July 29, 2021

County of Ventura

Public Works Agency

Hueneme Road and Lewis Road Widening

PROJECT STUDY REPORT

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APPROVAL RECOMMENDED:

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Date

APPROVED:

Director of Roads & Transportation — 29 Sep 21
Date

This project initiation document has been prepared under the direction of the following registered civil engineer. The registered civil engineer attests to the technical information contained herein and the engineering data upon which recommendations, conclusions and decisions are based.

Registered Civil Engineer — 7/29/2021
Date

Contents

Section 1. Introduction

Ventura County Public Works Agency Roads & Transportation (PWA-RT) proposes to widen Hueneme Road and Lewis Road from a two-lane roadway to a four-lane roadway with buffered bike lanes and a paved median. The project site is located in the unincorporated area of Ventura County on Hueneme Road and Lewis Road from Edison Drive (City of Oxnard City Limits) to approximately 1200' north of University Drive. Lewis Road begins at the intersection of Potrero Road/Laguna Road intersection. The project is approximately 7.2 miles. The project is located mainly in agricultural farmland. See Attachment A for the Project Location Map. The project will include widening the Hueneme Road undercrossing at State Route 1 (Pacific Coast Highway) and the Hueneme Road Bridge over the Revolon Slough. The project will provide improvements to regional vehicle and bicycle travel between Cities of Oxnard and Camarillo.

Section 2. Background

Hueneme Road and Lewis Road within the project limits is a two-lane roadway classified as a County Secondary Free Access Road. Hueneme Road is an east-west arterial from the Port Hueneme to the edge of the California State University Channel campus at the Potrero Road/Laguna Road intersection. Lewis Road starts at this intersection and runs northeast and becomes State Route 34 at the intersection of Pleasant Valley Road. The road functional classification for Hueneme Road changes from Other Principal Arterial to Major Collector, and Lewis Road is classified as a Major Arterial.

Hueneme Road is part of the National Highway System and is designated the primary truck route between US101 and the Port of Hueneme also known as the Hueneme Road – Rice Avenue Corridor. Hueneme Road provides access to the Naval Base Ventura County (NBVC) and Port Hueneme. The Port of Hueneme is the U.S. Port of Entry for the central coast of California, and the only deep-sea port between Los Angeles and the San Francisco Bay area.

Section 3. Purpose and Need

3.1 Purpose

The purpose of this project are as follows:

- Improve vehicle and bicycle travel and safety on Hueneme Road from Oxnard City Limits to Laguna Road/Potrero Road and Lewis Road from Laguna Road/Potrero Road to University Drive.
- Improve the freight movement corridor on Hueneme Road from Oxnard City Limits to Rice Avenue.
- Increase regional connectivity between the coast and City of Camarillo for drivers and bicycle riders.
- Complete vehicle and bicycle improvements consistent with the County of Ventura General Plan.

3.2 Need

Hueneme Road and Lewis Road within the project corridor is a two-lane roadway which experiences heavy travel flows during peak hours. In addition, Hueneme Road serves as the primary freight route to and from Port of Hueneme; therefore, Hueneme Road experiences a large percentage of truck traffic from the Oxnard City Limit to Rice Avenue.

Section 4. Traffic Engineering Performance Assessment

A Traffic Engineering Performance Assessment was based on traffic data and information available from Ventura County Transportation Commission and Ventura County PWA-RT. This assessment provides a technical foundation for developing the purpose and need for the proposed project and outlines the scope of the traffic study to be conducted as part of the PA&ED phase of the project.

LOS D is the minimum acceptable level of service for all County-maintained thoroughfares and federal/state highways in Ventura County, with a few exceptions. LOS C is the minimum acceptable level of service for all County -maintained local roads. Below are the traffic conditions for the Level of Service as presented in Table 6-7 of the 2040 General Plan Update.

LEVEL OF SERVICE DESCRIPTIONS	
LOS	**Traffic Conditions**
A	Free uninterrupted low volume flow at high speeds with no restriction on maneuverability (lane changing) and with little or no delays.
B	Stable flow with some restrictions to operating speed occurring.
C	Stable flow but with speed and maneuverability restricted by higher traffic volumes. Satisfactory operating speed for urban locations with some delays at signals.
D	Approaching unstable flow with tolerable operating speeds subject to considerable and sudden variation, little freedom to maneuver and with major delays at signals.
E	Unstable flow with volume at or near capacity, lower operating speeds and major delays and stoppages.
F	Forced flow operation with low speeds and stoppages for long periods due to congestion. Volumes below capacity.

Table 6-10 in Chapter 6 – Transportation and Mobility of the 2040 General Plan Update provides existing Level of Service based on 2015 traffic volumes for Hueneme Road and Lewis Road.

Road	Location	Road Class[1]	Lanes	Count (Day: 2015 VPD)	LOS	Part of Regional Network
Hueneme Road	e/o Las Posas Rd	1	2	11,200	D	✓
	e/o Nauman Rd	1	2	10,500	D	✓
	e/o Wood Rd	1	2	10,400	D	✓
	w/o Olds Rd	1	2	12,300	D	✓
Lewis Road	s/o Pleasant Valley Rd	1	4	15,500	A	✓
	n/o Potrero Rd	1	2	9,500	C	✓

Note: 1 - Class I roadways are rural two-lane or multi-lane roads of essentially level terrain,where the road section has been improved to meet current road standard criteria

In addition, Table 6-12 in Chapter 6 – Transportation and Mobility of the 2040 General Plan Update provides the LOS on Freeway/Multilane Highway Facilities.

Fwy Rte	Post mile	Location Description	Road Class	Lanes	AADT	LOS
1	12.785	Hueneme Road	Freeway	4	11,500	A

Ventura County PWA-RT updates the County's road daily traffic volumes periodically and has the following 2019 daily traffic volumes for this corridor. Due to the impact of COVID-19 stay at home order traffic counts have not been conducted for 2020-21.

Road	Location	Count (Day: 2019 VPD)	LOS
Hueneme Road	e/o Las Posas Rd	12,800	D
	e/o Nauman Rd	11,300	D
	e/o Wood Rd	10,300	D
	w/o Olds Rd	15,700	D
Lewis Road	s/o Pleasant Valley Rd	19,700	B
	n/o Potrero Rd	11,400	D

The roadway segments are within the minimum acceptable level of service; however, the Hueneme Road segment from the Oxnard City Limit to Olds Road is nearing a LOS E. There has not been any recent traffic study to estimate the future traffic volumes and movements for this corridor based projected growth rates in the County. In addition, there are no recent vehicle turning volumes in the corridor to determine the need for left and right turn pockets and the required pocket lengths. As part of the next project phase, a Traffic Operational Analysis Report should be prepared for the project corridor. New data should be collected to reflect the most current conditions and new traffic forecasts for the Opening Year and Design Year. Safety analysis should be updated with the latest accident data.

Section 5. Deficiencies

The project proposes to address the existing and future level of service for this corridor. Hueneme Road and Lewis Road experience higher vehicles volumes for a two-lane roadway (i.e. LOS D). Due to high vehicle speeds in this project corridor, the County proposes to include a paved median to provide a buffer between opposing traffic and to accommodate the movements of agricultural vehicles and equipment.

The existing corridor has minimum roadway shoulders. The project would widen the roadway shoulder to 8'. The shoulder would provide additional lateral clearance and emergency access. The new roadway shoulder would serve as a Class II bike lane. When completed, a Class II bicycle facility would stretch from the City of Oxnard to the City of Camarillo through the County green belt.

Section 6. Corridor and System Coordination

6.1 Regional

6.1.1 Vehicle

Hueneme Road and Lewis Road within the project limits have been identified to be widened to a 4-lane roadway in past and recent regional transportation plans and studies.

In 2005, the County of Ventura Subsequent Environmental Impact Report for Focused General Plan Update amended the Public Facilities Map to reflect the road widening of the Regional Road Network to accommodate the projected traffic flows for the year 2020 at the prescribed LOS standards of the General Plan. Hueneme Road would be widened as follows:

Limits	Current Number of Lanes	Existing Plan Number of Lanes (2010)	Proposed Number of Lanes
Oxnard City Limits to Rice Avenue	2	4	4
Rice Avenue to Las Posas Road	2	2	4

The 2009 Ventura County Congestion Management Program identified the roadway improvements which included Hueneme Road from Oxnard City Limits to Rice Avenue – Widen 2 to 4 Lanes in the Near-Term Project List (FY2008/09 through FY2014/15) and Hueneme Road from Rice Avenue to Las Posas Road – Widen 2 to 4 lanes in the Long-Term Project List (FY2026/27 through FY2034/35).

The adopted Ventura County 2040 General Plan Update includes the County's plan for Transportation and Mobility in Chapter 6. Hueneme Road and Lewis Road are "Federally Classified Unincorporated County Roads." Hueneme Road is classified as a "Other Principal Arterial" (OPA) from Edison Drive to Olds Road and a "Major Collector" (MJC) from Olds Road to Laguna Road. Hueneme Road operates with a Level of Service of D in these segments based on 2015 traffic volumes. Lewis Road is a "Minor Arterial" (MA) from Laguna Road to Pleasant Valley Road. This segment operates at Level of Service of C using 2015 traffic volumes. Traffic conditions for Level of Service D is "approaching unstable flow with tolerable operating speeds subject to considerable and sudden variation, little freedom to maneuver and with major delays at signals."

6.1.2 Bicycle

Continue providing Class II Bike Lanes on Hueneme Road from the Oxnard City Limits to Laguna Road and on Lewis Road.

Adopted in 2007, Ventura County Transportation Commission (VCTC) - Ventura Countywide Bicycle Master Plan established a planning document that provided recommendations for expanding bikeway infrastructure, closing gaps, and encouraging bicycling for recreation and mobility. This master plan included the Recommended Countywide Bicycle Network consisting of existing facilities and proposed bikeway improvements. Hueneme Road and Lewis Road are to include Class II Bicycle Lanes as part of this master plan.

The County's Comprehensive Transportation Plan (CTP) developed by VCTC (2013) identified the need for pedestrian and bike facility improvements and funding. The CTP found that the bike and pedestrian infrastructure were relatively well developed within the cities but were not well connected across jurisdictional boundaries.

In 2017, VCTC released Ventura County Bicycle Wayfinding Plan to identify regional bicycle routes, inform prioritization of locations for bike infrastructure improvements, and develop a consistent bicycle wayfinding sign design for regional bike routes throughout Ventura County. Regional routes prioritized connections between communities. Lewis Road is part of the County's "Camarillo to Coastal Route." Hueneme Road is part of County's "Coast Route to Westlake Village" and the "Coast Route." The plan rated Hueneme Road as a segment with "most stress bicycling."

Presently, Hueneme Road and Lewis Road corridor has the following existing bike facilities:

Road Name	Road Limit	Bike Lane Miles	Class Type
Hueneme Road	Edison Drive to Laguna Road	12.58	II
Lewis Road	Laguna Road to Pleasant Valley Road	7.08	II

6.2 Freight Movement

Moving goods through Ventura County is critical to its economy and sustainability. The Port of Hueneme is the only deep-water port between Los Angeles and the San Francisco Bay Area, and the U.S. Port of Entry for California's central coast region. The Port of Hueneme specializes in the import and export of automobiles, fresh fruit and produce. Its location on the Santa Barbara Channel positions it as the primary support facility for the offshore oil industry.

Freight truck and rail movement to and from Port Hueneme is critical to its continued viability. The challenge for freight movements is that Port Hueneme is surrounded in urban development, placing truck traffic in competition with local traffic on local streets and roads. Maintaining effective and efficient port access that minimizes impacts to surrounding communities is a significant challenge for the future. VCTC recognized this challenge and has prepared studies to improve the access to and from the Port.

2008 Southern California Association of Governments (SCAG) Cities of Port Hueneme/Oxnard Truck Traffic Study recommended widening Hueneme Road to a full four lane divided arterial street between Ventura Road and Rice Avenue, installing directional signage along Port Hueneme Road/Hueneme Road and Rice Avenue and coordination of traffic signal along Port Hueneme Road/Hueneme Road between Ventura Road and Rice Avenue.

2009 Ventura County Congestion Management Program discussed Port Truck Access Corridor in Chapter 2. Government agencies and the Oxnard Harbor District (Port operator) designated a primary truck corridor for Port-related truck traffic traveling between the Port and US 101. The purpose for designating the corridor is to reduce truck traffic in residential neighborhoods, reduce congestion on city streets, and to speed the flow of goods between the freeway and the Port. The corridor selected was Hueneme Road to Rice Avenue. Projects required to bring the corridor up to standards for truck use include Widening Hueneme Rd between Oxnard City Limits and Rice Ave from 2 to 4 lanes - County of Ventura (Chapter 7 Near-Term Project List, RTIP# VEN011202)

Section 6.5 Goods Movement of the 2040 County of Ventura General Plan Update includes discussion of truck freight. Hueneme Road was identified as the Primary Port Access Route as well as the Cities of Oxnard and Port Hueneme Commercial Vehicle Route.

Section 7. Alternatives

This project evaluated three alternatives for Hueneme Road from Oxnard City Limit to the Laguna Road/Potrero Road intersection. This section provides the design parameters used in developing the three alternatives and a description of the proposed improvements.

Lewis Road would need to be widened to the west as the Calleguas Creek and Ventura County Watershed Protection District (VCWPD) right of way is immediately east of Lewis Road. As part of the Lewis Road Widening project, Ventura County PWA-RT coordinated the layout of the new Lewis Road with VCPWD. The space between Lewis Road and Calleguas Creek is reserved for future levee heightening.

7.1 Design Standards

7.1.1 Roadway Standards

The proposed roadway widening would conform to the Ventura County Road Standards (RdStds). Hueneme Road and Lewis Road within the project limits are classified as a Secondary Free Access Road B-3 [A] per Plate B-3. Based on the flat and open terrain, the proposed design speed for this corridor would be a minimum of 55 mph. The County proposes to include a paved 14' wide median to provide a buffer for oncoming traffic and movements of agricultural vehicles and equipment. The road section would include 4 -12' wide vehicle lanes, 2 – 8' wide roadway shoulders / bike lanes and 8' wide parkways. The parkway would include 4' wide shoulder backing. In result, the minimum roadway right of way width would be 94'. For roadway segments in fill, the roadway right of way would be wider to include the fill slope and the roadside ditch.

The minimum longitudinal grade for a Secondary Free Access Road is 1.0%. Some of the existing grades on Hueneme Road are far below this standard as the Oxnard Plain is flat. The roadway widening would not include reprofiling the roadway and therefore a design exception will be required for a substandard longitudinal grade. Hueneme Road is located in rural setting without curb and gutters; therefore, the proposed 2% cross slope would push stormwater flows to the roadway shoulder and/or ditch.

The final roadway pavement section would be based on geotechnical field testing. For this report, the project would use the Lewis Road pavement section of 2" ARHM, 6" AC, 7" PMB and 18" Sand as Lewis Road is a four-lane roadway with similar underlying soil conditions. With poor soil conditions, the 18" sand layer would improve the R value for the proposed pavement section.

The proposed roadway would include Class II bike lanes. With high vehicle speeds in the corridor, the 8' wide roadway shoulder would be striped as a 6' wide bike lane with a 2' wide buffer.

7.1.2 Roadway Drainage

The project would follow Plates A-4 and B-3 of the RdStds for roadway drainage. County roads are designed for 10-year average return period while ensuring that adjacent lot pads do not flood in 100-year average return period.

Per Section 4.4 of the RdStds, roadside ditches are provided on each side of the road to carry drainage from the road right-of-way and from overland sheet flows of adjacent property to the nearest natural drainage path or drainage channel. The ditch would be omitted when adjacent land drains away from the road. The roadside ditches would not intercept or divert natural or artificial channels.

For the ten percent storm, water shall be maintained below the elevation of the outer edge of the shoulder. For the two percent storm, water shall be maintained below the elevation of the edge of pavement.

7.1.3 Waterways

For County Transportation drainage facilities, culverts and bridges shall be designed to accommodate the two percent (50-year average return period) storm flow per Section 4.2, Plate A-4 of the RdStds. Bridges and large box culverts shall include 2 feet of freeboard to allow for debris bulking.

Mugu Drain and Revolon Slough are under the jurisdiction of Ventura County Watershed Protection District (VCWPD). Per VCWPD, formerly Ventura County Flood Control District (VCFCD) Design Manual, channels (i.e. Mugu Drain) are to be designed for a 50-year return period. For major waterways like the Revolon Slough, VCWPD requires bridge structures to convey 100-year return period flows and comply with VCWPD levee guidelines of 4 feet of freeboard.

7.1.4 Floodplain Encroachment

Based on a review of FEMA Flood Insurance Rate Maps (FIRM) 06111C0920E, 0611C0937E, 0611C0938E, 06111C0939E and 06111C0941E, Hueneme Road is within the 100-year floodplain from Wood Road to south of the Laguna Road/Potrero Road. Lewis Road is outside of the 100-year floodplain. FIRM maps are provided in Appendix C. The County flood encroachment permit requires the project not to increase the base flood elevation over a foot. This project would widen the existing roadway and would not reprofile the roadway except at Revolon Slough. In result, the project is not expected to have any impacts to the existing 100-year floodplain.

7.1.5 Stormwater Treatment

Proposed Ventura County projects need to abide by the California Regional Water Quality Control Board – Los Angeles Region Order R4-2010-0108, NPDES Permit No. CAS004002 for Stormwater (Wet Weather) and Non-Stormwater (Dry Weather) Discharge from the Municipal Separate Storm Sewer Systems. Per Section II – Applicability, "streets, roads, highways, and freeway construction of 10,000 square feet or more of impervious surface area shall incorporate United States Environmental Protection Agency (USEPA) guidance regarding Managing Wet Weather with Green Infrastructure: Green Streets to the maximum extent practicable." USEPA Green Street - Alternative Street Design include street width modification, swales, bioretention curb extensions and sidewalk planters, permeable pavement, sidewalk trees and tree boxes.

Since the project is located in a rural setting without curb and gutter and sidewalks, the green elements within an urban street parkway are not plausible. The proposed roadway section for Hueneme Road and Lewis Road will include roadside ditches. These ditches could include bioswale or bioretention elements to treat the stormwater. Although not required for a roadway project, this project could look into install desilting basins for drainage culverts that outlet directly to Mugu Drain, Revolon Slough and Calleguas Creek.

7.2 Geotechnical Considerations

Oakridge Geoscience, Inc. performed a desktop geotechnical review of the project corridor. See Appendix A for the Desktop Geotechnical Memorandum.

7.2.1 Geotechnical Site Conditions

The onsite earth materials generally consist of granular alluvial soils (silty to clayey sand) with interbedded fine-grained silt and clay soils to depths of greater than 70 feet. Shallow groundwater is present at depths of about 4 to 10 feet along the alignment. The granular soil in the upper 30 feet is typically loose to medium dense or fine-grained soils are soft to medium stiff. Below a depth of about 30 feet the soil is generally medium dense/medium stiff. The project alignment has an estimated peak ground acceleration of about 0.65g which is normal for the Ventura County area. Liquefaction potential is high, especially in the upper 30 feet of the onsite native soils. Based on previous studies, the estimated liquefaction related settlement is in the range of 4 to 6 inches. Preliminary evaluation of the liquefaction potential near the SR-1 structure is in the range of 6 inches to one foot.

7.2.2 Embankment Settlement

Previous studies by Fugro along the eastern portion of the study area (southern portion of Lewis Road) estimated settlement for roadway embankments up to about 6 to 12 inches for 20- foot high embankments and as high as about 1 to 2 feet for a 30-foot high embankment at the Laguna Road/Potrero Road/Lewis Road intersection founded on a relatively thick layer of soft clay soil. Mitigations for the settlement included vertical (wick) drains with a 2.5-foot thick sand layer to collect and disperse water generated from the vertical drains, survey monitoring of settlement and controlled fill loading height of a maximum of 2 feet of soil per day. New roadway embankments higher than about 8 to 10 feet would need to be evaluated to estimate settlement and possible subgrade improvement requirements.

7.2.3 Structure Foundation Design

Structure foundation design for bridges should use Caltrans structure design procedures which include site specific exploration, seismic evaluation and foundation design. Previous bridges have been founded primarily on driven piles founded in dense sand at an elevation of about -35 feet. Deeper foundations may be required depending on the type of pile support utilized and amount of downdrag associated with liquefaction related settlement evaluated as part of the foundation design studies.

Culverts and surface water conveyance facilities outside of the Caltrans right of way should be designed in accordance with VCWPD standards. The VCWPD standards include site specific soil and seismic design parameters based on CBC and in-house design procedures. Shallow groundwater and agricultural return water flow in the drainage facility in a year-round basis. Surface and groundwater dewatering would likely be required during construction of culverts and other surface water conveyance structures.

7.2.4 Constructability

Standard road improvements along a majority of the alignment will need to consider foundation subgrade preparation for the existing agricultural areas as well as protection of existing utilities and improvements. Preparation and compaction of the upper 1 to 2 feet of the existing agriculturally disturbed soil along the road widening alignment will likely result in a 20 percent volume reduction, requiring additional soil to be imported to construct the road subgrade. Groundwater should not be encountered during standard road subgrade preparation but likely will be encountered during subsurface work more than about 4 to 5 feet below existing grade. Existing utilities will need to be protected in-place and agencies should be contacted if additional loading is proposed over existing utilities.

7.3 Alternatives

7.3.1 Alternative # 1 - Widening on Both Sides

Alternative 1 would widen Hueneme Road approximately 20' on both sides. The roadway fill embankments range from close to existing to approximately 5 feet. Drainage cross culverts would need to be extended, and existing roadside ditches would need to be relocated. The project would require upgrading and modifying 9 traffic signals. (This assumes the proposed Wood Road intersection traffic signal would be in place.)

This alternative would acquire approximately the same right of way width from each property owner. This results in requiring property acquisition from 86 separate parcels and the removal of 3 building structures and approximately 1,784 trees. Hueneme Road is a major utility corridor. With SCE utility poles at close proximity to the roadway, a total of 185 poles would need to be relocated. Many water purveyors have facilities in or adjacent to the roadway. The project does not anticipate relocating any existing waterlines but would need to relocate or adjust existing appurtenances. Two Pleasant Valley Water District (PVWD) well stations would need to be relocated. Discussion of the right of way impacts (property owner and utilities) are found in Section 8.

See attachment B for Alternative 1 - Preliminary Hueneme and Lewis Road Plan and Profile. Below are discussions of the proposed improvements at the major intersections, interchange, and waterways.

7.3.1.1 Rice Avenue Intersection

The Rice Avenue intersection is a major truck/freight corridor to and from the US 101. The intersection presently has free right turns with lane tapers to merge vehicle in and out of Hueneme Road. With the road widening, the project would maintain the merging lane tapers. A traffic study would be needed to confirm the turn pocket lengths.

7.3.1.2 Mugu Drain

Mugu Drain is discussed in Section 7.3. The required modifications would not impact the profile of Hueneme Road.

7.3.1.3 Hueneme Road/State Route 1 (SR-1) Interchange

The existing Hueneme Road Undercrossing structure has existing bents adjacent to the roadway shoulder; therefore, the roadway widening would require a new undercrossing structure. The structure alternatives would be discussed further in Section 7.3. The new structure span and depth would require the reprofiling of SR-1. In result, Hueneme Road widening would most likely trigger the upgrade of this interchange. The improvements at the Hueneme Road/SR-1 interchange would need to follow Caltrans Project Development Procedures which would include Caltrans format Project Study Report, Project Report/Environmental Approval and Final Design Plans, Specifications and Estimate.

7.3.1.4 Revolon Slough Bridge

Revolon Slough is discussed in Section 7.3. The Revolon Slough presently does not contain the 100-year return storm event. To meet all the VCWPD bridge and levee requirements, the Hueneme Road profile would need to be raised over 9 feet. The large elevation difference would create challenges if the County chooses to keep the existing bridge in place. A retaining wall and/or an offset concrete barrier would need to be constructed between the two bridges. The VCWPD levee access driveways would need to be moved far west and east away from the levee. With proposed fill heights over 8', settlement would be an issue with poor underlying soil. Fill surcharge and settlement monitoring would most likely be needed.

7.3.1.5 Wood Road Intersection

The Wood Road intersection is the location of a large horizontal roadway curve. To avoid complicating the intersection and existing drainage pattern, the roadway would remain crowned through this curve. The curve radius is approximately 1800'. Per Figure 202.2 of the Caltrans Highway Design Manual, this radius with an adverse cross slope of -2% has a comfortable speed on horizontal curve of 55 mph.

7.3.1.6 Lewis Road

Lewis Road would be widened to the west as Calleguas Creek is located immediately east of Lewis Road. The fill embankment heights would be over 20 feet high at the Laguna Road/Potrero Road intersection and the University Drive intersection. With the expected poor soil conditions, settlement would be an issue. As done in the Lewis Road

Widening Project, the underlying soil and embankment would need to be consolidated using surcharge and wick drains.

7.3.2 Alternative #2 - Widening on One Side

Alternative 2 would widen the roadway approximately 38' on one side where the impacts would be less. In general, the project would widen one side; however, the existing roadway shoulder and shoulder backing on the opposite side of the road would be brought to County standards.

From the Oxnard City Limits to the Wood Road intersection, Hueneme Road would be widened to the south. From the Wood Road Intersection to the Laguna Road/Potrero Road intersection, Hueneme Road would be widened to the north / west. This alternative would require right of way acquisition from 62 parcels, the removals of 4 building structures and approximately 1,255 trees and the relocation of 56 SCE utility poles.

Improvement details to the major intersections, interchange, waterways and Lewis would be similar to Alternative 1. See Attachment C for the Alternative 2 - Preliminary Hueneme and Lewis Road Plan and Profile.

7.3.3 Alternative #3 – Hybrid

Alternative 3 would use a combination of widening both sides and only one side to lessen roadway improvement impacts.

From the Oxnard City Limits to the Olds Road intersection, Hueneme Road would be widened to the south. From the Olds Road intersection, Hueneme Road would transition to be widened on both side at the Rice Avenue intersection. East of the Rice Avenue intersection, Hueneme Road would transition back to be widened on the south. The roadway widening would continue to the south up to the Raytheon Road intersection (east of SR-1 highway). At the Raytheon Road intersection, the roadway widening would transition to be widened to the north. The roadway widening would continue to the north / west to the Laguna Road/Potrero Road intersection. Adjusting the roadway alignment provided limited benefits as the centerline transitions for a 55-mph facility requires thousands of feet. In result, this alternative would require right of way acquisition from 72 parcels, the removals of 3 building structures and approximately 1,282 trees, and the relocation of 72 SCE utility poles.

Improvement details for the major intersections, interchange, waterways and Lewis would be similar to Alternative 1. See Attachment D for the Alternative 3 - Preliminary Hueneme and Lewis Road Plan and Profile.

7.4 Structures

7.4.1 Hueneme Road Undercrossing at State Route 1 (Pacific Coast Highway)

The existing Hueneme Road Undercrossing structure has bents adjacent to Hueneme Road roadway shoulders; therefore, widening Hueneme Road will require the replacement of the existing structure. The proposed structure design would need to consider the falsework depth, the existing structure depth of 4.5', and the 15' minimum vertical clearance to minimize the impacts to the State Route 1 (SR-1) highway profile. With turn pockets required in the median, the proposed structure would need to clear the full Hueneme Road width. In order to provide longer spans while keeping the structure depth similar to the existing structure, precast concrete girder structures are proposed. The structure would have a pile foundation and require dewatering.

This report looked at two alternatives. The first alternative is a three-span precast concrete girder bridge. The structure span is 240' long with a middle span of 130'. The overall structure depth including the composite cast in place deck is 5.25'. The preliminary construction cost is $10,075,000.

The second alternative is a single-span precast concrete girder bridge with a 140' long span. The overall structure depth including the composite cast in place deck is 6.75'. The preliminary construction cost is $8,096,000. Alternatives 1 and 2 would increase the SR-1 highway profile by 0.75' and 2.25' respectively. The proposed structures followed the depth to span ratios prescribed in the Caltrans High Design Manual. The Hueneme Road Undercrossing - Preliminary Advanced Planning Studies are provided in Attachments E and F.

7.4.2 Hueneme Road Bridge at Revolon Slough

Revolon Slough is under the jurisdiction of VCWPD. The existing Hueneme Bridge at Revolon Slough was built in 1975 by VCWPD (Drawing No. Y-3-1400.) Existing Revolon Slough levees at Hueneme Road was built in 1977 by VCWPD (Drawing Y3-1566) for a 50-year Q of 10,800 cfs with 3' of freeboard.

VCPWD provided a hydrology study of the Revolon Slough watershed (Ventura County Watershed Protection District, 2005) in which the drainage area # 5869AC (Revolon Sl. At Jct. W/ Hueneme Rd. Drain) has 10,600 cfs and 13,920 cfs for a 50-year and a 100-year return period respectively. (Both flows include an aerial reduction factor peak.)

VCWPD also provided a HEC-RAS hydraulic model for Revolon Slough; however, the model did not cover the Hueneme Road Bridge. Using County LIDAR data, the HEC-RAS model was extended to cover this project. The hydraulic model based on the existing ground conditions shows the existing bridge does not pass the Q50 flow without the removal of the built-up sedimentation.

Revolon Slough is not specifically identified in VCWPD levee system; therefore, VCWPD was contacted to provide the requirements for the proposed bridge. Per correspondence from VCWPD Planning Division, the proposed bridge would need to convey the Q100 flow and comply with the levee guideline of a 4-foot freeboard.

The existing levee and bridge are not designed for a Q100 flow. The proposed bridge would need to consider the existing levees to contain the Q100 flow and account for freeboard to set the bridge span and height. Due to this new requirement, the proposed bridge would need to be approximately 9' higher, and the bridge span would increase from 225' to 266'. A Manning's roughness coefficient "n" of 0.031 was used in the hydraulic model based on the existing levee drawings. This roughness coefficient will need to be confirmed with VCWPD in final design.

This report looked at two bridge alternatives. Alternative 1 would remove the existing bridge and replace with a 4-lane vehicle bridge. The preliminary construction cost for Alternative 1 is $9,519,000. Alternative 2 would keep the existing bridge in place and construct a parallel two-lane vehicle bridge. The preliminary construction cost for Alternative 2 is $4,327,000. Both bridge alternatives would be cast in place and have a single bent/pier wall in the Revolon Slough. The bridge would have a pile foundation and require dewatering. The study did not consider widening the existing 45-year old bridge as repairing and seismic retrofitting would be problematic.

See Attachments G and H for the Advance Planning Studies - Hueneme Bridge at Revolon Slough Alternatives. Preliminary Revolon Slough Hydrology and HEC-RAS summary, profile and cross sections are provided in Appendix C.

7.4.3 Mugu Drain

Mugu Drain is a low flow well-defined trapezoidal soft bottom channel with earthen embankments. Mugu Drain under Hueneme Road (Bridge No. 535) maintained by Ventura County PWA-RT was constructed in 1952 and is a 12'-7" wide x 10' high reinforced concrete box (RCB) culvert. The existing culvert has 73-degree skew with Hueneme Road and has close to no cover (i.e. vehicles are driving direct on top of the RCB culvert.) This culvert was given a fair rating in a 2011 inspection.

A VCWPD Hydrology study done in 1994 shows an upstream drainage area of 2794 acres and a Q50 of 2442 cfs. Hydraulic analysis show both the existing trapezoidal open channel and box culvert being undersized for the Q50 flow. To avoid reprofiling Hueneme Road, this study considered the following two alternatives. Alternative 1 would remove existing culvert and replace with triple 10" wide x 10' high RCB culverts. The preliminary construction cost for Alternative 1 is $1,648,000. Alternative 2 would install a Double 7' wide x 7' high RCB culvert adjacent to the existing culvert. The trapezoidal open channel upstream will need to be widened to provide proper hydraulic transitions to the wider culvert. The preliminary construction cost for Alternative 2 is $1,047,000.

See Attachments I and J for the Advance Planning Studies – Mugu Drain Alternatives. Preliminary Mugu Drain Hydrology and Hydraulics are provided in Appendix C.

7.5 Bicycle, Pedestrian and Transit Facilities

The project would construct 8' wide roadway shoulders which would be signed and striped as 6' wide Class II bike lane with a 2' wide buffer. Enhanced green bike marking would be installed at intersection approaches and departures. Bicycle loop detectors would be installed at signalized intersections.

The project would not construct pedestrian facilities as the pedestrians are not anticipated in this rural agricultural setting.

The project would not construct transit facilities as Hueneme Road is not a transit route.

7.6 Project Segments

The project is over 7 miles long. The project costs have been broken down into five segments to help in identifying potential funding sources. The following are the segments:

1) Hueneme Road from Oxnard City Limits to the Rice Avenue Intersection
2) Hueneme Road from east of Rice Avenue Intersection to west of the SR-1 Interchange (Naval Air Road)
3) Hueneme Road/SR-1 Interchange
4) Hueneme Road from east of Raytheon Road to Las Posas Road Intersection
5) Hueneme Road/Lewis Road from east of Las Posas Road Intersection to 1200' north of University Drive

The first segment - Hueneme Road from Oxnard City Limits to the Rice Avenue Intersection is a regional freight movement corridor. Past and upcoming infrastructure funds have made this type of corridor a priority. The third segment is the Caltrans Hueneme Road/SR-1 interchange. The interchange improvements would need to follow Caltrans Project Development procedures; therefore, the segment could be made into a separate project/package.

Section 8. Right of Way

8.1 Right of Way Acquisition

The roadway widening would require additional County right of way from adjacent property owners. The right of way would include the necessary roadway embankments, roadside ditches and a toe of fill maintenance width. The corridor is located in mainly agricultural lands protected by the 2016 Save Open and Agricultural Resources (SOAR) initiative. In addition to right of way, the project would displace irrigation facilities and tree rows. The project would require the replacement of 3 to 4 building structures. Due to the required roadway width, the structures would either be within the new roadway footprint or have no setback from the road. The following is a right of way summaries of each alternative.

Alternative	Parcels	R/W need (acres)	Structure Replacement	Tree Replacements
1 – Widen Both Sides	86	30.1	3	1,784
2 – Widen One Side Only	62	32.3	4	1,255
3 - Hybrid	72	31.2	3	1,282

Attachment K provides a summary of the right of way impacts for each parcel for each alternative.

8.2 Utilities

The Lewis Road segment from Laguna Road/Potrero Road Intersection to University Drive was constructed in 2006 in a new alignment and in result has minimal utilities. Hueneme Road is a major utility corridor. The following section describes the known utilities within the project limits. Attachment L provides a summary of the utility impacts.

8.2.1 Southern California Edison (SCE)

SCE overhead power poles are located along the side of Hueneme Road within the whole project corridor. The poles are located within the County right-of-way and most likely installed in franchise agreement. Although the pole relocation would be at the expense of SCE, the project would require extensive coordination and preplanning with SCE. Alternatives 1, 2 and 3 would require the relocation of 185, 56 and 72 poles respectively.

8.2.1 Telecommunication

Frontier Communications are located on the existing SCE overhead poles Frontier have underground lines within Hueneme Road. Charter Communication has underground facilities at the SR-1 interchange. Crown Castle facilities are on SCE poles near and around the SR-1 interchange. Like SCE, the facilities were installed in franchise agreement; therefore, the County would not bear the relocation costs.

8.2.2 Water and Sewer Agencies

There are multiple water purveyors within the project corridor. The following are a brief description of the water agencies' facilities.

- Calleguas Municipal Water District – Brine pipeline, manhole/vaults, blow offs and air release valves
- Pleasant Valley Water District – Well stations and pipelines
- City of Oxnard – Waterline, Recycled Waterline/Turnouts and Sewer Lines and appurtenances
- Port Hueneme – Recycled waterline and appurtenances
- United Water Conversation - Waterline and appurtenances
- Navy – Sewer force main
- Oceanview Municipal Water District – Waterline and appurtenances
- Private waterline

The project would not relocate any waterlines, recycle waterlines or sewer main. Appurtenances such as blow offs, air release valves, backflow preventers, turnouts, service lines would need to be relocated with the roadway widening. Two Pleasant Valley Water District's well stations would need to be relocated. The City of Oxnard is presently constructing Phase 2 – Recycled Waterline Improvements from Olds Road to Wood Road. Portions of the City of Oxnard recycled waterline facilities are located outside of the County right of way; therefore, the City of Oxnard obtained easements for their facilities. Depending on which alternative is chosen, the County may need obtain a new easements on behalf of the City of Oxnard if the City of Oxnard facilities need to remain outside of the County right of way. The City of Oxnard Plans for Recycled Water Pipeline Phase 2 from Olds Road to Wood Road depicted the City's easements. More research will be needed to determine City's easements' width and locations from the Oxnard City limits to Olds Road. The City's Phase 1 Plans do not show the required easements.

8.2.3 Gas

Sempra Utilities (Gas Company) has gas transmission mains Hueneme Road near Edison Drive and from SR-1 to Wood Road. The existing gas main most likely would not be impacted except where drainage and/or waterline facilities are relocated.

Section 9. Environmental Compliance

Padre Associates, Inc. performed a desktop environmental review of biological and cultural constraints in the project corridor.

9.1 Biological Constraints

9.1.1 Vegetation

Native trees or vegetation would not be removed for construction or displaced by proposed roadway pavement and shoulders. Linear rows of small trees and shrubs and roadside landscaping would be removed by proposed roadway widening. Implementation of Alternative 1 would result in the greatest removal of trees and landscaping (about 9,600 linear feet), and Alternative 3 would result in the least (about 6,600 linear feet). The affected linear tree rows and landscaping provide wildlife habitat. However, special-status species are not anticipated to rely on this vegetation as foraging and nesting habitat. Therefore, impacts to special-status species are not anticipated.

Active bird nests are protected under the California Fish and Game Code and Federal Migratory Bird Treaty Act. The County policy is to avoid tree removal during the breeding season (February 15 through August 1) or conduct breeding bird surveys to determine if vegetation to be removed supports active bird nests. If active nests are found, vegetation removal is postponed until the nest is abandoned. Alternative 1 involves the greatest roadside vegetation removal which may increase the potential to find active nests which may adversely affect the construction schedule.

9.1.2 Revolon Slough

Two alternatives are under consideration to improve the Hueneme Road crossing of the Revolon Slough: four-lane bridge replacement and two-lane bridge adjacent to the existing bridge. Tidewater goby, arroyo chub, two striped garter snake and western pond turtle may be present at the bridge construction site and be adversely affected including direct mortality (by construction equipment), temporary habitat removal and surface flow diversion (habitat modification). Burrowing owl is known to winter in old ground squirrel burrows in local levees. The owls could be present at the bridge construction site and may suffer direct mortality by construction equipment.

White-faced ibis, tricolored blackbird, least Bell's vireo and yellow warbler may forage along Revolon Slough near the bridge construction site; however, these species are highly mobile and not expected to nest in Revolon Slough. In result, substantial adverse effects to these species are not expected.

The four-lane bridge replacement is anticipated to result in greater impacts to special-status species because more piles would be installed in the streambed, and a longer surface flow diversion duration is likely to be required.

Wetlands within Revolon Slough would be impacted by bridge improvements, with the four-lane bridge replacement likely involving greater impacts to wetlands. Costly wetlands mitigation may be required by regulatory agencies.

9.1.3 Calleguas Creek

The proposed project includes widening a 4,500-foot-long segment of Lewis Road adjacent to Calleguas Creek. White rabbit-tobacco has been reported in Calleguas Creek adjacent to the eastern terminus of the proposed project. It is unknown if this species is currently present at this location, considering that vegetation is removed annually by the VCWPD to maintain storm flow capacity.

Arroyo chub, two-striped garter snake and western pond turtle may be present in Calleguas Creek in proximity to proposed roadway improvements. Burrowing owl is known to winter in old ground squirrel burrows in local levees and could be present in proximity to proposed roadway improvements. White-faced ibis, tricolored blackbird, least Bell's vireo and yellow warbler may forage along Calleguas Creek near proposed roadway improvements.

All three alternatives under consideration involve widening to the north of the existing roadway along Calleguas Creek, such that encroachment into Calleguas Creek would not occur. Therefore, impacts to special-status species associated with Calleguas Creek is not anticipated.

See Appendix B for the Biological Resource Constraints Memorandum.

9.2 Cultural Resource Constraints

The records search results indicate that the 21 studies listed in Table 2 have covered most of the proposed Project corridor, and five cultural resources have been identified. P-56-001508 is a redeposited shell and lithic scatter that is believed to be buried by fill during construction of the new Hueneme Road Bridge (Maki, 2001). P-56-150027 is the location of the Old Ocean View School. While none of the original school buildings remain, there is a slight potential for buried historic-aged deposits (Durio, 2003). P-56-153096 is the original Hueneme Road Bridge, which was replaced in the early 2000s. The locations of Temporary Designations AS-2 and AS-3 were identified by Archaeological Advisory Group through archival research. While field surveys of both locations did not yield cultural materials, Temporary Designations AS-2 and AS-3 have a slight potential to contain nineteenth century deposits (Brock, 1987).

P-56-150028 is a Queen Anne style house built by Herbert H. Eastwood, a locally prominent businessman, farmer, and civic leader. The resource was evaluated by Caltrans in 1996 and not found eligible for listing on the National Register of Historic Places (NRHP) or the California Register of Historical Resources (CRHR) (Clement, 1996). The resource is located 35 feet north of the Project corridor.

CA-VEN-174 was initially recorded in 1967 as a prehistoric shell midden site bisected by Potrero Road on the south face of Round Mountain. The site boundary was expanded in the late 1990s to include all of Round Mountain as a possible Chumash summer solstice observation point (Maki, 2001). CA-VEN-174 has also been associated with the Chumash village site, Satwiwa (Singer, 1986). The edge of CA-VEN-174 is approximately 276 feet southeast of the Project corridor, and the shell midden is approximately 0.40 mile southeast of the Project corridor.

To avoid impacts to previously recorded and potential subsurface cultural resources, Padre recommends all project impacts stay within the proposed project corridor. The project corridor has been adequately surveyed more than once and has been previously disturbed from the previous construction of Hueneme Road and the channelization of Calleguas Creek. A change in scope (i.e., increased area of disturbance), will require additional study and a possible archaeological survey.

See Appendix B for the Cultural Resource Constraints Memorandum.

9.3 Environmental Clearance

The project would require an Environmental Impact Report. Key environmental issues would include:

- Aesthetics
- Air Quality
- Biological Resources
- Cultural Resources
- Geology/Soils
- Hydrology/Water Quality
- Noise
- Transportation and Traffic

Specific project impacts include protected agricultural resources, improvements over and in waterways (Revolon Slough and Mugu Drain) and right of way acquisition.

The project corridor is located within agricultural properties. As part of the environmental phase, the project will need to investigate and test for contaminated soils (pesticides) in areas where there will be grading and earthwork activities.

The State's GeoTracker website tracks and archives compliance data from authorized or unauthorized discharges of waste to land, or unauthorized releases of hazardous substances from underground storage tanks. Hueneme Road

and Lewis Road within the project limits are adjacent to past Leaking Underground Storage Tanks (LUST) cleanup sites. There are no active cleanup sites within the corridor. The approximate locations are provided in Appendix B.

The funding and implementing agency for PA&ED is not known at this time and will be decided on a date to be determined by the County. Caltrans would act as the lead agency for CEQA/NEPA.

Section 10. Funding

Funding for this project is expected to come from Federal, State and County funds.

Preliminary project cost estimates are provided in Attachment M. A summary of preliminary project cost is provided below. The project cost includes the construction, right of way, utility, environmental, engineering and construction engineering costs.

Capital Outlay Project Estimate

Alt 1 Widen Both Sides	**Segment**				
	Oxnard City Limit to Rice Ave	E/O Rice Ave to W/O SR-1	SR-1 Interchange	E/O Raytheon Dr to Las Posas Rd	E/O Las Posas Rd to 1200' N/O Univ. Dr
Project Cost	$19,438,000	$12,691,000	$26,837,000	$42,928,000	$14,088,000
				Grand Total	$115,982,000

Alt 2 Widen One Side	**Segment**				
	Oxnard City Limit to Rice Ave	E/O Rice Ave to W/O SR-1	SR-1 Interchange	E/O Raytheon Dr to Las Posas Rd	E/O Las Posas Rd to 1200' N/O Univ. Dr
Project Cost	$18,292,000	$13,323,000	$26,689,000	$43,002,000	$13,941,000
				Grand Total	$115,247,000

Alt 3 Hybrid	**Segment**				
	Oxnard City Limit to Rice Ave	E/O Rice Ave to W/O SR-1	SR-1 Interchange	E/O Raytheon Dr to Las Posas Rd	E/O Las Posas Rd to 1200' N/O Univ. Dr
Project Cost	$18,319,000	$12,663,000	$26,705,000	$41,213,000	$13,993,000
Grand Total					$112,893,000

The preliminary project costs are based on full replacement of the Mugu Drain, Hueneme Road Undercrossing at SR-1 and Revolon Slough Bridge. The level of detail available to develop these capital outlay project estimates is useful for long-range planning purposes only. The capital outlay project estimates should not be used to program or

commit State-programmed capital outlay funds. The project report would serve as the appropriate document from which the remaining support and capital components of the project would be programmed.

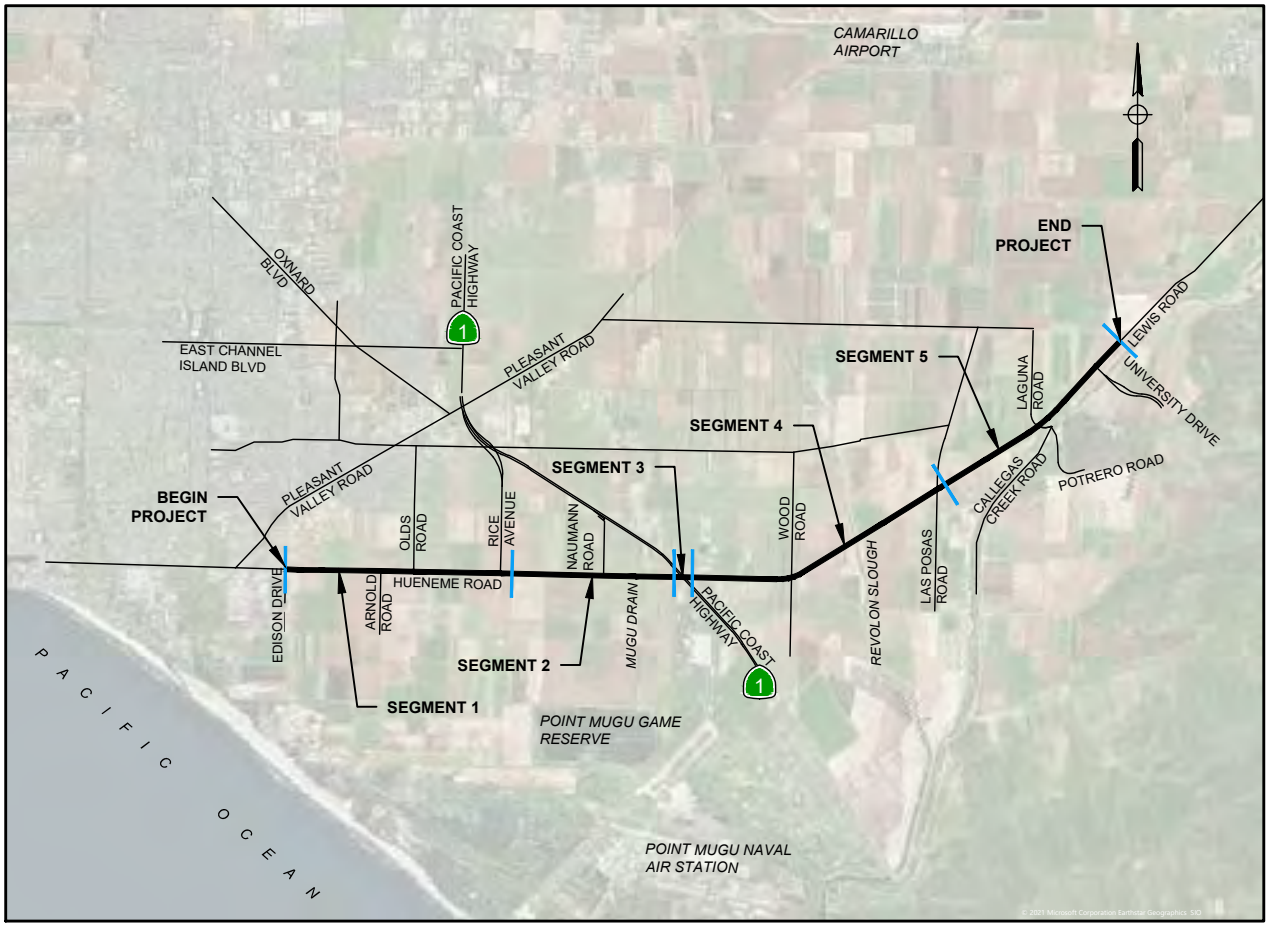
Section 11. External Agency Coordination

The project will require coordination with the following agencies:

- Caltrans
- Ventura County Watershed Protection District
- City of Oxnard
- Regional Water Quality Control Board – Los Angeles
- California Department of Fish and Wildlife
- Army Corps of Engineer

Section 12. Attachments

Attachment A. Project Location Map



8000' 0' 8000'

SCALE 1" = 8000'

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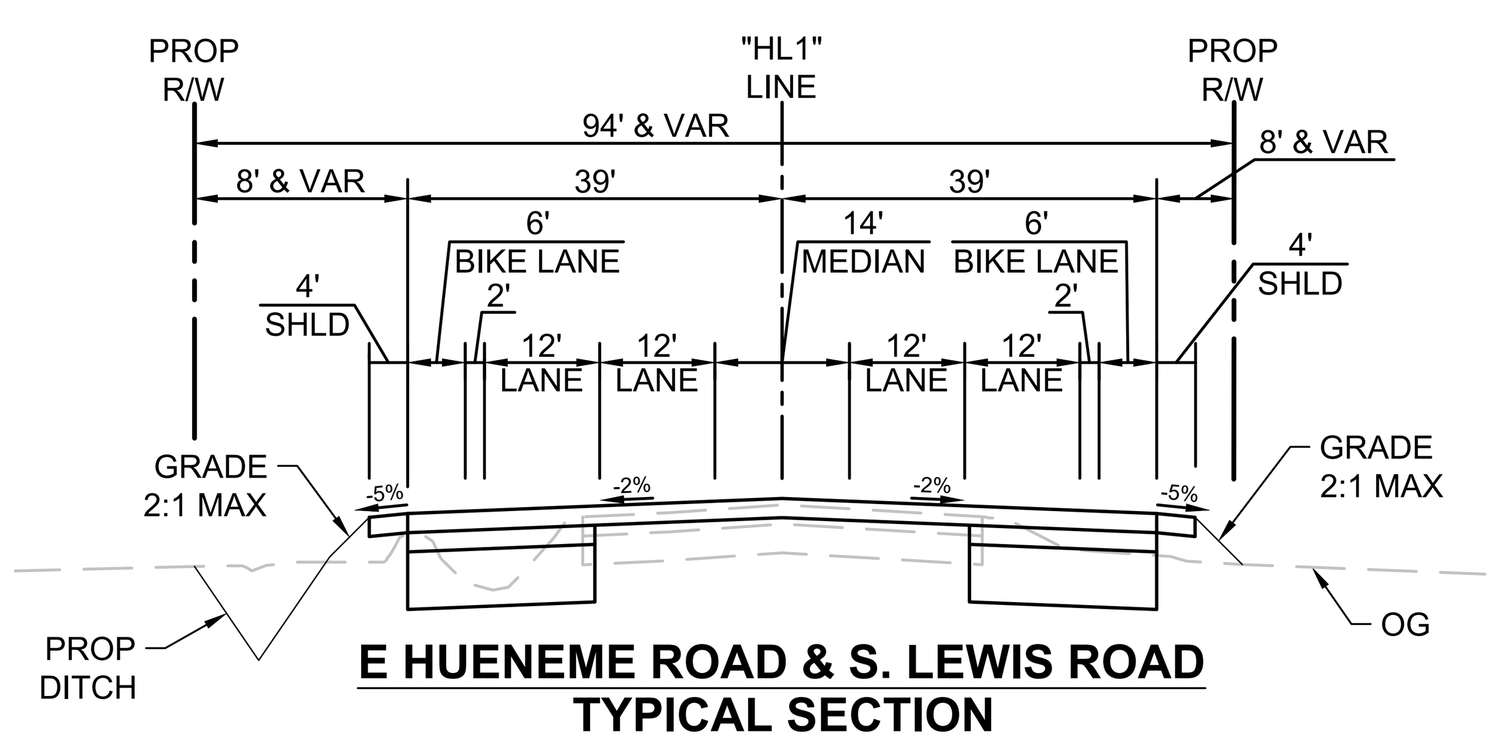
Hueneme Road and Lewis Road Widening Location Map

Attachment B. Alternative 1 – Widen Both Sides



E HUENEME ROAD & S. LEWIS ROAD
TYPICAL SECTION
NOT TO SCALE
STA 10+00 TO 392+79

DISPOSITION NOTES

1 GRADING LIMIT	9 ACCESS ROAD
2 DRAINAGE DITCH	10 IRRIGATION FACILITY RELOCATION
3 TRAFFIC SIGNAL MODIFICATIONS	11 WATER FACILITY RELOCATION
4 DRAINAGE PIPE / INLET RELOCATION	12 BRIDGE RECONSTRUCTION
5 CULVERT EXTENSION / RELOCATION	13 BUILDING REMOVAL
6 CULVERT RECONSTRUCTION	14 REMOVE SHRUBS
7 POWER POLE RELOCATION	15 GUARDRAIL RELOCATION
8 TREE REMOVAL	16 FENCE AND GATE RELOCATION

SCALE
HORIZ: 1" = 100'
VERT: 1" = 10'

GRAPHIC SCALE
1 inch = 100 ft.

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HUENEME ROAD WIDENING STREET IMPROVEMENT PLANS
PLAN AND PROFILE (ALTERNATIVE-1)

SHEET 1 OF 13
DRAWING NO. C-01

DISPOSITION NOTES

1 GRADING LIMIT	9 ACCESS ROAD
2 DRAINAGE DITCH	10 IRRIGATION FACILITY RELOCATION
3 TRAFFIC SIGNAL MODIFICATIONS	11 WATER FACILITY RELOCATION
4 DRAINAGE PIPE / INLET RELOCATION	12 BRIDGE RECONSTRUCTION
5 CULVERT EXTENSION / RELOCATION	13 BUILDING REMOVAL
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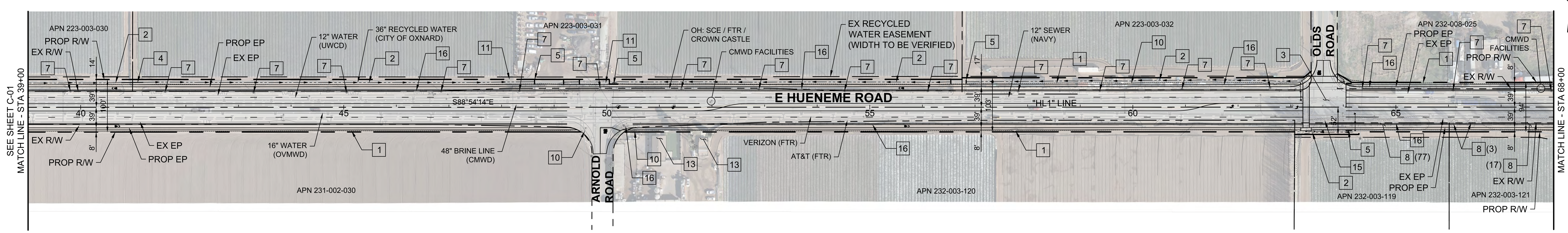
7 POWER POLE RELOCATION	15 GUARDRAIL RELOCATION
8 TREE REMOVAL	16 FENCE AND GATE RELOCATION

SCALE HORIZ: 1"= 100' VERT: 1"= 10'



GRAPHIC SCALE 1 inch = 100 ft.

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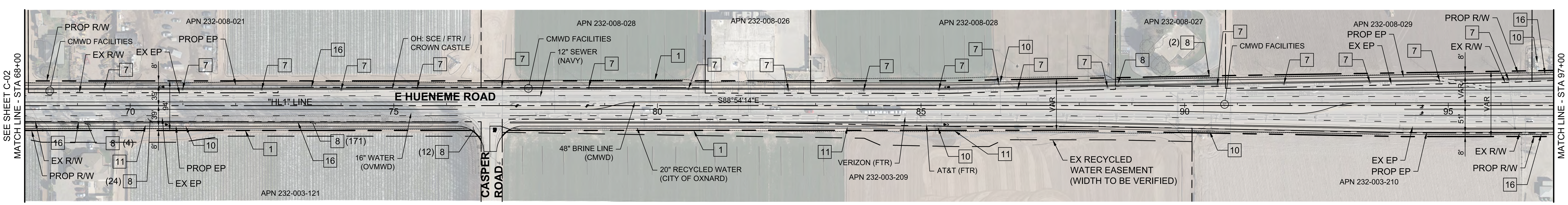
SHEET 2 OF 13
DRAWING NO. C-02

SCALE
HORIZ: 1" = 100'
VERT: 1" = 10'

DISPOSITION NOTES

1	GRADING LIMIT	9	ACCESS ROAD
2	DRAINAGE DITCH	10	IRRIGATION FACILITY RELOCATION
3	TRAFFIC SIGNAL MODIFICATIONS	11	WATER FACILITY RELOCATION
4	DRAINAGE PIPE / INLET RELOCATION	12	BRIDGE RECONSTRUCTION
5	CULVERT EXTENSION / RELOCATION	13	BUILDING REMOVAL
6	CULVERT RECONSTRUCTION	14	REMOVE SHRUBS
7	POWER POLE RELOCATION	15	GUARDRAIL RELOCATION
8	TREE REMOVAL	16	FENCE AND GATE RELOCATION



GRAPHIC SCALE
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STREET IMPROVEMENT PLANS
PLAN AND PROFILE
(ALTERNATIVE-1)

SHEET 3 OF 13
DRAWING NO. C-03

SCALE
HORIZ: 1"= 100'
VERT: 1"= 10'

DISPOSITION NOTES

1	GRADING LIMIT	9	ACCESS ROAD
2	DRAINAGE DITCH	10	IRRIGATION FACILITY RELOCATION
3	TRAFFIC SIGNAL MODIFICATIONS	11	WATER FACILITY RELOCATION
4	DRAINAGE PIPE / INLET RELOCATION	12	BRIDGE RECONSTRUCTION
5	CULVERT EXTENSION / RELOCATION	13	BUILDING REMOVAL
6	CULVERT RECONSTRUCTION	14	REMOVE SHRUBS
7	POWER POLE RELOCATION	15	GUARDRAIL RELOCATION
8	TREE REMOVAL	16	FENCE AND GATE RELOCATION

GRAPHIC SCALE
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1 inch = 100 ft.

