 0.00 Q V | | | |
26+ 5 0.0110 0.00 Q V | | | |
26+10 0.0110 0.00 Q V | | | |
26+15 0.0110 0.00 Q V | | | |
26+20 0.0111 0.00 Q V | | | |
26+25 0.0111 0.00 Q V | | | |
26+30 0.0111 0.00 Q V | | | |
26+35 0.0111 0.00 Q V | | | |
26+40 0.0112 0.00 Q V | | | |
26+45 0.0112 0.00 Q V | | | |
26+50 0.0112 0.00 Q V | | | |
26+55 0.0113 0.00 Q V | | | |
27+ 0 0.0113 0.00 Q V | | | |
27+ 5 0.0113 0.00 Q V | | | |
27+10 0.0114 0.00 Q V | | | |
27+15 0.0114 0.00 Q V | | | |
27+20 0.0114 0.00 Q V | | | |
27+25 0.0115 0.00 Q V | | | |
27+30 0.0115 0.00 Q V | | | |
27+35 0.0115 0.00 Q V | | | |
27+40 0.0116 0.00 Q V | | | |
27+45 0.0116 0.00 Q V | | | |
27+50 0.0116 0.01 Q V | | | |
27+55 0.0117 0.01 Q V | | | |
28+ 0 0.0117 0.01 Q V | | | |
28+ 5 0.0118 0.01 Q V | | | |
28+10 0.0118 0.01 Q V | | | |
28+15 0.0118 0.01 Q V | | | |
28+20 0.0119 0.01 Q V | | | |
28+25 0.0119 0.01 Q V | | | |
28+30 0.0120 0.01 Q V | | | |
28+35 0.0120 0.01 Q V | | | |
28+40 0.0121 0.01 Q V | | | |
28+45 0.0121 0.01 Q V | | | |
28+50 0.0122 0.01 Q V | | | |
28+55 0.0122 0.01 Q V | | | |
29+ 0 0.0123 0.01 Q V | | | |
29+ 5 0.0123 0.01 Q V | | | |
29+10 0.0124 0.01 Q V | | | |
29+15 0.0124 0.01 Q V | | | |
29+20 0.0124 0.01 Q V | | | |

29+25 0.0125 0.01 Q V | | | |
29+30 0.0125 0.01 Q V | | | |
29+35 0.0126 0.01 Q V | | | |
29+40 0.0126 0.01 Q V | | | |
29+45 0.0127 0.01 Q V | | | |
29+50 0.0127 0.01 Q V | | | |
29+55 0.0128 0.01 Q V | | | |
30+ 0 0.0128 0.01 Q V | | | |
30+ 5 0.0129 0.01 Q V | | | |
30+10 0.0130 0.01 Q V | | | |
30+15 0.0130 0.01 Q V | | | |
30+20 0.0131 0.01 Q V | | | |
30+25 0.0131 0.01 Q V | | | |
30+30 0.0132 0.01 Q V | | | |
30+35 0.0133 0.01 Q V | | | |
30+40 0.0133 0.01 Q V | | | |
30+45 0.0134 0.01 Q V | | | |
30+50 0.0135 0.01 Q V | | | |
30+55 0.0135 0.01 Q V | | | |
31+ 0 0.0136 0.01 Q V | | | |
31+ 5 0.0137 0.01 Q V | | | |
31+10 0.0137 0.01 Q V | | | |
31+15 0.0138 0.01 Q V | | | |
31+20 0.0139 0.01 Q V | | | |
31+25 0.0139 0.01 Q V | | | |
31+30 0.0140 0.01 Q V | | | |
31+35 0.0141 0.01 Q V | | | |
31+40 0.0142 0.01 Q V | | | |
31+45 0.0142 0.01 Q V | | | |
31+50 0.0143 0.01 Q V | | | |
31+55 0.0144 0.01 Q V | | | |
32+ 0 0.0145 0.01 Q V | | | |
32+ 5 0.0146 0.01 Q V | | | |
32+10 0.0147 0.01 Q V | | | |
32+15 0.0148 0.01 Q V | | | |
32+20 0.0149 0.01 Q V | | | |
32+25 0.0150 0.01 Q V | | | |
32+30 0.0151 0.01 Q V | | | |
32+35 0.0152 0.02 Q V | | | |
32+40 0.0153 0.02 Q V | | | |
32+45 0.0154 0.02 Q V | | | |
32+50 0.0155 0.02 Q V | | | |
32+55 0.0156 0.02 Q V | | | |
33+ 0 0.0157 0.02 Q V | | | |
33+ 5 0.0159 0.02 Q V | | | |
33+10 0.0160 0.02 Q V | | | |
33+15 0.0161 0.02 Q V | | | |
33+20 0.0162 0.02 Q V | | | |
33+25 0.0164 0.02 Q V | | | |
33+30 0.0165 0.02 Q V | | | |
33+35 0.0166 0.02 Q V | | | |
33+40 0.0168 0.02 Q V | | | |
33+45 0.0169 0.02 Q V | | | |
33+50 0.0171 0.02 Q V | | | |
33+55 0.0172 0.02 Q V | | | |
34+ 0 0.0174 0.02 Q V | | | |
34+ 5 0.0175 0.02 Q V | | | |
34+10 0.0176 0.01 Q V | | | |
34+15 0.0177 0.01 Q V | | | |
34+20 0.0178 0.01 Q V | | | |
34+25 0.0179 0.01 Q V | | | |
34+30 0.0180 0.01 Q V | | | |
34+35 0.0181 0.02 Q V | | | |
34+40 0.0182 0.02 Q V | | | |
34+45 0.0184 0.02 Q V | | | |

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34+50     0.0185     0.02  Q   V    |         |         |         |
34+55     0.0186     0.02  Q   V    |         |         |         |
35+ 0     0.0188     0.02  Q   V    |         |         |         |
35+ 5     0.0189     0.02  Q   V    |         |         |         |
35+10     0.0190     0.02  Q    V   |         |         |         |
35+15     0.0191     0.02  Q    V   |         |         |         |
35+20     0.0193     0.02  Q    V   |         |         |         |
35+25     0.0194     0.02  Q    V   |         |         |         |
35+30     0.0195     0.02  Q    V   |         |         |         |
35+35     0.0196     0.02  Q    V   |         |         |         |
35+40     0.0197     0.02  Q    V   |         |         |         |
35+45     0.0199     0.02  Q    V   |         |         |         |
35+50     0.0200     0.02  Q    V   |         |         |         |
35+55     0.0201     0.02  Q    V   |         |         |         |
36+ 0     0.0202     0.02  Q    V   |         |         |         |
36+ 5     0.0204     0.02  Q    V   |         |         |         |
36+10     0.0205     0.02  Q    V   |         |         |         |
36+15     0.0207     0.02  Q    V   |         |         |         |
36+20     0.0209     0.02  Q    V   |         |         |         |
36+25     0.0210     0.02  Q    V   |         |         |         |
36+30     0.0212     0.02  Q    V   |         |         |         |
36+35     0.0214     0.03  Q    V   |         |         |         |
36+40     0.0216     0.03  Q    V   |         |         |         |
36+45     0.0217     0.03  Q    V   |         |         |         |
36+50     0.0219     0.03  Q    V   |         |         |         |
36+55     0.0221     0.03  Q    V   |         |         |         |
37+ 0     0.0223     0.03  Q    V   |         |         |         |
37+ 5     0.0225     0.03  Q     V  |         |         |         |
37+10     0.0228     0.03  Q     V  |         |         |         |
37+15     0.0230     0.03  Q     V  |         |         |         |
37+20     0.0232     0.03  Q     V  |         |         |         |
37+25     0.0234     0.03  Q     V  |         |         |         |
37+30     0.0237     0.03  Q     V  |         |         |         |
37+35     0.0238     0.03  Q     V  |         |         |         |
37+40     0.0240     0.02  Q     V  |         |         |         |
37+45     0.0241     0.02  Q     V  |         |         |         |
37+50     0.0243     0.02  Q     V  |         |         |         |
37+55     0.0244     0.02  Q     V  |         |         |         |
38+ 0     0.0246     0.02  Q     V  |         |         |         |
38+ 5     0.0248     0.02  Q     V  |         |         |         |
38+10     0.0249     0.03  Q     V  |         |         |         |
38+15     0.0251     0.03  Q     V  |         |         |         |
38+20     0.0253     0.03  Q     V  |         |         |         |
38+25     0.0255     0.02  Q     V  |         |         |         |
38+30     0.0256     0.02  Q     V  |         |         |         |
38+35     0.0258     0.02  Q     V  |         |         |         |
38+40     0.0260     0.02  Q     V  |         |         |         |
38+45     0.0262     0.02  Q     V  |         |         |         |
38+50     0.0263     0.02  Q      V |         |         |         |
38+55     0.0265     0.02  Q      V |         |         |         |
39+ 0     0.0267     0.02  Q      V |         |         |         |
39+ 5     0.0268     0.02  Q      V |         |         |         |
39+10     0.0270     0.02  Q      V |         |         |         |
39+15     0.0271     0.02  Q      V |         |         |         |
39+20     0.0273     0.02  Q      V |         |         |         |
39+25     0.0274     0.02  Q      V |         |         |         |
39+30     0.0276     0.02  Q      V |         |         |         |
39+35     0.0277     0.02  Q      V |         |         |         |
39+40     0.0279     0.02  Q      V |         |         |         |
39+45     0.0280     0.02  Q      V |         |         |         |
39+50     0.0281     0.02  Q      V |         |         |         |
39+55     0.0282     0.02  Q      V |         |         |         |
40+ 0     0.0284     0.02  Q      V |         |         |         |
40+ 5     0.0284     0.01  Q      V |         |         |         |
40+10     0.0284     0.00  Q      V |         |         |         |
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40+15     0.0285     0.00  Q     V  |        |        |        |
40+20     0.0285     0.00  Q     V  |        |        |        |
40+25     0.0285     0.00  Q     V  |        |        |        |
40+30     0.0285     0.00  Q     V  |        |        |        |
40+35     0.0286     0.00  Q     V  |        |        |        |
40+40     0.0286     0.00  Q     V  |        |        |        |
40+45     0.0286     0.00  Q     V  |        |        |        |
40+50     0.0286     0.00  Q     V  |        |        |        |
40+55     0.0287     0.00  Q     V  |        |        |        |
41+ 0     0.0287     0.00  Q     V  |        |        |        |
41+ 5     0.0287     0.00  Q     V  |        |        |        |
41+10     0.0287     0.00  Q     V  |        |        |        |
41+15     0.0288     0.00  Q     V  |        |        |        |
41+20     0.0288     0.00  Q     V  |        |        |        |
41+25     0.0288     0.00  Q     V  |        |        |        |
41+30     0.0289     0.00  Q     V  |        |        |        |
41+35     0.0289     0.00  Q     V  |        |        |        |
41+40     0.0289     0.00  Q     V  |        |        |        |
41+45     0.0290     0.00  Q     V  |        |        |        |
41+50     0.0290     0.00  Q     V  |        |        |        |
41+55     0.0290     0.00  Q     V  |        |        |        |
42+ 0     0.0290     0.00  Q     V  |        |        |        |
42+ 5     0.0291     0.00  Q     V  |        |        |        |
42+10     0.0291     0.00  Q     V  |        |        |        |
42+15     0.0291     0.00  Q     V  |        |        |        |
42+20     0.0292     0.00  Q     V  |        |        |        |
42+25     0.0292     0.00  Q     V  |        |        |        |
42+30     0.0292     0.00  Q     V  |        |        |        |
42+35     0.0292     0.00  Q     V  |        |        |        |
42+40     0.0292     0.00  Q     V  |        |        |        |
42+45     0.0293     0.00  Q     V  |        |        |        |
42+50     0.0293     0.00  Q     V  |        |        |        |
42+55     0.0293     0.00  Q     V  |        |        |        |
43+ 0     0.0293     0.00  Q     V  |        |        |        |
43+ 5     0.0293     0.00  Q     V  |        |        |        |
43+10     0.0293     0.00  Q     V  |        |        |        |
43+15     0.0294     0.00  Q     V  |        |        |        |
43+20     0.0294     0.00  Q     V  |        |        |        |
43+25     0.0294     0.00  Q     V  |        |        |        |
43+30     0.0294     0.00  Q     V  |        |        |        |
43+35     0.0295     0.00  Q     V  |        |        |        |
43+40     0.0295     0.00  Q     V  |        |        |        |
43+45     0.0295     0.00  Q     V  |        |        |        |
43+50     0.0295     0.00  Q     V  |        |        |        |
43+55     0.0295     0.00  Q     V  |        |        |        |
44+ 0     0.0295     0.00  Q     V  |        |        |        |
44+ 5     0.0296     0.00  Q     V  |        |        |        |
44+10     0.0296     0.00  Q     V  |        |        |        |
44+15     0.0296     0.00  Q     V  |        |        |        |
44+20     0.0296     0.00  Q     V  |        |        |        |
44+25     0.0296     0.00  Q     V  |        |        |        |
44+30     0.0297     0.00  Q     V  |        |        |        |
44+35     0.0297     0.00  Q     V  |        |        |        |
44+40     0.0297     0.00  Q     V  |        |        |        |
44+45     0.0297     0.00  Q     V  |        |        |        |
44+50     0.0297     0.00  Q     V  |        |        |        |
44+55     0.0298     0.00  Q     V  |        |        |        |
45+ 0     0.0298     0.00  Q     V  |        |        |        |
45+ 5     0.0298     0.00  Q     V  |        |        |        |
45+10     0.0298     0.00  Q     V  |        |        |        |
45+15     0.0298     0.00  Q     V  |        |        |        |
45+20     0.0298     0.00  Q     V  |        |        |        |
45+25     0.0298     0.00  Q     V  |        |        |        |
45+30     0.0299     0.00  Q     V  |        |        |        |
45+35     0.0299     0.00  Q     V  |        |        |        |
```

45+40	0.0299	0.00	Q	V				
45+45	0.0299	0.00	Q	V				
45+50	0.0299	0.00	Q	V				
45+55	0.0299	0.00	Q	V				
46+ 0	0.0300	0.00	Q	V				
46+ 5	0.0300	0.00	Q	V				
46+10	0.0300	0.00	Q	V				
46+15	0.0300	0.00	Q	V				
46+20	0.0300	0.00	Q	V				
46+25	0.0300	0.00	Q	V				
46+30	0.0301	0.00	Q	V				
46+35	0.0301	0.00	Q	V				
46+40	0.0301	0.00	Q	V				
46+45	0.0301	0.00	Q	V				
46+50	0.0301	0.00	Q	V				
46+55	0.0301	0.00	Q	V				
47+ 0	0.0301	0.00	Q	V				
47+ 5	0.0302	0.00	Q	V				
47+10	0.0302	0.00	Q	V				
47+15	0.0302	0.00	Q	V				
47+20	0.0302	0.00	Q	V				
47+25	0.0302	0.00	Q	V				
47+30	0.0302	0.00	Q	V				
47+35	0.0302	0.00	Q	V				
47+40	0.0302	0.00	Q	V				
47+45	0.0303	0.00	Q	V				
47+50	0.0303	0.00	Q	V				
47+55	0.0303	0.00	Q	V				
48+ 0	0.0303	0.00	Q	V				
48+ 5	0.0303	0.00	Q	V				
48+10	0.0304	0.01	Q	V				
48+15	0.0304	0.01	Q	V				
48+20	0.0304	0.01	Q	V				
48+25	0.0305	0.01	Q	V				
48+30	0.0306	0.01	Q	V				
48+35	0.0306	0.01	Q	V				
48+40	0.0307	0.01	Q	V				
48+45	0.0307	0.01	Q	V				
48+50	0.0308	0.01	Q	V				
48+55	0.0309	0.01	Q	V				
49+ 0	0.0309	0.01	Q	V				
49+ 5	0.0310	0.01	Q	V				
49+10	0.0311	0.01	Q	V				
49+15	0.0311	0.01	Q	V				
49+20	0.0312	0.01	Q	V				
49+25	0.0312	0.01	Q	V				
49+30	0.0313	0.01	Q	V				
49+35	0.0313	0.01	Q	V				
49+40	0.0314	0.01	Q	V				
49+45	0.0314	0.01	Q	V				
49+50	0.0315	0.01	Q	V				
49+55	0.0316	0.01	Q	V				
50+ 0	0.0317	0.01	Q	V				
50+ 5	0.0317	0.01	Q	V				
50+10	0.0318	0.01	Q	V				
50+15	0.0319	0.01	Q	V				
50+20	0.0319	0.01	Q	V				
50+25	0.0320	0.01	Q	V				
50+30	0.0321	0.01	Q	V				
50+35	0.0322	0.01	Q	V				
50+40	0.0323	0.01	Q	V				
50+45	0.0324	0.01	Q	V				
50+50	0.0325	0.01	Q	V				
50+55	0.0325	0.01	Q	V				
51+ 0	0.0326	0.01	Q	V				

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51+ 5     0.0327    0.01  Q      V |         |         |         |
51+10     0.0328    0.01  Q      V |         |         |         |
51+15     0.0329    0.01  Q      V |         |         |         |
51+20     0.0330    0.01  Q      V |         |         |         |
51+25     0.0331    0.01  Q      V |         |         |         |
51+30     0.0332    0.01  Q      V |         |         |         |
51+35     0.0333    0.01  Q      V |         |         |         |
51+40     0.0334    0.01  Q      V |         |         |         |
51+45     0.0335    0.01  Q      V |         |         |         |
51+50     0.0336    0.02  Q      V |         |         |         |
51+55     0.0337    0.02  Q      V |         |         |         |
52+ 0     0.0338    0.02  Q      V|         |         |         |
52+ 5     0.0339    0.02  Q      V|         |         |         |
52+10     0.0340    0.02  Q      V|         |         |         |
52+15     0.0341    0.02  Q      V|         |         |         |
52+20     0.0342    0.02  Q      V|         |         |         |
52+25     0.0344    0.02  Q      V|         |         |         |
52+30     0.0345    0.02  Q      V|         |         |         |
52+35     0.0346    0.02  Q      V|         |         |         |
52+40     0.0348    0.02  Q      V|         |         |         |
52+45     0.0349    0.02  Q      V|         |         |         |
52+50     0.0350    0.02  Q      V|         |         |         |
52+55     0.0352    0.02  Q      V|         |         |         |
53+ 0     0.0353    0.02  Q      V|         |         |         |
53+ 5     0.0354    0.02  Q      V|         |         |         |
53+10     0.0356    0.02  Q      V|         |         |         |
53+15     0.0357    0.02  Q      V|         |         |         |
53+20     0.0358    0.02  Q      V|         |         |         |
53+25     0.0359    0.02  Q      V|         |         |         |
53+30     0.0360    0.02  Q      V|         |         |         |
53+35     0.0362    0.02  Q      V|         |         |         |
53+40     0.0363    0.02  Q      V|         |         |         |
53+45     0.0365    0.02  Q      V|         |         |         |
53+50     0.0366    0.02  Q      V|         |         |         |
53+55     0.0368    0.02  Q      V|         |         |         |
54+ 0     0.0369    0.02  Q      V|         |         |         |
54+ 5     0.0371    0.02  Q      V|         |         |         |
54+10     0.0372    0.02  Q      V|         |         |         |
54+15     0.0374    0.02  Q      V|         |         |         |
54+20     0.0376    0.02  Q       V         |         |         |
54+25     0.0377    0.02  Q       V         |         |         |
54+30     0.0379    0.02  Q       V         |         |         |
54+35     0.0381    0.03  Q       V         |         |         |
54+40     0.0383    0.03  Q       V         |         |         |
54+45     0.0384    0.03  Q       V         |         |         |
54+50     0.0386    0.03  Q       V         |         |         |
54+55     0.0388    0.03  Q       V         |         |         |
55+ 0     0.0390    0.03  Q       V         |         |         |
55+ 5     0.0392    0.03  Q       V         |         |         |
55+10     0.0394    0.03  Q       V         |         |         |
55+15     0.0395    0.03  Q       V         |         |         |
55+20     0.0397    0.03  Q       V         |         |         |
55+25     0.0399    0.03  Q       V         |         |         |
55+30     0.0401    0.03  Q       V         |         |         |
55+35     0.0404    0.03  Q       V         |         |         |
55+40     0.0406    0.03  Q       V         |         |         |
55+45     0.0408    0.03  Q       V         |         |         |
55+50     0.0410    0.03  Q       V         |         |         |
55+55     0.0413    0.03  Q        |V        |         |         |
56+ 0     0.0415    0.03  Q        |V        |         |         |
56+ 5     0.0418    0.04  Q        |V        |         |         |
56+10     0.0421    0.04  Q        |V        |         |         |
56+15     0.0423    0.04  Q        |V        |         |         |
56+20     0.0426    0.04  Q        |V        |         |         |
56+25     0.0429    0.04  Q        |V        |         |         |
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56+30 0.0432 0.04 Q |V | | |
56+35 0.0434 0.04 Q |V | | |
56+40 0.0437 0.04 Q |V | | |
56+45 0.0440 0.04 Q |V | | |
56+50 0.0442 0.02 Q |V | | |
56+55 0.0442 0.01 Q |V | | |
57+ 0 0.0443 0.01 Q |V | | |
57+ 5 0.0446 0.04 Q |V | | |
57+10 0.0449 0.05 Q | V | | |
57+15 0.0453 0.05 Q | V | | |
57+20 0.0457 0.07 Q | V | | |
57+25 0.0462 0.07 Q | V | | |
57+30 0.0468 0.07 Q | V | | |
57+35 0.0474 0.09 Q | V | | |
57+40 0.0480 0.10 Q | V | | |
57+45 0.0487 0.10 Q | V | | |
57+50 0.0494 0.11 Q | V | | |
57+55 0.0503 0.12 Q | V | | |
58+ 0 0.0511 0.12 Q | V | | |
58+ 5 0.0515 0.07 Q | V | | |
58+10 0.0518 0.04 Q | V | | |
58+15 0.0521 0.04 Q | V | | |
58+20 0.0524 0.04 Q | V | | |
58+25 0.0526 0.04 Q | V | | |
58+30 0.0527 0.01 Q | V | | |
58+35 0.0532 0.06 Q | V | | |
58+40 0.0538 0.09 Q | V | | |
58+45 0.0545 0.09 Q | V | | |
58+50 0.0551 0.10 Q | V | | |
58+55 0.0558 0.10 Q | V | | |
59+ 0 0.0565 0.10 Q | V | | |
59+ 5 0.0571 0.09 Q | V | | |
59+10 0.0576 0.08 Q | V | | |
59+15 0.0582 0.08 Q | V | | |
59+20 0.0588 0.09 Q | V | | |
59+25 0.0594 0.09 Q | V | | |
59+30 0.0600 0.09 Q | V | | |
59+35 0.0605 0.07 Q | V | | |
59+40 0.0609 0.05 Q | V | | |
59+45 0.0612 0.06 Q | V | | |
59+50 0.0617 0.07 Q | V | | |
59+55 0.0622 0.08 Q | V | | |
60+ 0 0.0628 0.08 Q | V | | |
60+ 5 0.0639 0.16 Q | V | | |
60+10 0.0653 0.21 Q | V | | |
60+15 0.0668 0.21 Q | V | | |
60+20 0.0683 0.22 Q | V| | |
60+25 0.0699 0.23 Q | V| | |
60+30 0.0715 0.23 Q | V| | |
60+35 0.0732 0.26 |Q | V| | |
60+40 0.0751 0.27 |Q | V | |
60+45 0.0769 0.27 |Q | V | |
60+50 0.0789 0.28 |Q | |V | |
60+55 0.0809 0.29 |Q | |V | |
61+ 0 0.0829 0.29 |Q | | V | |
61+ 5 0.0853 0.35 |Q | | V | |
61+10 0.0880 0.39 |Q | | V | |
61+15 0.0906 0.39 |Q | | V | |
61+20 0.0933 0.39 |Q | | V | |
61+25 0.0960 0.39 |Q | | V | |
61+30 0.0987 0.39 |Q | | V | |
61+35 0.1005 0.26 |Q | | V | |
61+40 0.1018 0.19 Q | | V | |
61+45 0.1031 0.19 Q | | V | |
61+50 0.1045 0.19 Q | | V | |

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61+55    0.1058    0.20  Q       |       |      V |       |
62+ 0    0.1072    0.20  Q       |       |      V |       |
62+ 5    0.1089    0.25  Q       |       |       V|       |
62+10    0.1108    0.27  |Q      |       |       V|       |
62+15    0.1126    0.27  |Q      |       |        V       |
62+20    0.1144    0.26  |Q      |       |        V       |
62+25    0.1162    0.26  |Q      |       |        |V      |
62+30    0.1180    0.26  |Q      |       |        |V      |
62+35    0.1198    0.26  |Q      |       |        | V     |
62+40    0.1216    0.26  |Q      |       |        | V     |
62+45    0.1234    0.26  |Q      |       |        | V     |
62+50    0.1251    0.25  |Q      |       |        |  V    |
62+55    0.1268    0.25  Q       |       |        |  V    |
63+ 0    0.1285    0.25  Q       |       |        |  V    |
63+ 5    0.1301    0.24  Q       |       |        |  V    |
63+10    0.1317    0.23  Q       |       |        |   V   |
63+15    0.1333    0.23  Q       |       |        |   V   |
63+20    0.1348    0.22  Q       |       |        |    V  |
63+25    0.1363    0.22  Q       |       |        |    V  |
63+30    0.1378    0.22  Q       |       |        |    V  |
63+35    0.1390    0.17  Q       |       |        |     V |
63+40    0.1400    0.15  Q       |       |        |     V |
63+45    0.1410    0.15  Q       |       |        |     V |
63+50    0.1420    0.15  Q       |       |        |     V |
63+55    0.1430    0.15  Q       |       |        |      V|
64+ 0    0.1441    0.15  Q       |       |        |     V |
64+ 5    0.1445    0.06  Q       |       |        |     V |
64+10    0.1446    0.01  Q       |       |        |      V |
64+15    0.1446    0.01  Q       |       |        |      V |
64+20    0.1447    0.01  Q       |       |        |      V |
64+25    0.1448    0.01  Q       |       |        |      V |
64+30    0.1449    0.01  Q       |       |        |      V |
64+35    0.1449    0.01  Q       |       |        |      V |
64+40    0.1450    0.01  Q       |       |        |      V |
64+45    0.1450    0.01  Q       |       |        |      V |
64+50    0.1451    0.01  Q       |       |        |      V |
64+55    0.1451    0.01  Q       |       |        |      V |
65+ 0    0.1452    0.01  Q       |       |        |     V |
65+ 5    0.1453    0.01  Q       |       |        |     V |
65+10    0.1454    0.01  Q       |       |        |      V |
65+15    0.1455    0.01  Q       |       |        |      V |
65+20    0.1455    0.01  Q       |       |        |      V |
65+25    0.1456    0.01  Q       |       |        |      V |
65+30    0.1457    0.01  Q       |       |        |      V |
65+35    0.1458    0.01  Q       |       |        |      V |
65+40    0.1459    0.01  Q       |       |        |      V |
65+45    0.1460    0.01  Q       |       |        |       V|
65+50    0.1461    0.01  Q       |       |        |       V|
65+55    0.1462    0.01  Q       |       |        |       V|
66+ 0    0.1462    0.01  Q       |       |        |      V|
66+ 5    0.1463    0.01  Q       |       |        |      V|
66+10    0.1464    0.01  Q       |       |        |       V|
66+15    0.1464    0.01  Q       |       |        |       V|
66+20    0.1465    0.01  Q       |       |        |       V|
66+25    0.1466    0.01  Q       |       |        |       V|
66+30    0.1467    0.01  Q       |       |        |       V|
66+35    0.1467    0.01  Q       |       |        |       V|
66+40    0.1468    0.01  Q       |       |        |       V|
66+45    0.1468    0.01  Q       |       |        |       V|
66+50    0.1469    0.01  Q       |       |        |       V|
66+55    0.1469    0.01  Q       |       |        |       V|
67+ 0    0.1470    0.01  Q       |       |        |      V|
67+ 5    0.1470    0.01  Q       |       |        |      V|
67+10    0.1471    0.01  Q       |       |        |       V|
67+15    0.1471    0.01  Q       |       |        |       V|
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67+20	0.1472	0.01	Q			V
67+25	0.1473	0.01	Q			V
67+30	0.1473	0.01	Q			V
67+35	0.1474	0.01	Q			V
67+40	0.1474	0.01	Q			V
67+45	0.1475	0.01	Q			V
67+50	0.1475	0.01	Q			V
67+55	0.1476	0.01	Q			V
68+ 0	0.1476	0.01	Q			V
68+ 5	0.1477	0.01	Q			V
68+10	0.1477	0.01	Q			V
68+15	0.1478	0.01	Q			V
68+20	0.1478	0.01	Q			V
68+25	0.1479	0.01	Q			V
68+30	0.1479	0.01	Q			V
68+35	0.1480	0.01	Q			V
68+40	0.1481	0.01	Q			V
68+45	0.1481	0.01	Q			V
68+50	0.1482	0.01	Q			V
68+55	0.1482	0.01	Q			V
69+ 0	0.1482	0.01	Q			V
69+ 5	0.1483	0.01	Q			V
69+10	0.1483	0.01	Q			V
69+15	0.1484	0.01	Q			V
69+20	0.1484	0.01	Q			V
69+25	0.1485	0.01	Q			V
69+30	0.1485	0.01	Q			V
69+35	0.1485	0.01	Q			V
69+40	0.1486	0.01	Q			V
69+45	0.1487	0.01	Q			V
69+50	0.1487	0.01	Q			V
69+55	0.1487	0.01	Q			V
70+ 0	0.1488	0.01	Q			V
70+ 5	0.1488	0.01	Q			V
70+10	0.1489	0.01	Q			V
70+15	0.1489	0.01	Q			V
70+20	0.1490	0.01	Q			V
70+25	0.1490	0.01	Q			V
70+30	0.1491	0.01	Q			V
70+35	0.1491	0.01	Q			V
70+40	0.1491	0.01	Q			V
70+45	0.1492	0.01	Q			V
70+50	0.1492	0.01	Q			V
70+55	0.1492	0.01	Q			V
71+ 0	0.1493	0.01	Q			V
71+ 5	0.1493	0.01	Q			V
71+10	0.1493	0.01	Q			V
71+15	0.1494	0.01	Q			V
71+20	0.1494	0.01	Q			V
71+25	0.1495	0.01	Q			V
71+30	0.1495	0.01	Q			V
71+35	0.1495	0.01	Q			V
71+40	0.1496	0.01	Q			V
71+45	0.1496	0.01	Q			V
71+50	0.1496	0.01	Q			V
71+55	0.1497	0.01	Q			V
72+ 0	0.1497	0.01	Q			V
72+ 5	0.1497	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

Study date 09/23/20 File: APRE2YR2410.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

28771 Central Avenue Gas Station
Area A
Pre-development
24-Hr 10-Yr Storm Event

Drainage Area = 1.32(Ac.) = 0.002 Sq. Mi.
Length along longest watercourse = 408.00(Ft.)
Length along longest watercourse measured to centroid = 87.50(Ft.)
Length along longest watercourse = 0.077 Mi.
Length along longest watercourse measured to centroid = 0.017 Mi.
Difference in elevation = 16.34(Ft.)
Slope along watercourse = 211.4588 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.021 Hr.
Lag time = 1.24 Min.
25% of lag time = 0.31 Min.
40% of lag time = 0.50 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]
1.32	2.43	3.22

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
1.32	6.58	8.71

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 2.430(In)
Area Averaged 100-Year Rainfall = 6.580(In)

Point rain (area averaged) = 4.137(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 4.137(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
1.324	83.00	0.059

Total Area Entered = 1.32(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
83.0	83.0	0.210	0.059	0.199	1.000	0.199

Sum (F) = 0.199

Area averaged mean soil loss (F) (In/Hr) = 0.199

Minimum soil loss rate ((In/Hr)) = 0.099

(for 24 hour storm duration)

Soil low loss rate (decimal) = 0.853

U n i t H y d r o g r a p h

DESERT S-Curve

Unit Hydrograph Data

	Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	402.223	65.137	0.869
2	0.167	804.446	34.863	0.465
			Sum = 100.000	Sum= 1.334

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Loss rate(In./Hr) Low	Effective (In/Hr)
1	0.08	0.07	0.033	0.352	0.028	0.00
2	0.17	0.07	0.033	0.351	0.028	0.00
3	0.25	0.07	0.033	0.349	0.028	0.00
4	0.33	0.10	0.050	0.348	0.042	0.01
5	0.42	0.10	0.050	0.347	0.042	0.01
6	0.50	0.10	0.050	0.345	0.042	0.01
7	0.58	0.10	0.050	0.344	0.042	0.01
8	0.67	0.10	0.050	0.343	0.042	0.01
9	0.75	0.10	0.050	0.341	0.042	0.01
10	0.83	0.13	0.066	0.340	0.056	0.01
11	0.92	0.13	0.066	0.339	0.056	0.01
12	1.00	0.13	0.066	0.337	0.056	0.01
13	1.08	0.10	0.050	0.336	0.042	0.01
14	1.17	0.10	0.050	0.335	0.042	0.01
15	1.25	0.10	0.050	0.333	0.042	0.01
16	1.33	0.10	0.050	0.332	0.042	0.01
17	1.42	0.10	0.050	0.331	0.042	0.01
18	1.50	0.10	0.050	0.329	0.042	0.01
19	1.58	0.10	0.050	0.328	0.042	0.01
20	1.67	0.10	0.050	0.327	0.042	0.01
21	1.75	0.10	0.050	0.325	0.042	0.01
22	1.83	0.13	0.066	0.324	0.056	0.01
23	1.92	0.13	0.066	0.323	0.056	0.01
24	2.00	0.13	0.066	0.322	0.056	0.01
25	2.08	0.13	0.066	0.320	0.056	0.01
26	2.17	0.13	0.066	0.319	0.056	0.01
27	2.25	0.13	0.066	0.318	0.056	0.01
28	2.33	0.13	0.066	0.316	0.056	0.01
29	2.42	0.13	0.066	0.315	0.056	0.01
30	2.50	0.13	0.066	0.314	0.056	0.01
31	2.58	0.17	0.083	0.312	0.071	0.01
32	2.67	0.17	0.083	0.311	0.071	0.01
33	2.75	0.17	0.083	0.310	0.071	0.01

34	2.83	0.17	0.083	0.309	0.071	0.01
35	2.92	0.17	0.083	0.307	0.071	0.01
36	3.00	0.17	0.083	0.306	0.071	0.01
37	3.08	0.17	0.083	0.305	0.071	0.01
38	3.17	0.17	0.083	0.304	0.071	0.01
39	3.25	0.17	0.083	0.302	0.071	0.01
40	3.33	0.17	0.083	0.301	0.071	0.01
41	3.42	0.17	0.083	0.300	0.071	0.01
42	3.50	0.17	0.083	0.299	0.071	0.01
43	3.58	0.17	0.083	0.297	0.071	0.01
44	3.67	0.17	0.083	0.296	0.071	0.01
45	3.75	0.17	0.083	0.295	0.071	0.01
46	3.83	0.20	0.099	0.294	0.085	0.01
47	3.92	0.20	0.099	0.292	0.085	0.01
48	4.00	0.20	0.099	0.291	0.085	0.01
49	4.08	0.20	0.099	0.290	0.085	0.01
50	4.17	0.20	0.099	0.289	0.085	0.01
51	4.25	0.20	0.099	0.287	0.085	0.01
52	4.33	0.23	0.116	0.286	0.099	0.02
53	4.42	0.23	0.116	0.285	0.099	0.02
54	4.50	0.23	0.116	0.284	0.099	0.02
55	4.58	0.23	0.116	0.282	0.099	0.02
56	4.67	0.23	0.116	0.281	0.099	0.02
57	4.75	0.23	0.116	0.280	0.099	0.02
58	4.83	0.27	0.132	0.279	0.113	0.02
59	4.92	0.27	0.132	0.278	0.113	0.02
60	5.00	0.27	0.132	0.276	0.113	0.02
61	5.08	0.20	0.099	0.275	0.085	0.01
62	5.17	0.20	0.099	0.274	0.085	0.01
63	5.25	0.20	0.099	0.273	0.085	0.01
64	5.33	0.23	0.116	0.272	0.099	0.02
65	5.42	0.23	0.116	0.270	0.099	0.02
66	5.50	0.23	0.116	0.269	0.099	0.02
67	5.58	0.27	0.132	0.268	0.113	0.02
68	5.67	0.27	0.132	0.267	0.113	0.02
69	5.75	0.27	0.132	0.266	0.113	0.02
70	5.83	0.27	0.132	0.265	0.113	0.02
71	5.92	0.27	0.132	0.263	0.113	0.02
72	6.00	0.27	0.132	0.262	0.113	0.02
73	6.08	0.30	0.149	0.261	0.127	0.02
74	6.17	0.30	0.149	0.260	0.127	0.02
75	6.25	0.30	0.149	0.259	0.127	0.02
76	6.33	0.30	0.149	0.258	0.127	0.02
77	6.42	0.30	0.149	0.256	0.127	0.02
78	6.50	0.30	0.149	0.255	0.127	0.02
79	6.58	0.33	0.165	0.254	0.141	0.02
80	6.67	0.33	0.165	0.253	0.141	0.02
81	6.75	0.33	0.165	0.252	0.141	0.02
82	6.83	0.33	0.165	0.251	0.141	0.02
83	6.92	0.33	0.165	0.250	0.141	0.02
84	7.00	0.33	0.165	0.248	0.141	0.02
85	7.08	0.33	0.165	0.247	0.141	0.02
86	7.17	0.33	0.165	0.246	0.141	0.02
87	7.25	0.33	0.165	0.245	0.141	0.02
88	7.33	0.37	0.182	0.244	0.155	0.03
89	7.42	0.37	0.182	0.243	0.155	0.03
90	7.50	0.37	0.182	0.242	0.155	0.03
91	7.58	0.40	0.199	0.241	0.169	0.03
92	7.67	0.40	0.199	0.240	0.169	0.03
93	7.75	0.40	0.199	0.238	0.169	0.03
94	7.83	0.43	0.215	0.237	0.184	0.03
95	7.92	0.43	0.215	0.236	0.184	0.03
96	8.00	0.43	0.215	0.235	0.184	0.03
97	8.08	0.50	0.248	0.234	---	0.01
98	8.17	0.50	0.248	0.233	---	0.02

99	8.25	0.50	0.248	0.232	---	0.02
100	8.33	0.50	0.248	0.231	---	0.02
101	8.42	0.50	0.248	0.230	---	0.02
102	8.50	0.50	0.248	0.229	---	0.02
103	8.58	0.53	0.265	0.228	---	0.04
104	8.67	0.53	0.265	0.226	---	0.04
105	8.75	0.53	0.265	0.225	---	0.04
106	8.83	0.57	0.281	0.224	---	0.06
107	8.92	0.57	0.281	0.223	---	0.06
108	9.00	0.57	0.281	0.222	---	0.06
109	9.08	0.63	0.314	0.221	---	0.09
110	9.17	0.63	0.314	0.220	---	0.09
111	9.25	0.63	0.314	0.219	---	0.10
112	9.33	0.67	0.331	0.218	---	0.11
113	9.42	0.67	0.331	0.217	---	0.11
114	9.50	0.67	0.331	0.216	---	0.12
115	9.58	0.70	0.348	0.215	---	0.13
116	9.67	0.70	0.348	0.214	---	0.13
117	9.75	0.70	0.348	0.213	---	0.13
118	9.83	0.73	0.364	0.212	---	0.15
119	9.92	0.73	0.364	0.211	---	0.15
120	10.00	0.73	0.364	0.210	---	0.15
121	10.08	0.50	0.248	0.209	---	0.04
122	10.17	0.50	0.248	0.208	---	0.04
123	10.25	0.50	0.248	0.207	---	0.04
124	10.33	0.50	0.248	0.206	---	0.04
125	10.42	0.50	0.248	0.205	---	0.04
126	10.50	0.50	0.248	0.204	---	0.04
127	10.58	0.67	0.331	0.203	---	0.13
128	10.67	0.67	0.331	0.202	---	0.13
129	10.75	0.67	0.331	0.201	---	0.13
130	10.83	0.67	0.331	0.200	---	0.13
131	10.92	0.67	0.331	0.199	---	0.13
132	11.00	0.67	0.331	0.198	---	0.13
133	11.08	0.63	0.314	0.197	---	0.12
134	11.17	0.63	0.314	0.196	---	0.12
135	11.25	0.63	0.314	0.195	---	0.12
136	11.33	0.63	0.314	0.194	---	0.12
137	11.42	0.63	0.314	0.193	---	0.12
138	11.50	0.63	0.314	0.192	---	0.12
139	11.58	0.57	0.281	0.191	---	0.09
140	11.67	0.57	0.281	0.190	---	0.09
141	11.75	0.57	0.281	0.189	---	0.09
142	11.83	0.60	0.298	0.188	---	0.11
143	11.92	0.60	0.298	0.187	---	0.11
144	12.00	0.60	0.298	0.186	---	0.11
145	12.08	0.83	0.414	0.185	---	0.23
146	12.17	0.83	0.414	0.185	---	0.23
147	12.25	0.83	0.414	0.184	---	0.23
148	12.33	0.87	0.430	0.183	---	0.25
149	12.42	0.87	0.430	0.182	---	0.25
150	12.50	0.87	0.430	0.181	---	0.25
151	12.58	0.93	0.463	0.180	---	0.28
152	12.67	0.93	0.463	0.179	---	0.28
153	12.75	0.93	0.463	0.178	---	0.29
154	12.83	0.97	0.480	0.177	---	0.30
155	12.92	0.97	0.480	0.176	---	0.30
156	13.00	0.97	0.480	0.175	---	0.30
157	13.08	1.13	0.563	0.175	---	0.39
158	13.17	1.13	0.563	0.174	---	0.39
159	13.25	1.13	0.563	0.173	---	0.39
160	13.33	1.13	0.563	0.172	---	0.39
161	13.42	1.13	0.563	0.171	---	0.39
162	13.50	1.13	0.563	0.170	---	0.39
163	13.58	0.77	0.381	0.169	---	0.21

164	13.67	0.77	0.381	0.168	---	0.21
165	13.75	0.77	0.381	0.168	---	0.21
166	13.83	0.77	0.381	0.167	---	0.21
167	13.92	0.77	0.381	0.166	---	0.21
168	14.00	0.77	0.381	0.165	---	0.22
169	14.08	0.90	0.447	0.164	---	0.28
170	14.17	0.90	0.447	0.163	---	0.28
171	14.25	0.90	0.447	0.163	---	0.28
172	14.33	0.87	0.430	0.162	---	0.27
173	14.42	0.87	0.430	0.161	---	0.27
174	14.50	0.87	0.430	0.160	---	0.27
175	14.58	0.87	0.430	0.159	---	0.27
176	14.67	0.87	0.430	0.158	---	0.27
177	14.75	0.87	0.430	0.158	---	0.27
178	14.83	0.83	0.414	0.157	---	0.26
179	14.92	0.83	0.414	0.156	---	0.26
180	15.00	0.83	0.414	0.155	---	0.26
181	15.08	0.80	0.397	0.154	---	0.24
182	15.17	0.80	0.397	0.154	---	0.24
183	15.25	0.80	0.397	0.153	---	0.24
184	15.33	0.77	0.381	0.152	---	0.23
185	15.42	0.77	0.381	0.151	---	0.23
186	15.50	0.77	0.381	0.150	---	0.23
187	15.58	0.63	0.314	0.150	---	0.16
188	15.67	0.63	0.314	0.149	---	0.17
189	15.75	0.63	0.314	0.148	---	0.17
190	15.83	0.63	0.314	0.147	---	0.17
191	15.92	0.63	0.314	0.147	---	0.17
192	16.00	0.63	0.314	0.146	---	0.17
193	16.08	0.13	0.066	0.145	0.056	0.01
194	16.17	0.13	0.066	0.144	0.056	0.01
195	16.25	0.13	0.066	0.144	0.056	0.01
196	16.33	0.13	0.066	0.143	0.056	0.01
197	16.42	0.13	0.066	0.142	0.056	0.01
198	16.50	0.13	0.066	0.141	0.056	0.01
199	16.58	0.10	0.050	0.141	0.042	0.01
200	16.67	0.10	0.050	0.140	0.042	0.01
201	16.75	0.10	0.050	0.139	0.042	0.01
202	16.83	0.10	0.050	0.139	0.042	0.01
203	16.92	0.10	0.050	0.138	0.042	0.01
204	17.00	0.10	0.050	0.137	0.042	0.01
205	17.08	0.17	0.083	0.137	0.071	0.01
206	17.17	0.17	0.083	0.136	0.071	0.01
207	17.25	0.17	0.083	0.135	0.071	0.01
208	17.33	0.17	0.083	0.134	0.071	0.01
209	17.42	0.17	0.083	0.134	0.071	0.01
210	17.50	0.17	0.083	0.133	0.071	0.01
211	17.58	0.17	0.083	0.132	0.071	0.01
212	17.67	0.17	0.083	0.132	0.071	0.01
213	17.75	0.17	0.083	0.131	0.071	0.01
214	17.83	0.13	0.066	0.131	0.056	0.01
215	17.92	0.13	0.066	0.130	0.056	0.01
216	18.00	0.13	0.066	0.129	0.056	0.01
217	18.08	0.13	0.066	0.129	0.056	0.01
218	18.17	0.13	0.066	0.128	0.056	0.01
219	18.25	0.13	0.066	0.127	0.056	0.01
220	18.33	0.13	0.066	0.127	0.056	0.01
221	18.42	0.13	0.066	0.126	0.056	0.01
222	18.50	0.13	0.066	0.125	0.056	0.01
223	18.58	0.10	0.050	0.125	0.042	0.01
224	18.67	0.10	0.050	0.124	0.042	0.01
225	18.75	0.10	0.050	0.124	0.042	0.01
226	18.83	0.07	0.033	0.123	0.028	0.00
227	18.92	0.07	0.033	0.122	0.028	0.00
228	19.00	0.07	0.033	0.122	0.028	0.00

229	19.08	0.10	0.050	0.121	0.042	0.01
230	19.17	0.10	0.050	0.121	0.042	0.01
231	19.25	0.10	0.050	0.120	0.042	0.01
232	19.33	0.13	0.066	0.120	0.056	0.01
233	19.42	0.13	0.066	0.119	0.056	0.01
234	19.50	0.13	0.066	0.119	0.056	0.01
235	19.58	0.10	0.050	0.118	0.042	0.01
236	19.67	0.10	0.050	0.117	0.042	0.01
237	19.75	0.10	0.050	0.117	0.042	0.01
238	19.83	0.07	0.033	0.116	0.028	0.00
239	19.92	0.07	0.033	0.116	0.028	0.00
240	20.00	0.07	0.033	0.115	0.028	0.00
241	20.08	0.10	0.050	0.115	0.042	0.01
242	20.17	0.10	0.050	0.114	0.042	0.01
243	20.25	0.10	0.050	0.114	0.042	0.01
244	20.33	0.10	0.050	0.113	0.042	0.01
245	20.42	0.10	0.050	0.113	0.042	0.01
246	20.50	0.10	0.050	0.112	0.042	0.01
247	20.58	0.10	0.050	0.112	0.042	0.01
248	20.67	0.10	0.050	0.111	0.042	0.01
249	20.75	0.10	0.050	0.111	0.042	0.01
250	20.83	0.07	0.033	0.111	0.028	0.00
251	20.92	0.07	0.033	0.110	0.028	0.00
252	21.00	0.07	0.033	0.110	0.028	0.00
253	21.08	0.10	0.050	0.109	0.042	0.01
254	21.17	0.10	0.050	0.109	0.042	0.01
255	21.25	0.10	0.050	0.108	0.042	0.01
256	21.33	0.07	0.033	0.108	0.028	0.00
257	21.42	0.07	0.033	0.108	0.028	0.00
258	21.50	0.07	0.033	0.107	0.028	0.00
259	21.58	0.10	0.050	0.107	0.042	0.01
260	21.67	0.10	0.050	0.106	0.042	0.01
261	21.75	0.10	0.050	0.106	0.042	0.01
262	21.83	0.07	0.033	0.106	0.028	0.00
263	21.92	0.07	0.033	0.105	0.028	0.00
264	22.00	0.07	0.033	0.105	0.028	0.00
265	22.08	0.10	0.050	0.105	0.042	0.01
266	22.17	0.10	0.050	0.104	0.042	0.01
267	22.25	0.10	0.050	0.104	0.042	0.01
268	22.33	0.07	0.033	0.104	0.028	0.00
269	22.42	0.07	0.033	0.103	0.028	0.00
270	22.50	0.07	0.033	0.103	0.028	0.00
271	22.58	0.07	0.033	0.103	0.028	0.00
272	22.67	0.07	0.033	0.102	0.028	0.00
273	22.75	0.07	0.033	0.102	0.028	0.00
274	22.83	0.07	0.033	0.102	0.028	0.00
275	22.92	0.07	0.033	0.102	0.028	0.00
276	23.00	0.07	0.033	0.101	0.028	0.00
277	23.08	0.07	0.033	0.101	0.028	0.00
278	23.17	0.07	0.033	0.101	0.028	0.00
279	23.25	0.07	0.033	0.101	0.028	0.00
280	23.33	0.07	0.033	0.100	0.028	0.00
281	23.42	0.07	0.033	0.100	0.028	0.00
282	23.50	0.07	0.033	0.100	0.028	0.00
283	23.58	0.07	0.033	0.100	0.028	0.00
284	23.67	0.07	0.033	0.100	0.028	0.00
285	23.75	0.07	0.033	0.100	0.028	0.00
286	23.83	0.07	0.033	0.099	0.028	0.00
287	23.92	0.07	0.033	0.099	0.028	0.00
288	24.00	0.07	0.033	0.099	0.028	0.00
Sum =		100.0		Sum =	18.9	

Flood volume = Effective rainfall 1.58(In)
times area 1.3(Ac.)/[(In)/(Ft.)] = 0.2(Ac.Ft)
Total soil loss = 2.56(In)
Total soil loss = 0.283(Ac.Ft)

Total rainfall = 4.14(In)
Flood volume = 7577.1 Cubic Feet
Total soil loss = 12307.4 Cubic Feet

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--------------------------------------------------------------------
 Peak flow rate of this hydrograph =      0.524(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    0.0004    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    0.01  Q       |        |        |        |
  1+ 5    0.0008    0.01  Q       |        |        |        |
  1+10    0.0009    0.01  Q       |        |        |        |
  1+15    0.0010    0.01  Q       |        |        |        |
  1+20    0.0010    0.01  Q       |        |        |        |
  1+25    0.0011    0.01  Q       |        |        |        |
  1+30    0.0012    0.01  Q       |        |        |        |
  1+35    0.0012    0.01  Q       |        |        |        |
  1+40    0.0013    0.01  Q       |        |        |        |
  1+45    0.0014    0.01  Q       |        |        |        |
  1+50    0.0015    0.01  Q       |        |        |        |
  1+55    0.0016    0.01  Q       |        |        |        |
  2+ 0    0.0016    0.01  Q       |        |        |        |
  2+ 5    0.0017    0.01  Q       |        |        |        |
  2+10    0.0018    0.01  Q       |        |        |        |
  2+15    0.0019    0.01  Q       |        |        |        |
  2+20    0.0020    0.01  Q       |        |        |        |
  2+25    0.0021    0.01  Q       |        |        |        |
  2+30    0.0022    0.01  Q       |        |        |        |
  2+35    0.0023    0.02  Q       |        |        |        |
  2+40    0.0024    0.02  Q       |        |        |        |
  2+45    0.0025    0.02  Q       |        |        |        |
  2+50    0.0026    0.02  Q       |        |        |        |
  2+55    0.0027    0.02  Q       |        |        |        |
  3+ 0    0.0028    0.02  Q       |        |        |        |
  3+ 5    0.0030    0.02  Q       |        |        |        |
  3+10    0.0031    0.02  Q       |        |        |        |
  3+15    0.0032    0.02  Q       |        |        |        |
  3+20    0.0033    0.02  Q       |        |        |        |
  3+25    0.0034    0.02  Q       |        |        |        |
  3+30    0.0035    0.02  Q       |        |        |        |
  3+35    0.0036    0.02  Q       |        |        |        |
  3+40    0.0037    0.02  Q       |        |        |        |
  3+45    0.0038    0.02  Q       |        |        |        |
  3+50    0.0040    0.02  Q       |        |        |        |
  3+55    0.0041    0.02  Q       |        |        |        |
  4+ 0    0.0042    0.02  Q       |        |        |        |
  4+ 5    0.0044    0.02  QV      |        |        |        |
  4+10    0.0045    0.02  QV      |        |        |        |
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4+15    0.0046    0.02  QV      |       |       |       |
4+20    0.0048    0.02  QV      |       |       |       |
4+25    0.0049    0.02  QV      |       |       |       |
4+30    0.0051    0.02  QV      |       |       |       |
4+35    0.0053    0.02  QV      |       |       |       |
4+40    0.0054    0.02  QV      |       |       |       |
4+45    0.0056    0.02  QV      |       |       |       |
4+50    0.0057    0.02  QV      |       |       |       |
4+55    0.0059    0.03  QV      |       |       |       |
5+ 0    0.0061    0.03  QV      |       |       |       |
5+ 5    0.0063    0.02  QV      |       |       |       |
5+10    0.0064    0.02  QV      |       |       |       |
5+15    0.0065    0.02  QV      |       |       |       |
5+20    0.0067    0.02  QV      |       |       |       |
5+25    0.0068    0.02  QV      |       |       |       |
5+30    0.0070    0.02  QV      |       |       |       |
5+35    0.0072    0.02  QV      |       |       |       |
5+40    0.0073    0.03  QV      |       |       |       |
5+45    0.0075    0.03  QV      |       |       |       |
5+50    0.0077    0.03  QV      |       |       |       |
5+55    0.0079    0.03  QV      |       |       |       |
6+ 0    0.0080    0.03  QV      |       |       |       |
6+ 5    0.0082    0.03  QV      |       |       |       |
6+10    0.0084    0.03  QV      |       |       |       |
6+15    0.0086    0.03  QV      |       |       |       |
6+20    0.0088    0.03  Q V     |       |       |       |
6+25    0.0090    0.03  Q V     |       |       |       |
6+30    0.0092    0.03  Q V     |       |       |       |
6+35    0.0095    0.03  Q V     |       |       |       |
6+40    0.0097    0.03  Q V     |       |       |       |
6+45    0.0099    0.03  Q V     |       |       |       |
6+50    0.0101    0.03  Q V     |       |       |       |
6+55    0.0104    0.03  Q V     |       |       |       |
7+ 0    0.0106    0.03  Q V     |       |       |       |
7+ 5    0.0108    0.03  Q V     |       |       |       |
7+10    0.0110    0.03  Q V     |       |       |       |
7+15    0.0112    0.03  Q V     |       |       |       |
7+20    0.0115    0.03  Q V     |       |       |       |
7+25    0.0117    0.04  Q V     |       |       |       |
7+30    0.0120    0.04  Q V     |       |       |       |
7+35    0.0122    0.04  Q V     |       |       |       |
7+40    0.0125    0.04  Q V     |       |       |       |
7+45    0.0128    0.04  Q V     |       |       |       |
7+50    0.0131    0.04  Q  V    |       |       |       |
7+55    0.0133    0.04  Q  V    |       |       |       |
8+ 0    0.0136    0.04  Q  V    |       |       |       |
8+ 5    0.0138    0.03  Q  V    |       |       |       |
8+10    0.0140    0.02  Q  V    |       |       |       |
8+15    0.0141    0.02  Q  V    |       |       |       |
8+20    0.0143    0.02  Q  V    |       |       |       |
8+25    0.0144    0.02  Q  V    |       |       |       |
8+30    0.0146    0.03  Q  V    |       |       |       |
8+35    0.0149    0.04  Q  V    |       |       |       |
8+40    0.0152    0.05  Q  V    |       |       |       |
8+45    0.0156    0.05  Q  V    |       |       |       |
8+50    0.0161    0.07  Q  V    |       |       |       |
8+55    0.0166    0.08  Q  V    |       |       |       |
9+ 0    0.0171    0.08  Q  V    |       |       |       |
9+ 5    0.0179    0.11  Q   V   |       |       |       |
9+10    0.0188    0.13  Q   V   |       |       |       |
9+15    0.0196    0.13  Q   V   |       |       |       |
9+20    0.0206    0.14  Q   V   |       |       |       |
9+25    0.0217    0.15  Q   V   |       |       |       |
9+30    0.0227    0.15  Q    V  |       |       |       |
9+35    0.0239    0.17  Q    V  |       |       |       |
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  9+40     0.0251    0.18  Q    V    |         |         |         |
  9+45     0.0263    0.18  Q     V   |         |         |         |
  9+50     0.0277    0.20  Q     V   |         |         |         |
  9+55     0.0291    0.20  Q     V   |         |         |         |
 10+ 0     0.0305    0.21  Q      V  |         |         |         |
 10+ 5     0.0312    0.11  Q      V  |         |         |         |
 10+10     0.0316    0.05  Q      V  |         |         |         |
 10+15     0.0320    0.05  Q      V  |         |         |         |
 10+20     0.0324    0.06  Q      V  |         |         |         |
 10+25     0.0328    0.06  Q      V  |         |         |         |
 10+30     0.0332    0.06  Q      V  |         |         |         |
 10+35     0.0341    0.13  Q      V  |         |         |         |
 10+40     0.0353    0.17  Q       V |         |         |         |
 10+45     0.0365    0.17  Q       V |         |         |         |
 10+50     0.0377    0.17  Q       V |         |         |         |
 10+55     0.0389    0.18  Q       V |         |         |         |
 11+ 0     0.0401    0.18  Q        V|         |         |         |
 11+ 5     0.0412    0.16  Q        V|         |         |         |
 11+10     0.0423    0.16  Q        V|         |         |         |
 11+15     0.0434    0.16  Q        V|         |         |         |
 11+20     0.0445    0.16  Q         V         |         |         |
 11+25     0.0456    0.16  Q         V         |         |         |
 11+30     0.0467    0.16  Q         V         |         |         |
 11+35     0.0477    0.14  Q         V         |         |         |
 11+40     0.0485    0.12  Q         |V        |         |         |
 11+45     0.0494    0.12  Q         |V        |         |         |
 11+50     0.0503    0.14  Q         |V        |         |         |
 11+55     0.0513    0.15  Q         |V        |         |         |
 12+ 0     0.0523    0.15  Q         | V       |         |         |
 12+ 5     0.0541    0.25  |Q        | V       |         |         |
 12+10     0.0562    0.31  |Q        | V       |         |         |
 12+15     0.0583    0.31  |Q        |  V      |         |         |
 12+20     0.0605    0.32  |Q        |  V      |         |         |
 12+25     0.0628    0.33  |Q        |   V     |         |         |
 12+30     0.0651    0.33  |Q        |   V     |         |         |
 12+35     0.0676    0.36  |Q        |    V    |         |         |
 12+40     0.0702    0.38  |Q        |     V   |         |         |
 12+45     0.0728    0.38  |Q        |     V   |         |         |
 12+50     0.0755    0.40  |Q        |      V  |         |         |
 12+55     0.0783    0.40  |Q        |       V |         |         |
 13+ 0     0.0811    0.41  |Q        |       V |         |         |
 13+ 5     0.0844    0.48  |Q        |        V|         |         |
 13+10     0.0880    0.52  | Q       |         V         |         |
 13+15     0.0916    0.52  | Q       |         |V        |         |
 13+20     0.0952    0.52  | Q       |         |V        |         |
 13+25     0.0988    0.52  | Q       |         | V       |         |
 13+30     0.1024    0.52  | Q       |         |  V      |         |
 13+35     0.1049    0.37  |Q        |         |   V     |         |
 13+40     0.1068    0.28  |Q        |         |   V     |         |
 13+45     0.1088    0.28  |Q        |         |    V    |         |
 13+50     0.1108    0.29  |Q        |         |    V    |         |
 13+55     0.1127    0.29  |Q        |         |    V    |         |
 14+ 0     0.1147    0.29  |Q        |         |    V    |         |
 14+ 5     0.1171    0.35  |Q        |         |    V    |         |
 14+10     0.1197    0.38  |Q        |         |      V  |         |
 14+15     0.1223    0.38  |Q        |         |       V |         |
 14+20     0.1248    0.37  |Q        |         |       V |         |
 14+25     0.1273    0.36  |Q        |         |        V|         |
 14+30     0.1298    0.36  |Q        |         |        V|         |
 14+35     0.1323    0.36  |Q        |         |         V         |
 14+40     0.1348    0.36  |Q        |         |         V         |
 14+45     0.1373    0.36  |Q        |         |         |V        |
 14+50     0.1397    0.35  |Q        |         |         | V       |
 14+55     0.1421    0.34  |Q        |         |         | V       |
 15+ 0     0.1444    0.34  |Q        |         |         | V       |
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15+ 5      0.1467     0.33  |Q       |        |        |  V      |
15+10      0.1490     0.32  |Q       |        |        |   V     |
15+15      0.1512     0.33  |Q       |        |        |   V     |
15+20      0.1534     0.31  |Q       |        |        |    V    |
15+25      0.1555     0.31  |Q       |        |        |    V    |
15+30      0.1576     0.31  |Q       |        |        |     V   |
15+35      0.1593     0.25  |Q       |        |        |     V   |
15+40      0.1608     0.22  Q        |        |        |     V   |
15+45      0.1624     0.22  Q        |        |        |      V  |
15+50      0.1639     0.22  Q        |        |        |      V  |
15+55      0.1654     0.22  Q        |        |        |       V |
16+ 0      0.1670     0.22  Q        |        |        |       V |
16+ 5      0.1676     0.09  Q        |        |        |       V |
16+10      0.1677     0.01  Q        |        |        |       V |
16+15      0.1678     0.01  Q        |        |        |       V |
16+20      0.1678     0.01  Q        |        |        |       V |
16+25      0.1679     0.01  Q        |        |        |       V |
16+30      0.1680     0.01  Q        |        |        |       V |
16+35      0.1681     0.01  Q        |        |        |       V |
16+40      0.1682     0.01  Q        |        |        |       V |
16+45      0.1682     0.01  Q        |        |        |       V |
16+50      0.1683     0.01  Q        |        |        |       V |
16+55      0.1684     0.01  Q        |        |        |       V |
17+ 0      0.1684     0.01  Q        |        |        |       V |
17+ 5      0.1685     0.01  Q        |        |        |       V |
17+10      0.1686     0.02  Q        |        |        |       V |
17+15      0.1687     0.02  Q        |        |        |       V |
17+20      0.1689     0.02  Q        |        |        |       V |
17+25      0.1690     0.02  Q        |        |        |       V |
17+30      0.1691     0.02  Q        |        |        |       V |
17+35      0.1692     0.02  Q        |        |        |       V |
17+40      0.1693     0.02  Q        |        |        |       V |
17+45      0.1694     0.02  Q        |        |        |       V |
17+50      0.1695     0.01  Q        |        |        |       V |
17+55      0.1696     0.01  Q        |        |        |        V|
18+ 0      0.1697     0.01  Q        |        |        |        V|
18+ 5      0.1698     0.01  Q        |        |        |        V|
18+10      0.1699     0.01  Q        |        |        |        V|
18+15      0.1700     0.01  Q        |        |        |        V|
18+20      0.1701     0.01  Q        |        |        |        V|
18+25      0.1701     0.01  Q        |        |        |        V|
18+30      0.1702     0.01  Q        |        |        |        V|
18+35      0.1703     0.01  Q        |        |        |        V|
18+40      0.1704     0.01  Q        |        |        |        V|
18+45      0.1704     0.01  Q        |        |        |        V|
18+50      0.1705     0.01  Q        |        |        |        V|
18+55      0.1705     0.01  Q        |        |        |        V|
19+ 0      0.1706     0.01  Q        |        |        |        V|
19+ 5      0.1706     0.01  Q        |        |        |        V|
19+10      0.1707     0.01  Q        |        |        |        V|
19+15      0.1708     0.01  Q        |        |        |        V|
19+20      0.1709     0.01  Q        |        |        |        V|
19+25      0.1709     0.01  Q        |        |        |        V|
19+30      0.1710     0.01  Q        |        |        |        V|
19+35      0.1711     0.01  Q        |        |        |        V|
19+40      0.1712     0.01  Q        |        |        |        V|
19+45      0.1712     0.01  Q        |        |        |        V|
19+50      0.1713     0.01  Q        |        |        |        V|
19+55      0.1713     0.01  Q        |        |        |        V|
20+ 0      0.1714     0.01  Q        |        |        |        V|
20+ 5      0.1714     0.01  Q        |        |        |        V|
20+10      0.1715     0.01  Q        |        |        |        V|
20+15      0.1716     0.01  Q        |        |        |        V|
20+20      0.1716     0.01  Q        |        |        |        V|
20+25      0.1717     0.01  Q        |        |        |        V|
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20+30	0.1718	0.01	Q	|	|	|	V|
20+35	0.1718	0.01	Q	|	|	|	V|
20+40	0.1719	0.01	Q	|	|	|	V|
20+45	0.1720	0.01	Q	|	|	|	V|
20+50	0.1720	0.01	Q	|	|	|	V|
20+55	0.1721	0.01	Q	|	|	|	V|
21+ 0	0.1721	0.01	Q	|	|	|	V|
21+ 5	0.1722	0.01	Q	|	|	|	V|
21+10	0.1722	0.01	Q	|	|	|	V|
21+15	0.1723	0.01	Q	|	|	|	V|
21+20	0.1724	0.01	Q	|	|	|	V|
21+25	0.1724	0.01	Q	|	|	|	V|
21+30	0.1725	0.01	Q	|	|	|	V|
21+35	0.1725	0.01	Q	|	|	|	V|
21+40	0.1726	0.01	Q	|	|	|	V|
21+45	0.1727	0.01	Q	|	|	|	V|
21+50	0.1727	0.01	Q	|	|	|	V|
21+55	0.1727	0.01	Q	|	|	|	V|
22+ 0	0.1728	0.01	Q	|	|	|	V|
22+ 5	0.1729	0.01	Q	|	|	|	V|
22+10	0.1729	0.01	Q	|	|	|	V|
22+15	0.1730	0.01	Q	|	|	|	V|
22+20	0.1730	0.01	Q	|	|	|	V|
22+25	0.1731	0.01	Q	|	|	|	V|
22+30	0.1731	0.01	Q	|	|	|	V|
22+35	0.1732	0.01	Q	|	|	|	V|
22+40	0.1732	0.01	Q	|	|	|	V|
22+45	0.1733	0.01	Q	|	|	|	V|
22+50	0.1733	0.01	Q	|	|	|	V|
22+55	0.1734	0.01	Q	|	|	|	V|
23+ 0	0.1734	0.01	Q	|	|	|	V|
23+ 5	0.1734	0.01	Q	|	|	|	V|
23+10	0.1735	0.01	Q	|	|	|	V|
23+15	0.1735	0.01	Q	|	|	|	V|
23+20	0.1736	0.01	Q	|	|	|	V|
23+25	0.1736	0.01	Q	|	|	|	V|
23+30	0.1737	0.01	Q	|	|	|	V|
23+35	0.1737	0.01	Q	|	|	|	V|
23+40	0.1738	0.01	Q	|	|	|	V|
23+45	0.1738	0.01	Q	|	|	|	V|
23+50	0.1738	0.01	Q	|	|	|	V|
23+55	0.1739	0.01	Q	|	|	|	V|
24+ 0	0.1739	0.01	Q	|	|	|	V|
24+ 5	0.1739	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

Study date 09/23/20 File: APOST12.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

28771 Central Avenue Gas Station
Area A
Post-development
1-Hr 2-Yr Storm Event

Drainage Area = 0.58(Ac.) = 0.001 Sq. Mi.
Length along longest watercourse = 345.00(Ft.)
Length along longest watercourse measured to centroid = 97.38(Ft.)
Length along longest watercourse = 0.065 Mi.
Length along longest watercourse measured to centroid = 0.018 Mi.
Difference in elevation = 6.34(Ft.)
Slope along watercourse = 97.0296 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.023 Hr.
Lag time = 1.41 Min.
25% of lag time = 0.35 Min.
40% of lag time = 0.56 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
0.58	0.48	0.28

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
0.58	1.34	0.78

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 0.483(In)
Area Averaged 100-Year Rainfall = 1.340(In)

Point rain (area averaged) = 0.483(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 0.483(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
0.582	79.00	0.095

Total Area Entered = 0.58(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
79.0	61.8	0.451	0.095	0.412	1.000	0.412

Sum (F) = 0.412

Area averaged mean soil loss (F) (In/Hr) = 0.412
Minimum soil loss rate ((In/Hr)) = 0.206
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.824

Slope of intensity-duration curve for a 1 hour storm =0.4800

U n i t H y d r o g r a p h
DESERT S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	354.985	61.437	0.360
2	0.167	709.970	35.423	0.208
3	0.250	1064.955	3.140	0.018
			Sum = 100.000	Sum= 0.587

Storm Event 3 Effective Rainfall = 0.092(In)

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Loss rate(In./Hr) Low	Effective (In/Hr)
1	0.08	4.40	0.048	0.412	0.040	0.01
2	0.17	4.50	0.050	0.412	0.041	0.01
3	0.25	5.40	0.059	0.412	0.049	0.01
4	0.33	5.40	0.059	0.412	0.049	0.01
5	0.42	5.70	0.063	0.412	0.052	0.01
6	0.50	6.40	0.070	0.412	0.058	0.01
7	0.58	7.90	0.087	0.412	0.072	0.02
8	0.67	9.10	0.100	0.412	0.083	0.02
9	0.75	12.80	0.141	0.412	0.116	0.02
10	0.83	25.60	0.282	0.412	0.232	0.05
11	0.92	7.90	0.087	0.412	0.072	0.02
12	1.00	4.90	0.054	0.412	0.044	0.01
Sum =		100.0			Sum =	0.2

Flood volume = Effective rainfall 0.02(In)
times area 0.6(Ac.)/[(In)/(Ft.)] = 0.0(Ac.Ft)
Total soil loss = 0.08(In)
Total soil loss = 0.004(Ac.Ft)
Total rainfall = 0.09(In)
Flood volume = 34.1 Cubic Feet
Total soil loss = 159.8 Cubic Feet

Storm Event 2 Effective Rainfall = 0.174(In)

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Loss rate(In./Hr) Low	Effective (In/Hr)

1	0.08	4.40	0.092	0.412	0.076	0.02
2	0.17	4.50	0.094	0.412	0.077	0.02
3	0.25	5.40	0.113	0.412	0.093	0.02
4	0.33	5.40	0.113	0.412	0.093	0.02
5	0.42	5.70	0.119	0.412	0.098	0.02
6	0.50	6.40	0.134	0.412	0.110	0.02
7	0.58	7.90	0.165	0.412	0.136	0.03
8	0.67	9.10	0.190	0.412	0.156	0.03
9	0.75	12.80	0.267	0.412	0.220	0.05
10	0.83	25.60	0.534	0.412	---	0.12
11	0.92	7.90	0.165	0.412	0.136	0.03
12	1.00	4.90	0.102	0.412	0.084	0.02
Sum =		100.0			Sum =	0.4

Flood volume = Effective rainfall 0.03(In)
times area 0.6(Ac.)/[(In)/(Ft.)] = 0.0(Ac.Ft)
Total soil loss = 0.14(In)
Total soil loss = 0.007(Ac.Ft)
Total rainfall = 0.17(In)
Flood volume = 69.5 Cubic Feet
Total soil loss = 297.8 Cubic Feet

Storm Event 1 Effective Rainfall = 0.483(In)

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	4.40	0.255	0.412	0.210	0.04
2	0.17	4.50	0.261	0.412	0.215	0.05
3	0.25	5.40	0.313	0.412	0.258	0.06
4	0.33	5.40	0.313	0.412	0.258	0.06
5	0.42	5.70	0.330	0.412	0.272	0.06
6	0.50	6.40	0.371	0.412	0.306	0.07
7	0.58	7.90	0.458	0.412	---	0.05
8	0.67	9.10	0.527	0.412	---	0.12
9	0.75	12.80	0.742	0.412	---	0.33
10	0.83	25.60	1.484	0.412	---	1.07
11	0.92	7.90	0.458	0.412	---	0.05
12	1.00	4.90	0.284	0.412	0.234	0.05
Sum =		100.0			Sum =	2.0

Flood volume = Effective rainfall 0.17(In)
times area 0.6(Ac.)/[(In)/(Ft.)] = 0.0(Ac.Ft)
Total soil loss = 0.32(In)
Total soil loss = 0.015(Ac.Ft)
Total rainfall = 0.48(In)
Flood volume = 348.9 Cubic Feet
Total soil loss = 671.5 Cubic Feet

Peak flow rate of this hydrograph = 0.457(CFS)

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TOTAL OF: 3 1 - H O U R S T O R M E V E N T S

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	0.00	Q	|	|	|	|
0+15	0.0001	0.01	Q	|	|	|	|
0+20	0.0001	0.01	Q	|	|	|	|
0+25	0.0002	0.01	Q	|	|	|	|
0+30	0.0002	0.01	Q	|	|	|	|
0+35	0.0003	0.01	QV	|	|	|	|

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  0+40      0.0004     0.01  QV       |        |        |        |
  0+45      0.0004     0.01  QV       |        |        |        |
  0+50      0.0006     0.02  Q V      |        |        |        |
  0+55      0.0007     0.02  Q V      |        |        |        |
  1+ 0      0.0008     0.01  Q V      |        |        |        |
  1+ 5      0.0008     0.01  Q  V     |        |        |        |
  1+10      0.0009     0.01  Q  V     |        |        |        |
  1+15      0.0009     0.01  Q  V     |        |        |        |
  1+20      0.0010     0.01  Q  V     |        |        |        |
  1+25      0.0011     0.01  Q   V    |        |        |        |
  1+30      0.0012     0.01  Q   V    |        |        |        |
  1+35      0.0013     0.02  Q    V   |        |        |        |
  1+40      0.0014     0.02  Q    V   |        |        |        |
  1+45      0.0016     0.02  Q     V  |        |        |        |
  1+50      0.0020     0.05  Q      V |        |        |        |
  1+55      0.0022     0.04  Q       V|        |        |        |
  2+ 0      0.0023     0.01  Q       V|        |        |        |
  2+ 5      0.0024     0.02  Q       V|        |        |        |
  2+10      0.0026     0.03  Q        V        |        |        |
  2+15      0.0028     0.03  Q        V        |        |        |
  2+20      0.0030     0.03  Q        |V       |        |        |
  2+25      0.0033     0.03  Q        | V      |        |        |
  2+30      0.0035     0.04  Q        |  V     |        |        |
  2+35      0.0037     0.03  Q        |   V    |        |        |
  2+40      0.0041     0.05  Q        |    V   |        |        |
  2+45      0.0051     0.14  Q        |       V|        |        |
  2+50      0.0082     0.46  |Q       |        |        |V       |
  2+55      0.0099     0.25  Q        |        |        |      V |
  3+ 0      0.0103     0.05  Q        |        |        |       V|
  3+ 5      0.0103     0.01  Q        |        |        |       V|
  3+10      0.0103     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

Study date 09/23/20 File: APOST15.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

28771 Central Avenue Gas Station
Area A
Post-development
1-Hr 5-Yr Storm Event

Drainage Area = 0.58(Ac.) = 0.001 Sq. Mi.
Length along longest watercourse = 345.00(Ft.)
Length along longest watercourse measured to centroid = 97.38(Ft.)
Length along longest watercourse = 0.065 Mi.
Length along longest watercourse measured to centroid = 0.018 Mi.
Difference in elevation = 6.34(Ft.)
Slope along watercourse = 97.0296 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.023 Hr.
Lag time = 1.41 Min.
25% of lag time = 0.35 Min.
40% of lag time = 0.56 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
0.58	0.48	0.28

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
0.58	1.34	0.78

STORM EVENT (YEAR) = 5.00
Area Averaged 2-Year Rainfall = 0.483(In)
Area Averaged 100-Year Rainfall = 1.340(In)

Point rain (area averaged) = 0.684(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 0.684(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
0.582	79.00	0.095

Total Area Entered = 0.58(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
79.0	61.8	0.451	0.095	0.412	1.000	0.412

Sum (F) = 0.412

Area averaged mean soil loss (F) (In/Hr) = 0.412

Minimum soil loss rate ((In/Hr)) = 0.206

(for 24 hour storm duration)

Soil low loss rate (decimal) = 0.824

Slope of intensity-duration curve for a 1 hour storm =0.4800

U n i t H y d r o g r a p h

DESERT S-Curve

Unit Hydrograph Data

	Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	354.985	61.437	0.360
2	0.167	709.970	35.423	0.208
3	0.250	1064.955	3.140	0.018
			Sum = 100.000	Sum= 0.587

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	4.40	0.361	0.412	0.298	0.06
2	0.17	4.50	0.369	0.412	0.304	0.06
3	0.25	5.40	0.443	0.412	---	0.03
4	0.33	5.40	0.443	0.412	---	0.03
5	0.42	5.70	0.468	0.412	---	0.06
6	0.50	6.40	0.525	0.412	---	0.11
7	0.58	7.90	0.648	0.412	---	0.24
8	0.67	9.10	0.747	0.412	---	0.33
9	0.75	12.80	1.050	0.412	---	0.64
10	0.83	25.60	2.100	0.412	---	1.69
11	0.92	7.90	0.648	0.412	---	0.24
12	1.00	4.90	0.402	0.412	0.331	0.07
Sum =		100.0			Sum =	3.6

Flood volume = Effective rainfall 0.30(In)

times area 0.6(Ac.)/[(In)/(Ft.)] = 0.0(Ac.Ft)

Total soil loss = 0.39(In)

Total soil loss = 0.019(Ac.Ft)

Total rainfall = 0.68(In)

Flood volume = 627.1 Cubic Feet

Total soil loss = 817.4 Cubic Feet

Peak flow rate of this hydrograph = 0.747(CFS)

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1 - 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))

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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      0.0004      0.04  QV       |         |         |         |
  0+15      0.0006      0.03  QV       |         |         |         |
  0+20      0.0007      0.02  QV       |         |         |         |
  0+25      0.0009      0.03  Q V      |         |         |         |
  0+30      0.0013      0.05  Q  V     |         |         |         |
  0+35      0.0020      0.11  Q    V   |         |         |         |
  0+40      0.0032      0.17  Q       V |        |         |         |
  0+45      0.0053      0.30  |Q       |   V     |         |         |
  0+50      0.0104      0.75  | Q      |         |       V|         |
  0+55      0.0135      0.45  |Q       |         |         |      V  |
  1+ 0      0.0143      0.11  Q        |         |         |       V|
  1+ 5      0.0144      0.02  Q        |         |         |       V|
  1+10      0.0144      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

Study date 09/23/20 File: APOST110.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

28771 Central Avenue Gas Station
Area A
Post-development
1-Hr 10-Yr Storm Event

Drainage Area = 0.58(Ac.) = 0.001 Sq. Mi.
Length along longest watercourse = 345.00(Ft.)
Length along longest watercourse measured to centroid = 97.38(Ft.)
Length along longest watercourse = 0.065 Mi.
Length along longest watercourse measured to centroid = 0.018 Mi.
Difference in elevation = 6.34(Ft.)
Slope along watercourse = 97.0296 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.023 Hr.
Lag time = 1.41 Min.
25% of lag time = 0.35 Min.
40% of lag time = 0.56 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
0.58	0.48	0.28

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
0.58	1.34	0.78

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 0.483(In)
Area Averaged 100-Year Rainfall = 1.340(In)

Point rain (area averaged) = 0.836(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 0.836(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
0.582	79.00	0.095

Total Area Entered = 0.58(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
79.0	61.8	0.451	0.095	0.412	1.000	0.412

Sum (F) = 0.412

Area averaged mean soil loss (F) (In/Hr) = 0.412
Minimum soil loss rate ((In/Hr)) = 0.206
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.824

Slope of intensity-duration curve for a 1 hour storm =0.4800

U n i t H y d r o g r a p h
DESERT S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	354.985	61.437	0.360
2	0.167	709.970	35.423	0.208
3	0.250	1064.955	3.140	0.018
			Sum = 100.000	Sum= 0.587

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	4.40	0.441	0.412	---	0.03
2	0.17	4.50	0.451	0.412	---	0.04
3	0.25	5.40	0.541	0.412	---	0.13
4	0.33	5.40	0.541	0.412	---	0.13
5	0.42	5.70	0.572	0.412	---	0.16
6	0.50	6.40	0.642	0.412	---	0.23
7	0.58	7.90	0.792	0.412	---	0.38
8	0.67	9.10	0.912	0.412	---	0.50
9	0.75	12.80	1.283	0.412	---	0.87
10	0.83	25.60	2.567	0.412	---	2.15
11	0.92	7.90	0.792	0.412	---	0.38
12	1.00	4.90	0.491	0.412	---	0.08
Sum =		100.0			Sum =	5.1

Flood volume = Effective rainfall 0.42(In)
times area 0.6(Ac.)/[(In)/(Ft.)] = 0.0(Ac.Ft)
Total soil loss = 0.41(In)
Total soil loss = 0.020(Ac.Ft)
Total rainfall = 0.84(In)
Flood volume = 894.5 Cubic Feet
Total soil loss = 870.8 Cubic Feet

Peak flow rate of this hydrograph = 0.967(CFS)

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1 - 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      0.0006      0.06  QV       |        |        |        |
  0+20      0.0011      0.07  Q V      |        |        |        |
  0+25      0.0017      0.09  Q  V     |        |        |        |
  0+30      0.0025      0.12  Q   V    |        |        |        |
  0+35      0.0038      0.19  Q     V  |        |        |        |
  0+40      0.0056      0.26  |Q       V        |        |        |
  0+45      0.0085      0.43  |Q       |    V   |        |        |
  0+50      0.0152      0.97  |  Q     |        |       V|        |
  0+55      0.0193      0.60  | Q      |        |        |     V  |
  1+ 0      0.0204      0.15  Q        |        |        |       V|
  1+ 5      0.0205      0.02  Q        |        |        |       V|
  1+10      0.0205      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

Study date 09/23/20 File: APOST32.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

28771 Central Avenue Gas Station
Area A
Post-development
3-Hr 2-Yr Storm Event

Drainage Area = 0.58(Ac.) = 0.001 Sq. Mi.
Length along longest watercourse = 345.00(Ft.)
Length along longest watercourse measured to centroid = 97.38(Ft.)
Length along longest watercourse = 0.065 Mi.
Length along longest watercourse measured to centroid = 0.018 Mi.
Difference in elevation = 6.34(Ft.)
Slope along watercourse = 97.0296 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.023 Hr.
Lag time = 1.41 Min.
25% of lag time = 0.35 Min.
40% of lag time = 0.56 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
0.58	0.88	0.51

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
0.58	2.20	1.28

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 0.877(In)
Area Averaged 100-Year Rainfall = 2.200(In)

Point rain (area averaged) = 0.877(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 0.877(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
0.582	79.00	0.095

Total Area Entered = 0.58(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
79.0	61.8	0.451	0.095	0.412	1.000	0.412

Sum (F) = 0.412

Area averaged mean soil loss (F) (In/Hr) = 0.412

Minimum soil loss rate ((In/Hr)) = 0.206

(for 24 hour storm duration)

Soil low loss rate (decimal) = 0.824

U n i t H y d r o g r a p h

DESERT S-Curve

Unit Hydrograph Data

	Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	354.985	61.437	0.360
2	0.167	709.970	35.423	0.208
3	0.250	1064.955	3.140	0.018
			Sum = 100.000	Sum= 0.587

Storm Event 3 Effective Rainfall = 0.167(In)

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	1.30	0.026	0.412	0.021	0.00
2	0.17	1.30	0.026	0.412	0.021	0.00
3	0.25	1.10	0.022	0.412	0.018	0.00
4	0.33	1.50	0.030	0.412	0.025	0.01
5	0.42	1.50	0.030	0.412	0.025	0.01
6	0.50	1.80	0.036	0.412	0.030	0.01
7	0.58	1.50	0.030	0.412	0.025	0.01
8	0.67	1.80	0.036	0.412	0.030	0.01
9	0.75	1.80	0.036	0.412	0.030	0.01
10	0.83	1.50	0.030	0.412	0.025	0.01
11	0.92	1.60	0.032	0.412	0.026	0.01
12	1.00	1.80	0.036	0.412	0.030	0.01
13	1.08	2.20	0.044	0.412	0.036	0.01
14	1.17	2.20	0.044	0.412	0.036	0.01
15	1.25	2.20	0.044	0.412	0.036	0.01
16	1.33	2.00	0.040	0.412	0.033	0.01
17	1.42	2.60	0.052	0.412	0.043	0.01
18	1.50	2.70	0.054	0.412	0.044	0.01
19	1.58	2.40	0.048	0.412	0.040	0.01
20	1.67	2.70	0.054	0.412	0.044	0.01
21	1.75	3.30	0.066	0.412	0.054	0.01
22	1.83	3.10	0.062	0.412	0.051	0.01
23	1.92	2.90	0.058	0.412	0.048	0.01
24	2.00	3.00	0.060	0.412	0.049	0.01
25	2.08	3.10	0.062	0.412	0.051	0.01
26	2.17	4.20	0.084	0.412	0.069	0.01
27	2.25	5.00	0.100	0.412	0.082	0.02
28	2.33	3.50	0.070	0.412	0.058	0.01

29	2.42	6.80	0.136	0.412	0.112	0.02
30	2.50	7.30	0.146	0.412	0.120	0.03
31	2.58	8.20	0.164	0.412	0.135	0.03
32	2.67	5.90	0.118	0.412	0.097	0.02
33	2.75	2.00	0.040	0.412	0.033	0.01
34	2.83	1.80	0.036	0.412	0.030	0.01
35	2.92	1.80	0.036	0.412	0.030	0.01
36	3.00	0.60	0.012	0.412	0.010	0.00
Sum =		100.0			Sum =	0.4

Flood volume = Effective rainfall 0.03(In)
times area 0.6(Ac.)/[(In)/(Ft.)] = 0.0(Ac.Ft)
Total soil loss = 0.14(In)
Total soil loss = 0.007(Ac.Ft)
Total rainfall = 0.17(In)
Flood volume = 61.9 Cubic Feet
Total soil loss = 290.1 Cubic Feet

Storm Event 2 Effective Rainfall = 0.316(In)

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	1.30	0.049	0.412	0.041	0.01
2	0.17	1.30	0.049	0.412	0.041	0.01
3	0.25	1.10	0.042	0.412	0.034	0.01
4	0.33	1.50	0.057	0.412	0.047	0.01
5	0.42	1.50	0.057	0.412	0.047	0.01
6	0.50	1.80	0.068	0.412	0.056	0.01
7	0.58	1.50	0.057	0.412	0.047	0.01
8	0.67	1.80	0.068	0.412	0.056	0.01
9	0.75	1.80	0.068	0.412	0.056	0.01
10	0.83	1.50	0.057	0.412	0.047	0.01
11	0.92	1.60	0.061	0.412	0.050	0.01
12	1.00	1.80	0.068	0.412	0.056	0.01
13	1.08	2.20	0.083	0.412	0.069	0.01
14	1.17	2.20	0.083	0.412	0.069	0.01
15	1.25	2.20	0.083	0.412	0.069	0.01
16	1.33	2.00	0.076	0.412	0.062	0.01
17	1.42	2.60	0.099	0.412	0.081	0.02
18	1.50	2.70	0.102	0.412	0.084	0.02
19	1.58	2.40	0.091	0.412	0.075	0.02
20	1.67	2.70	0.102	0.412	0.084	0.02
21	1.75	3.30	0.125	0.412	0.103	0.02
22	1.83	3.10	0.117	0.412	0.097	0.02
23	1.92	2.90	0.110	0.412	0.091	0.02
24	2.00	3.00	0.114	0.412	0.094	0.02
25	2.08	3.10	0.117	0.412	0.097	0.02
26	2.17	4.20	0.159	0.412	0.131	0.03
27	2.25	5.00	0.189	0.412	0.156	0.03
28	2.33	3.50	0.133	0.412	0.109	0.02
29	2.42	6.80	0.258	0.412	0.212	0.05
30	2.50	7.30	0.277	0.412	0.228	0.05
31	2.58	8.20	0.311	0.412	0.256	0.05
32	2.67	5.90	0.224	0.412	0.184	0.04
33	2.75	2.00	0.076	0.412	0.062	0.01
34	2.83	1.80	0.068	0.412	0.056	0.01
35	2.92	1.80	0.068	0.412	0.056	0.01
36	3.00	0.60	0.023	0.412	0.019	0.00
Sum =		100.0			Sum =	0.7

Flood volume = Effective rainfall 0.06(In)
times area 0.6(Ac.)/[(In)/(Ft.)] = 0.0(Ac.Ft)
Total soil loss = 0.26(In)
Total soil loss = 0.013(Ac.Ft)
Total rainfall = 0.32(In)
Flood volume = 117.3 Cubic Feet

Total soil loss = 549.7 Cubic Feet

Storm Event 1 Effective Rainfall = 0.877(In)

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	1.30	0.137	0.412	0.113	0.02
2	0.17	1.30	0.137	0.412	0.113	0.02
3	0.25	1.10	0.116	0.412	0.095	0.02
4	0.33	1.50	0.158	0.412	0.130	0.03
5	0.42	1.50	0.158	0.412	0.130	0.03
6	0.50	1.80	0.189	0.412	0.156	0.03
7	0.58	1.50	0.158	0.412	0.130	0.03
8	0.67	1.80	0.189	0.412	0.156	0.03
9	0.75	1.80	0.189	0.412	0.156	0.03
10	0.83	1.50	0.158	0.412	0.130	0.03
11	0.92	1.60	0.168	0.412	0.139	0.03
12	1.00	1.80	0.189	0.412	0.156	0.03
13	1.08	2.20	0.232	0.412	0.191	0.04
14	1.17	2.20	0.232	0.412	0.191	0.04
15	1.25	2.20	0.232	0.412	0.191	0.04
16	1.33	2.00	0.210	0.412	0.173	0.04
17	1.42	2.60	0.274	0.412	0.226	0.05
18	1.50	2.70	0.284	0.412	0.234	0.05
19	1.58	2.40	0.253	0.412	0.208	0.04
20	1.67	2.70	0.284	0.412	0.234	0.05
21	1.75	3.30	0.347	0.412	0.286	0.06
22	1.83	3.10	0.326	0.412	0.269	0.06
23	1.92	2.90	0.305	0.412	0.252	0.05
24	2.00	3.00	0.316	0.412	0.260	0.06
25	2.08	3.10	0.326	0.412	0.269	0.06
26	2.17	4.20	0.442	0.412	---	0.03
27	2.25	5.00	0.526	0.412	---	0.11
28	2.33	3.50	0.368	0.412	0.304	0.06
29	2.42	6.80	0.716	0.412	---	0.30
30	2.50	7.30	0.768	0.412	---	0.36
31	2.58	8.20	0.863	0.412	---	0.45
32	2.67	5.90	0.621	0.412	---	0.21
33	2.75	2.00	0.210	0.412	0.173	0.04
34	2.83	1.80	0.189	0.412	0.156	0.03
35	2.92	1.80	0.189	0.412	0.156	0.03
36	3.00	0.60	0.063	0.412	0.052	0.01
Sum =		100.0		Sum =		2.6

Flood volume = Effective rainfall 0.22(In)
times area 0.6(Ac.)/[(In)/(Ft.)] = 0.0(Ac.Ft)
Total soil loss = 0.66(In)
Total soil loss = 0.032(Ac.Ft)
Total rainfall = 0.88(In)
Flood volume = 461.5 Cubic Feet
Total soil loss = 1391.3 Cubic Feet

Peak flow rate of this hydrograph = 0.242(CFS)

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TOTAL OF: 3 3 - H O U R S T O R M E V E N T S
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	0.0000	0.00	Q	|	|	|	|

```
0+15    0.0000   0.00  Q       |       |       |       |
0+20    0.0001   0.00  Q       |       |       |       |
0+25    0.0001   0.00  Q       |       |       |       |
0+30    0.0001   0.00  Q       |       |       |       |
0+35    0.0001   0.00  Q       |       |       |       |
0+40    0.0002   0.00  Q       |       |       |       |
0+45    0.0002   0.00  Q       |       |       |       |
0+50    0.0002   0.00  Q       |       |       |       |
0+55    0.0002   0.00  Q       |       |       |       |
1+ 0    0.0003   0.00  Q       |       |       |       |
1+ 5    0.0003   0.00  Q       |       |       |       |
1+10    0.0003   0.00  Q       |       |       |       |
1+15    0.0003   0.00  Q       |       |       |       |
1+20    0.0004   0.00  QV      |       |       |       |
1+25    0.0004   0.00  QV      |       |       |       |
1+30    0.0004   0.01  QV      |       |       |       |
1+35    0.0005   0.01  QV      |       |       |       |
1+40    0.0005   0.01  QV      |       |       |       |
1+45    0.0006   0.01  QV      |       |       |       |
1+50    0.0006   0.01  QV      |       |       |       |
1+55    0.0006   0.01  QV      |       |       |       |
2+ 0    0.0007   0.01  QV      |       |       |       |
2+ 5    0.0007   0.01  QV      |       |       |       |
2+10    0.0008   0.01  Q V     |       |       |       |
2+15    0.0009   0.01  Q V     |       |       |       |
2+20    0.0009   0.01  Q V     |       |       |       |
2+25    0.0010   0.01  Q V     |       |       |       |
2+30    0.0011   0.01  Q V     |       |       |       |
2+35    0.0012   0.02  Q  V    |       |       |       |
2+40    0.0013   0.01  Q  V    |       |       |       |
2+45    0.0013   0.01  Q  V    |       |       |       |
2+50    0.0014   0.00  Q  V    |       |       |       |
2+55    0.0014   0.00  Q  V    |       |       |       |
3+ 0    0.0014   0.00  Q  V    |       |       |       |
3+ 5    0.0014   0.00  Q  V    |       |       |       |
3+10    0.0015   0.00  Q   V   |       |       |       |
3+15    0.0015   0.00  Q   V   |       |       |       |
3+20    0.0015   0.01  Q   V   |       |       |       |
3+25    0.0016   0.01  Q   V   |       |       |       |
3+30    0.0016   0.01  Q   V   |       |       |       |
3+35    0.0017   0.01  Q   V   |       |       |       |
3+40    0.0017   0.01  Q   V   |       |       |       |
3+45    0.0018   0.01  Q   V   |       |       |       |
3+50    0.0018   0.01  Q   V   |       |       |       |
3+55    0.0018   0.01  Q    V  |       |       |       |
4+ 0    0.0019   0.01  Q    V  |       |       |       |
4+ 5    0.0019   0.01  Q    V  |       |       |       |
4+10    0.0020   0.01  Q    V  |       |       |       |
4+15    0.0021   0.01  Q    V  |       |       |       |
4+20    0.0021   0.01  Q    V  |       |       |       |
4+25    0.0022   0.01  Q    V  |       |       |       |
4+30    0.0023   0.01  Q     V |       |       |       |
4+35    0.0023   0.01  Q     V |       |       |       |
4+40    0.0024   0.01  Q     V |       |       |       |
4+45    0.0025   0.01  Q     V |       |       |       |
4+50    0.0026   0.01  Q     V |       |       |       |
4+55    0.0026   0.01  Q      V|       |       |       |
5+ 0    0.0027   0.01  Q      V|       |       |       |
5+ 5    0.0028   0.01  Q      V|       |       |       |
5+10    0.0029   0.01  Q      V|       |       |       |
5+15    0.0030   0.02  Q       V|      |       |       |
5+20    0.0031   0.02  Q       V|      |       |       |
5+25    0.0033   0.02  Q       V|      |       |       |
5+30    0.0035   0.03  Q        V|     |       |       |
5+35    0.0037   0.03  Q        V      |       |       |
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   5+40      0.0039     0.03  Q        V        |        |        |
   5+45      0.0040     0.01  Q        V        |        |        |
   5+50      0.0040     0.01  Q        V        |        |        |
   5+55      0.0041     0.01  Q        |V       |        |        |
   6+ 0      0.0041     0.00  Q        |V       |        |        |
   6+ 5      0.0042     0.01  Q        |V       |        |        |
   6+10      0.0043     0.01  Q        |V       |        |        |
   6+15      0.0043     0.01  Q        |V       |        |        |
   6+20      0.0044     0.01  Q        | V      |        |        |
   6+25      0.0046     0.02  Q        | V      |        |        |
   6+30      0.0047     0.02  Q        | V      |        |        |
   6+35      0.0048     0.02  Q        |  V     |        |        |
   6+40      0.0049     0.02  Q        |  V     |        |        |
   6+45      0.0051     0.02  Q        |  V     |        |        |
   6+50      0.0052     0.02  Q        |   V    |        |        |
   6+55      0.0053     0.02  Q        |   V    |        |        |
   7+ 0      0.0054     0.02  Q        |   V    |        |        |
   7+ 5      0.0056     0.02  Q        |    V   |        |        |
   7+10      0.0057     0.02  Q        |    V   |        |        |
   7+15      0.0059     0.02  Q        |     V  |        |        |
   7+20      0.0061     0.02  Q        |     V  |        |        |
   7+25      0.0062     0.03  Q        |     V  |        |        |
   7+30      0.0064     0.03  Q        |      V |        |        |
   7+35      0.0066     0.03  Q        |       V|        |        |
   7+40      0.0068     0.03  Q        |       V|        |        |
   7+45      0.0071     0.03  Q        |       V|        |        |
   7+50      0.0073     0.03  Q        |       V|        |        |
   7+55      0.0075     0.03  Q        |        V        |        |
   8+ 0      0.0077     0.03  Q        |        |V       |        |
   8+ 5      0.0080     0.03  Q        |        |V       |        |
   8+10      0.0081     0.02  Q        |        | V      |        |
   8+15      0.0085     0.05  Q        |        |  V     |        |
   8+20      0.0088     0.05  Q        |        |  V     |        |
   8+25      0.0096     0.12  Q        |        |    V   |        |
   8+30      0.0110     0.19  Q        |        |       V|        |
   8+35      0.0126     0.24  Q        |        |        |  V     |
   8+40      0.0138     0.18  Q        |        |        |     V  |
   8+45      0.0143     0.07  Q        |        |        |      V |
   8+50      0.0145     0.02  Q        |        |        |       V|
   8+55      0.0146     0.02  Q        |        |        |       V|
   9+ 0      0.0147     0.01  Q        |        |        |       V|
   9+ 5      0.0147     0.00  Q        |        |        |       V|
   9+10      0.0147     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

Study date 09/23/20 File: APOST35.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

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English Units used in output format

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Post-development
3-Hr 5-Yr Storm Event

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Length along longest watercourse measured to centroid = 0.018 Mi.
Difference in elevation = 6.34(Ft.)
Slope along watercourse = 97.0296 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.023 Hr.
Lag time = 1.41 Min.
25% of lag time = 0.35 Min.
40% of lag time = 0.56 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
0.58	0.88	0.51

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
0.58	2.20	1.28

STORM EVENT (YEAR) = 5.00
Area Averaged 2-Year Rainfall = 0.877(In)
Area Averaged 100-Year Rainfall = 2.200(In)

Point rain (area averaged) = 1.187(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.187(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
0.582	79.00	0.095

Total Area Entered = 0.58(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
79.0	61.8	0.451	0.095	0.412	1.000	0.412

Sum (F) = 0.412

Area averaged mean soil loss (F) (In/Hr) = 0.412

Minimum soil loss rate ((In/Hr)) = 0.206

(for 24 hour storm duration)

Soil low loss rate (decimal) = 0.824

U n i t H y d r o g r a p h

DESERT S-Curve

Unit Hydrograph Data

	Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	354.985	61.437	0.360
2	0.167	709.970	35.423	0.208
3	0.250	1064.955	3.140	0.018
			Sum = 100.000	Sum= 0.587

	Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Loss rate(In./Hr) Low	Effective (In/Hr)
1	0.08	1.30	0.185	0.412	0.153	0.03
2	0.17	1.30	0.185	0.412	0.153	0.03
3	0.25	1.10	0.157	0.412	0.129	0.03
4	0.33	1.50	0.214	0.412	0.176	0.04
5	0.42	1.50	0.214	0.412	0.176	0.04
6	0.50	1.80	0.256	0.412	0.211	0.05
7	0.58	1.50	0.214	0.412	0.176	0.04
8	0.67	1.80	0.256	0.412	0.211	0.05
9	0.75	1.80	0.256	0.412	0.211	0.05
10	0.83	1.50	0.214	0.412	0.176	0.04
11	0.92	1.60	0.228	0.412	0.188	0.04
12	1.00	1.80	0.256	0.412	0.211	0.05
13	1.08	2.20	0.313	0.412	0.258	0.06
14	1.17	2.20	0.313	0.412	0.258	0.06
15	1.25	2.20	0.313	0.412	0.258	0.06
16	1.33	2.00	0.285	0.412	0.235	0.05
17	1.42	2.60	0.370	0.412	0.305	0.07
18	1.50	2.70	0.385	0.412	0.317	0.07
19	1.58	2.40	0.342	0.412	0.282	0.06
20	1.67	2.70	0.385	0.412	0.317	0.07
21	1.75	3.30	0.470	0.412	---	0.06
22	1.83	3.10	0.442	0.412	---	0.03
23	1.92	2.90	0.413	0.412	---	0.00
24	2.00	3.00	0.427	0.412	---	0.02
25	2.08	3.10	0.442	0.412	---	0.03
26	2.17	4.20	0.598	0.412	---	0.19
27	2.25	5.00	0.712	0.412	---	0.30
28	2.33	3.50	0.498	0.412	---	0.09
29	2.42	6.80	0.968	0.412	---	0.56
30	2.50	7.30	1.040	0.412	---	0.63
31	2.58	8.20	1.168	0.412	---	0.76
32	2.67	5.90	0.840	0.412	---	0.43

```
33   2.75     2.00     0.285        0.412    0.235        0.05
34   2.83     1.80     0.256        0.412    0.211        0.05
35   2.92     1.80     0.256        0.412    0.211        0.05
36   3.00     0.60     0.085        0.412    0.070        0.02
  Sum =     100.0                          Sum =     4.2
           Flood volume = Effective rainfall      0.35(In)
            times area      0.6(Ac.)/[(In)/(Ft.)] =      0.0(Ac.Ft)
           Total soil loss =      0.84(In)
           Total soil loss =     0.041(Ac.Ft)
           Total rainfall =      1.19(In)
           Flood volume =        733.6 Cubic Feet
           Total soil loss =       1773.9 Cubic Feet
           --------------------------------------------------------------------
            Peak flow rate of this hydrograph =      0.413(CFS)
           --------------------------------------------------------------------
           +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                     3 - 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  QV      |        |        |        |
  0+25      0.0006     0.02  QV      |        |        |        |
  0+30      0.0008     0.02  QV      |        |        |        |
  0+35      0.0009     0.02  Q V     |        |        |        |
  0+40      0.0011     0.02  Q V     |        |        |        |
  0+45      0.0013     0.03  Q  V    |        |        |        |
  0+50      0.0015     0.02  Q  V    |        |        |        |
  0+55      0.0016     0.02  Q  V    |        |        |        |
  1+ 0      0.0018     0.03  Q   V   |        |        |        |
  1+ 5      0.0020     0.03  Q   V   |        |        |        |
  1+10      0.0022     0.03  Q    V  |        |        |        |
  1+15      0.0024     0.03  Q    V  |        |        |        |
  1+20      0.0027     0.03  Q     V |        |        |        |
  1+25      0.0029     0.03  Q     V |        |        |        |
  1+30      0.0032     0.04  Q      V|        |        |        |
  1+35      0.0034     0.04  Q      V|        |        |        |
  1+40      0.0037     0.04  Q      V|        |        |        |
  1+45      0.0039     0.04  Q       V|       |        |        |
  1+50      0.0041     0.02  Q       V|       |        |        |
  1+55      0.0041     0.01  Q       V|       |        |        |
  2+ 0      0.0042     0.01  Q       V|       |        |        |
  2+ 5      0.0043     0.01  Q       V        |        |        |
  2+10      0.0048     0.07  Q       |V       |        |        |
  2+15      0.0058     0.15  Q       |  V     |        |        |
  2+20      0.0065     0.10  Q       |    V   |        |        |
  2+25      0.0080     0.22  Q       |       V|        |        |
  2+30      0.0104     0.34  |Q      |        |  V     |        |
  2+35      0.0132     0.41  |Q      |        |        |V       |
  2+40      0.0155     0.32  |Q      |        |        |    V   |
  2+45      0.0163     0.12  Q       |        |        |      V |
  2+50      0.0165     0.03  Q       |        |        |       V|
  2+55      0.0167     0.03  Q       |        |        |       V|
  3+ 0      0.0168     0.02  Q       |        |        |       V|
  3+ 5      0.0168     0.00  Q       |        |        |       V|
  3+10      0.0168     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

Study date 09/23/20 File: APOST310.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

28771 Central Avenue Gas Station
Area A
Post-development
3-Hr 10-Yr Storm Event

Drainage Area = 0.58(Ac.) = 0.001 Sq. Mi.
Length along longest watercourse = 345.00(Ft.)
Length along longest watercourse measured to centroid = 97.38(Ft.)
Length along longest watercourse = 0.065 Mi.
Length along longest watercourse measured to centroid = 0.018 Mi.
Difference in elevation = 6.34(Ft.)
Slope along watercourse = 97.0296 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.023 Hr.
Lag time = 1.41 Min.
25% of lag time = 0.35 Min.
40% of lag time = 0.56 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
0.58	0.88	0.51

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
0.58	2.20	1.28

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 0.877(In)
Area Averaged 100-Year Rainfall = 2.200(In)

Point rain (area averaged) = 1.421(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.421(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
0.582	79.00	0.095

Total Area Entered = 0.58(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
79.0	61.8	0.451	0.095	0.412	1.000	0.412

Sum (F) = 0.412

Area averaged mean soil loss (F) (In/Hr) = 0.412

Minimum soil loss rate ((In/Hr)) = 0.206

(for 24 hour storm duration)

Soil low loss rate (decimal) = 0.824

U n i t H y d r o g r a p h

DESERT S-Curve

Unit Hydrograph Data

	Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	354.985	61.437	0.360
2	0.167	709.970	35.423	0.208
3	0.250	1064.955	3.140	0.018
			Sum = 100.000	Sum= 0.587

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Loss rate(In./Hr) Low	Effective (In/Hr)
1	0.08	1.30	0.222	0.412	0.183	0.04
2	0.17	1.30	0.222	0.412	0.183	0.04
3	0.25	1.10	0.188	0.412	0.155	0.03
4	0.33	1.50	0.256	0.412	0.211	0.04
5	0.42	1.50	0.256	0.412	0.211	0.04
6	0.50	1.80	0.307	0.412	0.253	0.05
7	0.58	1.50	0.256	0.412	0.211	0.04
8	0.67	1.80	0.307	0.412	0.253	0.05
9	0.75	1.80	0.307	0.412	0.253	0.05
10	0.83	1.50	0.256	0.412	0.211	0.04
11	0.92	1.60	0.273	0.412	0.225	0.05
12	1.00	1.80	0.307	0.412	0.253	0.05
13	1.08	2.20	0.375	0.412	0.309	0.07
14	1.17	2.20	0.375	0.412	0.309	0.07
15	1.25	2.20	0.375	0.412	0.309	0.07
16	1.33	2.00	0.341	0.412	0.281	0.06
17	1.42	2.60	0.443	0.412	---	0.03
18	1.50	2.70	0.460	0.412	---	0.05
19	1.58	2.40	0.409	0.412	0.337	0.07
20	1.67	2.70	0.460	0.412	---	0.05
21	1.75	3.30	0.563	0.412	---	0.15
22	1.83	3.10	0.529	0.412	---	0.12
23	1.92	2.90	0.495	0.412	---	0.08
24	2.00	3.00	0.512	0.412	---	0.10
25	2.08	3.10	0.529	0.412	---	0.12
26	2.17	4.20	0.716	0.412	---	0.30
27	2.25	5.00	0.853	0.412	---	0.44
28	2.33	3.50	0.597	0.412	---	0.18
29	2.42	6.80	1.160	0.412	---	0.75
30	2.50	7.30	1.245	0.412	---	0.83
31	2.58	8.20	1.399	0.412	---	0.99
32	2.67	5.90	1.006	0.412	---	0.59

33	2.75	2.00	0.341	0.412	0.281	0.06
34	2.83	1.80	0.307	0.412	0.253	0.05
35	2.92	1.80	0.307	0.412	0.253	0.05
36	3.00	0.60	0.102	0.412	0.084	0.02
Sum =		100.0		Sum =		5.9

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            Flood volume = Effective rainfall      0.49(In)
             times area       0.6(Ac.)/[(In)/(Ft.)] =       0.0(Ac.Ft)
            Total soil loss =      0.93(In)
            Total soil loss =     0.045(Ac.Ft)
            Total rainfall =      1.42(In)
            Flood volume =        1030.7 Cubic Feet
            Total soil loss =       1972.0 Cubic Feet
            ---------------------------------------------------------------------
             Peak flow rate of this hydrograph =      0.543(CFS)
            ---------------------------------------------------------------------
            +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                       3 - 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     0.02  Q        |        |        |        |
  0+20      0.0006     0.02  Q        |        |        |        |
  0+25      0.0007     0.03  QV       |        |        |        |
  0+30      0.0009     0.03  QV       |        |        |        |
  0+35      0.0011     0.03  QV       |        |        |        |
  0+40      0.0013     0.03  Q V      |        |        |        |
  0+45      0.0016     0.03  Q V      |        |        |        |
  0+50      0.0018     0.03  Q V      |        |        |        |
  0+55      0.0019     0.03  Q  V     |        |        |        |
  1+ 0      0.0022     0.03  Q  V     |        |        |        |
  1+ 5      0.0024     0.04  Q   V    |        |        |        |
  1+10      0.0027     0.04  Q   V    |        |        |        |
  1+15      0.0029     0.04  Q   V    |        |        |        |
  1+20      0.0032     0.04  Q    V   |        |        |        |
  1+25      0.0034     0.02  Q    V   |        |        |        |
  1+30      0.0035     0.03  Q    V   |        |        |        |
  1+35      0.0038     0.04  Q     V  |        |        |        |
  1+40      0.0040     0.03  Q     V  |        |        |        |
  1+45      0.0045     0.07  Q      V |        |        |        |
  1+50      0.0050     0.07  Q       V|        |        |        |
  1+55      0.0054     0.06  Q       V|        |        |        |
  2+ 0      0.0057     0.06  Q       V|        |        |        |
  2+ 5      0.0062     0.06  Q        V        |        |        |
  2+10      0.0071     0.14  Q        | V      |        |        |
  2+15      0.0087     0.22  Q        |   V    |        |        |
  2+20      0.0098     0.16  Q        |     V  |        |        |
  2+25      0.0120     0.32  |Q       |        V        |        |
  2+30      0.0151     0.46  |Q       |        |    V   |        |
  2+35      0.0189     0.54  | Q      |        |        |V       |
  2+40      0.0219     0.43  |Q       |        |        |    V   |
  2+45      0.0230     0.16  Q        |        |        |      V |
  2+50      0.0233     0.04  Q        |        |        |       V|
  2+55      0.0235     0.03  Q        |        |        |       V|
  3+ 0      0.0236     0.02  Q        |        |        |       V|
  3+ 5      0.0237     0.00  Q        |        |        |       V|
  3+10      0.0237     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

Study date 09/23/20 File: APOST62.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

28771 Central Avenue Gas Station
Area A
Post-development
6-Hr 2-Yr Storm Event

Drainage Area = 0.58(Ac.) = 0.001 Sq. Mi.
Length along longest watercourse = 345.00(Ft.)
Length along longest watercourse measured to centroid = 97.38(Ft.)
Length along longest watercourse = 0.065 Mi.
Length along longest watercourse measured to centroid = 0.018 Mi.
Difference in elevation = 6.34(Ft.)
Slope along watercourse = 97.0296 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.023 Hr.
Lag time = 1.41 Min.
25% of lag time = 0.35 Min.
40% of lag time = 0.56 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
0.58	1.27	0.74

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
0.58	3.12	1.82

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 1.270(In)
Area Averaged 100-Year Rainfall = 3.120(In)

Point rain (area averaged) = 1.270(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.270(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
0.582	79.00	0.095

Total Area Entered = 0.58(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
79.0	61.8	0.451	0.095	0.412	1.000	0.412

Sum (F) = 0.412

Area averaged mean soil loss (F) (In/Hr) = 0.412

Minimum soil loss rate ((In/Hr)) = 0.206

(for 24 hour storm duration)

Soil low loss rate (decimal) = 0.824

U n i t H y d r o g r a p h

DESERT S-Curve

Unit Hydrograph Data

	Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	354.985	61.437	0.360
2	0.167	709.970	35.423	0.208
3	0.250	1064.955	3.140	0.018
			Sum = 100.000	Sum= 0.587

Storm Event 3 Effective Rainfall = 0.241(In)

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.50	0.014	0.412	0.012	0.00
2	0.17	0.60	0.017	0.412	0.014	0.00
3	0.25	0.60	0.017	0.412	0.014	0.00
4	0.33	0.60	0.017	0.412	0.014	0.00
5	0.42	0.60	0.017	0.412	0.014	0.00
6	0.50	0.70	0.020	0.412	0.017	0.00
7	0.58	0.70	0.020	0.412	0.017	0.00
8	0.67	0.70	0.020	0.412	0.017	0.00
9	0.75	0.70	0.020	0.412	0.017	0.00
10	0.83	0.70	0.020	0.412	0.017	0.00
11	0.92	0.70	0.020	0.412	0.017	0.00
12	1.00	0.80	0.023	0.412	0.019	0.00
13	1.08	0.80	0.023	0.412	0.019	0.00
14	1.17	0.80	0.023	0.412	0.019	0.00
15	1.25	0.80	0.023	0.412	0.019	0.00
16	1.33	0.80	0.023	0.412	0.019	0.00
17	1.42	0.80	0.023	0.412	0.019	0.00
18	1.50	0.80	0.023	0.412	0.019	0.00
19	1.58	0.80	0.023	0.412	0.019	0.00
20	1.67	0.80	0.023	0.412	0.019	0.00
21	1.75	0.80	0.023	0.412	0.019	0.00
22	1.83	0.80	0.023	0.412	0.019	0.00
23	1.92	0.80	0.023	0.412	0.019	0.00
24	2.00	0.90	0.026	0.412	0.021	0.00
25	2.08	0.80	0.023	0.412	0.019	0.00
26	2.17	0.90	0.026	0.412	0.021	0.00
27	2.25	0.90	0.026	0.412	0.021	0.00
28	2.33	0.90	0.026	0.412	0.021	0.00

29	2.42	0.90	0.026	0.412	0.021	0.00
30	2.50	0.90	0.026	0.412	0.021	0.00
31	2.58	0.90	0.026	0.412	0.021	0.00
32	2.67	0.90	0.026	0.412	0.021	0.00
33	2.75	1.00	0.029	0.412	0.024	0.01
34	2.83	1.00	0.029	0.412	0.024	0.01
35	2.92	1.00	0.029	0.412	0.024	0.01
36	3.00	1.00	0.029	0.412	0.024	0.01
37	3.08	1.00	0.029	0.412	0.024	0.01
38	3.17	1.10	0.032	0.412	0.026	0.01
39	3.25	1.10	0.032	0.412	0.026	0.01
40	3.33	1.10	0.032	0.412	0.026	0.01
41	3.42	1.20	0.035	0.412	0.029	0.01
42	3.50	1.30	0.038	0.412	0.031	0.01
43	3.58	1.40	0.041	0.412	0.033	0.01
44	3.67	1.40	0.041	0.412	0.033	0.01
45	3.75	1.50	0.043	0.412	0.036	0.01
46	3.83	1.50	0.043	0.412	0.036	0.01
47	3.92	1.60	0.046	0.412	0.038	0.01
48	4.00	1.60	0.046	0.412	0.038	0.01
49	4.08	1.70	0.049	0.412	0.041	0.01
50	4.17	1.80	0.052	0.412	0.043	0.01
51	4.25	1.90	0.055	0.412	0.045	0.01
52	4.33	2.00	0.058	0.412	0.048	0.01
53	4.42	2.10	0.061	0.412	0.050	0.01
54	4.50	2.10	0.061	0.412	0.050	0.01
55	4.58	2.20	0.064	0.412	0.053	0.01
56	4.67	2.30	0.067	0.412	0.055	0.01
57	4.75	2.40	0.069	0.412	0.057	0.01
58	4.83	2.40	0.069	0.412	0.057	0.01
59	4.92	2.50	0.072	0.412	0.060	0.01
60	5.00	2.60	0.075	0.412	0.062	0.01
61	5.08	3.10	0.090	0.412	0.074	0.02
62	5.17	3.60	0.104	0.412	0.086	0.02
63	5.25	3.90	0.113	0.412	0.093	0.02
64	5.33	4.20	0.122	0.412	0.100	0.02
65	5.42	4.70	0.136	0.412	0.112	0.02
66	5.50	5.60	0.162	0.412	0.134	0.03
67	5.58	1.90	0.055	0.412	0.045	0.01
68	5.67	0.90	0.026	0.412	0.021	0.00
69	5.75	0.60	0.017	0.412	0.014	0.00
70	5.83	0.50	0.014	0.412	0.012	0.00
71	5.92	0.30	0.009	0.412	0.007	0.00
72	6.00	0.20	0.006	0.412	0.005	0.00
Sum =		100.0		Sum =		0.5

Flood volume = Effective rainfall 0.04(In)
times area 0.6(Ac.)/[(In)/(Ft.)] = 0.0(Ac.Ft)
Total soil loss = 0.20(In)
Total soil loss = 0.010(Ac.Ft)
Total rainfall = 0.24(In)
Flood volume = 89.6 Cubic Feet
Total soil loss = 420.2 Cubic Feet

Storm Event 2 Effective Rainfall = 0.457(In)

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Loss rate(In./Hr) Low	Effective (In/Hr)
1	0.08	0.50	0.027	0.412	0.023	0.00
2	0.17	0.60	0.033	0.412	0.027	0.01
3	0.25	0.60	0.033	0.412	0.027	0.01
4	0.33	0.60	0.033	0.412	0.027	0.01
5	0.42	0.60	0.033	0.412	0.027	0.01
6	0.50	0.70	0.038	0.412	0.032	0.01
7	0.58	0.70	0.038	0.412	0.032	0.01

8	0.67	0.70	0.038	0.412	0.032	0.01
9	0.75	0.70	0.038	0.412	0.032	0.01
10	0.83	0.70	0.038	0.412	0.032	0.01
11	0.92	0.70	0.038	0.412	0.032	0.01
12	1.00	0.80	0.044	0.412	0.036	0.01
13	1.08	0.80	0.044	0.412	0.036	0.01
14	1.17	0.80	0.044	0.412	0.036	0.01
15	1.25	0.80	0.044	0.412	0.036	0.01
16	1.33	0.80	0.044	0.412	0.036	0.01
17	1.42	0.80	0.044	0.412	0.036	0.01
18	1.50	0.80	0.044	0.412	0.036	0.01
19	1.58	0.80	0.044	0.412	0.036	0.01
20	1.67	0.80	0.044	0.412	0.036	0.01
21	1.75	0.80	0.044	0.412	0.036	0.01
22	1.83	0.80	0.044	0.412	0.036	0.01
23	1.92	0.80	0.044	0.412	0.036	0.01
24	2.00	0.90	0.049	0.412	0.041	0.01
25	2.08	0.80	0.044	0.412	0.036	0.01
26	2.17	0.90	0.049	0.412	0.041	0.01
27	2.25	0.90	0.049	0.412	0.041	0.01
28	2.33	0.90	0.049	0.412	0.041	0.01
29	2.42	0.90	0.049	0.412	0.041	0.01
30	2.50	0.90	0.049	0.412	0.041	0.01
31	2.58	0.90	0.049	0.412	0.041	0.01
32	2.67	0.90	0.049	0.412	0.041	0.01
33	2.75	1.00	0.055	0.412	0.045	0.01
34	2.83	1.00	0.055	0.412	0.045	0.01
35	2.92	1.00	0.055	0.412	0.045	0.01
36	3.00	1.00	0.055	0.412	0.045	0.01
37	3.08	1.00	0.055	0.412	0.045	0.01
38	3.17	1.10	0.060	0.412	0.050	0.01
39	3.25	1.10	0.060	0.412	0.050	0.01
40	3.33	1.10	0.060	0.412	0.050	0.01
41	3.42	1.20	0.066	0.412	0.054	0.01
42	3.50	1.30	0.071	0.412	0.059	0.01
43	3.58	1.40	0.077	0.412	0.063	0.01
44	3.67	1.40	0.077	0.412	0.063	0.01
45	3.75	1.50	0.082	0.412	0.068	0.01
46	3.83	1.50	0.082	0.412	0.068	0.01
47	3.92	1.60	0.088	0.412	0.072	0.02
48	4.00	1.60	0.088	0.412	0.072	0.02
49	4.08	1.70	0.093	0.412	0.077	0.02
50	4.17	1.80	0.099	0.412	0.081	0.02
51	4.25	1.90	0.104	0.412	0.086	0.02
52	4.33	2.00	0.110	0.412	0.090	0.02
53	4.42	2.10	0.115	0.412	0.095	0.02
54	4.50	2.10	0.115	0.412	0.095	0.02
55	4.58	2.20	0.121	0.412	0.099	0.02
56	4.67	2.30	0.126	0.412	0.104	0.02
57	4.75	2.40	0.132	0.412	0.109	0.02
58	4.83	2.40	0.132	0.412	0.109	0.02
59	4.92	2.50	0.137	0.412	0.113	0.02
60	5.00	2.60	0.143	0.412	0.118	0.03
61	5.08	3.10	0.170	0.412	0.140	0.03
62	5.17	3.60	0.198	0.412	0.163	0.03
63	5.25	3.90	0.214	0.412	0.176	0.04
64	5.33	4.20	0.230	0.412	0.190	0.04
65	5.42	4.70	0.258	0.412	0.213	0.05
66	5.50	5.60	0.307	0.412	0.253	0.05
67	5.58	1.90	0.104	0.412	0.086	0.02
68	5.67	0.90	0.049	0.412	0.041	0.01
69	5.75	0.60	0.033	0.412	0.027	0.01
70	5.83	0.50	0.027	0.412	0.023	0.00
71	5.92	0.30	0.016	0.412	0.014	0.00
72	6.00	0.20	0.011	0.412	0.009	0.00

Sum = 100.0 Sum = 1.0

Flood volume = Effective rainfall 0.08(In)

times area 0.6(Ac.)/[(In)/(Ft.)] = 0.0(Ac.Ft)

Total soil loss = 0.38(In)

Total soil loss = 0.018(Ac.Ft)

Total rainfall = 0.46(In)

Flood volume = 169.8 Cubic Feet

Total soil loss = 796.1 Cubic Feet

Storm Event 1 Effective Rainfall = 1.270(In)

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Loss rate(In./Hr) Low	Effective (In/Hr)
1	0.08	0.50	0.076	0.412	0.063	0.01
2	0.17	0.60	0.091	0.412	0.075	0.02
3	0.25	0.60	0.091	0.412	0.075	0.02
4	0.33	0.60	0.091	0.412	0.075	0.02
5	0.42	0.60	0.091	0.412	0.075	0.02
6	0.50	0.70	0.107	0.412	0.088	0.02
7	0.58	0.70	0.107	0.412	0.088	0.02
8	0.67	0.70	0.107	0.412	0.088	0.02
9	0.75	0.70	0.107	0.412	0.088	0.02
10	0.83	0.70	0.107	0.412	0.088	0.02
11	0.92	0.70	0.107	0.412	0.088	0.02
12	1.00	0.80	0.122	0.412	0.100	0.02
13	1.08	0.80	0.122	0.412	0.100	0.02
14	1.17	0.80	0.122	0.412	0.100	0.02
15	1.25	0.80	0.122	0.412	0.100	0.02
16	1.33	0.80	0.122	0.412	0.100	0.02
17	1.42	0.80	0.122	0.412	0.100	0.02
18	1.50	0.80	0.122	0.412	0.100	0.02
19	1.58	0.80	0.122	0.412	0.100	0.02
20	1.67	0.80	0.122	0.412	0.100	0.02
21	1.75	0.80	0.122	0.412	0.100	0.02
22	1.83	0.80	0.122	0.412	0.100	0.02
23	1.92	0.80	0.122	0.412	0.100	0.02
24	2.00	0.90	0.137	0.412	0.113	0.02
25	2.08	0.80	0.122	0.412	0.100	0.02
26	2.17	0.90	0.137	0.412	0.113	0.02
27	2.25	0.90	0.137	0.412	0.113	0.02
28	2.33	0.90	0.137	0.412	0.113	0.02
29	2.42	0.90	0.137	0.412	0.113	0.02
30	2.50	0.90	0.137	0.412	0.113	0.02
31	2.58	0.90	0.137	0.412	0.113	0.02
32	2.67	0.90	0.137	0.412	0.113	0.02
33	2.75	1.00	0.152	0.412	0.126	0.03
34	2.83	1.00	0.152	0.412	0.126	0.03
35	2.92	1.00	0.152	0.412	0.126	0.03
36	3.00	1.00	0.152	0.412	0.126	0.03
37	3.08	1.00	0.152	0.412	0.126	0.03
38	3.17	1.10	0.168	0.412	0.138	0.03
39	3.25	1.10	0.168	0.412	0.138	0.03
40	3.33	1.10	0.168	0.412	0.138	0.03
41	3.42	1.20	0.183	0.412	0.151	0.03
42	3.50	1.30	0.198	0.412	0.163	0.03
43	3.58	1.40	0.213	0.412	0.176	0.04
44	3.67	1.40	0.213	0.412	0.176	0.04
45	3.75	1.50	0.229	0.412	0.188	0.04
46	3.83	1.50	0.229	0.412	0.188	0.04
47	3.92	1.60	0.244	0.412	0.201	0.04
48	4.00	1.60	0.244	0.412	0.201	0.04
49	4.08	1.70	0.259	0.412	0.214	0.05
50	4.17	1.80	0.274	0.412	0.226	0.05
51	4.25	1.90	0.290	0.412	0.239	0.05

52	4.33	2.00	0.305	0.412	0.251	0.05
53	4.42	2.10	0.320	0.412	0.264	0.06
54	4.50	2.10	0.320	0.412	0.264	0.06
55	4.58	2.20	0.335	0.412	0.276	0.06
56	4.67	2.30	0.351	0.412	0.289	0.06
57	4.75	2.40	0.366	0.412	0.301	0.06
58	4.83	2.40	0.366	0.412	0.301	0.06
59	4.92	2.50	0.381	0.412	0.314	0.07
60	5.00	2.60	0.396	0.412	0.327	0.07
61	5.08	3.10	0.472	0.412	---	0.06
62	5.17	3.60	0.549	0.412	---	0.14
63	5.25	3.90	0.594	0.412	---	0.18
64	5.33	4.20	0.640	0.412	---	0.23
65	5.42	4.70	0.716	0.412	---	0.30
66	5.50	5.60	0.853	0.412	---	0.44
67	5.58	1.90	0.290	0.412	0.239	0.05
68	5.67	0.90	0.137	0.412	0.113	0.02
69	5.75	0.60	0.091	0.412	0.075	0.02
70	5.83	0.50	0.076	0.412	0.063	0.01
71	5.92	0.30	0.046	0.412	0.038	0.01
72	6.00	0.20	0.030	0.412	0.025	0.01
Sum =	100.0			Sum =	3.4	

Flood volume = Effective rainfall 0.28(In)
times area 0.6(Ac.)/[(In)/(Ft.)] = 0.0(Ac.Ft)
Total soil loss = 0.99(In)
Total soil loss = 0.048(Ac.Ft)
Total rainfall = 1.27(In)
Flood volume = 591.4 Cubic Feet
Total soil loss = 2091.7 Cubic Feet

Peak flow rate of this hydrograph = 0.227(CFS)

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TOTAL OF: 3 6 - H O U R S T O R M E V E N T S
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	0.0000	0.00	Q	|	|	|	|
0+15	0.0000	0.00	Q	|	|	|	|
0+20	0.0000	0.00	Q	|	|	|	|
0+25	0.0001	0.00	Q	|	|	|	|
0+30	0.0001	0.00	Q	|	|	|	|
0+35	0.0001	0.00	Q	|	|	|	|
0+40	0.0001	0.00	Q	|	|	|	|
0+45	0.0001	0.00	Q	|	|	|	|
0+50	0.0001	0.00	Q	|	|	|	|
0+55	0.0001	0.00	Q	|	|	|	|
1+ 0	0.0002	0.00	Q	|	|	|	|
1+ 5	0.0002	0.00	Q	|	|	|	|
1+10	0.0002	0.00	Q	|	|	|	|
1+15	0.0002	0.00	Q	|	|	|	|
1+20	0.0002	0.00	Q	|	|	|	|
1+25	0.0002	0.00	Q	|	|	|	|
1+30	0.0003	0.00	Q	|	|	|	|
1+35	0.0003	0.00	Q	|	|	|	|
1+40	0.0003	0.00	Q	|	|	|	|
1+45	0.0003	0.00	Q	|	|	|	|
1+50	0.0003	0.00	Q	|	|	|	|
1+55	0.0003	0.00	Q	|	|	|	|
2+ 0	0.0004	0.00	Q	|	|	|	|

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2+ 5     0.0004    0.00  Q       |       |       |       |
2+10     0.0004    0.00  Q       |       |       |       |
2+15     0.0004    0.00  Q       |       |       |       |
2+20     0.0004    0.00  Q       |       |       |       |
2+25     0.0004    0.00  Q       |       |       |       |
2+30     0.0005    0.00  Q       |       |       |       |
2+35     0.0005    0.00  Q       |       |       |       |
2+40     0.0005    0.00  QV      |       |       |       |
2+45     0.0005    0.00  QV      |       |       |       |
2+50     0.0005    0.00  QV      |       |       |       |
2+55     0.0006    0.00  QV      |       |       |       |
3+ 0     0.0006    0.00  QV      |       |       |       |
3+ 5     0.0006    0.00  QV      |       |       |       |
3+10     0.0006    0.00  QV      |       |       |       |
3+15     0.0006    0.00  QV      |       |       |       |
3+20     0.0007    0.00  QV      |       |       |       |
3+25     0.0007    0.00  QV      |       |       |       |
3+30     0.0007    0.00  QV      |       |       |       |
3+35     0.0007    0.00  QV      |       |       |       |
3+40     0.0008    0.00  QV      |       |       |       |
3+45     0.0008    0.00  QV      |       |       |       |
3+50     0.0008    0.00  QV      |       |       |       |
3+55     0.0009    0.00  QV      |       |       |       |
4+ 0     0.0009    0.00  QV      |       |       |       |
4+ 5     0.0009    0.00  QV      |       |       |       |
4+10     0.0010    0.01  QV      |       |       |       |
4+15     0.0010    0.01  Q V     |       |       |       |
4+20     0.0011    0.01  Q V     |       |       |       |
4+25     0.0011    0.01  Q V     |       |       |       |
4+30     0.0011    0.01  Q V     |       |       |       |
4+35     0.0012    0.01  Q V     |       |       |       |
4+40     0.0012    0.01  Q V     |       |       |       |
4+45     0.0013    0.01  Q V     |       |       |       |
4+50     0.0013    0.01  Q V     |       |       |       |
4+55     0.0014    0.01  Q V     |       |       |       |
5+ 0     0.0014    0.01  Q V     |       |       |       |
5+ 5     0.0015    0.01  Q  V    |       |       |       |
5+10     0.0016    0.01  Q  V    |       |       |       |
5+15     0.0016    0.01  Q  V    |       |       |       |
5+20     0.0017    0.01  Q  V    |       |       |       |
5+25     0.0018    0.01  Q  V    |       |       |       |
5+30     0.0019    0.02  Q  V    |       |       |       |
5+35     0.0020    0.01  Q   V   |       |       |       |
5+40     0.0020    0.00  Q   V   |       |       |       |
5+45     0.0020    0.00  Q   V   |       |       |       |
5+50     0.0020    0.00  Q   V   |       |       |       |
5+55     0.0021    0.00  Q   V   |       |       |       |
6+ 0     0.0021    0.00  Q   V   |       |       |       |
6+ 5     0.0021    0.00  Q   V   |       |       |       |
6+10     0.0021    0.00  Q   V   |       |       |       |
6+15     0.0021    0.00  Q   V   |       |       |       |
6+20     0.0021    0.00  Q   V   |       |       |       |
6+25     0.0022    0.00  Q   V   |       |       |       |
6+30     0.0022    0.00  Q   V   |       |       |       |
6+35     0.0022    0.00  Q   V   |       |       |       |
6+40     0.0022    0.00  Q   V   |       |       |       |
6+45     0.0023    0.00  Q   V   |       |       |       |
6+50     0.0023    0.00  Q   V   |       |       |       |
6+55     0.0023    0.00  Q   V   |       |       |       |
7+ 0     0.0024    0.00  Q   V   |       |       |       |
7+ 5     0.0024    0.00  Q   V   |       |       |       |
7+10     0.0024    0.00  Q   V   |       |       |       |
7+15     0.0024    0.00  Q    V  |       |       |       |
7+20     0.0025    0.00  Q    V  |       |       |       |
7+25     0.0025    0.00  Q    V  |       |       |       |
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 7+30    0.0025    0.00  Q    V    |         |         |         |
 7+35    0.0026    0.00  Q    V    |         |         |         |
 7+40    0.0026    0.00  Q    V    |         |         |         |
 7+45    0.0026    0.00  Q    V    |         |         |         |
 7+50    0.0027    0.00  Q    V    |         |         |         |
 7+55    0.0027    0.00  Q    V    |         |         |         |
 8+ 0    0.0027    0.00  Q    V    |         |         |         |
 8+ 5    0.0028    0.00  Q    V    |         |         |         |
 8+10    0.0028    0.00  Q    V    |         |         |         |
 8+15    0.0028    0.01  Q    V    |         |         |         |
 8+20    0.0029    0.01  Q    V    |         |         |         |
 8+25    0.0029    0.01  Q    V    |         |         |         |
 8+30    0.0029    0.01  Q     V   |         |         |         |
 8+35    0.0030    0.01  Q     V   |         |         |         |
 8+40    0.0030    0.01  Q     V   |         |         |         |
 8+45    0.0030    0.01  Q     V   |         |         |         |
 8+50    0.0031    0.01  Q     V   |         |         |         |
 8+55    0.0031    0.01  Q     V   |         |         |         |
 9+ 0    0.0032    0.01  Q     V   |         |         |         |
 9+ 5    0.0032    0.01  Q     V   |         |         |         |
 9+10    0.0032    0.01  Q     V   |         |         |         |
 9+15    0.0033    0.01  Q     V   |         |         |         |
 9+20    0.0033    0.01  Q     V   |         |         |         |
 9+25    0.0034    0.01  Q     V   |         |         |         |
 9+30    0.0034    0.01  Q      V  |         |         |         |
 9+35    0.0035    0.01  Q      V  |         |         |         |
 9+40    0.0035    0.01  Q      V  |         |         |         |
 9+45    0.0036    0.01  Q      V  |         |         |         |
 9+50    0.0036    0.01  Q      V  |         |         |         |
 9+55    0.0037    0.01  Q      V  |         |         |         |
10+ 0    0.0038    0.01  Q      V  |         |         |         |
10+ 5    0.0038    0.01  Q      V  |         |         |         |
10+10    0.0039    0.01  Q      V  |         |         |         |
10+15    0.0040    0.01  Q       V |         |         |         |
10+20    0.0040    0.01  Q       V |         |         |         |
10+25    0.0041    0.01  Q       V |         |         |         |
10+30    0.0042    0.01  Q       V |         |         |         |
10+35    0.0043    0.01  Q       V |         |         |         |
10+40    0.0044    0.01  Q       V |         |         |         |
10+45    0.0045    0.01  Q        V|         |         |         |
10+50    0.0046    0.01  Q        V|         |         |         |
10+55    0.0047    0.01  Q        V|         |         |         |
11+ 0    0.0048    0.01  Q        V|         |         |         |
11+ 5    0.0049    0.02  Q        V|         |         |         |
11+10    0.0050    0.02  Q         V         |         |         |
11+15    0.0052    0.02  Q         V         |         |         |
11+20    0.0053    0.02  Q         V         |         |         |
11+25    0.0055    0.03  Q         |V        |         |         |
11+30    0.0057    0.03  Q         |V        |         |         |
11+35    0.0058    0.02  Q         |V        |         |         |
11+40    0.0059    0.01  Q         | V       |         |         |
11+45    0.0059    0.00  Q         | V       |         |         |
11+50    0.0059    0.00  Q         | V       |         |         |
11+55    0.0059    0.00  Q         | V       |         |         |
12+ 0    0.0060    0.00  Q         | V       |         |         |
12+ 5    0.0060    0.00  Q         | V       |         |         |
12+10    0.0060    0.01  Q         | V       |         |         |
12+15    0.0061    0.01  Q         | V       |         |         |
12+20    0.0062    0.01  Q         | V       |         |         |
12+25    0.0062    0.01  Q         | V       |         |         |
12+30    0.0063    0.01  Q         | V       |         |         |
12+35    0.0064    0.01  Q         |  V      |         |         |
12+40    0.0065    0.01  Q         |  V      |         |         |
12+45    0.0065    0.01  Q         |  V      |         |         |
12+50    0.0066    0.01  Q         |  V      |         |         |
```

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 12+55     0.0067     0.01  Q     |  V      |        |        |
 13+ 0     0.0068     0.01  Q     |  V      |        |        |
 13+ 5     0.0069     0.01  Q     |   V     |        |        |
 13+10     0.0069     0.01  Q     |   V     |        |        |
 13+15     0.0070     0.01  Q     |   V     |        |        |
 13+20     0.0071     0.01  Q     |   V     |        |        |
 13+25     0.0072     0.01  Q     |   V     |        |        |
 13+30     0.0073     0.01  Q     |   V     |        |        |
 13+35     0.0074     0.01  Q     |    V    |        |        |
 13+40     0.0075     0.01  Q     |    V    |        |        |
 13+45     0.0075     0.01  Q     |    V    |        |        |
 13+50     0.0076     0.01  Q     |    V    |        |        |
 13+55     0.0077     0.01  Q     |    V    |        |        |
 14+ 0     0.0078     0.01  Q     |    V    |        |        |
 14+ 5     0.0079     0.01  Q     |    V    |        |        |
 14+10     0.0080     0.01  Q     |     V   |        |        |
 14+15     0.0081     0.01  Q     |     V   |        |        |
 14+20     0.0082     0.01  Q     |     V   |        |        |
 14+25     0.0083     0.01  Q     |     V   |        |        |
 14+30     0.0084     0.01  Q     |      V  |        |        |
 14+35     0.0085     0.01  Q     |      V  |        |        |
 14+40     0.0086     0.01  Q     |      V  |        |        |
 14+45     0.0087     0.02  Q     |      V  |        |        |
 14+50     0.0088     0.02  Q     |       V |        |        |
 14+55     0.0089     0.02  Q     |       V |        |        |
 15+ 0     0.0090     0.02  Q     |       V |        |        |
 15+ 5     0.0091     0.02  Q     |       V |        |        |
 15+10     0.0092     0.02  Q     |       V |        |        |
 15+15     0.0094     0.02  Q     |        V|        |        |
 15+20     0.0095     0.02  Q     |        V|        |        |
 15+25     0.0096     0.02  Q     |        V|        |        |
 15+30     0.0097     0.02  Q     |        V|        |        |
 15+35     0.0099     0.02  Q     |         V        |        |
 15+40     0.0100     0.02  Q     |         V        |        |
 15+45     0.0102     0.02  Q     |         V        |        |
 15+50     0.0104     0.02  Q     |         |V       |        |
 15+55     0.0105     0.02  Q     |         |V       |        |
 16+ 0     0.0107     0.03  Q     |         |V       |        |
 16+ 5     0.0109     0.03  Q     |         | V      |        |
 16+10     0.0111     0.03  Q     |         | V      |        |
 16+15     0.0113     0.03  Q     |         |  V     |        |
 16+20     0.0115     0.03  Q     |         |  V     |        |
 16+25     0.0117     0.03  Q     |         |  V     |        |
 16+30     0.0119     0.03  Q     |         |   V    |        |
 16+35     0.0122     0.03  Q     |         |   V    |        |
 16+40     0.0124     0.04  Q     |         |    V   |        |
 16+45     0.0127     0.04  Q     |         |    V   |        |
 16+50     0.0129     0.04  Q     |         |     V  |        |
 16+55     0.0132     0.04  Q     |         |      V |        |
 17+ 0     0.0135     0.04  Q     |         |      V |        |
 17+ 5     0.0137     0.04  Q     |         |       V|        |
 17+10     0.0142     0.06  Q     |         |       V|        |
 17+15     0.0148     0.10  Q     |         |        V        |
 17+20     0.0157     0.12  Q     |         |        | V      |
 17+25     0.0168     0.16  Q     |         |        |  V     |
 17+30     0.0183     0.23  Q     |         |        |     V  |
 17+35     0.0191     0.12  Q     |         |        |       V|
 17+40     0.0193     0.03  Q     |         |        |       V|
 17+45     0.0194     0.01  Q     |         |        |       V|
 17+50     0.0194     0.01  Q     |         |        |       V|
 17+55     0.0195     0.01  Q     |         |        |       V|
 18+ 0     0.0195     0.00  Q     |         |        |       V|
 18+ 5     0.0195     0.00  Q     |         |        |       V|
 18+10     0.0195     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

Study date 09/23/20 File: APOST65.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

28771 Central Avenue Gas Station
Area A
Post-development
6-Hr 5-Yr Storm Event

Drainage Area = 0.58(Ac.) = 0.001 Sq. Mi.
Length along longest watercourse = 345.00(Ft.)
Length along longest watercourse measured to centroid = 97.38(Ft.)
Length along longest watercourse = 0.065 Mi.
Length along longest watercourse measured to centroid = 0.018 Mi.
Difference in elevation = 6.34(Ft.)
Slope along watercourse = 97.0296 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.023 Hr.
Lag time = 1.41 Min.
25% of lag time = 0.35 Min.
40% of lag time = 0.56 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
0.58	1.27	0.74

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
0.58	3.12	1.82

STORM EVENT (YEAR) = 5.00
Area Averaged 2-Year Rainfall = 1.270(In)
Area Averaged 100-Year Rainfall = 3.120(In)

Point rain (area averaged) = 1.703(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.703(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
0.582	79.00	0.095

Total Area Entered = 0.58(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
79.0	61.8	0.451	0.095	0.412	1.000	0.412

Sum (F) = 0.412

Area averaged mean soil loss (F) (In/Hr) = 0.412

Minimum soil loss rate ((In/Hr)) = 0.206

(for 24 hour storm duration)

Soil low loss rate (decimal) = 0.824

U n i t H y d r o g r a p h

DESERT S-Curve

Unit Hydrograph Data

	Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	354.985	61.437	0.360
2	0.167	709.970	35.423	0.208
3	0.250	1064.955	3.140	0.018
			Sum = 100.000	Sum= 0.587

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.50	0.102	0.412	0.084	0.02
2	0.17	0.60	0.123	0.412	0.101	0.02
3	0.25	0.60	0.123	0.412	0.101	0.02
4	0.33	0.60	0.123	0.412	0.101	0.02
5	0.42	0.60	0.123	0.412	0.101	0.02
6	0.50	0.70	0.143	0.412	0.118	0.03
7	0.58	0.70	0.143	0.412	0.118	0.03
8	0.67	0.70	0.143	0.412	0.118	0.03
9	0.75	0.70	0.143	0.412	0.118	0.03
10	0.83	0.70	0.143	0.412	0.118	0.03
11	0.92	0.70	0.143	0.412	0.118	0.03
12	1.00	0.80	0.164	0.412	0.135	0.03
13	1.08	0.80	0.164	0.412	0.135	0.03
14	1.17	0.80	0.164	0.412	0.135	0.03
15	1.25	0.80	0.164	0.412	0.135	0.03
16	1.33	0.80	0.164	0.412	0.135	0.03
17	1.42	0.80	0.164	0.412	0.135	0.03
18	1.50	0.80	0.164	0.412	0.135	0.03
19	1.58	0.80	0.164	0.412	0.135	0.03
20	1.67	0.80	0.164	0.412	0.135	0.03
21	1.75	0.80	0.164	0.412	0.135	0.03
22	1.83	0.80	0.164	0.412	0.135	0.03
23	1.92	0.80	0.164	0.412	0.135	0.03
24	2.00	0.90	0.184	0.412	0.152	0.03
25	2.08	0.80	0.164	0.412	0.135	0.03
26	2.17	0.90	0.184	0.412	0.152	0.03
27	2.25	0.90	0.184	0.412	0.152	0.03
28	2.33	0.90	0.184	0.412	0.152	0.03
29	2.42	0.90	0.184	0.412	0.152	0.03
30	2.50	0.90	0.184	0.412	0.152	0.03
31	2.58	0.90	0.184	0.412	0.152	0.03
32	2.67	0.90	0.184	0.412	0.152	0.03

33	2.75	1.00	0.204	0.412	0.168	0.04
34	2.83	1.00	0.204	0.412	0.168	0.04
35	2.92	1.00	0.204	0.412	0.168	0.04
36	3.00	1.00	0.204	0.412	0.168	0.04
37	3.08	1.00	0.204	0.412	0.168	0.04
38	3.17	1.10	0.225	0.412	0.185	0.04
39	3.25	1.10	0.225	0.412	0.185	0.04
40	3.33	1.10	0.225	0.412	0.185	0.04
41	3.42	1.20	0.245	0.412	0.202	0.04
42	3.50	1.30	0.266	0.412	0.219	0.05
43	3.58	1.40	0.286	0.412	0.236	0.05
44	3.67	1.40	0.286	0.412	0.236	0.05
45	3.75	1.50	0.307	0.412	0.253	0.05
46	3.83	1.50	0.307	0.412	0.253	0.05
47	3.92	1.60	0.327	0.412	0.270	0.06
48	4.00	1.60	0.327	0.412	0.270	0.06
49	4.08	1.70	0.347	0.412	0.286	0.06
50	4.17	1.80	0.368	0.412	0.303	0.06
51	4.25	1.90	0.388	0.412	0.320	0.07
52	4.33	2.00	0.409	0.412	0.337	0.07
53	4.42	2.10	0.429	0.412	---	0.02
54	4.50	2.10	0.429	0.412	---	0.02
55	4.58	2.20	0.450	0.412	---	0.04
56	4.67	2.30	0.470	0.412	---	0.06
57	4.75	2.40	0.491	0.412	---	0.08
58	4.83	2.40	0.491	0.412	---	0.08
59	4.92	2.50	0.511	0.412	---	0.10
60	5.00	2.60	0.531	0.412	---	0.12
61	5.08	3.10	0.634	0.412	---	0.22
62	5.17	3.60	0.736	0.412	---	0.32
63	5.25	3.90	0.797	0.412	---	0.38
64	5.33	4.20	0.858	0.412	---	0.45
65	5.42	4.70	0.961	0.412	---	0.55
66	5.50	5.60	1.145	0.412	---	0.73
67	5.58	1.90	0.388	0.412	0.320	0.07
68	5.67	0.90	0.184	0.412	0.152	0.03
69	5.75	0.60	0.123	0.412	0.101	0.02
70	5.83	0.50	0.102	0.412	0.084	0.02
71	5.92	0.30	0.061	0.412	0.051	0.01
72	6.00	0.20	0.041	0.412	0.034	0.01
Sum =		100.0			Sum =	5.2

Flood volume = Effective rainfall 0.43(In)
times area 0.6(Ac.)/[(In)/(Ft.)] = 0.0(Ac.Ft)
Total soil loss = 1.27(In)
Total soil loss = 0.062(Ac.Ft)
Total rainfall = 1.70(In)
Flood volume = 912.8 Cubic Feet
Total soil loss = 2685.7 Cubic Feet

Peak flow rate of this hydrograph = 0.386(CFS)

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6 - 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      0.0002     0.01  Q        |        |        |        |
 0+20      0.0003     0.01  Q        |        |        |        |
 0+25      0.0004     0.01  Q        |        |        |        |
```

```
 0+30     0.0005    0.01  Q          |        |         |        |
 0+35     0.0006    0.01  QV         |        |         |        |
 0+40     0.0007    0.01  QV         |        |         |        |
 0+45     0.0008    0.01  QV         |        |         |        |
 0+50     0.0009    0.01  QV         |        |         |        |
 0+55     0.0010    0.01  QV         |        |         |        |
 1+ 0     0.0011    0.02  Q V        |        |         |        |
 1+ 5     0.0012    0.02  Q V        |        |         |        |
 1+10     0.0013    0.02  Q V        |        |         |        |
 1+15     0.0014    0.02  Q V        |        |         |        |
 1+20     0.0016    0.02  Q V        |        |         |        |
 1+25     0.0017    0.02  Q   V      |        |         |        |
 1+30     0.0018    0.02  Q   V      |        |         |        |
 1+35     0.0019    0.02  Q   V      |        |         |        |
 1+40     0.0020    0.02  Q   V      |        |         |        |
 1+45     0.0021    0.02  Q    V     |        |         |        |
 1+50     0.0023    0.02  Q    V     |        |         |        |
 1+55     0.0024    0.02  Q    V     |        |         |        |
 2+ 0     0.0025    0.02  Q    V     |        |         |        |
 2+ 5     0.0026    0.02  Q    V     |        |         |        |
 2+10     0.0027    0.02  Q     V    |        |         |        |
 2+15     0.0029    0.02  Q     V    |        |         |        |
 2+20     0.0030    0.02  Q     V    |        |         |        |
 2+25     0.0031    0.02  Q     V    |        |         |        |
 2+30     0.0033    0.02  Q      V   |        |         |        |
 2+35     0.0034    0.02  Q      V   |        |         |        |
 2+40     0.0035    0.02  Q      V   |        |         |        |
 2+45     0.0037    0.02  Q       V  |        |         |        |
 2+50     0.0038    0.02  Q       V  |        |         |        |
 2+55     0.0040    0.02  Q       V  |        |         |        |
 3+ 0     0.0041    0.02  Q       V  |        |         |        |
 3+ 5     0.0043    0.02  Q        V |        |         |        |
 3+10     0.0044    0.02  Q        V |        |         |        |
 3+15     0.0046    0.02  Q        V |        |         |        |
 3+20     0.0047    0.02  Q         V|        |         |        |
 3+25     0.0049    0.02  Q         V|        |         |        |
 3+30     0.0051    0.03  Q         V|        |         |        |
 3+35     0.0053    0.03  Q          V        |         |        |
 3+40     0.0055    0.03  Q          V        |         |        |
 3+45     0.0057    0.03  Q          V        |         |        |
 3+50     0.0059    0.03  Q          |V       |         |        |
 3+55     0.0061    0.03  Q          |V       |         |        |
 4+ 0     0.0064    0.03  Q          | V      |         |        |
 4+ 5     0.0066    0.04  Q          | V      |         |        |
 4+10     0.0069    0.04  Q          |  V     |         |        |
 4+15     0.0071    0.04  Q          |  V     |         |        |
 4+20     0.0074    0.04  Q          |   V    |         |        |
 4+25     0.0076    0.02  Q          |   V    |         |        |
 4+30     0.0076    0.01  Q          |   V    |         |        |
 4+35     0.0078    0.02  Q          |   V    |         |        |
 4+40     0.0080    0.03  Q          |    V   |         |        |
 4+45     0.0082    0.04  Q          |    V   |         |        |
 4+50     0.0086    0.05  Q          |     V  |         |        |
 4+55     0.0089    0.05  Q          |      V |         |        |
 5+ 0     0.0094    0.06  Q          |      V |         |        |
 5+ 5     0.0101    0.11  Q          |       V|         |        |
 5+10     0.0112    0.16  Q          |        |V        |        |
 5+15     0.0127    0.21  Q          |        |    V    |        |
 5+20     0.0144    0.25  Q          |        |      V  |        |
 5+25     0.0164    0.30  |Q         |        |         |V       |
 5+30     0.0191    0.39  |Q         |        |         |     V  |
 5+35     0.0204    0.19  Q          |        |         |      V |
 5+40     0.0207    0.04  Q          |        |         |       V|
 5+45     0.0208    0.02  Q          |        |         |       V|
 5+50     0.0209    0.01  Q          |        |         |       V|
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  5+55      0.0209     0.01  Q       |        |        |       V|
  6+ 0      0.0209     0.01  Q       |        |        |       V|
  6+ 5      0.0210     0.00  Q       |        |        |       V|
  6+10      0.0210     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

Study date 09/23/20 File: APOST610.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

28771 Central Avenue Gas Station
Area A
Post-development
6-Hr 10-Yr Storm Event

Drainage Area = 0.58(Ac.) = 0.001 Sq. Mi.
Length along longest watercourse = 345.00(Ft.)
Length along longest watercourse measured to centroid = 97.38(Ft.)
Length along longest watercourse = 0.065 Mi.
Length along longest watercourse measured to centroid = 0.018 Mi.
Difference in elevation = 6.34(Ft.)
Slope along watercourse = 97.0296 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.023 Hr.
Lag time = 1.41 Min.
25% of lag time = 0.35 Min.
40% of lag time = 0.56 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
0.58	1.27	0.74

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
0.58	3.12	1.82

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 1.270(In)
Area Averaged 100-Year Rainfall = 3.120(In)

Point rain (area averaged) = 2.031(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 2.031(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
0.582	79.00	0.095

Total Area Entered = 0.58(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
79.0	61.8	0.451	0.095	0.412	1.000	0.412

Sum (F) = 0.412

Area averaged mean soil loss (F) (In/Hr) = 0.412

Minimum soil loss rate ((In/Hr)) = 0.206

(for 24 hour storm duration)

Soil low loss rate (decimal) = 0.824

U n i t H y d r o g r a p h

DESERT S-Curve

Unit Hydrograph Data

	Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	354.985	61.437	0.360
2	0.167	709.970	35.423	0.208
3	0.250	1064.955	3.140	0.018
			Sum = 100.000	Sum= 0.587

	Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Loss rate(In./Hr) Low	Effective (In/Hr)
1	0.08	0.50	0.122	0.412	0.100	0.02
2	0.17	0.60	0.146	0.412	0.121	0.03
3	0.25	0.60	0.146	0.412	0.121	0.03
4	0.33	0.60	0.146	0.412	0.121	0.03
5	0.42	0.60	0.146	0.412	0.121	0.03
6	0.50	0.70	0.171	0.412	0.141	0.03
7	0.58	0.70	0.171	0.412	0.141	0.03
8	0.67	0.70	0.171	0.412	0.141	0.03
9	0.75	0.70	0.171	0.412	0.141	0.03
10	0.83	0.70	0.171	0.412	0.141	0.03
11	0.92	0.70	0.171	0.412	0.141	0.03
12	1.00	0.80	0.195	0.412	0.161	0.03
13	1.08	0.80	0.195	0.412	0.161	0.03
14	1.17	0.80	0.195	0.412	0.161	0.03
15	1.25	0.80	0.195	0.412	0.161	0.03
16	1.33	0.80	0.195	0.412	0.161	0.03
17	1.42	0.80	0.195	0.412	0.161	0.03
18	1.50	0.80	0.195	0.412	0.161	0.03
19	1.58	0.80	0.195	0.412	0.161	0.03
20	1.67	0.80	0.195	0.412	0.161	0.03
21	1.75	0.80	0.195	0.412	0.161	0.03
22	1.83	0.80	0.195	0.412	0.161	0.03
23	1.92	0.80	0.195	0.412	0.161	0.03
24	2.00	0.90	0.219	0.412	0.181	0.04
25	2.08	0.80	0.195	0.412	0.161	0.03
26	2.17	0.90	0.219	0.412	0.181	0.04
27	2.25	0.90	0.219	0.412	0.181	0.04
28	2.33	0.90	0.219	0.412	0.181	0.04
29	2.42	0.90	0.219	0.412	0.181	0.04
30	2.50	0.90	0.219	0.412	0.181	0.04
31	2.58	0.90	0.219	0.412	0.181	0.04
32	2.67	0.90	0.219	0.412	0.181	0.04

33	2.75	1.00	0.244	0.412	0.201	0.04
34	2.83	1.00	0.244	0.412	0.201	0.04
35	2.92	1.00	0.244	0.412	0.201	0.04
36	3.00	1.00	0.244	0.412	0.201	0.04
37	3.08	1.00	0.244	0.412	0.201	0.04
38	3.17	1.10	0.268	0.412	0.221	0.05
39	3.25	1.10	0.268	0.412	0.221	0.05
40	3.33	1.10	0.268	0.412	0.221	0.05
41	3.42	1.20	0.292	0.412	0.241	0.05
42	3.50	1.30	0.317	0.412	0.261	0.06
43	3.58	1.40	0.341	0.412	0.281	0.06
44	3.67	1.40	0.341	0.412	0.281	0.06
45	3.75	1.50	0.366	0.412	0.301	0.06
46	3.83	1.50	0.366	0.412	0.301	0.06
47	3.92	1.60	0.390	0.412	0.321	0.07
48	4.00	1.60	0.390	0.412	0.321	0.07
49	4.08	1.70	0.414	0.412	---	0.00
50	4.17	1.80	0.439	0.412	---	0.03
51	4.25	1.90	0.463	0.412	---	0.05
52	4.33	2.00	0.487	0.412	---	0.08
53	4.42	2.10	0.512	0.412	---	0.10
54	4.50	2.10	0.512	0.412	---	0.10
55	4.58	2.20	0.536	0.412	---	0.12
56	4.67	2.30	0.561	0.412	---	0.15
57	4.75	2.40	0.585	0.412	---	0.17
58	4.83	2.40	0.585	0.412	---	0.17
59	4.92	2.50	0.609	0.412	---	0.20
60	5.00	2.60	0.634	0.412	---	0.22
61	5.08	3.10	0.756	0.412	---	0.34
62	5.17	3.60	0.877	0.412	---	0.47
63	5.25	3.90	0.951	0.412	---	0.54
64	5.33	4.20	1.024	0.412	---	0.61
65	5.42	4.70	1.146	0.412	---	0.73
66	5.50	5.60	1.365	0.412	---	0.95
67	5.58	1.90	0.463	0.412	---	0.05
68	5.67	0.90	0.219	0.412	0.181	0.04
69	5.75	0.60	0.146	0.412	0.121	0.03
70	5.83	0.50	0.122	0.412	0.100	0.02
71	5.92	0.30	0.073	0.412	0.060	0.01
72	6.00	0.20	0.049	0.412	0.040	0.01
Sum =		100.0			Sum =	7.1

Flood volume = Effective rainfall 0.59(In)
times area 0.6(Ac.)/[(In)/(Ft.)] = 0.0(Ac.Ft)
Total soil loss = 1.44(In)
Total soil loss = 0.070(Ac.Ft)
Total rainfall = 2.03(In)
Flood volume = 1250.1 Cubic Feet
Total soil loss = 3040.9 Cubic Feet

Peak flow rate of this hydrograph = 0.507(CFS)

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6 - 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	0.0001	0.01	Q	|	|	|	|
0+15	0.0003	0.02	Q	|	|	|	|
0+20	0.0004	0.02	Q	|	|	|	|
0+25	0.0005	0.02	Q	|	|	|	|

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0+30    0.0006   0.02  Q        |        |        |        |
0+35    0.0007   0.02  Q        |        |        |        |
0+40    0.0008   0.02  QV       |        |        |        |
0+45    0.0009   0.02  QV       |        |        |        |
0+50    0.0011   0.02  QV       |        |        |        |
0+55    0.0012   0.02  QV       |        |        |        |
1+ 0    0.0013   0.02  QV       |        |        |        |
1+ 5    0.0014   0.02  Q V      |        |        |        |
1+10    0.0016   0.02  Q V      |        |        |        |
1+15    0.0017   0.02  Q V      |        |        |        |
1+20    0.0019   0.02  Q V      |        |        |        |
1+25    0.0020   0.02  Q V      |        |        |        |
1+30    0.0021   0.02  Q V      |        |        |        |
1+35    0.0023   0.02  Q  V     |        |        |        |
1+40    0.0024   0.02  Q  V     |        |        |        |
1+45    0.0026   0.02  Q  V     |        |        |        |
1+50    0.0027   0.02  Q  V     |        |        |        |
1+55    0.0028   0.02  Q  V     |        |        |        |
2+ 0    0.0030   0.02  Q   V    |        |        |        |
2+ 5    0.0031   0.02  Q   V    |        |        |        |
2+10    0.0033   0.02  Q   V    |        |        |        |
2+15    0.0034   0.02  Q   V    |        |        |        |
2+20    0.0036   0.02  Q    V   |        |        |        |
2+25    0.0037   0.02  Q    V   |        |        |        |
2+30    0.0039   0.02  Q    V   |        |        |        |
2+35    0.0041   0.02  Q    V   |        |        |        |
2+40    0.0042   0.02  Q    V   |        |        |        |
2+45    0.0044   0.02  Q     V  |        |        |        |
2+50    0.0046   0.03  Q     V  |        |        |        |
2+55    0.0047   0.03  Q     V  |        |        |        |
3+ 0    0.0049   0.03  Q     V  |        |        |        |
3+ 5    0.0051   0.03  Q      V |        |        |        |
3+10    0.0053   0.03  Q      V |        |        |        |
3+15    0.0054   0.03  Q      V |        |        |        |
3+20    0.0056   0.03  Q      V |        |        |        |
3+25    0.0058   0.03  Q       V|        |        |        |
3+30    0.0061   0.03  Q       V|        |        |        |
3+35    0.0063   0.03  Q       V|        |        |        |
3+40    0.0065   0.04  Q       V|        |        |        |
3+45    0.0068   0.04  Q       V|        |        |        |
3+50    0.0070   0.04  Q       V|        |        |        |
3+55    0.0073   0.04  Q        V        |        |        |
4+ 0    0.0076   0.04  Q        V        |        |        |
4+ 5    0.0077   0.02  Q        V        |        |        |
4+10    0.0078   0.01  Q        V        |        |        |
4+15    0.0079   0.02  Q        |V       |        |        |
4+20    0.0082   0.04  Q        |V       |        |        |
4+25    0.0086   0.05  Q        |V       |        |        |
4+30    0.0090   0.06  Q        | V      |        |        |
4+35    0.0094   0.07  Q        |  V     |        |        |
4+40    0.0100   0.08  Q        |  V     |        |        |
4+45    0.0107   0.10  Q        |   V    |        |        |
4+50    0.0113   0.10  Q        |    V   |        |        |
4+55    0.0121   0.11  Q        |     V  |        |        |
5+ 0    0.0130   0.12  Q        |      V |        |        |
5+ 5    0.0142   0.17  Q        |       V|        |        |
5+10    0.0158   0.24  Q        |        | V      |        |
5+15    0.0179   0.30  |Q       |        |   V    |        |
5+20    0.0202   0.34  |Q       |        |      V |        |
5+25    0.0230   0.40  |Q       |        |        | V      |
5+30    0.0265   0.51  | Q      |        |        |    V   |
5+35    0.0281   0.23  Q        |        |        |       V|
5+40    0.0284   0.04  Q        |        |        |       V|
5+45    0.0285   0.02  Q        |        |        |       V|
5+50    0.0286   0.01  Q        |        |        |       V|
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 5+55     0.0286    0.01  Q      |      |      |      V|
 6+ 0     0.0287    0.01  Q      |      |      |      V|
 6+ 5     0.0287    0.00  Q      |      |      |      V|
 6+10     0.0287    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

Study date 09/23/20 File: APOST242.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

28771 Central Avenue Gas Station
Area A
Post-development
24-Hr 2-Yr Storm Event

Drainage Area = 0.58(Ac.) = 0.001 Sq. Mi.
Length along longest watercourse = 345.00(Ft.)
Length along longest watercourse measured to centroid = 97.38(Ft.)
Length along longest watercourse = 0.065 Mi.
Length along longest watercourse measured to centroid = 0.018 Mi.
Difference in elevation = 6.34(Ft.)
Slope along watercourse = 97.0296 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.023 Hr.
Lag time = 1.41 Min.
25% of lag time = 0.35 Min.
40% of lag time = 0.56 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]
0.58	2.43	1.41

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
0.58	6.58	3.83

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 2.430(In)
Area Averaged 100-Year Rainfall = 6.580(In)

Point rain (area averaged) = 2.430(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 2.430(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
0.582	79.00	0.095

Total Area Entered = 0.58(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
79.0	61.8	0.451	0.095	0.412	1.000	0.412

Sum (F) = 0.412

Area averaged mean soil loss (F) (In/Hr) = 0.412

Minimum soil loss rate ((In/Hr)) = 0.206

(for 24 hour storm duration)

Soil low loss rate (decimal) = 0.824

U n i t H y d r o g r a p h

DESERT S-Curve

Unit Hydrograph Data

	Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	354.985	61.437	0.360
2	0.167	709.970	35.423	0.208
3	0.250	1064.955	3.140	0.018
			Sum = 100.000	Sum= 0.587

Storm Event 3 Effective Rainfall = 0.462(In)

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Loss rate(In./Hr) Low	Effective (In/Hr)
1	0.08	0.07	0.004	0.731	0.003	0.00
2	0.17	0.07	0.004	0.728	0.003	0.00
3	0.25	0.07	0.004	0.725	0.003	0.00
4	0.33	0.10	0.006	0.722	0.005	0.00
5	0.42	0.10	0.006	0.719	0.005	0.00
6	0.50	0.10	0.006	0.717	0.005	0.00
7	0.58	0.10	0.006	0.714	0.005	0.00
8	0.67	0.10	0.006	0.711	0.005	0.00
9	0.75	0.10	0.006	0.708	0.005	0.00
10	0.83	0.13	0.007	0.705	0.006	0.00
11	0.92	0.13	0.007	0.703	0.006	0.00
12	1.00	0.13	0.007	0.700	0.006	0.00
13	1.08	0.10	0.006	0.697	0.005	0.00
14	1.17	0.10	0.006	0.694	0.005	0.00
15	1.25	0.10	0.006	0.692	0.005	0.00
16	1.33	0.10	0.006	0.689	0.005	0.00
17	1.42	0.10	0.006	0.686	0.005	0.00
18	1.50	0.10	0.006	0.683	0.005	0.00
19	1.58	0.10	0.006	0.681	0.005	0.00
20	1.67	0.10	0.006	0.678	0.005	0.00
21	1.75	0.10	0.006	0.675	0.005	0.00
22	1.83	0.13	0.007	0.672	0.006	0.00
23	1.92	0.13	0.007	0.670	0.006	0.00
24	2.00	0.13	0.007	0.667	0.006	0.00
25	2.08	0.13	0.007	0.664	0.006	0.00
26	2.17	0.13	0.007	0.662	0.006	0.00
27	2.25	0.13	0.007	0.659	0.006	0.00
28	2.33	0.13	0.007	0.656	0.006	0.00

29	2.42	0.13	0.007	0.654	0.006	0.00
30	2.50	0.13	0.007	0.651	0.006	0.00
31	2.58	0.17	0.009	0.648	0.008	0.00
32	2.67	0.17	0.009	0.646	0.008	0.00
33	2.75	0.17	0.009	0.643	0.008	0.00
34	2.83	0.17	0.009	0.640	0.008	0.00
35	2.92	0.17	0.009	0.638	0.008	0.00
36	3.00	0.17	0.009	0.635	0.008	0.00
37	3.08	0.17	0.009	0.632	0.008	0.00
38	3.17	0.17	0.009	0.630	0.008	0.00
39	3.25	0.17	0.009	0.627	0.008	0.00
40	3.33	0.17	0.009	0.625	0.008	0.00
41	3.42	0.17	0.009	0.622	0.008	0.00
42	3.50	0.17	0.009	0.619	0.008	0.00
43	3.58	0.17	0.009	0.617	0.008	0.00
44	3.67	0.17	0.009	0.614	0.008	0.00
45	3.75	0.17	0.009	0.612	0.008	0.00
46	3.83	0.20	0.011	0.609	0.009	0.00
47	3.92	0.20	0.011	0.606	0.009	0.00
48	4.00	0.20	0.011	0.604	0.009	0.00
49	4.08	0.20	0.011	0.601	0.009	0.00
50	4.17	0.20	0.011	0.599	0.009	0.00
51	4.25	0.20	0.011	0.596	0.009	0.00
52	4.33	0.23	0.013	0.594	0.011	0.00
53	4.42	0.23	0.013	0.591	0.011	0.00
54	4.50	0.23	0.013	0.589	0.011	0.00
55	4.58	0.23	0.013	0.586	0.011	0.00
56	4.67	0.23	0.013	0.584	0.011	0.00
57	4.75	0.23	0.013	0.581	0.011	0.00
58	4.83	0.27	0.015	0.579	0.012	0.00
59	4.92	0.27	0.015	0.576	0.012	0.00
60	5.00	0.27	0.015	0.574	0.012	0.00
61	5.08	0.20	0.011	0.571	0.009	0.00
62	5.17	0.20	0.011	0.569	0.009	0.00
63	5.25	0.20	0.011	0.566	0.009	0.00
64	5.33	0.23	0.013	0.564	0.011	0.00
65	5.42	0.23	0.013	0.561	0.011	0.00
66	5.50	0.23	0.013	0.559	0.011	0.00
67	5.58	0.27	0.015	0.556	0.012	0.00
68	5.67	0.27	0.015	0.554	0.012	0.00
69	5.75	0.27	0.015	0.551	0.012	0.00
70	5.83	0.27	0.015	0.549	0.012	0.00
71	5.92	0.27	0.015	0.546	0.012	0.00
72	6.00	0.27	0.015	0.544	0.012	0.00
73	6.08	0.30	0.017	0.542	0.014	0.00
74	6.17	0.30	0.017	0.539	0.014	0.00
75	6.25	0.30	0.017	0.537	0.014	0.00
76	6.33	0.30	0.017	0.534	0.014	0.00
77	6.42	0.30	0.017	0.532	0.014	0.00
78	6.50	0.30	0.017	0.530	0.014	0.00
79	6.58	0.33	0.018	0.527	0.015	0.00
80	6.67	0.33	0.018	0.525	0.015	0.00
81	6.75	0.33	0.018	0.523	0.015	0.00
82	6.83	0.33	0.018	0.520	0.015	0.00
83	6.92	0.33	0.018	0.518	0.015	0.00
84	7.00	0.33	0.018	0.515	0.015	0.00
85	7.08	0.33	0.018	0.513	0.015	0.00
86	7.17	0.33	0.018	0.511	0.015	0.00
87	7.25	0.33	0.018	0.508	0.015	0.00
88	7.33	0.37	0.020	0.506	0.017	0.00
89	7.42	0.37	0.020	0.504	0.017	0.00
90	7.50	0.37	0.020	0.501	0.017	0.00
91	7.58	0.40	0.022	0.499	0.018	0.00
92	7.67	0.40	0.022	0.497	0.018	0.00
93	7.75	0.40	0.022	0.495	0.018	0.00

94	7.83	0.43	0.024	0.492	0.020	0.00
95	7.92	0.43	0.024	0.490	0.020	0.00
96	8.00	0.43	0.024	0.488	0.020	0.00
97	8.08	0.50	0.028	0.486	0.023	0.00
98	8.17	0.50	0.028	0.483	0.023	0.00
99	8.25	0.50	0.028	0.481	0.023	0.00
100	8.33	0.50	0.028	0.479	0.023	0.00
101	8.42	0.50	0.028	0.477	0.023	0.00
102	8.50	0.50	0.028	0.474	0.023	0.00
103	8.58	0.53	0.030	0.472	0.024	0.01
104	8.67	0.53	0.030	0.470	0.024	0.01
105	8.75	0.53	0.030	0.468	0.024	0.01
106	8.83	0.57	0.031	0.465	0.026	0.01
107	8.92	0.57	0.031	0.463	0.026	0.01
108	9.00	0.57	0.031	0.461	0.026	0.01
109	9.08	0.63	0.035	0.459	0.029	0.01
110	9.17	0.63	0.035	0.457	0.029	0.01
111	9.25	0.63	0.035	0.454	0.029	0.01
112	9.33	0.67	0.037	0.452	0.030	0.01
113	9.42	0.67	0.037	0.450	0.030	0.01
114	9.50	0.67	0.037	0.448	0.030	0.01
115	9.58	0.70	0.039	0.446	0.032	0.01
116	9.67	0.70	0.039	0.444	0.032	0.01
117	9.75	0.70	0.039	0.442	0.032	0.01
118	9.83	0.73	0.041	0.439	0.033	0.01
119	9.92	0.73	0.041	0.437	0.033	0.01
120	10.00	0.73	0.041	0.435	0.033	0.01
121	10.08	0.50	0.028	0.433	0.023	0.00
122	10.17	0.50	0.028	0.431	0.023	0.00
123	10.25	0.50	0.028	0.429	0.023	0.00
124	10.33	0.50	0.028	0.427	0.023	0.00
125	10.42	0.50	0.028	0.425	0.023	0.00
126	10.50	0.50	0.028	0.423	0.023	0.00
127	10.58	0.67	0.037	0.421	0.030	0.01
128	10.67	0.67	0.037	0.419	0.030	0.01
129	10.75	0.67	0.037	0.417	0.030	0.01
130	10.83	0.67	0.037	0.415	0.030	0.01
131	10.92	0.67	0.037	0.412	0.030	0.01
132	11.00	0.67	0.037	0.410	0.030	0.01
133	11.08	0.63	0.035	0.408	0.029	0.01
134	11.17	0.63	0.035	0.406	0.029	0.01
135	11.25	0.63	0.035	0.404	0.029	0.01
136	11.33	0.63	0.035	0.402	0.029	0.01
137	11.42	0.63	0.035	0.400	0.029	0.01
138	11.50	0.63	0.035	0.398	0.029	0.01
139	11.58	0.57	0.031	0.396	0.026	0.01
140	11.67	0.57	0.031	0.394	0.026	0.01
141	11.75	0.57	0.031	0.393	0.026	0.01
142	11.83	0.60	0.033	0.391	0.027	0.01
143	11.92	0.60	0.033	0.389	0.027	0.01
144	12.00	0.60	0.033	0.387	0.027	0.01
145	12.08	0.83	0.046	0.385	0.038	0.01
146	12.17	0.83	0.046	0.383	0.038	0.01
147	12.25	0.83	0.046	0.381	0.038	0.01
148	12.33	0.87	0.048	0.379	0.040	0.01
149	12.42	0.87	0.048	0.377	0.040	0.01
150	12.50	0.87	0.048	0.375	0.040	0.01
151	12.58	0.93	0.052	0.373	0.043	0.01
152	12.67	0.93	0.052	0.371	0.043	0.01
153	12.75	0.93	0.052	0.370	0.043	0.01
154	12.83	0.97	0.054	0.368	0.044	0.01
155	12.92	0.97	0.054	0.366	0.044	0.01
156	13.00	0.97	0.054	0.364	0.044	0.01
157	13.08	1.13	0.063	0.362	0.052	0.01
158	13.17	1.13	0.063	0.360	0.052	0.01

