

## Appendix G

### Preliminary Hydrology and WQMP

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# Preliminary Hydrology Report

Pilot Perris

APN: 329-250-011 & 329-250-012

**March 2022**

**PREPARED FOR:**

**Pilot Travel Centers LLC**  
5508 Lonas Drive  
Knoxville, TN 37909  
(865) 588-7488

**PREPARED BY:**

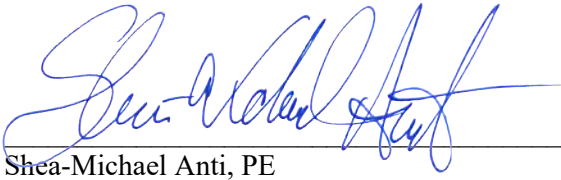
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KHA Project # 095426010

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# Certification by Engineer



3/22/22

Shea-Michael Anti, PE

Date



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## References

*Hydrology Manual.* Riverside County Flood Control and Water Conservation District, April 1978.

## **100.0 Introduction**

Kimley-Horn and Associates has been retained to prepare a Preliminary Hydrology Report for the proposed Pilot Travel Center in Perris, California. The purpose of this report is to demonstrate preliminary analysis of the hydrologic and hydraulic conditions associated with the development of the project site. To do so, the following is the scope of this report:

- Discuss the pre-development discharge patterns and points
- Discuss the post-development discharge patterns and points
- Determine the pre-development flow rates for the 10-year and 100-year events
- Determine the post-development unmitigated flow rates for the 10-year and 100-year events
- Analyze the required post-development onsite mitigation for the 100-year event

Even though this report discusses stormwater, this report is not a Stormwater Pollution Prevention Plan (SWPPP), a Groundwater Study, a Geotechnical Report, nor a Water Quality Management Plan (WQMP). Each of these separate reports discusses separate aspects of stormwater. Portions of the Geotechnical Report are utilized and referenced for the purpose of this report. Similarly, the requirements of the WQMP are considered for the stormwater mitigation and sizing of outlet structures for this project.

## **100.1 Project Description**

The existing vacant lot will be developed into the proposed Pilot Travel Center. The proposed development will include a proposed building with a restaurant, drive thru, and proposed fueling areas. Site improvements will include landscaping, concrete hardscape, and asphalt paving. The associated improvements include, but are not limited to onsite grading, domestic water service, sanitary sewer service, storm drain infrastructure, concrete and asphalt pavement, landscaping, and irrigation. The total project makes up nearly 14.0-acres. The project will not be phased.

## **100.2 Location**

The site is located northwest of Ethanac Road and Trumble Road in the City of Perris, within Riverside County. The project site is bordered by Interstate 215 to the west, a vacant property to the north, Trumble Road to the east, and Ethanac Road to the south. For reference, see Appendix A Location Map.

## **100.3 Methodology**

The hydrologic and hydraulic analyses were completed following the methods outlined in the RCFC & WCD Hydrology Manual. The rational method was used to estimate time of concentrations and peak flow rates generated from the existing and proposed 10-year and 100-year storm events. The synthetic unit hydrograph method was used to determine the onsite existing and proposed hydrographs for the 1, 3, 6 and 24-hour durations of the 100-year storm event. The CivilDesign Engineering Software – 2018 Version 9.0 was used to complete the rational method and synthetic unit hydrograph analyses. The results of the rational method analyses are included in Appendix I and the results of the synthetic unit hydrograph analyses are included in Appendix J. Bentley's FlowMaster was used to complete the hydraulic analyses for the offsite drainage ditch and culvert using the Federal Highway Administration HEC-22 method. The results of the analyses are included in Appendix L. Complete onsite and offsite drainage system analyses will be provided in the Final Hydrology Report.

For the rational method analysis, the rainfall data incorporated into CivilDesign from the Riverside County Flood Control and Water Conservation District Hydrology Manual was used. The rainfall data for the Perris Valley area was utilized due to the location of the project site. For the synthetic unit hydrograph analysis, the rainfall data from NOAA Atlas 14 for Moreno Valley, CA was used. See Appendix D and E for rainfall data.

The type of soil and soil conditions are major factors affecting infiltration/detention and resultant storm water runoff. The Natural Resources Conservation Service (NRCS) has classified soil into one general hydrologic soil group for comparing infiltration and runoff rates. The group is based on properties that influence runoff, such as water infiltration rate, texture, natural discharge, and moisture condition. The runoff potential is based on the amount of runoff at the end of a long duration storm that occurs after wetting and swelling of the soil not protected by vegetation. Using the United States Department of Agriculture Natural Resources Conservation Service Web Soil Survey online tool, it was determined the predominant hydrologic soil group classification onsite is D. Based

on Plate C-1.42 of the Hydrology Manual, the site soils is type D as well. Soil type D is defined as soils having poor infiltration rates (high runoff potential). Based on the Geotechnical Engineering Percolation/Infiltration Test Report prepared by Geotechnical Solutions, Inc the proposed site experiences a percolation rate of 1.14 in/hr on average. The reported infiltration rate based on the Porchet Method was determined to be 0.05 in/hr (without a factor of safety applied). See Appendix D and F for the soil information.

In addition, antecedent moisture condition (AMC) II was used to calculate the 10-year and (AMC) III was used to calculate the 100-year peak flows and runoff based on the hydrology manual. The land use for the proposed drainage subareas were selected based on the percent impervious that characterizes each subarea in the proposed conditions. See Appendix D Plate D-5.6 for the impervious percentages that correspond to each land use.

## 100.4 Drainage Characteristics

The site is mainly located in Zone X per the Federal Emergency Management Administration (FEMA) Flood Insurance Rate Map (FIRM) panel 06065C2055H and 06065C2060H, dated August 18, 2014. For reference, see FIRM Map in Appendix B. Flood Zone X is defined by FEMA as the area determined to be outside the 100-year flood. No portion of the site is located within the special flood hazard area inundated by the 100-year flood.

### 100.4.1 Pre-development Condition

Under the existing condition, the project site drains northwest. The existing condition of the project site is vacant and land cover consists mostly of annual grass. Under existing conditions, the project site was subdivided into two drainage areas (A-1 and A-2). Both A-1 and A-2 confluence and sheet flow out along the western boundary into an existing natural swale. The existing natural swale also accepts additional flows from an existing headwall southwest of the project site. The swale flows north and is intercepted by an existing double 6'x5' RCB culvert near Illinois Avenue and Interstate 215. Flows from the existing culvert are conveyed west across Interstate 215 and then continue west through existing drainage facilities until discharging into the San Jacinto River.

Under existing conditions, the project site accepts some offsite flows from the adjacent vacant properties on the east. Offsite runoff flows through the site, confluence with the onsite flows, and sheet flow out along the western boundary. Ultimately, existing storm water discharge from offsite and onsite areas are intercepted by the existing double 6'x5' RCB culvert and are tributary to the San Jacinto River.

Table 1 shows a summary of the Onsite Pre-development Flows. See Appendix H for Existing Drainage Maps and Appendix I for Rational Calculations.

**Table 1: 100-year Onsite Pre-development Flows**

Area Description	Area (acres)	Q <sub>10</sub> (cfs)	Q <sub>100</sub> (cfs)
A-1, A-2	13.97	12.72	20.43

### 100.4.2 Post-development Condition

Similar to existing condition, the post-developed project site will predominantly drain northwest to maintain the existing flow pattern to the maximum extent possible. The proposed development includes the construction of the proposed Pilot Perris Travel Center. The proposed site will encompass one (1) new building with a restaurant, drive thru, and fueling areas. The site will include landscaping, concrete hardscape, asphalt parking, a new concrete channel, a drainage ditch for offsite flows, and a bio-retention basin. See Appendix C for Construction Plans.

Per the Romoland Master Drainage Plan (MDP), originally prepared in April 1988 and revised in March 2006, the development of our project site requires the construction of a drainage facility along the west (specifically lateral A-11A). Lateral A-11A includes a concrete channel from the southwest corner of our site to the existing culvert near Illinois Avenue. The planned Lateral A-11A was planned to accept the flows from our project site along with the offsite flows that our project site accepts and the flows tributary to the northern property. The flows tributary to our project site are shown as areas W-1, W-2, and W-3 of the MDP in Appendix G. Although the hydrology of the MDP shows that the calculated channel flows are planned to accept developed areas, the planned developed flow

from our site was 20.3 cfs which is nearly the same as our calculated onsite pre-development flow (20.4 cfs). Therefore, the proposed discharge from the project site will be mitigated to release the same flows as in the undeveloped condition in order to stay consistent with the planned flows from the site in the MDP.

Under proposed conditions, the project site will not obstruct conveyance of the existing offsite flows. Under the developed condition, the offsite runoff will be accepted from the existing cross gutter near the intersection of Trumble Road and Ethanac Road. The project is proposing a drainage ditch along the south that flows west and into the proposed channel. The proposed ditch is anticipated to convey 32 cfs of offsite runoff per the Romoland MDP.

Additionally, the proposed development does not plan to alter the existing natural swale west of the project site. This existing swale is within Caltrans right-of-way and will not be disturbed. Under the proposed condition, the existing swale will only be conveying tributary flows from Caltrans right-of-way and from the existing headwall southwest of the project site.

The developed project site includes fourteen (14) drainage areas. Drainage Areas A-1 through A-8 include most of the proposed development. Runoff from A-1 through A-8 predominantly drain in a northwest direction and are conveyed by a proposed storm drain system into a proposed bio-retention basin west of the project site. The bio-retention area (A-9) also contributes to the flows into the basin. Discharge from the basin will be controlled by an outlet structure and, due to the basin bottom elevation and the need for an underdrain system, flows will be pumped to discharge into the proposed channel (MDP Lateral A-11A). Drainage areas A-10 and A-11 include the proposed drainage ditch that will convey offsite flows. Drainage area A-12 includes the proposed channel. Drainage area A-13 and A-14 are driveway areas that were unfeasible to capture onsite and will drain toward the adjacent streets which ultimately drain into the proposed channel. Ultimately, all of the proposed onsite drainage areas are tributary to the proposed channel as planned in the Romoland MDP.

Table 2 shows a summary of the Onsite Post-development Flows (unmitigated). See Appendix H for Proposed Drainage Maps and Appendix I for Rational Calculations.

**Table 2: Onsite Post-development Flows (unmitigated)**

<b>Area Description</b>	<b>Area (acres)</b>	<b>Q<sub>10</sub> (cfs)</b>	<b>Q<sub>100</sub> (cfs)</b>
<b>A-1 to A-12</b>	<b>13.88</b>	<b>17.62</b>	<b>26.92</b>

## 100.5 Stormwater Mitigation

The proposed development intends to coincide with the planned discharge flows from the Romoland MDP. Per the MDP, the planned discharge from our site is 20.3 cfs which nearly coincides with the onsite pre-development 100-year discharge of the site (20.4 cfs). Since our resulting unmitigated post-development flows exceed the existing flows, stormwater mitigation will be required. The proposed development is proposing a bio-retention basin (A-9) for dual purposes: stormwater quality treatment and mitigation. The volume of storage provided in the basin along with the size of the outflow riser structure is intended to restrict peak flows in the proposed condition to levels equal to or less than the existing flows. The existing and proposed unit hydrographs for the 1-hr, 3-hr, 6-hr and 24-hr durations of the 100-year storm event were compared in order to determine the required retention volume. The required retention volume was governed by the 100 year-24 hour storm. To estimate the retention volume required for preliminary purposes, the incremental storage (volume) in which the proposed unit hydrograph flows exceeded the existing unit hydrograph flows was calculated for each time step. These incremental volumes were added to determine the total estimated retention volume. Since the basin outlet riser structures will be sized in the Final Report, an additional 20% was added to the calculated retention volumes to account for the efficiency of the outlet structures. Through the mitigation that the proposed basin will provide, the proposed development is not expected to cause a significant impact to downstream systems. See Appendix J and K for the retention and proposed volume calculations. Table 3 shows a summary of the estimated retention volume required compared to the proposed retention volume provided.

**Table 3: Estimated Retention Volume Required vs. Proposed Retention Volume Provided**

Area	Estimated Volume Increase (cf)	Estimated Retention Volume Required (cf)	Proposed Basin Volume (cf)
A (Onsite)	30,475	36,569	225,788

### 100.6 Hydraulic Analysis

The calculated peak flows from the analyses discussed above will be used to size the onsite drainage devices. The offsite concrete channel size was determined in the MDP as shown in Appendix G. The proposed offsite drainage ditch and culvert were preliminarily sized to assure offsite flows are able to be properly conveyed through the site. Preliminary sizing calculations are included in Appendix L for reference. All remaining drainage devices will be sized in the Final Hydrology Report.

### 100.7 Conclusion

In conclusion, the following was covered in this report:

- The pre-development discharge patterns and points were analyzed
- The post-development discharge patterns and points were analyzed
- The pre-development flow rates for the 10-year and 100-year events were determined
- The post-development unmitigated flows for the 10-year and 100-year events were determined
- The required stormwater mitigation for the 100-year event was determined

As discussed in the contents of this report, the development of the existing site into the proposed development is not expected to cause a significant impact to downstream systems for storms up to the 100-year condition.

**Appendix A**  
**Location Map**



215

Case Rd

Case Rd

Illinois Ave

Trumble Rd

Sherman Rd

PROJECT SITE

Ethanac Rd

Ethanac Rd

Etha

Encanto Dr

Trumble Rd

Sherman Rd



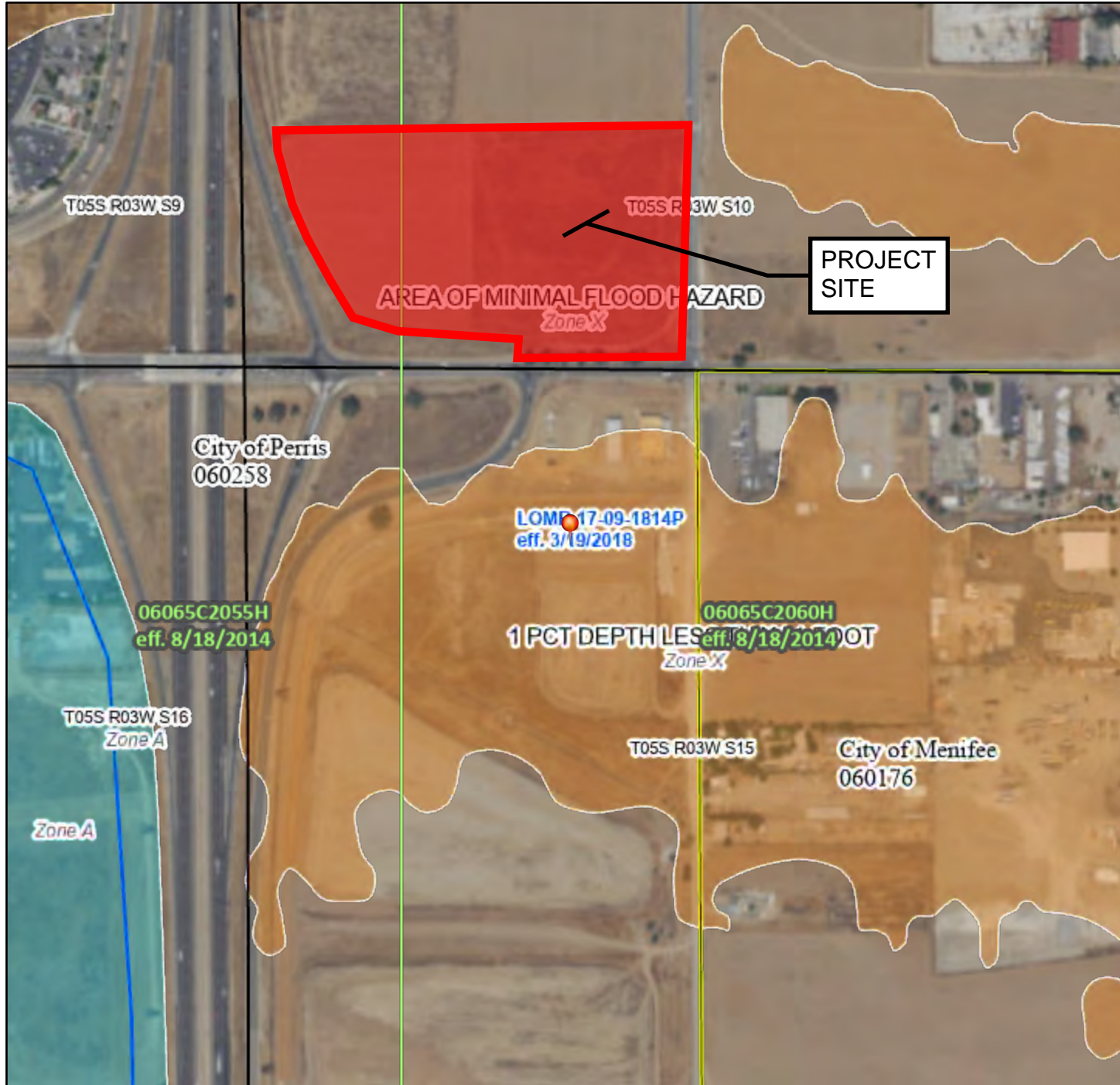
## **Appendix B**

### **FIRM Map**

# National Flood Hazard Layer FIRMMette



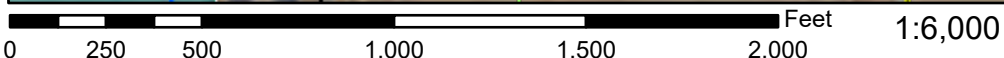
117°11'28"W 33°44'45"N



## Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

- |                                    |  |  |
|------------------------------------|--|--|
| <b>SPECIAL FLOOD HAZARD AREAS</b>  |  | Without Base Flood Elevation (BFE)<br><i>Zone A, V, A99</i>  |
|                                    |  | With BFE or Depth <i>Zone AE, AO, AH, VE, AR</i>   |
|                                    |  | Regulatory Floodway  |
| <b>OTHER AREAS OF FLOOD HAZARD</b> |  | 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile <i>Zone X</i> |
|                                    |  | Future Conditions 1% Annual Chance Flood Hazard <i>Zone X</i>  |
|                                    |  | Area with Reduced Flood Risk due to Levee. See Notes. <i>Zone X</i>  |
|                                    |  | Area with Flood Risk due to Levee <i>Zone D</i>  |
| <b>OTHER AREAS</b>                 |  | NO SCREEN Area of Minimal Flood Hazard <i>Zone X</i>   |
|                                    |  | Effective LOMRs  |
|                                    |  | Area of Undetermined Flood Hazard <i>Zone D</i>  |
| <b>GENERAL STRUCTURES</b>          |  | Channel, Culvert, or Storm Sewer   |
|                                    |  | Levee, Dike, or Floodwall  |
| <b>OTHER FEATURES</b>              |  | 20.2 Cross Sections with 1% Annual Chance Water Surface Elevation  |
|                                    |  | 17.5 Coastal Transect  |
|                                    |  | Base Flood Elevation Line (BFE)  |
|                                    |  | Limit of Study   |
|                                    |  | Jurisdiction Boundary  |
|                                    |  | Coastal Transect Baseline  |
|                                    |  | Profile Baseline   |
|                                    |  | Hydrographic Feature   |
| <b>MAP PANELS</b>                  |  | Digital Data Available   |
|                                    |  | No Digital Data Available  |
|                                    |  | Unmapped   |
|                                    |  | The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.                                     |



117°10'51"W 33°44'15"N

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on **8/17/2021 at 12:07 PM** and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

**Appendix C**  
**Construction Plans**

PROJECT TEAM

OWNER / DEVELOPER
PILOT TRAVEL CENTERS LLC
5508 LONAS DRIVE
KNOXVILLE, TN 37909
(865) 588-7488

CIVIL ENGINEER
SHEA-MICHAEL ANTI, P.E., LSIT, OSP/QSD
KIMLEY-HORN AND ASSOCIATES, INC.
3880 LEMON STREET, SUITE 420,
RIVERSIDE, CA 92501
(951) 335-8272
SHEA.ANTI@KIMLEY-HORN.COM

SURVEYOR
LG LAND SURVEYING, INC
30355 CALLE FELIZ TER
VALLEY CENTER, CA 92082
ATTN: JOHN GERVAIS, PLS 8674
(819) 535-1172
JOHN@GLSINC.COM
DATE OF FIELD SURVEY: 07/13/2021

GEOTECHNICAL CONSULTANT
GEOTECHNICAL SOLUTIONS, INC
27 MAUCHLY #210
IRVINE, CA 92618
PROJECT NO.: G-5908-01
DATED: JUNE 11, 2021

UTILITY PURVEYORS

WATER
EASTERN MUNICIPAL WATER DISTRICT
P.O. BOX 8300
2270 TRUMBLE ROAD PERRIS, CA
92572 (951) 928-3777

ELECTRICITY
SOUTHERN CALIFORNIA EDISON
26100 MENIFEE ROAD MENIFEE, CA
92585
PHONE: (800) 655-4555

TELEPHONE/CABLE
FRONTIER COMMUNICATIONS
E 3RD ST PERRIS, CA, 92570
PHONE: (909) 793-2826

SEWER
EASTERN MUNICIPAL WATER DISTRICT
P.O. BOX 8300
2270 TRUMBLE ROAD
PERRIS, CA 92572
(951) 928-3777

GAS
SOUTHERN CALIFORNIA GAS
1981 W. LUGONIA AVENUE
REDLANDS, CA 92374
PHONE: (800) 427-2200

PRIVATE ENGINEER'S NOTICE TO CONTRACTOR:

THE EXISTENCE AND LOCATION OF ANY UNDERGROUND UTILITY PIPES OR STRUCTURES SHOWN ON THESE PLANS WERE OBTAINED BY A SEARCH OF AVAILABLE RECORDS. THESE LOCATIONS ARE APPROXIMATE AND SHALL BE CONFIRMED IN THE FIELD BY THE CONTRACTOR SO THAT ANY NECESSARY ADJUSTMENTS CAN BE MADE IN ALIGNMENT AND/OR GRADE OF THE PROPOSED IMPROVEMENTS.

ACTUAL THICKNESS OR BASE MATERIAL TO BE DETERMINED BY THE SOILS TEST AND RECOMMENDED BY THE SOILS ENGINEER.

CARE SHOULD BE TAKEN TO PREVENT GRADED DITCHES AND SWALES FROM UNDERMINING STREET IMPROVEMENTS.

ATTENTION CONTRACTORS:

CONTRACTOR SHALL VERIFY ALL CONDITIONS AND DIMENSIONS AND SHALL REPORT ALL DISCREPANCIES TO THE ENGINEER PRIOR TO THE COMMENCEMENT OF WORK.

CONSTRUCTION CONTRACTOR AGREES THAT, IN ACCORDANCE WITH GENERALLY ACCEPTED CONSTRUCTION PRACTICES, CONSTRUCTION CONTRACTOR WILL BE REQUIRED TO ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THE PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY;

BASIS OF BEARINGS:

THE BASIS OF BEARINGS FOR THIS SURVEY IS THE CENTERLINE OF TRUMBLE ROAD PER RS 85/71, I.E. N00°13'05"E.

FLOOD ZONE INFORMATION

THE LAND SHOWN IS MAINLY LOCATED IN FLOOD ZONE "X" BEING DESCRIBED AS AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN. PER FLOOD INSURANCE RATE MAP (FIRM) - COMMUNITY PANEL NUMBER 06065C2055H AND 06065C2060H, DATED AUGUST 18, 2014.

BUILDING NOTE:

ALL INFORMATION WITH BUILDING (INCLUDING SETBACKS AND FINISH FLOOR ELEVATIONS) IS FOR REFERENCE ONLY AND THE APPROVAL OF THESE GRADING PLANS DO NOT INCLUDE ANY PROVISIONS ASSOCIATED WITH BUILDINGS.

NOTE:

A PRE-GRADING/PRE-CONSTRUCTION MEETING AND SITE INSPECTION SHALL BE ARRANGED FOR BY THE SITE DEVELOPER PRIOR TO COMMENCING GRADING OPERATIONS. THOSE PARTIES REQUIRED TO ATTEND THE PRE-CONSTRUCTION MEETING SHALL INCLUDE BUT ARE NOT LIMITED TO THE DEVELOPER, PROJECT SUPERINTENDENT, ENGINEER OF RECORD, SOIL ENGINEER, GRADING CONTRACTOR, THE UNDERGROUND UTILITIES CONTRACTOR AND CITY INSPECTOR.

NO WORK SHALL COMMENCE WITHIN THE ROAD RIGHT-OF-WAY (R/W) PRIOR TO ISSUANCE OF AN ENCROACHMENT PERMIT BY CITY OF PERRIS.

PROJECT WILL COMPLY WITH PM10 REQUIREMENTS.

NOTIFICATIONS:

AT LEAST 48 HOURS PRIOR TO COMMENCING CONSTRUCTION, CONTRACTOR SHALL NOTIFY:

- 1. EASTERN MUNICIPAL WATER DISTRICT (FIELD ENGINEERING DEPARTMENT) (951) 928-3777, EXT 4830
2. CITY OF PERRIS (951) 943-5003
3. UNDERGROUND SERVICE ALERT (USA) (800) 227-2600 OR 811
4. ALL OTHER AFFECTED UTILITIES AND PERMIT AGENCIES:

CITY OF PERRIS
PRELIMINARY GRADING PLANS
PILOT PERRIS
ETHANAC ROAD AND TRUMBLE ROAD

LEGAL DESCRIPTION

THE LAND REFERRED TO HEREIN BELOW IS SITUATED IN THE CITY OF PERRIS, IN THE COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, AND IS DESCRIBED AS FOLLOWS:

PARCEL A:

LOT 13 OF WATERS HOMESTEAD, A SUBDIVISION OF THE SOUTHWEST QUARTER OF SECTION 10, TOWNSHIP 5 SOUTH, RANGE 3 WEST, SAN BERNARDINO BASE AND MERIDIAN, AS SHOWN BY MAP OF SAID SUBDIVISION ON FILE IN BOOK 14, PAGE 681, SAN DIEGO COUNTY RECORDS.

EXCEPT FROM SAID LOT 13 THAT PORTION THEREOF GRANTED TO THE STATE OF CALIFORNIA FOR FREEWAY PURPOSES BY DEED RECORDED JULY 3, 1951 IN BOOK 1284, PAGE 162, OFFICIAL RECORDS, RIVERSIDE COUNTY RECORDS.

ALSO EXCEPT THOSE PORTIONS OF LOT 13 OF WATERS HOMESTEAD, A SUBDIVISION OF THE SOUTHWEST QUARTER OF SECTION 10, TOWNSHIP 5 SOUTH, RANGE 3 WEST, SAN BERNARDINO BASE AND MERIDIAN, AS SHOWN BY MAP OF SAID SUBDIVISION ON FILE IN BOOK 14, PAGE 681 OF MAPS, SAN DIEGO COUNTY RECORDS, LYING WESTERLY AND SOUTHERLY OF THE FOLLOWING DESCRIBED LINE:

BEGINNING ON THE NORTHERLY LINE OF SAID LOT 12, DISTANT ALONG SAID NORTHERLY LINE SOUTH 89° 17' 04" EAST 50.61 FEET FROM THE WESTERLY LINE OF SAID SECTION;
THENCE COURSE (1) SOUTH 0° 21' 45" EAST 82.75 FEET;
THENCE ALONG A TANGENT CURVE CONCAVE EASTERLY WITH A RADIUS OF 2947 FEET, THROUGH AN ANGLE OF 3° 11' 29", 164.15 FEET;
THENCE ALONG A COMPOUND CURVE CONCAVE EASTERLY WITH A RADIUS OF 2197 FEET FROM A TANGENT BEARING SOUTH 3° 33' 14" EAST, THROUGH AN ANGLE OF 15° 40' 18", 600.93 FEET;
THENCE SOUTH 19° 13' 32" EAST 67.41 FEET;
THENCE SOUTH 28° 16' 41" EAST 298.72 FEET;
THENCE SOUTH 58° 11' 26" EAST, 50.93 FEET;
THENCE SOUTH 82° 01' 10" EAST 438.46 FEET;
THENCE COURSE (2) CONTINUING SOUTH 82° 01' 10" EAST 207.28 FEET;
THENCE COURSE (3) SOUTH 0° 46' 23" WEST 24.30 FEET TO THE SOUTHERLY LINE OF SAID LOT 14, AS CONVEYED TO THE STATE OF CALIFORNIA BY DEED RECORDED JUNE 18, 1965 AS INSTRUMENT NO. 70888 OF OFFICIAL RECORDS OF RIVERSIDE COUNTY.

APN: 329-250-011

PARCEL B:

LOT 14 OF WATERS HOMESTEAD, A SUBDIVISION OF THE SOUTHWEST QUARTER OF SECTION 10, TOWNSHIP 5 SOUTH, RANGE 3 WEST, SAN BERNARDINO BASE AND MERIDIAN, AS SHOWN BY MAP OF SAID SUBDIVISION ON FILE IN BOOK 14, PAGE 681, SAN DIEGO COUNTY RECORDS.

EXCEPT THE EASTERLY RECTANGULAR 30 FEET OF SAID LOT 14, AS GRANTED TO COUNTY OF RIVERSIDE BY DEED RECORDED AUGUST 16, 1950 IN BOOK 1197, PAGE 206 AND BY DEED RECORDED AUGUST 16, 1950 IN BOOK 1197, PAGE 229, BOTH OF OFFICIAL RECORDS, RIVERSIDE COUNTY RECORDS.

EXCEPT THOSE PORTIONS OF LOT 14 OF WATERS HOMESTEAD, A SUBDIVISION OF THE SOUTHWEST QUARTER OF SECTION 10, TOWNSHIP 5 SOUTH, RANGE 3 WEST, SAN BERNARDINO BASE AND MERIDIAN, AS SHOWN BY MAP OF SAID SUBDIVISION ON FILE IN BOOK 14, PAGE 681 OF MAPS, SAN DIEGO COUNTY RECORDS, LYING WESTERLY AND SOUTHERLY OF THE FOLLOWING DESCRIBED LINE:

BEGINNING ON THE NORTHERLY LINE OF SAID LOT 12, DISTANT ALONG SAID NORTHERLY LINE SOUTH 89° 17' 04" EAST 50.61 FEET FROM THE WESTERLY LINE OF SAID SECTION;
THENCE COURSE (1) SOUTH 0° 21' 45" EAST 82.75 FEET;
THENCE ALONG A TANGENT CURVE CONCAVE EASTERLY WITH A RADIUS OF 2947 FEET, THROUGH AN ANGLE OF 3° 11' 29", 164.15 FEET;
THENCE ALONG A COMPOUND CURVE CONCAVE EASTERLY WITH A RADIUS OF 2197 FEET FROM A TANGENT BEARING SOUTH 3° 33' 14" EAST, THROUGH AN ANGLE OF 15° 40' 18", 600.93 FEET;
THENCE SOUTH 19° 13' 32" EAST 67.41 FEET;
THENCE SOUTH 28° 16' 41" EAST 298.72 FEET; THENCE SOUTH 58° 11' 26" EAST, 50.93 FEET;
THENCE SOUTH 82° 01' 10" EAST 438.46 FEET;
THENCE COURSE (2) CONTINUING SOUTH 82° 01' 10" EAST 207.28 FEET;
THENCE COURSE (3) SOUTH 0° 46' 23" WEST 24.30 FEET TO THE SOUTHERLY LINE OF SAID LOT 14, AS CONVEYED TO THE STATE OF CALIFORNIA BY DEED RECORDED JUNE 18, 1965 AS INSTRUMENT NO. 70888 OF OFFICIAL RECORDS OF RIVERSIDE COUNTY.

APN: 329-250-012

ESTIMATED EARTHWORK QUANTITIES

CUT: 21,176 CY

FILL: 20,864 CY

NET: 312 CY CUT

NOTE:

THE ABOVE QUANTITIES ARE APPROXIMATE AND FOR PERMIT PROCESS ONLY. QUANTITIES HAVE BEEN CALCULATED FROM EXISTING GRADE SURFACE TO PROPOSED FINAL GRADE. QUANTITIES ACCOUNT FOR THICKNESS OF PAVEMENT SECTIONS, BUILDING SLAB, AND DETENTION SPOILS. THEY DO NOT REFLECT SHRINKAGE, SWELL, SUBSIDENCE AND REMOVAL OF EXISTING BUILDING STRUCTURES AND SURFACE IMPROVEMENTS.

THE CONTRACTOR SHALL RELY ON THEIR OWN EARTHWORK ESTIMATES FOR BIDDING PURPOSES.

STATEMENT BY ENGINEER OF RECORD

ALL EASEMENTS SHOWN ON THIS PLAN ARE PER THE ALTA PREPARED BY LG LAND SURVEYING DATED 07/13/21.

APPLICABLE CODES:

ALL NEW CONSTRUCTION SHALL MEET OR EXCEED THE MINIMUM REQUIREMENTS OF THE CALIFORNIA BUILDING CODE 2016 EDITION THAT INCLUDE THE BUILDING, PLUMBING, MECHANICAL, ELECTRICAL, FIRE AND ENERGY COMMISSION SERIES. IN CASES WHERE THE CODES MAY CONFLICT WITH THE PROVISIONS IN THESE PLANS OR SPECIFICATIONS, THE MORE RESTRICTIVE PROVISIONS SHALL GOVERN.