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(ALTERNATIVE-1)

SHEET 4 OF 13
DRAWING NO. C-04

SCALE
HORIZ: 1"= 100'
VERT: 1"= 10'

DISPOSITION NOTES

1	GRADING LIMIT	9	ACCESS ROAD
2	DRAINAGE DITCH	10	IRRIGATION FACILITY RELOCATION
3	TRAFFIC SIGNAL MODIFICATIONS	11	WATER FACILITY RELOCATION
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HUENEME ROAD WIDENING STREET IMPROVEMENT PLANS
PLAN AND PROFILE (ALTERNATIVE-1)

SHEET 5 OF 13
DRAWING NO. C-05

SCALE
HORIZ: 1"= 100'
VERT: 1"= 10'

DISPOSITION NOTES

1	GRADING LIMIT	9	ACCESS ROAD
2	DRAINAGE DITCH	10	IRRIGATION FACILITY RELOCATION
3	TRAFFIC SIGNAL MODIFICATIONS	11	WATER FACILITY RELOCATION
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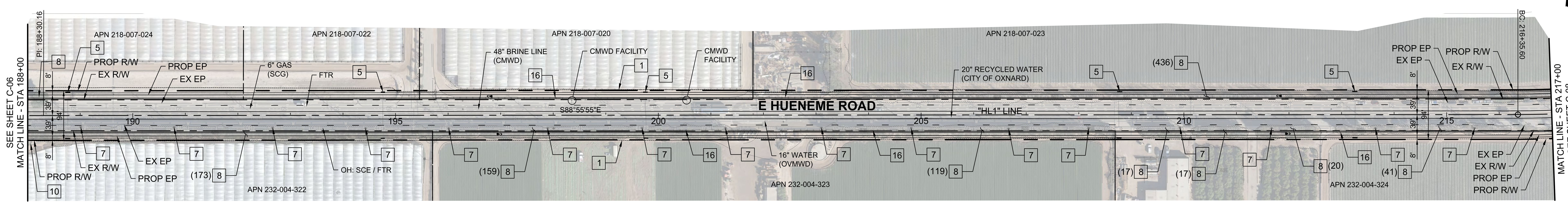
HUENEME ROAD WIDENING STREET IMPROVEMENT PLANS
PLAN AND PROFILE
(ALTERNATIVE-1)

SHEET 6 OF 13
DRAWING NO. C-06

SCALE
HORIZ: 1"= 100'
VERT: 1"= 10'

DISPOSITION NOTES

1	GRADING LIMIT	9	ACCESS ROAD
2	DRAINAGE DITCH	10	IRRIGATION FACILITY RELOCATION
3	TRAFFIC SIGNAL MODIFICATIONS	11	WATER FACILITY RELOCATION
4	DRAINAGE PIPE / INLET RELOCATION	12	BRIDGE RECONSTRUCTION
5	CULVERT EXTENSION / RELOCATION	13	BUILDING REMOVAL
6	CULVERT RECONSTRUCTION	14	REMOVE SHRUBS
7	POWER POLE RELOCATION	15	GUARDRAIL RELOCATION
8	TREE REMOVAL	16	FENCE AND GATE RELOCATION



DIGALERT
DIAL TOLL FREE
811
AT LEAST TWO DAYS BEFORE YOU DIG
UNDERGROUND SERVICE ALERT OF SOUTHERN CALIFORNIA

GRAPHIC SCALE
1 inch = 100 ft.

CONCEPTUAL PLANS - NOT FOR CONSTRUCTION

△	REVISION	DESCRIPTION	APP	DATE
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Phone: 805-648-4840
www.mnsengineers.com
PLANS PREPARED UNDER THE DIRECTION OF:
MICHAEL IP RCE 43671 DATE

REGISTERED PROFESSIONAL ENGINEER
Michael Ip
No.43671
Exp. 3/31/23
CIVIL
STATE OF CALIFORNIA

DESIGNED RW
DRAWN RW
CHECKED SP
APPROVED MI

COUNTY OF VENTURA PUBLIC WORKS AGENCY
ROADS & TRANSPORTATION

SPEC NO.
PROJ. NO. 50058

HUENEME ROAD WIDENING STREET IMPROVEMENT PLANS
PLAN AND PROFILE
(ALTERNATIVE-1)

SHEET 7 OF 13
DRAWING NO. C-07

SCALE
HORIZ: 1"= 100'
VERT: 1"= 10'

DISPOSITION NOTES

1	GRADING LIMIT	9	ACCESS ROAD
2	DRAINAGE DITCH	10	IRRIGATION FACILITY RELOCATION
3	TRAFFIC SIGNAL MODIFICATIONS	11	WATER FACILITY RELOCATION
4	DRAINAGE PIPE / INLET RELOCATION	12	BRIDGE RECONSTRUCTION
5	CULVERT EXTENSION / RELOCATION	13	BUILDING REMOVAL
6	CULVERT RECONSTRUCTION	14	REMOVE SHRUBS
7	POWER POLE RELOCATION	15	GUARDRAIL RELOCATION
8	TREE REMOVAL	16	FENCE AND GATE RELOCATION

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GRAPHIC SCALE
1 inch = 100 ft.

CONCEPTUAL PLANS - NOT FOR CONSTRUCTION

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DRAWN RW
CHECKED SP
APPROVED MI

COUNTY OF VENTURA PUBLIC WORKS AGENCY
ROADS & TRANSPORTATION

SPEC NO.
PROJ. NO. 50058

HUENEME ROAD WIDENING STREET IMPROVEMENT PLANS
PLAN AND PROFILE (ALTERNATIVE-1)

SHEET 8 OF 13
DRAWING NO. C-08

SCALE
HORIZ: 1"= 100'
VERT: 1"= 10'

DISPOSITION NOTES

1 GRADING LIMIT	9 ACCESS ROAD
2 DRAINAGE DITCH	10 IRRIGATION FACILITY RELOCATION
3 TRAFFIC SIGNAL MODIFICATIONS	11 WATER FACILITY RELOCATION
4 DRAINAGE PIPE / INLET RELOCATION	12 BRIDGE RECONSTRUCTION
5 CULVERT EXTENSION / RELOCATION	13 BUILDING REMOVAL
6 CULVERT RECONSTRUCTION	14 REMOVE SHRUBS
7 POWER POLE RELOCATION	15 GUARDRAIL RELOCATION
8 TREE REMOVAL	16 FENCE AND GATE RELOCATION

GRAPHIC SCALE
1 inch = 100 ft.

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STATE OF CALIFORNIA

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CHECKED SP
APPROVED MI

COUNTY OF VENTURA
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ROADS & TRANSPORTATION

SPEC NO.
PROJ. NO. 50058

HUENEME ROAD WIDENING
STREET IMPROVEMENT PLANS
PLAN AND PROFILE
(ALTERNATIVE-1)

SHEET 9 OF 13
DRAWING NO. C-09

DISPOSITION NOTES

1	GRADING LIMIT	9	ACCESS ROAD
2	DRAINAGE DITCH	10	IRRIGATION FACILITY RELOCATION
3	TRAFFIC SIGNAL MODIFICATIONS	11	WATER FACILITY RELOCATION
4	DRAINAGE PIPE / INLET RELOCATION	12	BRIDGE RECONSTRUCTION
5	CULVERT EXTENSION / RELOCATION	13	BUILDING REMOVAL
6	CULVERT RECONSTRUCTION	14	REMOVE SHRUBS
7	POWER POLE RELOCATION	15	GUARDRAIL RELOCATION
8	TREE REMOVAL	16	FENCE AND GATE RELOCATION

SCALE
HORIZ: 1"= 100'
VERT: 1"= 10'

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GRAPHIC SCALE
1 inch = 100 ft.

CONCEPTUAL PLANS - NOT FOR CONSTRUCTION

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ROADS & TRANSPORTATION

SPEC NO.
PROJ. NO. 50058

HUENEME ROAD WIDENING STREET IMPROVEMENT PLANS
PLAN AND PROFILE (ALTERNATIVE-1)

SHEET 10 OF 13
DRAWING NO. C-10

SCALE
HORIZ: 1"= 100'
VERT: 1"= 10'

DISPOSITION NOTES

1	GRADING LIMIT	9	ACCESS ROAD
2	DRAINAGE DITCH	10	IRRIGATION FACILITY RELOCATION
3	TRAFFIC SIGNAL MODIFICATIONS	11	WATER FACILITY RELOCATION
4	DRAINAGE PIPE / INLET RELOCATION	12	BRIDGE RECONSTRUCTION
5	CULVERT EXTENSION / RELOCATION	13	BUILDING REMOVAL
6	CULVERT RECONSTRUCTION	14	REMOVE SHRUBS
7	POWER POLE RELOCATION	15	GUARDRAIL RELOCATION
8	TREE REMOVAL	16	FENCE AND GATE RELOCATION

GRAPHIC SCALE
1 inch = 100 ft.

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CONCEPTUAL PLANS - NOT FOR CONSTRUCTION

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ROADS & TRANSPORTATION

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PROJ. NO. 50058

HUENEME ROAD WIDENING STREET IMPROVEMENT PLANS
PLAN AND PROFILE
(ALTERNATIVE-1)

SHEET 11 OF 13
DRAWING NO. C-11

DISPOSITION NOTES

1 GRADING LIMIT	9 ACCESS ROAD
2 DRAINAGE DITCH	10 IRRIGATION FACILITY RELOCATION
3 TRAFFIC SIGNAL MODIFICATIONS	11 WATER FACILITY RELOCATION
4 DRAINAGE PIPE / INLET RELOCATION	12 BRIDGE RECONSTRUCTION
5 CULVERT EXTENSION / RELOCATION	13 BUILDING REMOVAL
6 CULVERT RECONSTRUCTION	14 REMOVE SHRUBS
7 POWER POLE RELOCATION	15 GUARDRAIL RELOCATION
8 TREE REMOVAL	16 FENCE AND GATE RELOCATION

SCALE
HORIZ: 1"= 100'
VERT: 1"= 10'

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CONCEPTUAL PLANS - NOT FOR CONSTRUCTION

GRAPHIC SCALE
1 inch = 100 ft.

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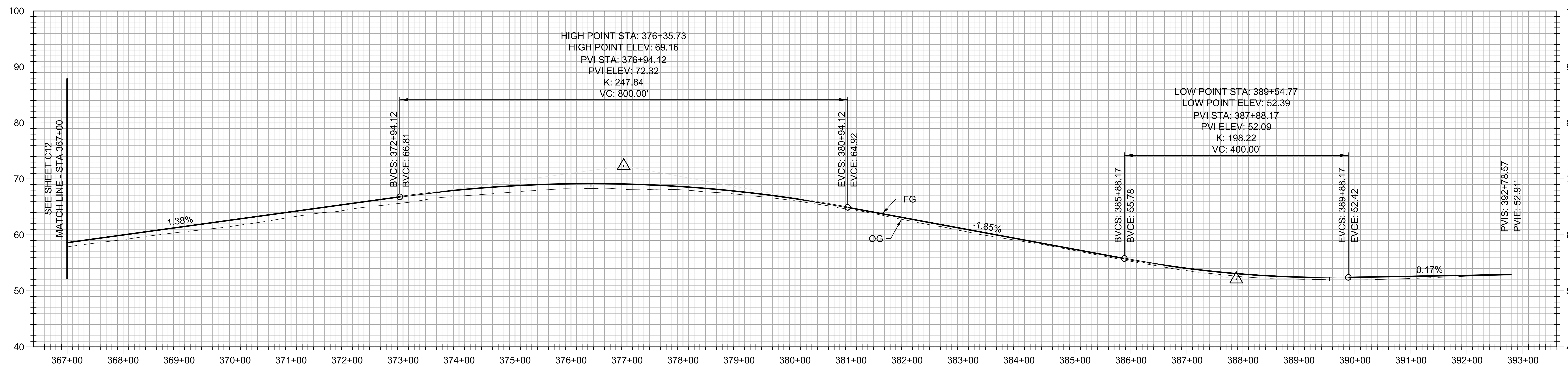
PROJ. NO. 50058

HUENEME ROAD WIDENING
STREET IMPROVEMENT PLANS
PLAN AND PROFILE
(ALTERNATIVE-1)

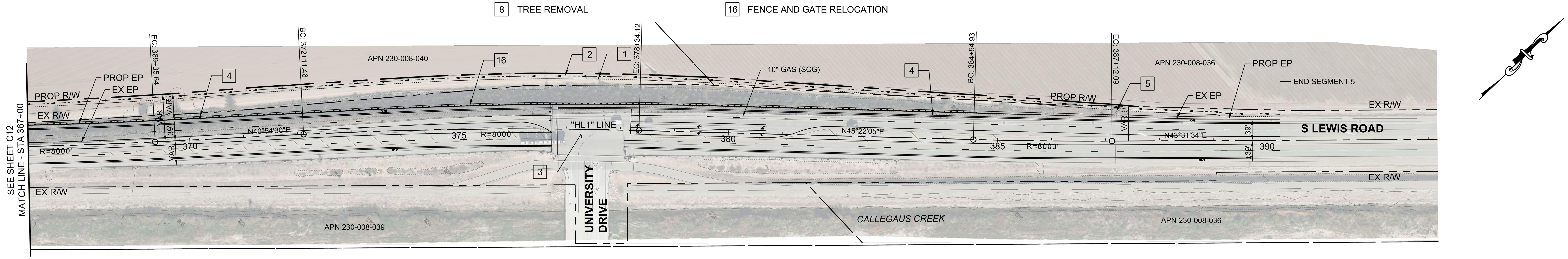
SHEET 12 OF 13
DRAWING NO. C-12



SCALE
HORIZ: 1"= 100'
VERT: 1"= 10'
10' 5' 2.5' 0 25' 50' 100'

DISPOSITION NOTES

1 GRADING LIMIT	9 ACCESS ROAD
2 DRAINAGE DITCH	10 IRRIGATION FACILITY RELOCATION
3 TRAFFIC SIGNAL MODIFICATIONS	11 WATER FACILITY RELOCATION
4 DRAINAGE PIPE / INLET RELOCATION	12 BRIDGE RECONSTRUCTION
5 CULVERT EXTENSION / RELOCATION	13 BUILDING REMOVAL
6 CULVERT RECONSTRUCTION	14 REMOVE SHRUBS
7 POWER POLE RELOCATION	15 GUARDRAIL RELOCATION
8 TREE REMOVAL	16 FENCE AND GATE RELOCATION



GRAPHIC SCALE
0 50' 100' 200'
1 inch = 100 ft.

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UNDERGROUND SERVICE ALERT OF SOUTHERN CALIFORNIA

CONCEPTUAL PLANS - NOT FOR CONSTRUCTION

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ROADS & TRANSPORTATION

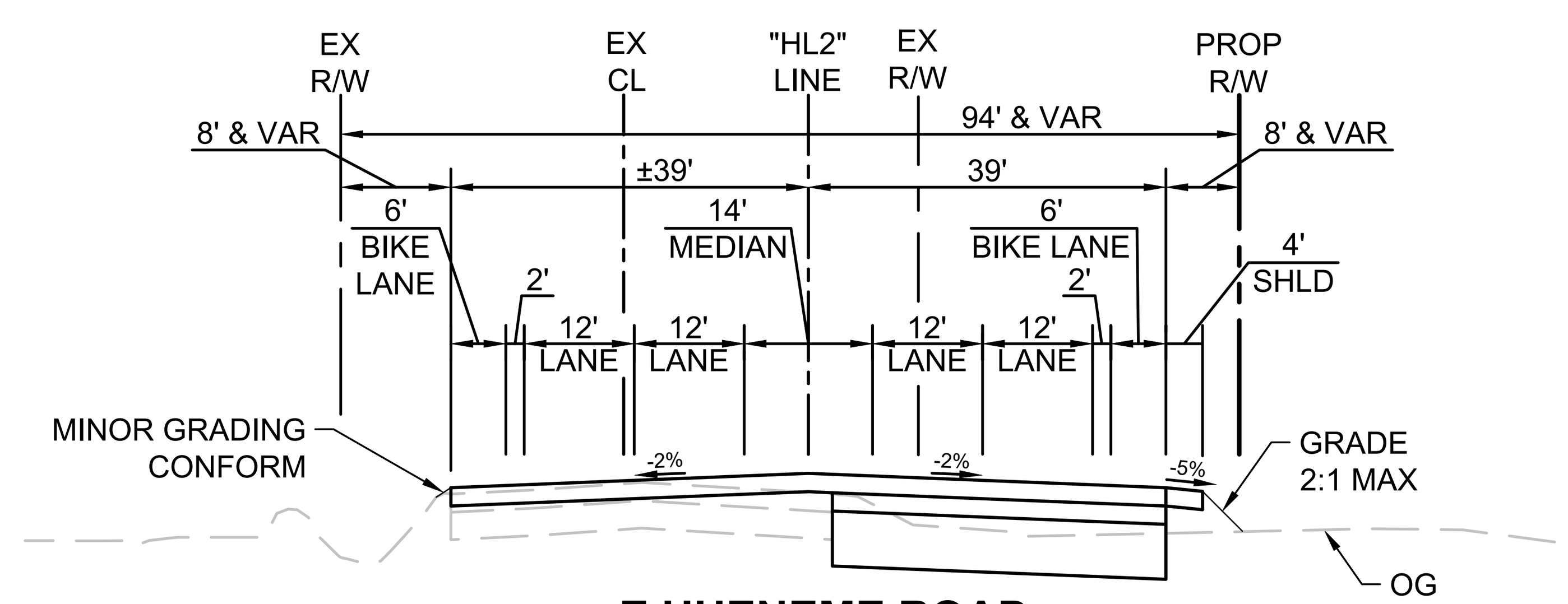
SPEC NO.
PROJ. NO. 50058

HUENEME ROAD WIDENING STREET IMPROVEMENT PLANS
PLAN AND PROFILE (ALTERNATIVE-1)

SHEET 13 OF 13

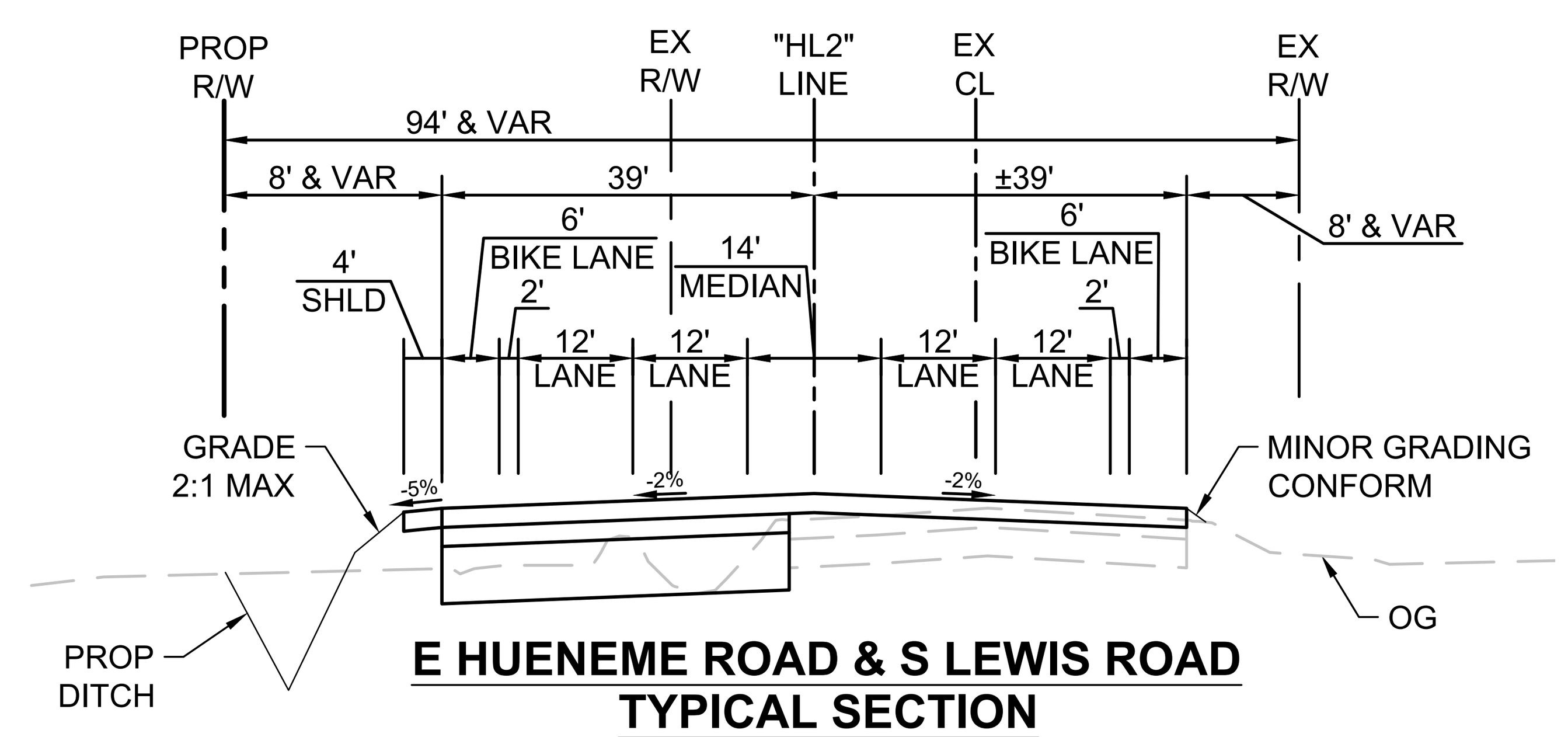
DRAWING NO. C-13

Attachment C. Alternative 2 – Widen One Side



E HUENEME ROAD TYPICAL SECTION

NOT TO SCALE
STA 10+00 TO 216+45



E HUENEME ROAD & S LEWIS ROAD TYPICAL SECTION

NOT TO SCALE
STA 222+86 TO 392+79

DISPOSITION NOTES

1	GRADING LIMIT	9	ACCESS ROAD
2	DRAINAGE DITCH	10	IRRIGATION FACILITY RELOCATION
3	TRAFFIC SIGNAL MODIFICATIONS	11	WATER FACILITY RELOCATION
4	DRAINAGE PIPE / INLET RELOCATION	12	BRIDGE RECONSTRUCTION
5	CULVERT EXTENSION / RELOCATION	13	BUILDING REMOVAL
6	CULVERT RECONSTRUCTION	14	REMOVE SHRUBS
7	POWER POLE RELOCATION	15	GUARDRAIL RELOCATION
8	TREE REMOVAL	16	FENCE AND GATE RELOCATION
		17	CONCRETE BARRIER / RETAINING FEATURE

SCALE
HORIZ: 1"= 100'
VERT: 1"= 10'

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GRAPHIC SCALE
0 50' 100' 200'
1 inch = 100 ft.

CONCEPTUAL PLANS - NOT FOR CONSTRUCTION

	REVISION	DESCRIPTION	APP	DATE
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SPEC NO.
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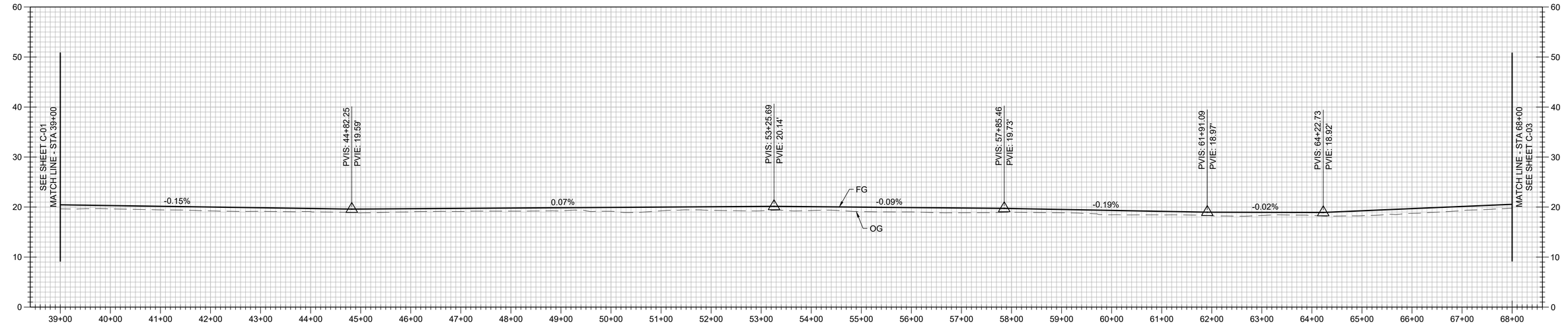
HUENEME ROAD WIDENING STREET IMPROVEMENT PLANS
PLAN AND PROFILE (ALTERNATIVE-2)

SHEET 1 OF 13
DRAWING NO. C-01



10'
5'
2.5'
0 25' 50' 100'

SCALE
HORIZ: 1"= 100'
VERT: 1"= 10'

DISPOSITION NOTES

1	GRADING LIMIT	9	ACCESS ROAD
2	DRAINAGE DITCH	10	IRRIGATION FACILITY RELOCATION
3	TRAFFIC SIGNAL MODIFICATIONS	11	WATER FACILITY RELOCATION
4	DRAINAGE PIPE / INLET RELOCATION	12	BRIDGE RECONSTRUCTION
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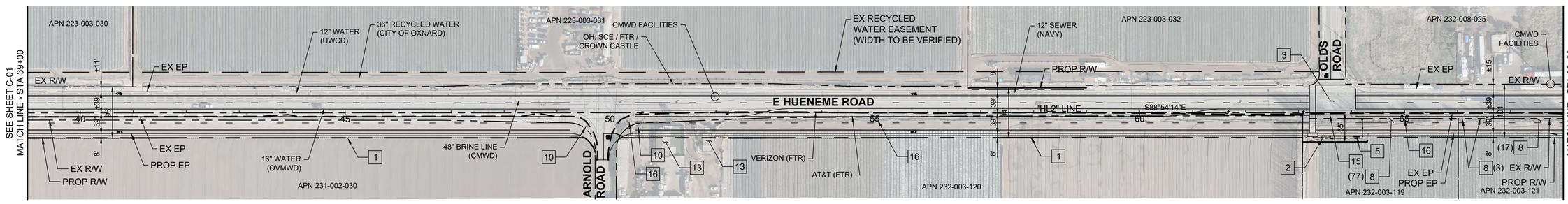
8	TREE REMOVAL	16	FENCE AND GATE RELOCATION
		17	CONCRETE BARRIER / RETAINING FEATURE



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CONCEPTUAL PLANS - NOT FOR CONSTRUCTION

GRAPHIC SCALE
0 50' 100' 200'
1 inch = 100 ft.

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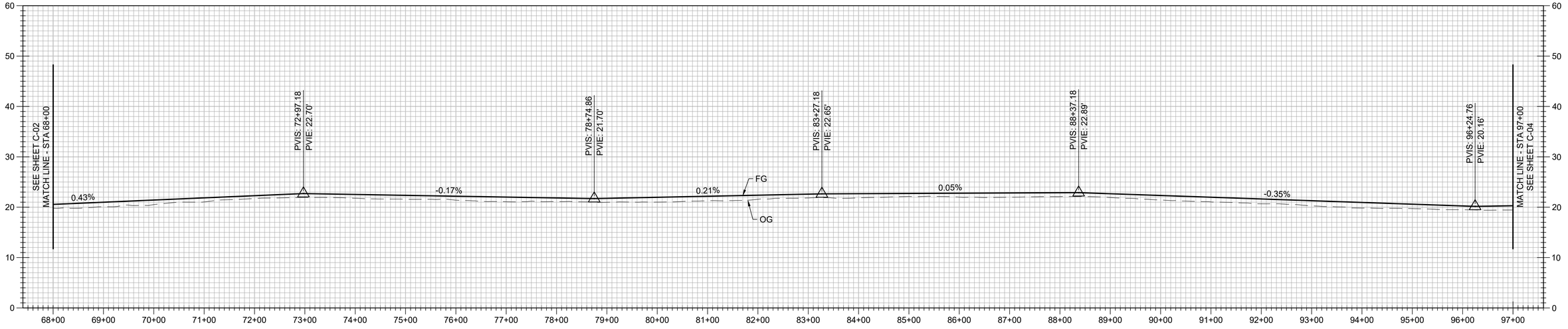
SPEC NO.
PROJ. NO.
50058

HUENEME ROAD WIDENING STREET IMPROVEMENT PLANS
PLAN AND PROFILE (ALTERNATIVE-2)

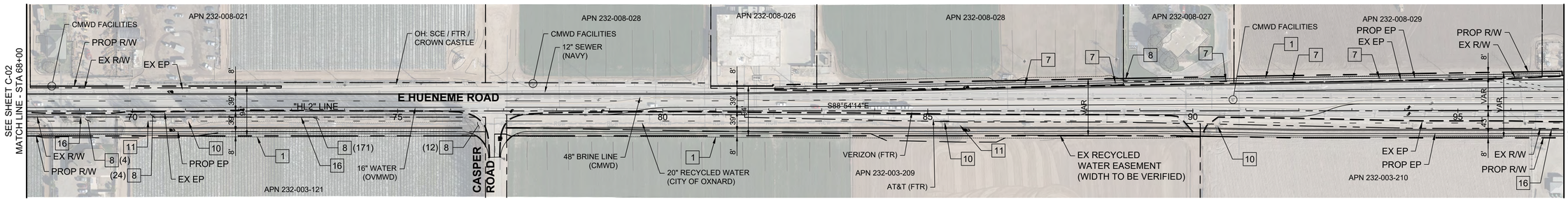
SHEET 2
OF 13
DRAWING NO.
C-02



SCALE
HORIZ: 1"= 100'
VERT: 1"= 10'
10'
5'
2.5'
0 25'50' 100'

DISPOSITION NOTES

- 1 GRADING LIMIT
- 2 DRAINAGE DITCH
- 3 TRAFFIC SIGNAL MODIFICATIONS
- 4 DRAINAGE PIPE / INLET RELOCATION
- 5 CULVERT EXTENSION / RELOCATION
- 6 CULVERT RECONSTRUCTION
- 7 POWER POLE RELOCATION
- 8 TREE REMOVAL
- 9 ACCESS ROAD
- 10 IRRIGATION FACILITY RELOCATION
- 11 WATER FACILITY RELOCATION
- 12 BRIDGE RECONSTRUCTION
- 13 BUILDING REMOVAL
- 14 REMOVE SHRUBS
- 15 GUARDRAIL RELOCATION
- 16 FENCE AND GATE RELOCATION
- 17 CONCRETE BARRIER / RETAINING FEATURE



GRAPHIC SCALE
0 50' 100' 200'
1 inch = 100 ft.

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ROADS & TRANSPORTATION

SPEC NO.
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HUENEME ROAD WIDENING STREET IMPROVEMENT PLANS
PLAN AND PROFILE (ALTERNATIVE-2)

SHEET 3
OF 13
DRAWING NO. C-03

SCALE
HORIZ: 1"= 100'
VERT: 1"= 10'

DISPOSITION NOTES

1	GRADING LIMIT	9	ACCESS ROAD
2	DRAINAGE DITCH	10	IRRIGATION FACILITY RELOCATION
3	TRAFFIC SIGNAL MODIFICATIONS	11	WATER FACILITY RELOCATION
4	DRAINAGE PIPE / INLET RELOCATION	12	BRIDGE RECONSTRUCTION
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8	TREE REMOVAL	16	FENCE AND GATE RELOCATION
		17	CONCRETE BARRIER / RETAINING FEATURE

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GRAPHIC SCALE
1 inch = 100 ft.

CONCEPTUAL PLANS - NOT FOR CONSTRUCTION

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Michael Ip
No.43671
Exp. 3/31/23
CIVIL
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HUENEME ROAD WIDENING STREET IMPROVEMENT PLANS
PLAN AND PROFILE
(ALTERNATIVE-2)

SHEET 4 OF 13
DRAWING NO. C-04

SCALE
HORIZ: 1"= 100'
VERT: 1"= 10'

DISPOSITION NOTES

1	GRADING LIMIT	9	ACCESS ROAD
2	DRAINAGE DITCH	10	IRRIGATION FACILITY RELOCATION
3	TRAFFIC SIGNAL MODIFICATIONS	11	WATER FACILITY RELOCATION
4	DRAINAGE PIPE / INLET RELOCATION	12	BRIDGE RECONSTRUCTION
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		17	CONCRETE BARRIER / RETAINING FEATURE

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No.43671
Exp. 3/31/23
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STATE OF CALIFORNIA

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HUENEME ROAD WIDENING
STREET IMPROVEMENT PLANS
PLAN AND PROFILE
(ALTERNATIVE-2)

SHEET 5 OF 13
DRAWING NO. C-05

DISPOSITION NOTES

1	GRADING LIMIT	9	ACCESS ROAD
2	DRAINAGE DITCH	10	IRRIGATION FACILITY RELOCATION
3	TRAFFIC SIGNAL MODIFICATIONS	11	WATER FACILITY RELOCATION
4	DRAINAGE PIPE / INLET RELOCATION	12	BRIDGE RECONSTRUCTION
5	CULVERT EXTENSION / RELOCATION	13	BUILDING REMOVAL
6	CULVERT RECONSTRUCTION	14	REMOVE SHRUBS
7	POWER POLE RELOCATION	15	GUARDRAIL RELOCATION
8	TREE REMOVAL	16	FENCE AND GATE RELOCATION
		17	CONCRETE BARRIER / RETAINING FEATURE

SCALE
HORIZ: 1"= 100'
VERT: 1"= 10'

GRAPHIC SCALE
1 inch = 100 ft.

DIGALERT
DIAL TOLL FREE
811
AT LEAST TWO DAYS BEFORE YOU DIG
UNDERGROUND SERVICE ALERT OF SOUTHERN CALIFORNIA

CONCEPTUAL PLANS - NOT FOR CONSTRUCTION

	REVISION	DESCRIPTION	APP	DATE
D				
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△	REVISION	DESCRIPTION	APP	DATE

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4580 E. Thousand Oaks Blvd.
Suite 101
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Phone: 805-648-4840
www.mnsengineers.com
PLANS PREPARED UNDER THE DIRECTION OF:
MICHAEL IP RCE 43671 DATE

REGISTERED PROFESSIONAL ENGINEER
Michael Ip
No.43671
Exp. 3/31/23
CIVIL
STATE OF CALIFORNIA

DESIGNED RW
DRAWN RW
CHECKED SP
APPROVED MI

COUNTY OF VENTURA PUBLIC WORKS AGENCY
ROADS & TRANSPORTATION

SPEC NO.
PROJ. NO. 50058

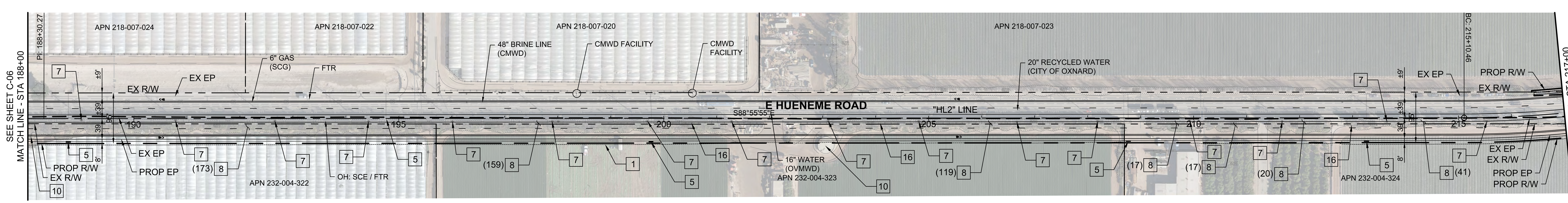
HUENEME ROAD WIDENING STREET IMPROVEMENT PLANS
PLAN AND PROFILE (ALTERNATIVE-2)

SHEET 6 OF 13
DRAWING NO. C-06

SCALE
HORIZ: 1"= 100'
VERT: 1"= 10'

DISPOSITION NOTES

1 GRADING LIMIT	9 ACCESS ROAD
2 DRAINAGE DITCH	10 IRRIGATION FACILITY RELOCATION
3 TRAFFIC SIGNAL MODIFICATIONS	11 WATER FACILITY RELOCATION
4 DRAINAGE PIPE / INLET RELOCATION	12 BRIDGE RECONSTRUCTION
5 CULVERT EXTENSION / RELOCATION	13 BUILDING REMOVAL
6 CULVERT RECONSTRUCTION	14 REMOVE SHRUBS
7 POWER POLE RELOCATION	15 GUARDRAIL RELOCATION
8 TREE REMOVAL	16 FENCE AND GATE RELOCATION
	17 CONCRETE BARRIER / RETAINING FEATURE



GRAPHIC SCALE
1 inch = 100 ft.

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CONCEPTUAL PLANS - NOT FOR CONSTRUCTION

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No.43671
Exp. 3/31/23
CIVIL
STATE OF CALIFORNIA

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COUNTY OF VENTURA PUBLIC WORKS AGENCY
ROADS & TRANSPORTATION

SPEC NO.
PROJ. NO. 50058

HUENEME ROAD WIDENING STREET IMPROVEMENT PLANS
PLAN AND PROFILE (ALTERNATIVE-2)

SHEET 7 OF 13
DRAWING NO. C-07

DISPOSITION NOTES

1 GRADING LIMIT	9 ACCESS ROAD
2 DRAINAGE DITCH	10 IRRIGATION FACILITY RELOCATION
3 TRAFFIC SIGNAL MODIFICATIONS	11 WATER FACILITY RELOCATION
4 DRAINAGE PIPE / INLET RELOCATION	12 BRIDGE RECONSTRUCTION
5 CULVERT EXTENSION / RELOCATION	13 BUILDING REMOVAL
6 CULVERT RECONSTRUCTION	14 REMOVE SHRUBS
7 POWER POLE RELOCATION	15 GUARDRAIL RELOCATION
8 TREE REMOVAL	16 FENCE AND GATE RELOCATION
	17 CONCRETE BARRIER / RETAINING FEATURE

SCALE
HORIZ: 1"= 100'
VERT: 1"= 10'

GRAPHIC SCALE
1 inch = 100 ft.

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COUNTY OF VENTURA
PUBLIC WORKS AGENCY
ROADS & TRANSPORTATION

SPEC NO.
PROJ. NO. 50058

HUENEME ROAD WIDENING
STREET IMPROVEMENT PLANS
PLAN AND PROFILE
(ALTERNATIVE-2)

SHEET 8 OF 13
DRAWING NO. C-08

DISPOSITION NOTES

1 GRADING LIMIT	9 ACCESS ROAD
2 DRAINAGE DITCH	10 IRRIGATION FACILITY RELOCATION
3 TRAFFIC SIGNAL MODIFICATIONS	11 WATER FACILITY RELOCATION
4 DRAINAGE PIPE / INLET RELOCATION	12 BRIDGE RECONSTRUCTION
5 CULVERT EXTENSION / RELOCATION	13 BUILDING REMOVAL
6 CULVERT RECONSTRUCTION	14 REMOVE SHRUBS
7 POWER POLE RELOCATION	15 GUARDRAIL RELOCATION
8 TREE REMOVAL	16 FENCE AND GATE RELOCATION
	17 CONCRETE BARRIER / RETAINING FEATURE

SCALE
HORIZ: 1"= 100'
VERT: 1"= 10'

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CONCEPTUAL PLANS - NOT FOR CONSTRUCTION

GRAPHIC SCALE 0 50' 100' 200'
1 inch = 100 ft.

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COUNTY OF VENTURA
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ROADS & TRANSPORTATION

SPEC NO.
PROJ. NO. 50058

HUENEME ROAD WIDENING
STREET IMPROVEMENT PLANS
PLAN AND PROFILE
(ALTERNATIVE-2)

SHEET 9 OF 13
DRAWING NO. C-09

SCALE
HORIZ: 1"= 100'
VERT: 1"= 10'

DISPOSITION NOTES

1	GRADING LIMIT
2	DRAINAGE DITCH
3	TRAFFIC SIGNAL MODIFICATIONS
4	DRAINAGE PIPE / INLET RELOCATION
5	CULVERT EXTENSION / RELOCATION
6	CULVERT RECONSTRUCTION
7	POWER POLE RELOCATION
8	TREE REMOVAL
9	ACCESS ROAD
10	IRRIGATION FACILITY RELOCATION
11	WATER FACILITY RELOCATION
12	BRIDGE RECONSTRUCTION
13	BUILDING REMOVAL
14	REMOVE SHRUBS
15	GUARDRAIL RELOCATION
16	FENCE AND GATE RELOCATION
17	CONCRETE BARRIER / RETAINING FEATURE

DIGALERT DIAL TOLL FREE 811 AT LEAST TWO DAYS BEFORE YOU DIG
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GRAPHIC SCALE 1 inch = 100 ft.

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ROADS & TRANSPORTATION

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HUENEME ROAD WIDENING STREET IMPROVEMENT PLANS
PLAN AND PROFILE (ALTERNATIVE-2)

SHEET 10 OF 13
DRAWING NO. C-10

DISPOSITION NOTES

1 GRADING LIMIT	9 ACCESS ROAD
2 DRAINAGE DITCH	10 IRRIGATION FACILITY RELOCATION
3 TRAFFIC SIGNAL MODIFICATIONS	11 WATER FACILITY RELOCATION
4 DRAINAGE PIPE / INLET RELOCATION	12 BRIDGE RECONSTRUCTION
5 CULVERT EXTENSION / RELOCATION	13 BUILDING REMOVAL
6 CULVERT RECONSTRUCTION	14 REMOVE SHRUBS
7 POWER POLE RELOCATION	15 GUARDRAIL RELOCATION
8 TREE REMOVAL	16 FENCE AND GATE RELOCATION
	17 CONCRETE BARRIER / RETAINING FEATURE

SCALE
HORIZ: 1"=200'
VERT: 1"= 20'

GRAPHIC SCALE
1 inch = 100 ft.

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ROADS & TRANSPORTATION

SPEC NO.
PROJ. NO. 50058

HUENEME ROAD WIDENING STREET IMPROVEMENT PLANS
PLAN AND PROFILE
(ALTERNATIVE-2)

SHEET 11 OF 13
DRAWING NO. C-11

DISPOSITION NOTES

1 GRADING LIMIT	9 ACCESS ROAD
2 DRAINAGE DITCH	10 IRRIGATION FACILITY RELOCATION
3 TRAFFIC SIGNAL MODIFICATIONS	11 WATER FACILITY RELOCATION
4 DRAINAGE PIPE / INLET RELOCATION	12 BRIDGE RECONSTRUCTION
5 CULVERT EXTENSION / RELOCATION	13 BUILDING REMOVAL
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8 TREE REMOVAL	16 FENCE AND GATE RELOCATION
	17 CONCRETE BARRIER / RETAINING FEATURE

SCALE
HORIZ: 1"= 100'
VERT: 1"= 10'

GRAPHIC SCALE
1 inch = 100 ft.

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ROADS & TRANSPORTATION

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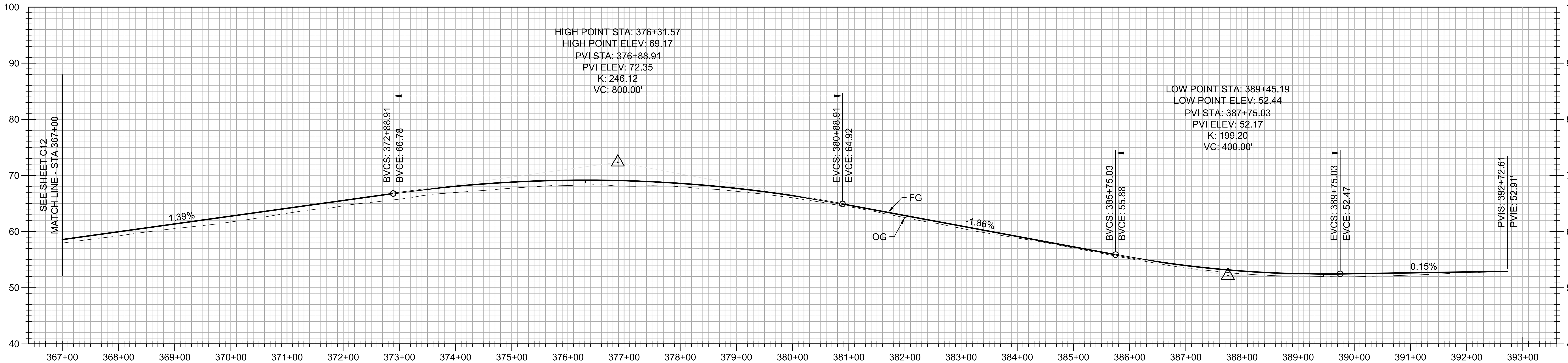
HUENEME ROAD WIDENING STREET IMPROVEMENT PLANS
PLAN AND PROFILE (ALTERNATIVE-2)

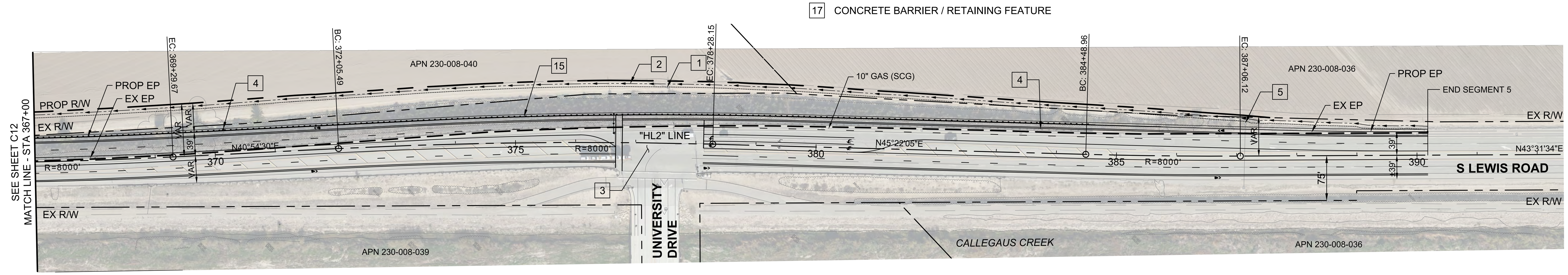
SHEET 12 OF 13
DRAWING NO. C-12



DISPOSITION NOTES

1 GRADING LIMIT	9 ACCESS ROAD
2 DRAINAGE DITCH	10 IRRIGATION FACILITY RELOCATION
3 TRAFFIC SIGNAL MODIFICATIONS	11 WATER FACILITY RELOCATION
4 DRAINAGE PIPE / INLET RELOCATION	12 BRIDGE RECONSTRUCTION
5 CULVERT EXTENSION / RELOCATION	13 BUILDING REMOVAL
6 CULVERT RECONSTRUCTION	14 REMOVE SHRUBS
7 POWER POLE RELOCATION	15 GUARDRAIL RELOCATION
8 TREE REMOVAL	16 FENCE AND GATE RELOCATION
	17 CONCRETE BARRIER / RETAINING FEATURE

SCALE
HORIZ: 1" = 100'
VERT: 1" = 10'



GRAPHIC SCALE
1 inch = 100 ft.

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CONCEPTUAL PLANS - NOT FOR CONSTRUCTION

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COUNTY OF VENTURA PUBLIC WORKS AGENCY

ROADS & TRANSPORTATION

SPEC NO.
PROJ. NO. 50058

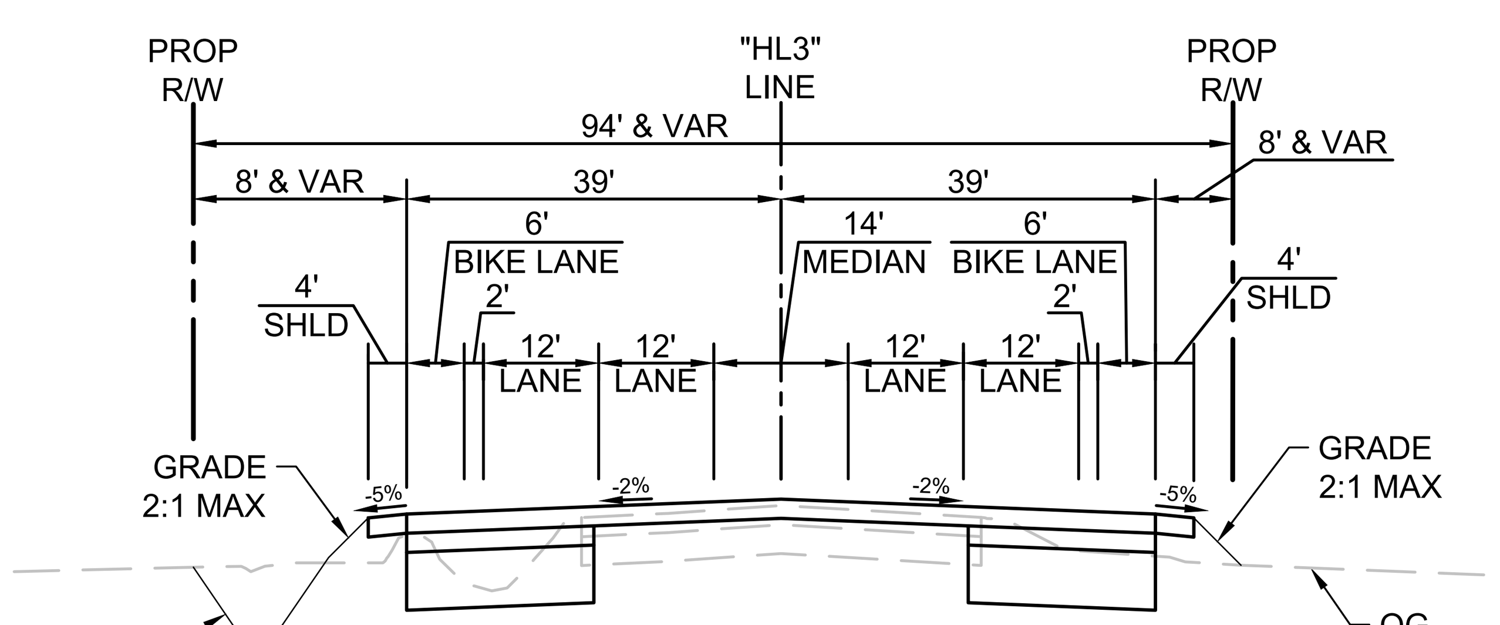
HUENEME ROAD WIDENING STREET IMPROVEMENT PLANS

PLAN AND PROFILE (ALTERNATIVE-2)

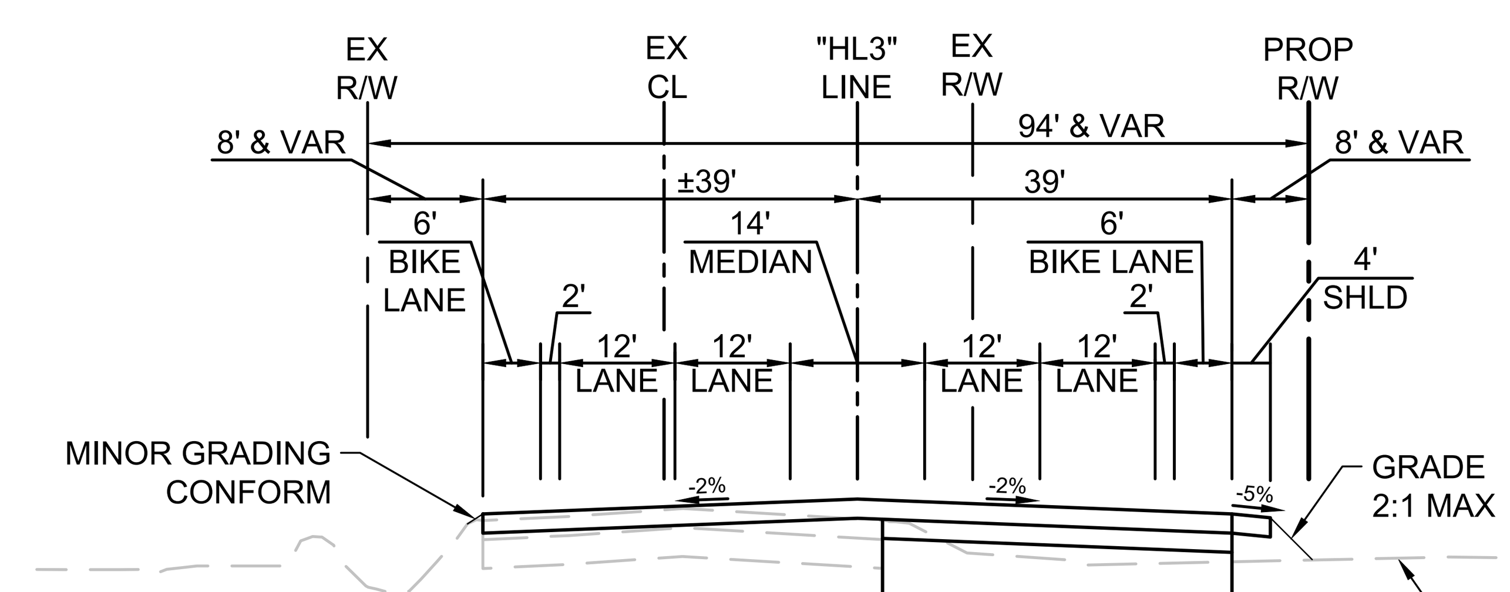
SHEET 13 OF 13

DRAWING NO. C-13

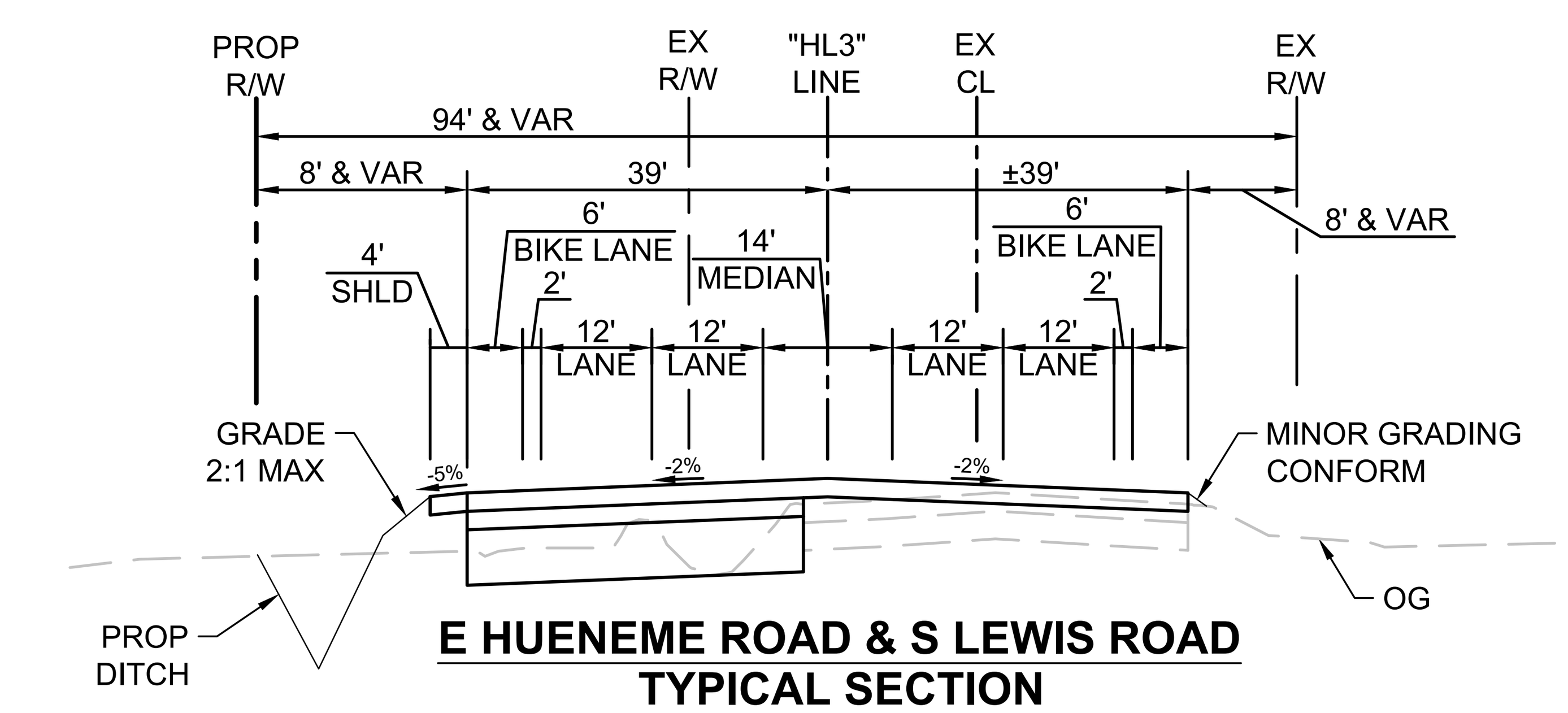
Attachment D. Alternative 3 - Hybrid



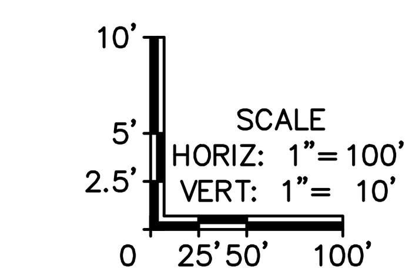
E HUENEME ROAD
TYPICAL SECTION
NOT TO SCALE
STA 10+00 TO 26+51
STA 76+97 TO 125+86
STA 161+62 TO 197+25
STA 273+92 TO 310+42

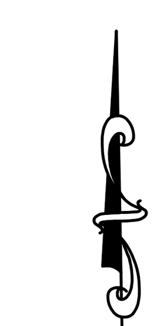


E HUENEME ROAD
TYPICAL SECTION
NOT TO SCALE
STA 26+51 TO 76+97
STA 125+86 TO 161+62



E HUENEME ROAD & S LEWIS ROAD
TYPICAL SECTION
NOT TO SCALE
STA 197+25 TO 273+92
STA 310+42 TO 392+79





DISPOSITION NOTES

1 GRADING LIMIT	5 CULVERT EXTENSION / RELOCATION	9 ACCESS ROAD	13 BUILDING REMOVAL
2 DRAINAGE DITCH	6 CULVERT RECONSTRUCTION	10 IRRIGATION FACILITY RELOCATION	14 REMOVE SHRUBS
3 TRAFFIC SIGNAL MODIFICATIONS	7 POWER POLE RELOCATION	11 WATER FACILITY RELOCATION	15 GUARDRAIL RELOCATION
4 DRAINAGE PIPE / INLET RELOCATION	8 TREE REMOVAL	12 BRIDGE RECONSTRUCTION	16 FENCE AND GATE RELOCATION

GRAPHIC SCALE
0 50' 100' 200'
1 inch = 100 ft.