159	13.25	1.13	0.063	0.358	0.052	0.01
160	13.33	1.13	0.063	0.357	0.052	0.01
161	13.42	1.13	0.063	0.355	0.052	0.01
162	13.50	1.13	0.063	0.353	0.052	0.01
163	13.58	0.77	0.042	0.351	0.035	0.01
164	13.67	0.77	0.042	0.349	0.035	0.01
165	13.75	0.77	0.042	0.348	0.035	0.01
166	13.83	0.77	0.042	0.346	0.035	0.01
167	13.92	0.77	0.042	0.344	0.035	0.01
168	14.00	0.77	0.042	0.342	0.035	0.01
169	14.08	0.90	0.050	0.341	0.041	0.01
170	14.17	0.90	0.050	0.339	0.041	0.01
171	14.25	0.90	0.050	0.337	0.041	0.01
172	14.33	0.87	0.048	0.335	0.040	0.01
173	14.42	0.87	0.048	0.334	0.040	0.01
174	14.50	0.87	0.048	0.332	0.040	0.01
175	14.58	0.87	0.048	0.330	0.040	0.01
176	14.67	0.87	0.048	0.329	0.040	0.01
177	14.75	0.87	0.048	0.327	0.040	0.01
178	14.83	0.83	0.046	0.325	0.038	0.01
179	14.92	0.83	0.046	0.324	0.038	0.01
180	15.00	0.83	0.046	0.322	0.038	0.01
181	15.08	0.80	0.044	0.320	0.037	0.01
182	15.17	0.80	0.044	0.319	0.037	0.01
183	15.25	0.80	0.044	0.317	0.037	0.01
184	15.33	0.77	0.042	0.315	0.035	0.01
185	15.42	0.77	0.042	0.314	0.035	0.01
186	15.50	0.77	0.042	0.312	0.035	0.01
187	15.58	0.63	0.035	0.311	0.029	0.01
188	15.67	0.63	0.035	0.309	0.029	0.01
189	15.75	0.63	0.035	0.307	0.029	0.01
190	15.83	0.63	0.035	0.306	0.029	0.01
191	15.92	0.63	0.035	0.304	0.029	0.01
192	16.00	0.63	0.035	0.303	0.029	0.01
193	16.08	0.13	0.007	0.301	0.006	0.00
194	16.17	0.13	0.007	0.300	0.006	0.00
195	16.25	0.13	0.007	0.298	0.006	0.00
196	16.33	0.13	0.007	0.297	0.006	0.00
197	16.42	0.13	0.007	0.295	0.006	0.00
198	16.50	0.13	0.007	0.294	0.006	0.00
199	16.58	0.10	0.006	0.292	0.005	0.00
200	16.67	0.10	0.006	0.291	0.005	0.00
201	16.75	0.10	0.006	0.289	0.005	0.00
202	16.83	0.10	0.006	0.288	0.005	0.00
203	16.92	0.10	0.006	0.286	0.005	0.00
204	17.00	0.10	0.006	0.285	0.005	0.00
205	17.08	0.17	0.009	0.283	0.008	0.00
206	17.17	0.17	0.009	0.282	0.008	0.00
207	17.25	0.17	0.009	0.280	0.008	0.00
208	17.33	0.17	0.009	0.279	0.008	0.00
209	17.42	0.17	0.009	0.278	0.008	0.00
210	17.50	0.17	0.009	0.276	0.008	0.00
211	17.58	0.17	0.009	0.275	0.008	0.00
212	17.67	0.17	0.009	0.273	0.008	0.00
213	17.75	0.17	0.009	0.272	0.008	0.00
214	17.83	0.13	0.007	0.271	0.006	0.00
215	17.92	0.13	0.007	0.269	0.006	0.00
216	18.00	0.13	0.007	0.268	0.006	0.00
217	18.08	0.13	0.007	0.267	0.006	0.00
218	18.17	0.13	0.007	0.265	0.006	0.00
219	18.25	0.13	0.007	0.264	0.006	0.00
220	18.33	0.13	0.007	0.263	0.006	0.00
221	18.42	0.13	0.007	0.262	0.006	0.00
222	18.50	0.13	0.007	0.260	0.006	0.00
223	18.58	0.10	0.006	0.259	0.005	0.00

224	18.67	0.10	0.006	0.258	0.005	0.00
225	18.75	0.10	0.006	0.257	0.005	0.00
226	18.83	0.07	0.004	0.255	0.003	0.00
227	18.92	0.07	0.004	0.254	0.003	0.00
228	19.00	0.07	0.004	0.253	0.003	0.00
229	19.08	0.10	0.006	0.252	0.005	0.00
230	19.17	0.10	0.006	0.251	0.005	0.00
231	19.25	0.10	0.006	0.249	0.005	0.00
232	19.33	0.13	0.007	0.248	0.006	0.00
233	19.42	0.13	0.007	0.247	0.006	0.00
234	19.50	0.13	0.007	0.246	0.006	0.00
235	19.58	0.10	0.006	0.245	0.005	0.00
236	19.67	0.10	0.006	0.244	0.005	0.00
237	19.75	0.10	0.006	0.243	0.005	0.00
238	19.83	0.07	0.004	0.241	0.003	0.00
239	19.92	0.07	0.004	0.240	0.003	0.00
240	20.00	0.07	0.004	0.239	0.003	0.00
241	20.08	0.10	0.006	0.238	0.005	0.00
242	20.17	0.10	0.006	0.237	0.005	0.00
243	20.25	0.10	0.006	0.236	0.005	0.00
244	20.33	0.10	0.006	0.235	0.005	0.00
245	20.42	0.10	0.006	0.234	0.005	0.00
246	20.50	0.10	0.006	0.233	0.005	0.00
247	20.58	0.10	0.006	0.232	0.005	0.00
248	20.67	0.10	0.006	0.231	0.005	0.00
249	20.75	0.10	0.006	0.230	0.005	0.00
250	20.83	0.07	0.004	0.229	0.003	0.00
251	20.92	0.07	0.004	0.228	0.003	0.00
252	21.00	0.07	0.004	0.227	0.003	0.00
253	21.08	0.10	0.006	0.227	0.005	0.00
254	21.17	0.10	0.006	0.226	0.005	0.00
255	21.25	0.10	0.006	0.225	0.005	0.00
256	21.33	0.07	0.004	0.224	0.003	0.00
257	21.42	0.07	0.004	0.223	0.003	0.00
258	21.50	0.07	0.004	0.222	0.003	0.00
259	21.58	0.10	0.006	0.221	0.005	0.00
260	21.67	0.10	0.006	0.221	0.005	0.00
261	21.75	0.10	0.006	0.220	0.005	0.00
262	21.83	0.07	0.004	0.219	0.003	0.00
263	21.92	0.07	0.004	0.218	0.003	0.00
264	22.00	0.07	0.004	0.218	0.003	0.00
265	22.08	0.10	0.006	0.217	0.005	0.00
266	22.17	0.10	0.006	0.216	0.005	0.00
267	22.25	0.10	0.006	0.216	0.005	0.00
268	22.33	0.07	0.004	0.215	0.003	0.00
269	22.42	0.07	0.004	0.214	0.003	0.00
270	22.50	0.07	0.004	0.214	0.003	0.00
271	22.58	0.07	0.004	0.213	0.003	0.00
272	22.67	0.07	0.004	0.212	0.003	0.00
273	22.75	0.07	0.004	0.212	0.003	0.00
274	22.83	0.07	0.004	0.211	0.003	0.00
275	22.92	0.07	0.004	0.211	0.003	0.00
276	23.00	0.07	0.004	0.210	0.003	0.00
277	23.08	0.07	0.004	0.210	0.003	0.00
278	23.17	0.07	0.004	0.209	0.003	0.00
279	23.25	0.07	0.004	0.209	0.003	0.00
280	23.33	0.07	0.004	0.208	0.003	0.00
281	23.42	0.07	0.004	0.208	0.003	0.00
282	23.50	0.07	0.004	0.208	0.003	0.00
283	23.58	0.07	0.004	0.207	0.003	0.00
284	23.67	0.07	0.004	0.207	0.003	0.00
285	23.75	0.07	0.004	0.207	0.003	0.00
286	23.83	0.07	0.004	0.206	0.003	0.00
287	23.92	0.07	0.004	0.206	0.003	0.00
288	24.00	0.07	0.004	0.206	0.003	0.00

Sum = 100.0 Sum = 1.0

Flood volume = Effective rainfall 0.08(In)

times area 0.6(Ac.)/[(In)/(Ft.)] = 0.0(Ac.Ft)

Total soil loss = 0.38(In)

Total soil loss = 0.018(Ac.Ft)

Total rainfall = 0.46(In)

Flood volume = 171.5 Cubic Feet

Total soil loss = 803.9 Cubic Feet

Storm Event 2 Effective Rainfall = 0.875(In)

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Loss rate(In./Hr) Low	Effective (In/Hr)
1	0.08	0.07	0.007	0.731	0.006	0.00
2	0.17	0.07	0.007	0.728	0.006	0.00
3	0.25	0.07	0.007	0.725	0.006	0.00
4	0.33	0.10	0.010	0.722	0.009	0.00
5	0.42	0.10	0.010	0.719	0.009	0.00
6	0.50	0.10	0.010	0.717	0.009	0.00
7	0.58	0.10	0.010	0.714	0.009	0.00
8	0.67	0.10	0.010	0.711	0.009	0.00
9	0.75	0.10	0.010	0.708	0.009	0.00
10	0.83	0.13	0.014	0.705	0.012	0.00
11	0.92	0.13	0.014	0.703	0.012	0.00
12	1.00	0.13	0.014	0.700	0.012	0.00
13	1.08	0.10	0.010	0.697	0.009	0.00
14	1.17	0.10	0.010	0.694	0.009	0.00
15	1.25	0.10	0.010	0.692	0.009	0.00
16	1.33	0.10	0.010	0.689	0.009	0.00
17	1.42	0.10	0.010	0.686	0.009	0.00
18	1.50	0.10	0.010	0.683	0.009	0.00
19	1.58	0.10	0.010	0.681	0.009	0.00
20	1.67	0.10	0.010	0.678	0.009	0.00
21	1.75	0.10	0.010	0.675	0.009	0.00
22	1.83	0.13	0.014	0.672	0.012	0.00
23	1.92	0.13	0.014	0.670	0.012	0.00
24	2.00	0.13	0.014	0.667	0.012	0.00
25	2.08	0.13	0.014	0.664	0.012	0.00
26	2.17	0.13	0.014	0.662	0.012	0.00
27	2.25	0.13	0.014	0.659	0.012	0.00
28	2.33	0.13	0.014	0.656	0.012	0.00
29	2.42	0.13	0.014	0.654	0.012	0.00
30	2.50	0.13	0.014	0.651	0.012	0.00
31	2.58	0.17	0.017	0.648	0.014	0.00
32	2.67	0.17	0.017	0.646	0.014	0.00
33	2.75	0.17	0.017	0.643	0.014	0.00
34	2.83	0.17	0.017	0.640	0.014	0.00
35	2.92	0.17	0.017	0.638	0.014	0.00
36	3.00	0.17	0.017	0.635	0.014	0.00
37	3.08	0.17	0.017	0.632	0.014	0.00
38	3.17	0.17	0.017	0.630	0.014	0.00
39	3.25	0.17	0.017	0.627	0.014	0.00
40	3.33	0.17	0.017	0.625	0.014	0.00
41	3.42	0.17	0.017	0.622	0.014	0.00
42	3.50	0.17	0.017	0.619	0.014	0.00
43	3.58	0.17	0.017	0.617	0.014	0.00
44	3.67	0.17	0.017	0.614	0.014	0.00
45	3.75	0.17	0.017	0.612	0.014	0.00
46	3.83	0.20	0.021	0.609	0.017	0.00
47	3.92	0.20	0.021	0.606	0.017	0.00
48	4.00	0.20	0.021	0.604	0.017	0.00
49	4.08	0.20	0.021	0.601	0.017	0.00
50	4.17	0.20	0.021	0.599	0.017	0.00
51	4.25	0.20	0.021	0.596	0.017	0.00

52	4.33	0.23	0.024	0.594	0.020	0.00
53	4.42	0.23	0.024	0.591	0.020	0.00
54	4.50	0.23	0.024	0.589	0.020	0.00
55	4.58	0.23	0.024	0.586	0.020	0.00
56	4.67	0.23	0.024	0.584	0.020	0.00
57	4.75	0.23	0.024	0.581	0.020	0.00
58	4.83	0.27	0.028	0.579	0.023	0.00
59	4.92	0.27	0.028	0.576	0.023	0.00
60	5.00	0.27	0.028	0.574	0.023	0.00
61	5.08	0.20	0.021	0.571	0.017	0.00
62	5.17	0.20	0.021	0.569	0.017	0.00
63	5.25	0.20	0.021	0.566	0.017	0.00
64	5.33	0.23	0.024	0.564	0.020	0.00
65	5.42	0.23	0.024	0.561	0.020	0.00
66	5.50	0.23	0.024	0.559	0.020	0.00
67	5.58	0.27	0.028	0.556	0.023	0.00
68	5.67	0.27	0.028	0.554	0.023	0.00
69	5.75	0.27	0.028	0.551	0.023	0.00
70	5.83	0.27	0.028	0.549	0.023	0.00
71	5.92	0.27	0.028	0.546	0.023	0.00
72	6.00	0.27	0.028	0.544	0.023	0.00
73	6.08	0.30	0.031	0.542	0.026	0.01
74	6.17	0.30	0.031	0.539	0.026	0.01
75	6.25	0.30	0.031	0.537	0.026	0.01
76	6.33	0.30	0.031	0.534	0.026	0.01
77	6.42	0.30	0.031	0.532	0.026	0.01
78	6.50	0.30	0.031	0.530	0.026	0.01
79	6.58	0.33	0.035	0.527	0.029	0.01
80	6.67	0.33	0.035	0.525	0.029	0.01
81	6.75	0.33	0.035	0.523	0.029	0.01
82	6.83	0.33	0.035	0.520	0.029	0.01
83	6.92	0.33	0.035	0.518	0.029	0.01
84	7.00	0.33	0.035	0.515	0.029	0.01
85	7.08	0.33	0.035	0.513	0.029	0.01
86	7.17	0.33	0.035	0.511	0.029	0.01
87	7.25	0.33	0.035	0.508	0.029	0.01
88	7.33	0.37	0.038	0.506	0.032	0.01
89	7.42	0.37	0.038	0.504	0.032	0.01
90	7.50	0.37	0.038	0.501	0.032	0.01
91	7.58	0.40	0.042	0.499	0.035	0.01
92	7.67	0.40	0.042	0.497	0.035	0.01
93	7.75	0.40	0.042	0.495	0.035	0.01
94	7.83	0.43	0.045	0.492	0.037	0.01
95	7.92	0.43	0.045	0.490	0.037	0.01
96	8.00	0.43	0.045	0.488	0.037	0.01
97	8.08	0.50	0.052	0.486	0.043	0.01
98	8.17	0.50	0.052	0.483	0.043	0.01
99	8.25	0.50	0.052	0.481	0.043	0.01
100	8.33	0.50	0.052	0.479	0.043	0.01
101	8.42	0.50	0.052	0.477	0.043	0.01
102	8.50	0.50	0.052	0.474	0.043	0.01
103	8.58	0.53	0.056	0.472	0.046	0.01
104	8.67	0.53	0.056	0.470	0.046	0.01
105	8.75	0.53	0.056	0.468	0.046	0.01
106	8.83	0.57	0.059	0.465	0.049	0.01
107	8.92	0.57	0.059	0.463	0.049	0.01
108	9.00	0.57	0.059	0.461	0.049	0.01
109	9.08	0.63	0.066	0.459	0.055	0.01
110	9.17	0.63	0.066	0.457	0.055	0.01
111	9.25	0.63	0.066	0.454	0.055	0.01
112	9.33	0.67	0.070	0.452	0.058	0.01
113	9.42	0.67	0.070	0.450	0.058	0.01
114	9.50	0.67	0.070	0.448	0.058	0.01
115	9.58	0.70	0.073	0.446	0.061	0.01
116	9.67	0.70	0.073	0.444	0.061	0.01

117	9.75	0.70	0.073	0.442	0.061	0.01
118	9.83	0.73	0.077	0.439	0.063	0.01
119	9.92	0.73	0.077	0.437	0.063	0.01
120	10.00	0.73	0.077	0.435	0.063	0.01
121	10.08	0.50	0.052	0.433	0.043	0.01
122	10.17	0.50	0.052	0.431	0.043	0.01
123	10.25	0.50	0.052	0.429	0.043	0.01
124	10.33	0.50	0.052	0.427	0.043	0.01
125	10.42	0.50	0.052	0.425	0.043	0.01
126	10.50	0.50	0.052	0.423	0.043	0.01
127	10.58	0.67	0.070	0.421	0.058	0.01
128	10.67	0.67	0.070	0.419	0.058	0.01
129	10.75	0.67	0.070	0.417	0.058	0.01
130	10.83	0.67	0.070	0.415	0.058	0.01
131	10.92	0.67	0.070	0.412	0.058	0.01
132	11.00	0.67	0.070	0.410	0.058	0.01
133	11.08	0.63	0.066	0.408	0.055	0.01
134	11.17	0.63	0.066	0.406	0.055	0.01
135	11.25	0.63	0.066	0.404	0.055	0.01
136	11.33	0.63	0.066	0.402	0.055	0.01
137	11.42	0.63	0.066	0.400	0.055	0.01
138	11.50	0.63	0.066	0.398	0.055	0.01
139	11.58	0.57	0.059	0.396	0.049	0.01
140	11.67	0.57	0.059	0.394	0.049	0.01
141	11.75	0.57	0.059	0.393	0.049	0.01
142	11.83	0.60	0.063	0.391	0.052	0.01
143	11.92	0.60	0.063	0.389	0.052	0.01
144	12.00	0.60	0.063	0.387	0.052	0.01
145	12.08	0.83	0.087	0.385	0.072	0.02
146	12.17	0.83	0.087	0.383	0.072	0.02
147	12.25	0.83	0.087	0.381	0.072	0.02
148	12.33	0.87	0.091	0.379	0.075	0.02
149	12.42	0.87	0.091	0.377	0.075	0.02
150	12.50	0.87	0.091	0.375	0.075	0.02
151	12.58	0.93	0.098	0.373	0.081	0.02
152	12.67	0.93	0.098	0.371	0.081	0.02
153	12.75	0.93	0.098	0.370	0.081	0.02
154	12.83	0.97	0.101	0.368	0.084	0.02
155	12.92	0.97	0.101	0.366	0.084	0.02
156	13.00	0.97	0.101	0.364	0.084	0.02
157	13.08	1.13	0.119	0.362	0.098	0.02
158	13.17	1.13	0.119	0.360	0.098	0.02
159	13.25	1.13	0.119	0.358	0.098	0.02
160	13.33	1.13	0.119	0.357	0.098	0.02
161	13.42	1.13	0.119	0.355	0.098	0.02
162	13.50	1.13	0.119	0.353	0.098	0.02
163	13.58	0.77	0.080	0.351	0.066	0.01
164	13.67	0.77	0.080	0.349	0.066	0.01
165	13.75	0.77	0.080	0.348	0.066	0.01
166	13.83	0.77	0.080	0.346	0.066	0.01
167	13.92	0.77	0.080	0.344	0.066	0.01
168	14.00	0.77	0.080	0.342	0.066	0.01
169	14.08	0.90	0.094	0.341	0.078	0.02
170	14.17	0.90	0.094	0.339	0.078	0.02
171	14.25	0.90	0.094	0.337	0.078	0.02
172	14.33	0.87	0.091	0.335	0.075	0.02
173	14.42	0.87	0.091	0.334	0.075	0.02
174	14.50	0.87	0.091	0.332	0.075	0.02
175	14.58	0.87	0.091	0.330	0.075	0.02
176	14.67	0.87	0.091	0.329	0.075	0.02
177	14.75	0.87	0.091	0.327	0.075	0.02
178	14.83	0.83	0.087	0.325	0.072	0.02
179	14.92	0.83	0.087	0.324	0.072	0.02
180	15.00	0.83	0.087	0.322	0.072	0.02
181	15.08	0.80	0.084	0.320	0.069	0.01

182	15.17	0.80	0.084	0.319	0.069	0.01
183	15.25	0.80	0.084	0.317	0.069	0.01
184	15.33	0.77	0.080	0.315	0.066	0.01
185	15.42	0.77	0.080	0.314	0.066	0.01
186	15.50	0.77	0.080	0.312	0.066	0.01
187	15.58	0.63	0.066	0.311	0.055	0.01
188	15.67	0.63	0.066	0.309	0.055	0.01
189	15.75	0.63	0.066	0.307	0.055	0.01
190	15.83	0.63	0.066	0.306	0.055	0.01
191	15.92	0.63	0.066	0.304	0.055	0.01
192	16.00	0.63	0.066	0.303	0.055	0.01
193	16.08	0.13	0.014	0.301	0.012	0.00
194	16.17	0.13	0.014	0.300	0.012	0.00
195	16.25	0.13	0.014	0.298	0.012	0.00
196	16.33	0.13	0.014	0.297	0.012	0.00
197	16.42	0.13	0.014	0.295	0.012	0.00
198	16.50	0.13	0.014	0.294	0.012	0.00
199	16.58	0.10	0.010	0.292	0.009	0.00
200	16.67	0.10	0.010	0.291	0.009	0.00
201	16.75	0.10	0.010	0.289	0.009	0.00
202	16.83	0.10	0.010	0.288	0.009	0.00
203	16.92	0.10	0.010	0.286	0.009	0.00
204	17.00	0.10	0.010	0.285	0.009	0.00
205	17.08	0.17	0.017	0.283	0.014	0.00
206	17.17	0.17	0.017	0.282	0.014	0.00
207	17.25	0.17	0.017	0.280	0.014	0.00
208	17.33	0.17	0.017	0.279	0.014	0.00
209	17.42	0.17	0.017	0.278	0.014	0.00
210	17.50	0.17	0.017	0.276	0.014	0.00
211	17.58	0.17	0.017	0.275	0.014	0.00
212	17.67	0.17	0.017	0.273	0.014	0.00
213	17.75	0.17	0.017	0.272	0.014	0.00
214	17.83	0.13	0.014	0.271	0.012	0.00
215	17.92	0.13	0.014	0.269	0.012	0.00
216	18.00	0.13	0.014	0.268	0.012	0.00
217	18.08	0.13	0.014	0.267	0.012	0.00
218	18.17	0.13	0.014	0.265	0.012	0.00
219	18.25	0.13	0.014	0.264	0.012	0.00
220	18.33	0.13	0.014	0.263	0.012	0.00
221	18.42	0.13	0.014	0.262	0.012	0.00
222	18.50	0.13	0.014	0.260	0.012	0.00
223	18.58	0.10	0.010	0.259	0.009	0.00
224	18.67	0.10	0.010	0.258	0.009	0.00
225	18.75	0.10	0.010	0.257	0.009	0.00
226	18.83	0.07	0.007	0.255	0.006	0.00
227	18.92	0.07	0.007	0.254	0.006	0.00
228	19.00	0.07	0.007	0.253	0.006	0.00
229	19.08	0.10	0.010	0.252	0.009	0.00
230	19.17	0.10	0.010	0.251	0.009	0.00
231	19.25	0.10	0.010	0.249	0.009	0.00
232	19.33	0.13	0.014	0.248	0.012	0.00
233	19.42	0.13	0.014	0.247	0.012	0.00
234	19.50	0.13	0.014	0.246	0.012	0.00
235	19.58	0.10	0.010	0.245	0.009	0.00
236	19.67	0.10	0.010	0.244	0.009	0.00
237	19.75	0.10	0.010	0.243	0.009	0.00
238	19.83	0.07	0.007	0.241	0.006	0.00
239	19.92	0.07	0.007	0.240	0.006	0.00
240	20.00	0.07	0.007	0.239	0.006	0.00
241	20.08	0.10	0.010	0.238	0.009	0.00
242	20.17	0.10	0.010	0.237	0.009	0.00
243	20.25	0.10	0.010	0.236	0.009	0.00
244	20.33	0.10	0.010	0.235	0.009	0.00
245	20.42	0.10	0.010	0.234	0.009	0.00
246	20.50	0.10	0.010	0.233	0.009	0.00

247	20.58	0.10	0.010	0.232	0.009	0.00
248	20.67	0.10	0.010	0.231	0.009	0.00
249	20.75	0.10	0.010	0.230	0.009	0.00
250	20.83	0.07	0.007	0.229	0.006	0.00
251	20.92	0.07	0.007	0.228	0.006	0.00
252	21.00	0.07	0.007	0.227	0.006	0.00
253	21.08	0.10	0.010	0.227	0.009	0.00
254	21.17	0.10	0.010	0.226	0.009	0.00
255	21.25	0.10	0.010	0.225	0.009	0.00
256	21.33	0.07	0.007	0.224	0.006	0.00
257	21.42	0.07	0.007	0.223	0.006	0.00
258	21.50	0.07	0.007	0.222	0.006	0.00
259	21.58	0.10	0.010	0.221	0.009	0.00
260	21.67	0.10	0.010	0.221	0.009	0.00
261	21.75	0.10	0.010	0.220	0.009	0.00
262	21.83	0.07	0.007	0.219	0.006	0.00
263	21.92	0.07	0.007	0.218	0.006	0.00
264	22.00	0.07	0.007	0.218	0.006	0.00
265	22.08	0.10	0.010	0.217	0.009	0.00
266	22.17	0.10	0.010	0.216	0.009	0.00
267	22.25	0.10	0.010	0.216	0.009	0.00
268	22.33	0.07	0.007	0.215	0.006	0.00
269	22.42	0.07	0.007	0.214	0.006	0.00
270	22.50	0.07	0.007	0.214	0.006	0.00
271	22.58	0.07	0.007	0.213	0.006	0.00
272	22.67	0.07	0.007	0.212	0.006	0.00
273	22.75	0.07	0.007	0.212	0.006	0.00
274	22.83	0.07	0.007	0.211	0.006	0.00
275	22.92	0.07	0.007	0.211	0.006	0.00
276	23.00	0.07	0.007	0.210	0.006	0.00
277	23.08	0.07	0.007	0.210	0.006	0.00
278	23.17	0.07	0.007	0.209	0.006	0.00
279	23.25	0.07	0.007	0.209	0.006	0.00
280	23.33	0.07	0.007	0.208	0.006	0.00
281	23.42	0.07	0.007	0.208	0.006	0.00
282	23.50	0.07	0.007	0.208	0.006	0.00
283	23.58	0.07	0.007	0.207	0.006	0.00
284	23.67	0.07	0.007	0.207	0.006	0.00
285	23.75	0.07	0.007	0.207	0.006	0.00
286	23.83	0.07	0.007	0.206	0.006	0.00
287	23.92	0.07	0.007	0.206	0.006	0.00
288	24.00	0.07	0.007	0.206	0.006	0.00
Sum =		100.0		Sum =	1.8	

Flood volume = Effective rainfall 0.15(In)
times area 0.6(Ac.)/[(In)/(Ft.)] = 0.0(Ac.Ft)
Total soil loss = 0.72(In)
Total soil loss = 0.035(Ac.Ft)
Total rainfall = 0.87(In)
Flood volume = 324.9 Cubic Feet
Total soil loss = 1523.2 Cubic Feet

Storm Event 1 Effective Rainfall = 2.430(In)

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Loss rate(In./Hr) Low	Effective (In/Hr)
1	0.08	0.07	0.019	0.731	0.016	0.00
2	0.17	0.07	0.019	0.728	0.016	0.00
3	0.25	0.07	0.019	0.725	0.016	0.00
4	0.33	0.10	0.029	0.722	0.024	0.01
5	0.42	0.10	0.029	0.719	0.024	0.01
6	0.50	0.10	0.029	0.717	0.024	0.01
7	0.58	0.10	0.029	0.714	0.024	0.01
8	0.67	0.10	0.029	0.711	0.024	0.01
9	0.75	0.10	0.029	0.708	0.024	0.01

10	0.83	0.13	0.039	0.705	0.032	0.01
11	0.92	0.13	0.039	0.703	0.032	0.01
12	1.00	0.13	0.039	0.700	0.032	0.01
13	1.08	0.10	0.029	0.697	0.024	0.01
14	1.17	0.10	0.029	0.694	0.024	0.01
15	1.25	0.10	0.029	0.692	0.024	0.01
16	1.33	0.10	0.029	0.689	0.024	0.01
17	1.42	0.10	0.029	0.686	0.024	0.01
18	1.50	0.10	0.029	0.683	0.024	0.01
19	1.58	0.10	0.029	0.681	0.024	0.01
20	1.67	0.10	0.029	0.678	0.024	0.01
21	1.75	0.10	0.029	0.675	0.024	0.01
22	1.83	0.13	0.039	0.672	0.032	0.01
23	1.92	0.13	0.039	0.670	0.032	0.01
24	2.00	0.13	0.039	0.667	0.032	0.01
25	2.08	0.13	0.039	0.664	0.032	0.01
26	2.17	0.13	0.039	0.662	0.032	0.01
27	2.25	0.13	0.039	0.659	0.032	0.01
28	2.33	0.13	0.039	0.656	0.032	0.01
29	2.42	0.13	0.039	0.654	0.032	0.01
30	2.50	0.13	0.039	0.651	0.032	0.01
31	2.58	0.17	0.049	0.648	0.040	0.01
32	2.67	0.17	0.049	0.646	0.040	0.01
33	2.75	0.17	0.049	0.643	0.040	0.01
34	2.83	0.17	0.049	0.640	0.040	0.01
35	2.92	0.17	0.049	0.638	0.040	0.01
36	3.00	0.17	0.049	0.635	0.040	0.01
37	3.08	0.17	0.049	0.632	0.040	0.01
38	3.17	0.17	0.049	0.630	0.040	0.01
39	3.25	0.17	0.049	0.627	0.040	0.01
40	3.33	0.17	0.049	0.625	0.040	0.01
41	3.42	0.17	0.049	0.622	0.040	0.01
42	3.50	0.17	0.049	0.619	0.040	0.01
43	3.58	0.17	0.049	0.617	0.040	0.01
44	3.67	0.17	0.049	0.614	0.040	0.01
45	3.75	0.17	0.049	0.612	0.040	0.01
46	3.83	0.20	0.058	0.609	0.048	0.01
47	3.92	0.20	0.058	0.606	0.048	0.01
48	4.00	0.20	0.058	0.604	0.048	0.01
49	4.08	0.20	0.058	0.601	0.048	0.01
50	4.17	0.20	0.058	0.599	0.048	0.01
51	4.25	0.20	0.058	0.596	0.048	0.01
52	4.33	0.23	0.068	0.594	0.056	0.01
53	4.42	0.23	0.068	0.591	0.056	0.01
54	4.50	0.23	0.068	0.589	0.056	0.01
55	4.58	0.23	0.068	0.586	0.056	0.01
56	4.67	0.23	0.068	0.584	0.056	0.01
57	4.75	0.23	0.068	0.581	0.056	0.01
58	4.83	0.27	0.078	0.579	0.064	0.01
59	4.92	0.27	0.078	0.576	0.064	0.01
60	5.00	0.27	0.078	0.574	0.064	0.01
61	5.08	0.20	0.058	0.571	0.048	0.01
62	5.17	0.20	0.058	0.569	0.048	0.01
63	5.25	0.20	0.058	0.566	0.048	0.01
64	5.33	0.23	0.068	0.564	0.056	0.01
65	5.42	0.23	0.068	0.561	0.056	0.01
66	5.50	0.23	0.068	0.559	0.056	0.01
67	5.58	0.27	0.078	0.556	0.064	0.01
68	5.67	0.27	0.078	0.554	0.064	0.01
69	5.75	0.27	0.078	0.551	0.064	0.01
70	5.83	0.27	0.078	0.549	0.064	0.01
71	5.92	0.27	0.078	0.546	0.064	0.01
72	6.00	0.27	0.078	0.544	0.064	0.01
73	6.08	0.30	0.087	0.542	0.072	0.02
74	6.17	0.30	0.087	0.539	0.072	0.02

75	6.25	0.30	0.087	0.537	0.072	0.02
76	6.33	0.30	0.087	0.534	0.072	0.02
77	6.42	0.30	0.087	0.532	0.072	0.02
78	6.50	0.30	0.087	0.530	0.072	0.02
79	6.58	0.33	0.097	0.527	0.080	0.02
80	6.67	0.33	0.097	0.525	0.080	0.02
81	6.75	0.33	0.097	0.523	0.080	0.02
82	6.83	0.33	0.097	0.520	0.080	0.02
83	6.92	0.33	0.097	0.518	0.080	0.02
84	7.00	0.33	0.097	0.515	0.080	0.02
85	7.08	0.33	0.097	0.513	0.080	0.02
86	7.17	0.33	0.097	0.511	0.080	0.02
87	7.25	0.33	0.097	0.508	0.080	0.02
88	7.33	0.37	0.107	0.506	0.088	0.02
89	7.42	0.37	0.107	0.504	0.088	0.02
90	7.50	0.37	0.107	0.501	0.088	0.02
91	7.58	0.40	0.117	0.499	0.096	0.02
92	7.67	0.40	0.117	0.497	0.096	0.02
93	7.75	0.40	0.117	0.495	0.096	0.02
94	7.83	0.43	0.126	0.492	0.104	0.02
95	7.92	0.43	0.126	0.490	0.104	0.02
96	8.00	0.43	0.126	0.488	0.104	0.02
97	8.08	0.50	0.146	0.486	0.120	0.03
98	8.17	0.50	0.146	0.483	0.120	0.03
99	8.25	0.50	0.146	0.481	0.120	0.03
100	8.33	0.50	0.146	0.479	0.120	0.03
101	8.42	0.50	0.146	0.477	0.120	0.03
102	8.50	0.50	0.146	0.474	0.120	0.03
103	8.58	0.53	0.156	0.472	0.128	0.03
104	8.67	0.53	0.156	0.470	0.128	0.03
105	8.75	0.53	0.156	0.468	0.128	0.03
106	8.83	0.57	0.165	0.465	0.136	0.03
107	8.92	0.57	0.165	0.463	0.136	0.03
108	9.00	0.57	0.165	0.461	0.136	0.03
109	9.08	0.63	0.185	0.459	0.152	0.03
110	9.17	0.63	0.185	0.457	0.152	0.03
111	9.25	0.63	0.185	0.454	0.152	0.03
112	9.33	0.67	0.194	0.452	0.160	0.03
113	9.42	0.67	0.194	0.450	0.160	0.03
114	9.50	0.67	0.194	0.448	0.160	0.03
115	9.58	0.70	0.204	0.446	0.168	0.04
116	9.67	0.70	0.204	0.444	0.168	0.04
117	9.75	0.70	0.204	0.442	0.168	0.04
118	9.83	0.73	0.214	0.439	0.176	0.04
119	9.92	0.73	0.214	0.437	0.176	0.04
120	10.00	0.73	0.214	0.435	0.176	0.04
121	10.08	0.50	0.146	0.433	0.120	0.03
122	10.17	0.50	0.146	0.431	0.120	0.03
123	10.25	0.50	0.146	0.429	0.120	0.03
124	10.33	0.50	0.146	0.427	0.120	0.03
125	10.42	0.50	0.146	0.425	0.120	0.03
126	10.50	0.50	0.146	0.423	0.120	0.03
127	10.58	0.67	0.194	0.421	0.160	0.03
128	10.67	0.67	0.194	0.419	0.160	0.03
129	10.75	0.67	0.194	0.417	0.160	0.03
130	10.83	0.67	0.194	0.415	0.160	0.03
131	10.92	0.67	0.194	0.412	0.160	0.03
132	11.00	0.67	0.194	0.410	0.160	0.03
133	11.08	0.63	0.185	0.408	0.152	0.03
134	11.17	0.63	0.185	0.406	0.152	0.03
135	11.25	0.63	0.185	0.404	0.152	0.03
136	11.33	0.63	0.185	0.402	0.152	0.03
137	11.42	0.63	0.185	0.400	0.152	0.03
138	11.50	0.63	0.185	0.398	0.152	0.03
139	11.58	0.57	0.165	0.396	0.136	0.03

140	11.67	0.57	0.165	0.394	0.136	0.03
141	11.75	0.57	0.165	0.393	0.136	0.03
142	11.83	0.60	0.175	0.391	0.144	0.03
143	11.92	0.60	0.175	0.389	0.144	0.03
144	12.00	0.60	0.175	0.387	0.144	0.03
145	12.08	0.83	0.243	0.385	0.200	0.04
146	12.17	0.83	0.243	0.383	0.200	0.04
147	12.25	0.83	0.243	0.381	0.200	0.04
148	12.33	0.87	0.253	0.379	0.208	0.04
149	12.42	0.87	0.253	0.377	0.208	0.04
150	12.50	0.87	0.253	0.375	0.208	0.04
151	12.58	0.93	0.272	0.373	0.224	0.05
152	12.67	0.93	0.272	0.371	0.224	0.05
153	12.75	0.93	0.272	0.370	0.224	0.05
154	12.83	0.97	0.282	0.368	0.232	0.05
155	12.92	0.97	0.282	0.366	0.232	0.05
156	13.00	0.97	0.282	0.364	0.232	0.05
157	13.08	1.13	0.330	0.362	0.272	0.06
158	13.17	1.13	0.330	0.360	0.272	0.06
159	13.25	1.13	0.330	0.358	0.272	0.06
160	13.33	1.13	0.330	0.357	0.272	0.06
161	13.42	1.13	0.330	0.355	0.272	0.06
162	13.50	1.13	0.330	0.353	0.272	0.06
163	13.58	0.77	0.224	0.351	0.184	0.04
164	13.67	0.77	0.224	0.349	0.184	0.04
165	13.75	0.77	0.224	0.348	0.184	0.04
166	13.83	0.77	0.224	0.346	0.184	0.04
167	13.92	0.77	0.224	0.344	0.184	0.04
168	14.00	0.77	0.224	0.342	0.184	0.04
169	14.08	0.90	0.262	0.341	0.216	0.05
170	14.17	0.90	0.262	0.339	0.216	0.05
171	14.25	0.90	0.262	0.337	0.216	0.05
172	14.33	0.87	0.253	0.335	0.208	0.04
173	14.42	0.87	0.253	0.334	0.208	0.04
174	14.50	0.87	0.253	0.332	0.208	0.04
175	14.58	0.87	0.253	0.330	0.208	0.04
176	14.67	0.87	0.253	0.329	0.208	0.04
177	14.75	0.87	0.253	0.327	0.208	0.04
178	14.83	0.83	0.243	0.325	0.200	0.04
179	14.92	0.83	0.243	0.324	0.200	0.04
180	15.00	0.83	0.243	0.322	0.200	0.04
181	15.08	0.80	0.233	0.320	0.192	0.04
182	15.17	0.80	0.233	0.319	0.192	0.04
183	15.25	0.80	0.233	0.317	0.192	0.04
184	15.33	0.77	0.224	0.315	0.184	0.04
185	15.42	0.77	0.224	0.314	0.184	0.04
186	15.50	0.77	0.224	0.312	0.184	0.04
187	15.58	0.63	0.185	0.311	0.152	0.03
188	15.67	0.63	0.185	0.309	0.152	0.03
189	15.75	0.63	0.185	0.307	0.152	0.03
190	15.83	0.63	0.185	0.306	0.152	0.03
191	15.92	0.63	0.185	0.304	0.152	0.03
192	16.00	0.63	0.185	0.303	0.152	0.03
193	16.08	0.13	0.039	0.301	0.032	0.01
194	16.17	0.13	0.039	0.300	0.032	0.01
195	16.25	0.13	0.039	0.298	0.032	0.01
196	16.33	0.13	0.039	0.297	0.032	0.01
197	16.42	0.13	0.039	0.295	0.032	0.01
198	16.50	0.13	0.039	0.294	0.032	0.01
199	16.58	0.10	0.029	0.292	0.024	0.01
200	16.67	0.10	0.029	0.291	0.024	0.01
201	16.75	0.10	0.029	0.289	0.024	0.01
202	16.83	0.10	0.029	0.288	0.024	0.01
203	16.92	0.10	0.029	0.286	0.024	0.01
204	17.00	0.10	0.029	0.285	0.024	0.01

205	17.08	0.17	0.049	0.283	0.040	0.01
206	17.17	0.17	0.049	0.282	0.040	0.01
207	17.25	0.17	0.049	0.280	0.040	0.01
208	17.33	0.17	0.049	0.279	0.040	0.01
209	17.42	0.17	0.049	0.278	0.040	0.01
210	17.50	0.17	0.049	0.276	0.040	0.01
211	17.58	0.17	0.049	0.275	0.040	0.01
212	17.67	0.17	0.049	0.273	0.040	0.01
213	17.75	0.17	0.049	0.272	0.040	0.01
214	17.83	0.13	0.039	0.271	0.032	0.01
215	17.92	0.13	0.039	0.269	0.032	0.01
216	18.00	0.13	0.039	0.268	0.032	0.01
217	18.08	0.13	0.039	0.267	0.032	0.01
218	18.17	0.13	0.039	0.265	0.032	0.01
219	18.25	0.13	0.039	0.264	0.032	0.01
220	18.33	0.13	0.039	0.263	0.032	0.01
221	18.42	0.13	0.039	0.262	0.032	0.01
222	18.50	0.13	0.039	0.260	0.032	0.01
223	18.58	0.10	0.029	0.259	0.024	0.01
224	18.67	0.10	0.029	0.258	0.024	0.01
225	18.75	0.10	0.029	0.257	0.024	0.01
226	18.83	0.07	0.019	0.255	0.016	0.00
227	18.92	0.07	0.019	0.254	0.016	0.00
228	19.00	0.07	0.019	0.253	0.016	0.00
229	19.08	0.10	0.029	0.252	0.024	0.01
230	19.17	0.10	0.029	0.251	0.024	0.01
231	19.25	0.10	0.029	0.249	0.024	0.01
232	19.33	0.13	0.039	0.248	0.032	0.01
233	19.42	0.13	0.039	0.247	0.032	0.01
234	19.50	0.13	0.039	0.246	0.032	0.01
235	19.58	0.10	0.029	0.245	0.024	0.01
236	19.67	0.10	0.029	0.244	0.024	0.01
237	19.75	0.10	0.029	0.243	0.024	0.01
238	19.83	0.07	0.019	0.241	0.016	0.00
239	19.92	0.07	0.019	0.240	0.016	0.00
240	20.00	0.07	0.019	0.239	0.016	0.00
241	20.08	0.10	0.029	0.238	0.024	0.01
242	20.17	0.10	0.029	0.237	0.024	0.01
243	20.25	0.10	0.029	0.236	0.024	0.01
244	20.33	0.10	0.029	0.235	0.024	0.01
245	20.42	0.10	0.029	0.234	0.024	0.01
246	20.50	0.10	0.029	0.233	0.024	0.01
247	20.58	0.10	0.029	0.232	0.024	0.01
248	20.67	0.10	0.029	0.231	0.024	0.01
249	20.75	0.10	0.029	0.230	0.024	0.01
250	20.83	0.07	0.019	0.229	0.016	0.00
251	20.92	0.07	0.019	0.228	0.016	0.00
252	21.00	0.07	0.019	0.227	0.016	0.00
253	21.08	0.10	0.029	0.227	0.024	0.01
254	21.17	0.10	0.029	0.226	0.024	0.01
255	21.25	0.10	0.029	0.225	0.024	0.01
256	21.33	0.07	0.019	0.224	0.016	0.00
257	21.42	0.07	0.019	0.223	0.016	0.00
258	21.50	0.07	0.019	0.222	0.016	0.00
259	21.58	0.10	0.029	0.221	0.024	0.01
260	21.67	0.10	0.029	0.221	0.024	0.01
261	21.75	0.10	0.029	0.220	0.024	0.01
262	21.83	0.07	0.019	0.219	0.016	0.00
263	21.92	0.07	0.019	0.218	0.016	0.00
264	22.00	0.07	0.019	0.218	0.016	0.00
265	22.08	0.10	0.029	0.217	0.024	0.01
266	22.17	0.10	0.029	0.216	0.024	0.01
267	22.25	0.10	0.029	0.216	0.024	0.01
268	22.33	0.07	0.019	0.215	0.016	0.00
269	22.42	0.07	0.019	0.214	0.016	0.00

270	22.50	0.07	0.019	0.214	0.016	0.00
271	22.58	0.07	0.019	0.213	0.016	0.00
272	22.67	0.07	0.019	0.212	0.016	0.00
273	22.75	0.07	0.019	0.212	0.016	0.00
274	22.83	0.07	0.019	0.211	0.016	0.00
275	22.92	0.07	0.019	0.211	0.016	0.00
276	23.00	0.07	0.019	0.210	0.016	0.00
277	23.08	0.07	0.019	0.210	0.016	0.00
278	23.17	0.07	0.019	0.209	0.016	0.00
279	23.25	0.07	0.019	0.209	0.016	0.00
280	23.33	0.07	0.019	0.208	0.016	0.00
281	23.42	0.07	0.019	0.208	0.016	0.00
282	23.50	0.07	0.019	0.208	0.016	0.00
283	23.58	0.07	0.019	0.207	0.016	0.00
284	23.67	0.07	0.019	0.207	0.016	0.00
285	23.75	0.07	0.019	0.207	0.016	0.00
286	23.83	0.07	0.019	0.206	0.016	0.00
287	23.92	0.07	0.019	0.206	0.016	0.00
288	24.00	0.07	0.019	0.206	0.016	0.00
Sum =	100.0			Sum =	5.1	

Flood volume = Effective rainfall 0.43(In)
times area 0.6(Ac.)/[(In)/(Ft.)] = 0.0(Ac.Ft)
Total soil loss = 2.00(In)
Total soil loss = 0.097(Ac.Ft)
Total rainfall = 2.43(In)
Flood volume = 902.5 Cubic Feet
Total soil loss = 4231.2 Cubic Feet

Peak flow rate of this hydrograph = 0.034(CFS)

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TOTAL OF: 3 24 - H O U R S T O R M E V E N T S

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	0.0000	0.00	Q	|	|	|	|
0+15	0.0000	0.00	Q	|	|	|	|
0+20	0.0000	0.00	Q	|	|	|	|
0+25	0.0000	0.00	Q	|	|	|	|
0+30	0.0000	0.00	Q	|	|	|	|
0+35	0.0000	0.00	Q	|	|	|	|
0+40	0.0000	0.00	Q	|	|	|	|
0+45	0.0000	0.00	Q	|	|	|	|
0+50	0.0000	0.00	Q	|	|	|	|
0+55	0.0000	0.00	Q	|	|	|	|
1+ 0	0.0000	0.00	Q	|	|	|	|
1+ 5	0.0000	0.00	Q	|	|	|	|
1+10	0.0001	0.00	Q	|	|	|	|
1+15	0.0001	0.00	Q	|	|	|	|
1+20	0.0001	0.00	Q	|	|	|	|
1+25	0.0001	0.00	Q	|	|	|	|
1+30	0.0001	0.00	Q	|	|	|	|
1+35	0.0001	0.00	Q	|	|	|	|
1+40	0.0001	0.00	Q	|	|	|	|
1+45	0.0001	0.00	Q	|	|	|	|
1+50	0.0001	0.00	Q	|	|	|	|
1+55	0.0001	0.00	Q	|	|	|	|
2+ 0	0.0001	0.00	Q	|	|	|	|
2+ 5	0.0001	0.00	Q	|	|	|	|
2+10	0.0001	0.00	Q	|	|	|	|

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2+15    0.0001    0.00  Q      |      |      |      |
2+20    0.0001    0.00  Q      |      |      |      |
2+25    0.0001    0.00  Q      |      |      |      |
2+30    0.0001    0.00  Q      |      |      |      |
2+35    0.0001    0.00  Q      |      |      |      |
2+40    0.0001    0.00  Q      |      |      |      |
2+45    0.0001    0.00  Q      |      |      |      |
2+50    0.0002    0.00  Q      |      |      |      |
2+55    0.0002    0.00  Q      |      |      |      |
3+ 0    0.0002    0.00  Q      |      |      |      |
3+ 5    0.0002    0.00  Q      |      |      |      |
3+10    0.0002    0.00  Q      |      |      |      |
3+15    0.0002    0.00  Q      |      |      |      |
3+20    0.0002    0.00  Q      |      |      |      |
3+25    0.0002    0.00  Q      |      |      |      |
3+30    0.0002    0.00  Q      |      |      |      |
3+35    0.0002    0.00  Q      |      |      |      |
3+40    0.0002    0.00  Q      |      |      |      |
3+45    0.0002    0.00  Q      |      |      |      |
3+50    0.0002    0.00  Q      |      |      |      |
3+55    0.0002    0.00  Q      |      |      |      |
4+ 0    0.0002    0.00  Q      |      |      |      |
4+ 5    0.0003    0.00  Q      |      |      |      |
4+10    0.0003    0.00  Q      |      |      |      |
4+15    0.0003    0.00  Q      |      |      |      |
4+20    0.0003    0.00  Q      |      |      |      |
4+25    0.0003    0.00  Q      |      |      |      |
4+30    0.0003    0.00  Q      |      |      |      |
4+35    0.0003    0.00  Q      |      |      |      |
4+40    0.0003    0.00  Q      |      |      |      |
4+45    0.0003    0.00  Q      |      |      |      |
4+50    0.0003    0.00  Q      |      |      |      |
4+55    0.0003    0.00  Q      |      |      |      |
5+ 0    0.0004    0.00  Q      |      |      |      |
5+ 5    0.0004    0.00  Q      |      |      |      |
5+10    0.0004    0.00  Q      |      |      |      |
5+15    0.0004    0.00  Q      |      |      |      |
5+20    0.0004    0.00  Q      |      |      |      |
5+25    0.0004    0.00  Q      |      |      |      |
5+30    0.0004    0.00  Q      |      |      |      |
5+35    0.0004    0.00  Q      |      |      |      |
5+40    0.0004    0.00  Q      |      |      |      |
5+45    0.0004    0.00  Q      |      |      |      |
5+50    0.0005    0.00  Q      |      |      |      |
5+55    0.0005    0.00  Q      |      |      |      |
6+ 0    0.0005    0.00  Q      |      |      |      |
6+ 5    0.0005    0.00  Q      |      |      |      |
6+10    0.0005    0.00  Q      |      |      |      |
6+15    0.0005    0.00  Q      |      |      |      |
6+20    0.0005    0.00  Q      |      |      |      |
6+25    0.0005    0.00  Q      |      |      |      |
6+30    0.0005    0.00  Q      |      |      |      |
6+35    0.0006    0.00  Q      |      |      |      |
6+40    0.0006    0.00  Q      |      |      |      |
6+45    0.0006    0.00  Q      |      |      |      |
6+50    0.0006    0.00  Q      |      |      |      |
6+55    0.0006    0.00  Q      |      |      |      |
7+ 0    0.0006    0.00  Q      |      |      |      |
7+ 5    0.0006    0.00  Q      |      |      |      |
7+10    0.0006    0.00  Q      |      |      |      |
7+15    0.0007    0.00  Q      |      |      |      |
7+20    0.0007    0.00  Q      |      |      |      |
7+25    0.0007    0.00  Q      |      |      |      |
7+30    0.0007    0.00  Q      |      |      |      |
7+35    0.0007    0.00  Q      |      |      |      |
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 7+40    0.0007    0.00  Q      |      |      |      |
 7+45    0.0007    0.00  Q      |      |      |      |
 7+50    0.0008    0.00  Q      |      |      |      |
 7+55    0.0008    0.00  Q      |      |      |      |
 8+ 0    0.0008    0.00  Q      |      |      |      |
 8+ 5    0.0008    0.00  QV     |      |      |      |
 8+10    0.0008    0.00  QV     |      |      |      |
 8+15    0.0009    0.00  QV     |      |      |      |
 8+20    0.0009    0.00  QV     |      |      |      |
 8+25    0.0009    0.00  QV     |      |      |      |
 8+30    0.0009    0.00  QV     |      |      |      |
 8+35    0.0009    0.00  QV     |      |      |      |
 8+40    0.0010    0.00  QV     |      |      |      |
 8+45    0.0010    0.00  QV     |      |      |      |
 8+50    0.0010    0.00  QV     |      |      |      |
 8+55    0.0010    0.00  QV     |      |      |      |
 9+ 0    0.0010    0.00  QV     |      |      |      |
 9+ 5    0.0011    0.00  QV     |      |      |      |
 9+10    0.0011    0.00  QV     |      |      |      |
 9+15    0.0011    0.00  QV     |      |      |      |
 9+20    0.0011    0.00  QV     |      |      |      |
 9+25    0.0012    0.00  QV     |      |      |      |
 9+30    0.0012    0.00  QV     |      |      |      |
 9+35    0.0012    0.00  QV     |      |      |      |
 9+40    0.0013    0.00  QV     |      |      |      |
 9+45    0.0013    0.00  QV     |      |      |      |
 9+50    0.0013    0.00  QV     |      |      |      |
 9+55    0.0013    0.00  QV     |      |      |      |
10+ 0    0.0014    0.00  QV     |      |      |      |
10+ 5    0.0014    0.00  QV     |      |      |      |
10+10    0.0014    0.00  QV     |      |      |      |
10+15    0.0014    0.00  QV     |      |      |      |
10+20    0.0014    0.00  QV     |      |      |      |
10+25    0.0015    0.00  QV     |      |      |      |
10+30    0.0015    0.00  QV     |      |      |      |
10+35    0.0015    0.00  QV     |      |      |      |
10+40    0.0015    0.00  QV     |      |      |      |
10+45    0.0016    0.00  QV     |      |      |      |
10+50    0.0016    0.00  QV     |      |      |      |
10+55    0.0016    0.00  Q V    |      |      |      |
11+ 0    0.0016    0.00  Q V    |      |      |      |
11+ 5    0.0017    0.00  Q V    |      |      |      |
11+10    0.0017    0.00  Q V    |      |      |      |
11+15    0.0017    0.00  Q V    |      |      |      |
11+20    0.0017    0.00  Q V    |      |      |      |
11+25    0.0018    0.00  Q V    |      |      |      |
11+30    0.0018    0.00  Q V    |      |      |      |
11+35    0.0018    0.00  Q V    |      |      |      |
11+40    0.0018    0.00  Q V    |      |      |      |
11+45    0.0019    0.00  Q V    |      |      |      |
11+50    0.0019    0.00  Q V    |      |      |      |
11+55    0.0019    0.00  Q V    |      |      |      |
12+ 0    0.0019    0.00  Q V    |      |      |      |
12+ 5    0.0020    0.00  Q V    |      |      |      |
12+10    0.0020    0.00  Q V    |      |      |      |
12+15    0.0020    0.00  Q V    |      |      |      |
12+20    0.0021    0.00  Q V    |      |      |      |
12+25    0.0021    0.00  Q V    |      |      |      |
12+30    0.0021    0.00  Q V    |      |      |      |
12+35    0.0022    0.01  Q V    |      |      |      |
12+40    0.0022    0.01  Q V    |      |      |      |
12+45    0.0022    0.01  Q V    |      |      |      |
12+50    0.0023    0.01  Q V    |      |      |      |
12+55    0.0023    0.01  Q V    |      |      |      |
13+ 0    0.0024    0.01  Q V    |      |      |      |
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```
13+ 5      0.0024      0.01  Q V       |          |          |          |
13+10      0.0024      0.01  Q  V      |          |          |          |
13+15      0.0025      0.01  Q  V      |          |          |          |
13+20      0.0025      0.01  Q  V      |          |          |          |
13+25      0.0026      0.01  Q  V      |          |          |          |
13+30      0.0026      0.01  Q  V      |          |          |          |
13+35      0.0027      0.01  Q  V      |          |          |          |
13+40      0.0027      0.00  Q  V      |          |          |          |
13+45      0.0027      0.00  Q  V      |          |          |          |
13+50      0.0027      0.00  Q  V      |          |          |          |
13+55      0.0028      0.00  Q  V      |          |          |          |
14+ 0      0.0028      0.00  Q  V      |          |          |          |
14+ 5      0.0028      0.00  Q  V      |          |          |          |
14+10      0.0029      0.01  Q  V      |          |          |          |
14+15      0.0029      0.01  Q  V      |          |          |          |
14+20      0.0029      0.01  Q  V      |          |          |          |
14+25      0.0030      0.00  Q  V      |          |          |          |
14+30      0.0030      0.00  Q  V      |          |          |          |
14+35      0.0030      0.00  Q  V      |          |          |          |
14+40      0.0031      0.00  Q  V      |          |          |          |
14+45      0.0031      0.00  Q  V      |          |          |          |
14+50      0.0031      0.00  Q  V      |          |          |          |
14+55      0.0032      0.00  Q  V      |          |          |          |
15+ 0      0.0032      0.00  Q  V      |          |          |          |
15+ 5      0.0032      0.00  Q   V     |          |          |          |
15+10      0.0033      0.00  Q   V     |          |          |          |
15+15      0.0033      0.00  Q   V     |          |          |          |
15+20      0.0033      0.00  Q   V     |          |          |          |
15+25      0.0034      0.00  Q   V     |          |          |          |
15+30      0.0034      0.00  Q   V     |          |          |          |
15+35      0.0034      0.00  Q   V     |          |          |          |
15+40      0.0034      0.00  Q   V     |          |          |          |
15+45      0.0035      0.00  Q   V     |          |          |          |
15+50      0.0035      0.00  Q   V     |          |          |          |
15+55      0.0035      0.00  Q   V     |          |          |          |
16+ 0      0.0035      0.00  Q   V     |          |          |          |
16+ 5      0.0036      0.00  Q   V     |          |          |          |
16+10      0.0036      0.00  Q   V     |          |          |          |
16+15      0.0036      0.00  Q   V     |          |          |          |
16+20      0.0036      0.00  Q   V     |          |          |          |
16+25      0.0036      0.00  Q   V     |          |          |          |
16+30      0.0036      0.00  Q   V     |          |          |          |
16+35      0.0036      0.00  Q   V     |          |          |          |
16+40      0.0036      0.00  Q   V     |          |          |          |
16+45      0.0036      0.00  Q   V     |          |          |          |
16+50      0.0036      0.00  Q   V     |          |          |          |
16+55      0.0036      0.00  Q   V     |          |          |          |
17+ 0      0.0036      0.00  Q   V     |          |          |          |
17+ 5      0.0036      0.00  Q   V     |          |          |          |
17+10      0.0036      0.00  Q   V     |          |          |          |
17+15      0.0036      0.00  Q   V     |          |          |          |
17+20      0.0036      0.00  Q   V     |          |          |          |
17+25      0.0036      0.00  Q   V     |          |          |          |
17+30      0.0037      0.00  Q   V     |          |          |          |
17+35      0.0037      0.00  Q   V     |          |          |          |
17+40      0.0037      0.00  Q   V     |          |          |          |
17+45      0.0037      0.00  Q   V     |          |          |          |
17+50      0.0037      0.00  Q   V     |          |          |          |
17+55      0.0037      0.00  Q   V     |          |          |          |
18+ 0      0.0037      0.00  Q   V     |          |          |          |
18+ 5      0.0037      0.00  Q   V     |          |          |          |
18+10      0.0037      0.00  Q   V     |          |          |          |
18+15      0.0037      0.00  Q   V     |          |          |          |
18+20      0.0037      0.00  Q   V     |          |          |          |
18+25      0.0037      0.00  Q   V     |          |          |          |
```

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18+30     0.0037     0.00  Q   V    |         |         |         |
18+35     0.0037     0.00  Q   V    |         |         |         |
18+40     0.0037     0.00  Q   V    |         |         |         |
18+45     0.0037     0.00  Q   V    |         |         |         |
18+50     0.0037     0.00  Q   V    |         |         |         |
18+55     0.0037     0.00  Q   V    |         |         |         |
19+ 0     0.0037     0.00  Q   V    |         |         |         |
19+ 5     0.0037     0.00  Q   V    |         |         |         |
19+10     0.0037     0.00  Q   V    |         |         |         |
19+15     0.0037     0.00  Q   V    |         |         |         |
19+20     0.0038     0.00  Q   V    |         |         |         |
19+25     0.0038     0.00  Q   V    |         |         |         |
19+30     0.0038     0.00  Q   V    |         |         |         |
19+35     0.0038     0.00  Q   V    |         |         |         |
19+40     0.0038     0.00  Q   V    |         |         |         |
19+45     0.0038     0.00  Q   V    |         |         |         |
19+50     0.0038     0.00  Q   V    |         |         |         |
19+55     0.0038     0.00  Q   V    |         |         |         |
20+ 0     0.0038     0.00  Q   V    |         |         |         |
20+ 5     0.0038     0.00  Q   V    |         |         |         |
20+10     0.0038     0.00  Q   V    |         |         |         |
20+15     0.0038     0.00  Q   V    |         |         |         |
20+20     0.0038     0.00  Q   V    |         |         |         |
20+25     0.0038     0.00  Q   V    |         |         |         |
20+30     0.0038     0.00  Q   V    |         |         |         |
20+35     0.0038     0.00  Q   V    |         |         |         |
20+40     0.0038     0.00  Q   V    |         |         |         |
20+45     0.0038     0.00  Q   V    |         |         |         |
20+50     0.0038     0.00  Q   V    |         |         |         |
20+55     0.0038     0.00  Q   V    |         |         |         |
21+ 0     0.0038     0.00  Q   V    |         |         |         |
21+ 5     0.0038     0.00  Q   V    |         |         |         |
21+10     0.0038     0.00  Q   V    |         |         |         |
21+15     0.0038     0.00  Q   V    |         |         |         |
21+20     0.0038     0.00  Q   V    |         |         |         |
21+25     0.0038     0.00  Q   V    |         |         |         |
21+30     0.0038     0.00  Q   V    |         |         |         |
21+35     0.0039     0.00  Q   V    |         |         |         |
21+40     0.0039     0.00  Q   V    |         |         |         |
21+45     0.0039     0.00  Q   V    |         |         |         |
21+50     0.0039     0.00  Q   V    |         |         |         |
21+55     0.0039     0.00  Q   V    |         |         |         |
22+ 0     0.0039     0.00  Q   V    |         |         |         |
22+ 5     0.0039     0.00  Q   V    |         |         |         |
22+10     0.0039     0.00  Q   V    |         |         |         |
22+15     0.0039     0.00  Q   V    |         |         |         |
22+20     0.0039     0.00  Q   V    |         |         |         |
22+25     0.0039     0.00  Q   V    |         |         |         |
22+30     0.0039     0.00  Q   V    |         |         |         |
22+35     0.0039     0.00  Q   V    |         |         |         |
22+40     0.0039     0.00  Q   V    |         |         |         |
22+45     0.0039     0.00  Q   V    |         |         |         |
22+50     0.0039     0.00  Q   V    |         |         |         |
22+55     0.0039     0.00  Q   V    |         |         |         |
23+ 0     0.0039     0.00  Q   V    |         |         |         |
23+ 5     0.0039     0.00  Q   V    |         |         |         |
23+10     0.0039     0.00  Q   V    |         |         |         |
23+15     0.0039     0.00  Q   V    |         |         |         |
23+20     0.0039     0.00  Q   V    |         |         |         |
23+25     0.0039     0.00  Q   V    |         |         |         |
23+30     0.0039     0.00  Q   V    |         |         |         |
23+35     0.0039     0.00  Q   V    |         |         |         |
23+40     0.0039     0.00  Q   V    |         |         |         |
23+45     0.0039     0.00  Q   V    |         |         |         |
23+50     0.0039     0.00  Q   V    |         |         |         |
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23+55     0.0039    0.00  Q   V     |         |         |         |
24+ 0     0.0039    0.00  Q   V     |         |         |         |
24+ 5     0.0039    0.00  Q   V     |         |         |         |
24+10     0.0039    0.00  Q   V     |         |         |         |
24+15     0.0039    0.00  Q   V     |         |         |         |
24+20     0.0040    0.00  Q   V     |         |         |         |
24+25     0.0040    0.00  Q   V     |         |         |         |
24+30     0.0040    0.00  Q   V     |         |         |         |
24+35     0.0040    0.00  Q   V     |         |         |         |
24+40     0.0040    0.00  Q   V     |         |         |         |
24+45     0.0040    0.00  Q   V     |         |         |         |
24+50     0.0040    0.00  Q   V     |         |         |         |
24+55     0.0040    0.00  Q   V     |         |         |         |
25+ 0     0.0040    0.00  Q    V    |         |         |         |
25+ 5     0.0040    0.00  Q    V    |         |         |         |
25+10     0.0040    0.00  Q    V    |         |         |         |
25+15     0.0040    0.00  Q    V    |         |         |         |
25+20     0.0041    0.00  Q    V    |         |         |         |
25+25     0.0041    0.00  Q    V    |         |         |         |
25+30     0.0041    0.00  Q    V    |         |         |         |
25+35     0.0041    0.00  Q    V    |         |         |         |
25+40     0.0041    0.00  Q    V    |         |         |         |
25+45     0.0041    0.00  Q    V    |         |         |         |
25+50     0.0041    0.00  Q    V    |         |         |         |
25+55     0.0041    0.00  Q    V    |         |         |         |
26+ 0     0.0041    0.00  Q    V    |         |         |         |
26+ 5     0.0041    0.00  Q    V    |         |         |         |
26+10     0.0041    0.00  Q    V    |         |         |         |
26+15     0.0041    0.00  Q    V    |         |         |         |
26+20     0.0042    0.00  Q    V    |         |         |         |
26+25     0.0042    0.00  Q    V    |         |         |         |
26+30     0.0042    0.00  Q    V    |         |         |         |
26+35     0.0042    0.00  Q    V    |         |         |         |
26+40     0.0042    0.00  Q    V    |         |         |         |
26+45     0.0042    0.00  Q    V    |         |         |         |
26+50     0.0042    0.00  Q    V    |         |         |         |
26+55     0.0042    0.00  Q    V    |         |         |         |
27+ 0     0.0043    0.00  Q    V    |         |         |         |
27+ 5     0.0043    0.00  Q    V    |         |         |         |
27+10     0.0043    0.00  Q    V    |         |         |         |
27+15     0.0043    0.00  Q    V    |         |         |         |
27+20     0.0043    0.00  Q    V    |         |         |         |
27+25     0.0043    0.00  Q    V    |         |         |         |
27+30     0.0043    0.00  Q    V    |         |         |         |
27+35     0.0043    0.00  Q    V    |         |         |         |
27+40     0.0044    0.00  Q    V    |         |         |         |
27+45     0.0044    0.00  Q    V    |         |         |         |
27+50     0.0044    0.00  Q    V    |         |         |         |
27+55     0.0044    0.00  Q    V    |         |         |         |
28+ 0     0.0044    0.00  Q    V    |         |         |         |
28+ 5     0.0044    0.00  Q    V    |         |         |         |
28+10     0.0044    0.00  Q    V    |         |         |         |
28+15     0.0045    0.00  Q    V    |         |         |         |
28+20     0.0045    0.00  Q    V    |         |         |         |
28+25     0.0045    0.00  Q    V    |         |         |         |
28+30     0.0045    0.00  Q    V    |         |         |         |
28+35     0.0045    0.00  Q    V    |         |         |         |
28+40     0.0045    0.00  Q    V    |         |         |         |
28+45     0.0046    0.00  Q    V    |         |         |         |
28+50     0.0046    0.00  Q    V    |         |         |         |
28+55     0.0046    0.00  Q    V    |         |         |         |
29+ 0     0.0046    0.00  Q    V    |         |         |         |
29+ 5     0.0046    0.00  Q    V    |         |         |         |
29+10     0.0046    0.00  Q    V    |         |         |         |
29+15     0.0047    0.00  Q    V    |         |         |         |
```

29+20 0.0047 0.00 Q V | | | |
29+25 0.0047 0.00 Q V | | | |
29+30 0.0047 0.00 Q V | | | |
29+35 0.0047 0.00 Q V | | | |
29+40 0.0048 0.00 Q V | | | |
29+45 0.0048 0.00 Q V | | | |
29+50 0.0048 0.00 Q V | | | |
29+55 0.0048 0.00 Q V | | | |
30+ 0 0.0048 0.00 Q V | | | |
30+ 5 0.0049 0.00 Q V | | | |
30+10 0.0049 0.00 Q V | | | |
30+15 0.0049 0.00 Q V | | | |
30+20 0.0049 0.00 Q V | | | |
30+25 0.0049 0.00 Q V | | | |
30+30 0.0050 0.00 Q V | | | |
30+35 0.0050 0.00 Q V | | | |
30+40 0.0050 0.00 Q V | | | |
30+45 0.0050 0.00 Q V | | | |
30+50 0.0051 0.00 Q V | | | |
30+55 0.0051 0.00 Q V | | | |
31+ 0 0.0051 0.00 Q V | | | |
31+ 5 0.0051 0.00 Q V | | | |
31+10 0.0052 0.00 Q V | | | |
31+15 0.0052 0.00 Q V | | | |
31+20 0.0052 0.00 Q V | | | |
31+25 0.0052 0.00 Q V | | | |
31+30 0.0053 0.00 Q V | | | |
31+35 0.0053 0.00 Q V | | | |
31+40 0.0053 0.00 Q V | | | |
31+45 0.0054 0.00 Q V | | | |
31+50 0.0054 0.00 Q V | | | |
31+55 0.0054 0.00 Q V | | | |
32+ 0 0.0055 0.00 Q V | | | |
32+ 5 0.0055 0.01 Q V | | | |
32+10 0.0055 0.01 Q V | | | |
32+15 0.0056 0.01 Q V | | | |
32+20 0.0056 0.01 Q V | | | |
32+25 0.0056 0.01 Q V | | | |
32+30 0.0057 0.01 Q V | | | |
32+35 0.0057 0.01 Q V | | | |
32+40 0.0058 0.01 Q V | | | |
32+45 0.0058 0.01 Q V | | | |
32+50 0.0058 0.01 Q V | | | |
32+55 0.0059 0.01 Q V | | | |
33+ 0 0.0059 0.01 Q V | | | |
33+ 5 0.0060 0.01 Q V | | | |
33+10 0.0060 0.01 Q V | | | |
33+15 0.0061 0.01 Q V | | | |
33+20 0.0061 0.01 Q V | | | |
33+25 0.0062 0.01 Q V | | | |
33+30 0.0062 0.01 Q V | | | |
33+35 0.0063 0.01 Q V | | | |
33+40 0.0063 0.01 Q V | | | |
33+45 0.0064 0.01 Q V | | | |
33+50 0.0064 0.01 Q V | | | |
33+55 0.0065 0.01 Q V | | | |
34+ 0 0.0065 0.01 Q V | | | |
34+ 5 0.0066 0.01 Q V | | | |
34+10 0.0066 0.01 Q V | | | |
34+15 0.0066 0.01 Q V | | | |
34+20 0.0067 0.01 Q V | | | |
34+25 0.0067 0.01 Q V | | | |
34+30 0.0068 0.01 Q V | | | |
34+35 0.0068 0.01 Q V | | | |
34+40 0.0068 0.01 Q V | | | |

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34+45    0.0069    0.01  Q      V |        |        |        |
34+50    0.0069    0.01  Q      V |        |        |        |
34+55    0.0070    0.01  Q      V |        |        |        |
35+ 0    0.0070    0.01  Q      V |        |        |        |
35+ 5    0.0071    0.01  Q      V |        |        |        |
35+10    0.0071    0.01  Q      V |        |        |        |
35+15    0.0072    0.01  Q      V |        |        |        |
35+20    0.0072    0.01  Q       V|        |        |        |
35+25    0.0073    0.01  Q       V|        |        |        |
35+30    0.0073    0.01  Q       V|        |        |        |
35+35    0.0074    0.01  Q       V|        |        |        |
35+40    0.0074    0.01  Q       V|        |        |        |
35+45    0.0075    0.01  Q       V|        |        |        |
35+50    0.0075    0.01  Q       V|        |        |        |
35+55    0.0075    0.01  Q       V|        |        |        |
36+ 0    0.0076    0.01  Q       V|        |        |        |
36+ 5    0.0076    0.01  Q       V|        |        |        |
36+10    0.0077    0.01  Q       V|        |        |        |
36+15    0.0078    0.01  Q       V|        |        |        |
36+20    0.0078    0.01  Q       V|        |        |        |
36+25    0.0079    0.01  Q       V|        |        |        |
36+30    0.0080    0.01  Q       V|        |        |        |
36+35    0.0080    0.01  Q        V        |        |        |
36+40    0.0081    0.01  Q        V        |        |        |
36+45    0.0082    0.01  Q        V        |        |        |
36+50    0.0082    0.01  Q        V        |        |        |
36+55    0.0083    0.01  Q        V        |        |        |
37+ 0    0.0084    0.01  Q        V        |        |        |
37+ 5    0.0085    0.01  Q        V        |        |        |
37+10    0.0086    0.01  Q        V        |        |        |
37+15    0.0086    0.01  Q        V        |        |        |
37+20    0.0087    0.01  Q        V        |        |        |
37+25    0.0088    0.01  Q        V        |        |        |
37+30    0.0089    0.01  Q        |V       |        |        |
37+35    0.0090    0.01  Q        |V       |        |        |
37+40    0.0090    0.01  Q        |V       |        |        |
37+45    0.0091    0.01  Q        |V       |        |        |
37+50    0.0091    0.01  Q        |V       |        |        |
37+55    0.0092    0.01  Q        |V       |        |        |
38+ 0    0.0092    0.01  Q        |V       |        |        |
38+ 5    0.0093    0.01  Q        |V       |        |        |
38+10    0.0094    0.01  Q        |V       |        |        |
38+15    0.0094    0.01  Q        |V       |        |        |
38+20    0.0095    0.01  Q        |V       |        |        |
38+25    0.0096    0.01  Q        |V       |        |        |
38+30    0.0096    0.01  Q        | V      |        |        |
38+35    0.0097    0.01  Q        | V      |        |        |
38+40    0.0098    0.01  Q        | V      |        |        |
38+45    0.0098    0.01  Q        | V      |        |        |
38+50    0.0099    0.01  Q        | V      |        |        |
38+55    0.0100    0.01  Q        | V      |        |        |
39+ 0    0.0100    0.01  Q        | V      |        |        |
39+ 5    0.0101    0.01  Q        | V      |        |        |
39+10    0.0101    0.01  Q        | V      |        |        |
39+15    0.0102    0.01  Q        | V      |        |        |
39+20    0.0103    0.01  Q        | V      |        |        |
39+25    0.0103    0.01  Q        | V      |        |        |
39+30    0.0104    0.01  Q        | V      |        |        |
39+35    0.0104    0.01  Q        | V      |        |        |
39+40    0.0105    0.01  Q        |  V     |        |        |
39+45    0.0105    0.01  Q        |  V     |        |        |
39+50    0.0106    0.01  Q        |  V     |        |        |
39+55    0.0106    0.01  Q        |  V     |        |        |
40+ 0    0.0107    0.01  Q        |  V     |        |        |
40+ 5    0.0107    0.00  Q        |  V     |        |        |
```

40+10	0.0107	0.00	Q		V			
40+15	0.0107	0.00	Q		V			
40+20	0.0107	0.00	Q		V			
40+25	0.0107	0.00	Q		V			
40+30	0.0107	0.00	Q		V			
40+35	0.0107	0.00	Q		V			
40+40	0.0107	0.00	Q		V			
40+45	0.0108	0.00	Q		V			
40+50	0.0108	0.00	Q		V			
40+55	0.0108	0.00	Q		V			
41+ 0	0.0108	0.00	Q		V			
41+ 5	0.0108	0.00	Q		V			
41+10	0.0108	0.00	Q		V			
41+15	0.0108	0.00	Q		V			
41+20	0.0108	0.00	Q		V			
41+25	0.0108	0.00	Q		V			
41+30	0.0109	0.00	Q		V			
41+35	0.0109	0.00	Q		V			
41+40	0.0109	0.00	Q		V			
41+45	0.0109	0.00	Q		V			
41+50	0.0109	0.00	Q		V			
41+55	0.0109	0.00	Q		V			
42+ 0	0.0109	0.00	Q		V			
42+ 5	0.0109	0.00	Q		V			
42+10	0.0109	0.00	Q		V			
42+15	0.0110	0.00	Q		V			
42+20	0.0110	0.00	Q		V			
42+25	0.0110	0.00	Q		V			
42+30	0.0110	0.00	Q		V			
42+35	0.0110	0.00	Q		V			
42+40	0.0110	0.00	Q		V			
42+45	0.0110	0.00	Q		V			
42+50	0.0110	0.00	Q		V			
42+55	0.0110	0.00	Q		V			
43+ 0	0.0110	0.00	Q		V			
43+ 5	0.0110	0.00	Q		V			
43+10	0.0110	0.00	Q		V			
43+15	0.0110	0.00	Q		V			
43+20	0.0110	0.00	Q		V			
43+25	0.0111	0.00	Q		V			
43+30	0.0111	0.00	Q		V			
43+35	0.0111	0.00	Q		V			
43+40	0.0111	0.00	Q		V			
43+45	0.0111	0.00	Q		V			
43+50	0.0111	0.00	Q		V			
43+55	0.0111	0.00	Q		V			
44+ 0	0.0111	0.00	Q		V			
44+ 5	0.0111	0.00	Q		V			
44+10	0.0111	0.00	Q		V			
44+15	0.0111	0.00	Q		V			
44+20	0.0111	0.00	Q		V			
44+25	0.0111	0.00	Q		V			
44+30	0.0112	0.00	Q		V			
44+35	0.0112	0.00	Q		V			
44+40	0.0112	0.00	Q		V			
44+45	0.0112	0.00	Q		V			
44+50	0.0112	0.00	Q		V			
44+55	0.0112	0.00	Q		V			
45+ 0	0.0112	0.00	Q		V			
45+ 5	0.0112	0.00	Q		V			
45+10	0.0112	0.00	Q		V			
45+15	0.0112	0.00	Q		V			
45+20	0.0112	0.00	Q		V			
45+25	0.0112	0.00	Q		V			
45+30	0.0112	0.00	Q		V			

45+35 0.0112 0.00 Q | V | | |
45+40 0.0112 0.00 Q | V | | |
45+45 0.0112 0.00 Q | V | | |
45+50 0.0113 0.00 Q | V | | |
45+55 0.0113 0.00 Q | V | | |
46+ 0 0.0113 0.00 Q | V | | |
46+ 5 0.0113 0.00 Q | V | | |
46+10 0.0113 0.00 Q | V | | |
46+15 0.0113 0.00 Q | V | | |
46+20 0.0113 0.00 Q | V | | |
46+25 0.0113 0.00 Q | V | | |
46+30 0.0113 0.00 Q | V | | |
46+35 0.0113 0.00 Q | V | | |
46+40 0.0113 0.00 Q | V | | |
46+45 0.0113 0.00 Q | V | | |
46+50 0.0113 0.00 Q | V | | |
46+55 0.0113 0.00 Q | V | | |
47+ 0 0.0113 0.00 Q | V | | |
47+ 5 0.0113 0.00 Q | V | | |
47+10 0.0113 0.00 Q | V | | |
47+15 0.0113 0.00 Q | V | | |
47+20 0.0114 0.00 Q | V | | |
47+25 0.0114 0.00 Q | V | | |
47+30 0.0114 0.00 Q | V | | |
47+35 0.0114 0.00 Q | V | | |
47+40 0.0114 0.00 Q | V | | |
47+45 0.0114 0.00 Q | V | | |
47+50 0.0114 0.00 Q | V | | |
47+55 0.0114 0.00 Q | V | | |
48+ 0 0.0114 0.00 Q | V | | |
48+ 5 0.0114 0.00 Q | V | | |
48+10 0.0114 0.00 Q | V | | |
48+15 0.0114 0.00 Q | V | | |
48+20 0.0114 0.00 Q | V | | |
48+25 0.0115 0.00 Q | V | | |
48+30 0.0115 0.00 Q | V | | |
48+35 0.0115 0.00 Q | V | | |
48+40 0.0115 0.00 Q | V | | |
48+45 0.0115 0.00 Q | V | | |
48+50 0.0116 0.00 Q | V | | |
48+55 0.0116 0.00 Q | V | | |
49+ 0 0.0116 0.00 Q | V | | |
49+ 5 0.0117 0.00 Q | V | | |
49+10 0.0117 0.00 Q | V | | |
49+15 0.0117 0.00 Q | V | | |
49+20 0.0117 0.00 Q | V | | |
49+25 0.0117 0.00 Q | V | | |
49+30 0.0118 0.00 Q | V | | |
49+35 0.0118 0.00 Q | V | | |
49+40 0.0118 0.00 Q | V | | |
49+45 0.0118 0.00 Q | V | | |
49+50 0.0118 0.00 Q | V | | |
49+55 0.0119 0.00 Q | V | | |
50+ 0 0.0119 0.00 Q | V | | |
50+ 5 0.0119 0.00 Q | V | | |
50+10 0.0120 0.00 Q | V | | |
50+15 0.0120 0.00 Q | V | | |
50+20 0.0120 0.00 Q | V | | |
50+25 0.0120 0.00 Q | V | | |
50+30 0.0121 0.00 Q | V | | |
50+35 0.0121 0.00 Q | V | | |
50+40 0.0121 0.00 Q | V | | |
50+45 0.0122 0.01 Q | V | | |
50+50 0.0122 0.01 Q | V | | |
50+55 0.0122 0.01 Q | V | | |

```
51+ 0    0.0123    0.01  Q     |    V    |         |         |
51+ 5    0.0123    0.01  Q     |    V    |         |         |
51+10    0.0123    0.01  Q     |    V    |         |         |
51+15    0.0124    0.01  Q     |    V    |         |         |
51+20    0.0124    0.01  Q     |    V    |         |         |
51+25    0.0124    0.01  Q     |    V    |         |         |
51+30    0.0125    0.01  Q     |    V    |         |         |
51+35    0.0125    0.01  Q     |    V    |         |         |
51+40    0.0125    0.01  Q     |    V    |         |         |
51+45    0.0126    0.01  Q     |    V    |         |         |
51+50    0.0126    0.01  Q     |    V    |         |         |
51+55    0.0127    0.01  Q     |    V    |         |         |
52+ 0    0.0127    0.01  Q     |    V    |         |         |
52+ 5    0.0127    0.01  Q     |    V    |         |         |
52+10    0.0128    0.01  Q     |    V    |         |         |
52+15    0.0128    0.01  Q     |    V    |         |         |
52+20    0.0129    0.01  Q     |     V   |         |         |
52+25    0.0129    0.01  Q     |     V   |         |         |
52+30    0.0130    0.01  Q     |     V   |         |         |
52+35    0.0130    0.01  Q     |     V   |         |         |
52+40    0.0131    0.01  Q     |     V   |         |         |
52+45    0.0131    0.01  Q     |     V   |         |         |
52+50    0.0132    0.01  Q     |     V   |         |         |
52+55    0.0132    0.01  Q     |     V   |         |         |
53+ 0    0.0133    0.01  Q     |     V   |         |         |
53+ 5    0.0133    0.01  Q     |     V   |         |         |
53+10    0.0134    0.01  Q     |     V   |         |         |
53+15    0.0134    0.01  Q     |     V   |         |         |
53+20    0.0135    0.01  Q     |     V   |         |         |
53+25    0.0135    0.01  Q     |     V   |         |         |
53+30    0.0135    0.01  Q     |     V   |         |         |
53+35    0.0136    0.01  Q     |     V   |         |         |
53+40    0.0137    0.01  Q     |      V  |         |         |
53+45    0.0137    0.01  Q     |      V  |         |         |
53+50    0.0138    0.01  Q     |      V  |         |         |
53+55    0.0138    0.01  Q     |      V  |         |         |
54+ 0    0.0139    0.01  Q     |      V  |         |         |
54+ 5    0.0139    0.01  Q     |      V  |         |         |
54+10    0.0140    0.01  Q     |      V  |         |         |
54+15    0.0141    0.01  Q     |      V  |         |         |
54+20    0.0141    0.01  Q     |      V  |         |         |
54+25    0.0142    0.01  Q     |      V  |         |         |
54+30    0.0142    0.01  Q     |      V  |         |         |
54+35    0.0143    0.01  Q     |      V  |         |         |
54+40    0.0144    0.01  Q     |      V  |         |         |
54+45    0.0145    0.01  Q     |       V |         |         |
54+50    0.0145    0.01  Q     |       V |         |         |
54+55    0.0146    0.01  Q     |       V |         |         |
55+ 0    0.0147    0.01  Q     |       V |         |         |
55+ 5    0.0147    0.01  Q     |       V |         |         |
55+10    0.0148    0.01  Q     |       V |         |         |
55+15    0.0149    0.01  Q     |       V |         |         |
55+20    0.0149    0.01  Q     |       V |         |         |
55+25    0.0150    0.01  Q     |       V |         |         |
55+30    0.0151    0.01  Q     |       V |         |         |
55+35    0.0152    0.01  Q     |       V |         |         |
55+40    0.0153    0.01  Q     |        V|         |         |
55+45    0.0153    0.01  Q     |        V|         |         |
55+50    0.0154    0.01  Q     |        V|         |         |
55+55    0.0155    0.01  Q     |        V|         |         |
56+ 0    0.0156    0.01  Q     |        V|         |         |
56+ 5    0.0157    0.01  Q     |        V|         |         |
56+10    0.0158    0.01  Q     |        V|         |         |
56+15    0.0159    0.02  Q     |        V|         |         |
56+20    0.0160    0.02  Q     |        V|         |         |
```

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56+25   0.0161   0.02  Q         |         V          |         |
56+30   0.0162   0.02  Q         |         V          |         |
56+35   0.0163   0.02  Q         |         V          |         |
56+40   0.0164   0.02  Q         |         V          |         |
56+45   0.0165   0.02  Q         |         V          |         |
56+50   0.0167   0.02  Q         |         V          |         |
56+55   0.0168   0.02  Q         |         V          |         |
57+ 0   0.0169   0.02  Q         |        |V          |         |
57+ 5   0.0170   0.02  Q         |        |V          |         |
57+10   0.0172   0.02  Q         |        |V          |         |
57+15   0.0173   0.02  Q         |        |V          |         |
57+20   0.0174   0.02  Q         |        |V          |         |
57+25   0.0176   0.02  Q         |        |V          |         |
57+30   0.0177   0.02  Q         |         | V        |         |
57+35   0.0178   0.02  Q         |         | V        |         |
57+40   0.0180   0.02  Q         |         | V        |         |
57+45   0.0181   0.02  Q         |         | V        |         |
57+50   0.0183   0.02  Q         |         | V        |         |
57+55   0.0184   0.02  Q         |         | V        |         |
58+ 0   0.0186   0.02  Q         |         |  V       |         |
58+ 5   0.0187   0.02  Q         |         |  V       |         |
58+10   0.0188   0.02  Q         |         |  V       |         |
58+15   0.0189   0.02  Q         |         |  V       |         |
58+20   0.0190   0.02  Q         |         |  V       |         |
58+25   0.0191   0.02  Q         |         |  V       |         |
58+30   0.0192   0.02  Q         |         |  V       |         |
58+35   0.0193   0.02  Q         |         |   V      |         |
58+40   0.0195   0.02  Q         |         |   V      |         |
58+45   0.0196   0.02  Q         |         |   V      |         |
58+50   0.0198   0.02  Q         |         |   V      |         |
58+55   0.0199   0.02  Q         |         |   V      |         |
59+ 0   0.0200   0.02  Q         |         |   V      |         |
59+ 5   0.0202   0.02  Q         |         |   V      |         |
59+10   0.0203   0.02  Q         |         |    V     |         |
59+15   0.0204   0.02  Q         |         |    V     |         |
59+20   0.0206   0.02  Q         |         |    V     |         |
59+25   0.0207   0.02  Q         |         |    V     |         |
59+30   0.0208   0.02  Q         |         |    V     |         |
59+35   0.0209   0.02  Q         |         |     V    |         |
59+40   0.0211   0.02  Q         |         |     V    |         |
59+45   0.0212   0.02  Q         |         |     V    |         |
59+50   0.0213   0.02  Q         |         |     V    |         |
59+55   0.0214   0.02  Q         |         |     V    |         |
60+ 0   0.0216   0.02  Q         |         |     V    |         |
60+ 5   0.0217   0.02  Q         |         |     V    |         |
60+10   0.0219   0.02  Q         |         |      V   |         |
60+15   0.0221   0.03  Q         |         |      V   |         |
60+20   0.0222   0.03  Q         |         |      V   |         |
60+25   0.0224   0.03  Q         |         |      V   |         |
60+30   0.0226   0.03  Q         |         |        V |         |
60+35   0.0228   0.03  Q         |         |        V |         |
60+40   0.0230   0.03  Q         |         |        V |         |
60+45   0.0232   0.03  Q         |         |        V |         |
60+50   0.0234   0.03  Q         |         |         V|         |
60+55   0.0236   0.03  Q         |         |         V|         |
61+ 0   0.0238   0.03  Q         |         |         V|         |
61+ 5   0.0240   0.03  Q         |         |         V|         |
61+10   0.0242   0.03  Q         |         |          V         |
61+15   0.0245   0.03  Q         |         |          V         |
61+20   0.0247   0.03  Q         |         |          V         |
61+25   0.0249   0.03  Q         |         |          |V        |
61+30   0.0252   0.03  Q         |         |          |V        |
61+35   0.0253   0.03  Q         |         |          |V        |
61+40   0.0255   0.02  Q         |         |          |V        |
61+45   0.0257   0.02  Q         |         |          |V        |
```

61+50 0.0258 0.02 Q | | | V |
61+55 0.0260 0.02 Q | | | V |
62+ 0 0.0261 0.02 Q | | | V |
62+ 5 0.0263 0.03 Q | | | V |
62+10 0.0265 0.03 Q | | | V |
62+15 0.0267 0.03 Q | | | V |
62+20 0.0269 0.03 Q | | | V |
62+25 0.0270 0.03 Q | | | V |
62+30 0.0272 0.03 Q | | | V |
62+35 0.0274 0.03 Q | | | V |
62+40 0.0276 0.03 Q | | | V |
62+45 0.0278 0.03 Q | | | V |
62+50 0.0279 0.03 Q | | | V |
62+55 0.0281 0.03 Q | | | V |
63+ 0 0.0283 0.03 Q | | | V |
63+ 5 0.0285 0.02 Q | | | V |
63+10 0.0286 0.02 Q | | | V |
63+15 0.0288 0.02 Q | | | V |
63+20 0.0290 0.02 Q | | | V |
63+25 0.0291 0.02 Q | | | V |
63+30 0.0293 0.02 Q | | | V |
63+35 0.0294 0.02 Q | | | V |
63+40 0.0295 0.02 Q | | | V |
63+45 0.0297 0.02 Q | | | V |
63+50 0.0298 0.02 Q | | | V |
63+55 0.0299 0.02 Q | | | V |
64+ 0 0.0301 0.02 Q | | | V |
64+ 5 0.0301 0.01 Q | | | V |
64+10 0.0302 0.00 Q | | | V |
64+15 0.0302 0.00 Q | | | V |
64+20 0.0302 0.00 Q | | | V |
64+25 0.0302 0.00 Q | | | V |
64+30 0.0303 0.00 Q | | | V |
64+35 0.0303 0.00 Q | | | V |
64+40 0.0303 0.00 Q | | | V |
64+45 0.0303 0.00 Q | | | V |
64+50 0.0304 0.00 Q | | | V |
64+55 0.0304 0.00 Q | | | V |
65+ 0 0.0304 0.00 Q | | | V |
65+ 5 0.0304 0.00 Q | | | V |
65+10 0.0305 0.00 Q | | | V |
65+15 0.0305 0.01 Q | | | V |
65+20 0.0305 0.01 Q | | | V |
65+25 0.0306 0.01 Q | | | V |
65+30 0.0306 0.01 Q | | | V |
65+35 0.0306 0.01 Q | | | V |
65+40 0.0307 0.01 Q | | | V |
65+45 0.0307 0.01 Q | | | V |
65+50 0.0307 0.00 Q | | | V |
65+55 0.0308 0.00 Q | | | V |
66+ 0 0.0308 0.00 Q | | | V |
66+ 5 0.0308 0.00 Q | | | V |
66+10 0.0308 0.00 Q | | | V |
66+15 0.0309 0.00 Q | | | V |
66+20 0.0309 0.00 Q | | | V |
66+25 0.0309 0.00 Q | | | V |
66+30 0.0310 0.00 Q | | | V |
66+35 0.0310 0.00 Q | | | V |
66+40 0.0310 0.00 Q | | | V |
66+45 0.0310 0.00 Q | | | V |
66+50 0.0310 0.00 Q | | | V |
66+55 0.0311 0.00 Q | | | V |
67+ 0 0.0311 0.00 Q | | | V |
67+ 5 0.0311 0.00 Q | | | V |
67+10 0.0311 0.00 Q | | | V |

```
 67+15     0.0311     0.00  Q       |       |       |      V |
 67+20     0.0312     0.00  Q       |       |       |      V |
 67+25     0.0312     0.00  Q       |       |       |      V |
 67+30     0.0312     0.00  Q       |       |       |      V |
 67+35     0.0312     0.00  Q       |       |       |      V |
 67+40     0.0313     0.00  Q       |       |       |      V |
 67+45     0.0313     0.00  Q       |       |       |      V |
 67+50     0.0313     0.00  Q       |       |       |      V |
 67+55     0.0313     0.00  Q       |       |       |      V |
 68+ 0     0.0313     0.00  Q       |       |       |      V|
 68+ 5     0.0313     0.00  Q       |       |       |      V|
 68+10     0.0314     0.00  Q       |       |       |      V|
 68+15     0.0314     0.00  Q       |       |       |      V|
 68+20     0.0314     0.00  Q       |       |       |      V|
 68+25     0.0314     0.00  Q       |       |       |      V|
 68+30     0.0314     0.00  Q       |       |       |      V|
 68+35     0.0315     0.00  Q       |       |       |      V|
 68+40     0.0315     0.00  Q       |       |       |      V|
 68+45     0.0315     0.00  Q       |       |       |      V|
 68+50     0.0315     0.00  Q       |       |       |      V|
 68+55     0.0315     0.00  Q       |       |       |      V|
 69+ 0     0.0315     0.00  Q       |       |       |      V|
 69+ 5     0.0316     0.00  Q       |       |       |      V|
 69+10     0.0316     0.00  Q       |       |       |      V|
 69+15     0.0316     0.00  Q       |       |       |      V|
 69+20     0.0316     0.00  Q       |       |       |      V|
 69+25     0.0316     0.00  Q       |       |       |      V|
 69+30     0.0316     0.00  Q       |       |       |      V|
 69+35     0.0317     0.00  Q       |       |       |      V|
 69+40     0.0317     0.00  Q       |       |       |      V|
 69+45     0.0317     0.00  Q       |       |       |      V|
 69+50     0.0317     0.00  Q       |       |       |      V|
 69+55     0.0317     0.00  Q       |       |       |      V|
 70+ 0     0.0318     0.00  Q       |       |       |      V|
 70+ 5     0.0318     0.00  Q       |       |       |      V|
 70+10     0.0318     0.00  Q       |       |       |      V|
 70+15     0.0318     0.00  Q       |       |       |      V|
 70+20     0.0318     0.00  Q       |       |       |      V|
 70+25     0.0318     0.00  Q       |       |       |      V|
 70+30     0.0319     0.00  Q       |       |       |      V|
 70+35     0.0319     0.00  Q       |       |       |      V|
 70+40     0.0319     0.00  Q       |       |       |      V|
 70+45     0.0319     0.00  Q       |       |       |      V|
 70+50     0.0319     0.00  Q       |       |       |      V|
 70+55     0.0319     0.00  Q       |       |       |      V|
 71+ 0     0.0319     0.00  Q       |       |       |      V|
 71+ 5     0.0320     0.00  Q       |       |       |      V|
 71+10     0.0320     0.00  Q       |       |       |      V|
 71+15     0.0320     0.00  Q       |       |       |      V|
 71+20     0.0320     0.00  Q       |       |       |      V|
 71+25     0.0320     0.00  Q       |       |       |      V|
 71+30     0.0320     0.00  Q       |       |       |      V|
 71+35     0.0320     0.00  Q       |       |       |      V|
 71+40     0.0321     0.00  Q       |       |       |      V|
 71+45     0.0321     0.00  Q       |       |       |      V|
 71+50     0.0321     0.00  Q       |       |       |      V|
 71+55     0.0321     0.00  Q       |       |       |      V|
 72+ 0     0.0321     0.00  Q       |       |       |      V|
 72+ 5     0.0321     0.00  Q       |       |       |      V|
 72+10     0.0321     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

Study date 09/23/20 File: APOST245.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

28771 Central Avenue Gas Station
Area A
Post-development
24-Hr 5-Yr Storm Event

Drainage Area =   0.58(Ac.) =   0.001 Sq. Mi.
Length along longest watercourse =   345.00(Ft.)
Length along longest watercourse measured to centroid =   97.38(Ft.)
Length along longest watercourse =   0.065 Mi.
Length along longest watercourse measured to centroid =   0.018 Mi.
Difference in elevation =   6.34(Ft.)
Slope along watercourse =   97.0296 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time =   0.023 Hr.
Lag time =   1.41 Min.
25% of lag time =   0.35 Min.
40% of lag time =   0.56 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]
0.58	2.43	1.41

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
0.58	6.58	3.83

STORM EVENT (YEAR) =   5.00
Area Averaged 2-Year Rainfall =   2.430(In)
Area Averaged 100-Year Rainfall =   6.580(In)

Point rain (area averaged) =   3.402(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain =   3.402(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
0.582	79.00	0.095

Total Area Entered = 0.58(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
79.0	61.8	0.451	0.095	0.412	1.000	0.412

Sum (F) = 0.412

Area averaged mean soil loss (F) (In/Hr) = 0.412
Minimum soil loss rate ((In/Hr)) = 0.206
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.824

U n i t H y d r o g r a p h
DESERT S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	354.985	61.437	0.360
2	0.167	709.970	35.423	0.208
3	0.250	1064.955	3.140	0.018
			Sum = 100.000	Sum= 0.587

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Loss rate(In./Hr) Low	Effective (In/Hr)
1	0.08	0.07	0.027	0.731	0.022	0.00
2	0.17	0.07	0.027	0.728	0.022	0.00
3	0.25	0.07	0.027	0.725	0.022	0.00
4	0.33	0.10	0.041	0.722	0.034	0.01
5	0.42	0.10	0.041	0.719	0.034	0.01
6	0.50	0.10	0.041	0.717	0.034	0.01
7	0.58	0.10	0.041	0.714	0.034	0.01
8	0.67	0.10	0.041	0.711	0.034	0.01
9	0.75	0.10	0.041	0.708	0.034	0.01
10	0.83	0.13	0.054	0.705	0.045	0.01
11	0.92	0.13	0.054	0.703	0.045	0.01
12	1.00	0.13	0.054	0.700	0.045	0.01
13	1.08	0.10	0.041	0.697	0.034	0.01
14	1.17	0.10	0.041	0.694	0.034	0.01
15	1.25	0.10	0.041	0.692	0.034	0.01
16	1.33	0.10	0.041	0.689	0.034	0.01
17	1.42	0.10	0.041	0.686	0.034	0.01
18	1.50	0.10	0.041	0.683	0.034	0.01
19	1.58	0.10	0.041	0.681	0.034	0.01
20	1.67	0.10	0.041	0.678	0.034	0.01
21	1.75	0.10	0.041	0.675	0.034	0.01
22	1.83	0.13	0.054	0.672	0.045	0.01
23	1.92	0.13	0.054	0.670	0.045	0.01
24	2.00	0.13	0.054	0.667	0.045	0.01
25	2.08	0.13	0.054	0.664	0.045	0.01
26	2.17	0.13	0.054	0.662	0.045	0.01
27	2.25	0.13	0.054	0.659	0.045	0.01
28	2.33	0.13	0.054	0.656	0.045	0.01
29	2.42	0.13	0.054	0.654	0.045	0.01
30	2.50	0.13	0.054	0.651	0.045	0.01
31	2.58	0.17	0.068	0.648	0.056	0.01
32	2.67	0.17	0.068	0.646	0.056	0.01

33	2.75	0.17	0.068	0.643	0.056	0.01
34	2.83	0.17	0.068	0.640	0.056	0.01
35	2.92	0.17	0.068	0.638	0.056	0.01
36	3.00	0.17	0.068	0.635	0.056	0.01
37	3.08	0.17	0.068	0.632	0.056	0.01
38	3.17	0.17	0.068	0.630	0.056	0.01
39	3.25	0.17	0.068	0.627	0.056	0.01
40	3.33	0.17	0.068	0.625	0.056	0.01
41	3.42	0.17	0.068	0.622	0.056	0.01
42	3.50	0.17	0.068	0.619	0.056	0.01
43	3.58	0.17	0.068	0.617	0.056	0.01
44	3.67	0.17	0.068	0.614	0.056	0.01
45	3.75	0.17	0.068	0.612	0.056	0.01
46	3.83	0.20	0.082	0.609	0.067	0.01
47	3.92	0.20	0.082	0.606	0.067	0.01
48	4.00	0.20	0.082	0.604	0.067	0.01
49	4.08	0.20	0.082	0.601	0.067	0.01
50	4.17	0.20	0.082	0.599	0.067	0.01
51	4.25	0.20	0.082	0.596	0.067	0.01
52	4.33	0.23	0.095	0.594	0.079	0.02
53	4.42	0.23	0.095	0.591	0.079	0.02
54	4.50	0.23	0.095	0.589	0.079	0.02
55	4.58	0.23	0.095	0.586	0.079	0.02
56	4.67	0.23	0.095	0.584	0.079	0.02
57	4.75	0.23	0.095	0.581	0.079	0.02
58	4.83	0.27	0.109	0.579	0.090	0.02
59	4.92	0.27	0.109	0.576	0.090	0.02
60	5.00	0.27	0.109	0.574	0.090	0.02
61	5.08	0.20	0.082	0.571	0.067	0.01
62	5.17	0.20	0.082	0.569	0.067	0.01
63	5.25	0.20	0.082	0.566	0.067	0.01
64	5.33	0.23	0.095	0.564	0.079	0.02
65	5.42	0.23	0.095	0.561	0.079	0.02
66	5.50	0.23	0.095	0.559	0.079	0.02
67	5.58	0.27	0.109	0.556	0.090	0.02
68	5.67	0.27	0.109	0.554	0.090	0.02
69	5.75	0.27	0.109	0.551	0.090	0.02
70	5.83	0.27	0.109	0.549	0.090	0.02
71	5.92	0.27	0.109	0.546	0.090	0.02
72	6.00	0.27	0.109	0.544	0.090	0.02
73	6.08	0.30	0.122	0.542	0.101	0.02
74	6.17	0.30	0.122	0.539	0.101	0.02
75	6.25	0.30	0.122	0.537	0.101	0.02
76	6.33	0.30	0.122	0.534	0.101	0.02
77	6.42	0.30	0.122	0.532	0.101	0.02
78	6.50	0.30	0.122	0.530	0.101	0.02
79	6.58	0.33	0.136	0.527	0.112	0.02
80	6.67	0.33	0.136	0.525	0.112	0.02
81	6.75	0.33	0.136	0.523	0.112	0.02
82	6.83	0.33	0.136	0.520	0.112	0.02
83	6.92	0.33	0.136	0.518	0.112	0.02
84	7.00	0.33	0.136	0.515	0.112	0.02
85	7.08	0.33	0.136	0.513	0.112	0.02
86	7.17	0.33	0.136	0.511	0.112	0.02
87	7.25	0.33	0.136	0.508	0.112	0.02
88	7.33	0.37	0.150	0.506	0.123	0.03
89	7.42	0.37	0.150	0.504	0.123	0.03
90	7.50	0.37	0.150	0.501	0.123	0.03
91	7.58	0.40	0.163	0.499	0.135	0.03
92	7.67	0.40	0.163	0.497	0.135	0.03
93	7.75	0.40	0.163	0.495	0.135	0.03
94	7.83	0.43	0.177	0.492	0.146	0.03
95	7.92	0.43	0.177	0.490	0.146	0.03
96	8.00	0.43	0.177	0.488	0.146	0.03
97	8.08	0.50	0.204	0.486	0.168	0.04

98	8.17	0.50	0.204	0.483	0.168	0.04
99	8.25	0.50	0.204	0.481	0.168	0.04
100	8.33	0.50	0.204	0.479	0.168	0.04
101	8.42	0.50	0.204	0.477	0.168	0.04
102	8.50	0.50	0.204	0.474	0.168	0.04
103	8.58	0.53	0.218	0.472	0.179	0.04
104	8.67	0.53	0.218	0.470	0.179	0.04
105	8.75	0.53	0.218	0.468	0.179	0.04
106	8.83	0.57	0.231	0.465	0.191	0.04
107	8.92	0.57	0.231	0.463	0.191	0.04
108	9.00	0.57	0.231	0.461	0.191	0.04
109	9.08	0.63	0.259	0.459	0.213	0.05
110	9.17	0.63	0.259	0.457	0.213	0.05
111	9.25	0.63	0.259	0.454	0.213	0.05
112	9.33	0.67	0.272	0.452	0.224	0.05
113	9.42	0.67	0.272	0.450	0.224	0.05
114	9.50	0.67	0.272	0.448	0.224	0.05
115	9.58	0.70	0.286	0.446	0.236	0.05
116	9.67	0.70	0.286	0.444	0.236	0.05
117	9.75	0.70	0.286	0.442	0.236	0.05
118	9.83	0.73	0.299	0.439	0.247	0.05
119	9.92	0.73	0.299	0.437	0.247	0.05
120	10.00	0.73	0.299	0.435	0.247	0.05
121	10.08	0.50	0.204	0.433	0.168	0.04
122	10.17	0.50	0.204	0.431	0.168	0.04
123	10.25	0.50	0.204	0.429	0.168	0.04
124	10.33	0.50	0.204	0.427	0.168	0.04
125	10.42	0.50	0.204	0.425	0.168	0.04
126	10.50	0.50	0.204	0.423	0.168	0.04
127	10.58	0.67	0.272	0.421	0.224	0.05
128	10.67	0.67	0.272	0.419	0.224	0.05
129	10.75	0.67	0.272	0.417	0.224	0.05
130	10.83	0.67	0.272	0.415	0.224	0.05
131	10.92	0.67	0.272	0.412	0.224	0.05
132	11.00	0.67	0.272	0.410	0.224	0.05
133	11.08	0.63	0.259	0.408	0.213	0.05
134	11.17	0.63	0.259	0.406	0.213	0.05
135	11.25	0.63	0.259	0.404	0.213	0.05
136	11.33	0.63	0.259	0.402	0.213	0.05
137	11.42	0.63	0.259	0.400	0.213	0.05
138	11.50	0.63	0.259	0.398	0.213	0.05
139	11.58	0.57	0.231	0.396	0.191	0.04
140	11.67	0.57	0.231	0.394	0.191	0.04
141	11.75	0.57	0.231	0.393	0.191	0.04
142	11.83	0.60	0.245	0.391	0.202	0.04
143	11.92	0.60	0.245	0.389	0.202	0.04
144	12.00	0.60	0.245	0.387	0.202	0.04
145	12.08	0.83	0.340	0.385	0.280	0.06
146	12.17	0.83	0.340	0.383	0.280	0.06
147	12.25	0.83	0.340	0.381	0.280	0.06
148	12.33	0.87	0.354	0.379	0.292	0.06
149	12.42	0.87	0.354	0.377	0.292	0.06
150	12.50	0.87	0.354	0.375	0.292	0.06
151	12.58	0.93	0.381	0.373	---	0.01
152	12.67	0.93	0.381	0.371	---	0.01
153	12.75	0.93	0.381	0.370	---	0.01
154	12.83	0.97	0.395	0.368	---	0.03
155	12.92	0.97	0.395	0.366	---	0.03
156	13.00	0.97	0.395	0.364	---	0.03
157	13.08	1.13	0.463	0.362	---	0.10
158	13.17	1.13	0.463	0.360	---	0.10
159	13.25	1.13	0.463	0.358	---	0.10
160	13.33	1.13	0.463	0.357	---	0.11
161	13.42	1.13	0.463	0.355	---	0.11
162	13.50	1.13	0.463	0.353	---	0.11

163	13.58	0.77	0.313	0.351	0.258	0.06
164	13.67	0.77	0.313	0.349	0.258	0.06
165	13.75	0.77	0.313	0.348	0.258	0.06
166	13.83	0.77	0.313	0.346	0.258	0.06
167	13.92	0.77	0.313	0.344	0.258	0.06
168	14.00	0.77	0.313	0.342	0.258	0.06
169	14.08	0.90	0.367	0.341	---	0.03
170	14.17	0.90	0.367	0.339	---	0.03
171	14.25	0.90	0.367	0.337	---	0.03
172	14.33	0.87	0.354	0.335	---	0.02
173	14.42	0.87	0.354	0.334	---	0.02
174	14.50	0.87	0.354	0.332	---	0.02
175	14.58	0.87	0.354	0.330	---	0.02
176	14.67	0.87	0.354	0.329	---	0.03
177	14.75	0.87	0.354	0.327	---	0.03
178	14.83	0.83	0.340	0.325	---	0.01
179	14.92	0.83	0.340	0.324	---	0.02
180	15.00	0.83	0.340	0.322	---	0.02
181	15.08	0.80	0.327	0.320	---	0.01
182	15.17	0.80	0.327	0.319	---	0.01
183	15.25	0.80	0.327	0.317	---	0.01
184	15.33	0.77	0.313	0.315	0.258	0.06
185	15.42	0.77	0.313	0.314	0.258	0.06
186	15.50	0.77	0.313	0.312	---	0.00
187	15.58	0.63	0.259	0.311	0.213	0.05
188	15.67	0.63	0.259	0.309	0.213	0.05
189	15.75	0.63	0.259	0.307	0.213	0.05
190	15.83	0.63	0.259	0.306	0.213	0.05
191	15.92	0.63	0.259	0.304	0.213	0.05
192	16.00	0.63	0.259	0.303	0.213	0.05
193	16.08	0.13	0.054	0.301	0.045	0.01
194	16.17	0.13	0.054	0.300	0.045	0.01
195	16.25	0.13	0.054	0.298	0.045	0.01
196	16.33	0.13	0.054	0.297	0.045	0.01
197	16.42	0.13	0.054	0.295	0.045	0.01
198	16.50	0.13	0.054	0.294	0.045	0.01
199	16.58	0.10	0.041	0.292	0.034	0.01
200	16.67	0.10	0.041	0.291	0.034	0.01
201	16.75	0.10	0.041	0.289	0.034	0.01
202	16.83	0.10	0.041	0.288	0.034	0.01
203	16.92	0.10	0.041	0.286	0.034	0.01
204	17.00	0.10	0.041	0.285	0.034	0.01
205	17.08	0.17	0.068	0.283	0.056	0.01
206	17.17	0.17	0.068	0.282	0.056	0.01
207	17.25	0.17	0.068	0.280	0.056	0.01
208	17.33	0.17	0.068	0.279	0.056	0.01
209	17.42	0.17	0.068	0.278	0.056	0.01
210	17.50	0.17	0.068	0.276	0.056	0.01
211	17.58	0.17	0.068	0.275	0.056	0.01
212	17.67	0.17	0.068	0.273	0.056	0.01
213	17.75	0.17	0.068	0.272	0.056	0.01
214	17.83	0.13	0.054	0.271	0.045	0.01
215	17.92	0.13	0.054	0.269	0.045	0.01
216	18.00	0.13	0.054	0.268	0.045	0.01
217	18.08	0.13	0.054	0.267	0.045	0.01
218	18.17	0.13	0.054	0.265	0.045	0.01
219	18.25	0.13	0.054	0.264	0.045	0.01
220	18.33	0.13	0.054	0.263	0.045	0.01
221	18.42	0.13	0.054	0.262	0.045	0.01
222	18.50	0.13	0.054	0.260	0.045	0.01
223	18.58	0.10	0.041	0.259	0.034	0.01
224	18.67	0.10	0.041	0.258	0.034	0.01
225	18.75	0.10	0.041	0.257	0.034	0.01
226	18.83	0.07	0.027	0.255	0.022	0.00
227	18.92	0.07	0.027	0.254	0.022	0.00

228	19.00	0.07	0.027	0.253	0.022	0.00
229	19.08	0.10	0.041	0.252	0.034	0.01
230	19.17	0.10	0.041	0.251	0.034	0.01
231	19.25	0.10	0.041	0.249	0.034	0.01
232	19.33	0.13	0.054	0.248	0.045	0.01
233	19.42	0.13	0.054	0.247	0.045	0.01
234	19.50	0.13	0.054	0.246	0.045	0.01
235	19.58	0.10	0.041	0.245	0.034	0.01
236	19.67	0.10	0.041	0.244	0.034	0.01
237	19.75	0.10	0.041	0.243	0.034	0.01
238	19.83	0.07	0.027	0.241	0.022	0.00
239	19.92	0.07	0.027	0.240	0.022	0.00
240	20.00	0.07	0.027	0.239	0.022	0.00
241	20.08	0.10	0.041	0.238	0.034	0.01
242	20.17	0.10	0.041	0.237	0.034	0.01
243	20.25	0.10	0.041	0.236	0.034	0.01
244	20.33	0.10	0.041	0.235	0.034	0.01
245	20.42	0.10	0.041	0.234	0.034	0.01
246	20.50	0.10	0.041	0.233	0.034	0.01
247	20.58	0.10	0.041	0.232	0.034	0.01
248	20.67	0.10	0.041	0.231	0.034	0.01
249	20.75	0.10	0.041	0.230	0.034	0.01
250	20.83	0.07	0.027	0.229	0.022	0.00
251	20.92	0.07	0.027	0.228	0.022	0.00
252	21.00	0.07	0.027	0.227	0.022	0.00
253	21.08	0.10	0.041	0.227	0.034	0.01
254	21.17	0.10	0.041	0.226	0.034	0.01
255	21.25	0.10	0.041	0.225	0.034	0.01
256	21.33	0.07	0.027	0.224	0.022	0.00
257	21.42	0.07	0.027	0.223	0.022	0.00
258	21.50	0.07	0.027	0.222	0.022	0.00
259	21.58	0.10	0.041	0.221	0.034	0.01
260	21.67	0.10	0.041	0.221	0.034	0.01
261	21.75	0.10	0.041	0.220	0.034	0.01
262	21.83	0.07	0.027	0.219	0.022	0.00
263	21.92	0.07	0.027	0.218	0.022	0.00
264	22.00	0.07	0.027	0.218	0.022	0.00
265	22.08	0.10	0.041	0.217	0.034	0.01
266	22.17	0.10	0.041	0.216	0.034	0.01
267	22.25	0.10	0.041	0.216	0.034	0.01
268	22.33	0.07	0.027	0.215	0.022	0.00
269	22.42	0.07	0.027	0.214	0.022	0.00
270	22.50	0.07	0.027	0.214	0.022	0.00
271	22.58	0.07	0.027	0.213	0.022	0.00
272	22.67	0.07	0.027	0.212	0.022	0.00
273	22.75	0.07	0.027	0.212	0.022	0.00
274	22.83	0.07	0.027	0.211	0.022	0.00
275	22.92	0.07	0.027	0.211	0.022	0.00
276	23.00	0.07	0.027	0.210	0.022	0.00
277	23.08	0.07	0.027	0.210	0.022	0.00
278	23.17	0.07	0.027	0.209	0.022	0.00
279	23.25	0.07	0.027	0.209	0.022	0.00
280	23.33	0.07	0.027	0.208	0.022	0.00
281	23.42	0.07	0.027	0.208	0.022	0.00
282	23.50	0.07	0.027	0.208	0.022	0.00
283	23.58	0.07	0.027	0.207	0.022	0.00
284	23.67	0.07	0.027	0.207	0.022	0.00
285	23.75	0.07	0.027	0.207	0.022	0.00
286	23.83	0.07	0.027	0.206	0.022	0.00
287	23.92	0.07	0.027	0.206	0.022	0.00
288	24.00	0.07	0.027	0.206	0.022	0.00
Sum =		100.0		Sum =	6.3	

Flood volume = Effective rainfall 0.53(In)

times area 0.6(Ac.)/[(In)/(Ft.)] = 0.0(Ac.Ft)

Total soil loss = 2.87(In)

Total soil loss = 0.139(Ac.Ft)
Total rainfall = 3.40(In)
Flood volume = 1117.7 Cubic Feet
Total soil loss = 6069.7 Cubic Feet

```
--------------------------------------------------------------------
 Peak flow rate of this hydrograph =     0.064(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    0.0000    0.00  Q        |        |        |        |
  0+15    0.0000    0.00  Q        |        |        |        |
  0+20    0.0001    0.00  Q        |        |        |        |
  0+25    0.0001    0.00  Q        |        |        |        |
  0+30    0.0001    0.00  Q        |        |        |        |
  0+35    0.0002    0.00  Q        |        |        |        |
  0+40    0.0002    0.00  Q        |        |        |        |
  0+45    0.0002    0.00  Q        |        |        |        |
  0+50    0.0003    0.01  Q        |        |        |        |
  0+55    0.0003    0.01  Q        |        |        |        |
  1+ 0    0.0003    0.01  Q        |        |        |        |
  1+ 5    0.0004    0.00  Q        |        |        |        |
  1+10    0.0004    0.00  Q        |        |        |        |
  1+15    0.0004    0.00  Q        |        |        |        |
  1+20    0.0005    0.00  Q        |        |        |        |
  1+25    0.0005    0.00  Q        |        |        |        |
  1+30    0.0005    0.00  Q        |        |        |        |
  1+35    0.0005    0.00  Q        |        |        |        |
  1+40    0.0006    0.00  Q        |        |        |        |
  1+45    0.0006    0.00  Q        |        |        |        |
  1+50    0.0006    0.01  Q        |        |        |        |
  1+55    0.0007    0.01  QV       |        |        |        |
  2+ 0    0.0007    0.01  QV       |        |        |        |
  2+ 5    0.0007    0.01  QV       |        |        |        |
  2+10    0.0008    0.01  QV       |        |        |        |
  2+15    0.0008    0.01  QV       |        |        |        |
  2+20    0.0009    0.01  QV       |        |        |        |
  2+25    0.0009    0.01  QV       |        |        |        |
  2+30    0.0009    0.01  QV       |        |        |        |
  2+35    0.0010    0.01  QV       |        |        |        |
  2+40    0.0010    0.01  QV       |        |        |        |
  2+45    0.0011    0.01  QV       |        |        |        |
  2+50    0.0011    0.01  QV       |        |        |        |
  2+55    0.0012    0.01  QV       |        |        |        |
  3+ 0    0.0012    0.01  QV       |        |        |        |
  3+ 5    0.0013    0.01  QV       |        |        |        |
  3+10    0.0013    0.01  Q V      |        |        |        |
  3+15    0.0014    0.01  Q V      |        |        |        |
  3+20    0.0014    0.01  Q V      |        |        |        |
  3+25    0.0015    0.01  Q V      |        |        |        |
  3+30    0.0015    0.01  Q V      |        |        |        |
  3+35    0.0016    0.01  Q V      |        |        |        |
  3+40    0.0016    0.01  Q V      |        |        |        |
  3+45    0.0017    0.01  Q V      |        |        |        |
  3+50    0.0017    0.01  Q V      |        |        |        |
  3+55    0.0018    0.01  Q V      |        |        |        |
  4+ 0    0.0018    0.01  Q V      |        |        |        |
  4+ 5    0.0019    0.01  Q V      |        |        |        |
```

```
4+10     0.0019    0.01  Q  V      |         |         |         |
4+15     0.0020    0.01  Q  V      |         |         |         |
4+20     0.0021    0.01  Q  V      |         |         |         |
4+25     0.0021    0.01  Q  V      |         |         |         |
4+30     0.0022    0.01  Q  V      |         |         |         |
4+35     0.0023    0.01  Q  V      |         |         |         |
4+40     0.0023    0.01  Q  V      |         |         |         |
4+45     0.0024    0.01  Q  V      |         |         |         |
4+50     0.0025    0.01  Q  V      |         |         |         |
4+55     0.0026    0.01  Q  V      |         |         |         |
5+ 0     0.0026    0.01  Q  V      |         |         |         |
5+ 5     0.0027    0.01  Q  V      |         |         |         |
5+10     0.0028    0.01  Q   V     |         |         |         |
5+15     0.0028    0.01  Q   V     |         |         |         |
5+20     0.0029    0.01  Q   V     |         |         |         |
5+25     0.0029    0.01  Q   V     |         |         |         |
5+30     0.0030    0.01  Q   V     |         |         |         |
5+35     0.0031    0.01  Q   V     |         |         |         |
5+40     0.0032    0.01  Q   V     |         |         |         |
5+45     0.0032    0.01  Q    V    |         |         |         |
5+50     0.0033    0.01  Q    V    |         |         |         |
5+55     0.0034    0.01  Q    V    |         |         |         |
6+ 0     0.0035    0.01  Q    V    |         |         |         |
6+ 5     0.0036    0.01  Q    V    |         |         |         |
6+10     0.0036    0.01  Q    V    |         |         |         |
6+15     0.0037    0.01  Q    V    |         |         |         |
6+20     0.0038    0.01  Q    V    |         |         |         |
6+25     0.0039    0.01  Q     V   |         |         |         |
6+30     0.0040    0.01  Q     V   |         |         |         |
6+35     0.0041    0.01  Q     V   |         |         |         |
6+40     0.0042    0.01  Q     V   |         |         |         |
6+45     0.0043    0.01  Q     V   |         |         |         |
6+50     0.0044    0.01  Q     V   |         |         |         |
6+55     0.0045    0.01  Q     V   |         |         |         |
7+ 0     0.0046    0.01  Q     V   |         |         |         |
7+ 5     0.0047    0.01  Q     V   |         |         |         |
7+10     0.0048    0.01  Q      V  |         |         |         |
7+15     0.0049    0.01  Q      V  |         |         |         |
7+20     0.0050    0.01  Q      V  |         |         |         |
7+25     0.0051    0.02  Q      V  |         |         |         |
7+30     0.0052    0.02  Q       V |         |         |         |
7+35     0.0053    0.02  Q       V |         |         |         |
7+40     0.0054    0.02  Q       V |         |         |         |
7+45     0.0055    0.02  Q       V |         |         |         |
7+50     0.0056    0.02  Q       V |         |         |         |
7+55     0.0058    0.02  Q       V |         |         |         |
8+ 0     0.0059    0.02  Q        V|         |         |         |
8+ 5     0.0060    0.02  Q        V|         |         |         |
8+10     0.0062    0.02  Q        V|         |         |         |
8+15     0.0063    0.02  Q        V|         |         |         |
8+20     0.0065    0.02  Q         V         |         |         |
8+25     0.0066    0.02  Q         V         |         |         |
8+30     0.0068    0.02  Q         V         |         |         |
8+35     0.0069    0.02  Q         V         |         |         |
8+40     0.0071    0.02  Q         |V        |         |         |
8+45     0.0072    0.02  Q         |V        |         |         |
8+50     0.0074    0.02  Q         |V        |         |         |
8+55     0.0075    0.02  Q         |V        |         |         |
9+ 0     0.0077    0.02  Q         | V       |         |         |
9+ 5     0.0079    0.03  Q         | V       |         |         |
9+10     0.0081    0.03  Q         | V       |         |         |
9+15     0.0082    0.03  Q         | V       |         |         |
9+20     0.0084    0.03  Q         |  V      |         |         |
9+25     0.0086    0.03  Q         |  V      |         |         |
9+30     0.0088    0.03  Q         |  V      |         |         |
```

```
 9+35   0.0090   0.03  Q    |   V     |         |         |
 9+40   0.0092   0.03  Q    |   V     |         |         |
 9+45   0.0094   0.03  Q    |   V     |         |         |
 9+50   0.0096   0.03  Q    |    V    |         |         |
 9+55   0.0099   0.03  Q    |    V    |         |         |
10+ 0   0.0101   0.03  Q    |    V    |         |         |
10+ 5   0.0102   0.02  Q    |    V    |         |         |
10+10   0.0104   0.02  Q    |     V   |         |         |
10+15   0.0105   0.02  Q    |     V   |         |         |
10+20   0.0107   0.02  Q    |     V   |         |         |
10+25   0.0108   0.02  Q    |     V   |         |         |
10+30   0.0110   0.02  Q    |      V  |         |         |
10+35   0.0111   0.03  Q    |      V  |         |         |
10+40   0.0113   0.03  Q    |      V  |         |         |
10+45   0.0115   0.03  Q    |      V  |         |         |
10+50   0.0117   0.03  Q    |       V |         |         |
10+55   0.0119   0.03  Q    |       V |         |         |
11+ 0   0.0121   0.03  Q    |       V |         |         |
11+ 5   0.0123   0.03  Q    |        V|         |         |
11+10   0.0125   0.03  Q    |        V|         |         |
11+15   0.0127   0.03  Q    |        V|         |         |
11+20   0.0128   0.03  Q    |         V         |         |
11+25   0.0130   0.03  Q    |         V         |         |
11+30   0.0132   0.03  Q    |         V         |         |
11+35   0.0134   0.02  Q    |         V         |         |
11+40   0.0135   0.02  Q    |         |V        |         |
11+45   0.0137   0.02  Q    |         |V        |         |
11+50   0.0139   0.02  Q    |         |V        |         |
11+55   0.0141   0.03  Q    |         |V        |         |
12+ 0   0.0142   0.03  Q    |         | V       |         |
12+ 5   0.0144   0.03  Q    |         | V       |         |
12+10   0.0147   0.03  Q    |         | V       |         |
12+15   0.0149   0.04  Q    |         |  V      |         |
12+20   0.0152   0.04  Q    |         |  V      |         |
12+25   0.0154   0.04  Q    |         |   V     |         |
12+30   0.0157   0.04  Q    |         |   V     |         |
12+35   0.0158   0.02  Q    |         |   V     |         |
12+40   0.0158   0.01  Q    |         |   V     |         |
12+45   0.0159   0.01  Q    |         |   V     |         |
12+50   0.0160   0.01  Q    |         |   V     |         |
12+55   0.0161   0.02  Q    |         |    V    |         |
13+ 0   0.0162   0.02  Q    |         |    V    |         |
13+ 5   0.0165   0.04  Q    |         |    V    |         |
13+10   0.0169   0.06  Q    |         |     V   |         |
13+15   0.0173   0.06  Q    |         |     V   |         |
13+20   0.0177   0.06  Q    |         |      V  |         |
13+25   0.0182   0.06  Q    |         |       V |         |
13+30   0.0186   0.06  Q    |         |        V|         |
13+35   0.0189   0.04  Q    |         |        V|         |
13+40   0.0191   0.03  Q    |         |        V|         |
13+45   0.0194   0.03  Q    |         |         V         |
13+50   0.0196   0.03  Q    |         |         V         |
13+55   0.0198   0.03  Q    |         |         V         |
14+ 0   0.0200   0.03  Q    |         |         |V        |
14+ 5   0.0202   0.02  Q    |         |         |V        |
14+10   0.0203   0.02  Q    |         |         |V        |
14+15   0.0204   0.02  Q    |         |         |V        |
14+20   0.0205   0.01  Q    |         |         |V        |
14+25   0.0206   0.01  Q    |         |         | V       |
14+30   0.0207   0.01  Q    |         |         | V       |
14+35   0.0208   0.01  Q    |         |         | V       |
14+40   0.0209   0.01  Q    |         |         | V       |
14+45   0.0210   0.02  Q    |         |         | V       |
14+50   0.0211   0.01  Q    |         |         | V       |
14+55   0.0211   0.01  Q    |         |         | V       |
```

```
15+ 0     0.0212     0.01  Q        |         |         |  V      |
15+ 5     0.0212     0.01  Q        |         |         |  V      |
15+10     0.0213     0.00  Q        |         |         |  V      |
15+15     0.0213     0.01  Q        |         |         |  V      |
15+20     0.0215     0.02  Q        |         |         |  V      |
15+25     0.0217     0.03  Q        |         |         |  V      |
15+30     0.0218     0.01  Q        |         |         |  V      |
15+35     0.0219     0.02  Q        |         |         |   V     |
15+40     0.0221     0.03  Q        |         |         |   V     |
15+45     0.0222     0.03  Q        |         |         |   V     |
15+50     0.0224     0.03  Q        |         |         |   V     |
15+55     0.0226     0.03  Q        |         |         |    V    |
16+ 0     0.0228     0.03  Q        |         |         |    V    |
16+ 5     0.0229     0.01  Q        |         |         |    V    |
16+10     0.0229     0.01  Q        |         |         |    V    |
16+15     0.0230     0.01  Q        |         |         |    V    |
16+20     0.0230     0.01  Q        |         |         |    V    |
16+25     0.0231     0.01  Q        |         |         |    V    |
16+30     0.0231     0.01  Q        |         |         |    V    |
16+35     0.0231     0.00  Q        |         |         |     V   |
16+40     0.0232     0.00  Q        |         |         |     V   |
16+45     0.0232     0.00  Q        |         |         |     V   |
16+50     0.0232     0.00  Q        |         |         |     V   |
16+55     0.0232     0.00  Q        |         |         |     V   |
17+ 0     0.0233     0.00  Q        |         |         |     V   |
17+ 5     0.0233     0.01  Q        |         |         |     V   |
17+10     0.0234     0.01  Q        |         |         |     V   |
17+15     0.0234     0.01  Q        |         |         |     V   |
17+20     0.0235     0.01  Q        |         |         |     V   |
17+25     0.0235     0.01  Q        |         |         |     V   |
17+30     0.0235     0.01  Q        |         |         |     V   |
17+35     0.0236     0.01  Q        |         |         |     V   |
17+40     0.0236     0.01  Q        |         |         |     V   |
17+45     0.0237     0.01  Q        |         |         |     V   |
17+50     0.0237     0.01  Q        |         |         |      V  |
17+55     0.0238     0.01  Q        |         |         |      V  |
18+ 0     0.0238     0.01  Q        |         |         |      V  |
18+ 5     0.0239     0.01  Q        |         |         |      V  |
18+10     0.0239     0.01  Q        |         |         |      V  |
18+15     0.0239     0.01  Q        |         |         |      V  |
18+20     0.0240     0.01  Q        |         |         |      V  |
18+25     0.0240     0.01  Q        |         |         |      V  |
18+30     0.0240     0.01  Q        |         |         |      V  |
18+35     0.0241     0.00  Q        |         |         |      V  |
18+40     0.0241     0.00  Q        |         |         |      V  |
18+45     0.0241     0.00  Q        |         |         |      V  |
18+50     0.0242     0.00  Q        |         |         |      V  |
18+55     0.0242     0.00  Q        |         |         |      V  |
19+ 0     0.0242     0.00  Q        |         |         |      V  |
19+ 5     0.0242     0.00  Q        |         |         |      V  |
19+10     0.0243     0.00  Q        |         |         |      V  |
19+15     0.0243     0.00  Q        |         |         |      V  |
19+20     0.0243     0.01  Q        |         |         |      V  |
19+25     0.0244     0.01  Q        |         |         |      V  |
19+30     0.0244     0.01  Q        |         |         |       V |
19+35     0.0244     0.00  Q        |         |         |       V |
19+40     0.0245     0.00  Q        |         |         |       V |
19+45     0.0245     0.00  Q        |         |         |       V |
19+50     0.0245     0.00  Q        |         |         |       V |
19+55     0.0245     0.00  Q        |         |         |       V |
20+ 0     0.0245     0.00  Q        |         |         |       V |
20+ 5     0.0246     0.00  Q        |         |         |       V |
20+10     0.0246     0.00  Q        |         |         |       V |
20+15     0.0246     0.00  Q        |         |         |       V |
20+20     0.0247     0.00  Q        |         |         |       V |
```

```
 20+25     0.0247     0.00  Q       |       |       |      V |
 20+30     0.0247     0.00  Q       |       |       |      V |
 20+35     0.0247     0.00  Q       |       |       |      V |
 20+40     0.0248     0.00  Q       |       |       |      V |
 20+45     0.0248     0.00  Q       |       |       |      V |
 20+50     0.0248     0.00  Q       |       |       |      V |
 20+55     0.0248     0.00  Q       |       |       |      V |
 21+ 0     0.0249     0.00  Q       |       |       |      V |
 21+ 5     0.0249     0.00  Q       |       |       |      V |
 21+10     0.0249     0.00  Q       |       |       |      V |
 21+15     0.0249     0.00  Q       |       |       |      V |
 21+20     0.0250     0.00  Q       |       |       |      V |
 21+25     0.0250     0.00  Q       |       |       |      V |
 21+30     0.0250     0.00  Q       |       |       |      V |
 21+35     0.0250     0.00  Q       |       |       |       V|
 21+40     0.0251     0.00  Q       |       |       |       V|
 21+45     0.0251     0.00  Q       |       |       |       V|
 21+50     0.0251     0.00  Q       |       |       |       V|
 21+55     0.0251     0.00  Q       |       |       |       V|
 22+ 0     0.0252     0.00  Q       |       |       |       V|
 22+ 5     0.0252     0.00  Q       |       |       |       V|
 22+10     0.0252     0.00  Q       |       |       |       V|
 22+15     0.0252     0.00  Q       |       |       |       V|
 22+20     0.0253     0.00  Q       |       |       |       V|
 22+25     0.0253     0.00  Q       |       |       |       V|
 22+30     0.0253     0.00  Q       |       |       |       V|
 22+35     0.0253     0.00  Q       |       |       |       V|
 22+40     0.0253     0.00  Q       |       |       |       V|
 22+45     0.0254     0.00  Q       |       |       |       V|
 22+50     0.0254     0.00  Q       |       |       |       V|
 22+55     0.0254     0.00  Q       |       |       |       V|
 23+ 0     0.0254     0.00  Q       |       |       |       V|
 23+ 5     0.0254     0.00  Q       |       |       |       V|
 23+10     0.0255     0.00  Q       |       |       |       V|
 23+15     0.0255     0.00  Q       |       |       |       V|
 23+20     0.0255     0.00  Q       |       |       |       V|
 23+25     0.0255     0.00  Q       |       |       |       V|
 23+30     0.0255     0.00  Q       |       |       |       V|
 23+35     0.0256     0.00  Q       |       |       |       V|
 23+40     0.0256     0.00  Q       |       |       |       V|
 23+45     0.0256     0.00  Q       |       |       |       V|
 23+50     0.0256     0.00  Q       |       |       |       V|
 23+55     0.0256     0.00  Q       |       |       |       V|
 24+ 0     0.0256     0.00  Q       |       |       |       V|
 24+ 5     0.0257     0.00  Q       |       |       |       V|
 24+10     0.0257     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

Study date 09/23/20 File: APOST2410.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

28771 Central Avenue Gas Station
Area A
Post-development
24-Hr 10-Yr Storm Event

Drainage Area = 0.58(Ac.) = 0.001 Sq. Mi.
Length along longest watercourse = 345.00(Ft.)
Length along longest watercourse measured to centroid = 97.38(Ft.)
Length along longest watercourse = 0.065 Mi.
Length along longest watercourse measured to centroid = 0.018 Mi.
Difference in elevation = 6.34(Ft.)
Slope along watercourse = 97.0296 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.023 Hr.
Lag time = 1.41 Min.
25% of lag time = 0.35 Min.
40% of lag time = 0.56 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]
0.58	2.43	1.41

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
0.58	6.58	3.83

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 2.430(In)
Area Averaged 100-Year Rainfall = 6.580(In)

Point rain (area averaged) = 4.137(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 4.137(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
0.582	79.00	0.095

Total Area Entered = 0.58(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
79.0	61.8	0.451	0.095	0.412	1.000	0.412

Sum (F) = 0.412

Area averaged mean soil loss (F) (In/Hr) = 0.412

Minimum soil loss rate ((In/Hr)) = 0.206

(for 24 hour storm duration)

Soil low loss rate (decimal) = 0.824

U n i t H y d r o g r a p h

DESERT S-Curve

Unit Hydrograph Data

	Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	354.985	61.437	0.360
2	0.167	709.970	35.423	0.208
3	0.250	1064.955	3.140	0.018
			Sum = 100.000	Sum= 0.587

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Loss rate(In./Hr) Low	Effective (In/Hr)
1	0.08	0.07	0.033	0.731	0.027	0.01
2	0.17	0.07	0.033	0.728	0.027	0.01
3	0.25	0.07	0.033	0.725	0.027	0.01
4	0.33	0.10	0.050	0.722	0.041	0.01
5	0.42	0.10	0.050	0.719	0.041	0.01
6	0.50	0.10	0.050	0.717	0.041	0.01
7	0.58	0.10	0.050	0.714	0.041	0.01
8	0.67	0.10	0.050	0.711	0.041	0.01
9	0.75	0.10	0.050	0.708	0.041	0.01
10	0.83	0.13	0.066	0.705	0.055	0.01
11	0.92	0.13	0.066	0.703	0.055	0.01
12	1.00	0.13	0.066	0.700	0.055	0.01
13	1.08	0.10	0.050	0.697	0.041	0.01
14	1.17	0.10	0.050	0.694	0.041	0.01
15	1.25	0.10	0.050	0.692	0.041	0.01
16	1.33	0.10	0.050	0.689	0.041	0.01
17	1.42	0.10	0.050	0.686	0.041	0.01
18	1.50	0.10	0.050	0.683	0.041	0.01
19	1.58	0.10	0.050	0.681	0.041	0.01
20	1.67	0.10	0.050	0.678	0.041	0.01
21	1.75	0.10	0.050	0.675	0.041	0.01
22	1.83	0.13	0.066	0.672	0.055	0.01
23	1.92	0.13	0.066	0.670	0.055	0.01
24	2.00	0.13	0.066	0.667	0.055	0.01
25	2.08	0.13	0.066	0.664	0.055	0.01
26	2.17	0.13	0.066	0.662	0.055	0.01
27	2.25	0.13	0.066	0.659	0.055	0.01
28	2.33	0.13	0.066	0.656	0.055	0.01
29	2.42	0.13	0.066	0.654	0.055	0.01
30	2.50	0.13	0.066	0.651	0.055	0.01
31	2.58	0.17	0.083	0.648	0.068	0.01
32	2.67	0.17	0.083	0.646	0.068	0.01

33	2.75	0.17	0.083	0.643	0.068	0.01
34	2.83	0.17	0.083	0.640	0.068	0.01
35	2.92	0.17	0.083	0.638	0.068	0.01
36	3.00	0.17	0.083	0.635	0.068	0.01
37	3.08	0.17	0.083	0.632	0.068	0.01
38	3.17	0.17	0.083	0.630	0.068	0.01
39	3.25	0.17	0.083	0.627	0.068	0.01
40	3.33	0.17	0.083	0.625	0.068	0.01
41	3.42	0.17	0.083	0.622	0.068	0.01
42	3.50	0.17	0.083	0.619	0.068	0.01
43	3.58	0.17	0.083	0.617	0.068	0.01
44	3.67	0.17	0.083	0.614	0.068	0.01
45	3.75	0.17	0.083	0.612	0.068	0.01
46	3.83	0.20	0.099	0.609	0.082	0.02
47	3.92	0.20	0.099	0.606	0.082	0.02
48	4.00	0.20	0.099	0.604	0.082	0.02
49	4.08	0.20	0.099	0.601	0.082	0.02
50	4.17	0.20	0.099	0.599	0.082	0.02
51	4.25	0.20	0.099	0.596	0.082	0.02
52	4.33	0.23	0.116	0.594	0.095	0.02
53	4.42	0.23	0.116	0.591	0.095	0.02
54	4.50	0.23	0.116	0.589	0.095	0.02
55	4.58	0.23	0.116	0.586	0.095	0.02
56	4.67	0.23	0.116	0.584	0.095	0.02
57	4.75	0.23	0.116	0.581	0.095	0.02
58	4.83	0.27	0.132	0.579	0.109	0.02
59	4.92	0.27	0.132	0.576	0.109	0.02
60	5.00	0.27	0.132	0.574	0.109	0.02
61	5.08	0.20	0.099	0.571	0.082	0.02
62	5.17	0.20	0.099	0.569	0.082	0.02
63	5.25	0.20	0.099	0.566	0.082	0.02
64	5.33	0.23	0.116	0.564	0.095	0.02
65	5.42	0.23	0.116	0.561	0.095	0.02
66	5.50	0.23	0.116	0.559	0.095	0.02
67	5.58	0.27	0.132	0.556	0.109	0.02
68	5.67	0.27	0.132	0.554	0.109	0.02
69	5.75	0.27	0.132	0.551	0.109	0.02
70	5.83	0.27	0.132	0.549	0.109	0.02
71	5.92	0.27	0.132	0.546	0.109	0.02
72	6.00	0.27	0.132	0.544	0.109	0.02
73	6.08	0.30	0.149	0.542	0.123	0.03
74	6.17	0.30	0.149	0.539	0.123	0.03
75	6.25	0.30	0.149	0.537	0.123	0.03
76	6.33	0.30	0.149	0.534	0.123	0.03
77	6.42	0.30	0.149	0.532	0.123	0.03
78	6.50	0.30	0.149	0.530	0.123	0.03
79	6.58	0.33	0.165	0.527	0.136	0.03
80	6.67	0.33	0.165	0.525	0.136	0.03
81	6.75	0.33	0.165	0.523	0.136	0.03
82	6.83	0.33	0.165	0.520	0.136	0.03
83	6.92	0.33	0.165	0.518	0.136	0.03
84	7.00	0.33	0.165	0.515	0.136	0.03
85	7.08	0.33	0.165	0.513	0.136	0.03
86	7.17	0.33	0.165	0.511	0.136	0.03
87	7.25	0.33	0.165	0.508	0.136	0.03
88	7.33	0.37	0.182	0.506	0.150	0.03
89	7.42	0.37	0.182	0.504	0.150	0.03
90	7.50	0.37	0.182	0.501	0.150	0.03
91	7.58	0.40	0.199	0.499	0.164	0.03
92	7.67	0.40	0.199	0.497	0.164	0.03
93	7.75	0.40	0.199	0.495	0.164	0.03
94	7.83	0.43	0.215	0.492	0.177	0.04
95	7.92	0.43	0.215	0.490	0.177	0.04
96	8.00	0.43	0.215	0.488	0.177	0.04
97	8.08	0.50	0.248	0.486	0.205	0.04

98	8.17	0.50	0.248	0.483	0.205	0.04
99	8.25	0.50	0.248	0.481	0.205	0.04
100	8.33	0.50	0.248	0.479	0.205	0.04
101	8.42	0.50	0.248	0.477	0.205	0.04
102	8.50	0.50	0.248	0.474	0.205	0.04
103	8.58	0.53	0.265	0.472	0.218	0.05
104	8.67	0.53	0.265	0.470	0.218	0.05
105	8.75	0.53	0.265	0.468	0.218	0.05
106	8.83	0.57	0.281	0.465	0.232	0.05
107	8.92	0.57	0.281	0.463	0.232	0.05
108	9.00	0.57	0.281	0.461	0.232	0.05
109	9.08	0.63	0.314	0.459	0.259	0.06
110	9.17	0.63	0.314	0.457	0.259	0.06
111	9.25	0.63	0.314	0.454	0.259	0.06
112	9.33	0.67	0.331	0.452	0.273	0.06
113	9.42	0.67	0.331	0.450	0.273	0.06
114	9.50	0.67	0.331	0.448	0.273	0.06
115	9.58	0.70	0.348	0.446	0.286	0.06
116	9.67	0.70	0.348	0.444	0.286	0.06
117	9.75	0.70	0.348	0.442	0.286	0.06
118	9.83	0.73	0.364	0.439	0.300	0.06
119	9.92	0.73	0.364	0.437	0.300	0.06
120	10.00	0.73	0.364	0.435	0.300	0.06
121	10.08	0.50	0.248	0.433	0.205	0.04
122	10.17	0.50	0.248	0.431	0.205	0.04
123	10.25	0.50	0.248	0.429	0.205	0.04
124	10.33	0.50	0.248	0.427	0.205	0.04
125	10.42	0.50	0.248	0.425	0.205	0.04
126	10.50	0.50	0.248	0.423	0.205	0.04
127	10.58	0.67	0.331	0.421	0.273	0.06
128	10.67	0.67	0.331	0.419	0.273	0.06
129	10.75	0.67	0.331	0.417	0.273	0.06
130	10.83	0.67	0.331	0.415	0.273	0.06
131	10.92	0.67	0.331	0.412	0.273	0.06
132	11.00	0.67	0.331	0.410	0.273	0.06
133	11.08	0.63	0.314	0.408	0.259	0.06
134	11.17	0.63	0.314	0.406	0.259	0.06
135	11.25	0.63	0.314	0.404	0.259	0.06
136	11.33	0.63	0.314	0.402	0.259	0.06
137	11.42	0.63	0.314	0.400	0.259	0.06
138	11.50	0.63	0.314	0.398	0.259	0.06
139	11.58	0.57	0.281	0.396	0.232	0.05
140	11.67	0.57	0.281	0.394	0.232	0.05
141	11.75	0.57	0.281	0.393	0.232	0.05
142	11.83	0.60	0.298	0.391	0.246	0.05
143	11.92	0.60	0.298	0.389	0.246	0.05
144	12.00	0.60	0.298	0.387	0.246	0.05
145	12.08	0.83	0.414	0.385	---	0.03
146	12.17	0.83	0.414	0.383	---	0.03
147	12.25	0.83	0.414	0.381	---	0.03
148	12.33	0.87	0.430	0.379	---	0.05
149	12.42	0.87	0.430	0.377	---	0.05
150	12.50	0.87	0.430	0.375	---	0.06
151	12.58	0.93	0.463	0.373	---	0.09
152	12.67	0.93	0.463	0.371	---	0.09
153	12.75	0.93	0.463	0.370	---	0.09
154	12.83	0.97	0.480	0.368	---	0.11
155	12.92	0.97	0.480	0.366	---	0.11
156	13.00	0.97	0.480	0.364	---	0.12
157	13.08	1.13	0.563	0.362	---	0.20
158	13.17	1.13	0.563	0.360	---	0.20
159	13.25	1.13	0.563	0.358	---	0.20
160	13.33	1.13	0.563	0.357	---	0.21
161	13.42	1.13	0.563	0.355	---	0.21
162	13.50	1.13	0.563	0.353	---	0.21

163	13.58	0.77	0.381	0.351	---	0.03
164	13.67	0.77	0.381	0.349	---	0.03
165	13.75	0.77	0.381	0.348	---	0.03
166	13.83	0.77	0.381	0.346	---	0.03
167	13.92	0.77	0.381	0.344	---	0.04
168	14.00	0.77	0.381	0.342	---	0.04
169	14.08	0.90	0.447	0.341	---	0.11
170	14.17	0.90	0.447	0.339	---	0.11
171	14.25	0.90	0.447	0.337	---	0.11
172	14.33	0.87	0.430	0.335	---	0.09
173	14.42	0.87	0.430	0.334	---	0.10
174	14.50	0.87	0.430	0.332	---	0.10
175	14.58	0.87	0.430	0.330	---	0.10
176	14.67	0.87	0.430	0.329	---	0.10
177	14.75	0.87	0.430	0.327	---	0.10
178	14.83	0.83	0.414	0.325	---	0.09
179	14.92	0.83	0.414	0.324	---	0.09
180	15.00	0.83	0.414	0.322	---	0.09
181	15.08	0.80	0.397	0.320	---	0.08
182	15.17	0.80	0.397	0.319	---	0.08
183	15.25	0.80	0.397	0.317	---	0.08
184	15.33	0.77	0.381	0.315	---	0.07
185	15.42	0.77	0.381	0.314	---	0.07
186	15.50	0.77	0.381	0.312	---	0.07
187	15.58	0.63	0.314	0.311	---	0.00
188	15.67	0.63	0.314	0.309	---	0.01
189	15.75	0.63	0.314	0.307	---	0.01
190	15.83	0.63	0.314	0.306	---	0.01
191	15.92	0.63	0.314	0.304	---	0.01
192	16.00	0.63	0.314	0.303	---	0.01
193	16.08	0.13	0.066	0.301	0.055	0.01
194	16.17	0.13	0.066	0.300	0.055	0.01
195	16.25	0.13	0.066	0.298	0.055	0.01
196	16.33	0.13	0.066	0.297	0.055	0.01
197	16.42	0.13	0.066	0.295	0.055	0.01
198	16.50	0.13	0.066	0.294	0.055	0.01
199	16.58	0.10	0.050	0.292	0.041	0.01
200	16.67	0.10	0.050	0.291	0.041	0.01
201	16.75	0.10	0.050	0.289	0.041	0.01
202	16.83	0.10	0.050	0.288	0.041	0.01
203	16.92	0.10	0.050	0.286	0.041	0.01
204	17.00	0.10	0.050	0.285	0.041	0.01
205	17.08	0.17	0.083	0.283	0.068	0.01
206	17.17	0.17	0.083	0.282	0.068	0.01
207	17.25	0.17	0.083	0.280	0.068	0.01
208	17.33	0.17	0.083	0.279	0.068	0.01
209	17.42	0.17	0.083	0.278	0.068	0.01
210	17.50	0.17	0.083	0.276	0.068	0.01
211	17.58	0.17	0.083	0.275	0.068	0.01
212	17.67	0.17	0.083	0.273	0.068	0.01
213	17.75	0.17	0.083	0.272	0.068	0.01
214	17.83	0.13	0.066	0.271	0.055	0.01
215	17.92	0.13	0.066	0.269	0.055	0.01
216	18.00	0.13	0.066	0.268	0.055	0.01
217	18.08	0.13	0.066	0.267	0.055	0.01
218	18.17	0.13	0.066	0.265	0.055	0.01
219	18.25	0.13	0.066	0.264	0.055	0.01
220	18.33	0.13	0.066	0.263	0.055	0.01
221	18.42	0.13	0.066	0.262	0.055	0.01
222	18.50	0.13	0.066	0.260	0.055	0.01
223	18.58	0.10	0.050	0.259	0.041	0.01
224	18.67	0.10	0.050	0.258	0.041	0.01
225	18.75	0.10	0.050	0.257	0.041	0.01
226	18.83	0.07	0.033	0.255	0.027	0.01
227	18.92	0.07	0.033	0.254	0.027	0.01

228	19.00	0.07	0.033	0.253	0.027	0.01
229	19.08	0.10	0.050	0.252	0.041	0.01
230	19.17	0.10	0.050	0.251	0.041	0.01
231	19.25	0.10	0.050	0.249	0.041	0.01
232	19.33	0.13	0.066	0.248	0.055	0.01
233	19.42	0.13	0.066	0.247	0.055	0.01
234	19.50	0.13	0.066	0.246	0.055	0.01
235	19.58	0.10	0.050	0.245	0.041	0.01
236	19.67	0.10	0.050	0.244	0.041	0.01
237	19.75	0.10	0.050	0.243	0.041	0.01
238	19.83	0.07	0.033	0.241	0.027	0.01
239	19.92	0.07	0.033	0.240	0.027	0.01
240	20.00	0.07	0.033	0.239	0.027	0.01
241	20.08	0.10	0.050	0.238	0.041	0.01
242	20.17	0.10	0.050	0.237	0.041	0.01
243	20.25	0.10	0.050	0.236	0.041	0.01
244	20.33	0.10	0.050	0.235	0.041	0.01
245	20.42	0.10	0.050	0.234	0.041	0.01
246	20.50	0.10	0.050	0.233	0.041	0.01
247	20.58	0.10	0.050	0.232	0.041	0.01
248	20.67	0.10	0.050	0.231	0.041	0.01
249	20.75	0.10	0.050	0.230	0.041	0.01
250	20.83	0.07	0.033	0.229	0.027	0.01
251	20.92	0.07	0.033	0.228	0.027	0.01
252	21.00	0.07	0.033	0.227	0.027	0.01
253	21.08	0.10	0.050	0.227	0.041	0.01
254	21.17	0.10	0.050	0.226	0.041	0.01
255	21.25	0.10	0.050	0.225	0.041	0.01
256	21.33	0.07	0.033	0.224	0.027	0.01
257	21.42	0.07	0.033	0.223	0.027	0.01
258	21.50	0.07	0.033	0.222	0.027	0.01
259	21.58	0.10	0.050	0.221	0.041	0.01
260	21.67	0.10	0.050	0.221	0.041	0.01
261	21.75	0.10	0.050	0.220	0.041	0.01
262	21.83	0.07	0.033	0.219	0.027	0.01
263	21.92	0.07	0.033	0.218	0.027	0.01
264	22.00	0.07	0.033	0.218	0.027	0.01
265	22.08	0.10	0.050	0.217	0.041	0.01
266	22.17	0.10	0.050	0.216	0.041	0.01
267	22.25	0.10	0.050	0.216	0.041	0.01
268	22.33	0.07	0.033	0.215	0.027	0.01
269	22.42	0.07	0.033	0.214	0.027	0.01
270	22.50	0.07	0.033	0.214	0.027	0.01
271	22.58	0.07	0.033	0.213	0.027	0.01
272	22.67	0.07	0.033	0.212	0.027	0.01
273	22.75	0.07	0.033	0.212	0.027	0.01
274	22.83	0.07	0.033	0.211	0.027	0.01
275	22.92	0.07	0.033	0.211	0.027	0.01
276	23.00	0.07	0.033	0.210	0.027	0.01
277	23.08	0.07	0.033	0.210	0.027	0.01
278	23.17	0.07	0.033	0.209	0.027	0.01
279	23.25	0.07	0.033	0.209	0.027	0.01
280	23.33	0.07	0.033	0.208	0.027	0.01
281	23.42	0.07	0.033	0.208	0.027	0.01
282	23.50	0.07	0.033	0.208	0.027	0.01
283	23.58	0.07	0.033	0.207	0.027	0.01
284	23.67	0.07	0.033	0.207	0.027	0.01
285	23.75	0.07	0.033	0.207	0.027	0.01
286	23.83	0.07	0.033	0.206	0.027	0.01
287	23.92	0.07	0.033	0.206	0.027	0.01
288	24.00	0.07	0.033	0.206	0.027	0.01
Sum =		100.0		Sum =	9.1	

Flood volume = Effective rainfall 0.76(In)
times area 0.6(Ac.)/[(In)/(Ft.)] = 0.0(Ac.Ft)
Total soil loss = 3.38(In)

Total soil loss = 0.164(Ac.Ft)
Total rainfall = 4.14(In)
Flood volume = 1605.3 Cubic Feet
Total soil loss = 7135.5 Cubic Feet

Peak flow rate of this hydrograph = 0.123(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	0.0000	0.00	Q	|	|	|	|
0+15	0.0001	0.00	Q	|	|	|	|
0+20	0.0001	0.00	Q	|	|	|	|
0+25	0.0001	0.01	Q	|	|	|	|
0+30	0.0002	0.01	Q	|	|	|	|
0+35	0.0002	0.01	Q	|	|	|	|
0+40	0.0002	0.01	Q	|	|	|	|
0+45	0.0003	0.01	Q	|	|	|	|
0+50	0.0003	0.01	Q	|	|	|	|
0+55	0.0004	0.01	Q	|	|	|	|
1+ 0	0.0004	0.01	Q	|	|	|	|
1+ 5	0.0004	0.01	Q	|	|	|	|
1+10	0.0005	0.01	Q	|	|	|	|
1+15	0.0005	0.01	Q	|	|	|	|
1+20	0.0005	0.01	Q	|	|	|	|
1+25	0.0006	0.01	Q	|	|	|	|
1+30	0.0006	0.01	Q	|	|	|	|
1+35	0.0007	0.01	Q	|	|	|	|
1+40	0.0007	0.01	Q	|	|	|	|
1+45	0.0007	0.01	Q	|	|	|	|
1+50	0.0008	0.01	Q	|	|	|	|
1+55	0.0008	0.01	Q	|	|	|	|
2+ 0	0.0009	0.01	Q	|	|	|	|
2+ 5	0.0009	0.01	Q	|	|	|	|
2+10	0.0010	0.01	QV	|	|	|	|
2+15	0.0010	0.01	QV	|	|	|	|
2+20	0.0011	0.01	QV	|	|	|	|
2+25	0.0011	0.01	QV	|	|	|	|
2+30	0.0011	0.01	QV	|	|	|	|
2+35	0.0012	0.01	QV	|	|	|	|
2+40	0.0013	0.01	QV	|	|	|	|
2+45	0.0013	0.01	QV	|	|	|	|
2+50	0.0014	0.01	QV	|	|	|	|
2+55	0.0014	0.01	QV	|	|	|	|
3+ 0	0.0015	0.01	QV	|	|	|	|
3+ 5	0.0016	0.01	QV	|	|	|	|
3+10	0.0016	0.01	QV	|	|	|	|
3+15	0.0017	0.01	QV	|	|	|	|
3+20	0.0017	0.01	QV	|	|	|	|
3+25	0.0018	0.01	QV	|	|	|	|
3+30	0.0018	0.01	Q V	|	|	|	|
3+35	0.0019	0.01	Q V	|	|	|	|
3+40	0.0020	0.01	Q V	|	|	|	|
3+45	0.0020	0.01	Q V	|	|	|	|
3+50	0.0021	0.01	Q V	|	|	|	|
3+55	0.0022	0.01	Q V	|	|	|	|
4+ 0	0.0022	0.01	Q V	|	|	|	|
4+ 5	0.0023	0.01	Q V	|	|	|	|

```
4+10    0.0024    0.01  Q V       |         |         |         |
4+15    0.0024    0.01  Q V       |         |         |         |
4+20    0.0025    0.01  Q V       |         |         |         |
4+25    0.0026    0.01  Q V       |         |         |         |
4+30    0.0027    0.01  Q V       |         |         |         |
4+35    0.0028    0.01  Q  V      |         |         |         |
4+40    0.0028    0.01  Q  V      |         |         |         |
4+45    0.0029    0.01  Q  V      |         |         |         |
4+50    0.0030    0.01  Q  V      |         |         |         |
4+55    0.0031    0.01  Q  V      |         |         |         |
5+ 0    0.0032    0.01  Q  V      |         |         |         |
5+ 5    0.0033    0.01  Q  V      |         |         |         |
5+10    0.0034    0.01  Q  V      |         |         |         |
5+15    0.0034    0.01  Q  V      |         |         |         |
5+20    0.0035    0.01  Q  V      |         |         |         |
5+25    0.0036    0.01  Q  V      |         |         |         |
5+30    0.0037    0.01  Q  V      |         |         |         |
5+35    0.0038    0.01  Q   V     |         |         |         |
5+40    0.0039    0.01  Q   V     |         |         |         |
5+45    0.0039    0.01  Q   V     |         |         |         |
5+50    0.0040    0.01  Q   V     |         |         |         |
5+55    0.0041    0.01  Q   V     |         |         |         |
6+ 0    0.0042    0.01  Q   V     |         |         |         |
6+ 5    0.0043    0.01  Q   V     |         |         |         |
6+10    0.0044    0.02  Q   V     |         |         |         |
6+15    0.0045    0.02  Q   V     |         |         |         |
6+20    0.0046    0.02  Q    V    |         |         |         |
6+25    0.0048    0.02  Q    V    |         |         |         |
6+30    0.0049    0.02  Q    V    |         |         |         |
6+35    0.0050    0.02  Q    V    |         |         |         |
6+40    0.0051    0.02  Q    V    |         |         |         |
6+45    0.0052    0.02  Q    V    |         |         |         |
6+50    0.0053    0.02  Q    V    |         |         |         |
6+55    0.0054    0.02  Q    V    |         |         |         |
7+ 0    0.0056    0.02  Q     V   |         |         |         |
7+ 5    0.0057    0.02  Q     V   |         |         |         |
7+10    0.0058    0.02  Q     V   |         |         |         |
7+15    0.0059    0.02  Q     V   |         |         |         |
7+20    0.0060    0.02  Q     V   |         |         |         |
7+25    0.0062    0.02  Q     V   |         |         |         |
7+30    0.0063    0.02  Q     V   |         |         |         |
7+35    0.0064    0.02  Q     V   |         |         |         |
7+40    0.0066    0.02  Q      V  |         |         |         |
7+45    0.0067    0.02  Q      V  |         |         |         |
7+50    0.0069    0.02  Q      V  |         |         |         |
7+55    0.0070    0.02  Q      V  |         |         |         |
8+ 0    0.0072    0.02  Q      V  |         |         |         |
8+ 5    0.0073    0.02  Q      V  |         |         |         |
8+10    0.0075    0.03  Q       V |         |         |         |
8+15    0.0077    0.03  Q       V |         |         |         |
8+20    0.0079    0.03  Q       V |         |         |         |
8+25    0.0080    0.03  Q       V |         |         |         |
8+30    0.0082    0.03  Q       V |         |         |         |
8+35    0.0084    0.03  Q        V|         |         |         |
8+40    0.0086    0.03  Q        V|         |         |         |
8+45    0.0088    0.03  Q        V|         |         |         |
8+50    0.0090    0.03  Q        V|         |         |         |
8+55    0.0092    0.03  Q        V|         |         |         |
9+ 0    0.0094    0.03  Q         V         |         |         |
9+ 5    0.0096    0.03  Q         V         |         |         |
9+10    0.0098    0.03  Q         V         |         |         |
9+15    0.0100    0.03  Q         V         |         |         |
9+20    0.0103    0.03  Q         |V        |         |         |
9+25    0.0105    0.03  Q         |V        |         |         |
9+30    0.0107    0.03  Q         |V        |         |         |
```

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 9+35     0.0110     0.04  Q       |V        |         |         |
 9+40     0.0112     0.04  Q       | V       |         |         |
 9+45     0.0115     0.04  Q       | V       |         |         |
 9+50     0.0117     0.04  Q       | V       |         |         |
 9+55     0.0120     0.04  Q       |  V      |         |         |
10+ 0     0.0122     0.04  Q       |  V      |         |         |
10+ 5     0.0124     0.03  Q       |  V      |         |         |
10+10     0.0126     0.03  Q       |  V      |         |         |
10+15     0.0128     0.03  Q       |  V      |         |         |
10+20     0.0130     0.03  Q       |   V     |         |         |
10+25     0.0132     0.03  Q       |   V     |         |         |
10+30     0.0133     0.03  Q       |   V     |         |         |
10+35     0.0135     0.03  Q       |   V     |         |         |
10+40     0.0138     0.03  Q       |   V     |         |         |
10+45     0.0140     0.03  Q       |    V    |         |         |
10+50     0.0142     0.03  Q       |    V    |         |         |
10+55     0.0145     0.03  Q       |    V    |         |         |
11+ 0     0.0147     0.03  Q       |    V    |         |         |
11+ 5     0.0149     0.03  Q       |     V   |         |         |
11+10     0.0152     0.03  Q       |     V   |         |         |
11+15     0.0154     0.03  Q       |     V   |         |         |
11+20     0.0156     0.03  Q       |     V   |         |         |
11+25     0.0158     0.03  Q       |      V  |         |         |
11+30     0.0161     0.03  Q       |      V  |         |         |
11+35     0.0163     0.03  Q       |      V  |         |         |
11+40     0.0165     0.03  Q       |      V  |         |         |
11+45     0.0167     0.03  Q       |       V |         |         |
11+50     0.0169     0.03  Q       |       V |         |         |
11+55     0.0171     0.03  Q       |       V |         |         |
12+ 0     0.0173     0.03  Q       |       V |         |         |
12+ 5     0.0175     0.02  Q       |       V |         |         |
12+10     0.0176     0.02  Q       |        V|         |         |
12+15     0.0177     0.02  Q       |        V|         |         |
12+20     0.0179     0.03  Q       |        V|         |         |
12+25     0.0181     0.03  Q       |        V|         |         |
12+30     0.0183     0.03  Q       |        V|         |         |
12+35     0.0186     0.04  Q       |         V         |         |
12+40     0.0190     0.05  Q       |         V         |         |
12+45     0.0194     0.05  Q       |         |V        |         |
12+50     0.0198     0.06  Q       |         |V        |         |
12+55     0.0202     0.07  Q       |         |V        |         |
13+ 0     0.0207     0.07  Q       |         | V       |         |
13+ 5     0.0214     0.10  Q       |         |  V      |         |
13+10     0.0222     0.12  Q       |         |  V      |         |
13+15     0.0230     0.12  Q       |         |  V      |         |
13+20     0.0238     0.12  Q       |         |   V     |         |
13+25     0.0247     0.12  Q       |         |    V    |         |
13+30     0.0255     0.12  Q       |         |     V   |         |
13+35     0.0259     0.06  Q       |         |       V |         |
13+40     0.0261     0.02  Q       |         |       V |         |
13+45     0.0262     0.02  Q       |         |       V |         |
13+50     0.0263     0.02  Q       |         |       V |         |
13+55     0.0265     0.02  Q       |         |       V |         |
14+ 0     0.0266     0.02  Q       |         |       V |         |
14+ 5     0.0270     0.05  Q       |         |        V|         |
14+10     0.0274     0.06  Q       |         |        V|         |
14+15     0.0278     0.06  Q       |         |         V         |
14+20     0.0282     0.06  Q       |         |         V         |
14+25     0.0286     0.06  Q       |         |         |V        |
14+30     0.0290     0.06  Q       |         |         |V        |
14+35     0.0294     0.06  Q       |         |         |V        |
14+40     0.0298     0.06  Q       |         |         | V       |
14+45     0.0302     0.06  Q       |         |         | V       |
14+50     0.0306     0.06  Q       |         |         |  V      |
14+55     0.0310     0.05  Q       |         |         |  V      |
```

```
15+ 0    0.0314   0.05  Q       |       |       |  V    |
15+ 5    0.0317   0.05  Q       |       |       |  V    |
15+10    0.0320   0.05  Q       |       |       |  V    |
15+15    0.0323   0.05  Q       |       |       |   V   |
15+20    0.0326   0.04  Q       |       |       |   V   |
15+25    0.0329   0.04  Q       |       |       |   V   |
15+30    0.0332   0.04  Q       |       |       |   V   |
15+35    0.0333   0.02  Q       |       |       |    V  |
15+40    0.0333   0.00  Q       |       |       |    V  |
15+45    0.0333   0.00  Q       |       |       |    V  |
15+50    0.0334   0.00  Q       |       |       |    V  |
15+55    0.0334   0.01  Q       |       |       |    V  |
16+ 0    0.0334   0.01  Q       |       |       |    V  |
16+ 5    0.0335   0.01  Q       |       |       |    V  |
16+10    0.0335   0.01  Q       |       |       |    V  |
16+15    0.0336   0.01  Q       |       |       |    V  |
16+20    0.0336   0.01  Q       |       |       |    V  |
16+25    0.0337   0.01  Q       |       |       |    V  |
16+30    0.0337   0.01  Q       |       |       |    V  |
16+35    0.0338   0.01  Q       |       |       |    V  |
16+40    0.0338   0.01  Q       |       |       |    V  |
16+45    0.0338   0.01  Q       |       |       |    V  |
16+50    0.0339   0.01  Q       |       |       |    V  |
16+55    0.0339   0.01  Q       |       |       |    V  |
17+ 0    0.0339   0.01  Q       |       |       |    V  |
17+ 5    0.0340   0.01  Q       |       |       |    V  |
17+10    0.0341   0.01  Q       |       |       |    V  |
17+15    0.0341   0.01  Q       |       |       |     V |
17+20    0.0342   0.01  Q       |       |       |     V |
17+25    0.0342   0.01  Q       |       |       |     V |
17+30    0.0343   0.01  Q       |       |       |     V |
17+35    0.0343   0.01  Q       |       |       |     V |
17+40    0.0344   0.01  Q       |       |       |     V |
17+45    0.0345   0.01  Q       |       |       |     V |
17+50    0.0345   0.01  Q       |       |       |     V |
17+55    0.0346   0.01  Q       |       |       |     V |
18+ 0    0.0346   0.01  Q       |       |       |     V |
18+ 5    0.0347   0.01  Q       |       |       |     V |
18+10    0.0347   0.01  Q       |       |       |     V |
18+15    0.0348   0.01  Q       |       |       |     V |
18+20    0.0348   0.01  Q       |       |       |     V |
18+25    0.0348   0.01  Q       |       |       |     V |
18+30    0.0349   0.01  Q       |       |       |     V |
18+35    0.0349   0.01  Q       |       |       |     V |
18+40    0.0350   0.01  Q       |       |       |     V |
18+45    0.0350   0.01  Q       |       |       |     V |
18+50    0.0350   0.00  Q       |       |       |      V|
18+55    0.0351   0.00  Q       |       |       |      V|
19+ 0    0.0351   0.00  Q       |       |       |      V|
19+ 5    0.0351   0.00  Q       |       |       |      V|
19+10    0.0351   0.01  Q       |       |       |      V|
19+15    0.0352   0.01  Q       |       |       |      V|
19+20    0.0352   0.01  Q       |       |       |      V|
19+25    0.0353   0.01  Q       |       |       |      V|
19+30    0.0353   0.01  Q       |       |       |      V|
19+35    0.0354   0.01  Q       |       |       |      V|
19+40    0.0354   0.01  Q       |       |       |      V|
19+45    0.0354   0.01  Q       |       |       |      V|
19+50    0.0355   0.00  Q       |       |       |      V|
19+55    0.0355   0.00  Q       |       |       |      V|
20+ 0    0.0355   0.00  Q       |       |       |      V|
20+ 5    0.0355   0.00  Q       |       |       |      V|
20+10    0.0356   0.01  Q       |       |       |      V|
20+15    0.0356   0.01  Q       |       |       |      V|
20+20    0.0356   0.01  Q       |       |       |      V|
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```
 20+25    0.0357   0.01  Q      |      |      |     V |
 20+30    0.0357   0.01  Q      |      |      |     V |
 20+35    0.0357   0.01  Q      |      |      |     V |
 20+40    0.0358   0.01  Q      |      |      |     V |
 20+45    0.0358   0.01  Q      |      |      |     V |
 20+50    0.0358   0.00  Q      |      |      |     V |
 20+55    0.0359   0.00  Q      |      |      |     V |
 21+ 0    0.0359   0.00  Q      |      |      |     V |
 21+ 5    0.0359   0.00  Q      |      |      |     V |
 21+10    0.0360   0.01  Q      |      |      |      V|
 21+15    0.0360   0.01  Q      |      |      |      V|
 21+20    0.0360   0.00  Q      |      |      |      V|
 21+25    0.0360   0.00  Q      |      |      |      V|
 21+30    0.0361   0.00  Q      |      |      |      V|
 21+35    0.0361   0.00  Q      |      |      |      V|
 21+40    0.0361   0.01  Q      |      |      |      V|
 21+45    0.0362   0.01  Q      |      |      |      V|
 21+50    0.0362   0.00  Q      |      |      |      V|
 21+55    0.0362   0.00  Q      |      |      |      V|
 22+ 0    0.0362   0.00  Q      |      |      |      V|
 22+ 5    0.0363   0.00  Q      |      |      |      V|
 22+10    0.0363   0.01  Q      |      |      |      V|
 22+15    0.0363   0.01  Q      |      |      |      V|
 22+20    0.0364   0.00  Q      |      |      |      V|
 22+25    0.0364   0.00  Q      |      |      |      V|
 22+30    0.0364   0.00  Q      |      |      |      V|
 22+35    0.0364   0.00  Q      |      |      |      V|
 22+40    0.0365   0.00  Q      |      |      |      V|
 22+45    0.0365   0.00  Q      |      |      |      V|
 22+50    0.0365   0.00  Q      |      |      |      V|
 22+55    0.0365   0.00  Q      |      |      |      V|
 23+ 0    0.0366   0.00  Q      |      |      |      V|
 23+ 5    0.0366   0.00  Q      |      |      |      V|
 23+10    0.0366   0.00  Q      |      |      |      V|
 23+15    0.0366   0.00  Q      |      |      |      V|
 23+20    0.0367   0.00  Q      |      |      |      V|
 23+25    0.0367   0.00  Q      |      |      |      V|
 23+30    0.0367   0.00  Q      |      |      |      V|
 23+35    0.0367   0.00  Q      |      |      |      V|
 23+40    0.0367   0.00  Q      |      |      |      V|
 23+45    0.0368   0.00  Q      |      |      |      V|
 23+50    0.0368   0.00  Q      |      |      |      V|
 23+55    0.0368   0.00  Q      |      |      |      V|
 24+ 0    0.0368   0.00  Q      |      |      |      V|
 24+ 5    0.0369   0.00  Q      |      |      |      V|
 24+10    0.0369   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

Study date 09/23/20 File: BPOST12.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