SITE DATA

APN'S: 329-250-011 AND 329-250-012

GROSS PARCEL ±14.4 ACRES
DISTURBED ±14.4 ACRES
TOTAL PERVIOUS ±4.5 ACRES
TOTAL IMPERVIOUS ±9.9 ACRES
(INCLUDING BUILDING)

TOTAL GROSS FLOOR AREA: 13,980 SF

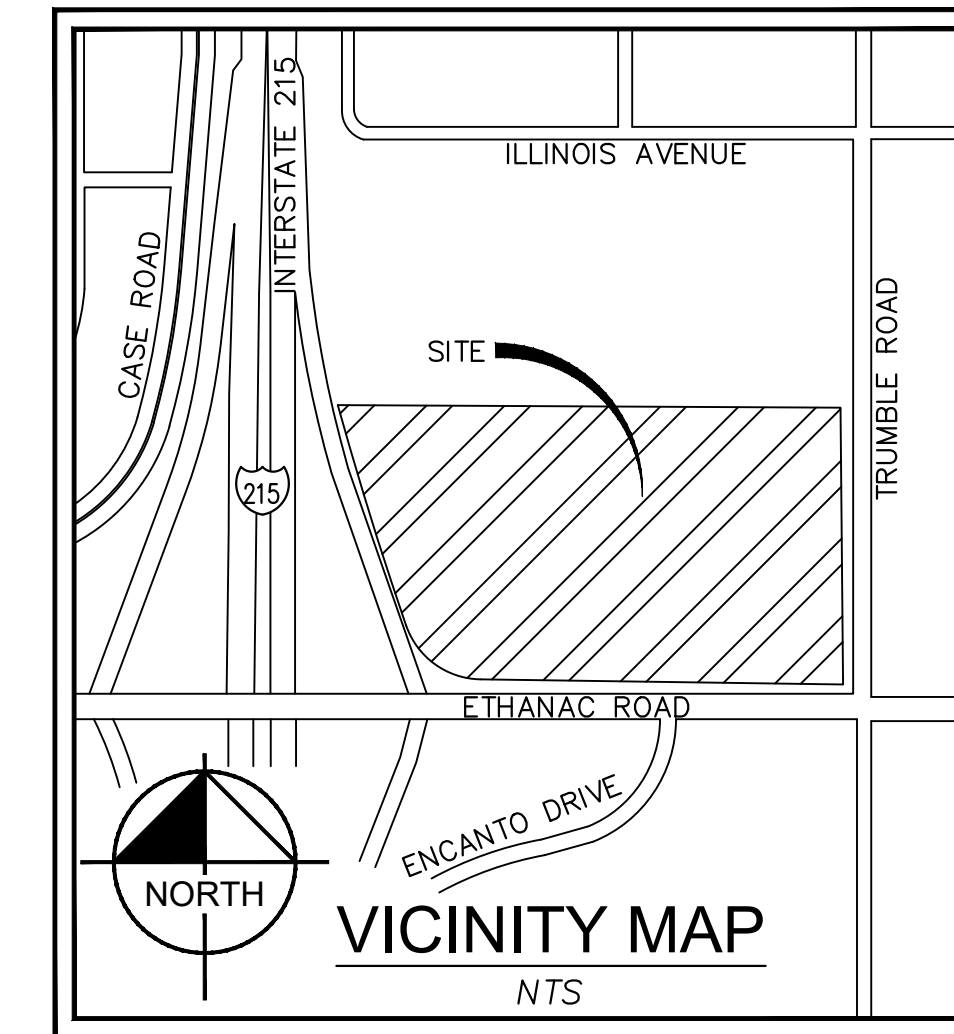
EXISTING: COMMERCIAL COMMUNITY (CC)

PROPOSED: COMMERCIAL COMMUNITY (CC)

PARKING PROVIDED:

STANDARD 88 SPACES
ACCESSIBLE 5 SPACES
TRUCK 116 SPACES

BICYCLE SPACES 2 PROPOSED



ABBREVIATIONS

- AB - AGGREGATE BASE
AC - ASPHALT
AHJ - AUTHORITY HAVING JURISDICTION
BC - BACK OF CURB
BS - BOTTOM OF STAIR
BLDG - BUILDING
BW - BACK OF WALK
CAB - COMPACTED AGGREGATE BASE
CB - CATCH BASIN
CF - CURB FACE
C/L - CENTERLINE
CONC. - CONCRETE
CONST. - CONSTRUCT, CONSTRUCTION
CSG - COMPACTED SUBGRADE
DF - DEEPEMED FOOTING
DI - DRAIN INLET
DW - DOMESTIC WATER
E - EAST
EG - EDGE OF GUTTER
ELEC - ELECTRIC
EP - EDGE OF PAVEMENT
FF - FINISHED FLOOR
FG - FINISHED GRADE
FL - FLOW LINE
FS - FINISHED SURFACE
FW - FIRE WATER
G - GAS
GB - GRADE BREAK
HP - HIGH POINT
INV - INVERT
IRR - IRRIGATION WATER
JS - JUNCTION STRUCTURE
L - LENGTH
LP - LOW POINT
MH - MANHOLE
N - NORTH
PCC - PORTLAND CEMENT CONCRETE
P/L - PROPERTY LINE
PUE - PUBLIC UTILITY EASEMENT
PVC - POLYVINYL CHLORIDE
R - RADIUS OR RIDGE
RD - ROOF DRAIN
RW - RECLAIMED WATER
ROW - RIGHT-OF-WAY
S - SLOPE GRADIENT
SD - STORM DRAIN
STA - STATION
SS - SANITARY SEWER
SPPWC - STANDARD PLANS FOR PUBLIC WORKS CONSTRUCTION
SW - SIDE WALK
T - TELEPHONE
TC - TOP OF CURB
TS - TOP OF STAIR
VIF - VERIFY IN FIELD
W - WATER OR WEST
XXX.XX - PROPOSED ELEVATION
(XXX.XX) - EXISTING ELEVATION

LEGEND

- PROPERTY LINE CIVIL
CENTERLINE
SETBACKS
EASEMENT LINE
LIMITS OF WORK LINE
PROPOSED SANITARY SEWER PIPE
PROPOSED STORM DRAIN PIPE
PROPOSED AIR
PROPOSED WATER PIPE
PROPOSED OIL WATER SEPARATOR
PROPOSED TELEPHONE LINE
PROPOSED UNDERGROUND ELECTRIC
GRADE BREAK
RIDGE LINE
ACCESSIBLE ROUTE
FENCE
PARKING COUNT
PROPOSED ELEVATION
EXISTING ELEVATION
SLOPE

SHEET INDEX

Table with 2 columns: SHEET NUMBER and SHEET TITLE. Contains 16 rows listing sheets from 1 (COVER SHEET) to 16 (LANDSCAPE PLAN).

GEOTECHNICAL REPORT

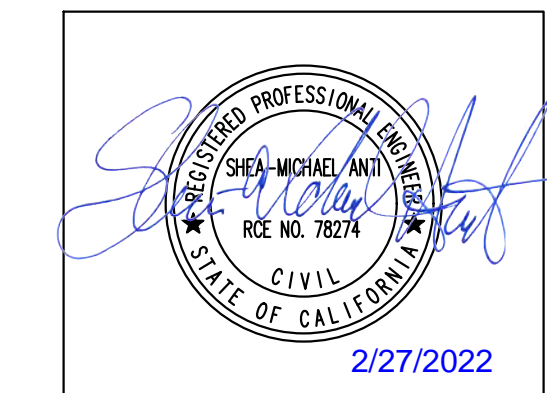
THE GEOTECHNICAL EVALUATION REPORT TRAVEL PLAZA PERRIS PROJECT NO. G-5908-01 DATED JUNE 11, 2021 PREPARED BY GEOTECHNICAL SOLUTIONS, INC. AND ALL ADDENDA SHALL BE CONSIDERED PART OF THESE CONSTRUCTION DOCUMENTS.

GEOTECHNICAL ENGINEER OF RECORD
GEOTECHNICAL SOLUTIONS, INC

DECLARATION OF ENGINEER OF RECORD

I HEREBY DECLARE THAT IN MY PROFESSIONAL OPINION, THE DESIGN OF THE IMPROVEMENTS AS SHOWN ON THESE PLANS COMPLIES WITH THE CURRENT PROFESSIONAL ENGINEERING STANDARDS AND PRACTICES. AS THE ENGINEER IN RESPONSIBLE CHARGE OF THE DESIGN OF THESE IMPROVEMENTS, I ACCEPT FULL RESPONSIBILITY FOR SUCH DESIGN.

SIGNATURE: [Signature] DATE: 2/27/2022
LICENSE NO. 78274 EXP. 9/30/2023

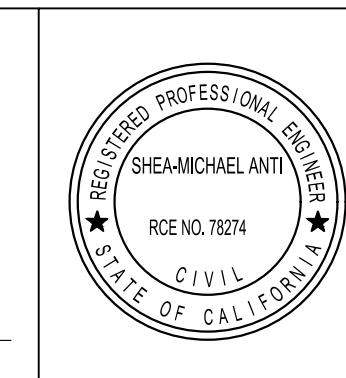


811 DIAL TOLL FREE 811
Know what's below. Call before you dig. AT LEAST TWO DAYS BEFORE YOU DIG
UNDERGROUND SERVICE ALERT OF SOUTHERN CALIFORNIA

BENCH MARK: COUNTY OF RIVERSIDE BENCHMARK "M 21-1 RESET", 373 FEET EAST ALONG ETHANAC ROAD FROM THE INTERSECTION OF ETHANAC ROAD AND THE SOUTHBOUND LANES OF HIGHWAY 395. 150 FEET SOUTH OF ETHANAC ROAD, 50 FEET SOUTHEAST OF THE NORTHEAST CORNER OF A 6 FOOT CHAIN LINK RIGHT-OF-WAY FENCE, 1 FOOT NORTHEAST OF AN ANGLE-POINT IN THE RIGHT-OF-WAY FENCE, 2 FEET NORTH OF A MARKER POST, A BRASS DISK STAMPED "M-21-1 RESET" SET IN THE TOP OF A CONCRETE POST 3 INCHES ABOVE GROUND. EL = 1421.891 NGVD 29 (5/85)

Table for tracking revisions with columns: MARK, BY, DATE, ENGINEER, REVISIONS, APPR, DATE, CITY.

CITY OF PERRIS
APPROVED BY: [Signature] DATE: 2/27/2022
CONTRACT CITY ENGINEER DATE



Kimley & Horn
765 THE CITY DRIVE SUITE 200, ORANGE, CA 92688
PHONE: 714-939-1030
PREPARED BY: [Signature] DATE: 2/27/2022
SHEA-MICHAEL ANTI R.C.E. 78274 DATE

COVER SHEET
PRELIMINARY PRECISE GRADING PLAN
PILOT PERRIS
ETHANAC ROAD AND TRUMBLE ROAD
APN: 329-250-011 & 329-250-012
PROJECT NUMBER: 095428010 FILE NO.:

Vertical text on the left margin: This document, together with the concepts and designs presented herein, as an instrument of service, is intended only for the specific purpose and client for which it was prepared. Reuse of and improper reliance on this document without written authorization and adaptation by Kimley-Horn and Associates, Inc. shall be without liability to Kimley-Horn and Associates, Inc.

This document, together with the concepts and designs presented herein, is intended only for the specific purpose and client for which it was prepared. Reuse of and improper reliance on this document without written authorization and adaptation by Kimley-Horn and Associates, Inc. shall be without liability to Kimley-Horn and Associates, Inc.

**GENERAL NOTES:**

- 1. NOTIFY CITY ENGINEER, CITY OF PERRIS, AT (951) 943-6504, AT LEAST 24 HOURS PRIOR TO START OF CONSTRUCTION.
- 2. PROOF ROLL BUILDING AND ALL PARKING AREAS. NOTIFY ARCHITECT OF ALL UNACCEPTABLE AREAS.
- 3. EDGE OF NEW PAVEMENT TO BE FLUSH WITH EXISTING PAVEMENT.
- 4. ALL SIDEWALK, CURB AND GUTTER, STREET PAVING, CURB CUTS, DRIVEWAY APPROACHES, ACCESSIBLE RAMPS, ETC. CONSTRUCTED OUTSIDE THE PROPERTY LINE IN THE RIGHT-OF-WAY SHALL CONFORM TO ALL MUNICIPAL AND/OR STATE SPECIFICATIONS AND REQUIREMENTS.
- 5. FOR AREAS OUTSIDE THE PROPERTY LINES, REPAIR AND REPLACE ALL DAMAGE DONE TO EXISTING ELEMENTS (SIDEWALKS, PAVING, LANDSCAPING, ETC.) AS REQUIRED BY OWNERS AND/OR GOVERNING AUTHORITY.
- 6. FOR PROPOSED UTILITY LOCATIONS, SEE UTILITY PLAN.
- 7. ALL DIMENSIONS REFER TO THE FACE OF CURB UNLESS OTHERWISE NOTED.
- 8. CONTRACTOR TO VERIFY ALL EXISTING CONDITIONS PRIOR TO ORDERING MATERIALS AND STARTING WORK, AND NOTIFY ENGINEER OF ANY DISCREPANCIES IMMEDIATELY.
- 9. CONTRACTOR SHALL ENSURE CLEAN JOINTS AND PROTECT PAVEMENT WHEREVER PROPOSED PAVEMENT MATCHES EXISTING PAVEMENT.
- 10. REFER TO ARCHITECTURAL PLANS FOR SIGN DETAILS. SEE MEP PLANS FOR SITE ELECTRICAL DRAWINGS.
- 11. REFER TO ARCHITECTURAL AND STRUCTURAL PLANS TO VERIFY ALL BUILDING DIMENSIONS.
- 12. ANY WORK IN THE RIGHT-OF-WAY SHALL BE APPROVED BY THE CITY ENGINEER.
- 13. ALL EARTHWORK TO COMPLY WITH RECOMMENDATIONS IN GEOTECHNICAL REPORT.
- 14. ALL PAINT STRIPING TO BE TWO COATS.
- 15. ALL PROPERTY LINES, EASEMENTS AND BUILDING, EXISTING AND PROPOSED, ARE SHOWN ON THIS SITE PLAN.
- 16. THE CONTRACTOR AND SUBCONTRACTORS SHOULD BE FAMILIAR WITH ALL STATE AND LOCAL REQUIREMENTS RELATED TO SITE CONSTRUCTION PRIOR TO BEGINNING TRENCHING WORK. ALL WORK SHALL CONFORM AS APPLICABLE TO THESE GOVERNING STANDARDS AND SPECIFICATIONS.
- 17. THE CONTRACTOR SHALL BE RESPONSIBLE FOR FURNISHING ALL MATERIAL AND LABOR TO CONSTRUCT THE FACILITY AS SHOWN AND DESCRIBED IN THE CONSTRUCTION DOCUMENTS IN ACCORDANCE WITH THE APPROPRIATE APPROVING AUTHORITIES, SPECIFICATIONS AND REQUIREMENTS. CONTRACTOR SHALL CLEAR AND GRUB ALL AREAS UNLESS OTHERWISE INDICATED, REMOVING TREES, STUMPS, ROOTS, MUCK, EXISTING PAVEMENT AND ALL OTHER DELETERIOUS MATERIAL.
- 18. EXISTING UTILITIES SHOWN ARE LOCATED ACCORDING TO THE INFORMATION AVAILABLE TO THE ENGINEER AT THE TIME OF THE TOPOGRAPHIC SURVEY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR THE ENGINEER. GUARANTEE IS NOT MADE THAT ALL EXISTING UNDERGROUND UTILITIES ARE SHOWN OR THAT THE LOCATION OF THOSE SHOWN ARE ENTIRELY ACCURATE. FINDING THE ACTUAL LOCATION OF ANY EXISTING UTILITIES IS THE CONTRACTOR'S RESPONSIBILITY AND SHALL BE DONE BEFORE COMMENCING ANY WORK IN THE VICINITY. FURTHERMORE, THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES DUE TO THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES. THE OWNER OR ENGINEER WILL ASSUME NO LIABILITY FOR ANY DAMAGES SUSTAINED OR COST INCURRED BECAUSE OF THE OPERATIONS IN THE VICINITY OF EXISTING UTILITIES OR STRUCTURES, NOR FOR TEMPORARY BRACING AND SHORING OF SAME. IF IT IS NECESSARY TO SCORE, BRACE, SWING OR RELOCATE A UTILITY, THE UTILITY COMPANY OR DEPARTMENT AFFECTED SHALL BE CONTACTED AND THEIR PERMISSION OBTAINED REGARDING THE METHOD TO USE FOR SUCH WORK.
- 19. IT IS THE CONTRACTOR'S RESPONSIBILITY TO CONTACT THE VARIOUS UTILITY COMPANIES WHICH MAY HAVE BURIED OR AERIAL UTILITIES WITHIN OR NEAR THE CONSTRUCTION AREA BEFORE COMMENCING WORK. THE CONTRACTOR SHALL PROVIDE 48 HOURS MINIMUM NOTICE TO ALL UTILITY COMPANIES PRIOR TO BEGINNING CONSTRUCTION. AN APPROXIMATE LIST OF THE UTILITY COMPANIES WHICH THE CONTRACTOR MUST CALL BEFORE COMMENCING WORK IS PROVIDED ON THE UTILITY SHEET OF THESE CONSTRUCTION PLANS. THIS LIST SERVES AS A GUIDE ONLY AND IS NOT INTENDED TO LIMIT THE UTILITY COMPANIES WHICH THE CONTRACTOR MAY WISH TO NOTIFY.
- 20. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL REQUIRED CONSTRUCTION PERMITS AND BONDS IF REQUIRED PRIOR TO CONSTRUCTION.
- 21. THE CONTRACTOR SHALL HAVE AVAILABLE AT THE JOB SITE AT ALL TIMES ONE COPY OF THE CONSTRUCTION DOCUMENTS INCLUDING PLANS, SPECIFICATIONS, GEOTECHNICAL REPORT AND SPECIAL CONDITIONS AND COPIES OF ANY REQUIRED CONSTRUCTION PERMITS.
- 22. ANY DISCREPANCIES ON THE DRAWINGS SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF THE OWNER AND ENGINEER BEFORE COMMENCING WORK. NO FIELD CHANGES OR DEVIATIONS FROM DESIGN ARE TO BE MADE WITHOUT PRIOR APPROVAL OF THE OWNER AND NOTIFICATION TO THE ENGINEER.
- 23. ALL COPIES OF COMPACTION, CONCRETE AND OTHER REQUIRED TEST RESULTS ARE TO BE SENT TO THE OWNER AND DESIGN ENGINEER OF RECORD DIRECTLY FROM THE TESTING AGENCY.
- 24. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SUBMITTING TO THE ENGINEER A CERTIFIED RECORD SURVEY SIGNED AND SEALED BY A PROFESSIONAL LAND SURVEYOR REGISTERED IN THE STATE OF ARIZONA DEPICTING THE ACTUAL FIELD LOCATION OF ALL CONSTRUCTED IMPROVEMENTS THAT ARE REQUIRED BY THE JURISDICTIONAL AGENCIES FOR THE CERTIFICATION PROCESS. ALL SURVEY COSTS WILL BE THE CONTRACTOR'S RESPONSIBILITY.
- 25. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DOCUMENTING AND MAINTAINING AS-BUILT INFORMATION WHICH SHALL BE RECORDED AS CONSTRUCTION PROGRESSES OR AT THE COMPLETION OF APPROPRIATE CONSTRUCTION INTERVALS AND SHALL BE RESPONSIBLE FOR PROVIDING AS-BUILT DRAWINGS TO THE OWNER FOR THE PURPOSE OF CERTIFICATION TO JURISDICTIONAL AGENCIES AS REQUIRED. ALL AS-BUILT DATA SHALL BE COLLECTED BY A STATE OF CALIFORNIA PROFESSIONAL LAND SURVEYOR WHOSE SERVICES ARE ENGAGED BY THE CONTRACTOR.
- 26. ANY WELLS DISCOVERED ON SITE THAT WILL HAVE NO USE MUST BE PLUGGED BY A LICENSED WELL DRILLING CONTRACTOR IN A MANNER APPROVED BY ALL JURISDICTIONAL AGENCIES. CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ANY WELL ABANDONMENT PERMITS REQUIRED.
- 27. ANY WELL DISCOVERED DURING EARTH MOVING OR EXCAVATION SHALL BE REPORTED TO THE APPROPRIATE JURISDICTIONAL AGENCIES WITHIN 24 HOURS AFTER DISCOVERY IS MADE.
- 28. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THAT THE PROPOSED IMPROVEMENTS SHOWN ON THE PLANS DO NOT CONFLICT WITH ANY KNOWN EXISTING OR OTHER PROPOSED IMPROVEMENTS. IF ANY CONFLICTS ARE DISCOVERED, THE CONTRACTOR SHALL NOTIFY THE OWNER PRIOR TO INSTALLATION OF ANY PORTION OF THE WORK THAT WOULD BE AFFECTED. FAILURE TO NOTIFY OWNER OF AN IDENTIFIABLE CONFLICT PRIOR TO PROCEEDING WITH INSTALLATION RELIEVES OWNER OF ANY OBLIGATION TO PAY FOR A RELATED CHANGE ORDER.
- 29. ANY EXISTING UTILITY, WHICH IS TO BE EXTENDED, WHICH IS THE CONNECTION POINT FOR NEW UNDERGROUND UTILITIES, OR WHICH NEW FACILITIES CROSS, SHALL BE EXPOSED BY THE CONTRACTOR PRIOR TO PLACEMENT OF THE NEW UTILITIES. COST OF SUCH EXCAVATION AND SUBSEQUENT BACKFILL SHALL BE INCLUDED IN THE PRICES PAID FOR THE VARIOUS ITEMS OF WORK. THE ELEVATIONS AND LOCATIONS OF THE EXISTING UTILITIES WILL BE CHECKED BY THE PUBLIC WORKS INSPECTOR AND THE ENGINEER. IF IN THE OPINION OF THE INSPECTOR A CONFLICT EXISTS, THEN THE ENGINEER SHALL MAKE ANY NEEDED GRADE AND/OR ALIGNMENT ADJUSTMENTS AND REVISE THE PLANS ACCORDINGLY. ALL GRAVITY FLOW PIPELINES TO BE LAID UPGRADE FROM THE LOWEST POINT STARTING AT THE END OF EXISTING IMPROVEMENTS. THE CONTRACTOR SHALL NOTIFY THE ENGINEER AT LEAST 24 HOURS PRIOR TO BACKFILLING OF ANY PIPE, WHICH STUBS TO A FUTURE PHASE OF CONSTRUCTION FOR INVERT VERIFICATION. TOLERANCE SHALL BE IN ACCORDANCE WITH CITY STANDARD SPECIFICATIONS.

**GENERAL NOTES CONTINUATION:**

- 1. ALL WORK TO BE PERFORMED PER CITY OF PERRIS, RIVERSIDE COUNTY TRANSPORTATION DEPARTMENT (R.C.T.D.), EASTERN MUNICIPAL WATER DISTRICT (E.M.W.D.), CALTRANS AND THE 2009 MANUAL ON UNIFORM CONTROL DEVICES (M.U.T.C.D.) STANDARDS WITH CALIFORNIA SUPPLEMENT.
- 2. NOTIFY CITY ENGINEER, CITY OF PERRIS, AT (951) 943-6504, AT LEAST 24 HOURS PRIOR TO START OF CONSTRUCTION.
- 3. CONTRACTOR IS REQUIRED TO LOCATE AND ADJUST TO GRADE ALL EXISTING MANHOLES, METERS, AND VALVE COVERS FOR WATER, SEWER, TELEPHONE, ELECTRIC, CABLE TV AND OTHER FACILITIES AS REQUIRED (WHEATEAR CALLED-OUT OR NOT ON PLANS).
- 4. ALL STRIPING & LEGENDS SHALL BE REPLACED IN ACCORDANCE WITH THE STRIPING PLANS HEREIN. ALL STRIPING TO BE PAINT (TWO COATS) AND ALL MARKINGS (INCLUDING CROSSWALKS) TO BE THERMOPLASTIC ALL STRIPING AND PAVEMENT MARKINGS TO BE PER 2006 M.U.T.C.D. STANDARDS WITH CALIFORNIA SUPPLEMENT.
- 5. ALL EXISTING A.C. AND CONCRETE TO BE SAW-CUT WHERE WIDENING IS TO TAKE PLACE OR ADJACENT TO WHERE CONCRETE IS TO BE CONSTRUCTED (1" MINIMUM).
- 6. ANY STOCKPILE OR STORAGE YARD ON PRIVATE PROPERTY MUST HAVE CITY'S AND OWNER'S APPROVAL.
- 7. THE CITY INSPECTOR WILL MARK ALL CONCRETE REMOVALS PRIOR TO CONSTRUCTION ALL CONCRETE WILL BE SAW-CUT WHERE REQUIRED PRIOR TO BEING REMOVED.
- 8. CONTRACTOR SHALL VERIFY THE EXISTENCE OF EXISTING SURVEY MONUMENTS AND PROTECT THEM IN PLACE. ANY SURVEY MONUMENTS MISSING AND/OR DAMAGED DURING CONSTRUCTION WILL HAVE TO BE RESET PRIOR TO PROJECT COMPETITION BY A QUALIFIED REGISTERED SURVEYOR.
- 9. IT IS THE CONTRACTOR'S RESPONSIBILITY TO PROTECT THE NEW WORK, FROM VANDALISM UNTIL THE IMPROVEMENTS HAVE BEEN ACCEPTED BY THE CITY AND A NOTICE OF COMPLETION MUST BE FILED.
- 10. ALL ASPHALT REMOVALS TO BE MARKED BY THE CITY INSPECTOR PRIOR TO CONTRACTOR BEGINNING WORK ON THAT PARTICULAR STREET SEGMENT.
- 11. CONTRACTOR SHALL CONTACT UNDERGROUND SERVICE ALERT OF SOUTHERN CALIFORNIA AND OTHER UTILITY COMPANIES AS NEEDED TO COORDINATE FOR PROTECTION AND/OR ADJUSTMENTS OF UTILITIES, AS REQUIRED.
- 12. CONTRACTOR TO VISIT THE SITE AND FAMILIARIZE HIMSELF WITH THE WORK AND AREA PRIOR TO BIDDING AND NOTIFY THE CITY OF DISCREPANCIES.
- 13. ALL DIMENSIONS ARE APPROXIMATE CONTRACTOR TO VERIFY IN FIELD.
- 14. CONTRACTOR IS RESPONSIBLE TO PROVIDE ALL TRAFFIC CONTROL DEVICES AS NEEDED AND PROVIDE TWO-WAY ACCESS AT ALL TIMES THROUGHOUT THE SITE. THE CONTRACTOR SHALL MAINTAIN THESE DEVICES AT ALL TIMES INCLUDING HOLIDAYS AND WEEKENDS. FLAGMAN SHALL BE UTILIZED AS REQUIRED TO PROVIDE TWO-WAY TRAFFIC DURING CONSTRUCTION.
- 15. CONTRACTOR SHALL PROVIDE TRAFFIC CONTROL IN COMPLIANCE WITH WATCH MANUAL, 2009 M.U.T.C.D., OR CURRENT EDITION, AND THE TRAFFIC PLANS PROVIDED HEREIN.
- 16. THE CONTRACTOR SHALL APPLY TO, AND BE ISSUED A NO FEE ENCROACHMENT PERMIT BY THE CITY OF PERRIS BEFORE BEGINNING ANY WORK WITH AN EXISTING CITY MAINTAINED PUBLIC STREET AND FOR UTILITY WORK WITHIN OFFERS OF DEDICATION FOR PUBLIC USE.
- 17. EXISTING PUBLIC STREETS, SHALL REMAIN OPEN TO THE PUBLIC DURING CONSTRUCTION AND SHALL BE MAINTAINED BY THE CONTRACTOR UNLESS OTHERWISE PROVIDED IN THE PLANS AND SPECIFICATIONS. PUBLIC INCONVENIENCE WILL BE MINIMIZED AT ALL TIMES AND SUCH STREETS SHALL BE LEFT FREE OF DIRT AND DEBRIS AT THE END OF EACH WORKING DAY UNLESS PERMISSION IS OTHERWISE GRANTED BY THE CITY ENGINEER.
- 18. THE CONTRACTOR IS RESPONSIBLE FOR CLEARING AND GRUBBING THE PROPOSED WORK AREA AND DISPOSAL OF EXCESS OR UNDESIRABLE MATERIAL CONTRACTOR SHALL RELOCATE OR CAUSE TO BE RELOCATED EXISTING CONFLICTING UTILITIES IF REQUIRED BY CONTRACT.
- 19. ANY PROPOSED DEVIATION FROM THESE PLANS BY THE CONTRACTOR MUST MET CITY'S APPROVAL. THE CONTRACTOR IS RESPONSIBLE TO REIMBURSE THE CITY FOR ANY RELATED COST TO THE CITY ASSOCIATED WITH SUCH CHANGE. IN THIS EVENT, NO INCREASE IN CONTRACTOR'S COST WILL BE APPROVED.
- 20. CONTRACTOR IS REQUIRED TO INSTALL BLUE REFLECTIVE PAVEMENT AT ALL FIRE HYDRANT LOCATION IN THE WORK AREA.
- 21. THE CONTRACTOR IS REQUIRED TO REMOVE ALL CONFLICTING STRIPING AND LEGENDS BY WET SANDBLASTING.
- 22. APPLY WEED KILL TO ALL EXISTING WEEDS BETWEEN 1-3 WEEKS PRIOR TO CONSTRUCTION AND REMOVE WEEDS. WEEDS SHALL BE REMOVED FROM ALL EXISTING PAVEMENT, MEDIANS, CURB AND GUTTER, SIDEWALK (BETWEEN CURB AND SIDEWALK) AND WHEREVER IMPROVEMENTS ARE PROPOSED, AND UP TO 4.0' BEHIND E.P. OR CURB WHEN NO SIDEWALK EXISTS.
- 23. CONTRACTOR SHALL REPLACE ALL STRIPING, LEGENDS, AND SIGNS IF THEY ARE DAMAGED DURING CONSTRUCTION AT NO EXTRA COST TO THE CITY. EXISTING STRIPING WITHIN PROJECT VICINITY THAT BECOMES DULL, SHALL BE REFRESHED AS DIRECTED BY THE CITY ENGINEER. CONFLICTING SIGNS SHALL BE REMOVED AS DIRECTED BY THE CITY ENGINEER OR HIS REPRESENTATIVE.
- 24. EXISTING TO PROPOSED CONCRETE PAVEMENT JOINTS SHALL BE CONSTRUCTED PER CALTRANS REVISED STANDARD PLAN RSP P10. 1 INCH MINIMUM DIAMETER DOWEL BARS SHALL BE USED AND AS APPROVED BY THE CITY ENGINEER.
- 25. ALL GRADING AND CONSTRUCTION ACTIVITIES SHALL BE PERFORMED IN ACCORDANCE WITH THE PROJECTS SWPPP AND NQI. REFER TO NPDES NOTED ON EROSION CONTROL PLANS.
- 26. ALL STREET SECTION ARE MINIMUM REQUIREMENTS. ADDITIONAL SOILS TESTS SHALL BE TAKEN AFTER ROUGH GRADING TO DETERMINE THE RECOMMENDED STREET SECTIONS REQUIREMENTS. USE RIVERSIDE COUNTY STD 401 IF EXPANSIVE SOILS ARE ENCOUNTERED.
- 27. ON-SITE LIGHTING, LANDSCAPE, AND LAYOUT TO BE APPROVED BY THE CITY OF PERRIS PLANNING DEPARTMENT.
- 28. WALLS/FENCE REQUIRE A SEPARATE PERMIT.
- 29. HAULING ROUTE SHALL BE SUBMITTED FOR APPROVAL BY THE CITY ENGINEER PRIOR TO START OF THE IMPORTATION/EXPORTATION OF DIRT.

**CITY OF PERRIS WOMP INSPECTION NOTIFICATION REQUIREMENTS:**

- 1. GENERAL CONTRACTOR IS RESPONSIBLE TO CALL FOR WOMP (WATER QUALITY MANAGEMENT PLAN) INSPECTIONS. A MINIMUM OF TWO (2) WOMP INSPECTIONS ARE REQUIRED IN THE FOLLOWING ORDER:
  - A. AT THE TIME OF PRECISE GRADE AND CONSTRUCTION OF FLOW-BASED/VOLUME BASED BMP'S, AND/OR INSTALLATION OF STORM DRAIN AND WOMP EQUIPMENT, WHEN THE TRENCHES ARE STILL OPEN, AND
  - B. AT FINAL INSPECTION, WHEN ALL PLANT MATERIALS, STRUCTURAL TREATMENT CONTROL BMP'S, STENCILING, EMPLOYEE SOURCE CONTROL HANDBOOKS, AND WOMP EQUIPMENT HAVE BEEN INSTALLED AND ARE FULLY OPERATIONAL.
- 2. A WRITTEN CLEARANCE LETTER SHALL BE SIGNED BY THE CITY'S ENGINEERING DEPARTMENT TO SIGNIFY APPROVAL OF WOMP SITE DESIGN, SOURCE CONTROL AND TREATMENT CONTROL BMP'S (BEST MANAGEMENT PRACTICES). THIS LETTER WILL NEED TO BE PRESENTED TO BUILDING AND SAFETY DEPARTMENT AS PART OF THE FINAL APPROVALS.