	REVISION	DESCRIPTION	APP	DATE
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SPEC NO.
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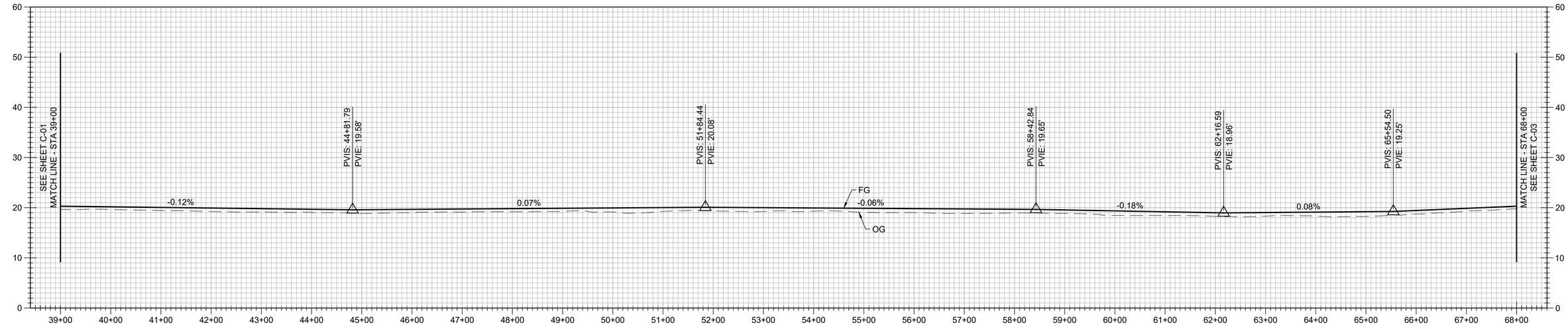
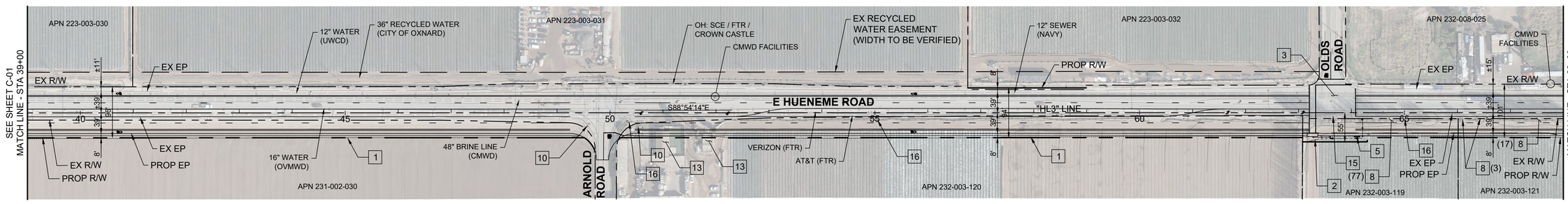
HUENEME ROAD WIDENING
STREET IMPROVEMENT PLANS
PLAN AND PROFILE
(ALTERNATIVE-3)

SHEET 1 OF 13
DRAWING NO.
C-01





DISPOSITION NOTES

1	GRADING LIMIT
2	DRAINAGE DITCH
3	TRAFFIC SIGNAL MODIFICATIONS
4	DRAINAGE PIPE / INLET RELOCATION
5	CULVERT EXTENSION / RELOCATION
6	CULVERT RECONSTRUCTION
7	POWER POLE RELOCATION
8	TREE REMOVAL
9	ACCESS ROAD
10	IRRIGATION FACILITY RELOCATION
11	WATER FACILITY RELOCATION
12	BRIDGE RECONSTRUCTION
13	BUILDING REMOVAL
14	REMOVE SHRUBS
15	GUARDRAIL RELOCATION
16	FENCE AND GATE RELOCATION

SCALE
HORIZ: 1"= 100'
VERT: 1"= 10'
10'
5'
2.5'
0 25' 50' 100'

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GRAPHIC SCALE
0 50' 100' 200'
1 inch = 100 ft.

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HUENEME ROAD WIDENING
STREET IMPROVEMENT PLANS
PLAN AND PROFILE
(ALTERNATIVE-3)

SHEET 2
OF 13
DRAWING NO.
C-02

SCALE
HORIZ: 1"= 100'
VERT: 1"= 10'

DISPOSITION NOTES

1	GRADING LIMIT	9	ACCESS ROAD
2	DRAINAGE DITCH	10	IRRIGATION FACILITY RELOCATION
3	TRAFFIC SIGNAL MODIFICATIONS	11	WATER FACILITY RELOCATION
4	DRAINAGE PIPE / INLET RELOCATION	12	BRIDGE RECONSTRUCTION
5	CULVERT EXTENSION / RELOCATION	13	BUILDING REMOVAL
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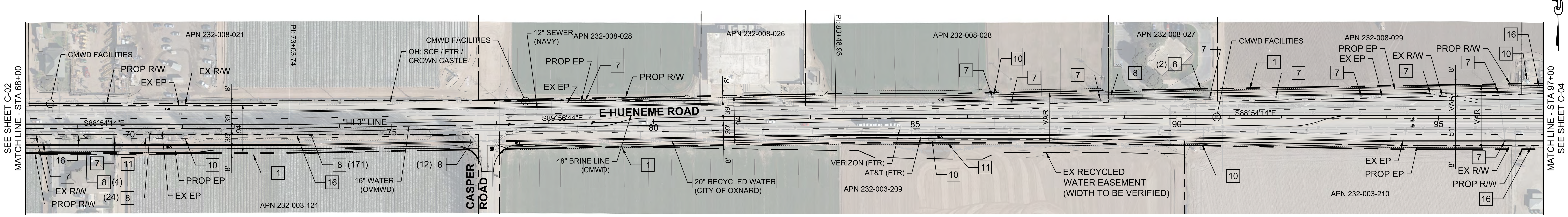

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GRAPHIC SCALE
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ROADS & TRANSPORTATION

SPEC NO.
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HUENEME ROAD WIDENING STREET IMPROVEMENT PLANS
PLAN AND PROFILE (ALTERNATIVE-3)

SHEET 3 OF 13
DRAWING NO. C-03

DISPOSITION NOTES

1 GRADING LIMIT	9 ACCESS ROAD
2 DRAINAGE DITCH	10 IRRIGATION FACILITY RELOCATION
3 TRAFFIC SIGNAL MODIFICATIONS	11 WATER FACILITY RELOCATION
4 DRAINAGE PIPE / INLET RELOCATION	12 BRIDGE RECONSTRUCTION
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SCALE
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VERT: 1"= 10'

GRAPHIC SCALE
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1 inch = 100 ft.

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SPEC NO.
PROJ. NO. 50058

HUENEME ROAD WIDENING STREET IMPROVEMENT PLANS
PLAN AND PROFILE (ALTERNATIVE-3)

SHEET 4 OF 13
DRAWING NO. C-04

SCALE
HORIZ: 1"= 100'
VERT: 1"= 10'

DISPOSITION NOTES

1	GRADING LIMIT	9	ACCESS ROAD
2	DRAINAGE DITCH	10	IRRIGATION FACILITY RELOCATION
3	TRAFFIC SIGNAL MODIFICATIONS	11	WATER FACILITY RELOCATION
4	DRAINAGE PIPE / INLET RELOCATION	12	BRIDGE RECONSTRUCTION
5	CULVERT EXTENSION / RELOCATION	13	BUILDING REMOVAL
6	CULVERT RECONSTRUCTION	14	REMOVE SHRUBS
7	POWER POLE RELOCATION	15	GUARDRAIL RELOCATION
8	TREE REMOVAL	16	FENCE AND GATE RELOCATION

GRAPHIC SCALE
0 50' 100' 200'
1 inch = 100 ft.

DIGALERT DIAL TOLL FREE 811 AT LEAST TWO DAYS BEFORE YOU DIG
UNDERGROUND SERVICE ALERT OF SOUTHERN CALIFORNIA

CONCEPTUAL PLANS - NOT FOR CONSTRUCTION

△	REVISION	DESCRIPTION	APP	DATE
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MICHAEL IP RCE 43671 DATE

REGISTERED PROFESSIONAL ENGINEER
Michael Ip
No.43671
Exp. 3/31/23
CIVIL
STATE OF CALIFORNIA

DESIGNED RW
DRAWN RW
CHECKED SP
APPROVED MI

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ROADS & TRANSPORTATION

SPEC NO.
PROJ. NO. 50058

HUENEME ROAD WIDENING STREET IMPROVEMENT PLANS
PLAN AND PROFILE (ALTERNATIVE-3)

SHEET 5 OF 13
DRAWING NO. C-05

DISPOSITION NOTES

1 GRADING LIMIT	9 ACCESS ROAD
2 DRAINAGE DITCH	10 IRRIGATION FACILITY RELOCATION
3 TRAFFIC SIGNAL MODIFICATIONS	11 WATER FACILITY RELOCATION
4 DRAINAGE PIPE / INLET RELOCATION	12 BRIDGE RECONSTRUCTION
5 CULVERT EXTENSION / RELOCATION	13 BUILDING REMOVAL
6 CULVERT RECONSTRUCTION	14 REMOVE SHRUBS
7 POWER POLE RELOCATION	15 GUARDRAIL RELOCATION
8 TREE REMOVAL	16 FENCE AND GATE RELOCATION

SCALE
HORIZ: 1"= 100'
VERT: 1"= 10'

GRAPHIC SCALE
1 inch = 100 ft.

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APPROVED MI

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SPEC NO.
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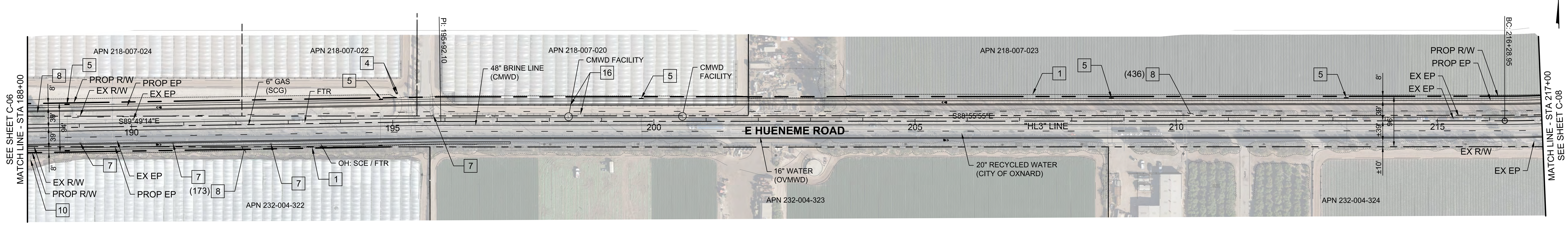
HUENEME ROAD WIDENING STREET IMPROVEMENT PLANS
PLAN AND PROFILE (ALTERNATIVE-3)

SHEET 6 OF 13
DRAWING NO. C-06

DISPOSITION NOTES

1	GRADING LIMIT	9	ACCESS ROAD
2	DRAINAGE DITCH	10	IRRIGATION FACILITY RELOCATION
3	TRAFFIC SIGNAL MODIFICATIONS	11	WATER FACILITY RELOCATION
4	DRAINAGE PIPE / INLET RELOCATION	12	BRIDGE RECONSTRUCTION
5	CULVERT EXTENSION / RELOCATION	13	BUILDING REMOVAL
6	CULVERT RECONSTRUCTION	14	REMOVE SHRUBS
7	POWER POLE RELOCATION	15	GUARDRAIL RELOCATION
8	TREE REMOVAL	16	FENCE AND GATE RELOCATION

SCALE
HORIZ: 1"= 100'
VERT: 1"= 10'



DIGALERT DIAL TOLL FREE 811 AT LEAST TWO DAYS BEFORE YOU DIG
UNDERGROUND SERVICE ALERT OF SOUTHERN CALIFORNIA

CONCEPTUAL PLANS - NOT FOR CONSTRUCTION

GRAPHIC SCALE
1 inch = 100 ft.

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APPROVED MI

COUNTY OF VENTURA
PUBLIC WORKS AGENCY
ROADS & TRANSPORTATION

SPEC NO.
PROJ. NO. 50058

HUENEME ROAD WIDENING
STREET IMPROVEMENT PLANS
PLAN AND PROFILE
(ALTERNATIVE-3)

SHEET 7 OF 13
DRAWING NO. C-07

SCALE
HORIZ: 1"= 100'
VERT: 1"= 10'

DISPOSITION NOTES

1	GRADING LIMIT	9	ACCESS ROAD
2	DRAINAGE DITCH	10	IRRIGATION FACILITY RELOCATION
3	TRAFFIC SIGNAL MODIFICATIONS	11	WATER FACILITY RELOCATION
4	DRAINAGE PIPE / INLET RELOCATION	12	BRIDGE RECONSTRUCTION
5	CULVERT EXTENSION / RELOCATION	13	BUILDING REMOVAL
6	CULVERT RECONSTRUCTION	14	REMOVE SHRUBS
7	POWER POLE RELOCATION	15	GUARDRAIL RELOCATION
8	TREE REMOVAL	16	FENCE AND GATE RELOCATION

DIGALERT
DIAL TOLL FREE 811
AT LEAST TWO DAYS BEFORE YOU DIG
UNDERGROUND SERVICE ALERT OF SOUTHERN CALIFORNIA

GRAPHIC SCALE
1 inch = 100 ft.

CONCEPTUAL PLANS - NOT FOR CONSTRUCTION

	REVISION	DESCRIPTION	APP	DATE
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STATE OF CALIFORNIA

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APPROVED MI

COUNTY OF VENTURA
PUBLIC WORKS AGENCY
ROADS & TRANSPORTATION

SPEC NO.
PROJ. NO. 50058

HUENEME ROAD WIDENING
STREET IMPROVEMENT PLANS
PLAN AND PROFILE
(ALTERNATIVE-3)

SHEET 8 OF 13
DRAWING NO. C-08

SCALE
HORIZ: 1"= 100'
VERT: 1"= 10'

DISPOSITION NOTES

1	GRADING LIMIT	9	ACCESS ROAD
2	DRAINAGE DITCH	10	IRRIGATION FACILITY RELOCATION
3	TRAFFIC SIGNAL MODIFICATIONS	11	WATER FACILITY RELOCATION
4	DRAINAGE PIPE / INLET RELOCATION	12	BRIDGE RECONSTRUCTION
5	CULVERT EXTENSION / RELOCATION	13	BUILDING REMOVAL
6	CULVERT RECONSTRUCTION	14	REMOVE SHRUBS
7	POWER POLE RELOCATION	15	GUARDRAIL RELOCATION
8	TREE REMOVAL	16	FENCE AND GATE RELOCATION

DIGALERT
DIAL TOLL FREE
811
AT LEAST TWO DAYS BEFORE YOU DIG
UNDERGROUND SERVICE ALERT OF SOUTHERN CALIFORNIA

CONCEPTUAL PLANS - NOT FOR CONSTRUCTION

GRAPHIC SCALE
0 50' 100' 200'
1 inch = 100 ft.

	REVISION	DESCRIPTION	APP	DATE
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ROADS & TRANSPORTATION

SPEC NO.

PROJ. NO.
50058

HUENEME ROAD WIDENING STREET IMPROVEMENT PLANS
PLAN AND PROFILE (ALTERNATIVE-3)

SHEET 9 OF 13

DRAWING NO.
C-09

SCALE
HORIZ: 1"= 100'
VERT: 1"= 10'

DISPOSITION NOTES

1 GRADING LIMIT	9 ACCESS ROAD
2 DRAINAGE DITCH	10 IRRIGATION FACILITY RELOCATION
3 TRAFFIC SIGNAL MODIFICATIONS	11 WATER FACILITY RELOCATION
4 DRAINAGE PIPE / INLET RELOCATION	12 BRIDGE RECONSTRUCTION
5 CULVERT EXTENSION / RELOCATION	13 BUILDING REMOVAL
6 CULVERT RECONSTRUCTION	14 REMOVE SHRUBS
7 POWER POLE RELOCATION	15 GUARDRAIL RELOCATION
8 TREE REMOVAL	16 FENCE AND GATE RELOCATION

GRAPHIC SCALE
1 inch = 100 ft.

DIGALERT
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811
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STATE OF CALIFORNIA

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CHECKED SP
APPROVED MI

COUNTY OF VENTURA PUBLIC WORKS AGENCY
ROADS & TRANSPORTATION

SPEC NO.
PROJ. NO. 50058

HUENEME ROAD WIDENING STREET IMPROVEMENT PLANS
PLAN AND PROFILE (ALTERNATIVE-3)

SHEET 10 OF 13
DRAWING NO. C-10

DISPOSITION NOTES

1	GRADING LIMIT	9	ACCESS ROAD
2	DRAINAGE DITCH	10	IRRIGATION FACILITY RELOCATION
3	TRAFFIC SIGNAL MODIFICATIONS	11	WATER FACILITY RELOCATION
4	DRAINAGE PIPE / INLET RELOCATION	12	BRIDGE RECONSTRUCTION
5	CULVERT EXTENSION / RELOCATION	13	BUILDING REMOVAL
6	CULVERT RECONSTRUCTION	14	REMOVE SHRUBS
7	POWER POLE RELOCATION	15	GUARDRAIL RELOCATION
8	TREE REMOVAL	16	FENCE AND GATE RELOCATION

SCALE
HORIZ: 1"=200'
VERT: 1"= 20'

GRAPHIC SCALE
1 inch = 100 ft.

DIGALERT DIAL TOLL FREE 811 AT LEAST TWO DAYS BEFORE YOU DIG
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SPEC NO.
PROJ. NO. 50058

HUENEME ROAD WIDENING STREET IMPROVEMENT PLANS
PLAN AND PROFILE (ALTERNATIVE-3)

SHEET 11 OF 13
DRAWING NO. C-11

SCALE
HORIZ: 1"= 100'
VERT: 1"= 10'

DISPOSITION NOTES

1	GRADING LIMIT	9	ACCESS ROAD
2	DRAINAGE DITCH	10	IRRIGATION FACILITY RELOCATION
3	TRAFFIC SIGNAL MODIFICATIONS	11	WATER FACILITY RELOCATION
4	DRAINAGE PIPE / INLET RELOCATION	12	BRIDGE RECONSTRUCTION
5	CULVERT EXTENSION / RELOCATION	13	BUILDING REMOVAL
6	CULVERT RECONSTRUCTION	14	REMOVE SHRUBS
7	POWER POLE RELOCATION	15	GUARDRAIL RELOCATION
8	TREE REMOVAL	16	FENCE AND GATE RELOCATION

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AT LEAST TWO DAYS BEFORE YOU DIG
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GRAPHIC SCALE
0 50' 100' 200'
1 inch = 100 ft.

CONCEPTUAL PLANS - NOT FOR CONSTRUCTION

	REVISION	DESCRIPTION	APP	DATE
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A				
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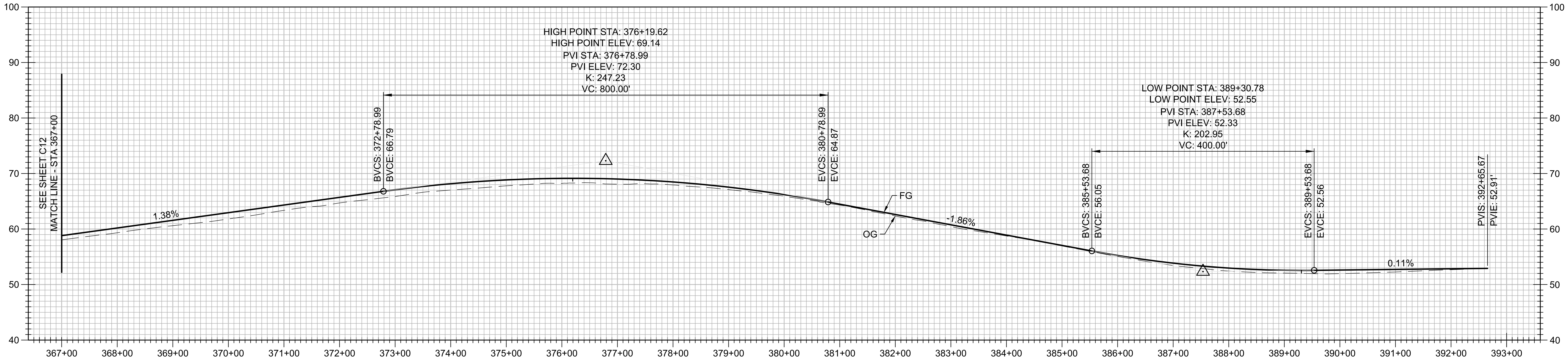
ROADS & TRANSPORTATION

SPEC NO.
PROJ. NO. 50058

HUENEME ROAD WIDENING STREET IMPROVEMENT PLANS

PLAN AND PROFILE
(ALTERNATIVE-3)

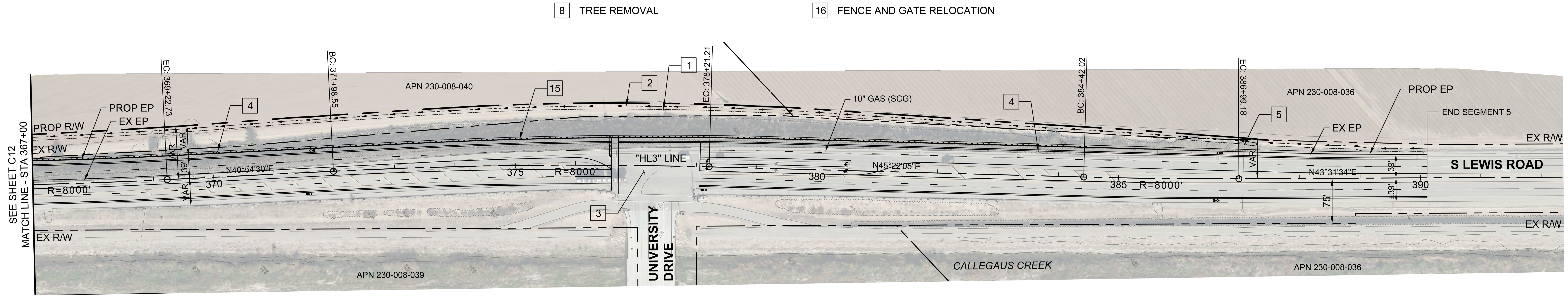
SHEET 12 OF 13
DRAWING NO. C-12



SCALE
HORIZ: 1"= 100'
VERT: 1"= 10'

DISPOSITION NOTES

1	GRADING LIMIT	9	ACCESS ROAD
2	DRAINAGE DITCH	10	IRRIGATION FACILITY RELOCATION
3	TRAFFIC SIGNAL MODIFICATIONS	11	WATER FACILITY RELOCATION
4	DRAINAGE PIPE / INLET RELOCATION	12	BRIDGE RECONSTRUCTION
5	CULVERT EXTENSION / RELOCATION	13	BUILDING REMOVAL
6	CULVERT RECONSTRUCTION	14	REMOVE SHRUBS
7	POWER POLE RELOCATION	15	GUARDRAIL RELOCATION
8	TREE REMOVAL	16	FENCE AND GATE RELOCATION



GRAPHIC SCALE
1 inch = 100 ft.

DIGALERT DIAL TOLL FREE 811 AT LEAST TWO DAYS BEFORE YOU DIG
UNDERGROUND SERVICE ALERT OF SOUTHERN CALIFORNIA

CONCEPTUAL PLANS - NOT FOR CONSTRUCTION

	REVISION	DESCRIPTION	APP	DATE
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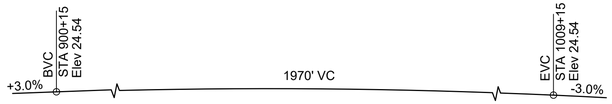
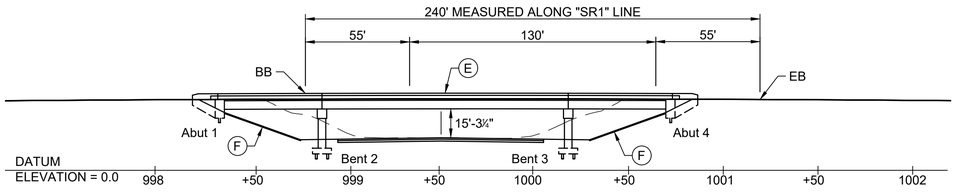
HUENEME ROAD WIDENING STREET IMPROVEMENT PLANS
PLAN AND PROFILE (ALTERNATIVE-3)

SHEET 13 OF 13
DRAWING NO. C-13

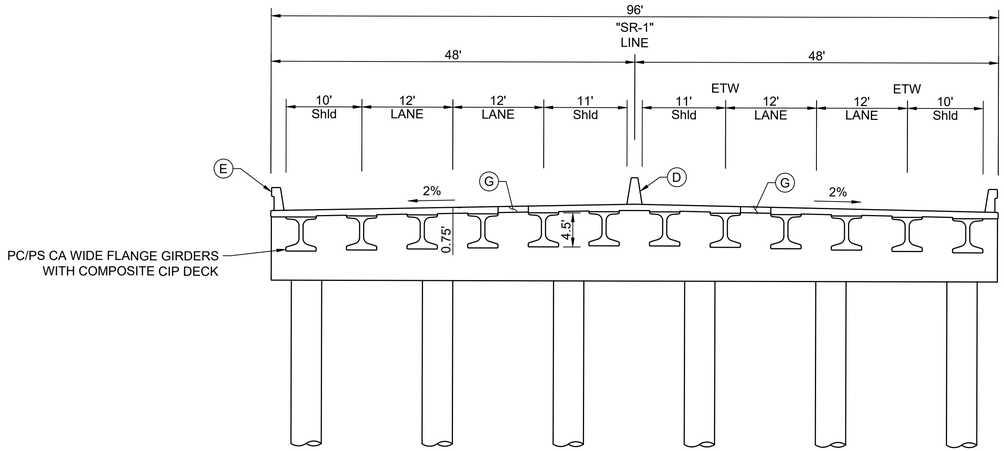
Attachment E. Advanced Planning Study – Alternative 1 - Hueneme Road Undercrossing at SR-1



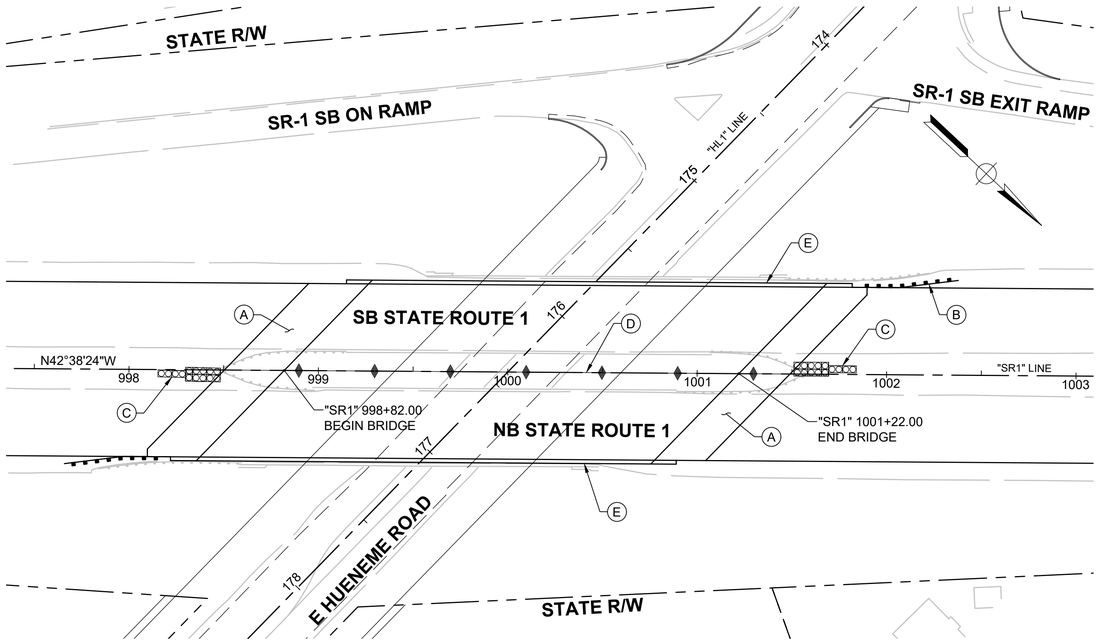
PROFILE
NO SCALE



ELEVATION
1" =40'



TYPICAL SECTION
NO SCALE



PLAN
1" =40'

NOTES:

(A) APPROACH SLAB TYPE N (30)

(B) MIDWEST GUARDRAIL SYSTEM TRANSITION (WB-31) AND TERMINAL SYSTEM

(C) CRASH CUSHION (ARRAY B14)

(D) CONCRETE BARRIER TYPE 60M

(E) CONCRETE BARRIER TYPE 836

(F) SLOPE PAVING

(G) CLOSURE POUR

DIGALERT — DIAL TOLL FREE 811 — AT LEAST TWO DAYS BEFORE YOU DIG — UNDERGROUND SERVICE ALERT OF SOUTHERN CALIFORNIA

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www.mnsengineers.com
PLANS PREPARED UNDER THE DIRECTION OF:
SHAWN KOWALEWSKI RCE 59539 DATE

REGISTERED PROFESSIONAL ENGINEER
Shawn Kowalewski No.59539
Exp. 12/31/21
CIVIL
STATE OF CALIFORNIA

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DRAWN DS
CHECKED MI
APPROVED

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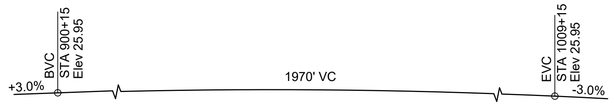
SPEC NO.
PROJ. NO. 50058

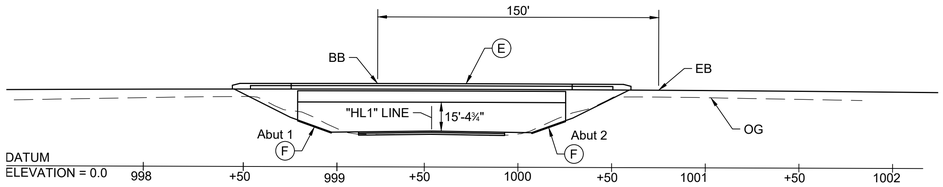
HUENEME ROAD UNDERCROSSING AT STATE ROUTE 1 ADVANCED PLANNING STUDY
REPLACEMENT- THREE SPAN GENERAL PLAN

SHEET 1
OF 1
DRAWING NO. G-01

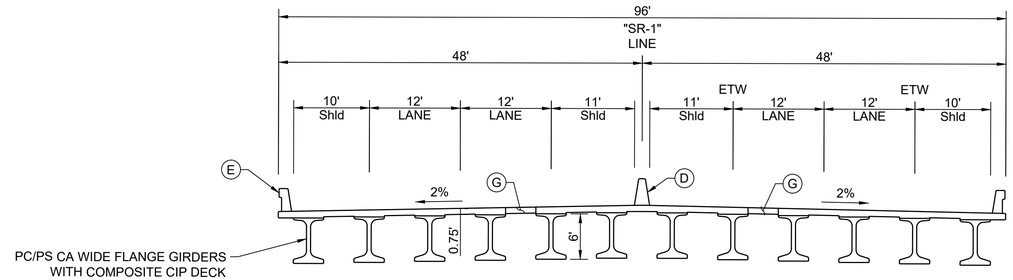
Attachment F. Advanced Planning Study – Alternative 2 - Hueneme Road Undercrossing at SR-1



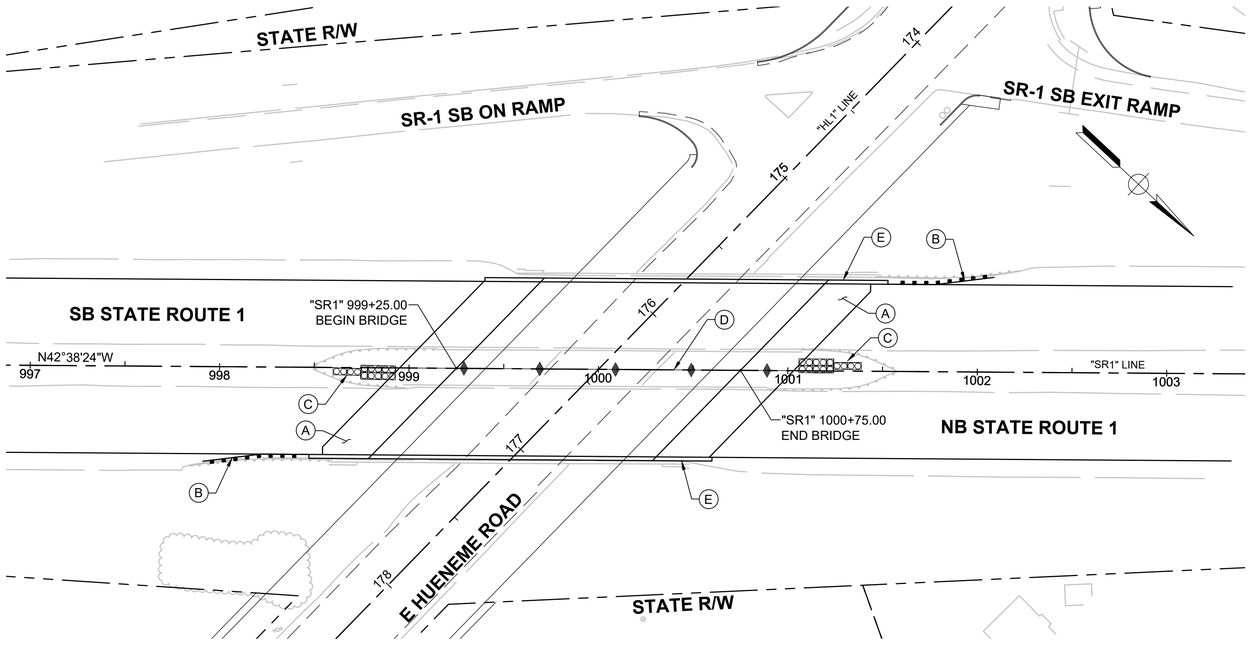
PROFILE
NO SCALE



ELEVATION
1" =40'



TYPICAL SECTION
1" = 10'



PLAN
1" =40'

NOTES:

- (A) APPROACH SLAB TYPE N (30)
- (B) MIDWEST GUARDRAIL SYSTEM TRANSITION (WB-31) AND TERMINAL SYSTEM
- (C) CRASH CUSHION (ARRAY B14)
- (D) CONCRETE BARRIER TYPE 60M
- (E) CONCRETE BARRIER TYPE 836
- (F) SLOPE PAVING
- (G) CLOSURE POUR

	REVISION	DESCRIPTION	APP	DATE
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Westlake Village, CA 91362
Phone: 805-648-4840
www.mnsengineers.com
PLANS PREPARED UNDER THE DIRECTION OF:
SHAWN KOWALEWSKI RCE 59539 DATE

REGISTERED PROFESSIONAL ENGINEER
Shawn Kowalewski
No.59539
Exp. 12/31/21
CIVIL
STATE OF CALIFORNIA

DESIGNED SK
DRAWN DS
CHECKED MI
APPROVED

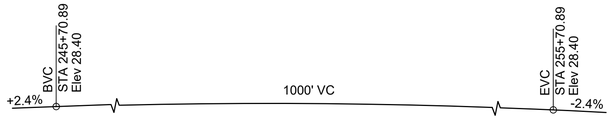
COUNTY OF VENTURA
PUBLIC WORKS AGENCY
ROADS & TRANSPORTATION

SPEC NO.
PROJ. NO. 50058

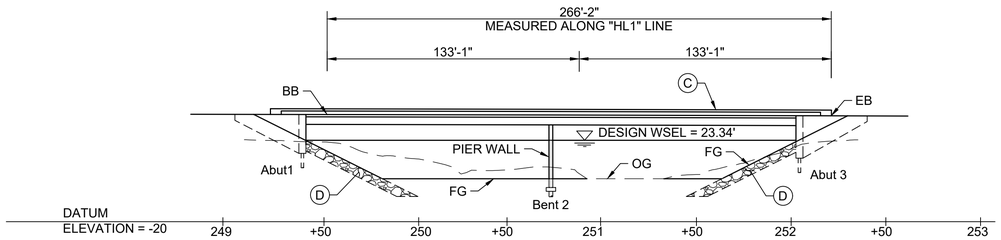
HUENEME ROAD UNDERCROSSING AT STATE ROUTE 1
ADVANCED PLANNING STUDY
REPLACEMENT- SINGLE SPAN GENERAL PLAN

SHEET 1
OF 1
DRAWING NO. G-02

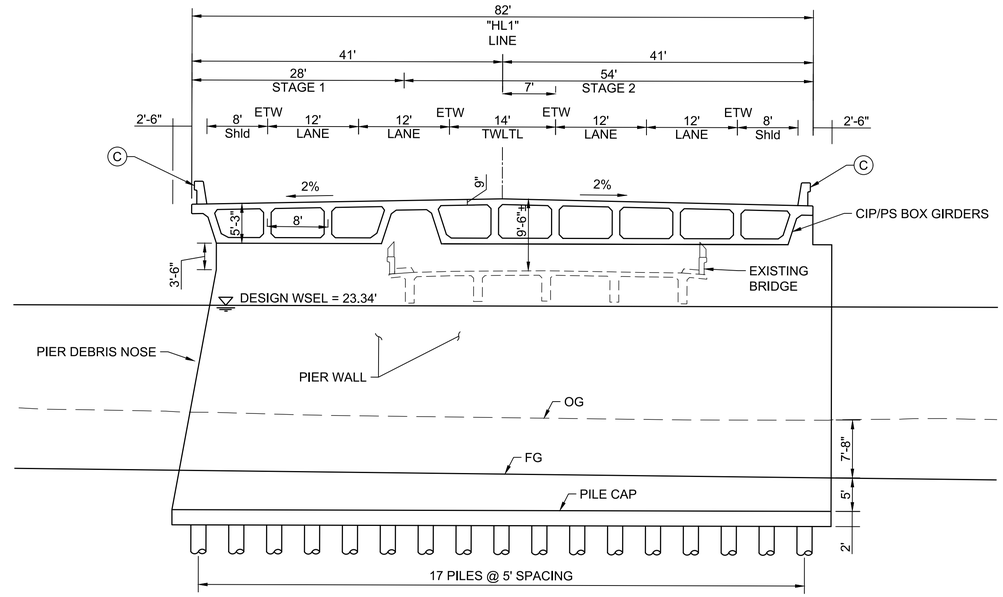
Attachment G. Advanced Planning Study – Alternative 1 - Revolon Slough Bridge



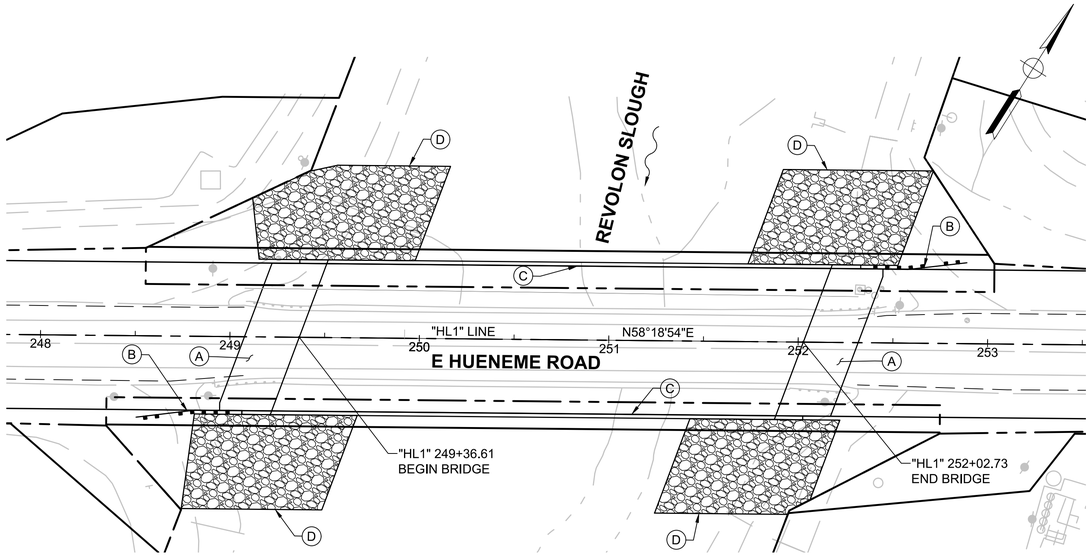
PROFILE
NO SCALE



ELEVATION
1" =40'



TYPICAL SECTION
NO SCALE



PLAN
1" =40'

CONSTRUCTION NOTES

- (A) APPROACH SLAB TYPE N (30)
- (B) MIDWEST GUARDRAIL SYSTEM TRANSITION (WB-31) AND TERMINAL SYSTEM
- (C) CONCRETE BARRIER TYPE 836
- (D) RSP CLASS IX

D				
C				
B				
A				
△	REVISION	DESCRIPTION	APP	DATE

PLANS PREPARED BY:
MNS ENGINEERS INC
ENGINEERING | SURVEYING
CONSTRUCTION MANAGEMENT
4580 E. Thousand Oaks Blvd.
Suite 101
Westlake Village, CA 91362
Phone: 805-648-4840
www.mnsengineers.com
PLANS PREPARED UNDER THE DIRECTION OF:
SHAWN KOWALEWSKI RCE 59539 DATE

REGISTERED PROFESSIONAL ENGINEER
Shawn Kowalewski
No.59539
Exp. 12/31/21
CIVIL
STATE OF CALIFORNIA

DESIGNED SK
DRAWN DS
CHECKED MI
APPROVED

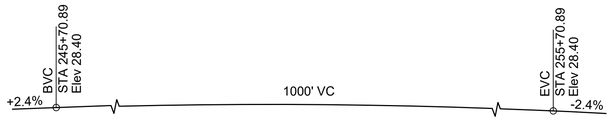
COUNTY OF VENTURA
PUBLIC WORKS AGENCY
ROADS & TRANSPORTATION

SPEC NO.
PROJ. NO. 50058

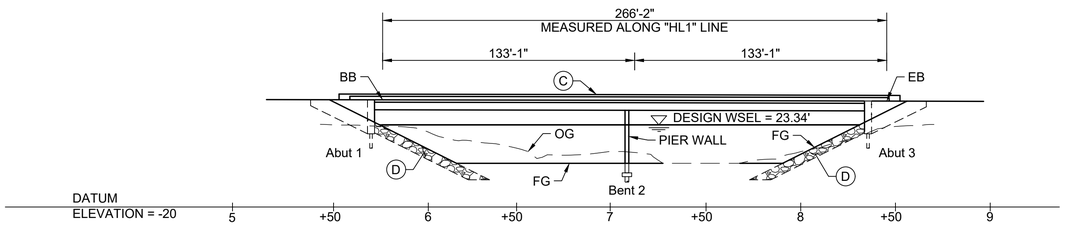
HUENEME ROAD BRIDGE AT REVOLON SLOUGH ADVANCED PLANNING STUDY
TWO SPAN (4-LANES) GENERAL PLAN

SHEET 1
OF 1
DRAWING NO. G-03

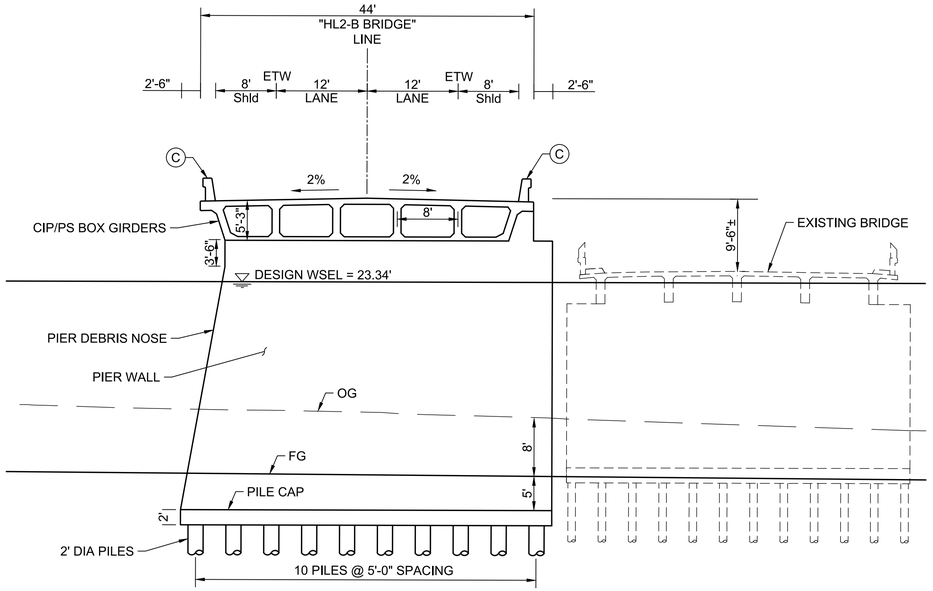
Attachment H. Advanced Planning Study – Alternative 2 - Revolon Slough Bridge



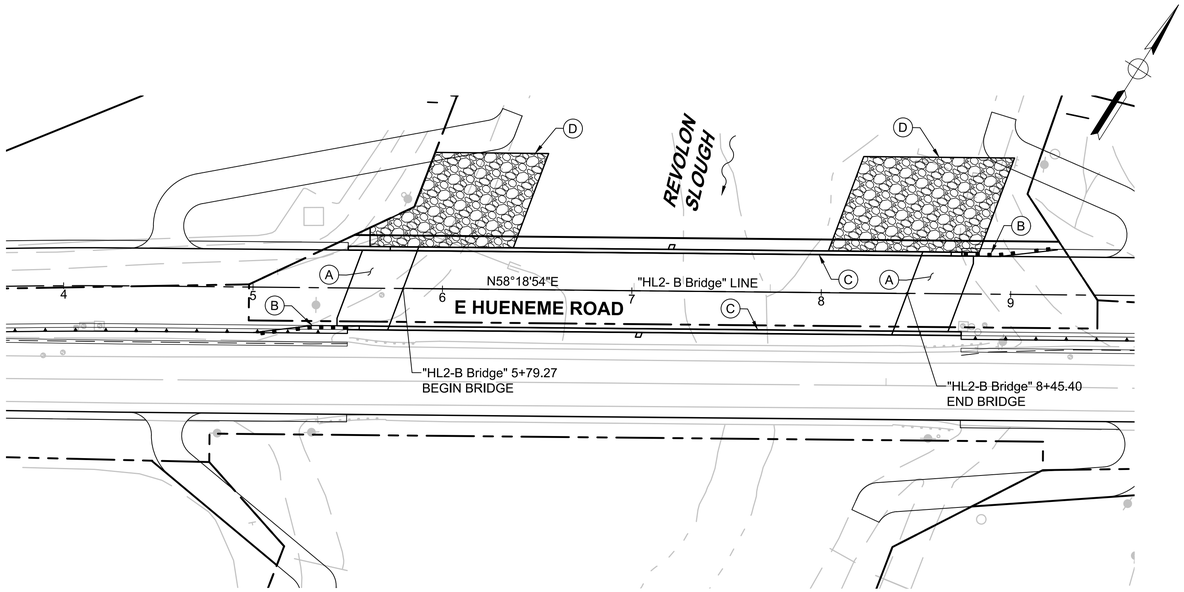
PROFILE
NO SCALE



ELEVATION
1" =40'



TYPICAL SECTION
NO SCALE



PLAN
1" =40'

CONSTRUCTION NOTES

- (A) APPROACH SLAB TYPE N (30)
- (B) MIDWEST GUARDRAIL SYSTEM TRANSITION (WB-31) AND TERMINAL SYSTEM
- (C) CONCRETE BARRIER TYPE 836
- (D) RSP CLASS IX

D				
C				
B				
A				
△	REVISION	DESCRIPTION	APP	DATE

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REGISTERED PROFESSIONAL ENGINEER
Shawn Kowalewski
No.59539
Exp. 12/31/21
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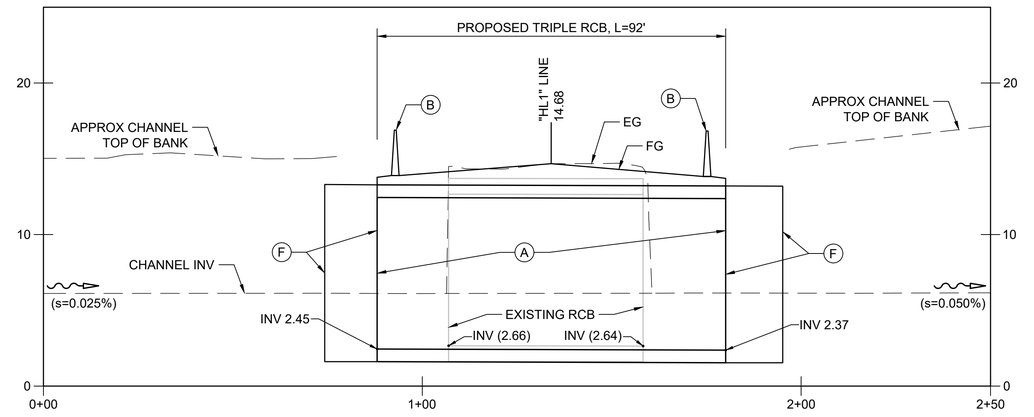
SPEC NO.
PROJ. NO. 50058

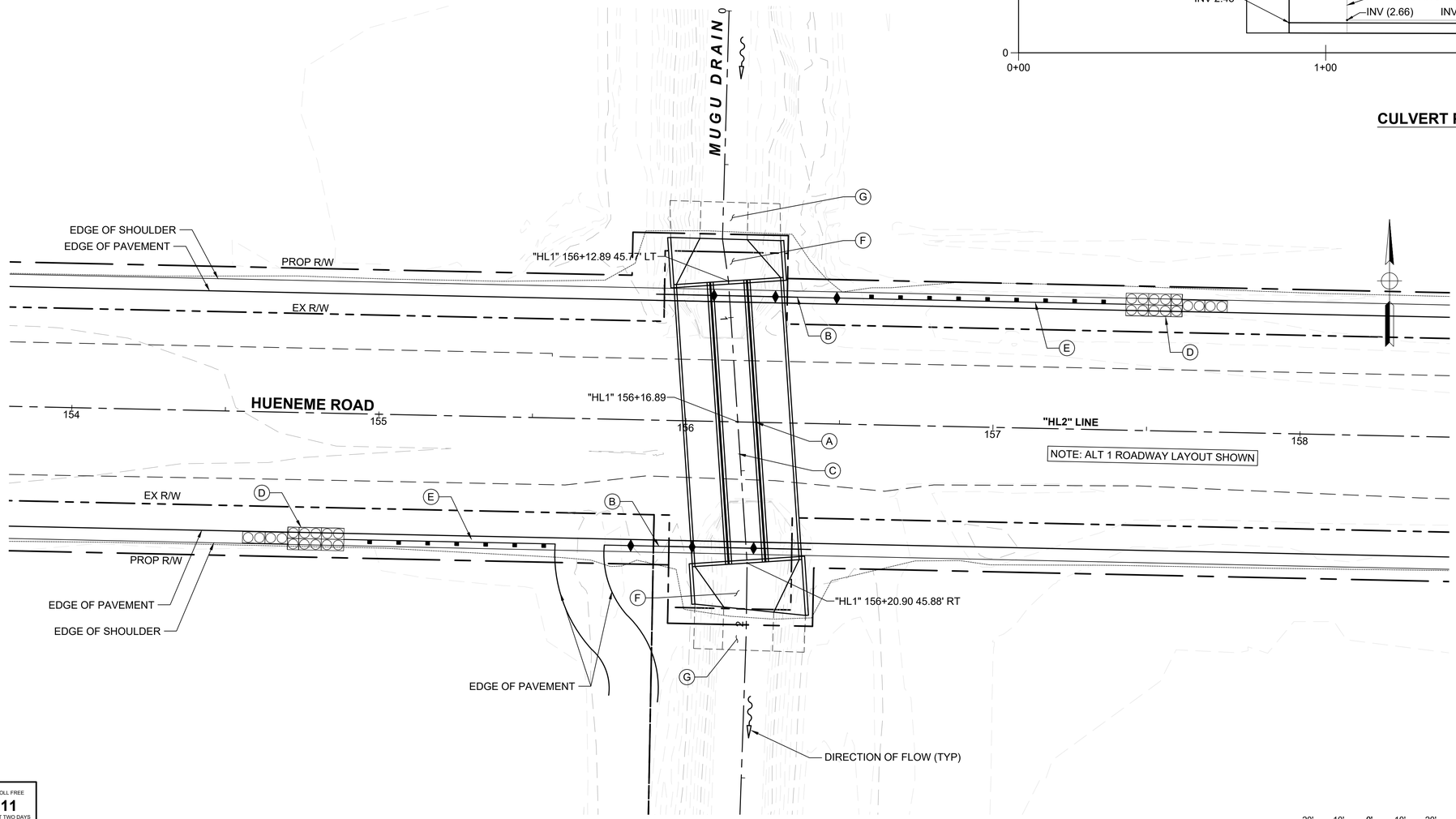
HUENEME ROAD BRIDGE AT REVOLON SLOUGH ADVANCED PLANNING STUDY
TWO SPAN (2-LANES) GENERAL PLAN

SHEET 1
OF 1
DRAWING NO. G-04

Attachment I. Advanced Planning Study – Alternative 1 - Mugu Drain

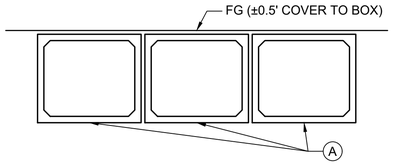


CULVERT PROFILE



CULVERT PLAN

20' 10' 0' 10' 20'
SCALE: 1" = 20'



CULVERT SECTION

NOT TO SCALE

CONSTRUCTION NOTES

- (A) REINFORCED CONCRETE BOX CULVERT (TRIPLE, 10' SPAN X 10' RISE)
- (B) CONCRETE BARRIER TYPE 60MS
- (C) REMOVE EXISTING CULVERT, HEADWALLS, AND WINGWALLS
- (D) CRASH CUSHION (ARRAY B14)
- (E) MIDWEST GUARDRAIL SYSTEM
- (F) HEADWALL AND WINGWALLS
- (G) RIPRAP

DIGALERT — DIAL TOLL FREE 811 AT LEAST TWO DAYS BEFORE YOU DIG — UNDERGROUND SERVICE ALERT OF SOUTHERN CALIFORNIA

D				
C				
B				
A				
△	REVISION	DESCRIPTION	APP	DATE

PLANS PREPARED BY:
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4580 E. Thousand Oaks Blvd.
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Westlake Village, CA 91362
Phone: 805-648-4840
www.mnsengineers.com
PLANS PREPARED UNDER THE DIRECTION OF:
MICHAEL IP RCE 43671 DATE

REGISTERED PROFESSIONAL ENGINEER — Michael Ip — No.43671 — Exp. 3/31/23 — CIVIL — STATE OF CALIFORNIA

DESIGNED SP
DRAWN JP
CHECKED MI
APPROVED

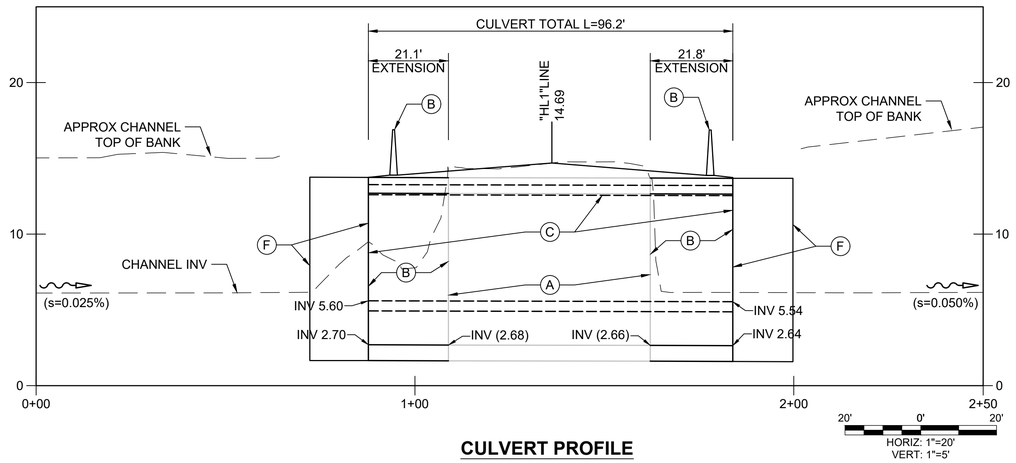
COUNTY OF VENTURA
PUBLIC WORKS AGENCY
ROADS & TRANSPORTATION

SPEC NO.
PROJ. NO. 50058

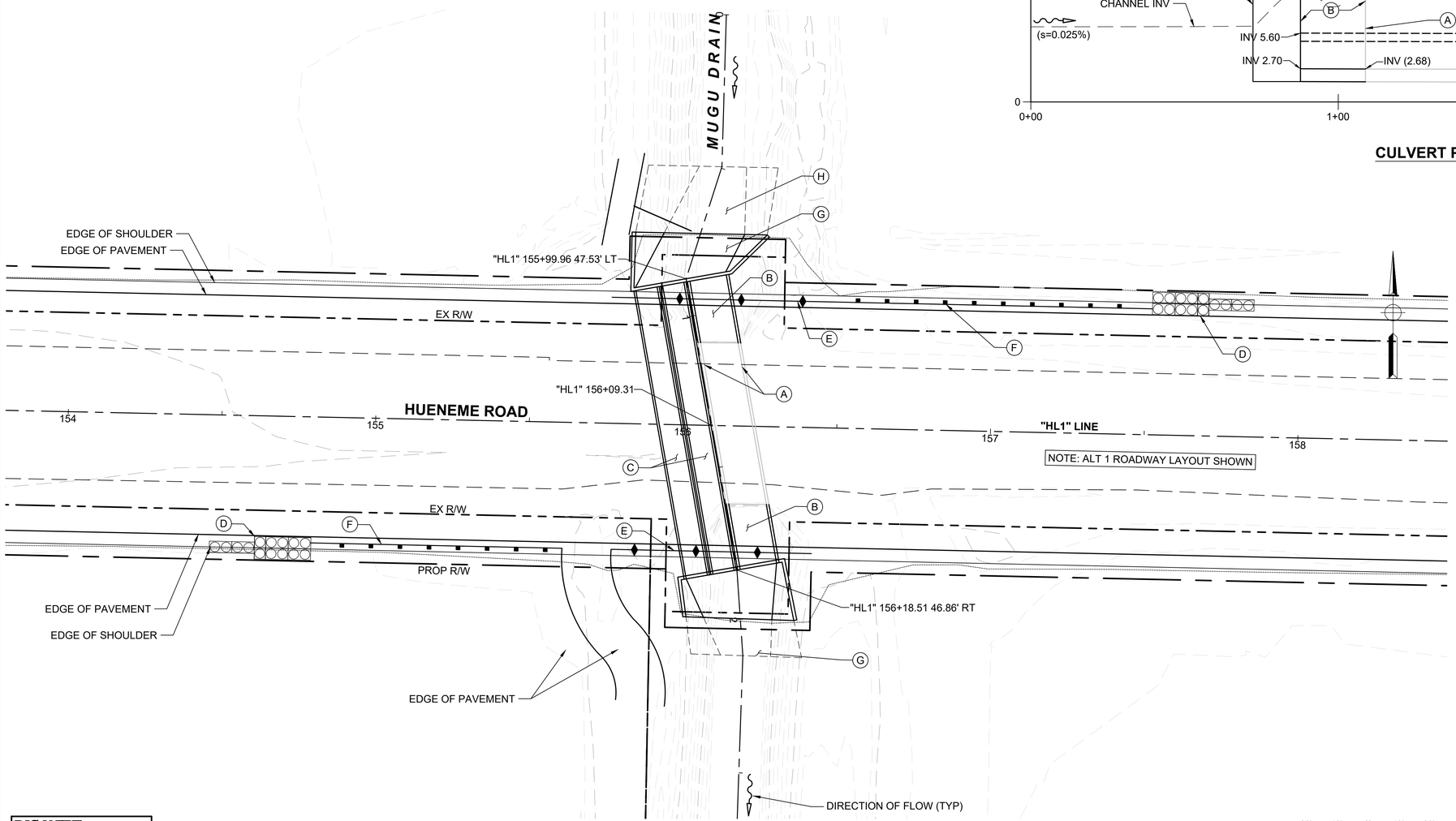
HUENEME ROAD AT MUGU DRAIN ADVANCED PLANNING STUDY
CULVERT REPLACEMENT - ALTERNATIVE 1

SHEET 1 OF 1
DRAWING NO. G-05

Attachment J. Advanced Planning Study – Alternative 2 - Mugu Drain

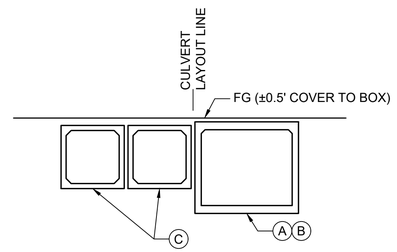


CULVERT PROFILE



CULVERT PLAN

20' 10' 0' 10' 20'
SCALE: 1" = 20'