28771 Central Avenue Gas Station
Area B
Post-development
1-Hr 2-Yr Storm Event

Drainage Area = 0.74(Ac.) = 0.001 Sq. Mi.
Length along longest watercourse = 284.00(Ft.)
Length along longest watercourse measured to centroid = 86.63(Ft.)
Length along longest watercourse = 0.054 Mi.
Length along longest watercourse measured to centroid = 0.016 Mi.
Difference in elevation = 1.69(Ft.)
Slope along watercourse = 31.4197 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.013 Hr.
Lag time = 0.78 Min.
25% of lag time = 0.19 Min.
40% of lag time = 0.31 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
0.74	0.48	0.36

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
0.74	1.34	0.99

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 0.483(In)
Area Averaged 100-Year Rainfall = 1.340(In)

Point rain (area averaged) = 0.483(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 0.483(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
0.742	55.00	0.792

Total Area Entered = 0.74(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
55.0	35.0	0.715	0.792	0.205	1.000	0.205

Sum (F) = 0.205

Area averaged mean soil loss (F) (In/Hr) = 0.205
Minimum soil loss rate ((In/Hr)) = 0.103
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.266

Slope of intensity-duration curve for a 1 hour storm =0.4800

U n i t H y d r o g r a p h
DESERT S-Curve

Unit Hydrograph Data

	Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	645.077	77.129	0.577
2	0.167	1290.154	22.871	0.171
			Sum = 100.000	Sum= 0.748

Storm Event 3 Effective Rainfall = 0.092(In)

	Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	4.40	0.048	0.205	0.013	0.04
2	0.17	4.50	0.050	0.205	0.013	0.04
3	0.25	5.40	0.059	0.205	0.016	0.04
4	0.33	5.40	0.059	0.205	0.016	0.04
5	0.42	5.70	0.063	0.205	0.017	0.05
6	0.50	6.40	0.070	0.205	0.019	0.05
7	0.58	7.90	0.087	0.205	0.023	0.06
8	0.67	9.10	0.100	0.205	0.027	0.07
9	0.75	12.80	0.141	0.205	0.038	0.10
10	0.83	25.60	0.282	0.205	---	0.08
11	0.92	7.90	0.087	0.205	0.023	0.06
12	1.00	4.90	0.054	0.205	0.014	0.04
Sum =		100.0			Sum =	0.7

Flood volume = Effective rainfall 0.06(In)
times area 0.7(Ac.)/[(In)/(Ft.)] = 0.0(Ac.Ft)
Total soil loss = 0.04(In)
Total soil loss = 0.002(Ac.Ft)
Total rainfall = 0.09(In)
Flood volume = 152.1 Cubic Feet
Total soil loss = 95.0 Cubic Feet

Storm Event 2 Effective Rainfall = 0.174(In)

	Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	4.40	0.092	0.205	0.024	0.07

2	0.17	4.50	0.094	0.205	0.025	0.07
3	0.25	5.40	0.113	0.205	0.030	0.08
4	0.33	5.40	0.113	0.205	0.030	0.08
5	0.42	5.70	0.119	0.205	0.032	0.09
6	0.50	6.40	0.134	0.205	0.036	0.10
7	0.58	7.90	0.165	0.205	0.044	0.12
8	0.67	9.10	0.190	0.205	0.051	0.14
9	0.75	12.80	0.267	0.205	---	0.06
10	0.83	25.60	0.534	0.205	---	0.33
11	0.92	7.90	0.165	0.205	0.044	0.12
12	1.00	4.90	0.102	0.205	0.027	0.08

Sum = 100.0 Sum = 1.3

Flood volume = Effective rainfall 0.11(In)
times area 0.7(Ac.)/[(In)/(Ft.)] = 0.0(Ac.Ft)
Total soil loss = 0.06(In)
Total soil loss = 0.004(Ac.Ft)
Total rainfall = 0.17(In)
Flood volume = 299.4 Cubic Feet
Total soil loss = 169.0 Cubic Feet

Storm Event 1 Effective Rainfall = 0.483(In)

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	4.40	0.255	0.205	---	0.05
2	0.17	4.50	0.261	0.205	---	0.06
3	0.25	5.40	0.313	0.205	---	0.11
4	0.33	5.40	0.313	0.205	---	0.11
5	0.42	5.70	0.330	0.205	---	0.13
6	0.50	6.40	0.371	0.205	---	0.17
7	0.58	7.90	0.458	0.205	---	0.25
8	0.67	9.10	0.527	0.205	---	0.32
9	0.75	12.80	0.742	0.205	---	0.54
10	0.83	25.60	1.484	0.205	---	1.28
11	0.92	7.90	0.458	0.205	---	0.25
12	1.00	4.90	0.284	0.205	---	0.08

Sum = 100.0 Sum = 3.3

Flood volume = Effective rainfall 0.28(In)
times area 0.7(Ac.)/[(In)/(Ft.)] = 0.0(Ac.Ft)
Total soil loss = 0.21(In)
Total soil loss = 0.013(Ac.Ft)
Total rainfall = 0.48(In)
Flood volume = 748.2 Cubic Feet
Total soil loss = 552.7 Cubic Feet

Peak flow rate of this hydrograph = 0.830(CFS)

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TOTAL OF: 3 1 - H O U R S T O R M E V E N T S
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      0.0005      0.03  Q        |         |         |         |
  0+20      0.0008      0.03  QV       |         |         |         |
  0+25      0.0010      0.03  QV       |         |         |         |
  0+30      0.0013      0.04  QV       |         |         |         |
  0+35      0.0016      0.05  Q V      |         |         |         |
  0+40      0.0019      0.05  Q V      |         |         |         |
```

```
  0+45      0.0024      0.07  Q  V      |         |         |         |
  0+50      0.0029      0.06  Q   V     |         |         |         |
  0+55      0.0032      0.05  Q   V     |         |         |         |
  1+ 0      0.0034      0.03  Q    V    |         |         |         |
  1+ 5      0.0037      0.04  Q    V    |         |         |         |
  1+10      0.0041      0.05  Q    V    |         |         |         |
  1+15      0.0045      0.06  Q     V   |         |         |         |
  1+20      0.0049      0.06  Q      V  |         |         |         |
  1+25      0.0053      0.06  Q      V  |         |         |         |
  1+30      0.0058      0.07  Q       V |         |         |         |
  1+35      0.0064      0.09  Q        V|         |         |         |
  1+40      0.0071      0.10  Q         V         |         |         |
  1+45      0.0075      0.06  Q         |V        |         |         |
  1+50      0.0089      0.20  Q         |  V      |         |         |
  1+55      0.0098      0.13  Q         |   V     |         |         |
  2+ 0      0.0102      0.06  Q         |   V     |         |         |
  2+ 5      0.0104      0.03  Q         |    V    |         |         |
  2+10      0.0107      0.04  Q         |    V    |         |         |
  2+15      0.0112      0.07  Q         |     V   |         |         |
  2+20      0.0118      0.08  Q         |      V  |         |         |
  2+25      0.0124      0.09  Q         |       V |         |         |
  2+30      0.0132      0.12  Q         |        V|         |         |
  2+35      0.0144      0.17  Q         |         V         |         |
  2+40      0.0160      0.23  Q         |         |  V      |         |
  2+45      0.0185      0.36  |Q        |         |     V   |         |
  2+50      0.0242      0.83  |  Q      |         |         |    V    |
  2+55      0.0267      0.36  |Q        |         |         |       V |
  3+ 0      0.0273      0.09  Q         |         |         |        V|
  3+ 5      0.0274      0.01  Q         |         |         |         V
-----------------------------------------------------------------------
```

U n i t   H y d r o g r a p h   A n a l y s i s

Study date 09/23/20 File: BPOST15.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

28771 Central Avenue Gas Station
Area B
Post-development
1-Hr 5-Yr Storm Event

Drainage Area = 0.74(Ac.) = 0.001 Sq. Mi.
Length along longest watercourse = 284.00(Ft.)
Length along longest watercourse measured to centroid = 86.63(Ft.)
Length along longest watercourse = 0.054 Mi.
Length along longest watercourse measured to centroid = 0.016 Mi.
Difference in elevation = 1.69(Ft.)
Slope along watercourse = 31.4197 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.013 Hr.
Lag time = 0.78 Min.
25% of lag time = 0.19 Min.
40% of lag time = 0.31 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
0.74	0.48	0.36

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
0.74	1.34	0.99

STORM EVENT (YEAR) = 5.00
Area Averaged 2-Year Rainfall = 0.483(In)
Area Averaged 100-Year Rainfall = 1.340(In)

Point rain (area averaged) = 0.684(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 0.684(In)

Sub-Area Data:
Area(Ac.) Runoff Index Impervious %
0.742 55.00 0.792
Total Area Entered = 0.74(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
55.0	35.0	0.715	0.792	0.205	1.000	0.205

Sum (F) = 0.205
Area averaged mean soil loss (F) (In/Hr) = 0.205
Minimum soil loss rate ((In/Hr)) = 0.103
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.266

Slope of intensity-duration curve for a 1 hour storm =0.4800

U n i t H y d r o g r a p h
DESERT S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	645.077	77.129	0.577
2	0.167	1290.154	22.871	0.171
			Sum = 100.000	Sum= 0.748

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	4.40	0.361	0.205	---	0.16
2	0.17	4.50	0.369	0.205	---	0.16
3	0.25	5.40	0.443	0.205	---	0.24
4	0.33	5.40	0.443	0.205	---	0.24
5	0.42	5.70	0.468	0.205	---	0.26
6	0.50	6.40	0.525	0.205	---	0.32
7	0.58	7.90	0.648	0.205	---	0.44
8	0.67	9.10	0.747	0.205	---	0.54
9	0.75	12.80	1.050	0.205	---	0.84
10	0.83	25.60	2.100	0.205	---	1.90
11	0.92	7.90	0.648	0.205	---	0.44
12	1.00	4.90	0.402	0.205	---	0.20
Sum =		100.0			Sum =	5.7

Flood volume = Effective rainfall 0.48(In)
times area 0.7(Ac.)/[(In)/(Ft.)] = 0.0(Ac.Ft)
Total soil loss = 0.21(In)
Total soil loss = 0.013(Ac.Ft)
Total rainfall = 0.68(In)
Flood volume = 1288.8 Cubic Feet
Total soil loss = 552.7 Cubic Feet

Peak flow rate of this hydrograph = 1.238(CFS)

++
1 - 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     0.0006    0.09  Q       |       |       |       |
 0+10     0.0015    0.12  QV      |       |       |       |
 0+15     0.0026    0.17  Q  V    |       |       |       |
 0+20     0.0038    0.18  Q   V   |       |       |       |
 0+25     0.0051    0.19  Q    V  |       |       |       |
 0+30     0.0067    0.23  Q      V|       |       |       |
 0+35     0.0089    0.31  |Q      |V      |       |       |
 0+40     0.0115    0.39  |Q      |   V   |       |       |
 0+45     0.0155    0.58  | Q     |       V       |       |
 0+50     0.0241    1.24  |   Q   |       |       | V     |
 0+55     0.0281    0.58  | Q     |       |       |     V |
 1+ 0     0.0294    0.19  Q       |       |       |      V|
 1+ 5     0.0296    0.03  Q       |       |       |       V
-----------------------------------------------------------------------
```

U n i t   H y d r o g r a p h   A n a l y s i s

Study date 09/23/20 File: BPOST110.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

28771 Central Avenue Gas Station
Area B
Post-development
1-Hr 10-Yr Storm Event

Drainage Area =   0.74(Ac.) =   0.001 Sq. Mi.
Length along longest watercourse =   284.00(Ft.)
Length along longest watercourse measured to centroid =   86.63(Ft.)
Length along longest watercourse =   0.054 Mi.
Length along longest watercourse measured to centroid =   0.016 Mi.
Difference in elevation =   1.69(Ft.)
Slope along watercourse =   31.4197 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time =   0.013 Hr.
Lag time =   0.78 Min.
25% of lag time =   0.19 Min.
40% of lag time =   0.31 Min.
Unit time =   5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow =   0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
0.74	0.48	0.36

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
0.74	1.34	0.99

STORM EVENT (YEAR) =   10.00
Area Averaged 2-Year Rainfall =   0.483(In)
Area Averaged 100-Year Rainfall =   1.340(In)

Point rain (area averaged) =   0.836(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain =   0.836(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
0.742	55.00	0.792

Total Area Entered = 0.74(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
55.0	35.0	0.715	0.792	0.205	1.000	0.205

Sum (F) = 0.205

Area averaged mean soil loss (F) (In/Hr) = 0.205

Minimum soil loss rate ((In/Hr)) = 0.103

(for 24 hour storm duration)

Soil low loss rate (decimal) = 0.266

Slope of intensity-duration curve for a 1 hour storm =0.4800

U n i t H y d r o g r a p h

DESERT S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	645.077	77.129	0.577
2	0.167	1290.154	22.871	0.171
			Sum = 100.000	Sum= 0.748

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	4.40	0.441	0.205	---	0.24
2	0.17	4.50	0.451	0.205	---	0.25
3	0.25	5.40	0.541	0.205	---	0.34
4	0.33	5.40	0.541	0.205	---	0.34
5	0.42	5.70	0.572	0.205	---	0.37
6	0.50	6.40	0.642	0.205	---	0.44
7	0.58	7.90	0.792	0.205	---	0.59
8	0.67	9.10	0.912	0.205	---	0.71
9	0.75	12.80	1.283	0.205	---	1.08
10	0.83	25.60	2.567	0.205	---	2.36
11	0.92	7.90	0.792	0.205	---	0.59
12	1.00	4.90	0.491	0.205	---	0.29
Sum =		100.0			Sum =	7.6

Flood volume = Effective rainfall 0.63(In)

times area 0.7(Ac.)/[(In)/(Ft.)] = 0.0(Ac.Ft)

Total soil loss = 0.21(In)

Total soil loss = 0.013(Ac.Ft)

Total rainfall = 0.84(In)

Flood volume = 1697.8 Cubic Feet

Total soil loss = 552.7 Cubic Feet

Peak flow rate of this hydrograph = 1.547(CFS)

+++

1 - 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     0.0009    0.14  Q       |       |       |       |
 0+10     0.0022    0.18  Q V     |       |       |       |
 0+15     0.0038    0.24  Q  V    |       |       |       |
 0+20     0.0056    0.25  |Q   V  |       |       |       |
 0+25     0.0074    0.27  |Q    V |       |       |       |
 0+30     0.0096    0.31  |Q      V|      |       |       |
 0+35     0.0124    0.41  |Q      | V     |       |       |
 0+40     0.0159    0.51  | Q     |     V |       |       |
 0+45     0.0210    0.74  | Q     |       |V      |       |
 0+50     0.0317    1.55  |    Q  |       |       | V     |
 0+55     0.0368    0.74  | Q     |       |       |     V |
 1+ 0     0.0386    0.27  |Q      |       |       |      V|
 1+ 5     0.0390    0.05  Q       |       |       |      V|
-----------------------------------------------------------------------
```

U n i t   H y d r o g r a p h   A n a l y s i s

Study date 09/23/20 File: BPOST32.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

28771 Central Avenue Gas Station
Area B
Post-development
3-Hr 2-Yr Storm Event

Drainage Area = 0.74(Ac.) = 0.001 Sq. Mi.
Length along longest watercourse = 284.00(Ft.)
Length along longest watercourse measured to centroid = 86.63(Ft.)
Length along longest watercourse = 0.054 Mi.
Length along longest watercourse measured to centroid = 0.016 Mi.
Difference in elevation = 1.69(Ft.)
Slope along watercourse = 31.4197 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.013 Hr.
Lag time = 0.78 Min.
25% of lag time = 0.19 Min.
40% of lag time = 0.31 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
0.74	0.88	0.65

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
0.74	2.20	1.63

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 0.877(In)
Area Averaged 100-Year Rainfall = 2.200(In)

Point rain (area averaged) = 0.877(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 0.877(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
0.742	55.00	0.792

Total Area Entered = 0.74(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
55.0	35.0	0.715	0.792	0.205	1.000	0.205

Sum (F) = 0.205

Area averaged mean soil loss (F) (In/Hr) = 0.205

Minimum soil loss rate ((In/Hr)) = 0.103

(for 24 hour storm duration)

Soil low loss rate (decimal) = 0.266

U n i t H y d r o g r a p h

DESERT S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	645.077	77.129	0.577
2	0.167	1290.154	22.871	0.171
			Sum = 100.000	Sum= 0.748

Storm Event 3 Effective Rainfall = 0.167(In)

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Loss rate(In./Hr) Low	Effective (In/Hr)
1	0.08	1.30	0.026	0.205	0.007	0.02
2	0.17	1.30	0.026	0.205	0.007	0.02
3	0.25	1.10	0.022	0.205	0.006	0.02
4	0.33	1.50	0.030	0.205	0.008	0.02
5	0.42	1.50	0.030	0.205	0.008	0.02
6	0.50	1.80	0.036	0.205	0.010	0.03
7	0.58	1.50	0.030	0.205	0.008	0.02
8	0.67	1.80	0.036	0.205	0.010	0.03
9	0.75	1.80	0.036	0.205	0.010	0.03
10	0.83	1.50	0.030	0.205	0.008	0.02
11	0.92	1.60	0.032	0.205	0.009	0.02
12	1.00	1.80	0.036	0.205	0.010	0.03
13	1.08	2.20	0.044	0.205	0.012	0.03
14	1.17	2.20	0.044	0.205	0.012	0.03
15	1.25	2.20	0.044	0.205	0.012	0.03
16	1.33	2.00	0.040	0.205	0.011	0.03
17	1.42	2.60	0.052	0.205	0.014	0.04
18	1.50	2.70	0.054	0.205	0.014	0.04
19	1.58	2.40	0.048	0.205	0.013	0.04
20	1.67	2.70	0.054	0.205	0.014	0.04
21	1.75	3.30	0.066	0.205	0.018	0.05
22	1.83	3.10	0.062	0.205	0.017	0.05
23	1.92	2.90	0.058	0.205	0.015	0.04
24	2.00	3.00	0.060	0.205	0.016	0.04
25	2.08	3.10	0.062	0.205	0.017	0.05
26	2.17	4.20	0.084	0.205	0.022	0.06
27	2.25	5.00	0.100	0.205	0.027	0.07
28	2.33	3.50	0.070	0.205	0.019	0.05
29	2.42	6.80	0.136	0.205	0.036	0.10

30	2.50	7.30	0.146	0.205	0.039	0.11
31	2.58	8.20	0.164	0.205	0.044	0.12
32	2.67	5.90	0.118	0.205	0.031	0.09
33	2.75	2.00	0.040	0.205	0.011	0.03
34	2.83	1.80	0.036	0.205	0.010	0.03
35	2.92	1.80	0.036	0.205	0.010	0.03
36	3.00	0.60	0.012	0.205	0.003	0.01
Sum =		100.0			Sum =	1.5

Flood volume = Effective rainfall 0.12(In)
times area 0.7(Ac.)/[(In)/(Ft.)] = 0.0(Ac.Ft)
Total soil loss = 0.04(In)
Total soil loss = 0.003(Ac.Ft)
Total rainfall = 0.17(In)
Flood volume = 329.3 Cubic Feet
Total soil loss = 119.5 Cubic Feet

Storm Event 2 Effective Rainfall = 0.316(In)

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	1.30	0.049	0.205	0.013	0.04
2	0.17	1.30	0.049	0.205	0.013	0.04
3	0.25	1.10	0.042	0.205	0.011	0.03
4	0.33	1.50	0.057	0.205	0.015	0.04
5	0.42	1.50	0.057	0.205	0.015	0.04
6	0.50	1.80	0.068	0.205	0.018	0.05
7	0.58	1.50	0.057	0.205	0.015	0.04
8	0.67	1.80	0.068	0.205	0.018	0.05
9	0.75	1.80	0.068	0.205	0.018	0.05
10	0.83	1.50	0.057	0.205	0.015	0.04
11	0.92	1.60	0.061	0.205	0.016	0.04
12	1.00	1.80	0.068	0.205	0.018	0.05
13	1.08	2.20	0.083	0.205	0.022	0.06
14	1.17	2.20	0.083	0.205	0.022	0.06
15	1.25	2.20	0.083	0.205	0.022	0.06
16	1.33	2.00	0.076	0.205	0.020	0.06
17	1.42	2.60	0.099	0.205	0.026	0.07
18	1.50	2.70	0.102	0.205	0.027	0.08
19	1.58	2.40	0.091	0.205	0.024	0.07
20	1.67	2.70	0.102	0.205	0.027	0.08
21	1.75	3.30	0.125	0.205	0.033	0.09
22	1.83	3.10	0.117	0.205	0.031	0.09
23	1.92	2.90	0.110	0.205	0.029	0.08
24	2.00	3.00	0.114	0.205	0.030	0.08
25	2.08	3.10	0.117	0.205	0.031	0.09
26	2.17	4.20	0.159	0.205	0.042	0.12
27	2.25	5.00	0.189	0.205	0.050	0.14
28	2.33	3.50	0.133	0.205	0.035	0.10
29	2.42	6.80	0.258	0.205	---	0.05
30	2.50	7.30	0.277	0.205	---	0.07
31	2.58	8.20	0.311	0.205	---	0.11
32	2.67	5.90	0.224	0.205	---	0.02
33	2.75	2.00	0.076	0.205	0.020	0.06
34	2.83	1.80	0.068	0.205	0.018	0.05
35	2.92	1.80	0.068	0.205	0.018	0.05
36	3.00	0.60	0.023	0.205	0.006	0.02
Sum =		100.0			Sum =	2.2

Flood volume = Effective rainfall 0.19(In)
times area 0.7(Ac.)/[(In)/(Ft.)] = 0.0(Ac.Ft)
Total soil loss = 0.13(In)
Total soil loss = 0.008(Ac.Ft)
Total rainfall = 0.32(In)
Flood volume = 503.5 Cubic Feet
Total soil loss = 346.8 Cubic Feet

Storm Event 1 Effective Rainfall = 0.877(In)

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Loss rate(In./Hr) Low	Effective (In/Hr)
1	0.08	1.30	0.137	0.205	0.036	0.10
2	0.17	1.30	0.137	0.205	0.036	0.10
3	0.25	1.10	0.116	0.205	0.031	0.08
4	0.33	1.50	0.158	0.205	0.042	0.12
5	0.42	1.50	0.158	0.205	0.042	0.12
6	0.50	1.80	0.189	0.205	0.050	0.14
7	0.58	1.50	0.158	0.205	0.042	0.12
8	0.67	1.80	0.189	0.205	0.050	0.14
9	0.75	1.80	0.189	0.205	0.050	0.14
10	0.83	1.50	0.158	0.205	0.042	0.12
11	0.92	1.60	0.168	0.205	0.045	0.12
12	1.00	1.80	0.189	0.205	0.050	0.14
13	1.08	2.20	0.232	0.205	---	0.03
14	1.17	2.20	0.232	0.205	---	0.03
15	1.25	2.20	0.232	0.205	---	0.03
16	1.33	2.00	0.210	0.205	---	0.01
17	1.42	2.60	0.274	0.205	---	0.07
18	1.50	2.70	0.284	0.205	---	0.08
19	1.58	2.40	0.253	0.205	---	0.05
20	1.67	2.70	0.284	0.205	---	0.08
21	1.75	3.30	0.347	0.205	---	0.14
22	1.83	3.10	0.326	0.205	---	0.12
23	1.92	2.90	0.305	0.205	---	0.10
24	2.00	3.00	0.316	0.205	---	0.11
25	2.08	3.10	0.326	0.205	---	0.12
26	2.17	4.20	0.442	0.205	---	0.24
27	2.25	5.00	0.526	0.205	---	0.32
28	2.33	3.50	0.368	0.205	---	0.16
29	2.42	6.80	0.716	0.205	---	0.51
30	2.50	7.30	0.768	0.205	---	0.56
31	2.58	8.20	0.863	0.205	---	0.66
32	2.67	5.90	0.621	0.205	---	0.42
33	2.75	2.00	0.210	0.205	---	0.01
34	2.83	1.80	0.189	0.205	0.050	0.14
35	2.92	1.80	0.189	0.205	0.050	0.14
36	3.00	0.60	0.063	0.205	0.017	0.05
Sum =		100.0			Sum =	5.6

Flood volume = Effective rainfall 0.46(In)
times area 0.7(Ac.)/[(In)/(Ft.)] = 0.0(Ac.Ft)
Total soil loss = 0.41(In)
Total soil loss = 0.025(Ac.Ft)
Total rainfall = 0.88(In)
Flood volume = 1252.1 Cubic Feet
Total soil loss = 1110.1 Cubic Feet

Peak flow rate of this hydrograph = 0.476(CFS)

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TOTAL OF: 3 3 - H O U R S T O R M E V E N T S
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	0.01	Q	|	|	|	|
0+15	0.0003	0.01	Q	|	|	|	|

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0+20    0.0004   0.02  Q       |        |        |        |
0+25    0.0005   0.02  Q       |        |        |        |
0+30    0.0006   0.02  Q       |        |        |        |
0+35    0.0007   0.02  Q       |        |        |        |
0+40    0.0009   0.02  Q       |        |        |        |
0+45    0.0010   0.02  Q       |        |        |        |
0+50    0.0011   0.02  Q       |        |        |        |
0+55    0.0012   0.02  QV      |        |        |        |
1+ 0    0.0014   0.02  QV      |        |        |        |
1+ 5    0.0015   0.02  QV      |        |        |        |
1+10    0.0017   0.02  QV      |        |        |        |
1+15    0.0019   0.02  QV      |        |        |        |
1+20    0.0020   0.02  QV      |        |        |        |
1+25    0.0022   0.03  QV      |        |        |        |
1+30    0.0024   0.03  Q V     |        |        |        |
1+35    0.0026   0.03  Q V     |        |        |        |
1+40    0.0028   0.03  Q V     |        |        |        |
1+45    0.0030   0.03  Q V     |        |        |        |
1+50    0.0033   0.03  Q V     |        |        |        |
1+55    0.0035   0.03  Q V     |        |        |        |
2+ 0    0.0037   0.03  Q  V    |        |        |        |
2+ 5    0.0039   0.03  Q  V    |        |        |        |
2+10    0.0042   0.04  Q  V    |        |        |        |
2+15    0.0046   0.05  Q  V    |        |        |        |
2+20    0.0049   0.04  Q   V   |        |        |        |
2+25    0.0054   0.07  Q   V   |        |        |        |
2+30    0.0059   0.08  Q   V   |        |        |        |
2+35    0.0065   0.09  Q    V  |        |        |        |
2+40    0.0070   0.07  Q    V  |        |        |        |
2+45    0.0072   0.03  Q     V |        |        |        |
2+50    0.0073   0.02  Q     V |        |        |        |
2+55    0.0075   0.02  Q     V |        |        |        |
3+ 0    0.0075   0.01  Q     V |        |        |        |
3+ 5    0.0077   0.02  Q     V |        |        |        |
3+10    0.0079   0.03  Q     V |        |        |        |
3+15    0.0080   0.02  Q     V |        |        |        |
3+20    0.0082   0.03  Q     V |        |        |        |
3+25    0.0085   0.03  Q      V|        |        |        |
3+30    0.0087   0.04  Q      V|        |        |        |
3+35    0.0089   0.03  Q      V|        |        |        |
3+40    0.0092   0.04  Q      V|        |        |        |
3+45    0.0094   0.04  Q      V|        |        |        |
3+50    0.0097   0.03  Q       V|       |        |        |
3+55    0.0099   0.03  Q       V|       |        |        |
4+ 0    0.0101   0.04  Q       V|       |        |        |
4+ 5    0.0104   0.04  Q       V|       |        |        |
4+10    0.0108   0.05  Q       V|       |        |        |
4+15    0.0111   0.05  Q        V|      |        |        |
4+20    0.0114   0.04  Q        V|      |        |        |
4+25    0.0117   0.05  Q        V|      |        |        |
4+30    0.0121   0.06  Q         V      |        |        |
4+35    0.0125   0.05  Q         V      |        |        |
4+40    0.0128   0.05  Q         V      |        |        |
4+45    0.0133   0.07  Q         |V     |        |        |
4+50    0.0137   0.07  Q         |V     |        |        |
4+55    0.0142   0.06  Q         |V     |        |        |
5+ 0    0.0146   0.06  Q         | V    |        |        |
5+ 5    0.0150   0.06  Q         | V    |        |        |
5+10    0.0156   0.08  Q         |  V   |        |        |
5+15    0.0163   0.10  Q         |  V   |        |        |
5+20    0.0168   0.08  Q         |   V  |        |        |
5+25    0.0172   0.05  Q         |   V  |        |        |
5+30    0.0175   0.05  Q         |   V  |        |        |
5+35    0.0180   0.07  Q         |    V |        |        |
5+40    0.0182   0.03  Q         |    V |        |        |
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  5+45      0.0184     0.04  Q       |    V    |        |        |
  5+50      0.0187     0.04  Q       |    V    |        |        |
  5+55      0.0190     0.04  Q       |    V    |        |        |
  6+ 0     0.0191     0.02  Q       |    V    |        |        |
  6+ 5     0.0195     0.06  Q       |     V   |        |        |
  6+10      0.0200     0.08  Q       |     V   |        |        |
  6+15      0.0205     0.07  Q       |      V  |        |        |
  6+20      0.0210     0.08  Q       |      V  |        |        |
  6+25      0.0216     0.09  Q       |       V |        |        |
  6+30      0.0223     0.10  Q       |       V |        |        |
  6+35      0.0229     0.09  Q       |        V|        |        |
  6+40      0.0236     0.10  Q       |        V|        |        |
  6+45      0.0243     0.10  Q       |         V        |        |
  6+50      0.0250     0.09  Q       |         V        |        |
  6+55      0.0256     0.09  Q       |         |V       |        |
  7+ 0     0.0263     0.10  Q       |         |V       |        |
  7+ 5     0.0266     0.04  Q       |         | V      |        |
  7+10      0.0267     0.02  Q       |         | V      |        |
  7+15      0.0268     0.02  Q       |         | V      |        |
  7+20      0.0269     0.01  Q       |         | V      |        |
  7+25      0.0272     0.04  Q       |         | V      |        |
  7+30      0.0275     0.06  Q       |         |  V     |        |
  7+35      0.0278     0.04  Q       |         |  V     |        |
  7+40      0.0282     0.05  Q       |         |  V     |        |
  7+45      0.0289     0.10  Q       |         |   V    |        |
  7+50      0.0295     0.09  Q       |         |   V    |        |
  7+55      0.0300     0.08  Q       |         |    V   |        |
  8+ 0     0.0306     0.08  Q       |         |    V   |        |
  8+ 5     0.0312     0.09  Q       |         |     V  |        |
  8+10      0.0323     0.16  Q       |         |      V |        |
  8+15      0.0339     0.23  Q       |         |       V|        |
  8+20      0.0349     0.15  Q       |         |        V|       |
  8+25      0.0371     0.32  |Q      |         |        |V       |
  8+30      0.0399     0.41  |Q      |         |        | V      |
  8+35      0.0432     0.48  |Q      |         |        |    V   |
  8+40      0.0456     0.35  |Q      |         |        |      V |
  8+45      0.0462     0.07  Q       |         |        |      V |
  8+50      0.0467     0.08  Q       |         |        |       V|
  8+55      0.0474     0.10  Q       |         |        |       V|
  9+ 0     0.0478     0.05  Q       |         |        |       V|
  9+ 5     0.0478     0.01  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

Study date 09/23/20 File: BPOST35.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

28771 Central Avenue Gas Station
Area B
Post-development
3-Hr 5-Yr Storm Event

Drainage Area = 0.74(Ac.) = 0.001 Sq. Mi.
Length along longest watercourse = 284.00(Ft.)
Length along longest watercourse measured to centroid = 86.63(Ft.)
Length along longest watercourse = 0.054 Mi.
Length along longest watercourse measured to centroid = 0.016 Mi.
Difference in elevation = 1.69(Ft.)
Slope along watercourse = 31.4197 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.013 Hr.
Lag time = 0.78 Min.
25% of lag time = 0.19 Min.
40% of lag time = 0.31 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
0.74	0.88	0.65

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
0.74	2.20	1.63

STORM EVENT (YEAR) = 5.00
Area Averaged 2-Year Rainfall = 0.877(In)
Area Averaged 100-Year Rainfall = 2.200(In)

Point rain (area averaged) = 1.187(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.187(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
0.742	55.00	0.792

Total Area Entered = 0.74(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
55.0	35.0	0.715	0.792	0.205	1.000	0.205

Sum (F) = 0.205

Area averaged mean soil loss (F) (In/Hr) = 0.205
Minimum soil loss rate ((In/Hr)) = 0.103
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.266

U n i t H y d r o g r a p h
DESERT S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	645.077	77.129	0.577
2	0.167	1290.154	22.871	0.171
			Sum = 100.000	Sum= 0.748

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Loss rate(In./Hr) Low	Effective (In/Hr)
1	0.08	1.30	0.185	0.205	0.049	0.14
2	0.17	1.30	0.185	0.205	0.049	0.14
3	0.25	1.10	0.157	0.205	0.042	0.11
4	0.33	1.50	0.214	0.205	---	0.01
5	0.42	1.50	0.214	0.205	---	0.01
6	0.50	1.80	0.256	0.205	---	0.05
7	0.58	1.50	0.214	0.205	---	0.01
8	0.67	1.80	0.256	0.205	---	0.05
9	0.75	1.80	0.256	0.205	---	0.05
10	0.83	1.50	0.214	0.205	---	0.01
11	0.92	1.60	0.228	0.205	---	0.02
12	1.00	1.80	0.256	0.205	---	0.05
13	1.08	2.20	0.313	0.205	---	0.11
14	1.17	2.20	0.313	0.205	---	0.11
15	1.25	2.20	0.313	0.205	---	0.11
16	1.33	2.00	0.285	0.205	---	0.08
17	1.42	2.60	0.370	0.205	---	0.17
18	1.50	2.70	0.385	0.205	---	0.18
19	1.58	2.40	0.342	0.205	---	0.14
20	1.67	2.70	0.385	0.205	---	0.18
21	1.75	3.30	0.470	0.205	---	0.26
22	1.83	3.10	0.442	0.205	---	0.24
23	1.92	2.90	0.413	0.205	---	0.21
24	2.00	3.00	0.427	0.205	---	0.22
25	2.08	3.10	0.442	0.205	---	0.24
26	2.17	4.20	0.598	0.205	---	0.39
27	2.25	5.00	0.712	0.205	---	0.51
28	2.33	3.50	0.498	0.205	---	0.29
29	2.42	6.80	0.968	0.205	---	0.76
30	2.50	7.30	1.040	0.205	---	0.83
31	2.58	8.20	1.168	0.205	---	0.96
32	2.67	5.90	0.840	0.205	---	0.64
33	2.75	2.00	0.285	0.205	---	0.08

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34   2.83     1.80     0.256       0.205     ---         0.05
35   2.92     1.80     0.256       0.205     ---         0.05
36   3.00     0.60     0.085       0.205    0.023        0.06
  Sum =     100.0                          Sum =     7.5
            Flood volume = Effective rainfall      0.63(In)
             times area       0.7(Ac.)/[(In)/(Ft.)] =       0.0(Ac.Ft)
            Total soil loss =      0.56(In)
            Total soil loss =     0.035(Ac.Ft)
            Total rainfall =      1.19(In)
            Flood volume =        1686.2 Cubic Feet
            Total soil loss =       1510.6 Cubic Feet
            --------------------------------------------------------------------
             Peak flow rate of this hydrograph =      0.698(CFS)
            --------------------------------------------------------------------
            ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                      3 - 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      0.0005     0.08  Q       |        |        |        |
  0+10      0.0012     0.10  QV      |        |        |        |
  0+15      0.0019     0.09  QV      |        |        |        |
  0+20      0.0020     0.02  Q V     |        |        |        |
  0+25      0.0021     0.01  Q V     |        |        |        |
  0+30      0.0023     0.03  Q V     |        |        |        |
  0+35      0.0024     0.01  Q V     |        |        |        |
  0+40      0.0026     0.03  Q V     |        |        |        |
  0+45      0.0029     0.04  Q V     |        |        |        |
  0+50      0.0029     0.01  Q  V    |        |        |        |
  0+55      0.0030     0.01  Q  V    |        |        |        |
  1+ 0      0.0033     0.03  Q  V    |        |        |        |
  1+ 5      0.0038     0.07  Q  V    |        |        |        |
  1+10      0.0043     0.08  Q   V   |        |        |        |
  1+15      0.0049     0.08  Q    V  |        |        |        |
  1+20      0.0053     0.06  Q    V  |        |        |        |
  1+25      0.0061     0.11  Q     V |        |        |        |
  1+30      0.0070     0.13  Q      V|        |        |        |
  1+35      0.0077     0.11  Q      V|        |        |        |
  1+40      0.0086     0.13  Q       V|       |        |        |
  1+45      0.0099     0.18  Q        V       |        |        |
  1+50      0.0111     0.18  Q       |V       |        |        |
  1+55      0.0122     0.16  Q       | V      |        |        |
  2+ 0      0.0134     0.16  Q       |  V     |        |        |
  2+ 5      0.0146     0.17  Q       |   V    |        |        |
  2+10      0.0164     0.27  |Q      |     V  |        |        |
  2+15      0.0189     0.36  |Q      |       V|        |        |
  2+20      0.0206     0.26  |Q      |        |V       |        |
  2+25      0.0240     0.49  |Q      |        |  V     |        |
  2+30      0.0282     0.61  | Q     |        |       V|        |
  2+35      0.0330     0.70  | Q     |        |        |  V     |
  2+40      0.0367     0.53  | Q     |        |        |     V  |
  2+45      0.0378     0.15  Q       |        |        |       V|
  2+50      0.0381     0.04  Q       |        |        |       V|
  2+55      0.0383     0.04  Q       |        |        |       V|
  3+ 0      0.0386     0.04  Q       |        |        |       V|
  3+ 5      0.0387     0.01  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

Study date 09/23/20 File: BPOST310.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

28771 Central Avenue Gas Station
Area B
Post-development
3-Hr 10-Yr Storm Event

Drainage Area = 0.74(Ac.) = 0.001 Sq. Mi.
Length along longest watercourse = 284.00(Ft.)
Length along longest watercourse measured to centroid = 86.63(Ft.)
Length along longest watercourse = 0.054 Mi.
Length along longest watercourse measured to centroid = 0.016 Mi.
Difference in elevation = 1.69(Ft.)
Slope along watercourse = 31.4197 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.013 Hr.
Lag time = 0.78 Min.
25% of lag time = 0.19 Min.
40% of lag time = 0.31 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
0.74	0.88	0.65

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
0.74	2.20	1.63

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 0.877(In)
Area Averaged 100-Year Rainfall = 2.200(In)

Point rain (area averaged) = 1.421(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.421(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
0.742	55.00	0.792

Total Area Entered = 0.74(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
55.0	35.0	0.715	0.792	0.205	1.000	0.205

Sum (F) = 0.205

Area averaged mean soil loss (F) (In/Hr) = 0.205

Minimum soil loss rate ((In/Hr)) = 0.103

(for 24 hour storm duration)

Soil low loss rate (decimal) = 0.266

U n i t H y d r o g r a p h

DESERT S-Curve

Unit Hydrograph Data

	Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	645.077	77.129	0.577
2	0.167	1290.154	22.871	0.171
			Sum = 100.000	Sum= 0.748

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Loss rate(In./Hr) Low	Effective (In/Hr)
1	0.08	1.30	0.222	0.205	---	0.02
2	0.17	1.30	0.222	0.205	---	0.02
3	0.25	1.10	0.188	0.205	0.050	0.14
4	0.33	1.50	0.256	0.205	---	0.05
5	0.42	1.50	0.256	0.205	---	0.05
6	0.50	1.80	0.307	0.205	---	0.10
7	0.58	1.50	0.256	0.205	---	0.05
8	0.67	1.80	0.307	0.205	---	0.10
9	0.75	1.80	0.307	0.205	---	0.10
10	0.83	1.50	0.256	0.205	---	0.05
11	0.92	1.60	0.273	0.205	---	0.07
12	1.00	1.80	0.307	0.205	---	0.10
13	1.08	2.20	0.375	0.205	---	0.17
14	1.17	2.20	0.375	0.205	---	0.17
15	1.25	2.20	0.375	0.205	---	0.17
16	1.33	2.00	0.341	0.205	---	0.14
17	1.42	2.60	0.443	0.205	---	0.24
18	1.50	2.70	0.460	0.205	---	0.26
19	1.58	2.40	0.409	0.205	---	0.20
20	1.67	2.70	0.460	0.205	---	0.26
21	1.75	3.30	0.563	0.205	---	0.36
22	1.83	3.10	0.529	0.205	---	0.32
23	1.92	2.90	0.495	0.205	---	0.29
24	2.00	3.00	0.512	0.205	---	0.31
25	2.08	3.10	0.529	0.205	---	0.32
26	2.17	4.20	0.716	0.205	---	0.51
27	2.25	5.00	0.853	0.205	---	0.65
28	2.33	3.50	0.597	0.205	---	0.39
29	2.42	6.80	1.160	0.205	---	0.95
30	2.50	7.30	1.245	0.205	---	1.04
31	2.58	8.20	1.399	0.205	---	1.19
32	2.67	5.90	1.006	0.205	---	0.80
33	2.75	2.00	0.341	0.205	---	0.14

```
34   2.83     1.80     0.307       0.205     ---        0.10
35   2.92     1.80     0.307       0.205     ---        0.10
36   3.00     0.60     0.102       0.205    0.027       0.08
  Sum =     100.0                          Sum =    10.0
           Flood volume = Effective rainfall     0.83(In)
            times area      0.7(Ac.)/[(In)/(Ft.)] =      0.1(Ac.Ft)
           Total soil loss =     0.59(In)
           Total soil loss =    0.036(Ac.Ft)
           Total rainfall =     1.42(In)
           Flood volume =       2244.7 Cubic Feet
           Total soil loss =       1583.5 Cubic Feet
           --------------------------------------------------------------------
            Peak flow rate of this hydrograph =     0.867(CFS)
           --------------------------------------------------------------------
           ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                        3 - 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     0.01  Q       |        |        |        |
 0+15      0.0007     0.08  Q       |        |        |        |
 0+20      0.0011     0.05  Q       |        |        |        |
 0+25      0.0013     0.04  QV      |        |        |        |
 0+30      0.0018     0.07  QV      |        |        |        |
 0+35      0.0021     0.05  QV      |        |        |        |
 0+40      0.0026     0.07  Q V     |        |        |        |
 0+45      0.0031     0.08  Q V     |        |        |        |
 0+50      0.0034     0.05  Q V     |        |        |        |
 0+55      0.0038     0.05  Q V     |        |        |        |
 1+ 0      0.0042     0.07  Q  V    |        |        |        |
 1+ 5      0.0050     0.12  Q  V    |        |        |        |
 1+10      0.0059     0.13  Q   V   |        |        |        |
 1+15      0.0068     0.13  Q    V  |        |        |        |
 1+20      0.0075     0.11  Q    V  |        |        |        |
 1+25      0.0086     0.16  Q     V |        |        |        |
 1+30      0.0099     0.19  Q      V|        |        |        |
 1+35      0.0111     0.16  Q      V|        |        |        |
 1+40      0.0123     0.18  Q       V        |        |        |
 1+45      0.0140     0.25  |Q      V        |        |        |
 1+50      0.0157     0.25  Q       | V      |        |        |
 1+55      0.0173     0.22  Q       |  V     |        |        |
 2+ 0      0.0188     0.23  Q       |  V     |        |        |
 2+ 5      0.0205     0.24  Q       |   V    |        |        |
 2+10      0.0229     0.35  |Q      |      V |        |        |
 2+15      0.0261     0.46  |Q      |        V        |        |
 2+20      0.0284     0.34  |Q      |        | V      |        |
 2+25      0.0326     0.62  | Q     |        |    V   |        |
 2+30      0.0379     0.76  |  Q    |        |       V|        |
 2+35      0.0439     0.87  |  Q    |        |        |  V     |
 2+40      0.0485     0.67  | Q     |        |        |     V  |
 2+45      0.0499     0.22  Q       |        |        |      V |
 2+50      0.0505     0.08  Q       |        |        |       V|
 2+55      0.0510     0.08  Q       |        |        |       V|
 3+ 0      0.0514     0.06  Q       |        |        |       V|
 3+ 5      0.0515     0.01  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

Study date 09/23/20 File: BPOST62.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

28771 Central Avenue Gas Station
Area B
Post-development
6-Hr 2-Yr Storm Event

Drainage Area = 0.74(Ac.) = 0.001 Sq. Mi.
Length along longest watercourse = 284.00(Ft.)
Length along longest watercourse measured to centroid = 86.63(Ft.)
Length along longest watercourse = 0.054 Mi.
Length along longest watercourse measured to centroid = 0.016 Mi.
Difference in elevation = 1.69(Ft.)
Slope along watercourse = 31.4197 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.013 Hr.
Lag time = 0.78 Min.
25% of lag time = 0.19 Min.
40% of lag time = 0.31 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
0.74	1.27	0.94

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
0.74	3.12	2.32

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 1.270(In)
Area Averaged 100-Year Rainfall = 3.120(In)

Point rain (area averaged) = 1.270(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.270(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
0.742	55.00	0.792

Total Area Entered = 0.74(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
55.0	35.0	0.715	0.792	0.205	1.000	0.205

Sum (F) = 0.205

Area averaged mean soil loss (F) (In/Hr) = 0.205

Minimum soil loss rate ((In/Hr)) = 0.103

(for 24 hour storm duration)

Soil low loss rate (decimal) = 0.266

U n i t H y d r o g r a p h

DESERT S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	645.077	77.129	0.577
2	0.167	1290.154	22.871	0.171
			Sum = 100.000	Sum= 0.748

Storm Event 3 Effective Rainfall = 0.241(In)

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Loss rate(In./Hr) Low	Effective (In/Hr)
1	0.08	0.50	0.014	0.205	0.004	0.01
2	0.17	0.60	0.017	0.205	0.005	0.01
3	0.25	0.60	0.017	0.205	0.005	0.01
4	0.33	0.60	0.017	0.205	0.005	0.01
5	0.42	0.60	0.017	0.205	0.005	0.01
6	0.50	0.70	0.020	0.205	0.005	0.01
7	0.58	0.70	0.020	0.205	0.005	0.01
8	0.67	0.70	0.020	0.205	0.005	0.01
9	0.75	0.70	0.020	0.205	0.005	0.01
10	0.83	0.70	0.020	0.205	0.005	0.01
11	0.92	0.70	0.020	0.205	0.005	0.01
12	1.00	0.80	0.023	0.205	0.006	0.02
13	1.08	0.80	0.023	0.205	0.006	0.02
14	1.17	0.80	0.023	0.205	0.006	0.02
15	1.25	0.80	0.023	0.205	0.006	0.02
16	1.33	0.80	0.023	0.205	0.006	0.02
17	1.42	0.80	0.023	0.205	0.006	0.02
18	1.50	0.80	0.023	0.205	0.006	0.02
19	1.58	0.80	0.023	0.205	0.006	0.02
20	1.67	0.80	0.023	0.205	0.006	0.02
21	1.75	0.80	0.023	0.205	0.006	0.02
22	1.83	0.80	0.023	0.205	0.006	0.02
23	1.92	0.80	0.023	0.205	0.006	0.02
24	2.00	0.90	0.026	0.205	0.007	0.02
25	2.08	0.80	0.023	0.205	0.006	0.02
26	2.17	0.90	0.026	0.205	0.007	0.02
27	2.25	0.90	0.026	0.205	0.007	0.02
28	2.33	0.90	0.026	0.205	0.007	0.02
29	2.42	0.90	0.026	0.205	0.007	0.02

30	2.50	0.90	0.026	0.205	0.007	0.02
31	2.58	0.90	0.026	0.205	0.007	0.02
32	2.67	0.90	0.026	0.205	0.007	0.02
33	2.75	1.00	0.029	0.205	0.008	0.02
34	2.83	1.00	0.029	0.205	0.008	0.02
35	2.92	1.00	0.029	0.205	0.008	0.02
36	3.00	1.00	0.029	0.205	0.008	0.02
37	3.08	1.00	0.029	0.205	0.008	0.02
38	3.17	1.10	0.032	0.205	0.008	0.02
39	3.25	1.10	0.032	0.205	0.008	0.02
40	3.33	1.10	0.032	0.205	0.008	0.02
41	3.42	1.20	0.035	0.205	0.009	0.03
42	3.50	1.30	0.038	0.205	0.010	0.03
43	3.58	1.40	0.041	0.205	0.011	0.03
44	3.67	1.40	0.041	0.205	0.011	0.03
45	3.75	1.50	0.043	0.205	0.012	0.03
46	3.83	1.50	0.043	0.205	0.012	0.03
47	3.92	1.60	0.046	0.205	0.012	0.03
48	4.00	1.60	0.046	0.205	0.012	0.03
49	4.08	1.70	0.049	0.205	0.013	0.04
50	4.17	1.80	0.052	0.205	0.014	0.04
51	4.25	1.90	0.055	0.205	0.015	0.04
52	4.33	2.00	0.058	0.205	0.015	0.04
53	4.42	2.10	0.061	0.205	0.016	0.04
54	4.50	2.10	0.061	0.205	0.016	0.04
55	4.58	2.20	0.064	0.205	0.017	0.05
56	4.67	2.30	0.067	0.205	0.018	0.05
57	4.75	2.40	0.069	0.205	0.019	0.05
58	4.83	2.40	0.069	0.205	0.019	0.05
59	4.92	2.50	0.072	0.205	0.019	0.05
60	5.00	2.60	0.075	0.205	0.020	0.06
61	5.08	3.10	0.090	0.205	0.024	0.07
62	5.17	3.60	0.104	0.205	0.028	0.08
63	5.25	3.90	0.113	0.205	0.030	0.08
64	5.33	4.20	0.122	0.205	0.032	0.09
65	5.42	4.70	0.136	0.205	0.036	0.10
66	5.50	5.60	0.162	0.205	0.043	0.12
67	5.58	1.90	0.055	0.205	0.015	0.04
68	5.67	0.90	0.026	0.205	0.007	0.02
69	5.75	0.60	0.017	0.205	0.005	0.01
70	5.83	0.50	0.014	0.205	0.004	0.01
71	5.92	0.30	0.009	0.205	0.002	0.01
72	6.00	0.20	0.006	0.205	0.002	0.00
Sum =		100.0			Sum =	2.1

Flood volume = Effective rainfall 0.18(In)
times area 0.7(Ac.)/[(In)/(Ft.)] = 0.0(Ac.Ft)
Total soil loss = 0.06(In)
Total soil loss = 0.004(Ac.Ft)
Total rainfall = 0.24(In)
Flood volume = 476.9 Cubic Feet
Total soil loss = 173.1 Cubic Feet

Storm Event 2 Effective Rainfall = 0.457(In)

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.50	0.027	0.205	0.007	0.02
2	0.17	0.60	0.033	0.205	0.009	0.02
3	0.25	0.60	0.033	0.205	0.009	0.02
4	0.33	0.60	0.033	0.205	0.009	0.02
5	0.42	0.60	0.033	0.205	0.009	0.02
6	0.50	0.70	0.038	0.205	0.010	0.03
7	0.58	0.70	0.038	0.205	0.010	0.03
8	0.67	0.70	0.038	0.205	0.010	0.03

9	0.75	0.70	0.038	0.205	0.010	0.03
10	0.83	0.70	0.038	0.205	0.010	0.03
11	0.92	0.70	0.038	0.205	0.010	0.03
12	1.00	0.80	0.044	0.205	0.012	0.03
13	1.08	0.80	0.044	0.205	0.012	0.03
14	1.17	0.80	0.044	0.205	0.012	0.03
15	1.25	0.80	0.044	0.205	0.012	0.03
16	1.33	0.80	0.044	0.205	0.012	0.03
17	1.42	0.80	0.044	0.205	0.012	0.03
18	1.50	0.80	0.044	0.205	0.012	0.03
19	1.58	0.80	0.044	0.205	0.012	0.03
20	1.67	0.80	0.044	0.205	0.012	0.03
21	1.75	0.80	0.044	0.205	0.012	0.03
22	1.83	0.80	0.044	0.205	0.012	0.03
23	1.92	0.80	0.044	0.205	0.012	0.03
24	2.00	0.90	0.049	0.205	0.013	0.04
25	2.08	0.80	0.044	0.205	0.012	0.03
26	2.17	0.90	0.049	0.205	0.013	0.04
27	2.25	0.90	0.049	0.205	0.013	0.04
28	2.33	0.90	0.049	0.205	0.013	0.04
29	2.42	0.90	0.049	0.205	0.013	0.04
30	2.50	0.90	0.049	0.205	0.013	0.04
31	2.58	0.90	0.049	0.205	0.013	0.04
32	2.67	0.90	0.049	0.205	0.013	0.04
33	2.75	1.00	0.055	0.205	0.015	0.04
34	2.83	1.00	0.055	0.205	0.015	0.04
35	2.92	1.00	0.055	0.205	0.015	0.04
36	3.00	1.00	0.055	0.205	0.015	0.04
37	3.08	1.00	0.055	0.205	0.015	0.04
38	3.17	1.10	0.060	0.205	0.016	0.04
39	3.25	1.10	0.060	0.205	0.016	0.04
40	3.33	1.10	0.060	0.205	0.016	0.04
41	3.42	1.20	0.066	0.205	0.018	0.05
42	3.50	1.30	0.071	0.205	0.019	0.05
43	3.58	1.40	0.077	0.205	0.020	0.06
44	3.67	1.40	0.077	0.205	0.020	0.06
45	3.75	1.50	0.082	0.205	0.022	0.06
46	3.83	1.50	0.082	0.205	0.022	0.06
47	3.92	1.60	0.088	0.205	0.023	0.06
48	4.00	1.60	0.088	0.205	0.023	0.06
49	4.08	1.70	0.093	0.205	0.025	0.07
50	4.17	1.80	0.099	0.205	0.026	0.07
51	4.25	1.90	0.104	0.205	0.028	0.08
52	4.33	2.00	0.110	0.205	0.029	0.08
53	4.42	2.10	0.115	0.205	0.031	0.08
54	4.50	2.10	0.115	0.205	0.031	0.08
55	4.58	2.20	0.121	0.205	0.032	0.09
56	4.67	2.30	0.126	0.205	0.034	0.09
57	4.75	2.40	0.132	0.205	0.035	0.10
58	4.83	2.40	0.132	0.205	0.035	0.10
59	4.92	2.50	0.137	0.205	0.037	0.10
60	5.00	2.60	0.143	0.205	0.038	0.10
61	5.08	3.10	0.170	0.205	0.045	0.12
62	5.17	3.60	0.198	0.205	0.053	0.14
63	5.25	3.90	0.214	0.205	---	0.01
64	5.33	4.20	0.230	0.205	---	0.03
65	5.42	4.70	0.258	0.205	---	0.05
66	5.50	5.60	0.307	0.205	---	0.10
67	5.58	1.90	0.104	0.205	0.028	0.08
68	5.67	0.90	0.049	0.205	0.013	0.04
69	5.75	0.60	0.033	0.205	0.009	0.02
70	5.83	0.50	0.027	0.205	0.007	0.02
71	5.92	0.30	0.016	0.205	0.004	0.01
72	6.00	0.20	0.011	0.205	0.003	0.01
	Sum =	100.0			Sum =	3.5

Flood volume = Effective rainfall 0.29(In)
times area 0.7(Ac.)/[(In)/(Ft.)] = 0.0(Ac.Ft)
Total soil loss = 0.17(In)
Total soil loss = 0.010(Ac.Ft)
Total rainfall = 0.46(In)
Flood volume = 779.6 Cubic Feet
Total soil loss = 451.8 Cubic Feet

Storm Event 1 Effective Rainfall = 1.270(In)

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Loss rate(In./Hr) Low	Effective (In/Hr)
1	0.08	0.50	0.076	0.205	0.020	0.06
2	0.17	0.60	0.091	0.205	0.024	0.07
3	0.25	0.60	0.091	0.205	0.024	0.07
4	0.33	0.60	0.091	0.205	0.024	0.07
5	0.42	0.60	0.091	0.205	0.024	0.07
6	0.50	0.70	0.107	0.205	0.028	0.08
7	0.58	0.70	0.107	0.205	0.028	0.08
8	0.67	0.70	0.107	0.205	0.028	0.08
9	0.75	0.70	0.107	0.205	0.028	0.08
10	0.83	0.70	0.107	0.205	0.028	0.08
11	0.92	0.70	0.107	0.205	0.028	0.08
12	1.00	0.80	0.122	0.205	0.032	0.09
13	1.08	0.80	0.122	0.205	0.032	0.09
14	1.17	0.80	0.122	0.205	0.032	0.09
15	1.25	0.80	0.122	0.205	0.032	0.09
16	1.33	0.80	0.122	0.205	0.032	0.09
17	1.42	0.80	0.122	0.205	0.032	0.09
18	1.50	0.80	0.122	0.205	0.032	0.09
19	1.58	0.80	0.122	0.205	0.032	0.09
20	1.67	0.80	0.122	0.205	0.032	0.09
21	1.75	0.80	0.122	0.205	0.032	0.09
22	1.83	0.80	0.122	0.205	0.032	0.09
23	1.92	0.80	0.122	0.205	0.032	0.09
24	2.00	0.90	0.137	0.205	0.037	0.10
25	2.08	0.80	0.122	0.205	0.032	0.09
26	2.17	0.90	0.137	0.205	0.037	0.10
27	2.25	0.90	0.137	0.205	0.037	0.10
28	2.33	0.90	0.137	0.205	0.037	0.10
29	2.42	0.90	0.137	0.205	0.037	0.10
30	2.50	0.90	0.137	0.205	0.037	0.10
31	2.58	0.90	0.137	0.205	0.037	0.10
32	2.67	0.90	0.137	0.205	0.037	0.10
33	2.75	1.00	0.152	0.205	0.041	0.11
34	2.83	1.00	0.152	0.205	0.041	0.11
35	2.92	1.00	0.152	0.205	0.041	0.11
36	3.00	1.00	0.152	0.205	0.041	0.11
37	3.08	1.00	0.152	0.205	0.041	0.11
38	3.17	1.10	0.168	0.205	0.045	0.12
39	3.25	1.10	0.168	0.205	0.045	0.12
40	3.33	1.10	0.168	0.205	0.045	0.12
41	3.42	1.20	0.183	0.205	0.049	0.13
42	3.50	1.30	0.198	0.205	0.053	0.15
43	3.58	1.40	0.213	0.205	---	0.01
44	3.67	1.40	0.213	0.205	---	0.01
45	3.75	1.50	0.229	0.205	---	0.02
46	3.83	1.50	0.229	0.205	---	0.02
47	3.92	1.60	0.244	0.205	---	0.04
48	4.00	1.60	0.244	0.205	---	0.04
49	4.08	1.70	0.259	0.205	---	0.05
50	4.17	1.80	0.274	0.205	---	0.07
51	4.25	1.90	0.290	0.205	---	0.08
52	4.33	2.00	0.305	0.205	---	0.10

53	4.42	2.10	0.320	0.205	---	0.11
54	4.50	2.10	0.320	0.205	---	0.11
55	4.58	2.20	0.335	0.205	---	0.13
56	4.67	2.30	0.351	0.205	---	0.15
57	4.75	2.40	0.366	0.205	---	0.16
58	4.83	2.40	0.366	0.205	---	0.16
59	4.92	2.50	0.381	0.205	---	0.18
60	5.00	2.60	0.396	0.205	---	0.19
61	5.08	3.10	0.472	0.205	---	0.27
62	5.17	3.60	0.549	0.205	---	0.34
63	5.25	3.90	0.594	0.205	---	0.39
64	5.33	4.20	0.640	0.205	---	0.43
65	5.42	4.70	0.716	0.205	---	0.51
66	5.50	5.60	0.853	0.205	---	0.65
67	5.58	1.90	0.290	0.205	---	0.08
68	5.67	0.90	0.137	0.205	0.037	0.10
69	5.75	0.60	0.091	0.205	0.024	0.07
70	5.83	0.50	0.076	0.205	0.020	0.06
71	5.92	0.30	0.046	0.205	0.012	0.03
72	6.00	0.20	0.030	0.205	0.008	0.02
Sum =		100.0			Sum =	8.6

Flood volume = Effective rainfall 0.71(In)
times area 0.7(Ac.)/[(In)/(Ft.)] = 0.0(Ac.Ft)
Total soil loss = 0.56(In)
Total soil loss = 0.034(Ac.Ft)
Total rainfall = 1.27(In)
Flood volume = 1923.0 Cubic Feet
Total soil loss = 1497.7 Cubic Feet

Peak flow rate of this hydrograph = 0.462(CFS)

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TOTAL OF: 3 6 - H O U R S T O R M E V E N T S
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 0.0002 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 0.0005 0.01 Q | | | |
0+45 0.0006 0.01 Q | | | |
0+50 0.0007 0.01 Q | | | |
0+55 0.0008 0.01 Q | | | |
1+ 0 0.0008 0.01 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 0.0015 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 0.01 QV | | | |
2+ 5 0.0020 0.01 QV | | | |

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2+10      0.0021     0.01  QV       |        |        |        |
2+15      0.0022     0.01  QV       |        |        |        |
2+20      0.0023     0.01  QV       |        |        |        |
2+25      0.0024     0.01  QV       |        |        |        |
2+30      0.0025     0.01  QV       |        |        |        |
2+35      0.0026     0.01  QV       |        |        |        |
2+40      0.0027     0.01  QV       |        |        |        |
2+45      0.0028     0.02  QV       |        |        |        |
2+50      0.0029     0.02  QV       |        |        |        |
2+55      0.0030     0.02  QV       |        |        |        |
3+ 0      0.0031     0.02  QV       |        |        |        |
3+ 5      0.0032     0.02  QV       |        |        |        |
3+10      0.0033     0.02  QV       |        |        |        |
3+15      0.0035     0.02  QV       |        |        |        |
3+20      0.0036     0.02  QV       |        |        |        |
3+25      0.0037     0.02  Q V      |        |        |        |
3+30      0.0039     0.02  Q V      |        |        |        |
3+35      0.0040     0.02  Q V      |        |        |        |
3+40      0.0042     0.02  Q V      |        |        |        |
3+45      0.0043     0.02  Q V      |        |        |        |
3+50      0.0045     0.02  Q V      |        |        |        |
3+55      0.0047     0.03  Q V      |        |        |        |
4+ 0      0.0048     0.03  Q V      |        |        |        |
4+ 5      0.0050     0.03  Q V      |        |        |        |
4+10      0.0052     0.03  Q V      |        |        |        |
4+15      0.0054     0.03  Q V      |        |        |        |
4+20      0.0056     0.03  Q  V     |        |        |        |
4+25      0.0059     0.03  Q  V     |        |        |        |
4+30      0.0061     0.03  Q  V     |        |        |        |
4+35      0.0063     0.03  Q  V     |        |        |        |
4+40      0.0066     0.04  Q  V     |        |        |        |
4+45      0.0068     0.04  Q  V     |        |        |        |
4+50      0.0071     0.04  Q  V     |        |        |        |
4+55      0.0074     0.04  Q   V    |        |        |        |
5+ 0      0.0077     0.04  Q   V    |        |        |        |
5+ 5      0.0080     0.05  Q   V    |        |        |        |
5+10      0.0084     0.06  Q   V    |        |        |        |
5+15      0.0088     0.06  Q   V    |        |        |        |
5+20      0.0092     0.07  Q    V   |        |        |        |
5+25      0.0097     0.07  Q    V   |        |        |        |
5+30      0.0103     0.09  Q    V   |        |        |        |
5+35      0.0106     0.04  Q    V   |        |        |        |
5+40      0.0107     0.02  Q    V   |        |        |        |
5+45      0.0108     0.01  Q    V   |        |        |        |
5+50      0.0109     0.01  Q    V   |        |        |        |
5+55      0.0109     0.01  Q    V   |        |        |        |
6+ 0      0.0109     0.00  Q    V   |        |        |        |
6+ 5      0.0110     0.01  Q     V  |        |        |        |
6+10      0.0111     0.02  Q     V  |        |        |        |
6+15      0.0113     0.02  Q     V  |        |        |        |
6+20      0.0114     0.02  Q     V  |        |        |        |
6+25      0.0115     0.02  Q     V  |        |        |        |
6+30      0.0117     0.02  Q     V  |        |        |        |
6+35      0.0118     0.02  Q     V  |        |        |        |
6+40      0.0119     0.02  Q     V  |        |        |        |
6+45      0.0121     0.02  Q     V  |        |        |        |
6+50      0.0122     0.02  Q     V  |        |        |        |
6+55      0.0124     0.02  Q     V  |        |        |        |
7+ 0      0.0125     0.02  Q     V  |        |        |        |
7+ 5      0.0127     0.02  Q     V  |        |        |        |
7+10      0.0129     0.02  Q      V |        |        |        |
7+15      0.0130     0.02  Q      V |        |        |        |
7+20      0.0132     0.02  Q      V |        |        |        |
7+25      0.0134     0.02  Q      V |        |        |        |
7+30      0.0135     0.02  Q      V |        |        |        |
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7+35	0.0137	0.02	Q V | | | |
7+40	0.0139	0.02	Q V | | | |
7+45	0.0140	0.02	Q V | | | |
7+50	0.0142	0.02	Q V | | | |
7+55	0.0144	0.02	Q V | | | |
8+ 0	0.0145	0.03	Q V | | | |
8+ 5	0.0147	0.02	Q V | | | |
8+10	0.0149	0.03	Q V | | | |
8+15	0.0151	0.03	Q V | | | |
8+20	0.0153	0.03	Q V | | | |
8+25	0.0155	0.03	Q V | | | |
8+30	0.0156	0.03	Q V | | | |
8+35	0.0158	0.03	Q V | | | |
8+40	0.0160	0.03	Q V | | | |
8+45	0.0162	0.03	Q V | | | |
8+50	0.0164	0.03	Q V| | | |
8+55	0.0166	0.03	Q V| | | |
9+ 0	0.0168	0.03	Q V| | | |
9+ 5	0.0171	0.03	Q V| | | |
9+10	0.0173	0.03	Q V| | | |
9+15	0.0175	0.03	Q V| | | |
9+20	0.0177	0.03	Q V| | | |
9+25	0.0180	0.04	Q V| | | |
9+30	0.0182	0.04	Q V| | | |
9+35	0.0185	0.04	Q V | | |
9+40	0.0188	0.04	Q V | | |
9+45	0.0191	0.04	Q V | | |
9+50	0.0194	0.05	Q V | | |
9+55	0.0198	0.05	Q V | | |
10+ 0	0.0201	0.05	Q |V | | |
10+ 5	0.0204	0.05	Q |V | | |
10+10	0.0208	0.05	Q |V | | |
10+15	0.0212	0.06	Q |V | | |
10+20	0.0216	0.06	Q |V | | |
10+25	0.0220	0.06	Q | V | | |
10+30	0.0225	0.06	Q | V | | |
10+35	0.0229	0.07	Q | V | | |
10+40	0.0234	0.07	Q | V | | |
10+45	0.0239	0.07	Q | V | | |
10+50	0.0244	0.07	Q | V | | |
10+55	0.0249	0.07	Q | V | | |
11+ 0	0.0254	0.08	Q | V | | |
11+ 5	0.0261	0.09	Q | V | | |
11+10	0.0268	0.10	Q | V | | |
11+15	0.0270	0.03	Q | V | | |
11+20	0.0271	0.02	Q | V | | |
11+25	0.0273	0.03	Q | V | | |
11+30	0.0278	0.07	Q | V | | |
11+35	0.0282	0.06	Q | V | | |
11+40	0.0285	0.03	Q | V | | |
11+45	0.0286	0.02	Q | V | | |
11+50	0.0287	0.02	Q | V | | |
11+55	0.0288	0.01	Q | V | | |
12+ 0	0.0288	0.01	Q | V | | |
12+ 5	0.0291	0.03	Q | V | | |
12+10	0.0294	0.05	Q | V | | |
12+15	0.0297	0.05	Q | V | | |
12+20	0.0301	0.05	Q | V | | |
12+25	0.0304	0.05	Q | V | | |
12+30	0.0308	0.06	Q | V | | |
12+35	0.0312	0.06	Q | V | | |
12+40	0.0316	0.06	Q | V | | |
12+45	0.0320	0.06	Q | V | | |
12+50	0.0324	0.06	Q | V | | |
12+55	0.0328	0.06	Q | V | | |

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13+ 0   0.0333   0.07  Q        |      V |        |        |
13+ 5   0.0337   0.07  Q        |      V |        |        |
13+10   0.0342   0.07  Q        |      V |        |        |
13+15   0.0347   0.07  Q        |      V |        |        |
13+20   0.0351   0.07  Q        |       V|        |        |
13+25   0.0356   0.07  Q        |       V|        |        |
13+30   0.0360   0.07  Q        |       V|        |        |
13+35   0.0365   0.07  Q        |        V        |        |
13+40   0.0370   0.07  Q        |        V        |        |
13+45   0.0374   0.07  Q        |        V        |        |
13+50   0.0379   0.07  Q        |        V        |        |
13+55   0.0383   0.07  Q        |        |V       |        |
14+ 0   0.0389   0.07  Q        |        |V       |        |
14+ 5   0.0393   0.07  Q        |        |V       |        |
14+10   0.0398   0.07  Q        |        |V       |        |
14+15   0.0403   0.08  Q        |        | V      |        |
14+20   0.0409   0.08  Q        |        | V      |        |
14+25   0.0414   0.08  Q        |        | V      |        |
14+30   0.0419   0.08  Q        |        | V      |        |
14+35   0.0424   0.08  Q        |        |  V     |        |
14+40   0.0429   0.08  Q        |        |  V     |        |
14+45   0.0435   0.08  Q        |        |  V     |        |
14+50   0.0441   0.08  Q        |        |   V    |        |
14+55   0.0447   0.08  Q        |        |   V    |        |
15+ 0   0.0452   0.08  Q        |        |   V    |        |
15+ 5   0.0458   0.08  Q        |        |    V   |        |
15+10   0.0464   0.09  Q        |        |    V   |        |
15+15   0.0471   0.09  Q        |        |    V   |        |
15+20   0.0477   0.09  Q        |        |     V  |        |
15+25   0.0484   0.10  Q        |        |     V  |        |
15+30   0.0491   0.11  Q        |        |     V  |        |
15+35   0.0493   0.03  Q        |        |      V |        |
15+40   0.0494   0.01  Q        |        |      V |        |
15+45   0.0495   0.01  Q        |        |      V |        |
15+50   0.0496   0.02  Q        |        |      V |        |
15+55   0.0498   0.03  Q        |        |      V |        |
16+ 0   0.0500   0.03  Q        |        |      V |        |
16+ 5   0.0502   0.04  Q        |        |      V |        |
16+10   0.0506   0.05  Q        |        |      V |        |
16+15   0.0510   0.06  Q        |        |      V |        |
16+20   0.0515   0.07  Q        |        |       V|        |
16+25   0.0520   0.08  Q        |        |       V|        |
16+30   0.0526   0.09  Q        |        |       V|        |
16+35   0.0533   0.09  Q        |        |       V|        |
16+40   0.0540   0.11  Q        |        |       V|        |
16+45   0.0548   0.12  Q        |        |        V        |
16+50   0.0557   0.12  Q        |        |        V        |
16+55   0.0565   0.13  Q        |        |        V        |
17+ 0   0.0575   0.14  Q        |        |        |V       |
17+ 5   0.0588   0.19  Q        |        |        | V      |
17+10   0.0605   0.24  Q        |        |        |  V     |
17+15   0.0624   0.28  |Q       |        |        |   V    |
17+20   0.0646   0.32  |Q       |        |        |    V   |
17+25   0.0672   0.37  |Q       |        |        |     V  |
17+30   0.0703   0.46  |Q       |        |        |      V |
17+35   0.0714   0.16  Q        |        |        |       V|
17+40   0.0719   0.07  Q        |        |        |       V|
17+45   0.0723   0.06  Q        |        |        |       V|
17+50   0.0726   0.04  Q        |        |        |       V|
17+55   0.0728   0.03  Q        |        |        |       V|
18+ 0   0.0729   0.02  Q        |        |        |       V|
18+ 5   0.0730   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

Study date 09/23/20 File: BPOST65.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

28771 Central Avenue Gas Station
Area B
Post-development
6-Hr 5-Yr Storm Event

Drainage Area = 0.74(Ac.) = 0.001 Sq. Mi.
Length along longest watercourse = 284.00(Ft.)
Length along longest watercourse measured to centroid = 86.63(Ft.)
Length along longest watercourse = 0.054 Mi.
Length along longest watercourse measured to centroid = 0.016 Mi.
Difference in elevation = 1.69(Ft.)
Slope along watercourse = 31.4197 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.013 Hr.
Lag time = 0.78 Min.
25% of lag time = 0.19 Min.
40% of lag time = 0.31 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
0.74	1.27	0.94

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
0.74	3.12	2.32

STORM EVENT (YEAR) = 5.00
Area Averaged 2-Year Rainfall = 1.270(In)
Area Averaged 100-Year Rainfall = 3.120(In)

Point rain (area averaged) = 1.703(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.703(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
0.742	55.00	0.792

Total Area Entered = 0.74(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
55.0	35.0	0.715	0.792	0.205	1.000	0.205

Sum (F) = 0.205

Area averaged mean soil loss (F) (In/Hr) = 0.205
Minimum soil loss rate ((In/Hr)) = 0.103
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.266

U n i t H y d r o g r a p h
DESERT S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	645.077	77.129	0.577
2	0.167	1290.154	22.871	0.171
			Sum = 100.000	Sum= 0.748

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.50	0.102	0.205	0.027	0.07
2	0.17	0.60	0.123	0.205	0.033	0.09
3	0.25	0.60	0.123	0.205	0.033	0.09
4	0.33	0.60	0.123	0.205	0.033	0.09
5	0.42	0.60	0.123	0.205	0.033	0.09
6	0.50	0.70	0.143	0.205	0.038	0.10
7	0.58	0.70	0.143	0.205	0.038	0.10
8	0.67	0.70	0.143	0.205	0.038	0.10
9	0.75	0.70	0.143	0.205	0.038	0.10
10	0.83	0.70	0.143	0.205	0.038	0.10
11	0.92	0.70	0.143	0.205	0.038	0.10
12	1.00	0.80	0.164	0.205	0.044	0.12
13	1.08	0.80	0.164	0.205	0.044	0.12
14	1.17	0.80	0.164	0.205	0.044	0.12
15	1.25	0.80	0.164	0.205	0.044	0.12
16	1.33	0.80	0.164	0.205	0.044	0.12
17	1.42	0.80	0.164	0.205	0.044	0.12
18	1.50	0.80	0.164	0.205	0.044	0.12
19	1.58	0.80	0.164	0.205	0.044	0.12
20	1.67	0.80	0.164	0.205	0.044	0.12
21	1.75	0.80	0.164	0.205	0.044	0.12
22	1.83	0.80	0.164	0.205	0.044	0.12
23	1.92	0.80	0.164	0.205	0.044	0.12
24	2.00	0.90	0.184	0.205	0.049	0.13
25	2.08	0.80	0.164	0.205	0.044	0.12
26	2.17	0.90	0.184	0.205	0.049	0.13
27	2.25	0.90	0.184	0.205	0.049	0.13
28	2.33	0.90	0.184	0.205	0.049	0.13
29	2.42	0.90	0.184	0.205	0.049	0.13
30	2.50	0.90	0.184	0.205	0.049	0.13
31	2.58	0.90	0.184	0.205	0.049	0.13
32	2.67	0.90	0.184	0.205	0.049	0.13
33	2.75	1.00	0.204	0.205	0.054	0.15

34	2.83	1.00	0.204	0.205	0.054	0.15
35	2.92	1.00	0.204	0.205	0.054	0.15
36	3.00	1.00	0.204	0.205	0.054	0.15
37	3.08	1.00	0.204	0.205	0.054	0.15
38	3.17	1.10	0.225	0.205	---	0.02
39	3.25	1.10	0.225	0.205	---	0.02
40	3.33	1.10	0.225	0.205	---	0.02
41	3.42	1.20	0.245	0.205	---	0.04
42	3.50	1.30	0.266	0.205	---	0.06
43	3.58	1.40	0.286	0.205	---	0.08
44	3.67	1.40	0.286	0.205	---	0.08
45	3.75	1.50	0.307	0.205	---	0.10
46	3.83	1.50	0.307	0.205	---	0.10
47	3.92	1.60	0.327	0.205	---	0.12
48	4.00	1.60	0.327	0.205	---	0.12
49	4.08	1.70	0.347	0.205	---	0.14
50	4.17	1.80	0.368	0.205	---	0.16
51	4.25	1.90	0.388	0.205	---	0.18
52	4.33	2.00	0.409	0.205	---	0.20
53	4.42	2.10	0.429	0.205	---	0.22
54	4.50	2.10	0.429	0.205	---	0.22
55	4.58	2.20	0.450	0.205	---	0.24
56	4.67	2.30	0.470	0.205	---	0.26
57	4.75	2.40	0.491	0.205	---	0.29
58	4.83	2.40	0.491	0.205	---	0.29
59	4.92	2.50	0.511	0.205	---	0.31
60	5.00	2.60	0.531	0.205	---	0.33
61	5.08	3.10	0.634	0.205	---	0.43
62	5.17	3.60	0.736	0.205	---	0.53
63	5.25	3.90	0.797	0.205	---	0.59
64	5.33	4.20	0.858	0.205	---	0.65
65	5.42	4.70	0.961	0.205	---	0.76
66	5.50	5.60	1.145	0.205	---	0.94
67	5.58	1.90	0.388	0.205	---	0.18
68	5.67	0.90	0.184	0.205	0.049	0.13
69	5.75	0.60	0.123	0.205	0.033	0.09
70	5.83	0.50	0.102	0.205	0.027	0.07
71	5.92	0.30	0.061	0.205	0.016	0.04
72	6.00	0.20	0.041	0.205	0.011	0.03
Sum =		100.0		Sum =	12.5	

Flood volume = Effective rainfall 1.04(In)
times area 0.7(Ac.)/[(In)/(Ft.)] = 0.1(Ac.Ft)
Total soil loss = 0.66(In)
Total soil loss = 0.041(Ac.Ft)
Total rainfall = 1.70(In)
Flood volume = 2812.5 Cubic Feet
Total soil loss = 1775.3 Cubic Feet

Peak flow rate of this hydrograph = 0.671(CFS)

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6 - 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	0.0007	0.06	Q	|	|	|	|
0+15	0.0012	0.07	Q	|	|	|	|
0+20	0.0017	0.07	QV	|	|	|	|
0+25	0.0021	0.07	QV	|	|	|	|
0+30	0.0027	0.08	QV	|	|	|	|

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0+35    0.0032    0.08  QV          |         |         |         |
0+40    0.0037    0.08  Q  V        |         |         |         |
0+45    0.0043    0.08  Q  V        |         |         |         |
0+50    0.0048    0.08  Q  V        |         |         |         |
0+55    0.0054    0.08  Q   V       |         |         |         |
1+ 0    0.0060    0.09  Q   V       |         |         |         |
1+ 5    0.0066    0.09  Q    V      |         |         |         |
1+10    0.0072    0.09  Q    V      |         |         |         |
1+15    0.0078    0.09  Q    V      |         |         |         |
1+20    0.0084    0.09  Q     V     |         |         |         |
1+25    0.0091    0.09  Q     V     |         |         |         |
1+30    0.0097    0.09  Q     V     |         |         |         |
1+35    0.0103    0.09  Q      V    |         |         |         |
1+40    0.0109    0.09  Q      V    |         |         |         |
1+45    0.0115    0.09  Q       V   |         |         |         |
1+50    0.0121    0.09  Q       V   |         |         |         |
1+55    0.0128    0.09  Q       V   |         |         |         |
2+ 0    0.0134    0.10  Q         V |         |         |         |
2+ 5    0.0141    0.09  Q         V |         |         |         |
2+10    0.0148    0.10  Q          V|         |         |         |
2+15    0.0155    0.10  Q          V|         |         |         |
2+20    0.0161    0.10  Q           V         |         |         |
2+25    0.0168    0.10  Q           V         |         |         |
2+30    0.0175    0.10  Q           V         |         |         |
2+35    0.0182    0.10  Q           |V        |         |         |
2+40    0.0189    0.10  Q           |V        |         |         |
2+45    0.0197    0.11  Q           | V       |         |         |
2+50    0.0205    0.11  Q           | V       |         |         |
2+55    0.0212    0.11  Q           |  V      |         |         |
3+ 0    0.0220    0.11  Q           |  V      |         |         |
3+ 5    0.0228    0.11  Q           |   V     |         |         |
3+10    0.0230    0.04  Q           |   V     |         |         |
3+15    0.0231    0.01  Q           |   V     |         |         |
3+20    0.0232    0.01  Q           |   V     |         |         |
3+25    0.0234    0.03  Q           |   V     |         |         |
3+30    0.0237    0.04  Q           |   V     |         |         |
3+35    0.0241    0.06  Q           |   V     |         |         |
3+40    0.0245    0.06  Q           |    V    |         |         |
3+45    0.0250    0.07  Q           |    V    |         |         |
3+50    0.0255    0.08  Q           |    V    |         |         |
3+55    0.0261    0.09  Q           |     V   |         |         |
4+ 0    0.0268    0.09  Q           |     V   |         |         |
4+ 5    0.0275    0.10  Q           |      V  |         |         |
4+10    0.0283    0.12  Q           |      V  |         |         |
4+15    0.0292    0.13  Q           |       V |         |         |
4+20    0.0302    0.15  Q           |       V |         |         |
4+25    0.0314    0.16  Q           |        V|         |         |
4+30    0.0325    0.17  Q           |         V         |         |
4+35    0.0338    0.18  Q           |         V         |         |
4+40    0.0351    0.19  Q           |         |V        |         |
4+45    0.0365    0.21  Q           |         | V       |         |
4+50    0.0380    0.21  Q           |         |  V      |         |
4+55    0.0396    0.23  Q           |         |   V     |         |
5+ 0    0.0412    0.24  Q           |         |    V    |         |
5+ 5    0.0433    0.30  |Q          |         |      V  |         |
5+10    0.0459    0.38  |Q          |         |       V |         |
5+15    0.0489    0.43  |Q          |         |         V         |
5+20    0.0522    0.48  |Q          |         |         | V       |
5+25    0.0560    0.55  | Q         |         |         |   V     |
5+30    0.0606    0.67  | Q         |         |         |      V  |
5+35    0.0624    0.27  |Q          |         |         |       V |
5+40    0.0632    0.11  Q           |         |         |        V|
5+45    0.0637    0.08  Q           |         |         |        V|
5+50    0.0641    0.06  Q           |         |         |        V|
5+55    0.0644    0.04  Q           |         |         |        V|
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  6+ 0      0.0645     0.03  Q       |        |        |       V|
  6+ 5      0.0646     0.01  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

Study date 09/23/20 File: BPOST610.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

28771 Central Avenue Gas Station
Area B
Post-development
6-Hr 10-Yr Storm Event

Drainage Area = 0.74(Ac.) = 0.001 Sq. Mi.
Length along longest watercourse = 284.00(Ft.)
Length along longest watercourse measured to centroid = 86.63(Ft.)
Length along longest watercourse = 0.054 Mi.
Length along longest watercourse measured to centroid = 0.016 Mi.
Difference in elevation = 1.69(Ft.)
Slope along watercourse = 31.4197 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.013 Hr.
Lag time = 0.78 Min.
25% of lag time = 0.19 Min.
40% of lag time = 0.31 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
0.74	1.27	0.94

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
0.74	3.12	2.32

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 1.270(In)
Area Averaged 100-Year Rainfall = 3.120(In)

Point rain (area averaged) = 2.031(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 2.031(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
0.742	55.00	0.792

Total Area Entered = 0.74(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
55.0	35.0	0.715	0.792	0.205	1.000	0.205

Sum (F) = 0.205

Area averaged mean soil loss (F) (In/Hr) = 0.205

Minimum soil loss rate ((In/Hr)) = 0.103

(for 24 hour storm duration)

Soil low loss rate (decimal) = 0.266

U n i t H y d r o g r a p h

DESERT S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	645.077	77.129	0.577
2	0.167	1290.154	22.871	0.171
			Sum = 100.000	Sum= 0.748

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.50	0.122	0.205	0.032	0.09
2	0.17	0.60	0.146	0.205	0.039	0.11
3	0.25	0.60	0.146	0.205	0.039	0.11
4	0.33	0.60	0.146	0.205	0.039	0.11
5	0.42	0.60	0.146	0.205	0.039	0.11
6	0.50	0.70	0.171	0.205	0.045	0.13
7	0.58	0.70	0.171	0.205	0.045	0.13
8	0.67	0.70	0.171	0.205	0.045	0.13
9	0.75	0.70	0.171	0.205	0.045	0.13
10	0.83	0.70	0.171	0.205	0.045	0.13
11	0.92	0.70	0.171	0.205	0.045	0.13
12	1.00	0.80	0.195	0.205	0.052	0.14
13	1.08	0.80	0.195	0.205	0.052	0.14
14	1.17	0.80	0.195	0.205	0.052	0.14
15	1.25	0.80	0.195	0.205	0.052	0.14
16	1.33	0.80	0.195	0.205	0.052	0.14
17	1.42	0.80	0.195	0.205	0.052	0.14
18	1.50	0.80	0.195	0.205	0.052	0.14
19	1.58	0.80	0.195	0.205	0.052	0.14
20	1.67	0.80	0.195	0.205	0.052	0.14
21	1.75	0.80	0.195	0.205	0.052	0.14
22	1.83	0.80	0.195	0.205	0.052	0.14
23	1.92	0.80	0.195	0.205	0.052	0.14
24	2.00	0.90	0.219	0.205	---	0.01
25	2.08	0.80	0.195	0.205	0.052	0.14
26	2.17	0.90	0.219	0.205	---	0.01
27	2.25	0.90	0.219	0.205	---	0.01
28	2.33	0.90	0.219	0.205	---	0.01
29	2.42	0.90	0.219	0.205	---	0.01
30	2.50	0.90	0.219	0.205	---	0.01
31	2.58	0.90	0.219	0.205	---	0.01
32	2.67	0.90	0.219	0.205	---	0.01
33	2.75	1.00	0.244	0.205	---	0.04

34	2.83	1.00	0.244	0.205	---	0.04
35	2.92	1.00	0.244	0.205	---	0.04
36	3.00	1.00	0.244	0.205	---	0.04
37	3.08	1.00	0.244	0.205	---	0.04
38	3.17	1.10	0.268	0.205	---	0.06
39	3.25	1.10	0.268	0.205	---	0.06
40	3.33	1.10	0.268	0.205	---	0.06
41	3.42	1.20	0.292	0.205	---	0.09
42	3.50	1.30	0.317	0.205	---	0.11
43	3.58	1.40	0.341	0.205	---	0.14
44	3.67	1.40	0.341	0.205	---	0.14
45	3.75	1.50	0.366	0.205	---	0.16
46	3.83	1.50	0.366	0.205	---	0.16
47	3.92	1.60	0.390	0.205	---	0.18
48	4.00	1.60	0.390	0.205	---	0.18
49	4.08	1.70	0.414	0.205	---	0.21
50	4.17	1.80	0.439	0.205	---	0.23
51	4.25	1.90	0.463	0.205	---	0.26
52	4.33	2.00	0.487	0.205	---	0.28
53	4.42	2.10	0.512	0.205	---	0.31
54	4.50	2.10	0.512	0.205	---	0.31
55	4.58	2.20	0.536	0.205	---	0.33
56	4.67	2.30	0.561	0.205	---	0.36
57	4.75	2.40	0.585	0.205	---	0.38
58	4.83	2.40	0.585	0.205	---	0.38
59	4.92	2.50	0.609	0.205	---	0.40
60	5.00	2.60	0.634	0.205	---	0.43
61	5.08	3.10	0.756	0.205	---	0.55
62	5.17	3.60	0.877	0.205	---	0.67
63	5.25	3.90	0.951	0.205	---	0.75
64	5.33	4.20	1.024	0.205	---	0.82
65	5.42	4.70	1.146	0.205	---	0.94
66	5.50	5.60	1.365	0.205	---	1.16
67	5.58	1.90	0.463	0.205	---	0.26
68	5.67	0.90	0.219	0.205	---	0.01
69	5.75	0.60	0.146	0.205	0.039	0.11
70	5.83	0.50	0.122	0.205	0.032	0.09
71	5.92	0.30	0.073	0.205	0.019	0.05
72	6.00	0.20	0.049	0.205	0.013	0.04
Sum =		100.0			Sum =	14.1

Flood volume = Effective rainfall 1.18(In)
times area 0.7(Ac.)/[(In)/(Ft.)] = 0.1(Ac.Ft)
Total soil loss = 0.86(In)
Total soil loss = 0.053(Ac.Ft)
Total rainfall = 2.03(In)
Flood volume = 3165.7 Cubic Feet
Total soil loss = 2305.0 Cubic Feet

Peak flow rate of this hydrograph = 0.830(CFS)

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6 - 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	0.0004	0.05	Q	|	|	|	|
0+10	0.0009	0.08	Q	|	|	|	|
0+15	0.0014	0.08	Q	|	|	|	|
0+20	0.0020	0.08	QV	|	|	|	|
0+25	0.0025	0.08	QV	|	|	|	|
0+30	0.0032	0.09	QV	|	|	|	|

```
0+35     0.0038    0.09  Q V        |         |        |         |
0+40     0.0045    0.09  Q V        |         |        |         |
0+45     0.0051    0.09  Q V        |         |        |         |
0+50     0.0057    0.09  Q  V       |         |        |         |
0+55     0.0064    0.09  Q  V       |         |        |         |
1+ 0     0.0071    0.10  Q  V       |         |        |         |
1+ 5     0.0078    0.11  Q   V      |         |        |         |
1+10     0.0086    0.11  Q   V      |         |        |         |
1+15     0.0093    0.11  Q    V     |         |        |         |
1+20     0.0101    0.11  Q    V     |         |        |         |
1+25     0.0108    0.11  Q    V     |         |        |         |
1+30     0.0115    0.11  Q     V    |         |        |         |
1+35     0.0123    0.11  Q     V    |         |        |         |
1+40     0.0130    0.11  Q      V   |         |        |         |
1+45     0.0137    0.11  Q      V   |         |        |         |
1+50     0.0145    0.11  Q      V   |         |        |         |
1+55     0.0152    0.11  Q       V  |         |        |         |
2+ 0     0.0154    0.03  Q       V  |         |        |         |
2+ 5     0.0160    0.08  Q       V  |         |        |         |
2+10     0.0163    0.03  Q       V  |         |        |         |
2+15     0.0163    0.01  Q       V  |         |        |         |
2+20     0.0164    0.01  Q        V|         |        |         |
2+25     0.0165    0.01  Q        V|         |        |         |
2+30     0.0165    0.01  Q        V|         |        |         |
2+35     0.0166    0.01  Q        V|         |        |         |
2+40     0.0167    0.01  Q        V|         |        |         |
2+45     0.0169    0.02  Q        V|         |        |         |
2+50     0.0171    0.03  Q        V|         |        |         |
2+55     0.0173    0.03  Q        V|         |        |         |
3+ 0     0.0175    0.03  Q        V|         |        |         |
3+ 5     0.0177    0.03  Q        V|         |        |         |
3+10     0.0180    0.04  Q        V|         |        |         |
3+15     0.0183    0.05  Q         V         |        |         |
3+20     0.0186    0.05  Q         V         |        |         |
3+25     0.0190    0.06  Q         V         |        |         |
3+30     0.0196    0.08  Q         V         |        |         |
3+35     0.0202    0.10  Q          |V        |        |         |
3+40     0.0209    0.10  Q          |V        |        |         |
3+45     0.0217    0.12  Q          |V        |        |         |
3+50     0.0226    0.12  Q          | V       |        |         |
3+55     0.0235    0.13  Q          | V       |        |         |
4+ 0     0.0244    0.14  Q          |  V      |        |         |
4+ 5     0.0255    0.15  Q          |  V      |        |         |
4+10     0.0267    0.17  Q          |   V     |        |         |
4+15     0.0280    0.19  Q          |    V    |        |         |
4+20     0.0294    0.21  Q          |     V   |        |         |
4+25     0.0309    0.23  Q          |      V  |        |         |
4+30     0.0325    0.23  Q          |      V  |        |         |
4+35     0.0342    0.24  Q          |       V |        |         |
4+40     0.0360    0.26  |Q         |        V|        |         |
4+45     0.0379    0.28  |Q         |         V        |         |
4+50     0.0399    0.28  |Q         |         |V       |         |
4+55     0.0419    0.30  |Q         |         | V      |         |
5+ 0     0.0441    0.32  |Q         |         |  V     |         |
5+ 5     0.0468    0.39  |Q         |         |   V    |         |
5+10     0.0501    0.48  |Q         |         |     V  |         |
5+15     0.0539    0.55  | Q        |         |       V|         |
5+20     0.0580    0.60  | Q        |         |        |V        |
5+25     0.0627    0.68  | Q        |         |        |   V     |
5+30     0.0684    0.83  |  Q       |         |        |      V  |
5+35     0.0708    0.35  |Q         |         |        |       V |
5+40     0.0712    0.05  Q          |         |        |        V|
5+45     0.0716    0.06  Q          |         |        |        V|
5+50     0.0721    0.07  Q          |         |        |        V|
5+55     0.0724    0.05  Q          |         |        |        V|
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   6+ 0      0.0726      0.03  Q        |        |        |       V|
   6+ 5      0.0727      0.01  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

Study date 09/23/20 File: BPOST242.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

28771 Central Avenue Gas Station
Area B
Post-development
24-Hr 2-Yr Storm Event

Drainage Area = 0.74(Ac.) = 0.001 Sq. Mi.
Length along longest watercourse = 284.00(Ft.)
Length along longest watercourse measured to centroid = 86.63(Ft.)
Length along longest watercourse = 0.054 Mi.
Length along longest watercourse measured to centroid = 0.016 Mi.
Difference in elevation = 1.69(Ft.)
Slope along watercourse = 31.4197 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.013 Hr.
Lag time = 0.78 Min.
25% of lag time = 0.19 Min.
40% of lag time = 0.31 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]
0.74	2.43	1.80

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
0.74	6.58	4.88

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 2.430(In)
Area Averaged 100-Year Rainfall = 6.580(In)

Point rain (area averaged) = 2.430(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 2.430(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
0.742	55.00	0.792

Total Area Entered = 0.74(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
55.0	35.0	0.715	0.792	0.205	1.000	0.205

Sum (F) = 0.205

Area averaged mean soil loss (F) (In/Hr) = 0.205

Minimum soil loss rate ((In/Hr)) = 0.103

(for 24 hour storm duration)

Soil low loss rate (decimal) = 0.266

U n i t H y d r o g r a p h

DESERT S-Curve

Unit Hydrograph Data

	Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	645.077	77.129	0.577
2	0.167	1290.154	22.871	0.171
			Sum = 100.000	Sum= 0.748

Storm Event 3 Effective Rainfall = 0.462(In)

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.004	0.364	0.001	0.00
2	0.17	0.07	0.004	0.362	0.001	0.00
3	0.25	0.07	0.004	0.361	0.001	0.00
4	0.33	0.10	0.006	0.360	0.001	0.00
5	0.42	0.10	0.006	0.358	0.001	0.00
6	0.50	0.10	0.006	0.357	0.001	0.00
7	0.58	0.10	0.006	0.355	0.001	0.00
8	0.67	0.10	0.006	0.354	0.001	0.00
9	0.75	0.10	0.006	0.353	0.001	0.00
10	0.83	0.13	0.007	0.351	0.002	0.01
11	0.92	0.13	0.007	0.350	0.002	0.01
12	1.00	0.13	0.007	0.348	0.002	0.01
13	1.08	0.10	0.006	0.347	0.001	0.00
14	1.17	0.10	0.006	0.346	0.001	0.00
15	1.25	0.10	0.006	0.344	0.001	0.00
16	1.33	0.10	0.006	0.343	0.001	0.00
17	1.42	0.10	0.006	0.342	0.001	0.00
18	1.50	0.10	0.006	0.340	0.001	0.00
19	1.58	0.10	0.006	0.339	0.001	0.00
20	1.67	0.10	0.006	0.338	0.001	0.00
21	1.75	0.10	0.006	0.336	0.001	0.00
22	1.83	0.13	0.007	0.335	0.002	0.01
23	1.92	0.13	0.007	0.333	0.002	0.01
24	2.00	0.13	0.007	0.332	0.002	0.01
25	2.08	0.13	0.007	0.331	0.002	0.01
26	2.17	0.13	0.007	0.329	0.002	0.01
27	2.25	0.13	0.007	0.328	0.002	0.01
28	2.33	0.13	0.007	0.327	0.002	0.01
29	2.42	0.13	0.007	0.325	0.002	0.01

30	2.50	0.13	0.007	0.324	0.002	0.01
31	2.58	0.17	0.009	0.323	0.002	0.01
32	2.67	0.17	0.009	0.321	0.002	0.01
33	2.75	0.17	0.009	0.320	0.002	0.01
34	2.83	0.17	0.009	0.319	0.002	0.01
35	2.92	0.17	0.009	0.318	0.002	0.01
36	3.00	0.17	0.009	0.316	0.002	0.01
37	3.08	0.17	0.009	0.315	0.002	0.01
38	3.17	0.17	0.009	0.314	0.002	0.01
39	3.25	0.17	0.009	0.312	0.002	0.01
40	3.33	0.17	0.009	0.311	0.002	0.01
41	3.42	0.17	0.009	0.310	0.002	0.01
42	3.50	0.17	0.009	0.308	0.002	0.01
43	3.58	0.17	0.009	0.307	0.002	0.01
44	3.67	0.17	0.009	0.306	0.002	0.01
45	3.75	0.17	0.009	0.305	0.002	0.01
46	3.83	0.20	0.011	0.303	0.003	0.01
47	3.92	0.20	0.011	0.302	0.003	0.01
48	4.00	0.20	0.011	0.301	0.003	0.01
49	4.08	0.20	0.011	0.299	0.003	0.01
50	4.17	0.20	0.011	0.298	0.003	0.01
51	4.25	0.20	0.011	0.297	0.003	0.01
52	4.33	0.23	0.013	0.296	0.003	0.01
53	4.42	0.23	0.013	0.294	0.003	0.01
54	4.50	0.23	0.013	0.293	0.003	0.01
55	4.58	0.23	0.013	0.292	0.003	0.01
56	4.67	0.23	0.013	0.291	0.003	0.01
57	4.75	0.23	0.013	0.289	0.003	0.01
58	4.83	0.27	0.015	0.288	0.004	0.01
59	4.92	0.27	0.015	0.287	0.004	0.01
60	5.00	0.27	0.015	0.286	0.004	0.01
61	5.08	0.20	0.011	0.284	0.003	0.01
62	5.17	0.20	0.011	0.283	0.003	0.01
63	5.25	0.20	0.011	0.282	0.003	0.01
64	5.33	0.23	0.013	0.281	0.003	0.01
65	5.42	0.23	0.013	0.279	0.003	0.01
66	5.50	0.23	0.013	0.278	0.003	0.01
67	5.58	0.27	0.015	0.277	0.004	0.01
68	5.67	0.27	0.015	0.276	0.004	0.01
69	5.75	0.27	0.015	0.275	0.004	0.01
70	5.83	0.27	0.015	0.273	0.004	0.01
71	5.92	0.27	0.015	0.272	0.004	0.01
72	6.00	0.27	0.015	0.271	0.004	0.01
73	6.08	0.30	0.017	0.270	0.004	0.01
74	6.17	0.30	0.017	0.268	0.004	0.01
75	6.25	0.30	0.017	0.267	0.004	0.01
76	6.33	0.30	0.017	0.266	0.004	0.01
77	6.42	0.30	0.017	0.265	0.004	0.01
78	6.50	0.30	0.017	0.264	0.004	0.01
79	6.58	0.33	0.018	0.263	0.005	0.01
80	6.67	0.33	0.018	0.261	0.005	0.01
81	6.75	0.33	0.018	0.260	0.005	0.01
82	6.83	0.33	0.018	0.259	0.005	0.01
83	6.92	0.33	0.018	0.258	0.005	0.01
84	7.00	0.33	0.018	0.257	0.005	0.01
85	7.08	0.33	0.018	0.255	0.005	0.01
86	7.17	0.33	0.018	0.254	0.005	0.01
87	7.25	0.33	0.018	0.253	0.005	0.01
88	7.33	0.37	0.020	0.252	0.005	0.01
89	7.42	0.37	0.020	0.251	0.005	0.01
90	7.50	0.37	0.020	0.250	0.005	0.01
91	7.58	0.40	0.022	0.249	0.006	0.02
92	7.67	0.40	0.022	0.247	0.006	0.02
93	7.75	0.40	0.022	0.246	0.006	0.02
94	7.83	0.43	0.024	0.245	0.006	0.02

95	7.92	0.43	0.024	0.244	0.006	0.02
96	8.00	0.43	0.024	0.243	0.006	0.02
97	8.08	0.50	0.028	0.242	0.007	0.02
98	8.17	0.50	0.028	0.241	0.007	0.02
99	8.25	0.50	0.028	0.239	0.007	0.02
100	8.33	0.50	0.028	0.238	0.007	0.02
101	8.42	0.50	0.028	0.237	0.007	0.02
102	8.50	0.50	0.028	0.236	0.007	0.02
103	8.58	0.53	0.030	0.235	0.008	0.02
104	8.67	0.53	0.030	0.234	0.008	0.02
105	8.75	0.53	0.030	0.233	0.008	0.02
106	8.83	0.57	0.031	0.232	0.008	0.02
107	8.92	0.57	0.031	0.231	0.008	0.02
108	9.00	0.57	0.031	0.230	0.008	0.02
109	9.08	0.63	0.035	0.228	0.009	0.03
110	9.17	0.63	0.035	0.227	0.009	0.03
111	9.25	0.63	0.035	0.226	0.009	0.03
112	9.33	0.67	0.037	0.225	0.010	0.03
113	9.42	0.67	0.037	0.224	0.010	0.03
114	9.50	0.67	0.037	0.223	0.010	0.03
115	9.58	0.70	0.039	0.222	0.010	0.03
116	9.67	0.70	0.039	0.221	0.010	0.03
117	9.75	0.70	0.039	0.220	0.010	0.03
118	9.83	0.73	0.041	0.219	0.011	0.03
119	9.92	0.73	0.041	0.218	0.011	0.03
120	10.00	0.73	0.041	0.217	0.011	0.03
121	10.08	0.50	0.028	0.216	0.007	0.02
122	10.17	0.50	0.028	0.215	0.007	0.02
123	10.25	0.50	0.028	0.214	0.007	0.02
124	10.33	0.50	0.028	0.213	0.007	0.02
125	10.42	0.50	0.028	0.212	0.007	0.02
126	10.50	0.50	0.028	0.210	0.007	0.02
127	10.58	0.67	0.037	0.209	0.010	0.03
128	10.67	0.67	0.037	0.208	0.010	0.03
129	10.75	0.67	0.037	0.207	0.010	0.03
130	10.83	0.67	0.037	0.206	0.010	0.03
131	10.92	0.67	0.037	0.205	0.010	0.03
132	11.00	0.67	0.037	0.204	0.010	0.03
133	11.08	0.63	0.035	0.203	0.009	0.03
134	11.17	0.63	0.035	0.202	0.009	0.03
135	11.25	0.63	0.035	0.201	0.009	0.03
136	11.33	0.63	0.035	0.200	0.009	0.03
137	11.42	0.63	0.035	0.199	0.009	0.03
138	11.50	0.63	0.035	0.198	0.009	0.03
139	11.58	0.57	0.031	0.197	0.008	0.02
140	11.67	0.57	0.031	0.196	0.008	0.02
141	11.75	0.57	0.031	0.195	0.008	0.02
142	11.83	0.60	0.033	0.194	0.009	0.02
143	11.92	0.60	0.033	0.193	0.009	0.02
144	12.00	0.60	0.033	0.193	0.009	0.02
145	12.08	0.83	0.046	0.192	0.012	0.03
146	12.17	0.83	0.046	0.191	0.012	0.03
147	12.25	0.83	0.046	0.190	0.012	0.03
148	12.33	0.87	0.048	0.189	0.013	0.04
149	12.42	0.87	0.048	0.188	0.013	0.04
150	12.50	0.87	0.048	0.187	0.013	0.04
151	12.58	0.93	0.052	0.186	0.014	0.04
152	12.67	0.93	0.052	0.185	0.014	0.04
153	12.75	0.93	0.052	0.184	0.014	0.04
154	12.83	0.97	0.054	0.183	0.014	0.04
155	12.92	0.97	0.054	0.182	0.014	0.04
156	13.00	0.97	0.054	0.181	0.014	0.04
157	13.08	1.13	0.063	0.180	0.017	0.05
158	13.17	1.13	0.063	0.179	0.017	0.05
159	13.25	1.13	0.063	0.178	0.017	0.05

160	13.33	1.13	0.063	0.178	0.017	0.05
161	13.42	1.13	0.063	0.177	0.017	0.05
162	13.50	1.13	0.063	0.176	0.017	0.05
163	13.58	0.77	0.042	0.175	0.011	0.03
164	13.67	0.77	0.042	0.174	0.011	0.03
165	13.75	0.77	0.042	0.173	0.011	0.03
166	13.83	0.77	0.042	0.172	0.011	0.03
167	13.92	0.77	0.042	0.171	0.011	0.03
168	14.00	0.77	0.042	0.170	0.011	0.03
169	14.08	0.90	0.050	0.170	0.013	0.04
170	14.17	0.90	0.050	0.169	0.013	0.04
171	14.25	0.90	0.050	0.168	0.013	0.04
172	14.33	0.87	0.048	0.167	0.013	0.04
173	14.42	0.87	0.048	0.166	0.013	0.04
174	14.50	0.87	0.048	0.165	0.013	0.04
175	14.58	0.87	0.048	0.164	0.013	0.04
176	14.67	0.87	0.048	0.164	0.013	0.04
177	14.75	0.87	0.048	0.163	0.013	0.04
178	14.83	0.83	0.046	0.162	0.012	0.03
179	14.92	0.83	0.046	0.161	0.012	0.03
180	15.00	0.83	0.046	0.160	0.012	0.03
181	15.08	0.80	0.044	0.159	0.012	0.03
182	15.17	0.80	0.044	0.159	0.012	0.03
183	15.25	0.80	0.044	0.158	0.012	0.03
184	15.33	0.77	0.042	0.157	0.011	0.03
185	15.42	0.77	0.042	0.156	0.011	0.03
186	15.50	0.77	0.042	0.155	0.011	0.03
187	15.58	0.63	0.035	0.155	0.009	0.03
188	15.67	0.63	0.035	0.154	0.009	0.03
189	15.75	0.63	0.035	0.153	0.009	0.03
190	15.83	0.63	0.035	0.152	0.009	0.03
191	15.92	0.63	0.035	0.151	0.009	0.03
192	16.00	0.63	0.035	0.151	0.009	0.03
193	16.08	0.13	0.007	0.150	0.002	0.01
194	16.17	0.13	0.007	0.149	0.002	0.01
195	16.25	0.13	0.007	0.148	0.002	0.01
196	16.33	0.13	0.007	0.148	0.002	0.01
197	16.42	0.13	0.007	0.147	0.002	0.01
198	16.50	0.13	0.007	0.146	0.002	0.01
199	16.58	0.10	0.006	0.145	0.001	0.00
200	16.67	0.10	0.006	0.145	0.001	0.00
201	16.75	0.10	0.006	0.144	0.001	0.00
202	16.83	0.10	0.006	0.143	0.001	0.00
203	16.92	0.10	0.006	0.142	0.001	0.00
204	17.00	0.10	0.006	0.142	0.001	0.00
205	17.08	0.17	0.009	0.141	0.002	0.01
206	17.17	0.17	0.009	0.140	0.002	0.01
207	17.25	0.17	0.009	0.140	0.002	0.01
208	17.33	0.17	0.009	0.139	0.002	0.01
209	17.42	0.17	0.009	0.138	0.002	0.01
210	17.50	0.17	0.009	0.138	0.002	0.01
211	17.58	0.17	0.009	0.137	0.002	0.01
212	17.67	0.17	0.009	0.136	0.002	0.01
213	17.75	0.17	0.009	0.135	0.002	0.01
214	17.83	0.13	0.007	0.135	0.002	0.01
215	17.92	0.13	0.007	0.134	0.002	0.01
216	18.00	0.13	0.007	0.133	0.002	0.01
217	18.08	0.13	0.007	0.133	0.002	0.01
218	18.17	0.13	0.007	0.132	0.002	0.01
219	18.25	0.13	0.007	0.132	0.002	0.01
220	18.33	0.13	0.007	0.131	0.002	0.01
221	18.42	0.13	0.007	0.130	0.002	0.01
222	18.50	0.13	0.007	0.130	0.002	0.01
223	18.58	0.10	0.006	0.129	0.001	0.00
224	18.67	0.10	0.006	0.128	0.001	0.00

225	18.75	0.10	0.006	0.128	0.001	0.00
226	18.83	0.07	0.004	0.127	0.001	0.00
227	18.92	0.07	0.004	0.127	0.001	0.00
228	19.00	0.07	0.004	0.126	0.001	0.00
229	19.08	0.10	0.006	0.125	0.001	0.00
230	19.17	0.10	0.006	0.125	0.001	0.00
231	19.25	0.10	0.006	0.124	0.001	0.00
232	19.33	0.13	0.007	0.124	0.002	0.01
233	19.42	0.13	0.007	0.123	0.002	0.01
234	19.50	0.13	0.007	0.122	0.002	0.01
235	19.58	0.10	0.006	0.122	0.001	0.00
236	19.67	0.10	0.006	0.121	0.001	0.00
237	19.75	0.10	0.006	0.121	0.001	0.00
238	19.83	0.07	0.004	0.120	0.001	0.00
239	19.92	0.07	0.004	0.120	0.001	0.00
240	20.00	0.07	0.004	0.119	0.001	0.00
241	20.08	0.10	0.006	0.119	0.001	0.00
242	20.17	0.10	0.006	0.118	0.001	0.00
243	20.25	0.10	0.006	0.118	0.001	0.00
244	20.33	0.10	0.006	0.117	0.001	0.00
245	20.42	0.10	0.006	0.117	0.001	0.00
246	20.50	0.10	0.006	0.116	0.001	0.00
247	20.58	0.10	0.006	0.116	0.001	0.00
248	20.67	0.10	0.006	0.115	0.001	0.00
249	20.75	0.10	0.006	0.115	0.001	0.00
250	20.83	0.07	0.004	0.114	0.001	0.00
251	20.92	0.07	0.004	0.114	0.001	0.00
252	21.00	0.07	0.004	0.113	0.001	0.00
253	21.08	0.10	0.006	0.113	0.001	0.00
254	21.17	0.10	0.006	0.112	0.001	0.00
255	21.25	0.10	0.006	0.112	0.001	0.00
256	21.33	0.07	0.004	0.112	0.001	0.00
257	21.42	0.07	0.004	0.111	0.001	0.00
258	21.50	0.07	0.004	0.111	0.001	0.00
259	21.58	0.10	0.006	0.110	0.001	0.00
260	21.67	0.10	0.006	0.110	0.001	0.00
261	21.75	0.10	0.006	0.109	0.001	0.00
262	21.83	0.07	0.004	0.109	0.001	0.00
263	21.92	0.07	0.004	0.109	0.001	0.00
264	22.00	0.07	0.004	0.108	0.001	0.00
265	22.08	0.10	0.006	0.108	0.001	0.00
266	22.17	0.10	0.006	0.108	0.001	0.00
267	22.25	0.10	0.006	0.107	0.001	0.00
268	22.33	0.07	0.004	0.107	0.001	0.00
269	22.42	0.07	0.004	0.107	0.001	0.00
270	22.50	0.07	0.004	0.106	0.001	0.00
271	22.58	0.07	0.004	0.106	0.001	0.00
272	22.67	0.07	0.004	0.106	0.001	0.00
273	22.75	0.07	0.004	0.105	0.001	0.00
274	22.83	0.07	0.004	0.105	0.001	0.00
275	22.92	0.07	0.004	0.105	0.001	0.00
276	23.00	0.07	0.004	0.105	0.001	0.00
277	23.08	0.07	0.004	0.104	0.001	0.00
278	23.17	0.07	0.004	0.104	0.001	0.00
279	23.25	0.07	0.004	0.104	0.001	0.00
280	23.33	0.07	0.004	0.104	0.001	0.00
281	23.42	0.07	0.004	0.104	0.001	0.00
282	23.50	0.07	0.004	0.103	0.001	0.00
283	23.58	0.07	0.004	0.103	0.001	0.00
284	23.67	0.07	0.004	0.103	0.001	0.00
285	23.75	0.07	0.004	0.103	0.001	0.00
286	23.83	0.07	0.004	0.103	0.001	0.00
287	23.92	0.07	0.004	0.103	0.001	0.00
288	24.00	0.07	0.004	0.103	0.001	0.00
	Sum =	100.0		Sum =	4.1	

Flood volume = Effective rainfall 0.34(In)
times area 0.7(Ac.)/[(In)/(Ft.)] = 0.0(Ac.Ft)
Total soil loss = 0.12(In)
Total soil loss = 0.008(Ac.Ft)
Total rainfall = 0.46(In)
Flood volume = 912.4 Cubic Feet
Total soil loss = 331.2 Cubic Feet

Storm Event 2 Effective Rainfall = 0.875(In)

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Loss rate(In./Hr) Low	Effective (In/Hr)
1	0.08	0.07	0.007	0.364	0.002	0.01
2	0.17	0.07	0.007	0.362	0.002	0.01
3	0.25	0.07	0.007	0.361	0.002	0.01
4	0.33	0.10	0.010	0.360	0.003	0.01
5	0.42	0.10	0.010	0.358	0.003	0.01
6	0.50	0.10	0.010	0.357	0.003	0.01
7	0.58	0.10	0.010	0.355	0.003	0.01
8	0.67	0.10	0.010	0.354	0.003	0.01
9	0.75	0.10	0.010	0.353	0.003	0.01
10	0.83	0.13	0.014	0.351	0.004	0.01
11	0.92	0.13	0.014	0.350	0.004	0.01
12	1.00	0.13	0.014	0.348	0.004	0.01
13	1.08	0.10	0.010	0.347	0.003	0.01
14	1.17	0.10	0.010	0.346	0.003	0.01
15	1.25	0.10	0.010	0.344	0.003	0.01
16	1.33	0.10	0.010	0.343	0.003	0.01
17	1.42	0.10	0.010	0.342	0.003	0.01
18	1.50	0.10	0.010	0.340	0.003	0.01
19	1.58	0.10	0.010	0.339	0.003	0.01
20	1.67	0.10	0.010	0.338	0.003	0.01
21	1.75	0.10	0.010	0.336	0.003	0.01
22	1.83	0.13	0.014	0.335	0.004	0.01
23	1.92	0.13	0.014	0.333	0.004	0.01
24	2.00	0.13	0.014	0.332	0.004	0.01
25	2.08	0.13	0.014	0.331	0.004	0.01
26	2.17	0.13	0.014	0.329	0.004	0.01
27	2.25	0.13	0.014	0.328	0.004	0.01
28	2.33	0.13	0.014	0.327	0.004	0.01
29	2.42	0.13	0.014	0.325	0.004	0.01
30	2.50	0.13	0.014	0.324	0.004	0.01
31	2.58	0.17	0.017	0.323	0.005	0.01
32	2.67	0.17	0.017	0.321	0.005	0.01
33	2.75	0.17	0.017	0.320	0.005	0.01
34	2.83	0.17	0.017	0.319	0.005	0.01
35	2.92	0.17	0.017	0.318	0.005	0.01
36	3.00	0.17	0.017	0.316	0.005	0.01
37	3.08	0.17	0.017	0.315	0.005	0.01
38	3.17	0.17	0.017	0.314	0.005	0.01
39	3.25	0.17	0.017	0.312	0.005	0.01
40	3.33	0.17	0.017	0.311	0.005	0.01
41	3.42	0.17	0.017	0.310	0.005	0.01
42	3.50	0.17	0.017	0.308	0.005	0.01
43	3.58	0.17	0.017	0.307	0.005	0.01
44	3.67	0.17	0.017	0.306	0.005	0.01
45	3.75	0.17	0.017	0.305	0.005	0.01
46	3.83	0.20	0.021	0.303	0.006	0.02
47	3.92	0.20	0.021	0.302	0.006	0.02
48	4.00	0.20	0.021	0.301	0.006	0.02
49	4.08	0.20	0.021	0.299	0.006	0.02
50	4.17	0.20	0.021	0.298	0.006	0.02
51	4.25	0.20	0.021	0.297	0.006	0.02
52	4.33	0.23	0.024	0.296	0.007	0.02

53	4.42	0.23	0.024	0.294	0.007	0.02
54	4.50	0.23	0.024	0.293	0.007	0.02
55	4.58	0.23	0.024	0.292	0.007	0.02
56	4.67	0.23	0.024	0.291	0.007	0.02
57	4.75	0.23	0.024	0.289	0.007	0.02
58	4.83	0.27	0.028	0.288	0.007	0.02
59	4.92	0.27	0.028	0.287	0.007	0.02
60	5.00	0.27	0.028	0.286	0.007	0.02
61	5.08	0.20	0.021	0.284	0.006	0.02
62	5.17	0.20	0.021	0.283	0.006	0.02
63	5.25	0.20	0.021	0.282	0.006	0.02
64	5.33	0.23	0.024	0.281	0.007	0.02
65	5.42	0.23	0.024	0.279	0.007	0.02
66	5.50	0.23	0.024	0.278	0.007	0.02
67	5.58	0.27	0.028	0.277	0.007	0.02
68	5.67	0.27	0.028	0.276	0.007	0.02
69	5.75	0.27	0.028	0.275	0.007	0.02
70	5.83	0.27	0.028	0.273	0.007	0.02
71	5.92	0.27	0.028	0.272	0.007	0.02
72	6.00	0.27	0.028	0.271	0.007	0.02
73	6.08	0.30	0.031	0.270	0.008	0.02
74	6.17	0.30	0.031	0.268	0.008	0.02
75	6.25	0.30	0.031	0.267	0.008	0.02
76	6.33	0.30	0.031	0.266	0.008	0.02
77	6.42	0.30	0.031	0.265	0.008	0.02
78	6.50	0.30	0.031	0.264	0.008	0.02
79	6.58	0.33	0.035	0.263	0.009	0.03
80	6.67	0.33	0.035	0.261	0.009	0.03
81	6.75	0.33	0.035	0.260	0.009	0.03
82	6.83	0.33	0.035	0.259	0.009	0.03
83	6.92	0.33	0.035	0.258	0.009	0.03
84	7.00	0.33	0.035	0.257	0.009	0.03
85	7.08	0.33	0.035	0.255	0.009	0.03
86	7.17	0.33	0.035	0.254	0.009	0.03
87	7.25	0.33	0.035	0.253	0.009	0.03
88	7.33	0.37	0.038	0.252	0.010	0.03
89	7.42	0.37	0.038	0.251	0.010	0.03
90	7.50	0.37	0.038	0.250	0.010	0.03
91	7.58	0.40	0.042	0.249	0.011	0.03
92	7.67	0.40	0.042	0.247	0.011	0.03
93	7.75	0.40	0.042	0.246	0.011	0.03
94	7.83	0.43	0.045	0.245	0.012	0.03
95	7.92	0.43	0.045	0.244	0.012	0.03
96	8.00	0.43	0.045	0.243	0.012	0.03
97	8.08	0.50	0.052	0.242	0.014	0.04
98	8.17	0.50	0.052	0.241	0.014	0.04
99	8.25	0.50	0.052	0.239	0.014	0.04
100	8.33	0.50	0.052	0.238	0.014	0.04
101	8.42	0.50	0.052	0.237	0.014	0.04
102	8.50	0.50	0.052	0.236	0.014	0.04
103	8.58	0.53	0.056	0.235	0.015	0.04
104	8.67	0.53	0.056	0.234	0.015	0.04
105	8.75	0.53	0.056	0.233	0.015	0.04
106	8.83	0.57	0.059	0.232	0.016	0.04
107	8.92	0.57	0.059	0.231	0.016	0.04
108	9.00	0.57	0.059	0.230	0.016	0.04
109	9.08	0.63	0.066	0.228	0.018	0.05
110	9.17	0.63	0.066	0.227	0.018	0.05
111	9.25	0.63	0.066	0.226	0.018	0.05
112	9.33	0.67	0.070	0.225	0.019	0.05
113	9.42	0.67	0.070	0.224	0.019	0.05
114	9.50	0.67	0.070	0.223	0.019	0.05
115	9.58	0.70	0.073	0.222	0.020	0.05
116	9.67	0.70	0.073	0.221	0.020	0.05
117	9.75	0.70	0.073	0.220	0.020	0.05

118	9.83	0.73	0.077	0.219	0.021	0.06
119	9.92	0.73	0.077	0.218	0.021	0.06
120	10.00	0.73	0.077	0.217	0.021	0.06
121	10.08	0.50	0.052	0.216	0.014	0.04
122	10.17	0.50	0.052	0.215	0.014	0.04
123	10.25	0.50	0.052	0.214	0.014	0.04
124	10.33	0.50	0.052	0.213	0.014	0.04
125	10.42	0.50	0.052	0.212	0.014	0.04
126	10.50	0.50	0.052	0.210	0.014	0.04
127	10.58	0.67	0.070	0.209	0.019	0.05
128	10.67	0.67	0.070	0.208	0.019	0.05
129	10.75	0.67	0.070	0.207	0.019	0.05
130	10.83	0.67	0.070	0.206	0.019	0.05
131	10.92	0.67	0.070	0.205	0.019	0.05
132	11.00	0.67	0.070	0.204	0.019	0.05
133	11.08	0.63	0.066	0.203	0.018	0.05
134	11.17	0.63	0.066	0.202	0.018	0.05
135	11.25	0.63	0.066	0.201	0.018	0.05
136	11.33	0.63	0.066	0.200	0.018	0.05
137	11.42	0.63	0.066	0.199	0.018	0.05
138	11.50	0.63	0.066	0.198	0.018	0.05
139	11.58	0.57	0.059	0.197	0.016	0.04
140	11.67	0.57	0.059	0.196	0.016	0.04
141	11.75	0.57	0.059	0.195	0.016	0.04
142	11.83	0.60	0.063	0.194	0.017	0.05
143	11.92	0.60	0.063	0.193	0.017	0.05
144	12.00	0.60	0.063	0.193	0.017	0.05
145	12.08	0.83	0.087	0.192	0.023	0.06
146	12.17	0.83	0.087	0.191	0.023	0.06
147	12.25	0.83	0.087	0.190	0.023	0.06
148	12.33	0.87	0.091	0.189	0.024	0.07
149	12.42	0.87	0.091	0.188	0.024	0.07
150	12.50	0.87	0.091	0.187	0.024	0.07
151	12.58	0.93	0.098	0.186	0.026	0.07
152	12.67	0.93	0.098	0.185	0.026	0.07
153	12.75	0.93	0.098	0.184	0.026	0.07
154	12.83	0.97	0.101	0.183	0.027	0.07
155	12.92	0.97	0.101	0.182	0.027	0.07
156	13.00	0.97	0.101	0.181	0.027	0.07
157	13.08	1.13	0.119	0.180	0.032	0.09
158	13.17	1.13	0.119	0.179	0.032	0.09
159	13.25	1.13	0.119	0.178	0.032	0.09
160	13.33	1.13	0.119	0.178	0.032	0.09
161	13.42	1.13	0.119	0.177	0.032	0.09
162	13.50	1.13	0.119	0.176	0.032	0.09
163	13.58	0.77	0.080	0.175	0.021	0.06
164	13.67	0.77	0.080	0.174	0.021	0.06
165	13.75	0.77	0.080	0.173	0.021	0.06
166	13.83	0.77	0.080	0.172	0.021	0.06
167	13.92	0.77	0.080	0.171	0.021	0.06
168	14.00	0.77	0.080	0.170	0.021	0.06
169	14.08	0.90	0.094	0.170	0.025	0.07
170	14.17	0.90	0.094	0.169	0.025	0.07
171	14.25	0.90	0.094	0.168	0.025	0.07
172	14.33	0.87	0.091	0.167	0.024	0.07
173	14.42	0.87	0.091	0.166	0.024	0.07
174	14.50	0.87	0.091	0.165	0.024	0.07
175	14.58	0.87	0.091	0.164	0.024	0.07
176	14.67	0.87	0.091	0.164	0.024	0.07
177	14.75	0.87	0.091	0.163	0.024	0.07
178	14.83	0.83	0.087	0.162	0.023	0.06
179	14.92	0.83	0.087	0.161	0.023	0.06
180	15.00	0.83	0.087	0.160	0.023	0.06
181	15.08	0.80	0.084	0.159	0.022	0.06
182	15.17	0.80	0.084	0.159	0.022	0.06

183	15.25	0.80	0.084	0.158	0.022	0.06
184	15.33	0.77	0.080	0.157	0.021	0.06
185	15.42	0.77	0.080	0.156	0.021	0.06
186	15.50	0.77	0.080	0.155	0.021	0.06
187	15.58	0.63	0.066	0.155	0.018	0.05
188	15.67	0.63	0.066	0.154	0.018	0.05
189	15.75	0.63	0.066	0.153	0.018	0.05
190	15.83	0.63	0.066	0.152	0.018	0.05
191	15.92	0.63	0.066	0.151	0.018	0.05
192	16.00	0.63	0.066	0.151	0.018	0.05
193	16.08	0.13	0.014	0.150	0.004	0.01
194	16.17	0.13	0.014	0.149	0.004	0.01
195	16.25	0.13	0.014	0.148	0.004	0.01
196	16.33	0.13	0.014	0.148	0.004	0.01
197	16.42	0.13	0.014	0.147	0.004	0.01
198	16.50	0.13	0.014	0.146	0.004	0.01
199	16.58	0.10	0.010	0.145	0.003	0.01
200	16.67	0.10	0.010	0.145	0.003	0.01
201	16.75	0.10	0.010	0.144	0.003	0.01
202	16.83	0.10	0.010	0.143	0.003	0.01
203	16.92	0.10	0.010	0.142	0.003	0.01
204	17.00	0.10	0.010	0.142	0.003	0.01
205	17.08	0.17	0.017	0.141	0.005	0.01
206	17.17	0.17	0.017	0.140	0.005	0.01
207	17.25	0.17	0.017	0.140	0.005	0.01
208	17.33	0.17	0.017	0.139	0.005	0.01
209	17.42	0.17	0.017	0.138	0.005	0.01
210	17.50	0.17	0.017	0.138	0.005	0.01
211	17.58	0.17	0.017	0.137	0.005	0.01
212	17.67	0.17	0.017	0.136	0.005	0.01
213	17.75	0.17	0.017	0.135	0.005	0.01
214	17.83	0.13	0.014	0.135	0.004	0.01
215	17.92	0.13	0.014	0.134	0.004	0.01
216	18.00	0.13	0.014	0.133	0.004	0.01
217	18.08	0.13	0.014	0.133	0.004	0.01
218	18.17	0.13	0.014	0.132	0.004	0.01
219	18.25	0.13	0.014	0.132	0.004	0.01
220	18.33	0.13	0.014	0.131	0.004	0.01
221	18.42	0.13	0.014	0.130	0.004	0.01
222	18.50	0.13	0.014	0.130	0.004	0.01
223	18.58	0.10	0.010	0.129	0.003	0.01
224	18.67	0.10	0.010	0.128	0.003	0.01
225	18.75	0.10	0.010	0.128	0.003	0.01
226	18.83	0.07	0.007	0.127	0.002	0.01
227	18.92	0.07	0.007	0.127	0.002	0.01
228	19.00	0.07	0.007	0.126	0.002	0.01
229	19.08	0.10	0.010	0.125	0.003	0.01
230	19.17	0.10	0.010	0.125	0.003	0.01
231	19.25	0.10	0.010	0.124	0.003	0.01
232	19.33	0.13	0.014	0.124	0.004	0.01
233	19.42	0.13	0.014	0.123	0.004	0.01
234	19.50	0.13	0.014	0.122	0.004	0.01
235	19.58	0.10	0.010	0.122	0.003	0.01
236	19.67	0.10	0.010	0.121	0.003	0.01
237	19.75	0.10	0.010	0.121	0.003	0.01
238	19.83	0.07	0.007	0.120	0.002	0.01
239	19.92	0.07	0.007	0.120	0.002	0.01
240	20.00	0.07	0.007	0.119	0.002	0.01
241	20.08	0.10	0.010	0.119	0.003	0.01
242	20.17	0.10	0.010	0.118	0.003	0.01
243	20.25	0.10	0.010	0.118	0.003	0.01
244	20.33	0.10	0.010	0.117	0.003	0.01
245	20.42	0.10	0.010	0.117	0.003	0.01
246	20.50	0.10	0.010	0.116	0.003	0.01
247	20.58	0.10	0.010	0.116	0.003	0.01

248	20.67	0.10	0.010	0.115	0.003	0.01
249	20.75	0.10	0.010	0.115	0.003	0.01
250	20.83	0.07	0.007	0.114	0.002	0.01
251	20.92	0.07	0.007	0.114	0.002	0.01
252	21.00	0.07	0.007	0.113	0.002	0.01
253	21.08	0.10	0.010	0.113	0.003	0.01
254	21.17	0.10	0.010	0.112	0.003	0.01
255	21.25	0.10	0.010	0.112	0.003	0.01
256	21.33	0.07	0.007	0.112	0.002	0.01
257	21.42	0.07	0.007	0.111	0.002	0.01
258	21.50	0.07	0.007	0.111	0.002	0.01
259	21.58	0.10	0.010	0.110	0.003	0.01
260	21.67	0.10	0.010	0.110	0.003	0.01
261	21.75	0.10	0.010	0.109	0.003	0.01
262	21.83	0.07	0.007	0.109	0.002	0.01
263	21.92	0.07	0.007	0.109	0.002	0.01
264	22.00	0.07	0.007	0.108	0.002	0.01
265	22.08	0.10	0.010	0.108	0.003	0.01
266	22.17	0.10	0.010	0.108	0.003	0.01
267	22.25	0.10	0.010	0.107	0.003	0.01
268	22.33	0.07	0.007	0.107	0.002	0.01
269	22.42	0.07	0.007	0.107	0.002	0.01
270	22.50	0.07	0.007	0.106	0.002	0.01
271	22.58	0.07	0.007	0.106	0.002	0.01
272	22.67	0.07	0.007	0.106	0.002	0.01
273	22.75	0.07	0.007	0.105	0.002	0.01
274	22.83	0.07	0.007	0.105	0.002	0.01
275	22.92	0.07	0.007	0.105	0.002	0.01
276	23.00	0.07	0.007	0.105	0.002	0.01
277	23.08	0.07	0.007	0.104	0.002	0.01
278	23.17	0.07	0.007	0.104	0.002	0.01
279	23.25	0.07	0.007	0.104	0.002	0.01
280	23.33	0.07	0.007	0.104	0.002	0.01
281	23.42	0.07	0.007	0.104	0.002	0.01
282	23.50	0.07	0.007	0.103	0.002	0.01
283	23.58	0.07	0.007	0.103	0.002	0.01
284	23.67	0.07	0.007	0.103	0.002	0.01
285	23.75	0.07	0.007	0.103	0.002	0.01
286	23.83	0.07	0.007	0.103	0.002	0.01
287	23.92	0.07	0.007	0.103	0.002	0.01
288	24.00	0.07	0.007	0.103	0.002	0.01
Sum =		100.0		Sum =		7.7

Flood volume = Effective rainfall 0.64(In)
times area 0.7(Ac.)/[(In)/(Ft.)] = 0.0(Ac.Ft)
Total soil loss = 0.23(In)
Total soil loss = 0.014(Ac.Ft)
Total rainfall = 0.87(In)
Flood volume = 1728.8 Cubic Feet
Total soil loss = 627.5 Cubic Feet

Storm Event 1 Effective Rainfall = 2.430(In)

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Loss rate(In./Hr) Low	Effective (In/Hr)
1	0.08	0.07	0.019	0.364	0.005	0.01
2	0.17	0.07	0.019	0.362	0.005	0.01
3	0.25	0.07	0.019	0.361	0.005	0.01
4	0.33	0.10	0.029	0.360	0.008	0.02
5	0.42	0.10	0.029	0.358	0.008	0.02
6	0.50	0.10	0.029	0.357	0.008	0.02
7	0.58	0.10	0.029	0.355	0.008	0.02
8	0.67	0.10	0.029	0.354	0.008	0.02
9	0.75	0.10	0.029	0.353	0.008	0.02
10	0.83	0.13	0.039	0.351	0.010	0.03

11	0.92	0.13	0.039	0.350	0.010	0.03
12	1.00	0.13	0.039	0.348	0.010	0.03
13	1.08	0.10	0.029	0.347	0.008	0.02
14	1.17	0.10	0.029	0.346	0.008	0.02
15	1.25	0.10	0.029	0.344	0.008	0.02
16	1.33	0.10	0.029	0.343	0.008	0.02
17	1.42	0.10	0.029	0.342	0.008	0.02
18	1.50	0.10	0.029	0.340	0.008	0.02
19	1.58	0.10	0.029	0.339	0.008	0.02
20	1.67	0.10	0.029	0.338	0.008	0.02
21	1.75	0.10	0.029	0.336	0.008	0.02
22	1.83	0.13	0.039	0.335	0.010	0.03
23	1.92	0.13	0.039	0.333	0.010	0.03
24	2.00	0.13	0.039	0.332	0.010	0.03
25	2.08	0.13	0.039	0.331	0.010	0.03
26	2.17	0.13	0.039	0.329	0.010	0.03
27	2.25	0.13	0.039	0.328	0.010	0.03
28	2.33	0.13	0.039	0.327	0.010	0.03
29	2.42	0.13	0.039	0.325	0.010	0.03
30	2.50	0.13	0.039	0.324	0.010	0.03
31	2.58	0.17	0.049	0.323	0.013	0.04
32	2.67	0.17	0.049	0.321	0.013	0.04
33	2.75	0.17	0.049	0.320	0.013	0.04
34	2.83	0.17	0.049	0.319	0.013	0.04
35	2.92	0.17	0.049	0.318	0.013	0.04
36	3.00	0.17	0.049	0.316	0.013	0.04
37	3.08	0.17	0.049	0.315	0.013	0.04
38	3.17	0.17	0.049	0.314	0.013	0.04
39	3.25	0.17	0.049	0.312	0.013	0.04
40	3.33	0.17	0.049	0.311	0.013	0.04
41	3.42	0.17	0.049	0.310	0.013	0.04
42	3.50	0.17	0.049	0.308	0.013	0.04
43	3.58	0.17	0.049	0.307	0.013	0.04
44	3.67	0.17	0.049	0.306	0.013	0.04
45	3.75	0.17	0.049	0.305	0.013	0.04
46	3.83	0.20	0.058	0.303	0.016	0.04
47	3.92	0.20	0.058	0.302	0.016	0.04
48	4.00	0.20	0.058	0.301	0.016	0.04
49	4.08	0.20	0.058	0.299	0.016	0.04
50	4.17	0.20	0.058	0.298	0.016	0.04
51	4.25	0.20	0.058	0.297	0.016	0.04
52	4.33	0.23	0.068	0.296	0.018	0.05
53	4.42	0.23	0.068	0.294	0.018	0.05
54	4.50	0.23	0.068	0.293	0.018	0.05
55	4.58	0.23	0.068	0.292	0.018	0.05
56	4.67	0.23	0.068	0.291	0.018	0.05
57	4.75	0.23	0.068	0.289	0.018	0.05
58	4.83	0.27	0.078	0.288	0.021	0.06
59	4.92	0.27	0.078	0.287	0.021	0.06
60	5.00	0.27	0.078	0.286	0.021	0.06
61	5.08	0.20	0.058	0.284	0.016	0.04
62	5.17	0.20	0.058	0.283	0.016	0.04
63	5.25	0.20	0.058	0.282	0.016	0.04
64	5.33	0.23	0.068	0.281	0.018	0.05
65	5.42	0.23	0.068	0.279	0.018	0.05
66	5.50	0.23	0.068	0.278	0.018	0.05
67	5.58	0.27	0.078	0.277	0.021	0.06
68	5.67	0.27	0.078	0.276	0.021	0.06
69	5.75	0.27	0.078	0.275	0.021	0.06
70	5.83	0.27	0.078	0.273	0.021	0.06
71	5.92	0.27	0.078	0.272	0.021	0.06
72	6.00	0.27	0.078	0.271	0.021	0.06
73	6.08	0.30	0.087	0.270	0.023	0.06
74	6.17	0.30	0.087	0.268	0.023	0.06
75	6.25	0.30	0.087	0.267	0.023	0.06

76	6.33	0.30	0.087	0.266	0.023	0.06
77	6.42	0.30	0.087	0.265	0.023	0.06
78	6.50	0.30	0.087	0.264	0.023	0.06
79	6.58	0.33	0.097	0.263	0.026	0.07
80	6.67	0.33	0.097	0.261	0.026	0.07
81	6.75	0.33	0.097	0.260	0.026	0.07
82	6.83	0.33	0.097	0.259	0.026	0.07
83	6.92	0.33	0.097	0.258	0.026	0.07
84	7.00	0.33	0.097	0.257	0.026	0.07
85	7.08	0.33	0.097	0.255	0.026	0.07
86	7.17	0.33	0.097	0.254	0.026	0.07
87	7.25	0.33	0.097	0.253	0.026	0.07
88	7.33	0.37	0.107	0.252	0.028	0.08
89	7.42	0.37	0.107	0.251	0.028	0.08
90	7.50	0.37	0.107	0.250	0.028	0.08
91	7.58	0.40	0.117	0.249	0.031	0.09
92	7.67	0.40	0.117	0.247	0.031	0.09
93	7.75	0.40	0.117	0.246	0.031	0.09
94	7.83	0.43	0.126	0.245	0.034	0.09
95	7.92	0.43	0.126	0.244	0.034	0.09
96	8.00	0.43	0.126	0.243	0.034	0.09
97	8.08	0.50	0.146	0.242	0.039	0.11
98	8.17	0.50	0.146	0.241	0.039	0.11
99	8.25	0.50	0.146	0.239	0.039	0.11
100	8.33	0.50	0.146	0.238	0.039	0.11
101	8.42	0.50	0.146	0.237	0.039	0.11
102	8.50	0.50	0.146	0.236	0.039	0.11
103	8.58	0.53	0.156	0.235	0.041	0.11
104	8.67	0.53	0.156	0.234	0.041	0.11
105	8.75	0.53	0.156	0.233	0.041	0.11
106	8.83	0.57	0.165	0.232	0.044	0.12
107	8.92	0.57	0.165	0.231	0.044	0.12
108	9.00	0.57	0.165	0.230	0.044	0.12
109	9.08	0.63	0.185	0.228	0.049	0.14
110	9.17	0.63	0.185	0.227	0.049	0.14
111	9.25	0.63	0.185	0.226	0.049	0.14
112	9.33	0.67	0.194	0.225	0.052	0.14
113	9.42	0.67	0.194	0.224	0.052	0.14
114	9.50	0.67	0.194	0.223	0.052	0.14
115	9.58	0.70	0.204	0.222	0.054	0.15
116	9.67	0.70	0.204	0.221	0.054	0.15
117	9.75	0.70	0.204	0.220	0.054	0.15
118	9.83	0.73	0.214	0.219	0.057	0.16
119	9.92	0.73	0.214	0.218	0.057	0.16
120	10.00	0.73	0.214	0.217	0.057	0.16
121	10.08	0.50	0.146	0.216	0.039	0.11
122	10.17	0.50	0.146	0.215	0.039	0.11
123	10.25	0.50	0.146	0.214	0.039	0.11
124	10.33	0.50	0.146	0.213	0.039	0.11
125	10.42	0.50	0.146	0.212	0.039	0.11
126	10.50	0.50	0.146	0.210	0.039	0.11
127	10.58	0.67	0.194	0.209	0.052	0.14
128	10.67	0.67	0.194	0.208	0.052	0.14
129	10.75	0.67	0.194	0.207	0.052	0.14
130	10.83	0.67	0.194	0.206	0.052	0.14
131	10.92	0.67	0.194	0.205	0.052	0.14
132	11.00	0.67	0.194	0.204	0.052	0.14
133	11.08	0.63	0.185	0.203	0.049	0.14
134	11.17	0.63	0.185	0.202	0.049	0.14
135	11.25	0.63	0.185	0.201	0.049	0.14
136	11.33	0.63	0.185	0.200	0.049	0.14
137	11.42	0.63	0.185	0.199	0.049	0.14
138	11.50	0.63	0.185	0.198	0.049	0.14
139	11.58	0.57	0.165	0.197	0.044	0.12
140	11.67	0.57	0.165	0.196	0.044	0.12

141	11.75	0.57	0.165	0.195	0.044	0.12
142	11.83	0.60	0.175	0.194	0.047	0.13
143	11.92	0.60	0.175	0.193	0.047	0.13
144	12.00	0.60	0.175	0.193	0.047	0.13
145	12.08	0.83	0.243	0.192	---	0.05
146	12.17	0.83	0.243	0.191	---	0.05
147	12.25	0.83	0.243	0.190	---	0.05
148	12.33	0.87	0.253	0.189	---	0.06
149	12.42	0.87	0.253	0.188	---	0.06
150	12.50	0.87	0.253	0.187	---	0.07
151	12.58	0.93	0.272	0.186	---	0.09
152	12.67	0.93	0.272	0.185	---	0.09
153	12.75	0.93	0.272	0.184	---	0.09
154	12.83	0.97	0.282	0.183	---	0.10
155	12.92	0.97	0.282	0.182	---	0.10
156	13.00	0.97	0.282	0.181	---	0.10
157	13.08	1.13	0.330	0.180	---	0.15
158	13.17	1.13	0.330	0.179	---	0.15
159	13.25	1.13	0.330	0.178	---	0.15
160	13.33	1.13	0.330	0.178	---	0.15
161	13.42	1.13	0.330	0.177	---	0.15
162	13.50	1.13	0.330	0.176	---	0.15
163	13.58	0.77	0.224	0.175	---	0.05
164	13.67	0.77	0.224	0.174	---	0.05
165	13.75	0.77	0.224	0.173	---	0.05
166	13.83	0.77	0.224	0.172	---	0.05
167	13.92	0.77	0.224	0.171	---	0.05
168	14.00	0.77	0.224	0.170	---	0.05
169	14.08	0.90	0.262	0.170	---	0.09
170	14.17	0.90	0.262	0.169	---	0.09
171	14.25	0.90	0.262	0.168	---	0.09
172	14.33	0.87	0.253	0.167	---	0.09
173	14.42	0.87	0.253	0.166	---	0.09
174	14.50	0.87	0.253	0.165	---	0.09
175	14.58	0.87	0.253	0.164	---	0.09
176	14.67	0.87	0.253	0.164	---	0.09
177	14.75	0.87	0.253	0.163	---	0.09
178	14.83	0.83	0.243	0.162	---	0.08
179	14.92	0.83	0.243	0.161	---	0.08
180	15.00	0.83	0.243	0.160	---	0.08
181	15.08	0.80	0.233	0.159	---	0.07
182	15.17	0.80	0.233	0.159	---	0.07
183	15.25	0.80	0.233	0.158	---	0.08
184	15.33	0.77	0.224	0.157	---	0.07
185	15.42	0.77	0.224	0.156	---	0.07
186	15.50	0.77	0.224	0.155	---	0.07
187	15.58	0.63	0.185	0.155	---	0.03
188	15.67	0.63	0.185	0.154	---	0.03
189	15.75	0.63	0.185	0.153	---	0.03
190	15.83	0.63	0.185	0.152	---	0.03
191	15.92	0.63	0.185	0.151	---	0.03
192	16.00	0.63	0.185	0.151	---	0.03
193	16.08	0.13	0.039	0.150	0.010	0.03
194	16.17	0.13	0.039	0.149	0.010	0.03
195	16.25	0.13	0.039	0.148	0.010	0.03
196	16.33	0.13	0.039	0.148	0.010	0.03
197	16.42	0.13	0.039	0.147	0.010	0.03
198	16.50	0.13	0.039	0.146	0.010	0.03
199	16.58	0.10	0.029	0.145	0.008	0.02
200	16.67	0.10	0.029	0.145	0.008	0.02
201	16.75	0.10	0.029	0.144	0.008	0.02
202	16.83	0.10	0.029	0.143	0.008	0.02
203	16.92	0.10	0.029	0.142	0.008	0.02
204	17.00	0.10	0.029	0.142	0.008	0.02
205	17.08	0.17	0.049	0.141	0.013	0.04

206	17.17	0.17	0.049	0.140	0.013	0.04
207	17.25	0.17	0.049	0.140	0.013	0.04
208	17.33	0.17	0.049	0.139	0.013	0.04
209	17.42	0.17	0.049	0.138	0.013	0.04
210	17.50	0.17	0.049	0.138	0.013	0.04
211	17.58	0.17	0.049	0.137	0.013	0.04
212	17.67	0.17	0.049	0.136	0.013	0.04
213	17.75	0.17	0.049	0.135	0.013	0.04
214	17.83	0.13	0.039	0.135	0.010	0.03
215	17.92	0.13	0.039	0.134	0.010	0.03
216	18.00	0.13	0.039	0.133	0.010	0.03
217	18.08	0.13	0.039	0.133	0.010	0.03
218	18.17	0.13	0.039	0.132	0.010	0.03
219	18.25	0.13	0.039	0.132	0.010	0.03
220	18.33	0.13	0.039	0.131	0.010	0.03
221	18.42	0.13	0.039	0.130	0.010	0.03
222	18.50	0.13	0.039	0.130	0.010	0.03
223	18.58	0.10	0.029	0.129	0.008	0.02
224	18.67	0.10	0.029	0.128	0.008	0.02
225	18.75	0.10	0.029	0.128	0.008	0.02
226	18.83	0.07	0.019	0.127	0.005	0.01
227	18.92	0.07	0.019	0.127	0.005	0.01
228	19.00	0.07	0.019	0.126	0.005	0.01
229	19.08	0.10	0.029	0.125	0.008	0.02
230	19.17	0.10	0.029	0.125	0.008	0.02
231	19.25	0.10	0.029	0.124	0.008	0.02
232	19.33	0.13	0.039	0.124	0.010	0.03
233	19.42	0.13	0.039	0.123	0.010	0.03
234	19.50	0.13	0.039	0.122	0.010	0.03
235	19.58	0.10	0.029	0.122	0.008	0.02
236	19.67	0.10	0.029	0.121	0.008	0.02
237	19.75	0.10	0.029	0.121	0.008	0.02
238	19.83	0.07	0.019	0.120	0.005	0.01
239	19.92	0.07	0.019	0.120	0.005	0.01
240	20.00	0.07	0.019	0.119	0.005	0.01
241	20.08	0.10	0.029	0.119	0.008	0.02
242	20.17	0.10	0.029	0.118	0.008	0.02
243	20.25	0.10	0.029	0.118	0.008	0.02
244	20.33	0.10	0.029	0.117	0.008	0.02
245	20.42	0.10	0.029	0.117	0.008	0.02
246	20.50	0.10	0.029	0.116	0.008	0.02
247	20.58	0.10	0.029	0.116	0.008	0.02
248	20.67	0.10	0.029	0.115	0.008	0.02
249	20.75	0.10	0.029	0.115	0.008	0.02
250	20.83	0.07	0.019	0.114	0.005	0.01
251	20.92	0.07	0.019	0.114	0.005	0.01
252	21.00	0.07	0.019	0.113	0.005	0.01
253	21.08	0.10	0.029	0.113	0.008	0.02
254	21.17	0.10	0.029	0.112	0.008	0.02
255	21.25	0.10	0.029	0.112	0.008	0.02
256	21.33	0.07	0.019	0.112	0.005	0.01
257	21.42	0.07	0.019	0.111	0.005	0.01
258	21.50	0.07	0.019	0.111	0.005	0.01
259	21.58	0.10	0.029	0.110	0.008	0.02
260	21.67	0.10	0.029	0.110	0.008	0.02
261	21.75	0.10	0.029	0.109	0.008	0.02
262	21.83	0.07	0.019	0.109	0.005	0.01
263	21.92	0.07	0.019	0.109	0.005	0.01
264	22.00	0.07	0.019	0.108	0.005	0.01
265	22.08	0.10	0.029	0.108	0.008	0.02
266	22.17	0.10	0.029	0.108	0.008	0.02
267	22.25	0.10	0.029	0.107	0.008	0.02
268	22.33	0.07	0.019	0.107	0.005	0.01
269	22.42	0.07	0.019	0.107	0.005	0.01
270	22.50	0.07	0.019	0.106	0.005	0.01

271	22.58	0.07	0.019	0.106	0.005	0.01
272	22.67	0.07	0.019	0.106	0.005	0.01
273	22.75	0.07	0.019	0.105	0.005	0.01
274	22.83	0.07	0.019	0.105	0.005	0.01
275	22.92	0.07	0.019	0.105	0.005	0.01
276	23.00	0.07	0.019	0.105	0.005	0.01
277	23.08	0.07	0.019	0.104	0.005	0.01
278	23.17	0.07	0.019	0.104	0.005	0.01
279	23.25	0.07	0.019	0.104	0.005	0.01
280	23.33	0.07	0.019	0.104	0.005	0.01
281	23.42	0.07	0.019	0.104	0.005	0.01
282	23.50	0.07	0.019	0.103	0.005	0.01
283	23.58	0.07	0.019	0.103	0.005	0.01
284	23.67	0.07	0.019	0.103	0.005	0.01
285	23.75	0.07	0.019	0.103	0.005	0.01
286	23.83	0.07	0.019	0.103	0.005	0.01
287	23.92	0.07	0.019	0.103	0.005	0.01
288	24.00	0.07	0.019	0.103	0.005	0.01
Sum =	100.0			Sum =	16.4	

Flood volume = Effective rainfall 1.37(In)
times area 0.7(Ac.)/[(In)/(Ft.)] = 0.1(Ac.Ft)
Total soil loss = 1.06(In)
Total soil loss = 0.066(Ac.Ft)
Total rainfall = 2.43(In)
Flood volume = 3682.5 Cubic Feet
Total soil loss = 2862.6 Cubic Feet

Peak flow rate of this hydrograph = 0.117(CFS)

++

TOTAL OF: 3 24 - H O U R S T O R M E V E N T S

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	0.0000	0.00	Q	|	|	|	|
0+15	0.0000	0.00	Q	|	|	|	|
0+20	0.0001	0.00	Q	|	|	|	|
0+25	0.0001	0.00	Q	|	|	|	|
0+30	0.0001	0.00	Q	|	|	|	|
0+35	0.0001	0.00	Q	|	|	|	|
0+40	0.0001	0.00	Q	|	|	|	|
0+45	0.0002	0.00	Q	|	|	|	|
0+50	0.0002	0.00	Q	|	|	|	|
0+55	0.0002	0.00	Q	|	|	|	|
1+ 0	0.0002	0.00	Q	|	|	|	|
1+ 5	0.0003	0.00	Q	|	|	|	|
1+10	0.0003	0.00	Q	|	|	|	|
1+15	0.0003	0.00	Q	|	|	|	|
1+20	0.0003	0.00	Q	|	|	|	|
1+25	0.0004	0.00	Q	|	|	|	|
1+30	0.0004	0.00	Q	|	|	|	|
1+35	0.0004	0.00	Q	|	|	|	|
1+40	0.0004	0.00	Q	|	|	|	|
1+45	0.0004	0.00	Q	|	|	|	|
1+50	0.0005	0.00	Q	|	|	|	|
1+55	0.0005	0.00	Q	|	|	|	|
2+ 0	0.0005	0.00	Q	|	|	|	|
2+ 5	0.0005	0.00	Q	|	|	|	|
2+10	0.0006	0.00	Q	|	|	|	|
2+15	0.0006	0.00	Q	|	|	|	|

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2+20    0.0006    0.00  Q     |     |     |     |
2+25    0.0007    0.00  Q     |     |     |     |
2+30    0.0007    0.00  Q     |     |     |     |
2+35    0.0007    0.00  Q     |     |     |     |
2+40    0.0008    0.01  Q     |     |     |     |
2+45    0.0008    0.01  Q     |     |     |     |
2+50    0.0008    0.01  Q     |     |     |     |
2+55    0.0009    0.01  Q     |     |     |     |
3+ 0    0.0009    0.01  Q     |     |     |     |
3+ 5    0.0009    0.01  Q     |     |     |     |
3+10    0.0010    0.01  Q     |     |     |     |
3+15    0.0010    0.01  Q     |     |     |     |
3+20    0.0010    0.01  Q     |     |     |     |
3+25    0.0011    0.01  Q     |     |     |     |
3+30    0.0011    0.01  Q     |     |     |     |
3+35    0.0011    0.01  Q     |     |     |     |
3+40    0.0012    0.01  Q     |     |     |     |
3+45    0.0012    0.01  Q     |     |     |     |
3+50    0.0012    0.01  Q     |     |     |     |
3+55    0.0013    0.01  Q     |     |     |     |
4+ 0    0.0013    0.01  Q     |     |     |     |
4+ 5    0.0014    0.01  Q     |     |     |     |
4+10    0.0014    0.01  Q     |     |     |     |
4+15    0.0015    0.01  Q     |     |     |     |
4+20    0.0015    0.01  Q     |     |     |     |
4+25    0.0016    0.01  Q     |     |     |     |
4+30    0.0016    0.01  Q     |     |     |     |
4+35    0.0017    0.01  Q     |     |     |     |
4+40    0.0017    0.01  Q     |     |     |     |
4+45    0.0017    0.01  Q     |     |     |     |
4+50    0.0018    0.01  Q     |     |     |     |
4+55    0.0019    0.01  Q     |     |     |     |
5+ 0    0.0019    0.01  Q     |     |     |     |
5+ 5    0.0020    0.01  Q     |     |     |     |
5+10    0.0020    0.01  Q     |     |     |     |
5+15    0.0020    0.01  Q     |     |     |     |
5+20    0.0021    0.01  Q     |     |     |     |
5+25    0.0021    0.01  Q     |     |     |     |
5+30    0.0022    0.01  Q     |     |     |     |
5+35    0.0022    0.01  Q     |     |     |     |
5+40    0.0023    0.01  Q     |     |     |     |
5+45    0.0024    0.01  Q     |     |     |     |
5+50    0.0024    0.01  Q     |     |     |     |
5+55    0.0025    0.01  Q     |     |     |     |
6+ 0    0.0025    0.01  Q     |     |     |     |
6+ 5    0.0026    0.01  Q     |     |     |     |
6+10    0.0026    0.01  Q     |     |     |     |
6+15    0.0027    0.01  Q     |     |     |     |
6+20    0.0028    0.01  Q     |     |     |     |
6+25    0.0028    0.01  Q     |     |     |     |
6+30    0.0029    0.01  Q     |     |     |     |
6+35    0.0030    0.01  Q     |     |     |     |
6+40    0.0030    0.01  Q     |     |     |     |
6+45    0.0031    0.01  Q     |     |     |     |
6+50    0.0032    0.01  Q     |     |     |     |
6+55    0.0032    0.01  Q     |     |     |     |
7+ 0    0.0033    0.01  Q     |     |     |     |
7+ 5    0.0034    0.01  Q     |     |     |     |
7+10    0.0035    0.01  Q     |     |     |     |
7+15    0.0035    0.01  Q     |     |     |     |
7+20    0.0036    0.01  Q     |     |     |     |
7+25    0.0037    0.01  QV     |     |     |     |
7+30    0.0038    0.01  QV     |     |     |     |
7+35    0.0038    0.01  QV     |     |     |     |
7+40    0.0039    0.01  QV     |     |     |     |
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 7+45      0.0040     0.01  QV       |        |        |        |
 7+50      0.0041     0.01  QV       |        |        |        |
 7+55      0.0042     0.01  QV       |        |        |        |
 8+ 0      0.0043     0.01  QV       |        |        |        |
 8+ 5      0.0044     0.01  QV       |        |        |        |
 8+10      0.0045     0.02  QV       |        |        |        |
 8+15      0.0046     0.02  QV       |        |        |        |
 8+20      0.0047     0.02  QV       |        |        |        |
 8+25      0.0048     0.02  QV       |        |        |        |
 8+30      0.0049     0.02  QV       |        |        |        |
 8+35      0.0050     0.02  QV       |        |        |        |
 8+40      0.0051     0.02  QV       |        |        |        |
 8+45      0.0052     0.02  QV       |        |        |        |
 8+50      0.0053     0.02  QV       |        |        |        |
 8+55      0.0055     0.02  QV       |        |        |        |
 9+ 0      0.0056     0.02  QV       |        |        |        |
 9+ 5      0.0057     0.02  QV       |        |        |        |
 9+10      0.0058     0.02  QV       |        |        |        |
 9+15      0.0060     0.02  QV       |        |        |        |
 9+20      0.0061     0.02  QV       |        |        |        |
 9+25      0.0063     0.02  QV       |        |        |        |
 9+30      0.0064     0.02  QV       |        |        |        |
 9+35      0.0065     0.02  QV       |        |        |        |
 9+40      0.0067     0.02  QV       |        |        |        |
 9+45      0.0068     0.02  QV       |        |        |        |
 9+50      0.0070     0.02  QV       |        |        |        |
 9+55      0.0071     0.02  QV       |        |        |        |
10+ 0      0.0073     0.02  Q V      |        |        |        |
10+ 5      0.0074     0.02  Q V      |        |        |        |
10+10      0.0075     0.02  Q V      |        |        |        |
10+15      0.0076     0.02  Q V      |        |        |        |
10+20      0.0077     0.02  Q V      |        |        |        |
10+25      0.0078     0.02  Q V      |        |        |        |
10+30      0.0079     0.02  Q V      |        |        |        |
10+35      0.0081     0.02  Q V      |        |        |        |
10+40      0.0082     0.02  Q V      |        |        |        |
10+45      0.0083     0.02  Q V      |        |        |        |
10+50      0.0085     0.02  Q V      |        |        |        |
10+55      0.0086     0.02  Q V      |        |        |        |
11+ 0      0.0088     0.02  Q V      |        |        |        |
11+ 5      0.0089     0.02  Q V      |        |        |        |
11+10      0.0090     0.02  Q V      |        |        |        |
11+15      0.0092     0.02  Q V      |        |        |        |
11+20      0.0093     0.02  Q V      |        |        |        |
11+25      0.0094     0.02  Q V      |        |        |        |
11+30      0.0096     0.02  Q V      |        |        |        |
11+35      0.0097     0.02  Q V      |        |        |        |
11+40      0.0098     0.02  Q V      |        |        |        |
11+45      0.0099     0.02  Q V      |        |        |        |
11+50      0.0100     0.02  Q V      |        |        |        |
11+55      0.0102     0.02  Q V      |        |        |        |
12+ 0      0.0103     0.02  Q V      |        |        |        |
12+ 5      0.0105     0.02  Q V      |        |        |        |
12+10      0.0106     0.03  Q V      |        |        |        |
12+15      0.0108     0.03  Q V      |        |        |        |
12+20      0.0110     0.03  Q  V     |        |        |        |
12+25      0.0112     0.03  Q  V     |        |        |        |
12+30      0.0114     0.03  Q  V     |        |        |        |
12+35      0.0115     0.03  Q  V     |        |        |        |
12+40      0.0117     0.03  Q  V     |        |        |        |
12+45      0.0119     0.03  Q  V     |        |        |        |
12+50      0.0121     0.03  Q  V     |        |        |        |
12+55      0.0123     0.03  Q  V     |        |        |        |
13+ 0      0.0125     0.03  Q  V     |        |        |        |
13+ 5      0.0128     0.03  Q  V     |        |        |        |
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13+10	0.0130	0.03	Q V
13+15	0.0132	0.03	Q V
13+20	0.0135	0.03	Q V
13+25	0.0137	0.03	Q V
13+30	0.0140	0.03	Q V
13+35	0.0141	0.03	Q V
13+40	0.0143	0.02	Q V
13+45	0.0145	0.02	Q V
13+50	0.0146	0.02	Q V
13+55	0.0148	0.02	Q V
14+ 0	0.0149	0.02	Q V
14+ 5	0.0151	0.03	Q V
14+10	0.0153	0.03	Q V
14+15	0.0155	0.03	Q V
14+20	0.0157	0.03	Q V
14+25	0.0159	0.03	Q V
14+30	0.0160	0.03	Q V
14+35	0.0162	0.03	Q V
14+40	0.0164	0.03	Q V
14+45	0.0166	0.03	Q V
14+50	0.0168	0.03	Q V
14+55	0.0169	0.03	Q V
15+ 0	0.0171	0.03	Q V
15+ 5	0.0173	0.02	Q V
15+10	0.0175	0.02	Q V
15+15	0.0176	0.02	Q V
15+20	0.0178	0.02	Q V
15+25	0.0179	0.02	Q V
15+30	0.0181	0.02	Q V
15+35	0.0182	0.02	Q V
15+40	0.0184	0.02	Q V
15+45	0.0185	0.02	Q V
15+50	0.0186	0.02	Q V
15+55	0.0188	0.02	Q V
16+ 0	0.0189	0.02	Q V
16+ 5	0.0190	0.01	Q V
16+10	0.0190	0.00	Q V
16+15	0.0190	0.00	Q V
16+20	0.0190	0.00	Q V
16+25	0.0191	0.00	Q V
16+30	0.0191	0.00	Q V
16+35	0.0191	0.00	Q V
16+40	0.0191	0.00	Q V
16+45	0.0192	0.00	Q V
16+50	0.0192	0.00	Q V
16+55	0.0192	0.00	Q V
17+ 0	0.0192	0.00	Q V
17+ 5	0.0193	0.00	Q V
17+10	0.0193	0.01	Q V
17+15	0.0193	0.01	Q V
17+20	0.0194	0.01	Q V
17+25	0.0194	0.01	Q V
17+30	0.0194	0.01	Q V
17+35	0.0195	0.01	Q V
17+40	0.0195	0.01	Q V
17+45	0.0195	0.01	Q V
17+50	0.0196	0.00	Q V
17+55	0.0196	0.00	Q V
18+ 0	0.0196	0.00	Q V
18+ 5	0.0196	0.00	Q V
18+10	0.0197	0.00	Q V
18+15	0.0197	0.00	Q V
18+20	0.0197	0.00	Q V
18+25	0.0198	0.00	Q V
18+30	0.0198	0.00	Q V

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18+35    0.0198    0.00  Q    V    |         |         |         |
18+40    0.0198    0.00  Q    V    |         |         |         |
18+45    0.0199    0.00  Q    V    |         |         |         |
18+50    0.0199    0.00  Q    V    |         |         |         |
18+55    0.0199    0.00  Q    V    |         |         |         |
19+ 0    0.0199    0.00  Q    V    |         |         |         |
19+ 5    0.0199    0.00  Q    V    |         |         |         |
19+10    0.0199    0.00  Q    V    |         |         |         |
19+15    0.0200    0.00  Q    V    |         |         |         |
19+20    0.0200    0.00  Q    V    |         |         |         |
19+25    0.0200    0.00  Q    V    |         |         |         |
19+30    0.0200    0.00  Q    V    |         |         |         |
19+35    0.0201    0.00  Q    V    |         |         |         |
19+40    0.0201    0.00  Q    V    |         |         |         |
19+45    0.0201    0.00  Q    V    |         |         |         |
19+50    0.0201    0.00  Q    V    |         |         |         |
19+55    0.0201    0.00  Q    V    |         |         |         |
20+ 0    0.0201    0.00  Q    V    |         |         |         |
20+ 5    0.0202    0.00  Q    V    |         |         |         |
20+10    0.0202    0.00  Q    V    |         |         |         |
20+15    0.0202    0.00  Q    V    |         |         |         |
20+20    0.0202    0.00  Q    V    |         |         |         |
20+25    0.0202    0.00  Q    V    |         |         |         |
20+30    0.0203    0.00  Q    V    |         |         |         |
20+35    0.0203    0.00  Q    V    |         |         |         |
20+40    0.0203    0.00  Q    V    |         |         |         |
20+45    0.0203    0.00  Q    V    |         |         |         |
20+50    0.0203    0.00  Q    V    |         |         |         |
20+55    0.0204    0.00  Q    V    |         |         |         |
21+ 0    0.0204    0.00  Q    V    |         |         |         |
21+ 5    0.0204    0.00  Q    V    |         |         |         |
21+10    0.0204    0.00  Q    V    |         |         |         |
21+15    0.0204    0.00  Q    V    |         |         |         |
21+20    0.0205    0.00  Q    V    |         |         |         |
21+25    0.0205    0.00  Q    V    |         |         |         |
21+30    0.0205    0.00  Q    V    |         |         |         |
21+35    0.0205    0.00  Q    V    |         |         |         |
21+40    0.0205    0.00  Q    V    |         |         |         |
21+45    0.0205    0.00  Q    V    |         |         |         |
21+50    0.0206    0.00  Q    V    |         |         |         |
21+55    0.0206    0.00  Q    V    |         |         |         |
22+ 0    0.0206    0.00  Q    V    |         |         |         |
22+ 5    0.0206    0.00  Q    V    |         |         |         |
22+10    0.0206    0.00  Q    V    |         |         |         |
22+15    0.0206    0.00  Q    V    |         |         |         |
22+20    0.0207    0.00  Q    V    |         |         |         |
22+25    0.0207    0.00  Q    V    |         |         |         |
22+30    0.0207    0.00  Q    V    |         |         |         |
22+35    0.0207    0.00  Q    V    |         |         |         |
22+40    0.0207    0.00  Q    V    |         |         |         |
22+45    0.0207    0.00  Q    V    |         |         |         |
22+50    0.0207    0.00  Q    V    |         |         |         |
22+55    0.0208    0.00  Q    V    |         |         |         |
23+ 0    0.0208    0.00  Q    V    |         |         |         |
23+ 5    0.0208    0.00  Q    V    |         |         |         |
23+10    0.0208    0.00  Q    V    |         |         |         |
23+15    0.0208    0.00  Q    V    |         |         |         |
23+20    0.0208    0.00  Q    V    |         |         |         |
23+25    0.0208    0.00  Q    V    |         |         |         |
23+30    0.0209    0.00  Q    V    |         |         |         |
23+35    0.0209    0.00  Q    V    |         |         |         |
23+40    0.0209    0.00  Q    V    |         |         |         |
23+45    0.0209    0.00  Q    V    |         |         |         |
23+50    0.0209    0.00  Q    V    |         |         |         |
23+55    0.0209    0.00  Q    V    |         |         |         |
```

24+ 0	0.0209	0.00	Q V | | | |
24+ 5	0.0210	0.00	Q V | | | |
24+10	0.0210	0.00	Q V | | | |
24+15	0.0210	0.00	Q V | | | |
24+20	0.0211	0.01	Q V | | | |
24+25	0.0211	0.01	Q V | | | |
24+30	0.0211	0.01	Q V | | | |
24+35	0.0212	0.01	Q V | | | |
24+40	0.0212	0.01	Q V | | | |
24+45	0.0213	0.01	Q V | | | |
24+50	0.0213	0.01	Q V | | | |
24+55	0.0214	0.01	Q V | | | |
25+ 0	0.0214	0.01	Q V | | | |
25+ 5	0.0214	0.01	Q V | | | |
25+10	0.0215	0.01	Q V | | | |
25+15	0.0215	0.01	Q V | | | |
25+20	0.0216	0.01	Q V | | | |
25+25	0.0216	0.01	Q V | | | |
25+30	0.0216	0.01	Q V | | | |
25+35	0.0217	0.01	Q V | | | |
25+40	0.0217	0.01	Q V | | | |
25+45	0.0218	0.01	Q V | | | |
25+50	0.0218	0.01	Q V | | | |
25+55	0.0219	0.01	Q V | | | |
26+ 0	0.0219	0.01	Q V | | | |
26+ 5	0.0220	0.01	Q V | | | |
26+10	0.0220	0.01	Q V | | | |
26+15	0.0221	0.01	Q V | | | |
26+20	0.0221	0.01	Q V | | | |
26+25	0.0222	0.01	Q V | | | |
26+30	0.0222	0.01	Q V | | | |
26+35	0.0223	0.01	Q V | | | |
26+40	0.0224	0.01	Q V | | | |
26+45	0.0224	0.01	Q V | | | |
26+50	0.0225	0.01	Q V | | | |
26+55	0.0226	0.01	Q V | | | |
27+ 0	0.0226	0.01	Q V | | | |
27+ 5	0.0227	0.01	Q V | | | |
27+10	0.0228	0.01	Q V | | | |
27+15	0.0228	0.01	Q V | | | |
27+20	0.0229	0.01	Q V | | | |
27+25	0.0230	0.01	Q V | | | |
27+30	0.0230	0.01	Q V | | | |
27+35	0.0231	0.01	Q V | | | |
27+40	0.0232	0.01	Q V | | | |
27+45	0.0232	0.01	Q V | | | |
27+50	0.0233	0.01	Q V | | | |
27+55	0.0234	0.01	Q V | | | |
28+ 0	0.0235	0.01	Q V | | | |
28+ 5	0.0235	0.01	Q V | | | |
28+10	0.0236	0.01	Q V | | | |
28+15	0.0237	0.01	Q V | | | |
28+20	0.0238	0.01	Q V | | | |
28+25	0.0239	0.01	Q V | | | |
28+30	0.0240	0.01	Q V | | | |
28+35	0.0241	0.01	Q V | | | |
28+40	0.0242	0.01	Q V | | | |
28+45	0.0243	0.01	Q V | | | |
28+50	0.0244	0.01	Q V | | | |
28+55	0.0245	0.02	Q V | | | |
29+ 0	0.0246	0.02	Q V | | | |
29+ 5	0.0247	0.01	Q V | | | |
29+10	0.0247	0.01	Q V | | | |
29+15	0.0248	0.01	Q V | | | |
29+20	0.0249	0.01	Q V | | | |

29+25	0.0250	0.01	Q V | | | |
29+30	0.0251	0.01	Q V | | | |
29+35	0.0252	0.01	Q V | | | |
29+40	0.0253	0.02	Q V | | | |
29+45	0.0254	0.02	Q V | | | |
29+50	0.0255	0.02	Q V | | | |
29+55	0.0256	0.02	Q V | | | |
30+ 0	0.0257	0.02	Q V | | | |
30+ 5	0.0258	0.02	Q V | | | |
30+10	0.0260	0.02	Q V | | | |
30+15	0.0261	0.02	Q V | | | |
30+20	0.0262	0.02	Q V | | | |
30+25	0.0263	0.02	Q V | | | |
30+30	0.0264	0.02	Q V | | | |
30+35	0.0266	0.02	Q V | | | |
30+40	0.0267	0.02	Q V | | | |
30+45	0.0268	0.02	Q V | | | |
30+50	0.0270	0.02	Q V | | | |
30+55	0.0271	0.02	Q V | | | |
31+ 0	0.0272	0.02	Q V | | | |
31+ 5	0.0274	0.02	Q V | | | |
31+10	0.0275	0.02	Q V | | | |
31+15	0.0276	0.02	Q V | | | |
31+20	0.0278	0.02	Q V | | | |
31+25	0.0279	0.02	Q V | | | |
31+30	0.0281	0.02	Q V | | | |
31+35	0.0282	0.02	Q V | | | |
31+40	0.0284	0.02	Q V | | | |
31+45	0.0285	0.02	Q V | | | |
31+50	0.0287	0.02	Q V | | | |
31+55	0.0289	0.02	Q V | | | |
32+ 0	0.0290	0.02	Q V | | | |
32+ 5	0.0292	0.03	Q V | | | |
32+10	0.0294	0.03	Q V | | | |
32+15	0.0296	0.03	Q V | | | |
32+20	0.0298	0.03	Q V | | | |
32+25	0.0300	0.03	Q V | | | |
32+30	0.0302	0.03	Q V | | | |
32+35	0.0304	0.03	Q V | | | |
32+40	0.0306	0.03	Q V | | | |
32+45	0.0309	0.03	Q V | | | |
32+50	0.0311	0.03	Q V | | | |
32+55	0.0313	0.03	Q V | | | |
33+ 0	0.0315	0.03	Q V | | | |
33+ 5	0.0318	0.04	Q V | | | |
33+10	0.0320	0.04	Q V | | | |
33+15	0.0323	0.04	Q V | | | |
33+20	0.0325	0.04	Q V | | | |
33+25	0.0328	0.04	Q V| | | |
33+30	0.0331	0.04	Q V| | | |
33+35	0.0333	0.04	Q V| | | |
33+40	0.0336	0.04	Q V| | | |
33+45	0.0339	0.04	Q V| | | |
33+50	0.0342	0.04	Q V| | | |
33+55	0.0345	0.04	Q V| | | |
34+ 0	0.0348	0.04	Q V| | | |
34+ 5	0.0350	0.03	Q V| | | |
34+10	0.0352	0.03	Q V| | | |
34+15	0.0354	0.03	Q V| | | |
34+20	0.0356	0.03	Q V| | | |
34+25	0.0358	0.03	Q V| | | |
34+30	0.0360	0.03	Q V| | | |
34+35	0.0362	0.04	Q V| | | |
34+40	0.0365	0.04	Q V | | |
34+45	0.0368	0.04	Q V | | |