**UTILITY NOTES:**

- 1. THE CONTRACTOR SHALL CONSTRUCT GRAVITY SEWER LATERALS, CLEANOUTS, GRAVITY SEWER LINES, AND DOMESTIC WATER AND FIRE PROTECTION SYSTEMS AS SHOWN ON THESE PLANS. THE CONTRACTOR SHALL FURNISH ALL NECESSARY MATERIALS, EQUIPMENT, MACHINERY, TOOLS, MEANS OF TRANSPORTATION AND LABOR NECESSARY TO COMPLETE THE WORK IN FULL AND COMPLETE ACCORDANCE WITH THE SHOWN, DESCRIBED AND REASONABLY INTENDED REQUIREMENTS OF THE CONTRACT DOCUMENTS AND JURISDICTIONAL AGENCY REQUIREMENTS. IN THE EVENT THAT THE CONTRACT DOCUMENTS AND THE JURISDICTIONAL AGENCY REQUIREMENTS ARE NOT IN AGREEMENT, THE MOST STRINGENT SHALL GOVERN.
- 2. ALL EXISTING UNDERGROUND UTILITY LOCATIONS SHOWN ARE APPROXIMATE THE CONTRACTOR SHALL COMPLY WITH ALL REQUIREMENTS FOR UTILITY LOCATION AND COORDINATION IN ACCORDANCE WITH THE NOTES CONTAINED IN THE GENERAL CONSTRUCTION SECTION OF THIS SHEET.
- 3. THE CONTRACTOR SHALL RESTORE ALL DISTURBED VEGETATION IN KIND, UNLESS SHOWN OTHERWISE.
- 4. DEFLECTION OF PIPE JOINTS AND CURVATURE OF PIPE SHALL NOT EXCEED THE MANUFACTURER'S SPECIFICATIONS. SECURELY CLOSE ALL OPEN ENDS OF PIPE AND FITTINGS WITH A WATERIGHT PLUG WHEN WORK IS NOT IN PROGRESS. THE INTERIOR OF ALL PIPES SHALL BE CLEAN AND JOINT SURFACES WIPED CLEAN AND DRY AFTER THE PIPE HAS BEEN LOWERED INTO THE TRENCH. VALVES SHALL BE PLUMB AND LOCATED ACCORDING TO THE PLANS.
- 5. ALL PHASES OF INSTALLATION, INCLUDING UNLOADING, TRENCHING, LAYING AND BACK FILLING, SHALL BE DONE IN A FIRST CLASS WORKMANLIKE MANNER. ALL PIPE AND FITTINGS SHALL BE CAREFULLY STORED FOLLOWING MANUFACTURER'S RECOMMENDATIONS. ANY PIPE OR FITTING WHICH IS DAMAGED OR WHICH HAS PLANS OR IMPERFECTIONS, WHICH IN THE OPINION OF THE ENGINEER OR OWNER, RENDERS IT UNFIT FOR USE, SHALL NOT BE USED. ANY PIPE NOT SATISFACTORY FOR USE SHALL BE CLEARLY MARKED AND IMMEDIATELY REMOVED FROM THE JOB SITE, AND SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE.
- 6. WATER FOR FIRE FIGHTING SHALL BE AVAILABLE FOR USE PRIOR TO COMBUSTIBLES BEING BROUGHT ON SITE.
- 7. ALL UTILITY AND STORM DRAIN TRENCHES LOCATED UNDER AREAS TO RECEIVE PAVING SHALL BE COMPLETELY BACK FILLED IN ACCORDANCE WITH THE GOVERNING JURISDICTIONAL AGENCY'S SPECIFICATIONS. IN THE EVENT THAT THE CONTRACT DOCUMENTS AND THE JURISDICTIONAL AGENCY REQUIREMENTS ARE NOT IN AGREEMENT, THE MOST STRINGENT SHALL GOVERN.
- 8. CONTRACTOR SHALL PERFORM, AT HIS OWN EXPENSE, ANY AND ALL TESTS REQUIRED BY THE SPECIFICATIONS AND/OR ANY AGENCY HAVING JURISDICTION. THESE TESTS MAY INCLUDE, BUT MAY NOT BE LIMITED TO, INFILTRATION AND EXFILTRATION, TELEVISION INSPECTION AND A MANDREL TEST ON GRAVITY SEWER. A COPY OF THE TEST RESULTS SHALL BE PROVIDED TO THE UTILITY PROVIDER, OWNER AND JURISDICTIONAL AGENCY AS REQUIRED.
- 9. THE EXISTING UTILITIES SHOWN ON THE PLAN ARE BASED ON AVAILABLE RECORDS. THE CONTRACTOR MUST FIELD DETERMINE THE LOCATION AND DEPTH OF ALL UTILITIES PRIOR TO ANY CONSTRUCTION. REPORT DISCREPANCIES AND POTENTIAL CONFLICTS WITH PROPOSED UTILITIES TO ENGINEER PRIOR TO INSTALLATION OF ANY PIPING.
- 10. DIMENSIONS PROVIDED ARE TO OUTSIDE PIPE DIAMETERS.
- 11. ALL WATER LINES ARE TO BE BURIED A MINIMUM OF 40" DEEP, MEASURED TO TOP OF PIPE.
- 12. WATER PIPE TRENCHING PER EMWD STANDARD DETAIL B-408.
- 13. SEWER PIPE TRENCHING PER EMWD STANDARD DETAIL SB-157 AND SB-158.
- 14. CONFORM UTILITY TIE-IN POINTS IN FIELD AND WITH MEP PLANS PRIOR TO CONSTRUCTION.

**DEMOLITION NOTES:**

- 1. REFER TO THE TOPOGRAPHIC SURVEY FOR ADDITIONAL DETAILS OF EXISTING STRUCTURES, ETC., LOCATED WITHIN THE PROJECT SITE. UNLESS OTHERWISE NOTED, ALL EXISTING BUILDINGS, STRUCTURES, SLABS, CONCRETE, ASPHALT, DEBRIS PILES, SIGNS, AND ALL OTHER STRUCTURES ARE TO BE REMOVED FROM THE SITE. A COPY OF THE TEST RESULTS DISPOSED OF IN A LEGAL MANNER AS PART OF THIS CONTRACT. SOME ITEMS TO BE REMOVED MAY NOT BE DEPICTED ON THE TOPOGRAPHIC SURVEY. REFER TO THE DEMOLITION PLAN FOR THE LIMITS OF ASPHALT REMOVAL (THE EXISTING PARKING LOT IS TO REMAIN). IT IS THE CONTRACTOR'S RESPONSIBILITY TO VISIT THE SITE AND DETERMINE THE FULL EXTENT OF ITEMS TO BE REMOVED. IF ANY ITEMS ARE IN QUESTION, THE CONTRACTOR SHALL CONTACT THE OWNER PRIOR TO REMOVAL OF SAID ITEMS.
- 2. THE CONTRACTOR SHALL CLEAR THE PROJECT SITE AREA WITHIN THE CONFINES OF THE DEMOLITION LIMIT LINE. THE CONTRACTOR SHALL CAP IN PLACE ALL EXISTING UTILITIES AT THE DEMOLITION LIMIT LINE, UNLESS NOTED ON THE PLAN. THE CONTRACTOR SHALL DEMOLISH AND LEGALLY REMOVE/DISPOSE OF ITEMS FROM THE SITE, INCLUDING ALL EXISTING UTILITY STRUCTURES, PLANTERS, TREES, AND ALL OTHER SITE FEATURES, UNLESS OTHERWISE NOTED ON THE PLAN.
- 3. DEMOLITION OF PAVEMENT INCLUDES PAVEMENT THICKNESS, REBAR IF ENCOUNTERED, AND BASE COURSE.
- 4. REMOVAL OF LANDSCAPING SHALL INCLUDE ROOTS AND ORGANIC MATERIAL.
- 5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ANY AND ALL PERMITS AND SHALL PAY ALL FEES NECESSARY FOR ENCROACHMENT, GRADING, DEMOLITION, AND DISPOSAL OF SAID MATERIALS AS REQUIRED BY PRIVATE, LOCAL, AND STATE JURISDICTIONS.
- 6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR A SITE INSPECTION TO FULLY ACKNOWLEDGE THE EXTENT OF DEMOLITION WORK.
- 7. THE CONTRACTOR SHALL VERIFY AND LOCATE ALL EXISTING ABOVE AND UNDERGROUND UTILITIES. LOCATIONS SHOWN ON THE PLANS ARE APPROXIMATE AND ARE SHOWN FOR GENERAL INFORMATION ONLY. CONTRACTOR SHALL ADJUST TO GRADE ANY EXISTING UTILITIES TO REMAIN.
- 8. DAMAGE TO ANY EXISTING UTILITIES AND SERVICES TO REMAIN SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. CONTRACTOR SHALL REPAIR AND/OR REPLACE IN KIND.
- 9. EROSION CONTROL MEASURES SHALL BE IMPLEMENTED TO PREVENT DEBRIS AND UNSUITABLE MATERIALS FROM ENTERING SANITARY SEWERS AND STREETS.
- 10. DUST CONTROL MEASURES SHALL BE IMPLEMENTED DURING DEMOLITION.
- 11. DEMOLITION IS LIMITED TO WITHIN THE DEMOLITION LIMIT LINE UNLESS OTHERWISE NOTED.
- 12. CONTRACTOR SHALL REMOVE DEMOLISHED MATERIALS FROM THE SITE AS WORK PROGRESSES.
- 13. THE DRAWINGS MAY NOT INDICATE IN DETAIL ALL DEMOLITION WORK TO BE PERFORMED. THE CONTRACTOR SHALL EXAMINE EXISTING CONDITIONS TO DETERMINE THE FULL EXTENT OF DEMOLITION.
- 14. ALL DEMOLITION SHALL COMPLY WITH CHAPTER 24 AND ARTICLE 87 OF THE CALIFORNIA FIRE CODE.
- 15. CONTRACTOR TO USE CARE IN HANDLING DEBRIS FROM SITE TO ENSURE THE SAFETY OF THE PUBLIC. HAUL ROUTE TO BE CLOSELY MONITORED FOR DEBRIS OR MATERIALS TRACKED ONTO ADJOINING ROADWAYS, SIDEWALKS, ETC. ROADWAYS AND WALKWAYS TO BE CLEARED DAILY OR AS NECESSARY TO MAINTAIN PUBLIC SAFETY.
- 16. SEE EROSION CONTROL PLAN FOR EROSION PREVENTION.
- 17. CONTRACTOR TO INSTALL CHAIN LINK FENCE WITH MESH SCREEN TO PROTECT PUBLIC FROM ENTERING CONSTRUCTION AREA.
- 18. CONTINUOUS ACCESS SHALL BE MAINTAINED FOR SURROUNDING PROPERTIES AT ALL TIMES DURING DEMOLITION OF EXISTING FACILITIES.
- 19. MONITORING WELLS TO BE REMOVED PRIOR TO BEGINNING OF CONSTRUCTION.
- 20. FULL DEMOLITION LIMITS DUE TO CONSTRUCTION OF UTILITIES IS NOT SHOWN. CONTRACTOR TO REFER TO SHEET 03 AND UTILITY PLANS TO DETERMINE LIMITS. CONTRACTOR TO USE CAUTION AROUND EXISTING UTILITIES.
- 21. A CITY-APPROVED WASTE HAULER SHALL BE USED FOR ALL CONSTRUCTION/OTHER WASTE DISPOSAL.
- 22. CONTRACTOR SHALL ADJUST TO GRADE ANY EXISTING UTILITIES TO REMAIN.

**PAVING, GRADING AND DRAINAGE NOTES:**

- 1. ALL PAVING, CONSTRUCTION, MATERIALS, AND WORKMANSHIP WITHIN JURISDICTION'S RIGHT-OF-WAY SHALL BE IN ACCORDANCE WITH LOCAL OR COUNTY SPECIFICATIONS AND STANDARDS (LATEST EDITION) OR SPWPS SPECIFICATIONS AND STANDARDS (LATEST EDITION) IF NOT COVERED BY LOCAL OR COUNTY REGULATIONS.
- 2. ALL UNPAVED AREAS IN EXISTING RIGHTS-OF-WAY DISTURBED BY CONSTRUCTION SHALL BE REGRADED AND REPAIRED TO EXISTING CONDITION OR BETTER.
- 3. TRAFFIC CONTROL ON ALL CALTRANS, LOCAL AND COUNTY RIGHTS-OF-WAY SHALL MEET THE REQUIREMENTS OF THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (U.S. DOT/FHA) AND THE REQUIREMENTS OF THE STATE AND ANY LOCAL AGENCY HAVING JURISDICTION. IN THE EVENT THAT THE CONTRACT DOCUMENTS AND THE JURISDICTIONAL AGENCY REQUIREMENTS ARE NOT IN AGREEMENT, THE MOST STRINGENT SHALL GOVERN.
- 4. THE CONTRACTOR SHALL GRADE THE SITE TO THE ELEVATIONS INDICATED AND SHALL REGRADE WASHOUTS WHERE THEY OCCUR AFTER EVERY RAINFALL UNTIL AN ADEQUATE STABILIZATION OCCURS.
- 5. ALL AREAS INDICATED AS PAVEMENT SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE TYPICAL PAVEMENT SECTIONS AS INDICATED ON THE DRAWINGS.
- 6. WHERE EXISTING PAVEMENT IS INDICATED TO BE REMOVED AND REPLACED, THE CONTRACTOR SHALL SAW CUT A MINIMUM 2" DEEP FOR A SMOOTH AND STRAIGHT JOINT AND REPLACE THE PAVEMENT WITH THE SAME TYPE AND DEPTH OF MATERIAL AS EXISTING OR AS INDICATED.
- 7. WHERE NEW PAVEMENT MEETS THE EXISTING PAVEMENT, THE CONTRACTOR SHALL SAW CUT THE EXISTING PAVEMENT A MINIMUM 2" DEEP FOR A SMOOTH AND STRAIGHT JOINT AND MATCH THE EXISTING PAVEMENT ELEVATION WITH THE PROPOSED PAVEMENT UNLESS OTHERWISE INDICATED.
- 8. IF DEWATERING IS REQUIRED, THE CONTRACTOR SHALL OBTAIN ANY APPLICABLE REQUIRED PERMITS. THE CONTRACTOR IS TO COORDINATE WITH THE OWNER AND THE DESIGN ENGINEER PRIOR TO ANY EXCAVATION.
- 9. STRIP TOPSOIL AND ORGANIC MATTER FROM ALL AREAS OF THE SITE AS REQUIRED. IN SOME CASES THE STRIP TOPSOIL MAY BE STABILIZED ON SITE FOR PLACEMENT WITHIN LANDSCAPED AREAS BUT ONLY AS DIRECTED BY THE OWNER.
- 11. ALL SLOPES AND AREAS DISTURBED BY CONSTRUCTION SHALL BE GRADED AS PER PLANS. THE AREAS SHALL THEN BE STABILIZED BY MEANS AND METHOD APPROVED BY THE LOCAL AGENCY. ANY AREAS DISTURBED FOR ANY REASON PRIOR TO FINAL ACCEPTANCE OF THE JOB SHALL BE CORRECTED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER. ALL EARTH AREAS WILL BE COVERED WITH ROCK OR MULCHED AS SHOWN ON THE LANDSCAPING PLAN.
- 12. ALL CUT OR FILL SLOPES SHALL BE 4 (HORIZONTAL) :1 (VERTICAL) OR FLATTER UNLESS OTHERWISE SHOWN.
- 13. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE CONTROL OF DUST AND DIRT RISING AND SCATTERING IN THE AIR DURING CONSTRUCTION AND SHALL PROVIDE WATER SPRINKLING OR OTHER SUITABLE METHODS OF CONTROL. THE CONTRACTOR SHALL COMPLY WITH ALL GOVERNING REGULATIONS PERTAINING TO ENVIRONMENTAL PROTECTION.
- 14. THE CONTRACTOR SHALL TAKE ALL REQUIRED MEASURES TO CONTROL TURBIDITY, INCLUDING BUT NOT LIMITED TO THE INSTALLATION OF TURBIDITY BARRIERS AT ALL LOCATIONS WHERE THE POSSIBILITY OF TRANSFERRING SUSPENDED SOLIDS INTO THE RECEIVING WATER BODY EXISTS DUE TO THE PROPOSED WORK. TURBIDITY BARRIERS MUST BE MAINTAINED IN EFFECTIVE CONDITION AT ALL LOCATIONS UNTIL CONSTRUCTION IS COMPLETED AND DISTURBED SOIL AREAS ARE STABILIZED. THEREAFTER, THE CONTRACTOR MUST REMOVE THE BARRIERS. AT NO TIME SHALL THERE BE ANY OFF-SITE DISCHARGE WHICH VIOLATES THE WATER QUALITY STANDARDS OF THE GOVERNING CODE.
- 15. EXPLOD SLOPES SHOULD BE STABILIZED WITHIN 48 HOURS OF COMPLETING FINAL GRADING, AND AT ANY OTHER TIME AS NECESSARY, TO PREVENT EROSION, SEDIMENTATION OR TURBID DISCHARGES.
- 16. THE CONTRACTOR MUST REVIEW AND MAINTAIN A COPY OF THE REQUIRED PERMITS COMPLETE WITH ALL CONDITIONS, ATTACHMENTS, EXHIBITS, AND PERMIT MODIFICATIONS IN GOOD CONDITION AT THE CONSTRUCTION SITE. THE COMPLETE PERMIT MUST BE AVAILABLE FOR REVIEW UPON REQUEST BY GOVERNING JURISDICTIONS.
- 17. THE CONTRACTOR SHALL ENSURE THAT ISLAND PLANTING AREAS AND OTHER PLANTING AREAS ARE NOT COMPACTED AND DO NOT CONTAIN ROAD BASE MATERIALS. THE CONTRACTOR SHALL ALSO EXCAVATE AND REMOVE ALL UNDESIRABLE MATERIAL FROM ALL AREAS ON THE SITE TO BE PLANTED AND PROPERLY DISPOSED OF IN A LEGAL MANNER.
- 18. CONTRACTOR TO VERIFY ALL EXISTING TOPOGRAPHY AND STRUCTURES ON THE SITE AND IMMEDIATELY NOTIFY THE ENGINEER OF ANY DISCREPANCIES PRIOR TO STARTING WORK.
- 19. ALL PAVEMENT SPOT GRADE ELEVATIONS WITHIN OR ALONG THE CURB REFER TO THE EDGE OF PAVEMENT ELEVATIONS UNLESS OTHERWISE NOTED.
- 20. ALL ELEVATIONS SHOWN DEPICT FINISHED GRADE UNLESS OTHERWISE NOTED. GENERAL CONTRACTOR TO COORDINATE WITH EXCAVATION, LANDSCAPING, AND PAVING SUBCONTRACTORS TO DETERMINE THICKNESS OF ITEMS FROM THE SITE. GENERAL CONTRACTOR TO ESTABLISH SUBGRADE ELEVATIONS.
- 21. NO EARTHEN SLOPE SHALL BE GREATER THAN 4:1 UNLESS OTHERWISE NOTED.
- 22. MAXIMUM SLOPE IN ACCESSIBLE PARKING SPACES AND LOADING ZONES SHALL NOTE EXCEED 2.0% IN ALL DIRECTIONS.
- 23. MAXIMUM RUNNING SLOPE SHALL NOTE EXCEED 5% AND CROSS SLOPE SHALL NOTE EXCEED 2.0% ON ALL SIDEWALKS AND ACCESSIBLE ROUTES UNLESS OTHERWISE NOTED.
- 24. WHEN NATURAL FLOW OF DRAINAGE IS AWAY FROM CURB CONTRACTOR TO INSTALL REVERSE GUTTER PITCH.
- 25. REFERENCE ARCHITECTURAL PLANS FOR ROOF DRAIN AND LOCATIONS.
- 26. CONTRACTOR TO USE APPROPRIATE PAINT COLORS PER DETAILS SHEET. ADA BARRIER FREE AREAS TO COMPLY WITH ALL LOCAL AND FEDERAL ADA STANDARDS.
- 27. ACCESSIBLE ROUTE TO ACCESSIBLE SPACES, BUILDING ENTRANCES, AND PUBLIC STREETS SHALL NOT EXCEED 5% RUNNING SLOPE AND 2% CROSS SLOPE.
- 28. THE ACCESSIBLE ROUTE IN FRONT OF PARKING SHALL BE A MINIMUM OF 48" WIDE AND NOT REDUCED BY VEHICLE OVERHANGS, CURBING, SIGN POSTS, OR OTHER OBSTRUCTIONS.
- 29. ANY WALK THAT CROSSES OR ADJUNS A VEHICULAR WAY NOT SEPARATED BY CURBS, RAILINGS, OR OTHER ELEMENTS SHALL BE DEFINED BY A CONTINUOUS 36" WIDE DETECTABLE WARNING.
- 30. SPECIAL RAMP RULES APPLY FOR ANY RISE GREATER THAN 6" INCLUDING BUT NOT LIMITED TO RESTRICTION ON SLOPE, TOTAL RISE BETWEEN LANDINGS, AND USE OF HANDRAILS.
- 31. TRANSITION CHANGE IN ELEVATION IS NOT TO EXCEED 1/4" WITHIN AN ACCESSIBLE ROUTE.
- 32. JOINT WIDTHS ARE NOT TO EXCEED 1/2" OF WIDTH.
- 33. CURB RAMPS MUST HAVE A DIFFERENT FINISH FROM THE ADJACENT PAVEMENT.
- 34. 2% SLOPE IN ALL DIRECTIONS WITHIN ADA PARKING STALLS. AFTER PROPOSED GRADE BREAK, ALLOWABLE SLOPE TO MATCH EXISTING IS 5.0%.
- 35. ALL AREAS WHERE STRIPING IS TO BE ERADICATED, CONTRACTOR IS TO ERADICATE AND SEAL COAT AREA.

**PRECISE GRADING NOTES (CITY OF PERRIS):**

- 1. ALL GRADING SHALL CONFORM TO THE UNIFORM CODE, APPENDIX CHAPTER 33, AS AMENDED BY ORDINANCE NO. 457.
- 2. ALL PROPERTY CORNERS SHALL BE CLEARLY DELINEATED IN THE FIELD PRIOR TO COMMENCEMENT OF ANY CONSTRUCTION/GRADING.
- 3. DURING ROUGH GRADING OPERATIONS AND PRIOR TO CONSTRUCTION OF PERMANENT DRAINAGE STRUCTURES, TEMPORARY DRAINAGE CONTROL SHOULD BE PROVIDED TO PREVENT PONDING WATER AND DAMAGE TO ADJACENT STRUCTURES.
- 4. DUST SHALL BE CONTROLLED BY WATERING OR OTHER APPROVED METHODS.
- 5. NO FILL SHALL BE PLACED ON EXISTING GROUND UNTIL THE GROUND HAS BEEN CLEARED OF WEEDS, DEBRIS, TOPSOIL, AND OTHER DELETERIOUS MATERIAL.
- 6. MAXIMUM CUT AND FILL SLOPE = 2:1, UNLESS OTHERWISE SHOWN ON PLANS.
- 7. STABILITY CALCULATIONS WITH A FACTOR OF SAFETY OF AT LEAST ONE AND FIVE TENTHS (1.5) SHALL BE SUBMITTED BY A SOILS ENGINEER TO THE BUILDING AND SAFETY DEPARTMENT FOR CUT AND FILL SLOPES OVER 30' IN VERTICAL HEIGHT.
- 8. PROVIDE 5' BY 1' HIGH BERM OR EQUIVALENT ALONG THE TOP OF ALL FILL SLOPES OVER 5' HIGH.
- 9. PROVIDE A BROW DITCH, DESIGNED TO HANDLE 100 YR. Q STORM FLOWS, ALONG THE TOP OF ALL FILL SLOPES OVER 5' HIGH.
- 10. MINIMUM BUILDING PAD AND DRAINAGE SWALE SLOPE SHALL BE 1% IF CUT OF FILL IS LESS THAN 10'. 2% IF CUT OR FILL IS GREATER THAN 10'. DRAINAGE SWALES SHALL BE A MINIMUM OF 0.2' DEEP AND BE CONSTRUCTED A MINIMUM OF 2' FROM THE TOP OF CUT OR FILL SLOPES.
- 11. NO OBSTRUCTION OF FLOOD PLAINS OR NATURAL WATER COURSES SHALL BE PERMITTED.
- 12. ALL EXISTING DRAINAGE COURSES ON THE PROJECT SITE MUST CONTINUE TO FUNCTION, ESPECIALLY DURING STORM CONDITIONS. PROTECTIVE MEASURES AND TEMPORARY DRAINAGE PROVISIONS MUST BE USED TO PROTECT ADJOINING PROPERTIES DURING GRADING OPERATIONS.
- 13. FINISHED GRADE SHALL BE SLOPED AWAY FROM ALL EXTERIOR WALLS AT NOT LESS THAN 1" PER FOOT FOR A MINIMUM OF 3'.
- 14. CUT AND FILL SLOPES EQUAL TO OR GREATER THAN 3' IN VERTICAL HEIGHT SHALL BE PLANTED WITH GRASS OR GROUND COVER TO PROTECT THE SLOPE FROM EROSION AND IN ACCORDANCE WITH ORDINANCE NO. 457 PRIOR TO FINAL GRADING INSPECTION.
- 15. EROSION CONTROL: ALL SLOPES REQUIRED TO BE PLANTED SHALL BE PROVIDED WITH ROSEA ICE PLANT (OR EQUAL) GROUND COVER AT 12" ON CENTER. SLOPES EXCEEDING 15' IN VERTICAL HEIGHT SHALL BE PLANTED WITH APPROVED TREES SPACED NOT TO EXCEED 20' ON CENTER OR SHRUBS NOT TO EXCEED 10', OR A COMBINATION OF SHRUBS AND TREES NOT TO EXCEED 15' IN ADDITION TO A GRASS MIX OR GROUND COVER. SLOPES EXCEEDING 4' IN VERTICAL HEIGHT SHALL BE PROVIDED WITH AN IN-GROUND IRRIGATION SYSTEM. SLOPES EQUAL TO OR LESS THAN 4' MAY BE IRRIGATED BY HOSE BID LOCATED AT THE TOP OR TOE OF THE SLOPE, SPACED TO MAKE USE OF A HOUSE NO LONGER THAN 50' IN HEIGHT. THE IRRIGATION SYSTEM SHALL BE PROVIDED WITH AN APPROPRIATE BACKFLOW DEVICE PER U.P.C., CHAPTER 10.
- 16. ALL GRADING SHALL BE DONE IN CONFORMANCE WITH RECOMMENDATIONS OF THE PRELIMINARY SOILS INVESTIGATION BY SALEM ENGINEERING GROUP, INC. TWO SETS OF THE PRELIMINARY SOILS INVESTIGATION REPORT SHALL BE SUBMITTED TO THE BUILDING AND SAFETY DEPARTMENT WHICH SHALL INCLUDE FOUNDATION DESIGN RECOMMENDATIONS AND CERTIFICATION THAT GRADING HAS BEEN DONE IN CONFORMANCE WITH THE RECOMMENDATIONS OF THE SITE INVESTIGATION REPORT.
- 17. IF STEEP SLOPING TERRAIN OCCURS UPON WHICH FILL IS TO BE PLACED, IT MUST BE CLEARED, KEVED AND BENCHED INTO FIRM NATURAL SOIL FOR FULL SUPPORT. PREPARATION SHALL BE APPROVED BY A SUITABLE QUALIFIED AND REGISTERED PROFESSIONAL PRIOR TO PLACEMENT OF FILL MATERIAL.
- 18. ALL GRADING SHALL BE DONE UNDER THE SUPERVISION OF A COMPETENT SOILS ENGINEER WHO SHALL CERTIFY THAT ALL FILL HAS BEEN PROPERLY PLACED AND WHO SHALL SUBMIT A FINAL COMPACTION REPORT FOR ALL FILLS OVER 1' DEEP.
- 19. FINAL COMPACTION REPORT WILL BE REQUIRED FOR ALL FILLS GREATER THAN 1'.
- 20. A SUITABLY QUALIFIED AND REGISTERED PROFESSIONAL SHALL SUBMIT TO THE BUILDING AND SAFETY DEPARTMENT WRITTEN CERTIFICATION OF COMPLETION OF ROUGH GRADING IN ACCORDANCE WITH THE APPROVED GRADING PLAN PRIOR TO REQUESTING INSPECTION AND ISSUANCE OF THE BUILDING PERMIT. CERTIFICATION SHALL INCLUDE LINE, GRADE, ELEVATION AND LOCATION OF CUT/FILL SLOPES.
- 21. A SUITABLE QUALIFIED AND REGISTERED PROFESSIONAL SHALL SUBMIT CERTIFICATION OF BUILDING PAD ELEVATION, WHERE SPECIFIC ELEVATIONS ARE REQUIRED. THE ELEVATION (WITH RESPECT TO MEAN SEA LEVEL) SHALL BE GIVEN. IF AN ELEVATION WITH RESPECT TO ADJACENT GROUND SURFACE IS REQUIRED, THE ACTUAL DISTANCE ABOVE THE ADJACENT SHALL BE GIVEN.
- 22. A SUITABLY QUALIFIED AND REGISTERED PROFESSIONAL SHALL SUBMIT TO THE BUILDING AND SAFETY DEPARTMENT WRITTEN CERTIFICATION OF FINISH GRADING IN ACCORDANCE WITH THE APPROVED PLANS FOR ALL GRADING AS "ENGINEERED GRADING".
- 23. THE CONTRACTOR SHALL NOTIFY UNDERGROUND SERVICE ALERT TWO DAYS BEFORE YOU DIG AT 1-800-227-2600, BY GRADING PERMIT MUST BE OBTAINED FROM THE DEPARTMENT OF BUILDING AND SAFETY, CITY OF PERRIS, PRIOR TO GRADING.
- 24. THE CONTRACTOR SHALL NOTIFY THE BUILDING AND SAFETY DEPARTMENT, 101 NORTH "D" STREET, PERRIS, CA 92571, TELEPHONE (951) 943-5003, AT LEAST 24 HOURS IN ADVANCE REQUESTING LOT GRADE AND DRAINAGE INSPECTION. THE INSPECTION MUST BE APPROVED PRIOR TO BUILDING PERMIT FINAL INSPECTION.
- 26. CONSTRUCTION ACTIVITIES AND EQUIPMENT MAINTENANCE IS LIMITED TO THE HOURS BETWEEN 7:00 A.M. AND 7:00 P.M. PER ZONING ORDINANCE, NOISE CONTROL, SECTION 7.34.060, IT IS UNLAWFUL FOR ANY PERSONS BETWEEN THE HOURS OF 7:00 P.M. OF ANY DAY AND 7:00 A.M. OF THE FOLLOWING DAY, OR ON A LEGAL HOLIDAY, OR ON SUNDAYS TO ERECT, CONSTRUCT, DEMOLISH, EXCAVATE, ALTER OR REPAIR ANY BUILDING OR STRUCTURE IN A MANNER AS TO CREATE DISTURBING EXCESSIVE OR OFFENSIVE NOISE.
- 27. STATIONARY CONSTRUCTION EQUIPMENT THAT GENERATES NOISE IN EXCESS OF 65 DBA AT THE PROJECT BOUNDARIES MUST BE SHIELDED AND LOCATED AT LEAST 100 FEET FROM OCCUPIED RESIDENCES. THE EQUIPMENT AREA WITH APPROPRIATE ACOUSTIC SHIELDING SHALL BE DESIGNATED ON BUILDING AND GRADING PLANS. EQUIPMENT AND SHIELDING SHALL REMAIN IN THE DESIGNATED LOCATION THROUGHOUT CONSTRUCTION ACTIVITIES.
- 28. CONSTRUCTION ROUTES ARE LIMITED TO CITY OF PERRIS DESIGNATED TRUCK ROUTES.
- 29. WATER TRUCKS OR SPRINKLER SYSTEMS SHALL BE USED DURING CLEANING, GRADING, EARTH MOVING, EXCAVATION, TRANSPORTATION OF CUT OR FILL MATERIALS AND CONSTRUCTION PHASES TO PREVENT DUST FROM LEAVING THE SITE AND TO CREATE A CRUST AFTER EACH DAY'S ACTIVITIES CEASE. AT A MINIMUM, THIS WOULD INCLUDE WETTING DOWN SUCH AREAS IN THE LATER MORNING AND AFTER WORK IS COMPLETED FOR THE DAY AND WHENEVER WIND EXCEEDS 15 MPH PER HOUR.
- 30. A PERSON OR PERSONS SHALL BE DESIGNATED TO MONITOR THE DUST CONTROL PROGRAM AND TO ORDER INCREASED WATERING AS NECESSARY TO PREVENT TRANSPORT OF DUST OFF-SITE. THE NAME AND TELEPHONE NUMBER OF SUCH PERSON SHALL BE PROVIDED TO THE CITY.
- 31. PROJECT APPLICANTS SHALL PROVIDE CONSTRUCTION SITE ELECTRICAL HOOK-UPS FOR ELECTRIC HAND TOOLS SUCH AS SAWS, DRILLS, AND COMPRESSORS, TO ELIMINATE THE NEED FOR DIESEL-POWERED ELECTRIC GENERATORS OR PROVIDE EVIDENCE THAT ELECTRICAL HOOK-UPS AT CONSTRUCTION SITES ARE NOT PRACTICAL OR PROHIBITIVELY EXPENSIVE.