CULVERT SECTION

NOT TO SCALE

CONSTRUCTION NOTES

(A) EXISTING REINFORCED CONCRETE BOX CULVERT. REMOVE EXISTING HEADWALLS AND WINGWALLS

(B) REINFORCED CONCRETE BOX CULVERT - EXTENSION - (1) 12' SPAN X 10' RISE

(C) REINFORCED CONCRETE BOX CULVERT - WIDEN - (2) 7' SPAN X 7' RISE

(D) CRASH CUSHION (ARRAY B14)

(E) CONCRETE BARRIER TYPE 60MS

(F) MIDWEST GUARDRAIL SYSTEM

(G) HEADWALL AND WINGWALLS

(H) RIPRAP AND CHANNEL TRANSITION

DIGALERT DIAL TOLL FREE 811 AT LEAST TWO DAYS BEFORE YOU DIG
UNDERGROUND SERVICE ALERT OF SOUTHERN CALIFORNIA

D				
C				
B				
A				
△	REVISION	DESCRIPTION	APP	DATE

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REGISTERED PROFESSIONAL ENGINEER
Michael Ip
No.43671
Exp. 3/31/23
CIVIL
STATE OF CALIFORNIA

DESIGNED SP
DRAWN JP
CHECKED MI
APPROVED

COUNTY OF VENTURA
PUBLIC WORKS AGENCY
ROADS & TRANSPORTATION

SPEC NO.
PROJ. NO. 50058

HUENEME ROAD AT MUGU DRAIN ADVANCED PLANNING STUDY

CULVERT EXTENSION AND WIDENING - ALTERNATIVE 2

SHEET 1
OF 1
DRAWING NO. G-06

Attachment K. Right of Way Impacts

APNs	SEGMENT	ALT-1 (R/W TAKES)(ACRES)	ALT-1 (R/W TAKES)(SQUARE FEET	ALT-1 (PROPERTY IMPACTS)	ALT-2 (R/W TAKES)(ACRES)	ALT-2 (R/W TAKES)(SQUARE FEET	ALT-2 (PROPERTY IMPACTS)	ALT-3 (R/W TAKES)(ACRES)	ALT-3 (R/W TAKES)(SQUARE FEET	ALT-3 (PROPERTY IMPACTS)	NOTES
223-003-014	SEGMENT 1 (STA 0-112)	0.28 AC	12,211.34 SF	DRAINAGE PIPE/INLET RELOCATION	0.31 AC	13,551.95 SF	DRAINAGE PIPE/INLET RELOCATION	0.31 AC	13,551.95 SF	DRAINAGE PIPE/INLET RELOCATION	
223-003-022	SEGMENT 1	0.02 AC	938.79 SF		0.02 AC	1,028.72 SF		0.02 AC	1,028.72 SF		
223-003-025	SEGMENT 1	0.007 AC	318.83 SF	DRAINAGE PIEP/INLET RELOCATION & DRAINAGE DITCH	0.02 AC	1,027.44 SF	DRAINAGE PIEP/INLET RELOCATION & DRAINAGE DITCH	0.02 AC	1,050.28 SF	DRAINAGE PIEP/INLET RELOCATION & DRAINAGE DITCH	
223-003-027	SEGMENT 1	0.06 AC	2,615.06 SF		0.04 AC	1,944.22 SF		0.04 AC	1,944.22 SF		
223-003-028	SEGMENT 1	0.12 AC	5,228.18 SF	FENCE & GATE RELOCATION	0.05 AC	2,394.33 SF	FENCE & GATE RELOCATION	0.05 AC	2,394.33 SF	FENCE & GATE RELOCATION	
223-003-029	SEGMENT 1	0.63 AC	27,505.83 SF	FENCE AND GATE RELOCATION, DRAINAGE DITCH, & CULVERT EXTENSION/RELOCATION	0.01 AC	526.08 SF		0.01 AC	526.08 SF		
223-003-030	SEGMENT 1	0.24 AC	10,478.83 SF	DRAINAGE DITCH AND IRRIGATION FACILITY, FENCE, AND GATE RELOCATION							
223-003-031	SEGMENT 1	0.72 AC	31,759.47 SF	DRAINAGE PIPE/INLET, FENCE, & GATE RELOCATION, CULVERT EXTENSION / RELOCATION, & DRAINAGE DITCH							
223-003-032	SEGMENT 1	0.39 AC	17,030.27 SF	CULVERT EXTENSION / RELOCATION, DRAINAGE DITCH, & FENCE AND GATE RELOCATION	0.01 AC	663.55 SF		0.01 AC	663.55 SF		
232-008-025	SEGMENT 1	0.12 AC	5,266.06 SF	FENCE AND GATE RELOCATION							
232-008-021	SEGMENT 1	0.35 AC	15,328.19 SF	FENCE & GATE RELOCATION				0.09 AC	4,097.46 SF		
232-008-028	SEGMENT 1	0.043 AC	18,908.81 SF	IRRIGATION FACILITY RELOCATION	0.15 AC	6,728.53 SF		0.35 AC	15,326.19 SF	IRRIGATION FACILITY RELOCATION	
232-008-026	SEGMENT 1	0.10 AC	4,670.67 SF		0.02 AC	1,112.48 SF		0.04 AC	1,861.89 SF		
232-008-027	SEGMENT 1	0.08 AC	3,788.27 SF	TREE REMOVAL	0.03 AC	1,565.38 SF	TREE REMOVAL	0.08 AC	3,788.37 SF	TREE REMOVAL	
232-008-029	SEGMENT 1	0.29 AC	13,002.47 SF		0.16 AC	7,020.08 SF		0.30 AC	13,252.37 SF		
232-008-030	SEGMENT 1	0.06 AC	2,985.08 SF	FENCE & GATE RELOCATION, DRAINAGE DITCH, & CULVERT EXTENSIONS / RELOCATION	0.007 AC	331.29 SF		0.05 AC	2,559.8 SF	FENCE & GATE RELOCATION, DRAINAGE DITCH, & CULVERT EXTENSIONS / RELOCATION	
232-007-015	SEGMENT 1	0.45 AC	19,907.02 SF	DRAINAGE DITCH, CULVERT EXTENSION / RELOCATION, & FENCE & GATE RELOCATION	0.20 AC	8,656.95 SF	DRAINAGE DITCH, CULVERT EXTENSION / RELOCATION, & FENCE & GATE RELOCATION	0.38 AC	16,606.69 SF	DRAINAGE DITCH, CULVERT EXTENSION / RELOCATION, & FENCE & GATE RELOCATION	
232-007-014	SEGMENT 1	0.36 AC	15,713.76 SF	TREE AND BUILDING REMOVAL, CULVERT EXTENSION / RELOCATION, DRAINAGE DITCH, & IRRIGATION FACILITY, GATE, & FENCE RELOCATION			TREE AND BUILDING REMOVAL, & GATE & FENCE RELOCATION	0.29 AC	12,787.69 SF	TREE AND BUILDING REMOVAL, CULVERT EXTENSION / RELOCATION, DRAINAGE DITCH, & GATE, & FENCE RELOCATION	
232-007-013	SEGMENT 2 (STA 112-172)	0.70 AC	30,707.03 SF	CULVERT EXTENSION / RELOCATION, DRAINAGE DITCH, IRRIGATION FACILITIES, FENCE, & GATE REMOVAL				0.42 AC	18,362.17 SF	CULVERT EXTENSION / RELOCATION, DRAINAGE DITCH, IRRIGATION FACILITIES, FENCE, & GATE REMOVAL	
232-007-016	SEGMENT 2	0.57 AC	25,044.49 SF	TREE & SHRUB REMOVAL, DRAINAGE DITCH, CULVERT EXTENSION / RELOCATION, & FENCE & GATE REMOVAL.							
218-009-206	SEGMENT 2	0.37 AC	16,384.90 SF		0.009 AC	422.36 SF		0.005	245.34 SF		
218-009-210	SEGMENT 2	0.28 AC	12,568.1 SF	FENCE & GATE RELOCATION	0.002 AC	115.96 SF		0.01 AC	614.52 SF		
218-009-208	SEGMENT 2	0.05 AC	2,286.3 SF					0.02 AC	928.27 SF		
218-009-209	SEGMENT 2	0.36 AC	15,706.16 SF	FENCE & GATE RELOCATION	0.06 AC	2,684.86 SF		0.32 AC	14,132.81 SF		
218-009-310	SEGMENT 3 (STA 172-182)	0.03 AC	1,350.94 SF	TREE REMOVAL, FENCE & GATE RELOCATION				0.04 AC	1,800.7 SF	TREE REMOVAL, FENCE & GATE RELOCATION	
218-009-121	SEGMENT 3	0.01 AC	615.75 SF					0.01 AC	629.78 SF		
218-009-122	SEGMENT 3	0.02 AC	939.43 SF	FENCE, GATE, & IRRIGATION FACILITY RELOCATION				0.02 AC	939.43 SF		
218-007-021	SEGMENT 4 (STA 182-302)	0.13 AC	6,007.86 SF	FENCE & GATE RELOCATION				0.15 AC	6,723.29 SF		
218-007-024	SEGMENT 4	0.19 AC	8,677.15 SF	TREE REMOVAL, CULVERT EXTENSION / RELOCATION				0.30 AC	13,181.12 SF	TREE REMOVAL, CULVERT EXTENSION / RELOCATION	
218-007-022	SEGMENT 4	0.13 AC	5,827.86 SF	CULVERT EXTENSION / RELOCATION				0.25 AC	11,088.05 SF	CULVERT EXTENSION / RELOCATION , DRAINAGE PIPE / INLET RELOCATION	
218-007-020	SEGMENT 4	0.25 AC	11,038.27 SF	CULVERT EXTENSION / RELOCATION & FENCE & GATE RELOCATION				0.53 AC	23,075.65 SF	CULVERT EXTENSION / RELOCATION & FENCE & GATE RELOCATION	
218-007-023	SEGMENT 4	0.79 AC	34,561.33 SF	TREE REMOVAL, CULVERT EXTENSION / RELOCATION, DRAINGAE PIPE / INLET RELOCATION	0.20 AC	8,784.13 SF	TREE REMOVAL	1.66 AC	72,360.74 SF	TREE REMOVAL, CULVERT EXTENSION / RELOCATION, DRAINGAE PIPE / INLET RELOCATION	
230-009-078	SEGMENT 4	0.81 AC	35,464.44 SF	CULVERT EXTENSION / RELOCATION	1.35 AC	59,080.98 SF		1.38 AC	60,246.42 SF	CULVERT EXTENSION / RELOCATION	
230-009-079	SEGMENT 4	1.32 AC	57,753.66 SF	DRAINAGE DITCH & DRAINAGE PIPE / INLET RELOCATION	2.03 AC	88,716.52 SF	DRAINAGE DITCH	2.00 AC	87,202.7 SF	DRAINAGE DITCH	
230-009-070	SEGMENT 4	0.20 AC	57,753.66 SF	ACCESS ROAD	0.44 AC	19,388.75 SF	ACCESS ROAD	0.39 AC	17,107.16 SF	ACCESS ROAD	REVLON SLOUGH
230-009-077	SEGMENT 4	1.72 AC	75,193.67 SF	IRRIGATION FACILITY & DRAINAGE PIPE / INLET RELOCATION & DRAINAGE DITCH	0.23 AC	10,026.37 SF	IRRIGATION FACILITY & DRAINAGE PIPE / INLET RELOCATION & DRAINAGE DITCH	2.27 AC	99,006.78 SF	IRRIGATION FACILITY & DRAINAGE PIPE / INLET RELOCATION & DRAINAGE DITCH	
230-009-072	SEGMENT 4	0.91 AC	39,924.50 SF	DRAINAGE DITCH & DRAINAGE PIPE / INLET & IRRIGATION FACILITY RELOCATION	1.66 AC	72,707.80 SF	DRAINAGE DITCH & DRAINAGE PIPE / INLET & IRRIGATION FACILITY RELOCATION	1.50 AC	65,757.5 SF	DRAINAGE DITCH & DRAINAGE PIPE / INLET & IRRIGATION FACILITY RELOCATION	
230-009-084	SEGMENT 4	0.22 AC	9,605.83 SF	TREE AND SHRUB REMOVAL, CULVERT EXTENSION / RELOCATION, & DRAINGAE PIPE / INLET, IRRIGATION FACILITY, FENCE, & GATE RELOCATION	0.64 AC	28,005.16 SF	TREE AND SHRUB REMOVAL, CULVERT EXTENSION / RELOCATION, & DRAINGAE PIPE / INLET, IRRIGATION FACILITY, FENCE, & GATE RELOCATION	0.23 AC	10,254.5 SF	TREE REMOVAL, CULVERT EXTENSION / RELOCATION, & DRAINGAE PIPE / INLET, IRRIGATION FACILITY, FENCE, & GATE RELOCATION	
230-018-035	SEGMENT 4	0.22 AC	9,816.46 SF	CULVERT EXTENSION / RELOCATION	0.43 AC	18,508.58 SF	CULVERT EXTENSION / RELOCATION	0.21 AC	9,559.02 SF	CULVERT EXTENSION / RELOCATION	
230-018-024	SEGMENT 4	0.32 AC	14,183.80 SF	DRAINAGE DITCH	0.59 AC	25,908.7 SF	DRAINAGE DITCH	0.33 AC	14,612.56 SF	DRAINAGE DITCH	
230-018-035	SEGMENT 4	0.06 AC	2,862.80 SF		0.14 AC	6,173.06 SF		0.07 AC	3,289.94 SF		
230-018-034	SEGMENT 5 (STA 302-END)	0.47 AC	20,867.28 AF	CULVERT EXTENSION / RELOCATION	0.82 AC	35,754.76 SF	CULVERT EXTENSION / RELOCATION	0.68 AC	29,923.38 SF	CULVERT EXTENSION / RELOCATION	
230-018-033	SEGMENT 5	0.54 AC	23,663.12 SF	IRRIGATION FACILITY RELOCATION	0.92 AC	40,151.72 SF	IRRIGATION FACILITY RELOCATION	0.90 AC	39,338.93 SF	IRRIGATION FACILITY RELOCATION	
230-018-032	SEGMENT 5	0.57 AC	24,807.05 SF	DRAINAGE DITCH	1.01 AC	43,937.06 SF	DRAINAGE DITCH	0.98 AC	43,072.75 SF	DRAINAGE DITCH	

APNs	SEGMENT	ALT-1 (R/W TAKES)(ACRES)	ALT-1 (R/W TAKES)(SQUARE FEET	ALT-1 (PROPERTY IMPACTS)	ALT-2 (R/W TAKES)(ACRES)	ALT-2 (R/W TAKES)(SQUARE FEET	ALT-2 (PROPERTY IMPACTS)	ALT-3 (R/W TAKES)(ACRES)	ALT-3 (R/W TAKES)(SQUARE FEET	ALT-3 (PROPERTY IMPACTS)	NOTES
230-018-031	SEGMENT 5	0.57 AC	28,746.46 SF	DRAINAGE DITCH & DRAINAGE PIPE / INLET, FENCE, & GATE RELOCATION	1.21 AC	52,851.56 SF	DRAINAGE DITCH & DRAINAGE PIPE / INLET, FENCE, & GATE RELOCATION	1.18 AC	51,491.56 SF	DRAINAGE DITCH & DRAINAGE PIPE / INLET, FENCE, & GATE RELOCATION	
230-008-045	SEGMENT 5	1.13 AC	49,361.31 SF	CULVERT EXTENSION / RELOCATION, DRAINAGE DITCH, DRAINAGE PIPE / INLET RELOCATION	1.25 AC	54,624.12 SF	CULVERT EXTENSION / RELOCATION, DRAINAGE DITCH, DRAINAGE PIPE / INLET RELOCATION	1.25 AC	54,619.88 SF	CULVERT EXTENSION / RELOCATION, DRAINAGE DITCH, DRAINAGE PIPE / INLET RELOCATION	
230-008-040	SEGMENT 5	1.54 AC	67,073.37 SF	DRAINAGE DITCH & DRAINAGE PIPE / INLET, FENCE, & GATE RELOCATION	1.53 AC	67,044.57 SF	DRAINAGE DITCH & DRAINAGE PIPE / INLET, FENCE, & GATE RELOCATION	1.54 AC	67,060.82 SF	DRAINAGE DITCH & DRAINAGE PIPE / INLET RELOCATION	
230-008-36	SEGMENT 5	0.18 AC	7,883.11 SF	DRAINAGE PIPE / INLET RELOCATION & CULVERT EXTENSION / RELOCATION	0.18 AC	7,867.66 SF	DRAINAGE PIPE / INLET RELOCATION & CULVERT EXTENSION / RELOCATION	0.18 AC	7,850.05 SF	DRAINAGE PIPE / INLET RELOCATION & CULVERT EXTENSION / RELOCATION	
231-002-004	SEGMENT 1 (STA 0-112)	0.01 AC	581.79 SF		0.01 AC	581.88 SF		0.01 AC	581.88 SF		
231-002-018	SEGMENT 1	0.16 AC	7,166 SF		0.16 AC	7,166 SF		0.16 AC	7,166 SF		
231-002-027	SEGMENT 1	0.37 AC	16,397.17 SF		0.58 AC	25,609.50 SF		0.58 AC	25,617.25 SF		
231-002-031	SEGMENT 1	0.25 AC	11,042.66 SF		0.55 AC	24,232.15 SF		0.54 AC	23,521.94 SF		
231-002-028	SEGMENT 1	0.08 AC	3,465.46 SF		0.18 AC	7,933.72 SF		0.18 AC	7,933.72 SF		
231-002-029	SEGMENT 1	0.16 AC	6,958.53 SF	IRRIGATION FACILITY RELOCATION	0.36 AC	16,023.07 SF	IRRIGATION FACILITY RELOCATION	0.36 AC	16,023.07 SF	IRRIGATION FACILITY RELOCATION	
231-002-030	SEGMENT 1	0.35 AC	15,257.97 SF		0.85 C	37,050.7 SF		0.85 AC	37,050.7 SF		
232-003-120	SEGMENT 1	0.57 AC	24,896.20 SF	FENCE, GATE, & IRRIGATION FACILITY RELOCATION & 2 BUILDING REMOVAL	1.13 AC	49,290.88 SF	FENCE, GATE, & IRRIGATION FACILITY RELOCATION & 2 BUILDING REMOVAL	1.13 AC	49,290.88 SF	FENCE, GATE, & IRRIGATION FACILITY RELOCATION & 2 BUILDING REMOVAL	
232-003-119	SEGMENT 1	0.12 AC	5,602.76 SF	DRAINAGE DITCH, TREE REMOVAL, CULVERT EXTENSION / RELOCATION, & FENCE & GATE RELOCATION	0.26 AC	11,551.15 SF	DRAINAGE DITCH, TREE REMOVAL, CULVERT EXTENSION / RELOCATION, & FENCE & GATE RELOCATION	0.26 AC	11,551.15 SF	DRAINAGE DITCH, TREE REMOVAL, CULVERT EXTENSION / RELOCATION, & FENCE & GATE RELOCATION	
232-003-121	SEGMENT 1	0.41 AC	17,850.61 SF	TREE REMOVAL & FENCE, GATE, AND IRRIGATION FACILITY RELOCATION	0.87 AC	38,060.65 SF	TREE REMOVAL & FENCE, GATE, AND IRRIGATION FACILITY RELOCATION	0.84 AC	36,886.36 SF	TREE REMOVAL & FENCE, GATE, AND IRRIGATION FACILITY RELOCATION	
232-003-209	SEGMENT 1	0.40 AC	17,670.26 SF	IRRIGATION FACILITY RELOCATION	0.96 AC	41,931.72 SF	IRRIGATION FACILITY RELOCATION	0.49 AC	21,420.33 SF	IRRIGATION FACILITY RELOCATION	
232-003-210	SEGMENT 1	0.21 AC	9,106.61 SF	IRRIGATION FACILITY, FENCE, & GATE RELOCATION	0.56 AC	24,718.05 SF	IRRIGATION FACILITY, FENCE, & GATE RELOCATION	0.21 AC	9,231.03 SF	IRRIGATION FACILITY, FENCE, & GATE RELOCATION	
232-003-305	SEGMENT 1	0.29 AC	12,672.67 SF	IRRIGATION FACILITIES, FENCE, & GATE RELOCATION & REMOVE SHRUBS	0.79 AC	34,502.93 SF	IRRIGATION FACILITIES, FENCE, & GATE RELOCATION & REMOVE SHRUBS & BUILDING	0.29 AC	12,678.0 SF	IRRIGATION FACILITIES, FENCE, & GATE RELOCATION & REMOVE SHRUBS	
232-003-304	SEGMENT 2 (STA 112-172)	0.47 AC	20,423.83 SF	IRRIGATION FACILITIES RELOCATION	1.04 AC	45,504.83 SF	IRRIGATION FACILITIES RELOCATION & CULVERT EXTENSION / RELOCATION	0.82 AC	36,028.18 SF	IRRIGATION FACILITIES RELOCATION & CULVERT EXTENSION / RELOCATION	
232-004-137	SEGMENT 2	0.006 AC	262.7 SF		0.01 AC	576.33 SF		0.01 AC	576.33 SF		
232-004-140	SEGMENT 2	0.96 AC	42,056.57 SF	GATE & FENCE RELOCATION & TREE REMOVAL	2.13 AC	92,752.14 SF	IRRIGATION FACILITY, GATE, & FENCE RELOCATION & TREE REMOVAL	2.13 AC	92,752.14 SF	IRRIGATION FACILITY, GATE, & FENCE RELOCATION & TREE REMOVAL	
232-004-138	SEGMENT 2	0.24 AC	42,056.57 SF	TREE REMOVAL, FENCE & GATE RELOCATION	0.54 AC	23,751.64 SF	TREE REMOVAL, FENCE & GATE RELOCATION	0.50 AC	22,144.74 SF	TREE REMOVAL, FENCE & GATE RELOCATION	
232-004-139	SEGMENT 2	0.26 AC	11,542.23 SF	IRRIGATION FACILITIES, FENCE, & GATE RELOCATION & TREE REMOVAL	0.58 AC	25,270.65 SF	IRRIGATION FACILITIES, FENCE, & GATE RELOCATION & TREE REMOVAL	0.38 AC	16,814.13 SF	IRRIGATION FACILITIES, FENCE, & GATE RELOCATION & TREE REMOVAL	
232-004-141	SEGMENT 2	0.02 AC	1,055.45 SF		0.04 AC	2,005.90 SF		0.02 AC	1,073.65 SF		
232-004-142	SEGMENT 2	0.09 AC	4,249.14 SF	FENCE & GATE RELOCATION	0.20 AC	8,773.55 SF	FENCE & GATE RELOCATION	0.09 AC	4,221.24 SF	FENCE & GATE RELOCATION	
232-004-204	SEGMENT 3 (STA 172-182)	0.07 AC	3,258.75 SF	CULVER EXTENSION / RELOCATION, FENCE & GATE RELOCATION	0.16 AC	6,981.65 SF	CULVER EXTENSION / RELOCATION, FENCE & GATE RELOCATION	0.07 AC	3,162.81 SF	CULVER EXTENSION / RELOCATION, FENCE & GATE RELOCATION	
232-004-321	SEGMENT 3				1,441.83 SF/0.03 AC	1,441.83 SF/0.03 AC					
232-004-314	SEGMENT 4 (STA 182-302)			FENCE & GATE RELOCATION	0.009 AC	415.24 SF	FENCE & GATE RELOCATION			FENCE & GATE RELOCATION	
232-004-315	SEGMENT 4				0.009 AC	397.72 SF					
232-004-322	SEGMENT 4	0.50 AC	21,806.03 SF	TREE REMOVAL, IRRIGATION FACILITY RELOCATION	1.01 AC	44,300.62 SF	TREE REMOVAL, IRRIGATION FACILITY RELOCATION, & CULVERT EXTENSION / RELOCATION	0.26 AC	11,374.26 SF	TREE REMOVAL, IRRIGATION FACILITY RELOCATION	
232-004-323	SEGMENT 4	0.50 AC	21,806.03 SF	TREE REMOVAL & FENCE & GATE RELOCATION	1.05 AC	45,835.22 SF	TREE REMOVAL, FENCE, IRRIGATION FACILITY & GATE RELOCATION, CULVERT EXTENSION / RELOCATION				
232-004-324	SEGMENT 4	0.35 AC	15,419.82 SF	TREE REMOVAL & FENCE & GATE RELOCATION	0.72 AC	31,746.50 SF	TREE REMOVAL, FENCE & GATE RELOCATION, & CULVERT EXTENSION / RELOCATION				
234-009-062	SEGMENT 4	0.15 AC	6,339.54 SF	ACCESS ROAD			ACCESS ROAD			ACCESS ROAD	REVOLON SLOUGH
234-009-072	SEGMENT 4	0.67 AC	29,434.80 SF		0.02 AC	1,100.52 SF		0.02 AC	983.74 SF		
234-009-075	SEGMENT 4	0.44 AC	19,317.07 SF	IRRIGATION FACILITY, FENCE, & GATE RELOCATION	0.02 AC	1,162.66 SF		0.02 AC	945.25 SF		
234-009-076	SEGMENT 4	0.03 AC	1,402.82 SF								
234-009-077	SEGMENT 4	0.18 AC	8,090.18 SF								
234-009-064	SEGMENT 4	0.03 AC	1,426.64 SF								
234-009-085	SEGMENT 4	0.29 AC	12,781.33 SF	IRRIGATION FACILITY RELOCATION				0.14 AC	6,399.23 SF	IRRIGATION FACILITY RELOCATION	
230-018-029	SEGMENT 4	0.44 AC	19,540.26 SF	TREE REMOVAL, DRAINAGE DITCH, CULVERT EXTENSION / RELOCATION, & FENCE , GATE, & DRAINAGE PIPE / INLET RELOCATION				0.04 AC	1,805.0 SF	TREE REMOVAL, DRAINAGE DITCH, CULVERT EXTENSION / RELOCATION, & FENCE , GATE, & DRAINAGE PIPE / INLET RELOCATION	
230-018-023	SEGMENT 4	0.14 AC	6,206.93 SF	FENCE & GATE RELOCATION				0.12 AC	5,380.63 SF		
230-018-005	SEGMENT 5 (STA 302-END)	0.03 AC	1,437.96 SF					0.01 AC	490.15 SF		
230-018-030	SEGMENT 5	0.56 AC	24,741.01 SF	FENCE & GATE RELOCATION			FENCE & GATE RELOCATION			FENCE & GATE RELOCATION	
230-018-004	SEGMENT 5	0.03 AC	1,456.75 SF								

Attachment L. Utility Impacts

SEGMENT LIMITS	UTILITIES	FACILITY TYPE	ALT-1 RELOCATION/ADJUST TO GRADE	ALT-2 RELOCATION/ADJUST TO GRADE	ALT-3 RELOCATION/ADJUST TO GRADE
EDISON DR TO ARNOLD					
	CMWD BRINE LINE	8" BLOW OFF	1 ADJUSTMENT	1 ADJUSTMENT	1 ADJUSTMENT
		MANHOLE	2 ADJUSTMENTS	1 ADJUSTMENT	1 ADJUSTMENT
		8" AVARV	1 ADJUSTMENT	1 ADJUSTMENT	1 ADJUSTMENT
	SCE	POWER POLE	25 RELOCATIONS	7 RELOCATIONS	7 RELOCATIONS
	AT&T	MANHOLE & TBM	1 ADJUSTMENT	1 ADJUSTMENT	1 ADJUSTMENT
	OCEAN VIEW MWD	WATER VALVE	8 ADJUSTMENTS	8 ADJUSTMENTS	8 ADJUSTMENTS
	UWCD	WATER VALVE	3 ADJUSTMENTS	3 ADJUSTMENTS	3 ADJUSTMENTS
		MANHOLE	1 ADJUSTMENT	1 ADJUSTMENT	1 ADJUSTMENT
	PHWA	WATER VALVE	3 ADJUSTMENTS	3 ADJUSTMENTS	3 ADJUSTMENTS
	SEWER DEPT NAVY	MANHOLE	3 ADJUSTMENTS	3 ADJUSTMENTS	3 ADJUSTMENTS
	VERIZON	MANHOLE	7 ADJUSTMENTS	6 ADJUSTMENTS	6 ADJUSTMENTS
	VENTURA COUNTY SURVEY	MANHOLE	1 ADJUSTMENT	1 ADJUSTMENT	1 ADJUSTMENT
	CITY OF OXNARD	MANHOLE (CTS)	2 ADJUSTMENTS	1 ADJUSTMENT	1 ADJUSTMENT
4 2"	CITY OF OXNARD - RECYCLED WATER LINE	8" BLOW OFF	3 ADJUSTMENTS		
		24" DISTRIBUTION TURNOUT	1 ADJUSTMENT		
		12" SERVICE TURNOUT	4 ADJUSTMENTS		
		42" TRANSMISSION TURNOUT	1 ADJUSTMENT		
		MANHOLE (VAULT)	2 RELOCATION		
		6" AVARV	1 ADJUSTMENT		
ARNOLD RD TO RICE AVE					
	CMWD BRINE LINE	MANHOLE & MANHOLE STRUCTURE	4 ADJUSTMENTS	4 ADJUSTMENTS	4 ADJUSTMENTS
		4" AVARV	2 ADJUSTMENTS	2 ADJUSTMENTS	2 ADJUSTMENTS
	SCE	POWER POLE	32 RELOCATIONS	6 RELOCATIONS	13 RELOCATIONS
	OCEAN VIEW MWD	WATER VALVE	4 ADJUSTMENTS	4 ADJUSTMENTS	4 ADJUSTMENTS
	SEWER DEPT NAVY	MANHOLE	5 ADJUSTMENTS	5 ADJUSTMENTS	5 ADJUSTMENTS
	VERIZON	MANHOLE	7 ADJUSTMENTS	3 ADJUSTMENTS	7 ADJUSTMENTS
	CITY OF OXNARD - RECYCLED WATER LINE	BLOW OFF	4 ADJUSTMENTS	2 ADJUSTMENTS	2 ADJUSTMENTS
		8" BLOW OFF	2 ADJUSTMENTS	1 ADJUSTMENT	1 ADJUSTMENT
		12" OUTLET	3 ADJUSTMENTS	3 ADJUSTMENTS	3 ADJUSTMENTS
		4" AVARV	2 ADJUSTMENTS	1 ADJUSTMENT	1 ADJUSTMENT
		10" TURNOUT	2 ADJUSTMENTS	1 ADJUSTMENT	1 ADJUSTMENT
		MANHOLE (VAULT)	1 RELOCATION		
		6" AVARV	1 ADJUSTMENT		

SEGMENT LIMITS	UTILITIES	FACILITY TYPE	ALT-1 RELOCATION/ADJUST TO GRADE	ALT-2 RELOCATION/ADJUST TO GRADE	ALT-3 RELOCATION/ADJUST TO GRADE
RICE AVE TO RAYTHEON RD					
	CMWD BRINE LINE	MANHOLE & MANHOLE STRUCTURE	5 ADJUSTMENTS	5 ADJUSTMENTS	5 ADJUSTMENTS
		8" BLOW OFF	2 ADJUSTMENTS	2 ADJUSTMENTS	2 ADJUSTMENTS
		4" AVARV	2 ADJUSTMENTS	2 ADJUSTMENTS	2 ADJUSTMENTS
		8" AVARV	2 ADJUSTMENTS	2 ADJUSTMENTS	2 ADJUSTMENTS
	SCE	POWER POLE	50 RELOCATIONS	9 RELOCATIONS	17 RELOCATIONS
	AT&T	MANHOLE	1 ADJUSTMENT	1 ADJUSTMENT	1 ADJUSTMENT
	OCEAN VIEW MWD	WATER VALVE	14 ADJUSTMENTS	14 ADJUSTMENTS	14 ADJUSTMENTS
		FIRE HYDRANT	7 ADJUSTMENTS	7 ADJUSTMENTS	7 ADJUSTMENTS
		BLOW OFF	1 ADJUSTMENT	1 ADJUSTMENT	1 ADJUSTMENT
	SEWER DEPT NAVY	MANHOLE	6 ADJUSTMENTS	6 ADJUSTMENTS	6 ADJUSTMENTS
	VERIZON	MANHOLE	12 ADJUSTMENTS	12 ADJUSTMENTS	12 ADJUSTMENTS
	VENTURA COUNTY SURVEY	MANHOLE	1 ADJUSTMENT	1 ADJUSTMENT	1 ADJUSTMENT
	CITY OF OXNARD - RECYCLED WATER LINE	8" BLOW OFF	6 ADJUSTMENTS	4 ADJUSTMENTS	6 ADJUSTMENTS
		MANHOLE (VAULT)	4 ADJUSTMENTS	4 ADJUSTMENTS	4 ADJUSTMENTS
		4" AVARV	7 ADJUSTMENTS	5 ADJUSTMENTS	7 ADJUSTMENTS
		10" TURNOUT	3 ADJUSTMENTS	3 ADJUSTMENTS	3 ADJUSTMENTS
		12" OUTLET	8 ADJUSTMENTS	7 ADJUSTMENTS	8 ADJUSTMENTS
RAYTHEON RD TO WOOD RD					
	CMWD BRINE LINE	8" BLOW OFF	1 ADJUSTMENT	1 ADJUSTMENT	1 ADJUSTMENT
		MANHOLE	3 ADUSTMENTS	3 ADUSTMENTS	3 ADUSTMENTS
		4" AVARV	1 ADJUSTMENT	1 ADJUSTMENT	1 ADJUSTMENT
		6" AVARV	1 ADJUSTMENT	1 ADJUSTMENT	1 ADJUSTMENT
	SCE	POWER POLE	21 RELOCATIONS	21 RELOCATIONS	8 RELOCATIONS
	CITY OF OXNARD - RECYCLED WATER LINE	8" BLOW OFF	3 ADJUSTMENTS	3 ADJUSTMENTS	3 ADJUSTMENTS
		4" AVARV	3 ADJUSTMENTS	3 ADJUSTMENTS	3 ADJUSTMENTS
		10" TURNOUT	1 ADJUSTMENT	1 ADJUSTMENT	1 ADJUSTMENT
		12" OUTLET	6 ADJUSTMENTS	6 ADJUSTMENTS	6 ADJUSTMENTS
WOOD RD TO LAS POSAS RD					
	CMWD BRINE LINE	MANHOLE	2 ADJUSTMENTS	2 ADJUSTMENTS	2 ADJUSTMENTS
		MANHOLE & MANHOLE STRUCTURE	2 ADJUSTMENTS	2 ADJUSTMENTS	2 ADJUSTMENTS
		8" BLOW OFF	1 ADJUSTMENT	1 ADJUSTMENT	1 ADJUSTMENT
		8" AVARV	2 ADJUSTMENTS	2 ADJUSTMENTS	2 ADJUSTMENTS
		4" AVARV	1 ADJUSTMENT	1 ADJUSTMENT	1 ADJUSTMENT

SEGMENT LIMITS	UTILITIES	FACILITY TYPE	ALT-1 RELOCATION/ADJUST TO GRADE	ALT-2 RELOCATION/ADJUST TO GRADE	ALT-3 RELOCATION/ADJUST TO GRADE
	SCE	POWER POLE	35 RELOCATIONS	0 RELOCATIONS	7 RELOCATIONS
	PLEASANT VALLEY COUNTY WATER DISTRICT	WELL STATION	1 RELOCATION	0 RELOCATIONS	0 RELOCATIONS
LAS POSAS RD TO UNIVERSITY DR					
	CMWD BRINE LINE	MANHOLE & MANHOLE STRUCTURE 4" AVARV 6" AVARV 10" AVARV 8" BLOW OFF	3 ADJUSTMENTS 1 ADJUSTMENT 2 ADJUSTMENTS 1 ADJUSTMENT 3 ADJUSTMENTS	3 ADJUSTMENTS 1 ADJUSTMENT 2 ADJUSTMENTS 1 ADJUSTMENT 3 ADJUSTMENTS	3 ADJUSTMENTS 1 ADJUSTMENT 2 ADJUSTMENTS 1 ADJUSTMENT 3 ADJUSTMENTS
	SCE	POWER POLE	22 RELOCATIONS	13 RELOCATIONS	20 RELOCATIONS
	PLEASANT VALLEY COUNTY WATER DISTRICT	WELL STATION	1 RELOCATION	0 RELOCATIONS	0 RELOCATIONS

Attachment M. Preliminary Project Cost Estimate

County of Ventura
Hueneme Road - Lewis Road Widening
Project Study Report

PRELIMINARY PROJECT COST ESTIMATE

Item #	Description	Unit	Unit Cost	Segment 1: Edison Drive to E/O Rice Avenue						Segment 2: E/O Rice Avenue to W/O PCH (Highway 1)						Segment 3:PCH (Highway 1) to Raytheon Road						Segment 4: E/O Raytheon Road to W/O Las Posas Road						Segment 5: W/O Las Posas Road to W/O University Drive						Notes
				Quantity			Cost			Quantity			Cost			Quantity			Cost			Quantity			Cost			Quantity			Cost		
				Alt-1	Alt-2	Alt-3	Alt-1	Alt-2	Alt-3	Alt-1	Alt-2	Alt-3	Alt-1	Alt-2	Alt-3	Alt-1	Alt-2	Alt-3	Alt-1	Alt-2	Alt-3	Alt-1	Alt-2	Alt-3	Alt-1	Alt-2	Alt-3	Alt-1	Alt-2	Alt-3	Alt-1	Alt-2	Alt-3	
1	Mobilization	LS	1	727,000	684,000	685,000	$ 727,000	$ 684,000	$ 685,000	475,000	499,000	474,000	$ 475,000	$ 499,000	$ 474,000	937,000	932,000	932,000	$ 937,000	$ 932,000	$ 932,000	1,450,000	1,452,000	1,392,000	$ 1,450,000	$ 1,452,000	$ 1,392,000	527,000	522,000	524,000	$ 527,000	$ 522,000	$ 524,000	
2	Storm Water Pollution Control	LS	1	150,000	150,000	150,000	$ 150,000	$ 150,000	$ 150,000	200,000	200,000	200,000	$ 200,000	$ 200,000	$ 200,000	50,000	50,000	50,000	$ 50,000	$ 50,000	$ 50,000	250,000	250,000	250,000	$ 250,000	$ 250,000	$ 250,000	150,000	150,000	150,000	$ 150,000	$ 150,000	$ 150,000	
3	Traffic Control	LS	1	15,000	15,000	15,000	$ 15,000	$ 15,000	$ 15,000	10,000	10,000	10,000	$ 10,000	$ 10,000	$ 10,000	5,000	5,000	5,000	$ 5,000	$ 5,000	$ 5,000	10,000	10,000	10,000	$ 10,000	$ 10,000	$ 10,000	10,000	10,000	10,000	$ 10,000	$ 10,000	$ 10,000	
4	Signing	LS	1	4,000	4,000	4,000	$ 4,000	$ 4,000	$ 4,000	2,000	2,000	2,000	$ 2,000	$ 2,000	$ 2,000	1,000	1,000	1,000	$ 1,000	$ 1,000	$ 1,000	2,000	2,000	2,000	$ 2,000	$ 2,000	$ 2,000	2,000	2,000	2,000	$ 2,000	$ 2,000	$ 2,000	
5	Striping	LS	1	15,000	15,000	15,000	$ 15,000	$ 15,000	$ 15,000	10,000	10,000	10,000	$ 10,000	$ 10,000	$ 10,000	5,000	5,000	5,000	$ 5,000	$ 5,000	$ 5,000	10,000	10,000	10,000	$ 10,000	$ 10,000	$ 10,000	10,000	10,000	10,000	$ 10,000	$ 10,000	$ 10,000	
6	Clearing and Grubbing	LS	1	10,000	10,000	10,000	$ 10,000	$ 10,000	$ 10,000	7,500	7,500	7,500	$ 7,500	$ 7,500	$ 7,500	3,000	3,000	3,000	$ 3,000	$ 3,000	$ 3,000	10,000	10,000	10,000	$ 10,000	$ 10,000	$ 10,000	10,000	10,000	10,000	$ 10,000	$ 10,000	$ 10,000	
7	Structure Demolition (House)	EA	$ 25,000	1	1	1	$ 25,000	$ 25,000	$ 25,000	0	0	0	$ -	$ -	$ -	0	0	0	$ -	$ -	$ -	0	0	0	$ -	$ -	$ -	0	0	0	$ -	$ -	$ -	
8	Structure Demolition (Garage)	EA	$ 10,000	2	2	2	$ 20,000	$ 20,000	$ 20,000	0	0	0	$ -	$ -	$ -	0	0	0	$ -	$ -	$ -	0	0	0	$ -	$ -	$ -	0	0	0	$ -	$ -	$ -	
9	Structure Demolition (Warehouse)	EA	$ 50,000	0	0	0	$ -	$ -	$ -	0	1	0	$ -	$ 50,000	$ -	0	0	0	$ -	$ -	$ -	0	0	0	$ -	$ -	$ -	0	0	0	$ -	$ -	$ -	
10	Construct Structure (House)	EA	$ 300,000	1	1	1	$ 300,000	$ 300,000	$ 300,000	0	0	0	$ -	$ -	$ -	0	0	0	$ -	$ -	$ -	0	0	0	$ -	$ -	$ -	0	0	0	$ -	$ -	$ -	
11	Construct Structure (Garage)	EA	$ 75,000	2	2	2	$ 150,000	$ 150,000	$ 150,000	0	0	0	$ -	$ -	$ -	0	0	0	$ -	$ -	$ -	0	0	0	$ -	$ -	$ -	0	0	0	$ -	$ -	$ -	
12	Construct Structure (Warehouse)	EA	$ 600,000	0	0	0	$ -	$ -	$ -	0	1	0	$ -	$ 600,000	$ -	0	0	0	$ -	$ -	$ -	0	0	0	$ -	$ -	$ -	0	0	0	$ -	$ -	$ -	
13	Extend Culvert & Reconstruct Headwalls	EA	$ 20,000	4	1	3	$ 80,000	$ 20,000	$ 60,000	1	1	1	$ 20,000	$ 20,000	$ 20,000	0	1	1	$ -	$ 20,000	$ 20,000	8	9	8	$ 160,000	$ 180,000	$ 160,000	0	0	0	$ -	$ -	$ -	
14	Reconstruct Culvert & Headwalls	EA	$ 25,000	4	1	1	$ 100,000	$ 25,000	$ 25,000	2	0	1	$ 50,000	$ -	$ 25,000	0	0	0	$ -	$ -	$ -	1	1	1	$ 25,000	$ 25,000	$ 25,000	5	5	5	$ 125,000	$ 125,000	$ 125,000	
15	Reconstruct Culvert & Flared End Sections	EA	$ 30,000	2	2	2	$ 60,000	$ 60,000	$ 60,000	0	0	0	$ -	$ -	$ -	0	0	0	$ -	$ -	$ -	0	0	0	$ -	$ -	$ -	0	0	0	$ -	$ -	$ -	
16	Remove and Install Overside Drain	EA	$ 5,000	0	0	0	$ -	$ -	$ -	0	0	0	$ -	$ -	$ -	0	0	0	$ -	$ -	$ -	0	0	0	$ -	$ -	$ -	6	6	6	$ 30,000	$ 30,000	$ 30,000	
17	Remove and Install Drainage Pipe	EA	$ 30,000	2	2	2	$ 60,000	$ 60,000	$ 60,000	1	1	1	$ 30,000	$ 30,000	$ 30,000	0	0	0	$ -	$ -	$ -	9	10	10	$ 270,000	$ 300,000	$ 300,000	2	2	2	$ 60,000	$ 60,000	$ 60,000	
18	Remove and Install Drainage Pipe (Driveway)	EA	$ 10,000	2	1	1	$ 20,000	$ 10,000	$ 10,000	0	0	0	$ -	$ -	$ -	0	0	0	$ -	$ -	$ -	5	4	5	$ 50,000	$ 40,000	$ 50,000	0	0	0	$ -	$ -	$ -	
19	Relocate Backflow Preventor Apparatus	EA	$ 50,000	5	4	4	$ 250,000	$ 200,000	$ 200,000	5	5	6	$ 250,000	$ 250,000	$ 300,000	0	0	0	$ -	$ -	$ -	2	2	2	$ 100,000	$ 100,000	$ 100,000	1	1	1	$ 50,000	$ 50,000	$ 50,000	
20	Relocate Turnout	EA	$ 50,000	9	5	5	$ 450,000	$ 250,000	$ 250,000	4	3	4	$ 200,000	$ 150,000	$ 200,000	1	1	1	$ 50,000	$ 50,000	$ 50,000	0	1	1	$ -	$ 50,000	$ 50,000	0	0	0	$ -	$ -	$ -	
21	Relocate Standpipe	EA	$ 50,000	5	6	5	$ 250,000	$ 300,000	$ 250,000	1	2	2	$ 50,000	$ 100,000	$ 100,000	0	0	0	$ -	$ -	$ -	0	0	0	$ -	$ -	$ -	0	0	0	$ -	$ -	$ -	
22	Relocate Irrigation Feeder	EA	$ 50,000	4	5	4	$ 200,000	$ 250,000	$ 200,000	1	2	2	$ 50,000	$ 100,000	$ 100,000	0	0	0	$ -	$ -	$ -	3	2	2	$ 150,000	$ 100,000	$ 100,000	0	0	0	$ -	$ -	$ -	
23	Relocate Irrigation Tank	EA	$ 75,000	2	2	2	$ 150,000	$ 150,000	$ 150,000	0	0	0	$ -	$ -	$ -	0	0	0	$ -	$ -	$ -	0	1	0	$ -	$ 75,000	$ -	0	0	0	$ -	$ -	$ -	
24	Relocate Irrigation Sump Pump	EA	$ 75,000	1	1	1	$ 75,000	$ 75,000	$ 75,000	0	0	0	$ -	$ -	$ -	0	0	0	$ -	$ -	$ -	1	1	1	$ 75,000	$ 75,000	$ 75,000	0	0	0	$ -	$ -	$ -	
25	Relocate Well Station	EA	$ 200,000	0	0	0	$ -	$ -	$ -	0	0	0	$ -	$ -	$ -	0	0	0	$ -	$ -	$ -	1	0	0	$ 200,000	$ -	$ -	1	0	0	$ 200,000	$ -	$ -	
26	Remove Existing Tree	EA	$ 500	311	309	287	$ 155,500	$ 154,500	$ 143,500	198	192	192	$ 99,000	$ 96,000	$ 96,000	8	0	8	$ 4,000	$ -	$ 4,000	1,232	754	795	$ 616,000	$ 377,000	$ 397,500	35	0	0	$ 17,500	$ -	$ -	
27	Remove Shrubs	LF	$ 20	300	300	300	$ 6,000	$ 6,000	$ 6,000	340	240	240	$ 6,800	$ 4,800	$ 4,800	0	0	0	$ -	$ -	$ -	180	180	180	$ 3,600	$ 3,600	$ 3,600	0	0	0	$ -	$ -	$ -	
28	Drainage Ditch	LF	$ 25	4,590	900	1,060	$ 114,750	$ 22,500	$ 26,500	2,680	0	1,360	$ 67,000	$ -	$ 34,000	0	0	0	$ -	$ -	$ -	6,530	6,240	6,920	$ 163,250	$ 156,000	$ 173,000	7,850	7,840	7,840	$ 196,250	$ 196,000	$ 196,000	
29	Unclassified Excavation	CY	$ 10	117	36	15	$ 1,170	$ 360	$ 150	111	36	21	$ 1,110	$ 360	$ 210	10	10	10	$ 100	$ 100	$ 100	52	188	238	$ 520	$ 1,880	$ 2,380	219	34	38	$ 2,190	$ 340	$ 380	
30	Unclassified Fill	CY	$ 10	1,771	2,706	2,685	$ 17,710	$ 27,060	$ 26,850	811	2,410	1,578	$ 8,110	$ 24,100	$ 15,780	150	150	150	$ 1,500	$ 1,500	$ 1,500	59,333	64,941	74,108	$ 593,330	$ 649,410	$ 741,080	62,846	90,450	88,691	$ 628,460	$ 904,500	$ 886,910	
31	Grading Surcharge & Monitoring	LS	$ 250,000	0	0	0	$ -	$ -	$ -	0	0	0	$ -	$ -	$ -	0	0	0	$ -	$ -	$ -	1	1	1	$ 250,000	$ 250,000	$ 250,000	1	1	1	$ 250,000	$ 250,000	$ 250,000	
32	2" Cold Milling	SF	$ 0.60	575,800	553,400	609,400	$ 345,480	$ 332,040	$ 365,640	258,800	271,600	263,900	$ 155,280	$ 162,960	$ 158,340	67,600	65,300	67,700	$ 40,560	$ 39,180	$ 40,620	515,500	530,900	518,000	$ 309,300	$ 318,540	$ 310,800	443,800	442,700	444,400	$ 266,280	$ 265,620	$ 266,640	
33	Processed Miscellaneous Base	CY	$ 80	7,000	7,300	7,200	$ 560,000	$ 584,000	$ 576,000	4,600	4,700	4,700	$ 368,000	$ 376,000	$ 376,000	800	700	600	$ 64,000	$ 56,000	$ 48,000	9,100	9,500	9,100	$ 728,000	$ 760,000	$ 728,000	5,900	6,200	6,200	$ 472,000	$ 496,000	$ 496,000	7" PMB
34	Sand Base	CY	$ 40	18,000	18,800	18,400	$ 720,000	$ 752,000	$ 736,000	11,800	11,900	12,000	$ 472,000	$ 476,000	$ 480,000	2,000	1,800	1,600	$ 80,000	$ 72,000	$ 64,000	23,200	24,300	23,400	$ 928,000	$ 972,000	$ 936,000	15,200	15,800	15,900	$ 608,000	$ 632,000	$ 636,000	18" SAND
35	Asphalt Concrete	TN	$ 110	12,200	12,700	12,400	$ 1,342,000	$ 1,397,000	$ 1,364,000	8,000	8,100	8,100	$ 880,000	$ 891,000	$ 891,000	1,300	1,200	1,100	$ 143,000	$ 132,000	$ 121,000	15,700	16,400	15,800	$ 1,727,000	$ 1,804,000	$ 1,738,000	10,200	10,700	10,700	$ 1,122,000	$ 1,177,000	$ 1,177,000	6" AC
36	Asphalt Rubberized Hot Mix	TN	$ 130	14,900	14,700	15,700	$ 1,937,000	$ 1,911,000	$ 2,041,000	7,600	7,800	7,700	$ 988,000	$ 1,014,000	$ 1,001,000	1,800	1,700	1,700	$ 234,000	$ 221,000	$ 221,000	15,000	15,500	15,100	$ 1,950,000	$ 2,015,000	$ 1,963,000	11,800	12,000	12,000	$ 1,534,000	$ 1,560,000	$ 1,560,000	2" ARHM & 3" Overlay
37	Shoulder Backing	SF	$ 5	80,500	55,600	60,500	$ 402,500	$ 278,000	$ 302,500	47,600	24,000	33,800	$ 238,000	$ 120,000	$ 169,000	5,400	2,400	5,300	$ 27,000	$ 12,000	$ 26,500	91,900	53,300	87,200	$ 459,500	$ 266,500	$ 436,000	52,200	35,800	38,900	$ 261,000	$ 179,000	$ 194,500	
38	Curb Ramp	EA	$ 5,000	1	1	1	$ 5,000	$ 5,000	$ 5,000	0	0	0	$ -	$ -	$ -	3	3	3	$ 15,000	$ 15,000	$ 15,000	0	0	0	$ -	$ -	$ -	0	0	0	$ -	$ -	$ -	Includes DWS
39	AC ADA Landing	EA	$ 1,000	7	3	5	$ 7,000	$ 3,000	$ 5,000	0	0	0	$ -	$ -	$ -	4	4	4	$ 4,000	$ 4,000	$ 4,000	4	2	4	$ 4,000	$ 2,000	$ 4,000	3	3	2	$ 3,000	$ 3,000	$ 2,000	
40	Hot Mix Asphalt Dike	LF	$ 12	1,000	170	890	$ 12,000	$ 2,040	$ 10,680	0	0	0	$ -	$ -	$ -	660	260	630	$ 7,920	$ 3,120	$ 7,560	410	210	250	$ 4,920	$ 2,520	$ 3,000	1,380	1,370	1,330	$ 16,560	$ 16,440	$ 15,960	
41	Dirt Driveway Reconstruction	EA	$ 3,000	24	14	14	$ 72,000	$ 42,000	$ 42,000	10	7	9	$ 30,000	$ 21,000	$ 27,000	3	2	3	$ 9,000	$ 6,000	$ 9,000	16	12	11	$ 48,000	$ 36,000	$ 33,000	8	5	4	$ 24,000	$ 15,000	$ 12,000	
42	AC Driveway Reconstruction	EA	$ 7,000	9	8	9	$ 63,000	$ 56,000	$ 63,000	5	3	4	$ 35,000	$ 21,000	$ 28,000	0	0	0	$ -	$ -	$ -	4	3	3	$ 28,000	$ 21,000	$ 21,000	0	0	0	$ -	$ -	$ -	
43	Access Road	SF	$ 25	0	0	0	$ -	$ -	$ -	0	0	0	$ -	$ -	$ -	0	0	0	$ -	$ -	$ -	10,610	10,560	10,650	$ 265,250	$ 264,000	$ 266,250	0	0	0	$ -	$ -	$ -	
44	Midwest Guardrail	LF	$ 50	150	150	150	$ 7,500	$ 7,500	$ 7,500	0	0	0	$ -	$ -	$ -	0	0	0	$ -	$ -	$ -	670	820	820	$ 33,500	$ 41,000	$ 41,000	2,970	2,970	2,920	$ 148,500	$ 148,500	$ 146,000	
45	Concrete Barrier	LF	$ 150	0	0	0	$ -	$ -	$ -	0	0	0	$ -	$ -	$ -	0	0	0	$ -	$ -	$ -	0	2,360	0	$ -	$ 354,000	$ -	0	0	0	$ -	$ -	$ -	
46	Retaining Wall	SF	$ 120	0	0	0	$ -	$ -	$ -	0	0	0	$ -	$ -	$ -	0	0	0	$ -	$ -	$ -	0	5,280	0	$ -	$ 633,600	$ -	0	0	0	$ -	$ -	$ -	
47	Chain Link Fence	LF	$ 60	3,550	2,850	2,780	$ 213,000	$ 171,000	$ 166,800	3,040	730	1,960	$ 182,400	$ 43,800	$ 117,600	590	140	290	$ 35,400	$ 8,400	$ 17,400	2,470	710	2,810	$ 148,200	$ 42,600	$ 168,600	1,660	360	930	$ 99,600	$ 21,600	$ 55,800	
48	Wire Fence	LF	$ 25	5,860	1,710	1,730	$ 146,500	$ 42,750	$ 43,250	5,430	4,000	4,600	$ 135,750	$ 100,000	$ 115,000	200	320	200	$ 5,000	$ 8,000	$ 5,000	4,010	2,330	2,100	$ 100,250	$ 58,250	$ 52,500	1,770	90	0	$ 44,250	$ 2,250	$ -	
49	Wrought Iron Fence	LF	$ 100	80	80	80	$ 8,000	$ 8,000	$ 8,000	0	0	0	$ -	$ -	$ -	0	0	0	$ -	$ -	$ -	0	0	0	$ -	$ -	$ -	0	0	0	$ -	$ -	$ -	
50	Tree Planting	EA	$ 1,500	311	309	287	$ 466,500	$ 463,500	$ 430,500	198	192	192	$ 297,000	$ 288,000	$ 288,000	8	0	8	$ 12,000	$ -	$ 12,000	1,232	754	795	$ 1,848,000	$ 1,131,000	$ 1,192,500	35	0	0	$ 52,500	$ -	$ -	
51	Shrub Planting	LF	$ 80	300	300	300	$ 24,000	$ 24,000	$ 24,000	340	240	240	$ 27,200	$ 19,200	$ 19,200	0	0	0	$ -	$ -	$ -	180	180	180	$ 14,400	$ 14,400	$ 14,400	0	0	0	$ -	$ -	$ -	
52	Pacific Coast Highway Reconstruction	LS	$ 4,000,000	0	0	0	$ -	$ -	$ -				$ -	$ -	$ -	1	1	1	$ 4,000,000	$ 4,000,000	$ 4,000,000				$ -	$ -	$ -				$ -	$ -	$ -	Mainline & Ramps
53	Structure: Pacific Coast Highway Bridge	LS	$ 8,059,850	0	0	0	$ -	$ -	$ -				$ -	$ -	$ -	1	1	1	$ 8,059,850	$ 8,059,850	$ 8,059,850				$ -	$ -	$ -				$ -	$ -	$ -	APS SR1-A shown
54	Structure: Revolon Slough Bridge	LS	$ 7,581,475	0	0	0	$ -	$ -	$ -				$ -	$ -	$ -				$ -	$ -	$ -	1	1	1	$ 7,581,475	$ 7,581,475	$ 7,581,475				$ -	$ -	$ -	APS HL1-A shown
55	Structure: Mugu Drain	LS	$ 1,356,593	0	0	0	$ -	$ -	$ -	1	1	1	$ 1,356,593	$ 1,356,593	$ 1,356,593				$ -	$ -	$ -				$ -	$ -	$ -				$ -	$ -	$ -	APS Alt 1 shown
56	Edison Drive Traffic Signal Improvements	LS	$ 100,000	1	1	1	$ 100,000	$ 100,000	$ 100,000				$ -	$ -	$ -				$ -	$ -	$ -				$ -	$ -	$ -				$ -	$ -	$ -	
57	Olds Road Traffic Signal Improvements	LS	$ 150,000	1	1	1	$ 150,000	$ 150,000	$ 150,000				$ -	$ -	$ -				$ -	$ -	$ -				$ -	$ -	$ -				$ -	$ -	$ -	
58	Rice Avenue Traffic Signal Improvements	LS	$ 200,000	1	1	1	$ 200,000	$ 200,000	$ 200,000				$ -	$ -	$ -				$ -	$ -	$ -				$ -	$ -	$ -				$ -	$ -	$ -	
59	Naval Air Road Traffic Signal Improvements	LS	$ 200,000	0	0	0	$ -	$ -	$ -				$ -	$ -	$ -	1	1	1	$ 200,000	$ 200,000	$ 200,000				$ -	$ -	$ -				$ -	$ -	$ -	
60	Raytheon Road Traffic Signal Improvements	LS	$ 200,000	0	0	0	$ -	$ -	$ -				$ -	$ -	$ -	1	1	1	$ 200,000	$ 200,000	$ 200,000				$ -	$ -	$ -				$ -	$ -	$ -	
61	Wood Road Traffic Signal Improvements	LS	$ 200,000	0	0	0	$ -	$ -	$ -				$ -	$ -	$ -				$ -	$ -	$ -	1	1	1	$ 200,000	$ 200,000	$ 200,000				$ -	$ -	$ -	
62	Las Posas Road Traffic Signal Improvements	LS	$ 200,000	0	0	0	$ -	$ -	$ -				$ -	$ -	$ -				$ -	$ -	$ -	1	1	1	$ 200,000	$ 200,000	$ 200,000				$ -	$ -	$ -	
63	Laguna Road Traffic Signal Improvements	LS	$ 200,000	0	0	0	$ -	$ -	$ -				$ -	$ -	$ -				$ -	$ -	$ -				$ -	$ -	$ -	1	1	1	$ 200,000	$ 200,000	$ 200,000	
64	University Drive Traffic Signal Improvements	LS	$ 200,000	0	0	0	$ -	$ -	$ -				$ -	$ -	$ -				$ -	$ -	$ -				$ -	$ -	$ -	1	1	1	$ 200,000	$ 200,000	$ 200,000	
65	Third Party Utility Adjustments/Relocations	LS	$ 100,000	1	1	1	$ 100,000	$ 100,000	$ 100,000	1	1	1	$ 100,000	$ 100,000	$ 100,000	1	1	1	$ 100,000	$ 100,000	$ 100,000	1	1	1	$ 100,000	$ 100,000	$ 100,000	1	1	1	$ 100,000	$ 100,000	$ 100,000	
66	Right of Way Acquisition	ACRE	$ 100,000	8.2	8.4	8.1	$ 820,000	$ 840,000	$ 810,000	4.5	4.7	4.8	$ 450,000	$ 470,000	$ 480,000	0.2	0.3	0.2	$ 20,000	$ 30,000	$ 20,000	10.9	12.6	11.8	$ 1,090,000	$ 1,260,000	$ 1,180,000	6.3	6.3	6.3	$ 630,000	$ 630,000	$ 630,000	
				Construction Subtotal			$ 11,107,610	$ 10,452,250	$ 10,467,870	*Construction Subtotal*			$ 7,251,743	$ 7,613,313	$ 7,236,023	*Construction Subtotal*			$ 14,313,330	$ 14,234,150	$ 14,242,530	*Construction Subtotal*			$ 22,156,495	$ 22,194,775	$ 21,271,085	*Construction Subtotal*			$ 8,050,090	$ 7,966,250	$ 7,996,190	
				Contingency	*25%*		$ 2,776,903	$ 2,613,063	$ 2,616,968	*Contingency*	*25%*		$ 1,812,936	$ 1,903,328	$ 1,809,006	*Contingency*	*25%*		$ 3,578,333	$ 3,558,538	$ 3,560,633	*Contingency*	*25%*		$ 5,539,124	$ 5,548,694	$ 5,317,771	*Contingency*	*25%*		$ 2,012,523	$ 1,991,563	$ 1,999,048	
				Construction Total			$ 13,884,513	$ 13,065,313	$ 13,084,838	***Construction Total***			$ 9,064,679	$ 9,516,641	$ 9,045,029	***Construction Total***			$ 17,891,663	$ 17,792,688	$ 17,803,163	***Construction Total***			$ 27,695,619	$ 27,743,469	$ 26,588,856	***Construction Total***			$ 10,062,613	$ 9,957,813	$ 9,995,238	
				Environmental	*15%*		$ 2,082,677	$ 1,959,797	$ 1,962,726	***Environmental***	*15%*		$ 1,359,702	$ 1,427,496	$ 1,356,754	***Environmental***	*15%*		$ 2,683,749	$ 2,668,903	$ 2,670,474	***Environmental***	*20%*		$ 5,539,124	$ 5,548,694	$ 5,317,771	***Environmental***	*15%*		$ 1,509,392	$ 1,493,672	$ 1,499,286	% of Construction Total
				Engineering	*15%*		$ 2,082,677	$ 1,959,797	$ 1,962,726	***Engineering***	*15%*		$ 1,359,702	$ 1,427,496	$ 1,356,754	***Engineering***	*20%*		$ 3,578,333	$ 3,558,538	$ 3,560,633	***Engineering***	*20%*		$ 5,539,124	$ 5,548,694	$ 5,317,771	***Engineering***	*15%*		$ 1,509,392	$ 1,493,672	$ 1,499,286	% of Construction Total
				Construction Engineering	*10%*		$ 1,388,451	$ 1,306,531	$ 1,308,484	***Construction Engineering***	*10%*		$ 906,468	$ 951,664	$ 904,503	***Construction Engineering***	*15%*		$ 2,683,749	$ 2,668,903	$ 2,670,474	***Construction Engineering***	*15%*		$ 4,154,343	$ 4,161,520	$ 3,988,328	***Construction Engineering***	*10%*		$ 1,006,261	$ 995,781	$ 999,524	% of Construction Total
				Project Cost Total			**$ 19,438,318**	**$ 18,291,438**	**$ 18,318,773**	Project Cost Total			**$ 12,690,550**	**$ 13,323,298**	**$ 12,663,040**	Project Cost Total			**$ 26,837,494**	**$ 26,689,031**	**$ 26,704,744**	Project Cost Total			**$ 42,928,209**	**$ 43,002,377**	**$ 41,212,727**	Project Cost Total			**$ 14,087,658**	**$ 13,940,938**	**$ 13,993,333**	
																														Grand Total (All Segments)			**$ 115,982,228**	**$ 115,247,081**	**$ 112,892,616**	

CONCEPT PLAN ESTIMATE

MNS ENGINEERS, INC.