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34+50     0.0370    0.04  Q       V       |       |       |
34+55     0.0373    0.04  Q       V       |       |       |
35+ 0     0.0376    0.04  Q       V       |       |       |
35+ 5     0.0378    0.04  Q       V       |       |       |
35+10     0.0381    0.04  Q       V       |       |       |
35+15     0.0383    0.04  Q       V       |       |       |
35+20     0.0386    0.04  Q       V       |       |       |
35+25     0.0388    0.04  Q       V       |       |       |
35+30     0.0391    0.04  Q       V       |       |       |
35+35     0.0393    0.03  Q       V       |       |       |
35+40     0.0395    0.03  Q       V       |       |       |
35+45     0.0397    0.03  Q       V       |       |       |
35+50     0.0400    0.03  Q       |V      |       |       |
35+55     0.0402    0.03  Q       |V      |       |       |
36+ 0     0.0405    0.03  Q       |V      |       |       |
36+ 5     0.0408    0.04  Q       |V      |       |       |
36+10     0.0411    0.05  Q       |V      |       |       |
36+15     0.0414    0.05  Q       |V      |       |       |
36+20     0.0418    0.05  Q       |V      |       |       |
36+25     0.0421    0.05  Q       |V      |       |       |
36+30     0.0425    0.05  Q       |V      |       |       |
36+35     0.0428    0.05  Q       |V      |       |       |
36+40     0.0432    0.05  Q       |V      |       |       |
36+45     0.0436    0.05  Q       | V     |       |       |
36+50     0.0439    0.06  Q       | V     |       |       |
36+55     0.0443    0.06  Q       | V     |       |       |
37+ 0     0.0447    0.06  Q       | V     |       |       |
37+ 5     0.0451    0.06  Q       | V     |       |       |
37+10     0.0456    0.07  Q       | V     |       |       |
37+15     0.0460    0.07  Q       | V     |       |       |
37+20     0.0465    0.07  Q       | V     |       |       |
37+25     0.0469    0.07  Q       | V     |       |       |
37+30     0.0474    0.07  Q       |  V    |       |       |
37+35     0.0477    0.05  Q       |  V    |       |       |
37+40     0.0480    0.04  Q       |  V    |       |       |
37+45     0.0483    0.04  Q       |  V    |       |       |
37+50     0.0486    0.04  Q       |  V    |       |       |
37+55     0.0489    0.04  Q       |  V    |       |       |
38+ 0     0.0492    0.04  Q       |  V    |       |       |
38+ 5     0.0496    0.05  Q       |  V    |       |       |
38+10     0.0500    0.05  Q       |  V    |       |       |
38+15     0.0503    0.05  Q       |  V    |       |       |
38+20     0.0507    0.05  Q       |  V    |       |       |
38+25     0.0510    0.05  Q       |   V   |       |       |
38+30     0.0513    0.05  Q       |   V   |       |       |
38+35     0.0517    0.05  Q       |   V   |       |       |
38+40     0.0520    0.05  Q       |   V   |       |       |
38+45     0.0524    0.05  Q       |   V   |       |       |
38+50     0.0527    0.05  Q       |   V   |       |       |
38+55     0.0530    0.05  Q       |   V   |       |       |
39+ 0     0.0534    0.05  Q       |   V   |       |       |
39+ 5     0.0537    0.05  Q       |   V   |       |       |
39+10     0.0540    0.05  Q       |   V   |       |       |
39+15     0.0543    0.05  Q       |   V   |       |       |
39+20     0.0546    0.04  Q       |    V  |       |       |
39+25     0.0549    0.04  Q       |    V  |       |       |
39+30     0.0552    0.04  Q       |    V  |       |       |
39+35     0.0555    0.04  Q       |    V  |       |       |
39+40     0.0558    0.04  Q       |    V  |       |       |
39+45     0.0560    0.04  Q       |    V  |       |       |
39+50     0.0563    0.04  Q       |    V  |       |       |
39+55     0.0565    0.04  Q       |    V  |       |       |
40+ 0     0.0568    0.04  Q       |    V  |       |       |
40+ 5     0.0569    0.01  Q       |    V  |       |       |
40+10     0.0569    0.01  Q       |    V  |       |       |
```

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40+15    0.0570    0.01  Q      |    V    |       |       |
40+20    0.0570    0.01  Q      |    V    |       |       |
40+25    0.0571    0.01  Q      |    V    |       |       |
40+30    0.0571    0.01  Q      |    V    |       |       |
40+35    0.0572    0.01  Q      |    V    |       |       |
40+40    0.0572    0.01  Q      |    V    |       |       |
40+45    0.0572    0.01  Q      |    V    |       |       |
40+50    0.0573    0.01  Q      |    V    |       |       |
40+55    0.0573    0.01  Q      |    V    |       |       |
41+ 0    0.0574    0.01  Q      |    V    |       |       |
41+ 5    0.0574    0.01  Q      |    V    |       |       |
41+10    0.0575    0.01  Q      |    V    |       |       |
41+15    0.0576    0.01  Q      |    V    |       |       |
41+20    0.0576    0.01  Q      |    V    |       |       |
41+25    0.0577    0.01  Q      |    V    |       |       |
41+30    0.0578    0.01  Q      |    V    |       |       |
41+35    0.0578    0.01  Q      |    V    |       |       |
41+40    0.0579    0.01  Q      |    V    |       |       |
41+45    0.0580    0.01  Q      |    V    |       |       |
41+50    0.0580    0.01  Q      |    V    |       |       |
41+55    0.0581    0.01  Q      |    V    |       |       |
42+ 0    0.0581    0.01  Q      |     V   |       |       |
42+ 5    0.0582    0.01  Q      |     V   |       |       |
42+10    0.0582    0.01  Q      |     V   |       |       |
42+15    0.0583    0.01  Q      |     V   |       |       |
42+20    0.0583    0.01  Q      |     V   |       |       |
42+25    0.0584    0.01  Q      |     V   |       |       |
42+30    0.0584    0.01  Q      |     V   |       |       |
42+35    0.0585    0.01  Q      |     V   |       |       |
42+40    0.0585    0.01  Q      |     V   |       |       |
42+45    0.0586    0.01  Q      |     V   |       |       |
42+50    0.0586    0.00  Q      |     V   |       |       |
42+55    0.0586    0.00  Q      |     V   |       |       |
43+ 0    0.0586    0.00  Q      |     V   |       |       |
43+ 5    0.0587    0.01  Q      |     V   |       |       |
43+10    0.0587    0.01  Q      |     V   |       |       |
43+15    0.0588    0.01  Q      |     V   |       |       |
43+20    0.0588    0.01  Q      |     V   |       |       |
43+25    0.0589    0.01  Q      |     V   |       |       |
43+30    0.0589    0.01  Q      |     V   |       |       |
43+35    0.0590    0.01  Q      |     V   |       |       |
43+40    0.0590    0.01  Q      |     V   |       |       |
43+45    0.0590    0.01  Q      |     V   |       |       |
43+50    0.0591    0.00  Q      |     V   |       |       |
43+55    0.0591    0.00  Q      |     V   |       |       |
44+ 0    0.0591    0.00  Q      |     V   |       |       |
44+ 5    0.0592    0.01  Q      |     V   |       |       |
44+10    0.0592    0.01  Q      |     V   |       |       |
44+15    0.0592    0.01  Q      |     V   |       |       |
44+20    0.0593    0.01  Q      |     V   |       |       |
44+25    0.0593    0.01  Q      |     V   |       |       |
44+30    0.0594    0.01  Q      |     V   |       |       |
44+35    0.0594    0.01  Q      |     V   |       |       |
44+40    0.0594    0.01  Q      |     V   |       |       |
44+45    0.0595    0.01  Q      |     V   |       |       |
44+50    0.0595    0.00  Q      |     V   |       |       |
44+55    0.0595    0.00  Q      |     V   |       |       |
45+ 0    0.0596    0.00  Q      |     V   |       |       |
45+ 5    0.0596    0.01  Q      |     V   |       |       |
45+10    0.0596    0.01  Q      |     V   |       |       |
45+15    0.0597    0.01  Q      |     V   |       |       |
45+20    0.0597    0.00  Q      |     V   |       |       |
45+25    0.0597    0.00  Q      |     V   |       |       |
45+30    0.0598    0.00  Q      |     V   |       |       |
45+35    0.0598    0.01  Q      |     V   |       |       |
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45+40    0.0598   0.01  Q      |    V   |       |       |
45+45    0.0599   0.01  Q      |    V   |       |       |
45+50    0.0599   0.00  Q      |    V   |       |       |
45+55    0.0599   0.00  Q      |    V   |       |       |
46+ 0    0.0599   0.00  Q      |    V   |       |       |
46+ 5    0.0600   0.01  Q      |    V   |       |       |
46+10    0.0600   0.01  Q      |    V   |       |       |
46+15    0.0601   0.01  Q      |    V   |       |       |
46+20    0.0601   0.00  Q      |    V   |       |       |
46+25    0.0601   0.00  Q      |    V   |       |       |
46+30    0.0601   0.00  Q      |    V   |       |       |
46+35    0.0602   0.00  Q      |    V   |       |       |
46+40    0.0602   0.00  Q      |    V   |       |       |
46+45    0.0602   0.00  Q      |    V   |       |       |
46+50    0.0603   0.00  Q      |    V   |       |       |
46+55    0.0603   0.00  Q      |    V   |       |       |
47+ 0    0.0603   0.00  Q      |    V   |       |       |
47+ 5    0.0603   0.00  Q      |    V   |       |       |
47+10    0.0604   0.00  Q      |    V   |       |       |
47+15    0.0604   0.00  Q      |    V   |       |       |
47+20    0.0604   0.00  Q      |    V   |       |       |
47+25    0.0604   0.00  Q      |    V   |       |       |
47+30    0.0605   0.00  Q      |    V   |       |       |
47+35    0.0605   0.00  Q      |    V   |       |       |
47+40    0.0605   0.00  Q      |    V   |       |       |
47+45    0.0605   0.00  Q      |    V   |       |       |
47+50    0.0606   0.00  Q      |    V   |       |       |
47+55    0.0606   0.00  Q      |    V   |       |       |
48+ 0    0.0606   0.00  Q      |    V   |       |       |
48+ 5    0.0607   0.01  Q      |    V   |       |       |
48+10    0.0608   0.01  Q      |    V   |       |       |
48+15    0.0608   0.01  Q      |    V   |       |       |
48+20    0.0609   0.01  Q      |    V   |       |       |
48+25    0.0610   0.02  Q      |    V   |       |       |
48+30    0.0611   0.02  Q      |    V   |       |       |
48+35    0.0613   0.02  Q      |    V   |       |       |
48+40    0.0614   0.02  Q      |    V   |       |       |
48+45    0.0615   0.02  Q      |    V   |       |       |
48+50    0.0616   0.02  Q      |    V   |       |       |
48+55    0.0618   0.02  Q      |     V  |       |       |
49+ 0    0.0619   0.02  Q      |     V  |       |       |
49+ 5    0.0620   0.02  Q      |     V  |       |       |
49+10    0.0621   0.02  Q      |     V  |       |       |
49+15    0.0623   0.02  Q      |     V  |       |       |
49+20    0.0624   0.02  Q      |     V  |       |       |
49+25    0.0625   0.02  Q      |     V  |       |       |
49+30    0.0626   0.02  Q      |     V  |       |       |
49+35    0.0627   0.02  Q      |     V  |       |       |
49+40    0.0628   0.02  Q      |     V  |       |       |
49+45    0.0629   0.02  Q      |     V  |       |       |
49+50    0.0631   0.02  Q      |     V  |       |       |
49+55    0.0632   0.02  Q      |     V  |       |       |
50+ 0    0.0633   0.02  Q      |     V  |       |       |
50+ 5    0.0635   0.02  Q      |     V  |       |       |
50+10    0.0636   0.02  Q      |     V  |       |       |
50+15    0.0638   0.02  Q      |     V  |       |       |
50+20    0.0639   0.02  Q      |     V  |       |       |
50+25    0.0641   0.02  Q      |     V  |       |       |
50+30    0.0642   0.02  Q      |     V  |       |       |
50+35    0.0644   0.03  Q      |     V  |       |       |
50+40    0.0646   0.03  Q      |     V  |       |       |
50+45    0.0648   0.03  Q      |     V  |       |       |
50+50    0.0650   0.03  Q      |     V  |       |       |
50+55    0.0651   0.03  Q      |     V  |       |       |
51+ 0    0.0653   0.03  Q      |     V  |       |       |
```

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51+ 5   0.0655   0.03  Q       |      V |        |        |
51+10   0.0657   0.03  Q       |      V |        |        |
51+15   0.0659   0.03  Q       |      V |        |        |
51+20   0.0661   0.03  Q       |      V |        |        |
51+25   0.0662   0.03  Q       |      V |        |        |
51+30   0.0664   0.03  Q       |      V |        |        |
51+35   0.0666   0.03  Q       |      V |        |        |
51+40   0.0668   0.03  Q       |      V |        |        |
51+45   0.0670   0.03  Q       |      V |        |        |
51+50   0.0672   0.03  Q       |      V |        |        |
51+55   0.0674   0.03  Q       |      V |        |        |
52+ 0   0.0676   0.03  Q       |      V |        |        |
52+ 5   0.0678   0.03  Q       |      V |        |        |
52+10   0.0681   0.03  Q       |      V |        |        |
52+15   0.0683   0.03  Q       |      V |        |        |
52+20   0.0685   0.04  Q       |      V |        |        |
52+25   0.0688   0.04  Q       |      V |        |        |
52+30   0.0691   0.04  Q       |       V|        |        |
52+35   0.0693   0.04  Q       |       V|        |        |
52+40   0.0696   0.04  Q       |       V|        |        |
52+45   0.0698   0.04  Q       |       V|        |        |
52+50   0.0701   0.04  Q       |       V|        |        |
52+55   0.0704   0.04  Q       |       V|        |        |
53+ 0   0.0707   0.04  Q       |       V|        |        |
53+ 5   0.0709   0.03  Q       |       V|        |        |
53+10   0.0712   0.03  Q       |       V|        |        |
53+15   0.0714   0.03  Q       |       V|        |        |
53+20   0.0716   0.04  Q       |       V|        |        |
53+25   0.0719   0.04  Q       |       V|        |        |
53+30   0.0721   0.04  Q       |       V|        |        |
53+35   0.0724   0.04  Q       |       V|        |        |
53+40   0.0727   0.04  Q       |        V        |        |
53+45   0.0730   0.04  Q       |        V        |        |
53+50   0.0733   0.04  Q       |        V        |        |
53+55   0.0736   0.04  Q       |        V        |        |
54+ 0   0.0739   0.04  Q       |        V        |        |
54+ 5   0.0742   0.05  Q       |        V        |        |
54+10   0.0745   0.05  Q       |        V        |        |
54+15   0.0749   0.05  Q       |        V        |        |
54+20   0.0752   0.05  Q       |        V        |        |
54+25   0.0755   0.05  Q       |        V        |        |
54+30   0.0759   0.05  Q       |        V        |        |
54+35   0.0762   0.05  Q       |        |V       |        |
54+40   0.0766   0.05  Q       |        |V       |        |
54+45   0.0770   0.05  Q       |        |V       |        |
54+50   0.0773   0.05  Q       |        |V       |        |
54+55   0.0777   0.05  Q       |        |V       |        |
55+ 0   0.0781   0.05  Q       |        |V       |        |
55+ 5   0.0784   0.05  Q       |        |V       |        |
55+10   0.0788   0.05  Q       |        |V       |        |
55+15   0.0792   0.05  Q       |        |V       |        |
55+20   0.0796   0.06  Q       |        |V       |        |
55+25   0.0800   0.06  Q       |        | V      |        |
55+30   0.0804   0.06  Q       |        | V      |        |
55+35   0.0808   0.06  Q       |        | V      |        |
55+40   0.0812   0.06  Q       |        | V      |        |
55+45   0.0817   0.06  Q       |        | V      |        |
55+50   0.0822   0.07  Q       |        | V      |        |
55+55   0.0826   0.07  Q       |        | V      |        |
56+ 0   0.0831   0.07  Q       |        | V      |        |
56+ 5   0.0836   0.08  Q       |        |  V     |        |
56+10   0.0842   0.08  Q       |        |  V     |        |
56+15   0.0848   0.08  Q       |        |  V     |        |
56+20   0.0853   0.08  Q       |        |  V     |        |
56+25   0.0859   0.08  Q       |        |  V     |        |
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56+30     0.0864    0.08  Q       |        |  V      |        |
56+35     0.0870    0.08  Q       |        |  V      |        |
56+40     0.0876    0.09  Q       |        |   V     |        |
56+45     0.0882    0.09  Q       |        |   V     |        |
56+50     0.0888    0.09  Q       |        |   V     |        |
56+55     0.0894    0.09  Q       |        |   V     |        |
57+ 0     0.0900    0.09  Q       |        |   V     |        |
57+ 5     0.0907    0.10  Q       |        |   V     |        |
57+10     0.0914    0.10  Q       |        |    V    |        |
57+15     0.0921    0.10  Q       |        |    V    |        |
57+20     0.0928    0.11  Q       |        |    V    |        |
57+25     0.0936    0.11  Q       |        |    V    |        |
57+30     0.0943    0.11  Q       |        |    V    |        |
57+35     0.0951    0.11  Q       |        |     V   |        |
57+40     0.0958    0.11  Q       |        |     V   |        |
57+45     0.0966    0.11  Q       |        |     V   |        |
57+50     0.0974    0.12  Q       |        |     V   |        |
57+55     0.0982    0.12  Q       |        |      V  |        |
58+ 0     0.0990    0.12  Q       |        |      V  |        |
58+ 5     0.0996    0.09  Q       |        |      V  |        |
58+10     0.1002    0.08  Q       |        |      V  |        |
58+15     0.1007    0.08  Q       |        |      V  |        |
58+20     0.1013    0.08  Q       |        |      V  |        |
58+25     0.1018    0.08  Q       |        |       V |        |
58+30     0.1024    0.08  Q       |        |       V |        |
58+35     0.1031    0.10  Q       |        |       V |        |
58+40     0.1038    0.11  Q       |        |       V |        |
58+45     0.1046    0.11  Q       |        |       V |        |
58+50     0.1053    0.11  Q       |        |        V|        |
58+55     0.1060    0.11  Q       |        |        V|        |
59+ 0     0.1068    0.11  Q       |        |        V|        |
59+ 5     0.1075    0.10  Q       |        |        V|        |
59+10     0.1082    0.10  Q       |        |        V|        |
59+15     0.1089    0.10  Q       |        |        V|        |
59+20     0.1096    0.10  Q       |        |         V       |
59+25     0.1103    0.10  Q       |        |         V       |
59+30     0.1110    0.10  Q       |        |         V       |
59+35     0.1116    0.09  Q       |        |         V       |
59+40     0.1122    0.09  Q       |        |         V       |
59+45     0.1128    0.09  Q       |        |         |V       |
59+50     0.1135    0.09  Q       |        |         |V       |
59+55     0.1142    0.10  Q       |        |         |V       |
60+ 0     0.1148    0.10  Q       |        |         |V       |
60+ 5     0.1152    0.05  Q       |        |         |V       |
60+10     0.1154    0.04  Q       |        |         |V       |
60+15     0.1157    0.04  Q       |        |         |V       |
60+20     0.1160    0.05  Q       |        |         |V       |
60+25     0.1164    0.05  Q       |        |         | V      |
60+30     0.1167    0.05  Q       |        |         | V      |
60+35     0.1171    0.06  Q       |        |         | V      |
60+40     0.1176    0.07  Q       |        |         | V      |
60+45     0.1180    0.07  Q       |        |         | V      |
60+50     0.1185    0.07  Q       |        |         | V      |
60+55     0.1190    0.07  Q       |        |         | V      |
61+ 0     0.1196    0.08  Q       |        |         | V      |
61+ 5     0.1203    0.10  Q       |        |         |  V     |
61+10     0.1211    0.11  Q       |        |         |  V     |
61+15     0.1218    0.11  Q       |        |         |  V     |
61+20     0.1226    0.11  Q       |        |         |  V     |
61+25     0.1234    0.11  Q       |        |         |   V    |
61+30     0.1242    0.12  Q       |        |         |   V    |
61+35     0.1246    0.05  Q       |        |         |   V    |
61+40     0.1248    0.04  Q       |        |         |   V    |
61+45     0.1251    0.04  Q       |        |         |   V    |
61+50     0.1254    0.04  Q       |        |         |   V    |
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61+55     0.1256    0.04  Q        |        |        |   V     |
62+ 0     0.1259    0.04  Q        |        |        |   V     |
62+ 5     0.1263    0.06  Q        |        |        |   V     |
62+10     0.1268    0.07  Q        |        |        |   V     |
62+15     0.1273    0.07  Q        |        |        |    V    |
62+20     0.1278    0.07  Q        |        |        |    V    |
62+25     0.1282    0.06  Q        |        |        |    V    |
62+30     0.1286    0.07  Q        |        |        |    V    |
62+35     0.1291    0.07  Q        |        |        |    V    |
62+40     0.1296    0.07  Q        |        |        |    V    |
62+45     0.1300    0.07  Q        |        |        |    V    |
62+50     0.1305    0.06  Q        |        |        |    V    |
62+55     0.1309    0.06  Q        |        |        |     V   |
63+ 0     0.1313    0.06  Q        |        |        |     V   |
63+ 5     0.1317    0.06  Q        |        |        |     V   |
63+10     0.1321    0.06  Q        |        |        |     V   |
63+15     0.1325    0.06  Q        |        |        |     V   |
63+20     0.1328    0.05  Q        |        |        |     V   |
63+25     0.1332    0.05  Q        |        |        |     V   |
63+30     0.1335    0.05  Q        |        |        |     V   |
63+35     0.1337    0.03  Q        |        |        |     V   |
63+40     0.1339    0.02  Q        |        |        |     V   |
63+45     0.1340    0.02  Q        |        |        |     V   |
63+50     0.1342    0.02  Q        |        |        |     V   |
63+55     0.1344    0.02  Q        |        |        |      V  |
64+ 0     0.1345    0.03  Q        |        |        |      V  |
64+ 5     0.1347    0.02  Q        |        |        |      V  |
64+10     0.1348    0.02  Q        |        |        |      V  |
64+15     0.1350    0.02  Q        |        |        |      V  |
64+20     0.1351    0.02  Q        |        |        |      V  |
64+25     0.1353    0.02  Q        |        |        |      V  |
64+30     0.1354    0.02  Q        |        |        |      V  |
64+35     0.1355    0.02  Q        |        |        |      V  |
64+40     0.1357    0.02  Q        |        |        |      V  |
64+45     0.1358    0.02  Q        |        |        |      V  |
64+50     0.1359    0.02  Q        |        |        |      V  |
64+55     0.1360    0.02  Q        |        |        |      V  |
65+ 0     0.1361    0.02  Q        |        |        |      V  |
65+ 5     0.1363    0.02  Q        |        |        |      V  |
65+10     0.1364    0.03  Q        |        |        |      V  |
65+15     0.1366    0.03  Q        |        |        |      V  |
65+20     0.1368    0.03  Q        |        |        |      V  |
65+25     0.1370    0.03  Q        |        |        |      V  |
65+30     0.1372    0.03  Q        |        |        |      V  |
65+35     0.1374    0.03  Q        |        |        |      V  |
65+40     0.1375    0.03  Q        |        |        |      V  |
65+45     0.1377    0.03  Q        |        |        |      V  |
65+50     0.1379    0.02  Q        |        |        |      V  |
65+55     0.1380    0.02  Q        |        |        |       V |
66+ 0     0.1382    0.02  Q        |        |        |       V |
66+ 5     0.1383    0.02  Q        |        |        |       V |
66+10     0.1385    0.02  Q        |        |        |       V |
66+15     0.1386    0.02  Q        |        |        |       V |
66+20     0.1388    0.02  Q        |        |        |       V |
66+25     0.1389    0.02  Q        |        |        |       V |
66+30     0.1391    0.02  Q        |        |        |       V |
66+35     0.1392    0.02  Q        |        |        |       V |
66+40     0.1393    0.02  Q        |        |        |       V |
66+45     0.1394    0.02  Q        |        |        |       V |
66+50     0.1395    0.01  Q        |        |        |       V |
66+55     0.1396    0.01  Q        |        |        |       V |
67+ 0     0.1396    0.01  Q        |        |        |       V |
67+ 5     0.1397    0.01  Q        |        |        |       V |
67+10     0.1398    0.02  Q        |        |        |       V |
67+15     0.1400    0.02  Q        |        |        |       V |
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 67+20      0.1401     0.02  Q        |         |         |        V |
 67+25      0.1402     0.02  Q        |         |         |        V |
 67+30      0.1404     0.02  Q        |         |         |        V |
 67+35      0.1405     0.02  Q        |         |         |        V |
 67+40      0.1406     0.02  Q        |         |         |        V |
 67+45      0.1407     0.02  Q        |         |         |        V |
 67+50      0.1408     0.01  Q        |         |         |        V |
 67+55      0.1409     0.01  Q        |         |         |        V |
 68+ 0      0.1410     0.01  Q        |         |         |        V |
 68+ 5      0.1411     0.01  Q        |         |         |        V |
 68+10      0.1412     0.02  Q        |         |         |        V |
 68+15      0.1413     0.02  Q        |         |         |        V |
 68+20      0.1414     0.02  Q        |         |         |        V |
 68+25      0.1415     0.02  Q        |         |         |        V |
 68+30      0.1416     0.02  Q        |         |         |         V|
 68+35      0.1417     0.02  Q        |         |         |         V|
 68+40      0.1418     0.02  Q        |         |         |         V|
 68+45      0.1419     0.02  Q        |         |         |         V|
 68+50      0.1420     0.01  Q        |         |         |         V|
 68+55      0.1421     0.01  Q        |         |         |         V|
 69+ 0      0.1422     0.01  Q        |         |         |         V|
 69+ 5      0.1423     0.01  Q        |         |         |         V|
 69+10      0.1424     0.02  Q        |         |         |         V|
 69+15      0.1425     0.02  Q        |         |         |         V|
 69+20      0.1426     0.01  Q        |         |         |         V|
 69+25      0.1426     0.01  Q        |         |         |         V|
 69+30      0.1427     0.01  Q        |         |         |         V|
 69+35      0.1428     0.01  Q        |         |         |         V|
 69+40      0.1429     0.02  Q        |         |         |         V|
 69+45      0.1430     0.02  Q        |         |         |         V|
 69+50      0.1431     0.01  Q        |         |         |         V|
 69+55      0.1432     0.01  Q        |         |         |         V|
 70+ 0      0.1433     0.01  Q        |         |         |         V|
 70+ 5      0.1434     0.01  Q        |         |         |         V|
 70+10      0.1435     0.02  Q        |         |         |         V|
 70+15      0.1436     0.02  Q        |         |         |         V|
 70+20      0.1437     0.01  Q        |         |         |         V|
 70+25      0.1437     0.01  Q        |         |         |         V|
 70+30      0.1438     0.01  Q        |         |         |         V|
 70+35      0.1439     0.01  Q        |         |         |         V|
 70+40      0.1440     0.01  Q        |         |         |         V|
 70+45      0.1440     0.01  Q        |         |         |         V|
 70+50      0.1441     0.01  Q        |         |         |         V|
 70+55      0.1442     0.01  Q        |         |         |         V|
 71+ 0      0.1443     0.01  Q        |         |         |         V|
 71+ 5      0.1443     0.01  Q        |         |         |         V|
 71+10      0.1444     0.01  Q        |         |         |         V|
 71+15      0.1445     0.01  Q        |         |         |         V|
 71+20      0.1446     0.01  Q        |         |         |         V|
 71+25      0.1446     0.01  Q        |         |         |         V|
 71+30      0.1447     0.01  Q        |         |         |         V|
 71+35      0.1448     0.01  Q        |         |         |         V|
 71+40      0.1449     0.01  Q        |         |         |         V|
 71+45      0.1449     0.01  Q        |         |         |         V|
 71+50      0.1450     0.01  Q        |         |         |         V|
 71+55      0.1451     0.01  Q        |         |         |         V|
 72+ 0      0.1451     0.01  Q        |         |         |         V|
 72+ 5      0.1452     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

Study date 09/23/20 File: BPOST245.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

28771 Central Avenue Gas Station
Area B
Post-development
24-Hr 5-Yr Storm Event

Drainage Area = 0.74(Ac.) = 0.001 Sq. Mi.
Length along longest watercourse = 284.00(Ft.)
Length along longest watercourse measured to centroid = 86.63(Ft.)
Length along longest watercourse = 0.054 Mi.
Length along longest watercourse measured to centroid = 0.016 Mi.
Difference in elevation = 1.69(Ft.)
Slope along watercourse = 31.4197 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.013 Hr.
Lag time = 0.78 Min.
25% of lag time = 0.19 Min.
40% of lag time = 0.31 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]
0.74	2.43	1.80

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
0.74	6.58	4.88

STORM EVENT (YEAR) = 5.00
Area Averaged 2-Year Rainfall = 2.430(In)
Area Averaged 100-Year Rainfall = 6.580(In)

Point rain (area averaged) = 3.402(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 3.402(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
0.742	55.00	0.792

Total Area Entered = 0.74(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
55.0	35.0	0.715	0.792	0.205	1.000	0.205

Sum (F) = 0.205

Area averaged mean soil loss (F) (In/Hr) = 0.205

Minimum soil loss rate ((In/Hr)) = 0.103

(for 24 hour storm duration)

Soil low loss rate (decimal) = 0.266

U n i t H y d r o g r a p h

DESERT S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	645.077	77.129	0.577
2	0.167	1290.154	22.871	0.171
			Sum = 100.000	Sum= 0.748

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Loss rate(In./Hr) Low	Effective (In/Hr)
1	0.08	0.07	0.027	0.364	0.007	0.02
2	0.17	0.07	0.027	0.362	0.007	0.02
3	0.25	0.07	0.027	0.361	0.007	0.02
4	0.33	0.10	0.041	0.360	0.011	0.03
5	0.42	0.10	0.041	0.358	0.011	0.03
6	0.50	0.10	0.041	0.357	0.011	0.03
7	0.58	0.10	0.041	0.355	0.011	0.03
8	0.67	0.10	0.041	0.354	0.011	0.03
9	0.75	0.10	0.041	0.353	0.011	0.03
10	0.83	0.13	0.054	0.351	0.014	0.04
11	0.92	0.13	0.054	0.350	0.014	0.04
12	1.00	0.13	0.054	0.348	0.014	0.04
13	1.08	0.10	0.041	0.347	0.011	0.03
14	1.17	0.10	0.041	0.346	0.011	0.03
15	1.25	0.10	0.041	0.344	0.011	0.03
16	1.33	0.10	0.041	0.343	0.011	0.03
17	1.42	0.10	0.041	0.342	0.011	0.03
18	1.50	0.10	0.041	0.340	0.011	0.03
19	1.58	0.10	0.041	0.339	0.011	0.03
20	1.67	0.10	0.041	0.338	0.011	0.03
21	1.75	0.10	0.041	0.336	0.011	0.03
22	1.83	0.13	0.054	0.335	0.014	0.04
23	1.92	0.13	0.054	0.333	0.014	0.04
24	2.00	0.13	0.054	0.332	0.014	0.04
25	2.08	0.13	0.054	0.331	0.014	0.04
26	2.17	0.13	0.054	0.329	0.014	0.04
27	2.25	0.13	0.054	0.328	0.014	0.04
28	2.33	0.13	0.054	0.327	0.014	0.04
29	2.42	0.13	0.054	0.325	0.014	0.04
30	2.50	0.13	0.054	0.324	0.014	0.04
31	2.58	0.17	0.068	0.323	0.018	0.05
32	2.67	0.17	0.068	0.321	0.018	0.05
33	2.75	0.17	0.068	0.320	0.018	0.05

34	2.83	0.17	0.068	0.319	0.018	0.05
35	2.92	0.17	0.068	0.318	0.018	0.05
36	3.00	0.17	0.068	0.316	0.018	0.05
37	3.08	0.17	0.068	0.315	0.018	0.05
38	3.17	0.17	0.068	0.314	0.018	0.05
39	3.25	0.17	0.068	0.312	0.018	0.05
40	3.33	0.17	0.068	0.311	0.018	0.05
41	3.42	0.17	0.068	0.310	0.018	0.05
42	3.50	0.17	0.068	0.308	0.018	0.05
43	3.58	0.17	0.068	0.307	0.018	0.05
44	3.67	0.17	0.068	0.306	0.018	0.05
45	3.75	0.17	0.068	0.305	0.018	0.05
46	3.83	0.20	0.082	0.303	0.022	0.06
47	3.92	0.20	0.082	0.302	0.022	0.06
48	4.00	0.20	0.082	0.301	0.022	0.06
49	4.08	0.20	0.082	0.299	0.022	0.06
50	4.17	0.20	0.082	0.298	0.022	0.06
51	4.25	0.20	0.082	0.297	0.022	0.06
52	4.33	0.23	0.095	0.296	0.025	0.07
53	4.42	0.23	0.095	0.294	0.025	0.07
54	4.50	0.23	0.095	0.293	0.025	0.07
55	4.58	0.23	0.095	0.292	0.025	0.07
56	4.67	0.23	0.095	0.291	0.025	0.07
57	4.75	0.23	0.095	0.289	0.025	0.07
58	4.83	0.27	0.109	0.288	0.029	0.08
59	4.92	0.27	0.109	0.287	0.029	0.08
60	5.00	0.27	0.109	0.286	0.029	0.08
61	5.08	0.20	0.082	0.284	0.022	0.06
62	5.17	0.20	0.082	0.283	0.022	0.06
63	5.25	0.20	0.082	0.282	0.022	0.06
64	5.33	0.23	0.095	0.281	0.025	0.07
65	5.42	0.23	0.095	0.279	0.025	0.07
66	5.50	0.23	0.095	0.278	0.025	0.07
67	5.58	0.27	0.109	0.277	0.029	0.08
68	5.67	0.27	0.109	0.276	0.029	0.08
69	5.75	0.27	0.109	0.275	0.029	0.08
70	5.83	0.27	0.109	0.273	0.029	0.08
71	5.92	0.27	0.109	0.272	0.029	0.08
72	6.00	0.27	0.109	0.271	0.029	0.08
73	6.08	0.30	0.122	0.270	0.033	0.09
74	6.17	0.30	0.122	0.268	0.033	0.09
75	6.25	0.30	0.122	0.267	0.033	0.09
76	6.33	0.30	0.122	0.266	0.033	0.09
77	6.42	0.30	0.122	0.265	0.033	0.09
78	6.50	0.30	0.122	0.264	0.033	0.09
79	6.58	0.33	0.136	0.263	0.036	0.10
80	6.67	0.33	0.136	0.261	0.036	0.10
81	6.75	0.33	0.136	0.260	0.036	0.10
82	6.83	0.33	0.136	0.259	0.036	0.10
83	6.92	0.33	0.136	0.258	0.036	0.10
84	7.00	0.33	0.136	0.257	0.036	0.10
85	7.08	0.33	0.136	0.255	0.036	0.10
86	7.17	0.33	0.136	0.254	0.036	0.10
87	7.25	0.33	0.136	0.253	0.036	0.10
88	7.33	0.37	0.150	0.252	0.040	0.11
89	7.42	0.37	0.150	0.251	0.040	0.11
90	7.50	0.37	0.150	0.250	0.040	0.11
91	7.58	0.40	0.163	0.249	0.043	0.12
92	7.67	0.40	0.163	0.247	0.043	0.12
93	7.75	0.40	0.163	0.246	0.043	0.12
94	7.83	0.43	0.177	0.245	0.047	0.13
95	7.92	0.43	0.177	0.244	0.047	0.13
96	8.00	0.43	0.177	0.243	0.047	0.13
97	8.08	0.50	0.204	0.242	0.054	0.15
98	8.17	0.50	0.204	0.241	0.054	0.15

99	8.25	0.50	0.204	0.239	0.054	0.15
100	8.33	0.50	0.204	0.238	0.054	0.15
101	8.42	0.50	0.204	0.237	0.054	0.15
102	8.50	0.50	0.204	0.236	0.054	0.15
103	8.58	0.53	0.218	0.235	0.058	0.16
104	8.67	0.53	0.218	0.234	0.058	0.16
105	8.75	0.53	0.218	0.233	0.058	0.16
106	8.83	0.57	0.231	0.232	0.062	0.17
107	8.92	0.57	0.231	0.231	---	0.00
108	9.00	0.57	0.231	0.230	---	0.00
109	9.08	0.63	0.259	0.228	---	0.03
110	9.17	0.63	0.259	0.227	---	0.03
111	9.25	0.63	0.259	0.226	---	0.03
112	9.33	0.67	0.272	0.225	---	0.05
113	9.42	0.67	0.272	0.224	---	0.05
114	9.50	0.67	0.272	0.223	---	0.05
115	9.58	0.70	0.286	0.222	---	0.06
116	9.67	0.70	0.286	0.221	---	0.06
117	9.75	0.70	0.286	0.220	---	0.07
118	9.83	0.73	0.299	0.219	---	0.08
119	9.92	0.73	0.299	0.218	---	0.08
120	10.00	0.73	0.299	0.217	---	0.08
121	10.08	0.50	0.204	0.216	0.054	0.15
122	10.17	0.50	0.204	0.215	0.054	0.15
123	10.25	0.50	0.204	0.214	0.054	0.15
124	10.33	0.50	0.204	0.213	0.054	0.15
125	10.42	0.50	0.204	0.212	0.054	0.15
126	10.50	0.50	0.204	0.210	0.054	0.15
127	10.58	0.67	0.272	0.209	---	0.06
128	10.67	0.67	0.272	0.208	---	0.06
129	10.75	0.67	0.272	0.207	---	0.06
130	10.83	0.67	0.272	0.206	---	0.07
131	10.92	0.67	0.272	0.205	---	0.07
132	11.00	0.67	0.272	0.204	---	0.07
133	11.08	0.63	0.259	0.203	---	0.06
134	11.17	0.63	0.259	0.202	---	0.06
135	11.25	0.63	0.259	0.201	---	0.06
136	11.33	0.63	0.259	0.200	---	0.06
137	11.42	0.63	0.259	0.199	---	0.06
138	11.50	0.63	0.259	0.198	---	0.06
139	11.58	0.57	0.231	0.197	---	0.03
140	11.67	0.57	0.231	0.196	---	0.03
141	11.75	0.57	0.231	0.195	---	0.04
142	11.83	0.60	0.245	0.194	---	0.05
143	11.92	0.60	0.245	0.193	---	0.05
144	12.00	0.60	0.245	0.193	---	0.05
145	12.08	0.83	0.340	0.192	---	0.15
146	12.17	0.83	0.340	0.191	---	0.15
147	12.25	0.83	0.340	0.190	---	0.15
148	12.33	0.87	0.354	0.189	---	0.17
149	12.42	0.87	0.354	0.188	---	0.17
150	12.50	0.87	0.354	0.187	---	0.17
151	12.58	0.93	0.381	0.186	---	0.20
152	12.67	0.93	0.381	0.185	---	0.20
153	12.75	0.93	0.381	0.184	---	0.20
154	12.83	0.97	0.395	0.183	---	0.21
155	12.92	0.97	0.395	0.182	---	0.21
156	13.00	0.97	0.395	0.181	---	0.21
157	13.08	1.13	0.463	0.180	---	0.28
158	13.17	1.13	0.463	0.179	---	0.28
159	13.25	1.13	0.463	0.178	---	0.28
160	13.33	1.13	0.463	0.178	---	0.29
161	13.42	1.13	0.463	0.177	---	0.29
162	13.50	1.13	0.463	0.176	---	0.29
163	13.58	0.77	0.313	0.175	---	0.14

164	13.67	0.77	0.313	0.174	---	0.14
165	13.75	0.77	0.313	0.173	---	0.14
166	13.83	0.77	0.313	0.172	---	0.14
167	13.92	0.77	0.313	0.171	---	0.14
168	14.00	0.77	0.313	0.170	---	0.14
169	14.08	0.90	0.367	0.170	---	0.20
170	14.17	0.90	0.367	0.169	---	0.20
171	14.25	0.90	0.367	0.168	---	0.20
172	14.33	0.87	0.354	0.167	---	0.19
173	14.42	0.87	0.354	0.166	---	0.19
174	14.50	0.87	0.354	0.165	---	0.19
175	14.58	0.87	0.354	0.164	---	0.19
176	14.67	0.87	0.354	0.164	---	0.19
177	14.75	0.87	0.354	0.163	---	0.19
178	14.83	0.83	0.340	0.162	---	0.18
179	14.92	0.83	0.340	0.161	---	0.18
180	15.00	0.83	0.340	0.160	---	0.18
181	15.08	0.80	0.327	0.159	---	0.17
182	15.17	0.80	0.327	0.159	---	0.17
183	15.25	0.80	0.327	0.158	---	0.17
184	15.33	0.77	0.313	0.157	---	0.16
185	15.42	0.77	0.313	0.156	---	0.16
186	15.50	0.77	0.313	0.155	---	0.16
187	15.58	0.63	0.259	0.155	---	0.10
188	15.67	0.63	0.259	0.154	---	0.10
189	15.75	0.63	0.259	0.153	---	0.11
190	15.83	0.63	0.259	0.152	---	0.11
191	15.92	0.63	0.259	0.151	---	0.11
192	16.00	0.63	0.259	0.151	---	0.11
193	16.08	0.13	0.054	0.150	0.014	0.04
194	16.17	0.13	0.054	0.149	0.014	0.04
195	16.25	0.13	0.054	0.148	0.014	0.04
196	16.33	0.13	0.054	0.148	0.014	0.04
197	16.42	0.13	0.054	0.147	0.014	0.04
198	16.50	0.13	0.054	0.146	0.014	0.04
199	16.58	0.10	0.041	0.145	0.011	0.03
200	16.67	0.10	0.041	0.145	0.011	0.03
201	16.75	0.10	0.041	0.144	0.011	0.03
202	16.83	0.10	0.041	0.143	0.011	0.03
203	16.92	0.10	0.041	0.142	0.011	0.03
204	17.00	0.10	0.041	0.142	0.011	0.03
205	17.08	0.17	0.068	0.141	0.018	0.05
206	17.17	0.17	0.068	0.140	0.018	0.05
207	17.25	0.17	0.068	0.140	0.018	0.05
208	17.33	0.17	0.068	0.139	0.018	0.05
209	17.42	0.17	0.068	0.138	0.018	0.05
210	17.50	0.17	0.068	0.138	0.018	0.05
211	17.58	0.17	0.068	0.137	0.018	0.05
212	17.67	0.17	0.068	0.136	0.018	0.05
213	17.75	0.17	0.068	0.135	0.018	0.05
214	17.83	0.13	0.054	0.135	0.014	0.04
215	17.92	0.13	0.054	0.134	0.014	0.04
216	18.00	0.13	0.054	0.133	0.014	0.04
217	18.08	0.13	0.054	0.133	0.014	0.04
218	18.17	0.13	0.054	0.132	0.014	0.04
219	18.25	0.13	0.054	0.132	0.014	0.04
220	18.33	0.13	0.054	0.131	0.014	0.04
221	18.42	0.13	0.054	0.130	0.014	0.04
222	18.50	0.13	0.054	0.130	0.014	0.04
223	18.58	0.10	0.041	0.129	0.011	0.03
224	18.67	0.10	0.041	0.128	0.011	0.03
225	18.75	0.10	0.041	0.128	0.011	0.03
226	18.83	0.07	0.027	0.127	0.007	0.02
227	18.92	0.07	0.027	0.127	0.007	0.02
228	19.00	0.07	0.027	0.126	0.007	0.02

229	19.08	0.10	0.041	0.125	0.011	0.03
230	19.17	0.10	0.041	0.125	0.011	0.03
231	19.25	0.10	0.041	0.124	0.011	0.03
232	19.33	0.13	0.054	0.124	0.014	0.04
233	19.42	0.13	0.054	0.123	0.014	0.04
234	19.50	0.13	0.054	0.122	0.014	0.04
235	19.58	0.10	0.041	0.122	0.011	0.03
236	19.67	0.10	0.041	0.121	0.011	0.03
237	19.75	0.10	0.041	0.121	0.011	0.03
238	19.83	0.07	0.027	0.120	0.007	0.02
239	19.92	0.07	0.027	0.120	0.007	0.02
240	20.00	0.07	0.027	0.119	0.007	0.02
241	20.08	0.10	0.041	0.119	0.011	0.03
242	20.17	0.10	0.041	0.118	0.011	0.03
243	20.25	0.10	0.041	0.118	0.011	0.03
244	20.33	0.10	0.041	0.117	0.011	0.03
245	20.42	0.10	0.041	0.117	0.011	0.03
246	20.50	0.10	0.041	0.116	0.011	0.03
247	20.58	0.10	0.041	0.116	0.011	0.03
248	20.67	0.10	0.041	0.115	0.011	0.03
249	20.75	0.10	0.041	0.115	0.011	0.03
250	20.83	0.07	0.027	0.114	0.007	0.02
251	20.92	0.07	0.027	0.114	0.007	0.02
252	21.00	0.07	0.027	0.113	0.007	0.02
253	21.08	0.10	0.041	0.113	0.011	0.03
254	21.17	0.10	0.041	0.112	0.011	0.03
255	21.25	0.10	0.041	0.112	0.011	0.03
256	21.33	0.07	0.027	0.112	0.007	0.02
257	21.42	0.07	0.027	0.111	0.007	0.02
258	21.50	0.07	0.027	0.111	0.007	0.02
259	21.58	0.10	0.041	0.110	0.011	0.03
260	21.67	0.10	0.041	0.110	0.011	0.03
261	21.75	0.10	0.041	0.109	0.011	0.03
262	21.83	0.07	0.027	0.109	0.007	0.02
263	21.92	0.07	0.027	0.109	0.007	0.02
264	22.00	0.07	0.027	0.108	0.007	0.02
265	22.08	0.10	0.041	0.108	0.011	0.03
266	22.17	0.10	0.041	0.108	0.011	0.03
267	22.25	0.10	0.041	0.107	0.011	0.03
268	22.33	0.07	0.027	0.107	0.007	0.02
269	22.42	0.07	0.027	0.107	0.007	0.02
270	22.50	0.07	0.027	0.106	0.007	0.02
271	22.58	0.07	0.027	0.106	0.007	0.02
272	22.67	0.07	0.027	0.106	0.007	0.02
273	22.75	0.07	0.027	0.105	0.007	0.02
274	22.83	0.07	0.027	0.105	0.007	0.02
275	22.92	0.07	0.027	0.105	0.007	0.02
276	23.00	0.07	0.027	0.105	0.007	0.02
277	23.08	0.07	0.027	0.104	0.007	0.02
278	23.17	0.07	0.027	0.104	0.007	0.02
279	23.25	0.07	0.027	0.104	0.007	0.02
280	23.33	0.07	0.027	0.104	0.007	0.02
281	23.42	0.07	0.027	0.104	0.007	0.02
282	23.50	0.07	0.027	0.103	0.007	0.02
283	23.58	0.07	0.027	0.103	0.007	0.02
284	23.67	0.07	0.027	0.103	0.007	0.02
285	23.75	0.07	0.027	0.103	0.007	0.02
286	23.83	0.07	0.027	0.103	0.007	0.02
287	23.92	0.07	0.027	0.103	0.007	0.02
288	24.00	0.07	0.027	0.103	0.007	0.02
Sum =	100.0			Sum =	21.7	

Flood volume = Effective rainfall 1.81(In)
times area 0.7(Ac.)/[(In)/(Ft.)] = 0.1(Ac.Ft)
Total soil loss = 1.59(In)
Total soil loss = 0.098(Ac.Ft)

```
Total rainfall =      3.40(In)
Flood volume =       4879.0 Cubic Feet
Total soil loss =       4284.2 Cubic Feet
--------------------------------------------------------------------
 Peak flow rate of this hydrograph =      0.215(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     0.01  Q       |        |        |        |
  0+15      0.0003     0.01  Q       |        |        |        |
  0+20      0.0004     0.02  Q       |        |        |        |
  0+25      0.0006     0.02  Q       |        |        |        |
  0+30      0.0007     0.02  Q       |        |        |        |
  0+35      0.0009     0.02  Q       |        |        |        |
  0+40      0.0010     0.02  Q       |        |        |        |
  0+45      0.0012     0.02  Q       |        |        |        |
  0+50      0.0014     0.03  Q       |        |        |        |
  0+55      0.0016     0.03  Q       |        |        |        |
  1+ 0      0.0018     0.03  Q       |        |        |        |
  1+ 5      0.0020     0.02  Q       |        |        |        |
  1+10      0.0021     0.02  Q       |        |        |        |
  1+15      0.0023     0.02  Q       |        |        |        |
  1+20      0.0024     0.02  Q       |        |        |        |
  1+25      0.0026     0.02  Q       |        |        |        |
  1+30      0.0027     0.02  Q       |        |        |        |
  1+35      0.0029     0.02  QV      |        |        |        |
  1+40      0.0031     0.02  QV      |        |        |        |
  1+45      0.0032     0.02  QV      |        |        |        |
  1+50      0.0034     0.03  QV      |        |        |        |
  1+55      0.0036     0.03  QV      |        |        |        |
  2+ 0      0.0038     0.03  QV      |        |        |        |
  2+ 5      0.0040     0.03  QV      |        |        |        |
  2+10      0.0042     0.03  QV      |        |        |        |
  2+15      0.0044     0.03  QV      |        |        |        |
  2+20      0.0046     0.03  QV      |        |        |        |
  2+25      0.0048     0.03  QV      |        |        |        |
  2+30      0.0050     0.03  QV      |        |        |        |
  2+35      0.0053     0.04  QV      |        |        |        |
  2+40      0.0055     0.04  QV      |        |        |        |
  2+45      0.0058     0.04  Q V     |        |        |        |
  2+50      0.0061     0.04  Q V     |        |        |        |
  2+55      0.0063     0.04  Q V     |        |        |        |
  3+ 0      0.0066     0.04  Q V     |        |        |        |
  3+ 5      0.0068     0.04  Q V     |        |        |        |
  3+10      0.0071     0.04  Q V     |        |        |        |
  3+15      0.0073     0.04  Q V     |        |        |        |
  3+20      0.0076     0.04  Q V     |        |        |        |
  3+25      0.0079     0.04  Q V     |        |        |        |
  3+30      0.0081     0.04  Q V     |        |        |        |
  3+35      0.0084     0.04  Q V     |        |        |        |
  3+40      0.0086     0.04  Q  V    |        |        |        |
  3+45      0.0089     0.04  Q  V    |        |        |        |
  3+50      0.0092     0.04  Q  V    |        |        |        |
  3+55      0.0095     0.04  Q  V    |        |        |        |
  4+ 0      0.0098     0.04  Q  V    |        |        |        |
  4+ 5      0.0101     0.04  Q  V    |        |        |        |
  4+10      0.0104     0.04  Q  V    |        |        |        |
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 4+15      0.0107     0.04  Q  V      |         |         |         |
 4+20      0.0111     0.05  Q  V      |         |         |         |
 4+25      0.0114     0.05  Q   V     |         |         |         |
 4+30      0.0118     0.05  Q   V     |         |         |         |
 4+35      0.0122     0.05  Q   V     |         |         |         |
 4+40      0.0125     0.05  Q   V     |         |         |         |
 4+45      0.0129     0.05  Q   V     |         |         |         |
 4+50      0.0133     0.06  Q   V     |         |         |         |
 4+55      0.0137     0.06  Q   V     |         |         |         |
 5+ 0      0.0141     0.06  Q   V     |         |         |         |
 5+ 5      0.0144     0.05  Q   V     |         |         |         |
 5+10      0.0147     0.04  Q    V    |         |         |         |
 5+15      0.0151     0.04  Q    V    |         |         |         |
 5+20      0.0154     0.05  Q    V    |         |         |         |
 5+25      0.0158     0.05  Q    V    |         |         |         |
 5+30      0.0161     0.05  Q    V    |         |         |         |
 5+35      0.0165     0.06  Q    V    |         |         |         |
 5+40      0.0169     0.06  Q     V   |         |         |         |
 5+45      0.0173     0.06  Q     V   |         |         |         |
 5+50      0.0178     0.06  Q     V   |         |         |         |
 5+55      0.0182     0.06  Q     V   |         |         |         |
 6+ 0      0.0186     0.06  Q     V   |         |         |         |
 6+ 5      0.0190     0.07  Q     V   |         |         |         |
 6+10      0.0195     0.07  Q     V   |         |         |         |
 6+15      0.0200     0.07  Q      V  |         |         |         |
 6+20      0.0204     0.07  Q      V  |         |         |         |
 6+25      0.0209     0.07  Q      V  |         |         |         |
 6+30      0.0213     0.07  Q      V  |         |         |         |
 6+35      0.0219     0.07  Q      V  |         |         |         |
 6+40      0.0224     0.07  Q      V  |         |         |         |
 6+45      0.0229     0.07  Q       V |         |         |         |
 6+50      0.0234     0.07  Q       V |         |         |         |
 6+55      0.0239     0.07  Q       V |         |         |         |
 7+ 0      0.0244     0.07  Q       V |         |         |         |
 7+ 5      0.0249     0.07  Q       V |         |         |         |
 7+10      0.0255     0.07  Q        V|         |         |         |
 7+15      0.0260     0.07  Q        V|         |         |         |
 7+20      0.0265     0.08  Q        V|         |         |         |
 7+25      0.0271     0.08  Q        V|         |         |         |
 7+30      0.0277     0.08  Q        V|         |         |         |
 7+35      0.0283     0.09  Q         V         |         |         |
 7+40      0.0289     0.09  Q         V         |         |         |
 7+45      0.0295     0.09  Q         V         |         |         |
 7+50      0.0301     0.10  Q         V         |         |         |
 7+55      0.0308     0.10  Q         |V        |         |         |
 8+ 0      0.0315     0.10  Q         |V        |         |         |
 8+ 5      0.0322     0.11  Q         |V        |         |         |
 8+10      0.0330     0.11  Q         |V        |         |         |
 8+15      0.0338     0.11  Q         | V       |         |         |
 8+20      0.0346     0.11  Q         | V       |         |         |
 8+25      0.0353     0.11  Q         | V       |         |         |
 8+30      0.0361     0.11  Q         | V       |         |         |
 8+35      0.0369     0.12  Q         |  V      |         |         |
 8+40      0.0377     0.12  Q         |  V      |         |         |
 8+45      0.0386     0.12  Q         |  V      |         |         |
 8+50      0.0394     0.13  Q         |   V     |         |         |
 8+55      0.0396     0.03  Q         |   V     |         |         |
 9+ 0      0.0396     0.00  Q         |   V     |         |         |
 9+ 5      0.0397     0.02  Q         |   V     |         |         |
 9+10      0.0399     0.02  Q         |   V     |         |         |
 9+15      0.0401     0.02  Q         |   V     |         |         |
 9+20      0.0403     0.03  Q         |   V     |         |         |
 9+25      0.0405     0.04  Q         |   V     |         |         |
 9+30      0.0408     0.04  Q         |   V     |         |         |
 9+35      0.0411     0.05  Q         |   V     |         |         |
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 9+40   0.0414   0.05  Q    |   V     |         |         |
 9+45   0.0418   0.05  Q    |   V     |         |         |
 9+50   0.0422   0.06  Q    |    V    |         |         |
 9+55   0.0426   0.06  Q    |    V    |         |         |
10+ 0   0.0430   0.06  Q    |    V    |         |         |
10+ 5   0.0437   0.10  Q    |    V    |         |         |
10+10   0.0445   0.11  Q    |    V    |         |         |
10+15   0.0453   0.11  Q    |     V   |         |         |
10+20   0.0460   0.11  Q    |     V   |         |         |
10+25   0.0468   0.11  Q    |     V   |         |         |
10+30   0.0476   0.11  Q    |     V   |         |         |
10+35   0.0480   0.06  Q    |      V  |         |         |
10+40   0.0483   0.05  Q    |      V  |         |         |
10+45   0.0487   0.05  Q    |      V  |         |         |
10+50   0.0490   0.05  Q    |      V  |         |         |
10+55   0.0493   0.05  Q    |      V  |         |         |
11+ 0   0.0497   0.05  Q    |      V  |         |         |
11+ 5   0.0500   0.04  Q    |      V  |         |         |
11+10   0.0503   0.04  Q    |      V  |         |         |
11+15   0.0506   0.04  Q    |       V |         |         |
11+20   0.0509   0.04  Q    |       V |         |         |
11+25   0.0512   0.04  Q    |       V |         |         |
11+30   0.0515   0.04  Q    |       V |         |         |
11+35   0.0517   0.03  Q    |       V |         |         |
11+40   0.0519   0.03  Q    |       V |         |         |
11+45   0.0520   0.03  Q    |       V |         |         |
11+50   0.0523   0.04  Q    |       V |         |         |
11+55   0.0526   0.04  Q    |       V |         |         |
12+ 0   0.0528   0.04  Q    |       V |         |         |
12+ 5   0.0535   0.09  Q    |        V|         |         |
12+10   0.0542   0.11  Q    |        V|         |         |
12+15   0.0550   0.11  Q    |        V|         |         |
12+20   0.0558   0.12  Q    |        V|         |         |
12+25   0.0567   0.12  Q    |         V         |         |
12+30   0.0576   0.12  Q    |         V         |         |
12+35   0.0585   0.14  Q    |         V         |         |
12+40   0.0595   0.15  Q    |         |V        |         |
12+45   0.0606   0.15  Q    |         |V        |         |
12+50   0.0616   0.16  Q    |         | V       |         |
12+55   0.0627   0.16  Q    |         | V       |         |
13+ 0   0.0638   0.16  Q    |         | V       |         |
13+ 5   0.0652   0.20  Q    |         |  V      |         |
13+10   0.0667   0.21  Q    |         |  V      |         |
13+15   0.0681   0.21  Q    |         |   V     |         |
13+20   0.0696   0.21  Q    |         |   V     |         |
13+25   0.0711   0.21  Q    |         |    V    |         |
13+30   0.0725   0.21  Q    |         |    V    |         |
13+35   0.0734   0.13  Q    |         |     V   |         |
13+40   0.0741   0.10  Q    |         |     V   |         |
13+45   0.0749   0.10  Q    |         |     V   |         |
13+50   0.0756   0.11  Q    |         |     V   |         |
13+55   0.0763   0.11  Q    |         |      V  |         |
14+ 0   0.0770   0.11  Q    |         |      V  |         |
14+ 5   0.0780   0.14  Q    |         |      V  |         |
14+10   0.0790   0.15  Q    |         |       V |         |
14+15   0.0801   0.15  Q    |         |       V |         |
14+20   0.0810   0.14  Q    |         |       V |         |
14+25   0.0820   0.14  Q    |         |        V|         |
14+30   0.0830   0.14  Q    |         |        V|         |
14+35   0.0839   0.14  Q    |         |        V|         |
14+40   0.0849   0.14  Q    |         |         V         |
14+45   0.0859   0.14  Q    |         |         V         |
14+50   0.0868   0.14  Q    |         |         |V        |
14+55   0.0878   0.13  Q    |         |         |V        |
15+ 0   0.0887   0.13  Q    |         |         |V        |
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15+ 5     0.0896     0.13  Q        |        |        |V       |
15+10     0.0904     0.13  Q        |        |        | V      |
15+15     0.0913     0.13  Q        |        |        | V      |
15+20     0.0921     0.12  Q        |        |        | V      |
15+25     0.0929     0.12  Q        |        |        |  V     |
15+30     0.0937     0.12  Q        |        |        |  V     |
15+35     0.0943     0.09  Q        |        |        |  V     |
15+40     0.0949     0.08  Q        |        |        |  V     |
15+45     0.0954     0.08  Q        |        |        |   V    |
15+50     0.0960     0.08  Q        |        |        |   V    |
15+55     0.0965     0.08  Q        |        |        |   V    |
16+ 0     0.0971     0.08  Q        |        |        |   V    |
16+ 5     0.0973     0.04  Q        |        |        |   V    |
16+10     0.0976     0.03  Q        |        |        |   V    |
16+15     0.0978     0.03  Q        |        |        |   V    |
16+20     0.0980     0.03  Q        |        |        |   V    |
16+25     0.0982     0.03  Q        |        |        |    V   |
16+30     0.0984     0.03  Q        |        |        |    V   |
16+35     0.0985     0.02  Q        |        |        |    V   |
16+40     0.0987     0.02  Q        |        |        |    V   |
16+45     0.0989     0.02  Q        |        |        |    V   |
16+50     0.0990     0.02  Q        |        |        |    V   |
16+55     0.0992     0.02  Q        |        |        |    V   |
17+ 0     0.0993     0.02  Q        |        |        |    V   |
17+ 5     0.0995     0.03  Q        |        |        |    V   |
17+10     0.0998     0.04  Q        |        |        |    V   |
17+15     0.1001     0.04  Q        |        |        |    V   |
17+20     0.1003     0.04  Q        |        |        |    V   |
17+25     0.1006     0.04  Q        |        |        |    V   |
17+30     0.1008     0.04  Q        |        |        |     V  |
17+35     0.1011     0.04  Q        |        |        |     V  |
17+40     0.1013     0.04  Q        |        |        |     V  |
17+45     0.1016     0.04  Q        |        |        |     V  |
17+50     0.1018     0.03  Q        |        |        |     V  |
17+55     0.1020     0.03  Q        |        |        |     V  |
18+ 0     0.1022     0.03  Q        |        |        |     V  |
18+ 5     0.1024     0.03  Q        |        |        |     V  |
18+10     0.1026     0.03  Q        |        |        |     V  |
18+15     0.1029     0.03  Q        |        |        |     V  |
18+20     0.1031     0.03  Q        |        |        |     V  |
18+25     0.1033     0.03  Q        |        |        |     V  |
18+30     0.1035     0.03  Q        |        |        |     V  |
18+35     0.1036     0.02  Q        |        |        |      V |
18+40     0.1038     0.02  Q        |        |        |      V |
18+45     0.1039     0.02  Q        |        |        |      V |
18+50     0.1041     0.02  Q        |        |        |      V |
18+55     0.1042     0.01  Q        |        |        |      V |
19+ 0     0.1043     0.01  Q        |        |        |      V |
19+ 5     0.1044     0.02  Q        |        |        |      V |
19+10     0.1046     0.02  Q        |        |        |      V |
19+15     0.1047     0.02  Q        |        |        |      V |
19+20     0.1049     0.03  Q        |        |        |      V |
19+25     0.1051     0.03  Q        |        |        |      V |
19+30     0.1053     0.03  Q        |        |        |      V |
19+35     0.1055     0.02  Q        |        |        |      V |
19+40     0.1056     0.02  Q        |        |        |      V |
19+45     0.1058     0.02  Q        |        |        |      V |
19+50     0.1059     0.02  Q        |        |        |      V |
19+55     0.1060     0.01  Q        |        |        |      V |
20+ 0     0.1061     0.01  Q        |        |        |      V |
20+ 5     0.1063     0.02  Q        |        |        |      V |
20+10     0.1064     0.02  Q        |        |        |       V|
20+15     0.1066     0.02  Q        |        |        |       V|
20+20     0.1067     0.02  Q        |        |        |       V|
20+25     0.1069     0.02  Q        |        |        |       V|
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 20+30      0.1070     0.02  Q        |         |         |        V |
 20+35      0.1072     0.02  Q        |         |         |        V |
 20+40      0.1073     0.02  Q        |         |         |        V |
 20+45      0.1075     0.02  Q        |         |         |        V |
 20+50      0.1076     0.02  Q        |         |         |        V |
 20+55      0.1077     0.01  Q        |         |         |        V |
 21+ 0      0.1078     0.01  Q        |         |         |        V |
 21+ 5      0.1080     0.02  Q        |         |         |        V |
 21+10      0.1081     0.02  Q        |         |         |        V |
 21+15      0.1083     0.02  Q        |         |         |        V |
 21+20      0.1084     0.02  Q        |         |         |        V |
 21+25      0.1085     0.01  Q        |         |         |        V |
 21+30      0.1086     0.01  Q        |         |         |        V |
 21+35      0.1087     0.02  Q        |         |         |        V |
 21+40      0.1089     0.02  Q        |         |         |        V |
 21+45      0.1090     0.02  Q        |         |         |        V |
 21+50      0.1092     0.02  Q        |         |         |        V |
 21+55      0.1093     0.01  Q        |         |         |         V|
 22+ 0      0.1094     0.01  Q        |         |         |         V|
 22+ 5      0.1095     0.02  Q        |         |         |         V|
 22+10      0.1097     0.02  Q        |         |         |         V|
 22+15      0.1098     0.02  Q        |         |         |         V|
 22+20      0.1099     0.02  Q        |         |         |         V|
 22+25      0.1100     0.01  Q        |         |         |         V|
 22+30      0.1101     0.01  Q        |         |         |         V|
 22+35      0.1102     0.01  Q        |         |         |         V|
 22+40      0.1103     0.01  Q        |         |         |         V|
 22+45      0.1104     0.01  Q        |         |         |         V|
 22+50      0.1105     0.01  Q        |         |         |         V|
 22+55      0.1106     0.01  Q        |         |         |         V|
 23+ 0      0.1107     0.01  Q        |         |         |         V|
 23+ 5      0.1109     0.01  Q        |         |         |         V|
 23+10      0.1110     0.01  Q        |         |         |         V|
 23+15      0.1111     0.01  Q        |         |         |         V|
 23+20      0.1112     0.01  Q        |         |         |         V|
 23+25      0.1113     0.01  Q        |         |         |         V|
 23+30      0.1114     0.01  Q        |         |         |         V|
 23+35      0.1115     0.01  Q        |         |         |         V|
 23+40      0.1116     0.01  Q        |         |         |         V|
 23+45      0.1117     0.01  Q        |         |         |         V|
 23+50      0.1118     0.01  Q        |         |         |         V|
 23+55      0.1119     0.01  Q        |         |         |         V|
 24+ 0      0.1120     0.01  Q        |         |         |         V|
 24+ 5      0.1120     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

Study date 09/23/20 File: BPOST2410.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

28771 Central Avenue Gas Station
Area B
Post-development
24-Hr 10-Yr Storm Event

Drainage Area = 0.74(Ac.) = 0.001 Sq. Mi.
Length along longest watercourse = 284.00(Ft.)
Length along longest watercourse measured to centroid = 86.63(Ft.)
Length along longest watercourse = 0.054 Mi.
Length along longest watercourse measured to centroid = 0.016 Mi.
Difference in elevation = 1.69(Ft.)
Slope along watercourse = 31.4197 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.013 Hr.
Lag time = 0.78 Min.
25% of lag time = 0.19 Min.
40% of lag time = 0.31 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]
0.74	2.43	1.80

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
0.74	6.58	4.88

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 2.430(In)
Area Averaged 100-Year Rainfall = 6.580(In)

Point rain (area averaged) = 4.137(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 4.137(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
0.742	55.00	0.792

Total Area Entered = 0.74(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
55.0	35.0	0.715	0.792	0.205	1.000	0.205

Sum (F) = 0.205

Area averaged mean soil loss (F) (In/Hr) = 0.205

Minimum soil loss rate ((In/Hr)) = 0.103

(for 24 hour storm duration)

Soil low loss rate (decimal) = 0.266

U n i t H y d r o g r a p h

DESERT S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	645.077	77.129	0.577
2	0.167	1290.154	22.871	0.171
			Sum = 100.000	Sum= 0.748

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Loss rate(In./Hr) Low	Effective (In/Hr)
1	0.08	0.07	0.033	0.364	0.009	0.02
2	0.17	0.07	0.033	0.362	0.009	0.02
3	0.25	0.07	0.033	0.361	0.009	0.02
4	0.33	0.10	0.050	0.360	0.013	0.04
5	0.42	0.10	0.050	0.358	0.013	0.04
6	0.50	0.10	0.050	0.357	0.013	0.04
7	0.58	0.10	0.050	0.355	0.013	0.04
8	0.67	0.10	0.050	0.354	0.013	0.04
9	0.75	0.10	0.050	0.353	0.013	0.04
10	0.83	0.13	0.066	0.351	0.018	0.05
11	0.92	0.13	0.066	0.350	0.018	0.05
12	1.00	0.13	0.066	0.348	0.018	0.05
13	1.08	0.10	0.050	0.347	0.013	0.04
14	1.17	0.10	0.050	0.346	0.013	0.04
15	1.25	0.10	0.050	0.344	0.013	0.04
16	1.33	0.10	0.050	0.343	0.013	0.04
17	1.42	0.10	0.050	0.342	0.013	0.04
18	1.50	0.10	0.050	0.340	0.013	0.04
19	1.58	0.10	0.050	0.339	0.013	0.04
20	1.67	0.10	0.050	0.338	0.013	0.04
21	1.75	0.10	0.050	0.336	0.013	0.04
22	1.83	0.13	0.066	0.335	0.018	0.05
23	1.92	0.13	0.066	0.333	0.018	0.05
24	2.00	0.13	0.066	0.332	0.018	0.05
25	2.08	0.13	0.066	0.331	0.018	0.05
26	2.17	0.13	0.066	0.329	0.018	0.05
27	2.25	0.13	0.066	0.328	0.018	0.05
28	2.33	0.13	0.066	0.327	0.018	0.05
29	2.42	0.13	0.066	0.325	0.018	0.05
30	2.50	0.13	0.066	0.324	0.018	0.05
31	2.58	0.17	0.083	0.323	0.022	0.06
32	2.67	0.17	0.083	0.321	0.022	0.06
33	2.75	0.17	0.083	0.320	0.022	0.06

34	2.83	0.17	0.083	0.319	0.022	0.06
35	2.92	0.17	0.083	0.318	0.022	0.06
36	3.00	0.17	0.083	0.316	0.022	0.06
37	3.08	0.17	0.083	0.315	0.022	0.06
38	3.17	0.17	0.083	0.314	0.022	0.06
39	3.25	0.17	0.083	0.312	0.022	0.06
40	3.33	0.17	0.083	0.311	0.022	0.06
41	3.42	0.17	0.083	0.310	0.022	0.06
42	3.50	0.17	0.083	0.308	0.022	0.06
43	3.58	0.17	0.083	0.307	0.022	0.06
44	3.67	0.17	0.083	0.306	0.022	0.06
45	3.75	0.17	0.083	0.305	0.022	0.06
46	3.83	0.20	0.099	0.303	0.026	0.07
47	3.92	0.20	0.099	0.302	0.026	0.07
48	4.00	0.20	0.099	0.301	0.026	0.07
49	4.08	0.20	0.099	0.299	0.026	0.07
50	4.17	0.20	0.099	0.298	0.026	0.07
51	4.25	0.20	0.099	0.297	0.026	0.07
52	4.33	0.23	0.116	0.296	0.031	0.08
53	4.42	0.23	0.116	0.294	0.031	0.08
54	4.50	0.23	0.116	0.293	0.031	0.08
55	4.58	0.23	0.116	0.292	0.031	0.08
56	4.67	0.23	0.116	0.291	0.031	0.08
57	4.75	0.23	0.116	0.289	0.031	0.08
58	4.83	0.27	0.132	0.288	0.035	0.10
59	4.92	0.27	0.132	0.287	0.035	0.10
60	5.00	0.27	0.132	0.286	0.035	0.10
61	5.08	0.20	0.099	0.284	0.026	0.07
62	5.17	0.20	0.099	0.283	0.026	0.07
63	5.25	0.20	0.099	0.282	0.026	0.07
64	5.33	0.23	0.116	0.281	0.031	0.08
65	5.42	0.23	0.116	0.279	0.031	0.08
66	5.50	0.23	0.116	0.278	0.031	0.08
67	5.58	0.27	0.132	0.277	0.035	0.10
68	5.67	0.27	0.132	0.276	0.035	0.10
69	5.75	0.27	0.132	0.275	0.035	0.10
70	5.83	0.27	0.132	0.273	0.035	0.10
71	5.92	0.27	0.132	0.272	0.035	0.10
72	6.00	0.27	0.132	0.271	0.035	0.10
73	6.08	0.30	0.149	0.270	0.040	0.11
74	6.17	0.30	0.149	0.268	0.040	0.11
75	6.25	0.30	0.149	0.267	0.040	0.11
76	6.33	0.30	0.149	0.266	0.040	0.11
77	6.42	0.30	0.149	0.265	0.040	0.11
78	6.50	0.30	0.149	0.264	0.040	0.11
79	6.58	0.33	0.165	0.263	0.044	0.12
80	6.67	0.33	0.165	0.261	0.044	0.12
81	6.75	0.33	0.165	0.260	0.044	0.12
82	6.83	0.33	0.165	0.259	0.044	0.12
83	6.92	0.33	0.165	0.258	0.044	0.12
84	7.00	0.33	0.165	0.257	0.044	0.12
85	7.08	0.33	0.165	0.255	0.044	0.12
86	7.17	0.33	0.165	0.254	0.044	0.12
87	7.25	0.33	0.165	0.253	0.044	0.12
88	7.33	0.37	0.182	0.252	0.048	0.13
89	7.42	0.37	0.182	0.251	0.048	0.13
90	7.50	0.37	0.182	0.250	0.048	0.13
91	7.58	0.40	0.199	0.249	0.053	0.15
92	7.67	0.40	0.199	0.247	0.053	0.15
93	7.75	0.40	0.199	0.246	0.053	0.15
94	7.83	0.43	0.215	0.245	0.057	0.16
95	7.92	0.43	0.215	0.244	0.057	0.16
96	8.00	0.43	0.215	0.243	0.057	0.16
97	8.08	0.50	0.248	0.242	---	0.01
98	8.17	0.50	0.248	0.241	---	0.01

99	8.25	0.50	0.248	0.239	---	0.01
100	8.33	0.50	0.248	0.238	---	0.01
101	8.42	0.50	0.248	0.237	---	0.01
102	8.50	0.50	0.248	0.236	---	0.01
103	8.58	0.53	0.265	0.235	---	0.03
104	8.67	0.53	0.265	0.234	---	0.03
105	8.75	0.53	0.265	0.233	---	0.03
106	8.83	0.57	0.281	0.232	---	0.05
107	8.92	0.57	0.281	0.231	---	0.05
108	9.00	0.57	0.281	0.230	---	0.05
109	9.08	0.63	0.314	0.228	---	0.09
110	9.17	0.63	0.314	0.227	---	0.09
111	9.25	0.63	0.314	0.226	---	0.09
112	9.33	0.67	0.331	0.225	---	0.11
113	9.42	0.67	0.331	0.224	---	0.11
114	9.50	0.67	0.331	0.223	---	0.11
115	9.58	0.70	0.348	0.222	---	0.13
116	9.67	0.70	0.348	0.221	---	0.13
117	9.75	0.70	0.348	0.220	---	0.13
118	9.83	0.73	0.364	0.219	---	0.15
119	9.92	0.73	0.364	0.218	---	0.15
120	10.00	0.73	0.364	0.217	---	0.15
121	10.08	0.50	0.248	0.216	---	0.03
122	10.17	0.50	0.248	0.215	---	0.03
123	10.25	0.50	0.248	0.214	---	0.03
124	10.33	0.50	0.248	0.213	---	0.04
125	10.42	0.50	0.248	0.212	---	0.04
126	10.50	0.50	0.248	0.210	---	0.04
127	10.58	0.67	0.331	0.209	---	0.12
128	10.67	0.67	0.331	0.208	---	0.12
129	10.75	0.67	0.331	0.207	---	0.12
130	10.83	0.67	0.331	0.206	---	0.12
131	10.92	0.67	0.331	0.205	---	0.13
132	11.00	0.67	0.331	0.204	---	0.13
133	11.08	0.63	0.314	0.203	---	0.11
134	11.17	0.63	0.314	0.202	---	0.11
135	11.25	0.63	0.314	0.201	---	0.11
136	11.33	0.63	0.314	0.200	---	0.11
137	11.42	0.63	0.314	0.199	---	0.12
138	11.50	0.63	0.314	0.198	---	0.12
139	11.58	0.57	0.281	0.197	---	0.08
140	11.67	0.57	0.281	0.196	---	0.08
141	11.75	0.57	0.281	0.195	---	0.09
142	11.83	0.60	0.298	0.194	---	0.10
143	11.92	0.60	0.298	0.193	---	0.10
144	12.00	0.60	0.298	0.193	---	0.11
145	12.08	0.83	0.414	0.192	---	0.22
146	12.17	0.83	0.414	0.191	---	0.22
147	12.25	0.83	0.414	0.190	---	0.22
148	12.33	0.87	0.430	0.189	---	0.24
149	12.42	0.87	0.430	0.188	---	0.24
150	12.50	0.87	0.430	0.187	---	0.24
151	12.58	0.93	0.463	0.186	---	0.28
152	12.67	0.93	0.463	0.185	---	0.28
153	12.75	0.93	0.463	0.184	---	0.28
154	12.83	0.97	0.480	0.183	---	0.30
155	12.92	0.97	0.480	0.182	---	0.30
156	13.00	0.97	0.480	0.181	---	0.30
157	13.08	1.13	0.563	0.180	---	0.38
158	13.17	1.13	0.563	0.179	---	0.38
159	13.25	1.13	0.563	0.178	---	0.38
160	13.33	1.13	0.563	0.178	---	0.39
161	13.42	1.13	0.563	0.177	---	0.39
162	13.50	1.13	0.563	0.176	---	0.39
163	13.58	0.77	0.381	0.175	---	0.21

164	13.67	0.77	0.381	0.174	---	0.21
165	13.75	0.77	0.381	0.173	---	0.21
166	13.83	0.77	0.381	0.172	---	0.21
167	13.92	0.77	0.381	0.171	---	0.21
168	14.00	0.77	0.381	0.170	---	0.21
169	14.08	0.90	0.447	0.170	---	0.28
170	14.17	0.90	0.447	0.169	---	0.28
171	14.25	0.90	0.447	0.168	---	0.28
172	14.33	0.87	0.430	0.167	---	0.26
173	14.42	0.87	0.430	0.166	---	0.26
174	14.50	0.87	0.430	0.165	---	0.26
175	14.58	0.87	0.430	0.164	---	0.27
176	14.67	0.87	0.430	0.164	---	0.27
177	14.75	0.87	0.430	0.163	---	0.27
178	14.83	0.83	0.414	0.162	---	0.25
179	14.92	0.83	0.414	0.161	---	0.25
180	15.00	0.83	0.414	0.160	---	0.25
181	15.08	0.80	0.397	0.159	---	0.24
182	15.17	0.80	0.397	0.159	---	0.24
183	15.25	0.80	0.397	0.158	---	0.24
184	15.33	0.77	0.381	0.157	---	0.22
185	15.42	0.77	0.381	0.156	---	0.22
186	15.50	0.77	0.381	0.155	---	0.23
187	15.58	0.63	0.314	0.155	---	0.16
188	15.67	0.63	0.314	0.154	---	0.16
189	15.75	0.63	0.314	0.153	---	0.16
190	15.83	0.63	0.314	0.152	---	0.16
191	15.92	0.63	0.314	0.151	---	0.16
192	16.00	0.63	0.314	0.151	---	0.16
193	16.08	0.13	0.066	0.150	0.018	0.05
194	16.17	0.13	0.066	0.149	0.018	0.05
195	16.25	0.13	0.066	0.148	0.018	0.05
196	16.33	0.13	0.066	0.148	0.018	0.05
197	16.42	0.13	0.066	0.147	0.018	0.05
198	16.50	0.13	0.066	0.146	0.018	0.05
199	16.58	0.10	0.050	0.145	0.013	0.04
200	16.67	0.10	0.050	0.145	0.013	0.04
201	16.75	0.10	0.050	0.144	0.013	0.04
202	16.83	0.10	0.050	0.143	0.013	0.04
203	16.92	0.10	0.050	0.142	0.013	0.04
204	17.00	0.10	0.050	0.142	0.013	0.04
205	17.08	0.17	0.083	0.141	0.022	0.06
206	17.17	0.17	0.083	0.140	0.022	0.06
207	17.25	0.17	0.083	0.140	0.022	0.06
208	17.33	0.17	0.083	0.139	0.022	0.06
209	17.42	0.17	0.083	0.138	0.022	0.06
210	17.50	0.17	0.083	0.138	0.022	0.06
211	17.58	0.17	0.083	0.137	0.022	0.06
212	17.67	0.17	0.083	0.136	0.022	0.06
213	17.75	0.17	0.083	0.135	0.022	0.06
214	17.83	0.13	0.066	0.135	0.018	0.05
215	17.92	0.13	0.066	0.134	0.018	0.05
216	18.00	0.13	0.066	0.133	0.018	0.05
217	18.08	0.13	0.066	0.133	0.018	0.05
218	18.17	0.13	0.066	0.132	0.018	0.05
219	18.25	0.13	0.066	0.132	0.018	0.05
220	18.33	0.13	0.066	0.131	0.018	0.05
221	18.42	0.13	0.066	0.130	0.018	0.05
222	18.50	0.13	0.066	0.130	0.018	0.05
223	18.58	0.10	0.050	0.129	0.013	0.04
224	18.67	0.10	0.050	0.128	0.013	0.04
225	18.75	0.10	0.050	0.128	0.013	0.04
226	18.83	0.07	0.033	0.127	0.009	0.02
227	18.92	0.07	0.033	0.127	0.009	0.02
228	19.00	0.07	0.033	0.126	0.009	0.02

229	19.08	0.10	0.050	0.125	0.013	0.04
230	19.17	0.10	0.050	0.125	0.013	0.04
231	19.25	0.10	0.050	0.124	0.013	0.04
232	19.33	0.13	0.066	0.124	0.018	0.05
233	19.42	0.13	0.066	0.123	0.018	0.05
234	19.50	0.13	0.066	0.122	0.018	0.05
235	19.58	0.10	0.050	0.122	0.013	0.04
236	19.67	0.10	0.050	0.121	0.013	0.04
237	19.75	0.10	0.050	0.121	0.013	0.04
238	19.83	0.07	0.033	0.120	0.009	0.02
239	19.92	0.07	0.033	0.120	0.009	0.02
240	20.00	0.07	0.033	0.119	0.009	0.02
241	20.08	0.10	0.050	0.119	0.013	0.04
242	20.17	0.10	0.050	0.118	0.013	0.04
243	20.25	0.10	0.050	0.118	0.013	0.04
244	20.33	0.10	0.050	0.117	0.013	0.04
245	20.42	0.10	0.050	0.117	0.013	0.04
246	20.50	0.10	0.050	0.116	0.013	0.04
247	20.58	0.10	0.050	0.116	0.013	0.04
248	20.67	0.10	0.050	0.115	0.013	0.04
249	20.75	0.10	0.050	0.115	0.013	0.04
250	20.83	0.07	0.033	0.114	0.009	0.02
251	20.92	0.07	0.033	0.114	0.009	0.02
252	21.00	0.07	0.033	0.113	0.009	0.02
253	21.08	0.10	0.050	0.113	0.013	0.04
254	21.17	0.10	0.050	0.112	0.013	0.04
255	21.25	0.10	0.050	0.112	0.013	0.04
256	21.33	0.07	0.033	0.112	0.009	0.02
257	21.42	0.07	0.033	0.111	0.009	0.02
258	21.50	0.07	0.033	0.111	0.009	0.02
259	21.58	0.10	0.050	0.110	0.013	0.04
260	21.67	0.10	0.050	0.110	0.013	0.04
261	21.75	0.10	0.050	0.109	0.013	0.04
262	21.83	0.07	0.033	0.109	0.009	0.02
263	21.92	0.07	0.033	0.109	0.009	0.02
264	22.00	0.07	0.033	0.108	0.009	0.02
265	22.08	0.10	0.050	0.108	0.013	0.04
266	22.17	0.10	0.050	0.108	0.013	0.04
267	22.25	0.10	0.050	0.107	0.013	0.04
268	22.33	0.07	0.033	0.107	0.009	0.02
269	22.42	0.07	0.033	0.107	0.009	0.02
270	22.50	0.07	0.033	0.106	0.009	0.02
271	22.58	0.07	0.033	0.106	0.009	0.02
272	22.67	0.07	0.033	0.106	0.009	0.02
273	22.75	0.07	0.033	0.105	0.009	0.02
274	22.83	0.07	0.033	0.105	0.009	0.02
275	22.92	0.07	0.033	0.105	0.009	0.02
276	23.00	0.07	0.033	0.105	0.009	0.02
277	23.08	0.07	0.033	0.104	0.009	0.02
278	23.17	0.07	0.033	0.104	0.009	0.02
279	23.25	0.07	0.033	0.104	0.009	0.02
280	23.33	0.07	0.033	0.104	0.009	0.02
281	23.42	0.07	0.033	0.104	0.009	0.02
282	23.50	0.07	0.033	0.103	0.009	0.02
283	23.58	0.07	0.033	0.103	0.009	0.02
284	23.67	0.07	0.033	0.103	0.009	0.02
285	23.75	0.07	0.033	0.103	0.009	0.02
286	23.83	0.07	0.033	0.103	0.009	0.02
287	23.92	0.07	0.033	0.103	0.009	0.02
288	24.00	0.07	0.033	0.103	0.009	0.02
Sum =		100.0		Sum =	27.1	

Flood volume = Effective rainfall 2.26(In)
times area 0.7(Ac.)/[(In)/(Ft.)] = 0.1(Ac.Ft)
Total soil loss = 1.88(In)
Total soil loss = 0.116(Ac.Ft)

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Total rainfall =      4.14(In)
Flood volume =       6081.8 Cubic Feet
Total soil loss =       5062.0 Cubic Feet
--------------------------------------------------------------------
 Peak flow rate of this hydrograph =      0.289(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     0.0003     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     0.0011     0.03  Q       |         |         |         |
  0+40     0.0013     0.03  Q       |         |         |         |
  0+45     0.0015     0.03  Q       |         |         |         |
  0+50     0.0017     0.03  Q       |         |         |         |
  0+55     0.0019     0.04  Q       |         |         |         |
  1+ 0     0.0022     0.04  Q       |         |         |         |
  1+ 5     0.0024     0.03  Q       |         |         |         |
  1+10     0.0026     0.03  Q       |         |         |         |
  1+15     0.0028     0.03  Q       |         |         |         |
  1+20     0.0030     0.03  Q       |         |         |         |
  1+25     0.0031     0.03  Q       |         |         |         |
  1+30     0.0033     0.03  Q       |         |         |         |
  1+35     0.0035     0.03  QV      |         |         |         |
  1+40     0.0037     0.03  QV      |         |         |         |
  1+45     0.0039     0.03  QV      |         |         |         |
  1+50     0.0041     0.03  QV      |         |         |         |
  1+55     0.0044     0.04  QV      |         |         |         |
  2+ 0     0.0046     0.04  QV      |         |         |         |
  2+ 5     0.0049     0.04  QV      |         |         |         |
  2+10     0.0051     0.04  QV      |         |         |         |
  2+15     0.0054     0.04  QV      |         |         |         |
  2+20     0.0056     0.04  QV      |         |         |         |
  2+25     0.0059     0.04  QV      |         |         |         |
  2+30     0.0061     0.04  QV      |         |         |         |
  2+35     0.0064     0.04  QV      |         |         |         |
  2+40     0.0067     0.05  QV      |         |         |         |
  2+45     0.0071     0.05  Q V     |         |         |         |
  2+50     0.0074     0.05  Q V     |         |         |         |
  2+55     0.0077     0.05  Q V     |         |         |         |
  3+ 0     0.0080     0.05  Q V     |         |         |         |
  3+ 5     0.0083     0.05  Q V     |         |         |         |
  3+10     0.0086     0.05  Q V     |         |         |         |
  3+15     0.0089     0.05  Q V     |         |         |         |
  3+20     0.0093     0.05  Q V     |         |         |         |
  3+25     0.0096     0.05  Q V     |         |         |         |
  3+30     0.0099     0.05  Q V     |         |         |         |
  3+35     0.0102     0.05  Q V     |         |         |         |
  3+40     0.0105     0.05  Q  V    |         |         |         |
  3+45     0.0108     0.05  Q  V    |         |         |         |
  3+50     0.0112     0.05  Q  V    |         |         |         |
  3+55     0.0116     0.05  Q  V    |         |         |         |
  4+ 0     0.0119     0.05  Q  V    |         |         |         |
  4+ 5     0.0123     0.05  Q  V    |         |         |         |
  4+10     0.0127     0.05  Q  V    |         |         |         |
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4+15     0.0131     0.05  Q  V      |         |         |         |
4+20     0.0135     0.06  Q  V      |         |         |         |
4+25     0.0139     0.06  Q  V      |         |         |         |
4+30     0.0144     0.06  Q   V     |         |         |         |
4+35     0.0148     0.06  Q   V     |         |         |         |
4+40     0.0152     0.06  Q   V     |         |         |         |
4+45     0.0157     0.06  Q   V     |         |         |         |
4+50     0.0162     0.07  Q   V     |         |         |         |
4+55     0.0167     0.07  Q   V     |         |         |         |
5+ 0     0.0172     0.07  Q   V     |         |         |         |
5+ 5     0.0176     0.06  Q   V     |         |         |         |
5+10     0.0179     0.05  Q    V    |         |         |         |
5+15     0.0183     0.05  Q    V    |         |         |         |
5+20     0.0187     0.06  Q    V    |         |         |         |
5+25     0.0192     0.06  Q    V    |         |         |         |
5+30     0.0196     0.06  Q    V    |         |         |         |
5+35     0.0201     0.07  Q    V    |         |         |         |
5+40     0.0206     0.07  Q    V    |         |         |         |
5+45     0.0211     0.07  Q     V   |         |         |         |
5+50     0.0216     0.07  Q     V   |         |         |         |
5+55     0.0221     0.07  Q     V   |         |         |         |
6+ 0     0.0226     0.07  Q     V   |         |         |         |
6+ 5     0.0231     0.08  Q     V   |         |         |         |
6+10     0.0237     0.08  Q     V   |         |         |         |
6+15     0.0243     0.08  Q     V   |         |         |         |
6+20     0.0248     0.08  Q      V  |         |         |         |
6+25     0.0254     0.08  Q      V  |         |         |         |
6+30     0.0260     0.08  Q      V  |         |         |         |
6+35     0.0266     0.09  Q      V  |         |         |         |
6+40     0.0272     0.09  Q      V  |         |         |         |
6+45     0.0278     0.09  Q      V  |         |         |         |
6+50     0.0284     0.09  Q       V |         |         |         |
6+55     0.0291     0.09  Q       V |         |         |         |
7+ 0     0.0297     0.09  Q       V |         |         |         |
7+ 5     0.0303     0.09  Q       V |         |         |         |
7+10     0.0310     0.09  Q       V |         |         |         |
7+15     0.0316     0.09  Q        V|         |         |         |
7+20     0.0323     0.10  Q        V|         |         |         |
7+25     0.0329     0.10  Q        V|         |         |         |
7+30     0.0336     0.10  Q        V|         |         |         |
7+35     0.0344     0.11  Q        V|         |         |         |
7+40     0.0351     0.11  Q         V         |         |         |
7+45     0.0359     0.11  Q         V         |         |         |
7+50     0.0367     0.12  Q         V         |         |         |
7+55     0.0375     0.12  Q         V         |         |         |
8+ 0     0.0383     0.12  Q         V         |         |         |
8+ 5     0.0385     0.03  Q         |V        |         |         |
8+10     0.0385     0.01  Q         |V        |         |         |
8+15     0.0386     0.01  Q         |V        |         |         |
8+20     0.0386     0.01  Q         |V        |         |         |
8+25     0.0387     0.01  Q         |V        |         |         |
8+30     0.0388     0.01  Q         |V        |         |         |
8+35     0.0389     0.02  Q         |V        |         |         |
8+40     0.0390     0.02  Q         |V        |         |         |
8+45     0.0392     0.02  Q         |V        |         |         |
8+50     0.0394     0.03  Q         |V        |         |         |
8+55     0.0397     0.04  Q         |V        |         |         |
9+ 0     0.0400     0.04  Q         |V        |         |         |
9+ 5     0.0404     0.06  Q         |V        |         |         |
9+10     0.0408     0.06  Q         |V        |         |         |
9+15     0.0413     0.07  Q         |V        |         |         |
9+20     0.0418     0.08  Q         |V        |         |         |
9+25     0.0423     0.08  Q         | V       |         |         |
9+30     0.0429     0.08  Q         | V       |         |         |
9+35     0.0435     0.09  Q         | V       |         |         |
```

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 9+40   0.0442   0.09  Q     | V       |         |         |
 9+45   0.0448   0.10  Q     | V       |         |         |
 9+50   0.0456   0.11  Q     |  V      |         |         |
 9+55   0.0463   0.11  Q     |  V      |         |         |
10+ 0   0.0471   0.11  Q     |  V      |         |         |
10+ 5   0.0474   0.04  Q     |  V      |         |         |
10+10   0.0475   0.02  Q     |  V      |         |         |
10+15   0.0477   0.03  Q     |  V      |         |         |
10+20   0.0479   0.03  Q     |  V      |         |         |
10+25   0.0481   0.03  Q     |  V      |         |         |
10+30   0.0483   0.03  Q     |  V      |         |         |
10+35   0.0488   0.08  Q     |  V      |         |         |
10+40   0.0494   0.09  Q     |   V     |         |         |
10+45   0.0501   0.09  Q     |   V     |         |         |
10+50   0.0507   0.09  Q     |   V     |         |         |
10+55   0.0514   0.09  Q     |   V     |         |         |
11+ 0   0.0520   0.09  Q     |   V     |         |         |
11+ 5   0.0526   0.09  Q     |    V    |         |         |
11+10   0.0532   0.08  Q     |    V    |         |         |
11+15   0.0538   0.08  Q     |    V    |         |         |
11+20   0.0544   0.09  Q     |    V    |         |         |
11+25   0.0549   0.09  Q     |    V    |         |         |
11+30   0.0555   0.09  Q     |    V    |         |         |
11+35   0.0560   0.07  Q     |     V   |         |         |
11+40   0.0564   0.06  Q     |     V   |         |         |
11+45   0.0569   0.06  Q     |     V   |         |         |
11+50   0.0574   0.07  Q     |     V   |         |         |
11+55   0.0579   0.08  Q     |     V   |         |         |
12+ 0   0.0585   0.08  Q     |     V   |         |         |
12+ 5   0.0595   0.15  Q     |      V  |         |         |
12+10   0.0606   0.17  Q     |      V  |         |         |
12+15   0.0618   0.17  Q     |      V  |         |         |
12+20   0.0630   0.18  Q     |       V |         |         |
12+25   0.0643   0.18  Q     |       V |         |         |
12+30   0.0655   0.18  Q     |       V |         |         |
12+35   0.0669   0.20  Q     |        V|         |         |
12+40   0.0683   0.21  Q     |        V|         |         |
12+45   0.0698   0.21  Q     |        V|         |         |
12+50   0.0713   0.22  Q     |         V         |         |
12+55   0.0728   0.22  Q     |         V         |         |
13+ 0   0.0744   0.22  Q     |         |V        |         |
13+ 5   0.0762   0.27 |Q     |         |V        |         |
13+10   0.0782   0.29 |Q     |         | V       |         |
13+15   0.0802   0.29 |Q     |         | V       |         |
13+20   0.0822   0.29 |Q     |         |  V      |         |
13+25   0.0842   0.29 |Q     |         |   V     |         |
13+30   0.0861   0.29 |Q     |         |   V     |         |
13+35   0.0874   0.18  Q     |         |   V     |         |
13+40   0.0885   0.15  Q     |         |   V     |         |
13+45   0.0896   0.16  Q     |         |   V     |         |
13+50   0.0906   0.16  Q     |         |   V     |         |
13+55   0.0917   0.16  Q     |         |    V    |         |
14+ 0   0.0928   0.16  Q     |         |    V    |         |
14+ 5   0.0941   0.20  Q     |         |    V    |         |
14+10   0.0956   0.21  Q     |         |     V   |         |
14+15   0.0970   0.21  Q     |         |     V   |         |
14+20   0.0984   0.20  Q     |         |      V  |         |
14+25   0.0997   0.20  Q     |         |      V  |         |
14+30   0.1011   0.20  Q     |         |      V  |         |
14+35   0.1025   0.20  Q     |         |        V|         |
14+40   0.1038   0.20  Q     |         |        V|         |
14+45   0.1052   0.20  Q     |         |         V         |
14+50   0.1065   0.19  Q     |         |         V         |
14+55   0.1078   0.19  Q     |         |         V         |
15+ 0   0.1091   0.19  Q     |         |         |V        |
```

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15+ 5    0.1104    0.18  Q     |      |      |V       |
15+10    0.1116    0.18  Q     |      |      |V       |
15+15    0.1128    0.18  Q     |      |      | V      |
15+20    0.1140    0.17  Q     |      |      | V      |
15+25    0.1152    0.17  Q     |      |      | V      |
15+30    0.1163    0.17  Q     |      |      |  V     |
15+35    0.1172    0.13  Q     |      |      |  V     |
15+40    0.1181    0.12  Q     |      |      |  V     |
15+45    0.1189    0.12  Q     |      |      |   V    |
15+50    0.1197    0.12  Q     |      |      |   V    |
15+55    0.1206    0.12  Q     |      |      |   V    |
16+ 0    0.1214    0.12  Q     |      |      |   V    |
16+ 5    0.1218    0.06  Q     |      |      |   V    |
16+10    0.1220    0.04  Q     |      |      |   V    |
16+15    0.1223    0.04  Q     |      |      |    V   |
16+20    0.1225    0.04  Q     |      |      |    V   |
16+25    0.1228    0.04  Q     |      |      |    V   |
16+30    0.1230    0.04  Q     |      |      |    V   |
16+35    0.1232    0.03  Q     |      |      |    V   |
16+40    0.1234    0.03  Q     |      |      |    V   |
16+45    0.1236    0.03  Q     |      |      |    V   |
16+50    0.1238    0.03  Q     |      |      |    V   |
16+55    0.1240    0.03  Q     |      |      |    V   |
17+ 0    0.1242    0.03  Q     |      |      |    V   |
17+ 5    0.1245    0.04  Q     |      |      |    V   |
17+10    0.1248    0.05  Q     |      |      |    V   |
17+15    0.1251    0.05  Q     |      |      |    V   |
17+20    0.1254    0.05  Q     |      |      |    V   |
17+25    0.1257    0.05  Q     |      |      |     V  |
17+30    0.1260    0.05  Q     |      |      |     V  |
17+35    0.1263    0.05  Q     |      |      |     V  |
17+40    0.1267    0.05  Q     |      |      |     V  |
17+45    0.1270    0.05  Q     |      |      |     V  |
17+50    0.1272    0.04  Q     |      |      |     V  |
17+55    0.1275    0.04  Q     |      |      |     V  |
18+ 0    0.1277    0.04  Q     |      |      |     V  |
18+ 5    0.1280    0.04  Q     |      |      |     V  |
18+10    0.1282    0.04  Q     |      |      |     V  |
18+15    0.1285    0.04  Q     |      |      |     V  |
18+20    0.1287    0.04  Q     |      |      |     V  |
18+25    0.1290    0.04  Q     |      |      |     V  |
18+30    0.1292    0.04  Q     |      |      |      V |
18+35    0.1294    0.03  Q     |      |      |      V |
18+40    0.1296    0.03  Q     |      |      |      V |
18+45    0.1298    0.03  Q     |      |      |      V |
18+50    0.1300    0.02  Q     |      |      |      V |
18+55    0.1301    0.02  Q     |      |      |      V |
19+ 0    0.1302    0.02  Q     |      |      |      V |
19+ 5    0.1304    0.03  Q     |      |      |      V |
19+10    0.1306    0.03  Q     |      |      |      V |
19+15    0.1308    0.03  Q     |      |      |      V |
19+20    0.1310    0.03  Q     |      |      |      V |
19+25    0.1312    0.04  Q     |      |      |      V |
19+30    0.1315    0.04  Q     |      |      |      V |
19+35    0.1317    0.03  Q     |      |      |      V |
19+40    0.1319    0.03  Q     |      |      |      V |
19+45    0.1321    0.03  Q     |      |      |      V |
19+50    0.1322    0.02  Q     |      |      |      V |
19+55    0.1323    0.02  Q     |      |      |      V |
20+ 0    0.1325    0.02  Q     |      |      |      V |
20+ 5    0.1326    0.03  Q     |      |      |      V |
20+10    0.1328    0.03  Q     |      |      |       V|
20+15    0.1330    0.03  Q     |      |      |       V|
20+20    0.1332    0.03  Q     |      |      |       V|
20+25    0.1334    0.03  Q     |      |      |       V|
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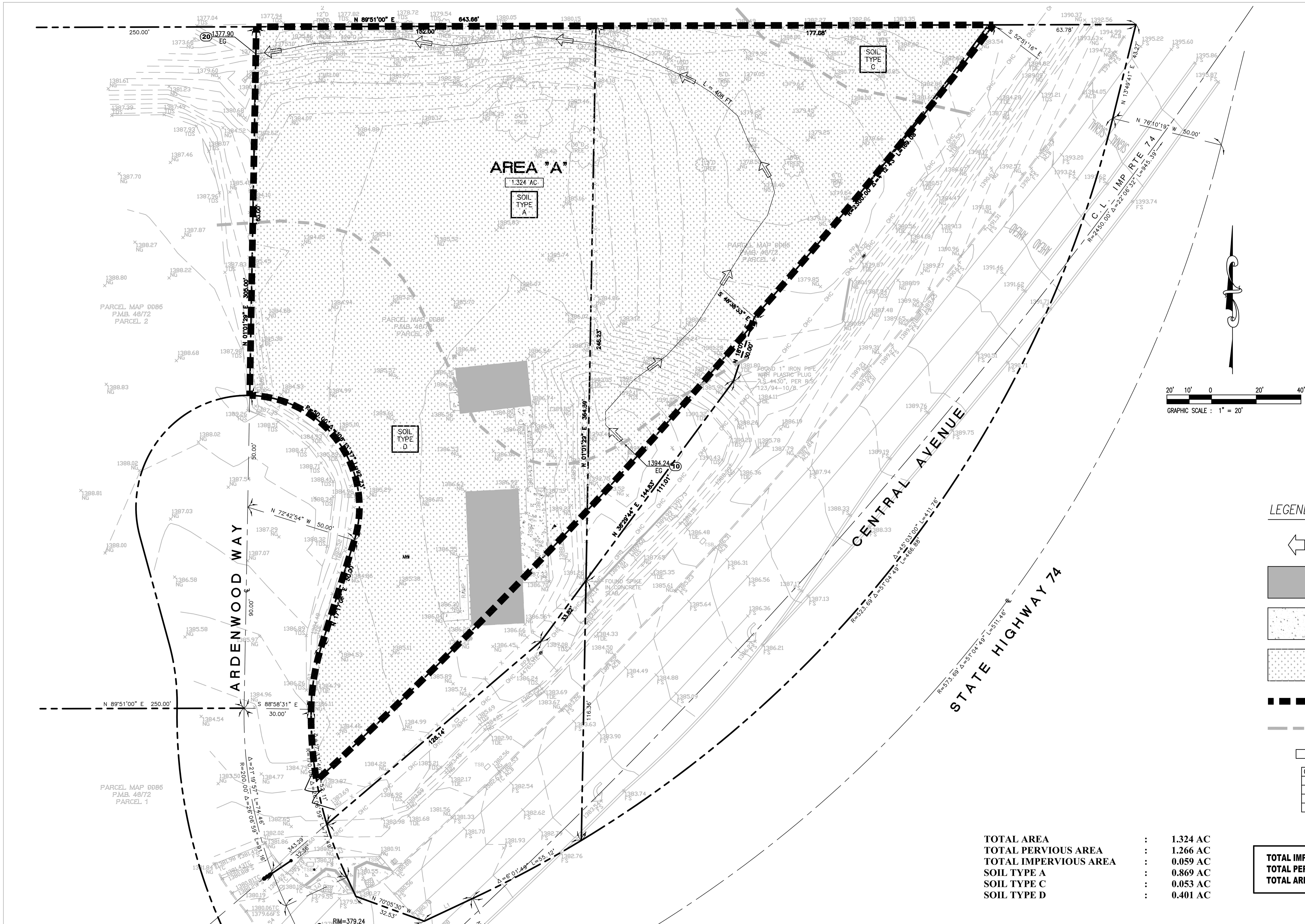
20+30     0.1336    0.03  Q       |       |       |     V |
20+35     0.1338    0.03  Q       |       |       |     V |
20+40     0.1339    0.03  Q       |       |       |     V |
20+45     0.1341    0.03  Q       |       |       |     V |
20+50     0.1343    0.02  Q       |       |       |     V |
20+55     0.1344    0.02  Q       |       |       |     V |
21+ 0     0.1345    0.02  Q       |       |       |     V |
21+ 5     0.1347    0.03  Q       |       |       |     V |
21+10     0.1349    0.03  Q       |       |       |     V |
21+15     0.1351    0.03  Q       |       |       |     V |
21+20     0.1352    0.02  Q       |       |       |     V |
21+25     0.1353    0.02  Q       |       |       |     V |
21+30     0.1355    0.02  Q       |       |       |     V |
21+35     0.1356    0.03  Q       |       |       |     V |
21+40     0.1358    0.03  Q       |       |       |     V |
21+45     0.1360    0.03  Q       |       |       |     V |
21+50     0.1361    0.02  Q       |       |       |      V|
21+55     0.1363    0.02  Q       |       |       |      V|
22+ 0     0.1364    0.02  Q       |       |       |      V|
22+ 5     0.1366    0.03  Q       |       |       |      V|
22+10     0.1368    0.03  Q       |       |       |      V|
22+15     0.1369    0.03  Q       |       |       |      V|
22+20     0.1371    0.02  Q       |       |       |      V|
22+25     0.1372    0.02  Q       |       |       |      V|
22+30     0.1373    0.02  Q       |       |       |      V|
22+35     0.1375    0.02  Q       |       |       |      V|
22+40     0.1376    0.02  Q       |       |       |      V|
22+45     0.1377    0.02  Q       |       |       |      V|
22+50     0.1378    0.02  Q       |       |       |      V|
22+55     0.1380    0.02  Q       |       |       |      V|
23+ 0     0.1381    0.02  Q       |       |       |      V|
23+ 5     0.1382    0.02  Q       |       |       |      V|
23+10     0.1383    0.02  Q       |       |       |      V|
23+15     0.1385    0.02  Q       |       |       |      V|
23+20     0.1386    0.02  Q       |       |       |      V|
23+25     0.1387    0.02  Q       |       |       |      V|
23+30     0.1388    0.02  Q       |       |       |      V|
23+35     0.1390    0.02  Q       |       |       |      V|
23+40     0.1391    0.02  Q       |       |       |      V|
23+45     0.1392    0.02  Q       |       |       |      V|
23+50     0.1393    0.02  Q       |       |       |      V|
23+55     0.1395    0.02  Q       |       |       |      V|
24+ 0     0.1396    0.02  Q       |       |       |      V|
24+ 5     0.1396    0.00  Q       |       |       |      V|
-----------------------------------------------------------------------
```

ATTACHMENT D



LEGEND:

Symbol	Description
Arrow	DRAINAGE FLOW
Dark fill	ROOF
Dotted fill	CONCRETE
Stippled fill	LANDSCAPE OR NATURAL GROUND
Heavy dashed line	CATCHMENT BOUNDARY
Grey dashed line	SOIL TYPE BOUNDARY
X.XXAC	AREA, IN ACRES
CP 2	CONTROL POINT ID
XXX	TIME OF CONCENTRATION, IN MINS.
XXX	2 YR. FLOW, IN CFS
XXX	10 YR. FLOW, IN CFS
XXX	100 YR. FLOW, IN CFS

TOTAL AREA	:	1.324 AC
TOTAL PERVIOUS AREA	:	1.266 AC
TOTAL IMPERVIOUS AREA	:	0.059 AC
SOIL TYPE A	:	0.869 AC
SOIL TYPE C	:	0.053 AC
SOIL TYPE D	:	0.401 AC

TOTAL IMPERVIOUS AREA	= 0.059 AC
TOTAL PERVIOUS AREA	= 1.266 AC
TOTAL AREA	= 1.324 AC

PRE-DEVELOPMENT HYDROLOGY MAP

MARK	REVISIONS	APPR.	DATE

THESE PLANS HAVE BEEN REVIEWED FOR COMPLIANCE WITH THE APPROPRIATE CONDITIONS OF DEVELOPMENT AND/OR CITY AND STATE LAWS AND A PERMIT MAY BE ISSUED

BRAD FAGRELL, RCE No. 43920 — DATE
CITY ENGINEER
CITY OF LAKE ELSINORE

PREPARED BY:
KARAKI | Western States
A DESIGN-BUILD COMPANY
4887 E. LA PALMA STE. 707
ANAHEIM, CA 92807
TEL: (714)695-9300 FAX: (714)693-1002
www.westernsec.com

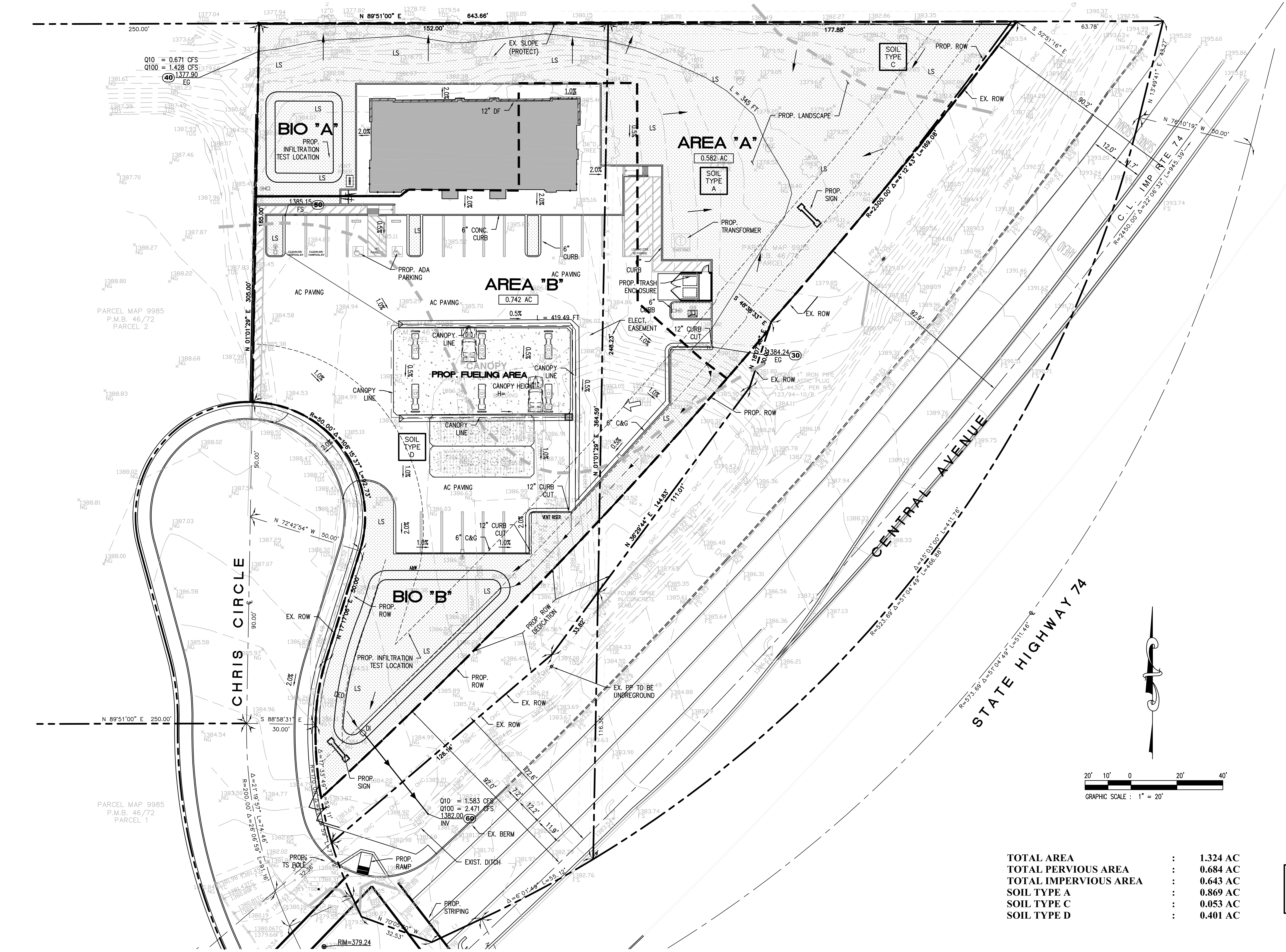
KAMAL McHANTAF, RCE C051050 — DATE

SEAL
REGISTERED PROFESSIONAL ENGINEER KAMAL B. McHANTAF No. C051050 Exp. 9-30-21 CIVIL STATE OF CALIFORNIA

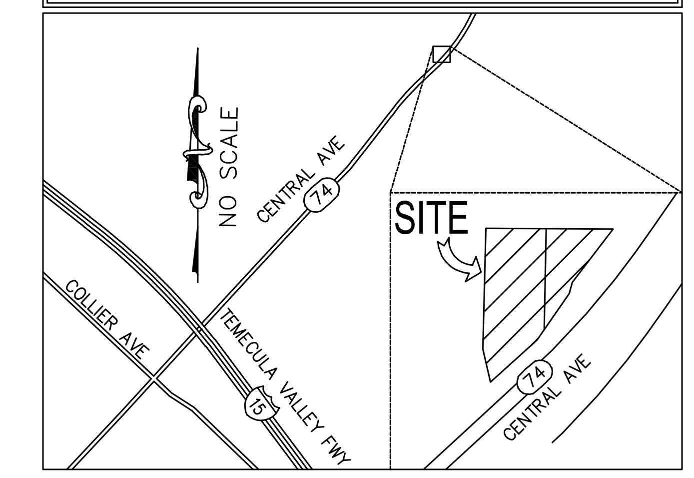
"AS-BUILT"
RCE ______ EXP ______ DATE: ______
REVIEWED BY:
INSPECTOR ______ DATE
SCALE : AS NOTED
BENCH MARK: SEE ABOVE
DATE: AUGUST 30, 2020

CITY OF LAKE ELSINORE
EXISTING HYDROLOGY MAP
28771 CENTRAL 74 HWY,
LAKE ELSINORE, CA
APN:

SHEET 1 OF 2 SHEETS
FILE No.



VICINITY MAP



VICINITY MAP
NTS

LEGEND:

(outlined arrow)	DRAINAGE FLOW DIRECTION (PIPE)
(arrow)	DRAINAGE FLOW
(dark fill)	ROOF
(white fill)	ASPHALT
(speckled fill)	CONCRETE
(dotted fill)	LANDSCAPE OR NATURAL GROUND
(heavy dashed line)	CATCHMENT BOUNDARY
(grey dashed line)	SOIL TYPE BOUNDARY
X.XXAC	AREA, IN ACRES
CP 2 / XXX / XXX / XXX / XXX	CONTROL POINT ID / TIME OF CONCENTRATION, IN MINS. / 2 YR. FLOW, IN CFS / 10 YR. FLOW, IN CFS / 100 YR. FLOW, IN CFS

GRAPHIC SCALE : 1" = 20'

TOTAL AREA	:	1.324 AC
TOTAL PERVIOUS AREA	:	0.684 AC
TOTAL IMPERVIOUS AREA	:	0.643 AC
SOIL TYPE A	:	0.869 AC
SOIL TYPE C	:	0.053 AC
SOIL TYPE D	:	0.401 AC

TOTAL IMPERVIOUS AREA	= 0.643 AC
TOTAL PERVIOUS AREA	= 0.681 AC
TOTAL AREA	= 1.324 AC

POST-DEVELOPMENT HYDROLOGY MAP

MARK	REVISIONS	APPR.	DATE

THESE PLANS HAVE BEEN REVIEWED FOR COMPLIANCE WITH THE APPROPRIATE CONDITIONS OF DEVELOPMENT AND/OR CITY AND STATE LAWS AND A PERMIT MAY BE ISSUED

BRAD FAGRELL, RCE No. 43920 — DATE
CITY ENGINEER
CITY OF LAKE ELSINORE

PREPARED BY:
KARAKI | Western States
A DESIGN-BUILD COMPANY
4887 E. LA PALMA STE. 707
ANAHEIM, CA 92807
TEL: (714)695-9300 FAX: (714)693-1002
www.westernsec.com

KAMAL McHANTAF, RCE C051050 — DATE

SEAL
REGISTERED PROFESSIONAL ENGINEER KAMAL B. McHANTAF No. C051050 Exp. 9-30-21 CIVIL STATE OF CALIFORNIA

"AS-BUILT"
RCE ______ EXP ______ DATE:
REVIEWED BY:
INSPECTOR — DATE
SCALE : AS NOTED
BENCH MARK: SEE ABOVE
DATE: JANUARY 18, 2020

CITY OF LAKE ELSINORE
PROPOSED HYDROLOGY MAP
28771 CENTRAL 74 HWY,
LAKE ELSINORE, CA
CUP200043

SHEET 2 OF 2 SHEETS
FILE No.

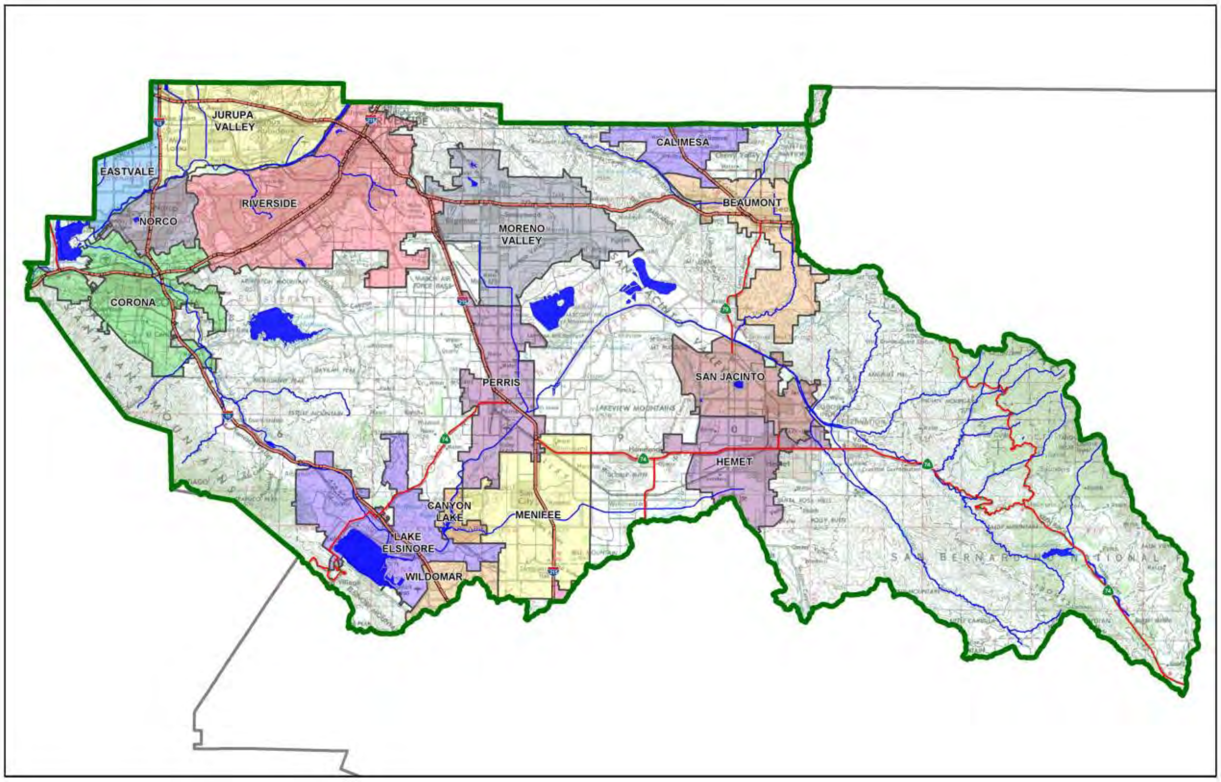
Project Specific Water Quality Management Plan

*A Template for Projects located within the **Santa Ana Watershed** Region of Riverside County*

Project Title: 28771 Central Avenue Gas Station

Development No: Insert text here

Design Review/Case No: PPT210016



Contact Information:

Prepared for:
Daher Oil Inc.
19851 Esperanza Road Yorba Linda,
California 92878

Prepared by:
Western States Engineering, Inc.
4887 E. La Palma, Ste. 707 Anaheim,
Oceanside, California 92807
(714) 695-9300

☒ **Preliminary**
☐ **Final**

Original Date Prepared: September 23, 2020

Revision Date(s): May 3, 2021

Prepared for Compliance with
Regional Board Order No. **R8-2010-0033**
Template revised June 30, 2016

OWNER'S CERTIFICATION

This Project-Specific Water Quality Management Plan (WQMP) has been prepared for Daher Oil Inc. by Western States Engineering, Inc. for the 28771 Central Avenue Gasoline Station and Convenience Store project.

This WQMP is intended to comply with the requirements of Country of Riverside for R8-2010-0033 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 Riverside Water Quality Ordinance Water Quality Ordinance (Municipal Code SectionR8-2010-0033).

"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
Salim S. Daher	President
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."

	5/3/21
Preparer's Signature	Date
Kamal B. Mchantaf	Owner
Preparer's Printed Name	Preparer's Title/Position

Preparer's Licensure:

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Section A: Project and Site Information

PROJECT INFORMATION		
Type of Project:	Commercial	
Planning Area:	C-P-S	
Community Name:	Warm Springs	
Development Name:	28771 Central Avenue Gasoline Station and Convenience Store	
PROJECT LOCATION		
Latitude & Longitude (DMS): 33°42'11"N, 117°19'35"W		
Project Watershed and Sub-Watershed: Santa Ana River Watershed, Temescal Creek		
Gross Acres: 1.448 APN(s): 347130029 Map Book and Page No.: PM 46/72		
PROJECT CHARACTERISTICS		
Proposed or Potential Land Use(s)		Commercial
Proposed or Potential SIC Code(s)		44711
Area of Impervious Project Footprint (SF)		34,888
Total Area of <u>proposed</u> Impervious Surfaces within the Project Footprint (SF)/or Replacement		34,888
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 <u>existing</u> Impervious Surfaces within the Project limits Footprint (SF)		2,549
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)		N/A
What is the Water Quality Design Storm Depth for the project?		0.65

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
- BMP Locations (Lat/Long)

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
Temescal Creek Reach 5	None	GWR, REC1, REC2, WARM, WILD	N/A
Santa Ana River Reach 3	Indicator Bacteria	AGR, GWR, REC1, REC2	N/A

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)* City of Riverside Conditional Use Permit	☒ 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)

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?

Portion of the development (DMA A) shall preserve the existing drainage pattern although the areas (DMA B) near the Central Avenue will be allowed to drain to the said road's drainage system. The runoff from the area will eventually drain into the Temascal Creek Reach 5.

Did you identify and protect existing vegetation? If so, how? If not, why?

Yes. *Areas within the improvement will be graded while the portions to be left from proposed gasoline station and convenience store shall be left ungraded along with the existing vegetation.*

Did you identify and preserve natural infiltration capacity? If so, how? If not, why?

Yes. Proposed bio-retention basins will be used without any impervious liners. This will allow captured volume to be infiltrated on-site.

Did you identify and minimize impervious area? If so, how? If not, why?

Yes. The project proposes to construct the gasoline station, convenient store and associated development into only a portion of the parcel while leaving a large portion of the project area as undeveloped and ungraded.

Did you identify and disperse runoff to adjacent pervious areas? If so, how? If not, why?

DMA A will be allowed to drain into the natural pervious area by placing the bioretention basin next to it. Any overflow of the captured volume for DMA A will be able to drain to this area that was naturally where the entire project site eventually drains to.

The overflow of DMA B shall drain towards the storm drain system along the Central Avenue. The flows will find its way to the Temascal Creek Reach 5.

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)[12]	Area (Sq. Ft.)	DMA Type
A-1	Roof	2,519.08	Type D
A-2	Asphalt/Concrete Pavement	877.78	Type D
A-3	Landscape	2,083.87	Type D
B-1	Roof	4,268.86	Type D
B-2	Asphalt/Concrete Pavement	27,221.98	Type D
B-3	Landscape	7,571.49	Type D

[1]Reference Table 2-1 in the WQMP Guidance Document to populate this column
[2]If multi-surface provide back-up

Table C.2 Type 'A', Self-Treating Areas

DMA Name or ID	Area (Sq. Ft.)	Stabilization Type	Irrigation Type (if any)
C-1	18,547.21	N/A	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]

$$[D] = [B] + \frac{[B] \cdot [C]}{[A]}$$

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	Impervious fraction	Product	DMA name /ID	Area (square feet)	Ratio
	[A]		[B]	[C] = [A] x [B]		[D]	[C]/[D]

Table C.5 Type 'D', Areas Draining to BMPs

DMA Name or ID	BMP Name or ID
A-1 to A-3	Bioretention BIO-A
B-1 to B-3	Bioretention BIO- B

<u>Note</u>: 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

If yes has been checked, Infiltration BMPs shall not be used for the site; proceed to section D.3

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

Does the project site…	YES	NO
…have any DMAs with a seasonal high groundwater mark shallower than 10 feet?		X
If Yes, list affected DMAs:		
…have any DMAs located within 100 feet of a water supply well?		X
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?		X
If Yes, list affected DMAs:		
…have measured in-situ infiltration rates of less than 1.6 inches / hour?		X
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?		X
If Yes, list affected DMAs:		
…geotechnical report identify other site-specific factors that would preclude effective and safe infiltration?		X
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 none 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: 0.217 Acres

Type of Landscaping (Conservation Design or Active Turf): Conservative Design (to be confirmed by landscape architect).

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: 0.639 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: 0.65

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: 0.415 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)**
0.415 Acres	0.217 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: 150

Project Type: Commercial

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: 0.639 Acres

Step 3: Enter the Design Storm depth for the project site (see Exhibit A) into the left column of Table 2-2 in Chapter 2 to determine the minimum number or toilet users per tributary impervious acre (TUTIA).

Enter your TUTIA factor: 141

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: 90

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)
90	150

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: N/A

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: N/A

Step 3: Enter the Design Storm depth for the project site (see Exhibit A) into the left column of Table 2-4 in Chapter 2 to determine the minimum demand for non-potable uses per tributary impervious acre.

Enter the factor from Table 2-4: N/A

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 gallons per day of non-potable use that would be required.

Minimum required use: N/A

Step 5: Determine if harvesting stormwater runoff for other non-potable use is feasible for the project by comparing the projected average daily use (Step 1) to the minimum required non-potable use (Step 4).

Minimum required non-potable use (Step 4)	**Projected average daily use (Step 1)**
N/A	N/A

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 per Section 3.4.2 of the WQMP Guidance Document.

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	
A	☐	☐	☒	☐	☐
B	☐	☐	☒	☐	☐
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐

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.

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	*Enter BMP Name / Identifier Here*		
	[A]		[B]	[C]	[A] x [C]			
A-1	*2,519.08*	*Roofs*	*1*	*0.89*	*2,247*	*Design Storm Depth (in)*	*Design Capture Volume,* **V_{BMP}** *(cubic feet)*	*Proposed Volume on Plans (cubic feet)*
A-2	*877.78*	*Concrete or Asphalt*	*1*	*0.89*	*783*			
A-3	*2,083.87*	*Ornamental Landscaping*	*0.1*	*0.11*	*230.2*			
	5,480.73				***3,260.2***	***0.65***	***176.6***	***934***

[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

Table D.4 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	*BIO-B*		
	[A]		[B]	[C]	[A] x [C]	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
B-1	*4,268.86*	*Roofs*	*1*	*0.89*	*3,807.8*			
B-2	*27,221.98*	*Concrete or Asphalt*	*1*	*0.89*	*24,282*			
B-3	*7,571.49*	*Ornamental Landscaping*	*0.1*	*0.11*	*836.3*			
	39,062.33				***28,926.1***	***0.65***	***1,566.8***	***3,173***

[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.

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)*
	$A_T = \Sigma[A]$				$\Sigma = [D]$	[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 for Flow-Based Treatment Control BMPs [E] = .2, for Volume-Based Control Treatment BMPs, [E] 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	11.17	8.9	20.32
Volume (Cubic Feet)	1,787.5	7,498.5	319

[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 Susceptibility 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:

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.

Be sure to include all pertinent documentation used in your analysis of the items a, b or c in Appendix 7.

For the pre-development stage, a portion of the proposed Chris Circle drains to the southwest corner although this is too small of an area so the calculations included this in the calculations for Area A. Area A drains to the northwest corner and has a 2-year volume of 1,787.5 cf.

For the post-development stage, the area is split into Area, which is mostly landscape and shall follow the natural drain to the northwest corner while the impervious areas of the proposed development can be found in Area B to drain into the proposed bioretention basins and drain to Central Avenue. The 2-year post-development volumes of Areas A and B total to 7,498.5 cf.

Both bioretention basins A and B shall have a combined volume of 5,731 cu.ft. Each basin shall have a ponding depth of 0.5 ft, soil media depth of 3.0 ft and a gravel depth of 1.0 ft. With the basin volume capacities, there is be a net decrease in the 2-year 24-hour volumes for the total area for the development.

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:

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	• Mark all inlets with the words "No Dumping! Flows to Bay" or similar	• 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.
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.

Potential Sources of Runoff pollutants	Permanent Structural Source Control BMPs	Operational Source Control BMPs
Landscape/Outdoor Pesticide Use	• 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 hardscapes. • To ensure successful establishment, select plants appropriate to site soils, slopes, climate, sun, wind, land use, air movement, ecological consistency, and plant interactions.	• Maintain landscaping using minimum or no pesticide. • See applicable operational BMPs in "What you should know for...Landscape and Gardening" at www.rivcocob.org/ords/800/859.pdf • Provide IPM information to new owners, lessees and operators.
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. • Any drains from dumpsters, compactors, and tallow bin areas shall be connected to a grease removal device before discharge to sanitary sewer.	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. Keep receptacles covered. 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.
Fuel Dispensing Areas		• The property owner shall dry sweep the fueling area routinely. • See the Business Guide Sheet, "Automotive Service—Service Stations" in the CASQA Stormwater

		Quality Handbooks at www.cabmphandbooks.com
Potential Sources of Runoff pollutants	Permanent Structural Source Control BMPs	Operational Source Control BMPs
Fire Sprinkler Test Water	• Provide a means to drain fire sprinkler test water to the sanitary sewer.	• See the note Fact Sheet SC-41, "Building and Grounds Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com
Miscellaneous Drain or Wash Water Roofing, gutters, and trim	Avoid roofing, gutters, and trim made of copper or other unprotected metals that may leach into runoff.	N/A
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 H.1 Construction Plan Cross-reference

BMP No. or ID	BMP Identifier and Description	Corresponding Plan Sheet(s)	BMP Location (Lat/Long)
BIO-A	Landscape	See WQMP Exhibit	33°42’12” 117°19’35”
BIO-B	Landscape	See WQMP Exhibit	33°42’10” 117°19’35”

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: Covenant & Agreement to be included. Daher Oil Inc. is responsible for the BMP maintenance.

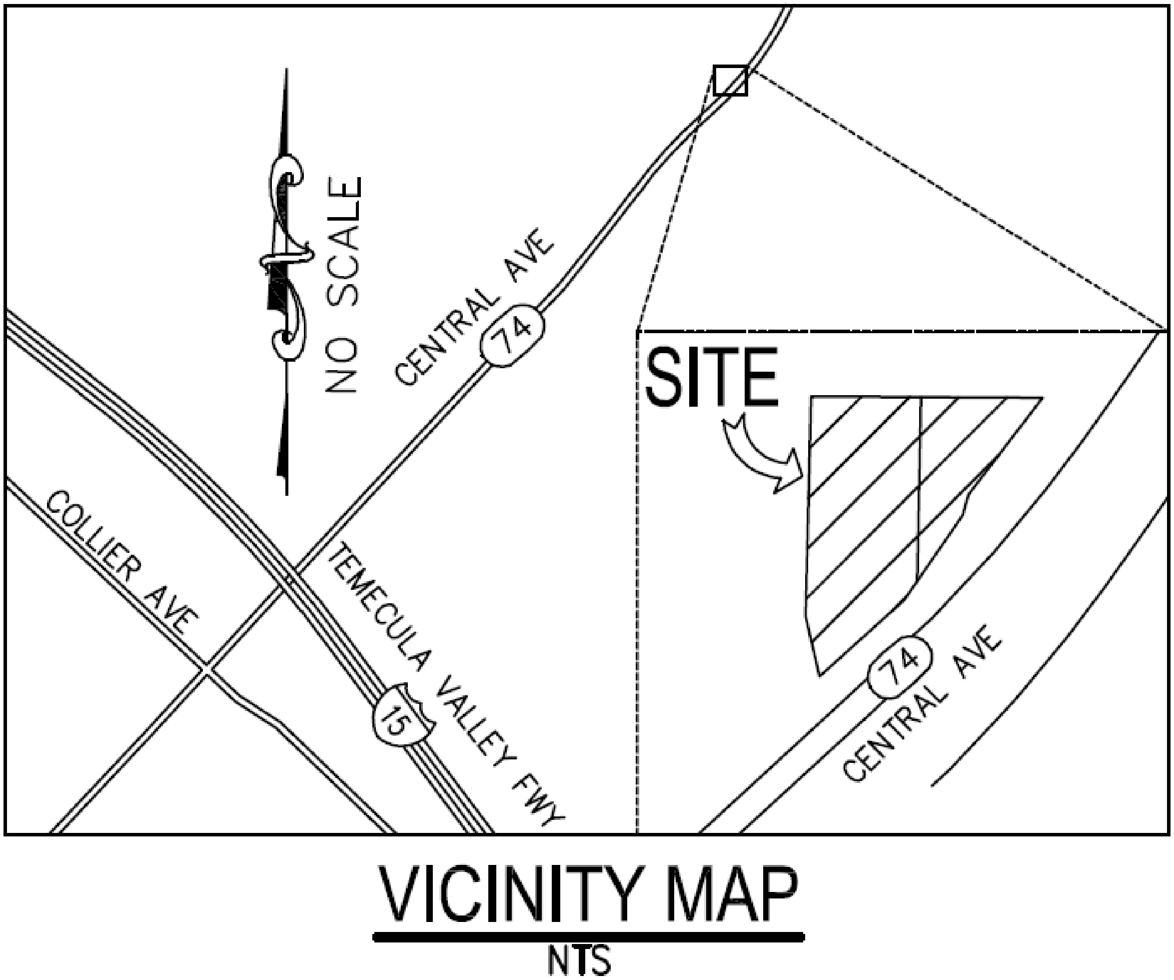
Will the proposed BMPs be maintained by a Home Owners' Association (HOA) or Property Owners Association (POA)?

☐ Y ☒ N

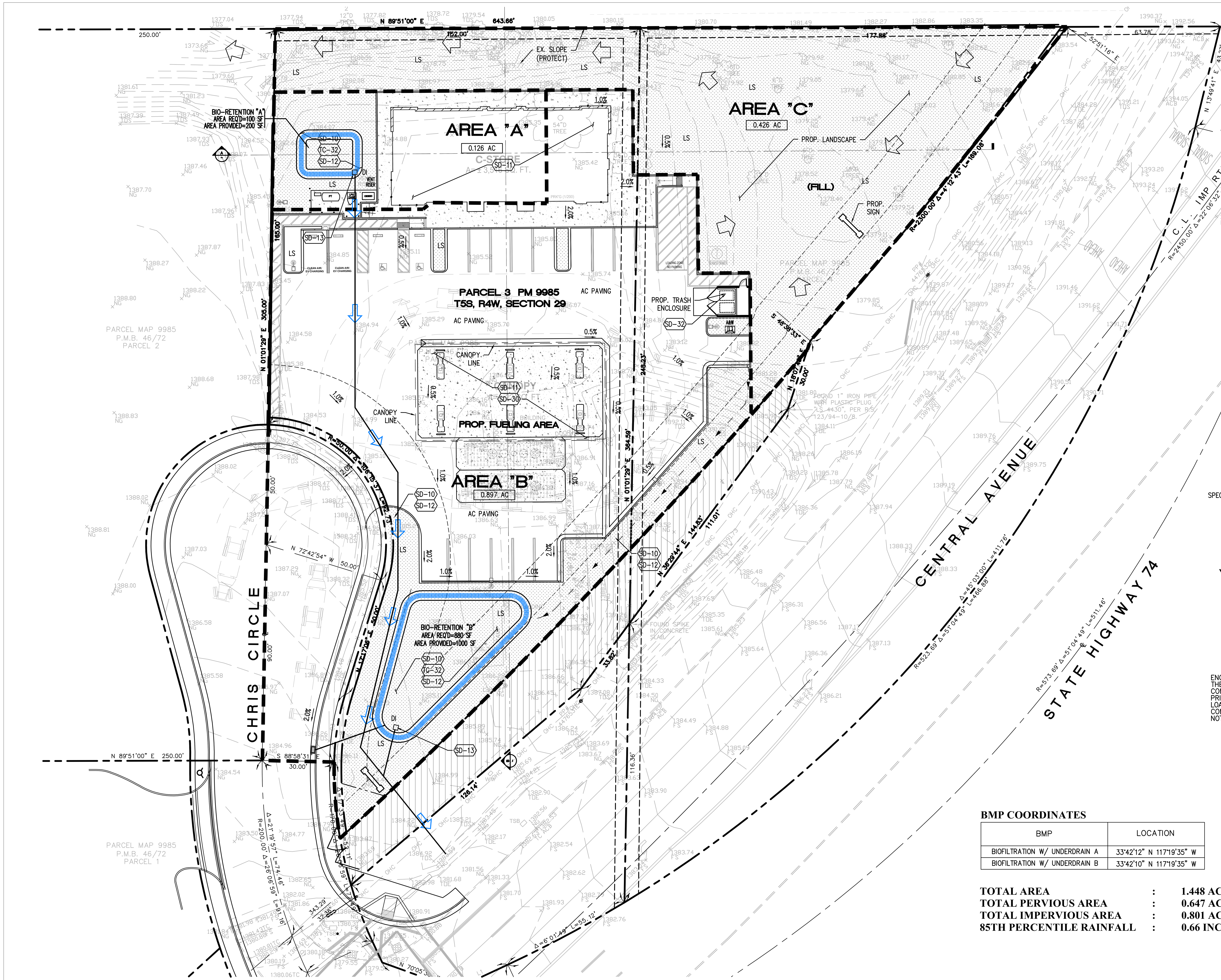
Include your Operation and Maintenance Plan and Maintenance Mechanism in Appendix 9. Additionally, include all pertinent forms of educational materials for those personnel that will be maintaining the proposed BMPs within this Project-Specific WQMP in Appendix 10.

Appendix 1: Maps and Site Plans

Location Map, WQMP Site Plan and Receiving Waters Map

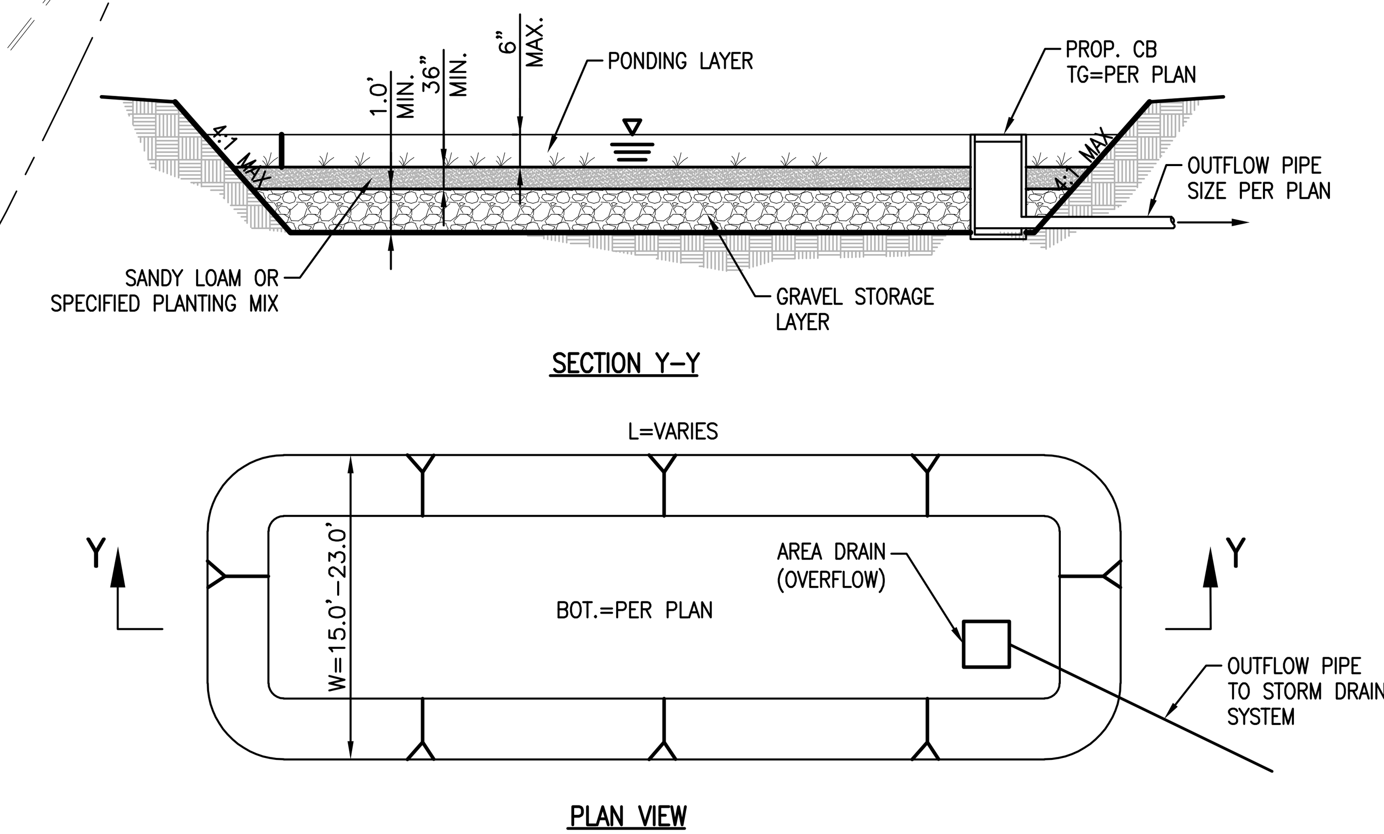


VICINITY MAP
Not to Scale



LEGEND:

- DRAINAGE FLOW DIRECTION (PIPE)
- DRAINAGE FLOW
- ROOF
- ASPHALT
- CONCRETE
- LANDSCAPE OR NATURAL GROUND
- CATCHMENT BOUNDARY
- BIOFILTRATION BASIN
- DMA X / X.XXX AC — DMA ID / AREA, IN ACRES



ENGINEERED SOIL MEDIA REQUIREMENTS:
THE ENGINEERED SOIL MEDIA SHALL BE COMPRISED OF 85% MINERAL COMPONENT AND 15% ORGANIC COMPONENT, BY VOLUME, DRUM MIXED PRIOR TO PLACEMENT. THE MINERAL COMPONENT SHALL BE CLASS A SANDY LOAM TOPSOIL THAT MEETS THE RANGE SPECIFIED IN TABLE 1. THE ORGANIC COMPONENT SHALL BE NITROGEN STABILIZED COMPOST SUCH THAT NITROGEN NOT LEACH FROM THE MEDIA.

TABLE 1

PERCENT RANGE	COMPONENT
70–80	SAND
15–20	SILT
5–10	CLAY

TYP. BIO-RETENTION DETAIL

N.T.S.

SOURCE CONTROL BMP

- SD-10 SIDE DESIGN AND LANDSCAPE PLANNING
- SD-11 ROOF RUNOFF CONTROL
- SD-12 EFFICIENT IRRIGATION
- SD-13 STORM DRAIN SIGNAGE
- SD-30 FUELING AREAS
- SD-32 TRASH ENCLOSURES

TREATMENT CONTROL BMP

- TC-32 BIORETENTION

BMP COORDINATES

BMP	LOCATION
BIOFILTRATION W/ UNDERDRAIN A	33°42'12" N 117°19'35" W
BIOFILTRATION W/ UNDERDRAIN B	33°42'10" N 117°19'35" W

TOTAL AREA	:	1.448 AC
TOTAL PERVIOUS AREA	:	0.647 AC
TOTAL IMPERVIOUS AREA	:	0.801 AC
85TH PERCENTILE RAINFALL	:	0.66 INCHES

MARK	REVISIONS	APPR.	DATE

THESE PLANS HAVE BEEN REVIEWED FOR COMPLIANCE WITH THE APPROPRIATE CONDITIONS OF DEVELOPMENT AND/OR CITY AND STATE LAWS AND A PERMIT MAY BE ISSUED

BRAD FAGRELL, RCE No. 43920 — DATE
CITY ENGINEER
CITY OF LAKE ELSINORE

PREPARED BY:
KARAKI | Western States
A DESIGN-BUILD COMPANY
4887 E. LA PALMA STE. 707
ANAHEIM, CA 92807
TEL: (714)695-9300 FAX: (714)693-1002
www.westernsec.com

KAMAL McHANTAF, RCE C051050 — DATE

SEAL
REGISTERED PROFESSIONAL ENGINEER — KAMAL B. McHANTAF — No. C051050 — Exp. 9-30-21 — CIVIL — STATE OF CALIFORNIA

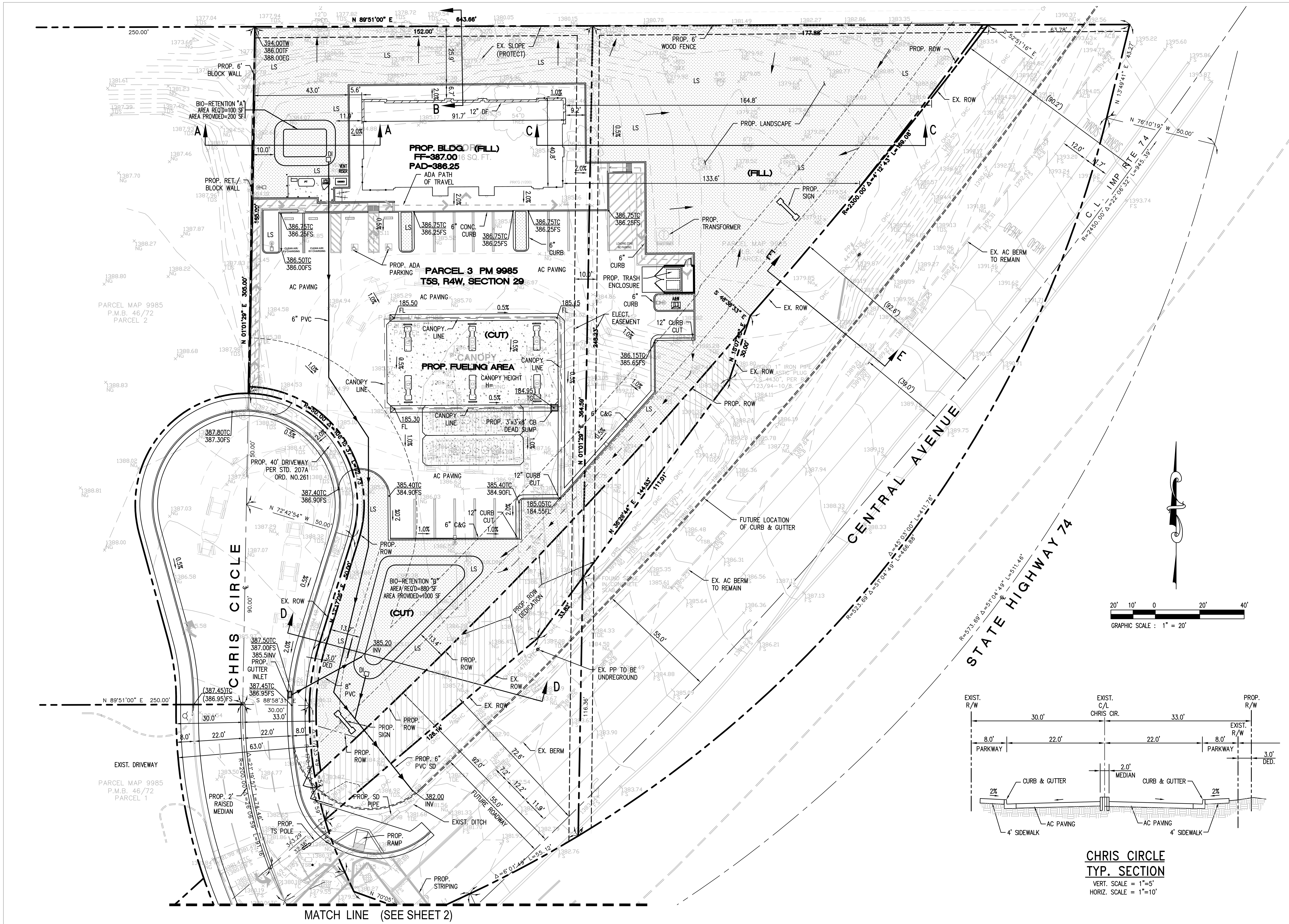
"AS-BUILT"
RCE______ EXP______ DATE:
REVIEWED BY:
INSPECTOR ______ DATE
SCALE : AS NOTED
BENCH MARK: SEE ABOVE
DATE: JANUARY 18, 2020

CITY OF LAKE ELSINORE
WQMP EXHIBIT
28771 CENTRAL 74 HWY,
LAKE ELSINORE, CA
CUP200043

SHEET 1 OF 1 SHEETS
FILE No.

Appendix 2: Construction Plans

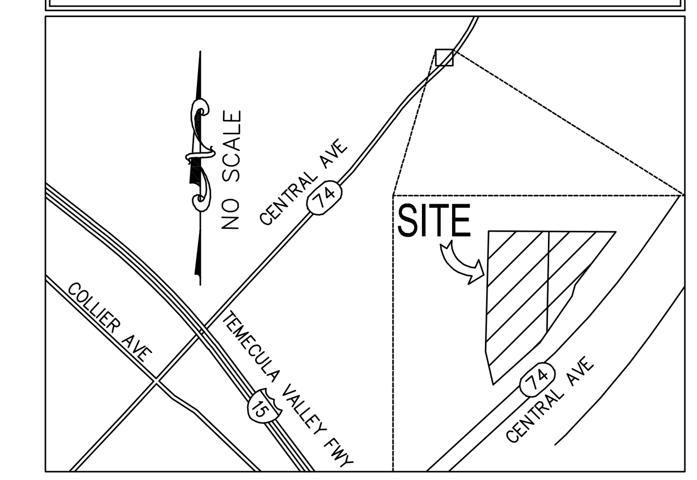
Grading and Drainage Plans



CHRIS CIRCLE TYP. SECTION

VERT. SCALE = 1"=5'
HORIZ. SCALE = 1"=10'

VICINITY MAP



VICINITY MAP
NTS

OWNER / SUBDIVIDER

DAHER OIL INC.
19851 ESPERANZA ROAD
YORBA LINDA, CA 92886
ATTN: ALFRED DAHER

SITE ADDRESS:

28771 HIGHWAY 74
LAKE ELSINORE, CA 92532

LEGAL DESCRIPTION:

REAL PROPERTY IN THE UNINCORPORATED AREA OF THE COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, DESCRIBED AS FOLLOWS:

PARCELS 4 OF PARCEL MAP 9985, AS SHOWN BY MAP ON FILE IN BOOK 46, PAGE 72, OF PARCEL MAPS, RECORDS OF RIVERSIDE COUNTY, CALIFORNIA.

EXCEPTING THEREFROM THAT PORTION CONVEYED TO THE RIVERSIDE COUNTY TRANSPORTATION COMMISSION, BY GRANT DEED RECORDED OCTOBER 09, 2001 AS INSTRUMENT NO. 01-489377, OF OFFICIAL RECORDS OF SAID COUNTY.

ASSESSOR'S PARCEL NUMBER: 347-130-028

TOTAL AREA: 62,757.88 S.F. (1.441 ACRES)

ENGINEER

WESTERN STATES ENGINEERING, INC.
4887 E. LA PALMA, STE 707
ANAHEIM, CA 92807
TEL. (714) 695-9300
FAX (714) 693-1002
ATTN: JOSEPH KARAKI

GEOTECHNICAL ENGINEER

PRELIM. GEOTECHNICAL INVESTIGATION REPORT
PROPOSED GAS STATION AND C-STORE
PREPARED ON SEPTEMBER 11, 2020
BY GEO ENVIRON ENGINEERING CONSULTANTS, INC.
4071 E. LA PALMA AVENUE, SUITE B
ANAHEIM, CA 92807
(714) 632-3190 PHONE
(714) 632-3191 FAX

SURVEYOR

PAYAN SURVEYING, INC.
2404 MARY CLARE STREET
CORONA, CA 92882
PHONE: 951-356-6456
EMAIL:atanacio@payansurveying.com
DATE PREPARED: 12/12/18

EARTHWORK QUANTITIES

RAW CUT : 100 CY
RAW FILL : 100 CY
NET : 0 CY

BASIS OF BEARINGS

THE BEARINGS SHOWN HEREON ARE BASED UPON THE WEST LINE OF PARCELS 1 AND 2, BEING N 01° 01' 29" E AS SHOWN ON PARCEL MAP NO. 9985 FILED IN BOOK 46, PAGE 72, OF PARCEL MAPS, RECORDS OF RIVERSIDE COUNTY.

BENCHMARK

CALIFORNIA DEPARTMENT OF TRANSPORTATION BM 13-A-93
ELEVATION = 1271.61 FEET
CAL D.O.T. BRASS DISK IN WESTERLY CURB RIVERSIDE DRIVE (RTE. 74) AT THE NORTHEASTERLY CORNER OF BRIDGE DECK RIVERSIDE COUNTY FLOOD CONTROL CANNEL (B-1) 150 FEET SOUTHERLY OF LAKECREST DRIVE AND 58 FEET NORTHERLY OF PP# 2105984FC

SHEET INDEX

SHEET 1 – PRELIMINARY GRADING PLAN
SHEET 2 – CROSS SECTIONS/INTERSECTION PLAN

CUP No. 200043
CASE NO. PPT210016

MARK	REVISIONS	APPR.	DATE

THESE PLANS HAVE BEEN REVIEWED FOR COMPLIANCE WITH THE APPROPRIATE CONDITIONS OF DEVELOPMENT AND/OR CITY AND STATE LAWS AND A PERMIT MAY BE ISSUED

BRAD FAGRELL, RCE No. 43920 — DATE
CITY ENGINEER
CITY OF LAKE ELSINORE

PREPARED BY:
KARAKI | Western States
A DESIGN-BUILD COMPANY
4887 E. LA PALMA STE. 707
ANAHEIM, CA 92807
TEL: (714)695-9300 FAX: (714)693-1002
www.westernsec.com

KAMAL McHANTAF, RCE C051050 — DATE

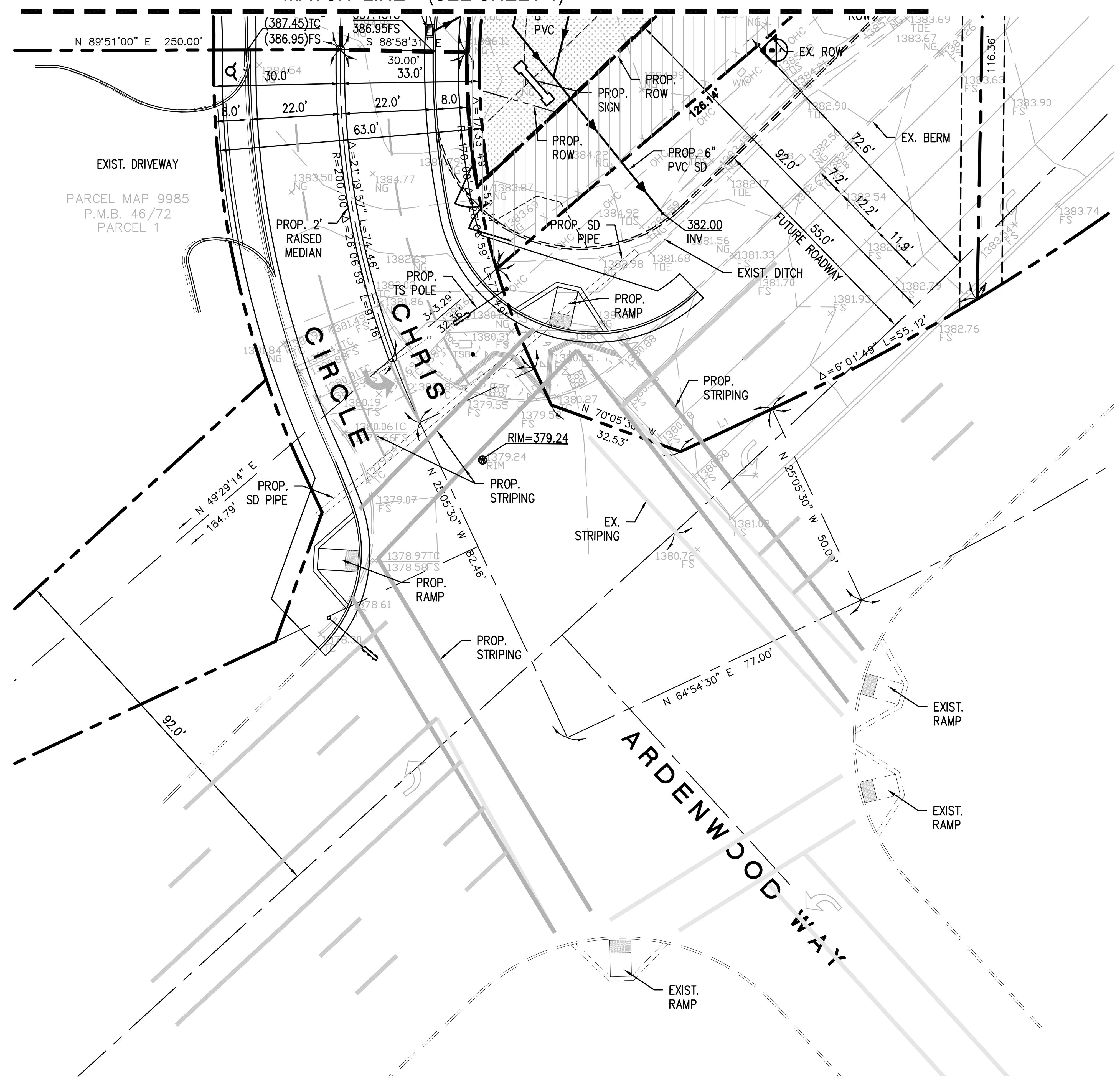
SEAL
REGISTERED PROFESSIONAL ENGINEER
KAMAL B. McHANTAF
No. C051050
Exp. 9-30-21
CIVIL
STATE OF CALIFORNIA

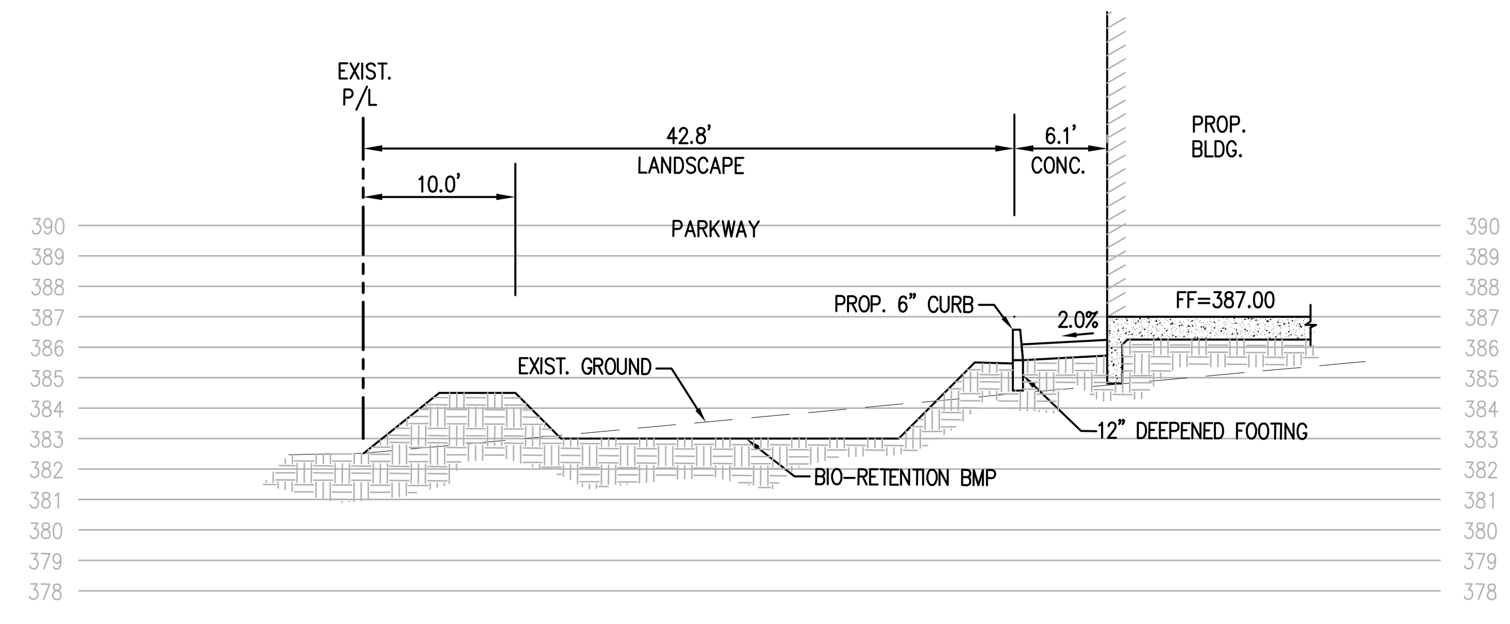
"AS-BUILT"
RCE ____ EXP ____ DATE:
REVIEWED BY:
INSPECTOR — DATE
SCALE : AS NOTED
BENCH MARK: SEE ABOVE
DATE: JANUARY 18, 2020

CITY OF LAKE ELSINORE
PRELIMINARY GRADING PLAN
28771 CENTRAL 74 HWY,
LAKE ELSINORE, CA
CUP200043

SHEET 1 OF 2 SHEETS
FILE No.

MATCH LINE (SEE SHEET 1)





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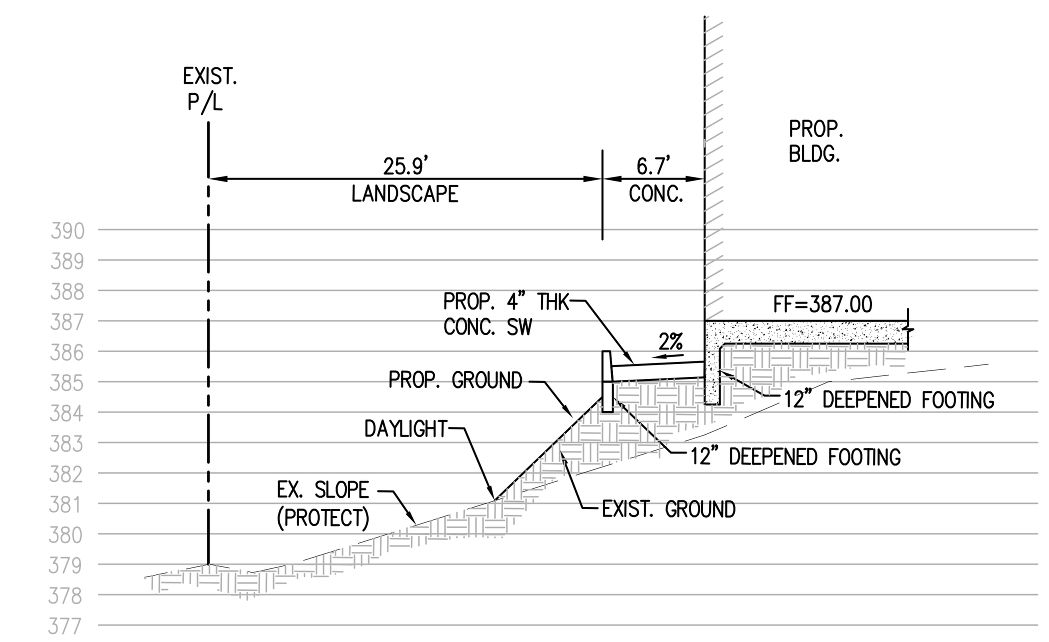

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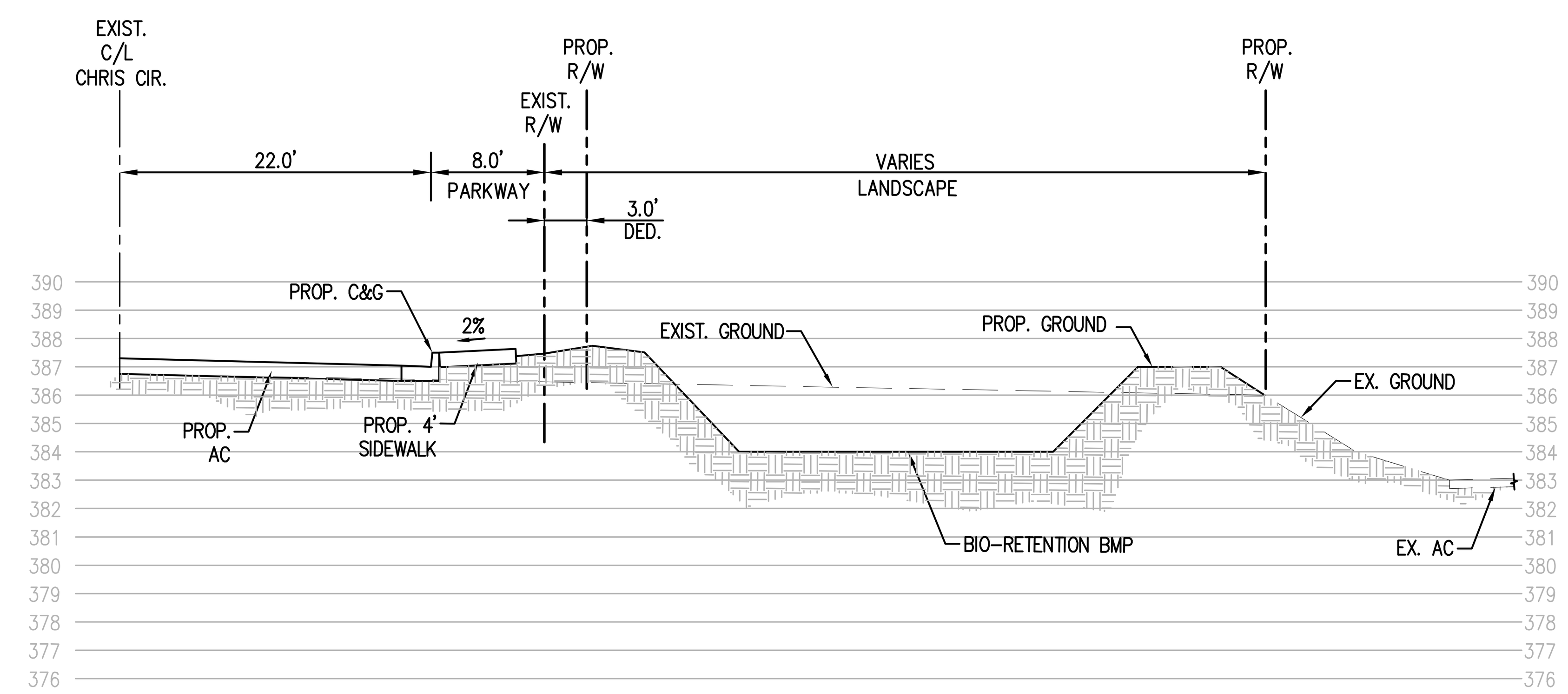

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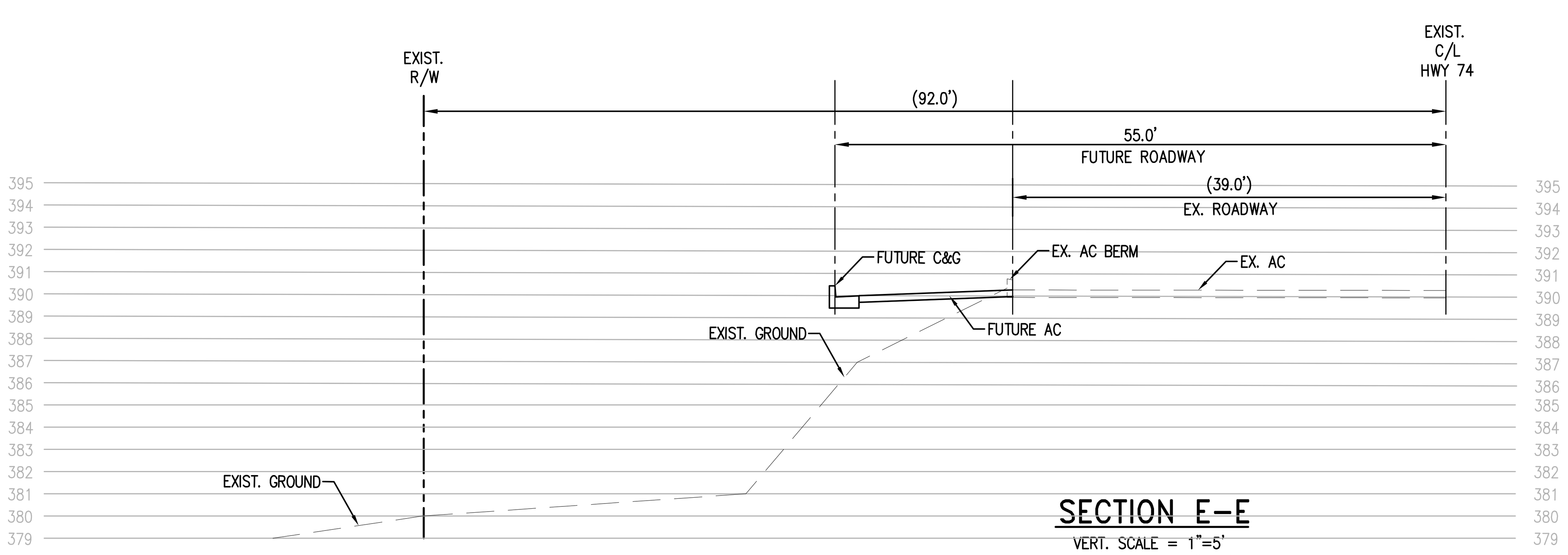

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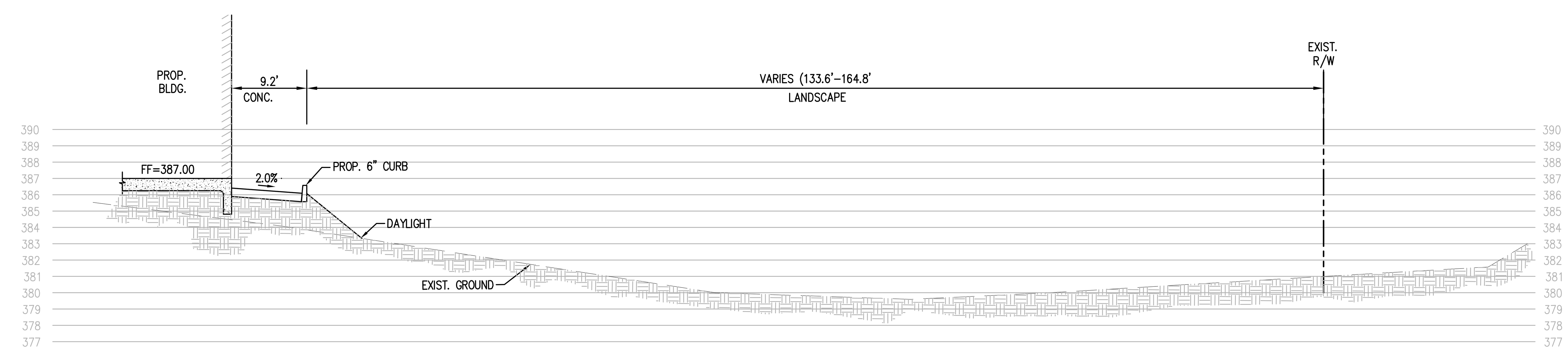

SECTION C–C
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HORIZ. SCALE = 1"=10'

MARK	REVISIONS	APPR.	DATE

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BRAD FAGRELL, RCE No. 43920
CITY ENGINEER
CITY OF LAKE ELSINORE
DATE

PREPARED BY:
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STATE OF CALIFORNIA

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CITY OF LAKE ELSINORE
PRELIMINARY GRADING PLAN
28771 CENTRAL 74 HWY,
LAKE ELSINORE, CA
CUP200043

SHEET 2
OF 2 SHEETS
FILE No.

Appendix 3: Soils Information

Geotechnical Study and Other Infiltration Testing Data

GEOTECHNICAL AND ENVIRONMENTAL ENGINEERING CONSULTANTS, INC.
4071 E. La Palma Ave., Ste. B, Anaheim, Ca 92807 • (714) 632-3190 • Fax (714) 632-3191

Job No. 20-1057P
September 11, 2020

Mr. Joseph Karaki
Western State Eng. & Construction, Inc.
4887 E. La Palma Street, Ste # 707
Anaheim, Ca 92807

Subject: **Preliminary Geotechnical Investigation Report for Foundation Design, Proposed Gasoline Service Station, 28771 Central Ave, Lake Elsinore California**

Reference:

1) WS Eng., Inc , 8/31/20, "Site Plan, Proposed Gas Station and C-Store , 28771 Central Ave (74 Hwy), Lake Elsinore California

Gentlemen:

In accordance with your request and authorization, we have performed a preliminary geotechnical engineering investigation for the subject project. The accompanying report presents the preliminary results of our field exploration work, laboratory tests, our geotechnical experience previously performed in the vicinity of the project site, as well as engineering analysis. The subsurface and foundation conditions are discussed and preliminary recommendations for the geotechnical engineering aspects of the project are presented.

This opportunity to be of service is appreciated. If you have any questions concerning our findings, please call at your convenience.

Respectfully submitted,

Geo Environ Eng. Consultants, Inc.