**811**  
DIAL TOLL FREE  
811  
AT LEAST TWO DAYS BEFORE YOU DIG  
Know what's below.  
Call before you dig.  
UNDERGROUND SERVICE ALERT OF SOUTHERN CALIFORNIA

**BENCH MARK:**  
COUNTY OF RIVERSIDE BENCHMARK "M 21-1 RESET", 373 FEET EAST ALONG ETHANAC ROAD FROM THE INTERSECTION OF ETHANAC ROAD AND THE SOUTHBOUND LANES OF HIGHWAY 395. 150 FEET SOUTH OF ETHANAC ROAD, 50 FEET SOUTHEAST OF THE NORTHEAST CORNER OF A 6 FOOT CHAIN LINK RIGHT-OF-WAY FENCE, 1.00 FOOT NORTH OF AN ANGLE-POINT IN THE RIGHT-OF-WAY FENCE, 2 FEET NORTH OF A MARKER POST, A BRASS DISK STAMPED "M-21-1 RESET" SET IN THE TOP OF A CONCRETE POST 3 INCHES ABOVE GROUND. EL = 1421.891 NGVD 29 (5/85)

MARK	BY	DATE	REVISIONS	APPR	DATE
	ENGINEER			CITY	

**CITY OF PERRIS**  
APPROVED BY: [Signature]  
CONTRACT CITY ENGINEER DATE

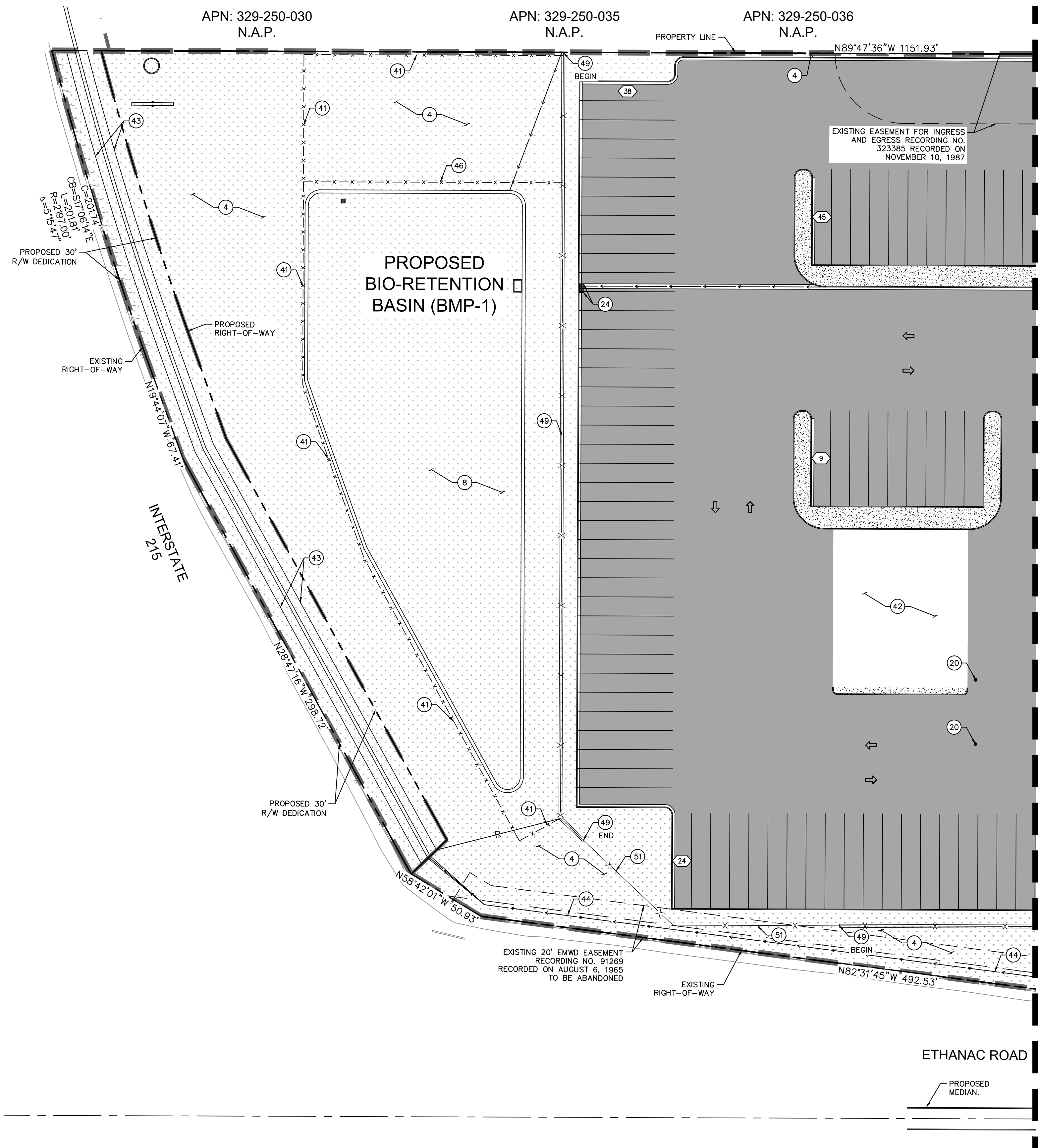
**Kimley»Horn**  
765 THE CITY DRIVE SUITE 200, ORANGE, CA 92668  
PHONE: 714-939-1030  
PREPARED BY: [Signature]  
SHEA-MICHAEL ANTI R.C.E. 78274  
2/27/2022 DATE

**GENERAL NOTES  
PRELIMINARY PRECISE GRADING PLAN  
PILOT PERRIS  
ETHANAC ROAD AND TRUMBLE ROAD  
APN: 329-250-011 & 329-250-012**

SHEET NO. **2**  
OF 16 SHTS

PROJECT NUMBER: 095428910 FILE NO.:

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**LEGEND**

---	PROPERTY LINE CIVIL	[Pattern]	STANDARD DUTY CONCRETE PAVEMENT
---	LIMITS OF WORK	[Pattern]	HEAVY DUTY CONCRETE PAVEMENT
---	CENTER LINE	[Pattern]	HEAVY DUTY ASPHALT PAVEMENT
---	SETBACKS	[Pattern]	STANDARD DUTY ASPHALT PAVEMENT
---	EASEMENT LINE	[Pattern]	LANDSCAPE/PLANTER AREA
---	ACCESSIBLE ROUTE	[Symbol]	DECORATIVE PAVEMENT
---	FENCE	[Symbol]	
---	GRADE BREAK	[Symbol]	
---	RIDGE LINE	[Symbol]	
---	PARKING COUNT	[Symbol]	
---	DETECTABLE WARNINGS	[Symbol]	
---		[Symbol]	

**SITE INFORMATION**

APN'S: 329-250-011 AND 329-250-012

GROSS PARCEL	±14.4	ACRES
DISTURBED	±14.4	ACRES
TOTAL PERVIOUS	±4.5	ACRES
TOTAL IMPERVIOUS (INCLUDING BUILDING)	±9.9	ACRES

TOTAL GROSS FLOOR AREA: 13,980 SF

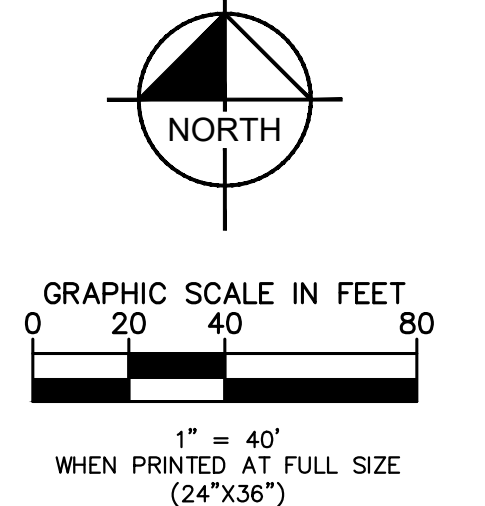
EXISTING: COMMERCIAL COMMUNITY (CC)  
 PROPOSED: COMMERCIAL COMMUNITY (CC)

PARKING PROVIDED:

STANDARD	88	SPACES
ACCESSIBLE	5	SPACES
TRUCK	116	SPACES
BICYCLE SPACES	2	PROPOSED

- CONSTRUCTION NOTES**
- PILOT TRAVEL CENTER BUILDING (SEE ARCHITECTURAL DRAWINGS), INSTALLED BY CONTRACTOR.
  - ABOVE GROUND STORAGE TANK FARM WITH CONTAINMENT. EACH AST FARM CONTAINS (4) 12,000 GALLON TACKS FOR DIESEL AND BIO. SEE PRODUCT PIPING DRAWINGS FOR MORE INFORMATION.
  - 25'-0" x 253'-7" AUTO CANOPY, FURNISHED AND INSTALLED BY CANOPY SUPPLIER. CANOPY FOUNDATIONS INSTALLED BY CONTRACTOR.
  - LANDSCAPE AREA INSTALLED BY CONTRACTOR. REFER TO LANDSCAPE AND IRRIGATION PLANS FOR MORE INFORMATION.
  - GREASE TRAP. FURNISHED AND INSTALLED BY CONTRACTOR.
  - CONCRETE ISLAND WITH A GAS/AUTO DIESEL (3+1) DISPENSER AND CONTAINMENT BOX TYPICAL AT (8) PLACES, INSTALLED BY CONTRACTOR.
  - 2'-0" HIGH GUARDRAIL AROUND CONTAINMENT AREA, 1'-0" OUTSIDE OF FENCE.
  - PROPOSED BIORETENTION BASIN. SEE UTILITY PLAN FOR MORE INFORMATION.
  - 25'-0" x 124'-9" TRUCK CANOPY, FURNISHED AND INSTALLED BY CANOPY SUPPLIER. CANOPY FOUNDATIONS INSTALLED BY CONTRACTOR.
  - TRUCK AIR STAND, TYPICAL AT EVERY OTHER TRUCK FUELING ISLAND, SUPPLIED BY OWNER AND INSTALLED BY CONTRACTOR.
  - CONCRETE ISLAND WITH A DIESEL DISPENSER AND CONTAINMENT BOX TYPICAL AT (8) PLACES, INSTALLED BY CONTRACTOR.
  - PREFABRICATED TRUCK ISLAND CATCH BASIN (TYP (7) PLACES). SUPPLIED BY OWNER INSTALLED BY CONTRACTOR
  - TRUCK FREEZE PROOF WATER STAND TYPICAL AT EVERY OTHER TRUCK FUELING ISLAND FURNISHED AND INSTALLED BY CONTRACTOR.
  - TANK #1, PRODUCT #1. 20,000 GALLON, 10'-0" x 37'-8 3/4" LONG, DOUBLE-WALL FIBERGLASS UNDERGROUND REGULAR UNLEADED GASOLINE TANK. FURNISHED BY OWNER, INSTALLED BY CONTRACTOR (TYP (1) PLACE). SEE PP DRAWINGS FOR MORE INFORMATION.
  - TANK #2 AND TANK #3. 20,000 GALLON, 10'-0" x 37'-10" LONG (2) CHAMBER UNDERGROUND DOUBLE WALL FIBERGLASS TANK, TANK #2, PRODUCT #2 - 12,000 GALLON SUPER UNLEADED GASOLINE, TANK #3, PRODUCT #3 - 8,000 AUTO DIESEL. FURNISHED BY OWNER, INSTALLED BY CONTRACTOR. (SEE PP DRAWINGS FOR MORE INFORMATION).
  - LOCAL UTILITY ELECTRICAL TRANSFORMER INSTALLED BY CONTRACTOR.
  - TRAVEL CENTER DISTRIBUTION ELECTRICAL TRANSFORMER INSTALLED BY CONTRACTOR.
  - PROPOSED WATER METER AND BACKFLOW. SEE UTILITY PLANS SHEET 11-12 FOR MORE INFORMATION.
  - PROPOSED IRRIGATION METER AND BACKFLOW PREVENTOR. SEE UTILITY PLANS SHEET 11-12 FOR MORE INFORMATION.
  - PROPOSED SEWER CLEANOUT. SEE UTILITY PLANS SHEET 11-12 FOR MORE INFORMATION.
  - PROPOSED U-SHAPED BIKE RACKS PER CITY STANDARDS AND SPECIFICATIONS.
  - INSTALL ACCESSIBLE RAMP. INSTALL CAST-IN-PLACE DETECTABLE WARNING SYSTEM (TRUNCATED DOME) PER ARMOR TILE - 36" X 48" PANEL. PRODUCT NO. ADA-C-3648W PER DETAIL X, SHEET XX.
  - INSTALL DETECTABLE WARNINGS.
  - PROPOSED CATCH BASIN. SEE STORM DRAIN PLANS SHEET 13-14 FOR MORE INFORMATION.
  - AUTO AIR/VACUUM (PROVIDED BY OWNER, ELECTRICAL BY CONTRACTOR), YARD HYDRANT BY CONTRACTOR.
  - NEW TANK VENT RISER CLUSTER, INSTALLED BY CONTRACTOR.
  - 4,000 GALLON, 6'-0" x 21'-11" LONG, SINGLE-WALL FIBERGLASS UNDERGROUND OIL/WATER SEPARATOR, FURNISHED BY OWNER, INSTALLED BY CONTRACTOR.
  - CLEAN OUT FOR OIL/WATER SEPARATOR FURNISHED AND INSTALLED BY CONTRACTOR.
  - B99 INJECTION SHED WITH PUMP. SUPPLIED BY OWNER. (SEE PRODUCT PIPING DRAWINGS FOR MORE INFORMATION).
  - 4" STEEL PIPE BOLLARD FURNISHED, INSTALLED BY CONTRACTOR (SEE CIVIL DWGS FOR SPECS.).
  - 6" STEEL PIPE BOLLARD FURNISHED, INSTALLED BY CONTRACTOR (SEE CIVIL DWGS FOR SPECS.).
  - 1'-0" CONCRETE BOLLARD FURNISHED, INSTALLED AND PAINTED BY CONTRACTOR (SEE CIVIL DWGS FOR SPECS.).
  - GREASE CONTAINER, PROVIDED BY OWNER.
  - SITE LIGHT, FURNISHED BY OWNER, INSTALLED BY CONTRACTOR. (LOCATION TO BE DETERMINED DURING FINAL ENGINEERING)
  - TRUCK SCALE, CONCRETE TRUCK SCALE PIT AND TRUCK SCALE FURNISHED AND INSTALLED BY TRUCK SCALE SUPPLIER. ELECTRICAL, COMMUNICATIONS AND DRAINAGE PROVIDED TO THE SCALE PIT BY CONTRACTOR, COORDINATION BY CONTRACTOR.
  - PARKING AREA DESIGNATED FOR GOLF CART.
  - TRASH ENCLOSURE 8' CHAIN LINK FENCE WITH VINYL INSERTS MOUNTED ON REINFORCED CONCRETE PAD WITH PROTECTIVE STEEL BOLLARDS, INSTALLED BY CONTRACTOR (SEE ARCH DWGS FOR DETAILS).
  - TRASH COMPACTOR, FURNISHED AND INSTALLED BY TRASH COMPACTOR SUPPLIER.
  - CARDBOARD BAILER OR RECYCLE DUMPSTER, FURNISHED AND INSTALLED BY DUMPSTER SUPPLIER.
  - STORAGE UNIT, FURNISHED BY OWNER. ELECTRICAL & A/C INSTALL BY CONTRACTOR.
  - PROPOSED "CERTAIN TEED BRAND; BUFFTECH VINYL FENCING; PRIVACY SERIES; STYLE "GALVESTON", 8' TALL; COLOR ALMOND." OR APPROVED EQUAL. FURNISHED AND INSTALLED BY CONTRACTOR.
  - PROPOSED SHOP BUILDING LOCATION.
  - PROPOSED CHANNEL (BOTTOM WIDTH 2', DEPTH 3.5', SIDE SLOPE 1.5:1) PER RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT PLAN FOR M.D.P. - ROLAND AREA LATERAL A-11A.
  - PROPOSED V-DITCH. REFER TO GRADING PLAN SHEET 9 AND 10 FOR MORE INFORMATION.
  - PROPOSED PORTE-COCHERE. REFER TO ARCHITECTURAL PLANS FOR MORE INFORMATION.
  - PROPOSED 4' CHAIN LINK FENCE.
  - INSTALL CHAIN LINK FENCE PER LANDSCAPE PLANS.
  - PROPOSED COMMERCIAL DRIVEWAY.
  - PROPOSED 8' AMETCO TITAN DESIGN ALUMINUM FENCE (COLOR TO MATCH BUILDING) ON TOP OF 3' BERM.
  - PROPOSED 10' CONCRETE MASONRY UNITS WALL.
  - PROPOSED 8' AMETCO TITAN DESIGN ALUMINUM FENCE (COLOR TO MATCH BUILDING) AT GRADE.

MATCHLINE - SEE SHEET 4



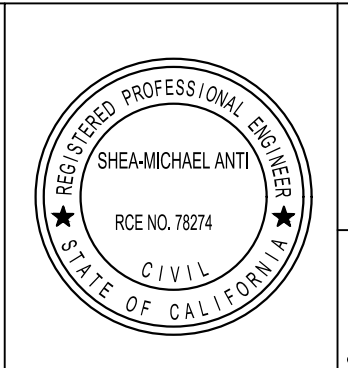
**811** DIAL TOLL FREE 811  
 AT LEAST TWO DAYS BEFORE YOU DIG  
 UNDERGROUND SERVICE ALERT OF SOUTHERN CALIFORNIA

**BENCH MARK:**  
 COUNTY OF RIVERSIDE BENCHMARK "M 21-1 RESET", 373 FEET EAST ALONG ETHANAC ROAD FROM THE INTERSECTION OF ETHANAC ROAD AND THE SOUTHBOUND LANES OF HIGHWAY 395. 150 FEET SOUTH OF ETHANAC ROAD. 50 FEET SOUTHEAST OF THE NORTHEAST CORNER OF A 6 FOOT CHAIN LINK RIGHT-OF-WAY FENCE. 1 FOOT NORTHEAST OF AN ANGLE-POINT IN THE RIGHT-OF-WAY FENCE. 2 FEET NORTH OF A MARKER POST. A BRASS DISK STAMPED "M-21-1 RESET" SET IN THE TOP OF A CONCRETE POST 3 INCHES ABOVE GROUND. EL = 1421.891 NGVD 29 (5/85)

MARK	BY	DATE	REVISIONS	APPR	DATE

**CITY OF PERRIS**

APPROVED BY: \_\_\_\_\_ DATE \_\_\_\_\_  
 CONTRACT CITY ENGINEER



**Kimley»Horn**  
 765 THE CITY DRIVE SUITE 200, ORANGE, CA 92868  
 PHONE: 714-939-1030

PREPARED BY: \_\_\_\_\_ DATE 2/27/2022  
 SHEA-MICHAEL ANTI R.C.E. 78274

**SITE PLAN PRELIMINARY PRECISE GRADING PLAN**  
 PILOT PERRIS  
 ETHANAC ROAD AND TRUMBLE ROAD  
 APN: 329-250-011 & 329-250-012

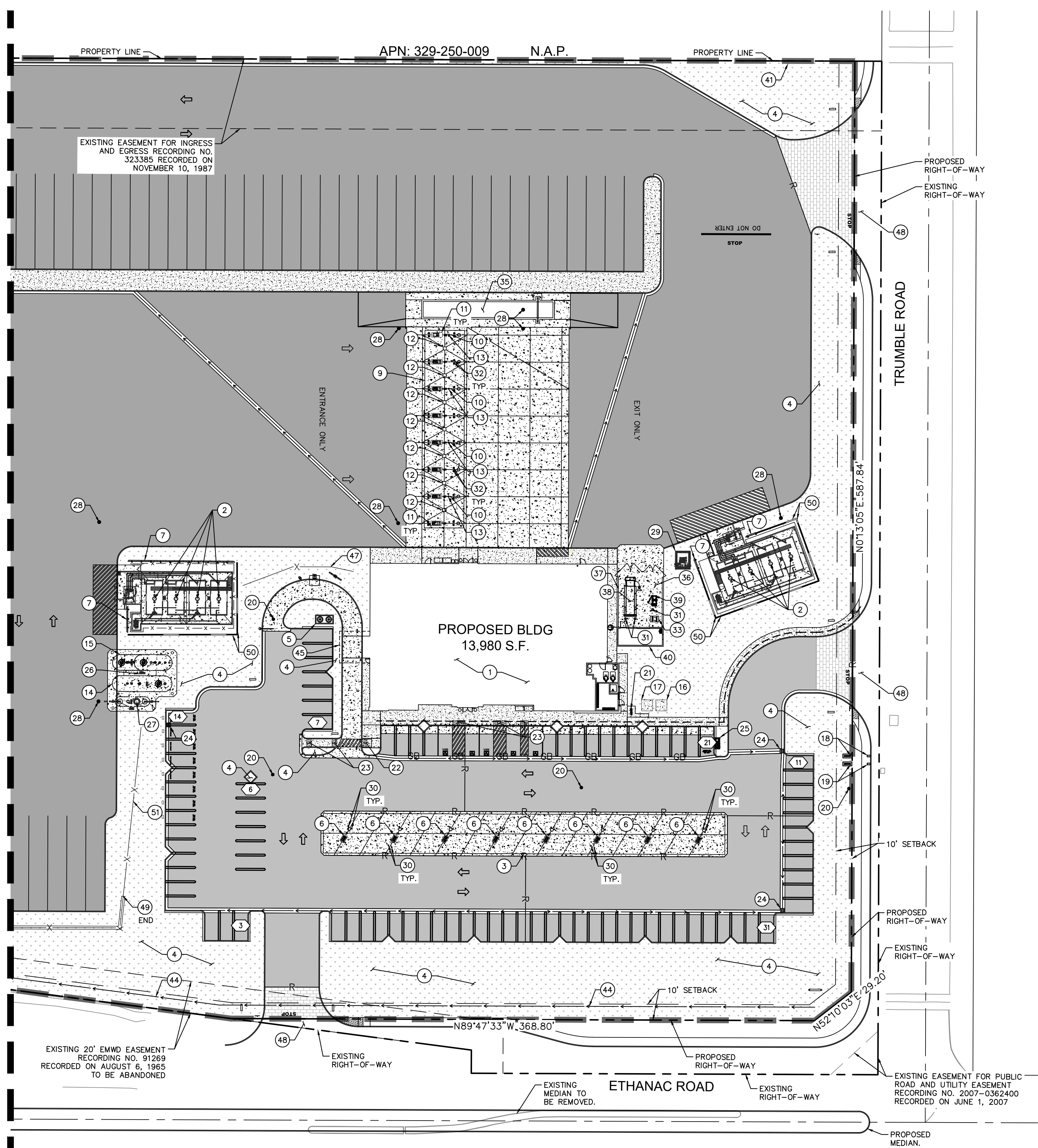
PROJECT NUMBER: 095428010

SHEET NO. **3**  
 OF 16 SHTS

FILE NO.:

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MATCHLINE - SEE SHEET 3



LEGEND	
---	PROPERTY LINE CIVIL
---	LIMITS OF WORK
---	CENTER LINE
- - -	SETBACKS
- - -	EASEMENT LINE
- - -	ACCESSIBLE ROUTE
x - x - x - x	FENCE
CB	GRADE BREAK
R	RIDGE LINE
⊕	PARKING COUNT
⊕	DETECTABLE WARNINGS
▒	DECORATIVE PAVEMENT
[Stippled]	STANDARD DUTY CONCRETE PAVEMENT
[Dotted]	HEAVY DUTY CONCRETE PAVEMENT
[Dark Grey]	HEAVY DUTY ASPHALT PAVEMENT
[Light Grey]	STANDARD DUTY ASPHALT PAVEMENT
[Patterned]	LANDSCAPE/PLANTER AREA

### SITE INFORMATION

APN'S: 329-250-011 AND 329-250-012

GROSS PARCEL	±14.4	ACRES
DISTURBED	±14.4	ACRES
TOTAL PERVIOUS	±4.5	ACRES
TOTAL IMPERVIOUS (INCLUDING BUILDING)	±9.9	ACRES

TOTAL GROSS FLOOR AREA: 13,980 SF

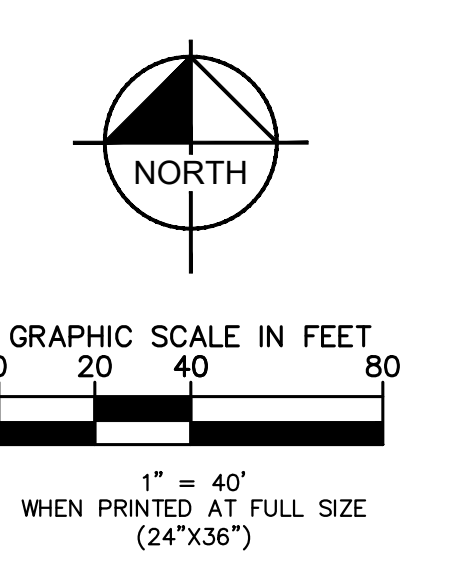
EXISTING: COMMERCIAL COMMUNITY (CC)

PROPOSED: COMMERCIAL COMMUNITY (CC)

PARKING PROVIDED:

STANDARD ACCESSIBLE TRUCK	88 SPACES
TRUCK	5 SPACES
BICYCLE SPACES	116 SPACES
	2 PROPOSED

- ### CONSTRUCTION NOTES
- PILOT TRAVEL CENTER BUILDING (SEE ARCHITECTURAL DRAWINGS), INSTALLED BY CONTRACTOR.
  - ABOVE GROUND STORAGE TANK FARM WITH CONTAINMENT. EACH AST FARM CONTAINS (4) 12,000 GALLON TACKS FOR DIESEL AND BIO. SEE PRODUCT PIPING DRAWINGS FOR MORE INFORMATION.
  - 25'-0" x 253'-7" AUTO CANOPY, FURNISHED AND INSTALLED BY CANOPY SUPPLIER. CANOPY FOUNDATIONS INSTALLED BY CONTRACTOR.
  - LANDSCAPE AREA INSTALLED BY CONTRACTOR. REFER TO LANDSCAPE AND IRRIGATION PLANS FOR MORE INFORMATION.
  - GREASE TRAP. FURNISHED AND INSTALLED BY CONTRACTOR.
  - CONCRETE ISLAND WITH A GAS/AUTO DIESEL (3+1) DISPENSER AND CONTAINMENT BOX TYPICAL AT (8) PLACES, INSTALLED BY CONTRACTOR.
  - 2'-0" HIGH GUARDRAIL AROUND CONTAINMENT AREA, 1'-0" OUTSIDE OF FENCE.
  - PROPOSED BIORETENTION BASIN. SEE UTILITY PLAN FOR MORE INFORMATION.
  - 25'-0" x 124'-9" TRUCK CANOPY, FURNISHED AND INSTALLED BY CANOPY SUPPLIER, CANOPY FOUNDATIONS INSTALLED BY CONTRACTOR.
  - TRUCK AIR STAND, TYPICAL AT EVERY OTHER TRUCK FUELING ISLAND, SUPPLIED BY OWNER AND INSTALLED BY CONTRACTOR.
  - CONCRETE ISLAND WITH A DIESEL DISPENSER AND CONTAINMENT BOX TYPICAL AT (8) PLACES, INSTALLED BY CONTRACTOR.
  - PREFABRICATED TRUCK ISLAND CATCH BASIN (TYP (7) PLACES). SUPPLIED BY OWNER INSTALLED BY CONTRACTOR
  - TRUCK FREEZE PROOF WATER STAND TYPICAL AT EVERY OTHER TRUCK FUELING ISLAND FURNISHED AND INSTALLED BY CONTRACTOR.
  - TANK #1, PRODUCT #1. 20,000 GALLON, 10'-0" x 37'-8 3/4" LONG, DOUBLE-WALL FIBERGLASS UNDERGROUND REGULAR UNLEADED GASOLINE TANK. FURNISHED BY OWNER, INSTALLED BY CONTRACTOR (TYP (1) PLACE). SEE PP DRAWINGS FOR MORE INFORMATION.
  - TANK #2 AND TANK #3. 20,000 GALLON, 10'-0" x 37'-10" LONG (2) CHAMBER UNDERGROUND DOUBLE WALL FIBERGLASS TANK, TANK #2, PRODUCT #2 - 12,000 GALLON SUPER UNLEADED GASOLINE, TANK #3, PRODUCT #3 - 8,000 AUTO DIESEL. FURNISHED BY OWNER, INSTALLED BY CONTRACTOR. (SEE PP DRAWINGS FOR MORE INFORMATION).
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  - TRAVEL CENTER DISTRIBUTION ELECTRICAL TRANSFORMER INSTALLED BY CONTRACTOR.
  - PROPOSED WATER METER AND BACKFLOW. SEE UTILITY PLANS SHEET 11-12 FOR MORE INFORMATION.
  - PROPOSED IRRIGATION METER AND BACKFLOW PREVENTOR. SEE UTILITY PLANS SHEET 11-12 FOR MORE INFORMATION.
  - PROPOSED SEWER CLEANOUT. SEE UTILITY PLANS SHEET 11-12 FOR MORE INFORMATION.
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  - PROPOSED CATCH BASIN. SEE STORM DRAIN PLANS SHEET 13-14 FOR MORE INFORMATION.
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  - CLEAN OUT FOR OIL/WATER SEPARATOR FURNISHED AND INSTALLED BY CONTRACTOR.
  - B99 INJECTION SHED WITH SUMP. SUPPLIED BY OWNER. (SEE PRODUCT PIPING DRAWINGS FOR MORE INFORMATION).
  - 4" STEEL PIPE BOLLARD FURNISHED, INSTALLED BY CONTRACTOR (SEE CIVIL DWGS FOR SPECS.).
  - 6" STEEL PIPE BOLLARD FURNISHED, INSTALLED BY CONTRACTOR (SEE CIVIL DWGS FOR SPECS.).
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  - GREASE CONTAINER, PROVIDED BY OWNER.
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  - TRUCK SCALE, CONCRETE TRUCK SCALE PIT AND TRUCK SCALE FURNISHED AND INSTALLED BY TRUCK SCALE SUPPLIER. ELECTRICAL, COMMUNICATIONS AND DRAINAGE PROVIDED TO THE SCALE PIT BY CONTRACTOR, COORDINATION BY CONTRACTOR.
  - PARKING AREA DESIGNATED FOR GOLF CART.
  - TRASH ENCLOSURE 8' CHAIN LINK FENCE WITH VINYL INSERTS MOUNTED ON REINFORCED CONCRETE PAD WITH PROTECTIVE STEEL BOLLARDS, INSTALLED BY CONTRACTOR (SEE ARCH DWGS FOR DETAILS).
  - TRASH COMPACTOR, FURNISHED AND INSTALLED BY TRASH COMPACTOR SUPPLIER.
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  - STORAGE UNIT, FURNISHED BY OWNER. ELECTRICAL & A/C INSTALL BY CONTRACTOR.
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  - PROPOSED SHOP BUILDING LOCATION.
  - PROPOSED CHANNEL (BOTTOM WIDTH 2', DEPTH 3.5', SIDE SLOPE 1.5:1) PER RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT PLAN FOR M.D.P. - ROMOLAND AREA LATERAL A-11A.
  - PROPOSED V-DITCH. REFER TO GRADING PLAN SHEET 9 AND 10 FOR MORE INFORMATION.
  - PROPOSED PORTE-COCHERE. REFER TO ARCHITECTURAL PLANS FOR MORE INFORMATION.
  - PROPOSED 4' CHAIN LINK FENCE.
  - INSTALL CHAIN LINK FENCE PER LANDSCAPE PLANS.
  - PROPOSED COMMERCIAL DRIVEWAY.
  - PROPOSED 8' AMETCO TITAN DESIGN ALUMINUM FENCE (COLOR TO MATCH BUILDING) ON TOP OF 3' BERM. REFER TO SHEET 9-10 FOR MORE INFORMATION.
  - PROPOSED 10' CONCRETE MASONRY UNITS WALL.
  - PROPOSED 8' AMETCO TITAN DESIGN ALUMINUM FENCE (COLOR TO MATCH BUILDING) AT GRADE.