ESTIMATE NO. 1

DATE 5/12/21

NAME Hueneme Road UC at SR 1 | QUANTITIES BY A. Larios

OWNER Ventura County Public Works - Transportation | PRICED BY A. Larios

DATA Bridge No. 52-0193R/L Replace; Three Span = 310' | CHECKED BY S. Kowalewski

NO.	BEES	[F]	CONTRACT ITEMS	UNIT	QUANTITY	PRICE	AMOUNT
1	157551		Bridge Removal, Location A	LS	1	$400,000	$400,000
2	157552		Bridge Removal, Location B	LS	1	$400,000	$400,000
3	157560		Bridge Removal (Portion)	LS	1	$400,000	$400,000
4	160101		Clearing & Grubbing	LS	1	$50,000	$50,000
5	192003	[F]	Structure Excavation (Bridge)	CY	751	$150	$112,650
6	193003	[F]	Structure Backfill (Bridge)	CY	512	$125	$64,000
7	5122xx		Furnish Precast Prestressed Concrete Girder (140-150')	EA	12	$65,000	$780,000
8	512207		Furnish Precast Prestressed Concrete Girder (80-90')	EA	24	$30,000	$720,000
9	512500		Erect Precast Prestressed Concrete Girder	EA	36	$12,000	$432,000
10	490738		Furnish Piling (Class 140)	LF	4,200	$100	$420,000
11	490739		Drive Pile (Class 140)	EA	70	$10,000	$700,000
12	**510053**	**[F]**	**Structural Concrete, Bridge**	**CY**	**1,070**	**$1,250**	**$1,337,500**
13	510086	[F]	Structural Concrete, Approach Slab (Type N)	CY	267	$1,000	$267,000
14	520102	[F]	Bar Reinforcing Steel (Bridge)	LB	267,000	$2	$534,000
15	721810		Slope Paving (Concrete)	CY	99	$1,200	$118,800
16	839543		Transition Railing (Type WB-31)	EA	2	$5,000	$10,000
17	839585		Alternative Flared Terminal System	EA	2	$4,000	$8,000
18	839591		Crash Cushion, Sand Filled	EA	28	$450	$12,600
19	839640		Concrete Barrier (Type 60M)	LF	299	$200	$59,800
20	8397xx		Concrete Barrier (Type 836)	LF	534	$250	$133,500
21	870200		Lighting System	LS	1	$50,000	$50,000
22	**999990**		**Mobilization**	**LS**	**1**	**$1,050,000**	**$1,050,000**

CONSTRUCTION WORK ITEMS TOTAL	**$8,059,850**
CONTINGENCY @ 25%	**$2,014,963**
UTILITY RELOCATION (PROJECT SHARE)	**$0**
RAILROAD WORK	**$0**
GRAND TOTAL	**$10,074,813**

*** Orange bold items are over 10% of the construction total.**

*** Red bold items are over 20% of the construction total.**

COMMENTS:

1 Does not include civil/roadway work or traffic control and traffic handling.

2

CONCEPT PLAN ESTIMATE

MNS ENGINEERS, INC.

ESTIMATE NO. 1

DATE 5/14/21

NAME Hueneme Road UC at SR 1

OWNER Ventura County Public Works - Transportation

DATA Bridge No. 52-0193R/L Replace; Single Span = 150'

QUANTITIES BY S. Kowalewski

PRICED BY S. Kowalewski

CHECKED BY

NO.	BEES	[F]	CONTRACT ITEMS	UNIT	QUANTITY	PRICE	AMOUNT
1	157551		Bridge Removal, Location A	LS	1	$400,000	$400,000
2	157552		Bridge Removal, Location B	LS	1	$400,000	$400,000
3	157560		Bridge Removal (Portion)	LS	1	$400,000	$400,000
4	160101		Clearing & Grubbing	LS	1	$50,000	$50,000
5	192003	[F]	Structure Excavation (Bridge)	CY	813	$120	$97,560
6	193003	[F]	Structure Backfill (Bridge)	CY	296	$175	$51,800
7	**5122xx**		**Furnish Precast Prestressed Concrete Girder (140-150')**	**EA**	**12**	**$65,000**	**$780,000**
8	490554A		Erect Precast Prestressed Concrete Girder	EA	12	$12,000	$144,000
9	490738		Furnish Piling (Class 140)	LF	2,760	$75	$207,000
10	490739		Drive Pile (Class 140)	EA	46	$10,000	$460,000
11	**510053**	**[F]**	**Structural Concrete, Bridge**	**CY**	**944**	**$1,500**	**$1,416,000**
12	510086	[F]	Structural Concrete, Approach Slab (Type N)	CY	267	$1,500	$400,500
13	520102	[F]	Bar Reinforcing Steel (Bridge)	LB	236,000	$2	$472,000
14	721810		Slope Paving (Concrete)	CY	99	$1,200	$118,800
15	839543		Transition Railing (Type WB-31)	EA	2	$5,000	$10,000
16	839585		Alternative Flared Terminal System	EA	2	$4,000	$8,000
17	839591		Crash Cushion, Sand Filled	EA	28	$450	$12,600
18	839640		Concrete Barrier (Type 60M)	LF	208	$200	$41,600
19	8397xx		Concrete Barrier (Type 836)	LF	426	$250	$106,500
20	870200		Lighting System	LS	1	$50,000	$50,000
21	**999990**		**Mobilization**	**LS**	**1**	**$850,000**	**$850,000**

CONSTRUCTION WORK ITEMS TOTAL	**$6,476,360**
CONTINGENCY @ 25%	**$1,619,090**
UTILITY RELOCATION (PROJECT SHARE)	**$0**
RAILROAD WORK	**$0**
GRAND TOTAL	**$8,095,450**

*** Orange bold items are over 10% of the construction total.**

*** Red bold items are over 20% of the construction total.**

COMMENTS:

1 Does not include civil/roadway work or traffic control and traffic handling.

CONCEPT PLAN ESTIMATE

MNS ENGINEERS, INC.

ESTIMATE NO. 1

DATE 7/28/21

NAME Hueneme Road Bridge over Revolon Slough

QUANTITIES BY S. Kowalewski

OWNER Ventura County Public Works - Transportation

PRICED BY S. Kowalewski

DATA County Bridge No. 222 Replace; Two Span = 264'

CHECKED BY D. Srividya

NO.	BEES	[F]	CONTRACT ITEMS	UNIT	QUANTITY	PRICE	AMOUNT
1	157550		Bridge Removal	LS	1	$500,000	$500,000
2	157560		Bridge Removal (Portion)	LS	1	$250,000	$250,000
3	160101		Clearing & Grubbing	LS	1	$75,000	$75,000
4	192003	[F]	Structure Excavation (Bridge)	CY	178	$250	$44,500
5	193003	[F]	Structure Backfill (Bridge)	CY	225	$325	$73,125
6	490738		Furnish Piling (Class 140)	LF	3,600	$75	$270,000
7	490739		Drive Pile (Class 140)	EA	60	$7,500	$450,000
8	490782		Furnish Piling (Class 200) (Alternative W)	LF	1,020	$60	$61,200
9	490783		Drive Pile (Class 200)	EA	17	$10,000	$170,000
10	**510053**	**[F]**	**Structural Concrete, Bridge**	**CY**	**2,140**	**$1,250**	**$2,675,000**
11	510086	[F]	Structural Concrete, Approach Slab (Type N)	CY	228	$1,500	$342,000
12	**520102**	**[F]**	**Bar Reinforcing Steel (Bridge)**	**LB**	**535,000**	**$2**	**$1,070,000**
13	723015		Rock Slope Protection (2T, Class IX, Method A)	CY	3,570	$125	$446,250
14	839543		Transition Railing (Type WB-31)	EA	4	$5,000	$20,000
15	839585		Alternative Flared Terminal System	EA	4	$4,000	$16,000
16	8397xx		Concrete Barrier (Type 836)	LF	592	$200	$118,400
17	**999990**		**Mobilization**	**LS**	**1**	**$1,000,000**	**$1,000,000**

CONSTRUCTION WORK ITEMS TOTAL	**$7,581,475**
CONTINGENCY @ 25%	**$1,895,369**
UTILITY RELOCATION (PROJECT SHARE)	**$0**
RAILROAD WORK	**$0**
GRAND TOTAL	**$9,476,844**

*** Orange bold items are over 10% of the construction total.**

*** Red bold items are over 20% of the construction total.**

COMMENTS:

1 Does not include civil/roadway work or traffic control and traffic handling.

2

CONCEPT PLAN ESTIMATE

MNS ENGINEERS, INC.

ESTIMATE NO. 1

DATE 7/27/21

NAME Hueneme Road Bridge over Revolon Slough

QUANTITIES BY S. Kowalewski

OWNER Ventura County Public Works - Transportation

PRICED BY S. Kowalewski

DATA County Bridge No. 222 Parallel; Two Span = 264'

CHECKED BY D. Srividya

NO.	BEES	[F]	CONTRACT ITEMS	UNIT	QUANTITY	PRICE	AMOUNT
1	160101		Clearing & Grubbing	LS	1	$50,000	$50,000
2	192003	[F]	Structure Excavation (Bridge)	CY	153	$300	$45,900
3	193003	[F]	Structure Backfill (Bridge)	CY	126	$350	$44,100
4	490738		Furnish Piling (Class 140)	LF	1,800	$75	$135,000
5	490739		Drive Pile (Class 140)	EA	30	$7,500	$225,000
6	490782		Furnish Piling (Class 200) (Alternative W)	LF	600	$60	$36,000
7	490783		Drive Pile (Class 200)	EA	10	$10,000	$100,000
8	**510053**	**[F]**	**Structural Concrete, Bridge**	**CY**	**1,070**	**$1,250**	**$1,337,500**
9	510086	[F]	Structural Concrete, Approach Slab (Type N)	CY	122	$1,500	$183,000
10	**520102**	**[F]**	**Bar Reinforcing Steel (Bridge)**	**LB**	**268,000**	**$2**	**$536,000**
11	723015		Rock Slope Protection (2T, Class IX, Method A)	CY	2,680	$125	$335,000
12	839543		Transition Railing (Type WB-31)	EA	2	$5,000	$10,000
13	839585		Alternative Flared Terminal System	EA	2	$4,000	$8,000
14	839591		Crash Cushion, Sand Filled	EA	28	$450	$12,600
15	839640		Concrete Barrier (Type 60M)	LF	60	$250	$15,000
16	**8397xx**		**Concrete Barrier (Type 836)**	**LF**	**592**	**$200**	**$118,400**
17	**999990**		**Mobilization**	**LS**	**1**	**$480,000**	**$480,000**

CONSTRUCTION WORK ITEMS TOTAL	**$3,671,500**
CONTINGENCY @ 25%	**$917,875**
UTILITY RELOCATION (PROJECT SHARE)	**$0**
RAILROAD WORK	**$0**
GRAND TOTAL	**$4,589,375**

*** Orange bold items are over 10% of the construction total.**

*** Red bold items are over 20% of the construction total.**

COMMENTS:

1 Does not include civil/roadway work or traffic control and traffic handling.

2

CONCEPT PLAN ESTIMATE
MNS ENGINEERS, INC.

ESTIMATE NO. 1
DATE 7/12/21

NAME Mugu Drain Culvert at Hueneme Road
OWNER Ventura County Public Works - Transportation
DATA

QUANTITIES BY S. Potts
PRICED BY S. Potts
CHECKED BY M. Ip

NO.	BEES	[F]	CONTRACT ITEMS	UNIT	ALT 1 QUANTITY	ALT 2 QUANTITY	PRICE	ALT 1 AMOUNT	ALT 2 AMOUNT
1	150825		Remove Reinforced Concrete Box Culvert	LF	40	0	$400	$16,000	$0
2	160101		Clearing & Grubbing	LS	1	1	$3,000	$3,000	$3,000
3			**Reinforced Concrete Box Culvert 10'x10'**	**LF**	**276**	**0**	**$3,500**	**$966,000**	**$0**
4	**002401**		**Reinfoced Concrete Box Culvert 12' W X 10' H**	**LF**	**0**	**43**	**$3,500**	**$0**	**$150,500**
5	**043387**		**Reinforced Concrete Box Culvert 7'X7'**	**LF**	**0**	**193**	**$2,000**	**$0**	**$386,000**
6	192003	[F]	Structure Excavation	CY	1,174	871	$60	$70,440	$52,260
7	193003	[F]	Structure Backfill	CY	283	283	$80	$22,613	$22,613
8	510053	[F]	Structural Concrete, Headwall	CY	40	40	$1,150	$46,000	$46,000
9	520102	[F]	Bar Reinforcing Steel (Headwall)	LB	300	300	$175	$52,500	$52,500
10	723070		Riprap	CY	96	150	$240	$23,040	$36,000
11	839591		Crash Cushion, Sand Filled	EA	2	2	$5,000	$10,000	$10,000
12	832007		Midwest Guardrail System	LF	200	200	$50	$10,000	$10,000
13	839640		Concrete Barrier (Type 60M)	LF	100	90	$420	$42,000	$37,800
14	**999990**		**Mobilization**	**LS**	**1**	**1**	**$95,000**	**$95,000**	**$95,000**
						CONSTRUCTION WORK ITEMS TOTAL		**$1,356,593**	**$901,673**
						CONTINGENCY @ 25%		**$339,148**	**$225,418**
						UTILITY RELOCATION (PROJECT SHARE)		**$0**	**$0**
							GRAND TOTAL	**$1,695,742**	**$1,127,092**

*** Orange bold items are over 10% of the construction total.**

*** Red bold items are over 20% of the construction total.**

COMMENTS:

1 Does not include civil/roadway work or traffic control and traffic handling.

2

Appendix A. Desktop Geotechnical Memorandum

GEOTECHNICAL DESKTOP REPORT
WIDENING OF HUENEME ROAD AND A PORTION OF LEWIS ROAD FEASIBILITY STUDY

OXNARD PLAIN AREA
VENTURA COUNTY, CALIFORNIA

Prepared for:
MNS Engineers, Inc.

June 2021
Job No. 007.017

PO Box 2540, Camarillo, California 93011
www.Oakridgegeo.com
805-603-4900

June 30, 2021
Project No. 007.017

MNS Engineers, Inc.
4580 East Thousand Oaks Boulevard, Suite 101
Westlake Village, California 91362

Attention: Mr. Michael Ip, PE

Subject: Geotechnical Desktop Study, Ventura County Public Works Agency Roads and Transportation, Widening of Hueneme Road and a Portion of Lewis Road Feasibility Study, Oxnard Plain Area, Ventura County

Dear Mr. Ip:

Oakridge Geoscience, Inc. (OGI) is pleased to provide this geotechnical desktop study for the Widening of Hueneme Road and a Portion of Lewis Road project. The scope of services provided for the project was based on the Request for Proposal (RFP) from the County of Ventura dated September 1, 2020 and on our experience with MNS Engineers for similar projects in the Ventura County and neighboring areas.

The purpose of the desktop study is to provide a summary of anticipated geotechnical conditions that may exist along the project roadway widening alignments and at the two bridge sites based on review of existing data and a site reconnaissance.

This desktop study was performed in general accordance with our proposal dated September 14, 2020 and authorized by receipt of a fully executed agreement from MNS Engineers dated March 9, 2021.

Thank you for the opportunity to provide preliminary geotechnical desktop services for this project. Please contact us if you have questions on the information provided in this report.

Sincerely,

OAKRIDGE GEOSCIENCE, INC.

Lori E. Prentice, CEG
President

CONTENTS

PLATES

1.0 INTRODUCTION

1.1 PROJECT DESCRIPTION

The proposed project consists of evaluating the feasibility to widen about 7.25 miles of Hueneme Road and Lewis Road in the Oxnard Plain area of Ventura County. The approximate overall project location is shown on Plate 1.

The scope of services provided by Oakridge Geoscience, Inc. (OGI) for the project was based on the Request for Proposal (RFP) from the County of Ventura dated September 1, 2020 and on our experience with MNS Engineers, Inc. (MNS) on similar projects in Ventura County and neighboring areas. Preliminary plans by MNS indicate the project alignment begins at the intersection of Edison Road and Hueneme Road at approximately Station (Sta.) 10+46, extends eastward along Hueneme Road to the intersection with Lewis Road at approximately Sta. 342+00, and then extends northerly along Lewis Road on the western side of Calleguas Creek to about 1,200 feet north of University Drive at approximately Sta. 390+00. The preliminary plans by MNS also indicate the project alignment has about 13 existing culvert crossings and two bridge widenings. The bridges to be widened consist of the existing Caltrans State Route 1 (SR1) overheads (one each for the northbound and southbound lanes) over Hueneme Road near Sta. 175+50 to 177+00 and the County of Ventura's bridge over the Revlon Slough near Sta. 249+00 to 252+30.

1.2 PURPOSE

The purpose of the desktop study is to provide a summary of anticipated geotechnical conditions that may exist along the project roadway widening alignment and at the two bridge sites based on review of existing data and a site reconnaissance. Subsurface exploration was not performed for this study to verify the findings from the data review but will be required as part of the design study.

1.3 EXISTING CONDITIONS

The road widening project is located in a low-lying, relatively flat agricultural area in the southeastern portion of the Oxnard Plain. The Hueneme Road segment of the project traverses easterly from Edison Road to about Wood Road crossing an unnamed drainage, the Mugu drainage, and under the SR1 overpasses. From Wood Road, the alignment trends northeasterly toward Laguna Road crossing over the Revolon Slough bridge to the intersection of Laguna Road/Hueneme Road/Lewis Road. The Hueneme Road alignment is constructed at or slightly above the existing grade and consists of one lane of travel in each direction, paved shoulder areas, and right- and/or left-turn lanes at the existing roadway intersections. This portion of the project alignment is bordered on the northern and southern sides by active agricultural properties. Shallow earthen drainage ditches parallel portions of the alignment, generally on the northern side of the alignment and overhead power lines are located on the northern side of the roadway between Edison Road and SR1, on the southern side of the roadway between SR1 and east of Las Posas Road, and on the northern side of the road to the intersection with Laguna Road. Additionally, a number of agricultural water wells were observed proximal to the alignment along the northern and southern sides of the roadway.

The segment of the alignment northeast of the Laguna Drive/Hueneme Road/Lewis Road intersection is bordered by the western bank of Calleguas Creek to the east and agricultural properties to the west. Between Laguna Road and University Drive, the Lewis Road project alignment consists of one lane of travel in each direction with paved shoulders; overhead utility poles are located on the southwestern portion of this segment. North of University Drive, Lewis Road consists of two lanes of travel in the northbound and southbound directions, paved shoulders, and an at grade center median. This segment of the alignment consists of an artificial fill embankment constructed in about 2006 for the South Lewis Road alignment along the western side of Calleguas Creek. The artificial fill embankment ranges from about 5 to 10 feet above the agricultural field grade at the southwestern extent, to about 30 feet thick at the channel infill near the intersection of Laguna Drive/Hueneme Road/Lewis Road to the northeast of Sta. 342+50, to about 20 feet above the western agricultural grade near the University Drive bridge. The western Calleguas Creek flood control levee forms the eastern side of the Lewis Road alignment.

1.4 PROPOSED WIDENING ALIGNMENTS

The conceptual plans by MNS indicate the length of the alignment will be widened by about 39 feet. MNS has identified three potential widening concepts for the project consisting of: 1) widening both sides of the alignment along the entire length, 2) widening one side of the alignment, and 3) a hybrid of concepts 1 and 2 to minimize the impacts to properties and existing SCE facilities. Review of the preliminary plans indicates the widening along the alignment that is currently at or near the surrounding grade will consist of minor cut and fill grading to achieve the design grades. MNS has indicated the artificial fill embankment along the Lewis Road segment will include widening by about 20 feet to the northeast that will require placing up to about 20 feet of fill adjacent to the existing fill embankment. MNS has also developed two Advanced Planning Studies for the SR1 undercrossing and the Revlon Slough bridge that indicate that the widen bridges will be supported on pile foundations with possible alternative bridge configurations with a single span or two bents/two abutments (SR1), and a middle bent (Revlon Slough bridge).

1.5 WORK PERFORMED

The work performed for the desktop geotechnical study consisted of data review, site reconnaissance, and preparation of this report summarizing our opinions of anticipated site conditions for the project elements and locations provided by MNS.

1.5.1 Data Review and Site Reconnaissance

We reviewed published geologic mapping, select historical aerial photographs, the Caltrans Logs of Test Boring (LOTB) for the existing SR1 overpass site, available information for the County's existing bridge over Revlon Slough, and existing geotechnical reports made available to us to characterize the general geologic conditions along the widening alignment. Following our data review, we performed a site reconnaissance to observe existing conditions along the alignment.

Geologic and geotechnical information from the data review and field reconnaissance were evaluated to characterize the potential subsurface conditions that may exist along the widening alignment, at the creek/channel crossings, and at the two bridge sites based on the site

reconnaissance and data review. The evaluations also include a preliminary discussion of potential geohazards that could affect the project during its design life.

Subsurface exploration to confirm our opinions relative to potential subsurface/ geotechnical conditions were not included in this scope of work but will be required for project design once the alignment and structure locations are finalized.

1.5.2 Desktop Report

This desktop report provides a summary of opinions relative to potential geotechnical and subsurface conditions along the widening alignment corridor based on the data review and site reconnaissance. We have also provided a recommended work scope for the geotechnical design study that will be required as part of the final design of the project. This desktop report provides the following based on the work performed:

- Summary of anticipated site conditions, including near surface soil materials, and groundwater conditions that may be encountered.
- Summary of regional and local geologic conditions and seismic setting.
- Summary of potential geohazards, including strong ground shaking, ground surface rupture, landsliding, flooding, soil liquefaction, and seismically induced settlement.
- Recommendations for the design-level geotechnical report.

2.0 FINDINGS

2.1 GEOLOGIC CONDITIONS

2.1.1 Regional Geology

The project alignment is located in the Transverse Ranges geologic/geomorphic province of California. The province is characterized by east-west-trending mountain ranges composed of sedimentary and volcanic rocks ranging in age from Cretaceous to Recent. Major east-trending folds, reverse faults, and left-lateral strike-slip faults reflect regional north-south compression and are characteristic of the Transverse Ranges.

The project site is located proximal to several active or potentially active faults known or postulated to exist within about 20 miles of the project site. Further, the site is located in a seismically active area of California, and most likely will be subjected to strong earthquake ground motion during its lifetime. Major faults in the project vicinity include the Simi-Santa Rosa, Springville, Bailey, Oak Ridge, Ventura-Pitas Point, San Cayetano, Red Mountain, and Channel Islands Thrust faults.

2.1.2 Local Geology

The site is located on the southeastern portion of the Oxnard Plain, an ancient delta of alluvial sediments deposited largely by the Santa Clara River. Many authors have mapped the geology of the Oxnard Plain area, including the California Geologic Survey (CGS, 2003), Dibblee (1976), and Weber, et al. (1973). As mapped by Dibblee, the widening alignment is underlain by alluvial sediments. Artificial fill materials associated with roadway and bridge construction, drainages, levees and culverts, and agriculture are common in the project vicinity.

2.2 ANTICIPATED SITE CONDITIONS

Potential subsurface conditions developed from the data review are described in the following sections. Additionally, a summary of conditions encountered at various locations within the project area based on review of select existing data provided to us is presented in Table 1. The approximate locations are indicated on Plate 1 for reference.

2.2.1 Hueneme Road Approximate Sta. 10+46 to Sta. 342+00

The Hueneme Road alignment is constructed near the existing grade of the surrounding agricultural properties between about Sta. 10+46 at Edison Road and Sta. 342+00 southwest of the Laguna Road/Hueneme Road/Lewis Road intersection.

Lowney (2001) advanced four borings in agricultural road areas adjacent to the paved roadway to depths of about 16 feet along the Hueneme Road alignment between about Sta. 10+46 and Sta. 342+00. Lowney also advanced one boring to a depth of about 26 feet near Sta. 169+00 west of Naval Air Road. The subsurface conditions reported by Lowney consist of about 4 to 8 feet of medium dense sandy gravel, sand with gravel, and silty sand artificial fill material; about 3 inches of asphalt concrete pavement over about 4 inches of base materials were encountered in one boring advanced in the paved shoulder. The fill materials were reportedly underlain by wet, soft to medium stiff silty fine sand, sandy silt, clayey silt, and silty clay, medium dense fine to medium sand, and sand with gravel. Groundwater was reportedly encountered at depths ranging from about 4.5 feet to 10.5 feet below the ground surface (bgs) at the exploration locations.

2.2.2 Revolon Slough Bridge Approximate Sta. 249+00 to 253+00

Review of boring data by Lowney (2001) indicate the earth materials in the vicinity of the Revolon Slough crossing consist of about 10 feet of artificial fill consisting of stiff clay with sand, sand with gravel, and moist silty clay likely associated with levee construction. The native alluvial sediments underlying the fill consist of soft to firm clayey silt, loose to medium dense, silty sand, silt, and sand to the depths explored (about 31 feet). Lowney reported groundwater depths of about 17 to 18 feet below the levee grades.

Review of Record Drawings by the County of Ventura indicate the existing bridge is supported by 15-inch minimum diameter piles founded at a minimum elevation of El. -35 feet (about 58 feet below the abutment grade). Geotechnical design data for the bridge were not available for review.

2.2.3 SR1 Overpass Over Hueneme Road Approximate Sta. 175+75 to 177+00

Review of the Caltrans LOTB for the SR1 crossings of Hueneme Road indicates the original bridge (Bridge No 52-193) was constructed in the mid-1950's and seismic retrofit and widening was conducted in the early 2000's. As part of the original design, Caltrans (1955) advanced a three-inch diameter mud-rotary drill hole (B-2) to a depth of about 75 feet below the ground surface (bgs) to evaluate the subsurface conditions for Bridge No 52-193. The Caltrans B-3 drill hole log indicates the subsurface conditions at the drill hole location consist of very loose to loose silty sand from the surface to a depth of about 17 feet, medium dense silt, fine sand, and clayey silt from about 17 feet to about 37 feet bgs, and dense fine sand with clay and silt streaks from about 37 feet to 75 feet bgs (total depth explored). The depth to groundwater was not

reported, likely because the drill hole was advanced using the mud-rotary drilling technique. Caltrans did not perform any borings as part of the seismic retrofit and widening. Review of Caltrans (2002) indicates the retrofit piles were founded at about El. -39 feet.

Lowney (2001) advanced borings to depths of about 21 to 26 feet near Sta. 172+50 west of SR1 and Sta. 182+00 on east of SR1. The subsurface conditions reported by Lowney consist of about 3 to 7.5 feet of medium dense moist to wet silty sand to sand fill materials overlying soft silt and sandy silt, firm silty sand to sandy silt, and medium stiff silty clay alluvial materials to the depths explored. Groundwater was reportedly encountered at depths of about 4.5 feet at both locations.

2.2.4 Lewis Road Approximate Sta. 342+50 to Sta. 390+00

Northeast of about Sta. 336+00, the project alignment is constructed on an artificial fill embankment constructed in about 2006 as part of the Laguna Road/Hueneme Road/Lewis Road intersection and the new Lewis Road alignment adjacent to the western Calleguas Creek flood control levee. The artificial fill embankment along the Hueneme Road and Lewis Road widening alignment ranges from about 5 to 10 feet above the agricultural field grade at the southwestern extent, to about 30 feet thick at the channel infill on the northeastern side of the Laguna Road/Hueneme Road/Lewis Road the intersection near Sta. 342+50, to about 20 feet above the western agricultural grade near the University Drive bridge near Sta. 377+50.

Earth materials encountered by Lowney (2001) and Fugro (2002a and 2002b) in borings advanced prior to construction of the Lewis Road alignment indicate the earth materials between about Sta. 342+00 to Sta. 391+00 consisted of about 2 to 14 feet of medium dense to dense moist silty sand and sandy silt fill materials associated with levee construction and agricultural activities. The fill materials were underlain by very loose to medium dense silty sand, clayey sand, and sand with lesser amounts of medium stiff to stiff clay and sandy clay to depths of about 40 feet. (2002a and 2002b) encountered medium dense to very dense sand with silt, silty sand, and silty fine sand interbedded with lesser amounts of hard clay between depths of about 40 and 76 feet (total depth explored). Groundwater depths generally ranged from less than 4 feet to about 15 feet at the exploration locations. The groundwater along the Lewis Road segment of the project is likely controlled by flow within Calleguas Creek which flows year-round.

Converse (2011) advanced two boings on the northeastern and southwestern sides of the western University Drive Bridge abutment to depths of about 41 and 51 feet. Converse described the earth materials as about 5 to 6 feet of silty sand and sand with silt fill materials underlain by soft to medium stiff clay and silty clay, loose to medium dense sand, sand with silt, and silty sand to the maximum depth explored. Perched groundwater was encountered at depths of about 10 feet and groundwater was reported at depths of 28 to 30 feet.

Review of Fugro (2002a) indicates the earth materials along the alignment to a depth of about 50 feet consist of compressible, soft, fine-grained clay soil that could settle from 1 to 2 feet under the embankment loading of 20-to 30-feet. The estimated settlement period for the 20-foot-high embankment near University Drive was 3 to 6 months and the estimated settlement period for the 30-foot-high embankment near Laguna/Hueneme Roads was 2 years without mitigation. The project design included vertical drains (wick drains) along a 900-foot-long section of the Lewis Road from Laguna Road northward toward University Drive to reduce the settlement period to

about 6 months. A 2.5-foot-thick sand layer was placed near original subgrade elevation to allow vertical drains to discharge into a subdrain. Survey monitoring was included along with vertical drains to evaluate when the observed settlement was complete. Surcharge loading was included as a possible mitigation to reduce post construction settlement to less than 3 to 4 inches. Staged construction (fill limit of 2 feet per day) was discussed with monitoring using piezometers to reduce excess porewater pressure buildup in soft clay soil layers.

University Drive (Santa Barbara Street) Bridge. The geotechnical study for the University Drive Bridge (Fugro, 2002b) indicated that the site was underlain by loose to medium dense granular soil and soft to medium stiff clay that could settle about 6 to 12 inches in response placement of 20 feet of embankment fill for the bridge abutments. The estimated liquefaction related settlement was 4 to 6 inches, primarily in the upper 30 feet of the site. The bridge foundations consisted of driven concrete piles (70 ton) about 80 feet long with a design tip elevation of -35 feet.

2.3 GROUNDWATER

As described in the sections above and summarized on Table 1, groundwater is commonly shallow along the project alignment, commonly ranging at depths of less than 5 feet to about 15 feet. Thus, shallow groundwater should be anticipated along the length of the project alignment.

2.4 GEOHAZARDS

2.4.1 Faulting and Ground Rupture Potential

Weber (1973) maps the Bailey fault as a buried, inferred fault trace generally parallel to the southern portion of Lewis Road/Calleguas Creek and crossing the project alignment near the intersection of Laguna Road/Hueneme Road/Lewis Road. The Southern California Earthquake Data Center (2021, Online) indicates that the Bailey fault is 20 kilometer long, left-lateral, oblique reverse fault with the most recent movement in the Late Quaternary (potentially active). The fault location is buried and not well defined by surficial geomorphic features. Based on the available data, the potential for damage associated with the Bailey fault is considered low.

2.4.2 Strong Ground Shaking and Peak Horizontal Ground Acceleration

The project site is located within a seismically active area and the potential exists for strong ground motion to affect the project elements during the design lifetime. In general, the primary effects will be those phenomena associated with shaking and/or ground acceleration. Those effects can be mitigated through appropriate design and construction procedures.

The project alignment is proximal to a number of faults that are considered active or potentially active by the CGS including the Simi-Santa Rosa, Malibu Coast, Oak Ridge, Anacapa-Dume, Ventura-Pitas Point, Bailey, and the Channel Islands Thrust faults.

The estimated peak horizontal ground acceleration (2 percent probability of exceedance in 50 years) near the center of the Hueneme Road alignment near SR1 is about 0.65g. Site-specific seismic criteria will be required for the project structural elements as part of the design-level geotechnical study.

2.4.3 Liquefaction Potential

Liquefaction is generally described as the sudden loss of soil strength because of a rapid increase in soil pore water pressures due to cyclic loading during a seismic event. In order for liquefaction to occur, three general geotechnical characteristics must be present: 1) groundwater must be present within the potentially liquefiable zone; 2) the potentially liquefiable soil must be granular and the grain size distribution should fall within a relatively specific range; and 3) the potentially liquefiable soil must be of low to moderate relative density. If those criteria are met and strong ground motion occurs, then those soils may liquefy, depending upon the intensity and cyclic nature of the strong ground motion. Liquefaction that produces surface effects generally occurs in the upper 40 to 50 feet of the soil column, although the phenomenon can occur deeper than 100 feet.

Groundwater has been reported at depths within 10 feet of the ground surface and the project area is underlain by loose to medium dense granular alluvial soils based on the data review performed for this study. Previous studies by Fugro (2002b) estimated seismic related settlement of about 4 to 6 inches near the University Drive Bridge near the northern portion of the widening alignment. Based on our preliminary evaluation of the subsurface data by Caltrans for the SR1 bridges over Hueneme Road, seismic related settlement at that location is likely in the range of 6 to 12 inches. Review of CGS (2002) indicates the project alignment is located in an area classified as having a high susceptibility to liquefaction. In our opinion there is a potential for liquefaction to occur in the project area and affect the project elements. The project design-level study will need to include site specific exploration to evaluate seismically related settlement at structure locations.

2.4.4 Landsliding and Slope Instability

The project alignment is located in a relatively flat alluvial area that is not susceptible to landsliding or slope instability. Areas where the alignment is located proximal to unprotected earthen drainages may be subject to slope instability as a result of creek bank erosion. There is also a potential for lateral seismic deformation near embankment areas.

2.4.5 Flooding and Tsunami

Review of Ventura County (2020) indicates the project alignment between SR1 and Wood Road is located within the 500-year (0.2 percent chance) floodplain and the segment northeast of Wood Road to the project end is located within the 100-year (1 percent chance) floodplain as mapped by FEMA. Also, the project area is transected by a number of drainages that cross the alignment area including the Mugu drain, Revolon Slough, Calleguas Creek, and several unnamed drainages. Thus, the potential exists for flooding/erosion to affect the project.

Review of Ventura County (2020) indicates the project area is not located within an area susceptible to tsunami inundation.

2.5 ENVIRONMENTAL HAZARDS

The scope of our services for this study did not include environmental assessments for the presence or absence of hazardous/toxic materials in the soil, surface water, groundwater or atmosphere. Environmental studies may be required as part of the project design to evaluate for the presence of contaminated materials prior to construction.

3.0 CONCLUSIONS AND RECOMMENDATIONS

3.1 CONCLUSIONS

3.1.1 Geotechnical Site Conditions

As described in Section 2, the onsite earth materials generally consist of granular alluvial soils (silty to clayey sand) with interbedded fine-grained silt and clay soils to depths of greater than 70 feet. Shallow groundwater is present at depths of about 4 to 10 feet along the alignment. The granular soil in the upper 30 feet is typically loose to medium dense or fine-grained soils are soft to medium stiff. Below a depth of about 30 feet the soil is generally medium dense/medium stiff. The project alignment has an estimated peak ground acceleration of about 0.65g which is normal for the Ventura County area. Liquefaction potential is high, especially in the upper 30 feet of the onsite native soils. Based on previous studies, the estimated liquefaction related settlement is in the range of 4 to 6 inches. Preliminary evaluation of the liquefaction potential near the SR1 bridge is in the range of 6 inches to one foot.

3.1.2 Embankment Settlement

Previous studies by Fugro along the eastern portion of the study area (southern portion of Lewis Road) estimated settlement for roadway embankments up to about 6 to 12 inches for 20-foot-high embankments and as high as about 1- to 2-feet for a 30-foot-high embankment at the Laguna Road/Hueneme Road/Lewis Road intersection founded on a relatively thick layer of soft clay soil. Mitigations for the settlement included vertical (wick) drains with a 2.5-foot-thick sand layer to collect and disperse water generated from the vertical drains, survey monitoring of settlement, and controlled fill loading height of a maximum of 2 feet of soil per day. New roadway embankments higher than about 8 to 10 feet will need to be evaluated to estimate settlement and possible subgrade improvement requirements.

3.1.3 Structure Foundation Design

Structure foundation design for bridges should use Caltrans structure design procedures which include site specific exploration, seismic evaluations and foundation design. Previous bridges have been founded primarily on driven piles founded in dense sand at an elevation of about -35 feet. Deeper foundations may be required depending on the type of pile support utilized and amount of downdrag associated with liquefaction related settlement evaluated as part of the foundation design studies.

Culverts and surface water conveyance facilities outside of the Caltrans easement will likely be designed in accordance with Ventura County Public Works Agency (VCPWA, Watershed Protection District) standards. The VCPWA standards include site specific soil and seismic design parameters based on CBC and in-house design procedures. Shallow groundwater and agricultural return water flow in the drainages in a year-round basis. Surface and groundwater dewatering likely will be required during construction of culverts and other surface water conveyance structures.

3.1.4 Constructability

Standard road improvements along a majority of the alignment will need to consider foundation subgrade preparation for the existing agricultural areas as well as protection of existing utilities and improvements. Preparation and compaction of the upper 1 to 2 feet of the existing agriculturally disturbed soil along the road widening alignment will likely result in a 20 percent volume reduction, requiring additional soil to be imported to construct the road subgrade. Groundwater should not be encountered during standard road subgrade preparation but likely will be encountered during subsurface work more than about 4 to 5 feet below existing grade. Existing utilities will need to be protected in-place and agencies should be contacted if additional loading is proposed over existing utilities.

3.2 RECOMMENDATIONS

This desktop letter-report summarizes potential conditions that may be encountered during construction of the project based on our observations during the site reconnaissance, our data review, and experience with similar projects in the site vicinity. Subsurface exploration, laboratory testing, and engineering evaluations were not part of the work performed for the desktop study but will be required as part of the geotechnical design study.

The geotechnical design study should address the following:

- Site-specific subsurface exploration (drill holes and/or test pits) at selected locations along the widening alignments to evaluate existing pavement/base thicknesses, soil engineering properties, and potential to encounter difficult construction conditions (high groundwater, caving soils, oversize materials, etc.).
- Site-specific subsurface exploration (drill holes and cone penetration tests) at structure locations (bridges, culverts, etc.) to evaluate foundation conditions, slope stability, liquefaction potential, potential for shallow groundwater, soil engineering properties, etc.
- Laboratory testing of recovered samples from the subsurface exploration.
- Logs of the drill holes, laboratory test data, and a site map showing exploration locations and site-specific geologic/geotechnical data collected during the site reconnaissance and field exploration.
- Summary of pavement thickness, soil, and groundwater conditions encountered at the exploration locations.
- Quantitative assessment of seismically-related geohazards such as fault-rupture potential, strong ground motion, liquefaction potential, and liquefaction-related settlement.
- Anticipated excavation conditions, temporary support/shoring considerations, and temporary slope considerations (does not include shoring design).
- Earthwork and grading recommendations.
- Dewatering considerations for temporary construction conditions if required (does not include design of dewatering systems).

- Suitability of excavated materials for use as fill and select fill material; suggested specifications for on-site and imported materials used as fill.
- Foundation design criteria for structures, including allowable bearing pressure, lateral earth pressure, uplift resistance, total and differential settlement estimates, expansive soil design, and recommendations for backfill, compaction and drainage of below-grade structures.
- Pavement design based on laboratory R-value data from site-specific explorations, and a design TI provided by the County of Ventura.
- Summary of corrosion potential based on results of laboratory testing for concrete and steel project improvements/structures).

4.0 LIMITATIONS

Oakridge Geoscience, Inc. prepared this desktop study in accordance with the generally accepted geotechnical principles and practices at this time and in this location. This desktop study was prepared for exclusive use of MNS Engineers, Inc. for the project described herein. It is not intended to address issues or conditions pertinent to other parties, projects, or for other uses. It is not intended as a design-level study and should not be used for project design or construction. Subsurface exploration was not performed for the preliminary geohazard evaluation presented herein but will be required as part of the design phase of work. The scope of services did not include any environmental assessments for presence or absence of mold, hazardous, or toxic materials in the soil, surface water or groundwater, or in the atmosphere.

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Table 1. Summary of Anticipated Conditions Based on Data Review and Site Reconnaissance

Approx. Station Number	Location	Earth Materials	Blowcounts	Approx. Groundwater		Date Recorded	Source
				Depth (ft.)	Elev. (ft.)		
52+50	Agricultural roadway, southern side of Hueneme Rd.	0 to 5' – Artificial Fill: medium dense sandy gravel, sand with gravel, and silty sand. 5' to 16' TD – Alluvium: medium stiff to soft sandy silt, and medium dense fine to medium grained wet sand.	-- 7 to 25	9.5	9	6/14/2001	Lowney (2001) LB-12
79+00	Agricultural roadway, southern side of Hueneme Rd.	0 to 4' – Artificial Fill: medium dense sandy gravel, sand with gravel, and medium stiff sandy silt. 4' to 16' TD – Alluvium: medium stiff, moist sandy silt, and medium dense fine to medium grained wet sand.	-- 12 to 31	9.5	11	6/14/2001	Lowney (2001) LB-11
169+00	Hueneme Rd.; southern shoulder.	0 to 7' – Artificial Fill: 3"a.c./4" a.b. over medium dense silty sand and sand. 7' to 26' TD' - Alluvium: soft moist to wet silt, medium stiff, wet sandy silt, clayey silt, and silty clay.	14 5 to 13	10.5	6	6/14/2001	Lowney (2001) LB-10
172+50	Southern side of Hueneme Rd., west of SR1 and Naval Air Sta. Rd.	0 to 7.5' – Artificial Fill: 3"a.c./6" a.b. over medium dense moist to wet silty sand to sand. 7.5' to 26' TD' - Alluvium: firm silty sand to sandy silt, wet, with clay.	9 4 to 6	4.5	12	6/14/2001	Lowney (2001) LB-9
176+75	Southern side of Hueneme Rd., between existing bridge decks, near southern abutments.	0 to 47' – Very loose silty fine sand; loose to slightly compact silt, fine sand and clayey silt; and soft silty clay; 47' to TD – Slightly compact to compact fine sand and silt layers; dense fine sand.	3 to 15 25 to 40	Not Reported	--	4/15/1955	Caltrans (2002) B-2 LOTB
182+00	Southern side of Hueneme Rd., east of SR1 and Raytheon Rd.	0 to 3' – Artificial Fill: medium stiff fine to medium sand to silty sand. 3' to 21' – Alluvium: soft, wet silty fine sand; soft, wet, silt and sandy silt; and medium stiff silty clay to clayey silt.	-- 2 to 7	4.5	12	6/14/2001	Lowney (2001) LB-8
220+50	Agricultural roadway, southern side of Hueneme Rd., west of Wood Rd.	0 to 5' – Artificial Fill: gravely sand and medium dense, moist, silty sand to sand. 5' to 16' – Alluvium: medium stiff moist silty sand to sandy silt; medium dense to dense, moist to wet sand.	-- 6 to 21	7	8	6/14/2001	Lowney (2001) LB-7
248+25	Western bank of Revolon Slough, north of Hueneme Rd.	0 to 5' – Artificial Fill: very stiff clay with fine sand. 5' to 10' - Artificial Fill: medium dense sand with gravel. 10' to 31' – Alluvium: loose to medium dense wet sand, silt, and silty sand.	36 20 to 27 12 to 16	17	6	10/30/2001	Lowney (2001) LB-6/6A
253+25	Eastern bank of Revolon Slough, north of Hueneme Rd.	0 to 7' – Artificial Fill: dense, moist, clayey gravel. 7' to 11.5' – Artificial Fill: very stiff, moist silty clay. 11.5' to 31' – Alluvium: soft to firm, wet, clayey silt; loose, wet silty sand; soft wet, silt.	20 to 32 29 6 to 11	18	4	10/30/2001	Lowney (2001) LB-5/5A
293+75	Agricultural roadway, southeastern side of Hueneme Rd, northeast of Las Posas Rd.	0 to 4.5' – Artificial Fill: base materials, medium dense, moist sand, sandy gravel, and fine to medium sand. 4.5' to 21' – Alluvium: medium stiff, moist silty fine sand to sandy silt; medium stiff, wet silty clay to clayey silt.	-- 7 to 8	9	11	6/14/2001	Lowney (2001) LB-4

Table 1. Summary of Anticipated Conditions Based on Data Review and Site Reconnaissance (Continued)

Approx. Station Number	Location	Earth Materials	Blowcounts	Approx. Groundwater		Date Recorded	Source
				Depth (ft.)	Elev. (ft.)		
342+00	Agricultural roadway, northwestern side of Hueneme Rd, southwest of intersection with Laguna Rd.	0 to 8‘ – Artificial Fill: base materials, sand to silty sand with gravel, and medium dense, moist fine to medium sand. 8‘ to 16‘ – Alluvium: stiff, moist to wet silty clay.	20 8 to 15	9.5	19	6/14/2001	Lowney (2001) LB-3
344+75	Agricultural roadway, future Lewis Road alignment fill embankment.	0-14’ – Artificial Fill: medium dense to dense silty fine sand and very stiff sandy clay. 14’ to 40’ – Alluvium: loose sand, silty sand, and clayey sand and medium stiff clay and clayey sandy silt.	27 to 42 4 to 18	19.5	23	6/13/2002	Fugro (2002) DH-9
352+00	Agricultural roadway future Lewis Road alignment fill embankment.	0 to 3’ – Artificial Fill: clay. 3’ to 15’ – Alluvium: loose to medium dense sandy silt, silty fine sand, and sand with lesser amounts of stiff clayey silt.	-- 5 to 10	6.5	35.5	6/13/2002	Fugro (2002) DH-10
360+50	Northwestern side of Lewis Rd. northwest of Calleguas Creek.	0 to 9‘ – Artificial Fill: dense, moist silty sand. 9‘ to 31‘ – Alluvium: loose to medium dense silty sand and soft wet silt.	33 5 to 18	16	34	10/30/2001	Lowney (2001) LB-2
363+50	Agricultural roadway, future Lewis Road alignment fill embankment.	0 to 2’ – Artificial Fill: sandy silt. 2’ to 11’ – Alluvium: very loose to loose wet. clayey sand, silty fine sand, and sand.	-- 2 to 8	3.8	36.2	6/13/2002	Fugro (2002) DH-11
376+50	Southwestern side of Lewis Rd southwest of University Dr. Bridge.	0 to 5’ – Artificial Fill: sand with silt 5’ to 51’ – Alluvium: soft clay and silty clay, loose to medium dense sandy silt, sand with silt, silty sand, and sand.	-- 2 to 25	10 (perched) 30	58 38	9/30/2011	Converse (2011) BH-2
377+00	Agricultural roadway, future Lewis Rd alignment/University Dr. Bridge future Lewis Road alignment fill embankment.	0 to 5’ - Artificial Fill: silty fine sand. 5’ to 40’ – Alluvium: loose to medium dense wet, silty fine sand, clayey sand, sand, fine sand with silt interbedded with lesser amounts of medium stiff to stiff clay and sandy clay. 40’ to 76.5’ – Alluvium: medium dense to very dense sand with silt, silty sand, and silty fine sand interbedded with lesser amounts of hard clay.	-- 5 to 20 23 to 44	5	39	6/20/2002	Fugro (2002) DH-12
378+00	Southwestern side of Lewis Rd northeast of University Dr. Bridge.	0 to 6’ – Artificial Fill: silty sand. 6’ to 41’ – Alluvium: soft to medium stiff clay and silty clay, loose to medium dense sand, sand with silt, and silty sand.	-- 2 to 17	10 (perched) 28	59 41	9/30/2011	Converse (2011) BH-1
391+00	Agricultural roadway, future Lewis Road alignment fill embankment.	0 to 5’ Artificial Fill: medium dense silty fine sand. 5’ to 15.5’ Alluvium: loose, wet sand and soft to medium stiff wet clay.	12 to 23 3 to 9	8.2	37.8	6/13/2002	Fugro (2002) DH-13

N

0 1500
Approx. Scale (feet)

Sta. 293+00 + Approximate Station Numbers

LB-1 Approximate location of boring advanced by Lowney (2001)

B-2 Approximate location of boring advanced by Caltrans (2002)

PROJECT ALIGNMENT
Edison Road to Wood Road
Hueneme Road/Lewis Road Widening Feasibility Study
Ventura County, California

PLATE 1a

N

0 1500
Approx. Scale (feet)

Sta. 293+00 + Approximate Station Numbers

DH-10 Approximate location of boring advanced by Fugro (2002)

BH-2 Approximate location of boring advanced by Converse (2011)

PROJECT ALIGNMENT
Wood Road to Northeast of University Drive
Hueneme Road/Lewis Road Widening Feasibility Study
Ventura County, California

PLATE 1b

Appendix B. Desktop Environmental Memorandum

padre associates, inc.
ENGINEERS, GEOLOGISTS & ENVIRONMENTAL SCIENTISTS

BIOLOGICAL CONSTRAINTS ANALYSIS

HUENEME ROAD AND LEWIS ROAD WIDENING PROJECT STUDY REPORT

VENTURA COUNTY, CALIFORNIA

Prepared for:
MNS Engineers, Inc.
4580 E. Thousand Oaks Blvd.
Westlake Village, CA 91362

Prepared by:
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Ventura, California 93003

July 2021

Project no. 2102-0771

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TABLES

1.0 STUDY PURPOSE AND METHODS

1.1 INTRODUCTION

MNS Engineers is in preparation of a Project Study Report for the Ventura County Public Works Agency, which addresses proposed widening of Hueneme Road (Edison Road to Laguna Road) and Lewis Road (Laguna Road to about 1,000 feet north of University Drive) from two to four traffic lanes. MNS has developed three concept plans for widening:

- Alternative 1: widen on the south side of the existing roadway.
- Alternative 2: widen on both sides of the existing roadway.
- Alternative 3: widen on either side of the existing roadway, focusing on minimizing impacts to adjacent properties.

The purpose of this study is to identify biological issues that may constraint/affect the proposed project and facilitate selection of alternatives.

1.2 SITE LOCATION AND PHYSICAL DESCRIPTION

Hueneme Road extends approximately 8.2 miles from Port Hueneme (at Market Street) east through the cities of Port Hueneme and Oxnard and unincorporated Ventura County to its intersection with Laguna Road. Lewis Road extends approximately 6.6 miles from its intersection with Laguna Road to Somis Road, passing through the City of Camarillo. The project entails widening the portion of Hueneme Road within unincorporated Ventura County (Edison Road to Laguna Road) from two lanes to four lanes and widening the portion of Lewis Road from its intersection with Laguna Road to about 1,000 feet north of University Drive.

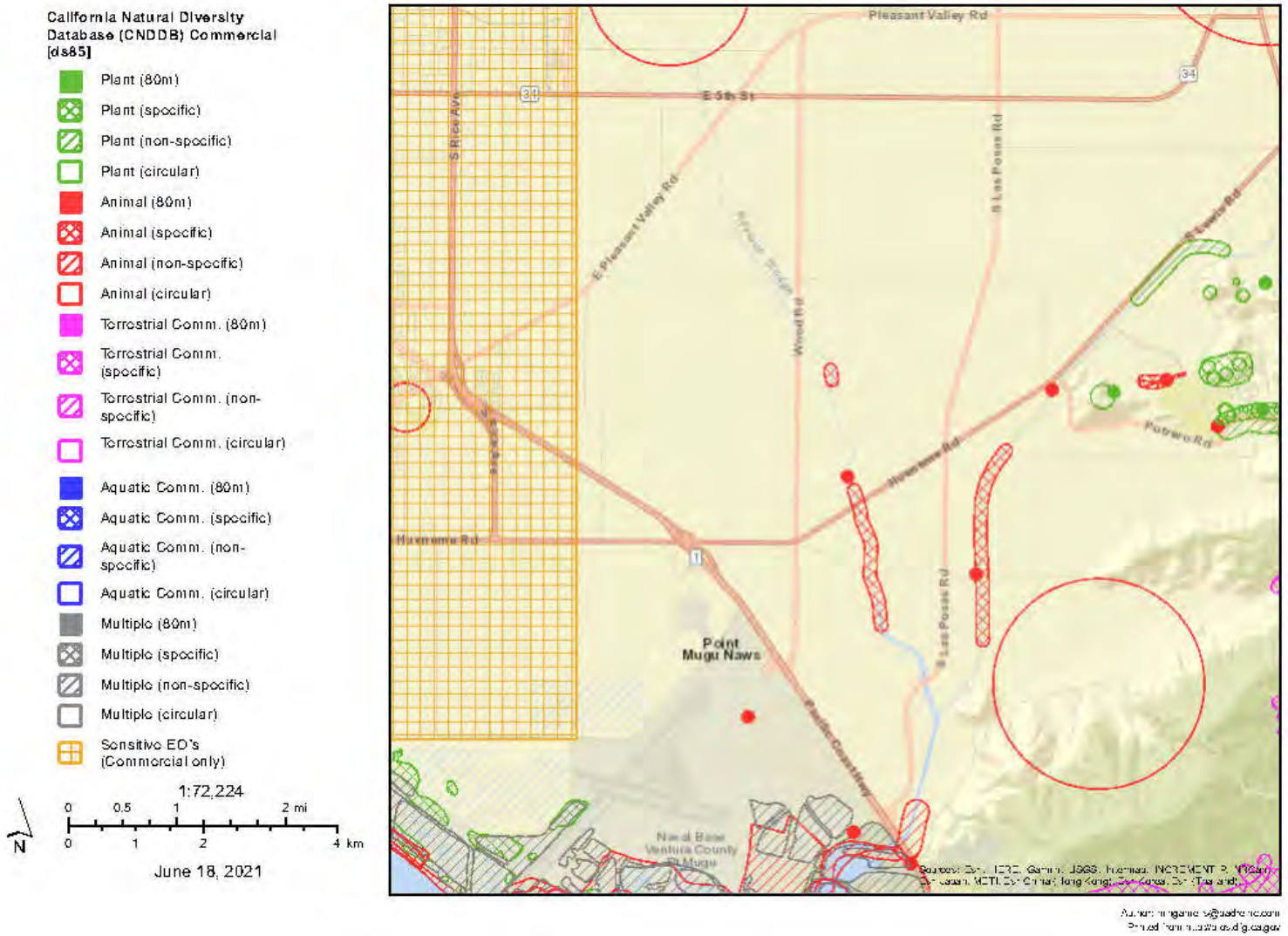
The affected portions of these roadways are located in farmlands. Major crossings include State Route 1 and Revolon Slough.

1.3 METHODS

Biological resources were assessed based upon a single field survey and literature research. Field work was focused on drainages and areas supporting native vegetation. The literature research included reviewing the following documents:

- California Natural Diversity Data Base.
- California Native Plant Society online inventory of rare and endangered plants.
- Environmental reports prepared for other nearby projects.
- Numerous biological monitoring reports prepared by Padre Associates for the Watershed Protection District for work conducted in Revolon Slough and Calleguas Creek.

Hueneme & Lewis Road Widening Area



California Natural Diversity Data Base Element Occurrences

2.0 DESCRIPTION OF THE RESOURCES

2.1 VEGETATION

Vegetation along the subject roadways is mostly limited to short-rotation row crops; however, small amounts of riparian and wetland vegetation occurs within Revolon Slough at its crossing of Hueneme Road and within Calleguas Creek adjacent to Lewis Road. Vegetation within Revolon Slough at the Hueneme Road crossing is dominated by castor bean (*Ricinus communis*), mulefat (*Baccharis salicifolia*) and California bulrush (*Schoenoplectus californicus*). Vegetation within Calleguas Creek along the subject segment of Lewis Road is dominated by castor bean, broad-leaf cattail (*Typha latifolia*), sandbar willow (*Salix exigua*) and white sweet-clover (*Melilotus alba*).