REGISTERED PROFESSIONAL ENGINEER
ESMAIL RASTEGARI
No. 43332
Exp.03/30/2022
CIVIL
STATE OF CALIFORNIA

Jabed Masud, MSCE
Principal

Esmail Rastegari, P.E.
Principal

JM/ER/gm

Attachments: Appendix 'A' - Drawings, Boring Location
Appendix 'B' - Boring Logs
Appendix 'C' - Laboratory Test Results
Appendix 'D' - Liquefaction Analysis

SCOPE

The scope of this study was designed to determine and evaluate the surface and subsurface conditions of the subject site and to present preliminary recommendations for the foundation systems and grading requirements as they relate to the planned development

The scope included the following geotechnical functions:

- Review of available literature pertaining to the site and vicinity.
- Evaluation of natural and manmade surface features at the site and contiguous areas.
- Drilling and logging of exploratory borings.
- Securing of bulk and undisturbed samples of earth materials from the trenches for laboratory testing.
- Laboratory testing of selected samples.
- Geotechnical engineering analysis of data obtained during the study.
- Preparation of this report and the accompanying illustrations to present the findings, conclusions, and recommendations pertaining to the planned construction.

The scope of work did not include any environmental assessment of the property or opinions relating to possible soil or subsurface contamination by hazardous or toxic substances.

SITE DESCRIPTION

Location & Site Conditions

The subject property upon which the soil exploration has been performed is located at N.E. C Central Ave (74 Hwy) & Arrowwood Way, Lake Elsinore, Riverside County, California. The subject site is a vacant plot of land, 1.4 acres in size. The site is bounded by commercial properties, on the south apartment buildings, on the east residential, and on the west light industrial buildings.

PROPOSED CONSTRUCTION & GRADING

Preliminary details of the proposed construction and the reference drawing were provided by the project Architect.

A C- store (4000 sft), and canopy (3,160 sft) are planned to be constructed within the subject site. Appurtenant construction will include underground utilities, gas pumps, asphalt concrete and concrete pavement , and underground tanks (USTs).

Loads on the foundations are unknown but are expected to be between 2 and 4 kips per linear foot. Column loads are expected to be between 50 and 100 kips. Other structures will remain in place. No grading plans were to provided to this firm for our use during this study. However, cut and fill grading are anticipated within the proposed construction areas. Should details involved in final design vary from those outlined above, this firm should be notified for review and possible revision of our recommendations.

FIELD STUDY

A field study consisting of site observations and subsurface exploration was conducted on September 4, 2020. Three exploratory borings were drilled to a maximum depth of 50 feet below existing surface The soils encountered in the exploratory drilling were logged by our field personnel. The boring log are included in Appendix 'B'. The approximate location of the borings are shown on the plot plan in Appendix 'A'. Disturbed and undisturbed samples of the soils encountered were obtained at frequent intervals in the borings. Undisturbed samples were obtained by driving a thin walled steel sampler with successive drops of a 140-pound weight having a free fall of 30 inches. The blow count for each one foot of penetration is shown on the boring logs. Undisturbed soils were retained in brass rings with a 1-inch height and 2.413-inch inside diameter. The ring samples were retained in close fitting moisture proof containers and transported to our laboratory for testing.

LABORATORY TEST

The results of laboratory tests performed on disturbed, undisturbed, and remolded soil samples are presented in appendix 'C'. Following is a listing and brief explanation of the laboratory tests which were performed as part of this study. The remaining soil samples are stored in our laboratory for future reference. Unless notified to the contrary, all samples will be disposed of 30 days after the date of this report.

Classification

The field classification of the soils were verified in the laboratory in general accordance with the Unified Soil Classification System. The final classification is shown on the boring logs.

Field Moistures and Densities

The field moisture content was determined for each of the disturbed and undisturbed soil samples. The dry density was also determined for each of the undisturbed samples. The dry density was determined in pounds per cubic foot and the field moisture content was determined as a percentage of the dry weight of the soil. Both results are shown on boring logs.

Consolidation Tests

Settlement predictions of the soil's behavior under load were made on the basis of the consolidation tests which are performed in general accordance with ASTM D-2435 procedures. The Consolidation apparatus is designed to receive a one inch high ring.

Expansion Characteristics

Laboratory expansion tests were performed on a near surface soil sample in general accordance with ASTM D-4829 procedures.

Direct Shear Test

Direct Shear test was performed in the Direct Shear Test Machine which is of the strain control type in general with ASTM D-3080 procedure. Each sample was sheared under varying pressures normal to the face of the specimen to determine the shear strength (cohesion and angle of internal friction). Samples were tested in a submerged condition. The result is plotted on the "Direct Shear Test Graph."

GEOTECHNICAL CONDITIONS

Earth Materials

The site consists of top native soils (alluvium) classified as brown-orange, sandy silt, moderately dense, moist with coarse sand & gravel that is found all the way to a depth of 50 feet. A more detailed description of the earth materials encountered is presented on the log borings in Appendix 'B'. The boring locations are presented on the log borings in Appendix 'A'. The soil strata as the boring logs represents the soil conditions in the actual boring locations other variations may occur between the borings. Lines of demarcation represent the approximate boundary between the soil types, but the transition may be gradual.

Groundwater

Groundwater was encountered in the exploratory borings during our subsurface exploration. Based upon our previous investigation in the site vicinity, the groundwater depth is expected to be between 32 to 38 feet below existing surface. Please refer to the referenced boring log B-1A.

Seismicity

The frequency of earthquake and intensity of seismic ground shaking to be expected at the site depends upon which fault produces the earthquake, the earthquake magnitude and the distance to the epicenter.

Nearby active fault lines are the Elsinore-Glen Ivy and Elsinore-Temecula, these have associated postulated, maximum probable earthquake magnitudes of 6.8. In turn, the probabilistic ground motion acceleration range upwards to $\pm$ 0.84g. The related California Building Code factors include the type B, Elsinore-Glen Ivy Fault the near source zone at 5.0 kilometers towards the south-west and a soil profile type of alluvium or Sd.

Based on the California Building Code acceptance of some structural damage without collapse, the subject development may be designed in accordance with the seismic formulas and requirements presented in the latest version of the California Building Code (CBC 2019). It is the responsibility of the project structural engineer to utilize the critical seismic factors to be used for building design and to implement the applicable sections of the code.

Liquefaction

A liquefaction analysis was performed to verify the susceptibility to liquefaction at the subject location due to no current data in existence to verify liquefaction potential in the area. **Our analysis has determined that subject property is NOT susceptible to liquefaction.** Please reference the liquefaction analysis report attached to this report (Appendix 'D').

CONCLUSIONS

- The plan construction and development of the site is considered feasible from a geotechnical engineering point of view provided the engineering recommendations of this report are followed.
- The surface and the subsurface soil on the site will be adequate for the support of the structure and any fill soils proposed for the site.
- The proposed structure, grading, and development of the site will not cause adverse safety hazards or instability to the adjacent properties or their structures.
- Conversely, the adjacent properties or their structures will not cause adverse safety hazards or instability to the planned development.
- Laboratory expansion test indicate that the soils on the site have low expansion potential.
- The site is not susceptible to liquefaction.

RECOMMENDATIONS

Rough Grading Recommendation

The following recommendations may need to be modified and/ or supplemented during rough grading as field conditions necessitate. All earthwork and grading shall be performed in accordance with the recommendations presented herein, and in accordance with all applicable requirements of the Grading Code of the County of Riverside, California.

The proposed building areas should be overexacavated to a depth of 4 .0 feet below the existing soil grade, or 2.0 feet below the proposed footing bottoms, whichever is greater. Where possible, the limits of overexcavation for building areas shall extend at least 5.0 feet beyond the proposed building limits or to the property line whichever is less. The excavated soils free from debris or other organic may be replaced as a certified compacted fill. The depth of the excavations will be determined by the soil engineer during grading and construction, based on the previously placed un-certified fill.

The competency of the exposed overexcavation bottoms must be determined by the soil engineer or his representative at the time they are exposed and prior to scarification or placement of fill. All overexcavation bottoms and any areas to receive fill shall be scarified a minimum of 6 inches, watered or aerated as necessary to achieve optimum moisture content, and properly compacted to at least 90% of maximum dry density prior to filling.

For the purpose of estimating earthwork quantities, a shrinkage factor of 15% (0.15) may be assumed for the existing near surface on-site soil to be used as fill and compacted to 90% of maximum dry density. Subsidence due to grading is estimated to be .1 feet.

Any soil to be placed as fill, whether natural or import, shall be approved by the soil engineer or his representative prior to their placement. The fill material shall be free from vegetation, organic material or debris. Import soil shall be no more expansive than the existing near surface soils on the site.

Suitable fill soil shall be placed in horizontal lifts not exceeding 6 inches in thickness after compaction and uniformly watered or aerated to obtain optimum moisture content. Each layer shall be spread evenly and shall be thoroughly mixed during the spreading to ensure uniformity of the soil and optimum moisture in each layer. After each lift has been placed, it shall be thoroughly compacted to not less than 90% of maximum dry density.

The soil engineer or his representative shall observe the placement of fill and should take sufficient tests to verify the moisture content and the uniformity and degree of compaction obtained. In-place density testing should be performed in accordance with ASTM acceptable to the local building authority. The optimum moisture content and the maximum dry density for compacted soils shall be determined in accordance with ASTM D-1557 procedures.

Due to the possibility of imported fill soil in the building areas and / or variable soil strata that may be exposed in the building pad, typical soil samples should be obtained at completion of rough grading for laboratory testing to confirm the expansion characteristics of the graded site.

FOUNDATION DESIGN RECOMMENDATIONS

Building Footing

- The footings for the proposed building should be founded into certified compacted fills and minimum 24 inches below lowest adjacent finished grade.
- Continuous footing should be reinforced with at least two (2) #4 rebars at the top and at the bottom of the footing in order to minimize the effects of any minor variations in the engineering characteristics in the supporting soils.
- All pad footings should be a minimum of 24 inches square by 24 inches in depth.

Canopy Footings

- The footings for the proposed canopies_should be penetrated into the competent native soils. The preliminary design indicates the size of the foundation to be 5.0 feet in diameter and 8.0 to 10 feet in depths. The project Architect / or Structural Engineer shall determine actual footing widths, depths and reinforcements necessary to resist design vertical, horizontal and uplift forces.

Allowable Soil Bearing Capacities

Based on the field and laboratory test data, **an allowable soil bearing value of 2000 psf is recommended for the design of the continuous and spread footings for the proposed building.** A 1/3 increase in the above bearing value may be used when considering short term loading from wind or seismic sources. **A maximum allowable soil bearing value of 4500 psf is recommended for the design of canopy footings embedded into competent native soils**. A factor of safety of 3 was used in calculation of the soil allowable bearing capacity.

Settlement

Using the recommended bearing value and the maximum assumed wall and column loads, the total settlement is estimated to be 0.5 inches . The differential settlement is estimated to be on the order of 0.25 inches, between similarly loading footing of the same size, over a minimum horizontal distance of 30 feet.

Lateral Bearing Pressure

Additional soil design parameters that may be pertinent to the design and development based on undisturbed natural soil or properly compacted fill are as follows:

- Allowable lateral soil pressures using a factor of safety of 3 (Equivalent Fluid Pressure) Passive case: 300 psf/ft.
- Allowable Coefficient of Friction between concrete and soil: 0.30

Seismic Design

In accordance with the ASCE 7-16 the structural design should consider the following design parameters:

Site Latitude: 33.702551 degree

Site Longitude:117.3264077degree

Site Class: Default

Short Period Site Coefficient- **Fa: 1.2**

Long Period Site Coefficient- **Fv: Null**

Mapped Spectral Response Acceleration-Short Period: (0.2 sec)-**Ss: 1.977**

Mapped Spectral Response Acceleration-Short Period: (1 sec)**-S1: 0.708**

Adjusted Spectral Response Acceleration-Short Period: (0.2 sec)-**Sms: 2.372**

Adjusted Spectral Response Acceleration-Short Period: (1 sec)-**Sm1**: **Null**

Design Spectral Response Acceleration-Short Period: (0.2 sec)-**Sds**: **1.581**

Design Spectral Response Acceleration-Short Period: (1 sec)-**Sd1**: **Null**

FLOOR SLAB RECOMMENDATIONS

Concrete slabs should be constructed in accordance with the following section.

Floor slabs should be a minimum of 4 inches thick. Floor slabs should be reinforced with # 3 rebars at 18- inches on centers.

Concrete slabs should be underlain with a minimum 6 mil polyvinyl chloride membrane vapor retarder with a minimum overlap of 12 inches in all directions. This membrane should be sandwiched between two, two-inch layers of sand.

The slab subgrade should be moisture conditioned to near optimum moisture content condition to a depth of 12 inches immediately prior to placement of the moisture barrier or pouring concrete.

CEMENT TYPE

A very low exposure to sulfate can be expected for concrete placed in contact with on site soil and native material. Therefore, based on the CBC no special cement will be required for concrete in contact with these materials.

Sample	**PH**	Soluble Sulfates per CA 417 (PPM)	**Soluble Sulfates per CA 422 (PPM)**	**Minimum Resistivity per CA 643 (ohm-cm)**
#1	6.0	20	45	2600

RETAINING WALL RECOMMENDATIONS

Retaining walls if planned should be designed to resist the active pressures summarized in the following table. The active pressure is no rmally calculated from the lowermost portion of the footing to the highest ground surface at the back of the wall, including necessary factors for sloping ground. The active and passive pressures indicated in the table are equivalent fluid densities. Walls that are not free to rotate or that are braced at the top should use active pressures that are 50% greater than those indicated in the table. Retaining wall design for passive resistance should neglect the top foot of earth in front of the wall.

Retaining Wall Design Parameters

Equivalent Fluid Pressures

Slope of adjacent ground	Active Pressure backfill with low expansive soil.
Level	30 pcf
2:1	45 pcf

The pressures shown on above table are for retaining walls backfilled with non-cohesive granular materials available on the site, and provided with drainage devices such as weep holes or subdrains to prevent the build-up of hydrostatic pressures beyond the design values. Also, it is strongly recommended that all backfill material be compacted to a minimum of 90 percent relative compaction, as this is the density from which the pressure are calculated. This recommendation cannot be overemphasized.

TEMPORARY CONSTRUCTION CUTS

Temporary construction cuts for retaining walls, foundations, utility trenches, etc., in excess of 5 feet in depth should cut back into an inclination not steeper than 1:1 (horizontal to vertical). Where more restrictive, the safety requirements for excavations contained in the State Construction Safety Orders enforced by the State Division of Industrial Safety (CAL-OSHA) and or the safety codes of the local agency having jurisdiction over the project shall apply. All excavations shall be initially observed by the geotechnical engineer or his representative to verify the recommendations presented or to make any additional recommendations necessary to maintain stability.

TRENCH BACKFILL

Trench excavations for utility lines which extend under building and paved areas are within the zone of influence of adjacent foundations shall be properly backfilled and compacted in accordance with the following recommendations.

The pipe should be bedded and backfilled with clean sand or approved granular soil (minimum Sand Equivalent Value of 30) to a depth of at least 1 foot over the pipe. This backfill should be uniformly watered and compacted to a firm condition.

The remainder of the backfill should be on-site soil or very low to low expansive import soil, which should be placed in loose lifts not exceeding 12 inches in thickness, watered or aerated to optimum moisture content, and mechanically compacted to at least 90% of maximum dry density as determined by ASTM D-1557 procedures. Water jetting of the backfill is not allowed.

PAVEMENT RECOMMENDATIONS

For preliminary design purposes, the typical soil anticipated in the subgrade will consist of fine silty sand. Based on this soil type (silty sand), a conservative R-Value of 50 may be estimated for preliminary design of the pavement section. The actual R-Value of the subgrade soil should be tested and verified at the time of construction. The following are our preliminary recommendations for the structural pavement section calculated in general accordance with Caltrans procedures and based on the estimated R-Value and the Traffic Indexes (TI's).

Site Area	Traffic Index	R-value	Pavement Section
Parking	4.5	50	3" A.C. over 4.5" Class II Base
Vehicle Drive Area	5.5	50	4" A.C. over 6" Class II Base
Heavy Truck Area	6.5	50	4" A.C. over 6.0" Class II Base

As an alternative to asphaltic concrete pavement, Portland Cement Concrete (PCC) pavement may be utilized. Concrete driveway and parking slabs shall be at least 5 inches thick and provided with saw cuts or expansion joints every 10 feet or less. The reinforcing shall consist with No. 3 bars spaced 24 inches on centers, both ways. Concrete pavement should be underlain by a minimum 4 inches of base course. The concrete should have a 28-day concrete strength of at least 2500 psi.

To reduce the potential of unsightly cracking concrete pavement for sidewalk and hardscape should be at least 4 inches thick and provided with saw cuts or expansion joints every 6 feet or less.

Subgrade soils should e overexcavated, scarified and compacted to at least 90% + of laboratory maximum dry density as recommended in the previous section of rough grading. Base course should be compacted to at least 95% + of laboratory maximum dry.

PLAN REVIEW

Subsequent to formulation of final development plans and specifications but prior to construction, grading and foundation plans should be reviewed by Geo Environ to verify compatibility with site geotechnical conditions and conformance with recommendations contained herein.

CONSTRUCTION OBSERVATIONS

All rough grading of the property shall be performed under engineering observation of Geo Environ.

Geo Environ shall observe all rough grading, foundation excavations, utility trenches backfill subgrade, and base compaction. Observations should be made prior to installation of concrete forms and reinforcing steel in order to verify or modify, if necessary, conclusions and recommendations in this report.

CLOSURE& LIMITATIONS

The findings, conclusions, and recommendations presented reflect our best estimate of subsurface conditions based on the data obtained from a limited subsurface exploration performed during the field study. The conclusions and recommendations are based on generally accepted geotechnical engineering principles and practices. No further warranties are implied nor made.

Due to the possible variability of soil and subsurface conditions within the site, conditions may be encountered during grading and development that may differ from those presented herein. Should any variation or unusual condition become apparent during grading and development, this office should be contacted to evaluate these conditions prior to continuation of work and necessary_revisions to the recommendations.

This office should be notified if changes of ownership occur or if the final plans for the site development indicate structures areas, type of structures, or structural loading conditions differing from those presented in this report.

If the site is not developed or grading does not begin within 12 months following the date of this report, further studies may be required to ensure that the surface or subsurface conditions have not changed.

Any charges for necessary review or updates will be at the prevailing rate at the time the review work is performed.

TECHNICAL REFERENCES

1. California Building Code 2019 foundation design parameters
2. County of Riverside Building and Grading Code
3. USGS, Ground Acceleration from Earthquakes
4. USGS, Seismic Design Values for Buildings
5. California Division of Mines and Geology (CDMG), Seismic Hazard & Liquefaction Evaluation
6. Geotracker- Historic Groundwater Data

OSHPD

New Service Station

28771 Central Ave, Lake Elsinore, CA 92532, USA

Latitude, Longitude: 33.70255119999999, -117.3264077

Date	9/14/2020, 9:57:07 AM
Design Code Reference Document	ASCE7-16
Risk Category	II
Site Class	D - Default (See Section 11.4.3)

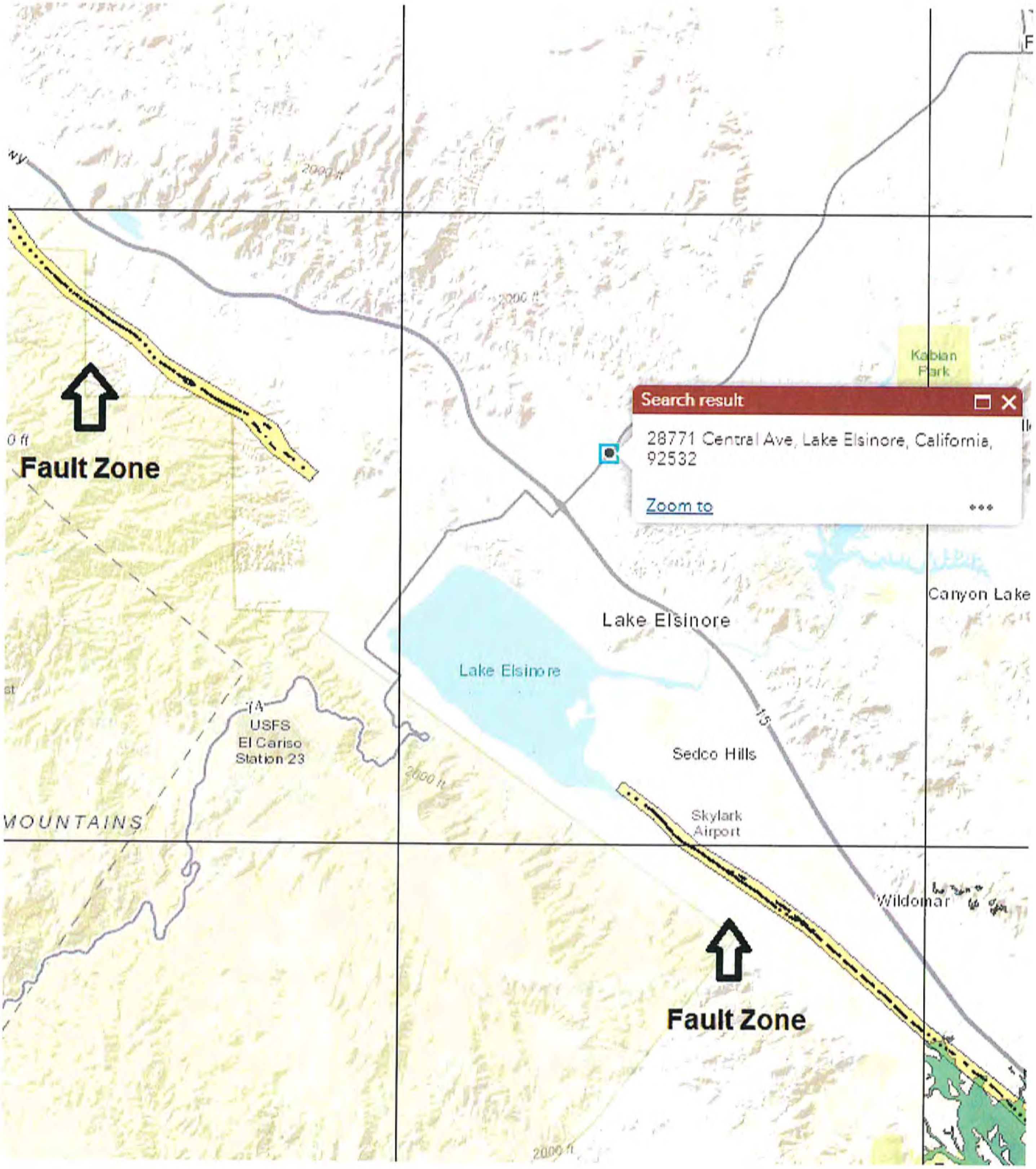
Type	Value	Description
S_S	1.977	MCE_R ground motion. (for 0.2 second period)
S_1	0.708	MCE_R ground motion. (for 1.0s period)
S_{MS}	2.372	Site-modified spectral acceleration value
S_{M1}	null -See Section 11.4.8	Site-modified spectral acceleration value
S_{DS}	1.581	Numeric seismic design value at 0.2 second SA
S_{D1}	null -See Section 11.4.8	Numeric seismic design value at 1.0 second SA

Type	Value	Description
SDC	null -See Section 11.4.8	Seismic design category
F_a	1.2	Site amplification factor at 0.2 second
F_v	null -See Section 11.4.8	Site amplification factor at 1.0 second
PGA	0.838	MCE_G peak ground acceleration
F_{PGA}	1.2	Site amplification factor at PGA
PGA_M	1.006	Site modified peak ground acceleration
T_L	8	Long-period transition period in seconds
SsRT	1.977	Probabilistic risk-targeted ground motion. (0.2 second)
SsUH	2.179	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration
SsD	2.01	Factored deterministic acceleration value. (0.2 second)
S1RT	0.708	Probabilistic risk-targeted ground motion. (1.0 second)
S1UH	0.786	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration.
S1D	0.792	Factored deterministic acceleration value. (1.0 second)
PGAd	0.848	Factored deterministic acceleration value. (Peak Ground Acceleration)
C_{RS}	0.907	Mapped value of the risk coefficient at short periods

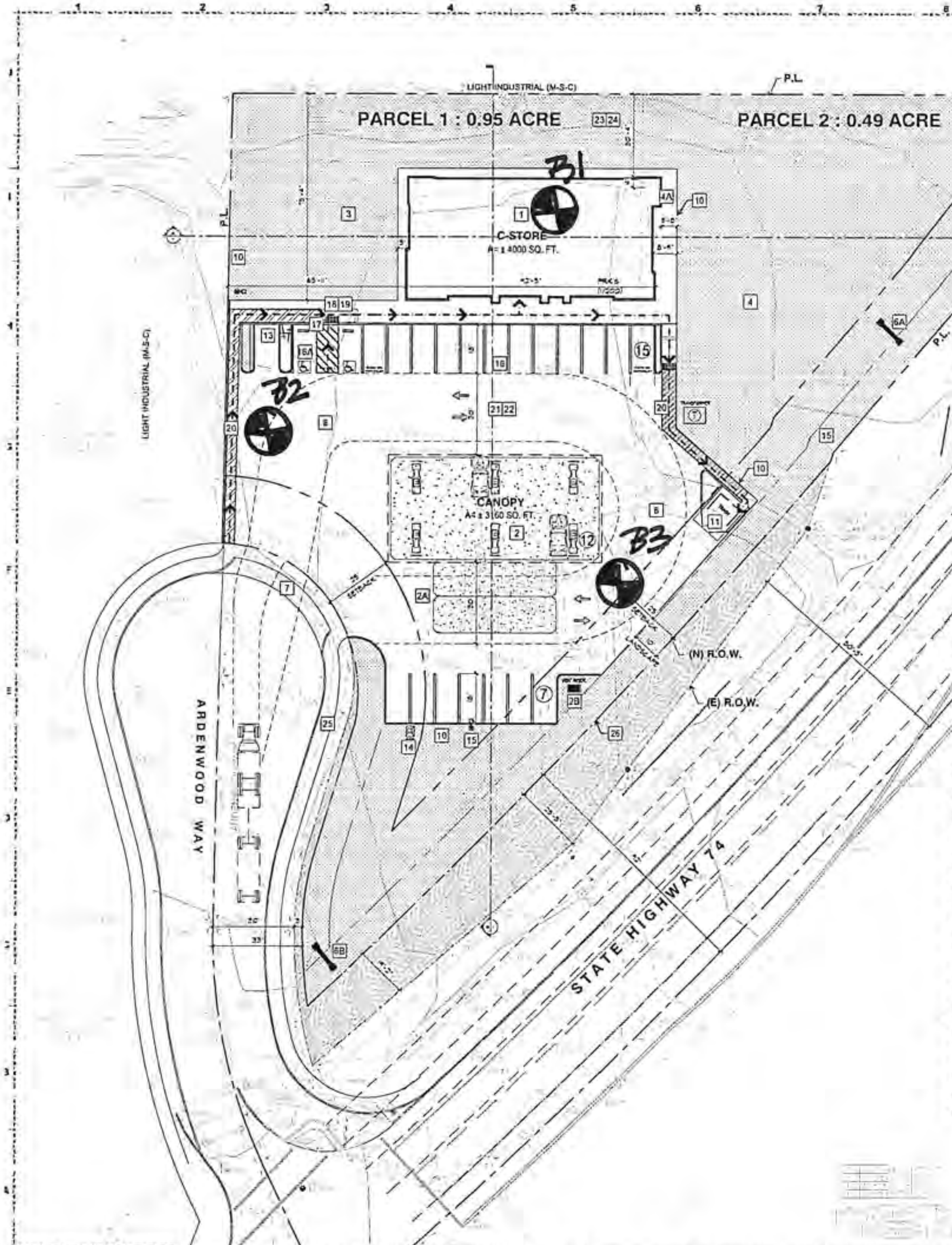
APPENDIX A

DRAWINGS

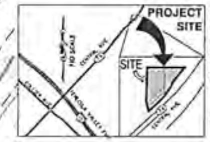

SUBJECT PROPERTY
Riverside St
Lindell Rd
Nichols Rd
500 m
Eucalyptus Ave
WARM SPRINGS VALLEY
Corona Fwy
Rosetta Canyon Dr
Conard Ave
Baker St
Collier Ave
NORTH ELSINORE
Kee Ave
2nd St
W Minthorn St
Chaney St
Davis St
Lakeshore Dr
Scrivener St
N Lindsay St
N Langstaff St
N Spring St
N Ellis St
E Hill St
Temecula Valley Fwy
Lake Elsinore
Mill St
74
15



Fault Zone
Fault Zone
Search result
28771 Central Ave, Lake Elsinore, California, 92532
Zoom to
Kabian Park
Canyon Lake
Lake Elsinore
Lake Elsinore
USFS
El Cariso
Station 23
MOUNTAINS
Sedco Hills
Skylark
Airport
Wildomar
2000 ft



VICINITY MAP



LEGEND

- NO. OF PARKING SPACES
- ACCESSIBLE PARKING
- PROPERTY LINE
- PROPOSED PARCEL SUBDIVISION
- ADA PATH OF TRAVEL
- CONCRETE PAVING AREA
- DECORATIVE PAVING AREA
- LANDSCAPED AREA
- DIRECTIONAL ARROW
- R.O.W. DEDICATION
- AREA LIGHTS
- WALL MOUNTED DECORATIVE AREA LIGHTS
- (E) FIRE HYDRANT
- (E) SEWER MANHOLE
- (E) SEWER CLEANOUT
- (E) POWER POLE
- (E) WATER METER
- (E) WATER POINT
- (E) SIGN

SCOPE OF WORK

PROPOSED DEVELOPMENT
- PROPOSED GAS STATION COMPRISING OF:
- CONVENIENCE STORE (WITH TYPE 20-ABC)
- FUELING CANOPY WITH SIX MULTI-PRODUCT DISPENSERS
- TWO UNDERGROUND STORAGE TANKS

PROJECT DATA

ZONING: LIGHT INDUSTRIAL
LAND USE: MANUFACTURING-SERVICE COMMERCIAL
AREA OF SITE (GROSS ACREAGE)
TOTAL AREA : ± 62,726 S.F. (1.44 acre)

BLDG SETBACKS	REQUIRED	PROVIDED
FRONT (SOUTH)	25'-0"	25'-0"
REAR (NORTH)	0'-0"	0'-0"
LEFT (WEST)	25'-0"	25'-0"
RIGHT (EAST)	0'-0"	0'-0"
LANDSCAPE AREA	10%	39,003 S.F. (5%)
FLOOR AREA RATIO	-	± 0.11
MAXIMUM HEIGHT	40'-0"	25'-0"
PARKING	34	51

SITE KEY NOTES

1. C-STORE
2. GAS STATION CANOPY AND FUEL DISPENSERS
2A. UNDERGROUND STORAGE TANKS
2B. VENT RISER WITH CARBON VAPOR CANISTER, PAINT BLACK & LANDSCAPE SCREENING
3. QUICK SERVICE RESTAURANT (QSR)
4. TRANSFORMER
4A. MAIN SWITCHGEAR
6A. MONUMENT SIGN (UNDER SEPARATE PERMIT)
6B. GAS PRICE SIGN (UNDER SEPARATE PERMIT)
7. (N) DRIVEWAY AS PER R.C. STD 207A
8. ASPHALT PAVING
9. CONCRETE PAVING
10. (N) LANDSCAPE WITH 6" CONCRETE CURB
11. TRASH ENCLOSURE (PER R.C. STANDARDS)
12. STEEL CONCRETE BOLLARDS
13. CLASS-2 BIKE PARKING RACK (5-BIKE CAPACITY)
14. AIR & WATER UNIT
15. AREA LIGHTS
16. PARKING STRIPING AS PER R.C. STANDARDS (WITH WHEELSTOP WHERE REQUIRED)
16A. ACCESSIBLE PARKING STRIPING (WITH WHEELSTOP WHERE REQUIRED)
17. ACCESSIBLE PARKING SIGN
18. ACCESSIBLE ACCESSIBLE RAMP
19. ACCESSIBLE TRUNCATED DOME PAVER
20. ACCESSIBLE PATH STRIPING (2% MAX CROSS SLOPE)
21. FIRE TRUCK PATH OF TRAVEL
22. FUEL TANKER/TRASH TRUCK PATH OF TRAVEL
23. RETAINING WALL PER CIVIL
24. 3' HIGH DECORATIVE WALL TO SHIELD AUTO HEADLIGHTS & LIGHT SPILLAGE
25. (N) SIDEWALK
26. (N) RIGHT OF WAY
27. (E) RIGHT OF WAY
28. (E) SIDEWALK

1 PROPOSED SITE PLAN
SCALE: 1" = 20'-0"

ASSESSOR'S PARCEL NUMBER

347-130-028 & 347-130-029

LEGAL DESCRIPTION

FIRST AMERICAN TITLE COMPANY
ORDER NO.: 0625-5788488
DATED: SEPTEMBER 11, 2018

LEGAL DESCRIPTION:
REAL PROPERTY IN THE UNINCORPORATED AREA OF THE COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, DESCRIBED AS FOLLOWS:

PARCEL 3 OF PARCEL MAP 9985, AS SHOWN BY MAP ON FILE IN BOOK 48, PAGE 72 OF PARCEL MAPS, RECORDS OF RIVERSIDE COUNTY, CALIFORNIA.

EXCEPTING THEREFROM A PORTION THAT GRANTS TO RIVERSIDE COUNTY TRANSPORTATION COMMISSION, A POLITICAL SUBDIVISION AS DESCRIBED IN DEED RECORDED OCTOBER 02, 2001 AS INSTRUMENT NO. 2001-478038 OF OFFICIAL RECORDS.

APN: 347-130-029

LEGAL DESCRIPTION:
ORDER NO.: 0625-5789283
DATED: SEPTEMBER 12, 2018

REAL PROPERTY IN THE UNINCORPORATED AREA OF THE COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, DESCRIBED AS FOLLOWS:

PARCELS 4 OF PARCEL MAP 9985, AS SHOWN BY MAP ON FILE IN BOOK 48, PAGE 72, OF PARCEL MAPS, RECORDS OF RIVERSIDE COUNTY, CALIFORNIA.

EXCEPTING THEREFROM THAT PORTION CONVEYED TO THE RIVERSIDE COUNTY TRANSPORTATION COMMISSION, BY GRANT DEED RECORDED OCTOBER 09, 2001 AS INSTRUMENT NO. 01-489377, OF OFFICIAL RECORDS OF SAID COUNTY.

ASSESSOR'S PARCEL NUMBER: 347-130-028

TOTAL AREA 62,757.88 S.F. (1.441 ACRES)

BUILDING DATA

C-STORE	
AREAS	± 4,000 SF
OCCUPANCY	M
TYPE OF CONST	V-B
NUMBER OF STORY	1
BLDG HEIGHT	± 25'-0"
SPRINKLERS	NONE

CANOPY	
AREA	± 3,160 SF
OCCUPANCY	M
TYPE OF CONST	II-B
NUMBER OF STORY	1
BLDG HEIGHT	20'-0"
SPRINKLERS	NONE

TOTAL BUILDINGS AREA (GFA) ± 9,160 SF
± 0.15 ACRE (NET ACREAGE)

PARKING COMPUTATION

PARKING STANDARDS

TYPE	SIZE
REGULAR	9'-0" X 18'-0"
COMPACT	8'-6" X 16'-0" (UP TO 20% OF TOTAL)
HANDICAP	17'-0" X 18'-0" (VAN ACCESSIBLE)

PARKING REQUIREMENTS

USE	FORMULA	REQUIRED	PROVIDED
C-STORE	(1/200 S.F.)	20	22
CANOPY		-	12
TOTAL PARKING		20	34

HANDICAP PARKING REQUIREMENTS

FORMULA	REQUIRED	PROVIDED
26-50 PARKING SPACES	(2)	(2)

CLEAN AIR/ELECTRIC VEHICLE PARKING

FORMULA	REQUIRED	PROVIDED
SECTION 17.18.045 R.C. MUN CODE (WITH 25-49 PARKING = 2 EV CHARGING SPACES	(2)	(2)

KAR...
WESTERN STATES E...
A DESIGN-BUILD...

CONSULTANT/ SE...

SUBMITTAL
NO. DESCRIPTION

REVISIONS
NO. DESCRIPTION

OWNER NAME & A...
DAHER OIL I...

PROJECT NAME & ...
GAS STATI...
CONVENIENCE...

NOTE TO CONTRA...

CONFIDENTIALITY

DESIGNED BY: WS
DRAWN BY: WS
CHECKED BY: JK
PLOT DATE:
SCALE: AS
SHEET TITLE
PROPOSED SITE PLAN

SHEET NUMBER
AS-1.

Soil Boring

GEO ENVIRO
GEOTECHNICAL & ENVIRONMENTAL ENG. CONSULTAN...
4071 E. La Palma Ave., St...
Anaheim, CA 92807

APPENDIX B

BORING LOGS

Project: **C-Store**	Project Number: **20-1057P**	Client: Westerm States	Boring No. **B-1**
Address, City, State **28771 Central Ave Lake Elsinore California**		Drilling Contractor: Geo Environ	Drill Rig Type: **HSA**
Logged By: **Fahad Masud**	**4/26/2020** Started: **9:30 AM**	Bit Type: **N/A**	Diameter: **2 feet**
Drill Crew: **N/A**	Completed: **12:30 PM**	Hammer Type: **Automatic Trip Hammer**	
USA Ticket Number: **N/A**	Backfilled:	Hammer Weight: **140 lb**	Hammer Drop: **30 inches**
	Groundwater Depth: **39 feet**	Elevation:	Total Depth of Boring: **50 feet**

Depth (feet)	Sample Type	Classification	Blow Counts (blows/foot)	Graphic Log	Description	Dry Density (pcf)	Moisture Content (%)
2	SPT	SM	23		Brownish orange, sandy silt, slightly moist, w/ fine-med sand, dense, some gravel	92.3	6.1
5	SPT		29			109.9	6.9
10	SPT		41		Brownish red, mod. dense, sandy silt, moist, w/ fine-medium coarse sand with gravel	117.4	8.7
15	SPT		30			110.1	9.2
20	SPT		46			114.9	9.6
25	SPT		44			120.1	9.4
30	SPT		37		Olive-brown, sandy silt, moist, w/coarse gravel, medium dense	113.7	13.7
35	SPT		24			108.4	15.6
40	SPT		▼ 50/6"		Olive-brown, **sandy silt**, wet, w/ coarse sand and gravel, very dense	120.8	19.9
45	SPT		50/6"			122.7	20.4
50	SPT		50/6"			121.9	20.6

Geo Environ Engineering, Inc. Boring Log: Sheet 1 of 3

- Standard Penetration Slit Spoon Sampler (SPT)
- California Sampler
- Shelby Tube
- CPP Sampler
- Bulk/ Bag Sample
- Stablized Ground water
- ∇ Groundwater At time of Drilling

Project: C-Store	Project Number: 20-1057P	Client: Westerm States	Boring No. B-2
Address, City, State: 28771 Central Ave, Lake Elsinore, California		Drilling Contractor: Geo Environ	Drill Rig Type: **HSA**
Logged By: **Fahad Masud**	Date: 4/26/2020 — Started: **9:30 AM**	Bit Type: **N/A**	Diameter: **2 feet**
Drill Crew: **N/A**	Completed: **12:30 PM**	Hammer Type: **Automatic Trip Hammer**	
USA Ticket Number: **N/A**	Backfilled:	Hammer Weight: **140 lb**	Hammer Drop: **30 inches**
	Groundwater Depth: **N/A**	Elevation:	Total Depth of Boring: **15 feet**

Depth (feet)	Sample Type	Classification	Blow Counts (blows/foot)	Graphic Log	Description	Dry Density (pcf)	Moisture Content (%)
2	SPT	SM	21		Brownish orange, **sandy silt**, slightly moist, w/ fine-med sand, dense	91.9	6.6
5	SPT	SM	25			108.7	7.2
10	SPT	SM	46		Orange-brown, sandy silt, moist, w/ coarse sand and gravel, moderately dense	116.8	8.8
15	SPT		29			111.1	9.4
20	SPT						
25	SPT						
30	SPT						
35	SPT						
40	SPT						
45	SPT						
50	SPT						

Geo Environ Engineering, Inc. Boring Log: Sheet 2 of 3

- Standard Penetration Slit Spoon Sampler (SPT)
- California Sampler
- Shelby Tube
- CPP Sampler
- Bulk/ Bag Sample
- Stabllized Ground water
- Groundwater At time of Drilling

Project: C-Store	Project Number: 20-1057P	Client: Westerm States	Boring No. B-3
Address, City, State	28771 Central Ave Lake Elsinore California	Drilling Contractor: Geo Environ	Drill Rig Type: HSA
Logged By: **Fahad Masud**	4/26/2020 Started: 9:30 AM	Bit Type: N/A	Diameter: 2 feet
Drill Crew: N/A	Completed: 12:30 PM	Hammer Type: Automatic Trip Hammer	
USA Ticket Number: N/A	Backfilled:	Hammer Weight: 140 lb	Hammer Drop: 30 inches
	Groundwater Depth: N/A	Elevation:	Total Depth of Boring: 15 feet

Depth (feet)	Sample Type	Classification	Blow Counts (blows/foot)	Graphic Log		Dry Density (pcf)	Moisture Content (%)	
2	SPT	SM	17		Reddish brown, sandy silt, slightly moist, w/ fine-med sand, dense	93.9	6.3	
5	SPT	SM	28			110.4	7.9	
10	SPT	SM	48		Reddish-brown, sandy silt, moist, w/ coarse sand and gravel, moderately dense	118.6	9.0	
15	SPT		24			110.7	8.4	
20	SPT							
25	SPT							
30	SPT							
35	SPT							
40	SPT							
45	SPT							
50	SPT							

Geo Environ Engineering, Inc. Boring Log: Sheet 3 of 3

- Standard Penetration Slit Spoon Sampler (SPT)
- California Sampler
- Shelby Tube
- CPP Sampler
- Bulk/ Bag Sample
- Stabllized Ground water
- Groundwater At time of Drilling

APPENDIX C

LABORATORY TEST RESULTS

EXPANSION CHARACTERISTICS
(ASTM D-2435)

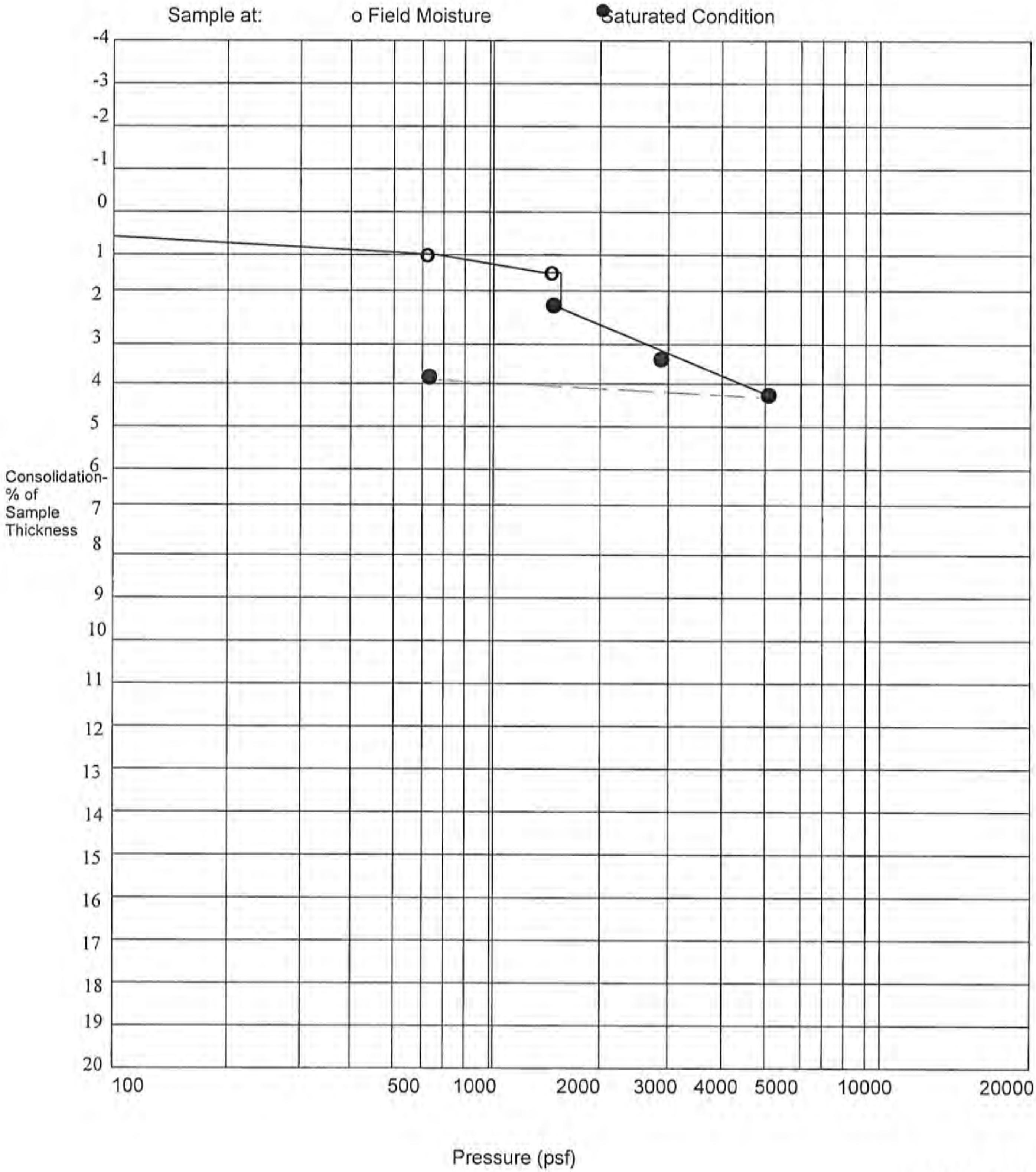
0-21	Very Low
21-50	Low
51-90	Medium
91-130	High
131+	Very High

Sample	Soil Type	Expansion Index	Expansion Classification
B1 @ 0-5'	Fine Sandy Silt	12	Low

MAXIMUM DRY DENSITY
(ASTM D1557)

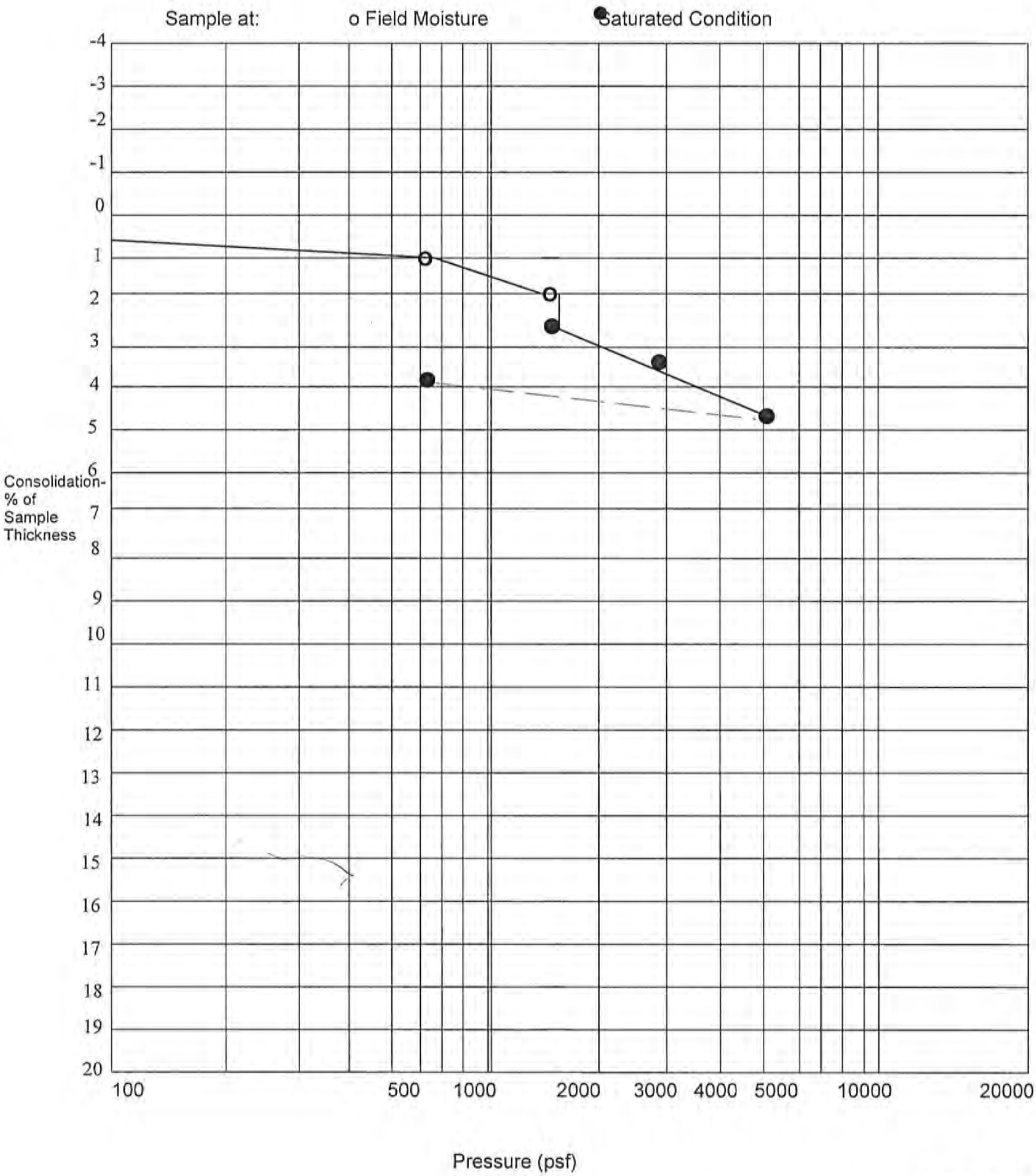
Sample		Max. Density (pcf)	Opt. Mois.(%)
B1 @ 0-5'	Fine Sand and Silt	120.0	12.5

PROJECT NO. 20-1057P
CLIENT: WS Eng.
JOB ADDRESS: 28771 Central Ave, Lake Elsinore
SAMPLE ID: B-1 @ 5'
SOIL CLASS: Fine Sandy Silt
TECH: F.M.
DATE: 9/4/20



GEO ENVIRON

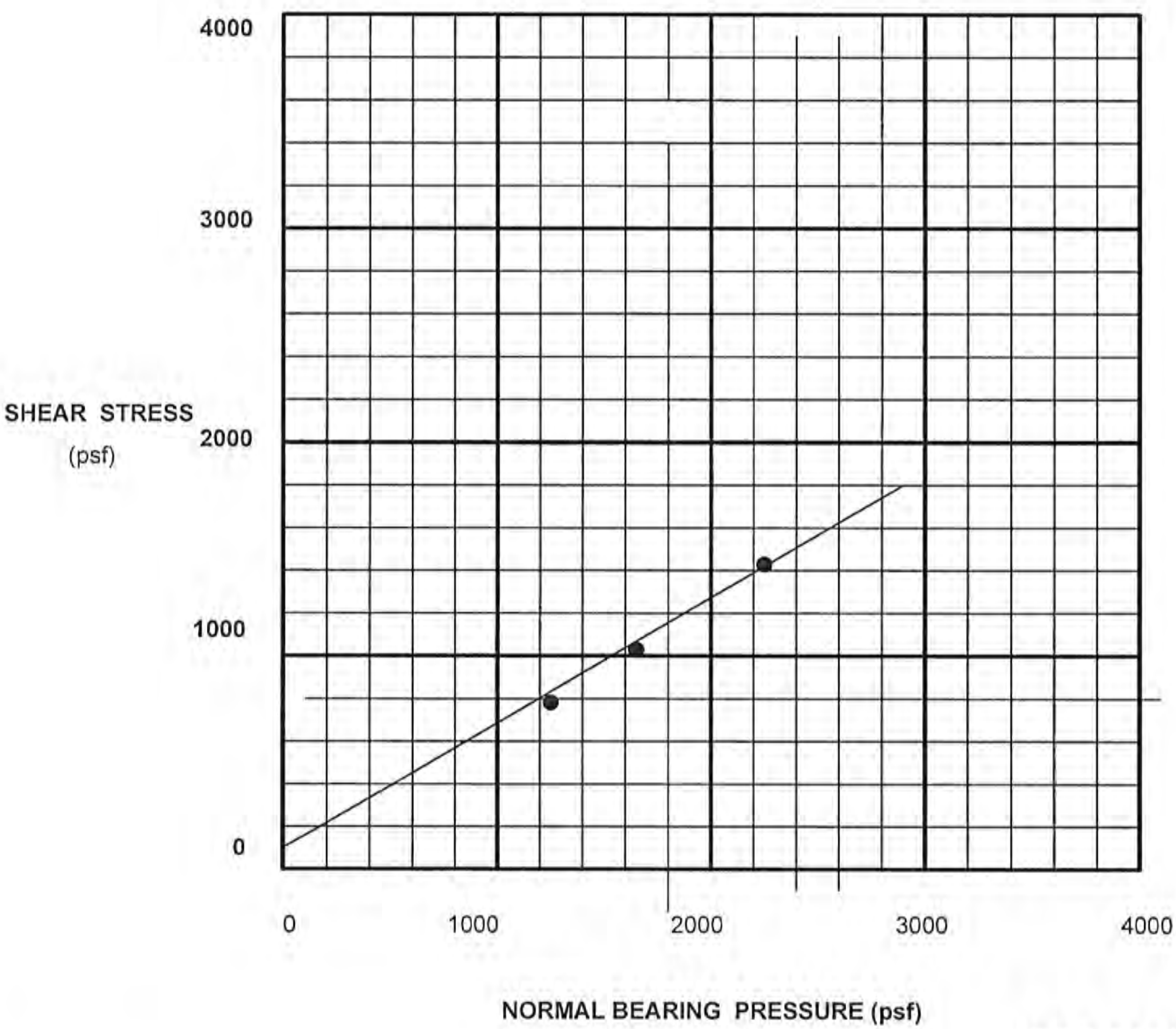
PROJECT NO: 20-1057P
CLIENT: WS Eng.
JOB ADDRESS: 28771 Central Ave, Lake Elsinore
SAMPLE ID: B-2 @ 5'
SOIL CLASS: Fine Silty Sand
TECH: F.M.
DATE: 9/5/20



GEO ENVIRON

DIRECT SHEAR TEST

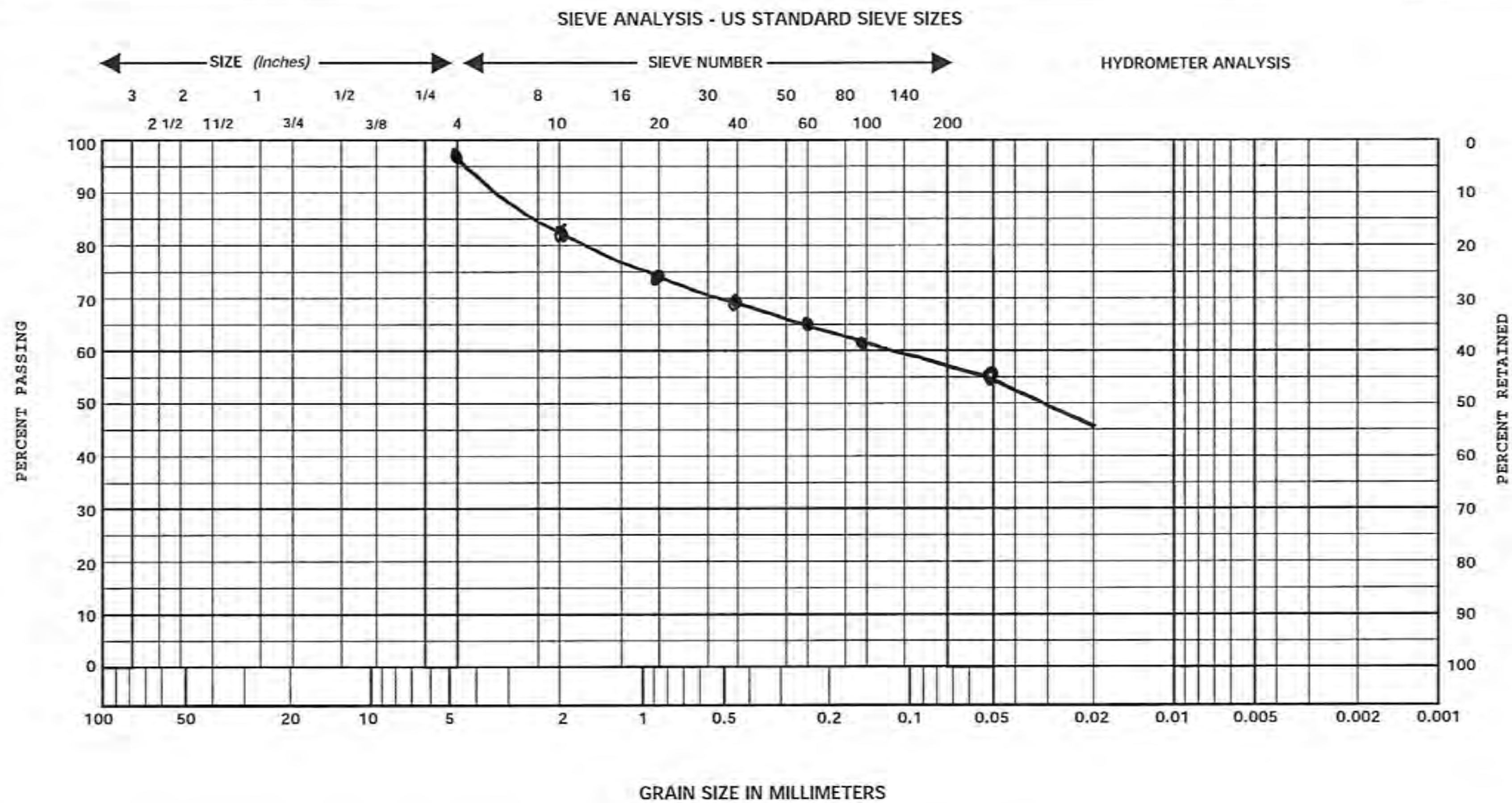
DATE: 9/4/20
JOB NO: 20-1057P
CLIENT: WS Eng.
JOB ADDRESS: 28771 Central Ave, Lake Elsinore
SAMPLE ID: B- 2 @ 2.5
SOIL CLASS: Sandy Silt
MOIS. CONTENT: 7.2
DRY DENSITY: 108.7
Sample Type: Un-Disturbed
STRAIN RATE: 0.002 in/min
SHEAR STRENGTH: Ultimate
ANGLE OF FRICTION : 30 deg.
COHESION (psf): 75



GEO ENVIRON

GRAIN SIZE DISTRIBUTION GRAPH - AGGREGATE GRADATION CHART

1. PROJECT	2. DATE
WS Eng. 28771 Central Ave, Lake Elsinore, LACO,	9/4/20



EXCAVATION NUMBER	SAMPLE NUMBER	LL	PL	PI	Cu (D_{60}/D_{10})	Cc $(D_{30})^2/(D_{60} \times D_{10})$	SOIL DESCRIPTION/REMARKS	CLASSIFICATION (USCS)
B-1 @ 15							Fine Sandy silt	ML

3. TECHNICIAN *(Signature)*	4. PLOTTED BY *(Signature)*	5. CHECKED BY *(Signature)*
F.M.		J.M.

APPENDIX D

LIQUEFACTION ANALYSIS

SPT BASED LIQUEFACTION ANALYSIS REPORT

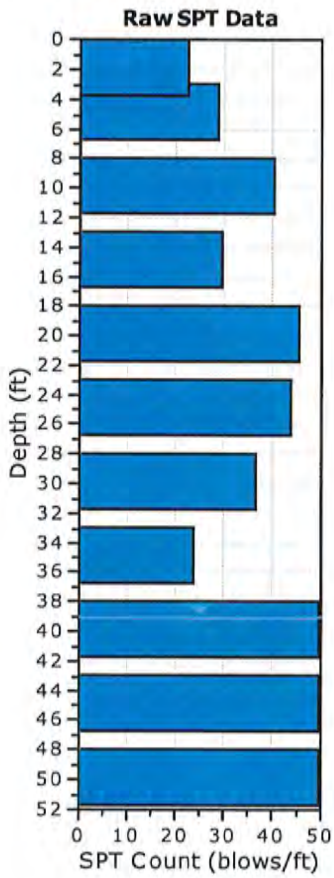
Project title : Karaki Western States 20-1057

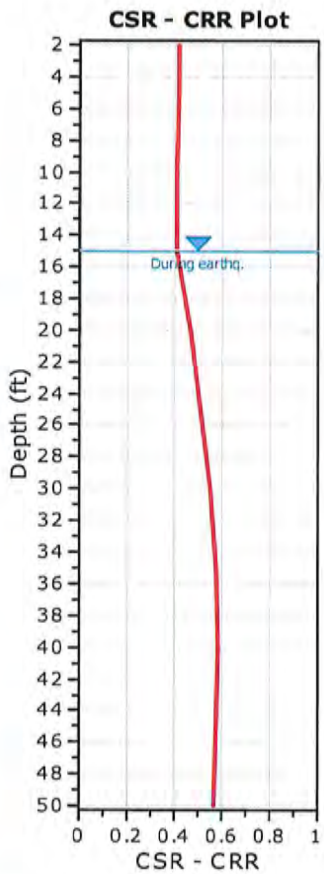
SPT Name: SPT #1

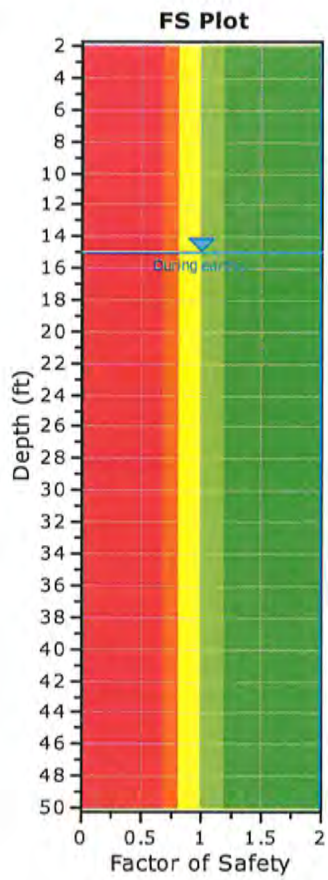
Location : 28771 Lake Elsinore, CA

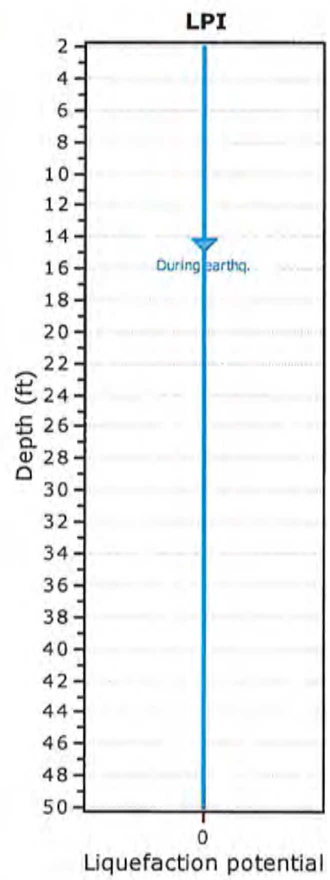
:: Input parameters and analysis properties ::

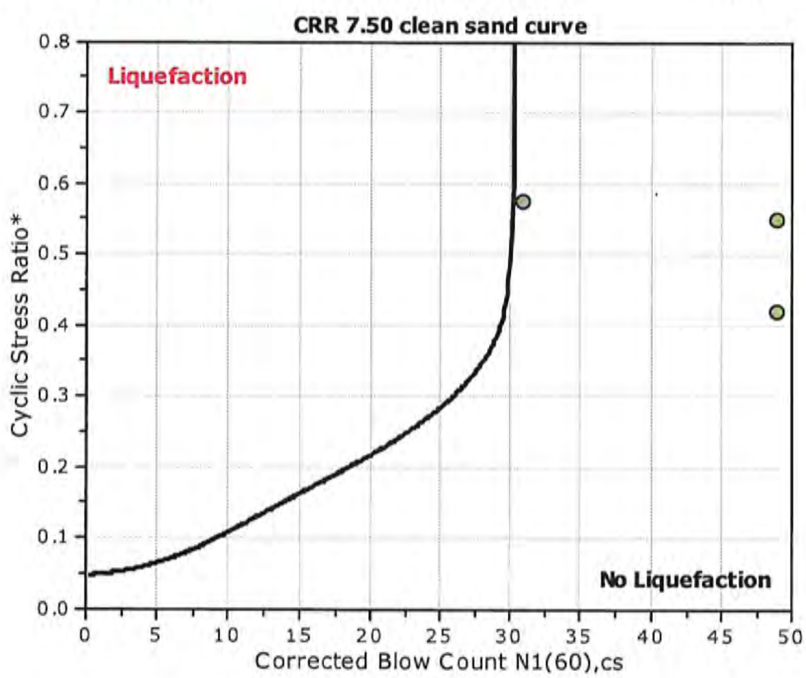
Analysis method:	NCEER 1998	G.W.T. (in-situ):	39.00 ft
Fines correction method:	NCEER 1998	G.W.T. (earthq.):	15.00 ft
Sampling method:	Standard Sampler	Earthquake magnitude M_w:	6.80
Borehole diameter:	150mm	Peak ground acceleration:	0.83 g
Rod length:	5.00 ft	Eq. external load:	0.00 tsf
Hammer energy ratio:	1.20		











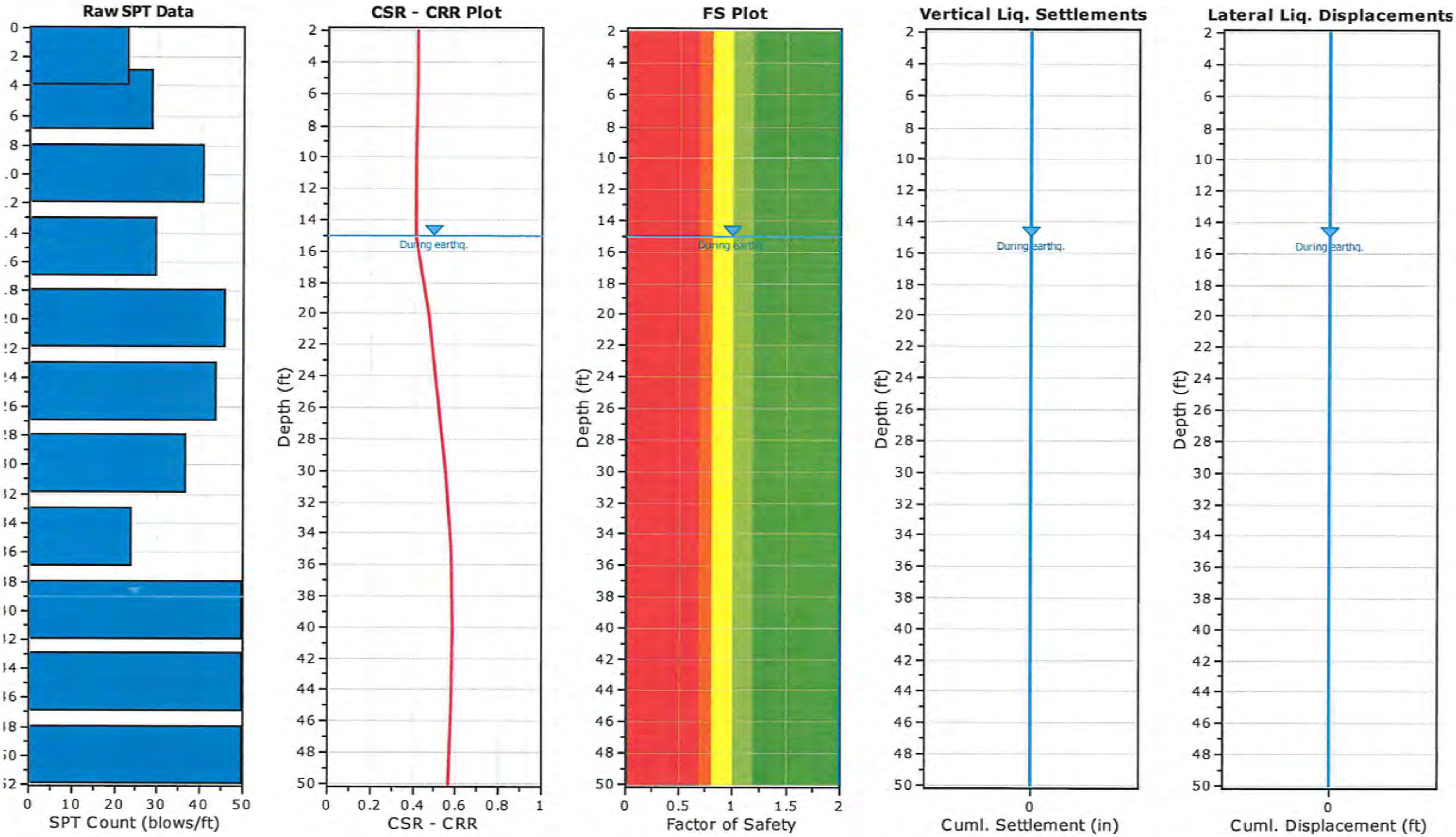
F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

verall Liquefaction Assessment Analysis Plots ::



:: Field input data ::

Test Depth (ft)	SPT Field Value (blows)	Fines Content (%)	Unit Weight (pcf)	Infl. Thickness (ft)	Can Liquefy
2.00	23	51.00	92.30	5.00	Yes
5.00	29	51.00	109.90	5.00	Yes
10.00	41	51.00	117.40	5.00	Yes
15.00	30	52.00	110.10	5.00	Yes
20.00	46	52.00	114.90	5.00	Yes
25.00	44	52.00	120.10	5.00	Yes
30.00	37	53.00	113.70	5.00	Yes
35.00	24	53.00	108.40	5.00	Yes
40.00	50	55.00	120.80	5.00	Yes
45.00	50	55.00	122.70	5.00	Yes
50.00	50	55.00	121.90	5.00	Yes

Abbreviations

Depth: Depth at which test was performed (ft)
SPT Field Value: Number of blows per foot
Fines Content: Fines content at test depth (%)
Unit Weight: Unit weight at test depth (pcf)
Infl. Thickness: Thickness of the soil layer to be considered in settlements analysis (ft)
Can Liquefy: User defined switch for excluding/including test depth from the analysis procedure

:: Cyclic Resistance Ratio (CRR) calculation data ::

Depth (ft)	SPT Field Value	Unit Weight (pcf)	σ_v (tsf)	u_o (tsf)	σ'_{vo} (tsf)	C_N	C_E	C_B	C_R	C_S	$(N_1)_{60}$	Fines Content (%)	α	β	$(N_1)_{60cs}$	$CRR_{7.5}$
2.00	23	92.30	0.09	0.00	0.09	1.70	1.20	1.05	0.75	1.00	37	51.00	5.00	1.20	49	4.000
5.00	29	109.90	0.26	0.00	0.26	1.52	1.20	1.05	0.75	1.00	42	51.00	5.00	1.20	55	4.000
10.00	41	117.40	0.55	0.00	0.55	1.28	1.20	1.05	0.85	1.00	56	51.00	5.00	1.20	72	4.000
15.00	30	110.10	0.83	0.00	0.83	1.11	1.20	1.05	0.95	1.00	40	52.00	5.00	1.20	53	4.000
20.00	46	114.90	1.11	0.00	1.11	0.98	1.20	1.05	0.95	1.00	54	52.00	5.00	1.20	70	4.000
25.00	44	120.10	1.41	0.00	1.41	0.87	1.20	1.05	0.95	1.00	46	52.00	5.00	1.20	60	4.000
30.00	37	113.70	1.70	0.00	1.70	0.78	1.20	1.05	1.00	1.00	37	53.00	5.00	1.20	49	4.000
35.00	24	108.40	1.97	0.00	1.97	0.72	1.20	1.05	1.00	1.00	22	53.00	5.00	1.20	31	4.000
40.00	50	120.80	2.27	0.03	2.24	0.66	1.20	1.05	1.00	1.00	42	55.00	5.00	1.20	55	4.000
45.00	50	122.70	2.58	0.19	2.39	0.64	1.20	1.05	1.00	1.00	40	55.00	5.00	1.20	53	4.000
50.00	50	121.90	2.88	0.34	2.54	0.61	1.20	1.05	1.00	1.00	39	55.00	5.00	1.20	52	4.000

Abbreviations

σ_v: Total stress during SPT test (tsf)
u_o: Water pore pressure during SPT test (tsf)
σ'_{vo}: Effective overburden pressure during SPT test (tsf)
C_N: Overburden corretion factor
C_E: Energy correction factor
C_B: Borehole diameter correction factor
C_R: Rod length correction factor
C_S: Liner correction factor
$N_{1(60)}$: Corrected N_{SPT} to a 60% energy ratio
α, β: Clean sand equivalent clean sand formula coefficients
$N_{1(60)cs}$: Corected $N_{1(60)}$ value for fines content
$CRR_{7.5}$: Cyclic resistance ratio for M=7.5

:: Cyclic Stress Ratio calculation (CSR fully adjusted and normalized) ::

Depth (ft)	Unit Weight (pcf)	$\sigma_{v,eq}$ (tsf)	$u_{o,eq}$ (tsf)	$\sigma'_{vo,eq}$ (tsf)	r_d	α	CSR	MSF	$CSR_{eq,M=7.5}$	K_{sigma}	CSR^*	FS

:: Cyclic Stress Ratio calculation (CSR fully adjusted and normalized) ::

Depth (ft)	Unit Weight (pcf)	$\sigma_{v,eq}$ (tsf)	$u_{o,eq}$ (tsf)	$\sigma'_{vo,eq}$ (tsf)	r_d	α	CSR	MSF	$CSR_{eq,M=7.5}$	K_{sigma}	CSR^*	FS
2.00	92.30	0.09	0.00	0.09	1.00	1.00	0.538	1.28	0.419	1.00	0.419	2.000
5.00	109.90	0.26	0.00	0.26	0.99	1.00	0.534	1.28	0.416	1.00	0.416	2.000
10.00	117.40	0.55	0.00	0.55	0.98	1.00	0.528	1.28	0.411	1.00	0.411	2.000
15.00	110.10	0.83	0.00	0.83	0.97	1.00	0.523	1.28	0.407	1.00	0.407	2.000
20.00	114.90	1.11	0.16	0.96	0.96	1.00	0.600	1.28	0.467	1.00	0.467	2.000
25.00	120.10	1.41	0.31	1.10	0.94	1.00	0.652	1.28	0.508	0.99	0.512	2.000
30.00	113.70	1.70	0.47	1.23	0.92	1.00	0.686	1.28	0.534	0.97	0.550	2.000
35.00	108.40	1.97	0.62	1.34	0.89	1.00	0.704	1.28	0.548	0.95	0.575	2.000
40.00	120.80	2.27	0.78	1.49	0.85	1.00	0.700	1.28	0.545	0.93	0.583	2.000
45.00	122.70	2.58	0.94	1.64	0.80	1.00	0.681	1.28	0.530	0.92	0.579	2.000
50.00	121.90	2.88	1.09	1.79	0.75	1.00	0.654	1.28	0.509	0.90	0.566	2.000

Abbreviations

$\sigma_{v,eq}$: Total overburden pressure at test point, during earthquake (tsf)
$u_{o,eq}$: Water pressure at test point, during earthquake (tsf)
$\sigma'_{vo,eq}$: Effective overburden pressure, during earthquake (tsf)
r_d : Nonlinear shear mass factor
α: Improvement factor due to stone columns
CSR : Cyclic Stress Ratio (adjusted for improvement)
MSF : Magnitude Scaling Factor
$CSR_{eq,M=7.5}$: CSR adjusted for M=7.5
K_{sigma}: Effective overburden stress factor
CSR^*: CSR fully adjusted (user FS applied)***
FS: Calculated factor of safety against soil liquefaction

*** User FS: 1.00

:: Liquefaction potential according to Iwasaki ::

Depth (ft)	FS	F	wz	Thickness (ft)	I_L
2.00	2.000	0.00	9.70	3.00	0.00
5.00	2.000	0.00	9.24	3.00	0.00
10.00	2.000	0.00	8.48	5.00	0.00
15.00	2.000	0.00	7.71	5.00	0.00
20.00	2.000	0.00	6.95	5.00	0.00
25.00	2.000	0.00	6.19	5.00	0.00
30.00	2.000	0.00	5.43	5.00	0.00
35.00	2.000	0.00	4.67	5.00	0.00
40.00	2.000	0.00	3.90	5.00	0.00
45.00	2.000	0.00	3.14	5.00	0.00
50.00	2.000	0.00	2.38	5.00	0.00

Overall potential I_L : 0.00

I_L = 0.00 - No liquefaction
I_L between 0.00 and 5 - Liquefaction not probable
I_L between 5 and 15 - Liquefaction probable
I_L > 15 - Liquefaction certain

:: Vertical settlements estimation for dry sands ::

Depth (ft)	$(N_1)_{60}$	T_{av}	p	G_{max} (tsf)	α	b	γ	ε_{15}	N_c	ε_{Nc} (%)	Δh (ft)	ΔS (in)

:: **Vertical settlements estimation for dry sands** ::

Depth (ft)	$(N_1)_{60}$	τ_{av}	p	G_{max} (tsf)	α	b	γ	ε_{15}	N_c	ε_{Nc} (%)	Δh (ft)	ΔS (in)
5.00	42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00	0.000
10.00	56	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00	0.000

Cumulative settlemetns: 0.000

Abbreviations

τ_{av}: Average cyclic shear stress
p: Average stress
G_{max}: Maximum shear modulus (tsf)
α, b: Shear strain formula variables
γ: Average shear strain
ε_{15}: Volumetric strain after 15 cycles
N_c: Number of cycles
ε_{Nc}: Volumetric strain for number of cycles N_c (%)
Δh: Thickness of soil layer (in)
ΔS: Settlement of soil layer (in)

:: **Vertical settlements estimation for saturated sands** ::

Depth (ft)	D_{50} (in)	q_c/N	e_v (%)	Δh (ft)	s (in)
15.00	1.00	7.99	0.00	5.00	0.000
20.00	1.00	7.99	0.00	5.00	0.000
25.00	1.00	7.99	0.00	5.00	0.000
30.00	1.00	7.99	0.00	5.00	0.000
35.00	1.00	7.99	0.00	5.00	0.000
40.00	1.00	7.99	0.00	5.00	0.000
45.00	1.00	7.99	0.00	5.00	0.000
50.00	1.00	7.99	0.00	5.00	0.000

Cumulative settlements: 0.000

Abbreviations

D_{50}: Median grain size (in)
q_c/N: Ratio of cone resistance to SPT
e_v: Post liquefaction volumetric strain (%)
Δh: Thickness of soil layer to be considered (ft)
s: Estimated settlement (in)

:: **Lateral displacements estimation for saturated sands** ::

Depth (ft)	$(N_1)_{60}$	D_r (%)	γ_{max} (%)	d_z (ft)	LDI	LD (ft)
2.00	37	85.16	0.00	5.00	0.000	0.00
5.00	42	90.73	0.00	5.00	0.000	0.00
10.00	56	100.00	0.00	5.00	0.000	0.00
15.00	40	88.54	0.00	5.00	0.000	0.00
20.00	54	100.00	0.00	5.00	0.000	0.00
25.00	46	100.00	0.00	5.00	0.000	0.00
30.00	37	85.16	0.00	5.00	0.000	0.00
35.00	22	65.67	0.00	5.00	0.000	0.00
40.00	42	90.73	0.00	5.00	0.000	0.00
45.00	40	88.54	0.00	5.00	0.000	0.00
50.00	39	87.43	0.00	5.00	0.000	0.00

:: **Lateral displacements estimation for saturated sands** ::

Depth (ft)	$(N_1)_{60}$	D_r (%)	γ_{max} (%)	d_z (ft)	LDI	LD (ft)

Cumulative lateral displacements: 0.00

Abbreviations

D_r: Relative density (%)
γ_{max}: Maximum amplitude of cyclic shear strain (%)
d_z: Soil layer thickness (ft)
LDI: Lateral displacement index (ft)
LD: Actual estimated displacement (ft)

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Job No. 20-1057P-1
September 11, 2020

Mr. Joseph Karaki
Western State Eng. & Construction, Inc.
4887 E. La Palma Street, Ste # 707
Anaheim, Ca 92807

Subject: **Report of Percolation Testing for the Proposed Infiltration System,** 28771 Central Ave, Lake Elsinore, Riverside County, California

Reference:

1) WS Eng., Inc , 8/31/20, "Site Plan, Proposed Gas Station and C-Store , 28771 Central Ave (74 Hwy), Lake Elsinore California

Gentlemen,

In accordance with your request, we have performed a percolation testing with regard to the proposed infiltration system. The intent of this report is to evaluate the feasibility of the proposed system to be constructed at the subject site.

The percolation rates of the subsurface soils was found to be 1.77 inch per hour. The bottom of the proposed infiltration system is estimated to be within 5.0 feet below the existing natural grade. The percolation testing and the relevant calculations were performed using the method per the Riverside County Manuel.

SITE GEOLOGY & GROUNDWATER

The site is underlain by **older alluvium consists of fine sandy silt and silty sand to 50 feet, the maximum depth explored..** A more detailed description of the earth materials encountered is presented on the log borings in Appendix 'B'. **Groundwater was encountered at approximately 39 feet below the existing surface** during this investigation.

PERCOLATION INVESTIGATION

A preliminary set of percolation tests were performed in order to determine the suitability of the surface soils as an absorb medium for seepage beds. Two (2) soil borings of 8 inches diameters were drilled to satisfy this investigation. The borings were drilled to depths of 15.0 feet below existing surface within the subject site to conduct percolation tests. One additional boring was drilled to depth of 50.0 feet below existing surface to determine depth to groundwater or any impervious layer. The test hole was presaturated over night. After the presaturation was completed, water level measurements were started. From a fixed reference point, the drop in water levels were measured over a 30 minute periods for an hour. The drop that occurred during the final reading was used calculate the percolation rate.

TEST RESULTS

The gross percolation rates of the subsurface soils was found to be 1.77 inch per hour.

CONCLUSION

1. The gross percolation rates of the subsurface soils was found to be 1.77 inch per hour.
2. We drilled to a depth of 15 feet below grade, and no groundwater was encountered. Therefore, the impact of the proposed infiltration system to ground water is nil
3. The site has no potential for liquefaction, and therefore the infiltration system will have minimal effect in the event of an earthquake.
4. There will be a minim 10 feet horizontal and 1:1 (H:V) set back from the proposed building foundation and the expected zone of saturation of the infiltration system. The depth to groundwater is greater than 15 feet from the bottom of the infiltration pit. Therefore, no perched water conditions are expected, or adversely affect the structures.
5. The system will not be located near a retaining wall or basement wall.
6. The site is underlain with non expansive (sandy silt) soils, and there will be no effect on infiltration behavior.
7. Since the proposed or existing structures will have adequate setbacks, therefore the susceptibility of hydro-consolidation from the proposed infiltration system will be very remote.
8. No ground settlements due to soil saturation from the proposed infiltration system are anticipated.

The system will not result in ground settlement that could affect structures, either or adjacent to the site. The infiltration of the storm water will not result in soil saturation that could affect retaining/ basement structures, if any.

CLOSURE & LIMITATIONS

The findings, conclusions, and recommendations presented reflect our best estimate of subsurface conditions based on the data obtained from a limited subsurface exploration performed during the field study. The conclusions and recommendations are based on generally accepted geotechnical engineering principles and practices. No further warranties are implied nor made.

This opportunity to be of service is appreciated. If you have any further questions regarding this matter, please contact our office at your earliest convenience.

Respectfully submitted,

Geo Environ Eng. Consultants, Inc.

Jabed Masud, MSCE
Principal

REGISTERED PROFESSIONAL ENGINEER
ESMAIL RASTEGARI
No. 43332
Exp.03/30/2022
CIVIL
STATE OF CALIFORNIA

Esmail Rastegari, P.E.
Principal

JM/ER/gm

Attachments:
Drawings
Boring Logs
Percolation Test Data

PERCOLATION TEST DATA SHEET

Date: *9/10/20*
Project No: *20-1057P*
Depth to Test Hole (Dt) : *15 ft.*
Test Hole ID: B-1
Test Hole Dimensions *(inches/ feet)*
Diameters: *8 inch.*

Project Name: *Service Station & Canopy*
Tested By: *F.M*
USCS Soil Classification: *SC*

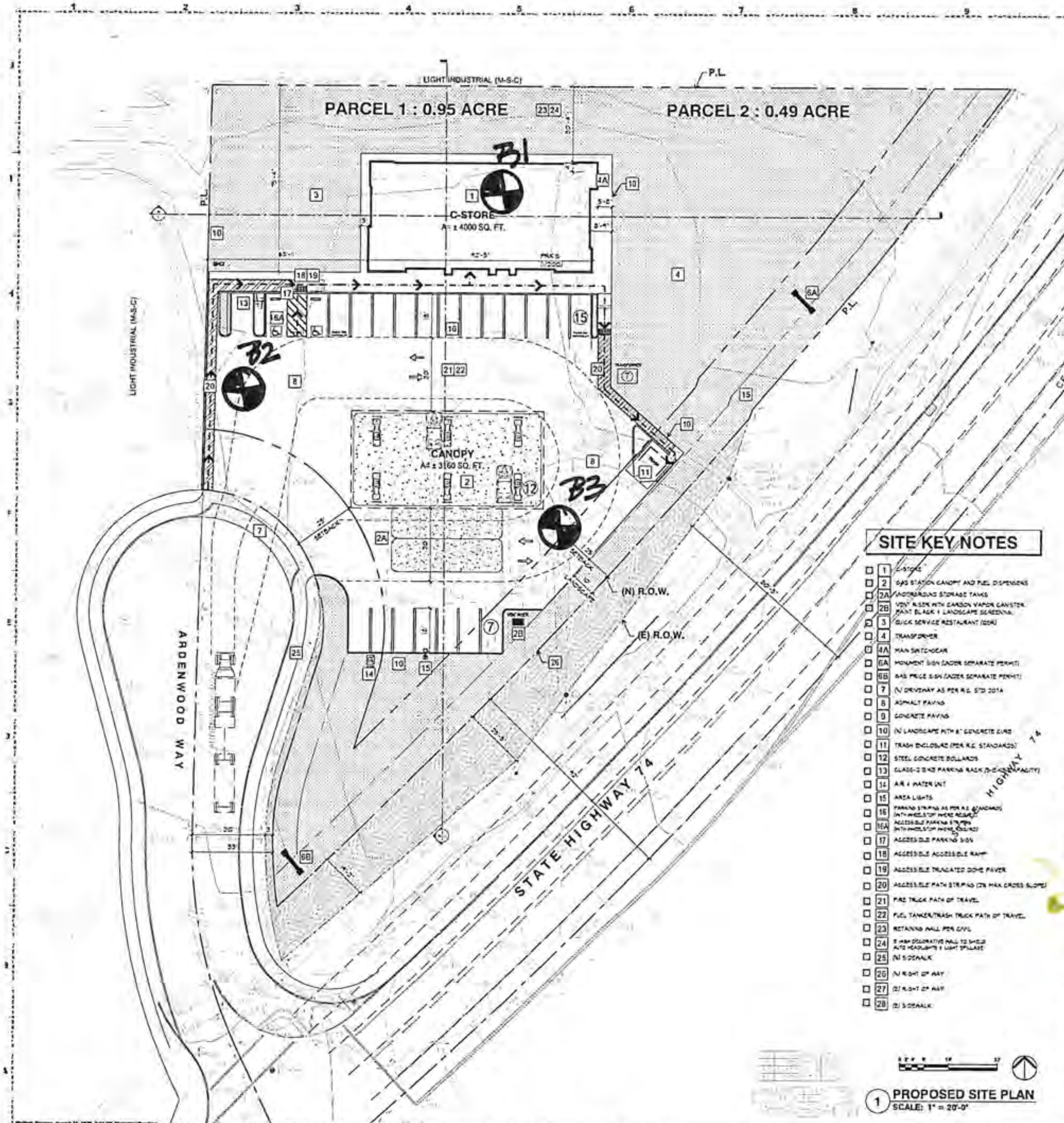
Rectangular:

TEST HOLE NO: B-2

Trial No.	Start Time	Stop Time	/\t Time Interval (min)	Di Initial Depth to Water(inch)	Df Final Depth to water (inch)	/\D Change in Water Level (inch)	Greater than or Equal to 6'?*
1	0:00	12:25	25.00	12	23.1	11.1	Y
2	12:25	12:35	25.00	12	22.9	10.9	Y

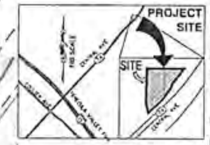
Trial No.	Start Time	Stop Time	/\t Time Interval (min)	Di Initial Depth to Water(inch)	Df Final Depth to water (inch)	/\D Change in Water Level (inch)	Percolation Rate (min./in)
1	1:00	1:10	10	12.2	22.3	10.10	1.0
2	1:10	1:20	10	12	21.4	9.40	1.1
3	1:20	1:30	10	12	20.6	8.60	1.2
4	1:30	1:40	10	12.25	20.1	7.85	1.3
5	1:40	1:50	10	12	19.2	7.20	1.4
6	1:50	2:00	10	12.25	19.1	6.85	1.5

TEST HOLE NO: B-1	
Time Interval: t (min)	10
Initial Depth to Water (in), Di	12.25
Final Depth to Water (in), Df	19.1
Total Depth of Test Hole (in): Dt	60
Test Hole Radius, r (in)	4
Hi, initial ht of water @ selected time interval	
Hi = (Dt - Di)	47.8
Hf, final ht. Of water @ selected time interval	
Hf = (Dt- Df)	40.9
/\H (change in ht. over the time interval = (Hi- Hf)	6.85
H (avg) = (Hi + Hf)/ 2	44.3
It = Test Infiltration Rate	
^h*60*R	1644.0
^T(R+2*Havg)	926.5
Rate	**1.77**



1 PROPOSED SITE PLAN
SCALE: 1" = 20'-0"

VICINITY MAP



LEGEND

①	NO. OF PARKING SPACES
	ACCESSIBLE PARKING
	PROPERTY LINE
	PROPOSED PARCEL SUBDIVISION
	ADA PATH OF TRAVEL
	CONCRETE PAVING AREA
	DECORATIVE PAVING AREA
	LANDSCAPED AREA
	DIRECTIONAL ARROW
	R.O.W. DEDICATION
	AREA LIGHTS
	WALL MOUNTED DECORATIVE AREA LIGHTS
	(E) FIRE HYDRANT
Ⓢ	(E) SEWER MANHOLE
Ⓒ	(E) SEWER CLEANOUT
	(E) POWER POLE
WM	(E) WATER METER
	(E) WATER POINT
	(E) SIGN

SCOPE OF WORK

PROPOSED DEVELOPMENT
PROPOSED GAS STATION COMPRISING OF:
-CONVENIENCE STORE (WITH TYPE 20-ABC)
-FUELING CANOPY WITH SIX MULTI-PRODUCT DISPENSERS
-TWO UNDERGROUND STORAGE TANKS

SITE KEY NOTES

1. C-STORE
2. GAS STATION CANOPY AND FUEL DISPENSERS
2A. UNDERGROUND STORAGE TANKS
2B. VENT RISER WITH CARBON VAPOR CANISTER PAINT BLACK + LANDSCAPE SCREENING
3. QUICK SERVICE RESTAURANT (QSR)
4. TRANSFORMER
4A. MAIN SWITCHGEAR
6A. MONUMENT SIGN (UNDER SEPARATE PERMIT)
6B. GAS PRICE SIGN (UNDER SEPARATE PERMIT)
7. (N) DRIVEWAY AS PER R.C. STD 207A
8. ASPHALT PAVING
9. CONCRETE PAVING
10. (N) LANDSCAPE WITH 6" CONCRETE CURB
11. TRASH ENCLOSURE (PER R.C. STANDARDS)
12. STEEL CONCRETE BOLLARDS
13. CLASS-2 BIKE PARKING RACK (5-BIKE CAPACITY)
14. AIR + WATER UNIT
15. AREA LIGHTS
16. PARKING STRIPING AS PER R.C. STANDARDS (WITH WHEELSTOP WHERE REQUIRED)
16A. ACCESSIBLE PARKING STRIPING (WITH WHEELSTOP WHERE REQUIRED)
17. ACCESSIBLE PARKING SIGN
18. ACCESSIBLE ACCESSIBLE RAMP
19. ACCESSIBLE TRUNCATED DOME PAVER
20. ACCESSIBLE PATH STRIPING (2% MAX CROSS SLOPE)
21. FIRE TRUCK PATH OF TRAVEL
22. FUEL TANKER/TRASH TRUCK PATH OF TRAVEL
23. RETAINING WALL PER CIVIL
24. 3' HIGH DECORATIVE WALL TO SHIELD AUTO HEADLIGHTS + LIGHT SPILLAGE
25. (N) SIDEWALK
26. (N) RIGHT OF WAY
27. (E) RIGHT OF WAY
28. (E) SIDEWALK

ASSESSOR'S PARCEL NUMBER

347-130-028 & 347-130-029

LEGAL DESCRIPTION

FIRST AMERICAN TITLE COMPANY
ORDER NO.: 0625-5758485
DATED: SEPTEMBER 11, 2018

LEGAL DESCRIPTION:
REAL PROPERTY IN THE UNINCORPORATED AREA OF THE COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, DESCRIBED AS FOLLOWS:

PARCEL 3 OF PARCEL MAP 9985, AS SHOWN BY MAP ON FILE IN BOOK 46, PAGE 72 OF PARCEL MAPS, RECORDS OF RIVERSIDE COUNTY, CALIFORNIA.

EXCEPTING THEREFROM A PORTION THAT GRANTS TO RIVERSIDE COUNTY TRANSPORTATION COMMISSION, A POLITICAL SUBDIVISION AS DESCRIBED IN DEED RECORDED OCTOBER 02, 2001 AS INSTRUMENT NO. 2001-478038 OF OFFICIAL RECORDS.

APN: 347-130-029

LEGAL DESCRIPTION:
ORDER NO.: 0625-5789283
DATED: SEPTEMBER 12, 2018

REAL PROPERTY IN THE UNINCORPORATED AREA OF THE COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, DESCRIBED AS FOLLOWS:

PARCELS 4 OF PARCEL MAP 9985, AS SHOWN BY MAP ON FILE IN BOOK 46, PAGE 72, OF PARCEL MAPS, RECORDS OF RIVERSIDE COUNTY, CALIFORNIA.

EXCEPTING THEREFROM THAT PORTION CONVEYED TO THE RIVERSIDE COUNTY TRANSPORTATION COMMISSION, BY GRANT DEED RECORDED OCTOBER 09, 2001 AS INSTRUMENT NO. 01-488317, OF OFFICIAL RECORDS OF SAID COUNTY.

ASSESSOR'S PARCEL NUMBER: 347-130-028

TOTAL AREA: 62,757.88 S.F. (1.441 ACRES)

PROJECT DATA

ZONING: LIGHT INDUSTRIAL
LAND USE: MANUFACTURING-SERVICE COMMERCIAL
AREA OF SITE (GROSS ACREAGE)
TOTAL AREA: ± 62,126 S.F. (1.44 acre)

BLDG SETBACKS	REQUIRED	PROVIDED
FRONT (SOUTH)	25'-0"	25'-0"
REAR (NORTH)	0'-0"	0'-0"
LEFT (WEST)	25'-0"	25'-0"
RIGHT (EAST)	0'-0"	0'-0"
LANDSCAPE AREA	10%	29,002 S.F. (51%)
FLOOR AREA RATIO	-	± 0.11
MAXIMUM HEIGHT	40'-0"	35'-0"
PARKING	34	51

BUILDING DATA

C-STORE	
AREAS	± 4,000 SF
OCCUPANCY	M
TYPE OF CONST	V-B
NUMBER OF STORY	1
BLDG HEIGHT	± 28'-0"
SPRINKLERS	NONE
CANOPY	
AREA	± 3,160 SF
OCCUPANCY	M
TYPE OF CONST	II-B
NUMBER OF STORY	1
BLDG HEIGHT	20'-0"
SPRINKLERS	NONE

TOTAL BUILDINGS AREA (GFA) ± 9,160 SF
± 0.15 ACRE (NET ACREAGE)

PARKING COMPUTATION

PARKING STANDARDS

TYPE	SIZE
REGULAR	9'-0" X 18'-0"
COMPACT	8'-6" X 16'-0" (UP TO 30% OF TOTAL)
HANDICAP	17'-0" X 18'-0" (VAN ACCESSIBLE)

PARKING REQUIREMENTS

USE	FORMULA	REQUIRED	PROVIDED
C-STORE	(1/200 S.F.)	20	22
CANOPY		-	12
TOTAL PARKING		20	34

HANDICAP PARKING REQUIREMENTS

FORMULA	REQUIRED	PROVIDED
26-50 PARKING SPACES	(2)	(2)

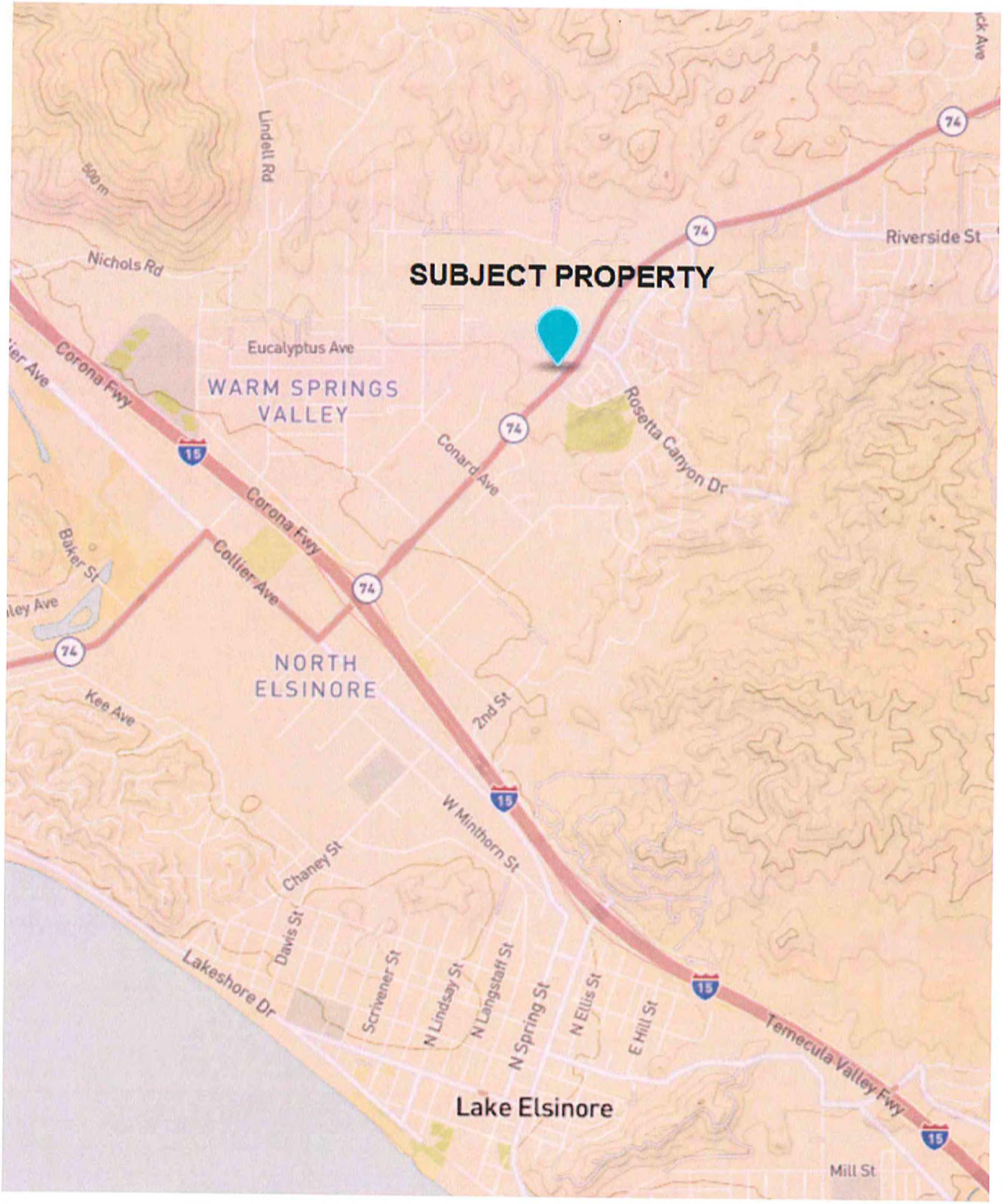
CLEAN AIR/ELECTRIC VEHICLE PARKING

FORMULA	REQUIRED	PROVIDED
SECTION 17.18.045 R.C. MUN CODE (WITH 25-49 PARKING = 2 EV CHARGING SPACES)	(2)	(2)

KAR
WESTERN STATES A DESIGN-BU...
4007 E. LA P...
■ CONSULTANT
■ SUBMITTAL
NO. DESCRIPTION
■ REVISIONS
NO. DESCRIPTION
■ OWNER NAME
DAHER O...
■ PROJECT NAME
GAS STA...
CONVENIEN...
■ NOTE TO CONT...
■ CONFIDENTIAL
■ DESIGNED BY:
■ DRAWN BY:
■ CHECKED BY:
■ PLOT DATE:
■ SCALE:
■ SHEET TITLE
PROPOS...
SITE PL...
■ SHEET NUMBER
AS-1

SOIL BORING

GEO ENVIRO...
GEOTECHNICAL & ENVIRONMENTAL ENG. CONSULTA...
4071 E. La Palma Ave., S...
Anaheim, CA 92807



SUBJECT PROPERTY
Riverside St
Lindell Rd
Nichols Rd
500 m
Eucalyptus Ave
WARM SPRINGS VALLEY
Corona Fwy
Rosetta Canyon Dr
Conard Ave
Collier Ave
Baker St
NORTH ELSINORE
Kee Ave
2nd St
W Minthorn St
Chaney St
Davis St
Lakeshore Dr
Scrivener St
N Lindsay St
N Langstaff St
N Spring St
N Ellis St
E Hill St
Temecula Valley Fwy
Lake Elsinore
Mill St
74
15

Appendix 4: Historical Site Conditions

Phase I Environmental Site Assessment or Other Information on Past Site Use

Appendix 5: LID Infeasibility

LID Technical Infeasibility Analysis

Appendix 6: BMP Design Details

BMP Sizing, Design Details and other Supporting Documentation

Santa Ana Watershed

V_{BMP} and Q_{BMP} worksheets

These worksheets are to be used to determine the required

Design Capture Volume (V_{BMP})
or the
Design Flow Rate (Q_{BMP})

for BMPs in the Santa Ana Watershed

To verify which watershed your project is located within, visit

www.rcflood.org/npdes

and use the 'Locate my Watershed' tool

If your project is not located in the Santa Ana Watershed,

Do not use these worksheets! Instead visit

www.rcflood.org/npdes/developers.aspx

To access worksheets applicable to your watershed

Use the tabs across the bottom
to access the worksheets for the Santa Ana Watershed

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: Western States Engineering, Inc. | Date: 04/28/2021

Designed by: JR | Case No: TBD

Company Project Number/Name: 28771 Central Avenue Lake Elsinore, CA

BMP Identification

BMP NAME / ID: BIO-A

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}= 0.65 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)*
A-1	*2519.08*	*Roofs*	*1*	*0.89*	*2247*			
A-2	*877.78*	*Concrete or Asphalt*	*1*	*0.89*	*783*			
A-3	*2083.87*	*Ornamental Landscaping*	*0.1*	*0.11*	*230.2*			
	5480.73	***Total***			**3260.2**	**0.65**	**176.6**	**1538**

Notes:

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: Western States Engineering, Inc. Date: 04/28/2021

Designed by: JR Case No: TBD

Company Project Number/Name: 28771 Central Avenue Lake Elsinore, CA

BMP Identification

BMP NAME / ID: BIO-B

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}= 0.65 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)*
B-1	*4268.86*	*Roofs*	*1*	*0.89*	*3807.8*			
B-2	*27221.98*	*Concrete or Asphalt*	*1*	*0.89*	*24282*			
B-3	*7571.49*	*Ornamental Landscaping*	*0.1*	*0.11*	*836.3*			
	39062.33	***Total***			**28926.1**	**0.65**	***1566.8***	***4193***

Notes:

Effective Impervious Fraction

Developed Cover Types	Effective Impervious Fraction
Roofs	1.00
Concrete or Asphalt	1.00
Grouted or Gapless Paving Blocks	1.00
Compacted Soil (e.g. unpaved parking)	0.40
Decomposed Granite	0.40
Permeable Paving Blocks w/ Sand Filled Gap	0.25
Class 2 Base	0.30
Gravel or Class 2 Permeable Base	0.10
Pervious Concrete / Porous Asphalt	0.10
Open and Porous Pavers	0.10
Turf block	0.10
Ornamental Landscaping	0.10
Natural (A Soil)	0.03
Natural (B Soil)	0.15
Natural (C Soil)	0.30
Natural (D Soil)	0.40

Mixed Surface Types

Use this table to determine the effective impervious fraction for the V_{BMP} and Q_{BMP} calculation sheets

Bioretention Facility - Design Procedure	BMP ID	Legend:	Required Entries
	BIO-A		Calculated Cells

Company Name: Western States Engineering, Inc. Date: 09/23/2020

Designed by: JR County/City Case No.: TBD

Design Volume

Enter the area tributary to this feature A_T= 0.126 acres

Enter V_{BMP} determined from Section 2.1 of this Handbook V_{BMP}= 177 ft^3

Type of Bioretention Facility Design

◉ Side slopes required (parallel to parking spaces or adjacent to walkways)

○ No side slopes required (perpendicular to parking space or Planter Boxes)

Bioretention Facility Surface Area

Depth of Soil Filter Media Layer d_S = 3.0 ft

Top Width of Bioretention Facility, excluding curb w_T = 27.4 ft

Total Effective Depth, d_E

$d_E = (0.3) \times d_S + (0.4) \times 1 - (0.7/w_T) + 0.5$ d_E = 1.77 ft

Minimum Surface Area, A_m

$$A_M\ (ft^2) = \frac{V_{BMP}\ (ft^3)}{d_E\ (ft)}$$

A_M = 100 ft^2

Proposed Surface Area A= 1,059 ft^2

Bioretention Facility Properties

Side Slopes in Bioretention Facility z = 4 :1

Diameter of Underdrain 6 inches

Longitudinal Slope of Site (3% maximum) 0 %

6" Check Dam Spacing 0 feet

Describe Vegetation:

Notes:

Bioretention Facility - Design Procedure	BMP ID	Legend:	Required Entries
	BIO-B		Calculated Cells

Company Name: Western States Engineering, Inc. Date: 09/21/2020

Designed by: JR County/City Case No.: TBD

Design Volume

Enter the area tributary to this feature A_T= 0.897 acres

Enter V_{BMP} determined from Section 2.1 of this Handbook V_{BMP}= 1,567 ft^3

Type of Bioretention Facility Design

◉ Side slopes required (parallel to parking spaces or adjacent to walkways)

○ No side slopes required (perpendicular to parking space or Planter Boxes)

Bioretention Facility Surface Area

Depth of Soil Filter Media Layer d_S = 3.0 ft

Top Width of Bioretention Facility, excluding curb w_T = 44.0 ft

Total Effective Depth, d_E

$d_E = (0.3) \times d_S + (0.4) \times 1 - (0.7/w_T) + 0.5$ d_E = 1.78 ft

Minimum Surface Area, A_m

$$A_M\ (ft^2) = \frac{V_{BMP}\ (ft^3)}{d_E\ (ft)}$$

A_M = 879 ft^2

Proposed Surface Area A= 2,715 ft^2

Bioretention Facility Properties

Side Slopes in Bioretention Facility z = 4 :1

Diameter of Underdrain 6 inches

Longitudinal Slope of Site (3% maximum) 0 %

6" Check Dam Spacing 0 feet

Describe Vegetation:

Notes:

Appendix 7: Hydromodification

Supporting Detail Relating to Hydrologic Conditions of Concern

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 1999 Version 6.0
Rational Hydrology Study Date: 05/03/21 File:PREA.out

28771 Central Avenue Gas Station
Area A
Pre-development
2-Yr Storm Event

********* Hydrology Study Control Information **********
English (in-lb) Units used in input data file

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 2.00 Antecedent Moisture Condition = 1

Standard intensity-duration curves data (Plate D-4.1)
For the [Elsinore-Wildomar] area used.
10 year storm 10 minute intensity = 2.320(In/Hr)
10 year storm 60 minute intensity = 0.980(In/Hr)
100 year storm 10 minute intensity = 3.540(In/Hr)
100 year storm 60 minute intensity = 1.500(In/Hr)

Storm event year = 2.0
Calculated rainfall intensity data:
1 hour intensity = 0.617(In/Hr)
Slope of intensity duration curve = 0.4800

++
Process from Point/Station 10.000 to Point/Station 20.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 408.000(Ft.)
Top (of initial area) elevation = 1394.240(Ft.)
Bottom (of initial area) elevation = 1377.900(Ft.)
Difference in elevation = 16.340(Ft.)
Slope = 0.04005 s(percent)= 4.00
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 11.169 min.
Rainfall intensity = 1.382(In/Hr) for a 2.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.528
Decimal fraction soil group A = 0.600
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.040
Decimal fraction soil group D = 0.360
RI index for soil(AMC 1) = 57.82
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 1.057(CFS)
Total initial stream area = 1.448(Ac.)
Pervious area fraction = 1.000
End of computations, total study area = 1.448 (Ac.)

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 1999 Version 6.0
Rational Hydrology Study Date: 05/03/21 File:APOST.out

28771 Central Avenue Gas Station
Area A
Post-development
2-Yr Storm Event

********* Hydrology Study Control Information **********
English (in-lb) Units used in input data file

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 2.00 Antecedent Moisture Condition = 1

Standard intensity-duration curves data (Plate D-4.1)
For the [Elsinore-Wildomar] area used.
10 year storm 10 minute intensity = 2.320(In/Hr)
10 year storm 60 minute intensity = 0.980(In/Hr)
100 year storm 10 minute intensity = 3.540(In/Hr)
100 year storm 60 minute intensity = 1.500(In/Hr)

Storm event year = 2.0
Calculated rainfall intensity data:
1 hour intensity = 0.617(In/Hr)
Slope of intensity duration curve = 0.4800

++
Process from Point/Station 30.000 to Point/Station 40.000
**** INITIAL AREA EVALUATION ****

____

Initial area flow distance = 354.000(Ft.)
Top (of initial area) elevation = 1387.000(Ft.)
Bottom (of initial area) elevation = 1377.900(Ft.)
Difference in elevation = 9.100(Ft.)
Slope = 0.02571 s(percent)= 2.57
TC = k(0.940)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 20.451 min.
Rainfall intensity = 1.034(In/Hr) for a 2.0 year storm
UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.176
Decimal fraction soil group A = 0.880
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.120
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1) = 23.86
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 0.077(CFS)
Total initial stream area = 0.426(Ac.)
Pervious area fraction = 1.000
End of computations, total study area = 0.426 (Ac.)

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 1999 Version 6.0
Rational Hydrology Study Date: 05/03/21 File:BPOST.out

28771 Central Avenue Gas Station
Area B
Post-development
2-Yr Storm Event

********* Hydrology Study Control Information **********
English (in-lb) Units used in input data file

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 2.00 Antecedent Moisture Condition = 1

Standard intensity-duration curves data (Plate D-4.1)
For the [Elsinore-Wildomar] area used.
10 year storm 10 minute intensity = 2.320(In/Hr)
10 year storm 60 minute intensity = 0.980(In/Hr)
100 year storm 10 minute intensity = 3.540(In/Hr)
100 year storm 60 minute intensity = 1.500(In/Hr)

Storm event year = 2.0
Calculated rainfall intensity data:
1 hour intensity = 0.617(In/Hr)
Slope of intensity duration curve = 0.4800

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Process from Point/Station 50.000 to Point/Station 60.000
**** INITIAL AREA EVALUATION ****

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Initial area flow distance = 348.000(Ft.)
Top (of initial area) elevation = 1386.280(Ft.)
Bottom (of initial area) elevation = 1384.500(Ft.)
Difference in elevation = 1.780(Ft.)
Slope = 0.00511 s(percent)= 0.51
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 8.953 min.
Rainfall intensity = 1.536(In/Hr) for a 2.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.842
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 1) = 31.99
Pervious area fraction = 0.100; Impervious fraction = 0.900
Initial subarea runoff = 1.323(CFS)
Total initial stream area = 1.023(Ac.)
Pervious area fraction = 0.100
End of computations, total study area = 1.023 (Ac.)

U n i t   H y d r o g r a p h   A n a l y s i s

Study date 05/03/21 File: APRE2YR242.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

28771 Central Avenue Gas Station
Area A
Pre-development
2-Yr 24-Hr Storm Event

Drainage Area = 1.45(Ac.) = 0.002 Sq. Mi.
Length along longest watercourse = 408.00(Ft.)
Length along longest watercourse measured to centroid = 205.00(Ft.)
Length along longest watercourse = 0.077 Mi.
Length along longest watercourse measured to centroid = 0.039 Mi.
Difference in elevation = 16.34(Ft.)
Slope along watercourse = 211.4588 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.029 Hr.
Lag time = 1.72 Min.
25% of lag time = 0.43 Min.
40% of lag time = 0.69 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]
1.45	2.43	3.52

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
1.45	6.58	9.53

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 2.430(In)
Area Averaged 100-Year Rainfall = 6.580(In)

Point rain (area averaged) = 2.430(In)
Areal adjustment factor = 100.00 %

Adjusted average point rain = 2.430(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
1.448	84.00	0.040

Total Area Entered = 1.45(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
84.0	68.6	0.377	0.040	0.363	1.000	0.363

Sum (F) = 0.363

Area averaged mean soil loss (F) (In/Hr) = 0.363
Minimum soil loss rate ((In/Hr)) = 0.182
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.853

U n i t H y d r o g r a p h
DESERT S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	291.047	55.153	0.805
2	0.167	582.095	39.333	0.574
3	0.250	873.142	5.514	0.080
			Sum = 100.000	Sum= 1.459

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Loss rate(In./Hr) Low	Effective (In/Hr)
1	0.08	0.07	0.019	0.644	0.017	0.00
2	0.17	0.07	0.019	0.642	0.017	0.00
3	0.25	0.07	0.019	0.639	0.017	0.00
4	0.33	0.10	0.029	0.637	0.025	0.00
5	0.42	0.10	0.029	0.634	0.025	0.00
6	0.50	0.10	0.029	0.632	0.025	0.00
7	0.58	0.10	0.029	0.629	0.025	0.00
8	0.67	0.10	0.029	0.627	0.025	0.00
9	0.75	0.10	0.029	0.624	0.025	0.00
10	0.83	0.13	0.039	0.622	0.033	0.01
11	0.92	0.13	0.039	0.620	0.033	0.01
12	1.00	0.13	0.039	0.617	0.033	0.01
13	1.08	0.10	0.029	0.615	0.025	0.00
14	1.17	0.10	0.029	0.612	0.025	0.00
15	1.25	0.10	0.029	0.610	0.025	0.00
16	1.33	0.10	0.029	0.607	0.025	0.00
17	1.42	0.10	0.029	0.605	0.025	0.00
18	1.50	0.10	0.029	0.603	0.025	0.00
19	1.58	0.10	0.029	0.600	0.025	0.00
20	1.67	0.10	0.029	0.598	0.025	0.00
21	1.75	0.10	0.029	0.595	0.025	0.00

22	1.83	0.13	0.039	0.593	0.033	0.01
23	1.92	0.13	0.039	0.591	0.033	0.01
24	2.00	0.13	0.039	0.588	0.033	0.01
25	2.08	0.13	0.039	0.586	0.033	0.01
26	2.17	0.13	0.039	0.583	0.033	0.01
27	2.25	0.13	0.039	0.581	0.033	0.01
28	2.33	0.13	0.039	0.579	0.033	0.01
29	2.42	0.13	0.039	0.576	0.033	0.01
30	2.50	0.13	0.039	0.574	0.033	0.01
31	2.58	0.17	0.049	0.572	0.041	0.01
32	2.67	0.17	0.049	0.569	0.041	0.01
33	2.75	0.17	0.049	0.567	0.041	0.01
34	2.83	0.17	0.049	0.565	0.041	0.01
35	2.92	0.17	0.049	0.562	0.041	0.01
36	3.00	0.17	0.049	0.560	0.041	0.01
37	3.08	0.17	0.049	0.558	0.041	0.01
38	3.17	0.17	0.049	0.555	0.041	0.01
39	3.25	0.17	0.049	0.553	0.041	0.01
40	3.33	0.17	0.049	0.551	0.041	0.01
41	3.42	0.17	0.049	0.548	0.041	0.01
42	3.50	0.17	0.049	0.546	0.041	0.01
43	3.58	0.17	0.049	0.544	0.041	0.01
44	3.67	0.17	0.049	0.542	0.041	0.01
45	3.75	0.17	0.049	0.539	0.041	0.01
46	3.83	0.20	0.058	0.537	0.050	0.01
47	3.92	0.20	0.058	0.535	0.050	0.01
48	4.00	0.20	0.058	0.532	0.050	0.01
49	4.08	0.20	0.058	0.530	0.050	0.01
50	4.17	0.20	0.058	0.528	0.050	0.01
51	4.25	0.20	0.058	0.526	0.050	0.01
52	4.33	0.23	0.068	0.523	0.058	0.01
53	4.42	0.23	0.068	0.521	0.058	0.01
54	4.50	0.23	0.068	0.519	0.058	0.01
55	4.58	0.23	0.068	0.517	0.058	0.01
56	4.67	0.23	0.068	0.515	0.058	0.01
57	4.75	0.23	0.068	0.512	0.058	0.01
58	4.83	0.27	0.078	0.510	0.066	0.01
59	4.92	0.27	0.078	0.508	0.066	0.01
60	5.00	0.27	0.078	0.506	0.066	0.01
61	5.08	0.20	0.058	0.503	0.050	0.01
62	5.17	0.20	0.058	0.501	0.050	0.01
63	5.25	0.20	0.058	0.499	0.050	0.01
64	5.33	0.23	0.068	0.497	0.058	0.01
65	5.42	0.23	0.068	0.495	0.058	0.01
66	5.50	0.23	0.068	0.493	0.058	0.01
67	5.58	0.27	0.078	0.490	0.066	0.01
68	5.67	0.27	0.078	0.488	0.066	0.01
69	5.75	0.27	0.078	0.486	0.066	0.01
70	5.83	0.27	0.078	0.484	0.066	0.01
71	5.92	0.27	0.078	0.482	0.066	0.01
72	6.00	0.27	0.078	0.480	0.066	0.01
73	6.08	0.30	0.087	0.478	0.075	0.01
74	6.17	0.30	0.087	0.475	0.075	0.01
75	6.25	0.30	0.087	0.473	0.075	0.01
76	6.33	0.30	0.087	0.471	0.075	0.01
77	6.42	0.30	0.087	0.469	0.075	0.01

78	6.50	0.30	0.087	0.467	0.075	0.01
79	6.58	0.33	0.097	0.465	0.083	0.01
80	6.67	0.33	0.097	0.463	0.083	0.01
81	6.75	0.33	0.097	0.461	0.083	0.01
82	6.83	0.33	0.097	0.459	0.083	0.01
83	6.92	0.33	0.097	0.457	0.083	0.01
84	7.00	0.33	0.097	0.454	0.083	0.01
85	7.08	0.33	0.097	0.452	0.083	0.01
86	7.17	0.33	0.097	0.450	0.083	0.01
87	7.25	0.33	0.097	0.448	0.083	0.01
88	7.33	0.37	0.107	0.446	0.091	0.02
89	7.42	0.37	0.107	0.444	0.091	0.02
90	7.50	0.37	0.107	0.442	0.091	0.02
91	7.58	0.40	0.117	0.440	0.100	0.02
92	7.67	0.40	0.117	0.438	0.100	0.02
93	7.75	0.40	0.117	0.436	0.100	0.02
94	7.83	0.43	0.126	0.434	0.108	0.02
95	7.92	0.43	0.126	0.432	0.108	0.02
96	8.00	0.43	0.126	0.430	0.108	0.02
97	8.08	0.50	0.146	0.428	0.124	0.02
98	8.17	0.50	0.146	0.426	0.124	0.02
99	8.25	0.50	0.146	0.424	0.124	0.02
100	8.33	0.50	0.146	0.422	0.124	0.02
101	8.42	0.50	0.146	0.420	0.124	0.02
102	8.50	0.50	0.146	0.418	0.124	0.02
103	8.58	0.53	0.156	0.416	0.133	0.02
104	8.67	0.53	0.156	0.414	0.133	0.02
105	8.75	0.53	0.156	0.412	0.133	0.02
106	8.83	0.57	0.165	0.410	0.141	0.02
107	8.92	0.57	0.165	0.408	0.141	0.02
108	9.00	0.57	0.165	0.406	0.141	0.02
109	9.08	0.63	0.185	0.405	0.158	0.03
110	9.17	0.63	0.185	0.403	0.158	0.03
111	9.25	0.63	0.185	0.401	0.158	0.03
112	9.33	0.67	0.194	0.399	0.166	0.03
113	9.42	0.67	0.194	0.397	0.166	0.03
114	9.50	0.67	0.194	0.395	0.166	0.03
115	9.58	0.70	0.204	0.393	0.174	0.03
116	9.67	0.70	0.204	0.391	0.174	0.03
117	9.75	0.70	0.204	0.389	0.174	0.03
118	9.83	0.73	0.214	0.387	0.182	0.03
119	9.92	0.73	0.214	0.386	0.182	0.03
120	10.00	0.73	0.214	0.384	0.182	0.03
121	10.08	0.50	0.146	0.382	0.124	0.02
122	10.17	0.50	0.146	0.380	0.124	0.02
123	10.25	0.50	0.146	0.378	0.124	0.02
124	10.33	0.50	0.146	0.376	0.124	0.02
125	10.42	0.50	0.146	0.375	0.124	0.02
126	10.50	0.50	0.146	0.373	0.124	0.02
127	10.58	0.67	0.194	0.371	0.166	0.03
128	10.67	0.67	0.194	0.369	0.166	0.03
129	10.75	0.67	0.194	0.367	0.166	0.03
130	10.83	0.67	0.194	0.365	0.166	0.03
131	10.92	0.67	0.194	0.364	0.166	0.03
132	11.00	0.67	0.194	0.362	0.166	0.03
133	11.08	0.63	0.185	0.360	0.158	0.03

134	11.17	0.63	0.185	0.358	0.158	0.03
135	11.25	0.63	0.185	0.357	0.158	0.03
136	11.33	0.63	0.185	0.355	0.158	0.03
137	11.42	0.63	0.185	0.353	0.158	0.03
138	11.50	0.63	0.185	0.351	0.158	0.03
139	11.58	0.57	0.165	0.350	0.141	0.02
140	11.67	0.57	0.165	0.348	0.141	0.02
141	11.75	0.57	0.165	0.346	0.141	0.02
142	11.83	0.60	0.175	0.344	0.149	0.03
143	11.92	0.60	0.175	0.343	0.149	0.03
144	12.00	0.60	0.175	0.341	0.149	0.03
145	12.08	0.83	0.243	0.339	0.207	0.04
146	12.17	0.83	0.243	0.338	0.207	0.04
147	12.25	0.83	0.243	0.336	0.207	0.04
148	12.33	0.87	0.253	0.334	0.216	0.04
149	12.42	0.87	0.253	0.332	0.216	0.04
150	12.50	0.87	0.253	0.331	0.216	0.04
151	12.58	0.93	0.272	0.329	0.232	0.04
152	12.67	0.93	0.272	0.327	0.232	0.04
153	12.75	0.93	0.272	0.326	0.232	0.04
154	12.83	0.97	0.282	0.324	0.240	0.04
155	12.92	0.97	0.282	0.323	0.240	0.04
156	13.00	0.97	0.282	0.321	0.240	0.04
157	13.08	1.13	0.330	0.319	---	0.01
158	13.17	1.13	0.330	0.318	---	0.01
159	13.25	1.13	0.330	0.316	---	0.01
160	13.33	1.13	0.330	0.314	---	0.02
161	13.42	1.13	0.330	0.313	---	0.02
162	13.50	1.13	0.330	0.311	---	0.02
163	13.58	0.77	0.224	0.310	0.191	0.03
164	13.67	0.77	0.224	0.308	0.191	0.03
165	13.75	0.77	0.224	0.307	0.191	0.03
166	13.83	0.77	0.224	0.305	0.191	0.03
167	13.92	0.77	0.224	0.303	0.191	0.03
168	14.00	0.77	0.224	0.302	0.191	0.03
169	14.08	0.90	0.262	0.300	0.224	0.04
170	14.17	0.90	0.262	0.299	0.224	0.04
171	14.25	0.90	0.262	0.297	0.224	0.04
172	14.33	0.87	0.253	0.296	0.216	0.04
173	14.42	0.87	0.253	0.294	0.216	0.04
174	14.50	0.87	0.253	0.293	0.216	0.04
175	14.58	0.87	0.253	0.291	0.216	0.04
176	14.67	0.87	0.253	0.290	0.216	0.04
177	14.75	0.87	0.253	0.288	0.216	0.04
178	14.83	0.83	0.243	0.287	0.207	0.04
179	14.92	0.83	0.243	0.285	0.207	0.04
180	15.00	0.83	0.243	0.284	0.207	0.04
181	15.08	0.80	0.233	0.282	0.199	0.03
182	15.17	0.80	0.233	0.281	0.199	0.03
183	15.25	0.80	0.233	0.279	0.199	0.03
184	15.33	0.77	0.224	0.278	0.191	0.03
185	15.42	0.77	0.224	0.277	0.191	0.03
186	15.50	0.77	0.224	0.275	0.191	0.03
187	15.58	0.63	0.185	0.274	0.158	0.03
188	15.67	0.63	0.185	0.272	0.158	0.03
189	15.75	0.63	0.185	0.271	0.158	0.03

190	15.83	0.63	0.185	0.270	0.158	0.03
191	15.92	0.63	0.185	0.268	0.158	0.03
192	16.00	0.63	0.185	0.267	0.158	0.03
193	16.08	0.13	0.039	0.266	0.033	0.01
194	16.17	0.13	0.039	0.264	0.033	0.01
195	16.25	0.13	0.039	0.263	0.033	0.01
196	16.33	0.13	0.039	0.261	0.033	0.01
197	16.42	0.13	0.039	0.260	0.033	0.01
198	16.50	0.13	0.039	0.259	0.033	0.01
199	16.58	0.10	0.029	0.257	0.025	0.00
200	16.67	0.10	0.029	0.256	0.025	0.00
201	16.75	0.10	0.029	0.255	0.025	0.00
202	16.83	0.10	0.029	0.254	0.025	0.00
203	16.92	0.10	0.029	0.252	0.025	0.00
204	17.00	0.10	0.029	0.251	0.025	0.00
205	17.08	0.17	0.049	0.250	0.041	0.01
206	17.17	0.17	0.049	0.248	0.041	0.01
207	17.25	0.17	0.049	0.247	0.041	0.01
208	17.33	0.17	0.049	0.246	0.041	0.01
209	17.42	0.17	0.049	0.245	0.041	0.01
210	17.50	0.17	0.049	0.244	0.041	0.01
211	17.58	0.17	0.049	0.242	0.041	0.01
212	17.67	0.17	0.049	0.241	0.041	0.01
213	17.75	0.17	0.049	0.240	0.041	0.01
214	17.83	0.13	0.039	0.239	0.033	0.01
215	17.92	0.13	0.039	0.238	0.033	0.01
216	18.00	0.13	0.039	0.236	0.033	0.01
217	18.08	0.13	0.039	0.235	0.033	0.01
218	18.17	0.13	0.039	0.234	0.033	0.01
219	18.25	0.13	0.039	0.233	0.033	0.01
220	18.33	0.13	0.039	0.232	0.033	0.01
221	18.42	0.13	0.039	0.231	0.033	0.01
222	18.50	0.13	0.039	0.230	0.033	0.01
223	18.58	0.10	0.029	0.228	0.025	0.00
224	18.67	0.10	0.029	0.227	0.025	0.00
225	18.75	0.10	0.029	0.226	0.025	0.00
226	18.83	0.07	0.019	0.225	0.017	0.00
227	18.92	0.07	0.019	0.224	0.017	0.00
228	19.00	0.07	0.019	0.223	0.017	0.00
229	19.08	0.10	0.029	0.222	0.025	0.00
230	19.17	0.10	0.029	0.221	0.025	0.00
231	19.25	0.10	0.029	0.220	0.025	0.00
232	19.33	0.13	0.039	0.219	0.033	0.01
233	19.42	0.13	0.039	0.218	0.033	0.01
234	19.50	0.13	0.039	0.217	0.033	0.01
235	19.58	0.10	0.029	0.216	0.025	0.00
236	19.67	0.10	0.029	0.215	0.025	0.00
237	19.75	0.10	0.029	0.214	0.025	0.00
238	19.83	0.07	0.019	0.213	0.017	0.00
239	19.92	0.07	0.019	0.212	0.017	0.00
240	20.00	0.07	0.019	0.211	0.017	0.00
241	20.08	0.10	0.029	0.210	0.025	0.00
242	20.17	0.10	0.029	0.209	0.025	0.00
243	20.25	0.10	0.029	0.208	0.025	0.00
244	20.33	0.10	0.029	0.207	0.025	0.00
245	20.42	0.10	0.029	0.206	0.025	0.00

246	20.50	0.10	0.029	0.206	0.025	0.00
247	20.58	0.10	0.029	0.205	0.025	0.00
248	20.67	0.10	0.029	0.204	0.025	0.00
249	20.75	0.10	0.029	0.203	0.025	0.00
250	20.83	0.07	0.019	0.202	0.017	0.00
251	20.92	0.07	0.019	0.201	0.017	0.00
252	21.00	0.07	0.019	0.201	0.017	0.00
253	21.08	0.10	0.029	0.200	0.025	0.00
254	21.17	0.10	0.029	0.199	0.025	0.00
255	21.25	0.10	0.029	0.198	0.025	0.00
256	21.33	0.07	0.019	0.197	0.017	0.00
257	21.42	0.07	0.019	0.197	0.017	0.00
258	21.50	0.07	0.019	0.196	0.017	0.00
259	21.58	0.10	0.029	0.195	0.025	0.00
260	21.67	0.10	0.029	0.195	0.025	0.00
261	21.75	0.10	0.029	0.194	0.025	0.00
262	21.83	0.07	0.019	0.193	0.017	0.00
263	21.92	0.07	0.019	0.193	0.017	0.00
264	22.00	0.07	0.019	0.192	0.017	0.00
265	22.08	0.10	0.029	0.191	0.025	0.00
266	22.17	0.10	0.029	0.191	0.025	0.00
267	22.25	0.10	0.029	0.190	0.025	0.00
268	22.33	0.07	0.019	0.189	0.017	0.00
269	22.42	0.07	0.019	0.189	0.017	0.00
270	22.50	0.07	0.019	0.188	0.017	0.00
271	22.58	0.07	0.019	0.188	0.017	0.00
272	22.67	0.07	0.019	0.187	0.017	0.00
273	22.75	0.07	0.019	0.187	0.017	0.00
274	22.83	0.07	0.019	0.186	0.017	0.00
275	22.92	0.07	0.019	0.186	0.017	0.00
276	23.00	0.07	0.019	0.185	0.017	0.00
277	23.08	0.07	0.019	0.185	0.017	0.00
278	23.17	0.07	0.019	0.184	0.017	0.00
279	23.25	0.07	0.019	0.184	0.017	0.00
280	23.33	0.07	0.019	0.184	0.017	0.00
281	23.42	0.07	0.019	0.183	0.017	0.00
282	23.50	0.07	0.019	0.183	0.017	0.00
283	23.58	0.07	0.019	0.183	0.017	0.00
284	23.67	0.07	0.019	0.182	0.017	0.00
285	23.75	0.07	0.019	0.182	0.017	0.00
286	23.83	0.07	0.019	0.182	0.017	0.00
287	23.92	0.07	0.019	0.182	0.017	0.00
288	24.00	0.07	0.019	0.182	0.017	0.00
Sum =	100.0			Sum =	4.1	

Flood volume = Effective rainfall 0.34(In)
times area 1.4(Ac.)/[(In)/(Ft.)] = 0.0(Ac.Ft)
Total soil loss = 2.09(In)
Total soil loss = 0.252(Ac.Ft)
Total rainfall = 2.43(In)
Flood volume = 1787.5 Cubic Feet
Total soil loss = 10985.1 Cubic Feet

Peak flow rate of this hydrograph = 0.060(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      0.0000      0.00  Q       |        |        |        |
  0+15      0.0001      0.00  Q       |        |        |        |
  0+20      0.0001      0.01  Q       |        |        |        |
  0+25      0.0002      0.01  Q       |        |        |        |
  0+30      0.0002      0.01  Q       |        |        |        |
  0+35      0.0002      0.01  Q       |        |        |        |
  0+40      0.0003      0.01  Q       |        |        |        |
  0+45      0.0003      0.01  Q       |        |        |        |
  0+50      0.0004      0.01  Q       |        |        |        |
  0+55      0.0004      0.01  Q       |        |        |        |
  1+ 0      0.0005      0.01  Q       |        |        |        |
  1+ 5      0.0005      0.01  Q       |        |        |        |
  1+10      0.0006      0.01  Q       |        |        |        |
  1+15      0.0006      0.01  Q       |        |        |        |
  1+20      0.0007      0.01  Q       |        |        |        |
  1+25      0.0007      0.01  Q       |        |        |        |
  1+30      0.0008      0.01  Q       |        |        |        |
  1+35      0.0008      0.01  Q       |        |        |        |
  1+40      0.0008      0.01  Q       |        |        |        |
  1+45      0.0009      0.01  Q       |        |        |        |
  1+50      0.0009      0.01  Q       |        |        |        |
  1+55      0.0010      0.01  Q       |        |        |        |
  2+ 0      0.0010      0.01  QV      |        |        |        |
  2+ 5      0.0011      0.01  QV      |        |        |        |
  2+10      0.0012      0.01  QV      |        |        |        |
  2+15      0.0012      0.01  QV      |        |        |        |
  2+20      0.0013      0.01  QV      |        |        |        |
  2+25      0.0013      0.01  QV      |        |        |        |
  2+30      0.0014      0.01  QV      |        |        |        |
  2+35      0.0015      0.01  QV      |        |        |        |
  2+40      0.0015      0.01  QV      |        |        |        |
  2+45      0.0016      0.01  QV      |        |        |        |
  2+50      0.0017      0.01  QV      |        |        |        |
  2+55      0.0017      0.01  QV      |        |        |        |
  3+ 0      0.0018      0.01  QV      |        |        |        |
  3+ 5      0.0019      0.01  QV      |        |        |        |
  3+10      0.0020      0.01  QV      |        |        |        |
  3+15      0.0020      0.01  QV      |        |        |        |
  3+20      0.0021      0.01  Q V     |        |        |        |
  3+25      0.0022      0.01  Q V     |        |        |        |
  3+30      0.0022      0.01  Q V     |        |        |        |
  3+35      0.0023      0.01  Q V     |        |        |        |
  3+40      0.0024      0.01  Q V     |        |        |        |
  3+45      0.0025      0.01  Q V     |        |        |        |
  3+50      0.0025      0.01  Q V     |        |        |        |
  3+55      0.0026      0.01  Q V     |        |        |        |
  4+ 0      0.0027      0.01  Q V     |        |        |        |
  4+ 5      0.0028      0.01  Q V     |        |        |        |
```

4+10	0.0029	0.01	Q V					
4+15	0.0030	0.01	Q V					
4+20	0.0031	0.01	Q V					
4+25	0.0032	0.01	Q V					
4+30	0.0033	0.01	Q V					
4+35	0.0034	0.01	Q V					
4+40	0.0035	0.01	Q V					
4+45	0.0036	0.01	Q V					
4+50	0.0037	0.02	Q V					
4+55	0.0038	0.02	Q V					
5+ 0	0.0039	0.02	Q V					
5+ 5	0.0040	0.01	Q V					
5+10	0.0041	0.01	Q V					
5+15	0.0042	0.01	Q V					
5+20	0.0043	0.01	Q V					
5+25	0.0044	0.01	Q V					
5+30	0.0045	0.01	Q V					
5+35	0.0046	0.02	Q V					
5+40	0.0047	0.02	Q V					
5+45	0.0048	0.02	Q V					
5+50	0.0049	0.02	Q V					
5+55	0.0050	0.02	Q V					
6+ 0	0.0052	0.02	Q V					
6+ 5	0.0053	0.02	Q V					
6+10	0.0054	0.02	Q V					
6+15	0.0055	0.02	Q V					
6+20	0.0057	0.02	Q V					
6+25	0.0058	0.02	Q V					
6+30	0.0059	0.02	Q V					
6+35	0.0061	0.02	Q V					
6+40	0.0062	0.02	Q V					
6+45	0.0063	0.02	Q V					
6+50	0.0065	0.02	Q V					
6+55	0.0066	0.02	Q V					
7+ 0	0.0068	0.02	Q V					
7+ 5	0.0069	0.02	Q V					
7+10	0.0071	0.02	Q V					
7+15	0.0072	0.02	Q V					
7+20	0.0074	0.02	Q V					
7+25	0.0075	0.02	Q V					
7+30	0.0077	0.02	Q V					
7+35	0.0078	0.02	Q V					
7+40	0.0080	0.02	Q V					
7+45	0.0082	0.03	Q V					
7+50	0.0084	0.03	Q V					
7+55	0.0085	0.03	Q V					
8+ 0	0.0087	0.03	Q V					
8+ 5	0.0089	0.03	Q V					
8+10	0.0091	0.03	Q V					
8+15	0.0094	0.03	Q V					
8+20	0.0096	0.03	Q V					
8+25	0.0098	0.03	Q V					
8+30	0.0100	0.03	Q V					
8+35	0.0102	0.03	Q V					
8+40	0.0105	0.03	Q V					
8+45	0.0107	0.03	Q V					

```
  8+50      0.0109      0.03  Q         V         |         |         |
  8+55      0.0112      0.04  Q         V         |         |         |
  9+ 0      0.0114      0.04  Q        |V         |         |         |
  9+ 5      0.0117      0.04  Q        |V         |         |         |
  9+10      0.0119      0.04  Q        |V         |         |         |
  9+15      0.0122      0.04  Q        |V         |         |         |
  9+20      0.0125      0.04  Q        | V        |         |         |
  9+25      0.0128      0.04  Q        | V        |         |         |
  9+30      0.0131      0.04  Q        | V        |         |         |
  9+35      0.0134      0.04  Q        |  V       |         |         |
  9+40      0.0137      0.04  Q        |  V       |         |         |
  9+45      0.0140      0.04  Q        |  V       |         |         |
  9+50      0.0143      0.04  Q        |  V       |         |         |
  9+55      0.0146      0.05  Q        |   V      |         |         |
 10+ 0      0.0149      0.05  Q        |   V      |         |         |
 10+ 5      0.0152      0.04  Q        |   V      |         |         |
 10+10      0.0154      0.03  Q        |    V     |         |         |
 10+15      0.0156      0.03  Q        |     V    |         |         |
 10+20      0.0158      0.03  Q        |     V    |         |         |
 10+25      0.0160      0.03  Q        |     V    |         |         |
 10+30      0.0162      0.03  Q        |     V    |         |         |
 10+35      0.0165      0.04  Q        |      V   |         |         |
 10+40      0.0168      0.04  Q        |      V   |         |         |
 10+45      0.0171      0.04  Q        |      V   |         |         |
 10+50      0.0174      0.04  Q        |      V   |         |         |
 10+55      0.0176      0.04  Q        |       V  |         |         |
 11+ 0      0.0179      0.04  Q        |       V  |         |         |
 11+ 5      0.0182      0.04  Q        |       V  |         |         |
 11+10      0.0185      0.04  Q        |        V |         |         |
 11+15      0.0188      0.04  Q        |        V |         |         |
 11+20      0.0190      0.04  Q        |        V |         |         |
 11+25      0.0193      0.04  Q        |        V |         |         |
 11+30      0.0196      0.04  Q        |         V|         |         |
 11+35      0.0198      0.04  Q        |         V|         |         |
 11+40      0.0201      0.04  Q        |         V|         |         |
 11+45      0.0203      0.04  Q        |         V|         |         |
 11+50      0.0206      0.04  Q        |          V         |         |
 11+55      0.0208      0.04  Q        |          V         |         |
 12+ 0      0.0211      0.04  Q        |          V         |         |
 12+ 5      0.0214      0.05  Q        |          V         |         |
 12+10      0.0218      0.05  Q        |          |V        |         |
 12+15      0.0221      0.05  Q        |          |V        |         |
 12+20      0.0225      0.05  Q        |          |V        |         |
 12+25      0.0229      0.05  Q        |          | V       |         |
 12+30      0.0232      0.05  Q        |          | V       |         |
 12+35      0.0236      0.06  Q        |          |  V      |         |
 12+40      0.0240      0.06  Q        |          |  V      |         |
 12+45      0.0244      0.06  Q        |          |  V      |         |
 12+50      0.0248      0.06  Q        |          |   V     |         |
 12+55      0.0252      0.06  Q        |          |   V     |         |
 13+ 0      0.0257      0.06  Q        |          |   V     |         |
 13+ 5      0.0259      0.04  Q        |          |   V     |         |
 13+10      0.0260      0.02  Q        |          |    V    |         |
 13+15      0.0262      0.02  Q        |          |    V    |         |
 13+20      0.0263      0.02  Q        |          |    V    |         |
 13+25      0.0265      0.02  Q        |          |    V    |         |
```

13+30 0.0267 0.03 Q | | V | |
13+35 0.0270 0.04 Q | | V | |
13+40 0.0273 0.05 Q | | V | |
13+45 0.0276 0.05 Q | | V | |
13+50 0.0279 0.05 Q | | V | |
13+55 0.0283 0.05 Q | | V | |
14+ 0 0.0286 0.05 Q | | V | |
14+ 5 0.0290 0.05 Q | | V | |
14+10 0.0293 0.06 Q | | V | |
14+15 0.0297 0.06 Q | | V | |
14+20 0.0301 0.06 Q | | V| |
14+25 0.0305 0.05 Q | | V| |
14+30 0.0309 0.05 Q | | V |
14+35 0.0312 0.05 Q | | V |
14+40 0.0316 0.05 Q | | V |
14+45 0.0320 0.05 Q | | |V |
14+50 0.0323 0.05 Q | | |V |
14+55 0.0327 0.05 Q | | |V |
15+ 0 0.0331 0.05 Q | | | V |
15+ 5 0.0334 0.05 Q | | | V |
15+10 0.0338 0.05 Q | | | V |
15+15 0.0341 0.05 Q | | | V |
15+20 0.0344 0.05 Q | | | V |
15+25 0.0348 0.05 Q | | | V |
15+30 0.0351 0.05 Q | | | V |
15+35 0.0354 0.04 Q | | | V |
15+40 0.0357 0.04 Q | | | V |
15+45 0.0359 0.04 Q | | | V |
15+50 0.0362 0.04 Q | | | V |
15+55 0.0365 0.04 Q | | | V |
16+ 0 0.0368 0.04 Q | | | V |
16+ 5 0.0369 0.02 Q | | | V |
16+10 0.0370 0.01 Q | | | V |
16+15 0.0370 0.01 Q | | | V |
16+20 0.0371 0.01 Q | | | V |
16+25 0.0372 0.01 Q | | | V |
16+30 0.0372 0.01 Q | | | V |
16+35 0.0373 0.01 Q | | | V |
16+40 0.0373 0.01 Q | | | V |
16+45 0.0374 0.01 Q | | | V |
16+50 0.0374 0.01 Q | | | V |
16+55 0.0374 0.01 Q | | | V |
17+ 0 0.0375 0.01 Q | | | V |
17+ 5 0.0375 0.01 Q | | | V |
17+10 0.0376 0.01 Q | | | V |
17+15 0.0377 0.01 Q | | | V |
17+20 0.0378 0.01 Q | | | V |
17+25 0.0378 0.01 Q | | | V |
17+30 0.0379 0.01 Q | | | V |
17+35 0.0380 0.01 Q | | | V |
17+40 0.0380 0.01 Q | | | V |
17+45 0.0381 0.01 Q | | | V |
17+50 0.0382 0.01 Q | | | V |
17+55 0.0382 0.01 Q | | | V |
18+ 0 0.0383 0.01 Q | | | V |
18+ 5 0.0384 0.01 Q | | | V |

```
18+10     0.0384   0.01  Q        |        |        |       V  |
18+15     0.0385   0.01  Q        |        |        |       V  |
18+20     0.0385   0.01  Q        |        |        |       V  |
18+25     0.0386   0.01  Q        |        |        |       V  |
18+30     0.0386   0.01  Q        |        |        |       V  |
18+35     0.0387   0.01  Q        |        |        |       V  |
18+40     0.0387   0.01  Q        |        |        |       V  |
18+45     0.0388   0.01  Q        |        |        |       V  |
18+50     0.0388   0.01  Q        |        |        |       V  |
18+55     0.0388   0.00  Q        |        |        |       V  |
19+ 0     0.0389   0.00  Q        |        |        |       V  |
19+ 5     0.0389   0.01  Q        |        |        |       V  |
19+10     0.0389   0.01  Q        |        |        |       V  |
19+15     0.0390   0.01  Q        |        |        |        V |
19+20     0.0390   0.01  Q        |        |        |        V |
19+25     0.0391   0.01  Q        |        |        |        V |
19+30     0.0392   0.01  Q        |        |        |        V |
19+35     0.0392   0.01  Q        |        |        |        V |
19+40     0.0392   0.01  Q        |        |        |        V |
19+45     0.0393   0.01  Q        |        |        |        V |
19+50     0.0393   0.01  Q        |        |        |        V |
19+55     0.0394   0.00  Q        |        |        |        V |
20+ 0     0.0394   0.00  Q        |        |        |        V |
20+ 5     0.0394   0.01  Q        |        |        |        V |
20+10     0.0395   0.01  Q        |        |        |        V |
20+15     0.0395   0.01  Q        |        |        |        V |
20+20     0.0396   0.01  Q        |        |        |        V |
20+25     0.0396   0.01  Q        |        |        |        V |
20+30     0.0396   0.01  Q        |        |        |        V |
20+35     0.0397   0.01  Q        |        |        |        V |
20+40     0.0397   0.01  Q        |        |        |        V |
20+45     0.0398   0.01  Q        |        |        |        V |
20+50     0.0398   0.01  Q        |        |        |        V |
20+55     0.0398   0.00  Q        |        |        |        V |
21+ 0     0.0399   0.00  Q        |        |        |        V |
21+ 5     0.0399   0.01  Q        |        |        |        V |
21+10     0.0399   0.01  Q        |        |        |        V |
21+15     0.0400   0.01  Q        |        |        |        V |
21+20     0.0400   0.01  Q        |        |        |         V|
21+25     0.0400   0.00  Q        |        |        |         V|
21+30     0.0401   0.00  Q        |        |        |         V|
21+35     0.0401   0.01  Q        |        |        |         V|
21+40     0.0402   0.01  Q        |        |        |         V|
21+45     0.0402   0.01  Q        |        |        |         V|
21+50     0.0402   0.01  Q        |        |        |         V|
21+55     0.0403   0.00  Q        |        |        |         V|
22+ 0     0.0403   0.00  Q        |        |        |         V|
22+ 5     0.0403   0.01  Q        |        |        |         V|
22+10     0.0404   0.01  Q        |        |        |         V|
22+15     0.0404   0.01  Q        |        |        |         V|
22+20     0.0404   0.01  Q        |        |        |         V|
22+25     0.0405   0.00  Q        |        |        |         V|
22+30     0.0405   0.00  Q        |        |        |         V|
22+35     0.0405   0.00  Q        |        |        |         V|
22+40     0.0406   0.00  Q        |        |        |         V|
22+45     0.0406   0.00  Q        |        |        |         V|
```

22+50	0.0406	0.00	Q	|	|	| V|
22+55	0.0406	0.00	Q	|	|	| V|
23+ 0	0.0407	0.00	Q	|	|	| V|
23+ 5	0.0407	0.00	Q	|	|	| V|
23+10	0.0407	0.00	Q	|	|	| V|
23+15	0.0408	0.00	Q	|	|	| V|
23+20	0.0408	0.00	Q	|	|	| V|
23+25	0.0408	0.00	Q	|	|	| V|
23+30	0.0408	0.00	Q	|	|	| V|
23+35	0.0409	0.00	Q	|	|	| V|
23+40	0.0409	0.00	Q	|	|	| V|
23+45	0.0409	0.00	Q	|	|	| V|
23+50	0.0410	0.00	Q	|	|	| V|
23+55	0.0410	0.00	Q	|	|	| V|
24+ 0	0.0410	0.00	Q	|	|	| V|
24+ 5	0.0410	0.00	Q	|	|	| V|
24+10	0.0410	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

Study date 04/28/21 File: APOST2YR242.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

28771 Central Avenue Gas Station
Area A
Post-development
2-Yr 24-Hr Storm Event

Drainage Area = 0.43(Ac.) = 0.001 Sq. Mi.
Length along longest watercourse = 354.00(Ft.)
Length along longest watercourse measured to centroid = 143.00(Ft.)
Length along longest watercourse = 0.067 Mi.
Length along longest watercourse measured to centroid = 0.027 Mi.
Difference in elevation = 9.10(Ft.)
Slope along watercourse = 135.7288 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.026 Hr.
Lag time = 1.54 Min.
25% of lag time = 0.39 Min.
40% of lag time = 0.62 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]
0.43	2.43	1.04

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
0.43	6.58	2.80

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 2.430(In)
Area Averaged 100-Year Rainfall = 6.580(In)

Point rain (area averaged) = 2.430(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 2.430(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
0.426	37.00	1.000

Total Area Entered = 0.43(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
37.0	19.6	0.843	1.000	0.084	1.000	0.084

Sum (F) = 0.084
Area averaged mean soil loss (F) (In/Hr) = 0.084
Minimum soil loss rate ((In/Hr)) = 0.042
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.100

U n i t H y d r o g r a p h
DESERT S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	323.778	58.587	0.252
2	0.167	647.555	37.249	0.160
3	0.250	971.333	4.164	0.018
			Sum = 100.000	Sum= 0.429

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Loss rate(In./Hr) Low	Effective (In/Hr)
1	0.08	0.07	0.019	0.149	0.002	0.02
2	0.17	0.07	0.019	0.149	0.002	0.02
3	0.25	0.07	0.019	0.148	0.002	0.02
4	0.33	0.10	0.029	0.148	0.003	0.03
5	0.42	0.10	0.029	0.147	0.003	0.03
6	0.50	0.10	0.029	0.147	0.003	0.03
7	0.58	0.10	0.029	0.146	0.003	0.03
8	0.67	0.10	0.029	0.145	0.003	0.03
9	0.75	0.10	0.029	0.145	0.003	0.03
10	0.83	0.13	0.039	0.144	0.004	0.03
11	0.92	0.13	0.039	0.144	0.004	0.03
12	1.00	0.13	0.039	0.143	0.004	0.03
13	1.08	0.10	0.029	0.143	0.003	0.03
14	1.17	0.10	0.029	0.142	0.003	0.03
15	1.25	0.10	0.029	0.141	0.003	0.03
16	1.33	0.10	0.029	0.141	0.003	0.03
17	1.42	0.10	0.029	0.140	0.003	0.03
18	1.50	0.10	0.029	0.140	0.003	0.03

19	1.58	0.10	0.029	0.139	0.003	0.03
20	1.67	0.10	0.029	0.139	0.003	0.03
21	1.75	0.10	0.029	0.138	0.003	0.03
22	1.83	0.13	0.039	0.138	0.004	0.03
23	1.92	0.13	0.039	0.137	0.004	0.03
24	2.00	0.13	0.039	0.136	0.004	0.03
25	2.08	0.13	0.039	0.136	0.004	0.03
26	2.17	0.13	0.039	0.135	0.004	0.03
27	2.25	0.13	0.039	0.135	0.004	0.03
28	2.33	0.13	0.039	0.134	0.004	0.03
29	2.42	0.13	0.039	0.134	0.004	0.03
30	2.50	0.13	0.039	0.133	0.004	0.03
31	2.58	0.17	0.049	0.133	0.005	0.04
32	2.67	0.17	0.049	0.132	0.005	0.04
33	2.75	0.17	0.049	0.132	0.005	0.04
34	2.83	0.17	0.049	0.131	0.005	0.04
35	2.92	0.17	0.049	0.130	0.005	0.04
36	3.00	0.17	0.049	0.130	0.005	0.04
37	3.08	0.17	0.049	0.129	0.005	0.04
38	3.17	0.17	0.049	0.129	0.005	0.04
39	3.25	0.17	0.049	0.128	0.005	0.04
40	3.33	0.17	0.049	0.128	0.005	0.04
41	3.42	0.17	0.049	0.127	0.005	0.04
42	3.50	0.17	0.049	0.127	0.005	0.04
43	3.58	0.17	0.049	0.126	0.005	0.04
44	3.67	0.17	0.049	0.126	0.005	0.04
45	3.75	0.17	0.049	0.125	0.005	0.04
46	3.83	0.20	0.058	0.125	0.006	0.05
47	3.92	0.20	0.058	0.124	0.006	0.05
48	4.00	0.20	0.058	0.124	0.006	0.05
49	4.08	0.20	0.058	0.123	0.006	0.05
50	4.17	0.20	0.058	0.122	0.006	0.05
51	4.25	0.20	0.058	0.122	0.006	0.05
52	4.33	0.23	0.068	0.121	0.007	0.06
53	4.42	0.23	0.068	0.121	0.007	0.06
54	4.50	0.23	0.068	0.120	0.007	0.06
55	4.58	0.23	0.068	0.120	0.007	0.06
56	4.67	0.23	0.068	0.119	0.007	0.06
57	4.75	0.23	0.068	0.119	0.007	0.06
58	4.83	0.27	0.078	0.118	0.008	0.07
59	4.92	0.27	0.078	0.118	0.008	0.07
60	5.00	0.27	0.078	0.117	0.008	0.07
61	5.08	0.20	0.058	0.117	0.006	0.05
62	5.17	0.20	0.058	0.116	0.006	0.05
63	5.25	0.20	0.058	0.116	0.006	0.05
64	5.33	0.23	0.068	0.115	0.007	0.06
65	5.42	0.23	0.068	0.115	0.007	0.06
66	5.50	0.23	0.068	0.114	0.007	0.06
67	5.58	0.27	0.078	0.114	0.008	0.07
68	5.67	0.27	0.078	0.113	0.008	0.07
69	5.75	0.27	0.078	0.113	0.008	0.07
70	5.83	0.27	0.078	0.112	0.008	0.07
71	5.92	0.27	0.078	0.112	0.008	0.07
72	6.00	0.27	0.078	0.111	0.008	0.07
73	6.08	0.30	0.087	0.111	0.009	0.08
74	6.17	0.30	0.087	0.110	0.009	0.08

75	6.25	0.30	0.087	0.110	0.009	0.08
76	6.33	0.30	0.087	0.109	0.009	0.08
77	6.42	0.30	0.087	0.109	0.009	0.08
78	6.50	0.30	0.087	0.108	0.009	0.08
79	6.58	0.33	0.097	0.108	0.010	0.09
80	6.67	0.33	0.097	0.107	0.010	0.09
81	6.75	0.33	0.097	0.107	0.010	0.09
82	6.83	0.33	0.097	0.106	0.010	0.09
83	6.92	0.33	0.097	0.106	0.010	0.09
84	7.00	0.33	0.097	0.105	0.010	0.09
85	7.08	0.33	0.097	0.105	0.010	0.09
86	7.17	0.33	0.097	0.104	0.010	0.09
87	7.25	0.33	0.097	0.104	0.010	0.09
88	7.33	0.37	0.107	0.104	---	0.00
89	7.42	0.37	0.107	0.103	---	0.00
90	7.50	0.37	0.107	0.103	---	0.00
91	7.58	0.40	0.117	0.102	---	0.01
92	7.67	0.40	0.117	0.102	---	0.01
93	7.75	0.40	0.117	0.101	---	0.02
94	7.83	0.43	0.126	0.101	---	0.03
95	7.92	0.43	0.126	0.100	---	0.03
96	8.00	0.43	0.126	0.100	---	0.03
97	8.08	0.50	0.146	0.099	---	0.05
98	8.17	0.50	0.146	0.099	---	0.05
99	8.25	0.50	0.146	0.098	---	0.05
100	8.33	0.50	0.146	0.098	---	0.05
101	8.42	0.50	0.146	0.097	---	0.05
102	8.50	0.50	0.146	0.097	---	0.05
103	8.58	0.53	0.156	0.097	---	0.06
104	8.67	0.53	0.156	0.096	---	0.06
105	8.75	0.53	0.156	0.096	---	0.06
106	8.83	0.57	0.165	0.095	---	0.07
107	8.92	0.57	0.165	0.095	---	0.07
108	9.00	0.57	0.165	0.094	---	0.07
109	9.08	0.63	0.185	0.094	---	0.09
110	9.17	0.63	0.185	0.093	---	0.09
111	9.25	0.63	0.185	0.093	---	0.09
112	9.33	0.67	0.194	0.093	---	0.10
113	9.42	0.67	0.194	0.092	---	0.10
114	9.50	0.67	0.194	0.092	---	0.10
115	9.58	0.70	0.204	0.091	---	0.11
116	9.67	0.70	0.204	0.091	---	0.11
117	9.75	0.70	0.204	0.090	---	0.11
118	9.83	0.73	0.214	0.090	---	0.12
119	9.92	0.73	0.214	0.089	---	0.12
120	10.00	0.73	0.214	0.089	---	0.12
121	10.08	0.50	0.146	0.089	---	0.06
122	10.17	0.50	0.146	0.088	---	0.06
123	10.25	0.50	0.146	0.088	---	0.06
124	10.33	0.50	0.146	0.087	---	0.06
125	10.42	0.50	0.146	0.087	---	0.06
126	10.50	0.50	0.146	0.086	---	0.06
127	10.58	0.67	0.194	0.086	---	0.11
128	10.67	0.67	0.194	0.086	---	0.11
129	10.75	0.67	0.194	0.085	---	0.11
130	10.83	0.67	0.194	0.085	---	0.11

131	10.92	0.67	0.194	0.084	---	0.11
132	11.00	0.67	0.194	0.084	---	0.11
133	11.08	0.63	0.185	0.084	---	0.10
134	11.17	0.63	0.185	0.083	---	0.10
135	11.25	0.63	0.185	0.083	---	0.10
136	11.33	0.63	0.185	0.082	---	0.10
137	11.42	0.63	0.185	0.082	---	0.10
138	11.50	0.63	0.185	0.082	---	0.10
139	11.58	0.57	0.165	0.081	---	0.08
140	11.67	0.57	0.165	0.081	---	0.08
141	11.75	0.57	0.165	0.080	---	0.08
142	11.83	0.60	0.175	0.080	---	0.10
143	11.92	0.60	0.175	0.080	---	0.10
144	12.00	0.60	0.175	0.079	---	0.10
145	12.08	0.83	0.243	0.079	---	0.16
146	12.17	0.83	0.243	0.078	---	0.16
147	12.25	0.83	0.243	0.078	---	0.17
148	12.33	0.87	0.253	0.078	---	0.18
149	12.42	0.87	0.253	0.077	---	0.18
150	12.50	0.87	0.253	0.077	---	0.18
151	12.58	0.93	0.272	0.076	---	0.20
152	12.67	0.93	0.272	0.076	---	0.20
153	12.75	0.93	0.272	0.076	---	0.20
154	12.83	0.97	0.282	0.075	---	0.21
155	12.92	0.97	0.282	0.075	---	0.21
156	13.00	0.97	0.282	0.074	---	0.21
157	13.08	1.13	0.330	0.074	---	0.26
158	13.17	1.13	0.330	0.074	---	0.26
159	13.25	1.13	0.330	0.073	---	0.26
160	13.33	1.13	0.330	0.073	---	0.26
161	13.42	1.13	0.330	0.073	---	0.26
162	13.50	1.13	0.330	0.072	---	0.26
163	13.58	0.77	0.224	0.072	---	0.15
164	13.67	0.77	0.224	0.071	---	0.15
165	13.75	0.77	0.224	0.071	---	0.15
166	13.83	0.77	0.224	0.071	---	0.15
167	13.92	0.77	0.224	0.070	---	0.15
168	14.00	0.77	0.224	0.070	---	0.15
169	14.08	0.90	0.262	0.070	---	0.19
170	14.17	0.90	0.262	0.069	---	0.19
171	14.25	0.90	0.262	0.069	---	0.19
172	14.33	0.87	0.253	0.069	---	0.18
173	14.42	0.87	0.253	0.068	---	0.18
174	14.50	0.87	0.253	0.068	---	0.18
175	14.58	0.87	0.253	0.068	---	0.19
176	14.67	0.87	0.253	0.067	---	0.19
177	14.75	0.87	0.253	0.067	---	0.19
178	14.83	0.83	0.243	0.067	---	0.18
179	14.92	0.83	0.243	0.066	---	0.18
180	15.00	0.83	0.243	0.066	---	0.18
181	15.08	0.80	0.233	0.066	---	0.17
182	15.17	0.80	0.233	0.065	---	0.17
183	15.25	0.80	0.233	0.065	---	0.17
184	15.33	0.77	0.224	0.065	---	0.16
185	15.42	0.77	0.224	0.064	---	0.16
186	15.50	0.77	0.224	0.064	---	0.16

187	15.58	0.63	0.185	0.064	---	0.12
188	15.67	0.63	0.185	0.063	---	0.12
189	15.75	0.63	0.185	0.063	---	0.12
190	15.83	0.63	0.185	0.063	---	0.12
191	15.92	0.63	0.185	0.062	---	0.12
192	16.00	0.63	0.185	0.062	---	0.12
193	16.08	0.13	0.039	0.062	0.004	0.03
194	16.17	0.13	0.039	0.061	0.004	0.03
195	16.25	0.13	0.039	0.061	0.004	0.03
196	16.33	0.13	0.039	0.061	0.004	0.03
197	16.42	0.13	0.039	0.060	0.004	0.03
198	16.50	0.13	0.039	0.060	0.004	0.03
199	16.58	0.10	0.029	0.060	0.003	0.03
200	16.67	0.10	0.029	0.059	0.003	0.03
201	16.75	0.10	0.029	0.059	0.003	0.03
202	16.83	0.10	0.029	0.059	0.003	0.03
203	16.92	0.10	0.029	0.059	0.003	0.03
204	17.00	0.10	0.029	0.058	0.003	0.03
205	17.08	0.17	0.049	0.058	0.005	0.04
206	17.17	0.17	0.049	0.058	0.005	0.04
207	17.25	0.17	0.049	0.057	0.005	0.04
208	17.33	0.17	0.049	0.057	0.005	0.04
209	17.42	0.17	0.049	0.057	0.005	0.04
210	17.50	0.17	0.049	0.057	0.005	0.04
211	17.58	0.17	0.049	0.056	0.005	0.04
212	17.67	0.17	0.049	0.056	0.005	0.04
213	17.75	0.17	0.049	0.056	0.005	0.04
214	17.83	0.13	0.039	0.055	0.004	0.03
215	17.92	0.13	0.039	0.055	0.004	0.03
216	18.00	0.13	0.039	0.055	0.004	0.03
217	18.08	0.13	0.039	0.055	0.004	0.03
218	18.17	0.13	0.039	0.054	0.004	0.03
219	18.25	0.13	0.039	0.054	0.004	0.03
220	18.33	0.13	0.039	0.054	0.004	0.03
221	18.42	0.13	0.039	0.054	0.004	0.03
222	18.50	0.13	0.039	0.053	0.004	0.03
223	18.58	0.10	0.029	0.053	0.003	0.03
224	18.67	0.10	0.029	0.053	0.003	0.03
225	18.75	0.10	0.029	0.052	0.003	0.03
226	18.83	0.07	0.019	0.052	0.002	0.02
227	18.92	0.07	0.019	0.052	0.002	0.02
228	19.00	0.07	0.019	0.052	0.002	0.02
229	19.08	0.10	0.029	0.051	0.003	0.03
230	19.17	0.10	0.029	0.051	0.003	0.03
231	19.25	0.10	0.029	0.051	0.003	0.03
232	19.33	0.13	0.039	0.051	0.004	0.03
233	19.42	0.13	0.039	0.051	0.004	0.03
234	19.50	0.13	0.039	0.050	0.004	0.03
235	19.58	0.10	0.029	0.050	0.003	0.03
236	19.67	0.10	0.029	0.050	0.003	0.03
237	19.75	0.10	0.029	0.050	0.003	0.03
238	19.83	0.07	0.019	0.049	0.002	0.02
239	19.92	0.07	0.019	0.049	0.002	0.02
240	20.00	0.07	0.019	0.049	0.002	0.02
241	20.08	0.10	0.029	0.049	0.003	0.03
242	20.17	0.10	0.029	0.049	0.003	0.03

243	20.25	0.10	0.029	0.048	0.003	0.03
244	20.33	0.10	0.029	0.048	0.003	0.03
245	20.42	0.10	0.029	0.048	0.003	0.03
246	20.50	0.10	0.029	0.048	0.003	0.03
247	20.58	0.10	0.029	0.048	0.003	0.03
248	20.67	0.10	0.029	0.047	0.003	0.03
249	20.75	0.10	0.029	0.047	0.003	0.03
250	20.83	0.07	0.019	0.047	0.002	0.02
251	20.92	0.07	0.019	0.047	0.002	0.02
252	21.00	0.07	0.019	0.047	0.002	0.02
253	21.08	0.10	0.029	0.046	0.003	0.03
254	21.17	0.10	0.029	0.046	0.003	0.03
255	21.25	0.10	0.029	0.046	0.003	0.03
256	21.33	0.07	0.019	0.046	0.002	0.02
257	21.42	0.07	0.019	0.046	0.002	0.02
258	21.50	0.07	0.019	0.045	0.002	0.02
259	21.58	0.10	0.029	0.045	0.003	0.03
260	21.67	0.10	0.029	0.045	0.003	0.03
261	21.75	0.10	0.029	0.045	0.003	0.03
262	21.83	0.07	0.019	0.045	0.002	0.02
263	21.92	0.07	0.019	0.045	0.002	0.02
264	22.00	0.07	0.019	0.045	0.002	0.02
265	22.08	0.10	0.029	0.044	0.003	0.03
266	22.17	0.10	0.029	0.044	0.003	0.03
267	22.25	0.10	0.029	0.044	0.003	0.03
268	22.33	0.07	0.019	0.044	0.002	0.02
269	22.42	0.07	0.019	0.044	0.002	0.02
270	22.50	0.07	0.019	0.044	0.002	0.02
271	22.58	0.07	0.019	0.044	0.002	0.02
272	22.67	0.07	0.019	0.043	0.002	0.02
273	22.75	0.07	0.019	0.043	0.002	0.02
274	22.83	0.07	0.019	0.043	0.002	0.02
275	22.92	0.07	0.019	0.043	0.002	0.02
276	23.00	0.07	0.019	0.043	0.002	0.02
277	23.08	0.07	0.019	0.043	0.002	0.02
278	23.17	0.07	0.019	0.043	0.002	0.02
279	23.25	0.07	0.019	0.043	0.002	0.02
280	23.33	0.07	0.019	0.043	0.002	0.02
281	23.42	0.07	0.019	0.043	0.002	0.02
282	23.50	0.07	0.019	0.042	0.002	0.02
283	23.58	0.07	0.019	0.042	0.002	0.02
284	23.67	0.07	0.019	0.042	0.002	0.02
285	23.75	0.07	0.019	0.042	0.002	0.02
286	23.83	0.07	0.019	0.042	0.002	0.02
287	23.92	0.07	0.019	0.042	0.002	0.02
288	24.00	0.07	0.019	0.042	0.002	0.02
Sum =		100.0			Sum =	19.8

Flood volume = Effective rainfall 1.65(In)
times area 0.4(Ac.)/[(In)/(Ft.)] = 0.1(Ac.Ft)
Total soil loss = 0.78(In)
Total soil loss = 0.028(Ac.Ft)
Total rainfall = 2.43(In)
Flood volume = 2556.8 Cubic Feet
Total soil loss = 1200.9 Cubic Feet

Peak flow rate of this hydrograph = 0.111(CFS)

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          -----------------------------------------------------------------------
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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       0.0004      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      0.01  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       0.0014      0.01  Q        |        |        |        |
  1+40       0.0015      0.01  QV       |        |        |        |
  1+45       0.0016      0.01  QV       |        |        |        |
  1+50       0.0017      0.01  QV       |        |        |        |
  1+55       0.0018      0.01  QV       |        |        |        |
  2+ 0       0.0019      0.02  QV       |        |        |        |
  2+ 5       0.0020      0.02  QV       |        |        |        |
  2+10       0.0021      0.02  QV       |        |        |        |
  2+15       0.0022      0.02  QV       |        |        |        |
  2+20       0.0023      0.02  QV       |        |        |        |
  2+25       0.0024      0.02  QV       |        |        |        |
  2+30       0.0025      0.02  QV       |        |        |        |
  2+35       0.0026      0.02  QV       |        |        |        |
  2+40       0.0028      0.02  QV       |        |        |        |
  2+45       0.0029      0.02  QV       |        |        |        |
  2+50       0.0030      0.02  Q V      |        |        |        |
  2+55       0.0032      0.02  Q V      |        |        |        |
  3+ 0       0.0033      0.02  Q V      |        |        |        |
  3+ 5       0.0034      0.02  Q V      |        |        |        |
  3+10       0.0035      0.02  Q V      |        |        |        |
  3+15       0.0037      0.02  Q V      |        |        |        |
  3+20       0.0038      0.02  Q V      |        |        |        |
  3+25       0.0039      0.02  Q V      |        |        |        |
  3+30       0.0041      0.02  Q V      |        |        |        |
  3+35       0.0042      0.02  Q V      |        |        |        |
  3+40       0.0043      0.02  Q V      |        |        |        |
  3+45       0.0044      0.02  Q  V     |        |        |        |
  3+50       0.0046      0.02  Q  V     |        |        |        |
```

```
3+55    0.0047    0.02  Q  V      |    |    |    |
4+ 0    0.0049    0.02  Q  V      |    |    |    |
4+ 5    0.0051    0.02  Q  V      |    |    |    |
4+10    0.0052    0.02  Q  V      |    |    |    |
4+15    0.0054    0.02  Q  V      |    |    |    |
4+20    0.0055    0.02  Q  V      |    |    |    |
4+25    0.0057    0.03  Q  V      |    |    |    |
4+30    0.0059    0.03  Q   V     |    |    |    |
4+35    0.0061    0.03  Q   V     |    |    |    |
4+40    0.0063    0.03  Q   V     |    |    |    |
4+45    0.0064    0.03  Q   V     |    |    |    |
4+50    0.0066    0.03  Q   V     |    |    |    |
4+55    0.0068    0.03  Q   V     |    |    |    |
5+ 0    0.0070    0.03  Q   V     |    |    |    |
5+ 5    0.0072    0.03  Q   V     |    |    |    |
5+10    0.0074    0.02  Q    V    |    |    |    |
5+15    0.0075    0.02  Q    V    |    |    |    |
5+20    0.0077    0.02  Q    V    |    |    |    |
5+25    0.0079    0.03  Q    V    |    |    |    |
5+30    0.0081    0.03  Q    V    |    |    |    |
5+35    0.0083    0.03  Q    V    |    |    |    |
5+40    0.0085    0.03  Q    V    |    |    |    |
5+45    0.0087    0.03  Q    V    |    |    |    |
5+50    0.0089    0.03  Q     V   |    |    |    |
5+55    0.0091    0.03  Q     V   |    |    |    |
6+ 0    0.0093    0.03  Q     V   |    |    |    |
6+ 5    0.0095    0.03  Q     V   |    |    |    |
6+10    0.0098    0.03  Q     V   |    |    |    |
6+15    0.0100    0.03  Q     V   |    |    |    |
6+20    0.0102    0.03  Q     V   |    |    |    |
6+25    0.0105    0.03  Q      V  |    |    |    |
6+30    0.0107    0.03  Q      V  |    |    |    |
6+35    0.0109    0.04  Q      V  |    |    |    |
6+40    0.0112    0.04  Q      V  |    |    |    |
6+45    0.0115    0.04  Q      V  |    |    |    |
6+50    0.0117    0.04  Q      V  |    |    |    |
6+55    0.0120    0.04  Q       V |    |    |    |
7+ 0    0.0122    0.04  Q       V |    |    |    |
7+ 5    0.0125    0.04  Q       V |    |    |    |
7+10    0.0127    0.04  Q       V |    |    |    |
7+15    0.0130    0.04  Q       V |    |    |    |
7+20    0.0131    0.02  Q       V |    |    |    |
7+25    0.0131    0.00  Q       V |    |    |    |
7+30    0.0131    0.00  Q       V |    |    |    |
7+35    0.0132    0.00  Q       V |    |    |    |
7+40    0.0132    0.01  Q        V|    |    |    |
7+45    0.0133    0.01  Q        V|    |    |    |
7+50    0.0133    0.01  Q        V|    |    |    |
7+55    0.0134    0.01  Q        V|    |    |    |
8+ 0    0.0135    0.01  Q        V|    |    |    |
8+ 5    0.0136    0.02  Q        V|    |    |    |
8+10    0.0137    0.02  Q        V|    |    |    |
8+15    0.0139    0.02  Q        V|    |    |    |
8+20    0.0140    0.02  Q        V|    |    |    |
8+25    0.0142    0.02  Q        V|    |    |    |
8+30    0.0143    0.02  Q        V|    |    |    |
```

```
  8+35     0.0145     0.02  Q     V|          |         |         |
  8+40     0.0146     0.03  Q     V|          |         |         |
  8+45     0.0148     0.03  Q      V          |         |         |
  8+50     0.0150     0.03  Q      V          |         |         |
  8+55     0.0152     0.03  Q      V          |         |         |
  9+ 0     0.0154     0.03  Q      V          |         |         |
  9+ 5     0.0157     0.04  Q      V          |         |         |
  9+10     0.0159     0.04  Q      V          |         |         |
  9+15     0.0162     0.04  Q      |V         |         |         |
  9+20     0.0165     0.04  Q      |V         |         |         |
  9+25     0.0168     0.04  Q      |V         |         |         |
  9+30     0.0171     0.04  Q      |V         |         |         |
  9+35     0.0174     0.05  Q      |V         |         |         |
  9+40     0.0178     0.05  Q      | V        |         |         |
  9+45     0.0181     0.05  Q      | V        |         |         |
  9+50     0.0184     0.05  Q      | V        |         |         |
  9+55     0.0188     0.05  Q      | V        |         |         |
 10+ 0     0.0192     0.05  Q      |  V       |         |         |
 10+ 5     0.0194     0.04  Q      |  V       |         |         |
 10+10     0.0196     0.03  Q      |   V      |         |         |
 10+15     0.0198     0.02  Q      |   V      |         |         |
 10+20     0.0200     0.03  Q      |   V      |         |         |
 10+25     0.0201     0.03  Q      |   V      |         |         |
 10+30     0.0203     0.03  Q      |   V      |         |         |
 10+35     0.0206     0.04  Q      |    V     |         |         |
 10+40     0.0209     0.05  Q      |    V     |         |         |
 10+45     0.0212     0.05  Q      |    V     |         |         |
 10+50     0.0215     0.05  Q      |    V     |         |         |
 10+55     0.0218     0.05  Q      |    V     |         |         |
 11+ 0     0.0222     0.05  Q      |    V     |         |         |
 11+ 5     0.0225     0.05  Q      |    V     |         |         |
 11+10     0.0228     0.04  Q      |     V    |         |         |
 11+15     0.0231     0.04  Q      |     V    |         |         |
 11+20     0.0234     0.04  Q      |     V    |         |         |
 11+25     0.0237     0.04  Q      |      V   |         |         |
 11+30     0.0240     0.04  Q      |      V   |         |         |
 11+35     0.0243     0.04  Q      |      V   |         |         |
 11+40     0.0245     0.04  Q      |      V   |         |         |
 11+45     0.0248     0.04  Q      |      V   |         |         |
 11+50     0.0250     0.04  Q      |       V  |         |         |
 11+55     0.0253     0.04  Q      |       V  |         |         |
 12+ 0     0.0256     0.04  Q      |      V   |         |         |
 12+ 5     0.0260     0.06  Q      |      V   |         |         |
 12+10     0.0265     0.07  Q      |        V |         |         |
 12+15     0.0270     0.07  Q      |        V |         |         |
 12+20     0.0275     0.07  Q      |        V |         |         |
 12+25     0.0280     0.08  Q      |         V|         |         |
 12+30     0.0285     0.08  Q      |         V|         |         |
 12+35     0.0291     0.08  Q      |         V|         |         |
 12+40     0.0296     0.08  Q      |          V         |         |
 12+45     0.0302     0.08  Q      |          V         |         |
 12+50     0.0308     0.09  Q      |          |V        |         |
 12+55     0.0314     0.09  Q      |          |V        |         |
 13+ 0     0.0321     0.09  Q      |          |V        |         |
 13+ 5     0.0327     0.10  Q      |          | V       |         |
 13+10     0.0335     0.11  Q      |          | V       |         |
```

```
13+15    0.0343    0.11  Q    |         |  V      |         |
13+20    0.0350    0.11  Q    |         |  V      |         |
13+25    0.0358    0.11  Q    |         |   V     |         |
13+30    0.0365    0.11  Q    |         |   V     |         |
13+35    0.0371    0.08  Q    |         |    V    |         |
13+40    0.0376    0.07  Q    |         |    V    |         |
13+45    0.0380    0.07  Q    |         |    V    |         |
13+50    0.0385    0.07  Q    |         |     V   |         |
13+55    0.0389    0.07  Q    |         |     V   |         |
14+ 0    0.0394    0.07  Q    |         |     V   |         |
14+ 5    0.0399    0.08  Q    |         |      V  |         |
14+10    0.0405    0.08  Q    |         |      V  |         |
14+15    0.0411    0.08  Q    |         |      V  |         |
14+20    0.0416    0.08  Q    |         |       V |         |
14+25    0.0422    0.08  Q    |         |       V |         |
14+30    0.0427    0.08  Q    |         |        V|         |
14+35    0.0433    0.08  Q    |         |        V|         |
14+40    0.0438    0.08  Q    |         |        V|         |
14+45    0.0444    0.08  Q    |         |         V         |
14+50    0.0449    0.08  Q    |         |         V         |
14+55    0.0454    0.08  Q    |         |         V         |
15+ 0    0.0459    0.08  Q    |         |         |V        |
15+ 5    0.0464    0.07  Q    |         |         |V        |
15+10    0.0469    0.07  Q    |         |         |V        |
15+15    0.0474    0.07  Q    |         |         | V       |
15+20    0.0479    0.07  Q    |         |         | V       |
15+25    0.0484    0.07  Q    |         |         | V       |
15+30    0.0489    0.07  Q    |         |         |  V      |
15+35    0.0493    0.06  Q    |         |         |  V      |
15+40    0.0496    0.05  Q    |         |         |  V      |
15+45    0.0500    0.05  Q    |         |         |   V     |
15+50    0.0504    0.05  Q    |         |         |   V     |
15+55    0.0507    0.05  Q    |         |         |   V     |
16+ 0    0.0511    0.05  Q    |         |         |   V     |
16+ 5    0.0513    0.03  Q    |         |         |   V     |
16+10    0.0514    0.02  Q    |         |         |    V    |
16+15    0.0515    0.02  Q    |         |         |    V    |
16+20    0.0516    0.02  Q    |         |         |    V    |
16+25    0.0517    0.02  Q    |         |         |    V    |
16+30    0.0518    0.02  Q    |         |         |    V    |
16+35    0.0519    0.01  Q    |         |         |    V    |
16+40    0.0520    0.01  Q    |         |         |    V    |
16+45    0.0521    0.01  Q    |         |         |    V    |
16+50    0.0521    0.01  Q    |         |         |    V    |
16+55    0.0522    0.01  Q    |         |         |    V    |
17+ 0    0.0523    0.01  Q    |         |         |    V    |
17+ 5    0.0524    0.02  Q    |         |         |    V    |
17+10    0.0525    0.02  Q    |         |         |    V    |
17+15    0.0527    0.02  Q    |         |         |    V    |
17+20    0.0528    0.02  Q    |         |         |    V    |
17+25    0.0529    0.02  Q    |         |         |     V   |
17+30    0.0530    0.02  Q    |         |         |     V   |
17+35    0.0532    0.02  Q    |         |         |     V   |
17+40    0.0533    0.02  Q    |         |         |     V   |
17+45    0.0534    0.02  Q    |         |         |     V   |
17+50    0.0536    0.02  Q    |         |         |     V   |
```