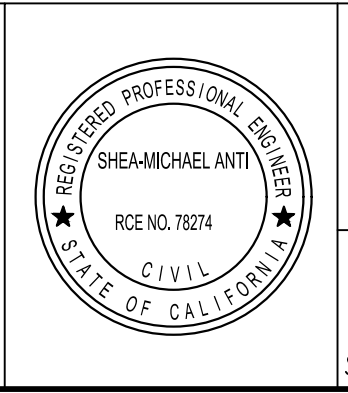
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DIAL TOLL FREE  
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Know what's below.  
Call before you dig.  
AT LEAST TWO DAYS BEFORE YOU DIG  
UNDERGROUND SERVICE ALERT OF SOUTHERN CALIFORNIA

**BENCH MARK:**  
COUNTY OF RIVERSIDE BENCHMARK "M 21-1 RESET", 373 FEET EAST ALONG ETHANAC ROAD FROM THE INTERSECTION OF ETHANAC ROAD AND THE SOUTHBOUND LANES OF HIGHWAY 395. 150 FEET SOUTH OF ETHANAC ROAD. 50 FEET SOUTHEAST OF THE NORTHEAST CORNER OF A 6 FOOT CHAIN LINK RIGHT-OF-WAY FENCE. 1 FOOT NORTHEAST OF AN ANGLE-POINT IN THE RIGHT-OF-WAY FENCE. 2 FEET NORTH OF A MARKER POST. A BRASS DISK STAMPED "M-21-1 RESET" SET IN THE TOP OF A CONCRETE POST 3 INCHES ABOVE GROUND. EL = 1421.891 NGVD 29 (5/85)

MARK	BY	DATE	REVISIONS	APPR	DATE

CITY OF PERRIS

APPROVED BY: \_\_\_\_\_ DATE \_\_\_\_\_  
CONTRACT CITY ENGINEER



**Kimley Horn**  
765 THE CITY DRIVE SUITE 200, ORANGE, CA 92668  
PHONE: 714-939-1030

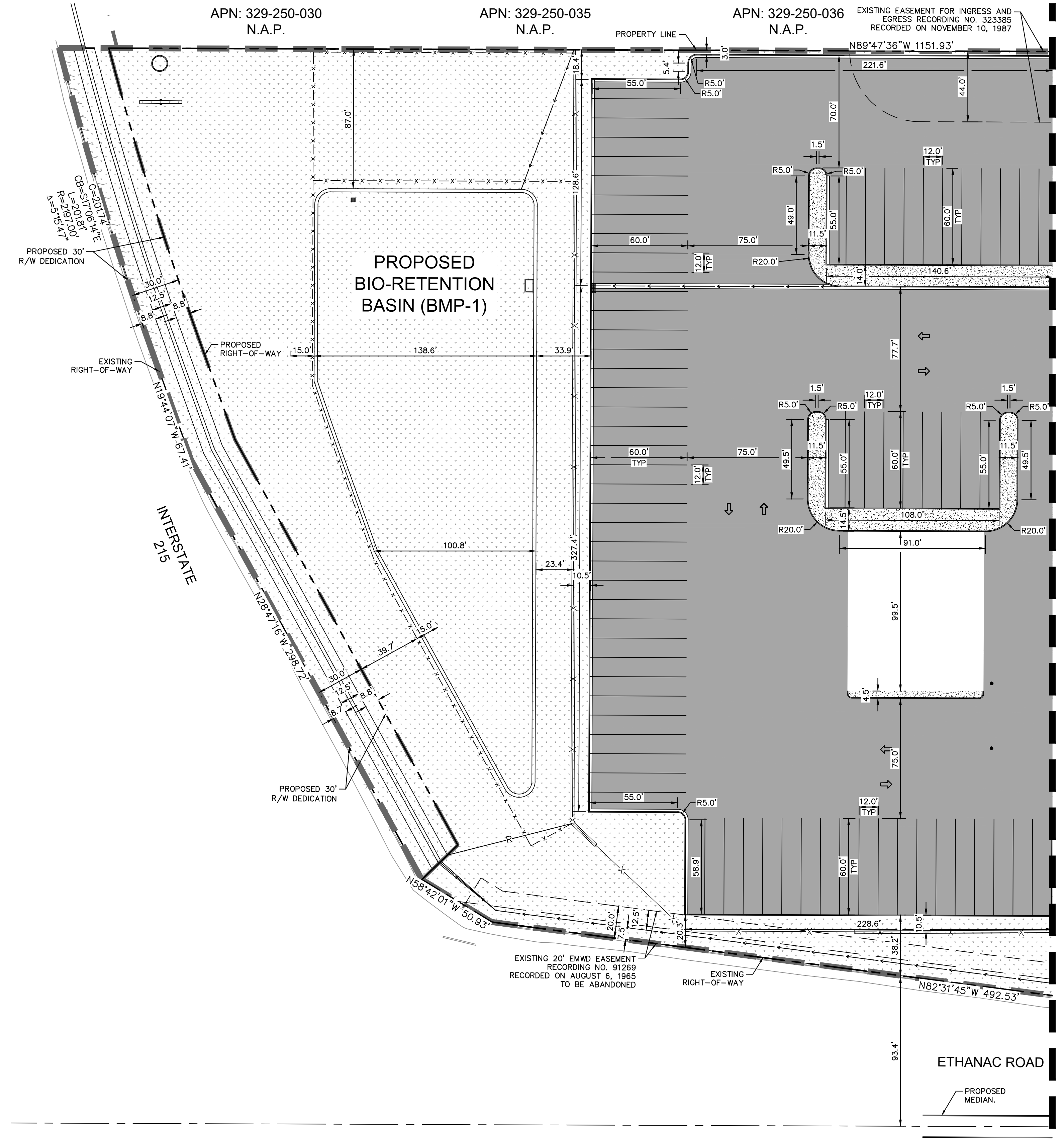
PREPARED BY: *Sheamichael Anti*  
SHEA-MICHAEL ANTI R.C.E. 78274 DATE 2/27/2022

SITE PLAN  
PRELIMINARY PRECISE GRADING PLAN  
PILOT PERRIS  
ETHANAC ROAD AND TRUMBLE ROAD  
APN: 329-250-011 & 329-250-012

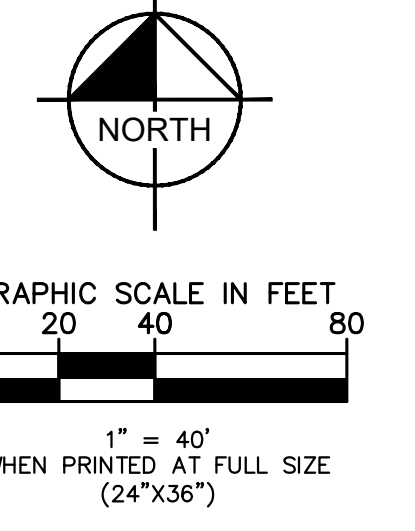
PROJECT NUMBER: 095428010

SHEET NO.  
**4**  
OF 16 SHTS  
FILE NO.:

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LEGEND			
	PROPERTY LINE CIVIL		STANDARD DUTY CONCRETE PAVEMENT
	LIMITS OF WORK		HEAVY DUTY CONCRETE PAVEMENT
	CENTER LINE		HEAVY DUTY ASPHALT PAVEMENT
	SETBACKS		STANDARD DUTY ASPHALT PAVEMENT
	EASEMENT LINE		LANDSCAPE/PLANTER AREA
	DETECTABLE WARNINGS		
	DECORATIVE PAVEMENT		



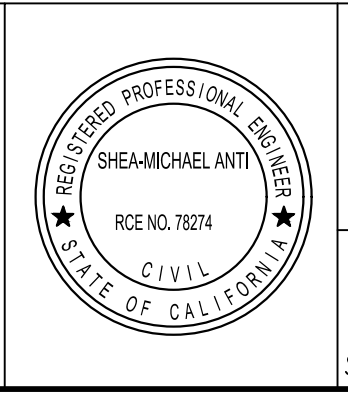
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**CITY OF PERRIS**

APPROVED BY: \_\_\_\_\_ DATE: \_\_\_\_\_

CONTRACT CITY ENGINEER \_\_\_\_\_ DATE \_\_\_\_\_



**Kimley»Horn**

765 THE CITY DRIVE SUITE 200, ORANGE, CA 92868  
 PHONE: 714-939-1030

PREPARED BY: *Shea-Michael Anti* DATE: 2/28/2022  
 SHEA-MICHAEL ANTI R.C.E. 78274 DATE

**HORIZONTAL CONTROL PLAN  
 PRELIMINARY PRECISE GRADING PLAN  
 PILOT PERRIS  
 ETHANAC ROAD AND TRUMBLE ROAD  
 APN: 329-250-011 & 329-250-012**

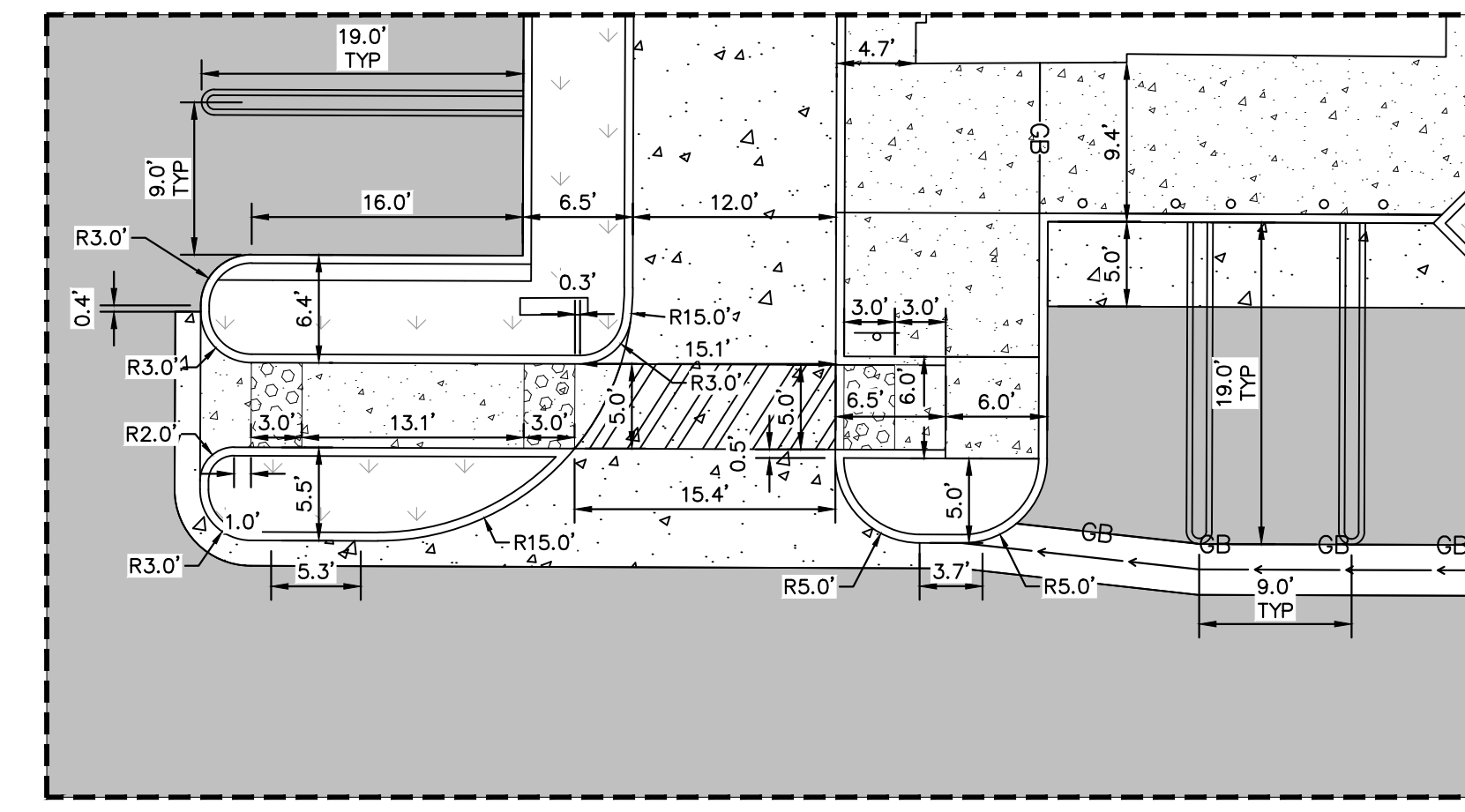
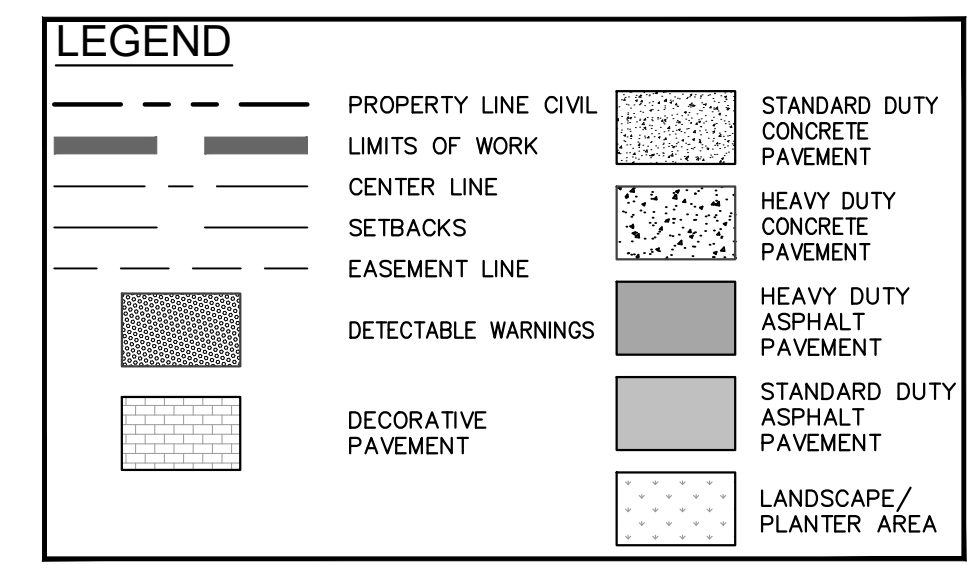
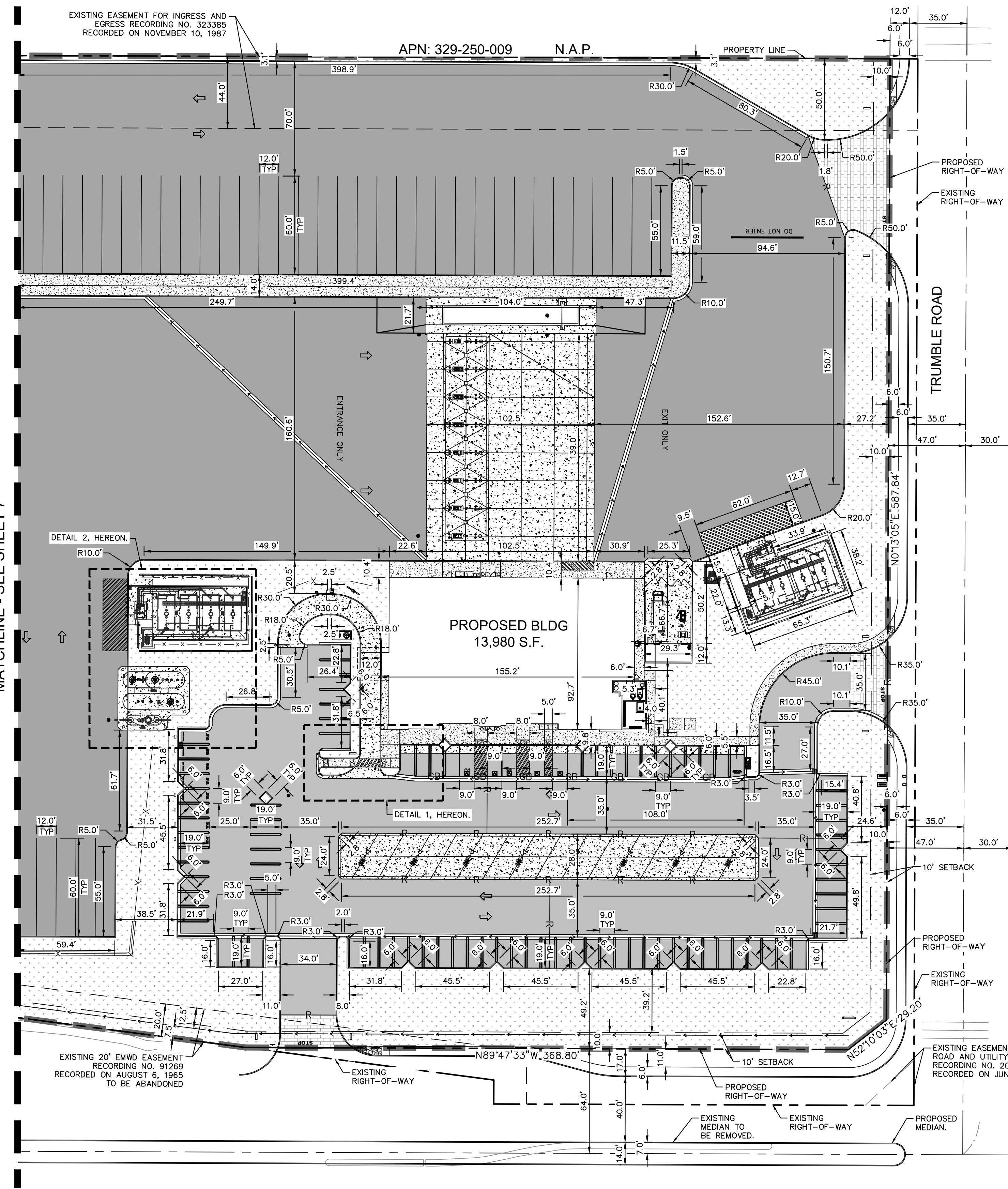
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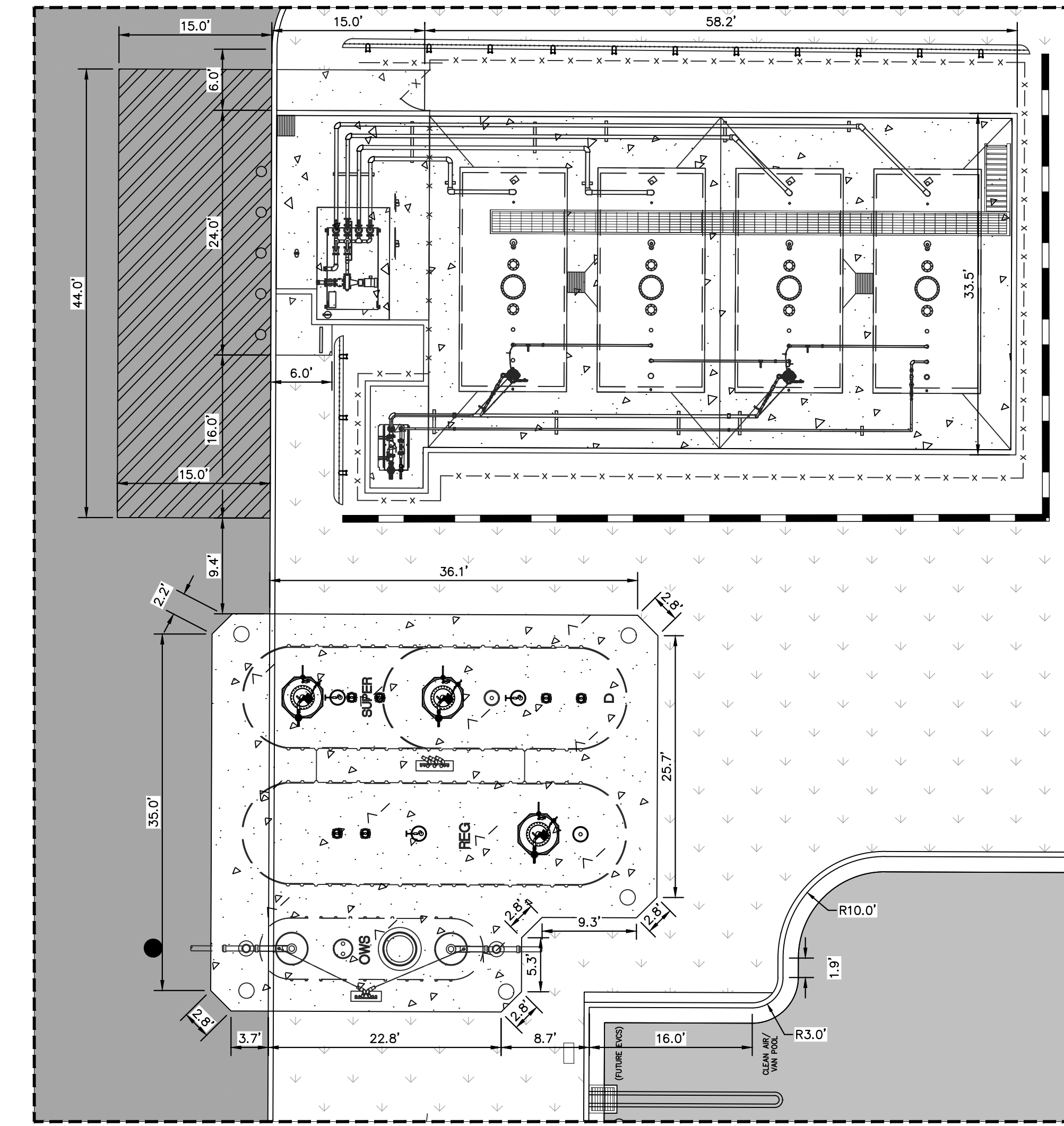
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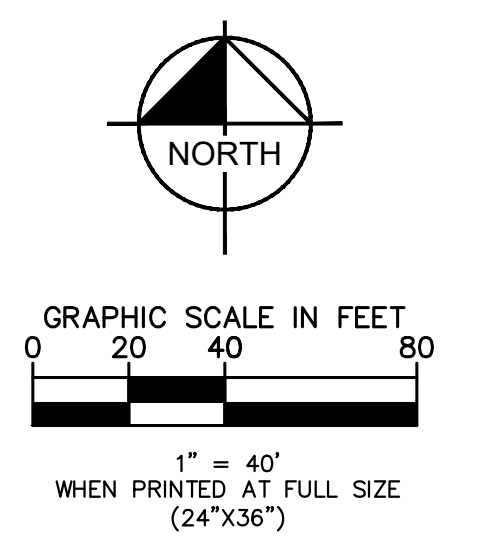
MATCHLINE - SEE SHEET 7



DETAIL 1  
1"=10'



DETAIL 2  
1"=10'

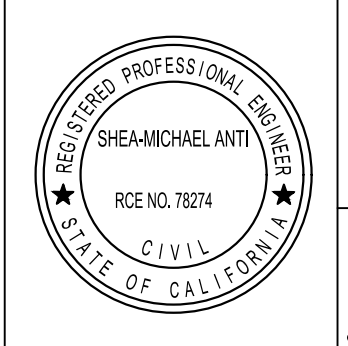


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CITY OF PERRIS  
APPROVED BY:  
CONTRACT CITY ENGINEER DATE

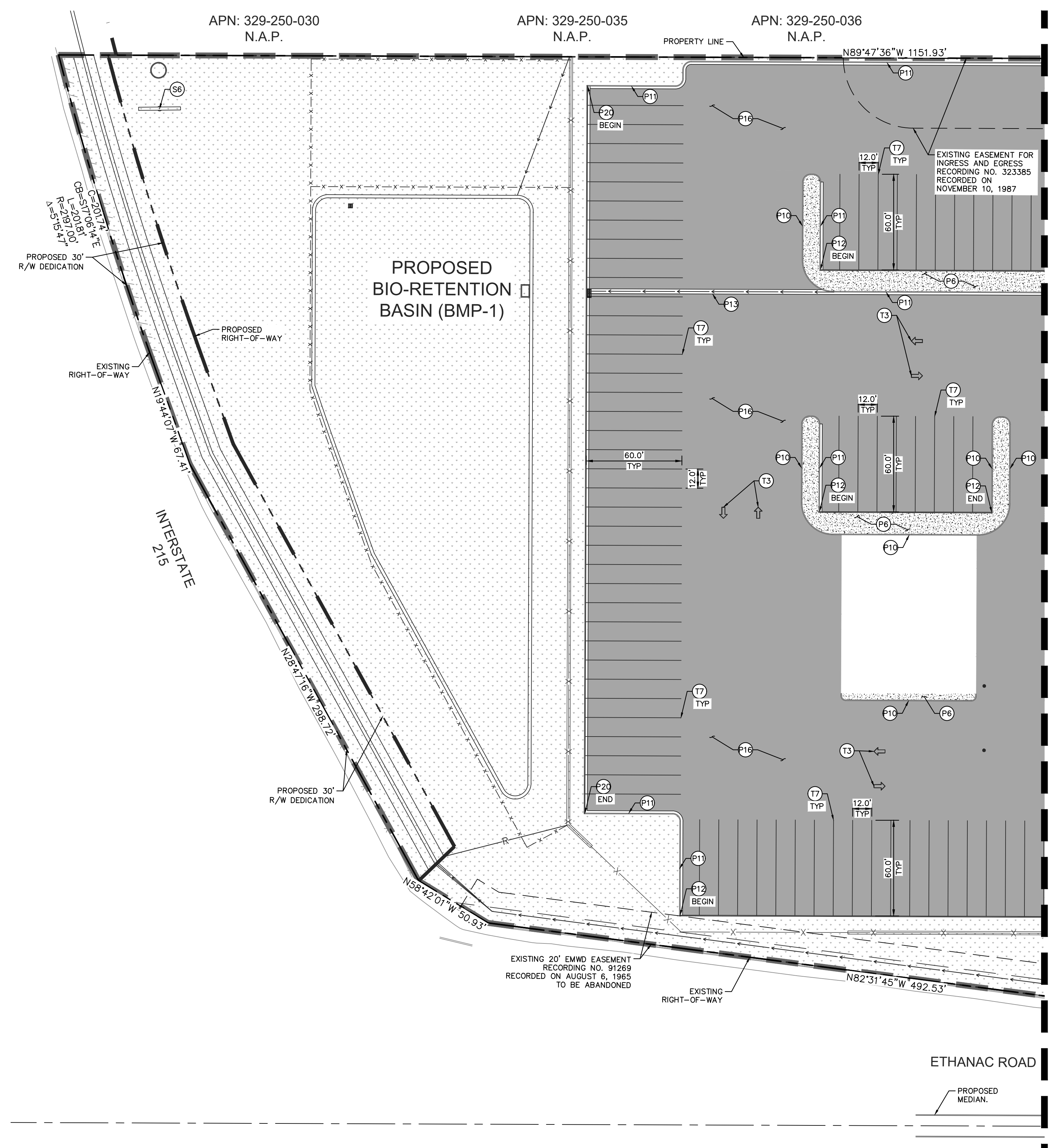


**Kimley Horn**  
765 THE CITY DRIVE SUITE 200, ORANGE, CA 92668  
PHONE: 714-939-1030  
PREPARED BY:  
SHEA-MICHAEL ANTI R.C.E. 78274 DATE: 2/28/2022

HORIZONTAL CONTROL PLAN  
PRELIMINARY PRECISE GRADING PLAN  
PILOT PERRIS  
ETHANAC ROAD AND TRUMBLE ROAD  
APN: 329-250-011 & 329-250-012  
PROJECT NUMBER: 095428010  
FILE NO.:

SHEET NO. 6  
OF 16 SHTS

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LEGEND		
---	PROPERTY LINE CIVIL	STANDARD DUTY CONCRETE PAVEMENT
---	LIMITS OF WORK	HEAVY DUTY CONCRETE PAVEMENT
---	CENTER LINE	HEAVY DUTY ASPHALT PAVEMENT
---	SETBACKS	STANDARD DUTY ASPHALT PAVEMENT
---	EASEMENT LINE	LANDSCAPE/PLANTER AREA
---	ACCESSIBLE ROUTE	
---	FENCE	
---	DETECTABLE WARNINGS	
---	DECORATIVE PAVEMENT	

**PAVEMENT NOTES**

- (P1) 6" REINFORCED CONCRETE PAD FOR AUTO CANOPY. WATER FROM SITE SHOULD NOT DRAIN ACROSS THE CONCRETE PAD FOR THE AUTO CANOPY. ASPHALT PAVING ON ALL (4) SIDES OF THE CONCRETE PAD SHOULD DRAIN AWAY FROM CONCRETE PAD. SEE DETAIL X SHEET X, INSTALLED BY CONTRACTOR.
- (P2) 8" REINFORCED CONCRETE PAD FOR TRUCK CANOPY. WATER FROM SITE SHOULD NOT DRAIN ACROSS THE CONCRETE PAD FOR THE TRUCK CANOPY. ASPHALT PAVING ON BOTH SIDES OF THE CONCRETE PAD SHOULD DRAIN AWAY FROM CONCRETE PAD. CONCRETE PAD FOR THE TRUCK CANOPY MUST DRAIN TO CATCH BASIN. SEE DETAIL X SHEET X, INSTALLED BY CONTRACTOR.
- (P3) 8" REINFORCED CONCRETE PAD AT TANK FARM. SEE DETAIL X SHEET X, INSTALLED BY CONTRACTOR.
- (P4) 8" REINFORCED CONCRETE PAD TRASH ENCLOSURE. SEE DETAIL X SHEET X, INSTALLED BY CONTRACTOR.
- (P5) 6" REINFORCED CONCRETE PARKING APRON AT PARKING SPACES IN FRONT OF BUILDING. SEE DETAIL X SHEET X, INSTALLED BY CONTRACTOR.
- (P6) 4" REINFORCED CONCRETE SIDEWALK. SEE DETAIL X SHEET X, INSTALLED BY CONTRACTOR.
- (P7) 7'-0" X 7'-0" X 6" REINFORCED CONCRETE PAD FOR ELECTRICAL TRANSFORMER. CONTRACTOR TO COORDINATE WITH UTILITY COMPANY FOR SIZE AND REINFORCING REQUIREMENTS. INSTALLED BY CONTRACTOR.
- (P8) 8" REINFORCED CONCRETE PAD AT OIL/WATER SEPARATOR. SEE DETAIL X SHEET X, INSTALLED BY CONTRACTOR.
- (P9) SEE BUILDING PLANS FOR AST AND BIO SHED FOUNDATION DESIGN.
- (P10) STANDARD DUTY 6" CURB. SEE DETAIL X SHEET X, INSTALLED BY CONTRACTOR.
- (P11) STANDARD DUTY CURB AND GUTTER. SEE DETAIL X SHEET X, INSTALLED BY CONTRACTOR.
- (P12) HEAVY DUTY CURB. SEE DETAIL X SHEET X, INSTALLED BY CONTRACTOR.
- (P13) INSTALL RIBBON GUTTER PER DETAIL X, SHEET X.
- (P14) 0" ELEVATION CURB. SEE GRADING PLANS FOR DETAILS AND SPECIFICATIONS.
- (P15) 8" REINFORCED CONCRETE RAMP FOR CAT SCALE.
- (P16) CONSTRUCT HEAVY DUTY ASPHALT PAVEMENT PER DETAIL X SHEET X.
- (P17) CONSTRUCT STANDARD DUTY ASPHALT PAVEMENT DETAIL X SHEET X.
- (P18) CONSTRUCT THICKENED EDGE PER DETAIL X, SHEET X.
- (P19) CONSTRUCT CONCRETE WALK-OFF PER DETAIL X, SHEET X.
- (P20) HEAVY DUTY CURB AND GUTTER PER DETAIL X, SHEET X.
- (P21) DECORATIVE PAVEMENT

**STRIPING NOTES**

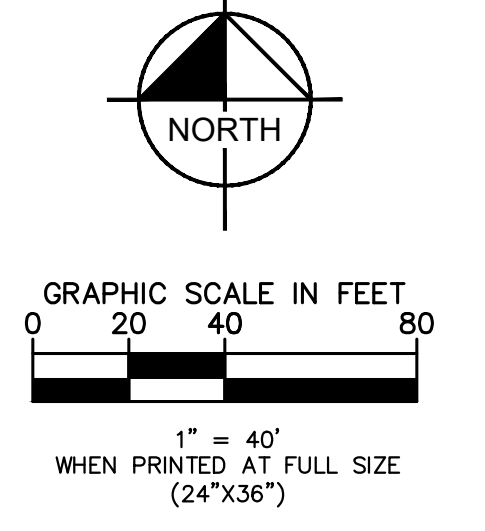
- (T1) INSTALL ACCESSIBLE PATH OF TRAVEL STRIPING.
- (T2) INSTALL ACCESSIBLE STRIPING PARKING STALL AND ACCESSIBLE PARKING SYMBOL.
- (T3) ALL DIRECTIONAL AND PARKING STRIPING TO BE SAFETY YELLOW-UNLESS NOTED OTHERWISE (TYP).
- (T4) STOP LINE INSTALLED BY CONTRACTOR.
- (T5) 5'-0" X 20'-0" PASSENGER DROP-OFF/LOADING ZONE. TRAFFIC STRIPING 4" WIDE PAINTED (SAFETY YELLOW) PARALLEL STRIPES AT 16" O.C. FURNISHED AND INSTALLED BY CONTRACTOR.
- (T6) 4" YELLOW DOUBLE HAIRPIN STRIPING, TYP. (COLOR PER CITY CODE).
- (T7) 4" YELLOW PAINTED SOLID LINE, TYP. (COLOR PER CITY CODE).
- (T8) PROPOSED "PARKING FOR SERVICE ISLAND USE ONLY." PAVEMENT MARKING.
- (T9) PROPOSED "CLEAN AIR/ VAN POOL." PAVEMENT MARKING.
- (T10) PROPOSED FUTURE EVCS PARKING STALLS.
- (T11) PROPOSED "ENTRANCE ONLY" PAVEMENT MARKING.
- (T12) PROPOSED "EXIT ONLY" PAVEMENT MARKING.

**SIGNING NOTES**

- (S1) INSTALL ACCESSIBLE PARKING STALL SIGN PER DETAIL X SHEET X AND SINGLE BASE SIGN POST PER DETAIL X SHEET X.
- (S2) INSTALL VAN ACCESSIBLE PARKING STALL SIGN PER DETAIL X SHEET X AND SINGLE BASE SIGN POST PER DETAIL X SHEET X.
- (S3) "PASSENGER LOADING ZONE ONLY" SIGN FURNISHED AND INSTALLED BY CONTRACTOR SHALL BE WALL MOUNTED.
- (S4) "STOP SIGN" SIGN INSTALLED BY CONTRACTOR.
- (S5) "PED-XING" SIGN FURNISHED AND INSTALLED BY CONTRACTOR.
- (S6) SEE BUILDING PLANS DRAWINGS FOR ALL OTHER SIGNAGE.
- (S7) RESTAURANT "DRIVE-THRU" (INTERNALLY ILLUMINATED) DIRECTIONAL SIGN FURNISHED BY OWNER, INSTALLED BY SIGN SUPPLIER. CONCRETE FOUNDATION AND ELECTRICAL INSTALLED BY CONTRACTOR.
- (S8) "DRIVE-THRU CLEARANCE 9 FT. 6 IN." SIGN FURNISHED BY OWNER, INSTALLED BY SIGN SUPPLIER. CONCRETE FOUNDATION INSTALLED BY CONTRACTOR.
- (S9) RESTAURANT PREVIEW BOARD (INTERNALLY ILLUMINATED) FURNISHED BY OWNER, INSTALLED BY SIGN SUPPLIER. CONCRETE FOUNDATION AND ELECTRICAL INSTALLED BY CONTRACTOR.
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- (S11) "THANK YOU / DO NOT ENTER" DIRECTIONAL SIGN (INTERNALLY ILLUMINATED) FURNISHED BY OWNER, INSTALLED BY SIGN SUPPLIER. CONCRETE FOUNDATION AND ELECTRICAL INSTALLED BY CONTRACTOR.