Linear rows of small non-native trees and shrubs (mostly black poplars [*Populus nigra*] and blue gum eucalyptus [*Eucalyptus globulus*]) are located along portions of the roadway shoulder along Hueneme Road. In addition, a few adjacent land uses include landscaping near the roadway shoulder of Hueneme Road.

2.2 WETLANDS

The U.S. Army Corps of Engineers (Corps) has jurisdiction over waters of the United States (U.S.) under the authority of Section 404 of the Clean Water Act. The limit of jurisdiction in non-tidal waters extends to the ordinary high water mark and includes all adjacent wetlands. Waters of the U.S. are defined as:

> *"All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide; including all interstate waters including interstate wetlands, all other waters such as intrastate lakes, rivers, streams, mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce."*

The subject segment of Hueneme Road crosses Revolon Slough (near project Station 250+00) and the subject segment of Lewis Road is located parallel to and adjacent to Calleguas Creek (project Station 344+00 to 390+00). Mugu Drain (also known as Oxnard Drain no. 2) crosses the subject segment of Hueneme Road at project Station 156+00). Calleguas Creek empties into the Pacific Ocean at Mugu Lagoon, and Revolon Slough and Mugu Drain are tributaries of Calleguas Creek. These drainages are considered waters of the U.S. under the Clean Water Act, and “waters of the State” as defined in Section 13050 of the California Water Code.

The Corps and EPA define wetlands as:

"Those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas."

Ventura County defines wetlands as (General Plan Goals Policies and Programs glossary):

"Lands that are transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is periodically covered with shallow water. The frequency of occurrence of water is sufficient to support a prevalence of vegetative or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction. Wetlands include marshes, bogs, sloughs, vernal pools, wet meadows, river and stream overflows, mudflats, ponds, springs and seeps."

Ventura County defines wetland habitat (General Plan Goals Policies and Programs glossary) as "plant communities that are associated with wetlands."

Federal-defined wetlands, County-defined wetlands and wetland habitat are expected to occur within Calleguas Creek and Revolon Slough near the subject roadway segments. County-defined wetlands may occur in the Mugu Drain.

2.3 SPECIAL-STATUS PLANT SPECIES

Special-status plant species are either listed as endangered or threatened under the Federal or California Endangered Species Acts, or rare under the California Native Plant Protection Act, or considered to be rare (but not formally listed) by resource agencies, professional organizations (California Native Plant Society), and the scientific community. For the purposes of this project, special-status plant species are defined in Table 1.

The literature search and field surveys conducted for this Analysis indicates that 16 special-status plant species have the potential to occur in the project area. Table 2 lists these species, current regulatory status, and nearest known location relative to the property. Only white rabbit-tobacco is likely to occur in proximity to proposed roadway improvements.

Table 1. Definitions of Special-Status Plant Species

Special-Status Plant Species
➢ Plants listed or proposed for listing as threatened or endangered under the Federal Endangered Species Act (50 CFR 17.12 for listed plants and various notices in the Federal Register for proposed species).
➢ Plants that are candidates for possible future listing as threatened or endangered under the Federal Endangered Species Act (Federal Register November 16, 2020).
➢ Plants that meet the definitions of rare or endangered species under the CEQA Guidelines (Section 15380).
➢ Plants considered by the CNPS to be "rare, threatened, or endangered" in California (Lists 1B and 2 maintained by the California Native Plant Society).
➢ Plants listed by CNPS as plants about which we need more information and plants of limited distribution (Lists 3 and 4 maintained by the California Native Plant Society).
➢ Plants listed or proposed for listing by the State of California as threatened or endangered under the California Endangered Species Act (14 CCR 670.5).
➢ Plants listed under the California Native Plant Protection Act (California Fish and Game Code 1900 et seq.).
➢ Plants considered locally important by the Ventura County Planning Division.

Table 2. Special-Status Plant Species of the Project Area

Common Name	Status	Habitat Description	Nearest Known Location Relative to Affected Roadways	Potential to Occur Near Affected Roadways
Braunton's milkvetch (*Astragalus brauntonii*)	FE, List 1B	Coastal scrub, chaparral, grassland	Long Grade Canyon (1989), 2.7 miles to the southeast (at University Drive) (CNDDB, 2021)	Considered absent due to lack of suitable habitat
Coulter's goldfields (*Lasthenia glabrata ssp. coulteri*)	List 1B, VLIP	Saltmarsh, vernal pools	Near terminus of McWane Blvd. (2015), 0.9 miles to the southwest (at Edison Road) (CNDDB, 2021)	Considered absent due to lack of suitable habitat
Mexican malacothrix (*Malacothrix similis*)	List 2A	Coastal sage scrub, chaparral	Hueneme Beach (1925, extirpated in California), ~1.5 miles to the southwest (CNDDB, 2021)	Extirpated, also considered absent due to lack of suitable habitat
Red sand verbena (A*bronia maritima*)	List 4	Coastal dunes	Near terminus of McWane Blvd. (2015), 0.7 miles to the southwest (at Edison Road) (Consortium of California Herbaria, 2021)	Considered absent due to lack of suitable habitat
Catalina mariposa lily (*Calochortus catalinae*)	List 4	Coastal scrub, chaparral, grassland	Long Grade Canyon (1989), 2.7 miles to the southeast (at University Drive) (Consortium of California Herbaria, 2021)	Considered absent due to lack of suitable habitat
Slender mariposa lily (*Calochortus clavatus var. gracilis*)	List 1B, VLIP	Coastal scrub, chaparral, grassland	Near Channel Islands State University (2019),1.4 miles to the southeast (at University Drive) (CNDDB, 2021)	Considered absent due to lack of suitable habitat
Plummer's mariposa lily (*Calochortus plummerae*)	List 4, VLIP	Coastal scrub, chaparral, grassland, woodland	Long Grade Canyon (2010), 2.0 miles to the southeast (at University Drive) (CNDDB, 2021)	Considered absent due to lack of suitable habitat
Blochman's dudleya (*Dudleya blochmaniae*)	List 1B	Coastal scrub, chaparral, grassland	Near Channel Islands State University (2015),1.1 miles to the southeast (at University Drive) (CNDDB, 2021)	Considered absent due to lack of suitable habitat

Common Name	Status	Habitat Description	Nearest Known Location Relative to the Affected Roadways	Potential to Occur Near Affected Roadways
Verity's dudleya (*Dudleya verityi*)	FT, List 1B, VLIP	Woodland, coastal scrub, chaparral	Near Channel Islands State University (2010),1.3 miles to the southeast (at University Drive) (CNDDB, 2021)	Considered absent due to lack of suitable habitat
Conejo buckwheat (*Eriogonum crocatum*)	SR, List 1B, VLIP	Volcanic outcrops	Long Grade Canyon (2010), 1.8 miles to the east (at University Drive) (CNDDB, 2021)	Considered absent due to lack of suitable habitat
Estuary sea-blite (*Suaeda esteroa*)	List 1B, VLIP	Saltmarsh	Mugu Lagoon (1980), 3.3 miles to the south (at Route 1) (CNDDB, 2021)	Considered absent due to lack of suitable habitat
California sea-blite (*Suaeda californica*)	FE, List 1B	Saltmarsh	Ormond Beach (1999), 1.2 miles to the southwest (at Edison Road) (Consortium of California Herbaria, 2021)	Considered absent due to lack of suitable habitat
Salt marsh bird's-beak (*Chloropyron maritimum ssp. maritimum*)	FE, SE, List 1B, VLIP	Saltmarsh	Ormond Beach (2019), 1.2 miles to the south (at Edison Road) (CNDDB, 2021)	Considered absent due to lack of suitable habitat
Southwestern spiny rush (*Juncus acutus ssp. leopoldii*)	List 4	Saltmarsh, coastal dunes	Ormond Beach (1996), 1.6 miles to the south (at Edison Road) (Consortium of California Herbaria, 2021)	Considered absent due to lack of suitable habitat
White rabbit-tobacco (*Pseudognaphalium leucocephalum*)	List 2B	Woodland, coastal scrub, chaparral	Calleguas Creek (1959), adjacent to Lewis Road near University Drive (CNDDB, 2021)	Reported ~50 feet from proposed terminus of Lewis Road widening, likely absent due to lack of suitable habitat
Chaparral ragwort (*Senecio aphanactis*)	List 2B, VLIP	Woodland, coastal scrub, chaparral	Long Grade Canyon (1962),~3.2 miles to the southeast (at University Drive) (CNDDB, 2021)	Considered absent due to lack of suitable habitat

Status Codes:
FE Federal Endangered (USFWS)
FT Federal Threatened (USFWS)
SE State Endangered (CDFW)
SR State Rare (CDFW)
List 1B Plants rare, threatened, or endangered in California and elsewhere (CNPS)
List 2A Plants extirpated in California, but more common elsewhere (CNPS)
List 2B Plants rare, threatened, or endangered in California, but more common elsewhere (CNPS)
List 4 Plants of limited distribution (CNPS)
VLIP Ventura County locally important plant species

2.4 WILDLIFE

The wildlife habitat value of roadside areas to be affected by proposed widening is low as most areas support only short-rotation row crops. Linear rows of small trees and shrubs are located along the roadway shoulder in some areas, which provide some habitat value. However, these areas are very small, highly fragmented and immediately adjacent to high speed traffic lanes (50-65 mph) where they are exposed to noise, dust and buffeting by passing trucks. Vegetation within Revolon Slough and Calleguas Creek near the affected roadside areas provides higher habitat value.

2.5 SPECIAL-STATUS WILDLIFE SPECIES

Special-status wildlife species are defined in Table 4. The potential for these species to occur in the vicinity of the subject roadway segments was determined by personal experience, review of sight records from other environmental documents and range maps including Zeiner et al. (1988, 1990a, 1990b), and Garrett and Dunn (1981). Table 5 lists special-status species that have the potential to occur in proximity to proposed roadway improvements.

Table 4. Definitions of Special-Status Wildlife Species

Special-Status Wildlife Species
➢ Animals listed or proposed for listing as threatened or endangered under the Federal Endangered Species Act (50 CFR 17.11 for listed animals and various notices in the Federal Register for proposed species). ➢ Animals that are candidates for possible future listing as threatened or endangered under the Federal Endangered Species Act (Federal Register November 16, 2020). ➢ Animals that meet the definitions of rare or endangered species under the CEQA Guidelines (Section 15380). ➢ Animals listed or proposed for listing by the State of California as threatened and endangered under the California Endangered Species Act (14 CCR 670.5). ➢ Animal species of special concern to the CDFW. ➢ Animal species that are fully protected in California (California Fish and Game Code, Section 3511 [birds], 4700 [mammals], and 5050 [reptiles and amphibians]). ➢ Animal species considered locally important by the Ventura County Planning Division.

Table 5. Special-Status Wildlife Species of the Project Area

Common Name	Habitat	Status	Nearest Known Location (date) Relative to Affected Roadways	Potential to Occur Near Affected Roadways
Invertebrates				
Globose dune beetle (*Coelus globosus*)	Beaches, foredunes	IUCN-VU	Ormond Beach (1991), 1.4 miles to the south (at Edison Road) (WRA, 2007)	Considered absent due to lack of suitable habitat
California brackish water snail (*Tryonia imitator*)	Coastal lagoons and adjacent stream reaches	IUCN-DD	Ormond Lagoon (2007), 1.3 miles to the southwest (at Edison Road) (CNDDB, 2021)	Considered absent due to lack of suitable habitat
Senile tiger beetle (*Cicindela senilis frosti*)	Beaches, foredunes	SA	Mugu Lagoon (1985), 2.5 miles to the south (at Wood Road) (CNDDB, 2021)	Considered absent due to lack of suitable habitat
Monarch butterfly (*Danaus plexippus*)	Eucalyptus groves and parks	FC	Etting Road (2018) 1.0 miles to the north (at Olds Road) (Xerces Society, 2019)	Considered absent due to lack of suitable habitat
Sandy beach tiger beetle (*Cicindela hirticollis gravida*)	Beaches, foredunes	SA	Naval Base Ventura County (1982), 3.1 miles to the south (at Rice Road) (CNDDB, 2021)	Considered absent due to lack of suitable habitat
Wandering skipper (*Panoquina errans*)	Saltmarsh	IUCN-NT	Ormond Beach (2004), 1.4 miles to the south (at Edison Road) (WRA, 2007)	Considered absent due to lack of suitable habitat
Crotch bumble bee (*Bombus crotchii*)	Coastal scrub, chaparral	CE	Naval Base Ventura County (1982), ~3 miles to the south (at Rice Road) (CNDDB, 2021)	Considered absent due to lack of suitable habitat

Common Name	Habitat	Status	Nearest Known Location (date) Relative to Affected Roadways	Potential to Occur Near Affected Roadways
Santa Monica grasshopper (*Trimerotropis occidentalioides*)	Chaparral	IUCN-EN	Long Grade Canyon (1974), 2.7 miles to the southeast (at University Drive) (CNDDB, 2021)	Considered absent due to lack of suitable habitat
Fish				
Tidewater goby (*Eucyclogobius newberryi)*	Coastal lagoons and adjacent stream reaches	FE, CSC	J Street Drain (2020), 1.2 miles to the west-southwest (at Edison Road) (Z. Abbey, personal observation); Revolon Slough 2.2 miles to the south (Cardno Entrix, 2011)	Habitat quality poor, but could be found in Revolon Slough near Hueneme Road following winter high flows
Arroyo chub (*Gila orcuttii*)	Coastal streams	CSC	Revolon Slough (2000), at Hueneme Road (CNDDB 2021)	Presumed present
Reptiles				
Southern California legless lizard (*Anniella stebbinsi*)	Undisturbed moist loose soils	CSC	Near Mugu Lagoon (1974), 2.8 miles to the south (at Wood Road) (CNDDB, 2018)	Considered absent due to lack of suitable habitat
Two-striped garter snake (*Thamnophis hammondii*)	Streams	CSC	Calleguas Creek 1.5 miles to the south (at Laguna Road); Revolon Slough 1.0 miles to the north (Zack Abbey pers. obs, 2016)	May occur in Calleguas Creek and Revolon Slough near widening areas
Western pond turtle (*Emys marmorata*)	Vegetated ponds, stream pools	CSC	Calleguas Creek (upstream of University Drive) and Revolon Slough near Hueneme Road (Zack Abbey, pers. obs, 2018)	May occur in Calleguas Creek and Revolon Slough near widening areas
Birds				
Yellow billed cuckoo (*Coccyzus americanus*)	Cottonwood forests	FT, SE	Port Hueneme (1936, extirpated), ~ one mile to the southwest (CNDDB, 2021)	Extirpated, considered absent
Western snowy plover (*Charadrius alexandrinus nivosus*)	Beaches, foredunes	FT, CSC	Ormond Beach (2017), 1.4 miles to the south (at Edison Road) (Ventura Audubon Society, 2018)	Considered absent due to lack of suitable habitat
Loggerhead shrike (*Lanius ludovicianus*)	Grasslands, farmlands, open shrublands	CSC (nesting)	Calleguas Creek near Lewis Road, ~100 feet to the southeast (eBird.org, 2021)	May forage in proximity to Lewis Road widening area
Ferruginous hawk (*Buteo regalis*)	Grasslands, farmlands, open shrublands	WL (winter)	Near Mugu Lagoon (1991), 2.9 miles to the south (at Route 1) (CNDDB, 2021)	Non-breeder in the region, considered absent due to lack of suitable habitat
Burrowing owl (*Athene cunicularia*)	Grasslands, farmlands, open shrublands	CSC	Near Revolon Slough (2017), 0.6 miles to the north (at Revolon Slough) (CNDDB, 2021)	Non-breeder in the region, could occur in winter near Calleguas Creek and Revolon Slough widening areas
California least tern (*Sternula antillarum browni*)	Coastal waters, estuaries, coastal foredunes	FE, SE, FP (nesting)	Ormond Beach (2017), 1.4 miles to the south (at Edison Road) (Ventura Audubon Society, 2018)	Considered absent due to lack of suitable habitat
Light-footed Ridgway's (clapper) rail (*Rallus longirostris levipes*)	Saltmarsh	FE, SE, FP	Mugu Lagoon (2017), 3.0 miles to the south (at Nauman Road) (Ferrara & Ruane, 2017)	Considered absent due to lack of suitable habitat

Common Name	Habitat	Status	Nearest Known Location (date) Relative to Affected Roadways	Potential to Occur Near Affected Roadways
White-faced ibis (*Plegadis chihi)*	Freshwater marsh, wet meadows	WL (nesting)	Calleguas Creek near Lewis Road, ~100 feet to the southeast (eBird.org, 2020)	May forage in proximity to widening areas near Calleguas Creek and Revolon Slough
Tri-colored blackbird (*Agelaius tricolor*)	Freshwater marsh	CSC, ST (nesting colony)	Ventura County Game Preserve, 1.6 miles to the south (at Rice Road) (WRA, 2007)	May forage in proximity to widening areas near Calleguas Creek and Revolon Slough
Least Bell's vireo (*Vireo bellii pusillus*)	Wide, contiguous riparian corridors	FE, SE (nesting)	Calleguas Creek near Lewis Road, ~100 feet to the southeast (eBird.org, 2021). Revolon Slough north of Hueneme Road (Zack Abbey, pers. obs. (2016, 2017)	May forage in proximity to widening areas near Calleguas Creek and Revolon Slough
White-tailed kite (*Elanus caeruleus)*	Grasslands, farmlands, open shrublands	FP (nesting)	Calleguas Creek near Lewis Road, ~100 feet to the southeast (eBird.org, 2021)	May forage in proximity to Lewis Road widening area
Peregrine falcon (*Falco peregrinus*)	Coastal bluffs	FP (nesting)	Calleguas Creek near Lewis Road, ~100 feet to the southeast (eBird.org, 2020)	May forage in proximity to widening areas near Calleguas Creek and Revolon Slough
California horned lark (*Eremophila alpestris actia*)	Grasslands, farmlands, open shrublands	WL	Calleguas Creek near Lewis Road, ~100 feet to the southeast (eBird.org, 2018)	May forage in crop areas near Hueneme Road and Lewis Road
Northern harrier (*Circus cyaneus*)	Grasslands, farmlands, marshes	CSC (nest)	Sod farms near Hueneme Road, ~800 feet to the north (eBird.org, 2020)	May forage in crop areas near Hueneme Road and Lewis Road
Cooper's hawk (*Accipiter cooperi)*	Riparian forest	WL (nest)	Calleguas Creek near Lewis Road, ~100 feet to the southeast (eBird.org, 2021)	May forage in proximity to widening areas near Calleguas Creek and Revolon Slough
Yellow warbler (*Dendroica petechia brewsteri)*	Riparian forest, riparian scrub	CSC (nesting)	Calleguas Creek near Lewis Road, ~100 feet to the southeast (eBird.org, 2021). Revolon Slough near Hueneme Road (Zack Abbey, pers. obs. (2020)	May forage in proximity to widening areas near Calleguas Creek and Revolon Slough
Yellow-breasted chat (*Icteria virens)*	Riparian forest, riparian scrub	CSC (nesting)	Calleguas Creek near Lewis Road, ~100 feet to the southeast (eBird.org, 2021)	May forage in proximity to widening areas near Calleguas Creek and Revolon Slough
Coastal California gnatcatcher (*Polioptila californica)*	Coastal scrub	FE, CSC	Near Channel Islands State University (2009), 0.6 miles to the southeast (at University Drive) (CNDDB, 2021)	May forage in proximity to Lewis Road widening area near Calleguas Creek
Belding's savannah sparrow (*Passerculus sandwichensis beldingi*)	Saltmarsh	SE	Ormond Beach (2015), 1.7 miles to the south (at Edison Road) (Zembal et al., 2015)	Considered absent due to lack of suitable habitat
Mammals				
American badger (*Taxidea taxus*)	Grasslands, open shrubland	CSC	Near Calleguas Creek (2013), 3.1 miles to the northeast (at University Drive) (CNDDB, 2021)	Considered absent due to lack of suitable habitat

Common Name	Habitat	Status	Nearest Known Location (date) Relative to Affected Roadways	Potential to Occur Near Affected Roadways
San Diego black-tailed jackrabbit *(Lepus californicus bennettii*)	Open shrublands	CSC	North Ormond Beach (1991, possibly extirpated), 1.0 miles to the southwest (at Edison Road) (Impact Sciences, 1995)	Considered absent due to lack of suitable habitat
Southern California saltmarsh shrew (*Sorex ornatus salicornicus)*	Saltmarsh	CSC	Naval Base Ventura County, ~2.7 miles to the south (at Route 1) (e-mail from Amanda Fagan at NBVC, dated December 27, 2017)	Considered absent due to lack of suitable habitat

Status Codes:
CE Candidate: California Endangered (CDFW)
CSC California Species of Special Concern (CDFW)
FC Federal Candidate (USFWS)
FP Fully protected under the California Fish and Game Code
FE Federal Endangered (USFWS)
FT Federal Threatened (USFWS)
IUCN-DD International Union for the Conservation of Nature: data deficient
IUCN-NT International Union for the Conservation of Nature: Near Threatened
IUCN-VU International Union for the Conservation of Nature: Vulnerable
SA Special Animal (CDFW)
SE State Endangered (CDFW)
ST State Threatened (CDFW)
WL Watch List (CDFW)

Special-status wildlife species that may occur in proximity to proposed roadway improvements are limited to species that may be present within or adjacent to Revolon Slough. These species include tidewater goby, arroyo chub, two-striped garter snake, western pond turtle, burrowing owl, white-faced ibis, tricolored blackbird, least Bell's vireo and yellow warbler. Several other special-status bird species may forage in proximity to affected roadways, including loggerhead shrike, white-tailed kite, peregrine falcon, California horned lark, northern harrier, Cooper's hawk and coastal California gnatcatcher.

3.0 RECOMMENDATIONS

The following preliminary recommendations are provided to reduce impacts to biological resources, which may facilitate selection of a preferred alternative.

3.1 ROADSIDE VEGETATION REMOVAL

Native trees or vegetation would not be removed for construction or displaced by proposed roadway pavement and shoulders. However, linear rows of small trees and shrubs and roadside landscaping would be removed by proposed roadway widening. Implementation of Alternative 1 would result in the greatest removal of trees and landscaping (about 9,600 linear feet), and Alternative 3 would result in the least (about 6,600 linear feet). The affected linear tree rows and landscaping provide wildlife habitat. However, special-status species are not anticipated to rely on this vegetation as foraging and nesting habitat. Therefore, impacts to special-status species are not anticipated.

Active bird nests are protected under the California Fish and Game Code and Federal Migratory Bird Treaty Act. County policy is to avoid tree removal during the breeding season (February 15 through August 1) or conduct breeding bird surveys to determine if vegetation to be removed supports active bird nests. If active nests are found, vegetation removal is postponed until the nest is abandoned. Alternative 1 involves the greatest roadside vegetation removal which may increase the potential to find active nests which may adversely affect the construction schedule.

3.2 REVOLON SLOUGH BRIDGE IMPROVEMENTS

Two alternatives are under consideration to improve the Hueneme Road crossing of the Revolon Slough; bridge replacement (two lane to four lane) and bridge widening (adding two traffic lanes). Tidewater goby, arroyo chub, two-striped garter snake and western pond turtle may be present at the bridge construction site and be adversely affected including direct mortality (by construction equipment), temporary habitat removal and surface flow diversion (habitat modification). Burrowing owl is known to winter in old ground squirrel burrows in local levees and could be present at the bridge construction site and may suffer direct mortality by construction equipment.

White-faced ibis, tricolored blackbird, least Bell's vireo and yellow warbler may forage along Revolon Slough near the bridge construction site. However, these species are highly mobile and not expected to nest in Revolon Slough. Therefore, substantial adverse effects to these species are not expected.

Bridge replacement is anticipated to result in greater impacts to special-status species because three piles would be installed in the streambed (two piles for bridge widening), and a longer surface flow diversion duration is likely to be required.

Wetlands within Revolon Slough would also be impacted by bridge improvements, with bridge replacement likely involving greater impacts to wetlands than bridge widening. Costly wetlands mitigation may be required by regulatory agencies.

Cliff swallows nest on the north side of the Hueneme Road bridge at Revolon Slough. Both bridge improvement options (widen or replace the existing bridge) would result in take of active nests of this species. However, take can be avoided by removing inactive nests during the non-breeding season (August 1 through February 15) and installing exclusion netting on the bridge to prevent nesting prior to bridge improvement work.

3.3 ROADWAY WIDENING ALONG CALLEGUAS CREEK

The proposed project includes widening a 4,500-foot-long segment of Lewis Road adjacent to Calleguas Creek. White rabbit-tobacco has been reported in Calleguas Creek adjacent to the eastern terminus of the proposed project. It is unknown if this species is currently present at this location, considering that vegetation is removed annually by the Ventura County Watershed Protection District to maintain storm flow capacity.

Arroyo chub, two-striped garter snake and western pond turtle may be present in Calleguas Creek in proximity to proposed roadway improvements. Burrowing owl is known to winter in old ground squirrel burrows in local levees and could be present in proximity to proposed roadway improvements. White-faced ibis, tricolored blackbird, least Bell's vireo and yellow warbler may forage along Calleguas Creek near proposed roadway improvements.

All three alternatives under consideration involve widening to the north of the existing roadway along Calleguas Creek, such that encroachment into Calleguas Creek would not occur. Therefore, impacts to special-status species associated with Calleguas Creek is not anticipated.

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4.0 REFERENCES

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padre associates, inc.
ENGINEERS, GEOLOGISTS & ENVIRONMENTAL SCIENTISTS

July 28, 2021
Project No. 2102-0771

MNS Engineers
16 N. Oak Street
Ventura, California 93001

Attention: Mr. Michael Ip

Subject: Cultural Resource Constraints Analysis, Hueneme Road and Lewis Road Widening Project, Ventura County, California

Dear Mr. Ip:

Padre Associates, Inc. (Padre) has completed a cultural resource constraints analysis in support of the Hueneme Road and Lewis Road Widening Project (Project) in the Oxnard Plains area of Ventura County, California. The proposed Project would widen the road from two lanes to four lanes for approximately 7.25 miles. This constraints analysis examined a 100-foot-wide Project corridor (50 feet on each side of the existing roadway centerline).

PROJECT LOCATION AND DESCRIPTION

The Project crosses through Sections 14, 15, 19, 21, 22, 28, 29, and 30 of Township 1 North, Range 21 West, and Sections 22, 23, 24, 25, 26, and 27 of Township 1 North, Range 22 West as shown on the Oxnard and Camarillo, California United States Geological Survey (USGS) 7.5-Minute Series topographic quadrangle map (Figure 1-1a through Figure 1-1c). Specifically, the Project limits are along Hueneme Road from Edison Road to Laguna Road which then converts to Lewis Road from Laguna Road to approximately 1,500 feet of University Drive.

RECORDS SEARCH RESULTS

On June 17, 2021, Padre ordered an archaeological records search from the Central Coast Information Center (CCIC) located at the University of California, Santa Barbara (UCSB). The center is an affiliate of the State of California Office of Historic Preservation and the official state repository of archaeological and historic records and reports for Santa Barbara and San Luis Obispo counties. Padre received the results on July 22, 2021. This memo summarizes the records search results and provides recommendations.

The records search included a review of all recorded historic-era and prehistoric archaeological sites within a 1/4-mile radius of the Project corridor as well as a review of known cultural resource surveys and technical reports. The State Historic Property Data Files, National Register of Historic Places, National Register of Determined Eligible Properties, California Points of Historic Interest, and the California Office of Historic Preservation Archaeological Determinations of Eligibility also were analyzed.

The records search identified five previously recorded cultural resources within the Project corridor and two previously recorded cultural resources within the 1/4-mile search radius. Two of these resources, Temporary Designations AS-2 and AS-3, were identified by Archaeological Advisory Group through archival research as areas with a potential to contain nineteenth century

deposits (Brock, 1987); however, formal California Department of Parks and Recreation (DPR) 523 forms were not completed for these resources. Table 1 lists and describes these resources.

Table 1. Previously Recorded Cultural Resources

Primary No.	Trinomial No.	Description
P-56-000174	CA-VEN-174	Prehistoric shell midden and ceremonial location, possible location of *satwiwa*
P-56-001508	**-**	**Redeposited shell and lithic scatter currently buried by fill**
P-56-150027	**-**	**Old Ocean View School**
P-56-150028	-	Eastwood House
P-56-153096	**-**	**Hueneme Road Bridge No. 52C0034**
-	**-**	**Temporary designation AS-2: "Francisco Aleeri" house**
-	**-**	**Temporary designation AS-3: Mrs. Guilos House/Satwiwa?**

Source: SCCIC, 2021. Note: Resources located within the Project corridor are listed in bold.

The records search also stated that 21 cultural resource studies have been completed within the Project corridor. Table 2 lists these studies. Additionally, ten cultural resources studies have been completed within the 1/4-mile search radius.

Table 2. Previous Cultural Resource Studies Completed within the Project Corridor

Report No.	Author(s), Year	Title
VN-00126	Clewlow, 1975	Archaeological Resources of the Proposed Calleguas Creek Project
VN-00380	Whitney-Desautels, 1978	Archaeological Survey Report on the Proposed Oxnard Wastewater Reclamation Facilities and Pipeline Routes Located in the Oxnard Area of Ventura County
VN-00506	Toren, 1986	Cultural Resources Investigation: Oxnard/Ventura Solids Processing and Compost Facility
VN-00509	Singer, 1986	Cultural Resources in the Vicinity of Five Potential County Jail Sites in the Western Part of the Oxnard Plain
VN-00583	Brock, 1987	A Cultural Resources Overview of Lower Calleguas Creek
VN-00635	Clevenger, 1988	Cultural Resource Survey of a 252-acre Parcel for the Proposed Ventura County Detention Facility
VN-00825	Peak and Neuenschwander, 1989	Cultural Resource Survey and Clearance Report for the Proposed Oxnard Terminal to Triunfo Pass Earth Station Fiber Optic Communication Route
VN-01044	Talley, 1984	Van Nuys Air National Guard Relocation Study Air Force Plant #42, Palmdale Naval Air Station, Point Mugu Norton Air Force Base

Table 2. Previous Cultural Resource Studies Completed within the Project Corridor

Report No.	Author(s), Year	Title
VN-01081	Whitley and Simon, 1991	Phase I Archaeological Survey and Cultural Resources Assessment for the Ormand Beach Specific Plan
VN-01299	Maki, 1994	Phase I Cultural Resources Survey of 9 Acres for the Hueneme Bridge Replacement Project County Bridge No. 280/ State Bridge No. 52C10034
VN-01410	Briuer, 1975	Assessment of the Archaeological Impact Revolon-Beardsley Projects
VN-01438	Clement, 1996	Pleasant Valley Road / State Route 1 Interchange Ventura County Historic Property Survey Report
VN-01496	Maki, 1994	Replacing the Existing Hueneme Road Bridge (County Bridge No. 280/ State Bridge No. 52C10034) spanning Calleguas Creek
VN-01937	Sylvia, 2000	Proposed Installation of Traffic Signal at the Southbound Off Ramp and On Ramp, Hueneme Road
VN-01961	Maki, 2001	Phase 1 Archaeological Survey of Approximately 18 Linear Miles for the CMWD Regional Salinity Management Program
VN-02572	Maki, 2007	Phase I Cultural Resources Investigation of 2.2 Linear Miles (8 acres) for the Calleguas Regional Salinity Management Plan's Hueneme Outfall Replacement Project
VN-02863	King, 2005	Cultural Resources in the Ormond Beach Wetlands Restoration Area
VN-02872	Fortier, 2009	TEA-21 Rural Roadside Inventory: Native American Consultants and Ethnographic Study for Caltrans District 7
VN-02978	Sharpe and Durio, 2004	Groundwater Recovery Enhancement and Treatment (GREAT) Program, Cultural Resources Inventory Report
VN-02986	Entrix, 2004	Environmental Analysis Onshore Component of BHP Billiton LNG International Inc. Cabrillo Port Project
VN-03109	Schmidt, 2012	Archaeological Survey Report for Southern California Edison Company's Houwelling Nursery Interconnection Project, New 16kV Gen-Tie

Source: SCCIC, 2021

RECOMMENDATIONS

The records search results indicate that the 21 studies listed in Table 2 have covered most of the proposed Project corridor, and five cultural resources have been identified. P-56-001508 is a redeposited shell and lithic scatter that is believed to be buried by fill during construction of the new Hueneme Road Bridge (Maki, 2001). P-56-150027 is the location of the Old Ocean View

School. While none of the original school buildings remain, there is a slight potential for buried historic-aged deposits (Durio, 2003). P-56-153096 is the original Hueneme Road Bridge, which was replaced in the early 2000s. The locations of Temporary Designations AS-2 and AS-3 were identified by Archaeological Advisory Group through archival research. While field surveys of both locations did not yield cultural materials, Temporary Designations AS-2 and AS-3 have a slight potential to contain nineteenth century deposits (Brock, 1987).

P-56-150028 is a Queen Anne style house built by Herbert H. Eastwood, a locally prominent businessman, farmer, and civic leader. The resource was evaluated by Caltrans in 1996 and not found eligible for listing on the National Register of Historic Places (NRHP) or the California Register of Historical Resources (CRHR) (Clement, 1996). The resource is located 35 feet north of the Project corridor.

CA-VEN-174 was initially recorded in 1967 as a prehistoric shell midden site bisected by Potrero Road on the south face of Round Mountain. The site boundary was expanded in the late 1990s to include all of Round Mountain as a possible Chumash summer solstice observation point (Maki, 2001). CA-VEN-174 has also been associated with the Chumash village site, *satwiwa* (Singer, 1986). The edge of CA-VEN-174 is approximately 276 feet southeast of the Project corridor, and the shell midden is approximately 0.40 mile southeast of the Project corridor.

To avoid impacts to previously recorded and potential subsurface cultural resources, Padre recommends all Project impacts stay within the proposed Project corridor. The Project corridor has been adequately surveyed more than once and has been previously disturbed from the previous construction of Hueneme Road and the channelization of Calleguas Creek. A change in scope (i.e., increased area of disturbance), will require additional study and a possible archaeological survey.

In the event archaeological resources are encountered during the proposed Project, Padre recommends the County cease construction activities within a 100-foot radius. Work will resume once an archaeologist who meets the U.S. Secretary of the Interior's Historic Preservation Professional Qualification Standards for Archaeology has assessed the find and identified and implemented appropriate mitigation measures.

CLOSING

If you should have any questions regarding the information presented and/or require additional information, please contact Rachael Letter at (805) 245-2650 or rletter@padreinc.com.

Sincerely,

Padre Associates, Inc.

Rachael J. Letter

Rachael J. Letter, M.S., RPA
Senior Archaeologist

Attachments: Figures 1-1a through 1-1c

REFERENCES CITED

Brock, J. 1987. *A Cultural Resources Overview of Lower Calleguas Creek*. Prepared by Archaeological Advisory Group. Prepared for U.S. Army Corps of Engineers, Los Angeles District. P.O. No. DACW09-87-M-2054. VN-00583.

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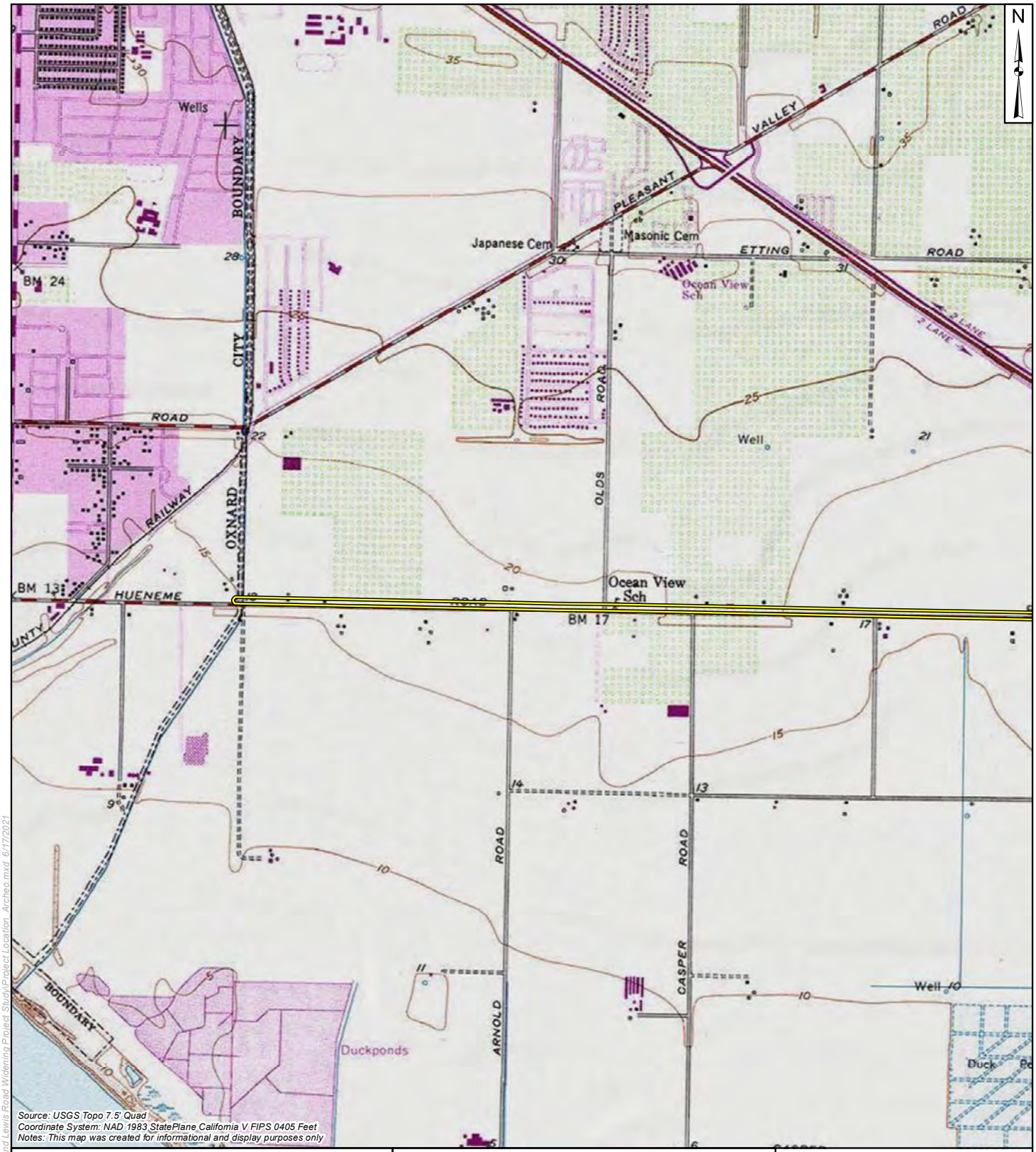

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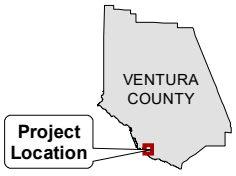
USGS 7.5' Quadrangle: Oxnard

Legal Description: T1N, R21W, Sec. 19, 30; T1N, R22W, Sec. 22, 23, 24, 25, 26, 27

LEGEND:

Project Location



padre associates, inc.
ENGINEERS, GEOLOGISTS & ENVIRONMENTAL SCIENTISTS

PROJECT NAME: HUENEME AND LEWIS ROAD WIDENING PROJECT STUDY VENTURA COUNTY, CA

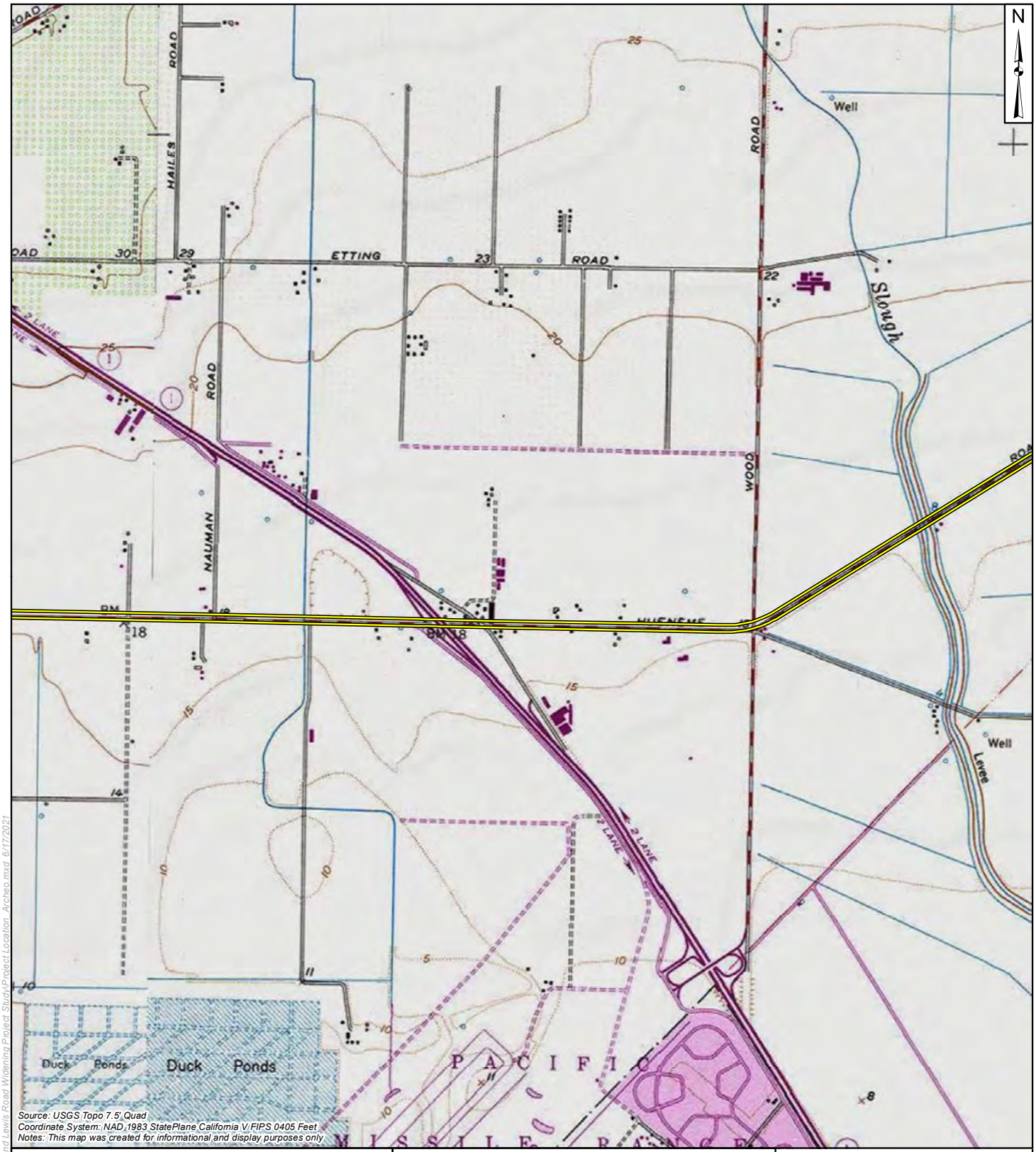
PROJECT NUMBER: 2102-0771

DATE: June 2021

PROJECT LOCATION

FIGURE 1-1a

Z:\GIS Projects\GIS Maps\Map Project\Hueneme and Lewis Road Widening Project Study\Project Location_Archeo.mxd 6/17/2021



Source: USGS Topo 7.5' Quad
Coordinate System: NAD 1983 StatePlane California V FIPS 0405 Feet
Notes: This map was created for informational and display purposes only

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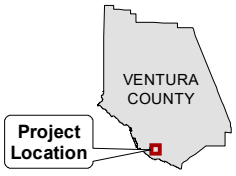
USGS 7.5' Quadrangle: Oxnard and Camarillo
Legal Description: T1N, R21W, Sec. 19, 21, 28, 29, 30; T1N, R22W, Sec. 24, 25

LEGEND:

Project Location



padre associates, inc.
ENGINEERS, GEOLOGISTS & ENVIRONMENTAL SCIENTISTS

PROJECT NAME: HUENEME AND LEWIS ROAD WIDENING PROJECT STUDY VENTURA COUNTY, CA

PROJECT NUMBER: 2102-0771

DATE: June 2021

PROJECT LOCATION

FIGURE 1-1b

Z:\GIS Projects\GIS Maps\Map Project\Hueneme and Lewis Road Widening Project Study\Project Location_Archeo.mxd 6/17/2021

0 1,000 2,000

FEET

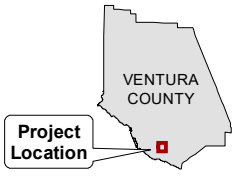
1:24,000

USGS 7.5' Quadrangle: Camarillo

Legal Description: T1N, R21W, Sec. 14, 15, 21, 22

LEGEND:

Project Location



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ENGINEERS, GEOLOGISTS & ENVIRONMENTAL SCIENTISTS

PROJECT NAME: HUENEME AND LEWIS ROAD WIDENING PROJECT STUDY VENTURA COUNTY, CA

PROJECT NUMBER: 2102-0771

DATE: June 2021

PROJECT LOCATION

FIGURE 1-1c

Z:\GIS Projects\GIS Maps\Map Project\Hueneme and Lewis Road Widening Project Study\Project Location_Archeo.mxd 6/17/2021

Appendix C. Floodplain, Hydrology and Hydraulics

NOTES TO USERS

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Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations tables in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations tables should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) zone 11. The **horizontal datum** was NAD 83, GRS80 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov or contact the National Geodetic Survey at the following address:

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National Geodetic Survey, NOAA
Silver Spring Metro Center
1315 East-West Highway
Silver Spring, Maryland 20910
(301) 713-3191

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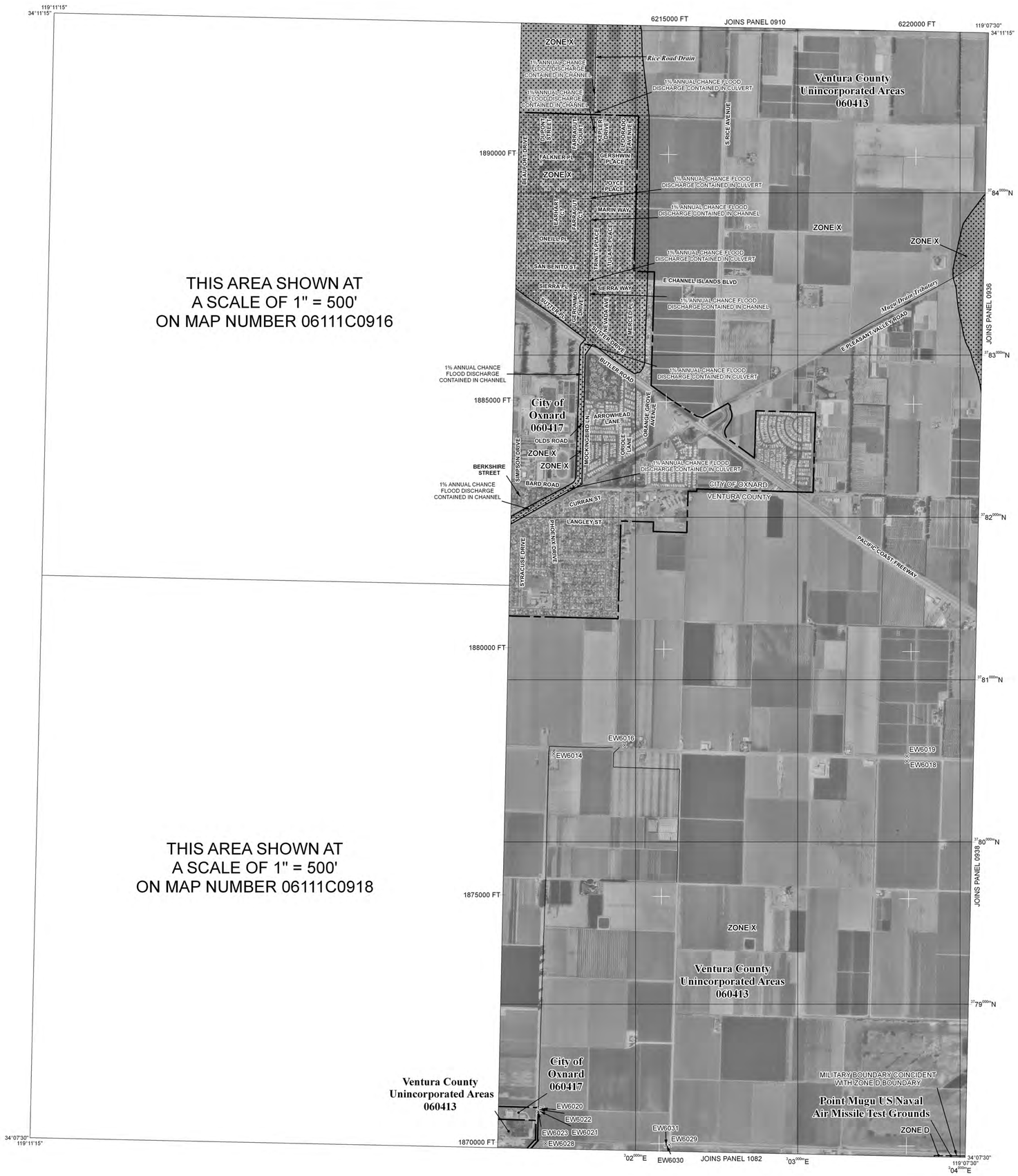

LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X — Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X — Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D — Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- 1% annual chance floodplain boundary
- 0.2% annual chance floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- 513 — Base Flood Elevation line and value; elevation in feet*
- (EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988

- A–A — Cross section line
- 23–23 — Transect line
- 87°07'45", 32°22'30" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
- 2°76'000"N — 1000-meter Universal Transverse Mercator grid values, zone 11
- 600000 FT — 5000-foot grid ticks: California State Plane coordinate system, zone V (FIPSZONE 0405), Lambert Conformal Conic projection
- DX5510 × — Bench mark (see explanation in Notes to Users section of this FIRM panel)
- ●M1.5 — River Mile

MAP REPOSITORY
Refer to listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
January 20, 2010

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

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MAP SCALE 1" = 1000'
500 0 1000 2000 FEET
300 0 300 600 METERS

NFIP
NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0920E

FIRM
FLOOD INSURANCE RATE MAP

VENTURA COUNTY, CALIFORNIA
AND INCORPORATED AREAS

PANEL 920 OF 1275
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
OXNARD, CITY OF	060417	0920	E
VENTURA COUNTY	060413	0920	E

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
06111C0920E

EFFECTIVE DATE
JANUARY 20, 2010

Federal Emergency Management Agency

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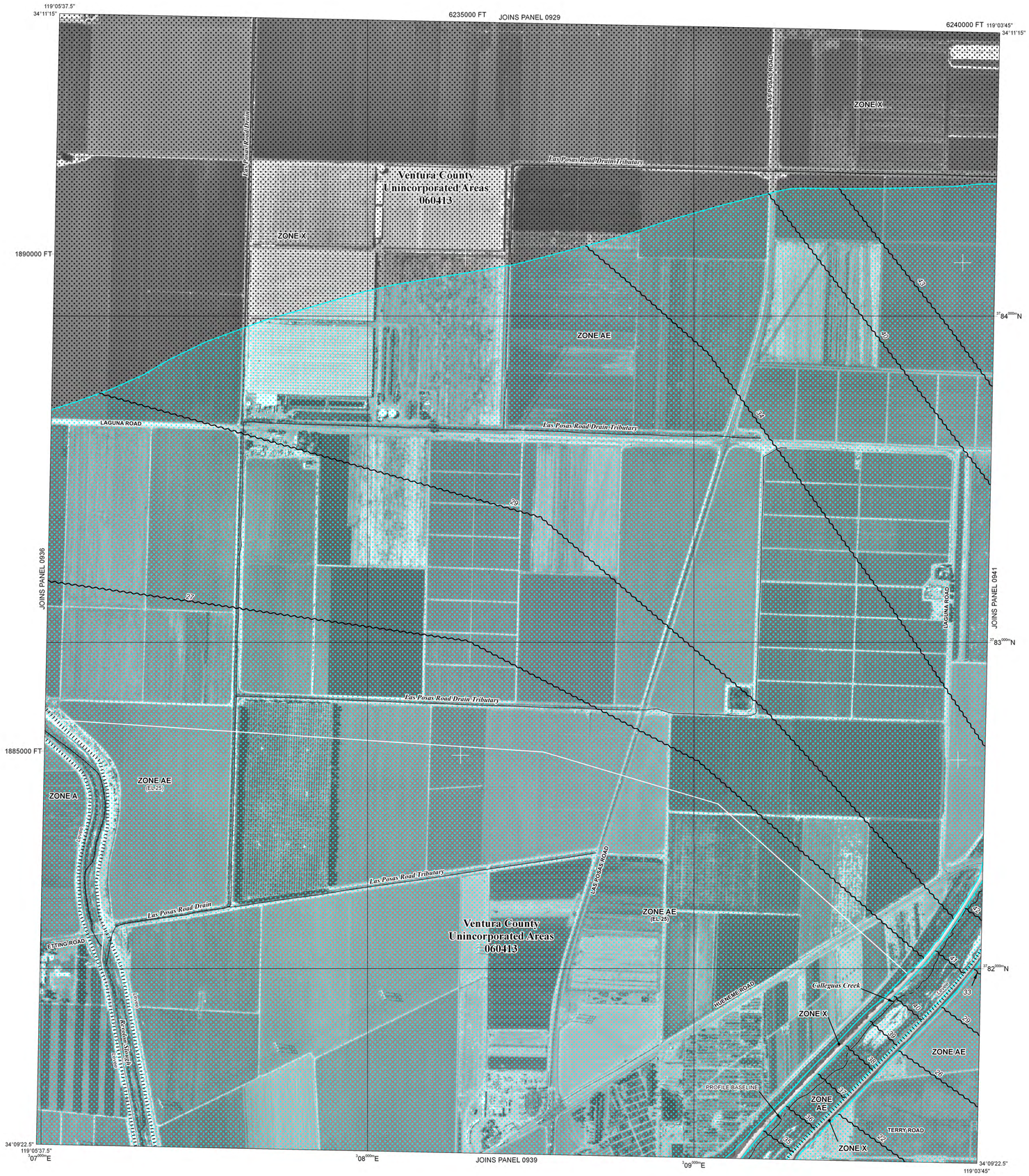

LEGEND

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ZONE A	No Base Flood Elevations determined.
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ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

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- 1% annual chance floodplain boundary
- 0.2% annual chance floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- 513 — Base Flood Elevation line and value; elevation in feet*
- (EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988

- (A)—(A) Cross section line
- (23)- - -(23) Transect line
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- 600000 FT — 5000-foot grid ticks: California State Plane coordinate system, zone V (FIPSZONE 0405), Lambert Conformal Conic projection
- DX5510 × — Bench mark (see explanation in Notes to Users section of this FIRM panel)
- M1.5 — River Mile

MAP REPOSITORY
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EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
January 20, 2010

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

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MAP SCALE 1" = 500'

250 0 500 1000 FEET

150 0 150 300 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0937E

FIRM

FLOOD INSURANCE RATE MAP

VENTURA COUNTY, CALIFORNIA AND INCORPORATED AREAS

PANEL 937 OF 1275

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
VENTURA COUNTY	060413	0937	E

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
06111C0937E

EFFECTIVE DATE
JANUARY 20, 2010

Federal Emergency Management Agency

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LEGEND

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ZONE A	No Base Flood Elevations determined.
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ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

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- A — A — Cross section line
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MAP REPOSITORY
Refer to listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
January 20, 2010

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250 0 500 1000 FEET
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NFIP
NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0938E

FIRM

FLOOD INSURANCE RATE MAP

VENTURA COUNTY, CALIFORNIA AND INCORPORATED AREAS

PANEL 938 OF 1275

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
VENTURA COUNTY	060413	0938	E

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MAP NUMBER
06111C0938E

EFFECTIVE DATE
JANUARY 20, 2010

Federal Emergency Management Agency

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Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

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Spatial Reference System Division
National Geodetic Survey, NOAA
Silver Spring Metro Center
1315 East-West Highway
Silver Spring, Maryland 20910
(301) 713-3191

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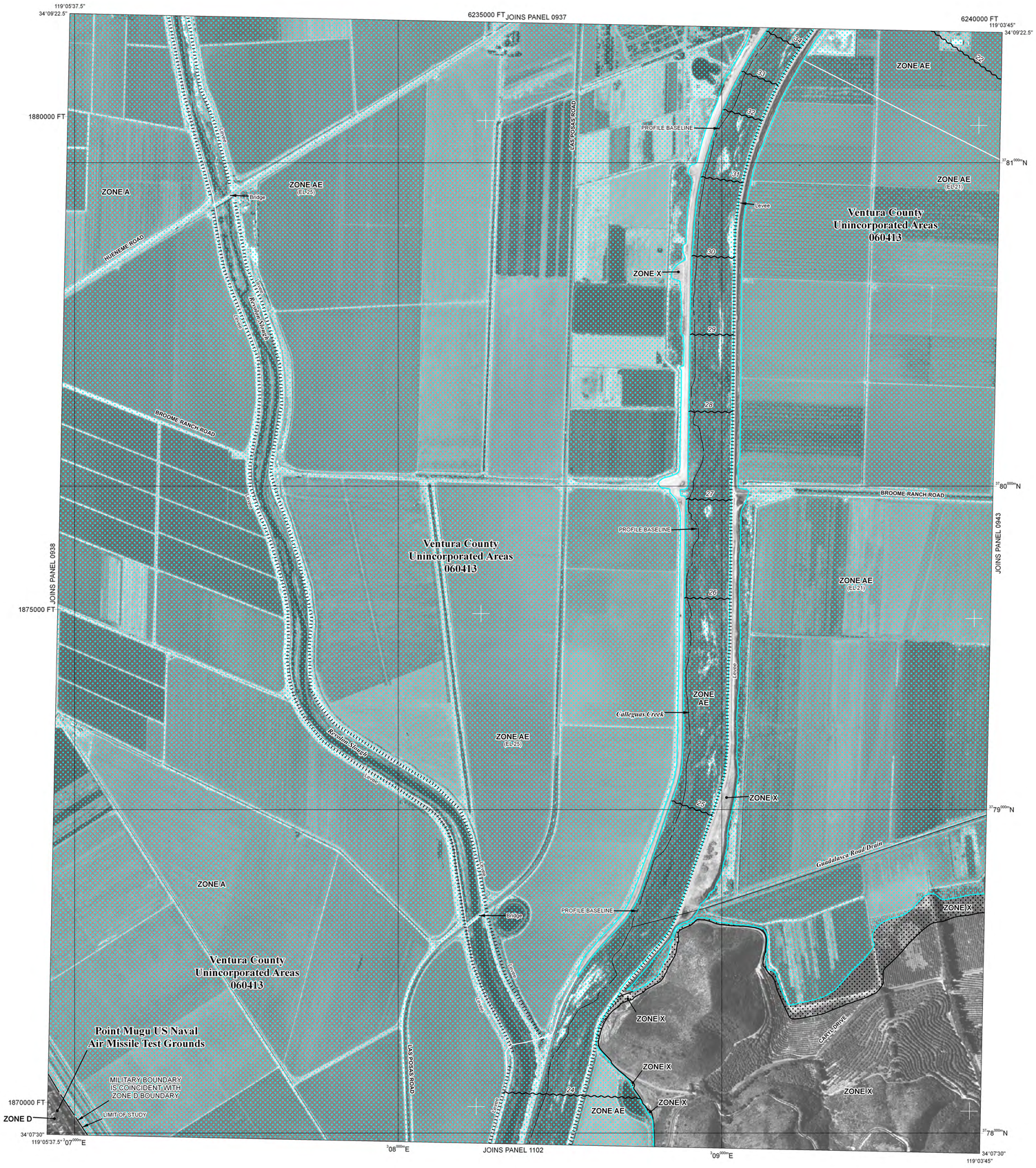

LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
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ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
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ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- 1% annual chance floodplain boundary
- 0.2% annual chance floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- 513 — Base Flood Elevation line and value; elevation in feet*
- (EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988

- (A)—(A) Cross section line
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- 87°07'45", 32°22'30" Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
- 3776000mN 1000-meter Universal Transverse Mercator grid values, zone 11
- 600000 FT 5000-foot grid ticks: California State Plane coordinate system, zone V (FIPSZONE 0405), Lambert Conformal Conic projection
- DX5510 × Bench mark (see explanation in Notes to Users section of this FIRM panel)
- ● M1.5 River Mile

MAP REPOSITORY
Refer to listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
January 20, 2010

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

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MAP SCALE 1" = 500'

250 0 500 1000 FEET

150 0 150 300 METERS

NFIP
NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0939E

FIRM

FLOOD INSURANCE RATE MAP

VENTURA COUNTY, CALIFORNIA AND INCORPORATED AREAS

PANEL 939 OF 1275

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
VENTURA COUNTY	060413	0939	E

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
06111C0939E

EFFECTIVE DATE
JANUARY 20, 2010

Federal Emergency Management Agency

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NFIP NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0941E

FIRM

FLOOD INSURANCE RATE MAP

VENTURA COUNTY, CALIFORNIA AND INCORPORATED AREAS

PANEL 941 OF 1275

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

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MAP NUMBER
06111C0941E

EFFECTIVE DATE
JANUARY 20, 2010

Federal Emergency Management Agency

MODEL ID NO	LOCATION POINT FOR FLOWRATE VALUES LISTED	AREA	2 YR WITH AR	5 YR WITH AR	10 YR WITH AR	50 YR WITH AR	100 YR WITH AR
	REVOLON SL. WATERSHED - CALLEGUAS CK. PRESENT CONDITION HYDROLOGY	(ac)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
5001A	REVOLON SLOUGH-CALLEG. MODEL OR/DBT 10/2002 FN=RVLN5000.99I	141	48	96	141	289	379
5007A	HONDA BARR. WEST FORK AT BERYLWOOD ROAD	817	122	247	362	741	973
5016AB	HONDA BARR CONFLUENCE W/BERYLWOOD DITCH (EAST FK)	1,428	190	384	563	1,150	1,511
5019A	HONDA BARR. AT PRICE ROAD CROSSING	1,779	191	386	566	1,158	1,521
5035C	ARROYO COLORADO AT BERYLWOOD ROAD	1,185	222	449	659	1,347	1,768
5037C	ARROYO COLORADO PRIOR TO JCT. W/DITCH FROM PRICE RD	1,253	203	410	602	1,230	1,615
5042E	PRICE ROAD DRAIN AT BERYLWOOD ROAD	345	47	96	140	287	377
5043CE	ARROYO COLORADO AFTER JCT.W/ PRICE ROAD DRN.	1,598	241	488	716	1,464	1,922
5049A	HONDA BARR. AFTER CONFLUENCE WITH ARROYO COLORADO	3,878	400	809	1,186	2,424	3,183
5057BE	AGGEN RD DRN. JCT. W/NATURAL CHANNEL	540	139	281	412	841	1,105
5072BC	LOS ANGELES AVE. DRN.W/ AGGEN RD DRN.JCT.	1,523	261	528	775	1,584	2,080
5079B	LOS ANGELES AVE. DITCH PRIOR TO JCT.W/ HONDA BARR	1,896	292	590	866	1,769	2,324
5083AB	HONDA BARR. AT CENTER SCHOOL RD.XING	5,925	551	1,116	1,637	3,346	4,394
5100DE	MILLIGAN BARRANCA AT LA LOMA ROAD XING	1,126	160	324	475	971	1,276
5105D	MILLIGAN BARRANCA AT LA AVE.(HWY 118)CROSSING	1,669	189	382	560	1,144	1,502
5107AD	HONDA BARR.CONFLUENCE W/MILLIGAN BARR.	8,006	697	1,410	2,067	4,226	5,550
5111AB	BEARDSLEY WASH AT CONFLUENCE WITH LAS POSAS DRN	8,195	701	1,418	2,080	4,252	5,584
5119BC	LAS POSAS DRN.PRIOR TO JCT.W/BEARDSLEY	180	56	114	167	340	447
5121AB	BEARDSLEY WASH AFTER JCT. W/ LAS POSAS DRAIN	8,634	707	1,432	2,100	4,292	5,637
5145CE	DITCH FROM WALNUT AVE PRIOR TO CROSSING LA AVE.	904	170	345	506	1,035	1,359
5149C	MESA SCHOOL DRAIN PRIOR TO JCT.W/ BEARDSLEY WASH	1,138	184	371	545	1,113	1,462
5167B	RAMONA DBRIS/DETNT. BASIN ROUTED & FATTENED HYDROGRAPH (Qout=130)	254	16	33	48	99	130
5174D	LAS POSAS DEBRIS/DETENTION BASIN RTED FAT HYDROGRAPH (Qout=62)	168	8	16	23	47	62
5182BC	LAS POSAS ESTATES DRN. OVERLAND FLOW @ TR.BNDRY W/RTN.BOX	613	86	173	254	519	682
5185D	SPANISH HILLS DRN.Q10F INTO LAKE (LOT99) FROM ARACENE CT.	57	23	46	68	139	183
5196D	SPANISH HILLS DRN-50 AC INTO LAKE LOT 101	50	16	32	47	95	125
5203BD	LAS POSAS ESTATES DRN. AFTER JCT.W/TR.4227 MR LAKES	946	142	288	422	863	1,133
5204E	TRACT 4948 OUTFLOW HYDRGRPH W/DKT APPRV. BSN 2A RAT	95	3	7	10	20	26
5205E	LAS POSAS EST.DRN-NORTH TRB. INC. BASIN IN TR 4948 PRIOR TO JCT W/CHNL	122	15	29	43	88	116
5206BE	LAS POS.EST.DRN, WITHPOST-TR 4227&4948 W/RTN.	1,068	136	276	404	826	1,085
5208D	TRACT 4948 OUTFLOW HYDROGRAPH W/DKT APPROVED BASIN	36	5	10	15	30	40
5209D	TRIB.TO LAS POSAS EST.DRN,POST TR.4948 W/RTN.PRR.TO JCT W/MAIN	56	13	26	38	77	101
5212BD	LAS POSAS ESTATES DRN.,POST TR 4227 &4948 W/RTN	1,156	146	295	432	884	1,160
5216BF	LAS POSAS ESTATES DRN. W/60% SPLIT TO BEARDSLEY	1,279	97	197	289	591	776
5219B	LAS POSAS ESTATES DIVERSION PRIOR TO JCT W/BEARDSLEY(60%)	1,371	94	191	280	572	751
5220AB	BEARDSLEY WASH AFTER JCT. W/ LAS POSAS ESTATES DRAIN (60%)	11,738	849	1,719	2,521	5,154	6,768
5234CD	LA VISTA DRN & UPPER PART OF LA AVE.W/S.CLR	666	127	256	376	768	1,008
5242E	LA VISTA DRAIN TRIBUTARY PRIOR TO JCT W/LA VISTA DRN.	361	78	159	233	476	625
5243CE	LA VISTA DRN @ LA VISTA RD.AFTER JCT W/ TRIBUTARY	1,115	199	403	590	1,207	1,585
5262D	WRIGHT RD. DRN. W/ DITCH PRIOR TO SANTA CLARA DRN. JCT.	433	102	206	302	618	811
5263CD	SANTA CLARA DRAIN AFTER JCT. W/ WRIGHT ROAD DRN.	1,787	278	563	826	1,688	2,217
5268C	SANTA CLARA DRAIN DIVERSION PRIOR TO JCT. W/ BEARDSLEY WASH	2,103	275	557	817	1,670	2,192
5272AC	BEARDSLEY WASH AFTER JCT. W/ SANTA CLARA DRN. DIVERSION	13,841	1,048	2,121	3,111	6,360	8,352
5275AC	BEARDSLEY WASH AT CENTRAL AVE. BRIDGE (GAGE SITE)	13,919	1,049	2,123	3,113	6,364	8,357
5279A	BEARDSLEY WASH PRIOR TO JCT. W/ NYELAND DRAIN ABOVE HWY 101	14,056	1,048	2,121	3,110	6,357	8,349
5284B	UPPER NYELAND DRN. NEAR SATICOY COUNTRY CLUB	334	64	130	191	391	513
5293BC	UPPER NYELAND OVERFLOW-CLUBHOUSE DR. INTO DITCH	849	127	257	376	769	1,010
5297BD	UPPER NYELAND DRN.AT CLUBHOUSE DR. PRIOR TO XING LA AVE.	1,111	147	298	437	894	1,174
5299B	UPPER NYELAND DRN. PRIOR TO JCT. W/FERRO DITCH	1,131	147	297	435	890	1,168
5305D	FERRO CANYON CHL. AT LA AVE.PRIOR JCT.W/UPPER NYELAND DRN.	544	108	218	320	655	860

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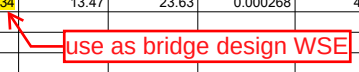
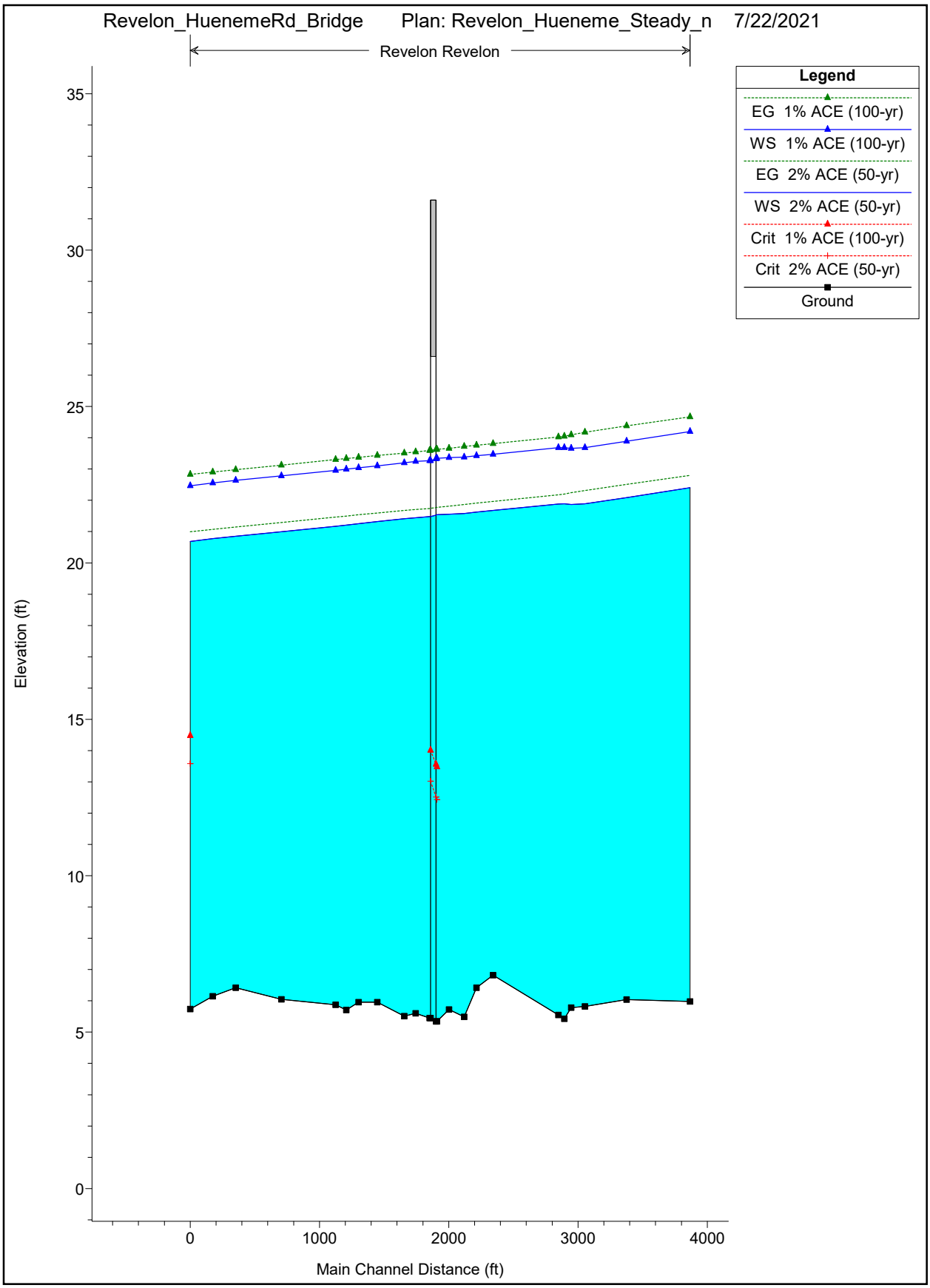
	REVOLON SL. WATERSHED - CALLEGUAS CK. PRESENT CONDITION HYDROLOGY	(ac)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
5306BD	NYELAND DRAIN AFTER JCT. W/ FERRO CHANNEL BELOW HWY 118 (LA AVE)	1,675	227	459	674	1,377	1,809
5334BC	NYELAND DRAIN AT CENTRAL AVE.W/UPPER NYELAND NOT DIVERTED	2,829	286	578	848	1,734	2,277
5375C	NYELAND DRN.TRIB.(ROSE RD-CENTRAL-101-STA.CLARA) W/BOYER	886	117	236	347	709	931
5376BC	NYELAND DRN. AFTER JCT.OF TRIB. W/BOYER PROJ.(AUTO CTR.)	4,119	351	711	1,043	2,132	2,800
5378B	NYELAND DRN. @ SANTA CLR & FRIEDRICH W/ BOYER(AUTO CTR.)	4,119	350	708	1,038	2,122	2,786
5380BE	NYELAND DRN AFTER JCT. W/ NYELAND ACRES SIDE DRN. W/ BOYER	4,181	350	709	1,040	2,125	2,791
5391D	LATERAL A AFTER JCT. W/LOCAL AREA	145	36	74	108	221	290
5392BD	NYELAND DRN.AFTER JCT W/LATERAL A	4,482	352	713	1,046	2,139	2,809
5400CE	NYELAND DRN.TRIB. TO NO.PRIOR TO JCT. W/NYELAND	373	40	81	118	241	317
5401BC	NYELAND DRN AFTER JCT. W/NORTH LATERALS-INC 477B W/BOYER	4,855	377	764	1,120	2,290	3,008
5406AB	NYELAND DRN. JUNCTION W/BEARDSLEY WASH	19,003	1,255	2,541	3,726	7,618	10,003
5439C	CAMARILLO HILLS DRN PRIOR TO JCT. W/ PONDEROSA DRN.	742	152	307	450	921	1,209
5450CD	CAMARILLO HILLS DRN. AFTER JCT. W/ PONDEROSA DRAIN	1,106	212	430	630	1,288	1,691
5471DE	MISSION DRAIN PRIOR TO JCT. W/ CAM. HILLS DRAIN	519	136	275	403	823	1,081
5472CD	CAMARILLO HILLS DRN. AFTER JCT. W/ MISSION DRAIN	1,776	330	669	981	2,005	2,633
5485D	WEST CAMARILLO HILLS DRN. PRIOR TO JCT. W/ CAM. HILLS DRN.	467	123	249	365	747	981
5487CD	CAMARILLO HILLS DRN. AFTER JCT. W/ WEST CAM. HILLS DRN.	2,287	422	854	1,252	2,560	3,362
5499D	EDGEMORE DRN. PRIOR TO JCT. W/ CAM. HILLS DRAIN	363	97	196	288	588	772
5501CD	CAMARILLO HILLS DRN. AFTER JCT. W/ EDGEMORE DRN.	2,650	482	975	1,430	2,923	3,839
5504C	CAMARILLO HILLS DRN. AT PONDEROSA DR. AND REDWOOD AVE.	2,704	484	979	1,435	2,934	3,853
5507CD	CAMARILLO HILLS DRN. AT POINT WHERE CHL. CURVES TO SOUTH	2,777	488	987	1,448	2,960	3,888
5513C	CAMARILLO HILLS DRN. PRIOR TO JCT. WITH CRESTVIEW DRN.	3,013	504	1,020	1,495	3,057	4,014
5517D	LEONARD PROJECT DIVERSION FROM PLEASANT VLY RD. DRN. PRIOR JCT.	157	50	101	148	302	397
5518CD	CAMARILLO HILLS DRN. AFTER JCT. W/ LEONARD PIPE NR. LAS POSAS RD.	3,170	533	1,079	1,582	3,234	4,246
5527D	CRESTVIEW DRN. PRIOR TO JCT. W/ CAMARILLO HILLS DRN.	385	120	243	356	728	956
5528CD	CAMARILLO HILLS DRN. AFTER JCT. W/ CRESTVIEW DRN.	3,555	601	1,216	1,783	3,644	4,786
5529C	CAMARILLO HILLS DRN AT LAS POSAS RD. BELOW HWY. 101	3,555	599	1,211	1,777	3,632	4,769
5577C	CAMARILLO HILLS DRN. PRIOR TO JCT. W/ LAS POSAS ESTATES DRN. (40%)	4,776	563	1,140	1,672	3,417	4,487
5584D	LAS POSAS ESTATES DRN. AT SR 101 W/60% DIVRS.TO BEARDSLEY	189	95	192	282	576	756
5586D	LAS POS. EST. DRN. PRIOR JCT. W/CAM. HILLS DRN. W/DIVR.	235	90	183	268	548	720
5590CD	CAM. HILLS DRN. AFTER JCT. W/ LAS POSAS ESTATES DRN. 40%	5,011	595	1,204	1,766	3,610	4,741
5601CD	CAMARILLO HILLS DRAIN AFTER JCT. W/ LARGE AG. AREA WEST	5,550	579	1,171	1,717	3,511	4,610
5602AC	REVOLON SLOUGH AT CONFL. W/ CAMARILLO HILLS DRAIN	24,818	1,617	3,272	4,798	9,809	12,881
5617BC	REVOLON TRIB. AT DEL NORTE BLVD. (PRTY. LINE SAKIOKA)	467	58	118	173	353	464
5618B	REVOLON TRIB. PRESENT CONDITION W/ NO DETN. OR DIVERSION	467	58	117	172	351	461
5623D	PROCTOR AND GAMBLE SITE W/ NO RUNOFF LEAVING SITE	60	18	36	52	107	140
5627B	REVOLON TRIB. AT SAKIOKA DIVERSION (EXC. PROC-GAMBLE)	730	89	179	263	538	706
5638E	REVOLON TRIB AT STURGIS, W/ SAKIOKA RTN. AND DIVERSION (EXC. P&G)	219	44	89	131	267	351
5640E	REVOLON TRIB. AT STURGIS PRIOR TO JCT. W/ SAKIOKA DITCH	287	37	75	110	225	295
5642B	SAKIOKA DITCH PRIOR TO JCT. W/ STURGIS RD. DRAIN	843	97	197	289	590	775
5644AB	REVOLON SLOUGH AFTER JCT. W/ REVOLON TRIB. INC. SAKIOKA DITCH	26,018	1,653	3,346	4,907	10,030	13,172
5649AB	REVOLON SLOUGH AT STURGIS W/O PLEASANT VALLEY DRAIN	26,232	1,654	3,349	4,911	10,039	13,183
5650A	REVOLON SLOUGH AT FIFTH STREET	26,249	1,653	3,345	4,906	10,029	13,170
5654C	FIFTH STREET DRAIN AT POSSIBLE RETN.SITE FOR ASSMT.DIST.	183	24	49	72	146	192
5663C	FLOW N-SIDE OF RR WEST OF REVOLON SLOUGH	383	30	61	89	182	239
5684C	INFLOW TO LEONARD TRACT Q10F W/VTA BLVD. DIVERSION TO CAM. HILLS	86	29	59	86	176	231
5685CD	OUTFLOW FROM LEONARD TRACT RETEN. BASIN Q10 F, W/ VTA BLVD. DIVERSION	86	6	11	17	34	45
5686D	SUMP IN LEONARD TRACT W/45 CFS OUTLET Q10F W/VTA BLVD DIVERSION	-	23	47	69	142	186
5693C	FIFTH STREET DRAIN AT POSSIBLE RETN.SITE FOR ASSMT.DIST,	55	16	32	47	97	127
5709AB	REV.SL. AFTER JCT W/PLEAST.VLY.RD.DRN.W/ SAK.DIVR.& RETN.	28,115	1,714	3,468	5,086	10,398	13,654

MODEL ID NO	LOCATION POINT FOR FLOWRATE VALUES LISTED	AREA	2 YR WITH AR	5 YR WITH AR	10 YR WITH AR	50 YR WITH AR	100 YR WITH AR
	REVOLON SL. WATERSHED - CALLEGUAS CK. PRESENT CONDITION HYDROLOGY	(ac)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
5739A	REVOLON. SL. AT WOOD RD.BELOW LAGUNA W/TRIB.W/ SAK DIVR.& RTN	29,126	1,701	3,442	5,048	10,319	13,551
5750AB	REVOLON SL. AT WOOD RD. BELOW LAGUNA RD. W/ LAGUNA TRIB	29,602	1,699	3,438	5,042	10,306	13,534
5781CD	CAWELTI RD. DRAIN UPPER REACH	453	112	228	334	682	896
5796B	LAS POSAS RD.DRN.AT LAGUNA RD.	2,527	295	597	875	1,789	2,349
5822BC	REVOLON SLOUGH TRIBUTARY ABOVE LAGUNA RD(LARGE FARM DRN.)	3,585	423	857	1,257	2,569	3,373
5849AB	REVOLON SL. AFTER CONFLUENCE WITH LARGE FARM DRN. TRIB.	34,238	1,756	3,553	5,211	10,653	13,990
5869AC	REVOLON SL. AT JCT.W/ HUENEME RD. DRAIN	35,065	1,747	3,536	5,185	10,600	13,920
5916AB	REVOLON SL. AT LAS POSAS RD.	37,087	1,746	3,534	5,182	10,594	13,912
5935AB	REVOLON SLOUGH PRIOR TO CONFLUENCE W/ CALLEGUAS CREEK	37,911	1,726	3,494	5,124	10,475	13,755

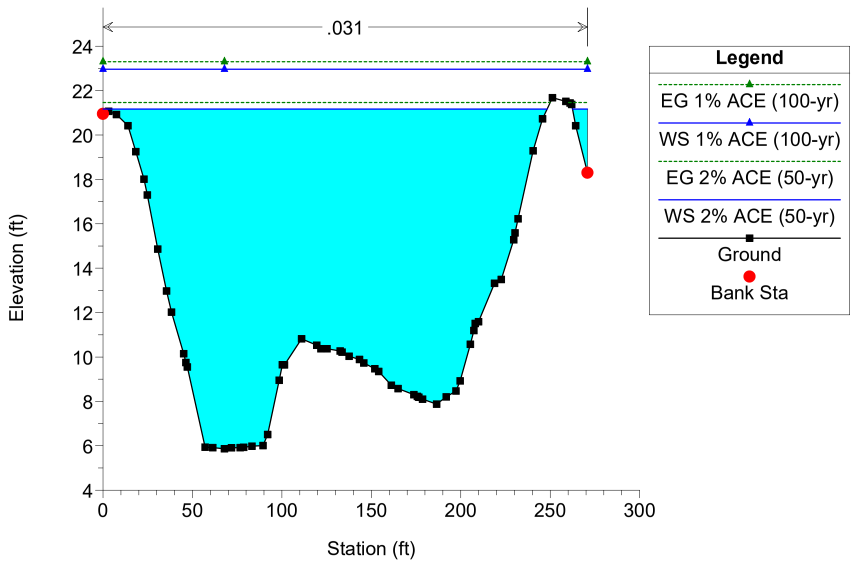
HEC-RAS Plan: Proposed widened Hueneme Rd bridge River: Revelon Reach: Revelon

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Revelon	16501.69	2% ACE (50-yr)	10800.00	5.98	22.40		22.80	0.000520	5.04	2142.12	204.15	0.27
Revelon	16501.69	1% ACE (100-yr)	13920.00	5.98	24.20		24.67	0.000558	5.49	2537.72	222.38	0.29
Revelon	16010.62	2% ACE (50-yr)	10800.00	6.04	22.09		22.51	0.000649	5.21	2072.07	224.51	0.30
Revelon	16010.62	1% ACE (100-yr)	13920.00	6.04	23.89		24.38	0.000607	5.62	2476.19	224.51	0.30
Revelon	15687.66	2% ACE (50-yr)	10800.00	5.82	21.89		22.31	0.000562	5.23	2064.90	200.41	0.29
Revelon	15687.66	1% ACE (100-yr)	13920.00	5.82	23.68		24.18	0.000629	5.66	2461.51	229.00	0.30
Revelon	15581.43	2% ACE (50-yr)	10800.00	5.78	21.87		22.24	0.000495	4.90	2203.87	216.06	0.27
Revelon	15581.43	1% ACE (100-yr)	13920.00	5.78	23.66		24.10	0.000548	5.26	2644.49	249.06	0.28
Revelon	15529.42	2% ACE (50-yr)	10800.00	5.43	21.89		22.20	0.000424	4.50	2399.61	238.65	0.25
Revelon	15529.42	1% ACE (100-yr)	13920.00	5.43	23.68		24.05	0.000448	4.85	2869.16	263.28	0.26
Revelon	15482.84	2% ACE (50-yr)	10800.00	5.55	21.88		22.17	0.000415	4.36	2476.40	254.93	0.25
Revelon	15482.84	1% ACE (100-yr)	13920.00	5.55	23.68		24.02	0.000419	4.69	2965.22	272.46	0.25
Revelon	14977.39	2% ACE (50-yr)	10800.00	6.82	21.67		21.97	0.000409	4.33	2494.76	256.42	0.24
Revelon	14977.39	1% ACE (100-yr)	13920.00	6.82	23.47		23.81	0.000409	4.68	2975.31	269.11	0.25
Revelon	14850.01	2% ACE (50-yr)	10800.00	6.42	21.63		21.91	0.000413	4.27	2527.76	265.85	0.24
Revelon	14850.01	1% ACE (100-yr)	13920.00	6.42	23.43		23.76	0.000393	4.63	3007.81	266.73	0.24
Revelon	14754.03	2% ACE (50-yr)	10800.00	5.49	21.58		21.87	0.000427	4.33	2496.73	264.82	0.25
Revelon	14754.03	1% ACE (100-yr)	13920.00	5.49	23.38		23.72	0.000403	4.68	2973.77	264.82	0.25
Revelon	14637.88	2% ACE (50-yr)	10800.00	5.72	21.56		21.81	0.000369	4.04	2671.53	282.32	0.23
Revelon	14637.88	1% ACE (100-yr)	13920.00	5.72	23.37		23.66	0.000348	4.37	3182.05	282.32	0.23
Revelon	14543.93	2% ACE (50-yr)	10800.00	5.34	21.54	12.43	21.77	0.000250	3.86	2797.92	239.48	0.20
Revelon	14543.93	1% ACE (100-yr)	13920.00	5.34	23.34	13.47	23.63	0.000268	4.30	3235.90	246.68	0.21
Revelon	14514.29		Bridge									
Revelon	14486.55	2% ACE (50-yr)	10800.00	5.45	21.48		21.74	0.000281	4.09	2642.00	225.47	0.21
Revelon	14486.55	1% ACE (100-yr)	13920.00	5.45	23.27		23.59	0.000303	4.56	3051.74	232.62	0.22
Revelon	14379.19	2% ACE (50-yr)	10800.00	5.60	21.45		21.71	0.000334	4.09	2642.11	254.16	0.22
Revelon	14379.19	1% ACE (100-yr)	13920.00	5.60	23.24		23.54	0.000383	4.41	3154.19	297.73	0.24
Revelon	14291.9	2% ACE (50-yr)	10800.00	5.51	21.41		21.68	0.000362	4.10	2633.41	266.40	0.23
Revelon	14291.9	1% ACE (100-yr)	13920.00	5.51	23.20		23.51	0.000353	4.47	3112.01	268.08	0.23
Revelon	14083.18	2% ACE (50-yr)	10800.00	5.96	21.32		21.60	0.000374	4.22	2557.95	254.72	0.23
Revelon	14083.18	1% ACE (100-yr)	13920.00	5.96	23.10		23.43	0.000382	4.59	3031.83	267.24	0.24
Revelon	13937.92	2% ACE (50-yr)	10800.00	5.96	21.25		21.54	0.000409	4.28	2522.25	263.54	0.24
Revelon	13937.92	1% ACE (100-yr)	13920.00	5.96	23.04		23.38	0.000393	4.65	2995.34	265.04	0.24
Revelon	13841.72	2% ACE (50-yr)	10800.00	5.71	21.21		21.50	0.000417	4.35	2485.27	258.64	0.25
Revelon	13841.72	1% ACE (100-yr)	13920.00	5.71	22.99		23.34	0.000414	4.69	2969.27	271.17	0.25
Revelon	13759.33	2% ACE (50-yr)	10800.00	5.87	21.17		21.46	0.000417	4.35	2483.68	256.58	0.25
Revelon	13759.33	1% ACE (100-yr)	13920.00	5.87	22.96		23.30	0.000420	4.70	2962.86	270.80	0.25
Revelon	13340.21	2% ACE (50-yr)	10800.00	6.05	20.99		21.29	0.000422	4.35	2480.16	258.03	0.25
Revelon	13340.21	1% ACE (100-yr)	13920.00	6.05	22.78		23.13	0.000419	4.70	2958.97	269.43	0.25
Revelon	12986.71	2% ACE (50-yr)	10800.00	6.42	20.85		21.14	0.000395	4.33	2492.54	248.48	0.24
Revelon	12986.71	1% ACE (100-yr)	13920.00	6.42	22.64		22.98	0.000409	4.69	2966.02	266.24	0.25
Revelon	12809.98	2% ACE (50-yr)	10800.00	6.15	20.78		21.07	0.000402	4.37	2470.96	246.78	0.24
Revelon	12809.98	1% ACE (100-yr)	13920.00	6.15	22.56		22.91	0.000419	4.74	2939.02	265.48	0.25
Revelon	12635.05	2% ACE (50-yr)	10800.00	5.74	20.68	13.58	21.00	0.000450	4.49	2407.56	252.62	0.26
Revelon	12635.05	1% ACE (100-yr)	13920.00	5.74	22.47	14.47	22.83	0.000451	4.83	2883.29	268.11	0.26

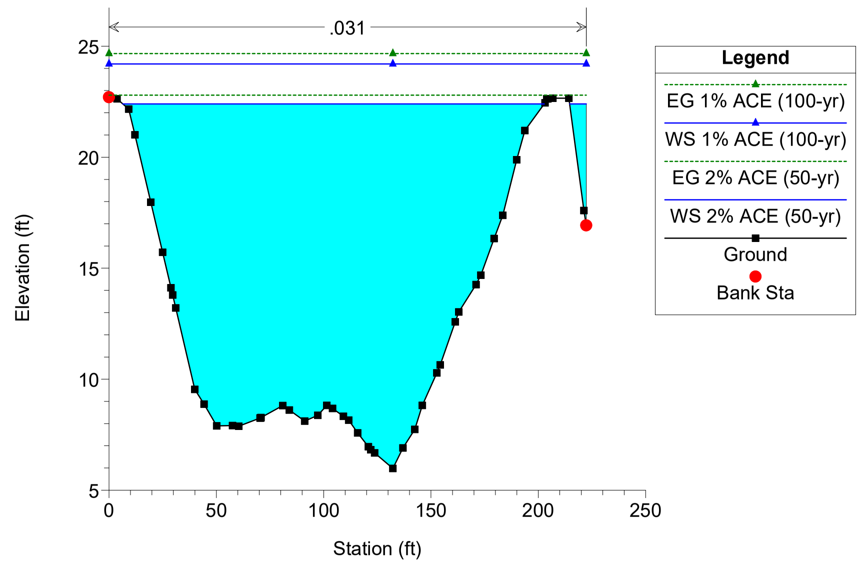



Revelon_HuenemeRd_Bridge
Plan: Revelon_Hueneme_Steady_n
7/22/2021
Revelon Revelon
Legend
EG 1% ACE (100-yr)
WS 1% ACE (100-yr)
EG 2% ACE (50-yr)
WS 2% ACE (50-yr)
Crit 1% ACE (100-yr)
Crit 2% ACE (50-yr)
Ground
Elevation (ft)
35
30
25
20
15
10
5
0
0
1000
2000
3000
4000
Main Channel Distance (ft)

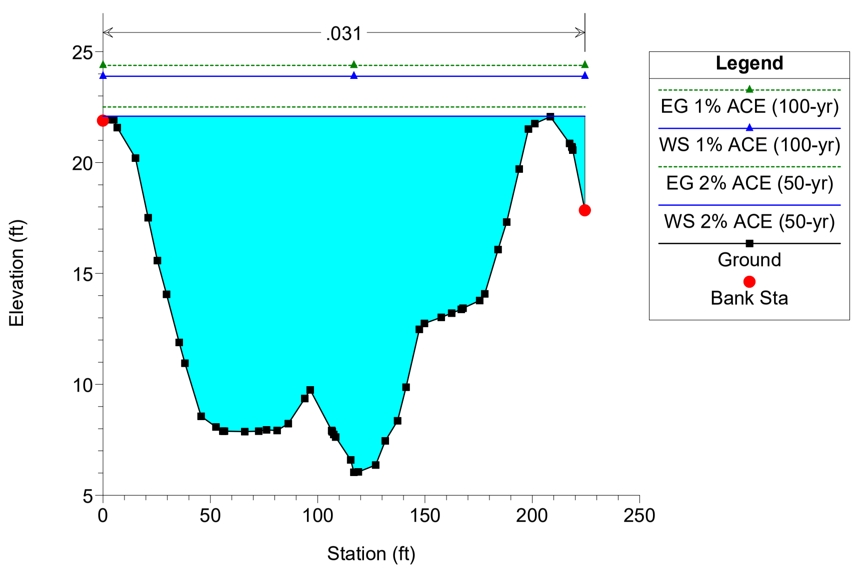
Revelon_HuenemeRd_Bridge Plan: Revelon_Hueneme_Steady_n 7/27/2021



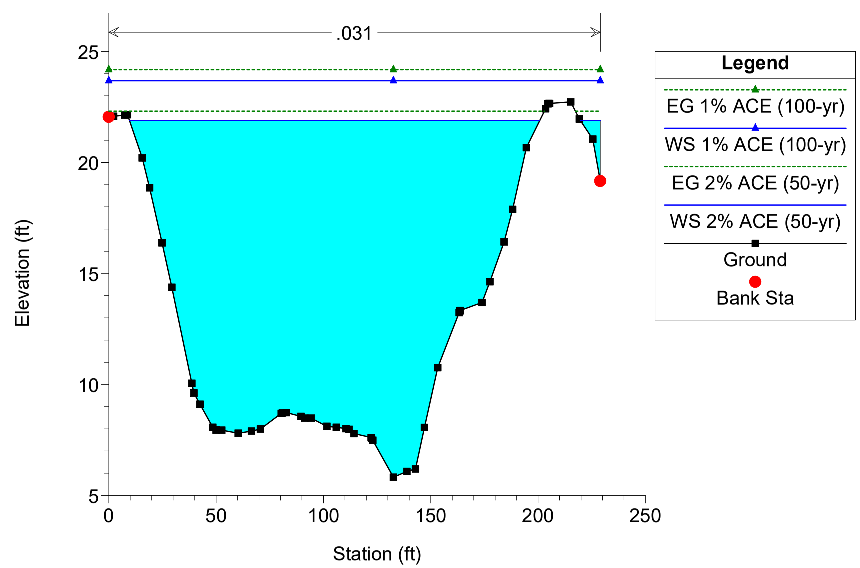
Revelon_HuenemeRd_Bridge Plan: Revelon_Hueneme_Steady_n 7/27/2021

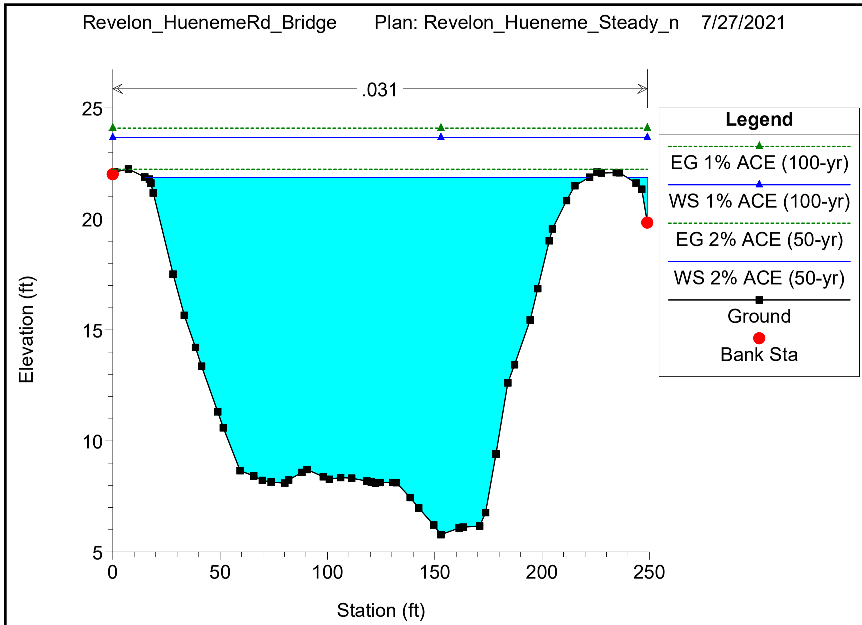


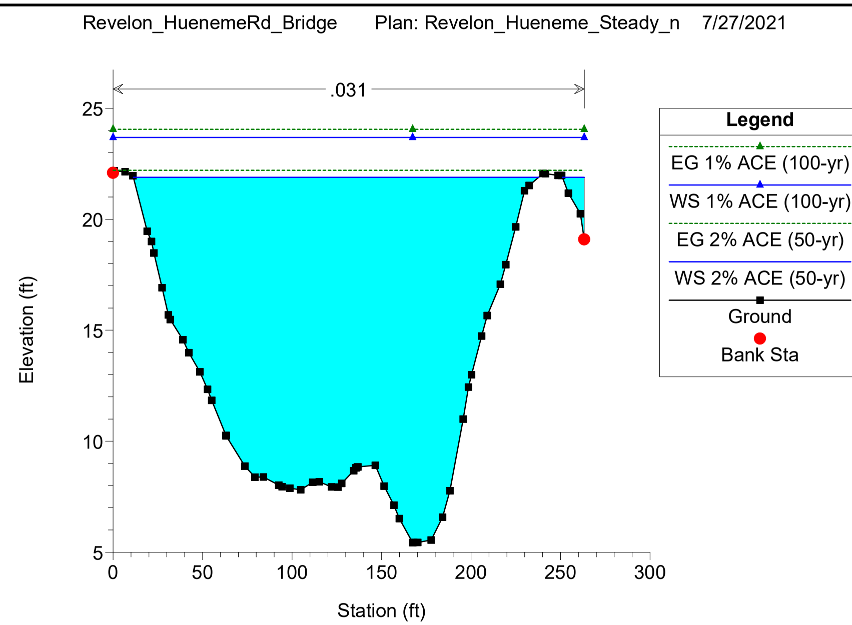
Revelon_HuenemeRd_Bridge Plan: Revelon_Hueneme_Steady_n 7/27/2021

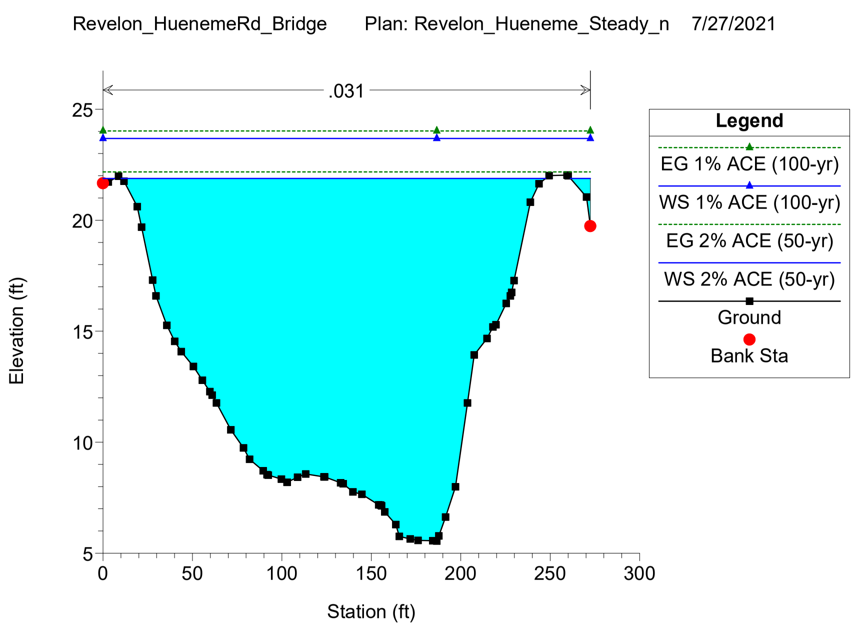


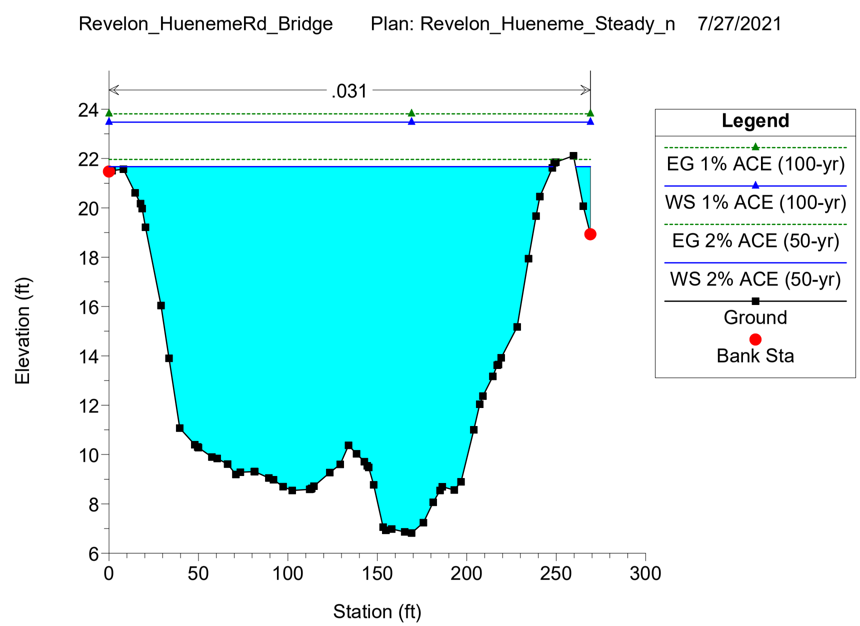
Revelon_HuenemeRd_Bridge Plan: Revelon_Hueneme_Steady_n 7/27/2021



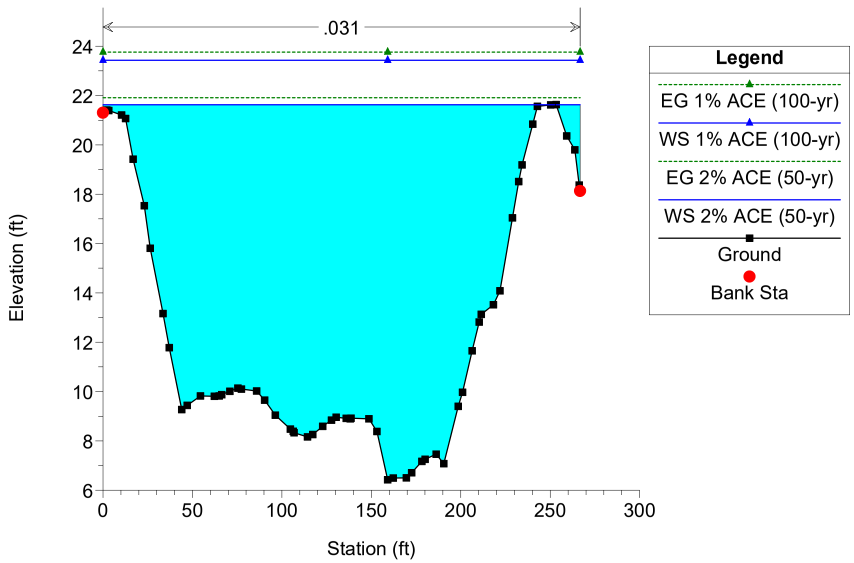

Revelon_HuenemeRd_Bridge Plan: Revelon_Hueneme_Steady_n 7/27/2021
.031
Elevation (ft)
Station (ft)
Legend
EG 1% ACE (100-yr)
WS 1% ACE (100-yr)
EG 2% ACE (50-yr)
WS 2% ACE (50-yr)
Ground
Bank Sta


Revelon_HuenemeRd_Bridge Plan: Revelon_Hueneme_Steady_n 7/27/2021
.031
Elevation (ft)
Station (ft)
Legend
EG 1% ACE (100-yr)
WS 1% ACE (100-yr)
EG 2% ACE (50-yr)
WS 2% ACE (50-yr)
Ground
Bank Sta

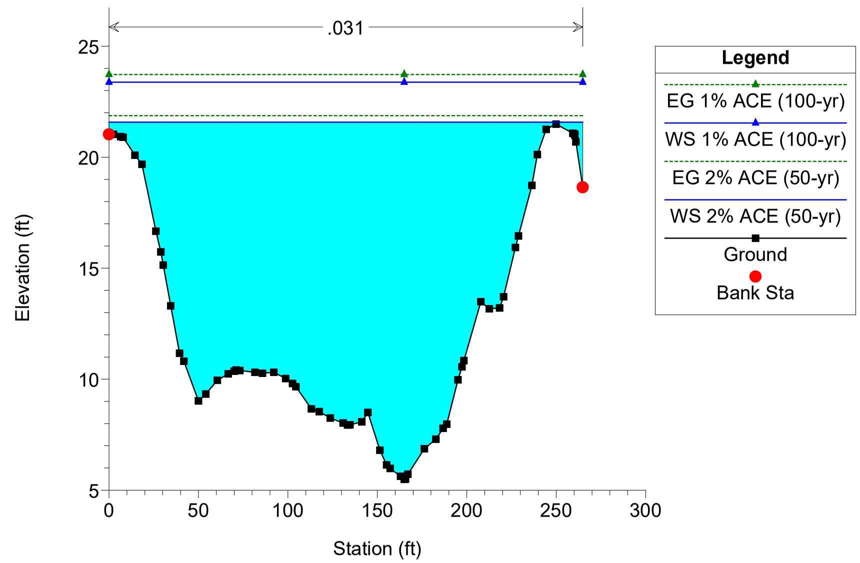

Revelon_HuenemeRd_Bridge Plan: Revelon_Hueneme_Steady_n 7/27/2021
.031
Elevation (ft)
Station (ft)
Legend
EG 1% ACE (100-yr)
WS 1% ACE (100-yr)
EG 2% ACE (50-yr)
WS 2% ACE (50-yr)
Ground
Bank Sta


Revelon_HuenemeRd_Bridge Plan: Revelon_Hueneme_Steady_n 7/27/2021
.031
Elevation (ft)
Station (ft)
Legend
EG 1% ACE (100-yr)
WS 1% ACE (100-yr)
EG 2% ACE (50-yr)
WS 2% ACE (50-yr)
Ground
Bank Sta

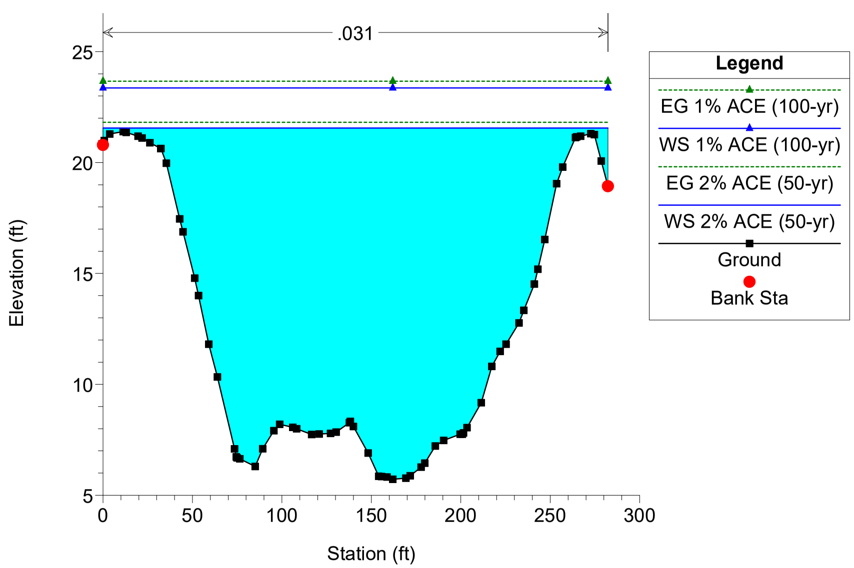
Revelon_HuenemeRd_Bridge Plan: Revelon_Hueneme_Steady_n 7/27/2021



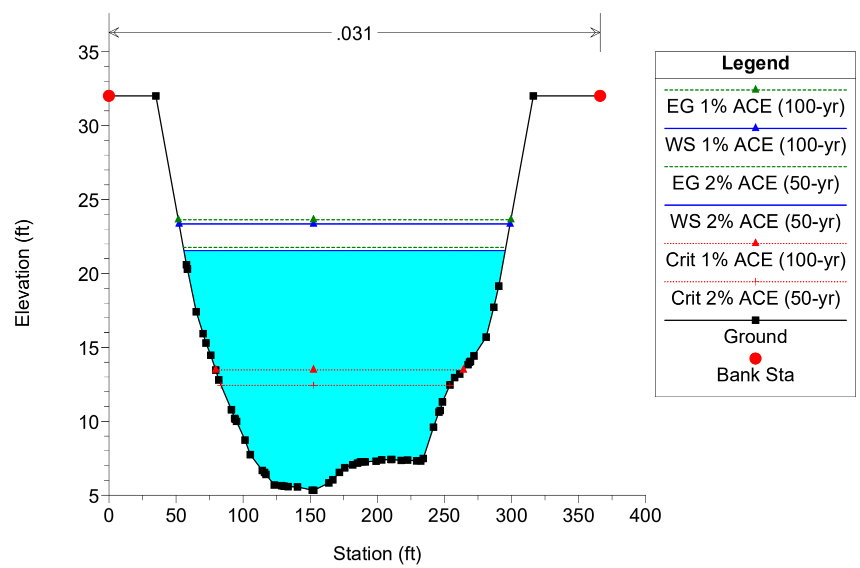
Revelon_HuenemeRd_Bridge Plan: Revelon_Hueneme_Steady_n 7/27/2021

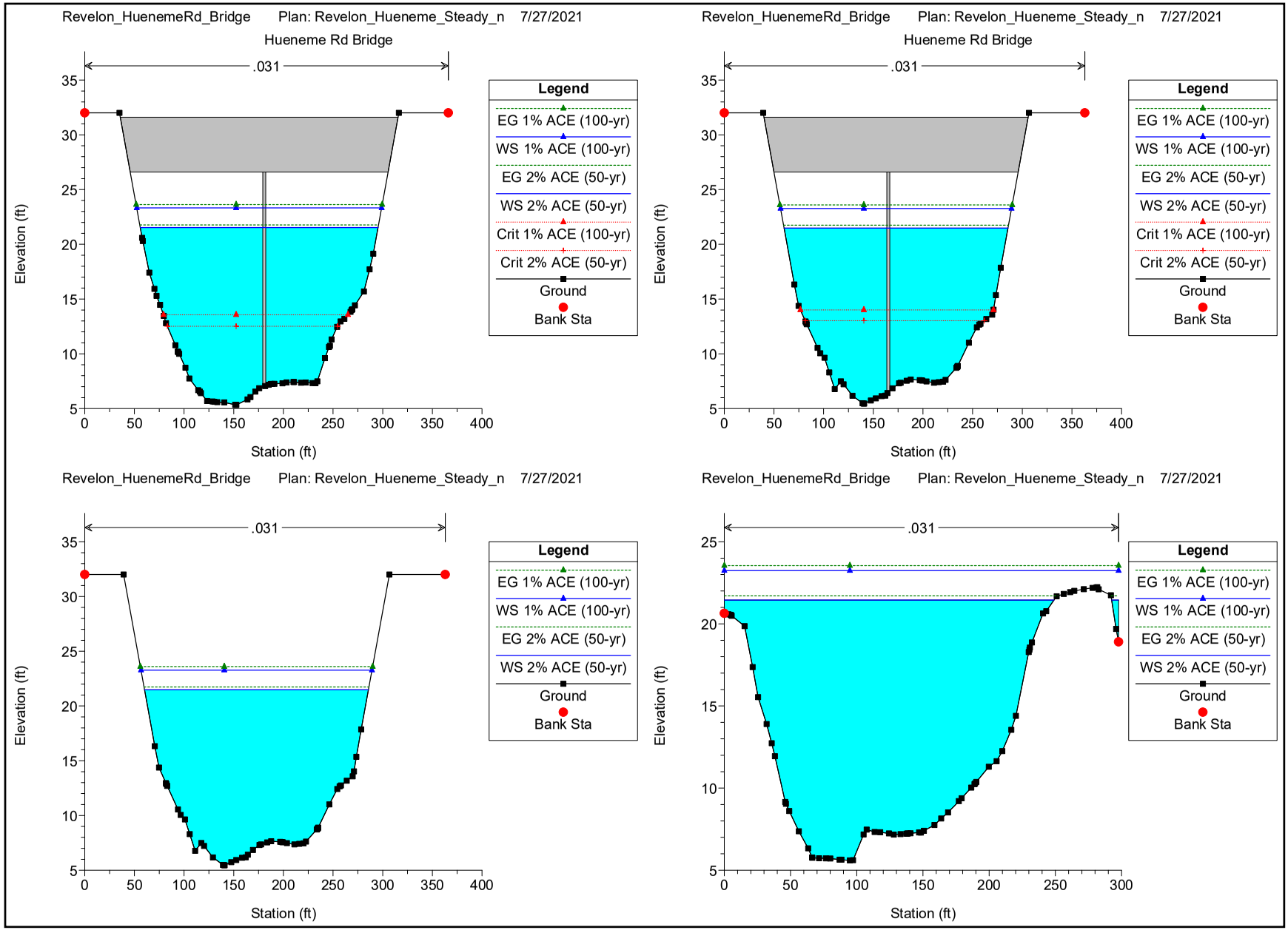


Revelon_HuenemeRd_Bridge Plan: Revelon_Hueneme_Steady_n 7/27/2021

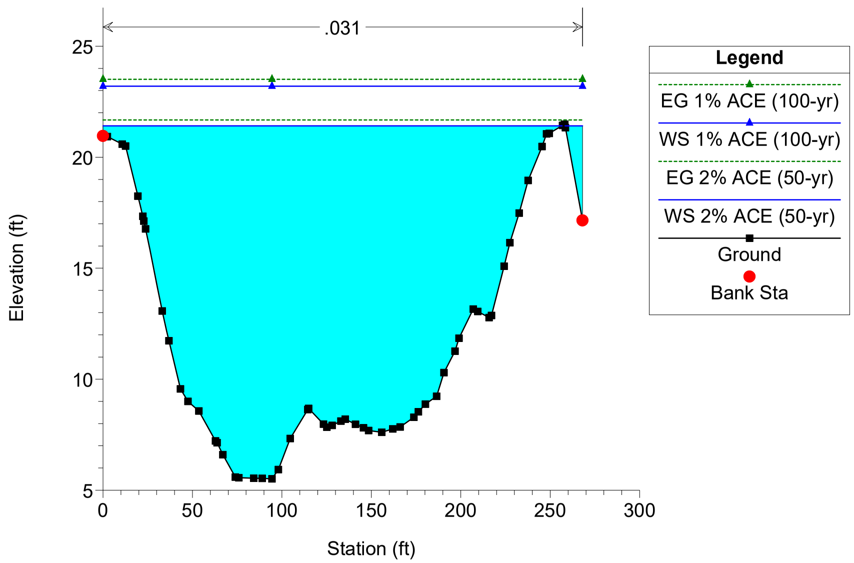


Revelon_HuenemeRd_Bridge Plan: Revelon_Hueneme_Steady_n 7/27/2021

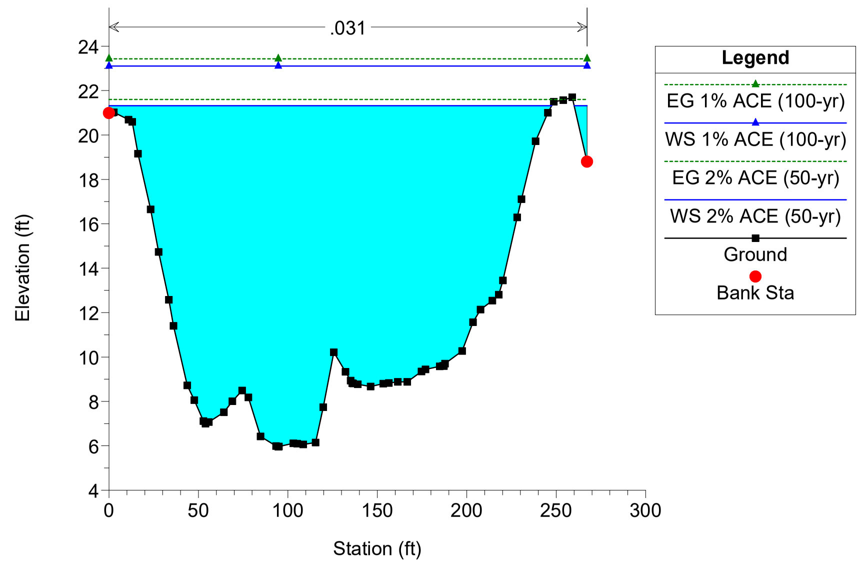



Revelon_HuenemeRd_Bridge Plan: Revelon_Hueneme_Steady_n 7/27/2021
Hueneme Rd Bridge
.031
Elevation (ft)
Station (ft)
Legend
EG 1% ACE (100-yr)
WS 1% ACE (100-yr)
EG 2% ACE (50-yr)
WS 2% ACE (50-yr)
Crit 1% ACE (100-yr)
Crit 2% ACE (50-yr)
Ground
Bank Sta
Revelon_HuenemeRd_Bridge Plan: Revelon_Hueneme_Steady_n 7/27/2021
Hueneme Rd Bridge
.031
Elevation (ft)
Station (ft)
Legend
EG 1% ACE (100-yr)
WS 1% ACE (100-yr)
EG 2% ACE (50-yr)
WS 2% ACE (50-yr)
Crit 1% ACE (100-yr)
Crit 2% ACE (50-yr)
Ground
Bank Sta
Revelon_HuenemeRd_Bridge Plan: Revelon_Hueneme_Steady_n 7/27/2021
.031
Elevation (ft)
Station (ft)
Legend
EG 1% ACE (100-yr)
WS 1% ACE (100-yr)
EG 2% ACE (50-yr)
WS 2% ACE (50-yr)
Ground
Bank Sta
Revelon_HuenemeRd_Bridge Plan: Revelon_Hueneme_Steady_n 7/27/2021
.031
Elevation (ft)
Station (ft)
Legend
EG 1% ACE (100-yr)
WS 1% ACE (100-yr)
EG 2% ACE (50-yr)
WS 2% ACE (50-yr)
Ground
Bank Sta