17+55	0.0537	0.02	Q	|	|	|	V |
18+ 0	0.0538	0.02	Q	|	|	|	V |
18+ 5	0.0539	0.02	Q	|	|	|	V |
18+10	0.0540	0.02	Q	|	|	|	V |
18+15	0.0541	0.02	Q	|	|	|	V |
18+20	0.0542	0.02	Q	|	|	|	V |
18+25	0.0543	0.02	Q	|	|	|	V |
18+30	0.0544	0.02	Q	|	|	|	V |
18+35	0.0545	0.01	Q	|	|	|	V |
18+40	0.0545	0.01	Q	|	|	|	V |
18+45	0.0546	0.01	Q	|	|	|	V |
18+50	0.0547	0.01	Q	|	|	|	V |
18+55	0.0547	0.01	Q	|	|	|	V |
19+ 0	0.0548	0.01	Q	|	|	|	V |
19+ 5	0.0549	0.01	Q	|	|	|	V |
19+10	0.0549	0.01	Q	|	|	|	V |
19+15	0.0550	0.01	Q	|	|	|	V |
19+20	0.0551	0.01	Q	|	|	|	V |
19+25	0.0552	0.01	Q	|	|	|	V |
19+30	0.0553	0.02	Q	|	|	|	V |
19+35	0.0554	0.01	Q	|	|	|	V |
19+40	0.0555	0.01	Q	|	|	|	V |
19+45	0.0556	0.01	Q	|	|	|	V |
19+50	0.0556	0.01	Q	|	|	|	V |
19+55	0.0557	0.01	Q	|	|	|	V |
20+ 0	0.0557	0.01	Q	|	|	|	V |
20+ 5	0.0558	0.01	Q	|	|	|	V |
20+10	0.0559	0.01	Q	|	|	|	V |
20+15	0.0559	0.01	Q	|	|	|	V |
20+20	0.0560	0.01	Q	|	|	|	V |
20+25	0.0561	0.01	Q	|	|	|	V |
20+30	0.0562	0.01	Q	|	|	|	V |
20+35	0.0563	0.01	Q	|	|	|	V |
20+40	0.0563	0.01	Q	|	|	|	V |
20+45	0.0564	0.01	Q	|	|	|	V |
20+50	0.0565	0.01	Q	|	|	|	V |
20+55	0.0565	0.01	Q	|	|	|	V |
21+ 0	0.0566	0.01	Q	|	|	|	V |
21+ 5	0.0566	0.01	Q	|	|	|	V |
21+10	0.0567	0.01	Q	|	|	|	V |
21+15	0.0568	0.01	Q	|	|	|	V |
21+20	0.0569	0.01	Q	|	|	|	V |
21+25	0.0569	0.01	Q	|	|	|	V |
21+30	0.0570	0.01	Q	|	|	|	V |
21+35	0.0570	0.01	Q	|	|	|	V |
21+40	0.0571	0.01	Q	|	|	|	V |
21+45	0.0572	0.01	Q	|	|	|	V |
21+50	0.0572	0.01	Q	|	|	|	V|
21+55	0.0573	0.01	Q	|	|	|	V|
22+ 0	0.0574	0.01	Q	|	|	|	V|
22+ 5	0.0574	0.01	Q	|	|	|	V|
22+10	0.0575	0.01	Q	|	|	|	V|
22+15	0.0576	0.01	Q	|	|	|	V|
22+20	0.0576	0.01	Q	|	|	|	V|
22+25	0.0577	0.01	Q	|	|	|	V|
22+30	0.0577	0.01	Q	|	|	|	V|

22+35	0.0578	0.01	Q	|	|	|	V|
22+40	0.0578	0.01	Q	|	|	|	V|
22+45	0.0579	0.01	Q	|	|	|	V|
22+50	0.0579	0.01	Q	|	|	|	V|
22+55	0.0580	0.01	Q	|	|	|	V|
23+ 0	0.0581	0.01	Q	|	|	|	V|
23+ 5	0.0581	0.01	Q	|	|	|	V|
23+10	0.0582	0.01	Q	|	|	|	V|
23+15	0.0582	0.01	Q	|	|	|	V|
23+20	0.0583	0.01	Q	|	|	|	V|
23+25	0.0583	0.01	Q	|	|	|	V|
23+30	0.0584	0.01	Q	|	|	|	V|
23+35	0.0584	0.01	Q	|	|	|	V|
23+40	0.0585	0.01	Q	|	|	|	V|
23+45	0.0585	0.01	Q	|	|	|	V|
23+50	0.0586	0.01	Q	|	|	|	V|
23+55	0.0586	0.01	Q	|	|	|	V|
24+ 0	0.0587	0.01	Q	|	|	|	V|
24+ 5	0.0587	0.00	Q	|	|	|	V|
24+10	0.0587	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

Study date 04/28/21 File: BPOST2YR242.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

28771 Central Avenue Gas Station
Area B
Post-development
2-Yr 24-Hr Storm Event

Drainage Area = 1.02(Ac.) = 0.002 Sq. Mi.
Length along longest watercourse = 348.00(Ft.)
Length along longest watercourse measured to centroid = 149.00(Ft.)
Length along longest watercourse = 0.066 Mi.
Length along longest watercourse measured to centroid = 0.028 Mi.
Difference in elevation = 1.78(Ft.)
Slope along watercourse = 27.0069 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.018 Hr.
Lag time = 1.06 Min.
25% of lag time = 0.26 Min.
40% of lag time = 0.42 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]
1.02	2.43	2.49

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
1.02	6.58	6.73

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 2.430(In)
Area Averaged 100-Year Rainfall = 6.580(In)

Point rain (area averaged) = 2.430(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 2.430(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
1.023	54.00	0.783

Total Area Entered = 1.02(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
54.0	34.2	0.722	0.783	0.213	1.000	0.213

Sum (F) = 0.213

Area averaged mean soil loss (F) (In/Hr) = 0.213

Minimum soil loss rate ((In/Hr)) = 0.107

(for 24 hour storm duration)

Soil low loss rate (decimal) = 0.273

U n i t H y d r o g r a p h

DESERT S-Curve

Unit Hydrograph Data

	Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	472.158	69.580	0.717
2	0.167	944.316	30.420	0.314
			Sum = 100.000	Sum= 1.031

	Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Loss rate(In./Hr) Low	Effective (In/Hr)
1	0.08	0.07	0.019	0.378	0.005	0.01
2	0.17	0.07	0.019	0.376	0.005	0.01
3	0.25	0.07	0.019	0.375	0.005	0.01
4	0.33	0.10	0.029	0.373	0.008	0.02
5	0.42	0.10	0.029	0.372	0.008	0.02
6	0.50	0.10	0.029	0.371	0.008	0.02
7	0.58	0.10	0.029	0.369	0.008	0.02
8	0.67	0.10	0.029	0.368	0.008	0.02
9	0.75	0.10	0.029	0.366	0.008	0.02
10	0.83	0.13	0.039	0.365	0.011	0.03
11	0.92	0.13	0.039	0.363	0.011	0.03
12	1.00	0.13	0.039	0.362	0.011	0.03
13	1.08	0.10	0.029	0.360	0.008	0.02
14	1.17	0.10	0.029	0.359	0.008	0.02
15	1.25	0.10	0.029	0.358	0.008	0.02
16	1.33	0.10	0.029	0.356	0.008	0.02
17	1.42	0.10	0.029	0.355	0.008	0.02
18	1.50	0.10	0.029	0.353	0.008	0.02
19	1.58	0.10	0.029	0.352	0.008	0.02
20	1.67	0.10	0.029	0.351	0.008	0.02
21	1.75	0.10	0.029	0.349	0.008	0.02
22	1.83	0.13	0.039	0.348	0.011	0.03
23	1.92	0.13	0.039	0.346	0.011	0.03

24	2.00	0.13	0.039	0.345	0.011	0.03
25	2.08	0.13	0.039	0.344	0.011	0.03
26	2.17	0.13	0.039	0.342	0.011	0.03
27	2.25	0.13	0.039	0.341	0.011	0.03
28	2.33	0.13	0.039	0.339	0.011	0.03
29	2.42	0.13	0.039	0.338	0.011	0.03
30	2.50	0.13	0.039	0.337	0.011	0.03
31	2.58	0.17	0.049	0.335	0.013	0.04
32	2.67	0.17	0.049	0.334	0.013	0.04
33	2.75	0.17	0.049	0.332	0.013	0.04
34	2.83	0.17	0.049	0.331	0.013	0.04
35	2.92	0.17	0.049	0.330	0.013	0.04
36	3.00	0.17	0.049	0.328	0.013	0.04
37	3.08	0.17	0.049	0.327	0.013	0.04
38	3.17	0.17	0.049	0.326	0.013	0.04
39	3.25	0.17	0.049	0.324	0.013	0.04
40	3.33	0.17	0.049	0.323	0.013	0.04
41	3.42	0.17	0.049	0.322	0.013	0.04
42	3.50	0.17	0.049	0.320	0.013	0.04
43	3.58	0.17	0.049	0.319	0.013	0.04
44	3.67	0.17	0.049	0.318	0.013	0.04
45	3.75	0.17	0.049	0.316	0.013	0.04
46	3.83	0.20	0.058	0.315	0.016	0.04
47	3.92	0.20	0.058	0.314	0.016	0.04
48	4.00	0.20	0.058	0.312	0.016	0.04
49	4.08	0.20	0.058	0.311	0.016	0.04
50	4.17	0.20	0.058	0.310	0.016	0.04
51	4.25	0.20	0.058	0.308	0.016	0.04
52	4.33	0.23	0.068	0.307	0.019	0.05
53	4.42	0.23	0.068	0.306	0.019	0.05
54	4.50	0.23	0.068	0.304	0.019	0.05
55	4.58	0.23	0.068	0.303	0.019	0.05
56	4.67	0.23	0.068	0.302	0.019	0.05
57	4.75	0.23	0.068	0.300	0.019	0.05
58	4.83	0.27	0.078	0.299	0.021	0.06
59	4.92	0.27	0.078	0.298	0.021	0.06
60	5.00	0.27	0.078	0.297	0.021	0.06
61	5.08	0.20	0.058	0.295	0.016	0.04
62	5.17	0.20	0.058	0.294	0.016	0.04
63	5.25	0.20	0.058	0.293	0.016	0.04
64	5.33	0.23	0.068	0.291	0.019	0.05
65	5.42	0.23	0.068	0.290	0.019	0.05
66	5.50	0.23	0.068	0.289	0.019	0.05
67	5.58	0.27	0.078	0.288	0.021	0.06
68	5.67	0.27	0.078	0.286	0.021	0.06
69	5.75	0.27	0.078	0.285	0.021	0.06
70	5.83	0.27	0.078	0.284	0.021	0.06
71	5.92	0.27	0.078	0.283	0.021	0.06
72	6.00	0.27	0.078	0.281	0.021	0.06
73	6.08	0.30	0.087	0.280	0.024	0.06
74	6.17	0.30	0.087	0.279	0.024	0.06
75	6.25	0.30	0.087	0.278	0.024	0.06
76	6.33	0.30	0.087	0.276	0.024	0.06
77	6.42	0.30	0.087	0.275	0.024	0.06
78	6.50	0.30	0.087	0.274	0.024	0.06
79	6.58	0.33	0.097	0.273	0.027	0.07

80	6.67	0.33	0.097	0.271	0.027	0.07
81	6.75	0.33	0.097	0.270	0.027	0.07
82	6.83	0.33	0.097	0.269	0.027	0.07
83	6.92	0.33	0.097	0.268	0.027	0.07
84	7.00	0.33	0.097	0.267	0.027	0.07
85	7.08	0.33	0.097	0.265	0.027	0.07
86	7.17	0.33	0.097	0.264	0.027	0.07
87	7.25	0.33	0.097	0.263	0.027	0.07
88	7.33	0.37	0.107	0.262	0.029	0.08
89	7.42	0.37	0.107	0.261	0.029	0.08
90	7.50	0.37	0.107	0.259	0.029	0.08
91	7.58	0.40	0.117	0.258	0.032	0.08
92	7.67	0.40	0.117	0.257	0.032	0.08
93	7.75	0.40	0.117	0.256	0.032	0.08
94	7.83	0.43	0.126	0.255	0.035	0.09
95	7.92	0.43	0.126	0.253	0.035	0.09
96	8.00	0.43	0.126	0.252	0.035	0.09
97	8.08	0.50	0.146	0.251	0.040	0.11
98	8.17	0.50	0.146	0.250	0.040	0.11
99	8.25	0.50	0.146	0.249	0.040	0.11
100	8.33	0.50	0.146	0.248	0.040	0.11
101	8.42	0.50	0.146	0.246	0.040	0.11
102	8.50	0.50	0.146	0.245	0.040	0.11
103	8.58	0.53	0.156	0.244	0.043	0.11
104	8.67	0.53	0.156	0.243	0.043	0.11
105	8.75	0.53	0.156	0.242	0.043	0.11
106	8.83	0.57	0.165	0.241	0.045	0.12
107	8.92	0.57	0.165	0.240	0.045	0.12
108	9.00	0.57	0.165	0.238	0.045	0.12
109	9.08	0.63	0.185	0.237	0.050	0.13
110	9.17	0.63	0.185	0.236	0.050	0.13
111	9.25	0.63	0.185	0.235	0.050	0.13
112	9.33	0.67	0.194	0.234	0.053	0.14
113	9.42	0.67	0.194	0.233	0.053	0.14
114	9.50	0.67	0.194	0.232	0.053	0.14
115	9.58	0.70	0.204	0.231	0.056	0.15
116	9.67	0.70	0.204	0.229	0.056	0.15
117	9.75	0.70	0.204	0.228	0.056	0.15
118	9.83	0.73	0.214	0.227	0.058	0.16
119	9.92	0.73	0.214	0.226	0.058	0.16
120	10.00	0.73	0.214	0.225	0.058	0.16
121	10.08	0.50	0.146	0.224	0.040	0.11
122	10.17	0.50	0.146	0.223	0.040	0.11
123	10.25	0.50	0.146	0.222	0.040	0.11
124	10.33	0.50	0.146	0.221	0.040	0.11
125	10.42	0.50	0.146	0.220	0.040	0.11
126	10.50	0.50	0.146	0.219	0.040	0.11
127	10.58	0.67	0.194	0.218	0.053	0.14
128	10.67	0.67	0.194	0.216	0.053	0.14
129	10.75	0.67	0.194	0.215	0.053	0.14
130	10.83	0.67	0.194	0.214	0.053	0.14
131	10.92	0.67	0.194	0.213	0.053	0.14
132	11.00	0.67	0.194	0.212	0.053	0.14
133	11.08	0.63	0.185	0.211	0.050	0.13
134	11.17	0.63	0.185	0.210	0.050	0.13
135	11.25	0.63	0.185	0.209	0.050	0.13

136	11.33	0.63	0.185	0.208	0.050	0.13
137	11.42	0.63	0.185	0.207	0.050	0.13
138	11.50	0.63	0.185	0.206	0.050	0.13
139	11.58	0.57	0.165	0.205	0.045	0.12
140	11.67	0.57	0.165	0.204	0.045	0.12
141	11.75	0.57	0.165	0.203	0.045	0.12
142	11.83	0.60	0.175	0.202	0.048	0.13
143	11.92	0.60	0.175	0.201	0.048	0.13
144	12.00	0.60	0.175	0.200	0.048	0.13
145	12.08	0.83	0.243	0.199	---	0.04
146	12.17	0.83	0.243	0.198	---	0.05
147	12.25	0.83	0.243	0.197	---	0.05
148	12.33	0.87	0.253	0.196	---	0.06
149	12.42	0.87	0.253	0.195	---	0.06
150	12.50	0.87	0.253	0.194	---	0.06
151	12.58	0.93	0.272	0.193	---	0.08
152	12.67	0.93	0.272	0.192	---	0.08
153	12.75	0.93	0.272	0.191	---	0.08
154	12.83	0.97	0.282	0.190	---	0.09
155	12.92	0.97	0.282	0.189	---	0.09
156	13.00	0.97	0.282	0.188	---	0.09
157	13.08	1.13	0.330	0.187	---	0.14
158	13.17	1.13	0.330	0.186	---	0.14
159	13.25	1.13	0.330	0.185	---	0.15
160	13.33	1.13	0.330	0.184	---	0.15
161	13.42	1.13	0.330	0.183	---	0.15
162	13.50	1.13	0.330	0.183	---	0.15
163	13.58	0.77	0.224	0.182	---	0.04
164	13.67	0.77	0.224	0.181	---	0.04
165	13.75	0.77	0.224	0.180	---	0.04
166	13.83	0.77	0.224	0.179	---	0.04
167	13.92	0.77	0.224	0.178	---	0.05
168	14.00	0.77	0.224	0.177	---	0.05
169	14.08	0.90	0.262	0.176	---	0.09
170	14.17	0.90	0.262	0.175	---	0.09
171	14.25	0.90	0.262	0.174	---	0.09
172	14.33	0.87	0.253	0.173	---	0.08
173	14.42	0.87	0.253	0.173	---	0.08
174	14.50	0.87	0.253	0.172	---	0.08
175	14.58	0.87	0.253	0.171	---	0.08
176	14.67	0.87	0.253	0.170	---	0.08
177	14.75	0.87	0.253	0.169	---	0.08
178	14.83	0.83	0.243	0.168	---	0.07
179	14.92	0.83	0.243	0.167	---	0.08
180	15.00	0.83	0.243	0.166	---	0.08
181	15.08	0.80	0.233	0.166	---	0.07
182	15.17	0.80	0.233	0.165	---	0.07
183	15.25	0.80	0.233	0.164	---	0.07
184	15.33	0.77	0.224	0.163	---	0.06
185	15.42	0.77	0.224	0.162	---	0.06
186	15.50	0.77	0.224	0.161	---	0.06
187	15.58	0.63	0.185	0.161	---	0.02
188	15.67	0.63	0.185	0.160	---	0.02
189	15.75	0.63	0.185	0.159	---	0.03
190	15.83	0.63	0.185	0.158	---	0.03
191	15.92	0.63	0.185	0.157	---	0.03

192	16.00	0.63	0.185	0.157	---	0.03
193	16.08	0.13	0.039	0.156	0.011	0.03
194	16.17	0.13	0.039	0.155	0.011	0.03
195	16.25	0.13	0.039	0.154	0.011	0.03
196	16.33	0.13	0.039	0.153	0.011	0.03
197	16.42	0.13	0.039	0.153	0.011	0.03
198	16.50	0.13	0.039	0.152	0.011	0.03
199	16.58	0.10	0.029	0.151	0.008	0.02
200	16.67	0.10	0.029	0.150	0.008	0.02
201	16.75	0.10	0.029	0.149	0.008	0.02
202	16.83	0.10	0.029	0.149	0.008	0.02
203	16.92	0.10	0.029	0.148	0.008	0.02
204	17.00	0.10	0.029	0.147	0.008	0.02
205	17.08	0.17	0.049	0.146	0.013	0.04
206	17.17	0.17	0.049	0.146	0.013	0.04
207	17.25	0.17	0.049	0.145	0.013	0.04
208	17.33	0.17	0.049	0.144	0.013	0.04
209	17.42	0.17	0.049	0.144	0.013	0.04
210	17.50	0.17	0.049	0.143	0.013	0.04
211	17.58	0.17	0.049	0.142	0.013	0.04
212	17.67	0.17	0.049	0.141	0.013	0.04
213	17.75	0.17	0.049	0.141	0.013	0.04
214	17.83	0.13	0.039	0.140	0.011	0.03
215	17.92	0.13	0.039	0.139	0.011	0.03
216	18.00	0.13	0.039	0.139	0.011	0.03
217	18.08	0.13	0.039	0.138	0.011	0.03
218	18.17	0.13	0.039	0.137	0.011	0.03
219	18.25	0.13	0.039	0.137	0.011	0.03
220	18.33	0.13	0.039	0.136	0.011	0.03
221	18.42	0.13	0.039	0.135	0.011	0.03
222	18.50	0.13	0.039	0.135	0.011	0.03
223	18.58	0.10	0.029	0.134	0.008	0.02
224	18.67	0.10	0.029	0.133	0.008	0.02
225	18.75	0.10	0.029	0.133	0.008	0.02
226	18.83	0.07	0.019	0.132	0.005	0.01
227	18.92	0.07	0.019	0.131	0.005	0.01
228	19.00	0.07	0.019	0.131	0.005	0.01
229	19.08	0.10	0.029	0.130	0.008	0.02
230	19.17	0.10	0.029	0.130	0.008	0.02
231	19.25	0.10	0.029	0.129	0.008	0.02
232	19.33	0.13	0.039	0.128	0.011	0.03
233	19.42	0.13	0.039	0.128	0.011	0.03
234	19.50	0.13	0.039	0.127	0.011	0.03
235	19.58	0.10	0.029	0.127	0.008	0.02
236	19.67	0.10	0.029	0.126	0.008	0.02
237	19.75	0.10	0.029	0.125	0.008	0.02
238	19.83	0.07	0.019	0.125	0.005	0.01
239	19.92	0.07	0.019	0.124	0.005	0.01
240	20.00	0.07	0.019	0.124	0.005	0.01
241	20.08	0.10	0.029	0.123	0.008	0.02
242	20.17	0.10	0.029	0.123	0.008	0.02
243	20.25	0.10	0.029	0.122	0.008	0.02
244	20.33	0.10	0.029	0.122	0.008	0.02
245	20.42	0.10	0.029	0.121	0.008	0.02
246	20.50	0.10	0.029	0.121	0.008	0.02
247	20.58	0.10	0.029	0.120	0.008	0.02

248	20.67	0.10	0.029	0.120	0.008	0.02
249	20.75	0.10	0.029	0.119	0.008	0.02
250	20.83	0.07	0.019	0.119	0.005	0.01
251	20.92	0.07	0.019	0.118	0.005	0.01
252	21.00	0.07	0.019	0.118	0.005	0.01
253	21.08	0.10	0.029	0.117	0.008	0.02
254	21.17	0.10	0.029	0.117	0.008	0.02
255	21.25	0.10	0.029	0.116	0.008	0.02
256	21.33	0.07	0.019	0.116	0.005	0.01
257	21.42	0.07	0.019	0.115	0.005	0.01
258	21.50	0.07	0.019	0.115	0.005	0.01
259	21.58	0.10	0.029	0.115	0.008	0.02
260	21.67	0.10	0.029	0.114	0.008	0.02
261	21.75	0.10	0.029	0.114	0.008	0.02
262	21.83	0.07	0.019	0.113	0.005	0.01
263	21.92	0.07	0.019	0.113	0.005	0.01
264	22.00	0.07	0.019	0.113	0.005	0.01
265	22.08	0.10	0.029	0.112	0.008	0.02
266	22.17	0.10	0.029	0.112	0.008	0.02
267	22.25	0.10	0.029	0.111	0.008	0.02
268	22.33	0.07	0.019	0.111	0.005	0.01
269	22.42	0.07	0.019	0.111	0.005	0.01
270	22.50	0.07	0.019	0.110	0.005	0.01
271	22.58	0.07	0.019	0.110	0.005	0.01
272	22.67	0.07	0.019	0.110	0.005	0.01
273	22.75	0.07	0.019	0.110	0.005	0.01
274	22.83	0.07	0.019	0.109	0.005	0.01
275	22.92	0.07	0.019	0.109	0.005	0.01
276	23.00	0.07	0.019	0.109	0.005	0.01
277	23.08	0.07	0.019	0.108	0.005	0.01
278	23.17	0.07	0.019	0.108	0.005	0.01
279	23.25	0.07	0.019	0.108	0.005	0.01
280	23.33	0.07	0.019	0.108	0.005	0.01
281	23.42	0.07	0.019	0.108	0.005	0.01
282	23.50	0.07	0.019	0.107	0.005	0.01
283	23.58	0.07	0.019	0.107	0.005	0.01
284	23.67	0.07	0.019	0.107	0.005	0.01
285	23.75	0.07	0.019	0.107	0.005	0.01
286	23.83	0.07	0.019	0.107	0.005	0.01
287	23.92	0.07	0.019	0.107	0.005	0.01
288	24.00	0.07	0.019	0.107	0.005	0.01
Sum =		100.0			Sum =	16.0

Flood volume = Effective rainfall 1.33(In)
times area 1.0(Ac.)/[(In)/(Ft.)] = 0.1(Ac.Ft)
Total soil loss = 1.10(In)
Total soil loss = 0.094(Ac.Ft)
Total rainfall = 2.43(In)
Flood volume = 4941.7 Cubic Feet
Total soil loss = 4082.1 Cubic Feet

Peak flow rate of this hydrograph = 0.160(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	0.0002	0.01	Q
0+15	0.0003	0.01	Q
0+20	0.0004	0.02	Q
0+25	0.0006	0.02	Q
0+30	0.0007	0.02	Q
0+35	0.0009	0.02	Q
0+40	0.0010	0.02	Q
0+45	0.0012	0.02	Q
0+50	0.0013	0.03	Q
0+55	0.0015	0.03	Q
1+ 0	0.0017	0.03	Q
1+ 5	0.0019	0.02	Q
1+10	0.0021	0.02	Q
1+15	0.0022	0.02	Q
1+20	0.0024	0.02	Q
1+25	0.0025	0.02	Q
1+30	0.0027	0.02	Q
1+35	0.0028	0.02	Q
1+40	0.0030	0.02	QV
1+45	0.0031	0.02	QV
1+50	0.0033	0.03	QV
1+55	0.0035	0.03	QV
2+ 0	0.0037	0.03	QV
2+ 5	0.0039	0.03	QV
2+10	0.0041	0.03	QV
2+15	0.0043	0.03	QV
2+20	0.0045	0.03	QV
2+25	0.0047	0.03	QV
2+30	0.0049	0.03	QV
2+35	0.0051	0.03	QV
2+40	0.0054	0.04	QV
2+45	0.0056	0.04	QV
2+50	0.0059	0.04	Q V
2+55	0.0061	0.04	Q V
3+ 0	0.0064	0.04	Q V
3+ 5	0.0066	0.04	Q V
3+10	0.0069	0.04	Q V
3+15	0.0071	0.04	Q V
3+20	0.0074	0.04	Q V
3+25	0.0077	0.04	Q V
3+30	0.0079	0.04	Q V
3+35	0.0082	0.04	Q V
3+40	0.0084	0.04	Q V
3+45	0.0087	0.04	Q V
3+50	0.0089	0.04	Q V
3+55	0.0092	0.04	Q V
4+ 0	0.0095	0.04	Q V
4+ 5	0.0098	0.04	Q V
4+10	0.0101	0.04	Q V
4+15	0.0104	0.04	Q V

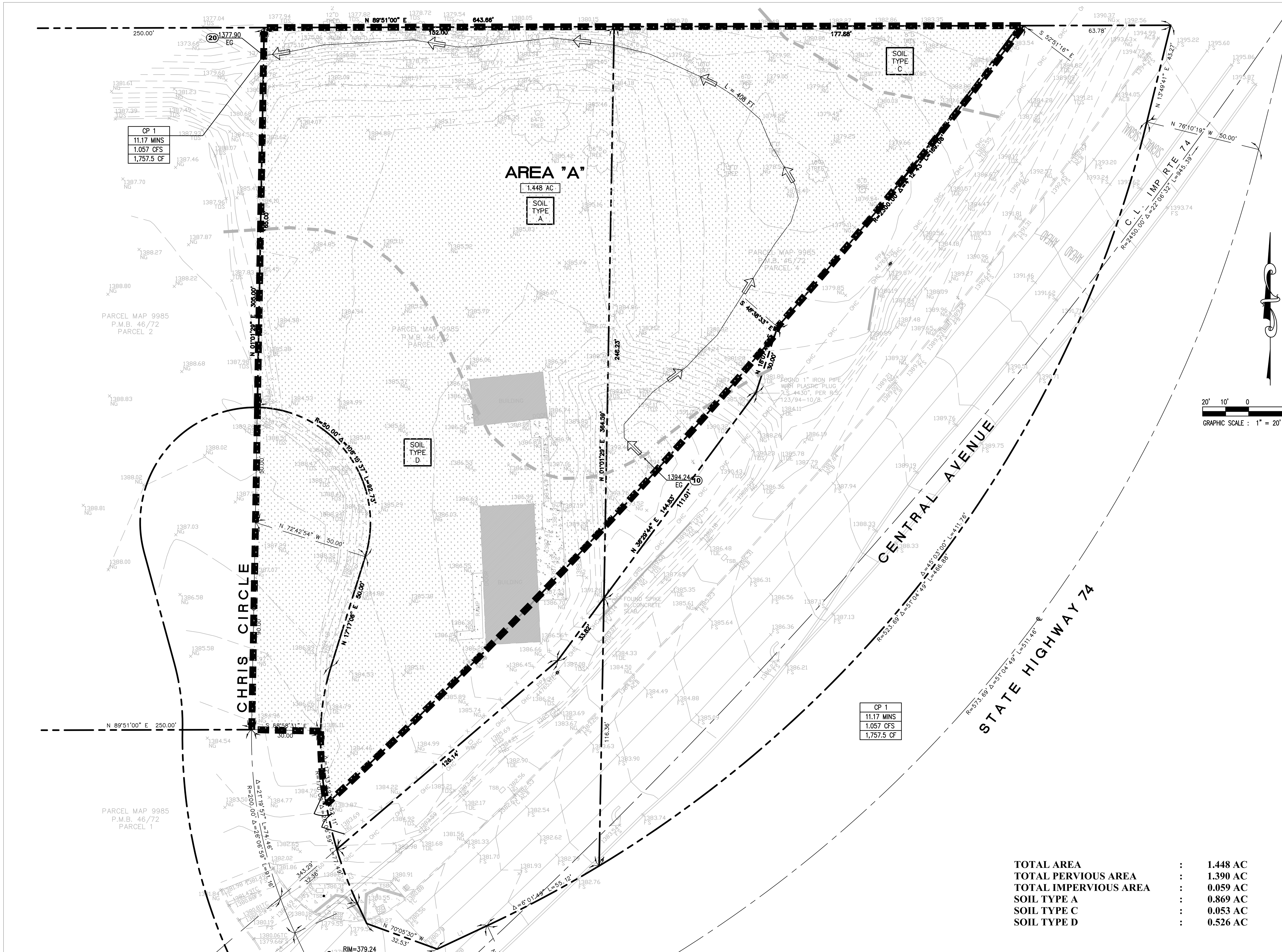
```
4+20    0.0108    0.05  Q   V      |        |        |        |
4+25    0.0111    0.05  Q   V      |        |        |        |
4+30    0.0115    0.05  Q    V     |        |        |        |
4+35    0.0118    0.05  Q    V     |        |        |        |
4+40    0.0122    0.05  Q    V     |        |        |        |
4+45    0.0125    0.05  Q    V     |        |        |        |
4+50    0.0129    0.06  Q    V     |        |        |        |
4+55    0.0133    0.06  Q    V     |        |        |        |
5+ 0    0.0137    0.06  Q    V     |        |        |        |
5+ 5    0.0141    0.05  Q    V     |        |        |        |
5+10    0.0144    0.04  Q     V    |        |        |        |
5+15    0.0147    0.04  Q     V    |        |        |        |
5+20    0.0150    0.05  Q     V    |        |        |        |
5+25    0.0153    0.05  Q     V    |        |        |        |
5+30    0.0157    0.05  Q     V    |        |        |        |
5+35    0.0161    0.06  Q     V    |        |        |        |
5+40    0.0165    0.06  Q     V    |        |        |        |
5+45    0.0169    0.06  Q     V    |        |        |        |
5+50    0.0173    0.06  Q      V   |        |        |        |
5+55    0.0177    0.06  Q      V   |        |        |        |
6+ 0    0.0181    0.06  Q      V   |        |        |        |
6+ 5    0.0185    0.06  Q      V   |        |        |        |
6+10    0.0190    0.07  Q      V   |        |        |        |
6+15    0.0194    0.07  Q      V   |        |        |        |
6+20    0.0199    0.07  Q       V  |        |        |        |
6+25    0.0203    0.07  Q       V  |        |        |        |
6+30    0.0208    0.07  Q       V  |        |        |        |
6+35    0.0213    0.07  Q       V  |        |        |        |
6+40    0.0218    0.07  Q       V  |        |        |        |
6+45    0.0223    0.07  Q       V  |        |        |        |
6+50    0.0228    0.07  Q        V |        |        |        |
6+55    0.0233    0.07  Q        V |        |        |        |
7+ 0    0.0238    0.07  Q        V |        |        |        |
7+ 5    0.0243    0.07  Q        V |        |        |        |
7+10    0.0248    0.07  Q        V |        |        |        |
7+15    0.0253    0.07  Q        V |        |        |        |
7+20    0.0258    0.08  Q         V|        |        |        |
7+25    0.0264    0.08  Q         V|        |        |        |
7+30    0.0269    0.08  Q         V|        |        |        |
7+35    0.0275    0.09  Q         V|        |        |        |
7+40    0.0281    0.09  Q         V|        |        |        |
7+45    0.0287    0.09  Q          V        |        |        |
7+50    0.0294    0.09  Q          V        |        |        |
7+55    0.0300    0.09  Q          V        |        |        |
8+ 0    0.0307    0.09  Q          V        |        |        |
8+ 5    0.0314    0.10  Q         |V        |        |        |
8+10    0.0321    0.11  Q         |V        |        |        |
8+15    0.0329    0.11  Q         |V        |        |        |
8+20    0.0336    0.11  Q         |V        |        |        |
8+25    0.0344    0.11  Q         | V       |        |        |
8+30    0.0351    0.11  Q         | V       |        |        |
8+35    0.0359    0.11  Q         | V       |        |        |
8+40    0.0367    0.12  Q         | V       |        |        |
8+45    0.0375    0.12  Q         |  V      |        |        |
8+50    0.0384    0.12  Q         |  V      |        |        |
8+55    0.0392    0.12  Q         |  V      |        |        |
```

```
 9+ 0      0.0401      0.12  Q        |   V      |         |         |
 9+ 5      0.0410      0.13  Q        |   V      |         |         |
 9+10      0.0420      0.14  Q        |   V      |         |         |
 9+15      0.0429      0.14  Q        |    V     |         |         |
 9+20      0.0439      0.14  Q        |    V     |         |         |
 9+25      0.0449      0.15  Q        |    V     |         |         |
 9+30      0.0459      0.15  Q        |     V    |         |         |
 9+35      0.0469      0.15  Q        |     V    |         |         |
 9+40      0.0480      0.15  Q        |     V    |         |         |
 9+45      0.0491      0.15  Q        |      V   |         |         |
 9+50      0.0501      0.16  Q        |      V   |         |         |
 9+55      0.0512      0.16  Q        |       V  |         |         |
10+ 0      0.0523      0.16  Q        |       V  |         |         |
10+ 5      0.0532      0.12  Q        |       V  |         |         |
10+10      0.0540      0.11  Q        |         V|         |         |
10+15      0.0547      0.11  Q        |         V|         |         |
10+20      0.0555      0.11  Q        |         V|         |         |
10+25      0.0562      0.11  Q        |         V|         |         |
10+30      0.0570      0.11  Q        |          V         |         |
10+35      0.0579      0.13  Q        |          V         |         |
10+40      0.0589      0.15  Q        |          V         |         |
10+45      0.0599      0.15  Q        |          |V        |         |
10+50      0.0609      0.15  Q        |          |V        |         |
10+55      0.0619      0.15  Q        |          |V        |         |
11+ 0      0.0629      0.15  Q        |          | V       |         |
11+ 5      0.0639      0.14  Q        |          | V       |         |
11+10      0.0648      0.14  Q        |          | V       |         |
11+15      0.0658      0.14  Q        |          |  V      |         |
11+20      0.0667      0.14  Q        |          |  V      |         |
11+25      0.0677      0.14  Q        |          |  V      |         |
11+30      0.0686      0.14  Q        |          |   V     |         |
11+35      0.0695      0.13  Q        |          |   V     |         |
11+40      0.0704      0.12  Q        |          |   V     |         |
11+45      0.0712      0.12  Q        |          |    V    |         |
11+50      0.0721      0.13  Q        |          |    V    |         |
11+55      0.0730      0.13  Q        |          |    V    |         |
12+ 0      0.0739      0.13  Q        |          |    V    |         |
12+ 5      0.0744      0.07  Q        |          |    V    |         |
12+10      0.0747      0.05  Q        |          |     V   |         |
12+15      0.0751      0.05  Q        |          |     V   |         |
12+20      0.0754      0.06  Q        |          |     V   |         |
12+25      0.0759      0.06  Q        |          |     V   |         |
12+30      0.0763      0.06  Q        |          |     V   |         |
12+35      0.0768      0.08  Q        |          |      V  |         |
12+40      0.0774      0.08  Q        |          |      V  |         |
12+45      0.0779      0.08  Q        |          |      V  |         |
12+50      0.0786      0.09  Q        |          |      V  |         |
12+55      0.0792      0.10  Q        |          |      V  |         |
13+ 0      0.0799      0.10  Q        |          |       V |         |
13+ 5      0.0808      0.13  Q        |          |       V |         |
13+10      0.0818      0.15  Q        |          |       V |         |
13+15      0.0828      0.15  Q        |          |        V|         |
13+20      0.0839      0.15  Q        |          |        V|         |
13+25      0.0849      0.15  Q        |          |        V|         |
13+30      0.0860      0.15  Q        |          |         V         |
13+35      0.0865      0.08  Q        |          |         V         |
```

```
13+40      0.0868      0.04  Q        |        |        V        |
13+45      0.0871      0.04  Q        |        |        V        |
13+50      0.0874      0.05  Q        |        |        V        |
13+55      0.0877      0.05  Q        |        |        V        |
14+ 0      0.0881      0.05  Q        |        |        |V       |
14+ 5      0.0886      0.08  Q        |        |        |V       |
14+10      0.0892      0.09  Q        |        |        |V       |
14+15      0.0898      0.09  Q        |        |        |V       |
14+20      0.0904      0.08  Q        |        |        |V       |
14+25      0.0910      0.08  Q        |        |        | V      |
14+30      0.0916      0.08  Q        |        |        | V      |
14+35      0.0921      0.08  Q        |        |        | V      |
14+40      0.0927      0.09  Q        |        |        | V      |
14+45      0.0933      0.09  Q        |        |        | V      |
14+50      0.0939      0.08  Q        |        |        |  V     |
14+55      0.0944      0.08  Q        |        |        |  V     |
15+ 0      0.0949      0.08  Q        |        |        |  V     |
15+ 5      0.0954      0.07  Q        |        |        |  V     |
15+10      0.0959      0.07  Q        |        |        |  V     |
15+15      0.0964      0.07  Q        |        |        |  V     |
15+20      0.0969      0.07  Q        |        |        |   V    |
15+25      0.0973      0.06  Q        |        |        |   V    |
15+30      0.0977      0.06  Q        |        |        |   V    |
15+35      0.0980      0.04  Q        |        |        |   V    |
15+40      0.0982      0.03  Q        |        |        |   V    |
15+45      0.0984      0.03  Q        |        |        |   V    |
15+50      0.0985      0.03  Q        |        |        |   V    |
15+55      0.0987      0.03  Q        |        |        |   V    |
16+ 0      0.0989      0.03  Q        |        |        |   V    |
16+ 5      0.0991      0.03  Q        |        |        |   V    |
16+10      0.0993      0.03  Q        |        |        |    V   |
16+15      0.0995      0.03  Q        |        |        |    V   |
16+20      0.0997      0.03  Q        |        |        |    V   |
16+25      0.0999      0.03  Q        |        |        |    V   |
16+30      0.1001      0.03  Q        |        |        |    V   |
16+35      0.1003      0.02  Q        |        |        |    V   |
16+40      0.1005      0.02  Q        |        |        |    V   |
16+45      0.1006      0.02  Q        |        |        |    V   |
16+50      0.1008      0.02  Q        |        |        |    V   |
16+55      0.1009      0.02  Q        |        |        |    V   |
17+ 0      0.1011      0.02  Q        |        |        |    V   |
17+ 5      0.1013      0.03  Q        |        |        |    V   |
17+10      0.1015      0.04  Q        |        |        |    V   |
17+15      0.1018      0.04  Q        |        |        |    V   |
17+20      0.1020      0.04  Q        |        |        |    V   |
17+25      0.1023      0.04  Q        |        |        |     V  |
17+30      0.1025      0.04  Q        |        |        |     V  |
17+35      0.1028      0.04  Q        |        |        |     V  |
17+40      0.1030      0.04  Q        |        |        |     V  |
17+45      0.1033      0.04  Q        |        |        |     V  |
17+50      0.1035      0.03  Q        |        |        |     V  |
17+55      0.1037      0.03  Q        |        |        |     V  |
18+ 0      0.1039      0.03  Q        |        |        |     V  |
18+ 5      0.1041      0.03  Q        |        |        |     V  |
18+10      0.1043      0.03  Q        |        |        |     V  |
18+15      0.1045      0.03  Q        |        |        |     V  |
```

18+20	0.1047	0.03	Q	|	|	|	V |
18+25	0.1049	0.03	Q	|	|	|	V |
18+30	0.1051	0.03	Q	|	|	|	V |
18+35	0.1053	0.02	Q	|	|	|	V |
18+40	0.1054	0.02	Q	|	|	|	V |
18+45	0.1056	0.02	Q	|	|	|	V |
18+50	0.1057	0.02	Q	|	|	|	V |
18+55	0.1058	0.01	Q	|	|	|	V |
19+ 0	0.1059	0.01	Q	|	|	|	V |
19+ 5	0.1060	0.02	Q	|	|	|	V |
19+10	0.1062	0.02	Q	|	|	|	V |
19+15	0.1063	0.02	Q	|	|	|	V |
19+20	0.1065	0.03	Q	|	|	|	V |
19+25	0.1067	0.03	Q	|	|	|	V |
19+30	0.1069	0.03	Q	|	|	|	V |
19+35	0.1071	0.02	Q	|	|	|	V |
19+40	0.1072	0.02	Q	|	|	|	V |
19+45	0.1074	0.02	Q	|	|	|	V |
19+50	0.1075	0.02	Q	|	|	|	V |
19+55	0.1076	0.01	Q	|	|	|	V |
20+ 0	0.1077	0.01	Q	|	|	|	V |
20+ 5	0.1078	0.02	Q	|	|	|	V |
20+10	0.1080	0.02	Q	|	|	|	V |
20+15	0.1081	0.02	Q	|	|	|	V |
20+20	0.1083	0.02	Q	|	|	|	V |
20+25	0.1084	0.02	Q	|	|	|	V |
20+30	0.1086	0.02	Q	|	|	|	V |
20+35	0.1087	0.02	Q	|	|	|	V |
20+40	0.1089	0.02	Q	|	|	|	V |
20+45	0.1090	0.02	Q	|	|	|	V |
20+50	0.1091	0.02	Q	|	|	|	V |
20+55	0.1093	0.01	Q	|	|	|	V |
21+ 0	0.1094	0.01	Q	|	|	|	V |
21+ 5	0.1095	0.02	Q	|	|	|	V |
21+10	0.1096	0.02	Q	|	|	|	V |
21+15	0.1098	0.02	Q	|	|	|	V |
21+20	0.1099	0.02	Q	|	|	|	V |
21+25	0.1100	0.01	Q	|	|	|	V |
21+30	0.1101	0.01	Q	|	|	|	V |
21+35	0.1102	0.02	Q	|	|	|	V |
21+40	0.1104	0.02	Q	|	|	|	V |
21+45	0.1105	0.02	Q	|	|	|	V |
21+50	0.1107	0.02	Q	|	|	|	V|
21+55	0.1108	0.01	Q	|	|	|	V|
22+ 0	0.1109	0.01	Q	|	|	|	V|
22+ 5	0.1110	0.02	Q	|	|	|	V|
22+10	0.1111	0.02	Q	|	|	|	V|
22+15	0.1113	0.02	Q	|	|	|	V|
22+20	0.1114	0.02	Q	|	|	|	V|
22+25	0.1115	0.01	Q	|	|	|	V|
22+30	0.1116	0.01	Q	|	|	|	V|
22+35	0.1117	0.01	Q	|	|	|	V|
22+40	0.1118	0.01	Q	|	|	|	V|
22+45	0.1119	0.01	Q	|	|	|	V|
22+50	0.1120	0.01	Q	|	|	|	V|
22+55	0.1121	0.01	Q	|	|	|	V|

```
  23+ 0      0.1122     0.01  Q        |        |        |        V|
  23+ 5      0.1123     0.01  Q        |        |        |        V|
  23+10      0.1124     0.01  Q        |        |        |        V|
  23+15      0.1125     0.01  Q        |        |        |        V|
  23+20      0.1126     0.01  Q        |        |        |        V|
  23+25      0.1127     0.01  Q        |        |        |        V|
  23+30      0.1128     0.01  Q        |        |        |        V|
  23+35      0.1129     0.01  Q        |        |        |        V|
  23+40      0.1130     0.01  Q        |        |        |        V|
  23+45      0.1131     0.01  Q        |        |        |        V|
  23+50      0.1132     0.01  Q        |        |        |        V|
  23+55      0.1133     0.01  Q        |        |        |        V|
  24+ 0      0.1134     0.01  Q        |        |        |        V|
  24+ 5      0.1134     0.00  Q        |        |        |        V
-----------------------------------------------------------------------
```



TOTAL AREA	:	1.448 AC
TOTAL PERVIOUS AREA	:	1.390 AC
TOTAL IMPERVIOUS AREA	:	0.059 AC
SOIL TYPE A	:	0.869 AC
SOIL TYPE C	:	0.053 AC
SOIL TYPE D	:	0.526 AC

LEGEND:

- DRAINAGE FLOW
- ROOF
- CONCRETE
- LANDSCAPE OR NATURAL GROUND
- CATCHMENT BOUNDARY
- SOIL TYPE BOUNDARY
- X.XXAC — AREA, IN ACRES
- CP 2 — CONTROL POINT ID
- XXX — TIME OF CONCENTRATION, IN MINS.
- XXX — 2 YR. FLOW, IN CFS
- XXX — 2 YR. 24 HR VOLUME IN CF

TOTAL IMPERVIOUS AREA	=	0.059 AC
TOTAL PERVIOUS AREA	=	1.390 AC
TOTAL AREA	=	1.448 AC

PRE-DEVELOPMENT HYDROLOGY MAP

MARK	REVISIONS	APPR.	DATE

THESE PLANS HAVE BEEN REVIEWED FOR COMPLIANCE WITH THE APPROPRIATE CONDITIONS OF DEVELOPMENT AND/OR CITY AND STATE LAWS AND A PERMIT MAY BE ISSUED

BRAD FAGRELL, RCE No. 43920 DATE
CITY ENGINEER
CITY OF LAKE ELSINORE

PREPARED BY:
KARAKI | Western States
A DESIGN-BUILD COMPANY
4887 E. LA PALMA STE. 707
ANAHEIM, CA 92807
TEL: (714)695-9300 FAX: (714)693-1002
www.westernsec.com

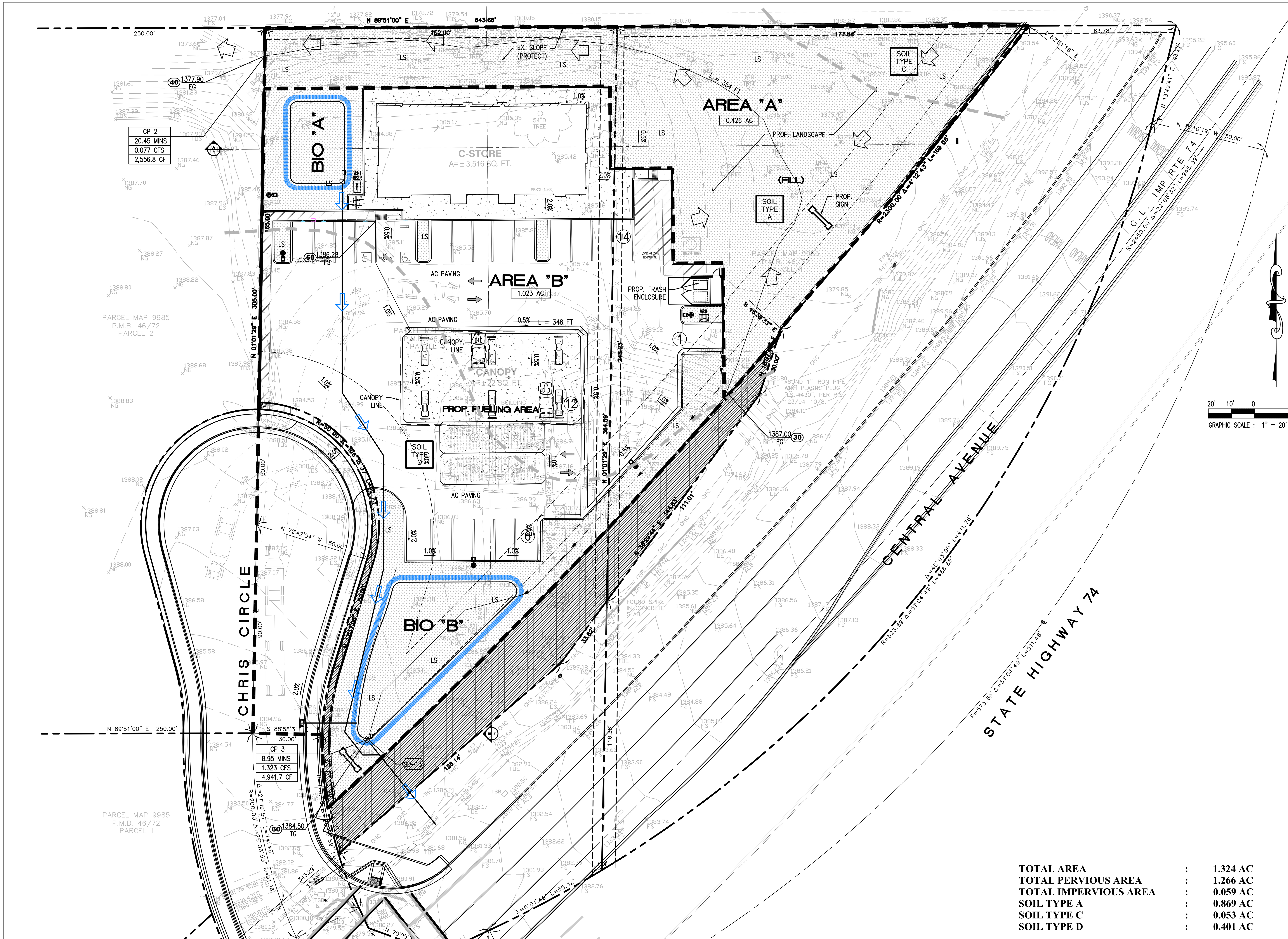
KAMAL McHANTAF, RCE C051050 DATE

SEAL: REGISTERED PROFESSIONAL ENGINEER KAMAL B. McHANTAF No. C051050 Exp. 9-30-21 CIVIL STATE OF CALIFORNIA

"AS-BUILT"
RCE ____ EXP ____ DATE: ____
REVIEWED BY:
INSPECTOR ____ DATE
SCALE : AS NOTED
BENCH MARK: SEE ABOVE
DATE: JANUARY 18, 2020

CITY OF LAKE ELSINORE
EXISTING HYDROLOGY MAP
28771 CENTRAL 74 HWY,
LAKE ELSINORE, CA
CUP200043

SHEET 1 OF 2 SHEETS
FILE No.



LEGEND:

Symbol	Description
(arrow)	DRAINAGE FLOW
(dark shading)	ROOF
(dotted)	CONCRETE
(light dotted)	LANDSCAPE OR NATURAL GROUND
(heavy dashed line)	CATCHMENT BOUNDARY
(grey dashed line)	SOIL TYPE BOUNDARY
X.XXAC	AREA, IN ACRES
CP 2	CONTROL POINT ID
XXX	TIME OF CONCENTRATION, IN MINS.
XXX	2 YR. FLOW, IN CFS
XXX	2 YR. 24 HR VOLUME IN CF

TOTAL AREA	:	1.324 AC
TOTAL PERVIOUS AREA	:	1.266 AC
TOTAL IMPERVIOUS AREA	:	0.059 AC
SOIL TYPE A	:	0.869 AC
SOIL TYPE C	:	0.053 AC
SOIL TYPE D	:	0.401 AC

TOTAL IMPERVIOUS AREA	= 0.059 AC
TOTAL PERVIOUS AREA	= 1.266 AC
TOTAL AREA	= 1.324 AC

POST-DEVELOPMENT HYDROLOGY MAP

MARK	REVISIONS	APPR.	DATE

THESE PLANS HAVE BEEN REVIEWED FOR COMPLIANCE WITH THE APPROPRIATE CONDITIONS OF DEVELOPMENT AND/OR CITY AND STATE LAWS AND A PERMIT MAY BE ISSUED

BRAD FAGRELL, RCE No. 43920 DATE
CITY ENGINEER
CITY OF LAKE ELSINORE

PREPARED BY:
KARAKI | Western States
A DESIGN-BUILD COMPANY
4887 E. LA PALMA STE. 707
ANAHEIM, CA 92807
TEL: (714)695-9300 FAX: (714)693-1002
www.westernsec.com

KAMAL McHANTAF, RCE C051050 DATE

SEAL
REGISTERED PROFESSIONAL ENGINEER
KAMAL B. McHANTAF
No. C051050
Exp. 9-30-21
CIVIL
STATE OF CALIFORNIA

"AS-BUILT"
RCE ____ EXP ____ DATE:
REVIEWED BY:
INSPECTOR DATE
SCALE : AS NOTED
BENCH MARK: SEE ABOVE
DATE: JANUARY 18, 2020

CITY OF LAKE ELSINORE
PROPOSED HYDROLOGY MAP
28771 CENTRAL 74 HWY,
LAKE ELSINORE, CA
CUP200043

SHEET 2
OF 2 SHEETS
FILE No.

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 STORMWATER CONTROL PLAN SHOULD INCLUDE THESE SOURCE CONTROL BMPS**		
Potential Sources of Runoff Pollutants	**Permanent Controls – Show on Source Control Exhibit, Appendix 1**	**Permanent Control – List in SUSMP Table and Narrative**	**Operational BMPs – Include in SUSMP Table and Narrative**
☒ **A.** On-site storm drain inlets	☒ Locations of inlets.	☒ Mark all inlets with the words "No Dumping! Flows to Bay" or similar	☒ 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 STORMWATER CONTROL PLAN SHOULD INCLUDE THESE SOURCE CONTROL BMPS		
Potential Sources of Runoff Pollutants	**Permanent Controls – Show on Source Control Exhibit, Appendix 1**	**Permanent Control – List in SUSMP Table and Narrative**	**Operational BMPs – Include in SUSMP 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 Note: should be consistent with project landscape plan (if applicable).	☒ 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 Fact Sheet SC-41, "Building and Grounds Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com ☒ Provide Integrated Pest Management information to new owners, lessees and operators

IF THESE SOURCES WILL BE ON THE PROJECT SITE…	…THEN YOUR STORMWATER CONTROL PLAN SHOULD INCLUDE THESE SOURCE CONTROL BMPS		
Potential Sources of Runoff Pollutants	**Permanent Controls – Show on Source Control Exhibit, Appendix 1**	**Permanent Control – List in SUSMP Table and Narrative**	**Operational BMPs – Include in SUSMP 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.	☐ If the local municipality 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 Fact Sheet SC-72, "Fountain and Pool Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com
☐ **F.** Food Services	☐ 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.

IF THESE SOURCES WILL BE ON THE PROJECT SITE…	…THEN YOUR STORMWATER CONTROL PLAN SHOULD INCLUDE THESE SOURCE CONTROL BMPS		
Potential Sources of Runoff Pollutants	**Permanent Controls – Show on Source Control Exhibit, Appendix 1**	**Permanent Control – List in SUSMP Table and Narrative**	**Operational BMPs – Include in SUSMP Table and Narrative**
☒ **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.	☒ State how site refuse will be handled and provide supporting detail to what is shown on plans.	☒ State how the following will be implemented:
	☒ 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.	☒ State that signs will be posted on or near dumpsters with the words “Do not dump hazardous materials here” or similar.	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.
	☒ Any drains from dumpsters, compactors, and tallow bin areas shall be connected to a grease removal device before discharge to sanitary sewer.		Inspect and pick up litter daily and clean up spills immediately. Keep spill control materials available onsite. See Fact Sheet SC-34, “Waste Handling and Disposal” in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com
☐ **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

IF THESE SOURCES WILL BE ON THE PROJECT SITE…	…THEN YOUR STORMWATER CONTROL PLAN SHOULD INCLUDE THESE SOURCE CONTROL BMPS		
Potential Sources of Runoff Pollutants	**Permanent Controls – Show on Source Control Exhibit, Appendix 1**	**Permanent Control – List in SUSMP Table and Narrative**	**Operational BMPs – Include in SUSMP 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 contamination. ☐ 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 local 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	☐ 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 STORMWATER CONTROL PLAN SHOULD INCLUDE THESE SOURCE CONTROL BMPS		
Potential Sources of Runoff Pollutants	**Permanent Controls – Show on Source Control Exhibit, Appendix 1**	**Permanent Control – List in SUSMP Table and Narrative**	**Operational BMPs – Include in SUSMP 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 shutoff 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 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. ☐ Car dealerships and similar may rinse cars with water only. ☐ See Fact Sheet SC-21, "Vehicle and Equipment Cleaning," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com

IF THESE SOURCES WILL BE ON THE	…THEN YOUR STORMWATER CONTROL PLAN SHOULD INCLUDE THESE SOURCE CONTROL BMPS

PROJECT SITE…			
Potential Sources of Runoff Pollutants	**Permanent Controls – Show on Source Control Exhibit, Appendix 1**	**Permanent Control – List in SUSMP Table and Narrative**	**Operational BMPs – Include in SUSMP 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 SUSMP report, 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.

STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

IF THESE SOURCES WILL BE ON THE PROJECT SITE…	…THEN YOUR STORMWATER CONTROL PLAN SHOULD INCLUDE THESE SOURCE CONTROL BMPS		
Potential Sources of Runoff Pollutants	**Permanent Controls – Show on Source Control Exhibit, Appendix 1**	**Permanent Control – List in SUSMP Table and Narrative**	**Operational BMPs – Include in SUSMP Table and Narrative**
☒ **L.** Fuel Dispensing Areas	☒ Fueling areas1 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 area1.] The canopy [or cover] shall not drain onto the fueling area.		☒ The property owner shall dry sweep the fueling area routinely. ☒ See the Business Guide Sheet, "Automotive Service—Service Stations" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com

IF THESE SOURCES WILL BE ON THE PROJECT SITE…	…THEN YOUR STORMWATER CONTROL PLAN SHOULD INCLUDE THESE SOURCE CONTROL BMPS		
Potential Sources of Runoff Pollutants	**Permanent Controls – Show on Source Control Exhibit, Appendix 1**	**Permanent Control – List in SUSMP Table and Narrative**	**Operational BMPs – Include in SUSMP 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 should be drained to the sanitary sewer where feasible. Direct connections to storm drains from depressed loading docks are prohibited. ☐ 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
☒ **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

IF THESE SOURCES WILL BE ON THE PROJECT SITE…	…THEN YOUR STORMWATER CONTROL PLAN SHOULD INCLUDE THESE SOURCE CONTROL BMPS		
Potential Sources of Runoff Pollutants	**Permanent Controls – Show on Source Control Exhibit, Appendix 1**	**Permanent Control – List in SUSMP Table and Narrative**	**Operational BMPs – Include in SUSMP Table and Narrative**
O. Miscellaneous Drain or Wash Water			
☐ Boiler Drain Lines		☐ 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		☐ 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		☐ Rooftop mounted equipment with potential to produce pollutants shall be roofed and/or have secondary containment.	
☐ Drainage Sumps		☐ Any drainage sumps on-site shall feature a sediment sump to reduce the quantity of sediment in pumped water.	
☒ Roofing, gutters, and trim		☒ Avoid roofing, gutters, and trim made of copper or other unprotected metals that may leach into runoff.	
☒ **P.** Plazas, sidewalks, and parking lots			☒ Plazas, sidewalks, and parking lots shall be swept regularly to prevent the accumulation of litter and debris. Debris from pressure washing shall be collected to prevent entry into the storm drain system. Washwater containing any cleaning agent or degreaser shall be collected and discharged to the sanitary sewer and not discharged to a storm drain.

Appendix 9: O&M

Operation and Maintenance Plan and Documentation of Finance, Maintenance and Recording Mechanisms

OPERATIONS AND MAINTENANCE PLAN

Operations & Maintenance of BMPs is essential for the success of any SWQMP. In order to perform proper O&M the project site owner will be required to maintain and inspect their Permanent and Post Construction BMPs for the life of the project. An inspection schedule and maintenance directions must be prepared for each BMP that is install on the project site.

O&M PLAN CONTACT INFORMATION MATRIX

Project Name:	28771 Central Avenue Gasoline Station and Convenience Store
Project Location:	28771 Central Avenue Lake Elsinore Riverside, CA
Permit Number (Land Development Projects):	To be determined
Fiscally Responsible Party for O&M:	Daher Oil Inc.
Contact Name:	Alim S. Daher
Contact Street Address:	19851 Esperanza Road
Contact City, State, Zip:	Yorba Linda, California 92878
Contact Phone Number:	
Contact Fax Number:	
Contact Email Address:	
Start Date of Responsibility:	
O&M Plan Prepared By:	Western States Engineering, Inc.
O&M Preparer Street Address:	4887 E. La Palma, Ste. 707
O&M Preparer City, State, Zip:	Anaheim Oceanside, California 92807
O&M Preparer Phone Number:	(714) 695-9300
O&M Preparer Fax Number:	(714) 693-1002
O&M Preparer Contact:	Kamal B. Mchantaf
O&M Preparer Contact Email Address:	

FISCALLY RESPONSIBLE PARTY CERTIFICATION

This project-specific Operations and Maintenance (O&M) Plan has been prepared for the 28771 Central Avenue Gasoline Station and Convenience Store by Western States Engineering, Inc. for the project site on 28771 Central Avenue Lake Elsinore Riverside, California. This O&M Plan is intended to comply with the requirements of County of Riverside, which includes the requirement for the preparation and implementation of a project-specific Priority Project Water Quality Management Plan (WQMP).

The undersigned, while owning the property/project described in the preceding paragraph, shall be fiscally responsible for the O&M Plan associated with all permanent and post-construction BMPs as outlined in the associated County of Riverside WQMP.

The undersigned is authorized to certify and to approve implementation of this O&M Plan. The undersigned is aware that implementation of this O&M Plan is enforceable under the applicable County of Riverside Municipal Code.

If the undersigned transfers its interest in the subject property/project, the undersigned shall notify the successor in interest in writing of its responsibility to implement this O&M Plan in perpetuity. The undersigned shall provide the County with a copy of the signed notification, including the name, address, and contact information of the successor.

"I, the undersigned, certify under penalty of law that the provisions of this Water Quality Management Plan O&M Plan have been reviewed and accepted and that the BMP maintenance requirements will be transferred to future successors in interest."

______________________________	_________________________________
Owner's signature	Date
DB Oil – Salim S. Daher	President
______________________________	_________________________________
Owner's Printed Name	Owner's Title/Position

Street: ________________________________
City: ________________________________
State: ________________________________
Zip: ________________________________
Telephone: ________________________________
E-Mail: ________________________________

ASSOCIATED MAINTENANCE LOG

The owner may use the project specific maintenance log form blank attached to the end of this attachment to keep a record of maintenance activities. The County will have the required length of time that records must be kept, but keep in mind that the Regional Water Quality Control Board can ask for inspection and maintenance records for up to five years from the time of initial installation. The attached maintenance log is general and fill-in the blank. This log is intended to be copied each time it is needed.

ASSOCIATED INSPECTION FORM

The owner may use the project specific inspection form blank attached to the end of this attachment to keep a record of inspection and maintenance activities. The County will have the required length of time that records must be kept, but keep in mind that the Regional Water Quality Control Board can ask for inspection and maintenance records for up to five years from the time of initial installation. The attached inspection form is general and fill-in the blank. This form is intended to be copied each time it is needed.

SOURCE CONTROL REFERENCES

Please see the attached references. Included for reference are the following items:

- CASQA BMP Fact Sheet SD-10: Site Design and Landscape Planning
- CASQA BMP Fact Sheet SD-11: Roof Runoff Control
- CASQA BMP Fact Sheet SD-12: Efficient Irrigation
- CASQA BMP Fact Sheet SD-13: Storm Drain Signage
- CASQA BMP Fact Sheet SD-30: Fueling Areas
- CASQA BMP Fact Sheet SD-32: Trash Enclosures
- CASQA BMP Fact Sheet TC-32: Bioretention

To save on reproduction costs and environmental resources, electronic copies of the above referenced CASQA BMP Fact Sheets can be found at the following web address:
http://www.cabmphandbooks.com/Development.asp

***Please note that this link and the associated information are not maintained by the engineer of record and the engineer of record cannot be held accountable if this link or internet location changes.*

TYPICAL MAINTENANCE ACTIVITIES

The following is a compilation of Routine Actions required for each installed BMP on the project site.

BIOFILTRATION SYSTEM

The following is inspection and maintenance guidance information for bioretention systems:

Routine Action: Inspect Health of Vegetation

Maintenance Indicator:	Dead Vegetation or Bio
Field Measurements:	Visual Inspection
Inspection Frequency:	Twice a year
Maintenance Activity:	Re-establish vegetation as needed
Approximate Costs:	Varies per maintenance required

Routine Action: Inspect for Debris Accumulation

Maintenance Indicator:	Debris, trash, or litter present
Field Measurements:	Visual Inspection
Inspection Frequency:	During routine trashing
Maintenance Activity:	Remove debris, trash, and litter
Approximate Costs:	None anticipated

Routine Action: Inspect for Sedimentation Accumulation

Maintenance Indicator:	Sediment at or near height of vegetation
Field Measurements:	Visual Inspection
Inspection Frequency:	1. End of Summer Season 2. End of Rainy Season
Maintenance Activity:	Remove Sediment and re-vegetate
Approximate Costs:	$1,100 per maintenance (Approx. once every three years)

Routine Action: Inspect for Standing Water

Maintenance Indicator: Standing water after 96 hours

Field Measurements: Visual Inspection

Inspection Frequency: After each qualifying rain event

Maintenance Activity: Dewater and inspect sub-drain discharge points (when applicable)

Approximate Costs: Varies per maintenance required

STORM DRAIN STENCILING AND SIGNAGE (SD-13)

The following is inspection and maintenance guidance information for Storm Drain Stenciling and Signage:

Routine Action: Inspect Symbol Paint for visibility

Maintenance Indicator: Symbols and words are no longer visible

Field Measurements: Visual Inspection

Inspection Frequency:
1. Once during wet season
2. Once during dry season

Maintenance Activity: Re-apply paint to symbols and words.

Approximate Costs: $100 per maintenance

Routine Action: Inspect Sign and Sign Posts

Maintenance Indicator: Sign poles or signs are broken or missing

Field Measurements: Visual Inspection

Inspection Frequency:
1. Once during wet season
2. Once during dry season

Maintenance Activity: Install or re-install sign posts and signs

Approximate Costs: Varies per maintenance required

STABILIZED DRAINAGE DITCH

The following is inspection and maintenance guidance information for Stabilized Drainage Ditches:

Routine Action: Cracks and Fractures

Maintenance Indicator:	Visual cracking not along score lines
Field Measurements:	Visual Inspection
Inspection Frequency:	1. Once in the wet season (late) 2. Once in dry season (late)
Maintenance Activity:	Consult Engineer of Record for recommendations
Approximate Costs:	Varies per maintenance required

Routine Action: Inspect for Debris Accumulation

Maintenance Indicator:	Debris, trash, or litter present
Field Measurements:	Visual Inspection
Inspection Frequency:	During routine trashing
Maintenance Activity:	Remove debris, trash, and litter
Approximate Costs:	None anticipated

Routine Action: Inspect for Sedimentation Accumulation

Maintenance Indicator:	Sediment at or near height of rock
Field Measurements:	Visual Inspection
Inspection Frequency:	Annually
Maintenance Activity:	1. Remove Sediment 2. Re-channel if needed 3. Re-establish grade 4. Re-distribute rock if needed
Approximate Costs:	$1,100 per maintenance (Approx. once every three years)

MAINTENANCE RECORDS

All copies of the project's Maintenance Logs and Inspections Reports should be kept on file with the primary copy of this WQMP by the owner. Records should be kept for the life of the project site's BMPs. A log is provided on the following pages.

INSPECTION FORMS

All copies of the project's Maintenance Inspections Reports should be kept on file with a primary copy of this WQMP by the owner. Inspection records should be kept for the life of the project site's BMPs. A standard inspection form for the project site is provided in this attachment.

APPROPRIATE MAINTENANCE MECHANISMS

At the time of approval, County staff will work with the owner to obtain the necessary Maintenance Assurance Mechanism, be it an encroachment agreement, easement, etc. A copy of this executed document should be kept with this WQMP.

MAINTENANCE LOG FOR 28771 CENTRAL AVE. GAS STATION & C-STORE WQMP				***Sheet***		***OF***	
DATE	***COMPANY***	***COMPANY PHONE***	***COMPANY SIGNATURE***	***INSPECTION REPORTS***			
		(____) ____-_______		☐ Yes ☐ No			
		(____) ____-_______		☐ Yes ☐ No			
		(____) ____-_______		☐ Yes ☐ No			
		(____) ____-_______		☐ Yes ☐ No			
		(____) ____-_______		☐ Yes ☐ No			
		(____) ____-_______		☐ Yes ☐ No			
		(____) ____-_______		☐ Yes ☐ No			
		(____) ____-_______		☐ Yes ☐ No			
		(____) ____-_______		☐ Yes ☐ No			
		(____) ____-_______		☐ Yes ☐ No			

BMP INSPECTION REPORT

GENERAL INSPECTION INFORMATION	
Project Name	28771 Central Avenue Gasoline Station and Convenience Store
County Reference No.:	To be determined
Owner's Name:	Daher Oil Inc.
Inspector's Name:	
Inspector's Company:	
Inspector's Phone No.:	
Inspector's Signature:	
Inspection Date:	

INSPECTION DAY INFORMATION					
Inspection Type:	☐ Prior to Forecast Rain ☐ 24-Hour Interval During Extended Rain Event ☐ After a rain Event ☐ Other: ____________________				
Season:	☐ Wet (Rainy)	☐ Dry (non-Rainy)			
Storm Data:	Storm Start Date & Time:				
	Storm Duration (hours):				
	Time Elapsed Since Last Storm:				
			Min	Hrs	Days
	Approximate Rainfall Amount (mm)				

BIOFILTRATION SYSTEM INSPECTION TABLE			
Was this item inspected this site visit:	☐ YES ☐ NO		
INSPECTION REQUIREMENT	***INSPECTED THIS VISIT***		***See Corrective Action Note***
Inspect Health of Vegetation	☐ YES	☐ NO	
Inspect Debris Accumulation	☐ YES	☐ NO	
Inspect for Sedimentation Accumulation	☐ YES	☐ NO	
Inspect for Standing Water	☐ YES	☐ NO	

Corrective Action Notes:

1. ____

____

2. ____

____

3. ____

____

4. ____

____

5. ____

____

STORM DRAIN STENCILING AND SIGNAGE INSPECTION TABLE			
Was this item inspected this site visit:	☐ YES ☐ NO		
INSPECTION REQUIREMENT	***INSPECTED THIS VISIT***		***See Corrective Action Note***
Inspect Symbol Paint for Visibility	☐ YES	☐ NO	
Inspect Signs and Sign Posts	☐ YES	☐ NO	

Corrective Action Notes:

1. ____

____

2. ____

____

3. ____

____

4. ____

____

Appendix 10: Educational Materials

BMP Fact Sheets, Maintenance Guidelines and Other End-User BMP Information

3.5 Bioretention Facility

Type of BMP	LID – Bioretention
Treatment Mechanisms	Infiltration, Evapotranspiration, Evaporation, Biofiltration
Maximum Drainage Area	This BMP is intended to be integrated into a project's landscaped area in a distributed manner. Typically, contributing drainage areas to Bioretention Facilities range from less than 1 acre to a maximum of around 10 acres.
Other Names	Rain Garden, Bioretention Cell, Bioretention Basin, Biofiltration Basin, Landscaped Filter Basin, Porous Landscape Detention

Description

Bioretention Facilities are shallow, vegetated basins underlain by an engineered soil media. Healthy plant and biological activity in the root zone maintain and renew the macro-pore space in the soil and maximize plant uptake of pollutants and runoff. This keeps the Best Management Practice (BMP) from becoming clogged and allows more of the soil column to function as both a sponge (retaining water) and a highly effective and self-maintaining biofilter. In most cases, the bottom of a Bioretention Facility is unlined, which also provides an opportunity for infiltration to the extent the underlying onsite soil can accommodate. When the infiltration rate of the underlying soil is exceeded, fully biotreated flows are discharged via underdrains. Bioretention Facilities therefore will inherently achieve the maximum feasible level of infiltration and evapotranspiration and achieve the minimum feasible (but highly biotreated) discharge to the storm drain system.

Siting Considerations

These facilities work best when they are designed in a relatively level area. Unlike other BMPs, Bioretention Facilities can be used in smaller landscaped spaces on the site, such as:

- ✓ Parking islands
- ✓ Medians
- ✓ Site entrances

Landscaped areas on the site (such as may otherwise be required through minimum landscaping ordinances), can often be designed as Bioretention Facilities. This can be accomplished by:

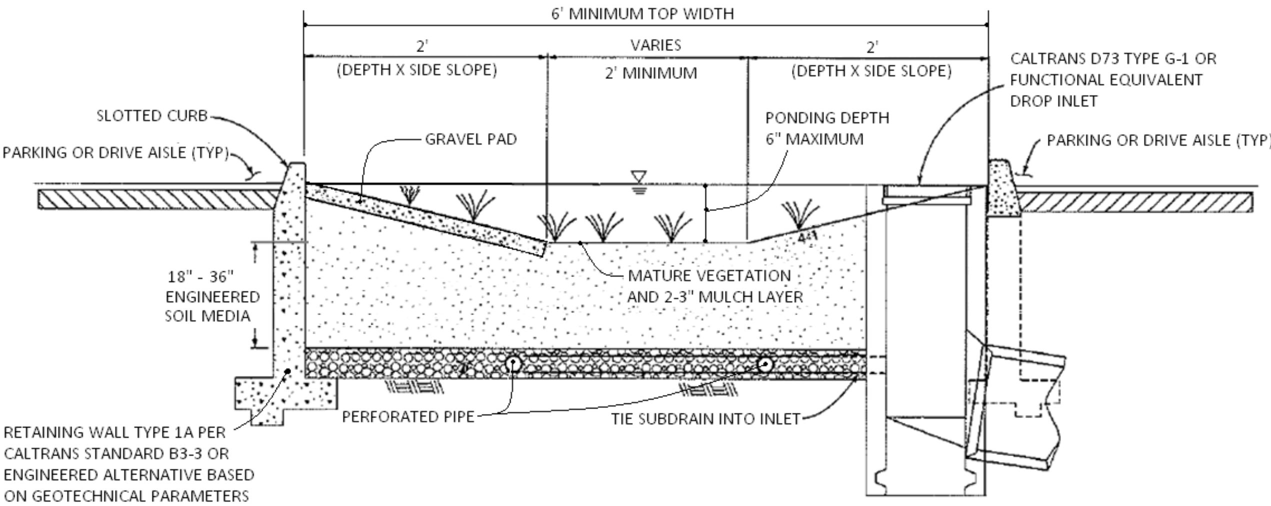
- *Depressing* landscaped areas below adjacent impervious surfaces, rather than elevating those areas
- Grading the site to direct runoff from those impervious surfaces *into* the Bioretention Facility, rather than away from the landscaping
- Sizing and designing the depressed landscaped area as a Bioretention Facility as described in this Fact Sheet

Bioretention Facilities should however not be used downstream of areas where large amounts of sediment can clog the system. Placing a Bioretention Facility at the toe of a steep slope should also be avoided due to the potential for clogging the engineered soil media with erosion from the slope, as well as the potential for damaging the vegetation.

Design and Sizing Criteria

The recommended cross section necessary for a Bioretention Facility includes:

- Vegetated area
- 18' minimum depth of engineered soil media
- 12' minimum gravel layer depth with 6' perforated pipes (added flow control features such as orifice plates may be required to mitigate for HCOC conditions)



While the 18-inch minimum engineered soil media depth can be used in some cases, it is recommended to use 24 inches or a preferred 36 inches to provide an adequate root zone for the chosen plant palate. Such a design also provides for improved removal effectiveness for nutrients. The recommended ponding depth inside of a Bioretention Facility is 6 inches; measured from the flat bottom surface to the top of the water surface as shown in Figure 1.

Because this BMP is filled with an engineered soil media, pore space in the soil and gravel layer is assumed to provide storage volume. However, several considerations must be noted:

- Surcharge storage above the soil surface (6 inches) is important to assure that design flows do not bypass the BMP when runoff exceeds the soil's absorption rate.
- In cases where the Bioretention Facility contains engineered soil media deeper than 36 inches, the pore space within the engineered soil media can only be counted to the 36-inch depth.
- A maximum of 30 percent pore space can be used for the soil media whereas a maximum of 40 percent pore space can be use for the gravel layer.

Figure 1: Standard Layout for a Bioretention Facility

Engineered Soil Media Requirements

The engineered soil media shall be comprised of 85 percent mineral component and 15 percent organic component, by volume, drum mixed prior to placement. The mineral component shall be a Class A sandy loam topsoil that meets the range specified in Table 1 below. The organic component shall be nitrogen stabilized compost[1], such that nitrogen does not leach from the media.

Table 1: Mineral Component Range Requirements

Percent Range	Component
70-80	Sand
15-20	Silt
5-10	Clay

The trip ticket, or certificate of compliance, shall be made available to the inspector to prove the engineered mix meets this specification.

Vegetation Requirements

Vegetative cover is important to minimize erosion and ensure that treatment occurs in the Bioretention Facility. The area should be designed for at least 70 percent mature coverage throughout the Bioretention Facility. To prevent the BMP from being used as walkways, Bioretention Facilities shall be planted with a combination of small trees, densely planted shrubs, and natural grasses. Grasses shall be native or ornamental; preferably ones that do not need to be mowed. The application of fertilizers and pesticides should be minimal. To maintain oxygen levels for the vegetation and promote biodegradation, it is important that vegetation not be completely submerged for any extended period of time. Therefore, a maximum of 6 inches of ponded water shall be used in the design to ensure that plants within the Bioretention Facility remain healthy.

A 2 to 3-inch layer of standard shredded aged hardwood mulch shall be placed as the top layer inside the Bioretention Facility. The 6-inch ponding depth shown in Figure 1 above shall be measured from the top surface of the 2 to 3-inch mulch layer.

Curb Cuts

To allow water to flow into the Bioretention Facility, 1-foot-wide (minimum) curb cuts should be placed approximately every 10 feet around the perimeter of the Bioretention Facility. Figure 2 shows a curb cut in a Bioretention Facility. Curb cut flow lines must be at or above the V_{BMP} water surface level.

[1] For more information on compost, visit the US Composting Council website at: http://compostingcouncil.org/

Figure 2: Curb Cut located in a Bioretention Facility

To reduce erosion, a gravel pad shall be placed at each inlet point to the Bioretention Facility. The gravel should be 1- to 1.5-inch diameter in size. The gravel should overlap the curb cut opening a minimum of 6 inches. The gravel pad inside the Bioretention Facility should be flush with the finished surface at the curb cut and extend to the bottom of the slope.

In addition, place an apron of stone or concrete, a foot square or larger, inside each inlet to prevent vegetation from growing up and blocking the inlet. See Figure 3.

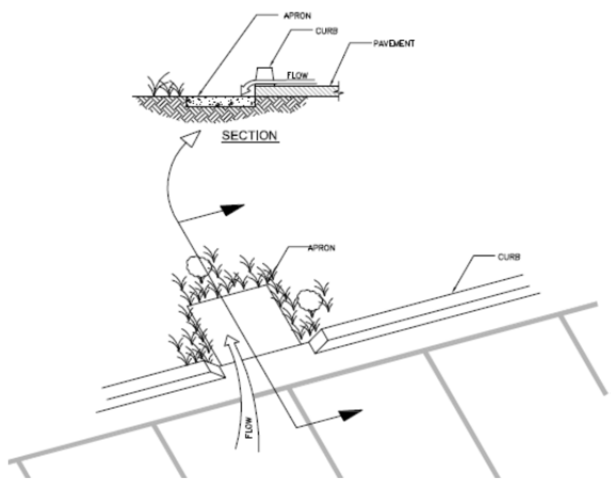


Figure 3: Apron located in a Bioretention Facility

Terracing the Landscaped Filter Basin

It is recommended that Bioretention Facilities be level. In the event the facility site slopes and lacks proper design, water would fill the lowest point of the BMP and then discharge from the basin without being treated. To ensure that the water will be held within the Bioretention Facility on sloped sites, the BMP must be terraced with nonporous check dams to provide the required storage and treatment capacity.

The terraced version of this BMP shall be used on non-flat sites with no more than a 3 percent slope. The surcharge depth cannot exceed 0.5 feet, and side slopes shall not exceed 4:1. Table 2 below shows the spacing of the check dams, and slopes shall be rounded up (i.e., 2.5 percent slope shall use 10' spacing for check dams).

Table 2: Check Dam Spacing

6" Check Dam Spacing	
Slope	**Spacing**
1%	*25'*
2%	*15'*
3%	*10'*

Roof Runoff

Roof downspouts may be directed towards Bioretention Facilities. However, the downspouts must discharge onto a concrete splash block to protect the Bioretention Facility from erosion.

Retaining Walls

It is recommended that Retaining Wall Type 1A, per Caltrans Standard B3-3 or equivalent, be constructed around the entire perimeter of the Bioretention Facility. This practice will protect the sides of the Bioretention Facility from collapsing during construction and maintenance or from high service loads adjacent to the BMP. Where such service loads would not exist adjacent to the BMP, an engineered alternative may be used if signed by a licensed civil engineer.

Side Slope Requirements

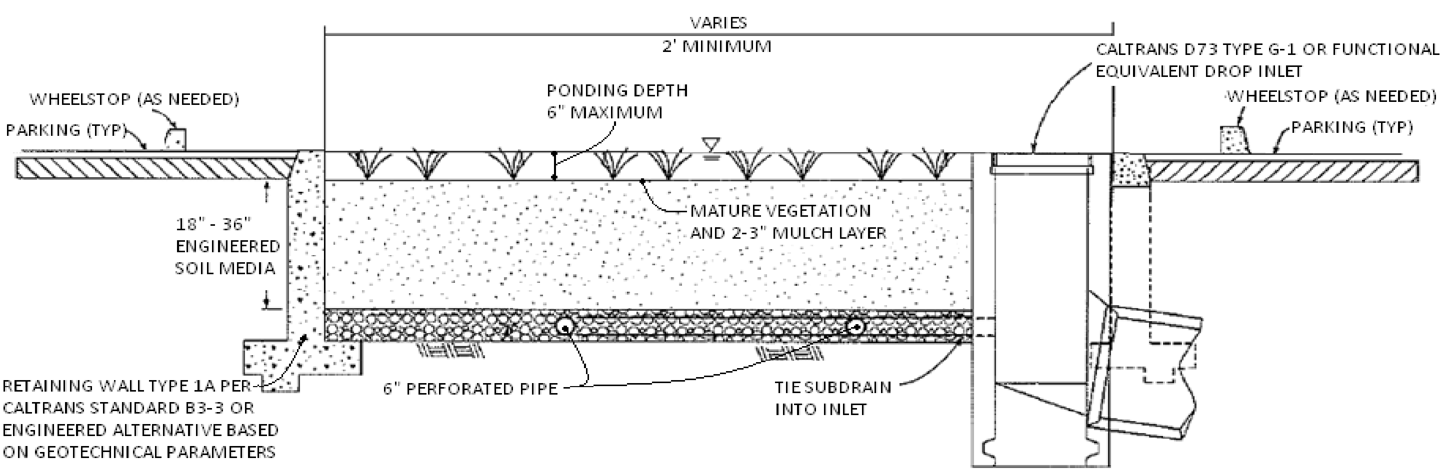
Bioretention Facilities Requiring Side Slopes

The design should assure that the Bioretention Facility does not present a tripping hazard. Bioretention Facilities proposed near pedestrian areas, such as areas parallel to parking spaces or along a walkway, must have a gentle slope to the bottom of the facility. Side slopes inside of a Bioretention Facility shall be 4:1. A typical cross section for the Bioretention Facility is shown in Figure 1.

Bioretention Facilities Not Requiring Side Slopes

Where cars park perpendicular to the Bioretention Facility, side slopes are not required. A 6-inch maximum drop may be used, and the Bioretention Facility must be planted with trees and shrubs to prevent pedestrian access. In this case, a curb is not placed around the Bioretention Facility,

but wheel stops shall be used to prevent vehicles from entering the Bioretention Facility, as shown in Figure 4.



Planter Boxes

Bioretention Facilities can also be placed above ground as planter boxes. Planter boxes must have a minimum width of 2 feet, a maximum surcharge depth of 6 inches, and no side slopes are necessary. Planter boxes must be constructed so as to ensure that the top surface of the engineered soil media will remain level. This option may be constructed of concrete, brick, stone or other stable materials that will not warp or bend. Chemically treated wood or galvanized steel, which has the ability to contaminate stormwater, should not be used. Planter boxes must be lined with an impermeable liner on all sides, including the bottom. Due to the impermeable liner, the inside bottom of the planter box shall be designed and constructed with a cross fall, directing treated flows within the subdrain layer toward the point where subdrain exits the planter box, and subdrains shall be oriented with drain holes oriented down. These provisions will help avoid excessive stagnant water within the gravel underdrain layer. Similar to the in-ground Bioretention Facility versions, this BMP benefits from healthy plants and biological activity in the root zone. Planter boxes should be planted with appropriately selected vegetation.

Figure 5: Planter Box

Source: LA Team Effort

Overflow

An overflow route is needed in the Bioretention Facility design to bypass stored runoff from storm events larger than V_{BMP} or in the event of facility or subdrain clogging. Overflow systems must connect to an acceptable discharge point, such as a downstream conveyance system as shown in Figure 1 and Figure 4. The inlet to the overflow structure shall be elevated inside the Bioretention Facility to be flush with the ponding surface for the design capture volume (V_{BMP}) as shown in Figure 4. This will allow the design capture volume to be fully treated by the Bioretention Facility, and for larger events to safely be conveyed to downstream systems. The overflow inlet shall **<u>not</u>** be located in the entrance of a Bioretention Facility, as shown in Figure 6.

Underdrain Gravel and Pipes

An underdrain gravel layer and pipes shall be provided in accordance with Appendix B – Underdrains.

Figure 6: Incorrect Placement of an Overflow Inlet.

Inspection and Maintenance Schedule

The Bioretention Facility area shall be inspected for erosion, dead vegetation, soggy soils, or standing water. The use of fertilizers and pesticides on the plants inside the Bioretention Facility should be minimized.

Schedule	Activity
Ongoing	• Keep adjacent landscape areas maintained. Remove clippings from landscape maintenance activities. • Remove trash and debris • Replace damaged grass and/or plants • Replace surface mulch layer as needed to maintain a 2-3 inch soil cover.
After storm events	• Inspect areas for ponding
Annually	• Inspect/clean inlets and outlets

Bioretention Facility Design Procedure

1) Enter the area tributary, A_T, to the Bioretention Facility.

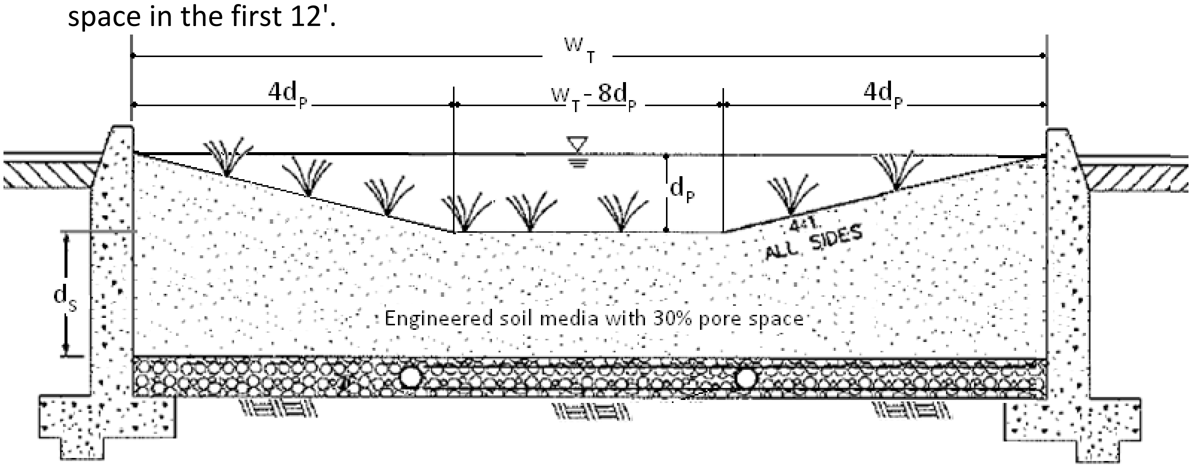
2) Enter the Design Volume, $V_{BMP,}$ determined from Section 2.1 of this Handbook.

3) Select the type of design used. There are two types of Bioretention Facility designs: the standard design used for most project sites that include side slopes, and the modified design used when the BMP is located perpendicular to the parking spaces or with planter boxes that do not use side slopes.

4) Enter the depth of the engineered soil media, d_S. The minimum depth for the engineered soil media can be 18' in limited cases, but it is recommended to use 24' or a preferred 36' to provide an adequate root zone for the chosen plant palette. Engineered soil media deeper than 36' will only get credit for the pore space in the first 36'.

5) Enter the top width of the Bioretention Facility.

6) Calculate the total effective depth, d_E, within the Bioretention Facility. The maximum allowable pore space of the soil media is 30% while the maximum allowable pore space for the gravel layer is 40%. Gravel layer deeper than 12' will only get credit for the pore space in the first 12'.



a. For the design with side slopes the following equation shall be used to determine the total effective depth. Where, d_P is the depth of ponding within the basin.

$$d_E(\text{ft}) = \frac{0.3 \times \left[\left(w_T(\text{ft}) \times d_S(\text{ft})\right) + 4\left(d_P(\text{ft})\right)^2\right] + 0.4 \times 1(\text{ft}) + d_P(\text{ft})\left[4d_P(\text{ft}) + \left(w_T(\text{ft}) - 8d_P(\text{ft})\right)\right]}{w_T(\text{ft})}$$

This above equation can be simplified if the maximum ponding depth of 0.5' is used. The equation below is used on the worksheet to find the minimum area required for the Bioretention Facility:

$$d_E(\text{ft}) = (0.3 \times d_S(\text{ft}) + 0.4 \text{ x } 1(\text{ft})) - \left(\frac{0.7\ (\text{ft}^2)}{w_T(\text{ft})}\right) + 0.5(\text{ft})$$

b. For the design without side slopes the following equation shall be used to determine the total effective depth:

$$d_E(ft) = d_P(ft) + [(0.3) \times d_S(ft) + (0.4) \times 1(ft)]$$

The equation below, using the maximum ponding depth of 0.5', is used on the worksheet to find the minimum area required for the Bioretention Facility:

$$d_E(ft) = 0.5\ (ft) + [(0.3) \times d_S(ft) + (0.4) \times 1(ft)]$$

7) Calculate the minimum surface area, A_M, required for the Bioretention Facility. This does not include the curb surrounding the Bioretention Facility or side slopes.

$$A_M(ft^2) = \frac{V_{BMP}(ft^3)}{d_E\ (ft)}$$

8) Enter the proposed surface area. This area shall not be less than the minimum required surface area.

9) Verify that side slopes are no steeper than 4:1 in the standard design, and are not required in the modified design.

10) Provide the diameter, minimum 6 inches, of the perforated underdrain used in the Bioretention Facility. See Appendix B for specific information regarding perforated pipes.

11) Provide the slope of the site around the Bioretention Facility, if used. The maximum slope is 3 percent for a standard design.

12) Provide the check dam spacing, if the site around the Bioretention Facility is sloped.

13) Describe the vegetation used within the Bioretention Facility.

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County of Los Angeles Public Works. Stormwater Best Management Practice Design and Maintenance Manual. Los Angeles, 2009.

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United States Environmental Protection Agency. Storm Water Technology Fact Sheet Bioretention. Washington D.C, 1999.

Urban Drainage and Flood Control District. Urban Storm Drainage Criteria Manual Volume 3 - Best Management Practices. Vol. 3. Denver, 2008. 3 vols.

Urbonas, Ben R. Stormwater Sand Filter Sizing and Design: A Unit Operations Approach. Denver: Urban Drainage and Flood Control District, 2002.

Site Design & Landscape Planning SD-10

Design Objectives

- ☑ Maximize Infiltration
- ☑ Provide Retention
- ☑ Slow Runoff
- ☑ Minimize Impervious Land Coverage
- Prohibit Dumping of Improper Materials
- Contain Pollutants
- Collect and Convey

Description

Each project site possesses unique topographic, hydrologic, and vegetative features, some of which are more suitable for development than others. Integrating and incorporating appropriate landscape planning methodologies into the project design is the most effective action that can be done to minimize surface and groundwater contamination from stormwater.

Approach

Landscape planning should couple consideration of land suitability for urban uses with consideration of community goals and projected growth. Project plan designs should conserve natural areas to the extent possible, maximize natural water storage and infiltration opportunities, and protect slopes and channels.

Suitable Applications

Appropriate applications include residential, commercial and industrial areas planned for development or redevelopment.

Design Considerations

Design requirements for site design and landscapes planning should conform to applicable standards and specifications of agencies with jurisdiction and be consistent with applicable General Plan and Local Area Plan policies.

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Designing New Installations

Begin the development of a plan for the landscape unit with attention to the following general principles:

- Formulate the plan on the basis of clearly articulated community goals. Carefully identify conflicts and choices between retaining and protecting desired resources and community growth.

- Map and assess land suitability for urban uses. Include the following landscape features in the assessment: wooded land, open unwooded land, steep slopes, erosion-prone soils, foundation suitability, soil suitability for waste disposal, aquifers, aquifer recharge areas, wetlands, floodplains, surface waters, agricultural lands, and various categories of urban land use. When appropriate, the assessment can highlight outstanding local or regional resources that the community determines should be protected (e.g., a scenic area, recreational area, threatened species habitat, farmland, fish run). Mapping and assessment should recognize not only these resources but also additional areas needed for their sustenance.

Project plan designs should conserve natural areas to the extent possible, maximize natural water storage and infiltration opportunities, and protect slopes and channels.

Conserve Natural Areas during Landscape Planning

If applicable, the following items are required and must be implemented in the site layout during the subdivision design and approval process, consistent with applicable General Plan and Local Area Plan policies:

- Cluster development on least-sensitive portions of a site while leaving the remaining land in a natural undisturbed condition.

- Limit clearing and grading of native vegetation at a site to the minimum amount needed to build lots, allow access, and provide fire protection.

- Maximize trees and other vegetation at each site by planting additional vegetation, clustering tree areas, and promoting the use of native and/or drought tolerant plants.

- Promote natural vegetation by using parking lot islands and other landscaped areas.

- Preserve riparian areas and wetlands.

Maximize Natural Water Storage and Infiltration Opportunities Within the Landscape Unit

- Promote the conservation of forest cover. Building on land that is already deforested affects basin hydrology to a lesser extent than converting forested land. Loss of forest cover reduces interception storage, detention in the organic forest floor layer, and water losses by evapotranspiration, resulting in large peak runoff increases and either their negative effects or the expense of countering them with structural solutions.

- Maintain natural storage reservoirs and drainage corridors, including depressions, areas of permeable soils, swales, and intermittent streams. Develop and implement policies and regulations to discourage the clearing, filling, and channelization of these features. Utilize them in drainage networks in preference to pipes, culverts, and engineered ditches.

- Evaluating infiltration opportunities by referring to the stormwater management manual for the jurisdiction and pay particular attention to the selection criteria for avoiding groundwater contamination, poor soils, and hydrogeological conditions that cause these facilities to fail. If necessary, locate developments with large amounts of impervious surfaces or a potential to produce relatively contaminated runoff away from groundwater recharge areas.

Protection of Slopes and Channels during Landscape Design

- Convey runoff safely from the tops of slopes.
- Avoid disturbing steep or unstable slopes.
- Avoid disturbing natural channels.
- Stabilize disturbed slopes as quickly as possible.
- Vegetate slopes with native or drought tolerant vegetation.
- Control and treat flows in landscaping and/or other controls prior to reaching existing natural drainage systems.
- Stabilize temporary and permanent channel crossings as quickly as possible, and ensure that increases in run-off velocity and frequency caused by the project do not erode the channel.
- Install energy dissipaters, such as riprap, at the outlets of new storm drains, culverts, conduits, or channels that enter unlined channels in accordance with applicable specifications to minimize erosion. Energy dissipaters shall be installed in such a way as to minimize impacts to receiving waters.
- Line on-site conveyance channels where appropriate, to reduce erosion caused by increased flow velocity due to increases in tributary impervious area. The first choice for linings should be grass or some other vegetative surface, since these materials not only reduce runoff velocities, but also provide water quality benefits from filtration and infiltration. If velocities in the channel are high enough to erode grass or other vegetative linings, riprap, concrete, soil cement, or geo-grid stabilization are other alternatives.
- Consider other design principles that are comparable and equally effective.

Redeveloping Existing Installations

Various jurisdictional stormwater management and mitigation plans (SUSMP, WQMP, etc.) define "redevelopment" in terms of amounts of additional impervious area, increases in gross floor area and/or exterior construction, and land disturbing activities with structural or impervious surfaces. The definition of " redevelopment" must be consulted to determine whether or not the requirements for new development apply to areas intended for redevelopment. If the definition applies, the steps outlined under "designing new installations" above should be followed.

Redevelopment may present significant opportunity to add features which had not previously been implemented. Examples include incorporation of depressions, areas of permeable soils, and swales in newly redeveloped areas. While some site constraints may exist due to the status of already existing infrastructure, opportunities should not be missed to maximize infiltration, slow runoff, reduce impervious areas, disconnect directly connected impervious areas.

Other Resources

A Manual for the Standard Urban Stormwater Mitigation Plan (SUSMP), Los Angeles County Department of Public Works, May 2002.

Stormwater Management Manual for Western Washington, Washington State Department of Ecology, August 2001.

Model Standard Urban Storm Water Mitigation Plan (SUSMP) for San Diego County, Port of San Diego, and Cities in San Diego County, February 14, 2002.

Model Water Quality Management Plan (WQMP) for County of Orange, Orange County Flood Control District, and the Incorporated Cities of Orange County, Draft February 2003.

Ventura Countywide Technical Guidance Manual for Stormwater Quality Control Measures, July 2002.

Roof Runoff Controls   SD-11

Rain Garden

Design Objectives

- ☑ Maximize Infiltration
- ☑ Provide Retention
- ☑ Slow Runoff
- Minimize Impervious Land Coverage
- Prohibit Dumping of Improper Materials
- ☑ Contain Pollutants
- Collect and Convey

Description

Various roof runoff controls are available to address stormwater that drains off rooftops. The objective is to reduce the total volume and rate of runoff from individual lots, and retain the pollutants on site that may be picked up from roofing materials and atmospheric deposition. Roof runoff controls consist of directing the roof runoff away from paved areas and mitigating flow to the storm drain system through one of several general approaches: cisterns or rain barrels; dry wells or infiltration trenches; pop-up emitters, and foundation planting. The first three approaches require the roof runoff to be contained in a gutter and downspout system. Foundation planting provides a vegetated strip under the drip line of the roof.

Approach

Design of individual lots for single-family homes as well as lots for higher density residential and commercial structures should consider site design provisions for containing and infiltrating roof runoff or directing roof runoff to vegetative swales or buffer areas. Retained water can be reused for watering gardens, lawns, and trees. Benefits to the environment include reduced demand for potable water used for irrigation, improved stormwater quality, increased groundwater recharge, decreased runoff volume and peak flows, and decreased flooding potential.

Suitable Applications

Appropriate applications include residential, commercial and industrial areas planned for development or redevelopment.

Design Considerations

Designing New Installations

Cisterns or Rain Barrels

One method of addressing roof runoff is to direct roof downspouts to cisterns or rain barrels. A cistern is an above ground storage vessel with either a manually operated valve or a permanently open outlet. Roof runoff is temporarily stored and then released for irrigation or infiltration between storms. The number of rain

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barrels needed is a function of the rooftop area. Some low impact developers recommend that every house have at least 2 rain barrels, with a minimum storage capacity of 1000 liters. Roof barrels serve several purposes including mitigating the first flush from the roof which has a high volume, amount of contaminants, and thermal load. Several types of rain barrels are commercially available. Consideration must be given to selecting rain barrels that are vector proof and childproof. In addition, some barrels are designed with a bypass valve that filters out grit and other contaminants and routes overflow to a soak-away pit or rain garden.

If the cistern has an operable valve, the valve can be closed to store stormwater for irrigation or infiltration between storms. This system requires continual monitoring by the resident or grounds crews, but provides greater flexibility in water storage and metering. If a cistern is provided with an operable valve and water is stored inside for long periods, the cistern must be covered to prevent mosquitoes from breeding.

A cistern system with a permanently open outlet can also provide for metering stormwater runoff. If the cistern outlet is significantly smaller than the size of the downspout inlet (say ¼ to ½ inch diameter), runoff will build up inside the cistern during storms, and will empty out slowly after peak intensities subside. This is a feasible way to mitigate the peak flow increases caused by rooftop impervious land coverage, especially for the frequent, small storms.

Dry wells and Infiltration Trenches

Roof downspouts can be directed to dry wells or infiltration trenches. A dry well is constructed by excavating a hole in the ground and filling it with an open graded aggregate, and allowing the water to fill the dry well and infiltrate after the storm event. An underground connection from the downspout conveys water into the dry well, allowing it to be stored in the voids. To minimize sedimentation from lateral soil movement, the sides and top of the stone storage matrix can be wrapped in a permeable filter fabric, though the bottom may remain open. A perforated observation pipe can be inserted vertically into the dry well to allow for inspection and maintenance.

In practice, dry wells receiving runoff from single roof downspouts have been successful over long periods because they contain very little sediment. They must be sized according to the amount of rooftop runoff received, but are typically 4 to 5 feet square, and 2 to 3 feet deep, with a minimum of 1-foot soil cover over the top (maximum depth of 10 feet).

To protect the foundation, dry wells must be set away from the building at least 10 feet. They must be installed in solids that accommodate infiltration. In poorly drained soils, dry wells have very limited feasibility.

Infiltration trenches function in a similar manner and would be particularly effective for larger roof areas. An infiltration trench is a long, narrow, rock-filled trench with no outlet that receives stormwater runoff. These are described under Treatment Controls.

Pop-up Drainage Emitter

Roof downspouts can be directed to an underground pipe that daylights some distance from the building foundation, releasing the roof runoff through a pop-up emitter. Similar to a pop-up irrigation head, the emitter only opens when there is flow from the roof. The emitter remains flush to the ground during dry periods, for ease of lawn or landscape maintenance.

Foundation Planting

Landscape planting can be provided around the base to allow increased opportunities for stormwater infiltration and protect the soil from erosion caused by concentrated sheet flow coming off the roof. Foundation plantings can reduce the physical impact of water on the soil and provide a subsurface matrix of roots that encourage infiltration. These plantings must be sturdy enough to tolerate the heavy runoff sheet flows, and periodic soil saturation.

Redeveloping Existing Installations

Various jurisdictional stormwater management and mitigation plans (SUSMP, WQMP, etc.) define "redevelopment" in terms of amounts of additional impervious area, increases in gross floor area and/or exterior construction, and land disturbing activities with structural or impervious surfaces. The definition of " redevelopment" must be consulted to determine whether or not the requirements for new development apply to areas intended for redevelopment. If the definition applies, the steps outlined under "designing new installations" above should be followed.

Supplemental Information

Examples

- City of Ottawa's Water Links Surface –Water Quality Protection Program
- City of Toronto Downspout Disconnection Program
- City of Boston, MA, Rain Barrel Demonstration Program

Other Resources

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Design Objectives

- ☑ Maximize Infiltration
- ☑ Provide Retention
- ☑ Slow Runoff
- Minimize Impervious Land Coverage
- Prohibit Dumping of Improper Materials
- Contain Pollutants
- Collect and Convey

Description

Irrigation water provided to landscaped areas may result in excess irrigation water being conveyed into stormwater drainage systems.

Approach

Project plan designs for development and redevelopment should include application methods of irrigation water that minimize runoff of excess irrigation water into the stormwater conveyance system.

Suitable Applications

Appropriate applications include residential, commercial and industrial areas planned for development or redevelopment. (Detached residential single-family homes are typically excluded from this requirement.)

Design Considerations

Designing New Installations

The following methods to reduce excessive irrigation runoff should be considered, and incorporated and implemented where determined applicable and feasible by the Permittee:

- Employ rain-triggered shutoff devices to prevent irrigation after precipitation.
- Design irrigation systems to each landscape area's specific water requirements.
- Include design featuring flow reducers or shutoff valves triggered by a pressure drop to control water loss in the event of broken sprinkler heads or lines.
- Implement landscape plans consistent with County or City water conservation resolutions, which may include provision of water sensors, programmable irrigation times (for short cycles), etc.

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- Design timing and application methods of irrigation water to minimize the runoff of excess irrigation water into the storm water drainage system.

- Group plants with similar water requirements in order to reduce excess irrigation runoff and promote surface filtration. Choose plants with low irrigation requirements (for example, native or drought tolerant species). Consider design features such as:

  - Using mulches (such as wood chips or bar) in planter areas without ground cover to minimize sediment in runoff

  - Installing appropriate plant materials for the location, in accordance with amount of sunlight and climate, and use native plant materials where possible and/or as recommended by the landscape architect

  - Leaving a vegetative barrier along the property boundary and interior watercourses, to act as a pollutant filter, where appropriate and feasible

  - Choosing plants that minimize or eliminate the use of fertilizer or pesticides to sustain growth

- Employ other comparable, equally effective methods to reduce irrigation water runoff.

Redeveloping Existing Installations

Various jurisdictional stormwater management and mitigation plans (SUSMP, WQMP, etc.) define "redevelopment" in terms of amounts of additional impervious area, increases in gross floor area and/or exterior construction, and land disturbing activities with structural or impervious surfaces. The definition of " redevelopment" must be consulted to determine whether or not the requirements for new development apply to areas intended for redevelopment. If the definition applies, the steps outlined under "designing new installations" above should be followed.

Other Resources

A Manual for the Standard Urban Stormwater Mitigation Plan (SUSMP), Los Angeles County Department of Public Works, May 2002.

Model Standard Urban Storm Water Mitigation Plan (SUSMP) for San Diego County, Port of San Diego, and Cities in San Diego County, February 14, 2002.

Model Water Quality Management Plan (WQMP) for County of Orange, Orange County Flood Control District, and the Incorporated Cities of Orange County, Draft February 2003.

Ventura Countywide Technical Guidance Manual for Stormwater Quality Control Measures, July 2002.

Design Objectives

- Maximize Infiltration
- Provide Retention
- Slow Runoff
- Minimize Impervious Land Coverage
- ☑ Prohibit Dumping of Improper Materials
- Contain Pollutants
- Collect and Convey

Description

Waste materials dumped into storm drain inlets can have severe impacts on receiving and ground waters. Posting notices regarding discharge prohibitions at storm drain inlets can prevent waste dumping. Storm drain signs and stencils are highly visible source controls that are typically placed directly adjacent to storm drain inlets.

Approach

The stencil or affixed sign contains a brief statement that prohibits dumping of improper materials into the urban runoff conveyance system. Storm drain messages have become a popular method of alerting the public about the effects of and the prohibitions against waste disposal.

Suitable Applications

Stencils and signs alert the public to the destination of pollutants discharged to the storm drain. Signs are appropriate in residential, commercial, and industrial areas, as well as any other area where contributions or dumping to storm drains is likely.

Design Considerations

Storm drain message markers or placards are recommended at all storm drain inlets within the boundary of a development project. The marker should be placed in clear sight facing toward anyone approaching the inlet from either side. All storm drain inlet locations should be identified on the development site map.

Designing New Installations

The following methods should be considered for inclusion in the project design and show on project plans:

- Provide stenciling or labeling of all storm drain inlets and catch basins, constructed or modified, within the project area with prohibitive language. Examples include "NO DUMPING

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– DRAINS TO OCEAN" and/or other graphical icons to discourage illegal dumping.

- Post signs with prohibitive language and/or graphical icons, which prohibit illegal dumping at public access points along channels and creeks within the project area.

Note - Some local agencies have approved specific signage and/or storm drain message placards for use. Consult local agency stormwater staff to determine specific requirements for placard types and methods of application.

Redeveloping Existing Installations

Various jurisdictional stormwater management and mitigation plans (SUSMP, WQMP, etc.) define "redevelopment" in terms of amounts of additional impervious area, increases in gross floor area and/or exterior construction, and land disturbing activities with structural or impervious surfaces. If the project meets the definition of "redevelopment", then the requirements stated under " designing new installations" above should be included in all project design plans.

Additional Information

Maintenance Considerations

- Legibility of markers and signs should be maintained. If required by the agency with jurisdiction over the project, the owner/operator or homeowner's association should enter into a maintenance agreement with the agency or record a deed restriction upon the property title to maintain the legibility of placards or signs.

Placement

- Signage on top of curbs tends to weather and fade.

- Signage on face of curbs tends to be worn by contact with vehicle tires and sweeper brooms.

Supplemental Information

Examples

- Most MS4 programs have storm drain signage programs. Some MS4 programs will provide stencils, or arrange for volunteers to stencil storm drains as part of their outreach program.

Other Resources

A Manual for the Standard Urban Stormwater Mitigation Plan (SUSMP), Los Angeles County Department of Public Works, May 2002.

Model Standard Urban Storm Water Mitigation Plan (SUSMP) for San Diego County, Port of San Diego, and Cities in San Diego County, February 14, 2002.

Model Water Quality Management Plan (WQMP) for County of Orange, Orange County Flood Control District, and the Incorporated Cities of Orange County, Draft February 2003.

Ventura Countywide Technical Guidance Manual for Stormwater Quality Control Measures, July 2002.

Fueling Areas SD-30

Photo Credit: Geoff Brosseau

Design Objectives

- ☐ Maximize Infiltration
- ☐ Provide Retention
- ☐ Slow Runoff
- ☐ Minimize Impervious Land Coverage
- ☐ Prohibit Dumping of Improper Materials
- ☑ Contain Pollutants
- ☑ Collect and Convey

Description

Fueling areas have the potential to contribute oil and grease, solvents, car battery acid, coolant and gasoline to the stormwater conveyance system. Spills at vehicle and equipment fueling areas can be a significant source of pollution because fuels contain toxic materials and heavy metals that are not easily removed by stormwater treatment devices.

Approach

Project plans must be developed for cleaning near fuel dispensers, emergency spill cleanup, containment, and leak prevention.

Suitable Applications

Appropriate applications include commercial, industrial, and any other areas planned to have fuel dispensing equipment, including retail gasoline outlets, automotive repair shops, and major non-retail dispensing areas.

Design Considerations

Design requirements for fueling areas are governed by Building and Fire Codes and by current local agency ordinances and zoning requirements. Design requirements described in this fact sheet are meant to enhance and be consistent with these code and ordinance requirements.

Designing New Installations

Covering

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Fuel dispensing areas should provide an overhanging roof structure or canopy. The cover's minimum dimensions must be equal to or greater than the area within the grade break. The cover must not drain onto the fuel dispensing area and the downspouts must be routed to prevent drainage across the fueling area. The fueling area should drain to the project's treatment control BMP(s) prior to discharging to the stormwater conveyance system. Note - If fueling large equipment or vehicles that would prohibit the use of covers or roofs, the fueling island should be designed to sufficiently accommodate the larger vehicles and equipment and to prevent stormwater run-on and runoff. Grade to direct stormwater to a dead-end sump.

Surfacing

Fuel dispensing areas should be paved with Portland cement concrete (or equivalent smooth impervious surface). The use of asphalt concrete should be prohibited. Use asphalt sealant to protect asphalt paved areas surrounding the fueling area. This provision may be made to sites that have pre-existing asphalt surfaces.

The concrete fuel dispensing area should be extended a minimum of 6.5 ft from the corner of each fuel dispenser, or the length at which the hose and nozzle assembly may be operated plus 1 ft, whichever is less.

Grading/Contouring

Dispensing areas should have an appropriate slope to prevent ponding, and be separated from the rest of the site by a grade break that prevents run-on of urban runoff. (Slope is required to be 2 to 4% in some jurisdictions' stormwater management and mitigation plans.)

Fueling areas should be graded to drain toward a dead-end sump. Runoff from downspouts/roofs should be directed away from fueling areas. Do not locate storm drains in the immediate vicinity of the fueling area.

Redeveloping Existing Installations

Various jurisdictional stormwater management and mitigation plans (SUSMP, WQMP, etc.) define "redevelopment" in terms of amounts of additional impervious area, increases in gross floor area and/or exterior construction, and land disturbing activities with structural or impervious surfaces. The definition of " redevelopment" must be consulted to determine whether or not the requirements for new development apply to areas intended for redevelopment. If the definition applies, the steps outlined under "designing new installations" above should be followed.

Additional Information

- In the case of an emergency, provide storm drain seals, such as isolation valves, drain plugs, or drain covers, to prevent spills or contaminated stormwater from entering the stormwater conveyance system.

Other Resources

A Manual for the Standard Urban Stormwater Mitigation Plan (SUSMP), Los Angeles County Department of Public Works, May 2002.

Model Standard Urban Storm Water Mitigation Plan (SUSMP) for San Diego County, Port of San Diego, and Cities in San Diego County, February 14, 2002.

Model Water Quality Management Plan (WQMP) for County of Orange, Orange County Flood Control District, and the Incorporated Cities of Orange County, Draft February 2003.

Ventura Countywide Technical Guidance Manual for Stormwater Quality Control Measures, July 2002.

Gas Station & Convenience Store

Noise Impact Study

County of Riverside, CA

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Date: 1/26/2023

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1.0 Introduction

1.1 Purpose of Analysis and Study Objectives

This purpose of this noise impact study is to evaluate the potential noise impacts for the project study area and compare results to City and CEQA thresholds. The assessment was conducted and compared to the noise standards set forth by the Federal, State and Local agencies. Consistent with the California Environmental Quality Act (CEQA) and CEQA Guidelines, a significant impact related to noise would occur if a proposed project is determined to result in:

- Exposure of persons to or generation of noise levels in excess of standards established in the local General Plan or noise ordinance, or applicable agencies.
- Exposure of persons to or generation of excessive ground-borne vibration or ground-borne noise levels.
- A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project.
- A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.

The following is provided in this report:

- A description of the study area and the proposed project
- Information regarding the fundamentals of noise
- A description of the local noise guidelines and standards
- An evaluation of the existing ambient noise environment
- An analysis of stationary noise impacts from the project site to adjacent land uses
- Construction noise and vibration evaluation

1.2 Site Location and Study Area

The project site is located at 28771 Central Ave (Hwy 74) in an unincorporated area of the County of Riverside within the Sphere of Influence of the City of Lake Elsinore, California, as shown in Exhibit A. The site is located within the County of Riverside's Elsinore Area Plan and has a current land use classification of Light Industrial. In addition, per the City of Lake Elsinore North Central Sphere Specific Plan Land Use Plan the site has a current land use classification of Business Professional. Land uses surrounding the site include vacant land to the west, a single-family residential use to and commercial uses to the north, multi-family residential uses to the south (across Highway 74), and single-family residential uses to the east (across Highway 74).

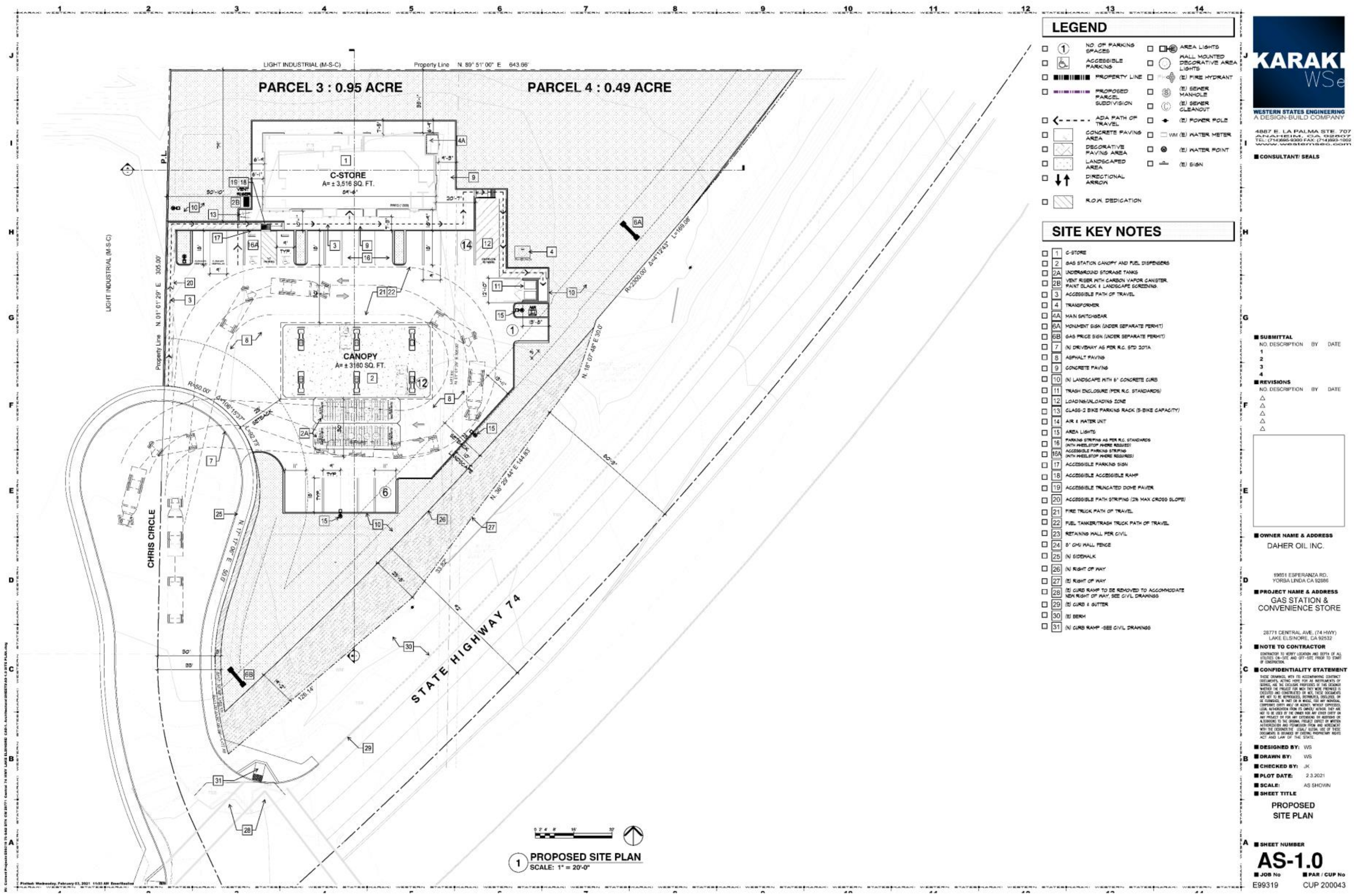
1.3 Proposed Project Description

The Project proposes to develop the approximately 1.44-acre project site with a 3,516 square foot convenience market with 12 pump gas station. Exhibit B demonstrates the site plan for the project.

Exhibit A

Location Map

Exhibit B
Site Plan



2.0 Fundamentals of Noise

This section of the report provides basic information about noise and presents some of the terms used in the report.

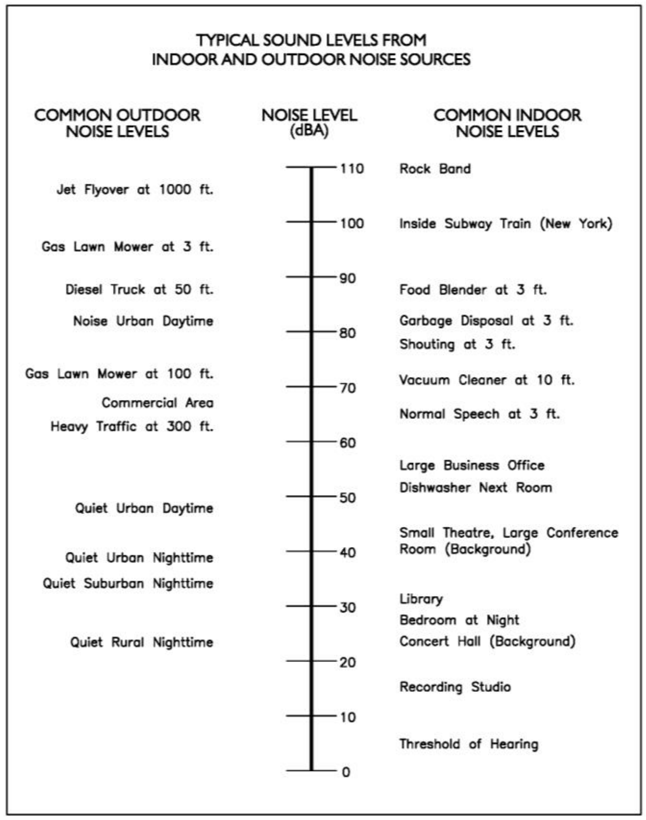
2.1 Sound, Noise and Acoustics

Sound is a disturbance created by a moving or vibrating source and is capable of being detected by the hearing organs. Sound may be thought of as mechanical energy of a moving object transmitted by pressure waves through a medium to a human ear. For traffic or stationary noise, the medium of concern is air. *Noise* is defined as sound that is loud, unpleasant, unexpected, or unwanted.

2.2 Frequency and Hertz

A continuous sound is described by its *frequency* (pitch) and its *amplitude* (loudness). Frequency relates to the number of pressure oscillations per second. Low-frequency sounds are low in pitch (bass sounding) and high-frequency sounds are high in pitch (squeak). These oscillations per second (cycles) are commonly referred to as Hertz (Hz). The human ear can hear from the bass pitch starting out at 20 Hz all the way to the high pitch of 20,000 Hz.

Exhibit C: Typical A-Weighted Noise Levels



2.3 Sound Pressure Levels and Decibels

The *amplitude* of a sound determines its loudness. The loudness of sound increases or decreases as the amplitude increases or decreases. Sound pressure amplitude is measured in units of micro-Newton per square inch meter ($\mu N/m^2$), also called micro-Pascal (µPa). One µPa is approximately one hundred billionths (0.00000000001) of normal atmospheric pressure. Sound pressure level (SPL or L_p) is used to describe in logarithmic units the ratio of actual sound pressures to a reference pressure squared. These units are called decibels, abbreviated dB. Exhibit C illustrates references sound levels for different noise sources.

2.4 Addition of Decibels

Because decibels are on a logarithmic scale, sound pressure levels cannot be added or subtracted by simple plus or minus addition. When two sounds or equal SPL are combined, they will produce an SPL 3 dB greater than the original single SPL. In other words, sound energy must be doubled to produce a 3 dB increase. If two sounds differ by approximately 10 dB, the higher sound level is the predominant sound.

2.5 Human Response to Changes in Noise Levels

In general, the healthy human ear is most sensitive to sounds between 1,000 Hz and 5,000 Hz, and it perceives a sound within that range as being more intense than a sound with a higher or lower frequency with the same magnitude. For purposes of this report as well as with most environmental documents, the A-scale weighting is typically reported in terms of A-weighted decibel (dBA), a scale designed to account for the frequency-dependent sensitivity of the ear. Typically, the human ear can barely perceive a change in noise level of 3 dB. A change in 5 dB is readily perceptible, and a change in 10 dB is perceived as being twice or half as loud. As previously discussed, a doubling of sound energy results in a 3 dB increase in sound, which means that a doubling of sound energy (e.g. doubling the volume of traffic on a highway) would result in a barely perceptible change in sound level.

2.6 Noise Descriptors

Noise in our daily environment fluctuates over time. Some noise levels occur in regular patterns, others are random. Some noise levels are constant while others are sporadic. Noise descriptors were created to describe the different time-varying noise levels.

A-Weighted Sound Level: The sound pressure level in decibels as measured on a sound level meter using the A-weighted filter network. The A-weighting filter de-emphasizes the very low and very high-frequency components of the sound in a manner similar to the response of the human ear. A numerical method of rating human judgment of loudness.

Ambient Noise Level: The composite of noise from all sources, near and far. In this context, the ambient noise level constitutes the normal or existing level of environmental noise at a given location.

Community Noise Equivalent Level (CNEL): The average equivalent A-weighted sound level during a 24-hour day, obtained after addition of five (5) decibels to sound levels in the evening from 7:00 to 10:00 PM and after addition of ten (10) decibels to sound levels in the night before 7:00 AM and after 10:00 PM.

Decibel (dB): A unit for measuring the amplitude of a sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micro-pascals.

dB(A): A-weighted sound level (see definition above).

Equivalent Sound Level (LEQ): The sound level corresponding to a steady noise level over a given sample period with the same amount of acoustic energy as the actual time-varying noise level. The energy average noise level during the sample period.

Habitable Room: Any room meeting the requirements of the Uniform Building Code, or other applicable regulations, which is intended to be used for sleeping, living, cooking or dining purposes, excluding such enclosed spaces as closets, pantries, bath or toilet rooms, service rooms, connecting corridors, laundries, unfinished attics, foyers, storage spaces, cellars, utility rooms and similar spaces.

L(n): The A-weighted sound level exceeded during a certain percentage of the sample time. For example, L10 in the sound level exceeded 10 percent of the sample time. Similarly L50, L90, and L99, etc.

Noise: *A*ny unwanted sound or sound which is undesirable because it interferes with speech and hearing, or is intense enough to damage hearing, or is otherwise annoying. The State Noise Control Act defines noise as "...excessive undesirable sound...".

Outdoor Living Area: Outdoor spaces that are associated with residential land uses typically used for passive recreational activities or other noise-sensitive uses. Such spaces include patio areas, barbecue areas, jacuzzi areas, etc. associated with residential uses; outdoor patient recovery or resting areas associated with hospitals, convalescent hospitals, or rest homes; outdoor areas associated with places of worship which have a significant role in services or other noise-sensitive activities; and outdoor school facilities routinely used for educational purposes which may be adversely impacted by noise. Outdoor areas usually not included in this definition are: front yard areas, driveways, greenbelts, maintenance areas and storage areas associated with residential land uses; exterior areas at hospitals that are not used for patient activities; outdoor areas associated with places of worship and principally used for short-term social gatherings; and, outdoor areas associated with school facilities that are not typically associated with educational uses prone to adverse noise impacts (for example, school play yard areas).

Percent Noise Levels: See L(n).

Sound Level (Noise Level): The weighted sound pressure level obtained by use of a sound level meter having a standard frequency filter for attenuating part of the sound spectrum.

Sound Level Meter: An instrument, including a microphone, an amplifier, an output meter, and frequency weighting networks for the measurement and determination of noise and sound levels.

Single Event Noise Exposure Level (SENEL): The dB(A) level which, if it lasted for one second, would produce the same A-weighted sound energy as the actual event.

2.7 Traffic Noise Prediction

Noise levels associated with traffic depends on a variety of factors: (1) volume of traffic, (2) speed of traffic, (3) auto, medium truck (2–3 axle) and heavy truck percentage (4 axle and greater), and sound propagation. The greater the volume of traffic, higher speeds and truck percentages equate to a louder volume in noise. A doubling of the Average Daily Traffic (ADT) along a roadway will increase noise levels by approximately 3 dB; reasons for this are discussed in the sections above.

2.8 Sound Propagation

As sound propagates from a source it spreads geometrically. Sound from a small, localized source (i.e., a point source) radiates uniformly outward as it travels away from the source in a spherical pattern. The sound level attenuates at a rate of 6 dB per doubling of distance. The movement of vehicles down a roadway makes the source of the sound appear to propagate from a line (i.e., line source) rather than a point source. This line source results in the noise propagating from a roadway in a cylindrical spreading versus a spherical spreading that results from a point source. The sound level attenuates for a line source at a rate of 3 dB per doubling of distance.

As noise propagates from the source, it is affected by the ground and atmosphere. Noise models use hard site (reflective surfaces) and soft site (absorptive surfaces) to help calculate predicted noise levels. Hard site conditions assume no excessive ground absorption between the noise source and the receiver. Soft site conditions such as grass, soft dirt or landscaping attenuate noise at a rate of 1.5 dB per doubling of distance. When added to the geometric spreading, the excess ground attenuation results in an overall noise attenuation of 4.5 dB per doubling of distance for a line source and 7.5 dB per doubling of distance for a point source.

Research has demonstrated that atmospheric conditions can have a significant effect on noise levels when noise receivers are located 200 feet from a noise source. Wind, temperature, air humidity, and turbulence can further impact have far sound can travel.

3.0 Ground-Borne Vibration Fundamentals

3.1 Vibration Descriptors

Ground-borne vibrations consist of rapidly fluctuating motions within the ground that have an average motion of zero. The effects of ground-borne vibrations typically only cause a nuisance to people, but at extreme vibration levels, damage to buildings may occur. Although ground-borne vibration can be felt outdoors, it is typically only an annoyance to people indoors where the associated effects of the shaking of a building can be notable. Ground-borne noise is an effect of ground-borne vibration and only exists indoors since it is produced from noise radiated from the motion of the walls and floors of a room and may also consist of the rattling of windows or dishes on shelves.

Several different methods are used to quantify vibration amplitude.

PPV – Known as the peak particle velocity (PPV) which is the maximum instantaneous peak in vibration velocity, typically given in inches per second.

RMS – Known as root mean squared (RMS) can be used to denote vibration amplitude

VdB – A commonly used abbreviation to describe the vibration level (VdB) for a vibration source.

3.2 Vibration Perception

Typically, developed areas are continuously affected by vibration velocities of 50 VdB or lower. These continuous vibrations are not noticeable to humans whose threshold of perception is around 65 VdB. Outdoor sources that may produce perceptible vibrations are usually caused by construction equipment, steel-wheeled trains, and traffic on rough roads, while smooth roads rarely produce perceptible ground-borne noise or vibration. To counter the effects of ground-borne vibration, the Federal Transit Administration (FTA) has published guidance relative to vibration impacts. According to the FTA, fragile buildings can be exposed to ground-borne vibration levels of 0.3 inches per second without experiencing structural damage.

3.3 Vibration Propagation

There are three main types of vibration propagation: surface, compression, and shear waves. Surface waves, or Rayleigh waves, travel along the ground's surface. These waves carry most of their energy along an expanding circular wavefront, similar to ripples produced by throwing a rock into a pool of water. P-waves, or compression waves, are body waves that carry their energy along an expanding spherical wavefront. The particle motion in these waves is longitudinal (i.e., in a "push-pull" fashion). P-waves are analogous to airborne sound waves. S-waves, or shear waves, are also body waves that carry energy along an expanding spherical wavefront. However, unlike P-waves, the particle motion is transverse, or side-to-side and perpendicular to the direction of propagation.

As vibration waves propagate from a source, the vibration energy decreases in a logarithmic nature and the vibration levels typically decrease by 6 VdB per doubling of the distance from the vibration source. As stated above, this drop-off rate can vary greatly depending on the soil but has been shown to be effective enough for screening purposes, in order to identify potential vibration impacts that may need to be studied through actual field tests.

4.0 Regulatory Setting

The proposed project is located in Riverside County, California and noise regulations are addressed through the efforts of various federal, state and local government agencies. The agencies responsible for regulating noise are discussed below.

4.1 Federal Regulations

The adverse impact of noise was officially recognized by the federal government in the Noise Control Act of 1972, which serves three purposes:

- Publicize noise emission standards for interstate commerce
- Assist state and local abatement efforts
- Promote noise education and research

The Federal Office of Noise Abatement and Control (ONAC) originally was tasked with implementing the Noise Control Act. However, it was eventually eliminated leaving other federal agencies and committees to develop noise policies and programs. Some examples of these agencies are as follows: The Department of Transportation (DOT) assumed a significant role in noise control through its various agencies. The Federal Aviation Agency (FAA) is responsible for regulating noise from aircraft and airports. The Federal Highway Administration (FHWA) is responsible for regulating noise from the interstate highway system. The Occupational Safety and Health Administration (OSHA) is responsible for the prohibition of excessive noise exposure to workers. The Housing and Urban Development (HUD) is responsible for establishing noise regulations as it relates to exterior/interior noise levels for new HUD-assisted housing developments near high noise areas.

The federal government advocates that local jurisdictions use their land use regulatory authority to arrange new development in such a way that “noise sensitive” uses are either prohibited from being constructed adjacent to a highway or, or alternatively that the developments are planned and constructed in such a manner that potential noise impacts are minimized.

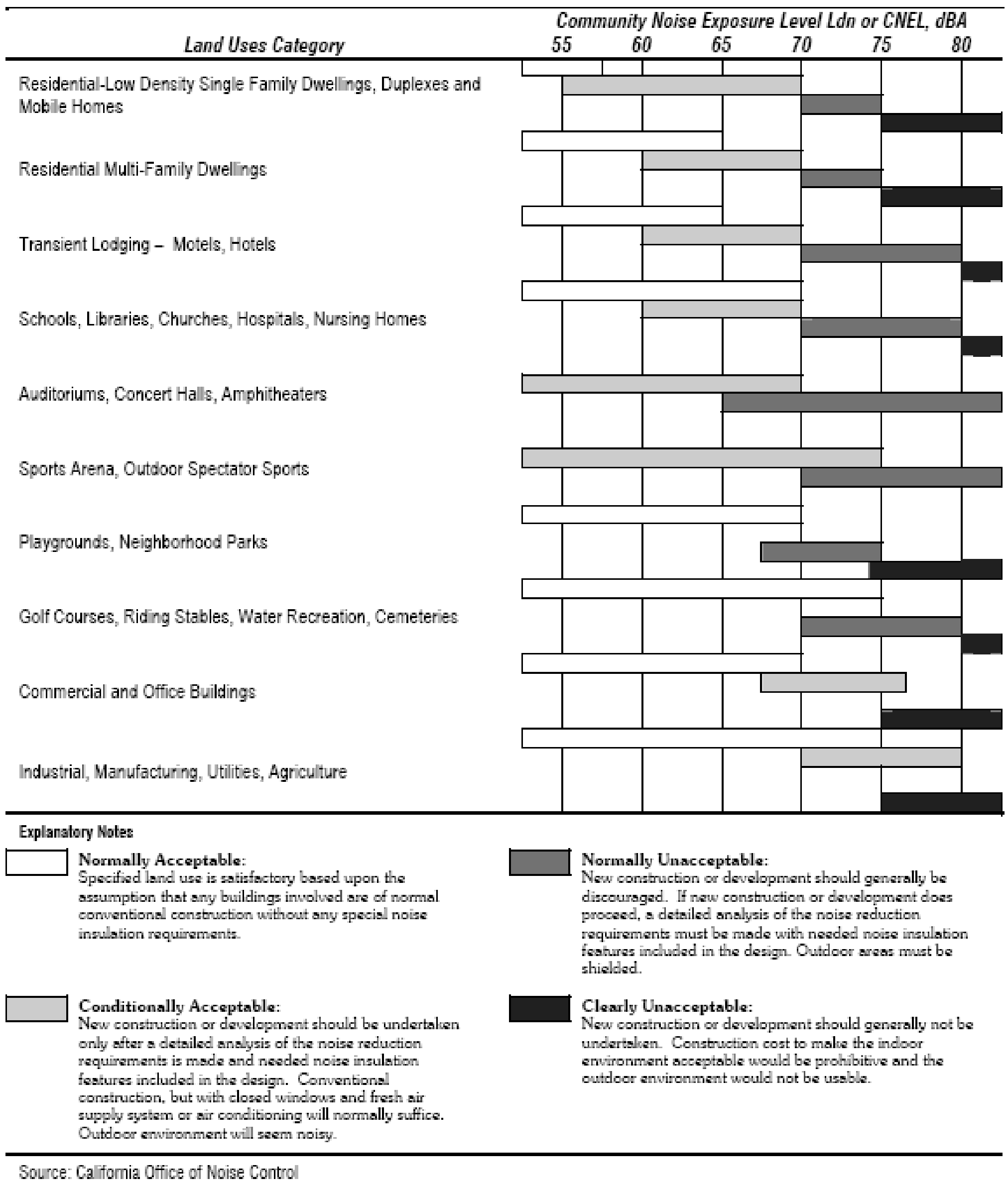
Since the federal government has preempted the setting of standards for noise levels that can be emitted by the transportation source, the City is restricted to regulating the noise generated by the transportation system through nuisance abatement ordinances and land use planning.

4.2 State Regulations

Established in 1973, the California Department of Health Services Office of Noise Control (ONC) was instrumental in developing regularity tools to control and abate noise for use by local agencies. One significant model is the “Land Use Compatibility for Community Noise Environments Matrix.” The matrix allows the local jurisdiction to clearly delineate compatibility of sensitive uses with various incremental levels of noise.

The State of California has established noise insulation standards as outlined in Title 24 and the Uniform Building Code (UBC) which in some cases requires acoustical analyses to outline exterior noise levels and to ensure interior noise levels do not exceed the interior threshold. The State mandates that the legislative body of each county and city adopt a noise element as part of its comprehensive general plan. The local noise element must recognize the land use compatibility guidelines published by the State Department of Health Services. The guidelines rank noise land use compatibility in terms of normally acceptable, conditionally acceptable, normally unacceptable, and clearly unacceptable as illustrated in Exhibit D.

Exhibit D: Land Use Compatibility Guidelines



4.3 County of Riverside Noise Regulations

The County of Riverside outlines their noise regulations and standards within the Municipal Code and the Noise Element of the County of Riverside General Plan.

County of Riverside Municipal Code

CHAPTER 9.52 –Noise Regulations

9.52.010. - Intent

At certain levels, sound becomes noise and may jeopardize the health, safety or general welfare of Riverside County residents and degrade their quality of life. Pursuant to its police power, the board of supervisors declares that noise shall be regulated in the manner described in this chapter. This chapter is intended to establish county-wide standards regulating noise. This chapter is not intended to establish thresholds of significance for the purpose of any analysis required by the California Environmental Quality Act and no such thresholds are established.
(Ord. 847 § 1, 2006)

9.52.020. - Exemptions

A. Sound emanating from the following sources is exempt from the provisions of this chapter:
B. Facilities owned or operated by or for a governmental agency;
C. Capital improvement projects of a governmental agency;
D. The maintenance or repair of public properties;
E. Public safety personnel in the course of executing their official duties, including, but not limited to, sworn peace officers, emergency personnel and public utility personnel. This exemption includes, without limitation, sound emanating from all equipment used by such personnel, whether stationary or mobile;
F. Public or private schools and school-sponsored activities;
G. Agricultural operations on land designated "Agriculture" in the Riverside County general plan, or land zoned A-l (light agriculture), A-P (light agriculture with poultry), A-2 (heavy agriculture), A-D (agriculture-dairy) or C/V (citrus/vineyard), provided such operations are carried out in a manner consistent with accepted industry standards. This exemption includes, without limitation, sound emanating from all equipment used during such operations, whether stationary or mobile;
H. Wind energy conversion systems (WECS), provided such systems comply with the WECS noise provisions of Riverside County Ordinance No. 348;
I. Private construction projects located one-quarter of a mile or more from an inhabited dwelling;
J. Private construction projects located within one-quarter of a mile from an inhabited dwelling, provided that:
   1. Construction does not occur between the hours of six p.m. and six a.m. during the months of June through September, and
   2. Construction does not occur between the hours of six p.m. and seven a.m. during the months of October through May;
K. Property maintenance, including, but not limited to, the operation of lawnmowers, leaf blowers, etc., provided such maintenance occurs between the hours of seven a.m. and eight p.m.;
L. Motor vehicles, other than off-highway vehicles. This exemption does not include sound emanating from motor vehicle sound systems;

M. Heating and air conditioning equipment;
Safety, warning and alarm devices, including, but not limited to, house and car alarms, and other warning devices that are designed to protect the public health, safety, and welfare;
N. The discharge of firearms consistent with all state laws.

(Ord. 847 § 2, 2006)

County of Riverside – Noise Ordinance

No person shall create any sound, or allow the creation of any sound, on any property that causes the exterior sound level on any other occupied property to exceed the sound level standards set forth in Table 1.

Table 1: Riverside County Allowable Exterior Noise Level[1]

Sound Level Standards (dBA Leq)*

General Plan Land Use Designation	Maximum Decibel Level	
	7 a.m. - 10 p.m.	10 p.m. - 7 a.m.
Light Industrial	75	55
Residential	65	45

(Ord. 847 § 4, 2006)

County of Riverside General Plan

Goals, Policies, and Implementation Measures

Policies, goals and implementation program measures from the Noise Element that would mitigate potential impacts on noise include the following.

N2.1 Create a County Noise Inventory to identify major noise generators and noise-sensitive land uses, and to establish appropriate noise mitigation strategies.

N2.2 Require a qualified acoustical specialist to prepare acoustical studies for proposed noise-sensitive projects within noise impacted areas to mitigate existing noise.

N2.3 Mitigate exterior and interior noises to the levels listed in the table below to the extent feasible, for stationary sources

City of Lake Elsinore Municipal Code

CHAPTER 17.176 - NOISE CONTROL

Sec. 17.176.010. - Purpose

In order to control unnecessary, excessive and annoying noise and vibration in the City, it is hereby declared to be the policy of the City to prohibit such noise and vibration generated from or by all sources as specified in this chapter. It shall be the policy of the City to maintain quiet in those areas which exhibit low noise levels and to implement programs aimed at reducing noise in those areas within the City where noise levels are above acceptable values.

It is determined that certain noise levels and vibrations are detrimental to the public health, welfare and safety, and are contrary to public interest. Therefore, the City Council does ordain and declare that creating, maintaining, causing or allowing to be created, caused or maintained, any noise or vibration in a manner prohibited by or not in conformity with the provisions of this chapter, is a public nuisance and shall be punishable as such.

[Ord. 772 § 17.78.010, 1986. Code 1987 § 17.78.010].

City of Lake Elsinore – Noise Ordinance

Section 17.176.060 from the noise ordinance outlines the City's exterior noise limits as it relates to stationary noise sources.

Table 2: Lake Elsinore Allowable Exterior Noise Level[1]

Sound Level Standards (dBA Leq)*

General Plan Land Use Designation	Maximum Decibel Level	
	7 a.m. - 10 p.m.	10 p.m. - 7 a.m.
Single-Family Residential	50	40
Multiple Dwelling Residential	50	45
Commercial and Office	60	55
General Commercial	65	60
Light Industrial	70	70
Heavy Industrial	75	75

(Ord. 772 § 17.78.060, 1986. Code 1987 § 17.78.060)

5.0 Study Method and Procedure

The following section describes the noise modeling procedures and assumptions used for this assessment.

5.1 Noise Measurement Procedure and Criteria

Noise measurements are taken to determine the existing noise levels. A noise receiver or receptor is any location in the noise analysis in which noise might produce an impact. The following criteria are used to select measurement locations and receptors:

- Locations expected to receive the highest noise impacts, such as the first row of houses
- Locations that are acoustically representative and equivalent of the area of concern
- Human land usage
- Sites clear of major obstruction and contamination

MD conducted the sound level measurements in accordance to the City's and Caltrans (TeNS) technical noise specifications. All measurement equipment meets American National Standards Institute (ANSI) specifications for sound level meters (S1.4-1983 identified in Chapter 19.68.020.AA). The following gives a brief description of the Caltrans Technical Noise Supplement procedures for sound level measurements:

- Microphones for sound level meters were placed 5-feet above the ground for all measurements
- Sound level meters were calibrated (Larson Davis CAL 200) before and after each measurement
- Following the calibration of equipment, a windscreen was placed over the microphone
- Frequency weighting was set on "A" and slow response
- Results of the long-term noise measurements were recorded on field data sheets
- During any short-term noise measurements, any noise contaminations such as barking dogs, local traffic, lawn mowers, or aircraft fly-overs were noted
- Temperature and sky conditions were observed and documented

5.2 Noise Measurement Locations

Noise monitoring locations were selected based on the nearest sensitive receptors relative to the proposed onsite noise sources. one (1) long-term 24-hour noise measurements was conducted at or near the project site and are illustrated in Exhibit E. Appendix A includes photos, field sheet, and measured noise data.

5.3 Stationary Noise Modeling

SoundPLAN (SP) acoustical modeling software was utilized to model future worst-case stationary noise impacts to the adjacent land uses. SP is capable of evaluating multiple stationary noise source impacts at various receiver locations. SP's software utilizes algorithms (based on the inverse square law and reference equipment noise level data) to calculate noise level projections. The software allows the user to input specific noise sources, spectral content, sound barriers, building placement, topography, and sensitive receptor locations.

The future worst-case noise level projections were modeled using referenced sound level data for the various stationary on-site sources (parking spaces, and gas canopy). The model assumes approximately 22 parking spots and 6 fueling stations under the gas canopy.

The gas canopy was modeled as an area source with a reference level of 65 dBA. The reference equipment sound level data is provided in Appendix B. This includes average noise levels associated with the closing of car doors, turning on/off vehicles, low voltage speakers associated with the gas canopy, and talking.

The SP model assumes that all noise sources are operating simultaneously (worst-case scenario), when in actuality the noise will be intermittent and lower in noise level. SP modeling inputs and outputs ate provided in Appendix C.

5.4 FHWA Traffic Noise Prediction Model

Traffic noise from vehicular traffic was projected using a computer program that replicates the FHWA Traffic Noise Prediction Model (FHWA-RD-77-108). The FHWA model arrives at the predicted noise level through a series of adjustments to the Reference Energy Mean Emission Level (REMEL). Roadway volumes and percentages correspond to the project's traffic scoping agreement as prepared by Integrated Engineering Group, the City's traffic counts, and roadway classification. The referenced traffic data was applied to the model and is in Appendix B. The following outlines the key adjustments made to the REMEL for the roadway inputs:

- Roadway classification – (e.g. freeway, major arterial, arterial, secondary, collector, etc),
- Roadway Active Width – (distance between the center of the outer most travel lanes on each side of the roadway)
- Average Daily Traffic Volumes (ADT), Travel Speeds, Percentages of automobiles, medium trucks and heavy trucks
- Roadway grade and angle of view
- Site Conditions (e.g. soft vs. hard)
- Percentage of total ADT which flows each hour through-out a 24-hour period

Table 3 indicates the roadway parameters and vehicle distribution utilized for this study.

<Table 3 Next Page>

Table 3: Roadway Parameters and Vehicle Distribution

Roadway	Segment	Existing ADT	Existing Plus Project ADT	Speed (MPH)	Site Conditions
SH-74/Central Ave	Ardenwood Way to Conard Ave	36,267	36,875	40	Hard
Vehicle Distribution (Truck Mix)[2]					
Motor-Vehicle Type		**Daytime % (7AM to 7 PM)**	**Evening % (7 PM to 10 PM)**	**Night % (10 PM to 7 AM)**	**Total % of Traffic Flow**
Automobiles		75.5	14.0	10.5	97.42
Medium Trucks		48.9	2.2	48.9	1.84
Heavy Trucks		47.3	5.4	47.3	0.74

Notes:
[1] Integrated Engineering Group (Central Avenue Commercial Retails), and The City's traffic counts.

The following outlines key adjustments to the REMEL for project site parameter inputs:

- Vertical and horizontal distances (Sensitive receptor distance from noise source)
- Noise barrier vertical and horizontal distances (Noise barrier distance from sound source and receptor).
- Traffic noise source spectra
- Topography

5.5 FHWA Roadway Construction Noise Model

The construction noise analysis utilizes the Federal Highway Administration (FHWA) Roadway Construction Noise Model (RNCM), together with several key construction parameters. Key inputs include distance to the sensitive receiver, equipment usage, % usage factor, and baseline parameters for the project site.

The project was analyzed based on the different construction phases. Construction noise is expected to be loudest during the grading, concrete and building phases of construction. The construction noise calculation output worksheet is located in Appendix E. The following assumptions relevant to short-term construction noise impacts were used:

- It is estimated that construction will occur over a 6-month time period. Construction noise is expected to be the loudest during the grading, concrete, and building phases.

Exhibit E
Measurement Locations

1 = short-term Monitoring Location

6.0 Existing Noise Environment

A twenty-four (24) hour ambient noise measurement was conducted at the property site. The noise measurement location was chosen based on the similar horizontal distance from the centerline of Central Avenue from the residential uses to the east. The noise measurement was taken to determine the existing ambient noise levels. Noise data indicates that traffic along SH-74/Central Avenue is the primary source of noise impacting the site and the adjacent uses. This assessment utilizes the ambient noise data as a basis and compares project operational levels to said data.

6.1 Long-Term Noise Measurement Results

The results of the Long-term noise data are presented in Table 4.

Table 4: Long-Term Noise Measurement Data[1]

Date	Time	dB(A)							
		L_{EQ}	L_{MAX}	L_{MIN}	L_2	L_8	L_{25}	L_{50}	L_{90}
1/6/2021	7PM-8PM	67.8	89.8	50.9	76.7	72.7	71.0	62.6	56.0
7/20/2020	8PM-9PM	66.7	88.7	49.8	75.6	71.6	69.9	61.5	54.9
7/20/2020	9PM-10PM	66.0	88.0	49.1	74.9	70.9	69.2	60.8	54.2
7/20/2020	10PM-11PM	65.0	87.0	48.1	73.9	69.9	68.2	59.8	53.2
7/20/2020	11PM-12AM	64.4	86.4	47.5	73.3	69.3	67.6	59.2	52.6
7/20/2020	12AM-1AM	62.8	84.8	45.9	71.7	67.7	66.0	57.6	51.0
7/20/2020	1AM-2AM	60.4	82.4	43.5	69.3	65.3	63.6	55.2	48.6
7/20/2020	2AM-3AM	59.1	81.1	42.2	68.0	64.0	62.3	53.9	47.3
7/20/2020	3AM-4AM	57.4	79.4	40.5	66.3	62.3	60.6	52.2	45.6
7/20/2020	4AM-5AM	58.4	80.4	41.5	67.3	63.3	61.6	53.2	46.6
7/21/2020	5AM-6AM	62.2	84.2	45.3	71.1	67.1	65.4	57.0	50.4
7/21/2020	6AM-7AM	68.6	90.6	51.7	77.5	73.5	71.8	63.4	56.8
7/21/2020	7AM-8AM	70.9	92.9	54.0	79.8	75.8	74.1	65.7	59.1
7/21/2020	8AM-9AM	69.0	91.0	52.1	77.9	73.9	72.2	63.8	57.2
7/21/2020	9AM-10AM	68.0	90.0	51.1	76.9	72.9	71.2	62.8	56.2
7/21/2020	10AM-11AM	67.9	89.9	51.0	76.8	72.8	71.1	62.7	56.1
7/21/2020	11AM-12PM	68.1	90.1	51.2	77.0	73.0	71.3	62.9	56.3
7/21/2020	12PM-1PM	68.2	90.2	51.3	77.1	73.1	71.4	63.0	56.4
7/21/2020	1PM-2PM	68.3	90.3	51.4	77.2	73.2	71.5	63.1	56.5
7/21/2020	2PM-3PM	68.5	90.5	51.6	77.4	73.4	71.7	63.3	56.7
7/21/2020	3PM-4PM	69.7	91.7	52.8	78.6	74.6	72.9	64.5	57.9
7/21/2020	4PM-5PM	71.2	93.2	54.3	80.1	76.1	74.4	66.0	59.4
7/21/2020	5PM-6PM	70.9	92.9	54.0	79.8	75.8	74.1	65.7	59.1
7/21/2020	6PM-7PM	69.1	91.1	52.2	78.0	74.0	72.3	63.9	57.3
LDN		71.6							

Notes:
1. Long-term noise monitoring location (LT1) is illustrated in Exhibit E. The quietest hourly nighttime noise interval is highlighted in blue when project operations could occur.

Noise data indicates the ambient noise level ranged between 57.4 dBA Leq(h) to 70.9 dBA Leq(h) at the project site. Maximum levels reach 70.9 dBA as a result of traffic along SH-74/Central Avenue. Additional field notes and photographs are provided in Appendix A.

For this evaluation, MD has utilized the quietest hourly level (during potential operational hours) and has compared the project's projected noise levels to the said ambient level. The quietest (lowest) nighttime hourly level occurred between 3AM to 4AM (57.4 dBA, Leq(h)).

7.0 Future Noise Environment Impacts and Mitigation

This assessment analyzes future noise impacts as a result of the project. The analysis details the estimated exterior noise levels. Stationary noise impacts are analyzed from the on-site noise sources such as cars coming and going, and drive-thru restaurant speakerphone.

7.1 Future Exterior Noise

The following outlines the exterior noise levels associated with the proposed project.

7.1.1 Noise Impacts to Off-Site Receptors Due to Stationary Sources

Sensitive receptors that may be affected by project operational noise include commercial and residential to the north and single family residential to the east (across Highway 74) and multi-family residential uses to the southeast (across Highway 74). The worst-case stationary noise was modeled using SoundPLAN acoustical modeling software. Worst-case assumes that all project activities are always operational when in reality the noise will be intermittent and cycle on/off depending on customer usage. Project convenience store and gas pumps are anticipated to be operational 24-hours a day.

A total of four (4) receptors were modeled to evaluate the proposed project's operational impact. A receptor is denoted by a yellow dot. All yellow dots represent either a property line or a sensitive receptor such as an outdoor sensitive area (courtyard, patio, backyard, etc).

This study compares the Project's operational noise levels to two (2) different noise assessment scenarios: 1) Project Only operational noise level projections, 2) Project plus ambient noise level projections.

Project Operational Noise Levels

Exhibit F shows the "project only" operational noise levels at the project site and illustrates how the noise will propagate at the property lines and/or sensitive receptor area. Operational noise levels at the adjacent uses are anticipated to range between 40 dBA to 53 dBA Leq (depending on the location).

Project Plus Ambient Operational Noise Levels

Table 5 demonstrates the project plus the ambient noise levels. Project plus ambient noise level projections are anticipated to range between 57 to 59 dBA Leq depending on location. Therefore, the project has been compared to the quietest hourly average ambient noise level for comparative purposes.

<Table 5 on Next Page>

Table 5: Worst-case Predicted Noise Level (dBA, Leq)

Receptor[1]	Floor	Existing Ambient Noise Level (dBA, Leq)[2]	Project Noise Level (dBA, Leq)[3]	Total Combined Noise Level (dBA, Leq)	Nighttime (10PM – 7AM) Stationary Noise Limit (dBA, Leq)[4]	Change in Noise Level as Result of Project
1	1	57	40	57	**45**	0.1
2	1		53	59	**55**	1.4
3	1		40	57	**40**	0.1
4	1		40	57	**45**	0.1

Notes:
1. Receptors 1 is the nearest north property approximately 140' from the site, Receptor-2 is the west property line of the site. R1 and R2 follow the County of Riverside Ordinance. Receptor 3 is the nearest property line to the east 200' to the east, Receptor-4 is the nearest southern property 225' from the site, both R3 and R4 follow the City of Lake Elsinore Ordinance.
2. Existing ambient taken as one-hour measurement.
3. See Exhibit G for the operational noise level projections at said receptors.
4. Per the County of Riverside noise ordinance Chapter 9.52 and the City of Lake Elsinore Municipal Code Section 17.176.060.

As shown in Table 5, the project does not exceed the County of Riverside and City of Lake Elsinore's nighttime exterior noise limits. The predicted exterior noise level will range between 40 to 53 dBA. Project operations are anticipated to remain below the County and City respective noise limits. Therefore, the impact is less than significant.

When comparing the baseline plus project condition the change in noise level will be between 0.1 to 1.4 dBA, Leq as shown in Table 5.

Table 6 provides the characteristics associated with changes in noise levels.

Table 6: Change in Noise Level Characteristics[1]

Changes in Intensity Level, dBA	Changes in Apparent Loudness
1	Not perceptible
3	Just perceptible
5	Clearly noticeable
10	Twice (or half) as loud

https://www.fhwa.dot.gov/environMent/noise/regulations_and_guidance/polguide/polguide02.cfm

The change in noise level at all receptors would fall within the "Not Perceptible" acoustic characteristic. Therefore, the impact would be considered less than significant.

7.1.2 Noise Impacts to Off Site Receptors Due to Project Generated Traffic

A worst-case project generated traffic noise level was modeled utilizing the FHWA Traffic Noise Prediction Model - FHWA-RD-77-108. Traffic noise levels were calculated 50 feet from the centerline of the analyzed roadway. The modeling is theoretical and does not take into account any existing barriers, structures, and/or topographical features that may further reduce noise levels. Therefore, the levels are shown for comparative purposes only to show the difference with and without project conditions. In addition, the noise contours for 60, 65 and 70 dBA CNEL were calculated. The potential off-site noise impacts caused by an increase of traffic from operation of the proposed project on the nearby roadways were calculated for the following scenarios:

Existing Year (without Project): This scenario refers to existing year traffic noise conditions.

Existing Year (Plus Project): This scenario refers to existing year + project traffic noise conditions.

Table 7 compares the without and with project scenario and shows the change in traffic noise levels as a result of the proposed project. It takes a change of 3 dB or more to hear a perceptible difference. As demonstrated in Table 6, the project is anticipated to change the noise 0.1 dBA CNEL.

The County of Riverside uses the FICON Approach. Because the ambient noise condition is over 65 dBA the noise is allowed a 1.5 dB increase. Although there is an increase in traffic noise levels the impact is considered less than significant as the noise levels at or near any existing proposed sensitive receptor would be 73.2 dBA and increase less than 1.5 dB. Therefore, no further mitigation is required.

Table 7: Existing Scenario - Noise Levels Along Roadways (dBA CNEL)

Existing Without Project Exterior Noise Levels

Roadway	Segment	CNEL at 50 Ft (dBA)	Distance to Contour (Ft)			
			70 dBA CNEL	65 dBA CNEL	60 dBA CNEL	55 dBA CNEL
SH-74/Central Ave	Ardenwood Way to Conard Ave	73.2	81	175	377	812

Existing With Project Exterior Noise Levels

Roadway	Segment	CNEL at 50 Ft (dBA)	Distance to Contour (Ft)			
			70 dBA CNEL	65 dBA CNEL	60 dBA CNEL	55 dBA CNEL
SH-74/Central Ave	Ardenwood Way to Conard Ave	73.2	82	177	380	819

Change in Existing Noise Levels as a Result of Project

Roadway[1]	Segment	CNEL at 50 Feet dBA[2]			
		Existing Without Project	Existing With Project	Change in Noise Level	Potential Significant Impact
SH-74/Central Ave	Ardenwood Way to Conard Ave	73.2	73.2	0.0	No

Notes:
[1] Exterior noise levels calculated at 5 feet above ground level.
[2] Noise levels calculated from centerline of subject roadway.

7.1.3 Noise Impacts to On Site Receptors Due to Project Generated Traffic

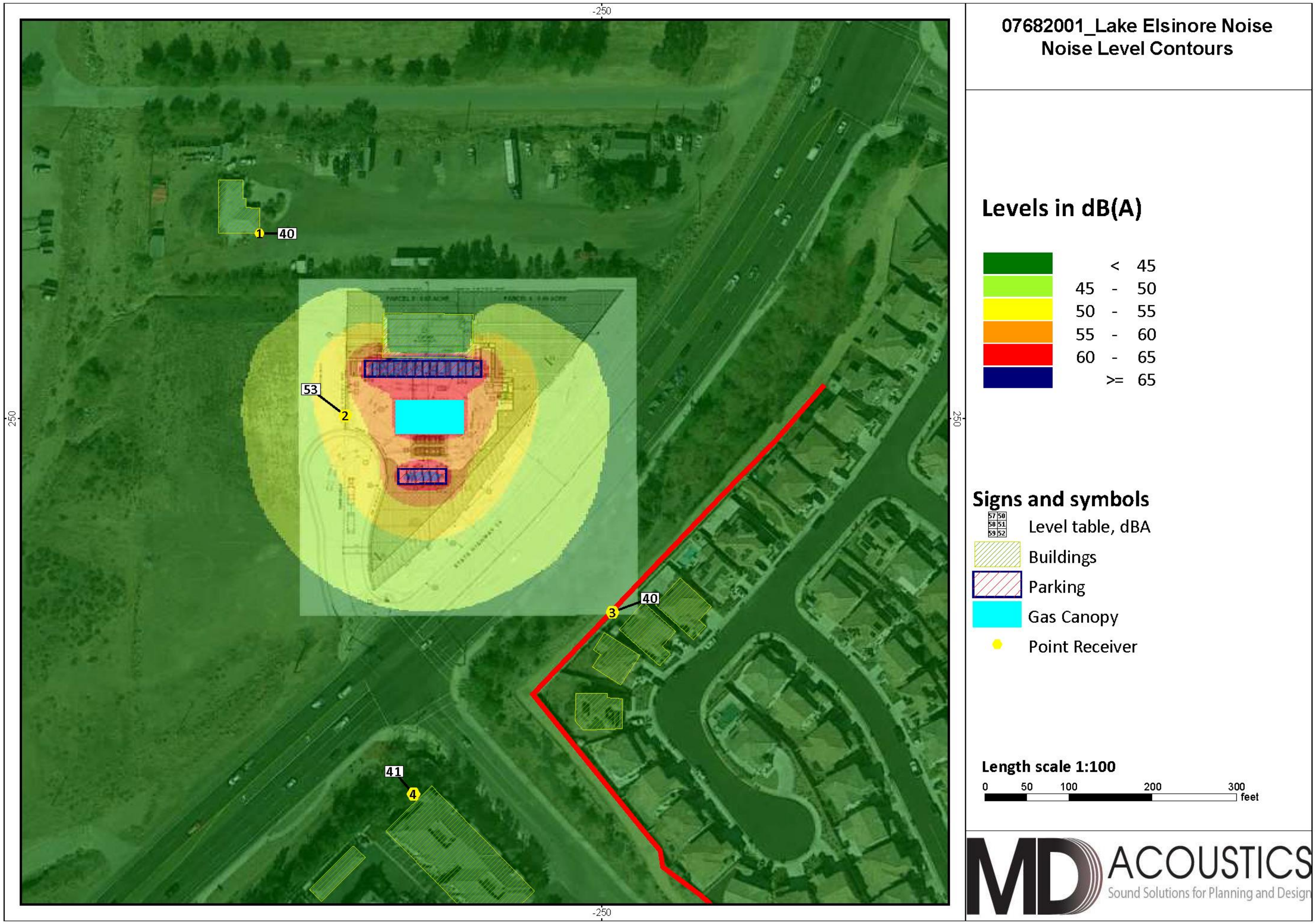
The project site is located approximately 78 feet from the center line of SH-74/Central Ave and would fall within the 70 dBA CNEL or less contour. Therefore, the project would be normally acceptable per the County's Land Use Compatibility Matrix.

7.2 Mitigation Measures

The project will meet the County's nighttime noise ordinance as well as the City of Lake Elsinore's Nighttime noise standard. Therefore, no further mitigation is required.

Exhibit F

Operational Noise Levels Leq(h)



8.0 Construction Noise Impact

The degree of construction noise may vary for different areas of the project site and also vary depending on the construction activities. Noise levels associated with the construction will vary with the different phases of construction.

8.1 Construction Noise

The Environmental Protection Agency (EPA) has compiled data regarding the noise generated characteristics of typical construction activities. The data is presented in Table 8.

Table 8: Typical Construction Equipment Noise Levels[1]

Type	Lmax (dBA) at 50 Feet
Backhoe	80
Truck	88
Concrete Mixer	85
Pneumatic Tool	85
Pump	76
Saw, Electric	76
Air Compressor	81
Generator	81
Paver	89
Roller	74

Notes:
[1] Referenced Noise Levels from FTA noise and vibration manual.

Construction noise is considered a short-term impact and would be considered significant if construction activities are taken outside the allowable times as described in the County of Riversides Ordinance no.847, and the City of Lake Elsinore's Noise Element Section 17.176.060 Table 1. Construction is anticipated to occur during the permissible hours according to the County's Municipal Code. Construction noise will have a temporary or periodic increase in the ambient noise level above the existing within the project vicinity. Furthermore, noise reduction measures are provided to further reduce construction noise. The impact is considered less than significant however construction noise level projections are provided.

Typical operating cycles for these types of construction equipment may involve one or two minutes of full power operation followed by three to four minutes at lower power settings. Noise levels will be loudest during grading phase. A likely worst-case construction noise scenario during grading assumes the use of 1-grader, 1-dozer, and 1-backhoe operating at 134 feet from the nearest property line.

Assuming a usage factor of 40 percent for each piece of equipment, unmitigated noise levels at 134 feet have the potential to reach 74 dBA L_{eq} at the nearest sensitive receptors during building construction. Noise levels for the other construction phases would be lower, approximately 74 dBA. This is below the NIOSH 85 dBA Leq 8hr standard.

8.2 Construction Vibration

Construction activities can produce vibration that may be felt by adjacent land uses. The construction of the proposed project would not require the use of equipment such as pile drivers, which are known to generate substantial construction vibration levels. The primary vibration source during construction may be from a bulldozer. A large bulldozer has a vibration impact of 0.089 inches per second peak particle velocity (PPV) at 25 feet which is perceptible but below any risk to architectural damage.

The fundamental equation used to calculate vibration propagation through average soil conditions and distance is as follows:

$$PPV_{equipment} = PPV_{ref}\ (100/D_{rec})^{n}$$

Where: PPV_{ref} = reference PPV at 100ft.
D_{rec} = distance from equipment to receiver in ft.
n = 1.1 (the value related to the attenuation rate through ground)

The thresholds from the Caltrans Transportation and Construction Induced Vibration Guidance Manual in Table 9 (below) provides general thresholds and guidelines as to the vibration damage potential from vibratory impacts.