**GENERAL PAVING NOTES**

1. ALL MANHOLES MUST BE SET 2" HIGHER THAN PAVING TO PROVIDE A CROWN IN A 24"Ø AREA AROUND EACH MANHOLE.
2. SUB-BASE MUST BE COMPACTED TO 95% STANDARD PROCTOR WITH A WATER CONTENT WITHIN 1.5% OF OPTIMUM.
3. STONE BASE MUST BE COMPACTED TO 95% STANDARD PROCTOR WITH A WATER CONTENT WITHIN 1.5% OF OPTIMUM.
4. PRIOR TO INSTALLING BITUMINOUS PAVING CONTRACTOR IS TO PROOF-ROLL SUB-BASE USING HEAVY, PNEUMATIC-TIRED ROLLERS TO LOCATE AREAS THAT ARE UNSTABLE OR THAT REQUIRE FURTHER COMPACTION. NOTIFY CONSTRUCTION MANAGER IN WRITING OF ANY UNSATISFACTORY CONDITIONS. DO NOT BEGIN PAVING INSTALLATION UNTIL THESE CONDITIONS HAVE BEEN SATISFACTORILY CORRECTED.
5. ASPHALT PAVING @ EDGE OF CONCRETE PAD FOR THE TRUCK CANOPY SHOULD BE LAID @ 1/4" HIGHER THAN CONCRETE PAD ON EXIT SIDE CANOPY.
6. CONCRETE COLLAR IS REQUIRED FOR ALL STRUCTURES IN PAVEMENT.



MATCHLINE - SEE SHEET 8

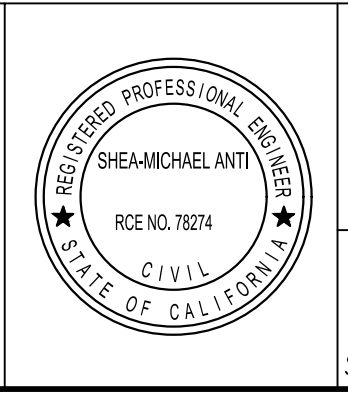
**BENCH MARK:**  
 COUNTY OF RIVERSIDE BENCHMARK "M 21-1 RESET", 373 FEET EAST ALONG ETHANAC ROAD FROM THE INTERSECTION OF ETHANAC ROAD AND THE SOUTHBOUND LANES OF HIGHWAY 395. 150 FEET SOUTH OF ETHANAC ROAD. 50 FEET SOUTHEAST OF THE NORTHEAST CORNER OF A 6 FOOT CHAIN LINK RIGHT-OF-WAY FENCE. 1 FOOT NORTHEAST OF AN ANGLE-POINT IN THE RIGHT-OF-WAY FENCE. 2 FEET NORTH OF A MARKER POST. A BRASS DISK STAMPED "M-21-1 RESET" SET IN THE TOP OF A CONCRETE POST 3 INCHES ABOVE GROUND. EL = 1421.891 NGVD 29 (5/85)

MARK	BY	DATE	REVISIONS	APPR	DATE

CITY OF PERRIS

APPROVED BY: \_\_\_\_\_ DATE \_\_\_\_\_

CONTRACT CITY ENGINEER \_\_\_\_\_ DATE \_\_\_\_\_



**Kimley»Horn**

765 THE CITY DRIVE SUITE 200, ORANGE, CA 92668  
 PHONE: 714-939-1030

PREPARED BY: *Sheamichael Anti* DATE: 2/28/2022  
 SHEA-MICHAEL ANTI R.C.E. 78274

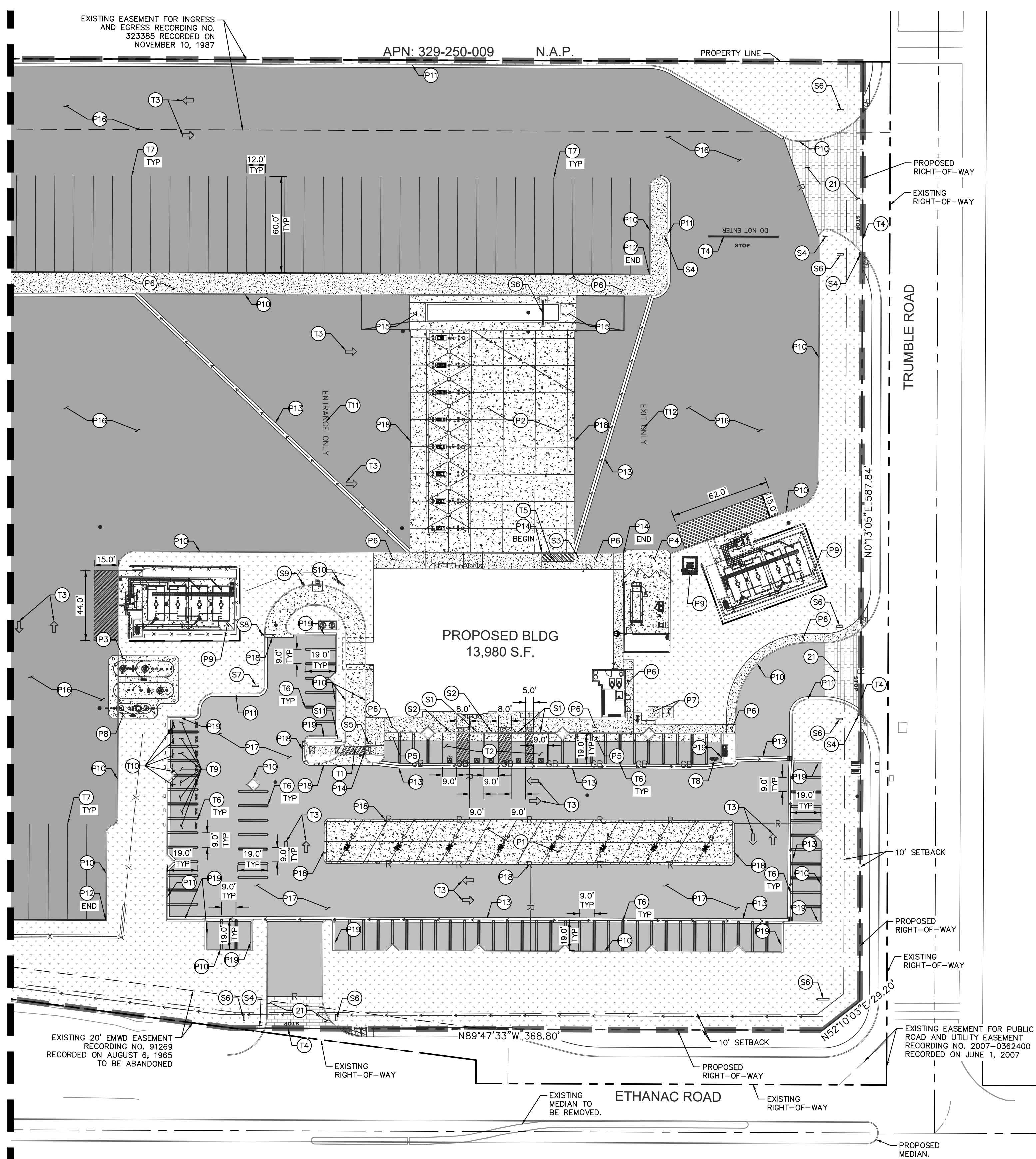
SIGNING, STRIPING, AND PAVEMENT PLAN  
 PRELIMINARY PRECISE GRADING PLAN  
 PILOT PERRIS  
 ETHANAC ROAD AND TRUMBLE ROAD  
 APN: 329-250-011 & 329-250-012

PROJECT NUMBER: 095428010 FILE NO.:

SHEET NO. 7 OF 16 SHTS

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MATCHLINE - SEE SHEET 7



LEGEND			
	PROPERTY LINE CIVIL		STANDARD DUTY CONCRETE PAVEMENT
	LIMITS OF WORK		HEAVY DUTY CONCRETE PAVEMENT
	CENTER LINE		HEAVY DUTY ASPHALT PAVEMENT
	SETBACKS		STANDARD DUTY ASPHALT PAVEMENT
	EASEMENT LINE		LANDSCAPE/PLANTER AREA
	ACCESSIBLE ROUTE		
	FENCE		
	DETECTABLE WARNINGS		
	DECORATIVE PAVEMENT		

**PAVEMENT NOTES**

- (P1) 6" REINFORCED CONCRETE PAD FOR AUTO CANOPY. WATER FROM SITE SHOULD NOT DRAIN ACROSS THE CONCRETE PAD FOR THE AUTO CANOPY. ASPHALT PAVING ON ALL (4) SIDES OF THE CONCRETE PAD SHOULD DRAIN AWAY FROM CONCRETE PAD. SEE DETAIL X SHEET X, INSTALLED BY CONTRACTOR.
- (P2) 8" REINFORCED CONCRETE PAD FOR TRUCK CANOPY. WATER FROM SITE SHOULD NOT DRAIN ACROSS THE CONCRETE PAD FOR THE TRUCK CANOPY. ASPHALT PAVING ON BOTH SIDES OF THE CONCRETE PAD SHOULD DRAIN AWAY FROM CONCRETE PAD. CONCRETE PAD FOR THE TRUCK CANOPY MUST DRAIN TO CATCH BASIN. SEE DETAIL X SHEET X, INSTALLED BY CONTRACTOR.
- (P3) 8" REINFORCED CONCRETE PAD AT TANK FARM. SEE DETAIL X SHEET X, INSTALLED BY CONTRACTOR.
- (P4) 8" REINFORCED CONCRETE PAD TRASH ENCLOSURE. SEE DETAIL X SHEET X, INSTALLED BY CONTRACTOR.
- (P5) 6" REINFORCED CONCRETE PARKING APRON AT PARKING SPACES IN FRONT OF BUILDING. SEE DETAIL X SHEET X, INSTALLED BY CONTRACTOR.
- (P6) 4" REINFORCED CONCRETE SIDEWALK. SEE DETAIL X SHEET X, INSTALLED BY CONTRACTOR.
- (P7) 7'-0" X 7'-0" X 6" REINFORCED CONCRETE PAD FOR ELECTRICAL TRANSFORMER. CONTRACTOR TO COORDINATE WITH UTILITY COMPANY FOR SIZE AND REINFORCING REQUIREMENTS. INSTALLED BY CONTRACTOR.
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**STRIPING NOTES**

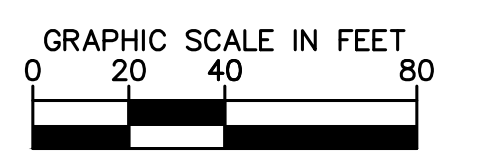
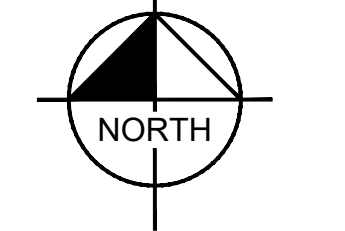
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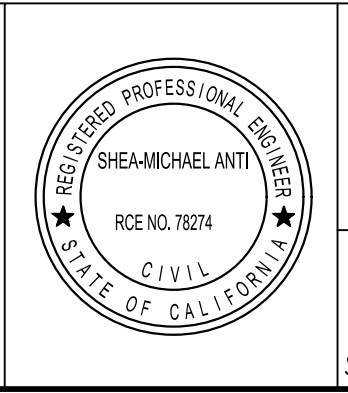
1" = 40'  
WHEN PRINTED AT FULL SIZE (24"x36")

**811**  
DIAL TOLL FREE  
811  
Know what's below.  
Call before you dig.  
AT LEAST TWO DAYS BEFORE YOU DIG  
UNDERGROUND SERVICE ALERT OF SOUTHERN CALIFORNIA

**BENCH MARK:**  
COUNTY OF RIVERSIDE BENCHMARK "M 21-1 RESET", 373 FEET EAST ALONG ETHANAC ROAD FROM THE INTERSECTION OF ETHANAC ROAD AND THE SOUTHBOUND LANES OF HIGHWAY 395. 150 FEET SOUTH OF ETHANAC ROAD. 50 FEET SOUTHEAST OF THE NORTHEAST CORNER OF A 6 FOOT CHAIN LINK RIGHT-OF-WAY FENCE. 1 FOOT NORTHEAST OF AN ANGLE-POINT IN THE RIGHT-OF-WAY FENCE. 2 FEET NORTH OF A MARKER POST. A BRASS DISK STAMPED "M-21-1 RESET" SET IN THE TOP OF A CONCRETE POST 3 INCHES ABOVE GROUND. EL = 1421.891 NGVD 29 (5/85)

MARK	BY	DATE	REVISIONS	APPR	DATE

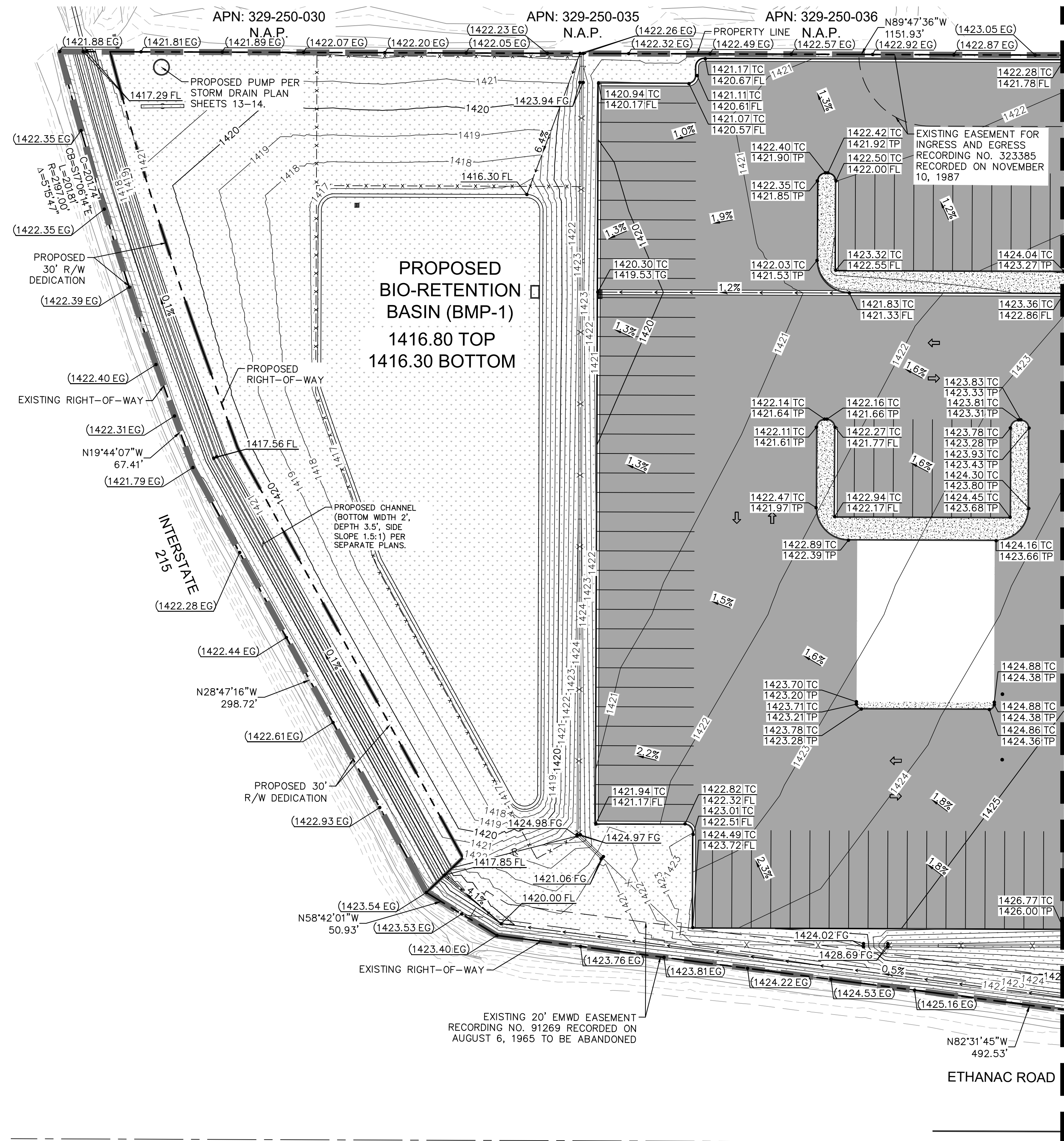
**CITY OF PERRIS**  
APPROVED BY: \_\_\_\_\_  
CONTRACT CITY ENGINEER DATE



**Kimley»Horn**  
765 THE CITY DRIVE SUITE 200, ORANGE, CA 92668  
PHONE: 714-939-1030  
PREPARED BY: *Shea-Michael Anti*  
SHEA-MICHAEL ANTI R.C.E. 78274 DATE: 2/28/2022

**SIGNING, STRIPING, AND PAVEMENT PLAN**  
**PRELIMINARY PRECISE GRADING PLAN**  
PILOT PERRIS  
ETHANAC ROAD AND TRUMBULE ROAD  
APN: 329-250-011 & 329-250-012  
PROJECT NUMBER: 095428010  
FILE NO.: \_\_\_\_\_  
SHEET NO. **8**  
OF 16 SHTS

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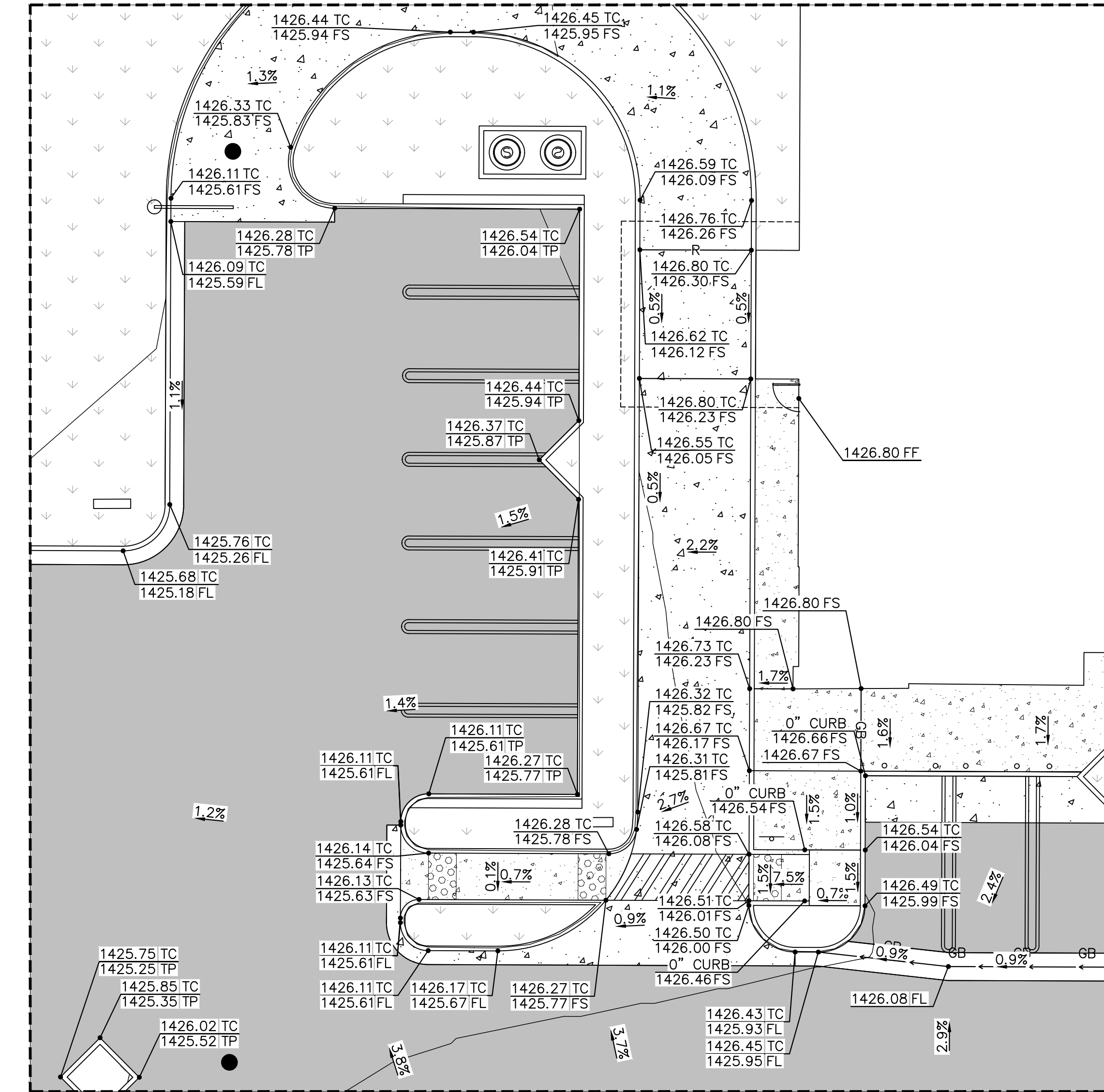
MATCHLINE - SEE SHEET 10

LEGEND			
	PROPERTY LINE CIVIL		STANDARD DUTY CONCRETE PAVEMENT
	LIMITS OF WORK		HEAVY DUTY CONCRETE PAVEMENT
	CENTER LINE		HEAVY DUTY ASPHALT PAVEMENT
	SETBACKS		STANDARD DUTY ASPHALT PAVEMENT
	EASEMENT LINE		LANDSCAPE/PLANTER AREA
	GRADE BREAK		DECORATIVE PAVEMENT
	RIDGE LINE		
	PROPOSED ELEVATION		
	EXISTING ELEVATION		
	SLOPE		
	DETECTABLE WARNINGS		

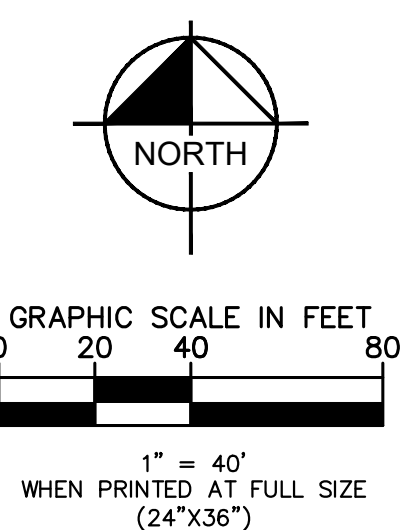
ABBREVIATIONS:	
EG	EXISTING GROUND ELEVATION
FF	FINISHED FLOOR ELEVATION
FS	FINISH SURFACE FLOW LINE
FL	FINISH GROUND FLOW LINE
GB	GRADE BREAK
HP	HIGH POINT
N.A.P.	NOT A PART
TC	TOP OF CURB
TG	TOP OF GRADE
TP	TOP OF PAVEMENT

**GRADING NOTES**

- CONTRACTOR TO VERIFY ALL EXISTING TOPOGRAPHY AND STRUCTURES ON THE SITE AND IMMEDIATELY NOTIFY THE ENGINEER OF ANY DISCREPANCIES PRIOR TO STARTING WORK.
- ALL PAVEMENT SPOT GRADE ELEVATIONS AND RIM ELEVATIONS WITHIN OR ALONG CURB AND GUTTER REFER TO FLOW LINE ELEVATIONS UNLESS OTHERWISE NOTED.
- ALL ELEVATIONS SHOWN DEPICT FINISHED GRADE OR EDGE OF PAVEMENT UNLESS OTHERWISE NOTED. GENERAL CONTRACTOR TO COORDINATE WITH EXCAVATION, LANDSCAPE AND PAVING SUBCONTRACTORS REGARDING TOPSOIL THICKNESS FOR LANDSCAPE AREAS AND PAVEMENT SECTION THICKNESS FOR PAVED AREAS TO PROPERLY ENSURE ADEQUATE CUT TO ESTABLISH SUBGRADE ELEVATIONS.
- NO EARTHEN SLOPE SHALL BE GREATER THAN 2:1, UNLESS OTHERWISE NOTED.
- MAXIMUM SLOPE IN ACCESSIBLE PARKING SPACES AND LOADING ZONES SHALL NOT EXCEED 2.0% IN ALL DIRECTIONS.
- MAXIMUM RUNNING SLOPE SHALL NOT EXCEED 5% AND CROSS SLOPE SHALL NOT EXCEED 2% ON ALL SIDEWALKS AND ACCESSIBLE ROUTES.
- MATCH EXISTING ELEVATIONS AT THE PROPERTY LIMITS.
- REFER TO STORM DRAIN PLANS FOR INLET SIZE AND LOCATION.
- EARTHWORK AND PAVING SPECIFICATION PER GEOTECHNICAL REPORT.
- A GRADING PERMIT FROM THE CITY OF PERRIS WILL BE REQUIRED PRIOR TO COMMENCEMENT OF WORK.
- ALL WORK DETAILED ON THESE PLANS TO BE PERFORMED, EXCEPT AS OTHERWISE STATED OR PROVIDED HEREON, SHALL BE CONSTRUCTED IN ACCORDANCE WITH CITY OF PERRIS STANDARDS AND SPECIFICATIONS.



**DETAIL 1**  
1"=10'

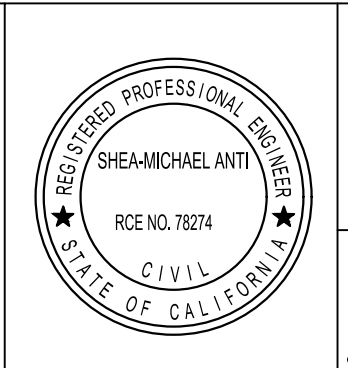


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MARK	BY	DATE	REVISIONS	APPR	DATE

**CITY OF PERRIS**  
APPROVED BY:  
CONTRACT CITY ENGINEER  
DATE



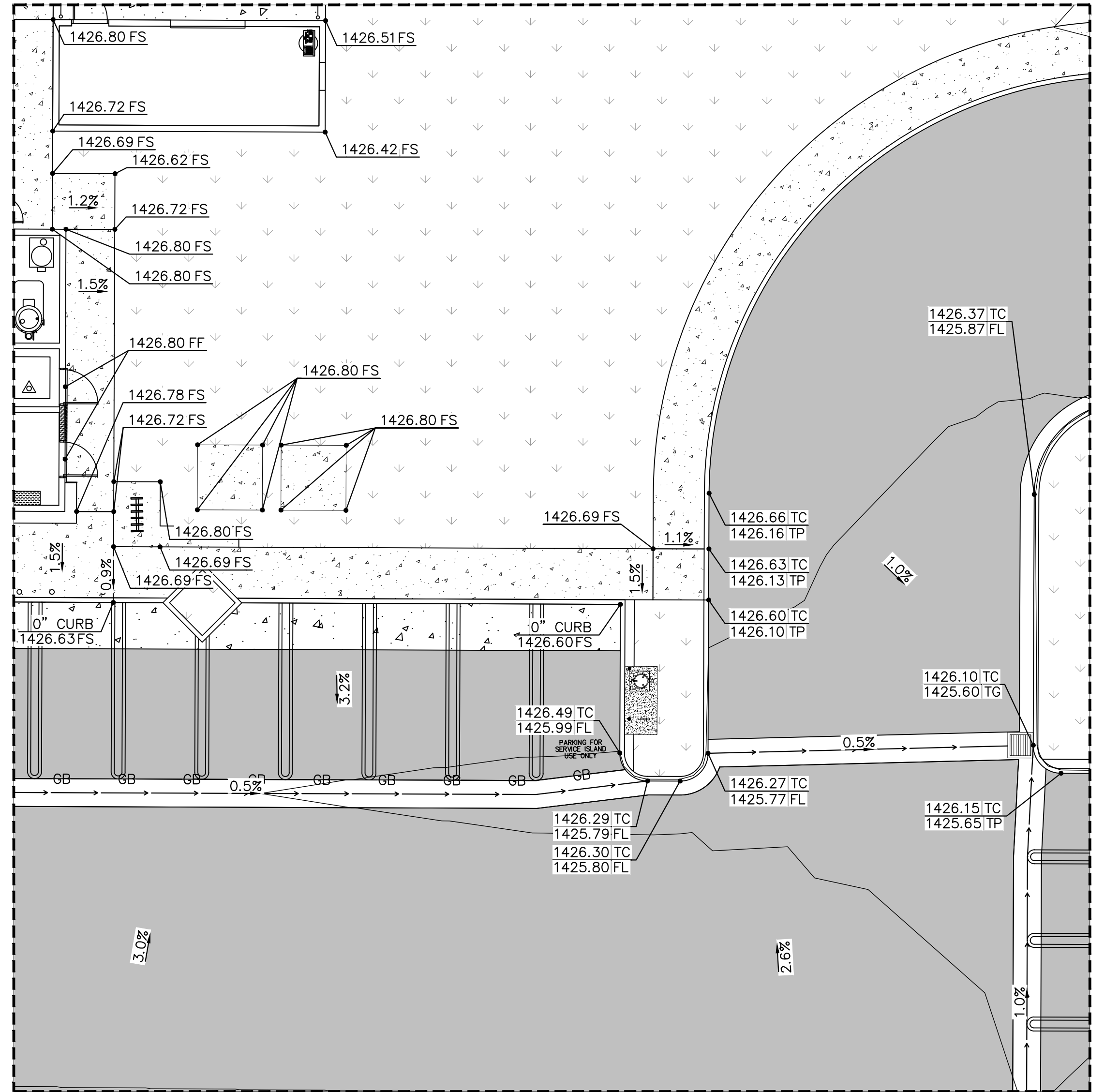
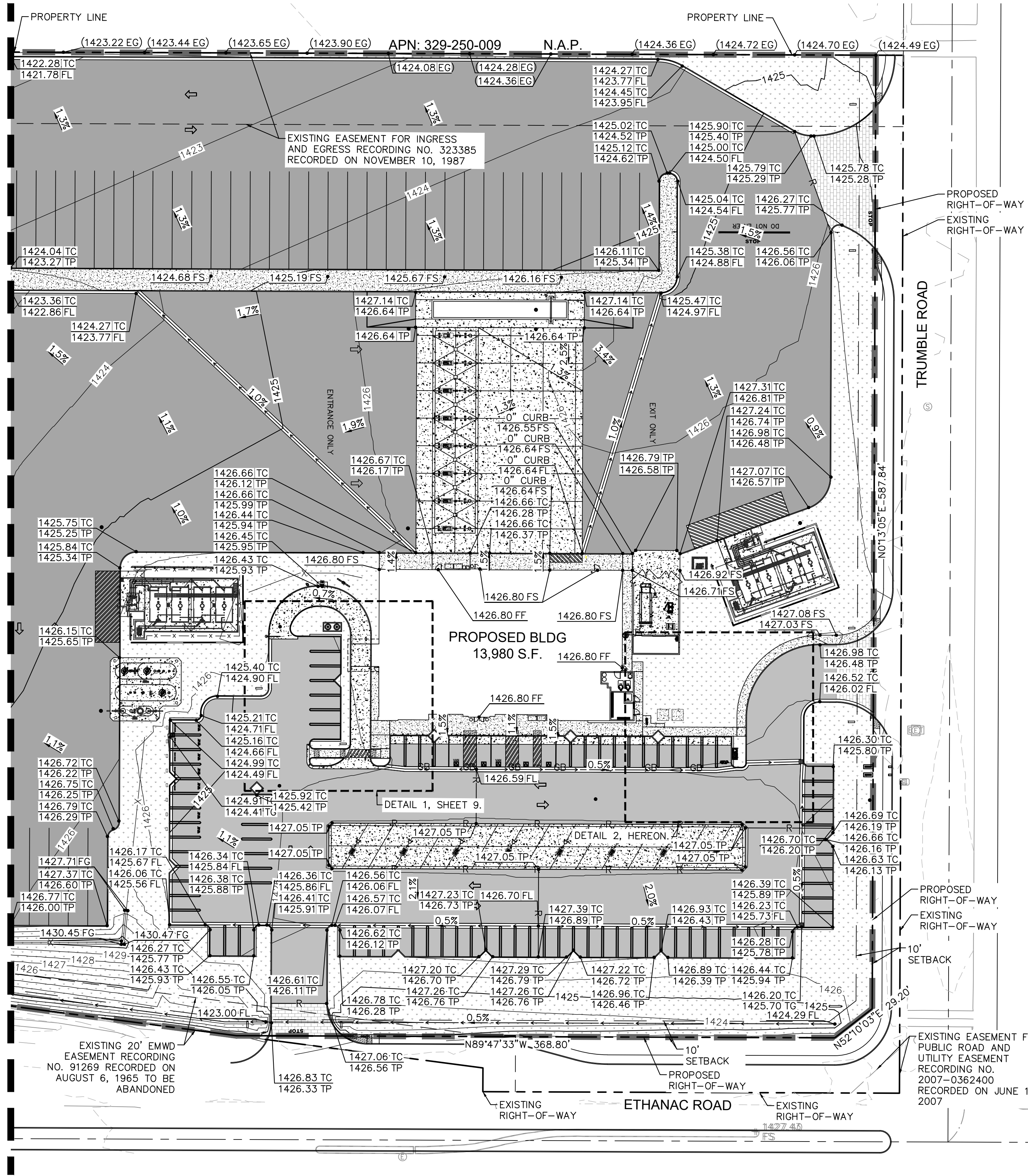
**Kimley Horn**  
765 THE CITY DRIVE SUITE 200, ORANGE, CA 92868  
PHONE: 714-939-1030  
PREPARED BY:  
SHEA-MICHAEL ANTI  
R.C.E. 78274  
DATE: 2/28/2022

**GRADING PLAN**  
PRELIMINARY PRECISE GRADING PLAN  
PILOT PERRIS  
ETHANAC ROAD AND TRUMBLE ROAD  
APN: 329-250-011 & 329-250-012  
PROJECT NUMBER: 095428010  
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SHEET NO. **9**  
OF 16 SHTS

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MATCHLINE - SEE SHEET 9



**LEGEND**

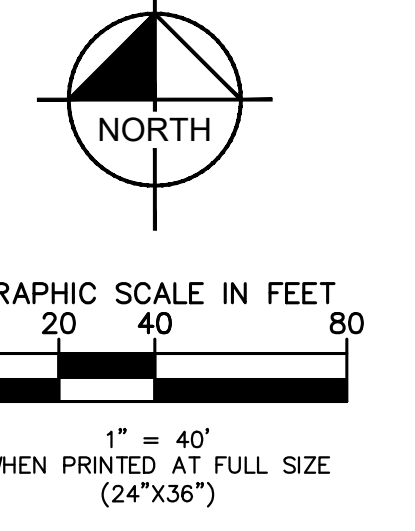
---	PROPERTY LINE CIVIL	[Pattern]	STANDARD DUTY CONCRETE PAVEMENT
---	LIMITS OF WORK	[Pattern]	HEAVY DUTY CONCRETE PAVEMENT
---	CENTER LINE	[Pattern]	HEAVY DUTY ASPHALT PAVEMENT
---	SETBACKS	[Pattern]	STANDARD DUTY ASPHALT PAVEMENT
---	EASEMENT LINE	[Pattern]	LANDSCAPE/PLANTER AREA
---	GRADE BREAK	[Pattern]	DECORATIVE PAVEMENT
---	RIDGE LINE	[Pattern]	
(1422.27 TC) (1421.77 TP)	PROPOSED ELEVATION		
1422.27 TC 1421.77 TP	EXISTING ELEVATION		
1.2%	SLOPE		
[Pattern]	DETECTABLE WARNINGS		

**ABBREVIATIONS:**

EG	EXISTING GROUND ELEVATION
FF	FINISHED FLOOR ELEVATION
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**GRADING NOTES**

- CONTRACTOR TO VERIFY ALL EXISTING TOPOGRAPHY AND STRUCTURES ON THE SITE AND IMMEDIATELY NOTIFY THE ENGINEER OF ANY DISCREPANCIES PRIOR TO STARTING WORK.
- ALL PAVEMENT SPOT GRADE ELEVATIONS AND RIM ELEVATIONS WITHIN OR ALONG CURB AND GUTTER REFER TO FLOW LINE ELEVATIONS UNLESS OTHERWISE NOTED.
- ALL ELEVATIONS SHOWN DEPICT FINISHED GRADE OR EDGE OF PAVEMENT UNLESS OTHERWISE NOTED. GENERAL CONTRACTOR TO COORDINATE WITH EXCAVATION, LANDSCAPE AND PAVING SUBCONTRACTORS REGARDING TOPSOIL THICKNESS FOR LANDSCAPE AREAS AND PAVEMENT SECTION THICKNESS FOR PAVED AREAS TO PROPERLY ENSURE ADEQUATE CUT TO ESTABLISH SUBGRADE ELEVATIONS.
- NO EARTHEN SLOPE SHALL BE GREATER THAN 2:1, UNLESS OTHERWISE NOTED.
- MAXIMUM SLOPE IN ACCESSIBLE PARKING SPACES AND LOADING ZONES SHALL NOT EXCEED 2.0% IN ALL DIRECTIONS.
- MAXIMUM RUNNING SLOPE SHALL NOT EXCEED 5% AND CROSS SLOPE SHALL NOT EXCEED 2% ON ALL SIDEWALKS AND ACCESSIBLE ROUTES.
- MATCH EXISTING ELEVATIONS AT THE CURB LIMITS.
- REFER TO STORM DRAIN PLANS FOR INLET SIZE AND LOCATION.
- EARTHWORK AND PAVING SPECIFICATION PER GEOTECHNICAL REPORT.
- A GRADING PERMIT FROM THE CITY OF PERRIS WILL BE REQUIRED PRIOR TO COMMENCEMENT OF WORK.
- ALL WORK DETAILED ON THESE PLANS TO BE PERFORMED, EXCEPT AS OTHERWISE STATED OR PROVIDED HEREON, SHALL BE CONSTRUCTED IN ACCORDANCE WITH CITY OF PERRIS STANDARDS AND SPECIFICATIONS.