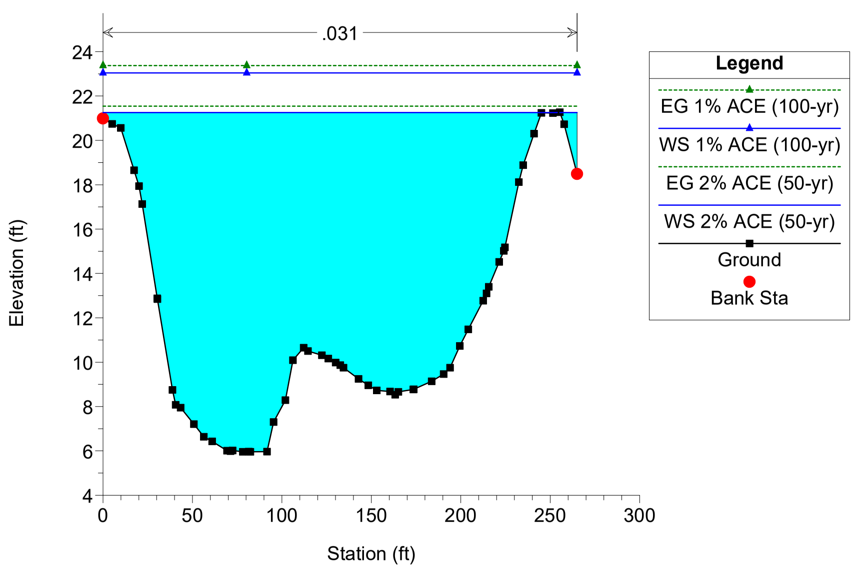
Revelon_HuenemeRd_Bridge Plan: Revelon_Hueneme_Steady_n 7/27/2021



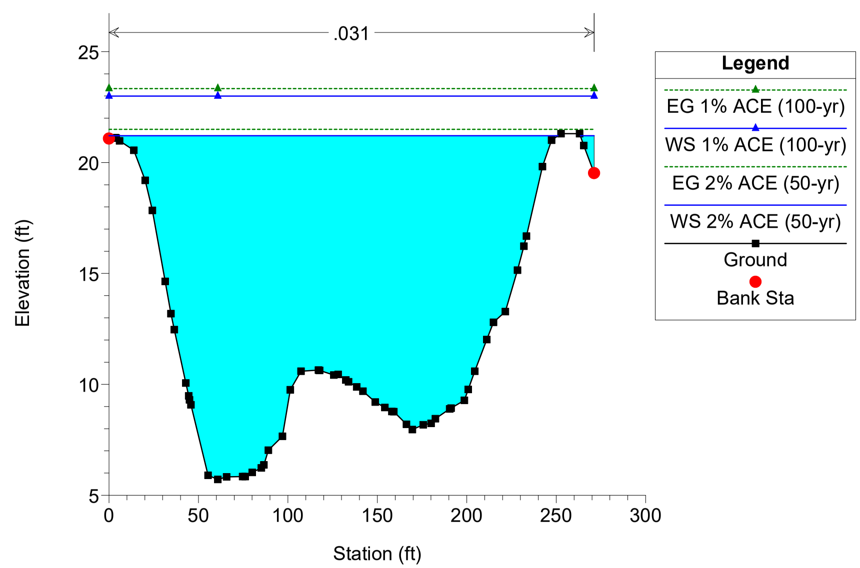
Revelon_HuenemeRd_Bridge Plan: Revelon_Hueneme_Steady_n 7/27/2021



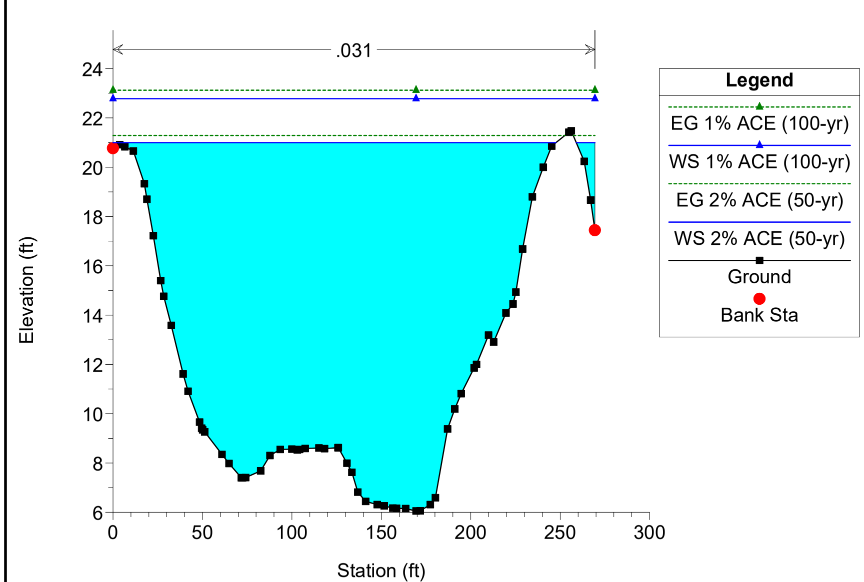
Revelon_HuenemeRd_Bridge Plan: Revelon_Hueneme_Steady_n 7/27/2021



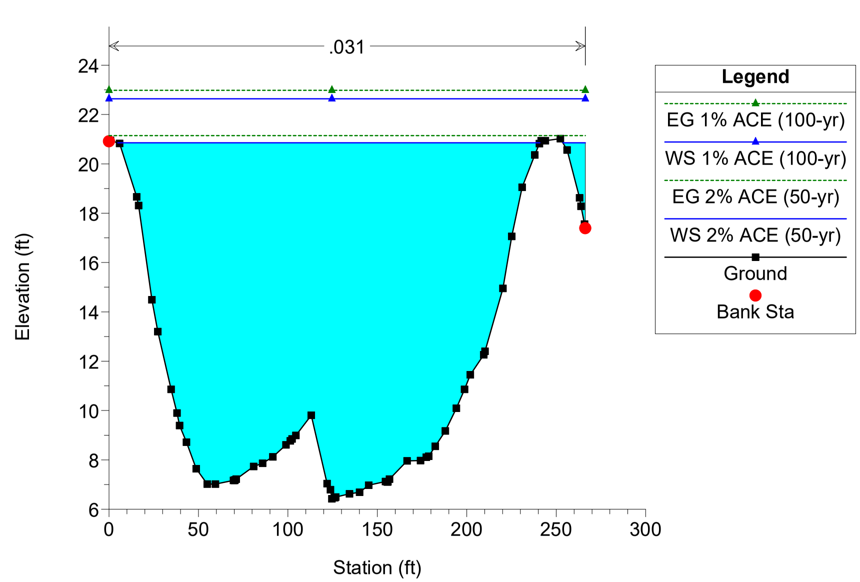
Revelon_HuenemeRd_Bridge Plan: Revelon_Hueneme_Steady_n 7/27/2021



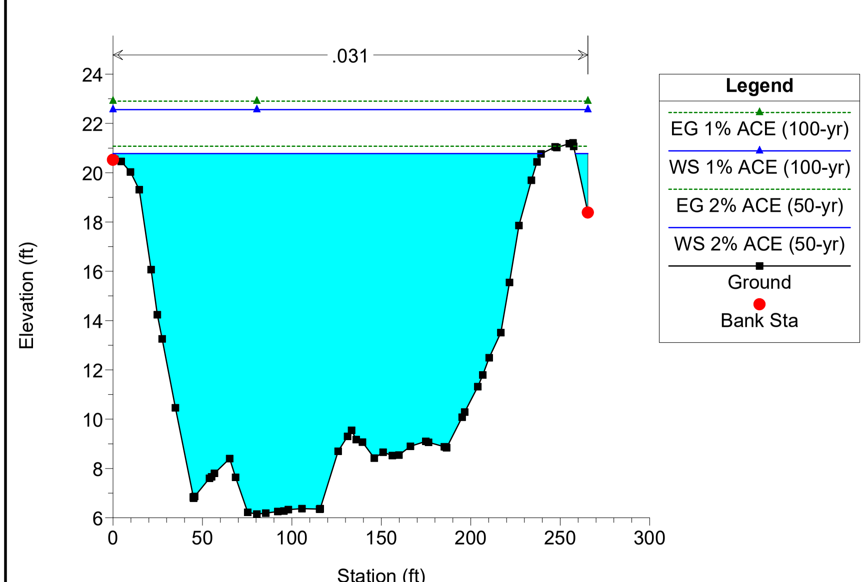
Revelon_HuenemeRd_Bridge Plan: Revelon_Hueneme_Steady_n 7/27/2021



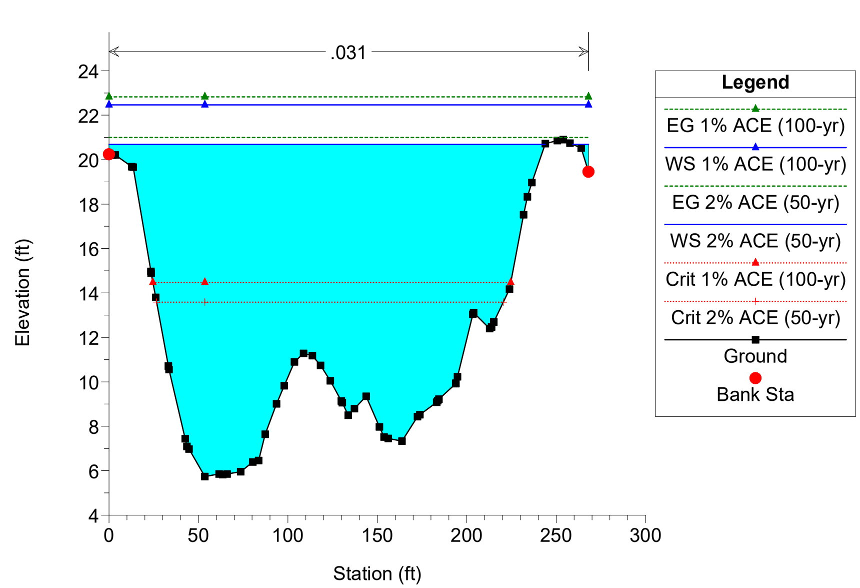
Revelon_HuenemeRd_Bridge Plan: Revelon_Hueneme_Steady_n 7/27/2021

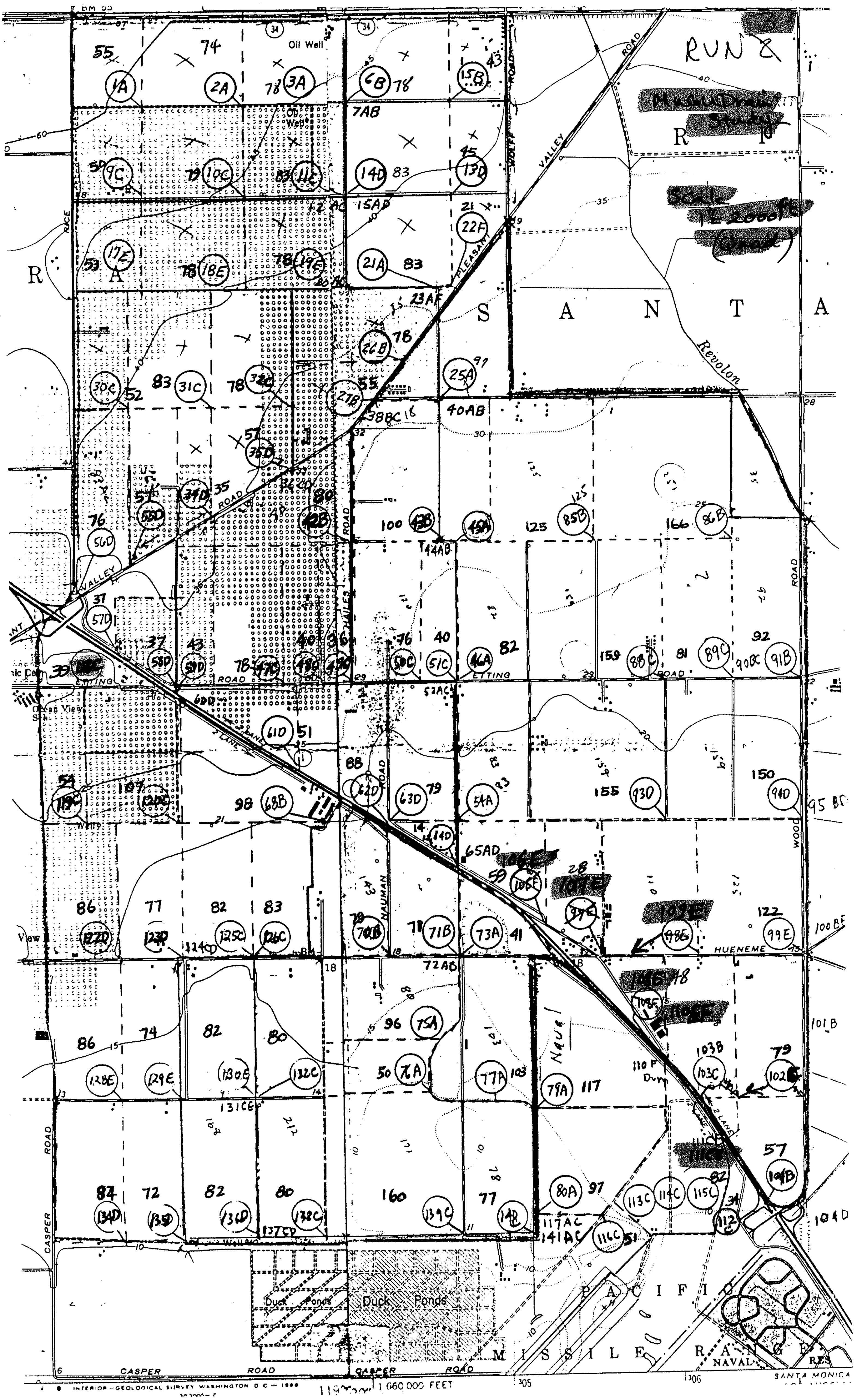


Revelon_HuenemeRd_Bridge Plan: Revelon_Hueneme_Steady_n 7/27/2021



Revelon_HuenemeRd_Bridge Plan: Revelon_Hueneme_Steady_n 7/27/2021




RUN 2
Oil Well
SANTA
Revolon
PLEASANT VALLEY ROAD
VALLEY
ETTING ROAD
HAILES ROAD
NAUMAN ROAD
WOOD ROAD
HUENEME
2 LANE
CASPER ROAD
Duck Ponds
PACIFIC MISSILE RANGE
NAVAL
SANTA MONICA
INTERIOR—GEOLOGICAL SURVEY WASHINGTON D C—1966
1 660 000 FEET

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999
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00682110   33C 030      099K50
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00682110  141AC030       K505 1600000030     32         11 2
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VENTURA COUNTY FLOOD CONTROL DISTRICT

MODIFIED RATIONAL METHOD HYDROLOGY / PC1292000-1.0

MUGU DRN-DET.STY.WOOD AB HWY1 BERMED,PRE-TR.4063,Q50PRESENT NOV. STORM DAY 4

LOCATION		SUBAREA AREA	SUBAREA Q	TOTAL AREA	TOTAL Q	CONV TYPE	CONV LNGTH	CONV SLOPE	CONV SIZE	CONV Z	CONTROL Q	SOIL NAME	TC	RAIN ZONE	PCT IMPV
821100	1A	55.	63.	55.	63.	2	2200.	0.00152	0.00	0.00	0.	30	35	K50	0.00
821100	2A	74.	100.	129.	110.	2	2000.	0.00116	0.00	0.00	0.	30	27	K50	0.00
821100	3A	78.	109.	207.	132.	0	0.	0.00000	0.00	0.00	0.	30	26	K50	0.00
821100	4A	0.	0.	207.	132.	0	0.	0.00000	0.00	0.00	0.	30	99	K50	0.00
821100	5B	43.	53.	43.	53.	4	2000.	0.00100	4.25	0.00	0.	30	31	K50	0.00
821100	6B	78.	106.	121.	142.	0	0.	0.00000	0.00	0.00	0.	30	27	K50	0.00

CONFLUENCE Q'S

* 821100 7A TA 1173 QA 132. QAB 262. QB 130. 821100 7B TB 1165 QB 142. QBA 268. QA 126.
* 821100 7AB TAB 1167 QAB 269. QA 128. QB 141.

LOCATION		SUBAREA AREA	SUBAREA Q	TOTAL AREA	TOTAL Q	CONV TYPE	CONV LNGTH	CONV SLOPE	CONV SIZE	CONV Z	CONTROL Q	SOIL NAME	TC	RAIN ZONE	PCT IMPV
821100	7AB	121.	142.	328.	269.	4	1800.	0.00167	7.00	0.00	0.	30	0	K50	0.00
821100	8A	0.	0.	328.	267.	0	0.	0.00000	0.00	0.00	0.	30	99	K50	0.00
821100	9C	50.	57.	50.	57.	4	2000.	0.00147	4.00	0.00	0.	30	35	K50	0.00
821100	10C	79.	105.	129.	148.	4	2000.	0.00147	4.00	0.00	0.	30	28	K50	0.00
821100	11C	83.	100.	212.	248.	0	0.	0.00000	0.00	0.00	0.	30	32	K50	0.00

CONFLUENCE Q'S

* 821100 12A TA 1175 QA 267. QAC 487. QC 221. 821100 12C TC 1159 QC 248. QCA 461. QA 213.
* 821100 12AC TAC 1168 QAC 504. QA 261. QC 243.

LOCATION		SUBAREA AREA	SUBAREA Q	TOTAL AREA	TOTAL Q	CONV TYPE	CONV LNGTH	CONV SLOPE	CONV SIZE	CONV Z	CONTROL Q	SOIL NAME	TC	RAIN ZONE	PCT IMPV
821100	12AC	212.	248.	540.	504.	0	0.	0.00000	0.00	0.00	0.	30	0	K50	0.00
821100	13D	45.	63.	45.	63.	4	1230.	0.04472	4.50	0.00	0.	30	26	K50	0.00
821100	14D	83.	105.	128.	167.	0	0.	0.00000	0.00	0.00	0.	30	30	K50	0.00

CONFLUENCE Q'S

* 821100 15A TA 1168 QA 504. QAD 658. QD 154. 821100 15D TD 1160 QD 167. QDA 604. QA 436.
* 821100 15AD TAD 1167 QAD 660. QA 503. QD 156.

LOCATION		SUBAREA AREA	SUBAREA Q	TOTAL AREA	TOTAL Q	CONV TYPE	CONV LNGTH	CONV SLOPE	CONV SIZE	CONV Z	CONTROL Q	SOIL NAME	TC	RAIN ZONE	PCT IMPV
821100	15AD	128.	167.	668.	660.	5	1700.	0.00238	12.00	0.00	0.	30	0	K50	0.00
821100	16A	0.	0.	668.	655.	0	0.	0.00000	0.00	0.00	0.	30	99	K50	0.00
821100	17E	53.	68.	53.	68.	4	2000.	0.00185	4.25	0.00	0.	30	29	K50	0.00
821100	18E	78.	106.	131.	162.	4	2000.	0.00200	5.75	0.00	0.	30	27	K50	0.00
821100	19E	78.	101.	209.	245.	0	0.	0.00000	0.00	0.00	0.	30	29	K50	0.00

CONFLUENCE Q'S

* 821100 20A TA 1170 QA 655. QAE 900. QE 244. 821100 20E TE 1169 QE 245. QEA 899. QA 653.
* 821100 20AE TAE 1170 QAE 900. QA 655. QE 244.

LOCATION		SUBAREA AREA	SUBAREA Q	TOTAL AREA	TOTAL Q	CONV TYPE	CONV LNGTH	CONV SLOPE	CONV SIZE	CONV Z	CONTROL Q	SOIL NAME	TC	RAIN ZONE	PCT IMPV
821100	20AE	209.	245.	877.	900.	5	2000.	0.00200	13.00	0.00	0.	30	0	K50	0.00
821100	21A	83.	100.	960.	975.	0	0.	0.00000	0.00	0.00	0.	30	32	K50	0.00
821100	22F	21.	30.	21.	30.	0	0.	0.00000	0.00	0.00	0.	30	25	K50	0.00

VENTURA COUNTY FLOOD CONTROL DISTRICT

MODIFIED RATIONAL METHOD HYDROLOGY / PC1292000-1.0

MUGU ORN-DET.STY.WOOD AB HWY1 BERMED,PRE-TR.4063,Q50PRESENT NOV. STORM DAY 4

LOCATION	SUBAREA AREA	SUBAREA Q	TOTAL AREA	TOTAL Q	CONV TYPE	CONV LNGTH	CONV SLOPE	CONV SIZE	CONV Z	CONTROL Q	SOIL NAME	TC	RAIN ZONE	PCT IMPV
* CONFLUENCE Q'S														
* 821100 23A TA 1174 QA	975.	QAF 995.	QF 20.	821100 23F TF 1160 QF	30.	QFA 654.	QA 624.							
* 821100 23AF TAF 1173 QAF	996.	QA 975.	QF 21.											
821100 23AF	21.	30.	981.	996.	5	2100.	0.00250	13.00	0.00	0.	30	0	K50	0.00
821100 24A	0.	0.	981.	986.	0	0.	0.00000	0.00	0.00	0.	30	99	K50	0.00
821100 25A	0.	0.	981.	986.	0	0.	0.00000	0.00	0.00	0.	30	99	K50	0.00
821100 26B	78.	94.	78.	94.	0	0.	0.00000	0.00	0.00	0.	30	32	K50	0.00
821100 27B	55.	69.	133.	164.	0	0.	0.00000	0.00	0.00	0.	30	30	K50	0.00
821100 28B	0.	0.	133.	164.	0	0.	0.00000	0.00	0.00	0.	30	99	K50	0.00
821100 29B	0.	0.	133.	164.	0	0.	0.00000	0.00	0.00	0.	30	99	K50	0.00
821100 30C	52.	69.	52.	69.	4	1600.	0.00167	4.25	0.00	0.	30	28	K50	0.00
821100 31C	83.	94.	135.	158.	4	1500.	0.00167	5.75	0.00	0.	30	35	K50	0.00
821100 32C	78.	94.	213.	240.	4	1200.	0.00176	6.75	0.00	0.	30	32	K50	0.00
821100 33C	0.	0.	213.	238.	0	0.	0.00000	0.00	0.00	0.	30	99	K50	0.00
821100 34D	35.	47.	35.	47.	3	1800.	0.00118	0.00	0.00	0.	30	27	K50	0.00
821100 35D	57.	72.	92.	85.	0	0.	0.00000	0.00	0.00	0.	30	30	K50	0.00
* CONFLUENCE Q'S														
* 821100 36C TC 1175 QC	238.	QCD 321.	QD 83.	821100 36D TD 1170 QD	85.	QDC 318.	QC 233.							
* 821100 36CD TCD 1174 QCD	322.	QC 238.	QD 84.											
821100 36CD	92.	85.	305.	322.	5	2000.	0.00050	12.00	0.00	0.	30	0	K50	0.00
821100 37C	0.	0.	305.	312.	0	0.	0.00000	0.00	0.00	0.	30	99	K50	0.00
* CONFLUENCE Q'S														
* 821100 38B TB 1160 QB	164.	QBC 303.	QC 139.	821100 38C TC 1183 QC	312.	QCB 370.	QB 57.							
* 821100 38BC TBC 1177 QBC	422.	QB 123.	QC 299.											
821100 38BC	305.	312.	438.	422.	5	1200.	0.00125	11.00	0.00	0.	30	0	K50	0.00
821100 39B	0.	0.	438.	419.	0	0.	0.00000	0.00	0.00	0.	30	99	K50	0.00
* CONFLUENCE Q'S														
* 821100 40A TA 1177 QA	986.	QAB 1400.	QB 413.	821100 40B TB 1180 QB	419.	QBA 1395.	QA 976.							
* 821100 40AB TAB 1178 QAB	1403.	QA 986.	QB 416.											
821100 40AB	438.	419.	1419.	1403.	5	2700.	0.00167	17.00	0.00	0.	30	0	K50	0.00
821100 41A	0.	0.	1419.	1381.	0	0.	0.00000	0.00	0.00	0.	30	99	K50	0.00
821100 42B	80.	97.	80.	97.	4	1700.	0.00060	5.75	0.00	0.	30	32	K50	0.00
821100 43B	100.	114.	180.	198.	0	0.	0.00000	0.00	0.00	0.	30	35	K50	0.00

VENTURA COUNTY FLOOD CONTROL DISTRICT

MODIFIED RATIONAL METHOD HYDROLOGY / PC1292000-1.0

MUGU DRN-DET.STY.WOOD AB HWY1 BERMED,PRE-TR.4063,Q50PRESENT NOV. STORM DAY 4

LOCATION	SUBAREA AREA	SUBAREA Q	TOTAL AREA	TOTAL Q	CONV TYPE	CONV LNGTH	CONV SLOPE	CONV SIZE	CONV Z	CONTROL Q	SOIL NAME	TC	RAIN ZONE	PCT IMPV
* CONFLUENCE Q'S *														
* 821100 44A TA 1184 QA	1381.	QAB 1537.	QB 156.	821100 44B	TB 1170	QB 198.	QBA 1136.	QA 938.	*					
* 821100 44AB TAB 1183	QAB 1540.	QA 1379.	QB 161.	*										
821100 44AB	180.	198.	1599.	1540.	5	300.	0.00125	18.00	0.00	0.	30	0	K50	0.00
821100 45A	0.	0.	1599.	1539.	0	0.	0.00000	0.00	0.00	0.	30	99	K50	0.00
821100 46A	82.	95.	1681.	1600.	0	0.	0.00000	0.00	0.00	0.	30	34	K50	0.00
821100 47C	78.	94.	78.	94.	4	670.	0.00071	5.50	0.00	0.	30	32	K50	0.00
821100 48C	40.	57.	118.	147.	4	600.	0.00385	4.75	0.00	0.	30	25	K50	0.00
821100 49C	36.	49.	154.	194.	4	1350.	0.00133	6.50	0.00	0.	30	27	K50	0.00
821100 50C	76.	94.	230.	276.	4	630.	0.00100	7.75	0.00	0.	30	31	K50	0.00
821100 51C	40.	54.	270.	319.	0	0.	0.00000	0.00	0.00	0.	30	27	K50	0.00
* CONFLUENCE Q'S *														
* 821100 52A TA 1183 QA	1600.	QAC 1827.	QC 227.	821100 52C	TC 1170	QC 319.	QCA 1504.	QA 1184.	*					
* 821100 52AC TAC 1181	QAC 1841.	QA 1592.	QC 250.	*										
821100 52AC	270.	319.	1951.	1841.	5	2650.	0.00133	19.00	0.00	0.	30	0	K50	0.00
821100 53A	82.	99.	2033.	1828.	0	0.	0.00000	0.00	0.00	0.	30	32	K50	0.00
821100 54A	0.	0.	2033.	1828.	5	900.	0.00421	15.00	0.00	0.	30	99	K50	0.00
821100 55D	57.	72.	57.	72.	3	1200.	0.00444	0.00	0.00	0.	30	30	K50	0.00
821100 56D	76.	92.	133.	153.	4	1300.	0.00400	4.75	0.00	0.	30	32	K50	0.00
821100 57D	37.	48.	170.	192.	4	1300.	0.00333	5.50	0.00	0.	30	29	K50	0.00
821100 58D	37.	49.	207.	230.	0	0.	0.00000	0.00	0.00	0.	30	28	K50	0.00
821100 59D	43.	54.	250.	278.	4	2800.	0.00333	6.25	0.00	0.	30	30	K50	0.00
821100 60D	0.	0.	250.	273.	0	0.	0.00000	0.00	0.00	0.	30	99	K50	0.00
821100 61D	51.	63.	301.	321.	4	2000.	0.00308	6.75	0.00	0.	30	31	K50	0.00
821100 62D	88.	102.	389.	394.	0	0.	0.00000	0.00	0.00	0.	30	34	K50	0.00
821100 63D	79.	93.	468.	472.	4	1600.	0.00313	7.75	0.00	0.	30	33	K50	0.00
821100 64D	14.	23.	482.	471.	0	0.	0.00000	0.00	0.00	0.	30	20	K50	0.00
* CONFLUENCE Q'S *														
* 821100 65A TA 1186 QA	1828.	QAD 2274.	QD 446.	821100 65D	TD 1179	QD 471.	QDA 2141.	QA 1670.	*					
* 821100 65AD TAD 1184	QAD 2283.	QA 1823.	QD 460.	*										
821100 65AD	482.	471.	2515.	2283.	5	1600.	0.00125	21.00	0.00	0.	30	0	K50	0.00
821100 66A	0.	0.	2515.	2268.	0	0.	0.00000	0.00	0.00	0.	30	99	K50	0.00
821100 67A	0.	0.	2515.	2268.	0	0.	0.00000	0.00	0.00	0.	30	99	K50	0.00
821100 68B	98.	112.	98.	112.	4	3400.	0.00056	6.25	0.00	0.	30	35	K50	0.00
821100 69B	0.	0.	98.	98.	0	0.	0.00000	0.00	0.00	0.	30	99	K50	0.00
821100 70B	79.	93.	177.	164.	4	1250.	0.00036	7.75	0.00	0.	30	33	K50	0.00
821100 71B	61.	75.	238.	206.	0	0.	0.00000	0.00	0.00	0.	30	31	K50	0.00

VENTURA COUNTY FLOOD CONTROL DISTRICT

MODIFIED RATIONAL METHOD HYDROLOGY / PC1292000-1.0

MUGU DRN-DET.STY.WOOD AB HWY1 BERMED,PRE-TR.4063,Q50PRESENT NOV. STORM DAY 4

LOCATION	SUBAREA AREA	SUBAREA Q	TOTAL AREA	TOTAL Q	CONV TYPE	CONV LNGTH	CONV SLOPE	CONV SIZE	CONV Z	CONTROL Q	SOIL NAME	TC	RAIN ZONE	PCT IMPV
* CONFLUENCE Q'S *														
* 821100 72A TA 1188 QA	2268.	QAB	2436.	QB	168.	821100 72B	TB 1177 QB	206.	QBA	2050.	QA	1844.	*	
* 821100 72AB TAB 1188 QAB	2436.	QA	2268.	QB	168.								*	
821100 72AB	238.	206.	2753.	2436.	0	0.	0.00000	0.00	0.00	0.	30	0	K50	0.00
821100 73A	41.	52.	2794.	2442.	5	1700.	0.00235	19.00	0.00	0.	30	30	K50	0.00
821100 74A	0.	0.	2794.	2432.	0	0.	0.00000	0.00	0.00	0.	30	99	K50	0.00
821100 75A	96.	111.	2890.	2447.	5	1200.	0.00111	22.00	0.00	0.	30	34	K50	0.00
821100 76A	50.	60.	2940.	2444.	5	1650.	0.00200	19.00	0.00	0.	30	32	K50	0.00
821100 77A	103.	115.	3043.	2448.	5	450.	0.00001	116.00	0.00	0.	30	36	K50	0.00
821100 78A	0.	0.	3043.	2422.	0	0.	0.00000	0.00	0.00	0.	30	99	K50	0.00
821100 79A	117.	131.	3160.	2432.	5	2150.	0.00105	22.00	0.00	0.	30	36	K50	0.00
821100 80A	97.	113.	3257.	2420.	0	0.	0.00000	0.00	0.00	0.	30	34	K50	0.00
821100 81A	0.	0.	3257.	2420.	0	0.	0.00000	0.00	0.00	0.	30	99	K50	0.00
821100 82A	0.	0.	3257.	2420.	0	0.	0.00000	0.00	0.00	0.	30	99	K50	0.00
821100 83A	0.	0.	3257.	2420.	0	0.	0.00000	0.00	0.00	0.	30	99	K50	0.00
821100 84A	0.	0.	3257.	2420.	0	0.	0.00000	0.00	0.00	0.	30	99	K50	0.00
821100 85B	125.	142.	125.	142.	2	2650.	0.00034	0.00	0.00	0.	30	35	K50	0.00
821100 86B	166.	186.	291.	190.	2	2650.	0.00160	0.00	0.00	0.	30	36	K50	0.00
821100 87B	0.	0.	291.	156.	0	0.	0.00000	0.00	0.00	0.	30	99	K50	0.00
821100 88C	159.	178.	159.	178.	2	1300.	0.00091	0.00	0.00	0.	30	36	K50	0.00
821100 89C	81.	96.	240.	228.	0	0.	0.00000	0.00	0.00	0.	30	33	K50	0.00
* CONFLUENCE Q'S *														
* 821100 90B TB 1193 QB	156.	QBC	310.	QC	155.	821100 90C	TC 1176 QC	228.	QCB	343.	QB	114.	*	
* 821100 90BC TBC 1182 QBC	358.	QB	138.	QC	220.								*	
821100 90BC	240.	228.	531.	358.	2	1250.	0.00090	0.00	0.00	0.	30	0	K50	0.00
821100 91B	92.	109.	623.	341.	2	2600.	0.00143	0.00	0.00	0.	30	33	K50	0.00
821100 92B	0.	0.	623.	315.	0	0.	0.00000	0.00	0.00	0.	30	99	K50	0.00
821100 93D	155.	173.	155.	173.	2	2600.	0.00008	0.00	0.00	0.	30	36	K50	0.00
821100 94D	150.	168.	305.	168.	0	0.	0.00000	0.00	0.00	0.	30	36	K50	0.00
* CONFLUENCE Q'S *														
* 821100 95B TB 1216 QB	315.	QBD	326.	QD	10.	821100 95D	TD 1160 QD	168.	QDB	214.	QB	46.	*	
* 821100 95BD TBD 1218 QBD	326.	QB	315.	QD	11.								*	
821100 95BD	305.	168.	928.	326.	2	2750.	0.00121	0.00	0.00	0.	30	0	K50	0.00
821100 96B	0.	0.	928.	311.	0	0.	0.00000	0.00	0.00	0.	30	99	K50	0.00
821100 97E	0.	0.	0.	245.	0	0.	0.00000	0.00	0.00	0.	30	99	K50	0.00
821100 98E	0.	0.	0.	0.	0	0.	0.00000	0.00	0.00	0.	30	99	K50	0.00
821100 99E	122.	134.	122.	134.	0	0.	0.00000	0.00	0.00	0.	30	37	K50	0.00

VENTURA COUNTY FLOOD CONTROL DISTRICT

MODIFIED RATIONAL METHOD HYDROLOGY / PC1292000-1.0

MUGU DRN-DET.STY.WOOD AB HWY1 BERMED,PRE-TR.4063,Q50PRESENT NOV. STORM DAY 4

LOCATION	SUBAREA AREA	SUBAREA Q	TOTAL AREA	TOTAL Q	CONV TYPE	CONV LNGTH	CONV SLOPE	CONV SIZE	CONV Z	CONTROL Q	SOIL NAME	TC	RAIN ZONE	PCT IMPV
* 821100 100B TB 1243 QB	311.	QBE	311.	QE	0.	821100 100E TE 1160 QE	134.	QEB	176.	QB	42.			*
* 821100 100BE TBE 1243 QBE	311.	QB	311.	QE	0.									*
821100 100BE	122.	134.	1050.	311.	2	2750.	0.00100	0.00	0.00	0.	30	0	K50	0.00
821100 101C	76.	96.	76.	96.	2	600.	0.00045	0.00	0.00	0.	30	30	K50	0.00
821100 102C	79.	98.	155.	169.	0	0.	0.00000	0.00	0.00	0.	30	31	K50	0.00
821100 103C	0.	0.	155.	169.	2	400.	0.00105	0.00	0.00	0.	30	99	K50	0.00
821100 104B	57.	74.	1107.	297.	2	950.	0.00158	0.00	0.00	0.	30	29	K50	0.00
821100 105E	28.	47.	28.	47.	2	1500.	0.00031	0.00	0.00	0.	30	20	K50	0.00
821100 106E	59.	80.	87.	82.	2	400.	0.00310	0.00	0.00	0.	30	27	K50	0.00
821100 107E	28.	34.	115.	115.	2	1800.	0.00031	0.00	0.00	0.	30	32	K50	0.00
821100 108E	48.	65.	163.	71.	0	0.	0.00000	0.00	0.00	0.	30	27	K50	0.00
821100 109E	108.	123.	271.	194.	2	1500.	0.00031	0.00	0.00	0.	30	35	K50	0.00
* 821100 110E TE 1196 QE	138.	QEF	138.	QF	0.	821100 110F TF 1160 QF	30.	QFE	24.	QE	24.			*
* 821100 110EF TEF 1196 QEF	138.	QE	138.	QF	0.									*
821100 110EF	0.	30.	271.	138.	2	1200.	0.00167	0.00	0.00	0.	30	0	K50	0.00
* 821100 111C TC 1175 QC	167.	QCE	187.	QE	20.	821100 111E TE 1211 QE	130.	QEC	164.	QC	33.			*
* 821100 111CE TCE 1183 QCE	192.	QC	155.	QE	37.									*
821100 111CE	271.	130.	426.	192.	2	2300.	0.00174	0.00	0.00	0.	30	0	K50	0.00
821100 112C	34.	45.	460.	174.	0	0.	0.00000	0.00	0.00	0.	30	28	K50	0.00
821100 113C	0.	0.	460.	174.	0	0.	0.00000	0.00	0.00	0.	30	99	K50	0.00
821100 114C	0.	0.	460.	174.	0	0.	0.00000	0.00	0.00	0.	30	99	K50	0.00
821100 115C	82.	99.	542.	186.	2	700.	0.00001	0.00	0.00	0.	30	32	K50	0.00
821100 116C	51.	63.	593.	131.	2	1200.	0.00083	0.00	0.00	0.	30	31	K50	0.00
* 821100 117A TA 1204 QA	2420.	QAC	2455.	QC	35.	821100 117C TC 1310 QC	130.	QCA	321.	QA	192.			*
* 821100 117AC TAC 1204 QAC	2455.	QA	2420.	QC	35.									*
821100 117AC	593.	130.	3850.	2455.	0	0.	0.00000	0.00	0.00	0.	30	0	K50	0.00
821100 118C	39.	53.	39.	53.	2	2600.	0.00250	0.00	0.00	0.	30	27	K50	0.00
821100 119C	54.	68.	93.	76.	2	1800.	0.00119	0.00	0.00	0.	30	30	K50	0.00
821100 120C	107.	124.	200.	148.	2	2550.	0.00119	0.00	0.00	0.	30	34	K50	0.00
821100 121C	0.	0.	200.	120.	0	0.	0.00000	0.00	0.00	0.	30	99	K50	0.00

VENTURA COUNTY FLOOD CONTROL DISTRICT

MODIFIED RATIONAL METHOD HYDROLOGY / PC1292000-1.0

MUGU ORN-DET.STY.WOOD AB HWY1 BERMED,PRE-TR.4063,Q50PRESENT NOV. STORM DAY 4

LOCATION		SUBAREA AREA	SUBAREA Q	TOTAL AREA	TOTAL Q	CONV TYPE	CONV LNGTH	CONV SLOPE	CONV SIZE	CONV Z	CONTROL Q	SOIL NAME	TC	RAIN ZONE	PCT IMPV
821100	122D	86.	104.	86.	104.	2	1200.	0.00250	0.00	0.00	0.	30	32	K50	0.00
821100	123D	77.	75.	163.	163.	0	0.	0.00000	0.00	0.00	0.	50	33	K50	0.00

* CONFLUENCE Q'S *

* 821100 124C TC 1201 QC 120. QCD 151. QD 31. 821100 124D TD 1170 QD 163. QDC 202. QC 38. *

* 821100 124CD TCD 1178 QCD 219. QC 68. QD 151. *

LOCATION		SUBAREA AREA	SUBAREA Q	TOTAL AREA	TOTAL Q	CONV TYPE	CONV LNGTH	CONV SLOPE	CONV SIZE	CONV Z	CONTROL Q	SOIL NAME	TC	RAIN ZONE	PCT IMPV
821100	124CD	163.	163.	363.	219.	2	1350.	0.00250	0.00	0.00	0.	30	0	K50	0.00
821100	125C	82.	95.	445.	267.	0	0.	0.00000	0.00	0.00	0.	30	34	K50	0.00
821100	126C	83.	94.	528.	338.	5	2680.	0.00044	13.00	0.00	0.	30	35	K50	0.00
821100	127C	0.	0.	528.	323.	0	0.	0.00000	0.00	0.00	0.	30	99	K50	0.00
821100	128E	86.	102.	86.	102.	5	1200.	0.00001	16.00	0.00	0.	30	33	K50	0.00
821100	129E	74.	89.	160.	118.	5	1350.	0.00001	16.00	0.00	0.	30	32	K50	0.00
821100	130E	82.	101.	242.	116.	0	0.	0.00000	0.00	0.00	0.	30	31	K50	0.00

* CONFLUENCE Q'S *

* 821100 131C TC 1190 QC 323. QCE 404. QE 81. 821100 131E TE 1176 QE 116. QEC 379. QC 263. *

* 821100 131CE TCE 1181 QCE 407. QC 296. QE 110. *

LOCATION		SUBAREA AREA	SUBAREA Q	TOTAL AREA	TOTAL Q	CONV TYPE	CONV LNGTH	CONV SLOPE	CONV SIZE	CONV Z	CONTROL Q	SOIL NAME	TC	RAIN ZONE	PCT IMPV
821100	131CE	242.	116.	770.	407.	0	0.	0.00000	0.00	0.00	0.	30	0	K50	0.00
821100	132C	80.	91.	850.	473.	5	2600.	0.00125	12.00	0.00	0.	30	35	K50	0.00
821100	133C	0.	0.	850.	457.	0	0.	0.00000	0.00	0.00	0.	30	99	K50	0.00
821100	134D	84.	97.	84.	97.	5	1200.	0.00001	16.00	0.00	0.	30	34	K50	0.00
821100	135D	72.	87.	156.	113.	5	1350.	0.00001	16.00	0.00	0.	30	32	K50	0.00
821100	136D	82.	93.	238.	116.	0	0.	0.00000	0.00	0.00	0.	30	35	K50	0.00

* CONFLUENCE Q'S *

* 821100 137C TC 1186 QC 457. QCD 560. QD 102. 821100 137D TD 1180 QD 116. QDC 540. QC 424. *

* 821100 137CD TCD 1185 QCD 566. QC 455. QD 111. *

LOCATION		SUBAREA AREA	SUBAREA Q	TOTAL AREA	TOTAL Q	CONV TYPE	CONV LNGTH	CONV SLOPE	CONV SIZE	CONV Z	CONTROL Q	SOIL NAME	TC	RAIN ZONE	PCT IMPV
821100	137CD	238.	116.	1088.	566.	5	1300.	0.00001	36.00	0.00	0.	30	0	K50	0.00
821100	138C	80.	99.	1168.	494.	5	2650.	0.00038	15.00	0.00	0.	30	31	K50	0.00
821100	139C	160.	179.	1328.	483.	5	1350.	0.00038	15.00	0.00	0.	30	36	K50	0.00
821100	140C	77.	89.	1405.	481.	0	0.	0.00000	0.00	0.00	0.	30	34	K50	0.00

* CONFLUENCE Q'S *

* 821100 141A TA 1204 QA 2455. QAC 2785. QC 330. 821100 141C TC 1231 QC 481. QCA 1888. QA 1407. *

* 821100 141AC TAC 1206 QAC 2793. QA 2444. QC 348. *

LOCATION		SUBAREA AREA	SUBAREA Q	TOTAL AREA	TOTAL Q	CONV TYPE	CONV LNGTH	CONV SLOPE	CONV SIZE	CONV Z	CONTROL Q	SOIL NAME	TC	RAIN ZONE	PCT IMPV
821100	141AC	1405.	481.	5255.	2793.	5	1600.	0.00030	32.00	0.00	0.	30	D	K50	0.00

MODIFIED RATIONAL METHOD HYDROLOGY / PC1292000-1.0

RUNOFF, MUGU DRN

HYDROGRAPH AT 821100 141A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	0.	100	7.	200	7.	300	7.	400	7.
500	7.	600	7.	700	7.	800	7.	900	7.
1000	20.	1050	36.	1100	133.	1110	163.	1120	207.
1130	269.	1131	276.	1132	284.	1133	292.	1134	300.
1135	307.	1136	317.	1137	328.	1138	339.	1139	350.
1140	362.	1141	377.	1142	392.	1143	408.	1144	424.
1145	440.	1146	458.	1147	476.	1148	496.	1149	518.
1150	546.	1151	587.	1152	632.	1153	673.	1154	699.
1155	728.	1156	763.	1157	804.	1158	844.	1159	881.
1160	917.	1161	949.	1162	982.	1163	1016.	1164	1050.
1165	1088.	1166	1128.	1167	1169.	1168	1212.	1169	1257.
1170	1301.	1171	1347.	1172	1397.	1173	1448.	1174	1501.
1175	1555.	1176	1610.	1177	1669.	1178	1729.	1179	1790.
1180	1851.	1181	1913.	1182	1975.	1183	2036.	1184	2092.
1185	2134.	1186	2170.	1187	2211.	1188	2269.	1189	2326.
1190	2378.	1191	2422.	1192	2461.	1193	2498.	1194	2533.
1195	2568.	1196	2602.	1197	2633.	1198	2663.	1199	2691.
1200	2716.	1201	2739.	1202	2758.	1203	2774.	1204	2785.
1205	2791.	1206	2793.	1207	2788.	1208	2778.	1209	2763.
1210	2744.	1211	2719.	1212	2691.	1213	2660.	1214	2626.
1215	2589.	1216	2550.	1217	2509.	1218	2466.	1219	2423.
1220	2380.	1221	2336.	1222	2290.	1223	2244.	1224	2198.
1225	2153.	1226	2108.	1227	2063.	1228	2018.	1229	1974.
1230	1930.	1231	1888.	1232	1846.	1233	1805.	1234	1765.
1235	1725.	1236	1687.	1237	1650.	1238	1614.	1239	1579.
1240	1546.	1241	1513.	1242	1480.	1243	1449.	1244	1419.
1245	1390.	1246	1361.	1247	1335.	1248	1309.	1249	1283.
1250	1259.	1251	1235.	1252	1212.	1253	1189.	1254	1167.
1255	1146.	1256	1126.	1257	1106.	1258	1087.	1259	1069.
1260	1052.	1261	1035.	1262	1018.	1263	1002.	1264	986.
1265	971.	1266	956.	1267	941.	1268	927.	1269	912.
1270	899.	1271	885.	1272	872.	1273	859.	1274	846.
1275	835.	1276	824.	1277	813.	1278	802.	1279	791.
1280	781.	1281	770.	1282	760.	1283	750.	1284	740.
1285	731.	1286	721.	1287	712.	1288	702.	1289	693.
1290	684.	1291	676.	1292	667.	1293	659.	1294	650.
1295	642.	1296	634.	1297	627.	1298	619.	1299	611.
1300	604.	1310	541.	1320	484.	1330	434.	1340	393.
1350	357.	1360	324.	1370	293.	1380	265.	1390	241.
1400	220.	1420	185.	1440	157.	1460	134.	1500	101.

Culvert Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Monday, Jul 12 2021

Proposed Culvert (Alt 1) (3x10'x10')

Invert Elev Dn (ft)	=	2.37
Pipe Length (ft)	=	92.00
Slope (%)	=	0.09
Invert Elev Up (ft)	=	2.45
Rise (in)	=	120.0
Shape	=	Box
Span (in)	=	120.0
No. Barrels	=	3
n-Value	=	0.013
Culvert Type	=	Flared Wingwalls
Culvert Entrance	=	30D to 75D wingwall flares
Coeff. K,M,c,Y,k	=	0.026, 1, 0.0347, 0.81, 0.4

Embankment

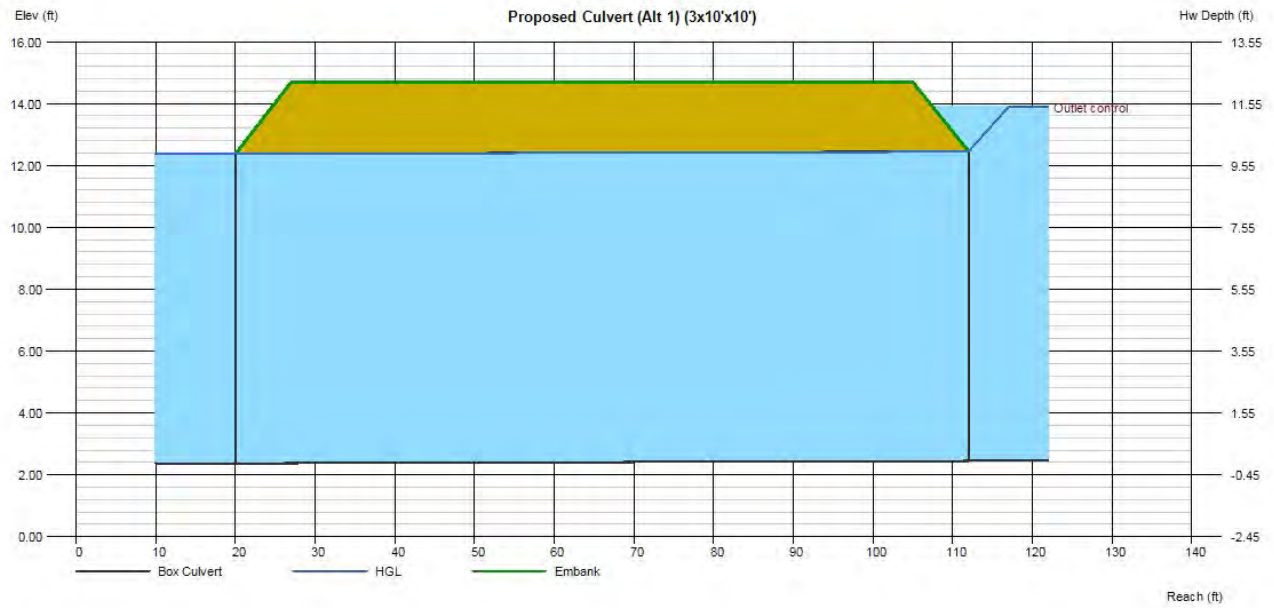
Top Elevation (ft)	=	14.69
Top Width (ft)	=	78.00
Crest Width (ft)	=	30.00

Calculations

Qmin (cfs)	=	2445.00
Qmax (cfs)	=	2445.00
Tailwater Elev (ft)	=	Crown

Highlighted

Qtotal (cfs)	=	2445.00
Qpipe (cfs)	=	2445.00
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	8.15
Veloc Up (ft/s)	=	8.16
HGL Dn (ft)	=	12.37
HGL Up (ft)	=	12.44
Hw Elev (ft)	=	13.89
Hw/D (ft)	=	1.14
Flow Regime	=	Outlet Control



Culvert Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Monday, Jul 12 2021

Proposed Culvert (Alt 2) (extended 10'rise X 12'span)

Invert Elev Dn (ft)	=	2.64
Pipe Length (ft)	=	96.20
Slope (%)	=	0.06
Invert Elev Up (ft)	=	2.70
Rise (in)	=	120.0
Shape	=	Box
Span (in)	=	144.0
No. Barrels	=	1
n-Value	=	0.013
Culvert Type	=	Flared Wingwalls
Culvert Entrance	=	30D to 75D wingwall flares
Coeff. K,M,c,Y,k	=	0.026, 1, 0.0347, 0.81, 0.4

Embankment

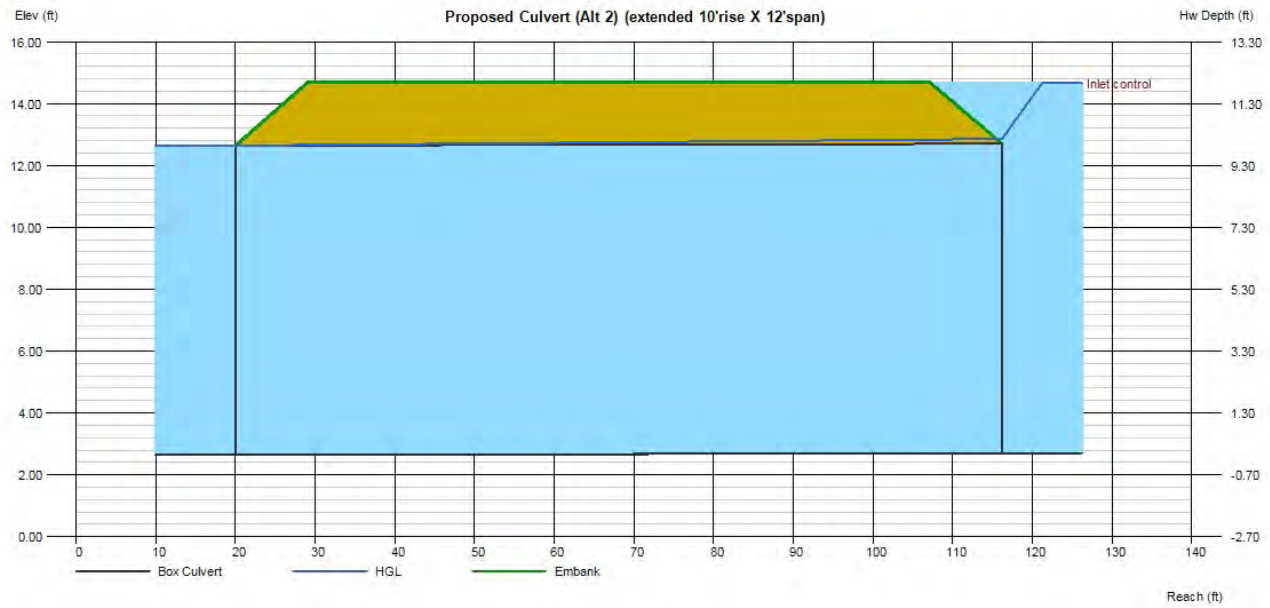
Top Elevation (ft)	=	14.69
Top Width (ft)	=	78.00
Crest Width (ft)	=	30.00

Calculations

Qmin (cfs)	=	1245.00
Qmax (cfs)	=	1345.00
Tailwater Elev (ft)	=	Crown

Highlighted

Qtotal (cfs)	=	1265.00
Qpipe (cfs)	=	1265.00
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	10.54
Veloc Up (ft/s)	=	10.54
HGL Dn (ft)	=	12.64
HGL Up (ft)	=	12.85
Hw Elev (ft)	=	14.65
Hw/D (ft)	=	1.20
Flow Regime	=	Inlet Control



Q			Veloc		Depth	
Total	Pipe	Over	Dn	Up	Dn	Up
(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(in)	(in)
1245.00	1245.00	0.00	10.38	10.38	120.00	120.00
1265.00	1265.00	0.00	10.54	10.54	120.00	120.00
1285.00	1283.42	1.58	10.70	10.70	120.00	120.00
1305.00	1298.92	6.08	10.82	10.82	120.00	120.00
1325.00	1313.22	11.78	10.94	10.94	120.00	120.00
1345.00	1326.74	18.26	11.06	11.06	120.00	120.00

HGL			
Dn	Up	Hw	Hw/D
(ft)	(ft)	(ft)	
12.64	12.85	14.53	1.18
12.64	12.85	14.65	1.20
12.64	12.86	14.77	1.21
12.64	12.87	14.86	1.22
12.64	12.87	14.95	1.23
12.64	12.88	15.04	1.23

Culvert Report

Proposed Culvert (Alt 2) (2x 7'X7' boxes on side)

Invert Elev Dn (ft)	=	5.54
Pipe Length (ft)	=	96.20
Slope (%)	=	0.06
Invert Elev Up (ft)	=	5.60
Rise (in)	=	84.0
Shape	=	Box
Span (in)	=	84.0
No. Barrels	=	2
n-Value	=	0.013
Culvert Type	=	Flared Wingwalls
Culvert Entrance	=	30D to 75D wingwall flares
Coeff. K,M,c,Y,k	=	0.026, 1, 0.0347, 0.81, 0.4

Embankment

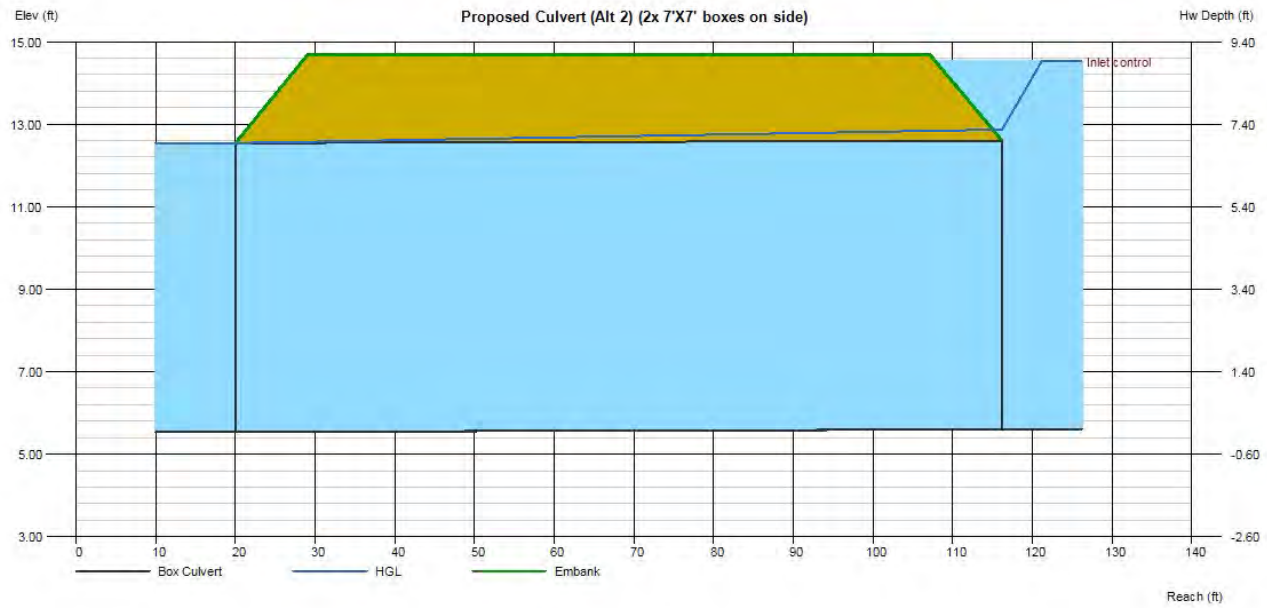
Top Elevation (ft)	=	14.69
Top Width (ft)	=	78.00
Crest Width (ft)	=	30.00

Calculations

Qmin (cfs)	=	910.00
Qmax (cfs)	=	950.00
Tailwater Elev (ft)	=	Crown

Highlighted

Qtotal (cfs)	=	950.00
Qpipe (cfs)	=	950.00
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	9.69
Veloc Up (ft/s)	=	9.69
HGL Dn (ft)	=	12.54
HGL Up (ft)	=	12.87
Hw Elev (ft)	=	14.53
Hw/D (ft)	=	1.28
Flow Regime	=	Inlet Control



Q			Veloc		Depth	
Total	Pipe	Over	Dn	Up	Dn	Up
(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(in)	(in)
910.00	910.00	0.00	9.29	9.29	84.00	84.00
930.00	930.00	0.00	9.49	9.49	84.00	84.00
950.00	950.00	0.00	9.69	9.69	84.00	84.00

HGL			
Dn	Up	Hw	Hw/D
(ft)	(ft)	(ft)	
12.54	12.84	14.26	1.24
12.54	12.85	14.39	1.26
12.54	12.87	14.53	1.28

1265 (extension)
+970 (side)
=2235 cfs (total)