Table 9: Guideline Vibration Damage Potential Threshold Criteria

Structure and Condition	Maximum PPV (in/sec)	
	Transient Sources	Continuous/Frequent Intermittent Sources
Extremely fragile historic buildings, ruins, ancient monuments	0.12	0.08
Fragile buildings	0.2	0.1
Historic and some old buildings	0.5	0.25
Older residential structures	0.5	0.3
New residential structures	1.0	0.5
Modern industrial/commercial buildings	2.0	0.5

Source: Table 19, Transportation and Construction Vibration Guidance Manual, Caltrans, Sept. 2013.
Note: Transient sources create a single isolated vibration event, such as blasting or drop balls. Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment.

Table 10 gives approximate vibration levels for particular construction activities. This data provides a reasonable estimate for a wide range of soil conditions.

Table 10: Vibration Source Levels for Construction Equipment[1]

Equipment	Peak Particle Velocity (inches/second) at 25 feet	Approximate Vibration Level LV (dVB) at 25 feet
Pile driver (impact)	1.518 (upper range)	112
	0.644 (typical)	104
Pile driver (sonic)	0.734 upper range	105
	0.170 typical	93
Clam shovel drop (slurry wall)	0.202	94
Hydromill	0.008 in soil	66
(slurry wall)	0.017 in rock	75
Vibratory Roller	0.21	94
Hoe Ram	0.089	87
Large bulldozer	0.089	87
Caisson drill	0.089	87
Loaded trucks	0.076	86
Jackhammer	0.035	79
Small bulldozer	0.003	58

[1] Source: Transit Noise and Vibration Impact Assessment, Federal Transit Administration, May 2006.

At a distance of 134 feet, a large bulldozer would yield a worst-case 0.020 PPV (in/sec) which may be perceptible for short periods of time during grading along the southern property line of the project site, but is below any threshold of damage. The impact is less than significant and no mitigation is required.

8.3 Construction Noise Reduction Measures

Construction operations must follow the City and County's General Plan and the Noise Ordinance, which states that construction, repair or excavation work performed must occur within the permissible hours. To further ensure that construction activities do not disrupt the adjacent land uses, the following measures should be taken:

1. Construction should occur during the permissible hours as defined in Ordinance No. 847 and Section 17.176.060.

2. During construction, the contractor shall ensure all construction equipment is equipped with appropriate noise attenuating devices.

3. The contractor should locate equipment staging areas that will create the greatest distance between construction-related noise/vibration sources and sensitive receptors nearest the project site during all project construction.

4. Idling equipment should be turned off when not in use.

5. Equipment shall be maintained so that vehicles and their loads are secured from rattling and banging.

9.0 References

State of California General Plan Guidelines: 1998. Governor's Office of Planning and Research

City of Lake Elsinore: General Plan Noise Element. Chapter 3.

City of Lake Elsinore: Municipal Code. Chapter 17.176 Noise Control

City of Lake Elsinore Ordinance no.847

City of Lake Elsinore: Traffic Counts

Integrated Engineering Group, Central Avenue Gas Station Scoping Agreement

County of Riverside Municipal Code Chapter 9.52-Noise Regulations

Appendix A:

Photographs and Field Measurement Data

MD ACOUSTICS
Sound Solutions for Planning and Design
www.mdacoustics.com

AZ Office
4960 S. Gilbert Rd, Ste 1-461
Chandler, AZ 85249

CA Office
1197 E Los Angeles Ave, C-256
Simi Valley, CA 93065

24-Hour Continuous Noise Measurement Datasheet

Project: 28771 Central Ave - Gas Station/Convenience
Site Address/Location: 28771 Central Ave, Lake Elsinore, CA
Date: 1/6/2021 to 1/7/2021
Field Tech/Engineer: Jason Schuyler

Site Observations: Clear Sky, mid 70s during the day, 50s at night. Measured 83 feet from the center line of Central Avenue

General Location:
Sound Meter: NTi XL2 **SN:** 80206
Settings: A-weighted, slow, 1-min, 24-hour duration
Meteorological Con.: 73 degrees F, 2 to 5 mph wind, west to east diretion
Site ID: LT-1

Site Topo: Flat
Ground Type: Soft site, Open raw ground with a road

Noise Source(s) w/ Distance:
C/L of Central Ave is 83 feet from meter

Figure 1: LT-1 Monitoring Location

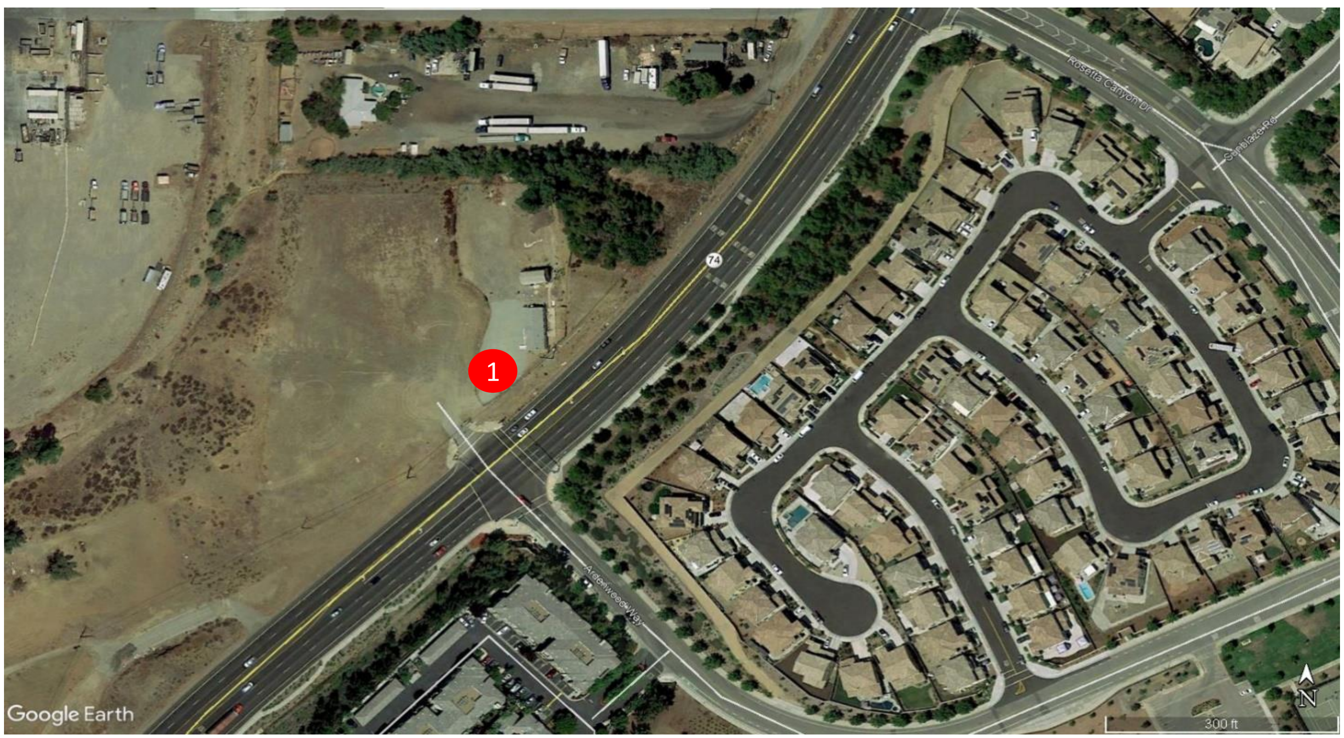


Figure 2: LT-1 Photo

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AZ Office
4960 S. Gilbert Rd, Ste 1-461
Chandler, AZ 85249

CA Office
1197 E Los Angeles Ave, C-256
Simi Valley, CA 93065

24-Hour Noise Measurement Datasheet - Cont.

Project: 28771 Central Ave - Gas Station/Convenience Store **Day:** 1 of 1
Site Address/Location: 28771 Central Ave, Lake Elsinore, CA
Site ID: LT-1

Date	Start	Stop	Leq	Lmax	Lmin	L2	L8	L25	L50	L90
1/6/2021	7:00 PM	8:00 PM	67.8	89.8	50.9	76.7	72.7	71.0	62.6	56.0
1/6/2021	8:00 PM	9:00 PM	66.7	88.7	49.8	75.6	71.6	69.9	61.5	54.9
1/6/2021	9:00 PM	10:00 PM	66.0	88.0	49.1	74.9	70.9	69.2	60.8	54.2
1/6/2021	10:00 PM	11:00 PM	65.0	87.0	48.1	73.9	69.9	68.2	59.8	53.2
1/6/2021	11:00 PM	12:00 AM	64.4	86.4	47.5	73.3	69.3	67.6	59.2	52.6
1/7/2021	12:00 AM	1:00 AM	62.8	84.8	45.9	71.7	67.7	66.0	57.6	51.0
1/7/2021	1:00 AM	2:00 AM	60.4	82.4	43.5	69.3	65.3	63.6	55.2	48.6
1/7/2021	2:00 AM	3:00 AM	59.1	81.1	42.2	68.0	64.0	62.3	53.9	47.3
1/7/2021	3:00 AM	4:00 AM	57.4	79.4	40.5	66.3	62.3	60.6	52.2	45.6
1/7/2021	4:00 AM	5:00 AM	58.4	80.4	41.5	67.3	63.3	61.6	53.2	46.6
1/7/2021	5:00 AM	6:00 AM	62.2	84.2	45.3	71.1	67.1	65.4	57.0	50.4
1/7/2021	6:00 AM	7:00 AM	68.6	90.6	51.7	77.5	73.5	71.8	63.4	56.8
1/7/2021	7:00 AM	8:00 AM	70.9	92.9	54.0	79.8	75.8	74.1	65.7	59.1
1/7/2021	8:00 AM	9:00 AM	69.0	91.0	52.1	77.9	73.9	72.2	63.8	57.2
1/7/2021	9:00 AM	10:00 AM	68.0	90.0	51.1	76.9	72.9	71.2	62.8	56.2
1/7/2021	10:00 AM	11:00 AM	67.9	89.9	51.0	76.8	72.8	71.1	62.7	56.1
1/7/2021	11:00 AM	12:00 PM	68.1	90.1	51.2	77.0	73.0	71.3	62.9	56.3
1/7/2021	12:00 PM	1:00 PM	68.2	90.2	51.3	77.1	73.1	71.4	63.0	56.4
1/7/2021	1:00 PM	2:00 PM	68.3	90.3	51.4	77.2	73.2	71.5	63.1	56.5
1/7/2021	2:00 PM	3:00 PM	68.5	90.5	51.6	77.4	73.4	71.7	63.3	56.7
1/7/2021	3:00 PM	4:00 PM	69.7	91.7	52.8	78.6	74.6	72.9	64.5	57.9
1/7/2021	4:00 PM	5:00 PM	71.2	93.2	54.3	80.1	76.1	74.4	66.0	59.4
1/7/2021	5:00 PM	6:00 PM	70.9	92.9	54.0	79.8	75.8	74.1	65.7	59.1
1/7/2021	6:00 PM	7:00 PM	69.1	91.1	52.2	78.0	74.0	72.3	63.9	57.3

CNEL: 71.6

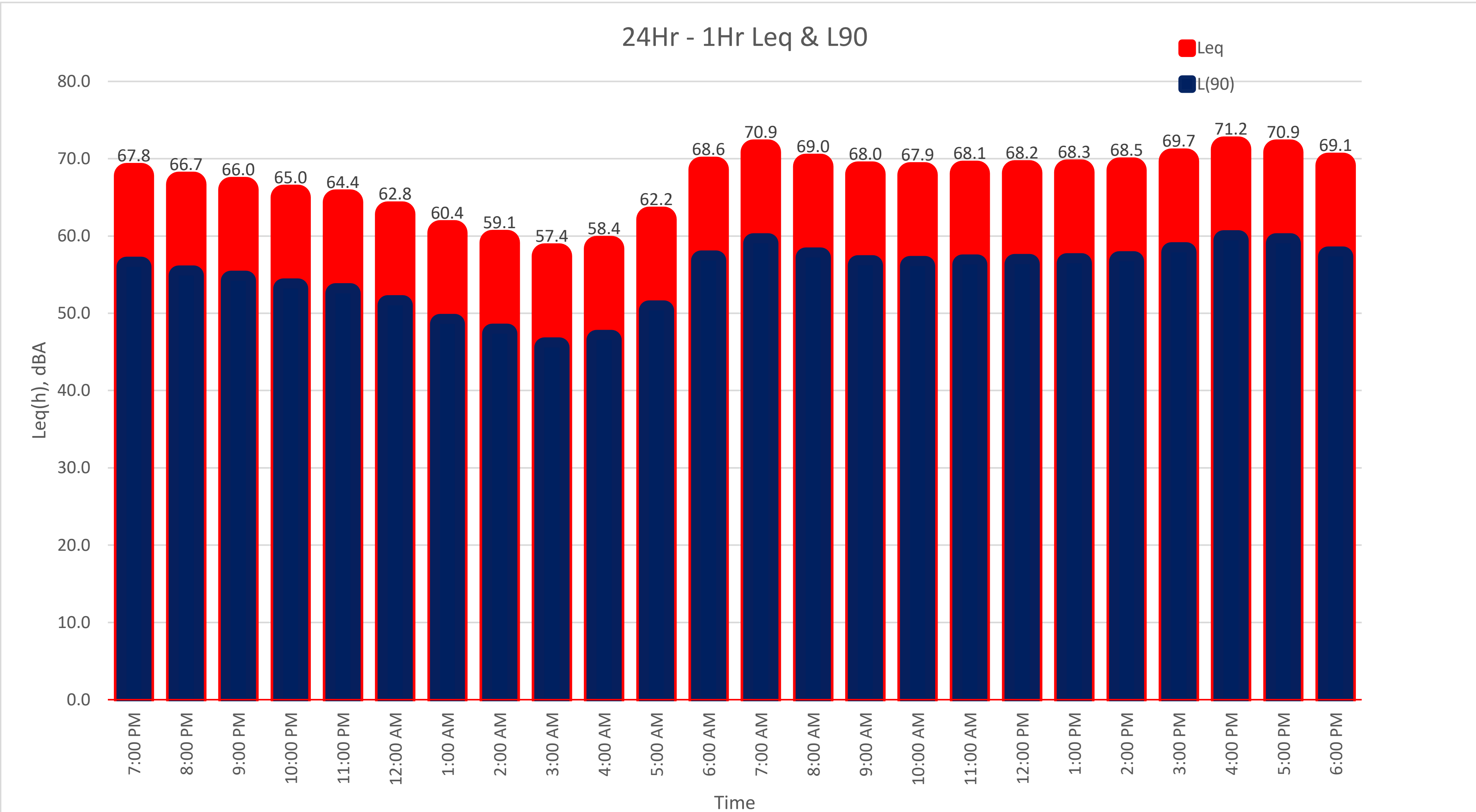
MD ACOUSTICS
Sound Solutions for Planning and Design
www.mdacoustics.com

AZ Office
4960 S. Gilbert Rd, Ste 1-461
Chandler, AZ 85249

CA Office
1197 E Los Angeles Ave, C-256
Simi Valley, CA 93065

24-Hour Continuous Noise Measurement Datasheet - Cont.

Project: 28771 Central Ave - Gas Station/Convenience Store **Day:** 1 of 1
Site Address/Location: 28771 Central Ave, Lake Elsinore, CA
Site ID: LT-1



Appendix B:

SoundPlan Input/Output

Lake Elsinore Noise
Octave spectra of the sources in dB(A) - Situation 1: Outdoor SP

Name	Source type	I or A m,m²	Li dB(A)	R'w dB	L'w dB(A)	Lw dB(A)	KI dB	KT dB	LwMax dB(A)	DO-Wall dB	Time histogram	Emission spectrum	63Hz dB(A)	125Hz dB(A)	250Hz dB(A)	500Hz dB(A)	1kHz dB(A)	2kHz dB(A)	4kHz dB(A)	8kHz dB(A)	16kHz dB(A)
Auto Gas Canopy	Area	300.56			54.1	78.8	0.0	0.0		0	100%/24h					78.8					
Auto Parking 1	PLot	236.11			56.5	80.2	0.0	0.0		0	Parking	Typical spectrum	63.6	75.2	67.7	72.2	72.3	72.7	70.0	63.8	51.0
Auto Parking 2	PLot	92.92			55.8	75.5	0.0	0.0		0	Parking	Typical spectrum	58.8	70.4	62.9	67.4	67.5	67.9	65.2	59.0	46.2

Lake Elsinore Noise
Input data parking lots - Situation 1: Outdoor SP

Parking lot	PLT	f	Unit B0	erence val	Sep.Mtd.	NRT	KPA dB	KI dB	KD dB	KStrO	ne hist.
Auto Parking 1	3	1	0	14	False	False	0	4	1.747424960136641	0	1
Auto Parking 2	3	1	0	7	False	False	0	4	0	0	1

Lake Elsinore Noise
Contribution level - Situation 1: Outdoor SP

Source	Source group	Source ty	Tr. lane	Ldn dB(A)	A dB	
Receiver Receiver 1 Fl GF dB(A) Ldn 40.2 dB(A)						
Auto Gas Canopy	Default industrial noise	Area		34.5	0.0	
Auto Parking 1	Default parking lot noise	PLot		37.5	0.0	
Auto Parking 2	Default parking lot noise	PLot		33.0	0.0	
Receiver Receiver 2 Fl GF dB(A) Ldn 53.1 dB(A)						
Auto Gas Canopy	Default industrial noise	Area		46.8	0.0	
Auto Parking 1	Default parking lot noise	PLot		51.2	0.0	
Auto Parking 2	Default parking lot noise	PLot		43.6	0.0	
Receiver Receiver 3 Fl GF dB(A) Ldn 40.4 dB(A)						
Auto Gas Canopy	Default industrial noise	Area		36.0	0.0	
Auto Parking 1	Default parking lot noise	PLot		37.6	0.0	
Auto Parking 2	Default parking lot noise	PLot		33.2	0.0	
Receiver Receiver 4 Fl GF dB(A) Ldn 41.4 dB(A)						
Auto Gas Canopy	Default industrial noise	Area		34.1	0.0	
Auto Parking 1	Default parking lot noise	PLot		39.0	0.0	
Auto Parking 2	Default parking lot noise	PLot		35.4	0.0	

Lake Elsinore Noise
Contribution spectra - Situation 1: Outdoor SP

Source	Time slice	Sum	50Hz	63Hz	80Hz	100Hz	125Hz	160Hz	200Hz	250Hz	315Hz	400Hz	500Hz	630Hz	800Hz	1kHz	1.25kHz	1.6kHz	2kHz	2.5kHz	3.15kHz	4kHz	5kHz	6.3kHz	8kHz	10kHz	12.5kHz	16kHz	20kHz
		dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
Receiver Receiver 1 Fl GF dB(A) Ldn 40.2 dB(A)																													
Auto Parking 1	Ldn	37.5	20.1	20.1	20.1	29.0	29.0	29.0	18.3	18.3	18.3	20.8	20.8	20.8	24.1	24.1	24.1	25.9	25.9	25.9	21.6	21.6	21.6	9.7	9.7	9.7	-19.6	-19.6	-19.6
Auto Gas Canopy	Ldn	34.5										29.8	29.8	29.8															
Auto Parking 2	Ldn	33.0	15.6	15.6	15.6	24.4	24.4	24.4	13.3	13.3	13.3	15.6	15.6	15.6	20.0	20.0	20.0	22.0	22.0	22.0	16.7	16.7	16.7	1.6	1.6	1.6	-37.6	-37.6	-37.6
Receiver Receiver 2 Fl GF dB(A) Ldn 53.1 dB(A)																													
Auto Parking 1	Ldn	51.2	31.9	31.9	31.9	42.2	42.2	42.2	31.1	31.1	31.1	35.1	35.1	35.1	38.4	38.4	38.4	39.9	39.9	39.9	36.5	36.5	36.5	27.8	27.8	27.8	8.5	8.5	8.5
Auto Gas Canopy	Ldn	46.8										42.1	42.1	42.1															
Auto Parking 2	Ldn	43.6	25.2	25.2	25.2	34.7	34.7	34.7	22.9	22.9	22.9	26.8	26.8	26.8	30.6	30.6	30.6	32.2	32.2	32.2	28.7	28.7	28.7	19.5	19.5	19.5	-1.7	-1.7	-1.7
Receiver Receiver 3 Fl GF dB(A) Ldn 40.4 dB(A)																													
Auto Parking 1	Ldn	37.6	16.1	16.1	16.1	29.5	29.5	29.5	19.6	19.6	19.6	23.0	23.0	23.0	24.2	24.2	24.2	25.1	25.1	25.1	19.7	19.7	19.7	2.4	2.4	2.4	-41.9	-41.9	-41.9
Auto Gas Canopy	Ldn	36.0										31.3	31.3	31.3															
Auto Parking 2	Ldn	33.2	13.2	13.2	13.2	25.1	25.1	25.1	15.5	15.5	15.5	18.9	18.9	18.9	19.7	19.7	19.7	20.5	20.5	20.5	15.9	15.9	15.9	0.7	0.7	0.7	-37.3	-37.3	-37.3
Receiver Receiver 4 Fl GF dB(A) Ldn 41.4 dB(A)																													
Auto Parking 1	Ldn	39.0	19.4	19.4	19.4	31.0	31.0	31.0	15.5	15.5	15.5	18.8	18.8	18.8	25.9	25.9	25.9	28.0	28.0	28.0	21.6	21.6	21.6	2.0	2.0	2.0	-50.0	-50.0	-50.0
Auto Parking 2	Ldn	35.4	16.3	16.3	16.3	26.9	26.9	26.9	11.7	11.7	11.7	15.1	15.1	15.1	22.8	22.8	22.8	24.9	24.9	24.9	19.2	19.2	19.2	2.7	2.7	2.7	-39.2	-39.2	-39.2
Auto Gas Canopy	Ldn	34.1										29.3	29.3	29.3															

Appendix C:

Traffic Noise Modeling Output

FHWA-RD-77-108 ROADWAY TRAFFIC NOISE PREDICTION MODEL (CNEL) - CALVENO

PROJECT: Convenience Store/Gas Station
ROADWAY: SH-74/Central Ave
SEGMENT: Ardenwood Way to Conard Ave
LOCATION: City of Lake Elsinore
SCENARIO: Existing

JOB #: 0768-20-01
DATE: 18-Jan-21
ENGINEER: R. Pearson

NOISE INPUT DATA

ROADWAY CONDITIONS

ADT = 36,267
SPEED = 40
PK HR % = 10
NEAR LANE/FAR LANE DIST = 44
ROAD ELEVATION = 0
GRADE = 0
PK HR VOL = 3,627

RECEIVER INPUT DATA

RECEIVER DISTANCE = 50
DIST C/L TO WALL = 0
RECEIVER HEIGHT = 5
WALL DISTANCE FROM RECEIVER = 50
PAD ELEVATION = 0
ROADWAY VIEW: LF ANGLE -90
RT ANGLE 90
DF ANGLE 180

SITE CONDITIONS

AUTOMOBILES 15
MED TRUCKS 15 (HARD SITE=10, SOFT SITE=15)
HVY TRUCKS 15

WALL INFORMATION

HTH WALL = 0 FT
AMBIENT = 0
BARRIER = 0 (0=WALL,1=BERM)

VEHICLE MIX DATA

VEHICLE TYPE	DAY	EVE	NIGHT	DAILY
AUTOMOBILES	0.755	0.140	0.105	0.974
MEDIUM TRUCKS	0.489	0.022	0.489	0.018
HEAVY TRUCKS	0.473	0.054	0.473	0.007

MISC. VEHICLE INFO

VEHICLE TYPE	HEIGHT	SLE DISTANCE	GRADE ADJUSTMENT
AUTOMOBILES =	2.00	45.0	- -
MEDIUM TRUCKS=	4.00	44.9	- -
HEAVY TRUCKS =	8.01	45.0	0.0

NOISE OUTPUT DATA

NOISE IMPACTS (WITHOUT TOPO OR BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	70.9	68.9	67.6	61.6	70.0	70.6
MEDIUM TRUCKS	62.6	58.7	51.3	60.0	66.1	66.2
HEAVY TRUCKS	63.5	59.5	56.1	60.7	66.9	67.0
VEHICULAR NOISE	72.1	69.7	68.0	65.6	72.8	**73.2**

NOISE CONTOUR (FT)				
NOISE LEVELS	**70 dBA**	**65 dBA**	**60 dBA**	**55 dBA**
CNEL	81	175	377	812
LDN	77	165	356	767

FHWA-RD-77-108 ROADWAY TRAFFIC NOISE PREDICTION MODEL (CNEL) - CALVENO

PROJECT: Convenience Store/Gas Station
ROADWAY SH-74/Central Ave
SEGMENT Ardenwood Way to Conard Ave
LOCATION: City of Lake Elsinore SCENARIO: E+P

JOB #: 0768-20-01
DATE: 18-Jan-21
ENGINEER: R. Pearson

NOISE INPUT DATA

ROADWAY CONDITIONS

ADT =	36,875
SPEED =	40
PK HR % =	10
NEAR LANE/FAR LANE DIST =	44
ROAD ELEVATION =	0
GRADE =	0
PK HR VOL =	3,688

RECEIVER INPUT DATA

RECEIVER DISTANCE =		50
DIST C/L TO WALL =		0
RECEIVER HEIGHT =		5
WALL DISTANCE FROM RECEIVER =		50
PAD ELEVATION =		0
ROADWAY VIEW:	LF ANGLE	-90
	RT ANGLE	90
	DF ANGLE	180

SITE CONDITIONS

AUTOMOBILES	15
MED TRUCKS	15
HVY TRUCKS	15

(HARD SITE=10, SOFT SITE=15)

WALL INFORMATION

HTH WALL = 0 FT
AMBIENT = 0
BARRIER = 0 (0=WALL,1=BERM)

VEHICLE MIX DATA

VEHICLE TYPE	DAY	EVE	NIGHT	DAILY
AUTOMOBILES	0.755	0.140	0.105	0.974
MEDIUM TRUCKS	0.489	0.002	0.489	0.018
HEAVY TRUCKS	0.473	0.054	0.473	0.007

MISC. VEHICLE INFO

VEHICLE TYPE	HEIGHT	SLE DISTANCE	GRADE ADJUSTMENT
AUTOMOBILES =	2.00	45.0	- -
MEDIUM TRUCKS=	4.00	44.9	- -
HEAVY TRUCKS =	8.01	45.0	0.0

NOISE OUTPUT DATA

NOISE IMPACTS (WITHOUT TOPO OR BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	71.0	69.0	67.6	61.6	70.1	70.7
MEDIUM TRUCKS	62.7	58.8	41.4	60.0	66.2	66.2
HEAVY TRUCKS	63.6	59.5	56.1	60.8	67.0	67.1
VEHICULAR NOISE	72.2	69.8	68.0	65.6	72.9	**73.2**

NOISE CONTOUR (FT)				
NOISE LEVELS	**70 dBA**	**65 dBA**	**60 dBA**	**55 dBA**
CNEL	82	177	380	819
LDN	77	167	360	775

Exhibit B

SCOPING AGREEMENT FOR TRAFFIC IMPACT STUDY

This letter acknowledges the Riverside County Transportation Department requirements for traffic impact analysis of the following project. The analysis must follow the Riverside County Transportation Department Traffic Study Guidelines dated February 2005.

Case No. CUP# 200043
Related Cases -
SP No.
EIR No.
GPA No.
CZ No.
Project Name: Central Avenue Gas Station
Project Address: Central Avenue and Ardenwood Way
Project Description: Project is proposing the construction of a gas station with 6 fuel dispensers and a 4k square feet C-store

	Consultant	Developer
Name:	Integrated Engineering Group	Western States Engineering
Address:	23905 Clinton Keith Road 114-280 Wildomar CA 92562	4887 E. La Palma, ste. 707 Anaheim CA, 92807
Telephone:	951-833-3105	714-695-9300
Fax:		

A. Trip Generation Source: (ITE 10th Edition)

Current GP Land Use *Provide General Plan Land Use Designation (e.g.: MDR, CR, etc)* Proposed Land Use

Current Zoning M-SC Proposed Zoning

	Current Trip Generation In	Out	Total	Proposed Trip Generation In	Out	Total
AM Trips	0	0	0	64	64	128
PM Trips	0	0	0	61	61	122

Internal Trip Allowance ☐ Yes ☐ No (0 % Trip Discount)
Pass-By Trip Allowance ☐ Yes ☐ No (62/56 % AM/PM Trip Discount)*

A passby trip discount of 25% is allowed for appropriate land uses. The passby trips at adjacent study area intersections and project driveways shall be indicated on a report figure.

* Pass-by reduction rates provided by the ITE Trip Generation Handbook (3rd Edition, 2017) were used in calculating the project trip generation.

B. Trip Geographic Distribution: N 20 % S 30 % E 25 % W 25 %
(attach exhibit for detailed assignment)

C. Background Traffic

Project Build-out Year: 2022 Annual Ambient Growth Rate: 2 %
Phase Year(s) N/A

Other area projects to be analyzed: Central Avenue Commercial Retail cumulative project will be included in the analysis

Model/Forecast methodology No buildout analysis

Exhibit B – Scoping Agreement – Page 2

***D.* Study intersections:** *(NOTE: Subject to revision after other projects, trip generation and distribution are determined, or comments from other agencies.)*

1. SH-74/Central Avenue and Ardenwood Way
2. SH-74/Central Avenue and Conrad Avenue
3. SH-74/Central Avenue and Allan Street
4. SH-74/Central Avenue and Rosetta Canyon Rd.
5. SH-74/Central Avenue and Crater Drive
6. ________
7. ________
8. ________
9. ________
10. ________

***E.* Study Roadway Segments:** *(NOTE: Subject to revision after other projects, trip generation and distribution are determined, or comments from other agencies.)*

1. ________
2. ________
3. ________
4. ________
5. ________
6. ________
7. ________
8. ________
9. ________
10. ________

E. Other Jurisdictional Impacts

Is this project within a City's Sphere of Influence or one-mile radius of City boundaries? ☐ Yes ☐ No

If so, name of City Jurisdiction: Lake Elsinore

F. Site Plan (please attach reduced copy)

G. Specific issues to be addressed in the Study (in addition to the standard analysis described in the Guideline) (To be filled out by Transportation Department)
(NOTE: If the traffic study states that "a traffic signal is warranted" (or "a traffic signal appears to be warranted," or similar statement) at an existing unsignalized intersection under existing conditions, 8-hour approach traffic volume information must be submitted in addition to the peak hourly turning movement counts for that intersection.)

VMT analysis will be provided for County staff review and approval

H. Existing Conditions

Traffic count data must be new or recent. Provide traffic count dates if using other than new counts.
Date of counts
Intersection turning movement counts conducted on October 22, 2020 will be used in the TIA.

***NOTE* Traffic Study Submittal Form and appropriate fee must be submitted with, or prior to submittal of this form. Transportation Department staff will not process the Scoping Agreement prior to receipt of the fee.**

Recommended by:

George Ghossain — 12/16/20

Consultant's Representative — Date

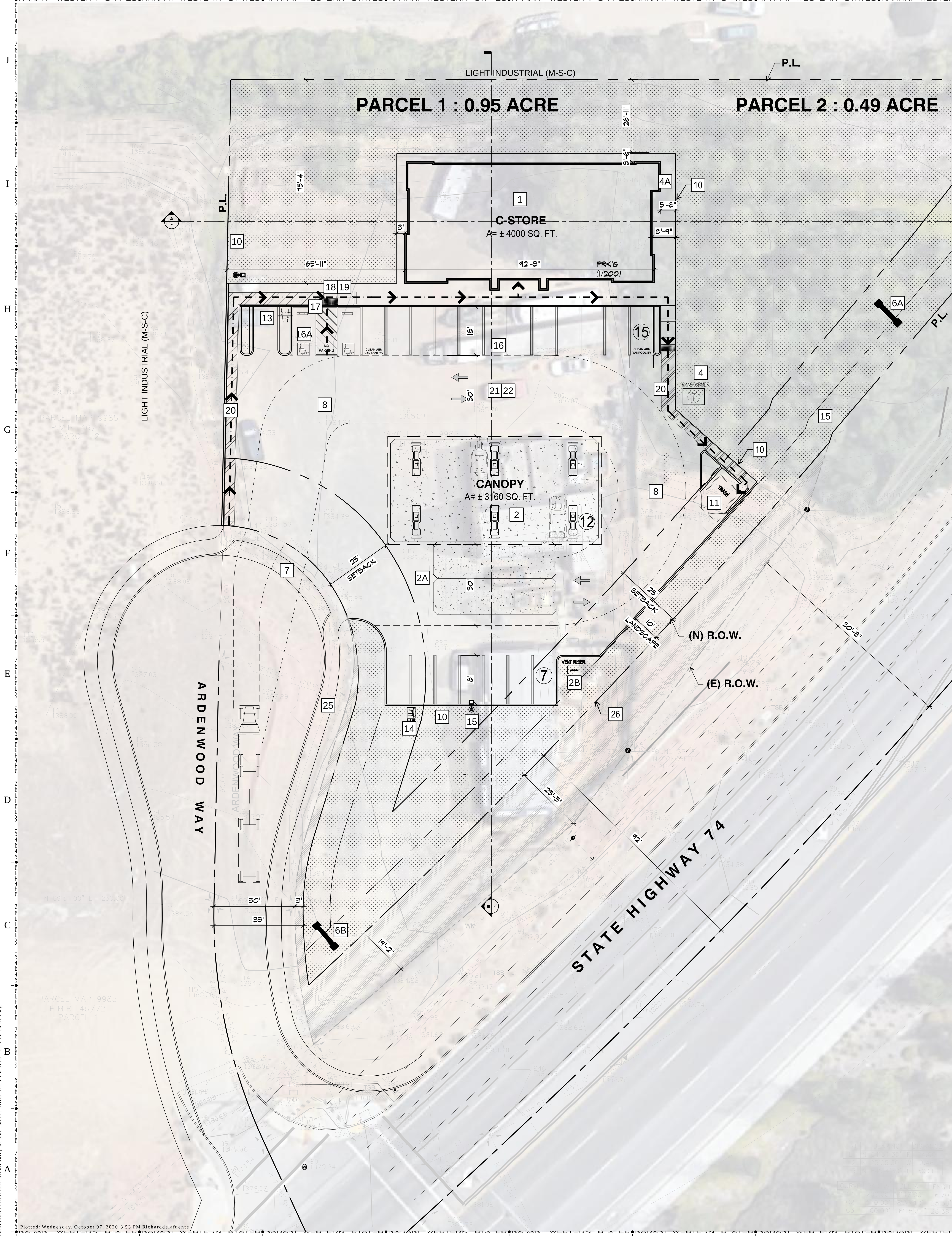
Scoping Agreement Submitted on 12/16/20

Revised on ____________________

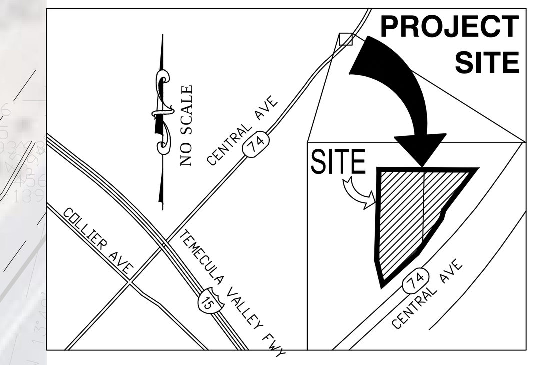
Approved Scoping Agreement:

____

Riverside County Transportation Department — Date



VICINITY MAP



LEGEND

- NO. OF PARKING SPACES
- ACCESSIBLE PARKING
- PROPERTY LINE
- PROPOSED PARCEL SUBDIVISION
- ADA PATH OF TRAVEL
- CONCRETE PAVING AREA
- DECORATIVE PAVING AREA
- LANDSCAPED AREA
- DIRECTIONAL ARROW
- R.O.W. DEDICATION
- AREA LIGHTS
- WALL MOUNTED DECORATIVE AREA LIGHTS
- (E) FIRE HYDRANT
- (E) SEWER MANHOLE
- (E) SEWER CLEANOUT
- (E) POWER POLE
- WM (E) WATER METER
- (E) WATER POINT
- (E) SIGN

SITE KEY NOTES

1	C-STORE
2	GAS STATION CANOPY AND FUEL DISPENSERS
2A	UNDERGROUND STORAGE TANKS
2B	VENT RISER WITH CARBON VAPOR CANISTER. PAINT BLACK & LANDSCAPE SCREENING.
3	QUICK SERVICE RESTAURANT (QSR)
4	TRANSFORMER
4A	MAIN SWITCHGEAR
6A	MONUMENT SIGN (UNDER SEPARATE PERMIT)
6B	GAS PRICE SIGN (UNDER SEPARATE PERMIT)
7	(N) DRIVEWAY AS PER R.C. STD 207A
8	ASPHALT PAVING
9	CONCRETE PAVING
10	(N) LANDSCAPE WITH 6" CONCRETE CURB
11	TRASH ENCLOSURE (PER R.C. STANDARDS)
12	STEEL CONCRETE BOLLARDS
13	CLASS-2 BIKE PARKING RACK (5-BIKE CAPACITY)
14	AIR & WATER UNIT
15	AREA LIGHTS
16	PARKING STRIPING AS PER R.C. STANDARDS (WITH WHEELSTOP WHERE REQUIRED)
16A	ACCESSIBLE PARKING STRIPING (WITH WHEELSTOP WHERE REQUIRD)
17	ACCESSIBLE PARKING SIGN
18	ACCESSIBLE ACCESSIBLE RAMP
19	ACCESSIBLE TRUNCATED DOME PAVER
20	ACCESSIBLE PATH STRIPING (2% MAX CROSS SLOPE)
21	FIRE TRUCK PATH OF TRAVEL
22	FUEL TANKER/TRASH TRUCK PATH OF TRAVEL
23	RETAINING WALL PER CIVIL
24	3' HIGH DECORATIVE WALL TO SHIELD AUTO HEADLIGHTS & LIGHT SPILLAGE
25	(N) SIDEWALK
26	(N) RIGHT OF WAY
27	(E) RIGHT OF WAY
28	(E) SIDEWALK

0 2' 4' 8' 16' 32'

1 **PROPOSED SITE PLAN**
SCALE: 1" = 20'-0"

SCOPE OF WORK

PROPOSED DEVELOPMENT

PROPOSED GAS STATION COMPRISING OF:
-CONVENIENCE STORE (WITH TYPE 20-ABC)
-FUELING CANOPY WITH SIX MULTI-PRODUCT DISPENSERS
-TWO UNDERGROUND STORAGE TANKS

ASSESSOR'S PARCEL NUMBER

347-130-028 & 347-130-029

LEGAL DESCRIPTION

FIRST AMERICAN TITLE COMPANY
ORDER NO.: 0625-5788488
DATED: SEPTEMBER 11, 2018

LEGAL DESCRIPTION:
REAL PROPERTY IN THE UNINCORPORATED AREA OF THE COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, DESCRIBED AS FOLLOWS:

PARCEL 3 OF PARCEL MAP 9985, AS SHOWN BY MAP ON FILE IN BOOK 46, PAGE 72 OF PARCEL MAPS, RECORDS OF RIVERSIDE COUNTY, CALIFORNIA.

EXCEPTING THEREFROM A PORTION THAT GRANTS TO RIVERSIDE COUNTY TRANSPORTATION COMMISSION, A POLITICAL SUBDIVISION AS DESCRIBED IN DEED RECORDED OCTOBER 02, 2001 AS INSTRUMENT NO. 2001-478038 OF OFFICIAL RECORDS.

APN: 347-130-029

LEGAL DESCRIPTION:
ORDER NO.: 0625-5789283
DATED: SEPTEMBER 12, 2018

REAL PROPERTY IN THE UNINCORPORATED AREA OF THE COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, DESCRIBED AS FOLLOWS:

PARCELS 4 OF PARCEL MAP 9985, AS SHOWN BY MAP ON FILE IN BOOK 46, PAGE 72, OF PARCEL MAPS, RECORDS OF RIVERSIDE COUNTY, CALIFORNIA.

EXCEPTING THEREFROM THAT PORTION CONVEYED TO THE RIVERSIDE COUNTY TRANSPORTATION COMMISSION, BY GRANT DEED RECORDED OCTOBER 09, 2001 AS INSTRUMENT NO. 01-489377, OF OFFICIAL RECORDS OF SAID COUNTY.

ASSESSOR'S PARCEL NUMBER: 347-130-028

TOTAL AREA: 62,757.88 S.F. (1.441 ACRES)

PROJECT DATA

ZONING: LIGHT INDUSTRIAL
LAND USE: MANUFACTURING-SERVICE COMMERCIAL
AREA OF SITE (GROSS ACREAGE)
TOTAL AREA : ± 62,726 S.F. (1.44 acre)
AREA OF PROJECT (NET ACREAGE)
TOTAL AREA : ± 62,726 S.F. (1.44 acre)

BLDG SETBACKS	REQUIRED	PROVIDED
FRONT (SOUTH)	25'-0"	25'-0"
REAR (NORTH)	0'-0"	0'-0"
LEFT (WEST)	25'-0"	25'-0"
RIGHT (EAST)	0'-0"	0'-0"
LANDSCAPE AREA	10%	29,002 S.F. (51%)
FLOOR AREA RATIO	-	± 0.11
MAXIMUM HEIGHT	40'-0"	28'-0"
PARKING	39	51

BUILDING DATA

C-STORE	
AREAS	± 4,000 SF
OCCUPANCY	M
TYPE OF CONST	V-B
NUMBER OF STORY	1
BLDG HEIGHT	± 28'-0"
SPRINKLERS	NONE

CANOPY	
AREA	± 3,160 SF
OCCUPANCY	M
TYPE OF CONST	II-B
NUMBER OF STORY	1
BLDG HEIGHT	20'-0"
SPRINKLERS	NONE

TOTAL BUILDINGS AREA (GFA) ± 9,160 SF
± 0.15 ACRE (NET ACREAGE)

PARKING COMPUTATION

PARKING STANDARDS

TYPE	SIZE
REGULAR	9'-0" X 18'-0"
COMPACT	8'-6" X 16'-0" (UP TO 20% OF TOTAL)
HANDICAP	17'-0" X 18'-0" (VAN ACCESSIBLE)

PARKING REQUIREMENTS

USE	FORMULA	REQUIRED	PROVIDED
C-STORE	(1/200 S.F.)	20	22
CANOPY		-	12
TOTAL PARKING		20	34

HANDICAP PARKING REQUIREMENTS

FORMULA	REQUIRED	PROVIDED
26-50 PARKING SPACES	(2)	(2)

CLEAN AIR/ELECTRIC VEHICLE PARKING

FORMULA	REQUIRED	PROVIDED
SECTION 17.18.045 R.C. MUN CODE (WITH 25-49 PARKING = 2 EV CHARGING SPACES	(2)	(2)

KARAKI WSE
WESTERN STATES ENGINEERING
A DESIGN-BUILD COMPANY
4887 E. LA PALMA STE. 707
ANAHEIM, CA 92807
TEL: (714)695-9300 FAX: (714)693-1002
www.westernsec.com

■ CONSULTANT/ SEALS

REGISTERED PROFESSIONAL ENGINEER
No. C051050
Exp. 9/30/17
CIVIL
STATE OF CALIFORNIA

■ SUBMITTAL

NO.	DESCRIPTION	BY	DATE
1			
2			
3			
4			

■ REVISIONS

NO.	DESCRIPTION	BY	DATE
△			
△			
△			
△			
△			

■ OWNER NAME & ADDRESS
DAHER OIL INC.
19851 ESPERANZA RD.
YORBA LINDA CA 92886

■ PROJECT NAME & ADDRESS
GAS STATION & CONVENIENCE STORE
28771 CENTRAL AVE. (74 HWY)
LAKE ELSINORE, CA 92532

■ NOTE TO CONTRACTOR
CONTRACTOR TO VERIFY LOCATION AND DEPTH OF ALL UTILITIES ON-SITE AND OFF-SITE PRIOR TO START OF CONSTRUCTION.

■ DESIGNED BY: WS
■ DRAWN BY: WS
■ CHECKED BY: JK
■ PLOT DATE: 10.7.2020
■ SCALE: AS SHOWN
■ SHEET TITLE
PROPOSED SITE PLAN

■ SHEET NUMBER
AS-1.0

■ JOB No E99319
■ PAR / CUP No PAR190001

Trip Generation Calculation:

Trip Generation Rates

Land Use[1]	Units[2]	ITE LU Code	AM Peak Hour			PM Peak Hour			Daily
			In	Out	Total	In	Out	Total	
Super Convenience Market/Gas Station	VFP	960	14.04	14.04	28.08	11.48	11.48	22.96	231

[1] Trip Generation Source: Institute of Transportation Engineers (ITE), Trip Generation Manual, Tenth Edition (2017).

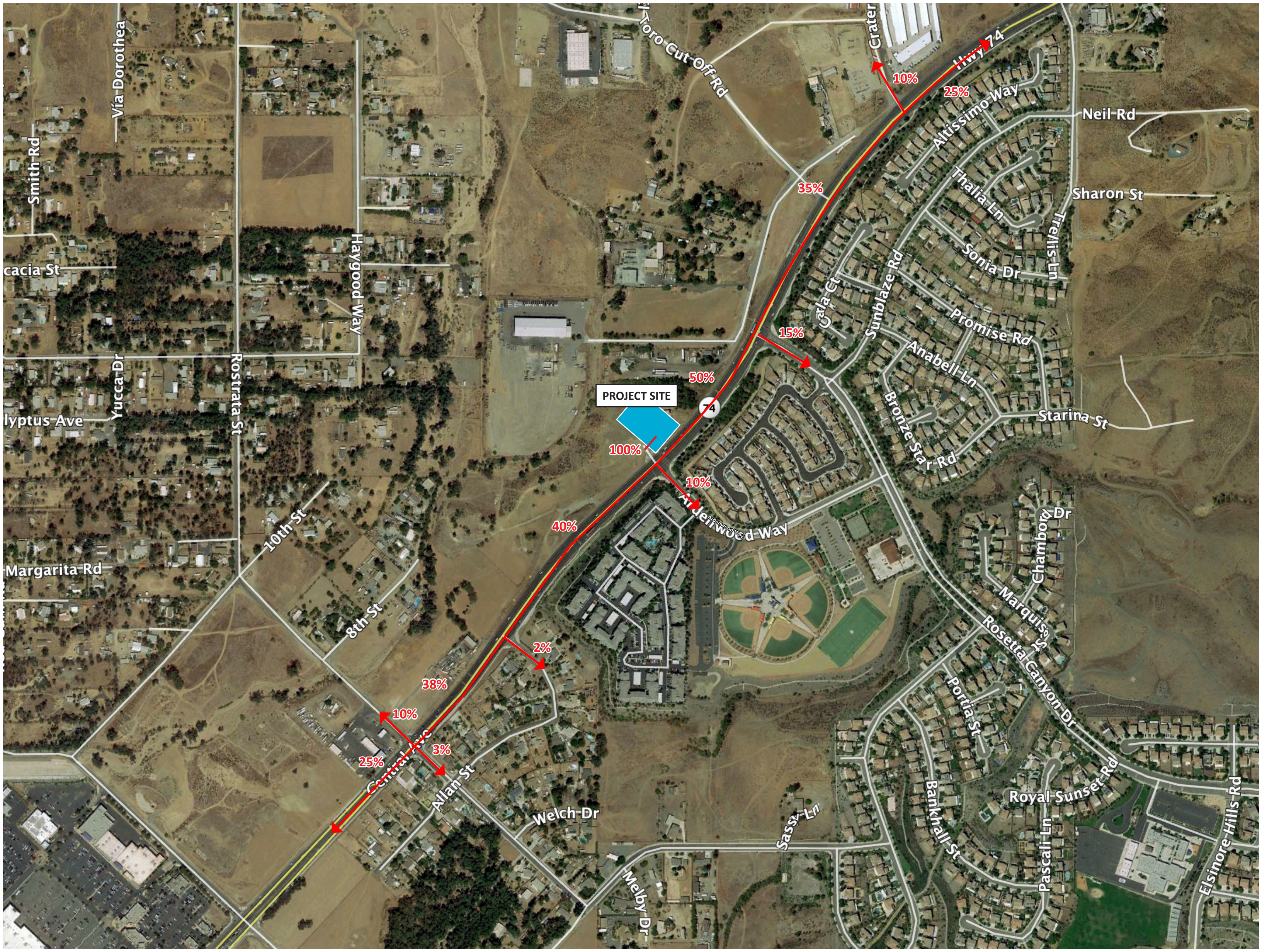
[2] VFP = Vehicle Fueling Positions

Project Trip Generation

Land Use	Intensity	Units[1]	AM Peak Hour			PM Peak Hour			Daily
			In	Out	Total	In	Out	Total	
Service Station									
Super Convenience Market/Gas Station	12	VFP	168	168	337	138	138	276	2,766
Pass-by Reduction (62% AM Peak Hour, 56% - PM Peak Hour)[2]			104	104	209	77	77	154	*1,549*
		TOTAL	*64*	*64*	*128*	*61*	*61*	*122*	*1,217*

[1] DU = Dwelling Units; TSF = Thousand Square Feet; VFP = Vehicle Fueling Positions

[2] Pass-by reduction percentage is based on the ITE methodology per Table E of ITE Trip Generation Handbook (3rd Edition, 2017).



INTEGRATED ENGINEERING GROUP
TRANSPORTATION PLANNING AND ENGINEERING

Central Avenue Gas Station
Project Trip Distribution

Counts Unlimited, Inc

PO Box 1178
Corona, CA 92878
Phone: 951-268-6268
email: counts@countsunlimited.com

City of Lake Elsinore
Highway 74
B/ Ardenwood Way - Conard Avenue
24 Hour Directional Volume Count

LKE012
Site Code: 017-14077

Start Time	01-Apr-14 Tue	Eastbound Morning	Eastbound Afternoon	Hour Totals Morning	Hour Totals Afternoon	Westbound Morning	Westbound Afternoon	Hour Totals Morning	Hour Totals Afternoon	Combined Totals Morning	Combined Totals Afternoon
12:00		41	209			22	205				
12:15		40	210			21	203				
12:30		27	204			16	192				
12:45		28	226	136	849	19	226	78	826	214	1675
01:00		23	246			15	215				
01:15		17	244			19	218				
01:30		16	268			15	203				
01:45		22	301	78	1059	13	**288**	62	924	140	1983
02:00		17	246			15	**304**				
02:15		14	255			13	**256**				
02:30		14	306			14	**281**				
02:45		16	356	61	1163	18	233	60	1074	121	2237
03:00		17	330			26	213				
03:15		22	343			24	240				
03:30		13	325			55	276				
03:45		17	345	69	1343	75	242	180	971	249	2314
04:00		27	325			102	240				
04:15		39	342			117	260				
04:30		37	342			145	242				
04:45		55	**442**	158	1451	184	263	548	1005	706	2456
05:00		63	**402**			190	241				
05:15		51	**393**			213	263				
05:30		65	**383**			257	274				
05:45		80	371	259	1549	269	246	929	1024	1188	2573
06:00		113	365			233	215				
06:15		145	300			274	221				
06:30		174	304			278	192				
06:45		198	286	630	1255	303	210	1088	838	1718	2093
07:00		**213**	278			**394**	191				
07:15		**250**	234			**407**	158				
07:30		**319**	228			**394**	151				
07:45		**256**	221	1038	961	**370**	132	1565	632	2603	1593
08:00		187	228			314	111				
08:15		155	212			246	122				
08:30		147	171			255	102				
08:45		156	173	645	784	261	107	1076	442	1721	1226
09:00		146	178			191	82				
09:15		150	130			253	83				
09:30		141	120			257	59				
09:45		161	101	598	529	238	69	939	293	1537	822
10:00		146	103			219	56				
10:15		167	79			200	49				
10:30		204	77			199	52				
10:45		182	79	699	338	199	44	817	201	1516	539
11:00		205	64			193	51				
11:15		172	38			198	35				
11:30		169	48			254	34				
11:45		196	52	742	202	216	19	861	139	1603	341
Total		5113	11483	5113	11483	8203	8369	8203	8369	13316	19852
Combined Total		16596		16596		16572		16572		33168	
AM Peak	-	07:00	-	-	-	07:00	-	-	-	-	-
Vol.	-	1038	-	-	-	1565	-	-	-	-	-
P.H.F.		0.813				0.961					
PM Peak	-	-	04:45	-	-	-	01:45	-	-	-	-
Vol.	-	-	1620	-	-	-	1129	-	-	-	-
P.H.F.			0.916				0.928				
Percentage		30.8%	69.2%			49.5%	50.5%				
ADT/AADT		ADT 33,168		AADT 33,168							

Appendix D:

Construction Noise Modeling Output

Activity	L_{eq} at 134 feet dBA	L_{Max} at 134 feet dBA
Grading	74	78
Building Construction	74	76
Paving	74	76

Equipment Summary	**Reference (dBA) 50 ft Lmax**
Rock Drills	96
Jack Hammers	82
Pneumatic Tools	85
Source: MD Acoustics, Nov 2020.	80
Dozers	85
Scrappers	87
Haul Trucks	88
Cranes	82
Portable Generators	80
Rollers	80
Tractors	80
Front-End Loaders	86
Hydraulic Excavators	86
Graders	86
Air Compressors	86
Trucks	86

Grading L_{Max} at 137 feet dBA

Noise Level Calculation Prior to Implementation of Noise Attenuation Requirements

No.	Equipment Description	Reference (dBA) 50 ft Lmax	Quantity	Usage Factor[1]	Distance to Receptor (ft)	Ground Effect	Shielding (dBA)	Calculated (dBA) Lmax	Calculated (dBA) Leq	Energy
1	Grader	86	1	40	134	0.5	0	75.3	71.3	13543253.5
2	Dozer	85	1	40	134	0.5	0	74.3	70.3	10757788.6
3	Tractor/Backhoe	80	1	40	134	0.5	0	69.3	65.3	3401911.46
							Lmax*	**78**	**Leq**	**74**
							Lw	**109**	**Lw**	**106**

Source: MD Acoustics, Nov 2020.

1- Percentage of time that a piece of equipment is operating at full power.

dBA – A-weighted Decibels

Lmax- Maximum Level

Leq- Equivalent Level

Feet	Meters	Ground Effect	No Shielding Leq dBA	1 dBA Shielding Leq dBA	2 dBA Shielding Leq dBA	3 dBA Shielding Leq dBA	4 dBA Shielding Leq dBA	5 dBA Shielding Leq dBA	6 dBA Shielding Leq dBA	7 dBA Shielding Leq dBA	8 dBA Shielding Leq dBA	9 dBA Shielding Leq dBA	10 dBA Shielding Leq dBA	11 dBA Shielding LeqdBA	12 dBA Shielding Leq dBA	13 dBA Shielding Leq dBA	14 dBA Shielding Leq dBA	15 dBA Shielding Leq dBA
50	**15.2**	**0.5**	**74**	**73**	**72**	**71**	**70**	**69**	**68**	**67**	**66**	**65**	**64**	**63**	**62**	**61**	**60**	**59**
60	18.3	0.5	72	71	70	69	68	67	66	65	64	63	62	61	60	59	58	57
70	21.3	0.5	71	70	69	68	67	66	65	64	63	62	61	60	59	58	57	56
80	24.4	0.5	69	68	67	66	65	64	63	62	61	60	59	58	57	56	55	54
90	27.4	0.5	68	67	66	65	64	63	62	61	60	59	58	57	56	55	54	53
100	30.5	0.5	67	66	65	64	63	62	61	60	59	58	57	56	55	54	53	52
110	33.5	0.5	66	65	64	63	62	61	60	59	58	57	56	55	54	53	52	51
120	36.6	0.5	65	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50
130	39.6	0.5	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49
140	42.7	0.5	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48
150	45.7	0.5	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48	47
160	48.8	0.5	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48	47
170	51.8	0.5	61	60	59	58	57	56	55	54	53	52	51	50	49	48	47	46
180	54.9	0.5	61	60	59	58	57	56	55	54	53	52	51	50	49	48	47	46
190	57.9	0.5	60	59	58	57	56	55	54	53	52	51	50	49	48	47	46	45
200	61.0	0.5	59	58	57	56	55	54	53	52	51	50	49	48	47	46	45	44
210	64.0	0.5	59	58	57	56	55	54	53	52	51	50	49	48	47	46	45	44
220	67.1	0.5	58	57	56	55	54	53	52	51	50	49	48	47	46	45	44	43
230	70.1	0.5	58	57	56	55	54	53	52	51	50	49	48	47	46	45	44	43
240	73.1	0.5	57	56	55	54	53	52	51	50	49	48	47	46	45	44	43	42
250	76.2	0.5	57	56	55	54	53	52	51	50	49	48	47	46	45	44	43	42
260	79.2	0.5	57	56	55	54	53	52	51	50	49	48	47	46	45	44	43	42
270	82.3	0.5	56	55	54	53	52	51	50	49	48	47	46	45	44	43	42	41
280	85.3	0.5	56	55	54	53	52	51	50	49	48	47	46	45	44	43	42	41
290	88.4	0.5	55	54	53	52	51	50	49	48	47	46	45	44	43	42	41	40
300	91.4	0.5	55	54	53	52	51	50	49	48	47	46	45	44	43	42	41	40
310	94.5	0.5	55	54	53	52	51	50	49	48	47	46	45	44	43	42	41	40
320	97.5	0.5	54	53	52	51	50	49	48	47	46	45	44	43	42	41	40	39
330	100.6	0.5	54	53	52	51	50	49	48	47	46	45	44	43	42	41	40	39
340	103.6	0.5	54	53	52	51	50	49	48	47	46	45	44	43	42	41	40	39
350	106.7	0.5	53	52	51	50	49	48	47	46	45	44	43	42	41	40	39	38
360	109.7	0.5	53	52	51	50	49	48	47	46	45	44	43	42	41	40	39	38
370	112.8	0.5	53	52	51	50	49	48	47	46	45	44	43	42	41	40	39	38

Building Construction L_{Max} **at 137 feet dBA**

		Noise Level Calculation Prior to Implementation of Noise Attenuation Requirements								
No.	Equipment Description	Reference (dBA) 50 ft Lmax	Quantity	Usage Factor[1]	Distance to Receptor (ft)	Ground Effect	Shielding (dBA)	Calculated (dBA) Lmax	Leq	Energy
1	Cranes	82	2	40	134	0.5	0	74.3	70.3	10783332.6
2	Forklift/Tractor	80	2	40	134	0.5	0	72.3	68.3	6803822.92
3	Generator	80	1	40	134	0.5	0	69.3	65.3	3401911.46
4	Tractor/Backhoe	80	2	40	134	0.5	0	72.3	68.3	6803822.92
							Lmax*	76	Leq	74
							Lw	108	Lw	106

Source: MD Acoustics, Nov 2020.

1- Percentage of time that a piece of equipment is operating at full power.

dBA – A-weighted Decibels

Lmax- Maximum Level

Leq- Equivalent Level

Feet	Meters	Ground Effect	No Shielding Leq dBA	1 dBA Shielding Leq dBA	2 dBA Shielding Leq dBA	3 dBA Shielding Leq dBA	4 dBA Shielding Leq dBA	5 dBA Shielding Leq dBA	6 dBA Shielding Leq dBA	7 dBA Shielding Leq dBA	8 dBA Shielding Leq dBA	9 dBA Shielding Leq dBA	10 dBA Shielding Leq dBA	11 dBA Shielding LeqdBA	12 dBA Shielding Leq dBA	13 dBA Shielding Leq dBA	14 dBA Shielding Leq dBA	15 dBA Shielding Leq dBA
50	**15.2**	**0.5**	**74**	**73**	**72**	**71**	**70**	**69**	**68**	**67**	**66**	**65**	**64**	**63**	**62**	**61**	**60**	**59**
60	18.3	0.5	72	71	70	69	68	67	66	65	64	63	62	61	60	59	58	57
70	21.3	0.5	71	70	69	68	67	66	65	64	63	62	61	60	59	58	57	56
80	24.4	0.5	69	68	67	66	65	64	63	62	61	60	59	58	57	56	55	54
90	27.4	0.5	68	67	66	65	64	63	62	61	60	59	58	57	56	55	54	53
100	30.5	0.5	67	66	65	64	63	62	61	60	59	58	57	56	55	54	53	52
110	33.5	0.5	66	65	64	63	62	61	60	59	58	57	56	55	54	53	52	51
120	36.6	0.5	65	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50
130	39.6	0.5	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49
140	42.7	0.5	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48
150	45.7	0.5	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48
160	48.8	0.5	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48	47
170	51.8	0.5	61	60	59	58	57	56	55	54	53	52	51	50	49	48	47	46
180	54.9	0.5	61	60	59	58	57	56	55	54	53	52	51	50	49	48	47	46
190	57.9	0.5	60	59	58	57	56	55	54	53	52	51	50	49	48	47	46	45
200	61.0	0.5	59	58	57	56	55	54	53	52	51	50	49	48	47	46	45	44
210	64.0	0.5	59	58	57	56	55	54	53	52	51	50	49	48	47	46	45	44
220	67.1	0.5	58	57	56	55	54	53	52	51	50	49	48	47	46	45	44	43
230	70.1	0.5	58	57	56	55	54	53	52	51	50	49	48	47	46	45	44	43
240	73.1	0.5	57	56	55	54	53	52	51	50	49	48	47	46	45	44	43	42
250	76.2	0.5	57	56	55	54	53	52	51	50	49	48	47	46	45	44	43	42
260	79.2	0.5	57	56	55	54	53	52	51	50	49	48	47	46	45	44	43	42
270	82.3	0.5	56	55	54	53	52	51	50	49	48	47	46	45	44	43	42	41
280	85.3	0.5	56	55	54	53	52	51	50	49	48	47	46	45	44	43	42	41
290	88.4	0.5	55	54	53	52	51	50	49	48	47	46	45	44	43	42	41	40
300	91.4	0.5	55	54	53	52	51	50	49	48	47	46	45	44	43	42	41	40
310	94.5	0.5	55	54	53	52	51	50	49	48	47	46	45	44	43	42	41	40
320	97.5	0.5	54	53	52	51	50	49	48	47	46	45	44	43	42	41	40	39
330	100.6	0.5	54	53	52	51	50	49	48	47	46	45	44	43	42	41	40	39
340	103.6	0.5	54	53	52	51	50	49	48	47	46	45	44	43	42	41	40	39
350	106.7	0.5	53	52	51	50	49	48	47	46	45	44	43	42	41	40	39	38
360	109.7	0.5	53	52	51	50	49	48	47	46	45	44	43	42	41	40	39	38
370	112.8	0.5	53	52	51	50	49	48	47	46	45	44	43	42	41	40	39	38

Paving L_{Max} **at 137 feet dBA**

No.	Equipment Description	Reference (dBA) 50 ft Lmax	Quantity	Usage Factor[1]	Distance to Receptor (ft)	Ground Effect	Shielding (dBA)	Calculated (dBA) Lmax	Calculated (dBA) Leq	Energy
Noise Level Calculation Prior to Implementation of Noise Attenuation Requirements										
1	Pavers	86	1	40	134	0.5	0	75.3	71.3	13543253.5
2	Rollers	80	1	40	134	0.5	0	69.3	65.3	3401911.46
3	Paving Equipment	80	1	40	134	0.5	0	69.3	65.3	3401911.46
4	Tractor/Backhoe	80	1	40	134	0.5	0	72.3	68.3	6803822.92
							Lmax*	**76**	**Leq**	**74**
							Lw	**108**	**Lw**	**106**

Source: MD Acoustics, Nov 2020.

1- Percentage of time that a piece of equipment is operating at full power.

dBA – A-weighted Decibels

Lmax- Maximum Level

Leq- Equivalent Level

Feet	Meters	Ground Effect	No Shielding Leq dBA	1 dBA Shielding Leq dBA	2 dBA Shielding Leq dBA	3 dBA Shielding Leq dBA	4 dBA Shielding Leq dBA	5 dBA Shielding Leq dBA	6 dBA Shielding Leq dBA	7 dBA Shielding Leq dBA	8 dBA Shielding Leq dBA	9 dBA Shielding Leq dBA	10 dBA Shielding Leq dBA	11 dBA Shielding LeqdBA	12 dBA Shielding Leq dBA	13 dBA Shielding Leq dBA	14 dBA Shielding Leq dBA	15 dBA Shielding Leq dBA
50	**15.2**	**0.5**	**74**	**73**	**72**	**71**	**70**	**69**	**68**	**67**	**66**	**65**	**64**	**63**	**62**	**61**	**60**	**59**
60	18.3	0.5	72	71	70	69	68	67	66	65	64	63	62	61	60	59	58	57
70	21.3	0.5	71	70	69	68	67	66	65	64	63	62	61	60	59	58	57	56
80	24.4	0.5	69	68	67	66	65	64	63	62	61	60	59	58	57	56	55	54
90	27.4	0.5	68	67	66	65	64	63	62	61	60	59	58	57	56	55	54	53
100	30.5	0.5	67	66	65	64	63	62	61	60	59	58	57	56	55	54	53	52
110	33.5	0.5	66	65	64	63	62	61	60	59	58	57	56	55	54	53	52	51
120	36.6	0.5	65	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50
130	39.6	0.5	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49
140	42.7	0.5	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48
150	45.7	0.5	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48	47
160	48.8	0.5	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48	47
170	51.8	0.5	61	60	59	58	57	56	55	54	53	52	51	50	49	48	47	46
180	54.9	0.5	60	59	58	57	56	55	54	53	52	51	50	49	48	47	46	45
190	57.9	0.5	60	59	58	57	56	55	54	53	52	51	50	49	48	47	46	45
200	61.0	0.5	59	58	57	56	55	54	53	52	51	50	49	48	47	46	45	44
210	64.0	0.5	59	58	57	56	55	54	53	52	51	50	49	48	47	46	45	44
220	67.1	0.5	58	57	56	55	54	53	52	51	50	49	48	47	46	45	44	43
230	70.1	0.5	58	57	56	55	54	53	52	51	50	49	48	47	46	45	44	43
240	73.1	0.5	57	56	55	54	53	52	51	50	49	48	47	46	45	44	43	42
250	76.2	0.5	57	56	55	54	53	52	51	50	49	48	47	46	45	44	43	42
260	79.2	0.5	56	55	54	53	52	51	50	49	48	47	46	45	44	43	42	41
270	82.3	0.5	56	55	54	53	52	51	50	49	48	47	46	45	44	43	42	41
280	85.3	0.5	56	55	54	53	52	51	50	49	48	47	46	45	44	43	42	41
290	88.4	0.5	55	54	53	52	51	50	49	48	47	46	45	44	43	42	41	40
300	91.4	0.5	55	54	53	52	51	50	49	48	47	46	45	44	43	42	41	40
310	94.5	0.5	55	54	53	52	51	50	49	48	47	46	45	44	43	42	41	40
320	97.5	0.5	54	53	52	51	50	49	48	47	46	45	44	43	42	41	40	39
330	100.6	0.5	54	53	52	51	50	49	48	47	46	45	44	43	42	41	40	39
340	103.6	0.5	54	53	52	51	50	49	48	47	46	45	44	43	42	41	40	39
350	106.7	0.5	53	52	51	50	49	48	47	46	45	44	43	42	41	40	39	38
360	109.7	0.5	53	52	51	50	49	48	47	46	45	44	43	42	41	40	39	38
370	112.8	0.5	53	52	51	50	49	48	47	46	45	44	43	42	41	40	39	38

VIBRATION LEVEL IMPACT

Project:	Lake Elsinore Gas and Store	Date: 1/12/21
Source:	Large Bulldozer	
Scenario:	Unmitigated	
Location:	Project Site	
Address:		

PPV = PPVref(25/D)^n (in/sec)

DATA INPUT

Equipment = Type	2	Large Bulldozer	INPUT SECTION IN BLUE
PPVref =	0.089	Reference PPV (in/sec) at 25 ft.	
D =	96.00	Distance from Equipment to Receiver (ft)	
n =	1.10	Vibration attenuation rate through the ground	

Note: Based on reference equations from Vibration Guidance Manual, California Department of Transportation, 2006, pgs 38-43.

DATA OUT RESULTS

PPV =	**0.020**	IN/SEC	OUTPUT IN RED

Paleontological Resources Assessment Report for the 28771 Highway 74 Project, APNs 347-130-028 and 347-130-029, Lake Elsinore, Riverside County, California

April 2021

Conditional Use Permit No. 200043

Lake Elsinore, California USGS 7.5' Quad, Township 5 South, Range 4 West, Section 29

Prepared for:

County of Riverside, Planning Department
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Prepared on Behalf of:

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MANAGEMENT SUMMARY

This report provides the results of a paleontological resources assessment completed by Red Tail Environmental (Red Tail) for the proposed 28771 Highway 74 Project (Project) in Lake Elsinore, Riverside County, California. The purpose of this report is to summarize identified paleontological resources occurring within the vicinity of the Project location, identify any Project activity that may negatively impact paleontological resources, and provide recommendations to mitigate impacts to less than significant levels.

The proposed Project includes developing two parcels to construct a gas station with a convenience market, a fueling canopy with six multi-product dispensers, and two underground storage tanks. Specific details on planned earthwork activity for this project are currently undefined, however over-excavation and recompaction earthwork over the entire Project area is anticipated.

Published geologic maps for the Project indicates the Project area is underlain by Mesozoic quartz-rich deposits, or phyllite (Morton, 2003; Morton and Miller, 2006; Morton and Weber, 2002)

Following paleontological guidelines are outlined in City of Lake Elsinore General Plan and supported by the occurrence of known fossils near the Project area and in other parts of western Riverside County, the geologic units underlying the Project have been assigned a low paleontological sensitivity. No recorded fossil collection localities are known from within a 1-mile radius of the Project site.

When existing information indicates that the proposed Project site is located completely within a zone with low paleontological sensitivity, no direct mitigation is required unless a fossil is encountered during site development. Therefore, in the case that a fossil is encountered during Project development, the Riverside County Geologist must be notified and a paleontologist must be retained by the Project proponent. The paleontologist will document the extent and potential significance of the paleontological resources discovered at the Project site and will establish appropriate mitigation measures for further site development.

1. INTRODUCTION

PURPOSE OF STUDY

This report provides the results of a paleontological resources assessment completed by Red Tail Environmental (Red Tail) for the proposed 28771 Highway 74 Project (Project) in Lake Elsinore, Riverside County, California, on the northwest side of State Route 74 between Rosetta Canyon Drive and Ardenwood Way (Figures 1 and 2). The Project area straddles Assessor Parcel Numbers (APN) 347-130-028 on the east and 347-130-029 on the west. The proposed Project includes developing two parcels to construct a gas station with a convenience market, a fueling canopy with six multi-product dispensers, and two underground storage tanks. Specific details on planned earthwork activity for this project are not currently defined, however over-excavation and recompaction earthwork over the entire Project area is anticipated.

A paleontological resources assessment was conducted in order to evaluated whether the proposed Project has the potential to negatively impact paleontological resources. This assessment report summarizes existing data of paleontological resource at the Project site, discusses the significance of these resources, evaluates possible Project-related impacts to paleontological resources, and provides recommendations to mitigate any impacts to these resources. This report was prepared by Jennifer DiCenzo and Spencer Bietz.

DEFINITION OF PALEONTOLOGICAL RESOURCES

Paleontological resources, or fossils, are the buried remains and traces of once-living organisms preserved in the geological formations within which they were originally buried. These include bones, teeth, shells, wood, leaf impressions, footprints, burrows and microscopic remains. Fossils are typically older than 10,000 years but remains of early Holocene age can also be considered to represent fossils because they represent a record of life in the past. Additionally, the localities of the fossil collections and the geological formations containing those localities are also considered paleontological resources.

Fossils are considered non-renewable resources because typically the organisms they represent no longer exist, and once destroyed can never be replaced. Fossils are important scientifically and educationally because they are evidence of prehistoric life on Earth. Paleontologists use fossils remains to better understand aspects of paleoenvironments and paleoclimates, to study patterns and processes of evolution and extinction, and to determine relationships between extinct and extant organisms. Fossil resources vary widely in their relative abundance and distribution and not all are regarded as significant. Preserved vertebrate fossils remains or track ways are classed as significant by most state and federal agencies and professional groups (and are specifically protected under the California Public Resources Code). In some cases, fossils of plants or invertebrate animals are also considered significant and can provide important information about ancient local environments.

A significant paleontological resource is considered to be of scientific interest if it is a rare or previously unknown species, it is of high quality and well preserved, it preserves a previously unknown anatomical or other characteristic, provides new information about the history of life on earth, or has an identified educational or recreational value. Paleontological resources that may be considered not to have scientific significance include those that lack provenience or context, lack physical integrity due to decay or natural erosion, or that are overly redundant or are otherwise not useful for research. The full significance of fossil specimens or fossil assemblages cannot be accurately predicted before they are collected, and in many cases, before they are prepared in the laboratory and compared with previously collected fossils. Pre-construction assessment of significance associated with an area or formation must be made based on previous finds, characteristics of the sediments, and other methods that can be used to determine depositional conditions.

REGULATORY FRAMEWORK

Paleontological resources are considered scientifically and educationally significant nonrenewable resources protected under federal, state, and local laws, regulations, and ordinances including: The Antiquities Act of 1906; National Environmental Policy Act of 1969; Federal Land Policy Management Act of 1976; Paleontological Resources Preservation Act of 2009; California Environmental Quality Act; and Public Resources Code. The Project site is located within the County of Riverside (County), and the paleontological guidelines from the General Plan are summarized below.

2. METHODS

PALEONTOLOGICAL RECORDS SEARCH AND LITERATURE REVIEW

A fossil locality records search was performed at the Western Science Center (WSC), Department of Paleontology. The records search included examination of the WSC paleontological database to identify if any previously recorded fossil localities were recorded within or near the Project area. The locality records search was also conducted in order to identify if other fossil localities were present within similar geologic contexts and to identify the locations of sensitive geologic formations that are conducive to fossil preservations. Additional review of relevant published geologic maps (Morton, 2003; Morton and Miller, 2006; Morton and Weber, 2002) was conducted in order to understand where fossil may be found by directly correlating paleontological resource potential with the geologic rock units underlying the Project site.

PALEONTOLOGICAL RESOURCE ASSESSMENT CRITERIA

The County uses specific criteria consistent with guidelines published by the Society of Vertebrate Paleontology (SVP, 2010) to assess the paleontological potential of geologic units to contain fossils. The geologic units underlying the County have been assigned paleontological sensitivity ratings based on the following scale: High Potential (High A and High B subgroups), Low Potential, and Undetermined Potential. The following is a summary of the criteria for determining paleontological sensitivity.

High Sensitivity

Geologic units are assigned a high sensitivity rating when they are known to contain paleontological localities with rare, well-preserved fossil material, have critical fossil material available for stratigraphic or paleoenvironmental interpretation, and fossils with important data about the paleobiology and phylogeny of plant and animal groups, or if the rock unit is considered to have the potential to produce these kinds of remains.

Additionally, the County further divides rock units assigned a high paleontological sensitivity ratings into two subgroups: High Paleontological Potential A and High Paleontological Potential B. Rock units are assigned to group A if they are present immediately at the surface, and are assigned to group B if the rock unit is found at a depth of four or more feet below the existing surface.

Low Sensitivity

Geologic units are assigned a low sensitivity based on their relatively “young” age or high-energy depositional history. Rock units are considered to have a low sensitivity when they are unlikely to produce significant fossil remains, if they produce a low abundance of fossil remains, are igneous in origin and therefore have no potential for containing fossil remains, or if they are artificial fill materials.

Undetermined Sensitivity

Geologic Units assigned an undetermined sensitivity rating are those which display geologic features and preservational conditions conducive to producing fossils but little information may be known about the geology or paleontological resources because little data from the formation exists.

PALEONTOLOGICAL IMPACT ANALYSIS

Impacts to paleontological resources occur when construction activity such as grading, trenching and drilling physically destroy fossil remains. Ground-disturbing activities which destroy or modify units that have the potential to produce fossils have the potential to significantly impact fossil resources. Paleontological mitigation during construction is usually recommended to reduce these impacts to a less than significant level.

The purpose of this report is to determine if any of the proposed Project-related ground-disturbing activities may impact potentially fossiliferous geologic units, and to examine where and at what depth this may occur. The paleontological impact analysis involved examining available Project documents and other geological and paleontological data gathered during the records search and literature review.

3. EXISTING GEOLOGICAL SETTING

The Project site is located in the Elsinore Trough within the Perris Block of the Peninsular Ranges Geomorphic Province (English, 1926; Norris and Webb, 1990). At the surface, this structural block is a relatively low relief, weathered basin characterized by hills and small mountains, bordered by the Santa Ana Mountains to the west and south, the San Jacinto Mountains to the east, and the San Gabriel and San Bernardino Mountains to the north. The Elsinore Trough is a fault-controlled, complex geologic structure formed by extensional faulting along the Elsinore Fault Zone, the mechanism responsible for the uplift of those surrounding mountain ranges and the sinking of the Perris Block. Subsequently, the uplifted ranges are actively eroding sediment into nearby lower-lying basins and depositing sediment as alluvial fans and stream deposits.

4. RESULTS

RESULTS OF THE RECORDS SEARCH AND LITERATURE REVIEW

The results of the paleontological assessment are summarized below.

Project Paleontology

A records search of paleontological collections data was requested from the WSC. The results of the records search were negative, there were zero records of localities within the Project area or within a one-mile radius of the Project area (WSC, 2021; Appendix A). The results indicate that the Mesozoic quartz and phyllite deposits underlying the project (described below) are considered to be of low paleontological sensitivity and are not known to produce fossil material within the region. The WSC suggests that given the geologic makeup of the sediments underlying the project, it is unlikely that fossil material will be present.

A records search of paleontological collections data was completed by Red Tail using the University of California Museum of Paleontology (UCMP) database, which also returned negative results, there are zero records of localities within similar rock units in the County.

Project Geology

Published geologic maps (Morton, 2003; Morton and Miller, 2006; Morton and Weber, 2002) indicate the Project area is underlain by Mesozoic quartz-rich deposits and phyllite (depicted in Figure 3). Quartz-rich rocks of contain quartzite and quartz-rich metasandstone. The fissile black phyllite in this area commonly has sheen produced by very fine-grained white mica on the surface and locally contains small elongate prisms of fine-grained white mica, which may be pseudomorphs after chiastolite. Within the project area, the phyllite appears a rusty reddish brown on the surface (Figure 4).

A geotechnical report for the Project site was prepared by Geotechnical and Environmental Engineering Consultants, Inc. Their field study included three exploratory borings drilled to a maximum of 50 feet below the existing surface and soils encountered were logged by the field technician. Samples of undisturbed soils were retained in brass rings and tested at a laboratory. The geotechnical report describes the geology as consisting of a moist moderately dense brown-orange sandy silt “top native soil” containing sand and gravel, or alluvium, that continued to the maximum depth of 50 feet at all three boring locations.

RESULTS OF THE PALEONTOLOGICAL SENSITIVITY ANALYSIS

The rock units underlying the Project area have been assigned a low paleontological sensitivity based on the aforementioned criteria set by the County, and the occurrence of known fossils elsewhere in western Riverside County. Sensitivity assignment for rock units located within the County are graphically represented in Figure 5.

RESULTS OF THE PALEONTOLOGICAL IMPACT ANALYSIS

Details regarding exact amounts of excavation are not clearly defined at this time, however preliminary Project plans indicate several thousand cubic yards of sediment would need to be excavated or graded to complete proposed Project construction. Additionally, the geotechnical report recommends the "proposed building areas should be overexcavated to a depth of 4.0 feet below the existing soil grad, or 2.0 feet below the proposed footing bottoms, whichever is greater" and "where possible, the limits of overexcavation for building areas shall extend at least 5.0 feet beyond the proposed building limits or to the property line, whichever is less". Given the proposed ground disturbance and the geotechnical recommendations for overexcavation to complete the Project, it is likely mass grading and excavation will directly impact the Mesozoic deposits (low paleontological sensitivity) underlying the Project Area.

RESULTS OF THE FIELD SURVEY

The project area bisects a low-rolling alluvial terrace that is aligned northeast-southwest and is bordered by a small seasonal drainage to the north and by Central Avenue to the south and east. The parcel immediately west of the Project area has been previously graded but now appears to lie fallow, displaying evidence of on-going opportunistic dumping activities. The south and eastern edges of the project area border an improved storm drain system that appears to be associated with the development along Central Avenue. The western parcel, APN 347-130-029, had been previously graded and was mostly devoid of vegetation but covered in gravel (Figure 6). The eastern parcel, APN 347-130-028, did not appear to have been previously graded or disturbed except for the southern edge which had been benched, presumably for slope retention (Figure 7). The southern border of the east parcel also contained a low-lying concrete retaining wall/curb which appeared to be modern in construction style (Figure 8). The north and northeastern portions of the Project area contained a small east/west-trending (Figure 9). Ground visibility within the north and northeastern portions of the Project Area were moderate (approximately 25 to 50 percent) to low (less than 25 percent) due to vegetation. Visibility within the central and southern portions of the east parcel and the entirety of the west parcel were moderate to good (75 percent and higher).

The pedestrian survey consisted of inspection of the Project area in transects spaced at 10-m intervals and the area was photographed. The survey transects were aligned in cardinal directions in order to survey the maximum amount of visible area. Special attention was given to outcrops, visible sediment in areas devoid of vegetation, and visibly bioturbated sediment.

5. RECOMMENDATIONS AND CONCLUSIONS

Geologists with the County apply general conditions when issuing grading permits for proposed projects. When existing information indicates that a proposed Project site is located completely within a zone with low paleontological sensitivity, no direct mitigation is required unless a fossil is encountered during site development. Therefore, in the case that a fossil is encountered during Project development, the Riverside County Geologist must be notified and a paleontologist must be retained by the Project proponent. The paleontologist will document the extent and potential significance of the paleontological resources discovered at the Project site and will establish appropriate mitigation measures for further site development. The following is an outline of mitigation measures related to paleontological resources encountered during Project construction

MITIGATION MEASURES

In the case that a paleontological resource is discovered during Project construction, the following conditions must be met:

a. All site earthmoving shall be ceased in the area of where the fossil remains are encountered, but earthmoving activities may be diverted to other areas of the site;
b. The owner of the property shall be immediately notified of the fossil discover and in turn shall immediately notify the County geologist of the discovery;
c. The applicant shall retain a qualified paleontologist approved by the County;
d. The paleontologist shall determine the significance of the encountered fossil remains;
e. Paleontological monitoring of ground-disturbing activities will continue thereafter on an as-needed basis by the paleontologist during all such activity that may expose sensitive strata. Ground-disturbing activities in areas of the Project site where previously undisturbed strata will be buried, but not otherwise disturbed, does not need to be monitored. The supervising paleontologist will have the authority to reduce monitoring if it is determined that the probability of encountering any additional fossils has dropped below an acceptable level;
f. If fossil remains are encountered by ground-disturbing activities when the paleontologist is not on site, these activities will be diverted around the fossil site and the paleontologist shall be called to the site immediately to recover the remains;
g. Any recovered fossil remains will be prepared to the point of identification and identified to the lowest taxonomic level possible by knowledgeable paleontologists. The remains then will be curated, catalogued, and the corresponding geologic and geographic site data will be archived at the appropriate museum or repository. The remains will then be accessioned into the museum or repository fossil collection where they will be permanently stored, maintained, and made available for future study by qualified scientific investigators. The County must be consulted on the repository or museum to receive the fossil material prior to being curated.

6. REFERENCES

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Figures

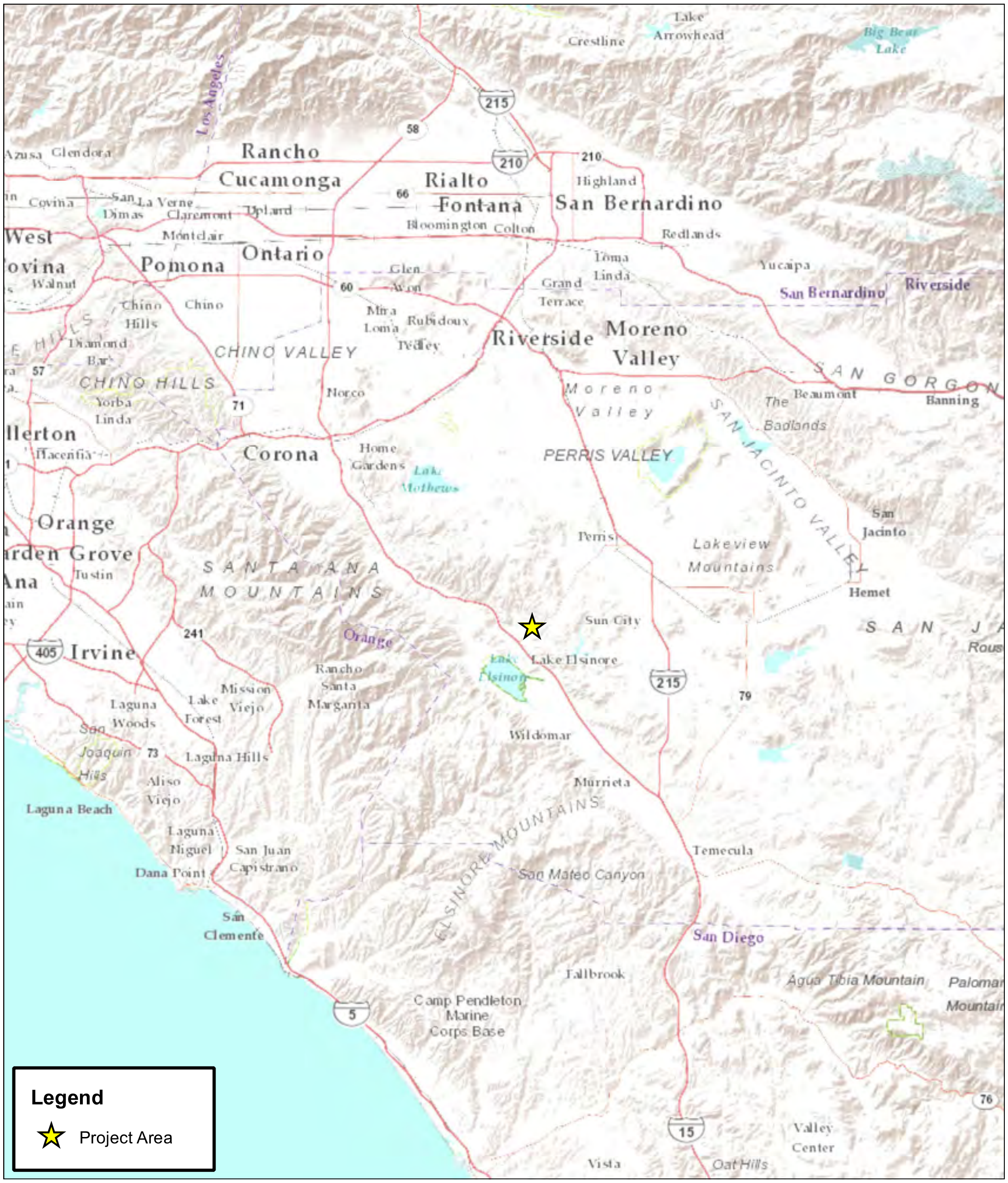

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Figure 1. Project Vicinity Map

RED TAIL ENVIRONMENTAL

Figure 2. Proposed Project Area.

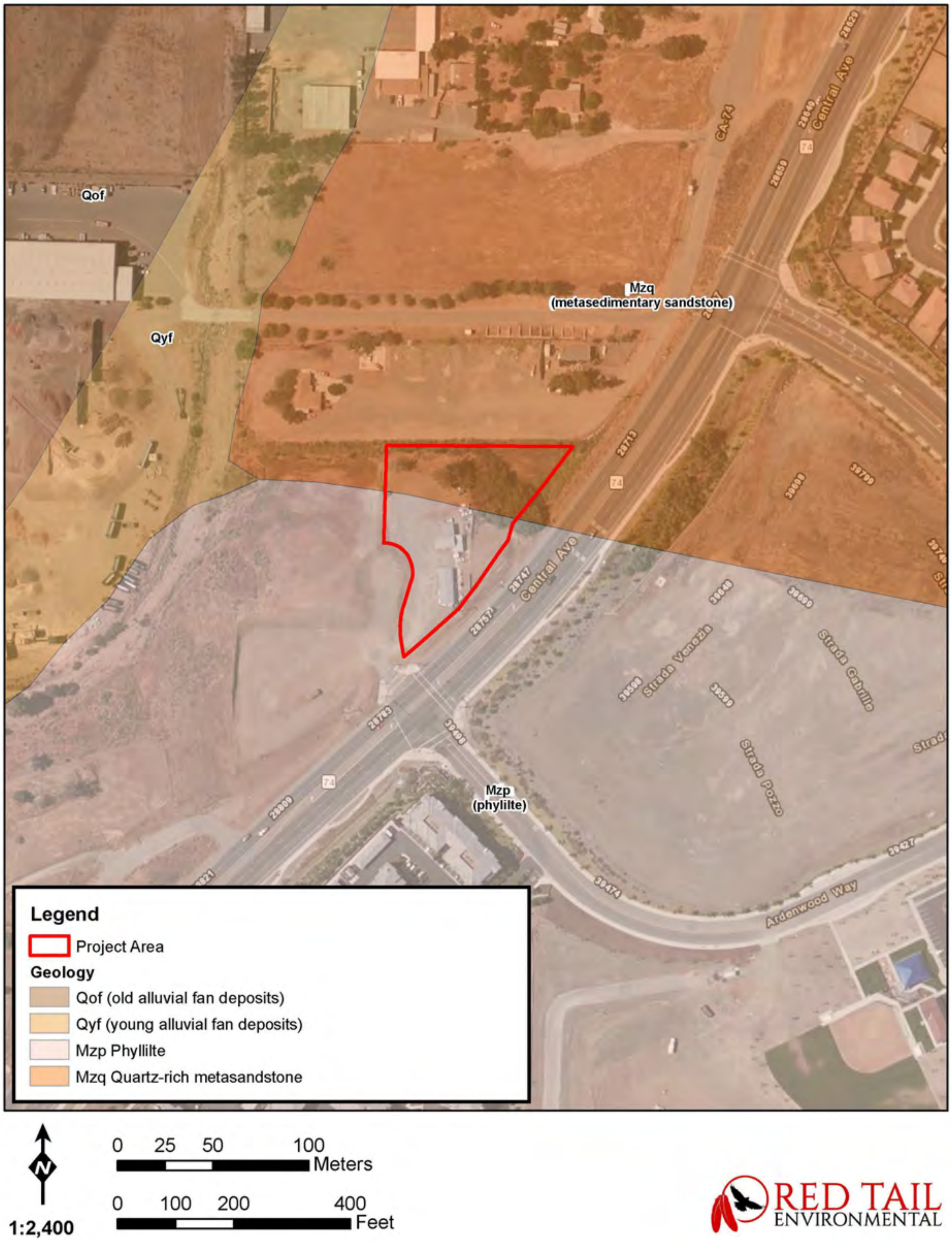


Figure 3. Site Geology

Figure 4. Surface Geology, plan view.

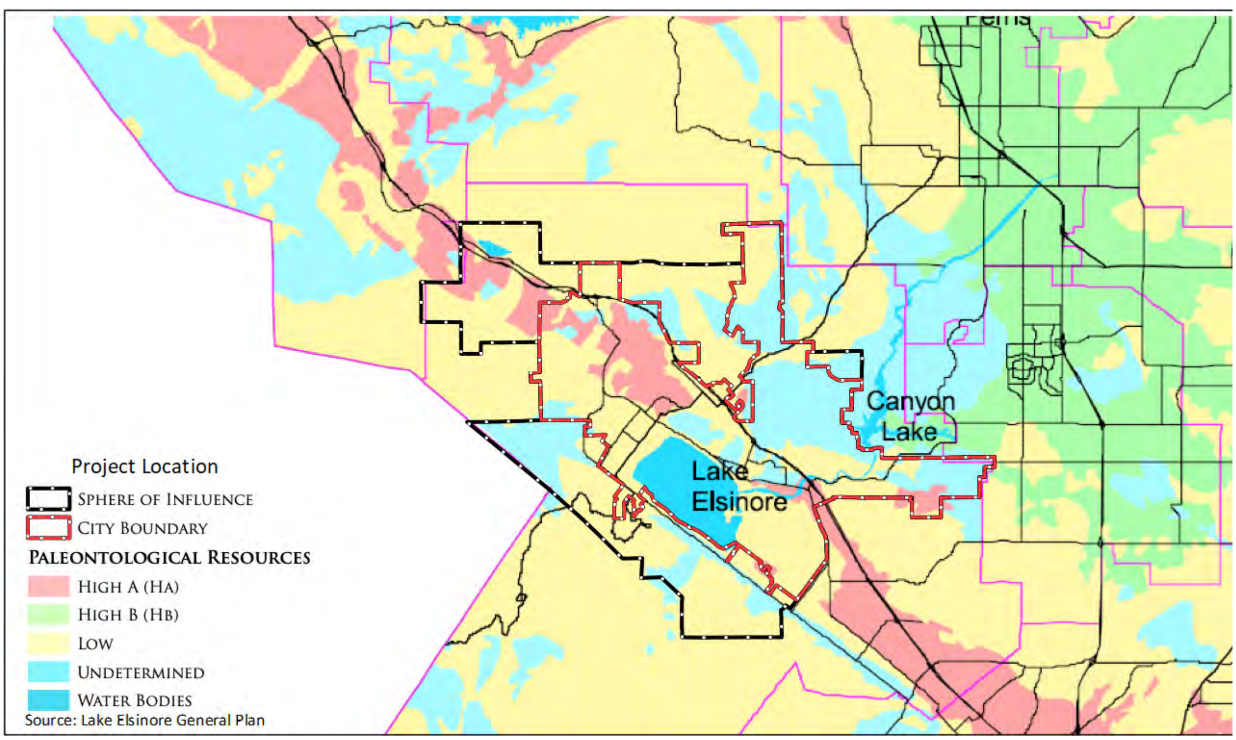


Figure 5. Paleontological Resources Sensitivity Map Near Project Area

Figure 6. Overview of west parcel APN 347-130-029, facing north.

Figure 7. Overview of east parcel APN 347-130-028, facing west.

Figure 8. Overview of modern disturbance at southeast border of Project area, facing northeast.

Figure 9. Overview of drainage at northeast corner of Project Area, facing west.

APPENDIX A

WSC PALEONTOLOGICAL RECORDS SEARCH RESULTS

WESTERN SCIENCE CENTER

Chambers Group
Spencer Bietz
328 State Place
San Diego, CA 92029

February 8, 2021

Dear Mr. Bietz,

This letter presents the results of a record search conducted for the 28771 Highway 74/76 Gas Station Project in the city of Lake Elsinore, Riverside County, California. The project site is located east of Highway 74 between Ardenwood Way and Rosetta Canyon Drive in Township 5 South, Range 4 West in Section 29 on the Lake Elsinore CA USGS 7.5 minute quadrangle.

The geologic units underlying this project are mapped as Mesozoic quartz rich deposits or phyllite (Morton and Webber, 1998). A map showing geologic mapping for the area has been included for your reference. Mesozoic quartz and phyllite deposits are considered to be of low paleontological sensitivity and are not know to produce fossil material within the region. The Western Science Center does not have localities within the project area or within a one mile radius.

Given the geologic makeup of sediments underlying the project area, it is unlikely that fossil material will be present. If you have any questions or would like further information, please feel free to contact me at dradford@westerncentermuseum.org

Sincerely,

Darla Radford
Collections Manager

2345 Searl Parkway ‖ Hemet, CA 92543 ‖ phone 951.791.0033 ‖ fax 951.791.0032 ‖ WesternScienceCenter.org

Central Avenue Gas Station Vehicle Miles Traveled (VMT) Analysis

Prepared for:
Western States Engineering
4887 E. La Palma, Suite 707
Anaheim, CA 92807

Prepared by:

INTEGRATED ENGINEERING GROUP
TRANSPORTATION PLANNING AND ENGINEERING

23905 Clinton Keith 114-280
Wildomar, CA 92595

March 2021

1.0 PROJECT INTRODUCTION

The purpose of this report is to evaluate the project's VMT analysis requirements and compliance with Senate Bill 743 (SB 743) and The California Environmental Quality Act (CEQA).

1.1 PROJECT DESCRIPTION

The project is located on a vacant lot in the northeast of the intersection of Central Avenue (CA-74) and Ardenwood Way in the County of Riverside. The project is designated as a greenfield development as the existing land is currently vacant/undeveloped. The proposed project is a gas station with a 3,516 square feet convenience store.

Figure 1-1 shows the Project site plan.

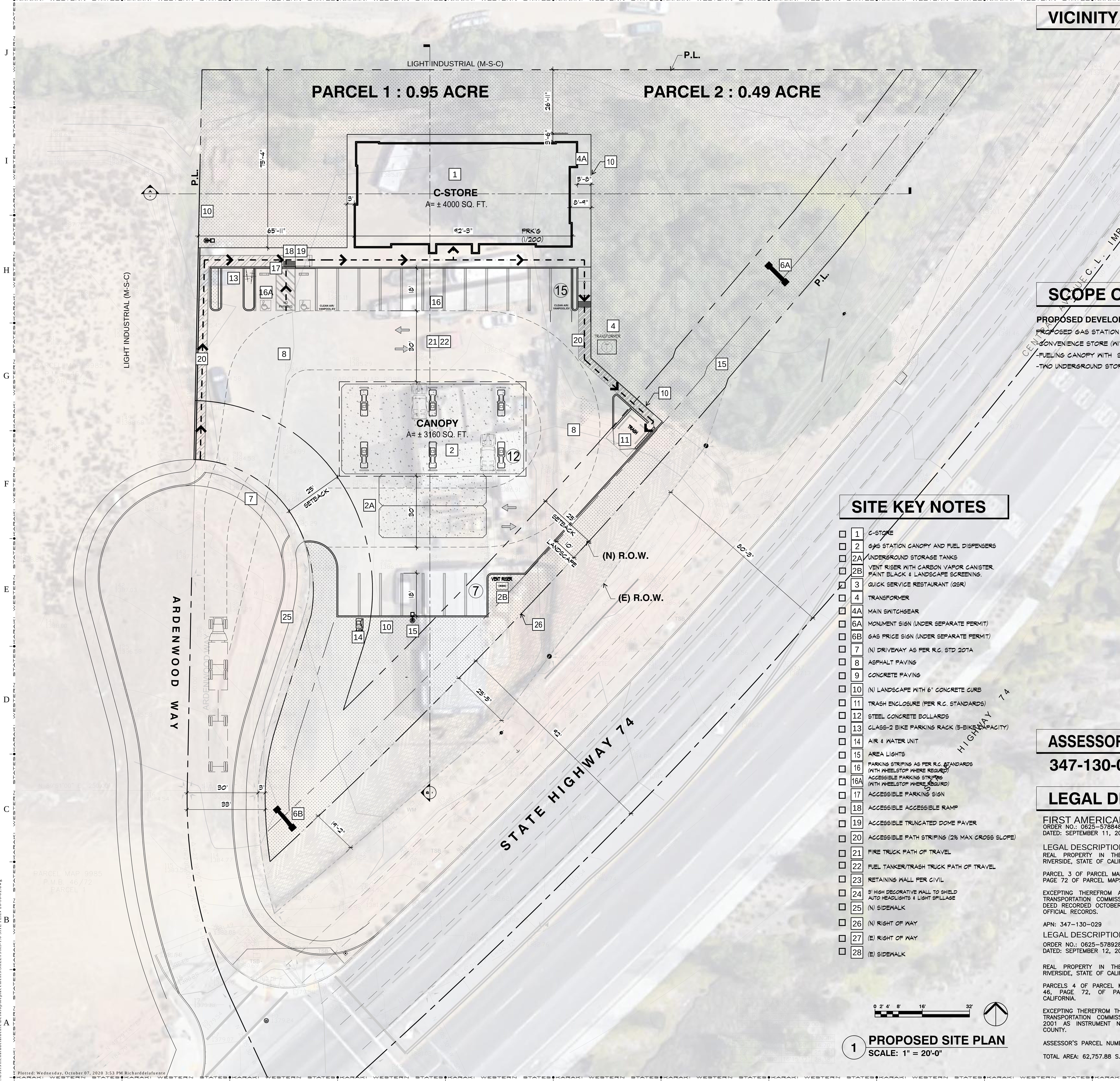
1.2 SENATE BILL 743

On September 27, 2013, SB 743 was signed into State law and started a process intended to fundamentally change transportation impact analysis as part of the CEQA compliance. The California Natural Resource Agency updated the CEQA transportation analysis guidelines in 2018. In this update automobile delay and LOS metrics are no longer to be used in determining transportation impacts. Instead VMT metrics will serve as the basis in determining impacts. Furthermore, the guidelines stated that after July 1, 2020, transportation analysis under CEQA must use VMT to determine impacts for land use projects.

1.3 GUIDANCE DOCUMENTS

The project is located within the jurisdiction of the County of Riverside. The County has adopted guidance on evaluating VMT for transportation impacts under CEQA. For this project the County of Riverside's, "Transportation Analysis Guidelines for Level of Service, Vehicle Miles Traveled", December 2020[1], hereafter referred to as Guidelines.

[1] https://rctlma.org/Portals/7/2020-12-15%20-%20Transportation%20Analysis%20Guidelines.pdf

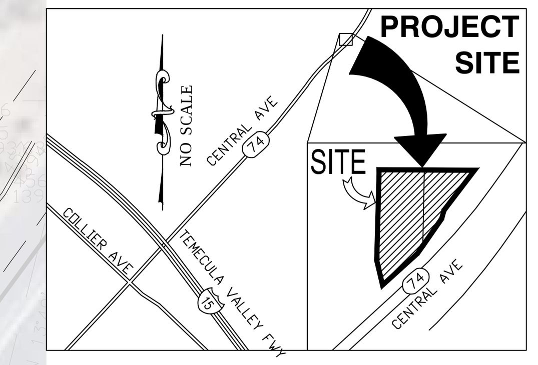


1 PROPOSED SITE PLAN
SCALE: 1" = 20'-0"

SITE KEY NOTES

1	C-STORE
2	GAS STATION CANOPY AND FUEL DISPENSERS
2A	UNDERGROUND STORAGE TANKS
2B	VENT RISER WITH CARBON VAPOR CANISTER. PAINT BLACK & LANDSCAPE SCREENING.
3	QUICK SERVICE RESTAURANT (QSR)
4	TRANSFORMER
4A	MAIN SWITCHGEAR
6A	MONUMENT SIGN (UNDER SEPARATE PERMIT)
6B	GAS PRICE SIGN (UNDER SEPARATE PERMIT)
7	(N) DRIVEWAY AS PER R.C. STD 207A
8	ASPHALT PAVING
9	CONCRETE PAVING
10	(N) LANDSCAPE WITH 6" CONCRETE CURB
11	TRASH ENCLOSURE (PER R.C. STANDARDS)
12	STEEL CONCRETE BOLLARDS
13	CLASS-2 BIKE PARKING RACK (5-BIKE CAPACITY)
14	AIR & WATER UNIT
15	AREA LIGHTS
16	PARKING STRIPING AS PER R.C. STANDARDS (WITH WHEELSTOP WHERE REQUIRED)
16A	ACCESSIBLE PARKING STRIPING (WITH WHEELSTOP WHERE REQUIRD)
17	ACCESSIBLE PARKING SIGN
18	ACCESSIBLE ACCESSIBLE RAMP
19	ACCESSIBLE TRUNCATED DOME PAVER
20	ACCESSIBLE PATH STRIPING (2% MAX CROSS SLOPE)
21	FIRE TRUCK PATH OF TRAVEL
22	FUEL TANKER/TRASH TRUCK PATH OF TRAVEL
23	RETAINING WALL PER CIVIL
24	3' HIGH DECORATIVE WALL TO SHIELD AUTO HEADLIGHTS & LIGHT SPILLAGE
25	(N) SIDEWALK
26	(N) RIGHT OF WAY
27	(E) RIGHT OF WAY
28	(E) SIDEWALK

VICINITY MAP



LEGEND

- NO. OF PARKING SPACES
- ACCESSIBLE PARKING
- PROPERTY LINE
- PROPOSED PARCEL SUBDIVISION
- ADA PATH OF TRAVEL
- CONCRETE PAVING AREA
- DECORATIVE PAVING AREA
- LANDSCAPED AREA
- DIRECTIONAL ARROW
- R.O.W. DEDICATION
- AREA LIGHTS
- WALL MOUNTED DECORATIVE AREA LIGHTS
- (E) FIRE HYDRANT
- (E) SEWER MANHOLE
- (E) SEWER CLEANOUT
- (E) POWER POLE
- WM (E) WATER METER
- (E) WATER POINT
- (E) SIGN

SCOPE OF WORK

PROPOSED DEVELOPMENT

PROPOSED GAS STATION COMPRISING OF:
-CONVENIENCE STORE (WITH TYPE 20-ABC)
-FUELING CANOPY WITH SIX MULTI-PRODUCT DISPENSERS
-TWO UNDERGROUND STORAGE TANKS

PROJECT DATA

ZONING: LIGHT INDUSTRIAL
LAND USE: MANUFACTURING-SERVICE COMMERCIAL

AREA OF SITE (GROSS ACREAGE)
TOTAL AREA : ± 62,726 S.F. (1.44 acre)

AREA OF PROJECT (NET ACREAGE)
TOTAL AREA : ± 62,726 S.F. (1.44 acre)

BLDG SETBACKS	REQUIRED	PROVIDED
FRONT (SOUTH)	25'-0"	25'-0"
REAR (NORTH)	0'-0"	0'-0"
LEFT (WEST)	25'-0"	25'-0"
RIGHT (EAST)	0'-0"	0'-0"
LANDSCAPE AREA	10%	29,002 S.F. (51%)
FLOOR AREA RATIO	-	± 0.11
MAXIMUM HEIGHT	40'-0"	28'-0"
PARKING	39	51

BUILDING DATA

C-STORE

AREAS	± 4,000 SF
OCCUPANCY	M
TYPE OF CONST	V-B
NUMBER OF STORY	1
BLDG HEIGHT	± 28'-0"
SPRINKLERS	NONE

CANOPY

AREA	± 3,160 SF
OCCUPANCY	M
TYPE OF CONST	II-B
NUMBER OF STORY	1
BLDG HEIGHT	20'-0"
SPRINKLERS	NONE

TOTAL BUILDINGS AREA (GFA) ± 9,160 SF
± 0.15 ACRE (NET ACREAGE)

ASSESSOR'S PARCEL NUMBER

347-130-028 & 347-130-029

LEGAL DESCRIPTION

FIRST AMERICAN TITLE COMPANY
ORDER NO.: 0625-5788488
DATED: SEPTEMBER 11, 2018

LEGAL DESCRIPTION:
REAL PROPERTY IN THE UNINCORPORATED AREA OF THE COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, DESCRIBED AS FOLLOWS:

PARCEL 3 OF PARCEL MAP 9985, AS SHOWN BY MAP ON FILE IN BOOK 46, PAGE 72 OF PARCEL MAPS, RECORDS OF RIVERSIDE COUNTY, CALIFORNIA.

EXCEPTING THEREFROM A PORTION THAT GRANTS TO RIVERSIDE COUNTY TRANSPORTATION COMMISSION, A POLITICAL SUBDIVISION AS DESCRIBED IN DEED RECORDED OCTOBER 02, 2001 AS INSTRUMENT NO. 2001-478038 OF OFFICIAL RECORDS.

APN: 347-130-029

LEGAL DESCRIPTION:
ORDER NO.: 0625-5789283
DATED: SEPTEMBER 12, 2018

REAL PROPERTY IN THE UNINCORPORATED AREA OF THE COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, DESCRIBED AS FOLLOWS:

PARCELS 4 OF PARCEL MAP 9985, AS SHOWN BY MAP ON FILE IN BOOK 46, PAGE 72, OF PARCEL MAPS, RECORDS OF RIVERSIDE COUNTY, CALIFORNIA.

EXCEPTING THEREFROM THAT PORTION CONVEYED TO THE RIVERSIDE COUNTY TRANSPORTATION COMMISSION, BY GRANT DEED RECORDED OCTOBER 09, 2001 AS INSTRUMENT NO. 01-489377, OF OFFICIAL RECORDS OF SAID COUNTY.

ASSESSOR'S PARCEL NUMBER: 347-130-028

TOTAL AREA: 62,757.88 S.F. (1.441 ACRES)

PARKING COMPUTATION

PARKING STANDARDS

TYPE	SIZE
REGULAR	9'-0" X 18'-0"
COMPACT	8'-6" X 16'-0" (UP TO 20% OF TOTAL)
HANDICAP	17'-0" X 18'-0" (VAN ACCESSIBLE)

PARKING REQUIREMENTS

USE	FORMULA	REQUIRED	PROVIDED
C-STORE	(1/200 S.F.)	20	22
CANOPY		-	12
TOTAL PARKING		20	34

HANDICAP PARKING REQUIREMENTS

FORMULA	REQUIRED	PROVIDED
26-50 PARKING SPACES	(2)	(2)

CLEAN AIR/ELECTRIC VEHICLE PARKING

FORMULA	REQUIRED	PROVIDED
SECTION 17.18.045 R.C. MUN CODE (WITH 25-49 PARKING = 2 EV CHARGING SPACES)	(2)	(2)

KARAKI WSe
WESTERN STATES ENGINEERING
A DESIGN-BUILD COMPANY
4887 E. LA PALMA STE. 707
ANAHEIM, CA 92807
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■ SUBMITTAL

NO.	DESCRIPTION	BY	DATE
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■ REVISIONS

NO.	DESCRIPTION	BY	DATE
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■ OWNER NAME & ADDRESS
DAHER OIL INC.
19851 ESPERANZA RD.
YORBA LINDA CA 92886

■ PROJECT NAME & ADDRESS
GAS STATION & CONVENIENCE STORE
28771 CENTRAL AVE. (74 HWY)
LAKE ELSINORE, CA 92532

■ NOTE TO CONTRACTOR
CONTRACTOR TO VERIFY LOCATION AND DEPTH OF ALL UTILITIES ON-SITE AND OFF-SITE PRIOR TO START OF CONSTRUCTION.

■ DESIGNED BY: WS
■ DRAWN BY: WS
■ CHECKED BY: JK
■ PLOT DATE: 10.7.2020
■ SCALE: AS SHOWN
■ SHEET TITLE
PROPOSED SITE PLAN

■ SHEET NUMBER
AS-1.0

■ JOB No: E99319
■ PAR / CUP No: PAR190001

2.0 ANALYSIS METHODOLGY

The Guidelines adopted by Riverside County require a 5-step process[2] for VMT analysis:

1. Project Screening: Identifies if the project needs additional VMT analysis based on if the project meets screening criteria set by Riverside County. Projects that meet any criteria would have a presumption of less than significance.
2. Identify VMT Measure: If the project does not meet any screening criteria, the project will need to identify the appropriate VMT metric as identified in the Guidelines based on land use type.
3. Identify VMT Threshold: Based on the required VMT Measure the project will need to identify the appropriate VMT Measure threshold as required in the Guidelines.
4. Assessment of Impact: Project will need to evaluate its project specific VMT Measure against the appropriate VMT Threshold to determine if the project would have an CEQA transportation VMT impact.
5. Mitigation Measures: If the project would have a VMT impact under CEQA the project would need to mitigate the impact to the extent feasible and disclose whether the project would fully mitigate its impact or require additional analysis.

2.1 SCREENING CRITERIA

2.1.1 County of Riverside Transportation Analysis Guidelines Screening Criteria

The Guidelines recognize that certain projects based on type, location, size and other contexts could lead to a *presumption of less than significance* (i.e. the project's VMT would not cause a transportation impact) and would not need additional VMT analysis. The Guidelines provide the following screening criteria[3]:

1. S*mall Projects*: This applies to projects with low trip generation per existing CEQA exemptions or based on the County Greenhouse Gas Emissions Screening Tables, result in a 3,000 Metric Tons of Carbon Dioxide Equivalent (MTCO2e) per year screening level threshold."
2. *Projects Near High Quality Transit*: High quality transit provides a viable option for many to replace automobile trips with transit trips resulting in an overall reduction in VMT.
3. *Local Retail*: The introduction of new Local-serving retail has been determined to reduce VMT by shortening trips that will occur.
4. *Affordable Housing: Lower-income residents make fewer trips on average, resulting in lower VMT overall*.
5. *Local Essential Service*: As with Local-Serving Retail, the introduction of new Local Essential services shortens non-discretionary trips by putting those goods and services closer to residents.
6. *Map*-Based Screening: This method eliminates the need for complex analyses by allowing existing VMT data to serve as a basis for the screening smaller developments. Note that screening is limited to residential and office projects.
7. *Redevelopment Projects*: Projects with lower VMT than existing on-site uses, can under limited circumstances, be presumed to have a non-significant impact. In the event this

[2] Guidelines, Figure 2 VMT Analysis Flow Chart
[3] Guidelines, Figure 3 Screening Criteria for Development Projects

screening does not apply, projects should be analyzed as though there is no existing uses on site (project analysis cannot take credit for existing VMT).

2.2 VMT ANALYSIS

Projects that do not meet any of the screening criteria identified would need to perform a VMT analysis per the Guidelines. The project would need evaluate the appropriate VMT metrics and compare them to thresholds to determine significance as defined by the Guidelines[4].

2.2.1 VMT Measures

The Guidelines assign the appropriate VMT Measure for land use projects based on land use type. Residential and Office uses are required to use the relevant VMT efficiency metric, VMT per Capita or Work VMT per Employee respectively. Retail and similar uses are required to use a total VMT metric to measure the net change in VMT a project would create due to the "customer component" of the project.

2.3 VMT THRESHOLDS

Once a project identifies the appropriate VMT measures for the proposed land uses it would need to be compared to thresholds for those metrics to determine significance under CEQA. The County has chosen to base its thresholds on the county and county-wide averages.

The thresholds[5] as defined by the Guidelines provides are as follows:

- Residential Projects: exceeding 15.2 VMT/Capita, based on the county-wide average.
- Office and Other Employment Projects: exceeding 14.2 Work VMT/Employee, based on the county-wide average.
- Retail and Other Customer Projects: An increase in total region wide (county) VMT.

3.0 PROJECT ANALYSIS

The project is primarily a retail project consisting of a gas station and complementary convenience.

3.1 RETAIL USE ASSESSMENT

3.1.1 Screening Criteria Assessment

The project proposes a gas station with 3,516 square feet convenience store.

Screening Criteria Small Projects

Based on the Guidelines, Retail buildings with area less than or equal to 60,000 square feet would be presumed to cause a less-than-significant impact, the project would potentially have a gas station with a total of 3,516 square feet of retail/convenience store. **The project's retail component does qualify for the small project screening**.

[4] Guidelines, Figure 4 Threshold Basisskjf

[5] Guidelines, Figure 6 VMT Threshold of Significance

Screening Criteria Local-Serving Retail

The proposed retail would not only serve the other uses on the site but the local community as well. The guidelines state that to be considered local-retail, no single store on-site exceeds 50,000 square feet. As stated previously, the entire project site provides approximately 3,516 square feet of convenience store that is considered local retail. **The project's retail component could qualify for the Local-Serving Retail screening**.

3.1.2 VMT Analysis

As shown in **Table 1**, the project's retail component would qualify for screening for being a small project. **For this reason, the project's retail component would be presumed to be less than significant for VMT impacts**.

3.2 VMT IMPACT ASSESSMENT AND CONCLUSION

The proposed project is presumed to be less than significant for VMT impacts due to all the proposed uses meeting at least one of the County's screening criteria outlined in Section 2.1. The project's VMT impact assessment for the proposed uses is summarized in Table 1:

Table 1: Summary of VMT Impacts

Land Use Type	Proposed Uses	Impact	Commentary
Retail	Gas Station with 3,516 Convenience Store	Presumed to be less than significant	Meets County's Screening Criteria for Small Projects and possibly Local-Serving Retail.

Central Avenue Gas Station
Traffic Impact Analysis

Prepared for:
Western States Engineering
4887 E. La Palma, Suite 707
Anaheim, CA 92807

Prepared by:

INTEGRATED ENGINEERING GROUP
TRANSPORTATION PLANNING AND ENGINEERING

23905 Clinton Keith 114-280
Wildomar, CA 92595

October 2021

EXECUTIVE SUMMARY

Purpose of the Report

The purpose of this traffic impact analysis (TIA) report is to identify and document potential traffic deficiencies related to the proposed Central Avenue Gas Station in the County of Riverside. This technical report will also recommend transportation improvements to address potential project deficiencies to local and regional transportation facilities.

Project Overview

The project is proposed to be developed on a vacant site located at the west side of State Highway 74 (SH-74)/Central Avenue and Ardenwood Way intersection. Access to the project site will be provided via a newly constructed driveway and cul-de-sac on the western leg of the SH-74/Central Avenue and Ardenwood Way signalized intersection.

The land use proposed as part of the project is a gas station with 6 fuel dispensers (12 vehicle fueling positions) and 3,516 square feet of convenience store.

The project trip generation was calculated using the ITE Trip Generation Manual (10th Edition). It is estimated that the project will generate 1,217 total daily trips, 128 AM peak hour trips and 122 PM peak hour trips. Project trip distribution and assignment were developed, in coordination with County of Riverside staff and City of Lake Elsinore, based on the land use characteristics of the proposed project and surrounding area, existing travel patterns within the study area, anticipated travel patterns to and from the project site, and approved projects located in the vicinity of the project site. Project scenarios and study area were then established in coordination with County and City staff to determine the potential project deficiencies on the transportation network. Refer to **Appendix A** for approved scoping agreement.

Project Scenarios:

- Existing Conditions (2020)
- Existing Plus Project (EP) Conditions
- Existing Plus Ambient Plus Project (EAP) Conditions
- Existing Plus Ambient Plus Cumulative Plus Project (EACP) Conditions

Study Area Intersections:

1. SH-74/Central Avenue and Conard Avenue
2. SH-74/Central Avenue and Allan Street
3. SH-74/Central Avenue and Ardenwood Way (Project Access)
4. SH-74/Central Avenue and Rosetta Canyon Drive

Analysis Results and Recommendations

<u>Existing Conditions (2020) Scenario</u>

All study area intersections operate at acceptable level of service (LOS) under Existing Conditions 2020 and Existing Plus Project Conditions. Therefore, no improvements are required by this project.

Existing Plus Ambient Plus Project Scenario

All study area intersections operate at acceptable LOS under Existing Plus Ambient Plus Project Conditions except for the intersection of SH-74/Central Avenue and Allan Street. The project will construct a raised median in the north-south direction along SH-74/Central Avenue to restrict access to right in/right out only at the intersection of SH-74/Central Avenue and Allan Street. This improvement will mitigate the deficiency at this location.

Existing Plus Ambient Plus Cumulative Plus Project Scenario

All study area intersections operate at acceptable LOS under Existing Plus Ambient Plus Cumulative Plus Project Conditions except at the intersection of SH-74/Central Avenue and Allan Street. The project will be conditioned to construct a raised median along SH-74/Central Avenue to restrict access to right in/right out vehicular movements at the intersection of SH-74/Central Avenue and Allan Street. With the construction of Central Avenue Commercial project driveway, the intersection of SH-74/Central Avenue and Allan Street is expected to operate at an acceptable level of service throughout the day except during the AM peak hour, where the operation of the driveway is expected to operate at LOS E.

Additionally, the project will be conditioned to widen SH-74/Central Avenue to its ultimate classification, per the City of Lake Elsinore General Plan, along the property frontage to an 8-lane augmented urban arterial including the implementation of a signal modification at the intersection of SH-74/Central Avenue and Ardenwood Way. Improvement plans including ultimate roadway alignment, striping and signage will be submitted to the City of Lake Elsinore for staff review and approval. All proposed improvements shall be constructed per City Standards satisfactory to the City Engineer.

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Appendices

1.0 PROJECT INTRODUCTION

This traffic impact analysis (TIA) report has been prepared for Central Avenue Gas Station project. The project is proposed to be developed on a vacant site located at the west side of State Highway 74 (SH-74)/Central Avenue and Ardenwood Way intersection.

PROJECT DESCRIPTION

The land use proposed as part of the project is a gas station with six (6) fueling dispensers (12 vehicle fueling positions) and 3,516 square feet of convenience store.

Figure 1-1 shows the project site plan.

STUDY AREA

The study area for this project was developed consistent with the Riverside County TIA Preparation Guide, including all intersections of "Collector" or higher classification streets with "Collector" or higher classification streets, at which the proposed project will add 50 or more peak hour trips. IEG prepared a project traffic study scoping agreement defining the study area, which was reviewed and approved by Riverside County and City of Lake Elsinore staff prior to the preparation of this technical report. Refer to **Appendix A** for approved scoping agreement.

Figure 1-2 presents the study area that includes the following key intersection locations:

1. SH-74/Central Avenue and Conard Avenue
2. SH-74/Central Avenue and Allan Street
3. SH-74/Central Avenue and Ardenwood Way (Project Access)
4. SH-74/Central Avenue and Rosetta Canyon Drive

Turning movement counts were conducted for one weekday during the morning and evening peak hours on October 22,2020. Due to the COVID-19 pandemic, traffic patterns are currently disrupted and not typical. Therefore, IEG, in coordination with City of Lake Elsinore staff used the Central Plaza Traffic Impact Study (February 2017) and the Dexter/Central Chick-fil-A Traffic Impact Analysis (July 2018) to calculate an adjustment factor based on the AM and PM peak hour relationship between different intersection count dates. The adjustment factor was applied to the October 22, 2020 turning movement counts to develop Existing Conditions 2020 baseline volumes. The turning movement counts, adjustment factor calculation, and adjusted volumes are provided in **Appendix B.** These baseline volumes will be utilized in Synchro 10 software to determine LOS at all study intersections. The Existing Plus Ambient without Project Conditions traffic volumes will be developed by adding a 2% annual growth for two years to the Existing Year 2020 adjusted baseline volumes.

PROJECT TRIP GENERATION

The trip generation is a measure or forecast of the number of trips that begin or end at the project site. These trips will result in some traffic increases on the streets where they occur. The rates used in this analysis were determined using *Trip Generation, 10th Edition*, published by the Institute of Transportation Engineers (ITE) that is widely used in Southern California. Project ITE average trip generation rates are presented in **Table 1-1**.

Table 1-1
Project Trip Generation Rate

Land Use	Units[1]	ITE LU Code	AM Peak Hour			PM Peak Hour			Daily
			In	Out	Total	In	Out	Total	
Super Convenience Market/Gas Station	VFP	934	14.04	14.04	28.08	11.48	11.48	22.96	231

Source: Institute of Transportation Engineers (ITE), Trip Generation Manual, 10th Edition (2017)
[1] VFP = Vehicle Fueling Positions

Tables 1-2 summarizes the calculated trip generation based on the vehicle fueling positions associated with the proposed Project. As shown on Table 1-2, the proposed development is anticipated to generate approximately 1,217 total daily trips, 128 AM peak hour trips and 122 PM peak hour trips.

Table 1-2
Project Trip Generation

Land Use	Intensity	Units[1]	AM Peak Hour			PM Peak Hour			Daily
			In	Out	Total	In	Out	Total	
Super Convenience Market/Gas Station	12	VFP	168	168	337	138	138	276	2,766
Pass-by Reduction (62% AM Peak Hour, 56% PM Peak Hour Only)[2]			104	104	209	*77*	*77*	*154*	*1,549*
Total			***64***	***64***	***128***	***61***	***61***	***122***	***1,217***

Source: Institute of Transportation Engineers (ITE), Trip Generation Manual, 10th Edition (2017)
[1] VFP = Vehicle Fueling Positions
[2] Pass-by reduction percentage is based on the ITE methodology per Table E of ITE Trip Generation Handbook (3rd Edition, 2017)

PROJECT TRIP DISTRIBUTION AND ASSIGNMENT

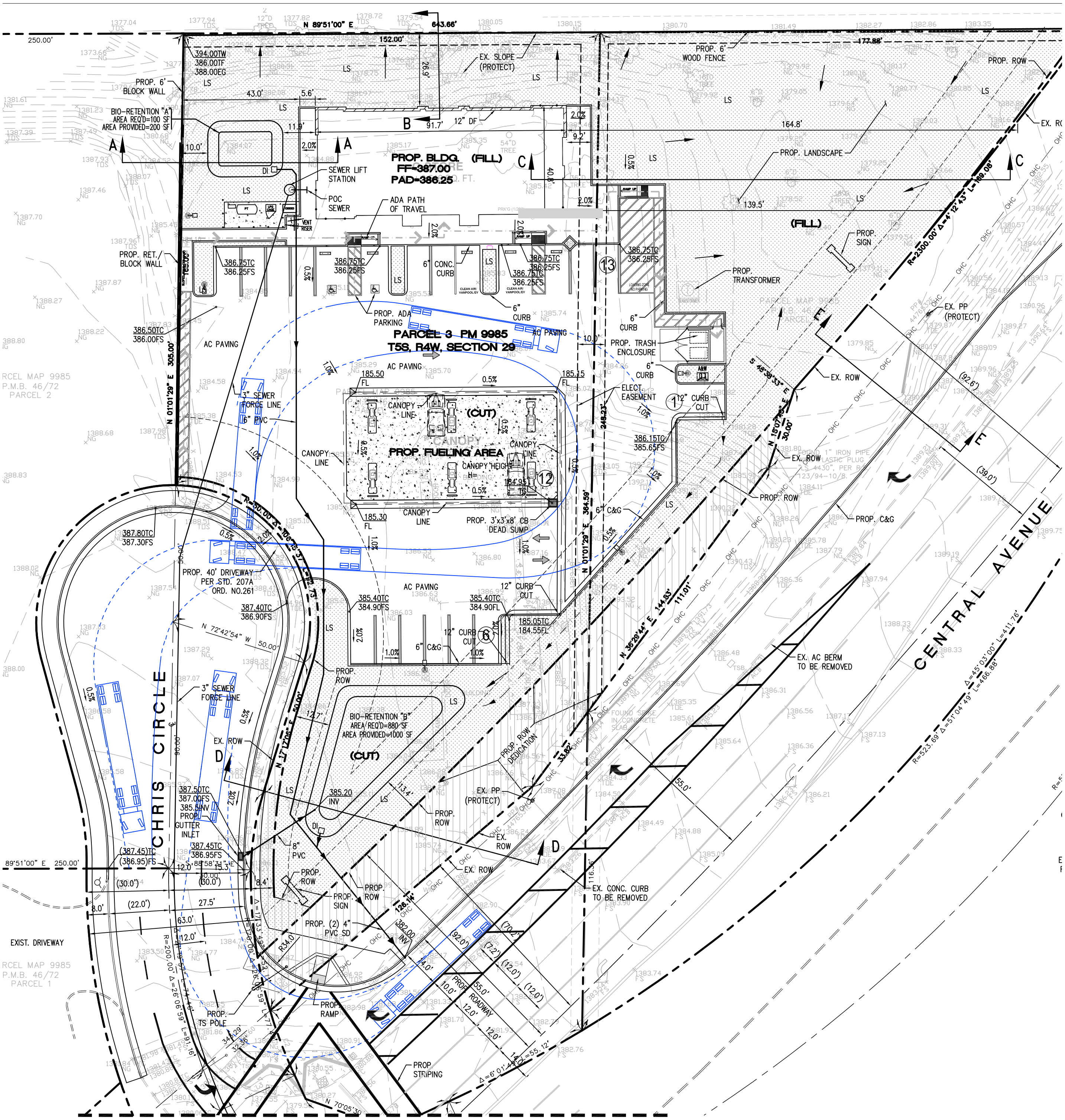
Trip distribution and assignment is the process of identifying the probable destinations, directions and traffic routes that project related traffic will affect. Once the proposed development's trips have been estimated, they are assigned to the study area network. For this development, the project trip distribution and assignment were developed, in coordination with County and City staff, based on the land use characteristics of the proposed project and surrounding area, existing travel patterns within the study area, anticipated travel patterns to and from the project site, and approved projects located in the vicinity of the project site. **Figures 1-1 through 1-3** show project site plan, study area/trip distribution and intersection turning movement volumes.

PROJECT ACCESS AND ON-SITE TRUCK CIRCULATION

Access to the project site will be provided via a newly constructed driveway and cul-de-sac on the northwestern leg of the SH-74/Central Avenue and Ardenwood Way signalized intersection. the on-site/internal truck circulation is adequate per the provided truck turning template shown on **Figure 1-1.**

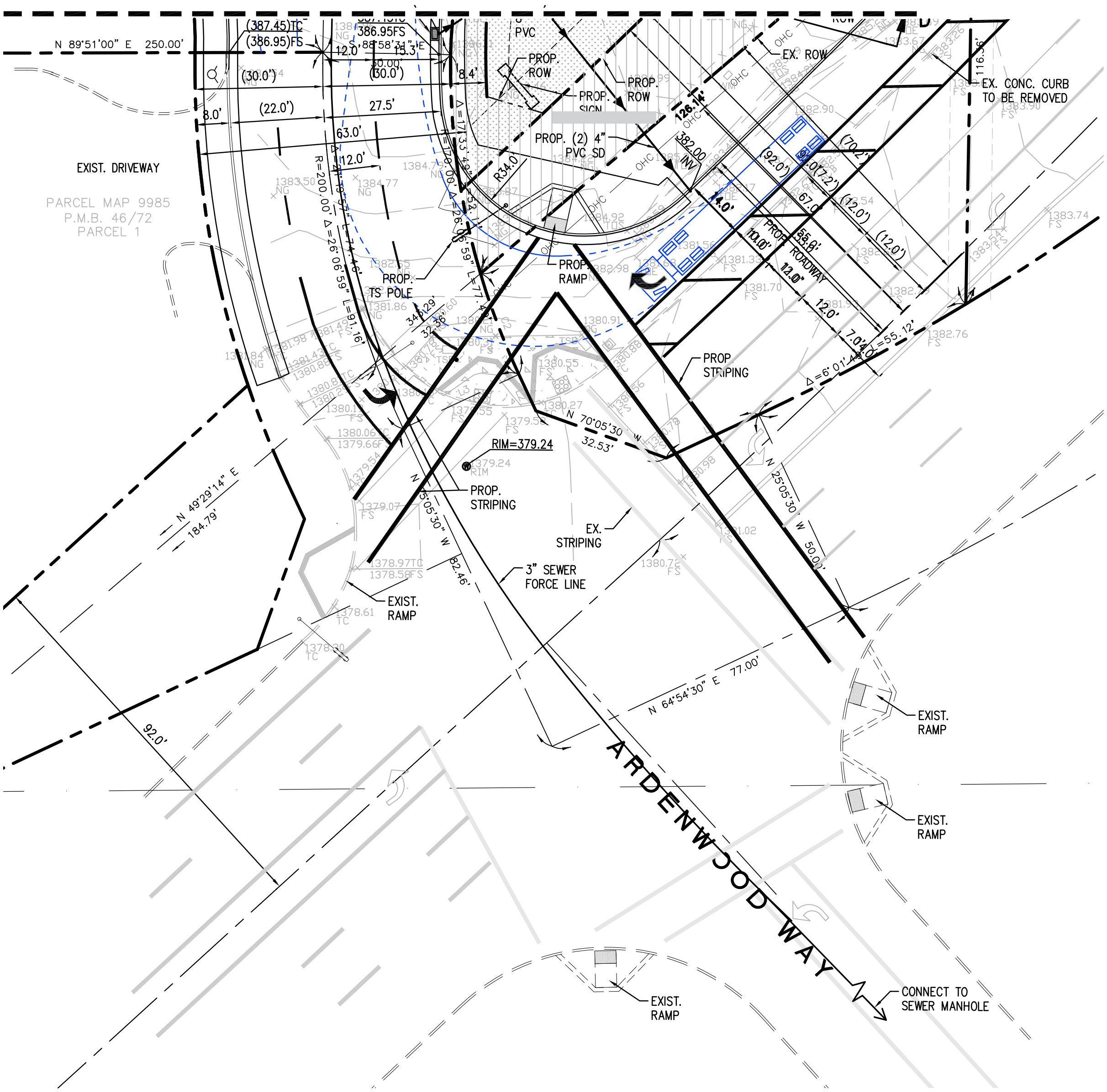
PARKING

The proposed development will be required to provide on-site parking spaces consistent with County of Riverside parking requirements.



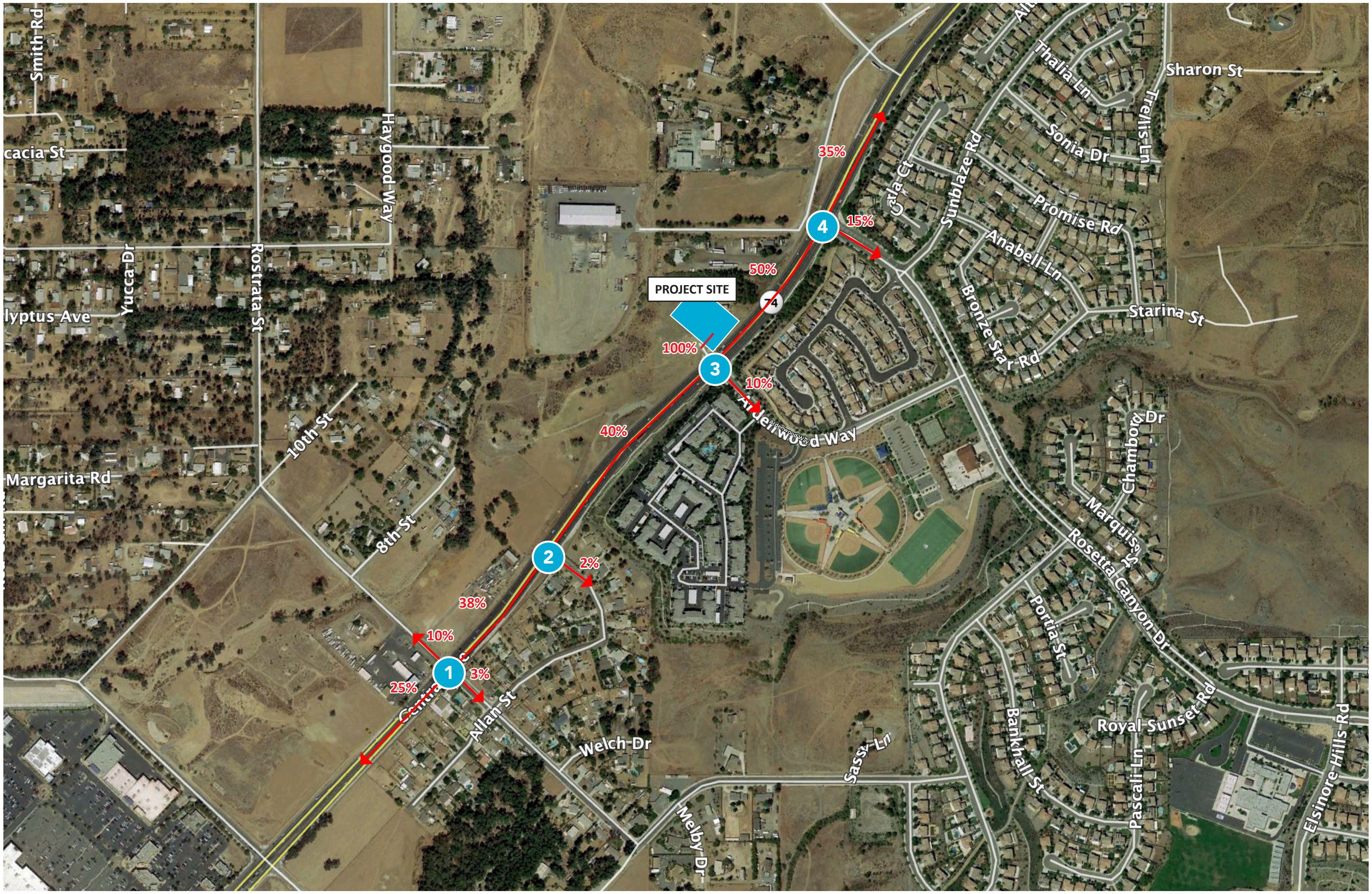
INTEGRATED ENGINEERING GROUP
TRANSPORTATION PLANNING AND ENGINEERING

Central Avenue Gas Station
Project Site Plan
Figure 1-1a

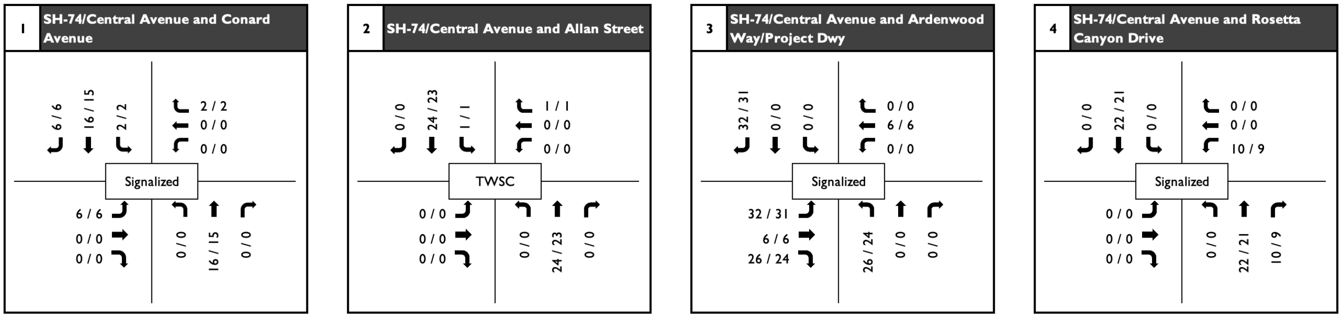


INTEGRATED ENGINEERING GROUP
TRANSPORTATION PLANNING AND ENGINEERING

Central Avenue Gas Station
Project Site Plan
Figure 1-1b



LEGEND # Intersection



LEGEND

(AM/PM) Peak Hour Volumes

2.0 METHODOLOGIES

This section documents the methodologies and assumptions used to conduct the circulation impact analysis for the proposed project. This section contains the following background information:

- Study scenarios
- Study time periods
- Analysis methodologies

Refer to **Appendix A** for approved scoping agreement.

STUDY SCENARIOS

This report presents an analysis of the intersections which were selected for the following anticipated timeframe scenarios:

- Existing Conditions (2020)
- Existing Plus Project (EP) Conditions
- Existing Plus Ambient Plus Project (EAP) Conditions
- Existing Plus Ambient Plus Cumulative Plus Project (EACP) Conditions

STUDY TIME PERIODS

The County of Riverside selected the following peak hours for analysis:

- Weekday AM (peak hour between 7:00 AM and 9:00 AM)
- Weekday PM (peak hour between 4:00 PM and 6:00 PM)

ANALYSIS METHODOLOGIES

Street system operating conditions are typically described in terms of "level of service." Level of service is a report-card scale used to indicate the quality of traffic flow on roadway segments and at intersections. Level of service (LOS) ranges from LOS A (free flow, little congestion) to LOS F (forced flow, extreme congestion). **Table 2-1** describes generalized definitions of auto LOS A through F.

Table 2-1
Vehicular Level of Service Definitions

LOS	Characteristics
A	Primarily free-flow operation. Vehicles are completely unimpeded in their ability to maneuver within the traffic stream. Controlled delay at the boundary intersections is minimal. The travel speed exceeds 85% of the base free-flow speed.
B	Reasonably unimpeded operation. The ability to maneuver within the traffic stream is only slightly restricted and control delay at the boundary intersections is not significant. The travel speed is between 67% and 85% of the base free-flow speed.
C	Stable operation. The ability to maneuver and change lanes at mid-segment locations may be more restricted than at LOS B. Longer queues at the boundary intersections may contribute to lower travel speeds. The travel speed is between 50% and 67% of the base free-flow speed.
D	Less stable condition in which small increases in flow may cause substantial increases in delay and decreases in travel speed. This operation may be due to adverse signal progression, high volume, or inappropriate signal timing at the boundary intersections. The travel speed is between 40% and 50% of the base free-flow speed.
E	Unstable operation and significant delay. Such operations may be due to some combination of adverse signal progression, high volume, and inappropriate signal timing at the boundary intersections. The travel speed is between 30% and 40% of the base free-flow speed.
F	Flow at extremely low speed. Congestion is likely occurring at the boundary intersections, as indicated by high delay and extensive queuing. The travel speed is 30% or less of the base free-flow speed. Also, LOS F is assigned to the subject direction of travel if the through movement at one or more boundary intersections have a volume-to-capacity ratio greater than 1.0.

Source: Highway Capacity Manual, Transportation Research Board (2010)

Intersection Capacity Analysis

The analysis of peak hour intersection performance was conducted using the Synchro 10 software program, which uses methodologies defined in the Highway Capacity Manual (HCM) 6th Edition to calculate LOS. Level of service (LOS) for intersections is determined by control delay. Control delay is defined as the total elapsed time from when a vehicle stops at the end of a queue to the time the vehicle departs from the stop line. The total elapsed time includes the time required for the vehicle to travel from the last-in-queue position to the first-in-queue position, including deceleration of vehicles from free-flow speed to the speed of vehicles in the queue.

Signalized Intersections

The HCM analysis methodology for evaluating signalized intersections is based on the "operational analysis" procedure. This technique uses 1,900 passenger cars per hour of green per lane (pcphpl) as the maximum saturation flow of a single lane at an intersection. Average control delay is calculated by taking a volume-weighted average of all the delays for all vehicles entering the intersection. **Table 2-2** summarizes the level of service criteria for signalized intersections.

Table 2-2
Signalized Intersection Level of Service HCM Operational Analysis Method

Average Control Delay Per Vehicle (seconds)	Level of Service (LOS) Characteristics
<10.0	*LOS A* occurs when the volume-to-capacity ratio is low and either progression is exceptionally favorable or the cycle length is very short. If it is due to favorable progression, most vehicles arrive during the green indication and travel through the intersection without stopping.
10.1 – 20.0	*LOS B* occurs when the volume-to-capacity ratio is low and either progression is highly favorable or the cycle length is short. More vehicles stop than with LOS A.
20.1 – 35.0	*LOS C* occurs when progression is favorable or the cycle length is moderate. The number of vehicles stopping is significant, although many vehicles still pass through the intersection without stopping.
35.1 – 55.0	*LOS D* occurs when the volume-to-capacity ratio is high and either progression is ineffective or the cycle length is long. Many vehicles stop and individual cycle failures are noticeable.
55.1 – 80.0	*LOS E* occurs when the volume-to-capacity ratio is high, progression is unfavorable, and the cycle length is long. Individual cycle failures are frequent.
>80.0	*LOS F* occurs when the volume-to-capacity ratio is very high, progression is very poor, and the cycle length is long. Most cycles fail to clear the queue.

Source: Highway Capacity Manual, Transportation Research Board (2010)

All-way Stop-controlled (AWSC) Intersections

The HCM analysis methodology for evaluating all-way Stop-controlled intersections is based on the degree of conflict for each independent approach created by the opposing approach and each conflicting approach. Level of Service for AWSC intersections is also based on the average control delay. However, AWSC intersections have different threshold values than those applied to signalized intersections. This is based on the rationale that drivers expect AWSC intersections to carry lower traffic volumes than at signalized intersections. Therefore, a higher level of delay is acceptable at a signalized intersection for the same LOS.

Two-way Stop-controlled (TWSC) Intersections

The HCM analysis methodology for evaluating two-way Stop-controlled (TWSC) intersections is based on gap acceptance and conflicting traffic for vehicles stopped on the minor-street approaches. The critical gap (minimum gap that would be acceptable) is defined as the minimum time interval in the major-street traffic stream that allows intersection entry for one minor-street vehicle. Average control delay and LOS for the "worst approach" are reported. Level of service is not defined for the intersection as a whole. **Table 2-3** summarizes the level of service criteria for unsignalized intersections.

Table 2-3
Level of Service Criteria for Stop Controlled Unsignalized Intersections

Average Control Delay (sec/veh)	Level of Service (LOS)
≤10.0	A
10.1 – 15.0	B
15.1 – 25.0	C
25.1 – 35.0	D
35.1 – 50.0	E
>50.0	F

Source: Highway Capacity Manual, Transportation Research Board (2010)

City of Lake Elsinore General Plan Compliance
In coordination with City staff, the traffic impact analysis will identify LOS deficiencies for compliance with City of Lake Elsinore General Plan goals. The City of Lake Elsinore has established LOS "D" as the minimum allowable level of service at intersections. Therefore, any intersection operating at LOS "E" or worse will be considered deficient for the purposes of this analysis.

3.0 EXISTING CONDITIONS (2020) SCENARIO

This section documents the circulation system conditions within the study area of the project under Existing Conditions 2020 project scenario. This section also documents operational deficiencies on the existing local and regional circulation networks. No network improvements are assumed under Existing Conditions 2020 project scenario.

ROADWAY NETWORK

Locally significant roadway located within the study area of the proposed project is discussed below.

SH-74/Central Avenue from Conard Avenue to Rosetta Canyon Drive functions as a 4-lane arterial highway between Conard Avenue and Allan Street and as a 5-lane arterial highway between Allan Street and Rosetta Canyon Drive. The posted speed limit on SH-74/Central Avenue is 55 miles per hour (mph). Per the City of Lake Elsinore General Plan Circulation Element, the buildout classification for this segment of SH-74/Central Avenue is an 8-lane augmented urban arterial – state highway, as shown in **Figure 3-1**.

Figures 3-1 and **3-2** show the City of Lake Elsinore General Plan Circulation Network and Recommended Roadway Cross Sections, respectively.

TRANSIT SYSTEM

The Riverside Transit Agency (RTA) is the main transit agency servicing the County of Riverside. Currently, RTA operates Route 9 within the vicinity of the project. Route 9 operates seven days a week and connects to the Lake Elsinore Outlet Center south of the site and Perris Station Transit Center north of the site. Weekday and weekend service frequency is 60 to 90 minutes. Bus stops for Route 9 are currently located at the intersection of SH-74/Central Avenue and Rosetta Canyon Road for northbound and southbound service, about 1150 feet from the site. Pedestrian accessibility and connectivity from the project site to these bus stops are provided with signalized crossings at the intersection of SH-74/Central Avenue and Ardenwood Way and sidewalk along the south side of SH-74/Central Avenue to the bus stops. Route information is included in **Appendix H**.

ACTIVE TRANSPORTATION SYSTEM

Active transportation facilities including pedestrian and bicycle facilities within the study area of the project are provided. Pedestrian crosswalks are generally provided at signalized intersections along SH-74/Central Avenue with sidewalks along the corridor. Class II bike lanes in both directions are provided along SH-74/Central Avenue.

TRAFFIC VOLUMES

The Existing Year 2020 peak hour intersection turning movement volumes were counted on Thursday October 22, 2020. Due to the COVID-19 pandemic, traffic patterns are currently disrupted and not typical. Therefore, IEG, in coordination with City of Lake Elsinore staff used the Central Plaza Traffic Impact Study (February 2017) and the Dexter/Central Chick-fil-A Traffic Impact Analysis (July 2018) to calculate an adjustment factor based on the AM and PM peak hour relationship between different intersection count dates. The adjustment factor was applied to the October 22,2020 turning movement counts to develop Existing Conditions 2020 baseline volumes. The turning movement counts, adjustment factor calculation, and adjusted volumes are provided in **Appendix B.** The provided October 22,2020 turning movement counts considered SH-74/Central Avenue as a north-south corridor. Therefore, intersection configurations for Synchro analysis were input consistent with the counts with the SH-74/Central Avenue movements as north and south at all intersections.

ANALYSIS RESULTS

Table 3-1 shows Existing Conditions intersection operation analysis results.

Figures 3-3 and 3-4 show intersection turning movement volumes under Existing Year 2020 and Existing Plus Project (EP) scenarios, respectively.

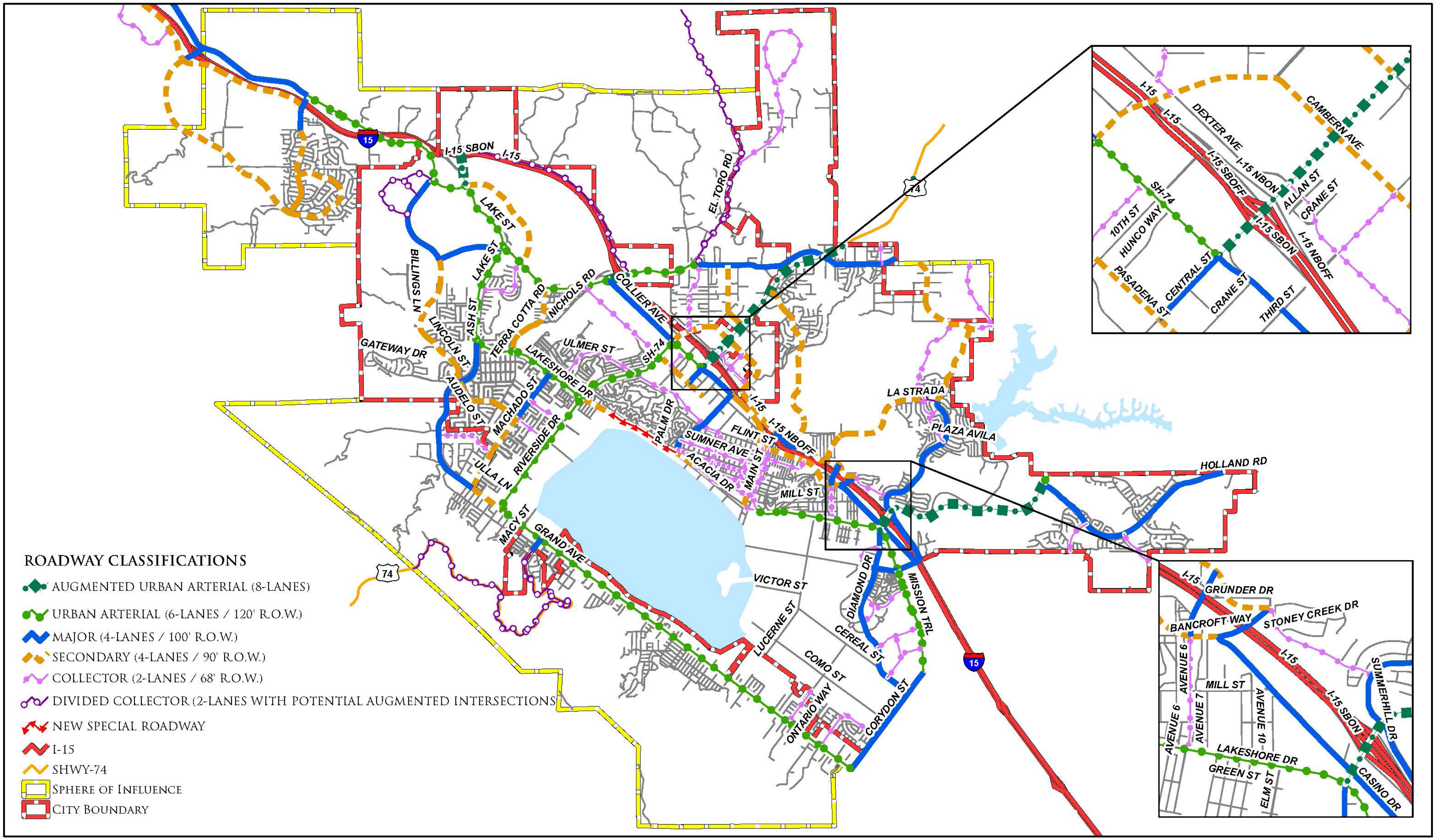
Table 3-1
Existing Condition 2020 Scenario Intersection Operation Analysis

Intersection	Intersection Control	Existing Conditions		Existing Year 2020 With Project	
		Delay (a)	LOS (b)	Delay (a)	LOS (b)
1. SH-74/Central Avenue and Conard Avenue	Signal	11.1/13.7	B/B	12.4/14.4	B/B
2. SH-74/Central Avenue and Allan Street	SSSC	32.1/22.5	D/C	32.9/22.9	D/D
3. SH-74/Central Avenue and Ardenwood Way	Signal	9.7/6.8	A/A	13.6/9.3	B/A
4. SH-74/Central Avenue and Rosetta Canyon Drive	Signal	8.7/8.0	A/A	9.1/8.2	A/A

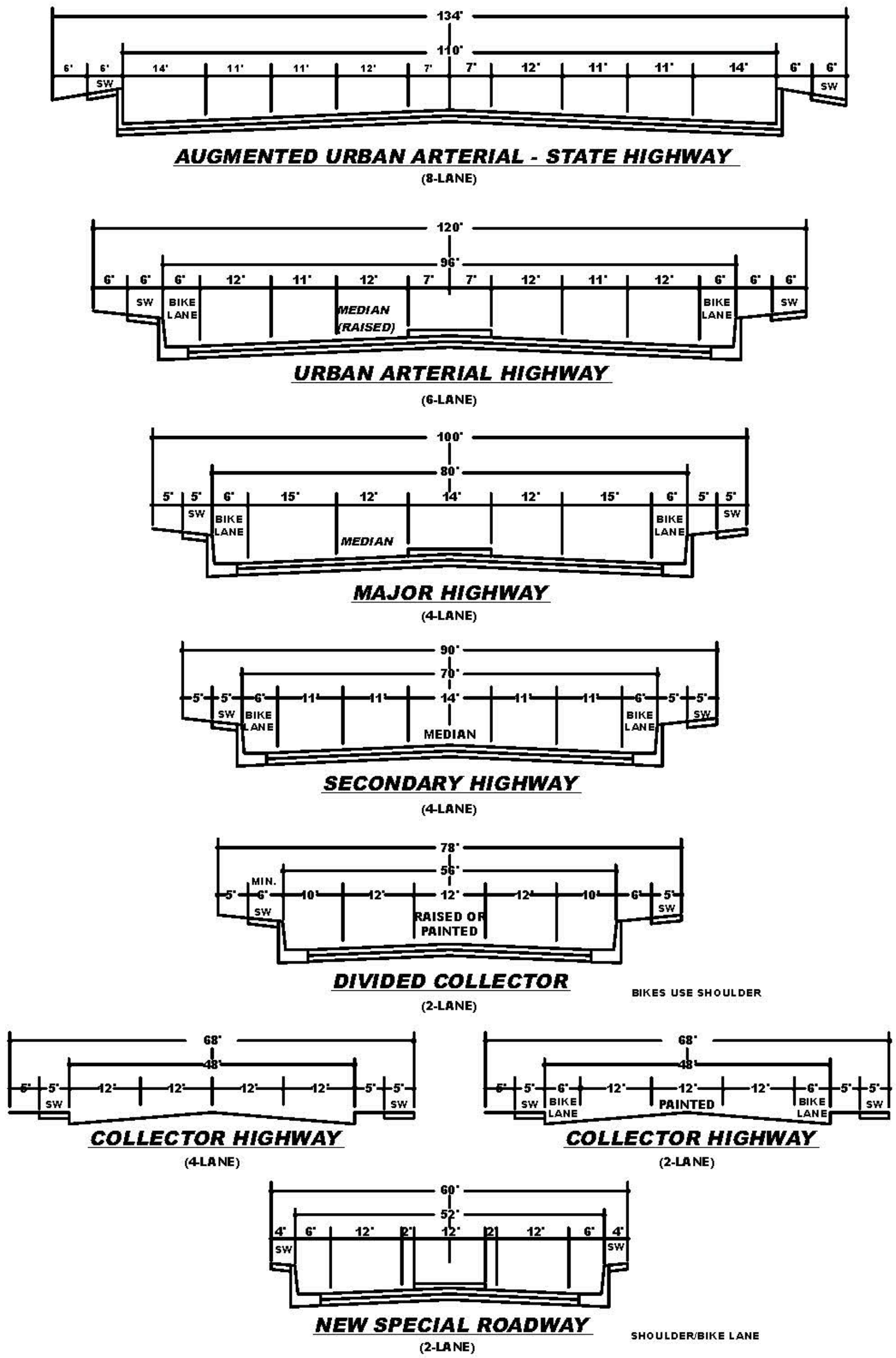
Notes:
SSSC = Side Street Stop Control
(a) Delay refers to the average control delay for the entire intersection, measured in seconds/vehicle. At unsignalized intersection, delay refers to the worst movement.
(b) LOS calculations are based on the methodology outlined in the Highway Capacity Manual 6th Edition and performed using Synchro 10

Per the analysis results shown in **Table 3-1**, all analyzed intersections are operating at an acceptable LOS under Existing Year 2020 Conditions and the proposed project would not have any operational deficiency under EP Conditions.

Existing Conditions and Existing Plus Project Conditions peak hour analysis worksheets are provided in **Appendices C** and **D**, respectively.

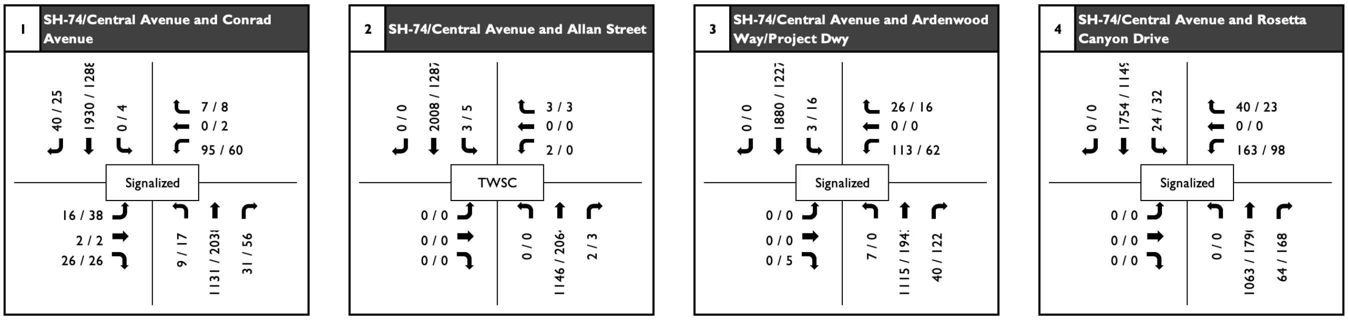

ROADWAY CLASSIFICATIONS
AUGMENTED URBAN ARTERIAL (8-LANES)
URBAN ARTERIAL (6-LANES / 120' R.O.W.)
MAJOR (4-LANES / 100' R.O.W.)
SECONDARY (4-LANES / 90' R.O.W.)
COLLECTOR (2-LANES / 68' R.O.W.)
DIVIDED COLLECTOR (2-LANES WITH POTENTIAL AUGMENTED INTERSECTIONS)
NEW SPECIAL ROADWAY
I-15
SHWY-74
SPHERE OF INFLUENCE
CITY BOUNDARY
I-15 SBON
I-15
LAKE ST
BILLINGS LN
ASH ST
LINCOLN ST
GATEWAY DR
TERRA COTTA RD
NICHOLS RD
COLLIER AVE
ULMER ST
SH-74
LAKESHORE DR
AUDELO ST
MACHADO ST
RIVERSIDE DR
ULLA LN
MACY ST
GRAND AVE
EL TORO RD
PALM DR
SUMNER AVE
FLINT ST
ACACIA DR
MAIN ST
MILL ST
I-15 NBOFF
LA STRADA
PLAZA AVILA
HOLLAND RD
VICTOR ST
LUCERNE ST
COMO ST
CEREAL ST
DIAMOND DR
MISSION TRL
CORYDON ST
ONTARIO WAY
DEXTER AVE
CAMBERN AVE
I-15 SBOFF
I-15 NBON
ALLAN ST
CRANE ST
10TH ST
HUNCO WAY
PASADENA ST
CENTRAL ST
THIRD ST
I-15 NBOFF
GRUNDER DR
BANCROFT WAY
STONEY CREEK DR
AVENUE 6
AVENUE 7
MILL ST
AVENUE 10
SUMMERHILL DR
I-15 SBON
LAKESHORE DR
GREEN ST
ELM ST
CASINO DR

CITY OF LAKE ELSINORE PROPOSED LAND USE PLAN SCENARIO
RECOMMENDED ROADWAY CROSS-SECTIONS

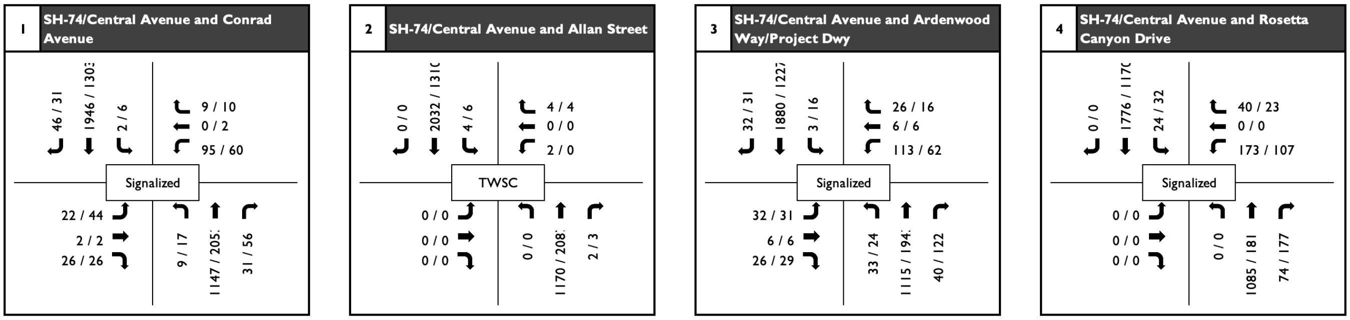


(PROPOSED FOR LAKESHORE DRIVE IN THE COUNTRY CLUB HEIGHT DISTRICT)

* BIKE LANES ARE NOT MANDATORY UNLESS SHOWN ON THE BIKEWAY CIRCULATION ELEMENT PLAN
PRECISE SIDEWALK LOCATION SUBJECT TO CITY ENGINEER APPROVAL
NOTE: CHECK THE DISTRICT PLAN OF YOUR AREA FOR ANY REQUIRED SPECIAL ROADWAY CROSS-SECTION, ESPECIALLY THE LAKE EDGE AND COUNTRY CLUB HEIGHTS DISTRICT PLANS.
STRIPPING OF COLLECTOR HIGHWAY AS DIRECTED BY CITY ENGINEER.



LEGEND
(AM/PM) Peak Hour Volumes



LEGEND

(AM/PM) Peak Hour Volumes

4.0 EXISTING PLUS AMBIENT PLUS PROJECT CONDITIONS

This section documents the circulation system conditions within the study area of the project under Existing Plus Ambient Plus Project (EAP) Conditions. Since the project is expected to be built and operational in 2022, a 2% annual growth factor for two years was applied to the adjusted Existing Year 2020 baseline volumes. Project traffic volumes are then added to these volumes to develop EAP Conditions traffic volumes. This section also documents potential operational deficiencies on the existing local and regional circulation networks. No network improvements are assumed under EAP Conditions.

ANALYSIS RESULTS

Table 4-1 shows EAP Conditions intersection operation analysis results.

Figure 4-1 shows intersection turning movement volumes under EAP Conditions.

Table 4-1
EAP Conditions Intersection Operation Analysis

Intersection	Intersection Control	Existing Conditions		EAP Conditions	
		Delay (a)	LOS (b)	Delay (a)	LOS (b)
AM Peak/PM Peak					
1. SH-74/Central Avenue and Conard Avenue	Signal	11.1/13.7	B/B	14.1/16.9	B/B
2. SH-74/Central Avenue and Allan Street	SSSC	32.1/22.5	D/C	35.3/24.4	**E**/C
3. SH-74/Central Avenue and Ardenwood Way	Signal	9.7/6.8	A/A	15.3/9.4	B/A
4. SH-74/Central Avenue and Rosetta Canyon Drive	Signal	8.7/8.0	A/A	9.6/8.3	A/A

Notes:
SSSC = Side Street Stop Control
(a) Delay refers to the average control delay for the entire intersection, measured in seconds/vehicle. At unsignalized intersection, delay refers to the worst movement.
(b) LOS calculations are based on the methodology outlined in the Highway Capacity Manual 6th Edition and performed using Synchro 10

Per the analysis results shown in **Table 4-1**, all analyzed intersections are operating at an acceptable LOS under EAP Conditions except for SH-74/Central Avenue and Allan Street.

TRAFFIC RELATED DEFICIENCIES AND RECOMMENDED IMPROVEMENTS

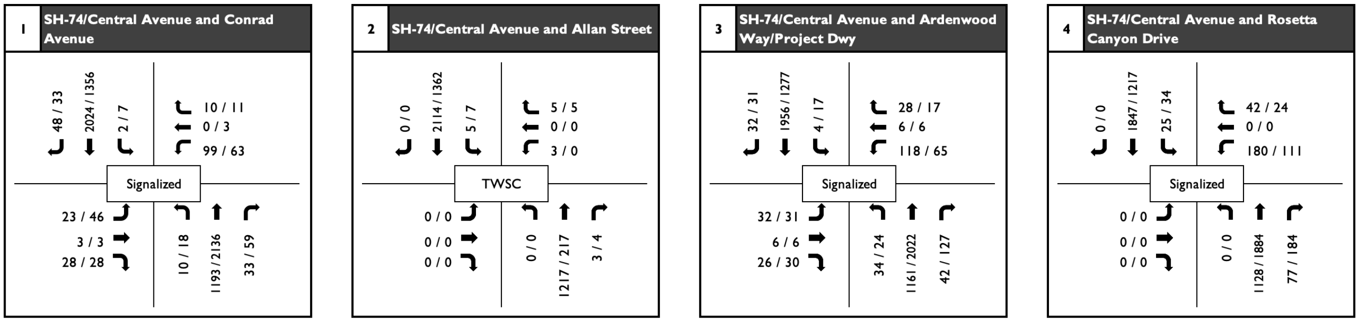
The project would have an operational deficiency under EAP conditions at the intersection of SH-74/Central Avenue and Allan Street. This project will construct a raised median in the north-south direction to restrict access to right in/right out only at the intersection of SH-74/Central Avenue and Allan Street. This improvement will mitigate the deficiency at this location, as shown in **Table 4-2** below.

Table 4-2
EAP Conditions with Improvements Intersection Operation Analysis

Intersection	Intersection Control	EAP Conditions		EAP Conditions with Improvement	
		Delay (a)	LOS (b)	Delay (a)	LOS (b)
AM Peak/PM Peak					
2. SH-74/Central Avenue and Allan Street	SSSC	35.3/24.4	**E**/C	13.9/24.4	B/C

Notes:
SSSC = Side Street Stop Control
(a) Delay refers to the average control delay for the entire intersection, measured in seconds/vehicle. At unsignalized intersection, delay refers to the worst movement.
(b) LOS calculations are based on the methodology outlined in the Highway Capacity Manual 6th Edition and performed using Synchro 10

EAP Conditions and Post-Mitigation peak hour analysis worksheets are provided in **Appendix E**.



LEGEND

(AM/PM) Peak Hour Volumes

Existing 2020 Plus Ambient Plus Project
Peak Hour Intersection Volumes

Figure 4-1

5.0 EXISTING PLUS AMBIENT PLUS CUMULATIVE PLUS PROJECT CONDITIONS

This section documents the circulation system conditions within the study area of the Project under Existing Plus Ambient Plus Cumulative Plus Project (EACP) Conditions. The EACP Conditions traffic volumes were developed by adding cumulative project trips to the EAP Conditions traffic volumes. These cumulative projects are shown in **Table 5-1** below. The locations and cumulative project trip volumes assigned to the study intersections are shown in **Figure 5-1**. This section also documents potential Cumulative Project impacts to the circulation network. The following network improvement is assumed under EACP conditions:

- SH-74/Central Avenue and Allan Street/Project Driveway – The development of the Central Avenue Commercial Retail project will be conditioned to construct a raised median along its property frontage on SH-74/Central Avenue to restrict access to right in/right out vehicular movements at its new project driveway and Allan Street. Should the Central Avenue Commercial Retail project not develop at the time of the subject project occupancy, it is the obligation of the subject property to construct the median at this location, satisfactory to the City Engineer.

Table 5-1
Cumulative Projects

#	Project/Location	Land Use	Quantity	Units[1]
		City of Lake Elsinore		
1	Lake Elsinore Walmart	Retail	151.397	TSF
		Specialty Retail	5.300	TSF
		Fast-Food without Drive-Thru	5.300	TSF
		Fast-Food with Drive-Thru	6.800	TSF
2	Tige Watersports	Boat Dealership	34.5	TSF
3	Kassab Travel Center	Gas Station w/ Convenience Market	18	VFP
		Fast-Food with Drive-Thru	2.54	TSF
4	Nichols Ranch (Phases I and II)	Single Family Residential	168	DU
		Park	8.3	AC
5	Central Avenue Commercial Retail	Shopping Center	10.49	TSF
		Fast-Food with Drive-Thru	1.51	TSF

[1]DU = Dwelling Units; TSF = Thousand Square Feet; VFP = Vehicle Fueling Position; AC = Acres
*See **Appendix F** for Cumulative Traffic Volumes

ANALYSIS RESULTS

Table 5-2 shows Existing Plus Ambient Plus Cumulative Plus Project Conditions intersection operation analysis results.

Figure 5-2 shows study intersection turning movement volumes under Existing Plus Ambient Plus Cumulative Plus Project Conditions.

Table 5-2
Existing Plus Ambient Plus Cumulative Plus Project Condition Intersection Operation Analysis

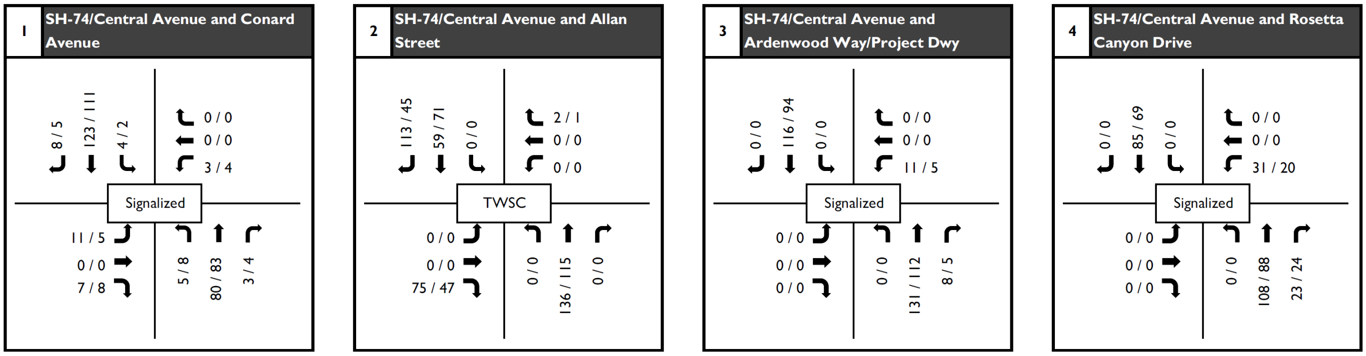
Intersection	Intersection Control	Existing Conditions		EACP Conditions	
		Delay (a)	LOS (b)	Delay (a)	LOS (b)
AM Peak/PM Peak					
1. SH-74/Central Avenue and Conard Avenue	Signal	11.1/13.7	B/B	19.6/22.7	B/C
2. SH-74/Central Avenue and Allan Street	SSSC	32.1/22.5	D/C	36.0/26.2	E/D
3. SH-74/Central Avenue and Ardenwood Way	Signal	9.7/6.8	A/A	18.9/9.5	B/A
4. SH-74/Central Avenue and Rosetta Canyon Drive	Signal	8.7/8.0	A/A	11.3/9.1	B/A

Notes:
SSSC = Side Street Stop Control
(a) Delay refers to the average control delay for the entire intersection, measured in seconds/vehicle. At unsignalized intersection, delay refers to the worst movement.
(b) LOS calculations are based on the methodology outlined in the Highway Capacity Manual 6th Edition and performed using Synchro 10

Per the analysis results shown in **Table 5-2**, all study area intersections operate at acceptable LOS under Existing Plus Ambient Plus Cumulative Plus Project Conditions except at the intersection of SH-74/ Central Avenue and Allan Street. The project will be conditioned to construct a raised median along SH-74/Central Avenue to restrict access to right in/right out vehicular movements at the intersection of SH-74/Central Avenue and Allan Street. With the construction of Central Avenue Commercial project driveway, the intersection of SH-74/Central Avenue and Allan Street is expected to operate at an acceptable level of service throughout the day except during the AM peak hour, where the operation of the driveway is expected to operate at LOS E. It should be noted that due to the construction of the raised median, the southbound left turn vehicular trips at the intersection of SH-74/Central Avenue and Allan Street were diverted to the intersection of SH-74/Central Avenue and Conard Avenue. These diverted trips were analyzed as through movements under this scenario. As noted above, the proposed project will be conditioned to construct a raised median along SH-74/Central Avenue to restrict access to right in/right out vehicular movements at the intersection of SH-74/Central Avenue and Allan Street.

Additionally, the project will be conditioned to widen SH-74/Central Avenue to its ultimate classification, per the City of Lake Elsinore General Plan, along the property frontage to an 8-lane augmented urban arterial including the implementation of a signal modification at the intersection of SH-74/Central Avenue and Ardenwood Way/Chris Circle. The final design detail related to the roadway widening and SH-74/Central Avenue and Ardenwood Way/Chris Circle intersection will be addressed through the City's ministerial approval process. Improvement plans including ultimate roadway alignment, intersection design; and roadway striping and signage will be designed to City of Lake Elsinore Standards and will be submitted for staff review and approval satisfactory to the City Engineer.