**811** DIAL TOLL FREE 811

Know what's below. Call before you dig.

AT LEAST TWO DAYS BEFORE YOU DIG

UNDERGROUND SERVICE ALERT OF SOUTHERN CALIFORNIA

**BENCH MARK:**  
COUNTY OF RIVERSIDE BENCHMARK "M 21-1 RESET", 373 FEET EAST ALONG ETHANAC ROAD FROM THE INTERSECTION OF ETHANAC ROAD AND THE SOUTHBOUND LANES OF HIGHWAY 395. 150 FEET SOUTH OF ETHANAC ROAD, 50 FEET SOUTHEAST OF THE NORTHEAST CORNER OF A 6 FOOT CHAIN LINK RIGHT-OF-WAY FENCE, 1 FOOT NORTHEAST OF AN ANGLE-POINT IN THE RIGHT-OF-WAY FENCE, 2 FEET NORTH OF A MARKER POST, A BRASS DISK STAMPED "M-21-1 RESET" SET IN THE TOP OF A CONCRETE POST 3 INCHES ABOVE GROUND. EL = 1421.891 NGVD 29 (5/85)

MARK	BY	DATE	REVISIONS	APPR	DATE
	ENGINEER				

CITY OF PERRIS

APPROVED BY: \_\_\_\_\_ DATE \_\_\_\_\_

CONTRACT CITY ENGINEER

**Kimley»Horn**

765 THE CITY DRIVE SUITE 200, ORANGE, CA 92668  
PHONE: 714-939-1030

PREPARED BY: *Shea-Michael Anti* DATE: 2/28/2022

SHEA-MICHAEL ANTI R.C.E. 78274

GRADING PLAN  
PRELIMINARY PRECISE GRADING PLAN  
PILOT PERRIS  
ETHANAC ROAD AND TRUMBLE ROAD  
APN: 329-250-011 & 329-250-012

PROJECT NUMBER: 095428010

FILE NO.:

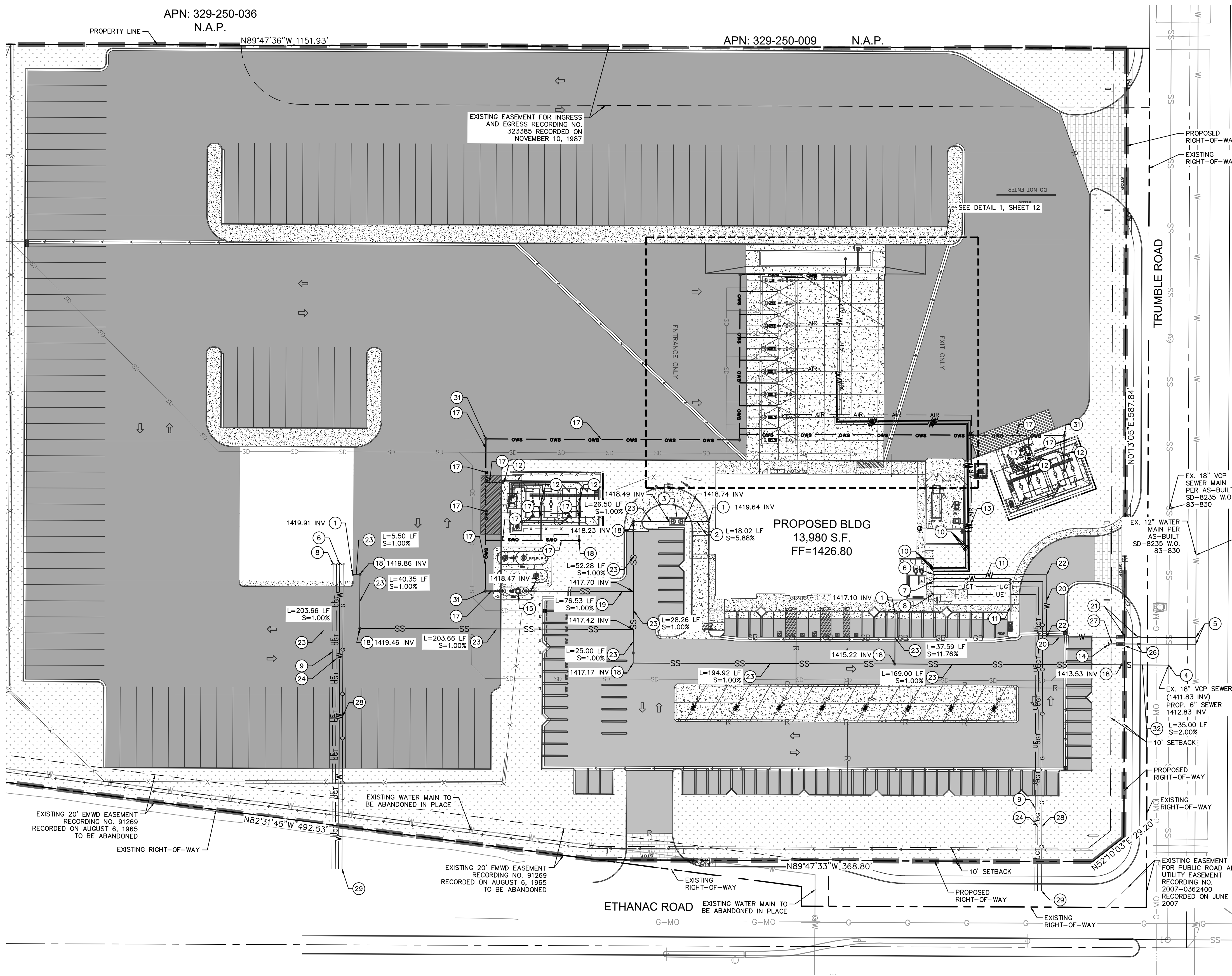
SHEET NO. **10**

OF 16 SHTS

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APN: 329-250-036  
N.A.P.

APN: 329-250-009 N.A.P.



LEGEND	
---	PROPERTY LINE CIVIL
---	LIMITS OF WORK
---	CENTER LINE
---	SETBACKS
---	EASEMENT LINE
SS	PROPOSED SANITARY SEWER
SD	PROPOSED STORM DRAIN PIPE
AIR	PROPOSED AIR
W	PROPOSED WATER PIPE
OWS	PROPOSED OIL WATER SEPARATOR
UGT	PROPOSED TELEPHONE LINE
UE	PROPOSED UNDERGROUND ELECTRIC

**UTILITY PLAN CONSTRUCTION NOTES**

- CONTRACTOR TO CONNECT TO 6" BUILDING SANITARY SEWER LINE. (4.00' MIN. BELOW FF)
- CONTRACTOR TO CONNECT 6" BUILDING SANITARY SEWER LINE FROM BUILDING TO THE GREASE TRAP. INVERT ELEVATION AT THE GREASE TRAP OUTLET PER PLAN.
- INSTALL GREASE TRAP. REFER TO MEP PLANS FOR MORE INFORMATION.
- CONNECT INTO EXISTING 18" VCP SEWER MAIN PER EMDM STANDARDS AND SPECIFICATION. GENERAL CONTRACTOR SHALL VERIFY INVERT ELEVATION AT CONNECTION PRIOR TO COMMENCEMENT OF WORK. GENERAL CONTRACTOR TO NOTIFY ENGINEER OF ANY DISCREPANCIES.
- HOT TAP INTO EXISTING 12" WATER MAIN. CONTRACTOR TO COORDINATE WITH UTILITY SERVICE PROVIDER.
- CONTRACTOR TO CONNECT TO 2" WATER SERVICE LINE AT THE BUILDING. WATER SERVICE LINE SHALL BE COPPER.
- CONTRACTOR TO CONNECT TO 3" GAS LINE AT THE BUILDING.
- CONTRACTOR TO INSTALL ELECTRICAL SERVICE LINE FROM ELECTRICAL TRANSFORMER PAD TO BUILDING ELECTRICAL PANELS.
- CONTRACTOR TO INSTALL AND/OR COORDINATE ELECTRICAL SERVICE LINE FROM ELECTRICAL TRANSFORMER TO THE LOCATION WHERE THE LOCAL UTILITY BRINGS SERVICE.
- CONTRACTOR TO INSTALL 3/4" PEX WATER LINES INSIDE OF 2" PVC SLEEVES FROM BUILDING TO TRUCK FREEZE PROOF WATER STAND (FURNISHED AND INSTALLED BY CONTRACTOR) LOCATED AT EVERY OTHER TRUCK FUELING ISLAND. PEX AND PVC SLEEVE TO BE PROVIDED AND INSTALLED BY CONTRACTOR. SEE CIVIL SHEETS FOR DETAILS.
- CONTRACTOR TO INSTALL 1/2" PEX WATER LINE INSIDE OF 2" PVC SLEEVE FROM BUILDING TO AUTO AIR/WATER STAND (TYP. (1) PLACE). PEX AND SLEEVE TO BE PROVIDED AND INSTALLED BY CONTRACTOR.
- INSTALL PREFABRICATED TRUCK ISLAND CATCH BASIN 2' BY 2' FOR OIL/WATER SEPARATION.
- CONTRACTOR TO INSTALL 1/2" COPPER AIR LINE FROM AIR COMPRESSOR IN THE YARD MAINTENANCE BUILDING TO THE TRUCK AIR STAND LOCATED AT EVERY OTHER TRUCK FUELING ISLAND. SEE TC SHEETS FOR DETAILS.
- REFER TO LANDSCAPE AND IRRIGATION PLANS FOR CONTINUATION.
- PROPOSED OIL/WATER SEPARATOR.
- CONTRACTOR TO INSTALL 4" SCHEDULE 40 PVC PIPE AND GLUED FITTINGS FROM THE TRUCK CANOPY PAD CATCH BASIN - TYPICAL AT EACH DRAIN. NO "FERNOCO" TYPE FITTINGS ALLOWED AT ANY PART OF THE OWS PIPING SYSTEM.
- CONTRACTOR TO INSTALL 6" SCHEDULE 40 PVC PIPE AND GLUED FITTINGS FROM 4" PVC CATCH BASIN LINES TO INLET OF OIL/WATER INTERCEPTOR. INVERT ELEVATION AT INTERCEPTOR INLET PER PLAN. NO "FERNOCO" TYPE FITTINGS ALLOWED AT ANY PART OF THE OWS PIPING SYSTEM.
- INSTALL SEWER CLEANOUT PER DETAIL 1, SHEET 12.
- CONTRACTOR TO FURNISH AND INSTALL 6" SCHEDULE 40 PVC PIPE AND GLUED FITTINGS FROM OIL/WATER SEPARATOR TO THE SEWER PIPE. INVERT ELEVATION AT OIL/WATER SEPARATOR OUTLET PER PLAN. INVERT ELEVATION AT THE STORM POND INLET PER PLAN. NO "FERNOCO" TYPE FITTINGS ALLOWED AT ANY PART OF THE OWS PIPING SYSTEM.
- INSTALL 2-1/2" COPPER WATER SERVICE LINE. MAINTAIN 3" MINIMUM COVER.
- INSTALL WATER METER AND BACKFLOW PREVENTOR. CONTRACTOR TO COORDINATE WITH UTILITY SERVICE PROVIDER.
- INSTALL 90° DOMESTIC WATER PIPE BEND.
- INSTALL 6" SDR-35 PVC AT MINIMUM 1% SLOPE.
- CONTRACTOR TO INSTALL (2) 4" PVC SCH 40 CONDUIT BURIED TO MIN. DEPTH OF 24" W/200 LB. PULL STRING AND CAPPED ON BOTH ENDS FOR TELEPHONE SERVICE, TO LOCATION WHERE LOCAL UTILITY BRINGS SERVICE. MINIMUM 3 FT. SWEEPING RADIUS (NO RIGHT ANGLES), NO MORE THAN THREE 90 DEGREE TURNS WITHOUT A PULL BOX (12"x12"x18" MINIMUM), AND PATHS LONGER THAN 300 FT. WILL REQUIRE A PULL BOX.
- CONTRACTOR TO INSTALL 3" PVC FROM TRUCK SCALE SUMP TO 6" TRUNK LINE TO GRIT CHAMBER.
- INSTALL 1" IRRIGATION METER AND 1.5" BACKFLOW PREVENTOR. CONTRACTOR TO COORDINATE WITH UTILITY SERVICE PURVEYOR.
- INSTALL 1" IRRIGATION WATER SERVICE LINE. CONTRACTOR TO COORDINATE WITH UTILITY SERVICE PURVEYOR.
- PROPOSED GAS LINE. COORDINATE WITH GAS UTILITY COMPANY.
- CONNECT TO EXISTING GAS MAIN BY OTHERS.
- CONTRACTOR TO MAINTAIN A VERTICAL SEPARATION OF A MINIMUM OF 1-FOOT FOR ALL UTILITY CROSSINGS SHOWN ON THIS PLAN PER DETAIL 2, SHEET 12.
- CLEANOUT FOR OIL/WATER SEPARATOR. REFER TO MEP PLANS FOR MORE INFORMATION.
- INSTALL 6" VCP SEWER LATERAL AT MINIMUM 2% SLOPE.

**EXISTING UTILITY NOTES**

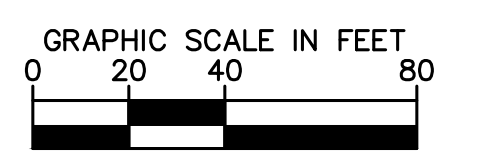
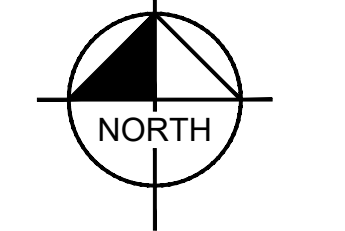
- THE EXISTING UTILITIES SHOWN ON THE PLAN ARE BASED ON AVAILABLE RECORDS. THE CONTRACTOR MUST FIELD DETERMINE THE LOCATION AND DEPTH OF ALL UTILITIES PRIOR TO ANY CONSTRUCTION. REPORT DISCREPANCIES AND POTENTIAL CONFLICTS WITH PROPOSED UTILITIES TO ENGINEER PRIOR TO INSTALLATION OF ANY PIPING.
- ALL SHUT DOWN OF EXISTING WATER MAIN TO BE DONE BY AND COORDINATED WITH THE CITY UTILITY DIVISION. CONTRACTOR SHALL NOTIFY ALL AFFECTED WATER USERS 72 HOURS IN ADVANCE OF SHUT DOWN.

**GENERAL NOTES**

- PRIOR TO ANY WORK PERFORMED IN THE RIGHT-OF-WAY A PERMIT FROM THE CITY OF PERRIS IS REQUIRED.
- ALL CATCH BASIN COVERS/GRATES AND CLEANOUT/MANHOLE COVERS EXPOSED TO VEHICULAR LOADS SHALL BE TRAFFIC RATED.
- FOR TRENCHING, PIPE BEDDING & ROADWAY PAVEMENT REPAIRS DETAILS & SPECIFICATIONS, TRENCH AND BACKFILL PER EMDM STANDARDS AND SPECIFICATIONS.
- STUB POINT OF CONNECTION 5' FROM BUILDING. REFER TO MEP PLAN FOR CONTINUATION OF BUILDING.
- CONTRACTOR TO MAINTAIN A VERTICAL SEPARATION OF A MINIMUM OF 1-FOOT FOR ALL UTILITY CROSSINGS SHOWN ON THIS PLAN PER DETAIL X, SHEET XX.

**WATER AND SEWER UTILITY NOTES**

SEE SHEET 2, FOR WATER AND SEWER UTILITY NOTES.



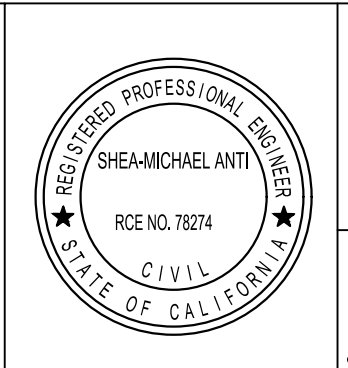
1" = 40'  
WHEN PRINTED AT FULL SIZE (24"x36")

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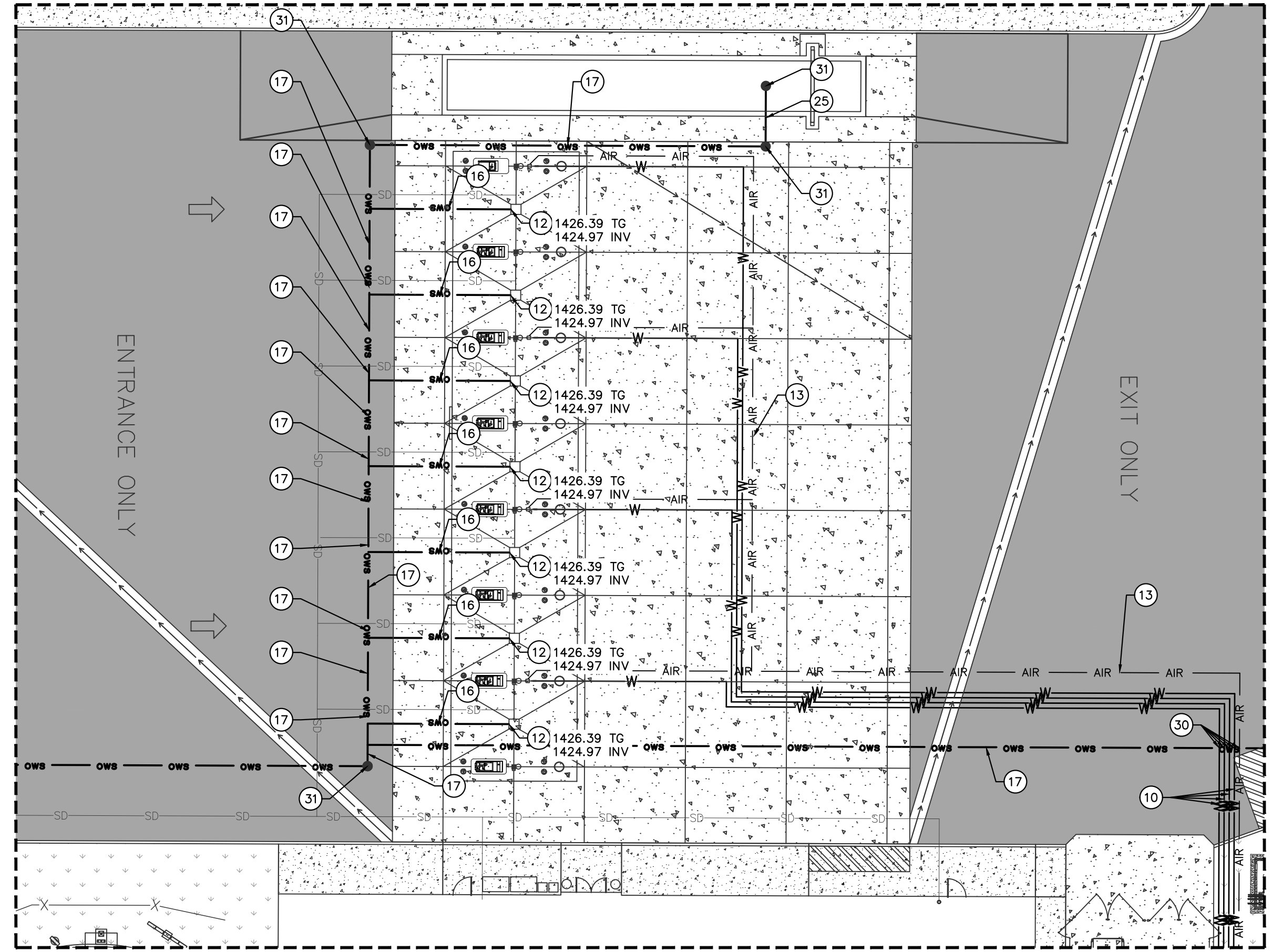
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CITY OF PERRIS  
APPROVED BY: \_\_\_\_\_  
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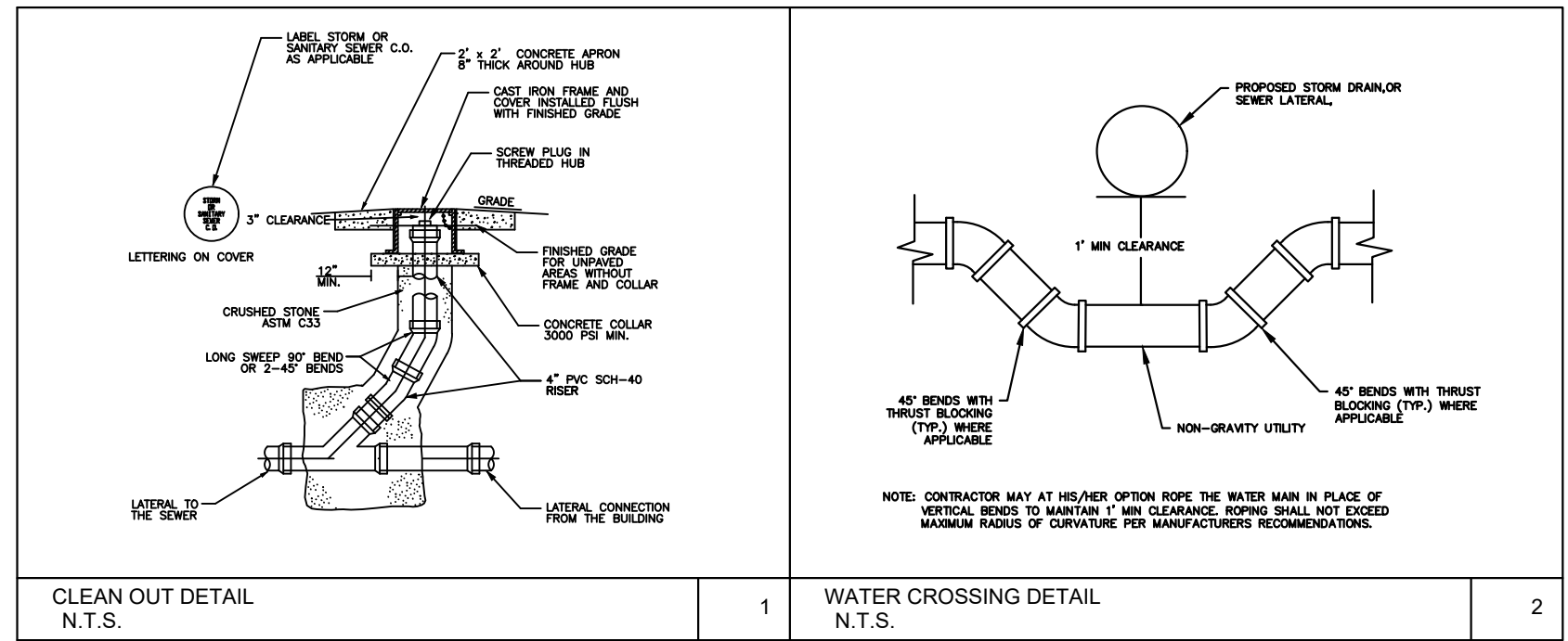
**Kimley»Horn**  
765 THE CITY DRIVE SUITE 200, ORANGE, CA 92668  
PHONE: 714-939-1030  
PREPARED BY: \_\_\_\_\_  
SHEA-MICHAEL ANTI R.C.E. 78274 DATE 2/28/2022

UTILITY PLAN  
PRELIMINARY PRECISE GRADING PLAN  
PILOT PERRIS  
ETHANAC ROAD AND TRUMBULE ROAD  
APN: 329-250-011 & 329-250-012  
PROJECT NUMBER: 095428010  
FILE NO.: \_\_\_\_\_  
SHEET NO. 11  
OF 16 SHTS



LEGEND	
---	PROPERTY LINE CIVIL
---	LIMITS OF WORK
---	CENTER LINE
---	SETBACKS
---	EASEMENT LINE
SS	PROPOSED SANITARY SEWER
SD	PROPOSED STORM DRAIN PIPE
AIR	PROPOSED AIR
W	PROPOSED WATER PIPE
OWS	PROPOSED OIL WATER SEPARATOR
UGT	PROPOSED TELEPHONE LINE
UE	PROPOSED UNDERGROUND ELECTRIC

DETAIL 1  
1"=20'



CLEAN OUT DETAIL N.T.S. 1 WATER CROSSING DETAIL N.T.S. 2

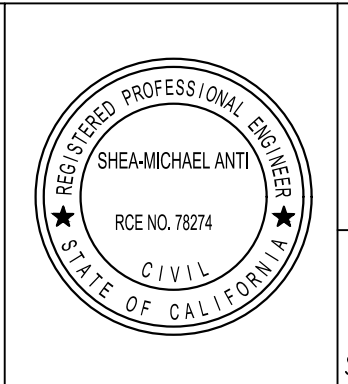
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	ENGINEER				

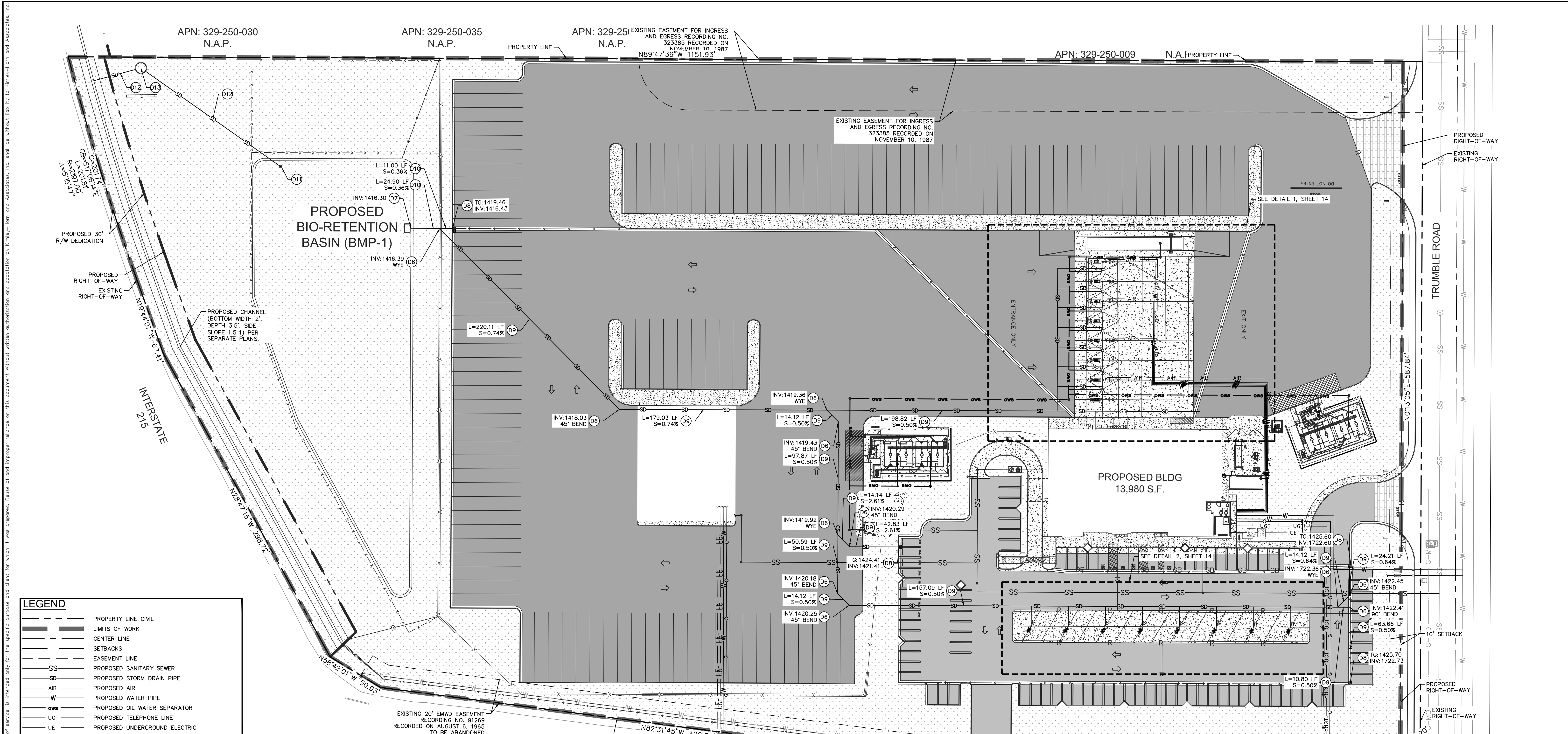
CITY OF PERRIS  
APPROVED BY: \_\_\_\_\_  
CONTRACT CITY ENGINEER DATE



**Kimley»Horn**  
765 THE CITY DRIVE SUITE 200, ORANGE, CA 92868  
PHONE: 714-939-1030  
PREPARED BY: *Shea-Michael Anti*  
SHEA-MICHAEL ANTI R.C.E. 78274 DATE 2/28/2022

UTILITY PLAN BLOW UPS  
PRELIMINARY PRECISE GRADING PLAN  
PILOT PERRIS  
ETHANAC ROAD AND TRUMBLE ROAD  
APN: 329-250-011 & 329-250-012  
PROJECT NUMBER: 095428010  
FILE NO.:

SHEET NO.  
**12**  
OF 16 SHTS



**LEGEND**

---	PROPERTY LINE CIVIL
---	LIMITS OF WORK
---	CENTER LINE
---	SETBACKS
---	EASEMENT LINE
SS	PROPOSED SANITARY SEWER
SD	PROPOSED STORM DRAIN PIPE
AIR	PROPOSED AIR
W	PROPOSED WATER PIPE
OWS	PROPOSED OIL WATER SEPARATOR
UGT	PROPOSED TELEPHONE LINE
UE	PROPOSED UNDERGROUND ELECTRIC

- STORM DRAIN CONSTRUCTION NOTES**
- (D1) CONTRACTOR TO CONNECT TO 6" BUILDING ROOF DRAIN (1.50' MIN. BELOW FF).
  - (D2) CONTRACTOR TO INSTALL 3" PVC FROM TRUCK CANOPY DRAINS. INVERT ELEVATION AT EACH ISLAND 1.25' BELOW CANOPY PAD FINISH GRADE.
  - (D3) CONTRACTOR TO INSTALL 6" PVC TRUNK LINE FROM 3" PVC CANOPY DRAIN LINES TO STORM WATER DRAINAGE.
  - (D4) CONTRACTOR TO INSTALL 3" PVC FROM AUTO CANOPY DRAINS. INVERT ELEVATION AT EACH ISLAND 1.25' BELOW CANOPY PAD FINISH GRADE.
  - (D5) INSTALL PVC FITTING (TYPE PER PLAN)
  - (D6) INSTALL HDPE FITTING (TYPE PER PLAN)
  - (D7) CONSTRUCT SAND FOREBAY PER DETAIL X ON SHEET X
  - (D8) INSTALL NYLOPLAST 12" DRAIN BASIN WITH SUMP INSERT 2' BY 2' ROAD & HIGHWAY GRATE INLET WITH FLEXBASTM PERMANENT USE PURE INLET PER DETAIL X AND X ON SHEET X
  - (D9) INSTALL 12" HDPE STORM DRAIN PIPE
  - (D10) INSTALL 24" HDPE STORM DRAIN PIPE
  - (D11) PROPOSED OVERFLOW STRUCTURE.
  - (D12) PROPOSED OVERFLOW PIPE.
  - (D13) PROPOSED PUMP.
  - (D14) PROPOSED 6" ROOF DRAIN LINE.