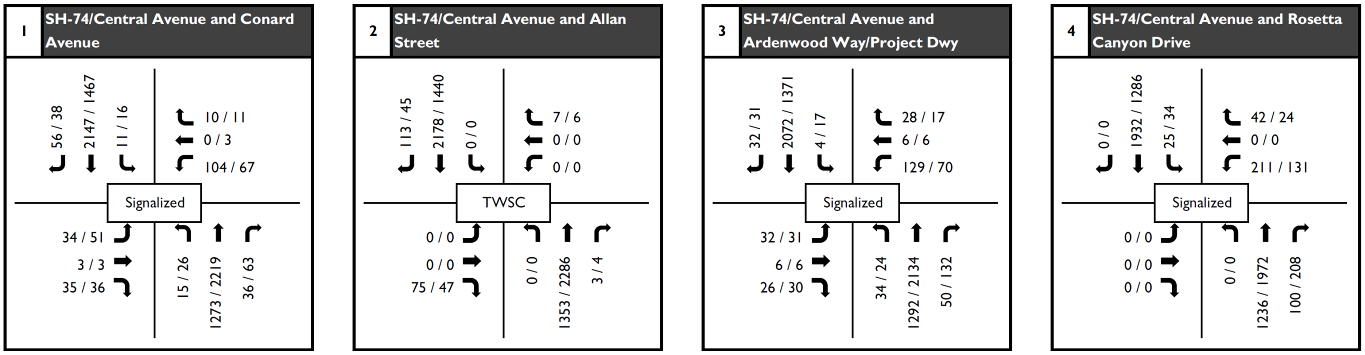
EACP peak hour analysis worksheets are provided in **Appendix G**.



① Lake Elsinore Walmart
② Tige Watersports
③ Kassab Travel Center
④ Nichols Ranch
⑤ Central Avenue Retail Center

INTEGRATED ENGINEERING GROUP
TRANSPORTATION PLANNING AND ENGINEERING

Central Avenue Gas Station
Cumulative Projects Locations and Peak Hour Volumes
Figure 5-1



LEGEND

(AM/PM) Peak Hour Volumes

Existing Plus Ambient Plus Cumulative Plus Project Peak Hour Intersection Volumes

Figure 5-2

APPENDIX A -

SCOPING AGREEMENT

APPENDIX A -

SCOPING AGREEMENT

Exhibit B

SCOPING AGREEMENT FOR TRAFFIC IMPACT STUDY

This letter acknowledges the Riverside County Transportation Department requirements for traffic impact analysis of the following project. The analysis must follow the Riverside County Transportation Analysis Guidelines dated December 2020.

Case No. CUP# 200043
Related Cases -
SP No. ______
EIR No. ______
GPA No. ______
CZ No. ______
Project Name: Central Avenue Gas Station
Project Address: Central Avenue and Ardenwood Way
Project Description: Project is proposing the construction of a gas station with 6 fuel dispensers (12 fueling positions) and a 4k square feet C-store

	Consultant	Developer
Name:	Integrated Engineering Group	Western States Engineering
Address:	23905 Clinton Keith Road 114-280 Wildomar CA 92562	4887 E. La Palma, ste. 707 Anaheim CA, 92807
Telephone:	951-833-3105	714-695-9300
Fax:		

A. Trip Generation Source: (ITE 10th Edition)

Current GP Land Use *Provide General Plan Land Use Designation (e.g.: MDR, CR, etc)* Proposed Land Use Service Commercial

Current Zoning M-SC Proposed Zoning M-SC

	Current Trip Generation In	Out	Total	Proposed Trip Generation In	Out	Total
AM Trips	0	0	0	64	64	128
PM Trips	0	0	0	61	61	122

Internal Trip Allowance ☐ Yes ☐ No (0 % Trip Discount)
Pass-By Trip Allowance ☐ Yes ☐ No (62/56 % AM/PM Trip Discount)*

A passby trip discount of 25% is allowed for appropriate land uses. The passby trips at adjacent study area intersections and project driveways shall be indicated on a report figure.

* Pass-by reduction rates provided by the ITE Trip Generation Handbook (3rd Edition, 2017) were used in calculating the project trip generation.

B. Trip Geographic Distribution: N 20 % S 30 % E 25 % W 25 %
(attach exhibit for detailed assignment)

C. Background Traffic

Project Build-out Year: 2022 Annual Ambient Growth Rate: 2 %
Phase Year(s) N/A

Other area projects to be analyzed: Central Avenue Commercial Retail cumulative project will be included in the analysis and other potential cumulative projects to be provided by the City of Lake Elsinore

Model/Forecast methodology No buildout analysis

Exhibit B – Scoping Agreement – Page 2

D. **Study intersections:** *(NOTE: Subject to revision after other projects, trip generation and distribution are determined, or comments from other agencies.)*

1. SH-74/Central Avenue and Ardenwood Way
2. SH-74/Central Avenue and Conrad Avenue
3. SH-74/Central Avenue and Allan Street
4. SH-74/Central Avenue and Rosetta Canyon Rd.
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

E. **Study Roadway Segments:** *(NOTE: Subject to revision after other projects, trip generation and distribution are determined, or comments from other agencies.)*

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

E. Other Jurisdictional Impacts

Is this project within a City's Sphere of Influence or one-mile radius of City boundaries? ☐ Yes ☐ No

If so, name of City Jurisdiction: Lake Elsinore

F. Site Plan (please attach reduced copy)

G. Specific issues to be addressed in the Study (in addition to the standard analysis described in the Guideline) (To be filled out by Transportation Department)
(NOTE: If the traffic study states that "a traffic signal is warranted" (or "a traffic signal appears to be warranted," or similar statement) at an existing unsignalized intersection under existing conditions, 8-hour approach traffic volume information must be submitted in addition to the peak hourly turning movement counts for that intersection.)
VMT analysis will be provided for County staff review and approval

H. Existing Conditions

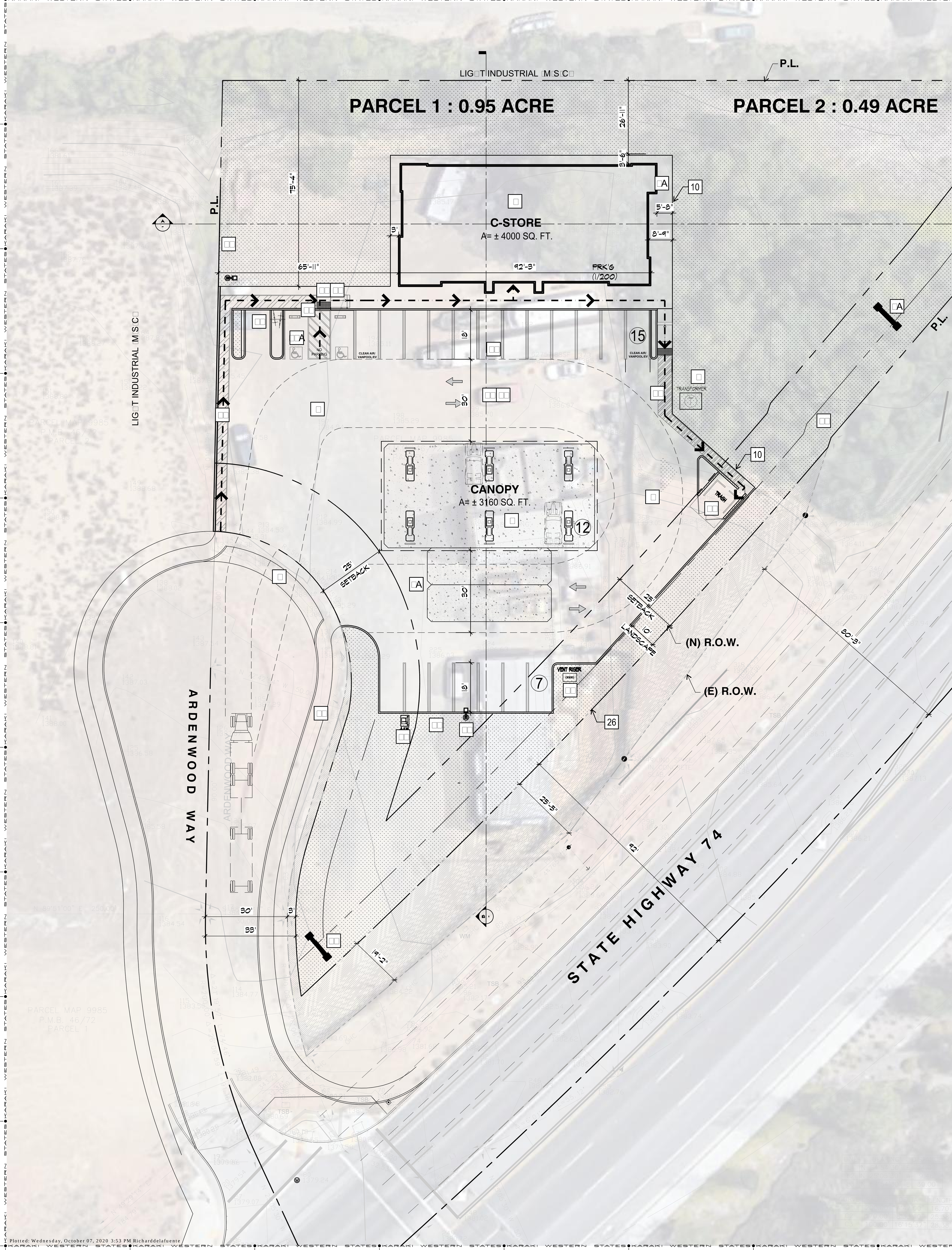
Traffic count data must be new or recent. Provide traffic count dates if using other than new counts.
Date of counts
Intersection turning movement counts conducted on October 22, 2020 will be used in the TIA. COVID adjustment factor to be provided by the City

***NOTE* Traffic Study Submittal Form and appropriate fee must be submitted with, or prior to submittal of this form. Transportation Department staff will not process the Scoping Agreement prior to receipt of the fee.**

Recommended by:		**Approved Scoping Agreement:**	
George Ghossain	12/16/20		01/27/2021
Consultant's Representative	Date	Riverside County Transportation Department	Date

Scoping Agreement Submitted on 12/16/20

Revised on 1/13/21



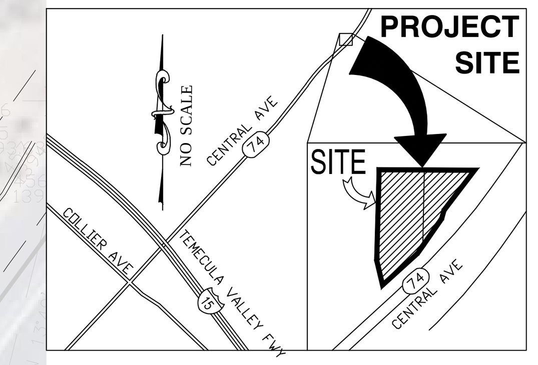
SITE KEY NOTES

- ☐ □ C-STORE
- ☐ □ GAS STATION CANOPY AND FUEL DISPENSERS
- ☐ □A UNDERGROUND STORAGE TANKS
- ☐ □□ VENT RISER WITH CARBON VAPOR CANISTER. PAINT BLACK & LANDSCAPE SCREENING.
- ☐ □ QUICK SERVICE RESTAURANT (QSR)
- ☐ □ TRANSFORMER
- ☐ □A MAIN SWITCHGEAR
- ☐ □A MONUMENT SIGN (UNDER SEPARATE PERMIT)
- ☐ □□ GAS PRICE SIGN (UNDER SEPARATE PERMIT)
- ☐ □ (N) DRIVEWAY AS PER R.C. STD 207A
- ☐ □ ASPHALT PAVING
- ☐ □ CONCRETE PAVING
- ☐ □□ (N) LANDSCAPE WITH 6" CONCRETE CURB
- ☐ 11 TRASH ENCLOSURE (PER R.C. STANDARDS)
- ☐ □□ STEEL CONCRETE BOLLARDS
- ☐ □□ CLASS-2 BIKE PARKING RACK (5-BIKE CAPACITY)
- ☐ 14 AIR & WATER UNIT
- ☐ 15 AREA LIGHTS
- ☐ 16 PARKING STRIPING AS PER R.C. STANDARDS (WITH WHEELSTOP WHERE REQUIED)
- ☐ 16A ACCESSIBLE PARKING STRIPING (WITH WHEELSTOP WHERE REQUIRD)
- ☐ 17 ACCESSIBLE PARKING SIGN
- ☐ □□ ACCESSIBLE ACCESSIBLE RAMP
- ☐ □□ ACCESSIBLE TRUNCATED DOME PAVER
- ☐ □□ ACCESSIBLE PATH STRIPING (2% MAX CROSS SLOPE)
- ☐ □□ FIRE TRUCK PATH OF TRAVEL
- ☐ □□ FUEL TANKER/TRASH TRUCK PATH OF TRAVEL
- ☐ □□ RETAINING WALL PER CIVIL
- ☐ □□ 3' HIGH DECORATIVE WALL TO SHIELD AUTO HEADLIGHTS & LIGHT SPILLAGE
- ☐ □□ (N) SIDEWALK
- ☐ □□ (N) RIGHT OF WAY
- ☐ □□ (E) RIGHT OF WAY
- ☐ □□ (E) SIDEWALK

0 2' 4' 8' 16' 32'

1 **PROPOSED SITE PLAN**
SCALE: 1" = 20'-0"

VICINITY MAP



LEGEND

NO. OF PARKING SPACES	AREA LIGHTS
ACCESSIBLE PARKING	WALL MOUNTED DECORATIVE AREA LIGHTS
PROPERTY LINE	(E) FIRE HYDRANT
PROPOSED PARCEL SUBDIVISION	(E) SEWER MANHOLE
	(E) SEWER CLEANOUT
ADA PATH OF TRAVEL	(E) POWER POLE
CONCRETE PAVING AREA	(E) WATER METER
DECORATIVE PAVING AREA	(E) WATER POINT
LANDSCAPED AREA	(E) SIGN
DIRECTIONAL ARROW	
R.O.W. DEDICATION	

SCOPE OF WORK

PROPOSED DEVELOPMENT

PROPOSED GAS STATION COMPRISING OF:
- CONVENIENCE STORE (WITH TYPE 20-ABC)
- FUELING CANOPY WITH SIX MULTI-PRODUCT DISPENSERS
- TWO UNDERGROUND STORAGE TANKS

PROJECT DATA

ZONING: LIGHT INDUSTRIAL
LAND USE: MANUFACTURING-SERVICE COMMERCIAL
AREA OF SITE (GROSS ACREAGE)
TOTAL AREA : ± 62,726 S.F. (1.44 acre)
AREA OF PROJECT (NET ACREAGE)
TOTAL AREA : ± 62,726 S.F. (1.44 acre)

BLDG SETBACKS	REQUIRED	PROVIDED
FRONT (SOUTH)	25'-0"	25'-0"
REAR (NORTH)	0'-0"	0'-0"
LEFT (WEST)	25'-0"	25'-0"
RIGHT (EAST)	0'-0"	0'-0"
LANDSCAPE AREA	10%	29,002 S.F. (51%)
FLOOR AREA RATIO	-	± 0.11
MAXIMUM HEIGHT	40'-0"	28'-0"
PARKING	39	51

BUILDING DATA

C-STORE	
AREAS	± 4,000 SF
OCCUPANCY	M
TYPE OF CONST	V-B
NUMBER OF STORY	1
BLDG HEIGHT	± 28'-0"
SPRINKLERS	NONE

CANOPY	
AREA	± 3,160 SF
OCCUPANCY	M
TYPE OF CONST	II-B
NUMBER OF STORY	1
BLDG HEIGHT	20'-0"
SPRINKLERS	NONE

TOTAL BUILDINGS AREA (GFA) ± 9,160 SF
± 0.15 ACRE (NET ACREAGE)

ASSESSOR'S PARCEL NUMBER

347-130-028 & 347-130-029

LEGAL DESCRIPTION

FIRST AMERICAN TITLE COMPAN□
ORDER NO.: 0625-5788488
DATED: SEPTEMBER 11, 2018

LEGAL DESCRIPTION□
REAL PROPERTY IN THE UNINCORPORATED AREA OF THE COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, DESCRIBED AS FOLLOWS:

PARCEL 3 OF PARCEL MAP 9985, AS SHOWN BY MAP ON FILE IN BOOK 46, PAGE 72 OF PARCEL MAPS, RECORDS OF RIVERSIDE COUNTY, CALIFORNIA.

EXCEPTING THEREFROM A PORTION THAT GRANTS TO RIVERSIDE COUNTY TRANSPORTATION COMMISSION, A POLITICAL SUBDIVISION AS DESCRIBED IN DEED RECORDED OCTOBER 02, 2001 AS INSTRUMENT NO. 2001-478038 OF OFFICIAL RECORDS.

APN: 347-130-029

LEGAL DESCRIPTION□
ORDER NO.: 0625-5789283
DATED: SEPTEMBER 12, 2018

REAL PROPERTY IN THE UNINCORPORATED AREA OF THE COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, DESCRIBED AS FOLLOWS:

PARCELS 4 OF PARCEL MAP 9985, AS SHOWN BY MAP ON FILE IN BOOK 46, PAGE 72, OF PARCEL MAPS, RECORDS OF RIVERSIDE COUNTY, CALIFORNIA.

EXCEPTING THEREFROM THAT PORTION CONVEYED TO THE RIVERSIDE COUNTY TRANSPORTATION COMMISSION, BY GRANT DEED RECORDED OCTOBER 09, 2001 AS INSTRUMENT NO. 01-489377, OF OFFICIAL RECORDS OF SAID COUNTY.

ASSESSOR'S PARCEL NUMBER: 347-130-028

TOTAL AREA: 62,757.88 S.F. (1.441 ACRES)

PARKING COMPUTATION

PARKING STANDARDS

TYPE	SIZE
REGULAR	9'-0" X 18'-0"
COMPACT	8'-6" X 16'-0" (UP TO 20% OF TOTAL)
HANDICAP	17'-0" X 18'-0" (VAN ACCESSIBLE)

PARKING REQUIREMENTS

USE	FORMULA	REQUIRED	PROVIDED
C-STORE	(1/200 S.F.)	20	22
CANOPY		-	12
TOTAL PARKING		20	34

HANDICAP PARKING REQUIREMENTS

FORMULA	REQUIRED	PROVIDED
26-50 PARKING SPACES	(2)	(2)

CLEAN AIR/ELECTRIC VEHICLE PARKING

FORMULA	REQUIRED	PROVIDED
SECTION 17.18.045 R.C. MUN CODE (WITH 25-49 PARKING = 2 EV CHARGING SPACES)	(2)	(2)

KARAKI WSe
WESTERN STATES ENGINEERING
A DESIGN-BUILD COMPANY
4887 E. LA PALMA STE. 707
ANAHEIM, CA 92807
TEL: (714)695-9300 FAX: (714)693-1002
www.westernsec.com

■ CONSULTANT/ SEALS

REGISTERED PROFESSIONAL ENGINEER
KAMAL B. MCHANTAF
NO. C051050
Exp. 9/30/17
CIVIL
STATE OF CALIFORNIA

■ SUBMITTAL

NO□DESCRIPTION	□□	DATE
1		
2		
3		
4		

■ REVISIONS

NO□DESCRIPTION	□□	DATE
△		
△		
△		
△		
△		

■ OWNER NAME & ADDRESS
DA□ER OIL INC□
□□□□□ ESPERAN□A RD□
□OR□A LINDA CA □□□□□

■ PROJECT NAME & ADDRESS
GAS STATION □
CON□ENIENCE STORE
□□□□□ CENTRAL A□E□□□□ □□ □□
LA□E ELSINORE□CA □□□□□

■ NOTE TO CONTRACTOR
CONTRACTOR TO VERIFY LOCATION AND DEPTH OF ALL UTILITIES ON-SITE AND OFF-SITE PRIOR TO START OF CONSTRUCTION.

■ DESIGNED BY: □S
■ DRAWN BY: □S
■ CHECKED BY: J□
■ PLOT DATE: □□□□□□□□
■ SCALE: AS S□O□N
■ SHEET TITLE
PROPOSED SITE PLAN

■ SHEET NUMBER
AS-1.0

■ JOB No E□□□□□
■ PAR / CUP No PAR□□□□□□

Trip Generation Calculation:

Trip Generation Rates

Land Use[1]	Units[2]	ITE LU Code	AM Peak Hour			PM Peak Hour			Daily
			In	Out	Total	In	Out	Total	
Super Convenience Market/Gas Station	VFP	960	14.04	14.04	28.08	11.48	11.48	22.96	231

[1] Trip Generation Source: Institute of Transportation Engineers (ITE), Trip Generation Manual, Tenth Edition (2017).

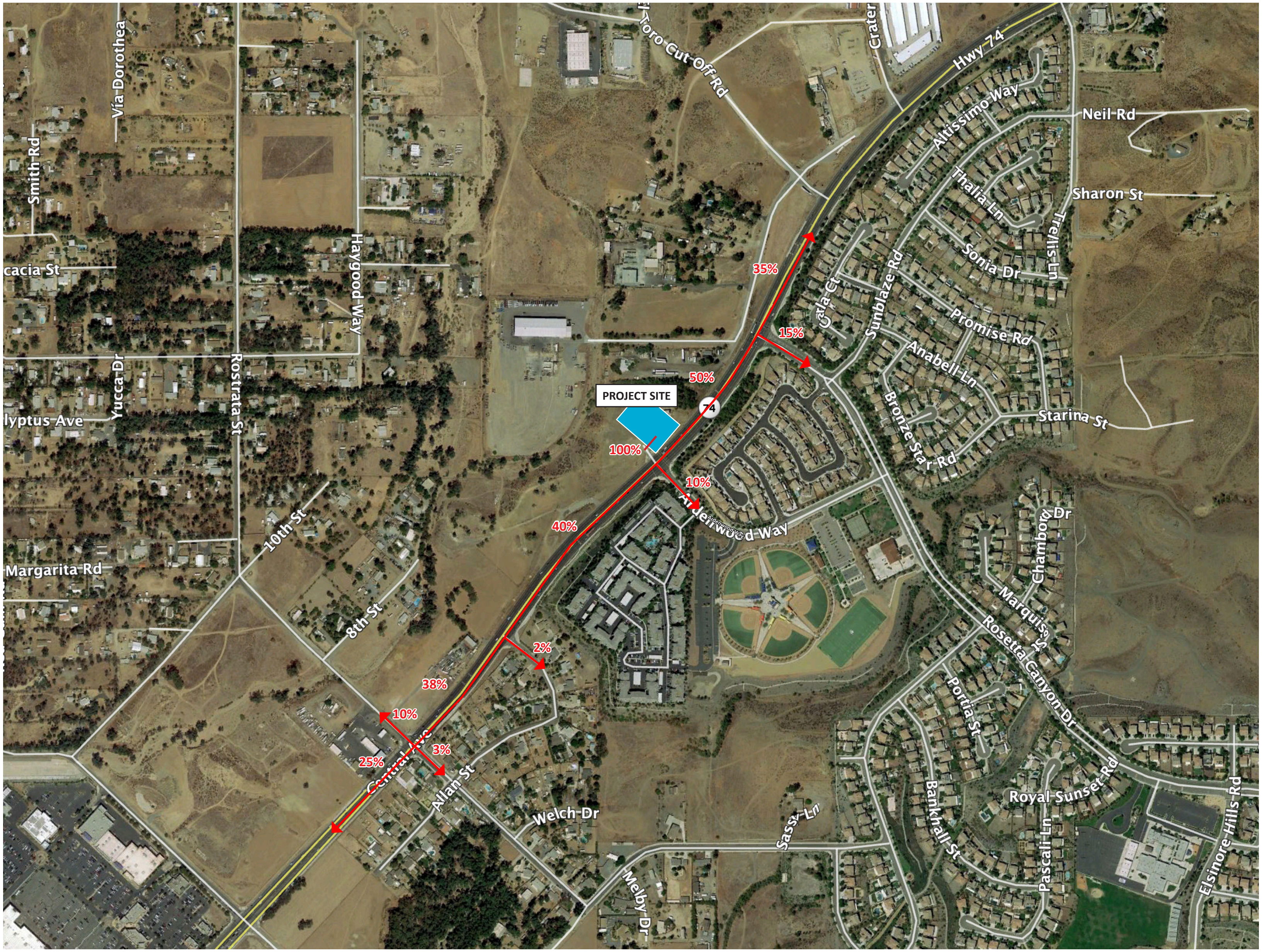
[2] VFP = Vehicle Fueling Positions

Project Trip Generation

Land Use	Intensity	Units[1]	AM Peak Hour			PM Peak Hour			Daily
			In	Out	Total	In	Out	Total	
Service Station									
Super Convenience Market/Gas Station	12	VFP	168	168	337	138	138	276	2,766
Pass-by Reduction (62% AM Peak Hour, 56% - PM Peak Hour)[2]			104	104	209	77	77	154	*1,549*
		TOTAL	*64*	*64*	*128*	*61*	*61*	*122*	*1,217*

[1] DU = Dwelling Units; TSF = Thousand Square Feet; VFP = Vehicle Fueling Positions

[2] Pass-by reduction percentage is based on the ITE methodology per Table E of ITE Trip Generation Handbook (3rd Edition, 2017).



INTEGRATED ENGINEERING GROUP
TRANSPORTATION PLANNING AND ENGINEERING

Central Avenue Gas Station
Project Trip Distribution

APPENDIX B -

TRAFFIC COUNT DATA

APPENDIX B -

TRAFFIC COUNT DATA

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	Lake Elsinore	PROJECT #:	SC2709
Thu, Oct 22, 20	NORTH & SOUTH:	Central	LOCATION #:	1
	EAST & WEST:	Conard	CONTROL:	SIGNAL

NOTES:

Minor construction WB 8:00 AM - 4:30 PM

AM / PM / MD / OTHER / OTHER

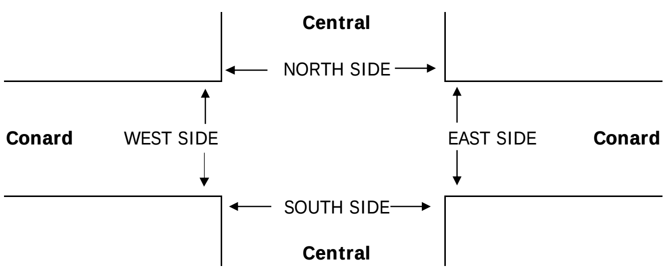
▲ N / ◄ W / E ► / S ▼

Add U-Turns to Left Turns

	NORTHBOUND Central/SH-74			SOUTHBOUND Central/SH-74			EASTBOUND Conard			WESTBOUND Conard			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	2	0	1	2	0	0	1	0	0	1	0	
AM 7:00 AM	3	127	2	0	317	4	4	0	3	10	0	0	470
7:15 AM	0	153	0	0	257	6	3	0	5	7	0	0	431
7:30 AM	1	148	8	0	303	4	2	0	4	12	0	1	483
7:45 AM	2	175	2	0	274	11	1	0	5	17	0	1	488
8:00 AM	2	177	8	0	281	2	3	1	1	19	0	2	496
8:15 AM	6	138	5	0	254	5	4	0	3	14	0	0	429
8:30 AM	4	172	3	0	244	5	4	0	6	14	0	1	453
8:45 AM	0	186	3	1	228	1	3	0	5	10	0	1	438
VOLUMES	18	1,276	31	1	2,158	38	24	1	32	103	0	6	3,688
APPROACH %	1%	96%	2%	0%	98%	2%	42%	2%	56%	94%	0%	6%	
APP/DEPART	1,325	/	1,306	2,197	/	2,293	57	/	33	109	/	56	0
BEGIN PEAK HR		7:15 AM											
VOLUMES	5	653	18	0	1,115	23	9	1	15	55	0	4	1,898
APPROACH %	1%	97%	3%	0%	98%	2%	36%	4%	60%	93%	0%	7%	
PEAK HR FACTOR		0.904			0.927			0.781			0.702		0.957
APP/DEPART	676	/	666	1,138	/	1,185	25	/	19	59	/	28	0
PM 4:00 PM	9	437	13	1	277	2	6	0	4	12	1	0	762
4:15 PM	8	446	14	0	263	3	18	1	6	11	0	1	771
4:30 PM	6	453	10	2	344	9	9	0	11	8	0	2	854
4:45 PM	5	467	14	2	315	3	9	2	3	18	1	2	841
5:00 PM	2	460	12	0	262	3	14	0	6	15	0	0	774
5:15 PM	3	517	16	0	278	8	3	0	4	15	1	3	848
5:30 PM	5	475	15	0	271	2	14	0	8	12	0	1	803
5:45 PM	10	502	17	1	275	2	3	0	2	11	2	1	826
VOLUMES	48	3,757	111	6	2,285	32	76	3	44	102	5	10	6,479
APPROACH %	1%	96%	3%	0%	98%	1%	62%	2%	36%	87%	4%	9%	
APP/DEPART	3,916	/	3,843	2,323	/	2,433	123	/	120	117	/	83	0
BEGIN PEAK HR		4:30 PM											
VOLUMES	16	1,897	52	4	1,199	23	35	2	24	56	2	7	3,317
APPROACH %	1%	97%	3%	0%	98%	2%	57%	3%	39%	86%	3%	11%	
PEAK HR FACTOR		0.917			0.863			0.763			0.774		0.971
APP/DEPART	1,965	/	1,939	1,226	/	1,280	61	/	58	65	/	40	0

U-TURNS

	NB	SB	EB	WB	TTL
LANES	0	0	0	0	
7:00 AM	0	0	0	0	0
7:15 AM	0	0	0	0	0
7:30 AM	0	0	0	0	0
7:45 AM	0	0	0	0	0
8:00 AM	0	0	0	0	0
8:15 AM	0	0	0	0	0
8:30 AM	0	0	0	0	0
8:45 AM	0	0	0	0	0
VOLUMES	0	0	0	0	0
4:00 PM	0	0	0	0	0
4:15 PM	1	0	0	0	1
4:30 PM	0	0	0	0	0
4:45 PM	0	0	0	0	0
5:00 PM	0	0	0	0	0
5:15 PM	1	0	0	0	1
5:30 PM	0	0	0	0	0
5:45 PM	0	0	0	0	0
VOLUMES	2	0	0	0	2



PEDESTRIAN + BIKE CROSSINGS

	N SIDE	S SIDE	E SIDE	W SIDE	TOTAL
AM 7:00 AM	0	0	0	0	0
7:15 AM	0	0	0	0	0
7:30 AM	0	0	1	0	1
7:45 AM	0	0	0	0	0
8:00 AM	0	0	0	0	0
8:15 AM	0	0	1	0	1
8:30 AM	1	0	0	1	2
8:45 AM	0	0	0	0	0
TOTAL	1	0	2	1	4
AM BEGIN PEAK HR			7:15 AM		
PM 4:00 PM	0	0	1	0	1
4:15 PM	0	0	0	0	0
4:30 PM	0	0	1	0	1
4:45 PM	0	0	1	0	1
5:00 PM	0	0	3	0	3
5:15 PM	0	0	0	0	0
5:30 PM	0	0	0	0	0
5:45 PM	0	0	0	0	0
TOTAL	0	0	6	0	6
PM BEGIN PEAK HR			4:30 PM		

PEDESTRIAN CROSSINGS

	N SIDE	S SIDE	E SIDE	W SIDE	TOTAL
7:00 AM	0	0	0	0	0
7:15 AM	0	0	0	0	0
7:30 AM	0	0	1	0	1
7:45 AM	0	0	0	0	0
8:00 AM	0	0	0	0	0
8:15 AM	0	0	1	0	1
8:30 AM	1	0	0	1	2
8:45 AM	0	0	0	0	0
TOTAL	1	0	2	1	4
AM BEGIN PEAK HR	0	0	1	0	1
4:00 PM	0	0	1	0	1
4:15 PM	0	0	0	0	0
4:30 PM	0	0	1	0	1
4:45 PM	0	0	1	0	1
5:00 PM	0	0	2	0	2
5:15 PM	0	0	0	0	0
5:30 PM	0	0	0	0	0
5:45 PM	0	0	0	0	0
TOTAL	0	0	5	0	5
PM BEGIN PEAK HR	0	0	4	0	4

BICYCLE CROSSINGS

	NS	SS	ES	WS	TOTAL
7:00 AM	0	0	0	0	0
7:15 AM	0	0	0	0	0
7:30 AM	0	0	0	0	0
7:45 AM	0	0	0	0	0
8:00 AM	0	0	0	0	0
8:15 AM	0	0	0	0	0
8:30 AM	0	0	0	0	0
8:45 AM	0	0	0	0	0
TOTAL	0	0	0	0	0
4:00 PM	0	0	0	0	0
4:15 PM	0	0	0	0	0
4:30 PM	0	0	0	0	0
4:45 PM	0	0	0	0	0
5:00 PM	0	0	1	0	1
5:15 PM	0	0	0	0	0
5:30 PM	0	0	0	0	0
5:45 PM	0	0	0	0	0
TOTAL	0	0	1	0	1

AimTD LLC

TURNING MOVEMENT COUNTS

Lake Elsinore

SC2709

ALL HOURS

Central/SH-74 (north leg)

TOTAL	**4,520**	**70**	**4,443**	**7**
PM	**2,323**	32	2,285	6
AM	**2,197**	38	2,158	1

TOTAL	**5,149**
PM	3,843
AM	1,306

Conard (west leg)

TOTAL	**139**
PM	83
AM	56

TOTAL	**100**	**4**	**76**	**180**
PM	76	3	44	**123**
AM	24	1	32	**57**

Conard (east leg)

TOTAL	**226**	**16**	**5**	**205**
PM	**117**	10	5	102
AM	**109**	6	0	103

TOTAL	**153**
PM	120
AM	33

Central/SH-74 (south leg)

AM	2,293
PM	2,433
TOTAL	**4,726**

AM	18	1,276	31	**1,325**
PM	48	3,757	111	**3,916**
TOTAL	**66**	**5,033**	**142**	**5,241**

PEAK HOUR

AM 7:15 AM

PM 4:30 PM

Central/SH-74 (north leg)

TOTAL	**2,364**	**46**	**2,314**	**4**
PM	**1,226**	23	1,199	4
AM	**1,138**	23	1,115	0

TOTAL	**2,605**
PM	1,939
AM	666

Conard (west leg)

TOTAL	**68**
PM	40
AM	28

TOTAL	**44**	**3**	**39**	**86**
PM	35	2	24	**61**
AM	9	1	15	**25**

Conard (east leg)

TOTAL	**124**	**11**	**2**	**111**
PM	**65**	7	2	56
AM	**59**	4	0	55

TOTAL	**77**
PM	58
AM	19

Central/SH-74 (south leg)

AM	1,185
PM	1,280
Total	**2,465**

AM	5	653	18	**676**
PM	16	1,897	52	**1,965**
Total	**21**	**2,550**	**70**	**2,641**

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE: Thu, Oct 22, 20	LOCATION:	Lake Elsinore	PROJECT #:	SC2709
	NORTH & SOUTH:	Central	LOCATION #:	2
	EAST & WEST:	Allan	CONTROL:	STOP W

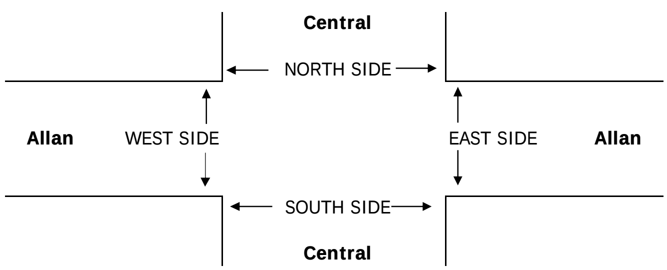
NOTES:

AM / PM / MD / OTHER / OTHER

▲ N / ◄ W / E ► / S ▼

Add U-Turns to Left Turns

	NORTHBOUND Central/SH-74			SOUTHBOUND Central/SH-74			EASTBOUND Allan			WESTBOUND Allan				U-TURNS				
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL
LANES:	X	2	0	1	2	X	X	X	X	0	X	0		0	0	0	0	
AM 7:00 AM	0	143	0	1	281	0	0	0	0	0	0	0	425	0	0	0	0	0
7:15 AM	0	161	0	0	283	0	0	0	0	1	0	0	445	0	0	0	0	0
7:30 AM	0	160	0	1	308	0	0	0	0	0	0	0	469	0	0	0	0	0
7:45 AM	0	198	1	0	288	0	0	0	0	0	0	2	489	0	0	0	0	0
8:00 AM	0	149	0	0	273	0	0	0	0	0	0	0	422	0	0	0	0	0
8:15 AM	0	160	0	0	236	0	0	0	0	0	0	1	397	0	0	0	0	0
8:30 AM	0	198	0	0	247	0	0	0	0	0	0	0	445	1	0	0	0	1
8:45 AM	0	137	0	2	263	0	0	0	0	1	0	0	403	0	0	0	0	0
VOLUMES	0	1,306	1	4	2,179	0	0	0	0	2	0	3	3,496	1	0	0	0	1
APPROACH %	0%	100%	0%	0%	100%	0%	0%	0%	0%	40%	0%	60%						
APP/DEPART	1,308	/	1,309	2,183	/	2,182	0	/	5	5	/	0	0					
BEGIN PEAK HR		7:00 AM																
VOLUMES	0	662	1	2	1,160	0	0	0	0	1	0	2	1,828					
APPROACH %	0%	100%	0%	0%	100%	0%	0%	0%	0%	33%	0%	67%						
PEAK HR FACTOR		0.833			0.940			0.000			0.375		0.935					
APP/DEPART	663	/	664	1,162	/	1,161	0	/	3	3	/	0	0					
PM 4:00 PM	0	468	0	1	309	0	0	0	0	0	0	1	779	0	0	0	0	0
4:15 PM	0	485	0	1	310	0	0	0	0	0	0	0	796	0	1	0	0	1
4:30 PM	0	454	1	0	306	0	0	0	0	0	0	2	763	0	1	0	0	1
4:45 PM	0	473	1	2	268	0	0	0	0	0	0	0	744	0	0	0	0	0
5:00 PM	0	509	1	2	314	0	0	0	0	0	0	1	827	0	0	0	0	0
5:15 PM	0	508	1	1	267	0	0	0	0	0	0	0	777	0	0	0	0	0
5:30 PM	0	488	0	0	282	0	0	0	0	0	0	0	770	0	0	0	0	0
5:45 PM	0	465	1	1	252	0	0	0	0	1	0	1	721	0	0	0	0	0
VOLUMES	0	3,850	5	8	2,308	0	0	0	0	1	0	5	6,179	0	2	0	0	2
APPROACH %	0%	100%	0%	0%	100%	0%	0%	0%	0%	17%	0%	83%						
APP/DEPART	3,855	/	3,857	2,318	/	2,309	0	/	13	6	/	0	0					
BEGIN PEAK HR		4:15 PM																
VOLUMES	0	1,921	3	5	1,198	0	0	0	0	0	0	3	3,132					
APPROACH %	0%	100%	0%	0%	99%	0%	0%	0%	0%	0%	0%	100%						
PEAK HR FACTOR		0.943			0.953			0.000			0.375		0.947					
APP/DEPART	1,924	/	1,926	1,205	/	1,198	0	/	8	3	/	0	0					



	PEDESTRIAN + BIKE CROSSINGS					PEDESTRIAN CROSSINGS					BICYCLE CROSSINGS				
	N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	NS	SS	ES	WS	TOTAL
AM 7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	1	0	1	0	0	1	0	1	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	1	0	1	0	0	1	0	1	0	0	0	0	0
8:00 AM	0	0	1	0	1	0	0	1	0	1	0	0	0	0	0
8:15 AM	0	0	1	0	1	0	0	1	0	1	0	0	0	0	0
8:30 AM	0	0	2	0	2	0	0	2	0	2	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	6	0	6	0	0	6	0	6	0	0	0	0	0
AM BEGIN PEAK HR			7:00 AM			0	0	2	0	2					
PM 4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	1	0	1	0	0	1	0	1	0	0	0	0	0
4:30 PM	0	0	1	0	1	0	0	1	0	1	0	0	0	0	0
4:45 PM	0	0	3	0	3	0	0	2	0	2	0	0	1	0	1
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	5	0	5	0	0	4	0	4	0	0	1	0	1
PM BEGIN PEAK HR			4:15 PM			0	0	4	0	4					

AimTD LLC

TURNING MOVEMENT COUNTS

Lake Elsinore

SC2709

ALL HOURS

Central/SH-74 (north)

4,501	0	4,487	12	TOTAL		5,166
2,318	0	2,308	8	PM		3,857
2,183	0	2,179	4	AM		1,309

Allan (west)

TOTAL	PM	AM
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0

Allan (east)

AM	PM	TOTAL
5	6	11
3	5	8
0	0	0
2	1	3
5	13	18

Central/SH-74 (south)

2,182	AM	0	1,306	1	1,308
2,309	PM	0	3,850	5	3,855
4,491	TOTAL	0	5,156	6	5,163

PEAK HOUR

AM 7:00 AM

PM 4:15 PM

Central/SH-74 (north)

2,367	0	2,358	7	TOTAL		2,590
1,205	0	1,198	5	PM		1,926
1,162	0	1,160	2	AM		664

Allan (west)

TOTAL	PM	AM
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0

Allan (east)

AM	PM	TOTAL
3	3	6
2	3	5
0	0	0
1	0	1
3	8	11

Central/SH-74 (south)

1,161	AM	0	662	1	663
1,198	PM	0	1,921	3	1,924
2,359	Total	0	2,583	4	2,587

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE: Thu, Oct 22, 20	LOCATION:	Lake Elsinore	PROJECT #:	SC2709
	NORTH & SOUTH:	Central	LOCATION #:	3
	EAST & WEST:	Ardenwood	CONTROL:	SIGNAL

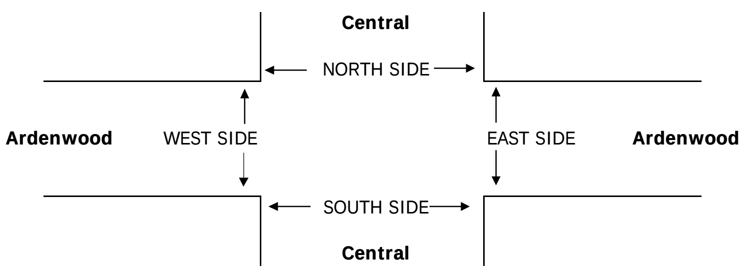
NOTES:

AM PM MD OTHER OTHER

▲ N ◄ W E ► S ▼

Add U-Turns to Left Turns

	NORTHBOUND Central/SH-74			SOUTHBOUND Central/SH-74			EASTBOUND Ardenwood			WESTBOUND Ardenwood				U-TURNS				
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL
LANES:	1	3	0	1	2	0	0	1	0	1	1	0		0	0	0	0	
AM 7:00 AM	0	134	9	2	266	0	0	0	0	16	0	2	429	0	0	0	0	0
7:15 AM	0	158	4	0	270	0	0	0	0	12	0	3	447	0	0	0	0	0
7:30 AM	2	151	7	0	293	0	0	0	0	15	0	3	471	0	0	0	0	0
7:45 AM	1	196	3	1	272	0	0	0	0	16	0	3	492	0	0	0	0	0
8:00 AM	1	139	9	1	251	0	0	0	0	22	0	6	429	0	0	0	0	0
8:15 AM	1	153	8	0	227	0	0	0	0	9	0	5	403	0	0	0	0	0
8:30 AM	1	189	8	0	230	0	0	0	0	16	0	2	446	0	0	0	0	0
8:45 AM	0	133	4	2	247	0	1	0	2	16	0	1	406	0	0	0	0	0
VOLUMES	6	1,253	52	6	2,056	0	1	0	2	122	0	25	3,523	0	0	0	0	0
APPROACH %	0%	96%	4%	0%	100%	0%	33%	0%	67%	83%	0%	17%						
APP/DEPART	1,311	/	1,279	2,062	/	2,180	3	/	58	147	/	6	0					
BEGIN PEAK HR		7:15 AM																
VOLUMES	4	644	23	2	1,086	0	0	0	0	65	0	15	1,839					
APPROACH %	1%	96%	3%	0%	100%	0%	0%	0%	0%	81%	0%	19%						
PEAK HR FACTOR		0.839			0.928			0.000			0.714		0.934					
APP/DEPART	671	/	659	1,088	/	1,151	0	/	25	80	/	4	0					
PM 4:00 PM	0	452	16	8	291	0	0	0	0	19	0	5	791	0	0	0	0	0
4:15 PM	0	463	23	3	290	0	0	0	2	20	0	2	803	0	0	0	0	0
4:30 PM	0	427	29	2	293	0	0	0	1	13	0	2	767	0	0	0	0	0
4:45 PM	0	443	29	8	256	0	0	0	2	12	0	6	756	0	1	0	0	1
5:00 PM	0	476	33	2	303	0	0	0	0	13	0	5	832	0	0	0	0	0
5:15 PM	0	475	32	3	243	0	0	0	0	25	0	2	780	0	0	0	0	0
5:30 PM	0	441	47	5	264	0	0	0	0	18	0	4	779	0	0	0	0	0
5:45 PM	0	436	29	2	243	0	0	0	0	10	0	1	721	0	0	0	0	0
VOLUMES	0	3,613	238	33	2,183	0	0	0	5	130	0	27	6,229	0	1	0	0	1
APPROACH %	0%	94%	6%	1%	99%	0%	0%	0%	100%	83%	0%	17%						
APP/DEPART	3,851	/	3,641	2,216	/	2,318	5	/	270	157	/	0	0					
BEGIN PEAK HR		4:15 PM																
VOLUMES	0	1,809	114	15	1,142	0	0	0	5	58	0	15	3,158					
APPROACH %	0%	94%	6%	1%	99%	0%	0%	0%	100%	79%	0%	21%						
PEAK HR FACTOR		0.944			0.948			0.625			0.830		0.949					
APP/DEPART	1,923	/	1,825	1,157	/	1,205	5	/	128	73	/	0	0					



	PEDESTRIAN + BIKE CROSSINGS					PEDESTRIAN CROSSINGS					BICYCLE CROSSINGS				
	N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	NS	SS	ES	WS	TOTAL
AM 7:00 AM	1	0	1	1	3	1	0	1	1	3	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	1	0	1	0	0	1	0	1	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	2	0	2	0	0	2	0	2	0	0	0	0	0
8:30 AM	0	0	1	0	1	0	0	1	0	1	0	0	0	0	0
8:45 AM	0	0	1	0	1	0	0	1	0	1	0	0	0	0	0
TOTAL	1	0	6	1	8	1	0	6	1	8	0	0	0	0	0
AM BEGIN PEAK HR			7:15 AM			0	0	1	0	1					
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	1	0	1	0	0	1	0	1	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	1	0	1	0	0	1	0	1	0	0	0	0	0
PM BEGIN PEAK HR			4:15 PM			0	0	1	0	1					

AimTD LLC

TURNING MOVEMENT COUNTS

Lake Elsinore — SC2709 — ALL HOURS

Central/SH-74 (north leg)

TOTAL	**4,278**	**0**	**4,239**	**39**
PM	**2,216**	0	2,183	33
AM	**2,062**	0	2,056	6

TOTAL	**4,920**
PM	3,641
AM	1,279

Ardenwood (west leg)

	TOTAL	PM	AM
	6	0	6

	TOTAL	PM	AM
	1	0	1
	0	0	0
	7	5	2
	8	**5**	**3**

Ardenwood (east leg)

	AM	PM	TOTAL
	147	**157**	**304**
	25	27	**52**
	0	0	**0**
	122	130	**252**

	AM	PM	TOTAL
	58	270	**328**

Central/SH-74 (south leg)

AM	2,180
PM	2,318
TOTAL	**4,498**

AM	6	1,253	52	**1,311**
PM	0	3,613	238	**3,851**
TOTAL	**6**	**4,866**	**290**	**5,162**

PEAK HOUR

AM 7:15 AM

PM 4:15 PM

Central/SH-74 (north leg)

TOTAL	**2,245**	**0**	**2,228**	**17**
PM	**1,157**	0	1,142	15
AM	**1,088**	0	1,086	2

TOTAL	**2,484**
PM	1,825
AM	659

Ardenwood (west leg)

	TOTAL	PM	AM
	4	0	4

	TOTAL	PM	AM
	0	0	0
	0	0	0
	5	5	0
	5	**5**	**0**

Ardenwood (east leg)

	AM	PM	TOTAL
	80	**73**	**153**
	15	15	**30**
	0	0	**0**
	65	58	**123**

	AM	PM	TOTAL
	25	128	**153**

Central/SH-74 (south leg)

AM	1,151
PM	1,205
Total	**2,356**

AM	4	644	23	**671**
PM	0	1,809	114	**1,923**
Total	**4**	**2,453**	**137**	**2,594**

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	Lake Elsinore	PROJECT #:	SC2709
Thu, Oct 22, 20	NORTH & SOUTH:	Central	LOCATION #:	4
	EAST & WEST:	Rosetta Canyon	CONTROL:	SIGNAL

NOTES:

AM / PM / MD / OTHER / OTHER

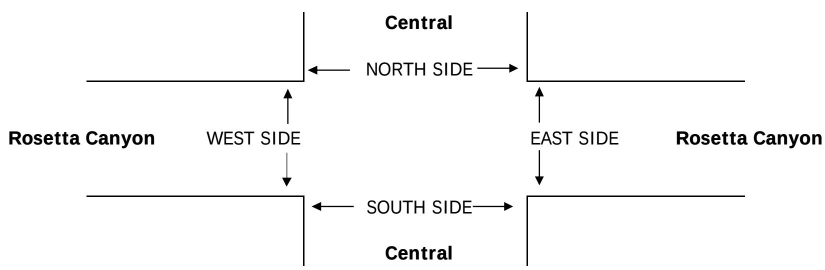
▲ N / ◄ W / E ► / S ▼

• Add U-Turns to Left Turns

	NORTHBOUND Central/SH-74			SOUTHBOUND Central/SH-74			EASTBOUND Rosetta Canyon			WESTBOUND Rosetta Canyon			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	X	3	0	1	2	X	X	X	X	1	X	1	
AM 7:00 AM	0	131	5	2	248	0	0	0	0	23	0	4	413
7:15 AM	0	152	9	5	252	0	0	0	0	18	0	9	445
7:30 AM	0	145	10	6	266	0	0	0	0	27	0	4	458
7:45 AM	0	186	13	1	247	0	0	0	0	26	0	6	479
8:00 AM	0	135	10	4	226	0	0	0	0	26	0	5	406
8:15 AM	0	148	10	0	202	0	0	0	0	25	0	4	389
8:30 AM	0	175	16	2	206	0	0	0	0	24	0	8	431
8:45 AM	0	125	10	1	214	0	0	0	0	35	0	3	388
VOLUMES	0	1,197	83	21	1,861	0	0	0	0	204	0	43	3,409
APPROACH %	0%	94%	6%	1%	99%	0%	0%	0%	0%	83%	0%	17%	
APP/DEPART	1,280	/	1,241	1,882	/	2,065	0	/	103	247	/	0	0
BEGIN PEAK HR		7:00 AM											
VOLUMES	0	614	37	14	1,013	0	0	0	0	94	0	23	1,795
APPROACH %	0%	94%	6%	1%	99%	0%	0%	0%	0%	80%	0%	20%	
PEAK HR FACTOR		0.818			0.944			0.000			0.914		0.937
APP/DEPART	651	/	638	1,027	/	1,107	0	/	50	117	/	0	0
PM 4:00 PM	0	428	29	7	275	0	0	0	0	24	0	7	770
4:15 PM	0	424	41	10	276	0	0	0	0	21	0	9	781
4:30 PM	0	396	33	7	276	0	0	0	0	19	0	1	732
4:45 PM	0	414	36	5	241	0	0	0	0	23	0	7	726
5:00 PM	0	432	46	8	277	0	0	0	0	28	0	4	795
5:15 PM	0	429	48	13	231	0	0	0	0	15	0	5	741
5:30 PM	0	415	30	7	237	0	0	0	0	32	0	7	728
5:45 PM	0	399	38	17	228	0	0	0	0	17	0	4	703
VOLUMES	0	3,337	301	74	2,041	0	0	0	0	179	0	44	5,976
APPROACH %	0%	92%	8%	3%	97%	0%	0%	0%	0%	80%	0%	20%	
APP/DEPART	3,638	/	3,383	2,115	/	2,220	0	/	373	223	/	0	0
BEGIN PEAK HR		4:15 PM											
VOLUMES	0	1,666	156	30	1,070	0	0	0	0	91	0	21	3,034
APPROACH %	0%	91%	9%	3%	97%	0%	0%	0%	0%	81%	0%	19%	
PEAK HR FACTOR		0.953			0.962			0.000			0.875		0.954
APP/DEPART	1,822	/	1,688	1,100	/	1,161	0	/	185	112	/	0	0

U-TURNS

	NB	SB	EB	WB	TTL
	0	0	0	0	
7:00 AM	0	0	0	0	0
7:15 AM	0	0	0	0	0
7:30 AM	0	1	0	0	1
7:45 AM	0	0	0	0	0
8:00 AM	0	0	0	0	0
8:15 AM	0	0	0	0	0
8:30 AM	0	0	0	0	0
8:45 AM	0	0	0	0	0
VOLUMES	0	1	0	0	1
4:00 PM	0	1	0	0	1
4:15 PM	0	1	0	0	1
4:30 PM	0	0	0	0	0
4:45 PM	0	0	0	0	0
5:00 PM	0	0	0	0	0
5:15 PM	0	0	0	0	0
5:30 PM	0	0	0	0	0
5:45 PM	0	0	0	0	0
VOLUMES	0	2	0	0	2



PEDESTRIAN + BIKE CROSSINGS

	N SIDE	S SIDE	E SIDE	W SIDE	TOTAL
AM 7:00 AM	0	0	1	0	1
7:15 AM	0	0	0	0	0
7:30 AM	0	0	0	0	0
7:45 AM	0	0	0	0	0
8:00 AM	0	0	0	0	0
8:15 AM	0	0	1	0	1
8:30 AM	0	0	0	0	0
8:45 AM	0	0	1	0	1
TOTAL	0	0	3	0	3
AM BEGIN PEAK HR			7:00 AM		
PM 4:00 PM	0	0	0	0	0
4:15 PM	0	0	0	0	0
4:30 PM	0	0	0	0	0
4:45 PM	0	0	1	0	1
5:00 PM	0	0	0	0	0
5:15 PM	0	0	0	0	0
5:30 PM	0	0	0	0	0
5:45 PM	0	0	2	0	2
TOTAL	0	0	3	0	3
PM BEGIN PEAK HR			4:15 PM		

PEDESTRIAN CROSSINGS

	N SIDE	S SIDE	E SIDE	W SIDE	TOTAL
7:00 AM	0	0	1	0	1
7:15 AM	0	0	0	0	0
7:30 AM	0	0	0	0	0
7:45 AM	0	0	0	0	0
8:00 AM	0	0	0	0	0
8:15 AM	0	0	1	0	1
8:30 AM	0	0	0	0	0
8:45 AM	0	0	1	0	1
TOTAL	0	0	3	0	3
AM BEGIN PEAK HR	0	0	1	0	1
4:00 PM	0	0	0	0	0
4:15 PM	0	0	0	0	0
4:30 PM	0	0	0	0	0
4:45 PM	0	0	1	0	1
5:00 PM	0	0	0	0	0
5:15 PM	0	0	0	0	0
5:30 PM	0	0	0	0	0
5:45 PM	0	0	0	0	0
TOTAL	0	0	1	0	1
PM BEGIN PEAK HR	0	0	1	0	1

BICYCLE CROSSINGS

	NS	SS	ES	WS	TOTAL
7:00 AM	0	0	0	0	0
7:15 AM	0	0	0	0	0
7:30 AM	0	0	0	0	0
7:45 AM	0	0	0	0	0
8:00 AM	0	0	0	0	0
8:15 AM	0	0	0	0	0
8:30 AM	0	0	0	0	0
8:45 AM	0	0	0	0	0
TOTAL	0	0	0	0	0
AM BEGIN PEAK HR					
4:00 PM	0	0	0	0	0
4:15 PM	0	0	0	0	0
4:30 PM	0	0	0	0	0
4:45 PM	0	0	0	0	0
5:00 PM	0	0	0	0	0
5:15 PM	0	0	0	0	0
5:30 PM	0	0	0	0	0
5:45 PM	0	0	2	0	2
TOTAL	0	0	2	0	2

AimTD LLC

TURNING MOVEMENT COUNTS

Lake Elsinore

SC2709

ALL HOURS

Central/SH-74 (north leg)

	Approach total				Departing
TOTAL	**3,997**	**0**	**3,902**	**95**	**4,624**
PM	**2,115**	0	2,041	74	3,383
AM	**1,882**	0	1,861	21	1,241

Rosetta Canyon (west leg)

	TOTAL	PM	AM
Departing	**0**	0	0
	0	0	0
	0	0	0
	0	0	0
Approach total	**0**	**0**	**0**

Rosetta Canyon (east leg)

	AM	PM	TOTAL
Approach total	**247**	**223**	**470**
	43	44	**87**
	0	0	**0**
	204	179	**383**
Departing	103	373	**476**

Central/SH-74 (south leg)

	Departing				Approach total
AM	2,065	0	1,197	83	**1,280**
PM	2,220	0	3,337	301	**3,638**
TOTAL	**4,285**	**0**	**4,534**	**384**	**4,918**

PEAK HOUR

AM 7:00 AM

PM 4:15 PM

Central/SH-74 (north leg)

	Approach total				Departing
TOTAL	**2,127**	**0**	**2,083**	**44**	**2,326**
PM	**1,100**	0	1,070	30	1,688
AM	**1,027**	0	1,013	14	638

Rosetta Canyon (west leg)

	TOTAL	PM	AM
Departing	**0**	0	0
	0	0	0
	0	0	0
	0	0	0
Approach total	**0**	**0**	**0**

Rosetta Canyon (east leg)

	AM	PM	TOTAL
Approach total	**117**	**112**	**229**
	23	21	**44**
	0	0	**0**
	94	91	**185**
Departing	50	185	**235**

Central/SH-74 (south leg)

	Departing				Approach total
AM	1,107	0	614	37	**651**
PM	1,161	0	1,666	156	**1,822**
Total	**2,268**	**0**	**2,280**	**193**	**2,473**

Appendix B - Developed 2020 Volumes

Intersection	Project Source	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	AM Adj	PM Adj
Central Ave/Cambern Ave	Chick-fil-A TIA	115	1017	0	2	1600	92	126	3	80	1	0	1	257	1722	3	4	1101	153	240	3	93	0	3	3	4%	3%
Central Ave/Cambern Ave	Central Plaza TIA	113	987	0	0	1486	114	144	2	78	0	2	0	287	1663	6	1	999	159	252	2	110	4	1	1		
Central Ave/Rosseta Canyon Drive		0	909	299	174	1179	0	0	0	0	315	0	118	0	1547	207	35	949	0	0	0	0	315	0	118		
Central Ave/Rosseta Canyon Drive	Applied growth of 4% AM/3% PM	0	943	310	181	1224	0	0	0	0	327	0	122	0	1590	213	36	975	0	0	0	0	324	0	121	73%	7%
Central Ave/Rosseta Canyon Drive	Central Ave Retail Count	0	614	37	14	1013	0	0	0	0	94	0	23	0	1666	156	30	1070	0	0	0	0	91	0	21		

Intersection	Intersection Name	Scenario	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
1	SH-74/Central Avenue and Conard Avenue	Existing 2020 Counts	5	653	18	0	1115	23	9	1	15	55	0	4	16	1897	52	4	1199	23	35	2	24	56	2	7
2	SH-74/Central Avenue and Allan Street		0	662	1	2	1160	0	0	0	0	1	0	2	0	1921	3	5	1198	0	0	0	0	0	0	3
3	SH-74/Central Avenue and Ardenwood Way/Project Driveway		4	644	23	2	1086	0	0	0	0	65	0	15	0	1809	114	15	1142	0	0	0	5	58	0	15
4	SH-74/Central Avenue and Rosetta Canyon Drive		0	614	37	14	1013	0	0	0	0	94	0	23	0	1666	156	30	1070	0	0	0	0	91	0	21
1	SH-74/Central Avenue and Conard Avenue	Existing 2020 (Applied growth of 73% AM/7% PM)	9	1131	31	0	1930	40	16	2	26	95	0	7	17	2038	56	4	1288	25	38	2	26	60	2	8
2	SH-74/Central Avenue and Allan Street		0	1146	2	3	2008	0	0	0	0	2	0	3	0	2064	3	5	1287	0	0	0	0	0	0	3
3	SH-74/Central Avenue and Ardenwood Way/Project Driveway		7	1115	40	3	1880	0	0	0	0	113	0	26	0	1943	122	16	1227	0	0	0	5	62	0	16
4	SH-74/Central Avenue and Rosetta Canyon Drive		0	1063	64	24	1754	0	0	0	0	163	0	40	0	1790	168	32	1149	0	0	0	0	98	0	23

APPENDIX C -

EXISTING CONDITIONS PEAK HOUR INTERSECTION ANALYSIS WORKSHEETS

APPENDIX C -

EXISTING CONDITIONS PEAK HOUR INTERSECTION ANALYSIS WORKSHEETS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	16	2	26	95	0	7	9	1131	31	0	1930	40
Future Volume (veh/h)	16	2	26	95	0	7	9	1131	31	0	1930	40
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	17	2	27	99	0	7	9	1178	32	0	2010	42
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	106	28	89	0	0	152	29	2634	72	3	2339	49
Arrive On Green	0.10	0.10	0.10	0.00	0.00	0.10	0.02	0.75	0.75	0.00	0.66	0.66
Sat Flow, veh/h	365	289	929	0	0	1585	1781	3534	96	1781	3560	74
Grp Volume(v), veh/h	46	0	0	0	0	7	9	592	618	0	1000	1052
Grp Sat Flow(s),veh/h/ln	1583	0	0	0	0	1585	1781	1777	1853	1781	1777	1857
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.3	0.3	8.8	8.8	0.0	30.5	31.0
Cycle Q Clear(g_c), s	1.7	0.0	0.0	0.0	0.0	0.3	0.3	8.8	8.8	0.0	30.5	31.0
Prop In Lane	0.37		0.59	0.00		1.00	1.00		0.05	1.00		0.04
Lane Grp Cap(c), veh/h	223	0	0	0	0	152	29	1324	1381	3	1167	1220
V/C Ratio(X)	0.21	0.00	0.00	0.00	0.00	0.05	0.31	0.45	0.45	0.00	0.86	0.86
Avail Cap(c_a), veh/h	606	0	0	0	0	1077	180	1324	1381	180	1284	1342
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	29.1	0.0	0.0	0.0	0.0	28.4	33.7	3.4	3.4	0.0	9.3	9.4
Incr Delay (d2), s/veh	0.5	0.0	0.0	0.0	0.0	0.1	6.1	0.2	0.2	0.0	5.5	5.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	0.0	0.0	0.0	0.1	0.2	0.9	0.9	0.0	7.7	8.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	29.5	0.0	0.0	0.0	0.0	28.5	39.8	3.6	3.6	0.0	14.8	15.0
LnGrp LOS	C	A	A	A	A	C	D	A	A	A	B	B
Approach Vol, veh/h		46			7			1219			2052	
Approach Delay, s/veh		29.5			28.5			3.9			14.9	
Approach LOS		C			C			A			B	

Timer - Assigned Phs		2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s		11.6	0.0	57.6	0.0	11.6	6.1	51.5
Change Period (Y+Rc), s		5.0	5.0	6.0	5.0	5.0	5.0	6.0
Max Green Setting (Gmax), s		47.0	7.0	50.0	18.0	24.0	7.0	50.0
Max Q Clear Time (g_c+I1), s		2.3	0.0	10.8	0.0	3.7	2.3	33.0
Green Ext Time (p_c), s		0.0	0.0	8.4	0.0	0.2	0.0	12.4

Intersection Summary	
HCM 6th Ctrl Delay	11.1
HCM 6th LOS	B

Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	2	3	1146	2	3	2008
Future Vol, veh/h	2	3	1146	2	3	2008
Conflicting Peds, #/hr	0	0	0	2	2	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	50	-	-	250	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	3	1219	2	3	2136

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	2296	613	0	0	1223	0
Stage 1	1222	-	-	-	-	-
Stage 2	1074	-	-	-	-	-
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	33	435	-	-	566	-
Stage 1	241	-	-	-	-	-
Stage 2	289	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	33	434	-	-	565	-
Mov Cap-2 Maneuver	135	-	-	-	-	-
Stage 1	241	-	-	-	-	-
Stage 2	288	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	20.9	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	135	434	565	-
HCM Lane V/C Ratio	-	-	0.016	0.007	0.006	-
HCM Control Delay (s)	-	-	32.1	13.4	11.4	-
HCM Lane LOS	-	-	D	B	B	-
HCM 95th %tile Q(veh)	-	-	0	0	0	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	113	0	26	7	1115	40	3	1880	0
Future Volume (veh/h)	0	0	0	113	0	26	7	1115	40	3	1880	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	0	0	0	122	0	28	8	1199	43	3	2022	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	0	175	0	259	0	149	25	3526	126	10	2446	0
Arrive On Green	0.00	0.00	0.00	0.09	0.00	0.09	0.01	0.70	0.70	0.01	0.69	0.00
Sat Flow, veh/h	0	1870	0	1781	0	1585	1781	5060	181	1781	3647	0
Grp Volume(v), veh/h	0	0	0	122	0	28	8	806	436	3	2022	0
Grp Sat Flow(s),veh/h/ln	0	1870	0	1781	0	1585	1781	1702	1838	1781	1777	0
Q Serve(g_s), s	0.0	0.0	0.0	5.2	0.0	1.3	0.3	7.4	7.4	0.1	32.3	0.0
Cycle Q Clear(g_c), s	0.0	0.0	0.0	5.2	0.0	1.3	0.3	7.4	7.4	0.1	32.3	0.0
Prop In Lane	0.00		0.00	1.00		1.00	1.00		0.10	1.00		0.00
Lane Grp Cap(c), veh/h	0	175	0	259	0	149	25	2372	1281	10	2446	0
V/C Ratio(X)	0.00	0.00	0.00	0.47	0.00	0.19	0.31	0.34	0.34	0.30	0.83	0.00
Avail Cap(c_a), veh/h	0	714	0	772	0	605	159	2903	1567	159	3031	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	0.0	34.6	0.0	32.8	38.3	4.7	4.7	38.9	8.9	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	1.3	0.0	0.6	6.9	0.1	0.2	15.7	1.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.0	2.3	0.0	0.5	0.2	1.4	1.5	0.1	7.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.0	0.0	36.0	0.0	33.4	45.2	4.8	4.9	54.6	10.5	0.0
LnGrp LOS	A	A	A	D	A	C	D	A	A	D	B	A
Approach Vol, veh/h		0			150			1250			2025	
Approach Delay, s/veh		0.0			35.5			5.1			10.6	
Approach LOS					D			A			B	
Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		12.4	5.4	60.7		12.4	6.1	60.1				
Change Period (Y+Rc), s		5.0	5.0	6.0		5.0	5.0	6.0				
Max Green Setting (Gmax), s		30.0	7.0	67.0		30.0	7.0	67.0				
Max Q Clear Time (g_c+I1), s		7.2	2.1	9.4		0.0	2.3	34.3				
Green Ext Time (p_c), s		0.4	0.0	9.1		0.0	0.0	19.7				
Intersection Summary												
HCM 6th Ctrl Delay			9.7									
HCM 6th LOS			A									

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	163	40	1063	64	24	1754
Future Volume (veh/h)	163	40	1063	64	24	1754
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	173	43	1131	68	26	1866
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	232	207	2871	173	72	2489
Arrive On Green	0.13	0.13	0.58	0.58	0.04	0.70
Sat Flow, veh/h	1781	1585	5093	296	1781	3647
Grp Volume(v), veh/h	173	43	782	417	26	1866
Grp Sat Flow(s),veh/h/ln	1781	1585	1702	1817	1781	1777
Q Serve(g_s), s	6.1	1.6	8.1	8.1	0.9	21.5
Cycle Q Clear(g_c), s	6.1	1.6	8.1	8.1	0.9	21.5
Prop In Lane	1.00	1.00		0.16	1.00	
Lane Grp Cap(c), veh/h	232	207	1985	1059	72	2489
V/C Ratio(X)	0.74	0.21	0.39	0.39	0.36	0.75
Avail Cap(c_a), veh/h	850	756	3457	1845	192	4265
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	27.2	25.3	7.3	7.3	30.4	6.1
Incr Delay (d2), s/veh	4.7	0.5	0.1	0.2	3.0	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.7	0.5	1.8	2.0	0.4	2.9
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	31.9	25.7	7.5	7.6	33.4	6.6
LnGrp LOS	C	C	A	A	C	A
Approach Vol, veh/h	216		1199			1892
Approach Delay, s/veh	30.7		7.5			7.0
Approach LOS	C		A			A

Timer - Assigned Phs	1	2	3	4	5	6	7	8
		2	3	4				8
Phs Duration (G+Y+Rc), s		13.5	7.6	43.9				51.5
Change Period (Y+Rc), s		5.0	5.0	6.0				6.0
Max Green Setting (Gmax), s		31.0	7.0	66.0				78.0
Max Q Clear Time (g_c+I1), s		8.1	2.9	10.1				23.5
Green Ext Time (p_c), s		0.6	0.0	8.7				22.0

Intersection Summary	
HCM 6th Ctrl Delay	8.7
HCM 6th LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	38	2	26	60	2	8	17	2038	56	4	1288	25
Future Volume (veh/h)	38	2	26	60	2	8	17	2038	56	4	1288	25
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	39	2	27	62	2	8	18	2101	58	4	1328	26
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	145	21	56	0	30	122	53	2373	65	13	2318	45
Arrive On Green	0.09	0.09	0.09	0.00	0.09	0.09	0.03	0.67	0.67	0.01	0.65	0.65
Sat Flow, veh/h	698	224	607	0	327	1308	1781	3530	97	1781	3565	70
Grp Volume(v), veh/h	68	0	0	0	0	10	18	1052	1107	4	662	692
Grp Sat Flow(s),veh/h/ln	1530	0	0	0	0	1635	1781	1777	1850	1781	1777	1858
Q Serve(g_s), s	1.7	0.0	0.0	0.0	0.0	0.4	0.7	33.5	34.4	0.2	14.6	14.6
Cycle Q Clear(g_c), s	2.9	0.0	0.0	0.0	0.0	0.4	0.7	33.5	34.4	0.2	14.6	14.6
Prop In Lane	0.57		0.40	0.00		0.80	1.00		0.05	1.00		0.04
Lane Grp Cap(c), veh/h	223	0	0	0	0	152	53	1194	1244	13	1155	1208
V/C Ratio(X)	0.31	0.00	0.00	0.00	0.00	0.07	0.34	0.88	0.89	0.30	0.57	0.57
Avail Cap(c_a), veh/h	590	0	0	0	0	1092	177	1262	1314	177	1262	1319
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.2	0.0	0.0	0.0	0.0	29.1	33.5	9.3	9.4	34.7	6.9	6.9
Incr Delay (d2), s/veh	0.8	0.0	0.0	0.0	0.0	0.2	3.8	7.2	7.7	12.1	0.5	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	0.0	0.0	0.0	0.0	0.2	0.3	8.6	9.3	0.1	3.2	3.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	31.0	0.0	0.0	0.0	0.0	29.3	37.3	16.5	17.1	46.8	7.4	7.4
LnGrp LOS	C	A	A	A	A	C	D	B	B	D	A	A
Approach Vol, veh/h		68			10			2177			1358	
Approach Delay, s/veh		31.0			29.3			17.0			7.5	
Approach LOS		C			C			B			A	

Timer - Assigned Phs	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.5	5.5	53.3	0.0	11.5	7.1	51.8
Change Period (Y+Rc), s	5.0	5.0	6.0	5.0	5.0	5.0	6.0
Max Green Setting (Gmax), s	47.0	7.0	50.0	18.0	24.0	7.0	50.0
Max Q Clear Time (g_c+I1), s	2.4	2.2	36.4	0.0	4.9	2.7	16.6
Green Ext Time (p_c), s	0.0	0.0	10.9	0.0	0.3	0.0	9.7

Intersection Summary	
HCM 6th Ctrl Delay	13.7
HCM 6th LOS	B

Intersection	
Int Delay, s/veh	0.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	3	2064	3	5	1287
Future Vol, veh/h	0	3	2064	3	5	1287
Conflicting Peds, #/hr	0	0	0	4	4	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	50	-	-	250	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	3	2173	3	5	1355

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	2867	1092	0	0	2180	0
Stage 1	2179	-	-	-	-	-
Stage 2	688	-	-	-	-	-
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	13	210	-	-	240	-
Stage 1	72	-	-	-	-	-
Stage 2	460	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	13	209	-	-	239	-
Mov Cap-2 Maneuver	59	-	-	-	-	-
Stage 1	72	-	-	-	-	-
Stage 2	450	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	22.5	0	0.1
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	-	209	239	-
HCM Lane V/C Ratio	-	-	-	0.015	0.022	-
HCM Control Delay (s)	-	-	0	22.5	20.4	-
HCM Lane LOS	-	-	A	C	C	-
HCM 95th %tile Q(veh)	-	-	-	0	0.1	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	5	62	0	16	0	1943	122	16	1227	0
Future Volume (veh/h)	0	0	5	62	0	16	0	1943	122	16	1227	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	0	0	5	65	0	17	0	2045	128	17	1292	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	0	0	135	227	0	135	3	3145	196	51	2649	0
Arrive On Green	0.00	0.00	0.09	0.09	0.00	0.09	0.00	0.64	0.64	0.03	0.75	0.00
Sat Flow, veh/h	0	0	1585	1411	0	1585	1781	4913	306	1781	3647	0
Grp Volume(v), veh/h	0	0	5	65	0	17	0	1414	759	17	1292	0
Grp Sat Flow(s),veh/h/ln	0	0	1585	1411	0	1585	1781	1702	1815	1781	1777	0
Q Serve(g_s), s	0.0	0.0	0.2	2.9	0.0	0.6	0.0	16.6	16.8	0.6	9.5	0.0
Cycle Q Clear(g_c), s	0.0	0.0	0.2	3.1	0.0	0.6	0.0	16.6	16.8	0.6	9.5	0.0
Prop In Lane	0.00		1.00	1.00		1.00	1.00		0.17	1.00		0.00
Lane Grp Cap(c), veh/h	0	0	135	227	0	135	3	2179	1162	51	2649	0
V/C Ratio(X)	0.00	0.00	0.04	0.29	0.00	0.13	0.00	0.65	0.65	0.34	0.49	0.00
Avail Cap(c_a), veh/h	0	0	780	801	0	780	192	3403	1814	192	3552	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	27.3	28.7	0.0	27.5	0.0	7.2	7.2	31.0	3.3	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.1	0.7	0.0	0.4	0.0	0.3	0.6	3.8	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.1	1.0	0.0	0.2	0.0	3.1	3.4	0.3	0.6	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.0	27.4	29.4	0.0	27.9	0.0	7.5	7.9	34.8	3.4	0.0
LnGrp LOS	A	A	C	C	A	C	A	A	A	C	A	A
Approach Vol, veh/h		5			82			2173			1309	
Approach Delay, s/veh		27.4			29.1			7.6			3.9	
Approach LOS		C			C			A			A	

Timer - Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		10.5	6.9	47.6		10.5	0.0	54.5
Change Period (Y+Rc), s		5.0	5.0	6.0		5.0	5.0	6.0
Max Green Setting (Gmax), s		32.0	7.0	65.0		32.0	7.0	65.0
Max Q Clear Time (g_c+I1), s		5.1	2.6	18.8		2.2	0.0	11.5
Green Ext Time (p_c), s		0.2	0.0	22.8		0.0	0.0	11.1

Intersection Summary	
HCM 6th Ctrl Delay	6.8
HCM 6th LOS	A

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	98	23	1790	168	32	1149
Future Volume (veh/h)	98	23	1790	168	32	1149
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	103	24	1884	177	34	1209
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	173	154	2885	270	88	2607
Arrive On Green	0.10	0.10	0.61	0.61	0.05	0.73
Sat Flow, veh/h	1781	1585	4918	444	1781	3647
Grp Volume(v), veh/h	103	24	1347	714	34	1209
Grp Sat Flow(s),veh/h/ln	1781	1585	1702	1790	1781	1777
Q Serve(g_s), s	3.6	0.9	16.7	16.9	1.2	8.9
Cycle Q Clear(g_c), s	3.6	0.9	16.7	16.9	1.2	8.9
Prop In Lane	1.00	1.00		0.25	1.00	
Lane Grp Cap(c), veh/h	173	154	2067	1087	88	2607
V/C Ratio(X)	0.60	0.16	0.65	0.66	0.39	0.46
Avail Cap(c_a), veh/h	933	830	3303	1737	192	4105
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.1	26.9	8.3	8.3	29.9	3.5
Incr Delay (d2), s/veh	3.3	0.5	0.4	0.7	2.8	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	0.3	3.5	3.9	0.5	0.8
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	31.4	27.4	8.6	9.0	32.7	3.6
LnGrp LOS	C	C	A	A	C	A
Approach Vol, veh/h	127		2061			1243
Approach Delay, s/veh	30.6		8.8			4.4
Approach LOS	C		A			A

Timer - Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		11.3	8.2	45.4				53.6
Change Period (Y+Rc), s		5.0	5.0	6.0				6.0
Max Green Setting (Gmax), s		34.0	7.0	63.0				75.0
Max Q Clear Time (g_c+I1), s		5.6	3.2	18.9				10.9
Green Ext Time (p_c), s		0.3	0.0	20.5				10.1

Intersection Summary		
HCM 6th Ctrl Delay		8.0
HCM 6th LOS		A

APPENDIX D -

EXISTING PLUS PROJECT CONDITIONS PEAK HOUR INTERSECTION ANALYSIS WORKSHEETS

APPENDIX D -

EXISTING PLUS PROJECT CONDITIONS PEAK HOUR INTERSECTION ANALYSIS WORKSHEETS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	22	2	26	95	0	9	9	1147	31	2	1946	46
Future Volume (veh/h)	22	2	26	95	0	9	9	1147	31	2	1946	46
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	23	2	27	99	0	9	9	1195	32	2	2027	48
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	119	27	78	0	0	152	29	2373	64	7	2339	55
Arrive On Green	0.10	0.10	0.10	0.00	0.00	0.10	0.02	0.67	0.67	0.00	0.66	0.66
Sat Flow, veh/h	469	285	815	0	0	1585	1781	3535	95	1781	3548	84
Grp Volume(v), veh/h	52	0	0	0	0	9	9	600	627	2	1011	1064
Grp Sat Flow(s),veh/h/ln	1569	0	0	0	0	1585	1781	1777	1853	1781	1777	1855
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.4	0.3	11.7	11.7	0.1	31.4	32.0
Cycle Q Clear(g_c), s	2.0	0.0	0.0	0.0	0.0	0.4	0.3	11.7	11.7	0.1	31.4	32.0
Prop In Lane	0.44		0.52	0.00		1.00	1.00		0.05	1.00		0.05
Lane Grp Cap(c), veh/h	225	0	0	0	0	152	29	1193	1244	7	1171	1223
V/C Ratio(X)	0.23	0.00	0.00	0.00	0.00	0.06	0.31	0.50	0.50	0.29	0.86	0.87
Avail Cap(c_a), veh/h	599	0	0	0	0	1067	179	1272	1327	179	1272	1328
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	29.4	0.0	0.0	0.0	0.0	28.7	34.0	5.7	5.7	34.7	9.4	9.5
Incr Delay (d2), s/veh	0.5	0.0	0.0	0.0	0.0	0.2	6.1	0.3	0.3	22.3	6.0	6.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.0	0.0	0.0	0.0	0.1	0.2	2.2	2.3	0.1	8.1	8.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	30.0	0.0	0.0	0.0	0.0	28.9	40.1	6.0	6.0	57.0	15.4	15.7
LnGrp LOS	C	A	A	A	A	C	D	A	A	E	B	B
Approach Vol, veh/h		52			9			1236			2077	
Approach Delay, s/veh		30.0			28.9			6.3			15.6	
Approach LOS		C			C			A			B	
Timer - Assigned Phs		2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s		11.7	5.3	52.9	0.0	11.7	6.1	52.0				
Change Period (Y+Rc), s		5.0	5.0	6.0	5.0	5.0	5.0	6.0				
Max Green Setting (Gmax), s		47.0	7.0	50.0	18.0	24.0	7.0	50.0				
Max Q Clear Time (g_c+I1), s		2.4	2.1	13.7	0.0	4.0	2.3	34.0				
Green Ext Time (p_c), s		0.0	0.0	8.4	0.0	0.2	0.0	12.0				
Intersection Summary												
HCM 6th Ctrl Delay			12.4									
HCM 6th LOS			B									

Intersection						
Int Delay, s/veh	0					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	↑↱		↰	↑↑
Traffic Vol, veh/h	2	4	1170	2	4	2032
Future Vol, veh/h	2	4	1170	2	4	2032
Conflicting Peds, #/hr	0	0	0	2	2	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	50	-	-	250	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	4	1245	2	4	2162

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	2337	626	0	0	1249	0
Stage 1	1248	-	-	-	-	-
Stage 2	1089	-	-	-	-	-
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	31	427	-	-	553	-
Stage 1	234	-	-	-	-	-
Stage 2	284	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	31	426	-	-	552	-
Mov Cap-2 Maneuver	131	-	-	-	-	-
Stage 1	234	-	-	-	-	-
Stage 2	282	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	20	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	131	426	552	-
HCM Lane V/C Ratio	-	-	0.016	0.01	0.008	-
HCM Control Delay (s)	-	-	32.9	13.5	11.6	-
HCM Lane LOS	-	-	D	B	B	-
HCM 95th %tile Q(veh)	-	-	0	0	0	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	32	6	26	113	6	26	33	1115	40	3	1880	32
Future Volume (veh/h)	32	6	26	113	6	26	33	1115	40	3	1880	32
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	34	6	28	122	6	28	35	1199	43	3	2022	34
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	123	33	65	241	30	138	82	3571	128	10	2379	40
Arrive On Green	0.10	0.10	0.10	0.10	0.10	0.10	0.05	0.71	0.71	0.01	0.67	0.67
Sat Flow, veh/h	585	324	636	1375	287	1341	1781	5060	181	1781	3576	60
Grp Volume(v), veh/h	68	0	0	122	0	34	35	806	436	3	1002	1054
Grp Sat Flow(s),veh/h/ln	1545	0	0	1375	0	1629	1781	1702	1838	1781	1777	1860
Q Serve(g_s), s	1.4	0.0	0.0	3.1	0.0	1.6	1.6	7.9	7.9	0.1	37.2	37.8
Cycle Q Clear(g_c), s	3.4	0.0	0.0	6.4	0.0	1.6	1.6	7.9	7.9	0.1	37.2	37.8
Prop In Lane	0.50		0.41	1.00		0.82	1.00		0.10	1.00		0.03
Lane Grp Cap(c), veh/h	222	0	0	241	0	168	82	2402	1297	10	1182	1237
V/C Ratio(X)	0.31	0.00	0.00	0.51	0.00	0.20	0.43	0.34	0.34	0.30	0.85	0.85
Avail Cap(c_a), veh/h	588	0	0	578	0	568	145	2649	1430	145	1383	1447
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	36.1	0.0	0.0	37.3	0.0	35.4	40.0	4.9	4.9	42.6	11.1	11.1
Incr Delay (d2), s/veh	0.8	0.0	0.0	1.6	0.0	0.6	3.5	0.1	0.2	15.8	4.5	4.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	0.0	0.0	2.5	0.0	0.7	0.8	1.6	1.8	0.1	10.7	11.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	36.9	0.0	0.0	39.0	0.0	36.0	43.4	5.0	5.0	58.4	15.6	15.7
LnGrp LOS	D	A	A	D	A	D	D	A	A	E	B	B
Approach Vol, veh/h		68			156			1277			2059	
Approach Delay, s/veh		36.9			38.3			6.0			15.7	
Approach LOS		D			D			A			B	
Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		13.9	5.5	66.8		13.9	9.0	63.3				
Change Period (Y+Rc), s		5.0	5.0	6.0		5.0	5.0	6.0				
Max Green Setting (Gmax), s		30.0	7.0	67.0		30.0	7.0	67.0				
Max Q Clear Time (g_c+I1), s		8.4	2.1	9.9		5.4	3.6	39.8				
Green Ext Time (p_c), s		0.5	0.0	9.1		0.3	0.0	17.5				
Intersection Summary												
HCM 6th Ctrl Delay			13.6									
HCM 6th LOS			B									

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	173	40	1085	74	24	1776
Future Volume (veh/h)	173	40	1085	74	24	1776
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	184	43	1154	79	26	1889
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	243	216	2861	196	71	2490
Arrive On Green	0.14	0.14	0.59	0.59	0.04	0.70
Sat Flow, veh/h	1781	1585	5048	334	1781	3647
Grp Volume(v), veh/h	184	43	805	428	26	1889
Grp Sat Flow(s),veh/h/ln	1781	1585	1702	1810	1781	1777
Q Serve(g_s), s	6.7	1.6	8.6	8.6	1.0	22.9
Cycle Q Clear(g_c), s	6.7	1.6	8.6	8.6	1.0	22.9
Prop In Lane	1.00	1.00		0.18	1.00	
Lane Grp Cap(c), veh/h	243	216	1996	1061	71	2490
V/C Ratio(X)	0.76	0.20	0.40	0.40	0.36	0.76
Avail Cap(c_a), veh/h	820	729	3334	1773	185	4114
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.0	25.8	7.6	7.6	31.5	6.4
Incr Delay (d2), s/veh	4.8	0.4	0.1	0.2	3.1	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.0	0.6	2.0	2.2	0.4	3.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	32.9	26.3	7.7	7.8	34.6	6.9
LnGrp LOS	C	C	A	A	C	A
Approach Vol, veh/h	227		1233			1915
Approach Delay, s/veh	31.6		7.7			7.3
Approach LOS	C		A			A

Timer - Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		14.2	7.7	45.5				53.2
Change Period (Y+Rc), s		5.0	5.0	6.0				6.0
Max Green Setting (Gmax), s		31.0	7.0	66.0				78.0
Max Q Clear Time (g_c+I1), s		8.7	3.0	10.6				24.9
Green Ext Time (p_c), s		0.6	0.0	9.1				22.3

Intersection Summary		
HCM 6th Ctrl Delay		9.1
HCM 6th LOS		A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	44	2	26	60	2	10	17	2053	56	6	1303	31
Future Volume (veh/h)	44	2	26	60	2	10	17	2053	56	6	1303	31
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	45	2	27	62	2	10	18	2116	58	6	1343	32
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	153	19	52	0	25	126	52	2369	65	20	2314	55
Arrive On Green	0.09	0.09	0.09	0.00	0.09	0.09	0.03	0.67	0.67	0.01	0.65	0.65
Sat Flow, veh/h	764	199	553	0	271	1355	1781	3531	96	1781	3547	84
Grp Volume(v), veh/h	74	0	0	0	0	12	18	1059	1115	6	672	703
Grp Sat Flow(s),veh/h/ln	1516	0	0	0	0	1626	1781	1777	1850	1781	1777	1855
Q Serve(g_s), s	2.2	0.0	0.0	0.0	0.0	0.5	0.7	34.5	35.5	0.2	15.0	15.1
Cycle Q Clear(g_c), s	3.2	0.0	0.0	0.0	0.0	0.5	0.7	34.5	35.5	0.2	15.0	15.1
Prop In Lane	0.61		0.36	0.00		0.83	1.00		0.05	1.00		0.05
Lane Grp Cap(c), veh/h	223	0	0	0	0	151	52	1192	1241	20	1159	1210
V/C Ratio(X)	0.33	0.00	0.00	0.00	0.00	0.08	0.34	0.89	0.90	0.31	0.58	0.58
Avail Cap(c_a), veh/h	583	0	0	0	0	1075	175	1249	1301	175	1249	1304
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.6	0.0	0.0	0.0	0.0	29.5	33.8	9.5	9.7	34.9	6.9	6.9
Incr Delay (d2), s/veh	0.9	0.0	0.0	0.0	0.0	0.2	3.8	7.9	8.4	8.5	0.6	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	0.0	0.0	0.0	0.0	0.2	0.3	9.2	9.9	0.1	3.3	3.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	31.5	0.0	0.0	0.0	0.0	29.7	37.7	17.4	18.1	43.4	7.5	7.5
LnGrp LOS	C	A	A	A	A	C	D	B	B	D	A	A
Approach Vol, veh/h		74			12			2192			1381	
Approach Delay, s/veh		31.5			29.7			17.9			7.6	
Approach LOS		C			C			B			A	

Timer - Assigned Phs	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.6	5.8	53.7	0.0	11.6	7.1	52.4
Change Period (Y+Rc), s	5.0	5.0	6.0	5.0	5.0	5.0	6.0
Max Green Setting (Gmax), s	47.0	7.0	50.0	18.0	24.0	7.0	50.0
Max Q Clear Time (g_c+I1), s	2.5	2.2	37.5	0.0	5.2	2.7	17.1
Green Ext Time (p_c), s	0.0	0.0	10.2	0.0	0.3	0.0	9.9

Intersection Summary	
HCM 6th Ctrl Delay	14.4
HCM 6th LOS	B

Intersection	
Int Delay, s/veh	0.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	4	2087	3	6	1310
Future Vol, veh/h	0	4	2087	3	6	1310
Conflicting Peds, #/hr	0	0	0	4	4	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	50	-	-	250	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	4	2197	3	6	1379

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	2905	1104	0	0	2204	0
Stage 1	2203	-	-	-	-	-
Stage 2	702	-	-	-	-	-
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	12	206	-	-	235	-
Stage 1	70	-	-	-	-	-
Stage 2	453	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	12	205	-	-	234	-
Mov Cap-2 Maneuver	58	-	-	-	-	-
Stage 1	70	-	-	-	-	-
Stage 2	441	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	22.9	0	0.1
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	-	205	234	-
HCM Lane V/C Ratio	-	-	-	0.021	0.027	-
HCM Control Delay (s)	-	-	0	22.9	20.8	-
HCM Lane LOS	-	-	A	C	C	-
HCM 95th %tile Q(veh)	-	-	-	0.1	0.1	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	31	6	29	62	6	16	24	1943	122	16	1227	31
Future Volume (veh/h)	31	6	29	62	6	16	24	1943	122	16	1227	31
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	33	6	31	65	6	17	25	2045	128	17	1292	33
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	134	32	68	260	43	121	69	3109	194	51	2203	56
Arrive On Green	0.10	0.10	0.10	0.10	0.10	0.10	0.04	0.63	0.63	0.03	0.62	0.62
Sat Flow, veh/h	546	321	689	1371	431	1220	1781	4913	306	1781	3540	90
Grp Volume(v), veh/h	70	0	0	65	0	23	25	1414	759	17	648	677
Grp Sat Flow(s),veh/h/ln	1557	0	0	1371	0	1651	1781	1702	1815	1781	1777	1854
Q Serve(g_s), s	1.2	0.0	0.0	0.0	0.0	0.8	0.9	17.4	17.6	0.6	14.5	14.5
Cycle Q Clear(g_c), s	2.7	0.0	0.0	2.3	0.0	0.8	0.9	17.4	17.6	0.6	14.5	14.5
Prop In Lane	0.47		0.44	1.00		0.74	1.00		0.17	1.00		0.05
Lane Grp Cap(c), veh/h	234	0	0	260	0	164	69	2154	1148	51	1106	1154
V/C Ratio(X)	0.30	0.00	0.00	0.25	0.00	0.14	0.36	0.66	0.66	0.34	0.59	0.59
Avail Cap(c_a), veh/h	805	0	0	781	0	791	187	3314	1767	187	1730	1805
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.3	0.0	0.0	28.1	0.0	27.5	31.3	7.7	7.7	31.8	7.5	7.5
Incr Delay (d2), s/veh	0.7	0.0	0.0	0.5	0.0	0.4	3.1	0.3	0.7	3.9	0.5	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.0	0.0	1.0	0.0	0.3	0.4	3.5	3.9	0.3	3.2	3.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	29.0	0.0	0.0	28.6	0.0	27.9	34.4	8.0	8.4	35.7	8.0	8.0
LnGrp LOS	C	A	A	C	A	C	C	A	A	D	A	A
Approach Vol, veh/h		70			88			2198			1342	
Approach Delay, s/veh		29.0			28.4			8.5			8.3	
Approach LOS		C			C			A			A	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		11.6	6.9	48.3		11.6	7.6	47.5				
Change Period (Y+Rc), s		5.0	5.0	6.0		5.0	5.0	6.0				
Max Green Setting (Gmax), s		32.0	7.0	65.0		32.0	7.0	65.0				
Max Q Clear Time (g_c+I1), s		4.3	2.6	19.6		4.7	2.9	16.5				
Green Ext Time (p_c), s		0.3	0.0	22.6		0.3	0.0	10.0				

Intersection Summary			
HCM 6th Ctrl Delay			9.3
HCM 6th LOS			A

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	107	23	1811	177	32	1170
Future Volume (veh/h)	107	23	1811	177	32	1170
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	113	24	1906	186	34	1232
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	173	154	2894	281	88	2617
Arrive On Green	0.10	0.10	0.61	0.61	0.05	0.74
Sat Flow, veh/h	1781	1585	4901	459	1781	3647
Grp Volume(v), veh/h	113	24	1368	724	34	1232
Grp Sat Flow(s),veh/h/ln	1781	1585	1702	1787	1781	1777
Q Serve(g_s), s	4.0	0.9	17.3	17.5	1.2	9.3
Cycle Q Clear(g_c), s	4.0	0.9	17.3	17.5	1.2	9.3
Prop In Lane	1.00	1.00		0.26	1.00	
Lane Grp Cap(c), veh/h	173	154	2082	1093	88	2617
V/C Ratio(X)	0.65	0.16	0.66	0.66	0.39	0.47
Avail Cap(c_a), veh/h	916	815	3244	1703	189	4031
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.8	27.3	8.3	8.4	30.5	3.5
Incr Delay (d2), s/veh	4.1	0.5	0.4	0.7	2.8	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	0.3	3.7	4.0	0.5	0.8
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	32.9	27.8	8.7	9.1	33.3	3.7
LnGrp LOS	C	C	A	A	C	A
Approach Vol, veh/h	137		2092			1266
Approach Delay, s/veh	32.0		8.8			4.4
Approach LOS	C		A			A

Timer - Assigned Phs	2	3	4	8
Phs Duration (G+Y+Rc), s	11.4	8.3	46.4	54.7
Change Period (Y+Rc), s	5.0	5.0	6.0	6.0
Max Green Setting (Gmax), s	34.0	7.0	63.0	75.0
Max Q Clear Time (g_c+I1), s	6.0	3.2	19.5	11.3
Green Ext Time (p_c), s	0.4	0.0	20.9	10.4

Intersection Summary	
HCM 6th Ctrl Delay	8.2
HCM 6th LOS	A

APPENDIX E -

EXISTING PLUS AMBIENT PLUS PROJECT PEAK HOUR INTERSECTION ANALYSIS WORKSHEETS

APPENDIX E -

EXISTING PLUS AMBIENT PLUS PROJECT PEAK HOUR INTERSECTION ANALYSIS WORKSHEETS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	23	3	28	99	0	10	10	1193	33	2	2024	48
Future Volume (veh/h)	23	3	28	99	0	10	10	1193	33	2	2024	48
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	24	3	29	103	0	10	10	1243	34	2	2108	50
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	115	28	77	0	0	149	31	2398	66	7	2359	56
Arrive On Green	0.09	0.09	0.09	0.00	0.00	0.09	0.02	0.68	0.68	0.00	0.66	0.66
Sat Flow, veh/h	463	294	813	0	0	1585	1781	3533	97	1781	3548	84
Grp Volume(v), veh/h	56	0	0	0	0	10	10	625	652	2	1051	1107
Grp Sat Flow(s),veh/h/ln	1571	0	0	0	0	1585	1781	1777	1853	1781	1777	1855
Q Serve(g_s), s	0.3	0.0	0.0	0.0	0.0	0.4	0.4	12.5	12.5	0.1	34.8	35.5
Cycle Q Clear(g_c), s	2.2	0.0	0.0	0.0	0.0	0.4	0.4	12.5	12.5	0.1	34.8	35.5
Prop In Lane	0.43		0.52	0.00		1.00	1.00		0.05	1.00		0.05
Lane Grp Cap(c), veh/h	220	0	0	0	0	149	31	1206	1258	7	1181	1234
V/C Ratio(X)	0.25	0.00	0.00	0.00	0.00	0.07	0.32	0.52	0.52	0.29	0.89	0.90
Avail Cap(c_a), veh/h	584	0	0	0	0	1039	174	1239	1292	174	1239	1294
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.4	0.0	0.0	0.0	0.0	29.6	34.8	5.7	5.7	35.6	9.9	10.0
Incr Delay (d2), s/veh	0.6	0.0	0.0	0.0	0.0	0.2	5.7	0.4	0.3	22.3	8.1	8.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.0	0.0	0.0	0.0	0.2	0.2	2.4	2.5	0.1	9.5	10.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	31.0	0.0	0.0	0.0	0.0	29.8	40.5	6.1	6.1	57.9	17.9	18.3
LnGrp LOS	C	A	A	A	A	C	D	A	A	E	B	B
Approach Vol, veh/h		56			10			1287			2160	
Approach Delay, s/veh		31.0			29.8			6.3			18.2	
Approach LOS		C			C			A			B	
Timer - Assigned Phs		2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s		11.8	5.3	54.7	0.0	11.8	6.3	53.7				
Change Period (Y+Rc), s		5.0	5.0	6.0	5.0	5.0	5.0	6.0				
Max Green Setting (Gmax), s		47.0	7.0	50.0	18.0	24.0	7.0	50.0				
Max Q Clear Time (g_c+I1), s		2.4	2.1	14.5	0.0	4.2	2.4	37.5				
Green Ext Time (p_c), s		0.0	0.0	9.0	0.0	0.2	0.0	10.1				
Intersection Summary												
HCM 6th Ctrl Delay			14.1									
HCM 6th LOS			B									

Intersection	
Int Delay, s/veh	0.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	3	5	1217	3	5	2114
Future Vol, veh/h	3	5	1217	3	5	2114
Conflicting Peds, #/hr	0	0	0	2	2	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	50	-	-	250	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	5	1295	3	5	2249

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	2434	651	0	0	1300	0
Stage 1	1299	-	-	-	-	-
Stage 2	1135	-	-	-	-	-
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	26	411	-	-	529	-
Stage 1	220	-	-	-	-	-
Stage 2	269	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	26	410	-	-	528	-
Mov Cap-2 Maneuver	122	-	-	-	-	-
Stage 1	220	-	-	-	-	-
Stage 2	267	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	21.9	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	122	410	528	-
HCM Lane V/C Ratio	-	-	0.026	0.013	0.01	-
HCM Control Delay (s)	-	-	35.3	13.9	11.9	-
HCM Lane LOS	-	-	E	B	B	-
HCM 95th %tile Q(veh)	-	-	0.1	0	0	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	32	6	26	118	6	28	34	1161	42	4	1956	32
Future Volume (veh/h)	32	6	26	118	6	28	34	1161	42	4	1956	32
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	34	6	28	127	6	30	37	1248	45	4	2103	34
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	122	33	67	240	29	143	83	3594	130	13	2401	39
Arrive On Green	0.11	0.11	0.11	0.11	0.11	0.11	0.05	0.71	0.71	0.01	0.67	0.67
Sat Flow, veh/h	595	312	634	1375	271	1355	1781	5059	182	1781	3579	58
Grp Volume(v), veh/h	68	0	0	127	0	36	37	840	453	4	1041	1096
Grp Sat Flow(s),veh/h/ln	1540	0	0	1375	0	1626	1781	1702	1837	1781	1777	1860
Q Serve(g_s), s	1.6	0.0	0.0	3.6	0.0	1.8	1.8	8.6	8.6	0.2	42.2	42.7
Cycle Q Clear(g_c), s	3.5	0.0	0.0	7.1	0.0	1.8	1.8	8.6	8.6	0.2	42.2	42.7
Prop In Lane	0.50		0.41	1.00		0.83	1.00		0.10	1.00		0.03
Lane Grp Cap(c), veh/h	222	0	0	240	0	172	83	2418	1305	13	1192	1248
V/C Ratio(X)	0.31	0.00	0.00	0.53	0.00	0.21	0.44	0.35	0.35	0.30	0.87	0.88
Avail Cap(c_a), veh/h	559	0	0	551	0	539	138	2519	1360	138	1315	1376
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	37.7	0.0	0.0	39.2	0.0	37.0	42.0	5.0	5.0	44.7	11.8	11.9
Incr Delay (d2), s/veh	0.8	0.0	0.0	1.8	0.0	0.6	3.7	0.1	0.2	12.4	6.3	6.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	0.0	0.0	2.8	0.0	0.7	0.8	1.8	2.0	0.1	12.8	13.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	38.5	0.0	0.0	41.0	0.0	37.6	45.7	5.1	5.2	57.1	18.1	18.3
LnGrp LOS	D	A	A	D	A	D	D	A	A	E	B	B
Approach Vol, veh/h		68			163			1330			2141	
Approach Delay, s/veh		38.5			40.2			6.3			18.3	
Approach LOS		D			D			A			B	
Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		14.6	5.7	70.3		14.6	9.2	66.7				
Change Period (Y+Rc), s		5.0	5.0	6.0		5.0	5.0	6.0				
Max Green Setting (Gmax), s		30.0	7.0	67.0		30.0	7.0	67.0				
Max Q Clear Time (g_c+I1), s		9.1	2.2	10.6		5.5	3.8	44.7				
Green Ext Time (p_c), s		0.5	0.0	9.7		0.3	0.0	16.0				
Intersection Summary												
HCM 6th Ctrl Delay			15.3									
HCM 6th LOS			B									

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	180	42	1128	77	25	1847
Future Volume (veh/h)	180	42	1128	77	25	1847
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	191	45	1200	82	27	1965
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	246	219	2935	201	72	2525
Arrive On Green	0.14	0.14	0.60	0.60	0.04	0.71
Sat Flow, veh/h	1781	1585	5049	333	1781	3647
Grp Volume(v), veh/h	191	45	837	445	27	1965
Grp Sat Flow(s),veh/h/ln	1781	1585	1702	1810	1781	1777
Q Serve(g_s), s	7.5	1.8	9.5	9.5	1.1	26.1
Cycle Q Clear(g_c), s	7.5	1.8	9.5	9.5	1.1	26.1
Prop In Lane	1.00	1.00		0.18	1.00	
Lane Grp Cap(c), veh/h	246	219	2047	1089	72	2525
V/C Ratio(X)	0.78	0.21	0.41	0.41	0.37	0.78
Avail Cap(c_a), veh/h	734	653	3133	1666	171	3857
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.3	27.8	7.7	7.7	34.0	6.8
Incr Delay (d2), s/veh	5.2	0.5	0.1	0.2	3.2	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.4	0.6	2.3	2.5	0.5	4.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	35.5	28.3	7.8	7.9	37.2	7.4
LnGrp LOS	D	C	A	A	D	A
Approach Vol, veh/h	236		1282			1992
Approach Delay, s/veh	34.1		7.8			7.8
Approach LOS	C		A			A

Timer - Assigned Phs	2	3	4	8
Phs Duration (G+Y+Rc), s	15.1	7.9	49.8	57.7
Change Period (Y+Rc), s	5.0	5.0	6.0	6.0
Max Green Setting (Gmax), s	30.0	7.0	67.0	79.0
Max Q Clear Time (g_c+I1), s	9.5	3.1	11.5	28.1
Green Ext Time (p_c), s	0.6	0.0	9.6	23.7

Intersection Summary	
HCM 6th Ctrl Delay	9.6
HCM 6th LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	46	3	28	63	3	11	18	2136	59	7	1356	33
Future Volume (veh/h)	46	3	28	63	3	11	18	2136	59	7	1356	33
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	47	3	29	65	3	11	19	2202	61	7	1398	34
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	149	19	51	0	32	119	55	2381	66	23	2328	57
Arrive On Green	0.09	0.09	0.09	0.00	0.09	0.09	0.03	0.67	0.67	0.01	0.66	0.66
Sat Flow, veh/h	758	201	556	0	351	1287	1781	3530	97	1781	3545	86
Grp Volume(v), veh/h	79	0	0	0	0	14	19	1102	1161	7	700	732
Grp Sat Flow(s),veh/h/ln	1515	0	0	0	0	1639	1781	1777	1850	1781	1777	1855
Q Serve(g_s), s	2.6	0.0	0.0	0.0	0.0	0.6	0.8	38.6	39.8	0.3	16.2	16.3
Cycle Q Clear(g_c), s	3.5	0.0	0.0	0.0	0.0	0.6	0.8	38.6	39.8	0.3	16.2	16.3
Prop In Lane	0.59		0.37	0.00		0.79	1.00		0.05	1.00		0.05
Lane Grp Cap(c), veh/h	219	0	0	0	0	151	55	1199	1248	23	1167	1218
V/C Ratio(X)	0.36	0.00	0.00	0.00	0.00	0.09	0.35	0.92	0.93	0.31	0.60	0.60
Avail Cap(c_a), veh/h	571	0	0	0	0	1060	172	1223	1273	172	1223	1276
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	31.5	0.0	0.0	0.0	0.0	30.2	34.5	10.1	10.3	35.5	7.1	7.1
Incr Delay (d2), s/veh	1.0	0.0	0.0	0.0	0.0	0.3	3.7	11.1	11.9	7.5	0.8	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	0.0	0.0	0.0	0.0	0.2	0.4	11.2	12.1	0.2	3.6	3.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	32.5	0.0	0.0	0.0	0.0	30.4	38.2	21.2	22.2	43.1	7.8	7.8
LnGrp LOS	C	A	A	A	A	C	D	C	C	D	A	A
Approach Vol, veh/h		79			14			2282			1439	
Approach Delay, s/veh		32.5			30.4			21.9			8.0	
Approach LOS		C			C			C			A	

Timer - Assigned Phs		2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s		11.7	5.9	55.0	0.0	11.7	7.2	53.7
Change Period (Y+Rc), s		5.0	5.0	6.0	5.0	5.0	5.0	6.0
Max Green Setting (Gmax), s		47.0	7.0	50.0	18.0	24.0	7.0	50.0
Max Q Clear Time (g_c+I1), s		2.6	2.3	41.8	0.0	5.5	2.8	18.3
Green Ext Time (p_c), s		0.0	0.0	7.2	0.0	0.3	0.0	10.5

Intersection Summary	
HCM 6th Ctrl Delay	16.9
HCM 6th LOS	B

Intersection	
Int Delay, s/veh	0.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	5	2171	4	7	1362
Future Vol, veh/h	0	5	2171	4	7	1362
Conflicting Peds, #/hr	0	0	0	4	4	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	50	-	-	250	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	5	2285	4	7	1434

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	3022	1149	0	0	2293	0
Stage 1	2291	-	-	-	-	-
Stage 2	731	-	-	-	-	-
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	10	192	-	-	217	-
Stage 1	62	-	-	-	-	-
Stage 2	437	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	10	191	-	-	216	-
Mov Cap-2 Maneuver	51	-	-	-	-	-
Stage 1	62	-	-	-	-	-
Stage 2	423	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	24.4	0	0.1
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	-	191	216	-
HCM Lane V/C Ratio	-	-	-	0.028	0.034	-
HCM Control Delay (s)	-	-	0	24.4	22.3	-
HCM Lane LOS	-	-	A	C	C	-
HCM 95th %tile Q(veh)	-	-	-	0.1	0.1	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	31	6	30	65	6	17	24	2022	127	17	1277	31
Future Volume (veh/h)	31	6	30	65	6	17	24	2022	127	17	1277	31
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	33	6	32	68	6	18	25	2128	134	18	1344	33
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	128	30	67	252	40	119	69	3166	198	53	2253	55
Arrive On Green	0.10	0.10	0.10	0.10	0.10	0.10	0.04	0.64	0.64	0.03	0.64	0.64
Sat Flow, veh/h	542	312	701	1370	412	1236	1781	4911	307	1781	3545	87
Grp Volume(v), veh/h	71	0	0	68	0	24	25	1471	791	18	673	704
Grp Sat Flow(s),veh/h/ln	1555	0	0	1370	0	1648	1781	1702	1815	1781	1777	1855
Q Serve(g_s), s	1.4	0.0	0.0	0.0	0.0	0.9	1.0	18.8	19.1	0.7	15.5	15.5
Cycle Q Clear(g_c), s	2.9	0.0	0.0	2.5	0.0	0.9	1.0	18.8	19.1	0.7	15.5	15.5
Prop In Lane	0.46		0.45	1.00		0.75	1.00		0.17	1.00		0.05
Lane Grp Cap(c), veh/h	225	0	0	252	0	158	69	2194	1170	53	1129	1179
V/C Ratio(X)	0.32	0.00	0.00	0.27	0.00	0.15	0.36	0.67	0.68	0.34	0.60	0.60
Avail Cap(c_a), veh/h	772	0	0	749	0	757	179	3176	1693	179	1658	1730
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	29.7	0.0	0.0	29.6	0.0	28.9	32.7	7.7	7.8	33.1	7.4	7.5
Incr Delay (d2), s/veh	0.8	0.0	0.0	0.6	0.0	0.4	3.2	0.4	0.7	3.8	0.5	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	0.0	0.0	1.1	0.0	0.4	0.4	3.8	4.2	0.3	3.5	3.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	30.5	0.0	0.0	30.2	0.0	29.3	35.9	8.1	8.5	36.9	8.0	7.9
LnGrp LOS	C	A	A	C	A	C	D	A	A	D	A	A
Approach Vol, veh/h		71			92			2287			1395	
Approach Delay, s/veh		30.5			29.9			8.5			8.3	
Approach LOS		C			C			A			A	
Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		11.7	7.1	50.9		11.7	7.7	50.3				
Change Period (Y+Rc), s		5.0	5.0	6.0		5.0	5.0	6.0				
Max Green Setting (Gmax), s		32.0	7.0	65.0		32.0	7.0	65.0				
Max Q Clear Time (g_c+I1), s		4.5	2.7	21.1		4.9	3.0	17.5				
Green Ext Time (p_c), s		0.3	0.0	23.8		0.3	0.0	10.7				
Intersection Summary												
HCM 6th Ctrl Delay			9.4									
HCM 6th LOS			A									

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	111	24	1884	184	34	1217
Future Volume (veh/h)	111	24	1884	184	34	1217
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	117	25	1983	194	36	1281
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	168	149	2959	287	90	2657
Arrive On Green	0.09	0.09	0.63	0.63	0.05	0.75
Sat Flow, veh/h	1781	1585	4900	459	1781	3647
Grp Volume(v), veh/h	117	25	1422	755	36	1281
Grp Sat Flow(s),veh/h/ln	1781	1585	1702	1787	1781	1777
Q Serve(g_s), s	4.4	1.0	18.7	19.1	1.4	9.9
Cycle Q Clear(g_c), s	4.4	1.0	18.7	19.1	1.4	9.9
Prop In Lane	1.00	1.00		0.26	1.00	
Lane Grp Cap(c), veh/h	168	149	2129	1118	90	2657
V/C Ratio(X)	0.70	0.17	0.67	0.68	0.40	0.48
Avail Cap(c_a), veh/h	819	729	3181	1670	179	3933
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.5	29.0	8.4	8.4	32.0	3.5
Incr Delay (d2), s/veh	5.2	0.5	0.4	0.7	2.9	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.0	0.4	4.0	4.4	0.6	0.9
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	35.7	29.5	8.7	9.2	34.9	3.6
LnGrp LOS	D	C	A	A	C	A
Approach Vol, veh/h	142		2177			1317
Approach Delay, s/veh	34.6		8.9			4.5
Approach LOS	C		A			A

Timer - Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		11.5	8.5	49.5				58.0
Change Period (Y+Rc), s		5.0	5.0	6.0				6.0
Max Green Setting (Gmax), s		32.0	7.0	65.0				77.0
Max Q Clear Time (g_c+I1), s		6.4	3.4	21.1				11.9
Green Ext Time (p_c), s		0.4	0.0	22.5				11.1

Intersection Summary		
HCM 6th Ctrl Delay		8.3
HCM 6th LOS		A

Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	5	1217	3	0	2119
Future Vol, veh/h	0	5	1217	3	0	2119
Conflicting Peds, #/hr	0	0	0	2	2	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	5	1295	3	0	2254

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	651	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-	-
Pot Cap-1 Maneuver	0	411	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	410	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	13.9	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	410	-
HCM Lane V/C Ratio	-	-	0.013	-
HCM Control Delay (s)	-	-	13.9	-
HCM Lane LOS	-	-	B	-
HCM 95th %tile Q(veh)	-	-	0	-

Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	5	2171	4	0	1369
Future Vol, veh/h	0	5	2171	4	0	1369
Conflicting Peds, #/hr	0	0	0	4	4	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	5	2285	4	0	1441

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	1149	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-	-
Pot Cap-1 Maneuver	0	192	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	191	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	24.4	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	191	-
HCM Lane V/C Ratio	-	-	0.028	-
HCM Control Delay (s)	-	-	24.4	-
HCM Lane LOS	-	-	C	-
HCM 95th %tile Q(veh)	-	-	0.1	-

APPENDIX F -

CUMULATIVE PROJECT TRIP DISTRIBUTION

APPENDIX F -

CUMULATIVE PROJECT TRIP DISTRIBUTION

EXHIBIT 4-4

PROJECT ONLY WEEKDAY AM PEAK HOUR INTERSECTION VOLUMES

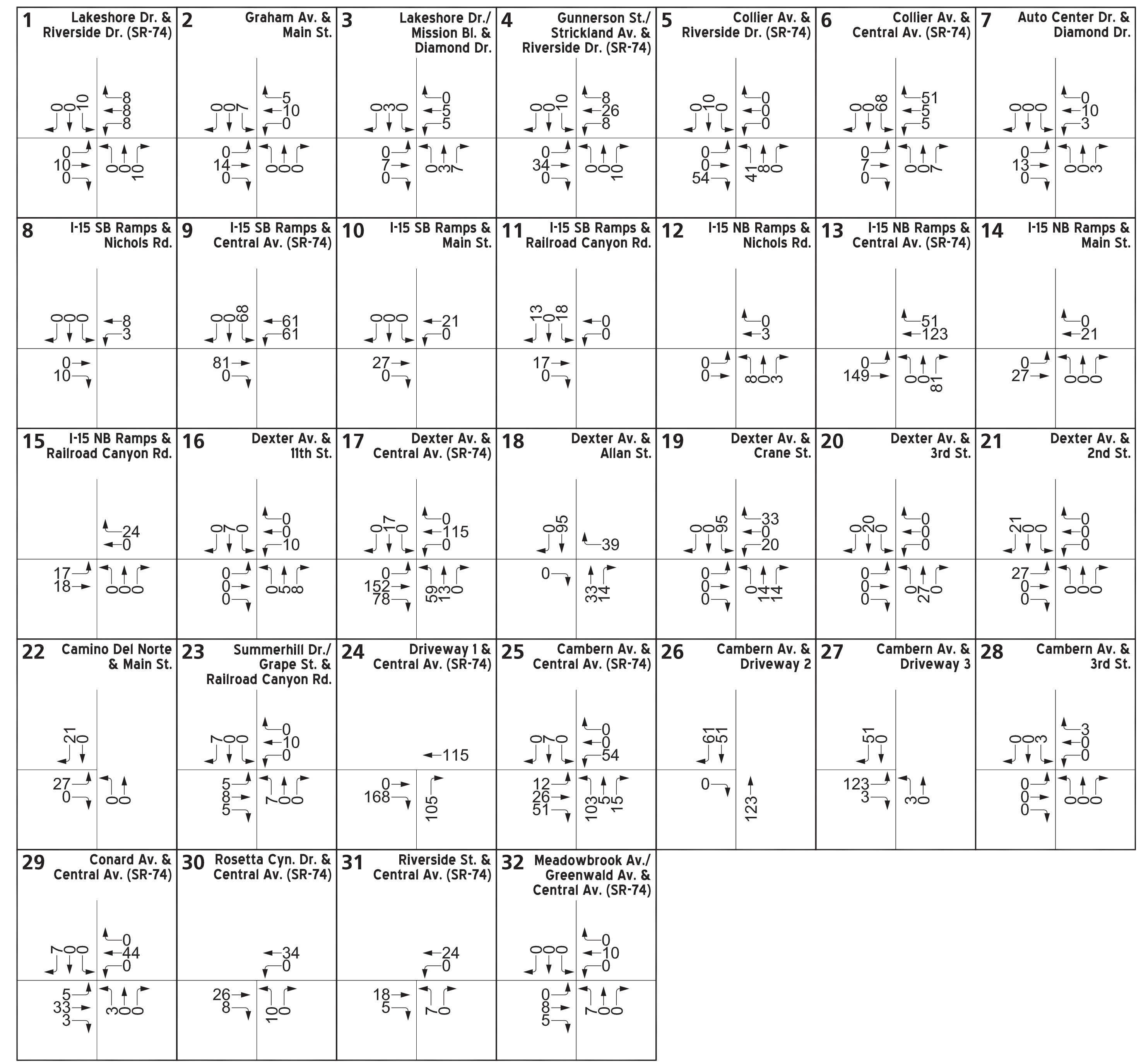
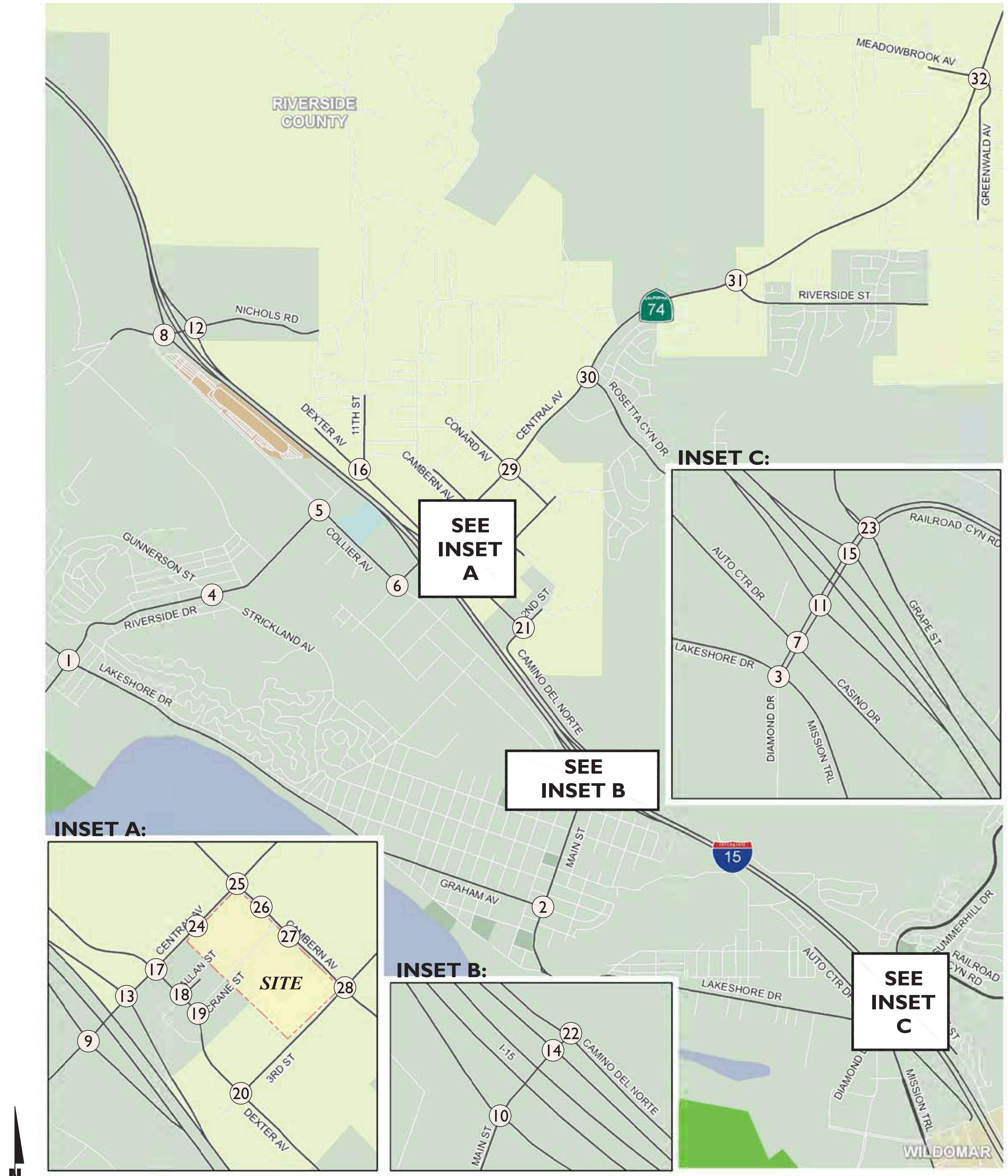
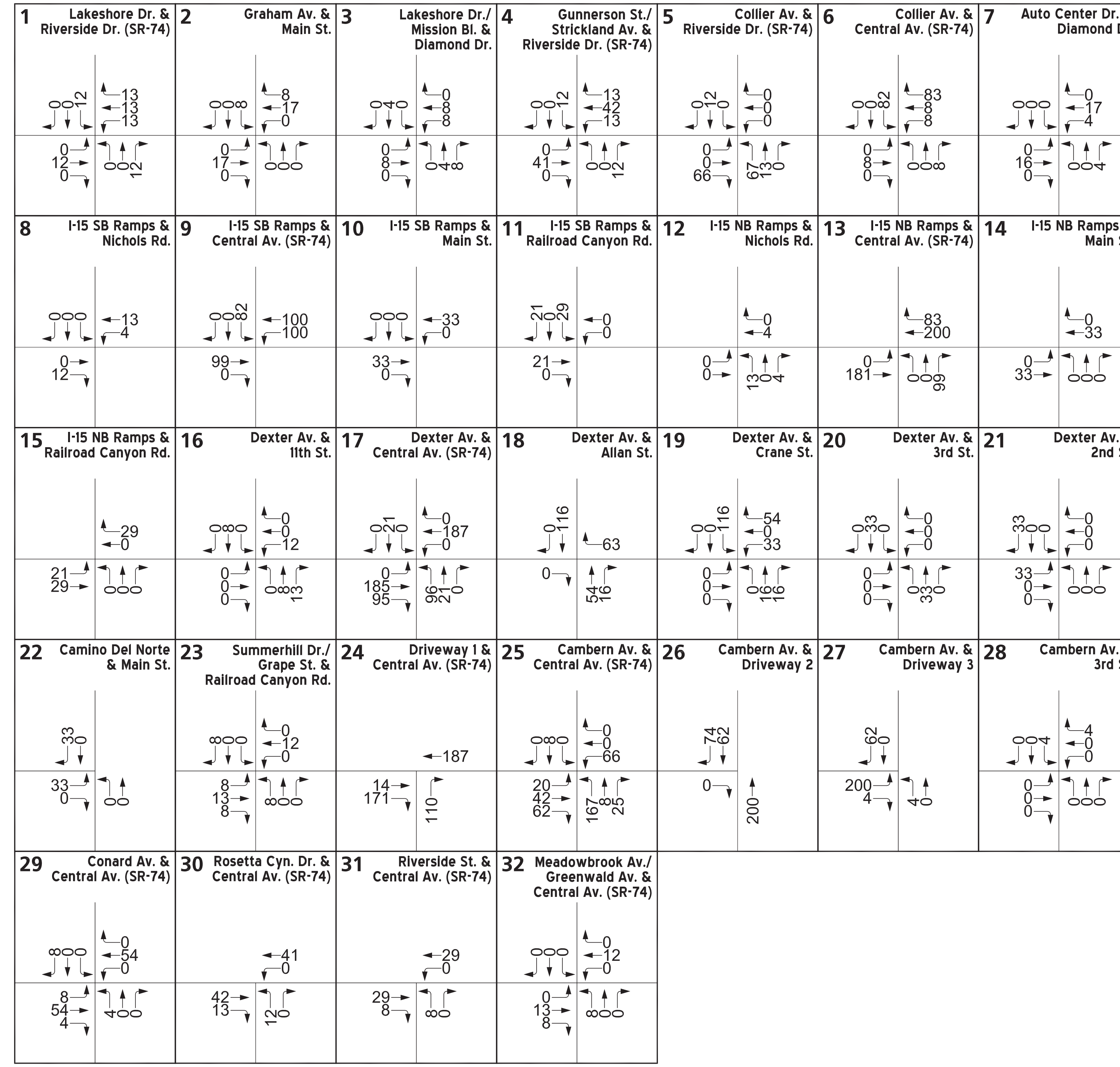


EXHIBIT 4-5

PROJECT ONLY
WEEKDAY PM PEAK HOUR INTERSECTION VOLUMES





ALBERT WILSON & ASSOCIATES

TRAFFIC ENGINEERS

SCOPING AGREEMENT

FOR

PROPOSED BOAT SALE AND MANUFACTURING FACILITY ON RIVERSIDE DRIVE (APN: 378-030-006)

CITY OF LAKE ELSINORE CA.

Revised June 30, 2017

REGISTERED PROFESSIONAL ENGINEER
CHIDI N ONUMONU
C046055
Exp. 12-31-18
CIVIL
STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER
CHIDI N ONUMONU
T2088
Exp. 6-30-18
TRAFFIC
STATE OF CALIFORNIA

7866 Henbane Street, Rancho Cucamonga Ca. 91739; Phone:909-483-4876; Fax: 909-989-1576; www.awatraffic.com

TABLE 1:

PROJECT TRIP GENERATION- Boat Manufacturing/Sales Facility

LAND USE	UNITS	A.M. PEAK HOUR IN	OUT	TOT	P.M. PEAK HOUR IN	OUT	TOT	DAILY IN	OUT	TOT
PHASE !: Land Use 140- Manufacturing	25.682 TSF									
Trips/Unit Trips		0.57 15	0.16 4	0.73 19	0.26 7	0.47 12	0.73 19	1.91 49	1.91 49	3.82 98
PHASE 2: Land Use 140- Manafacturing	9.8 TSF	0.57 6	0.16 2	0.73 8	0.26 3	0.47 5	0.73 8	1.91 19	1.91 19	3.82 38
Total New Trips		21	6	27	10	17	27	68	68	136

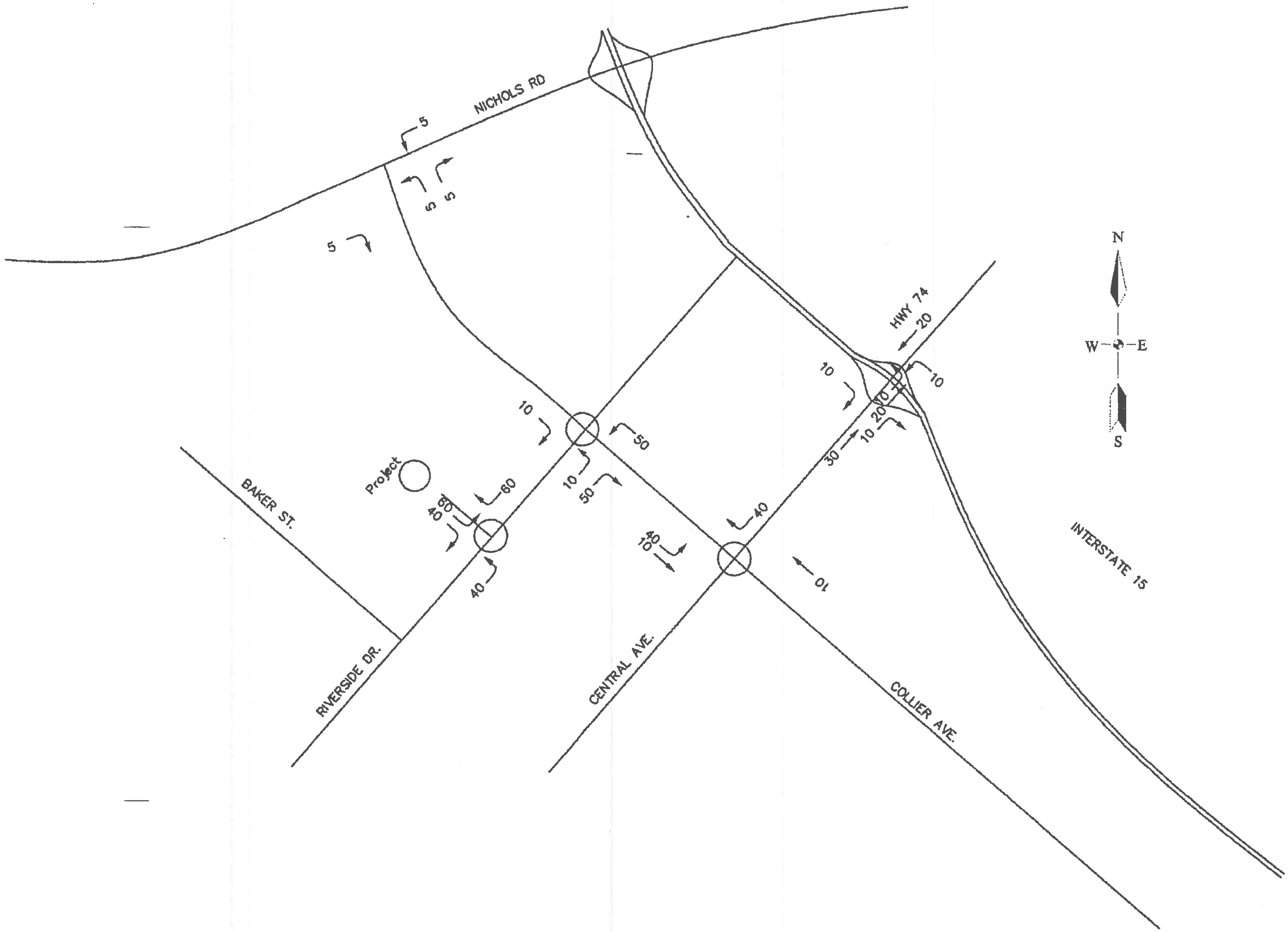
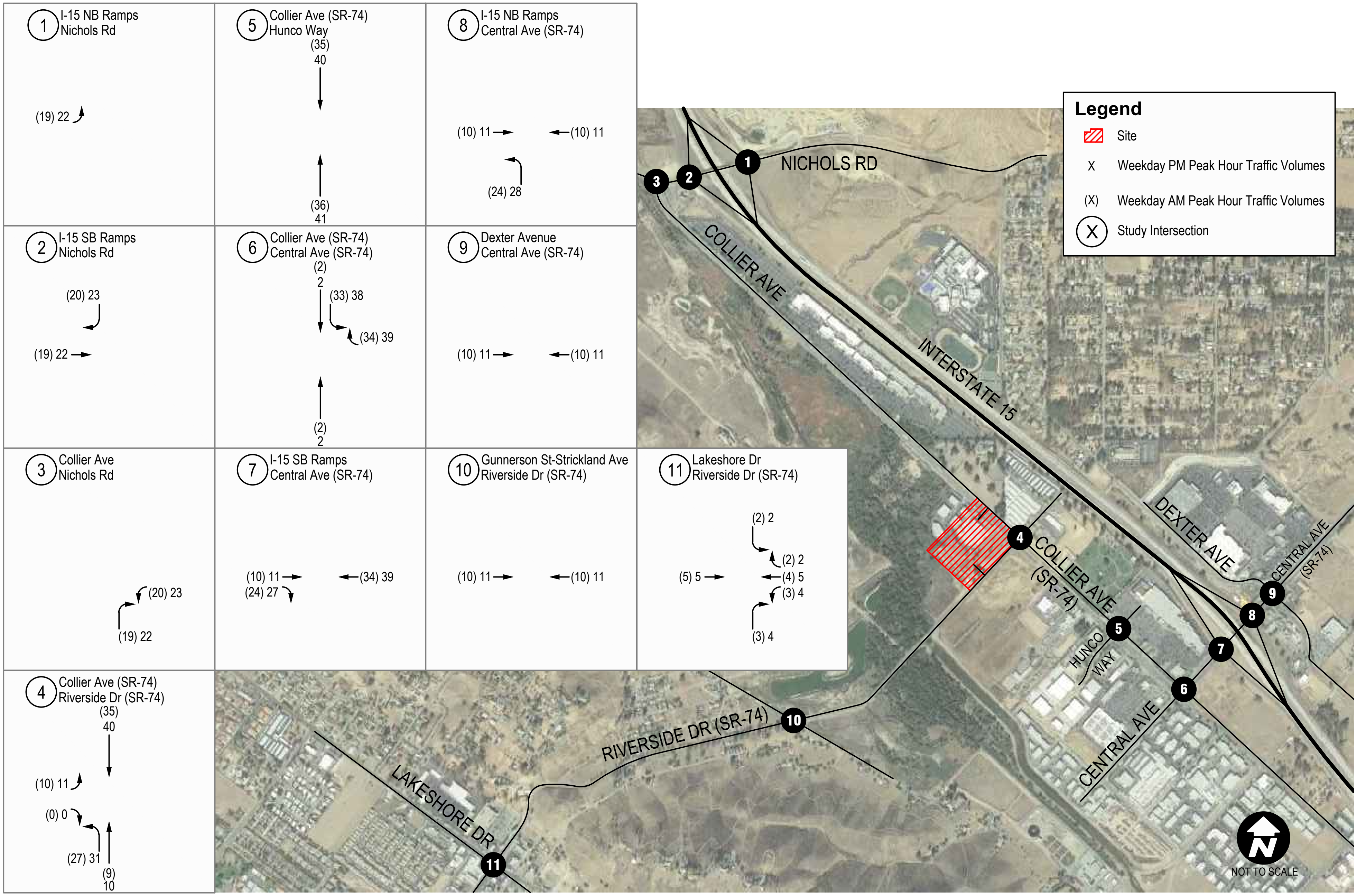


EXHIBIT 2: PROJECT TRIP DISTRIBUTION %

albert a. webb & associates, jan. 2017



Source: Google Maps, 10/2016

Project Net Total Trip Assignment

Kassab Travel Center TIA

FIGURE
5

Jul 31, 2018 - 2:16pm mpopovic P:\300.Environmental\Kassab Travel Center\Graphics\Base_KassabTravelCenter2.dwg Layout: Fig5-ProjAssign

1 INTRODUCTION

This report presents the results of the traffic impact analysis (TIA) for the proposed Nichols Ranch (referred to as "Project") located south of Nichols Road and east of the I-15 Freeway in the City of Lake Elsinore as shown on Exhibit 1-1.

The purpose of this traffic impact analysis is to evaluate the potential circulation system deficiencies that may result from the development of the proposed Project, and to recommend improvements to achieve acceptable circulation system operational conditions. As directed by City of Lake Elsinore staff, this traffic study has been prepared in accordance with the County of Riverside's Traffic Impact Analysis Preparation Guide (April 2008), the California Department of Transportation (Caltrans) Guide for the Preparation of Traffic Impact Studies (December 2002), and consultation with City of Lake Elsinore staff during the scoping process. (1) (2) The approved Project Traffic Study Scoping agreement is provided in Appendix 1.1 of this TIA.

1.1 PROJECT OVERVIEW

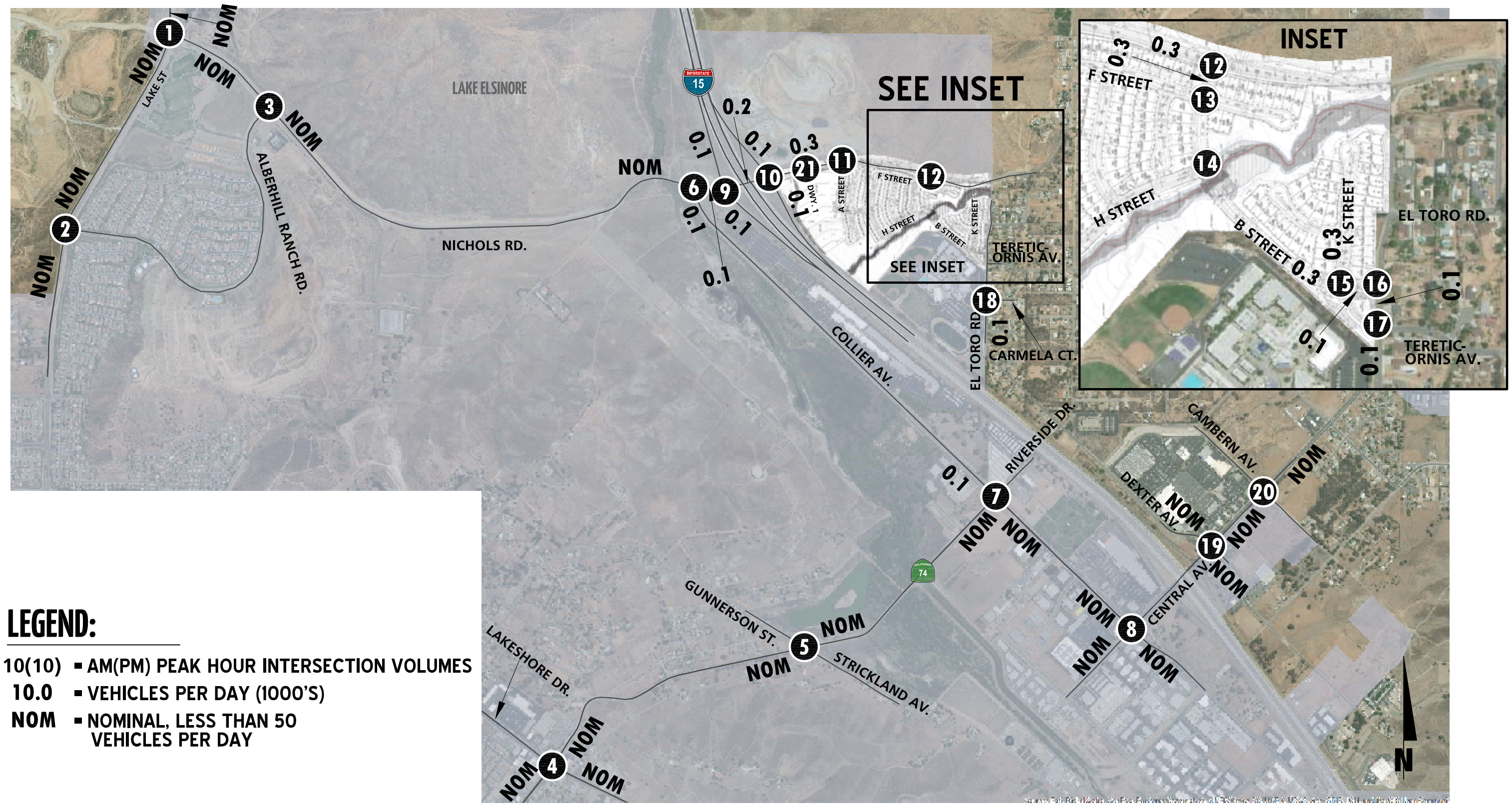
The proposed Project is located within the Alberhill Ranch Specific Plan and a portion (southern parcel) lies outside of the Specific Plan. For purposes of the traffic analysis it is anticipated that the Project will be evaluated in 3 phases, with Phase 1 having a projected Opening Year of 2020, Phase 2 having a project Opening Year of 2021, and Project Buildout anticipated to occur in 2024.

- Phase 1 (2020): 34 low-medium density residential dwelling units
- Phase 2 (2021): Phase 1 (2020) development plus 134 additional low-medium density residential dwelling units (buildout of residential) and an 8.3-acre park
- Phase 3 (2024): Phase 1 (2020) and Phase 2 (2021) development plus 6,000 square feet (sf) of fast-food restaurant with drive-through window use, 9,400 sf of high turnover (sit-down) restaurant use, 8,000 sf of health and fitness club use, 43,000 sf of office use, 5,500 sf of fast food without drive-through, a 16-vehicle fueling position gas station with convenience store and car wash, and 130 room hotel

As indicated on Exhibit 1-1, access to the Project site is proposed to be provided by Nichols Road via A Street and B Street and El Toro Road via B Street. The Project will construct B Street between El Toro Road and Nichols Road in Phase 1 (2020). Regional access to the Project site is provided via the I-15 Freeway at Nichols Road interchange.

Trips generated by the Project's proposed land uses have been estimated based on trip generation rates collected by the Institute of Transportation Engineers (ITE) Trip Generation Manual, 10th Edition, 2017. (3) The Project is estimated to generate a net total of 6,900 trip-ends per day on a typical weekday with approximately 734 AM peak hour trips, and 622 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.

Exhibit 4-4: Project Only (Phase 1) Traffic Volumes



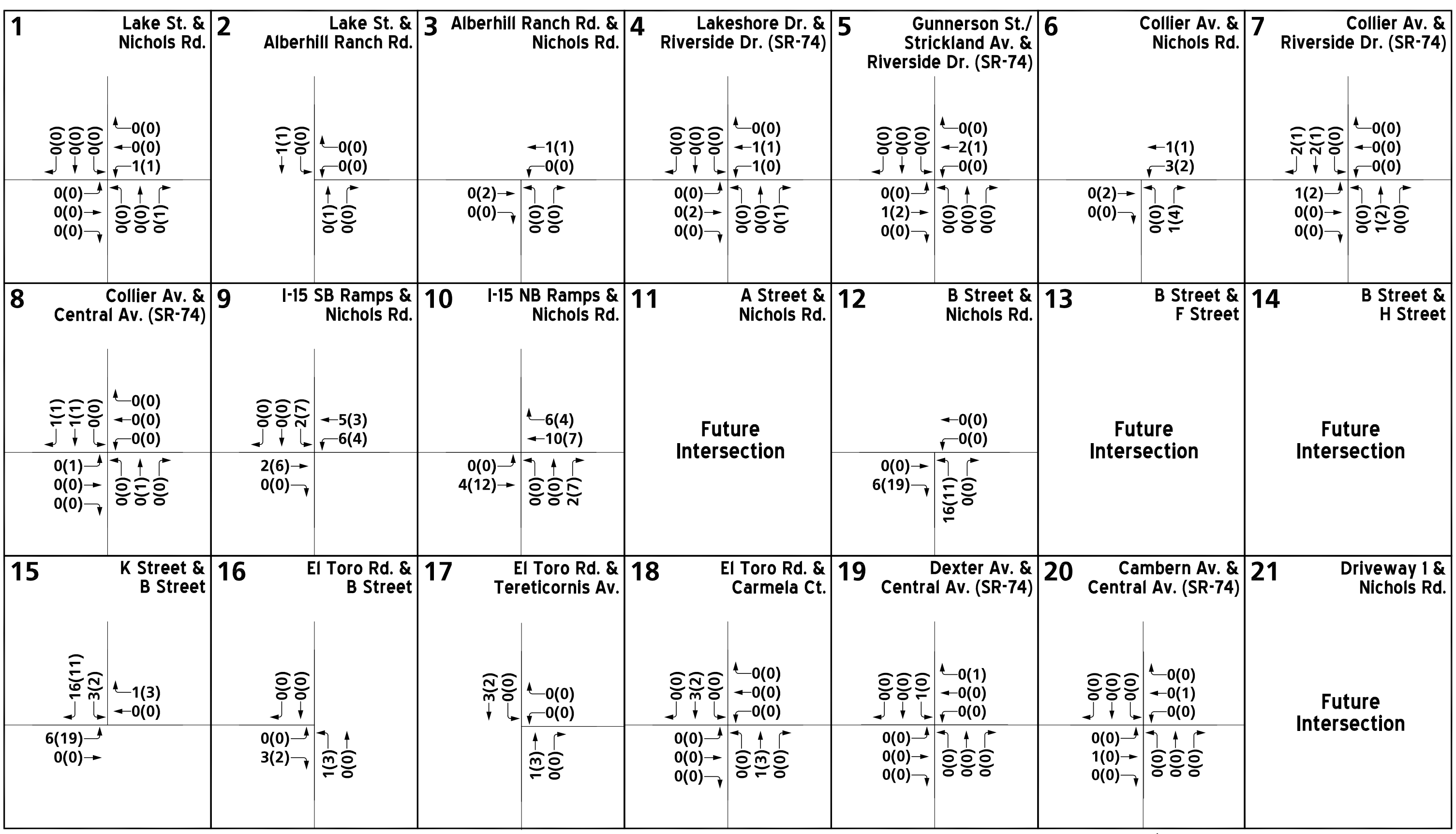
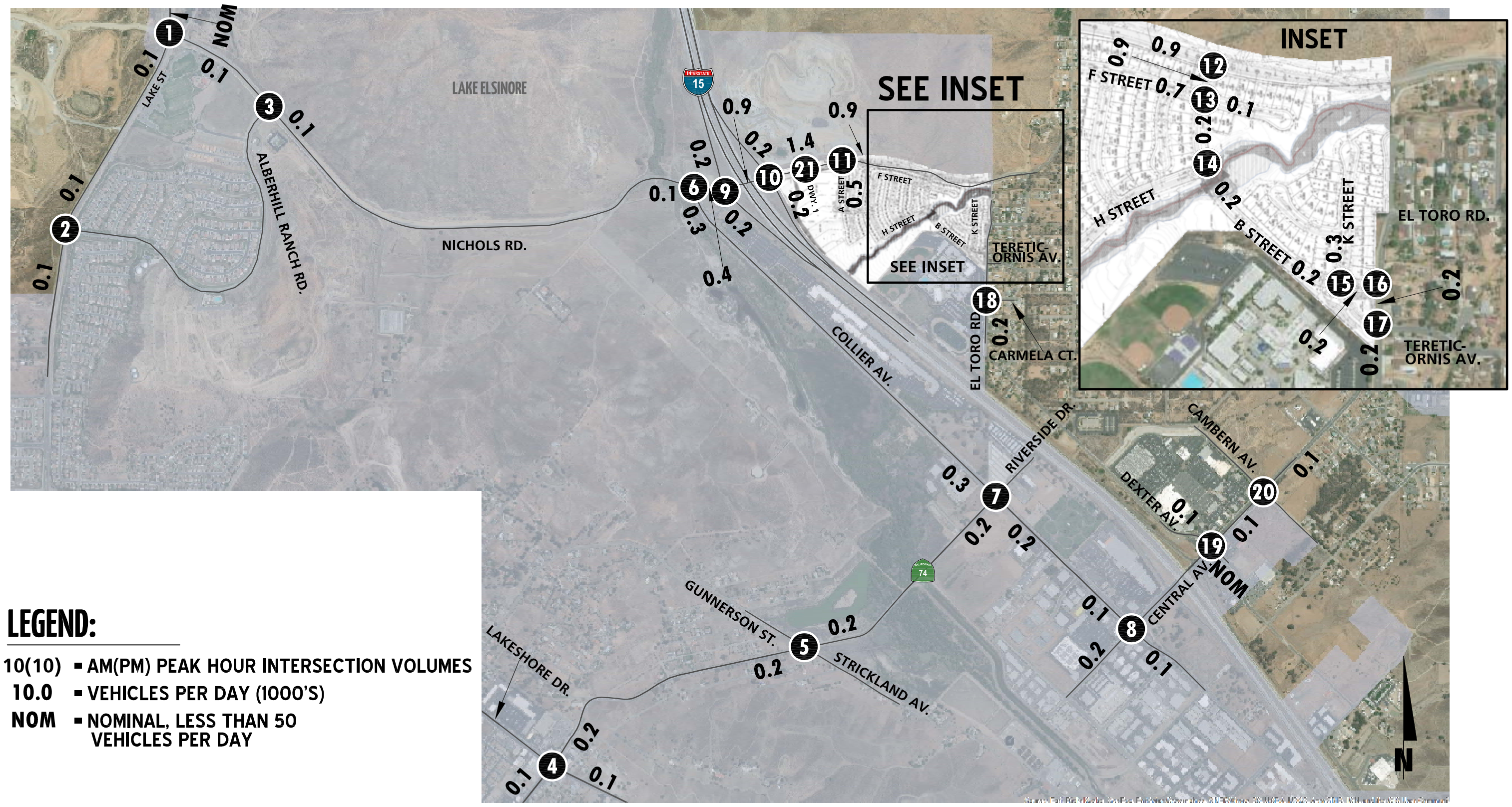
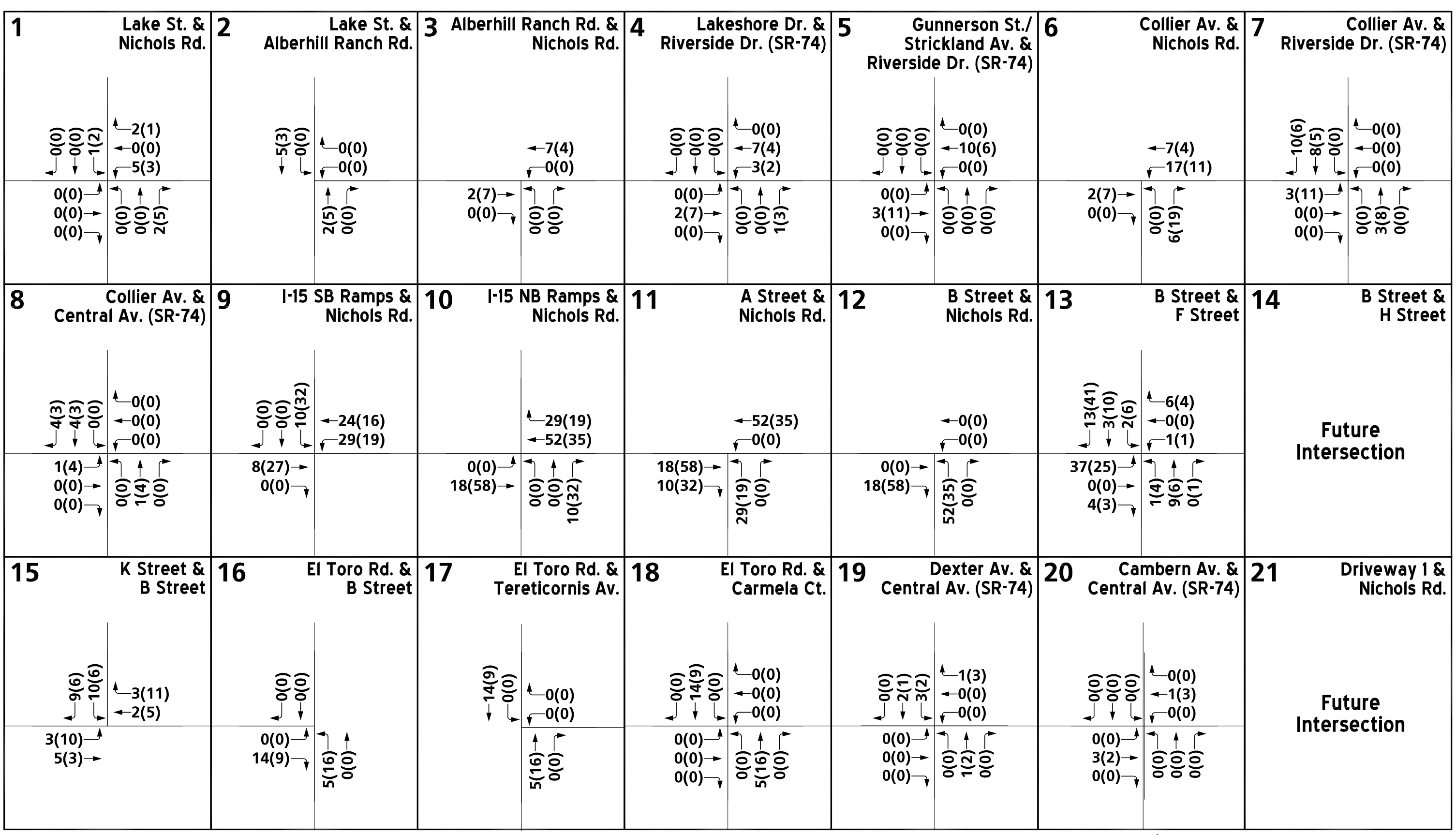


EXHIBIT 4-5: PROJECT ONLY (PHASE 2) TRAFFIC VOLUMES





APPENDIX G -

EXISTING PLUS AMBIENT PLUS CUMULATIVE PLUS PROJECT PEAK HOUR INTERSECTION ANALYSIS WORKSHEETS

APPENDIX G -

EXISTING PLUS AMBIENT PLUS CUMULATIVE PLUS PROJECT PEAK HOUR INTERSECTION ANALYSIS WORKSHEETS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	34	3	35	104	0	10	15	1273	36	11	2147	56
Future Volume (veh/h)	34	3	35	104	0	10	15	1273	36	11	2147	56
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1477	1870	1870
Adj Flow Rate, veh/h	35	3	36	108	0	10	16	1326	38	11	2236	58
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	123	21	69	0	0	146	47	2376	68	27	2358	61
Arrive On Green	0.09	0.09	0.09	0.00	0.00	0.09	0.03	0.67	0.67	0.02	0.67	0.67
Sat Flow, veh/h	566	229	753	0	0	1585	1781	3528	101	1406	3539	91
Grp Volume(v), veh/h	74	0	0	0	0	10	16	667	697	11	1118	1176
Grp Sat Flow(s),veh/h/ln	1547	0	0	0	0	1585	1781	1777	1852	1406	1777	1854
Q Serve(g_s), s	1.9	0.0	0.0	0.0	0.0	0.4	0.7	14.6	14.6	0.6	42.1	43.1
Cycle Q Clear(g_c), s	3.3	0.0	0.0	0.0	0.0	0.4	0.7	14.6	14.6	0.6	42.1	43.1
Prop In Lane	0.47		0.49	0.00		1.00	1.00		0.05	1.00		0.05
Lane Grp Cap(c), veh/h	214	0	0	0	0	146	47	1197	1248	27	1184	1235
V/C Ratio(X)	0.35	0.00	0.00	0.00	0.00	0.07	0.34	0.56	0.56	0.41	0.94	0.95
Avail Cap(c_a), veh/h	560	0	0	0	0	1001	168	1197	1248	132	1194	1245
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	32.1	0.0	0.0	0.0	0.0	30.9	35.6	6.3	6.4	36.1	11.2	11.3
Incr Delay (d2), s/veh	1.0	0.0	0.0	0.0	0.0	0.2	4.2	0.6	0.6	9.6	14.6	15.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	0.0	0.0	0.0	0.0	0.2	0.3	3.1	3.2	0.3	13.6	14.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	33.1	0.0	0.0	0.0	0.0	31.1	39.8	6.9	6.9	45.7	25.8	26.8
LnGrp LOS	C	A	A	A	A	C	D	A	A	D	C	C
Approach Vol, veh/h		74			10			1380			2305	
Approach Delay, s/veh		33.1			31.1			7.3			26.4	
Approach LOS		C			C			A			C	

Timer - Assigned Phs		2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s		11.9	6.4	56.1	0.0	11.9	7.0	55.6
Change Period (Y+Rc), s		5.0	5.0	6.0	5.0	5.0	5.0	6.0
Max Green Setting (Gmax), s		47.0	7.0	50.0	18.0	24.0	7.0	50.0
Max Q Clear Time (g_c+I1), s		2.4	2.6	16.6	0.0	5.3	2.7	45.1
Green Ext Time (p_c), s		0.0	0.0	9.8	0.0	0.3	0.0	4.4

Intersection Summary	
HCM 6th Ctrl Delay	19.6
HCM 6th LOS	B

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	75	0	0	7	0	1353	3	0	2178	113
Future Vol, veh/h	0	0	75	0	0	7	0	1353	3	0	2178	113
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	-	-	-	-	-	100
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	79	0	0	7	0	1424	3	0	2293	119

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	-	1147	-	-	714	-	0	0	-	-	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.94	-	-	6.94	-	-	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.32	-	-	3.32	-	-	-	-	-	-
Pot Cap-1 Maneuver	0	0	193	0	0	374	0	-	-	0	-	-
Stage 1	0	0	-	0	0	-	0	-	-	0	-	-
Stage 2	0	0	-	0	0	-	0	-	-	0	-	-
Platoon blocked, %	-							-	-		-	-
Mov Cap-1 Maneuver	-	-	193	-	-	374	-	-	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	36	14.8	0	0
HCM LOS	E	B		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	WBLn1	SBT	SBR
Capacity (veh/h)	-	-	193	374	-	-
HCM Lane V/C Ratio	-	-	0.409	0.02	-	-
HCM Control Delay (s)	-	-	36	14.8	-	-
HCM Lane LOS	-	-	E	B	-	-
HCM 95th %tile Q(veh)	-	-	1.8	0.1	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	32	6	26	129	6	28	34	1292	50	4	2072	32
Future Volume (veh/h)	32	6	26	129	6	28	34	1292	50	4	2072	32
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1477	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	34	6	28	139	6	30	37	1389	54	4	2228	34
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	125	33	71	246	31	153	64	3596	140	13	2418	37
Arrive On Green	0.11	0.11	0.11	0.11	0.11	0.11	0.05	0.71	0.71	0.01	0.67	0.67
Sat Flow, veh/h	611	292	632	1375	271	1355	1406	5043	196	1781	3583	55
Grp Volume(v), veh/h	68	0	0	139	0	36	37	938	505	4	1102	1160
Grp Sat Flow(s),veh/h/ln	1535	0	0	1375	0	1626	1406	1702	1835	1781	1777	1860
Q Serve(g_s), s	1.8	0.0	0.0	4.6	0.0	1.9	2.5	10.5	10.5	0.2	51.0	51.8
Cycle Q Clear(g_c), s	3.7	0.0	0.0	8.4	0.0	1.9	2.5	10.5	10.5	0.2	51.0	51.8
Prop In Lane	0.50		0.41	1.00		0.83	1.00		0.11	1.00		0.03
Lane Grp Cap(c), veh/h	230	0	0	246	0	184	64	2428	1309	13	1199	1255
V/C Ratio(X)	0.30	0.00	0.00	0.56	0.00	0.20	0.58	0.39	0.39	0.30	0.92	0.92
Avail Cap(c_a), veh/h	526	0	0	520	0	508	102	2428	1309	130	1239	1297
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	39.4	0.0	0.0	41.3	0.0	38.7	44.9	5.5	5.5	47.5	13.4	13.5
Incr Delay (d2), s/veh	0.7	0.0	0.0	2.0	0.0	0.5	7.9	0.1	0.2	12.5	10.9	11.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	0.0	0.0	3.3	0.0	0.8	1.0	2.4	2.6	0.1	17.2	18.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	40.1	0.0	0.0	43.3	0.0	39.2	52.8	5.6	5.6	59.9	24.2	24.5
LnGrp LOS	D	A	A	D	A	D	D	A	A	E	C	C
Approach Vol, veh/h		68			175			1480			2266	
Approach Delay, s/veh		40.1			42.4			6.8			24.4	
Approach LOS		D			D			A			C	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		15.9	5.7	74.5		15.9	9.4	70.8				
Change Period (Y+Rc), s		5.0	5.0	6.0		5.0	5.0	6.0				
Max Green Setting (Gmax), s		30.0	7.0	67.0		30.0	7.0	67.0				
Max Q Clear Time (g_c+I1), s		10.4	2.2	12.5		5.7	4.5	53.8				
Green Ext Time (p_c), s		0.5	0.0	11.6		0.3	0.0	11.1				

Intersection Summary	
HCM 6th Ctrl Delay	18.9
HCM 6th LOS	B

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	211	42	1236	100	25	1932
Future Volume (veh/h)	211	42	1236	100	25	1932
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	224	45	1315	106	27	2055
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	275	244	2948	238	70	2531
Arrive On Green	0.15	0.15	0.61	0.61	0.04	0.71
Sat Flow, veh/h	1781	1585	4984	388	1781	3647
Grp Volume(v), veh/h	224	45	929	492	27	2055
Grp Sat Flow(s),veh/h/ln	1781	1585	1702	1800	1781	1777
Q Serve(g_s), s	10.0	2.0	12.0	12.0	1.2	32.5
Cycle Q Clear(g_c), s	10.0	2.0	12.0	12.0	1.2	32.5
Prop In Lane	1.00	1.00		0.22	1.00	
Lane Grp Cap(c), veh/h	275	244	2084	1102	70	2531
V/C Ratio(X)	0.82	0.18	0.45	0.45	0.39	0.81
Avail Cap(c_a), veh/h	650	578	2774	1467	152	3415
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	33.6	30.3	8.5	8.5	38.5	8.1
Incr Delay (d2), s/veh	5.9	0.4	0.2	0.3	3.5	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.5	0.7	3.1	3.4	0.6	6.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	39.5	30.6	8.7	8.8	42.0	9.2
LnGrp LOS	D	C	A	A	D	A
Approach Vol, veh/h	269		1421			2082
Approach Delay, s/veh	38.0		8.7			9.6
Approach LOS	D		A			A

Timer - Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		17.7	8.2	56.3				64.5
Change Period (Y+Rc), s		5.0	5.0	6.0				6.0
Max Green Setting (Gmax), s		30.0	7.0	67.0				79.0
Max Q Clear Time (g_c+I1), s		12.0	3.2	14.0				34.5
Green Ext Time (p_c), s		0.7	0.0	11.3				24.1

Intersection Summary	
HCM 6th Ctrl Delay	11.3
HCM 6th LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣		↰	↑↱		↰	↑↱	
Traffic Volume (veh/h)	51	3	36	67	3	11	26	2219	63	16	1467	38
Future Volume (veh/h)	51	3	36	67	3	11	26	2219	63	16	1467	38
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1477	1870	1870
Adj Flow Rate, veh/h	53	3	37	69	3	11	27	2288	65	16	1512	39
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	144	14	55	0	32	117	72	2356	67	37	2316	60
Arrive On Green	0.09	0.09	0.09	0.00	0.09	0.09	0.04	0.67	0.67	0.03	0.65	0.65
Sat Flow, veh/h	753	156	600	0	351	1287	1781	3527	100	1406	3539	91
Grp Volume(v), veh/h	93	0	0	0	0	14	27	1146	1207	16	758	793
Grp Sat Flow(s),veh/h/ln	1509	0	0	0	0	1639	1781	1777	1850	1406	1777	1854
Q Serve(g_s), s	3.7	0.0	0.0	0.0	0.0	0.6	1.1	45.1	46.5	0.8	19.2	19.3
Cycle Q Clear(g_c), s	4.4	0.0	0.0	0.0	0.0	0.6	1.1	45.1	46.5	0.8	19.2	19.3
Prop In Lane	0.57		0.40	0.00		0.79	1.00		0.05	1.00		0.05
Lane Grp Cap(c), veh/h	213	0	0	0	0	150	72	1187	1236	37	1163	1213
V/C Ratio(X)	0.44	0.00	0.00	0.00	0.00	0.09	0.38	0.97	0.98	0.43	0.65	0.65
Avail Cap(c_a), veh/h	554	0	0	0	0	1031	167	1189	1238	132	1189	1240
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	32.8	0.0	0.0	0.0	0.0	31.1	34.9	11.6	11.8	35.8	7.8	7.8
Incr Delay (d2), s/veh	1.4	0.0	0.0	0.0	0.0	0.3	3.3	18.4	20.0	7.6	1.2	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	0.0	0.0	0.0	0.0	0.2	0.5	15.4	16.9	0.3	4.6	4.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	34.2	0.0	0.0	0.0	0.0	31.4	38.2	30.0	31.9	43.5	9.0	9.0
LnGrp LOS	C	A	A	A	A	C	D	C	C	D	A	A
Approach Vol, veh/h		93			14			2380			1567	
Approach Delay, s/veh		34.2			31.4			31.0			9.4	
Approach LOS		C			C			C			A	

Timer - Assigned Phs		2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s		11.8	7.0	55.9	0.0	11.8	8.0	54.9				
Change Period (Y+Rc), s		5.0	5.0	6.0	5.0	5.0	5.0	6.0				
Max Green Setting (Gmax), s		47.0	7.0	50.0	18.0	24.0	7.0	50.0				
Max Q Clear Time (g_c+I1), s		2.6	2.8	48.5	0.0	6.4	3.1	21.3				
Green Ext Time (p_c), s		0.0	0.0	1.4	0.0	0.4	0.0	11.5				

Intersection Summary		
HCM 6th Ctrl Delay		22.7
HCM 6th LOS		C

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	47	0	0	6	0	2286	4	0	1440	45
Future Vol, veh/h	0	0	47	0	0	6	0	2286	4	0	1440	45
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	-	-	-	-	-	100
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	92	95	92	92	92	95	95	92	92	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	49	0	0	7	0	2406	4	0	1516	47

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	-	758	-	-	1205	-	0	0	-	-	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.94	-	-	6.94	-	-	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.32	-	-	3.32	-	-	-	-	-	-
Pot Cap-1 Maneuver	0	0	350	0	0	176	0	-	-	0	-	-
Stage 1	0	0	-	0	0	-	0	-	-	0	-	-
Stage 2	0	0	-	0	0	-	0	-	-	0	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	-	350	-	-	176	-	-	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	17	26.2	0	0
HCM LOS	C	D		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	WBLn1	SBT	SBR
Capacity (veh/h)	-	-	350	176	-	-
HCM Lane V/C Ratio	-	-	0.141	0.037	-	-
HCM Control Delay (s)	-	-	17	26.2	-	-
HCM Lane LOS	-	-	C	D	-	-
HCM 95th %tile Q(veh)	-	-	0.5	0.1	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	31	6	30	70	6	17	24	2134	132	17	1371	31
Future Volume (veh/h)	31	6	30	70	6	17	24	2134	132	17	1371	31
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1477	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	33	6	32	74	6	18	25	2246	139	18	1443	33
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	122	28	64	240	38	113	53	3261	200	52	2324	53
Arrive On Green	0.09	0.09	0.09	0.09	0.09	0.09	0.04	0.66	0.66	0.03	0.65	0.65
Sat Flow, veh/h	549	304	700	1370	412	1236	1406	4918	302	1781	3551	81
Grp Volume(v), veh/h	71	0	0	74	0	24	25	1549	836	18	721	755
Grp Sat Flow(s),veh/h/ln	1553	0	0	1370	0	1648	1406	1702	1816	1781	1777	1856
Q Serve(g_s), s	1.6	0.0	0.0	0.0	0.0	1.0	1.3	20.8	21.3	0.7	17.5	17.6
Cycle Q Clear(g_c), s	3.1	0.0	0.0	2.9	0.0	1.0	1.3	20.8	21.3	0.7	17.5	17.6
Prop In Lane	0.46		0.45	1.00		0.75	1.00		0.17	1.00		0.04
Lane Grp Cap(c), veh/h	214	0	0	240	0	151	53	2257	1204	52	1163	1214
V/C Ratio(X)	0.33	0.00	0.00	0.31	0.00	0.16	0.47	0.69	0.69	0.35	0.62	0.62
Avail Cap(c_a), veh/h	685	0	0	670	0	668	133	3081	1643	168	1608	1679
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	31.9	0.0	0.0	31.9	0.0	31.0	34.9	7.7	7.8	35.2	7.4	7.5
Incr Delay (d2), s/veh	0.9	0.0	0.0	0.7	0.0	0.5	6.2	0.4	0.8	3.9	0.5	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	0.0	0.0	1.3	0.0	0.4	0.5	4.3	4.8	0.3	3.9	4.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	32.8	0.0	0.0	32.6	0.0	31.5	41.1	8.1	8.6	39.1	8.0	8.0
LnGrp LOS	C	A	A	C	A	C	D	A	A	D	A	A
Approach Vol, veh/h		71			98			2410			1494	
Approach Delay, s/veh		32.8			32.3			8.6			8.4	
Approach LOS		C			C			A			A	
Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		11.8	7.2	55.1		11.8	7.8	54.4				
Change Period (Y+Rc), s		5.0	5.0	6.0		5.0	5.0	6.0				
Max Green Setting (Gmax), s		30.0	7.0	67.0		30.0	7.0	67.0				
Max Q Clear Time (g_c+I1), s		4.9	2.7	23.3		5.1	3.3	19.6				
Green Ext Time (p_c), s		0.3	0.0	25.8		0.3	0.0	12.2				
Intersection Summary												
HCM 6th Ctrl Delay			9.5									
HCM 6th LOS			A									

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	131	24	1972	208	34	1286
Future Volume (veh/h)	131	24	1972	208	34	1286
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	138	25	2076	219	36	1354
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	185	165	2979	311	88	2665
Arrive On Green	0.10	0.10	0.63	0.63	0.05	0.75
Sat Flow, veh/h	1781	1585	4864	490	1781	3647
Grp Volume(v), veh/h	138	25	1498	797	36	1354
Grp Sat Flow(s),veh/h/ln	1781	1585	1702	1782	1781	1777
Q Serve(g_s), s	5.7	1.1	21.6	22.3	1.5	11.6
Cycle Q Clear(g_c), s	5.7	1.1	21.6	22.3	1.5	11.6
Prop In Lane	1.00	1.00		0.27	1.00	
Lane Grp Cap(c), veh/h	185	165	2160	1130	88	2665
V/C Ratio(X)	0.75	0.15	0.69	0.70	0.41	0.51
Avail Cap(c_a), veh/h	757	674	2940	1539	166	3636
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	32.8	30.7	9.0	9.1	34.7	3.8
Incr Delay (d2), s/veh	5.9	0.4	0.4	0.9	3.1	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.6	0.4	5.0	5.5	0.7	1.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	38.6	31.1	9.4	10.0	37.8	3.9
LnGrp LOS	D	C	A	B	D	A
Approach Vol, veh/h	163		2295			1390
Approach Delay, s/veh	37.5		9.6			4.8
Approach LOS	D		A			A

Timer - Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		12.8	8.7	53.7				62.4
Change Period (Y+Rc), s		5.0	5.0	6.0				6.0
Max Green Setting (Gmax), s		32.0	7.0	65.0				77.0
Max Q Clear Time (g_c+I1), s		7.7	3.5	24.3				13.6
Green Ext Time (p_c), s		0.4	0.0	23.5				12.2

Intersection Summary			
HCM 6th Ctrl Delay			9.1
HCM 6th LOS			A

APPENDIX H -

TRANSIT ROUTE INFORMATION

APPENDIX H -

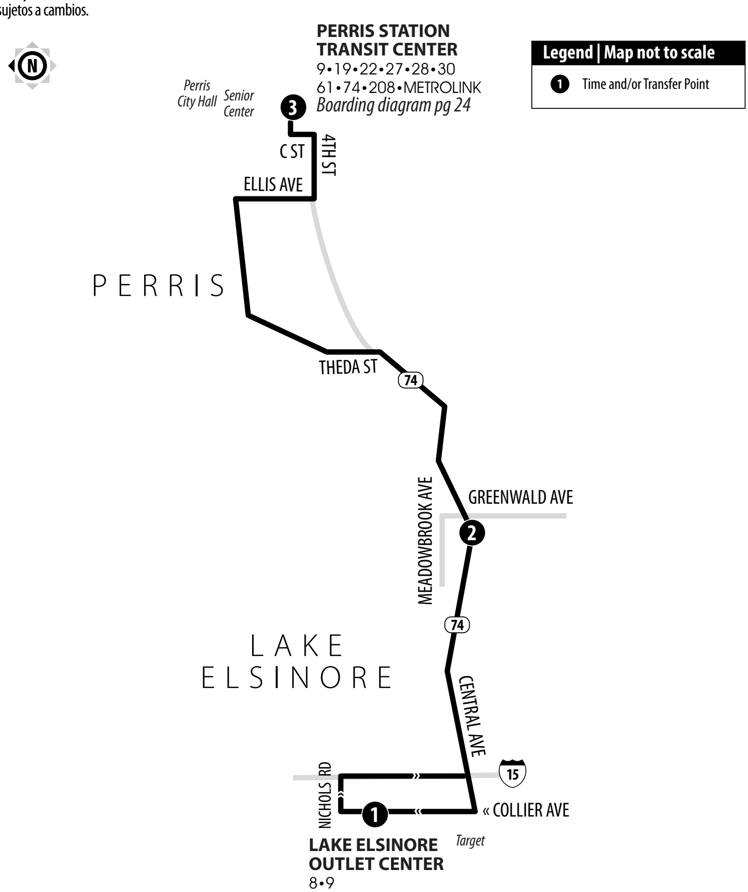
TRANSIT ROUTE INFORMATION

9

PERRIS STATION TRANSIT CENTER - LAKE ELSINORE OUTLET CENTER

Information Center
(951) 565-5002
RiversideTransit.com
RTABus.com

Routing and timetables subject to change.
Rutas y horarios son sujetos a cambios.



9 **Northbound to Perris Station Transit Center** | Weekdays & Weekends

A.M. times are in PLAIN, **P.M. times are in BOLD** | Times are approximate

Lake Elsinore Outlet Center	Hwy. 74 & Meadowbrook	Perris Station Transit Center
1	2	3
6:38	6:48	7:03
7:50	8:00	8:15
9:26	9:37	9:52
10:36	10:47	11:02
11:45	11:56	**12:13**
12:46	**12:59**	**1:16**
1:59	**2:12**	**2:29**
3:11	**3:24**	**3:41**
4:21	**4:34**	**4:51**
5:36	**5:48**	**6:05**
6:37	**6:49**	**7:04**

9 **Southbound to Lake Elsinore Outlet Center** | Weekdays & Weekends

A.M. times are in PLAIN, **P.M. times are in BOLD** | Times are approximate

Perris Station Transit Center	Hwy. 74 & Meadowbrook	Lake Elsinore Outlet Center
3	2	1
6:50	7:02	7:13
7:50	8:02	8:13
8:45	8:57	9:08
10:07	10:19	10:31
11:15	11:28	11:40
12:25	**12:38**	**12:50**
1:34	**1:47**	**1:59**
2:37	**2:50**	**3:02**
3:59	**4:12**	**4:24**
5:02	**5:15**	**5:27**
6:14	**6:27**	**6:39**