- EXISTING UTILITY NOTES**
- THE EXISTING UTILITIES SHOWN ON THE PLAN ARE BASED ON AVAILABLE RECORDS. THE CONTRACTOR MUST FIELD DETERMINE THE LOCATION AND DEPTH OF ALL UTILITIES PRIOR TO ANY CONSTRUCTION. REPORT DISCREPANCIES AND POTENTIAL CONFLICTS WITH PROPOSED UTILITIES TO ENGINEER PRIOR TO INSTALLATION OF ANY PIPING.
  - ALL SHUT DOWN OF EXISTING WATER MAIN TO BE DONE BY AND COORDINATED WITH THE CITY UTILITY DIVISION. CONTRACTOR SHALL NOTIFY ALL AFFECTED WATER USERS 72 HOURS IN ADVANCE OF SHUT DOWN.

- GENERAL NOTES**
1. PRIOR TO ANY WORK PERFORMED IN THE RIGHT-OF-WAY A PERMIT FROM THE CITY OF PERRIS IS REQUIRED.
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  3. FOR TRENCHING, PIPE BEDDING & ROADWAY PAVEMENT REPAIRS DETAILS & SPECIFICATIONS, TRENCH AND BACKFILL PER EMDM STANDARDS AND SPECIFICATIONS.
  4. STUB POINT OF CONNECTION 5' FROM BUILDING. REFER TO MEP PLAN FOR CONTINUATION OF BUILDING.
  5. CONTRACTOR TO MAINTAIN A VERTICAL SEPARATION OF A MINIMUM OF 1-FOOT FOR ALL UTILITY CROSSINGS SHOWN ON THIS PLAN PER DETAIL 2, SHEET 12.

**BENCH MARK:**  
 COUNTY OF RIVERSIDE BENCHMARK "M 21-1 RESET", 373 FEET EAST ALONG ETHANAC ROAD FROM THE INTERSECTION OF ETHANAC ROAD AND THE SOUTHBOUND LANES OF HIGHWAY 395. 150 FEET SOUTH OF ETHANAC ROAD, 50 FEET SOUTHEAST OF THE NORTHEAST CORNER OF A 6 FOOT CHAIN LINK RIGHT-OF-WAY FENCE, 1 FOOT NORTHEAST OF AN ANGLE-POINT IN THE RIGHT-OF-WAY FENCE, 2 FEET NORTH OF A MARKER POST. A BRASS DISK STAMPED "M-21-1 RESET" SET IN THE TOP OF A CONCRETE POST 3 INCHES ABOVE GROUND. EL = 1421.891 NGVD 29 (5/85)

MARK	BY	DATE	REVISIONS	APPR	DATE

**CITY OF PERRIS**

APPROVED BY: \_\_\_\_\_ DATE \_\_\_\_\_

CONTRACT CITY ENGINEER

**Kimley»Horn**

765 THE CITY DRIVE SUITE 200, ORANGE, CA 92668  
 PHONE: 714-939-1030

PREPARED BY: *Shea-Michael Anti* DATE: 2/28/2022  
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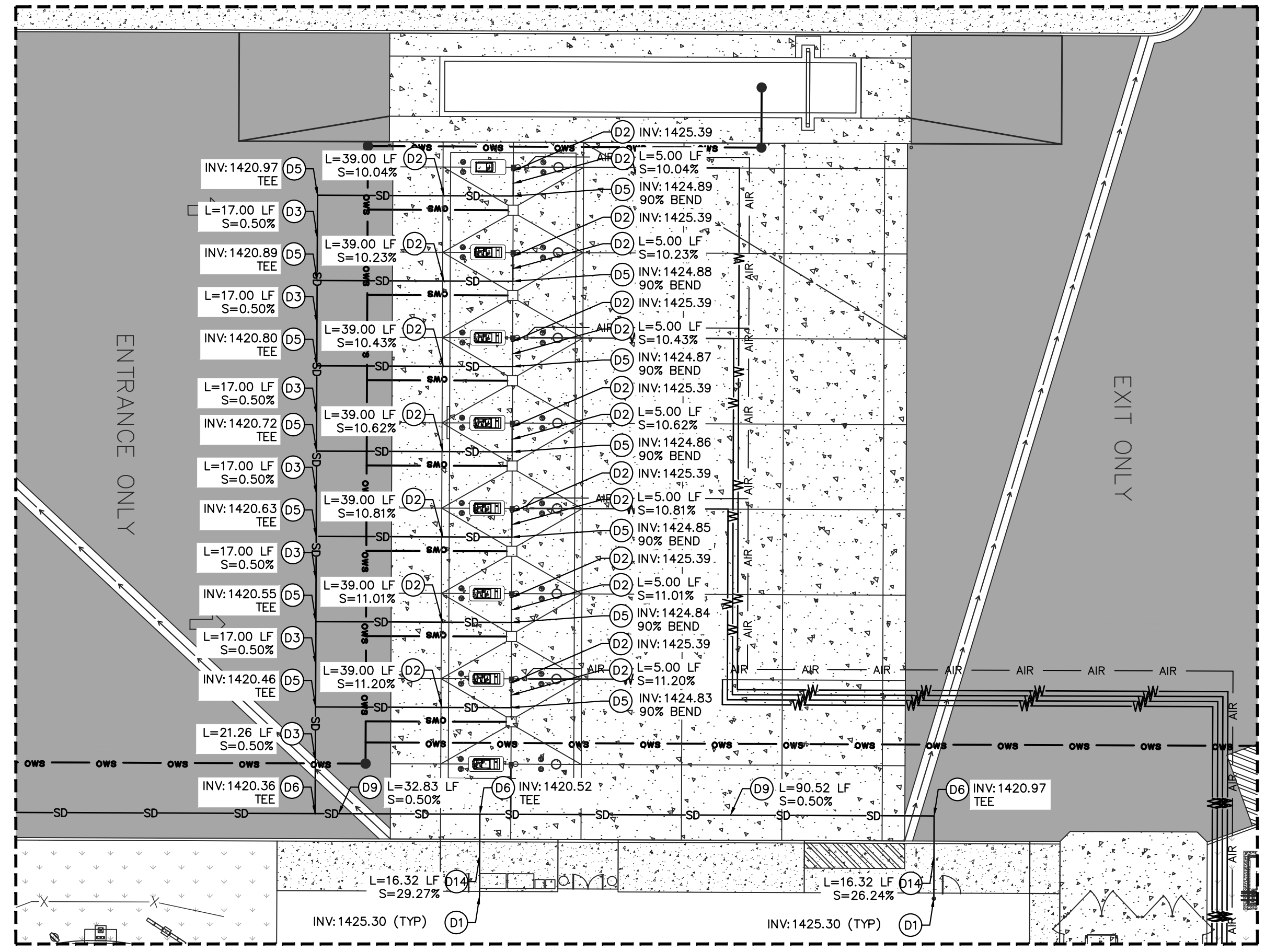
**STORM DRAIN PLAN  
 PRELIMINARY PRECISE GRADING PLAN  
 PILOT PERRIS  
 ETHANAC ROAD AND TRUMBLE ROAD  
 APN: 329-250-011 & 329-250-012**

PROJECT NUMBER: 095428010 FILE NO.:

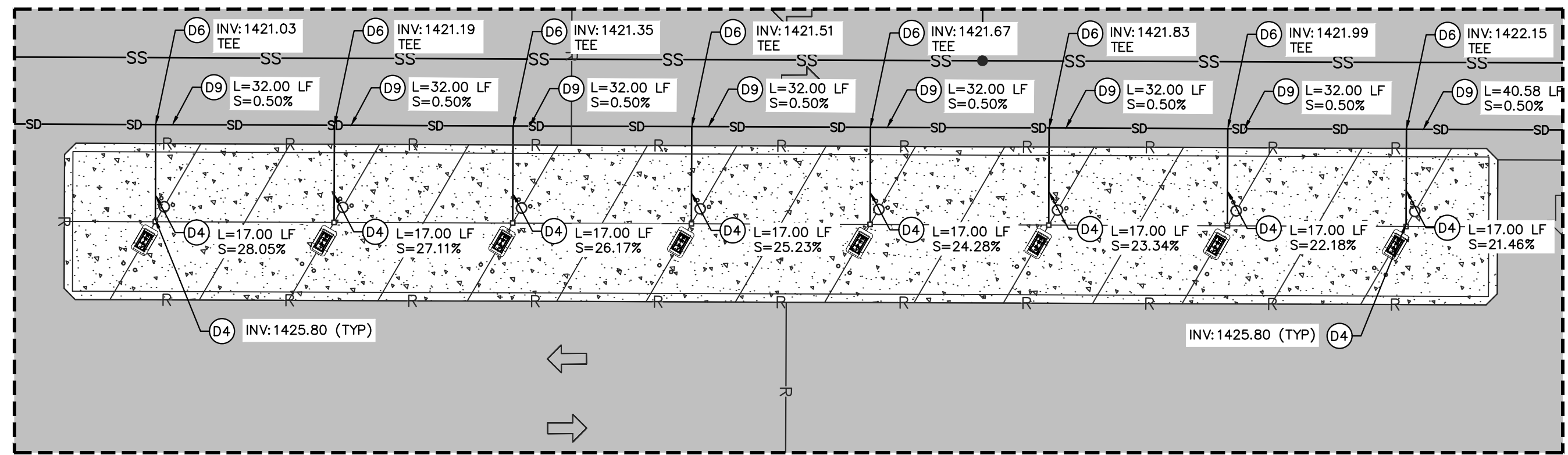
SHEET NO. **13**  
 OF 16 SHTS

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DETAIL 1  
1"=20'



DETAIL 2  
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LEGEND	
	PROPERTY LINE CIVIL
	LIMITS OF WORK
	CENTER LINE
	SETBACKS
	EASEMENT LINE
	PROPOSED SANITARY SEWER
	PROPOSED STORM DRAIN PIPE
	PROPOSED AIR
	PROPOSED WATER PIPE
	PROPOSED OIL WATER SEPARATOR
	PROPOSED TELEPHONE LINE
	PROPOSED UNDERGROUND ELECTRIC

**STORM DRAIN CONSTRUCTION NOTES**

- (D1) CONTRACTOR TO CONNECT TO 6" BUILDING ROOF DRAIN (1.50' MIN. BELOW FF).
- (D2) CONTRACTOR TO INSTALL 3" PVC FROM TRUCK CANOPY DRAINS. INVERT ELEVATION AT EACH ISLAND 1.25' BELOW CANOPY PAD FINISH GRADE.
- (D3) CONTRACTOR TO INSTALL 6" PVC TRUNK LINE FROM 3" PVC CANOPY DRAIN LINES TO STORM WATER DRAINAGE.
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- (D5) INSTALL PVC FITTING (TYPE PER PLAN)
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- (D7) CONSTRUCT SAND FOREBAY PER DETAIL X ON SHEET X
- (D8) INSTALL NYLOPLAST 12" DRAIN BASIN WITH SUMP INSERT 2' BY 2' ROAD & HIGHWAY GRATE INLET WITH FLEXSTORM PERMANENT USE PURE INLET PER DETAIL X AND X ON SHEET X
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**EXISTING UTILITY NOTES**

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4. STUB POINT OF CONNECTION 5' FROM BUILDING. REFER TO MEP PLAN FOR CONTINUATION OF BUILDING.
5. CONTRACTOR TO MAINTAIN A VERTICAL SEPARATION OF A MINIMUM OF 1-FOOT FOR ALL UTILITY CROSSINGS SHOWN ON THIS PLAN PER DETAIL X, SHEET XX.

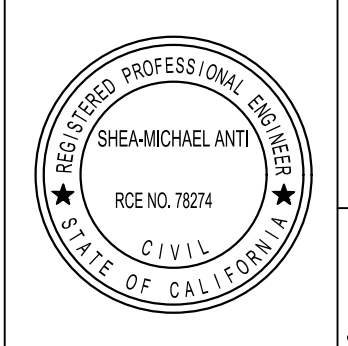
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CONTRACT CITY ENGINEER



**Kimley»Horn**

765 THE CITY DRIVE SUITE 200, ORANGE, CA 92668  
 PHONE: 714-939-1030

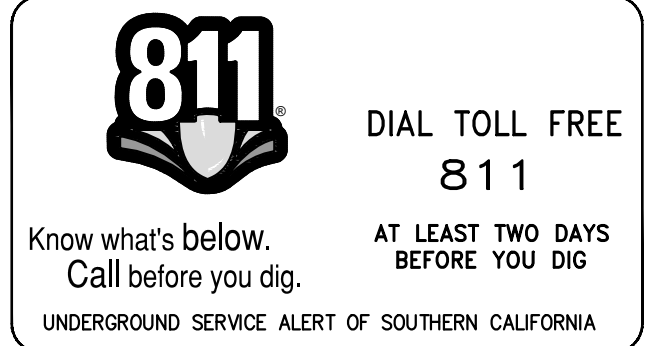
PREPARED BY: *Sheamichael Anti* DATE: 2/28/2022

SHEA-MICHAEL ANTI R.C.E. 78274

STORM DRAIN PLAN BLOW UPS  
 PRELIMINARY PRECISE GRADING PLAN  
 PILOT PERRIS  
 ETHANAC ROAD AND TRUMBLE ROAD  
 APN: 329-250-011 & 329-250-012

PROJECT NUMBER: 095428010

FILE NO.:



## **Appendix D**

### **Hydrology Manual and Other Reference Material**



**LEGEND**

- SOILS GROUP BOUNDARY
- A SOILS GROUP DESIGNATION

**RCFC & WCD**

HYDROLOGY MANUAL



**HYDROLOGIC SOILS GROUP MAP  
FOR  
ROMOLAND**

# RAINFALL INTENSITY—INCHES PER HOUR

**RCFC & WCD**  
 HYDROLOGY MANUAL

STANDARD  
 INTENSITY - DURATION  
 CURVES DATA

SUNNYMEAD - MORENO			WOODCREST		
DURATION MINUTES	FREQUENCY		DURATION MINUTES	FREQUENCY	
	10 YEAR	100 YEAR		10 YEAR	100 YEAR
5	2.84	4.16	5	3.37	5.30
6	2.59	3.79	6	3.05	4.79
7	2.40	3.51	7	2.80	4.40
8	2.25	3.29	8	2.60	4.09
9	2.12	3.10	9	2.44	3.83
10	2.01	2.94	10	2.30	3.62
11	1.92	2.80	11	2.19	3.43
12	1.83	2.68	12	2.08	3.27
13	1.76	2.58	13	1.99	3.13
14	1.70	2.48	14	1.91	3.01
15	1.64	2.40	15	1.84	2.89
16	1.59	2.32	16	1.78	2.79
17	1.54	2.25	17	1.72	2.70
18	1.50	2.19	18	1.67	2.62
19	1.46	2.13	19	1.62	2.54
20	1.42	2.08	20	1.57	2.47
22	1.35	1.98	22	1.49	2.34
24	1.30	1.90	24	1.42	2.23
26	1.25	1.82	26	1.36	2.14
28	1.20	1.76	28	1.31	2.05
30	1.16	1.70	30	1.26	1.98
32	1.12	1.64	32	1.22	1.91
34	1.09	1.59	34	1.18	1.85
36	1.06	1.55	36	1.14	1.79
38	1.03	1.51	38	1.11	1.74
40	1.00	1.47	40	1.07	1.69
45	.95	1.39	45	1.01	1.58
50	.90	1.31	50	.95	1.49
55	.86	1.25	55	.90	1.42
60	.82	1.20	60	.86	1.35
65	.79	1.15	65	.82	1.29
70	.76	1.11	70	.79	1.24
75	.73	1.07	75	.76	1.19
80	.71	1.04	80	.73	1.15
85	.69	1.01	85	.71	1.11

SLOPE = .500

SLOPE = .550

ACTUAL IMPERVIOUS COVER

Land Use (1)	Range-Percent	Recommended Value For Average Conditions-Percent (2)
Natural or Agriculture	0 - 10	0
Single Family Residential: (3)		
40,000 S. F. (1 Acre) Lots	10 - 25	20
20,000 S. F. (½ Acre) Lots	30 - 45	40
7,200 - 10,000 S. F. Lots	45 - 55	50
Multiple Family Residential:		
Condominiums	45 - 70	65
Apartments	65 - 90	80
Mobile Home Park	60 - 85	75
Commercial, Downtown Business or Industrial	80 -100	90

Notes:

1. Land use should be based on ultimate development of the watershed. Long range master plans for the County and incorporated cities should be reviewed to insure reasonable land use assumptions.
2. Recommended values are based on average conditions which may not apply to a particular study area. The percentage impervious may vary greatly even on comparable sized lots due to differences in dwelling size, improvements, etc. Landscape practices should also be considered as it is common in some areas to use ornamental gravels underlain by impervious plastic materials in place of lawns and shrubs. A field investigation of a study area should always be made, and a review of aerial photos, where available may assist in estimating the percentage of impervious cover in developed areas.
3. For typical horse ranch subdivisions increase impervious area 5 percent over the values recommended in the table above.

**RCFC & WCD**  
HYDROLOGY MANUAL

**IMPERVIOUS COVER  
FOR  
DEVELOPED AREAS**

## RUNOFF COEFFICIENT CURVE DATA

The data in the following tables may be used to develop runoff coefficient (C) curves for any combination of runoff index (RI) number and antecedent moisture condition (AMC). For an RI number with an AMC of II (from Plate D-5.5) enter the tables on the following pages and plot the "C" curve data directly on Plate D-5.8. "C" curve data is given for even RI numbers only, but values may easily be interpolated for odd RI numbers.

For an AMC of I or III enter the tabulation on this page with the RI for AMC II, and read the appropriate RI for AMC I or III. Use this revised RI to enter the tables on the following pages to determine "C". For example if RI = 40 for AMC II, then RI = 22 for AMC I and RI = 60 for AMC III.

### AMC ADJUSTMENT RELATIONSHIPS

RI FOR AMC II	RI FOR OTHER AMC CONDITIONS:		RI FOR AMC II	RI FOR OTHER AMC CONDITIONS:	
	AMC I	AMC III		AMC I	AMC III
10	--	22	55	35	74
11	--	24	56	36	75
12	--	25	57	37	75
13	--	27	58	38	76
14	--	28	59	39	77
15	--	30	60	40	78
16	--	31	61	41	78
17	--	33	62	42	79
18	--	34	63	43	80
19	--	36	64	44	81
20	--	37	65	45	82
21	10	38	66	46	82
22	10	39	67	47	83
23	11	41	68	48	84
24	11	42	69	50	84
25	12	43	70	51	85
26	12	44	71	52	86
27	13	46	72	53	86
28	14	47	73	54	87
29	14	49	74	55	88
30	15	50	75	57	88
31	16	51	76	58	89
32	16	52	77	59	89
33	17	53	78	60	90
34	18	54	79	62	91
35	18	55	80	63	91
36	19	56	81	64	92
37	20	57	82	66	92
38	21	58	83	67	93
39	21	59	84	68	93
40	22	60	85	70	94
41	23	61	86	72	94
42	24	62	87	73	95
43	25	63	88	75	95
44	25	64	89	76	96
45	26	65	90	78	96
46	27	66	91	80	97
47	28	67	92	81	97
48	29	68	93	83	98
49	30	69	94	85	98
50	31	70	95	87	98
51	31	70	96	89	99
52	32	71	97	91	99
53	33	72	98	94	99
54	34	73	99	97	--

**RCFC & WCD**  
HYDROLOGY MANUAL

RUNOFF COEFFICIENT  
CURVE DATA

RUNOFF INDEX NUMBERS OF HYDROLOGIC SOIL-COVER COMPLEXES FOR PERVIOUS AREAS-AMC II

Cover Type (3)	Quality of Cover (2)	Soil Group			
		A	B	C	D
<u>NATURAL COVERS -</u>					
Barren (Rockland, eroded and graded land)		78	86	91	93
Chaparrel, Broadleaf (Manzonita, ceanothus and scrub oak)	Poor	53	70	80	85
	Fair	40	63	75	81
	Good	31	57	71	78
Chaparrel, Narrowleaf (Chamise and redshank)	Poor	71	82	88	91
	Fair	55	72	81	86
Grass, Annual or Perennial	Poor	67	78	86	89
	Fair	50	69	79	84
	Good	38	61	74	80
Meadows or Cienegas (Areas with seasonally high water table, principal vegetation is sod forming grass)	Poor	63	77	85	88
	Fair	51	70	80	84
	Good	30	58	72	78
Open Brush (Soft wood shrubs - buckwheat, sage, etc.)	Poor	62	76	84	88
	Fair	46	66	77	83
	Good	41	63	75	81
Woodland (Coniferous or broadleaf trees predominate. Canopy density is at least 50 percent)	Poor	45	66	77	83
	Fair	36	60	73	79
	Good	28	55	70	77
Woodland, Grass (Coniferous or broadleaf trees with canopy density from 20 to 50 percent)	Poor	57	73	82	86
	Fair	44	65	77	82
	Good	33	58	72	79
<u>URBAN COVERS -</u>					
Residential or Commercial Landscaping (Lawn, shrubs, etc.)	Good	32	56	69	75
Turf (Irrigated and mowed grass)	Poor	58	74	83	87
	Fair	44	65	77	82
	Good	33	58	72	79
<u>AGRICULTURAL COVERS -</u>					
Fallow (Land plowed but not tilled or seeded)		76	85	90	92

**RCFC & WCD**  
HYDROLOGY MANUAL

**RUNOFF INDEX NUMBERS  
FOR  
PERVIOUS AREAS**

RUNOFF INDEX NUMBERS OF HYDROLOGIC SOIL-COVER COMPLEXES FOR PERVIOUS AREAS-AMC II

Cover Type (3)	Quality of Cover (2)	Soil Group			
		A	B	C	D
<u>AGRICULTURAL COVERS</u> (cont.) -					
Legumes, Close Seeded (Alfalfa, sweetclover, timothy, etc.)	Poor	66	77	85	89
	Good	58	72	81	85
Orchards, Deciduous (Apples, apricots, pears, walnuts, etc.)	See Note 4				
Orchards, Evergreen (Citrus, avocados, etc.)	Poor	57	73	82	86
	Fair	44	65	77	82
	Good	33	58	72	79
Pasture, Dryland (Annual grasses)	Poor	67	78	86	89
	Fair	50	69	79	84
	Good	38	61	74	80
Pasture, Irrigated (Legumes and perennial grass)	Poor	58	74	83	87
	Fair	44	65	77	82
	Good	33	58	72	79
Row Crops (Field crops - tomatoes, sugar beets, etc.)	Poor	72	81	88	91
	Good	67	78	85	89
Small Grain (Wheat, oats, barley, etc.)	Poor	65	76	84	88
	Good	63	75	83	87
Vineyard	See Note 4				

Notes:

1. All runoff index (RI) numbers are for Antecedent Moisture Condition (AMC) II.
2. Quality of cover definitions:  
 Poor-Heavily grazed or regularly burned areas. Less than 50 percent of the ground surface is protected by plant cover or brush and tree canopy.  
 Fair-Moderate cover with 50 percent to 75 percent of the ground surface protected.  
 Good-Heavy or dense cover with more than 75 percent of the ground surface protected.
3. See Plate C-2 for a detailed description of cover types.
4. Use runoff index numbers based on ground cover type. See discussion under "Cover Type Descriptions" on Plate C-2.
5. Reference Bibliography item 17.

**RCFC & WCD**  
 HYDROLOGY MANUAL

**RUNOFF INDEX NUMBERS  
 FOR  
 PERVIOUS AREAS**

**Appendix E**  
**NOAA Rainfall Data**



POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

[PF tabular](#) | [PF graphical](#) | [Maps & aeriels](#)

PF tabular

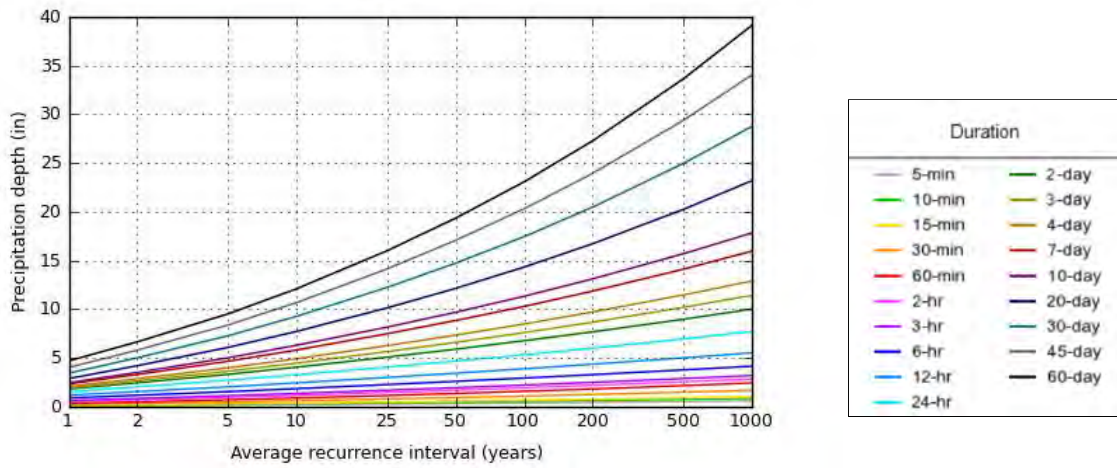
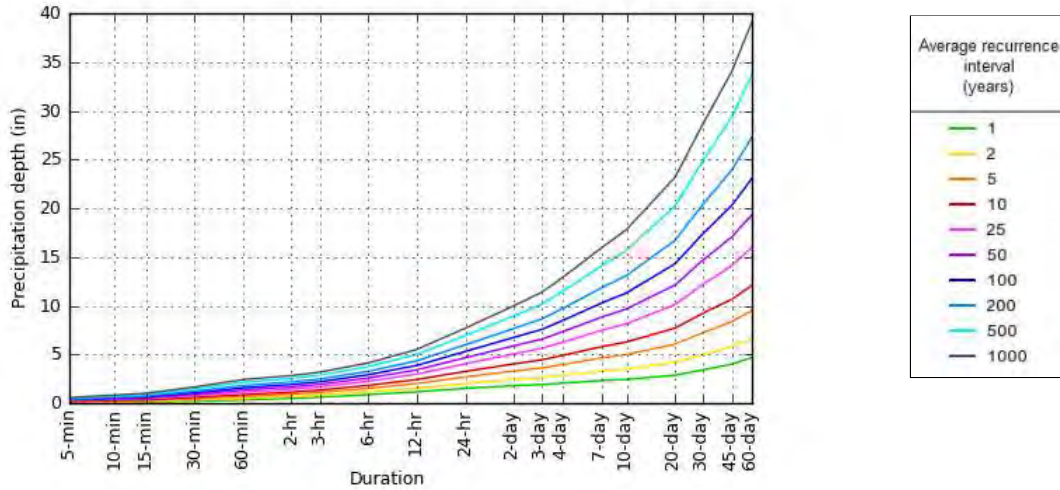
PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches) <sup>1</sup>										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.086 (0.072-0.104)	0.124 (0.104-0.150)	0.176 (0.147-0.213)	0.220 (0.182-0.269)	0.283 (0.226-0.359)	0.334 (0.261-0.433)	0.389 (0.296-0.516)	0.447 (0.330-0.611)	0.530 (0.375-0.758)	0.599 (0.408-0.886)
10-min	0.123 (0.103-0.149)	0.178 (0.148-0.215)	0.252 (0.210-0.305)	0.315 (0.261-0.386)	0.406 (0.324-0.514)	0.479 (0.374-0.621)	0.557 (0.424-0.740)	0.641 (0.473-0.876)	0.760 (0.538-1.09)	0.858 (0.585-1.27)
15-min	0.149 (0.125-0.180)	0.215 (0.180-0.259)	0.305 (0.254-0.369)	0.381 (0.315-0.466)	0.491 (0.392-0.622)	0.580 (0.453-0.750)	0.674 (0.513-0.895)	0.775 (0.573-1.06)	0.920 (0.650-1.31)	1.04 (0.708-1.54)
30-min	0.243 (0.203-0.293)	0.349 (0.292-0.422)	0.496 (0.413-0.601)	0.621 (0.513-0.759)	0.799 (0.638-1.01)	0.944 (0.737-1.22)	1.10 (0.834-1.46)	1.26 (0.932-1.73)	1.50 (1.06-2.1)	1.69 (1.15-2.50)
60-min	0.352 (0.295-0.425)	0.506 (0.423-0.612)	0.718 (0.599-0.871)	0.899 (0.743-1.10)	1.16 (0.924-1.47)	1.37 (1.07-1.77)	1.59 (1.21-2.11)	1.83 (1.35-2.50)	2.17 (1.53-3.10)	2.45 (1.67-3.62)
2-hr	0.522 (0.437-0.630)	0.709 (0.593-0.856)	0.961 (0.801-1.17)	1.17 (0.969-1.43)	1.47 (1.17-1.86)	1.70 (1.33-2.20)	1.95 (1.48-2.59)	2.21 (1.63-3.02)	2.57 (1.81-3.66)	2.85 (1.95-4.23)
3-hr	0.640 (0.536-0.772)	0.852 (0.712-1.03)	1.14 (0.947-1.38)	1.37 (1.13-1.68)	1.70 (1.36-2.15)	1.96 (1.53-2.53)	2.23 (1.69-2.96)	2.51 (1.85-3.43)	2.90 (2.05-4.14)	3.20 (2.19-4.74)
6-hr	0.904 (0.756-1.09)	1.18 (0.988-1.43)	1.55 (1.29-1.88)	1.86 (1.54-2.27)	2.28 (1.82-2.88)	2.61 (2.03-3.37)	2.94 (2.24-3.91)	3.30 (2.43-4.51)	3.78 (2.67-5.40)	4.16 (2.84-6.16)
12-hr	1.19 (0.997-1.44)	1.56 (1.30-1.88)	2.05 (1.71-2.48)	2.45 (2.03-2.99)	3.01 (2.40-3.81)	3.45 (2.69-4.46)	3.90 (2.96-5.17)	4.37 (3.23-5.97)	5.02 (3.55-7.17)	5.53 (3.77-8.19)
24-hr	1.55 (1.37-1.78)	2.05 (1.81-2.36)	2.72 (2.40-3.15)	3.28 (2.87-3.83)	4.07 (3.44-4.90)	4.69 (3.89-5.77)	5.33 (4.32-6.71)	6.01 (4.74-7.78)	6.96 (5.27-9.37)	7.71 (5.65-10.7)
2-day	1.82 (1.61-2.10)	2.46 (2.17-2.84)	3.33 (2.93-3.85)	4.06 (3.55-4.74)	5.09 (4.30-6.13)	5.91 (4.90-7.27)	6.77 (5.48-8.52)	7.68 (6.06-9.94)	8.97 (6.80-12.1)	10.0 (7.33-13.9)
3-day	1.94 (1.72-2.24)	2.66 (2.35-3.07)	3.64 (3.21-4.21)	4.47 (3.91-5.22)	5.65 (4.78-6.81)	6.60 (5.48-8.12)	7.60 (6.16-9.57)	8.67 (6.84-11.2)	10.2 (7.72-13.7)	11.4 (8.37-15.9)
4-day	2.08 (1.84-2.40)	2.88 (2.55-3.33)	3.99 (3.51-4.62)	4.93 (4.30-5.75)	6.26 (5.30-7.55)	7.34 (6.09-9.03)	8.49 (6.88-10.7)	9.72 (7.66-12.6)	11.5 (8.69-15.4)	12.9 (9.45-18.0)
7-day	2.34 (2.07-2.70)	3.31 (2.93-3.83)	4.66 (4.11-5.40)	5.82 (5.09-6.79)	7.48 (6.34-9.02)	8.84 (7.33-10.9)	10.3 (8.34-13.0)	11.9 (9.35-15.3)	14.1 (10.7-19.0)	16.0 (11.7-22.2)
10-day	2.46 (2.18-2.84)	3.53 (3.12-4.08)	5.02 (4.42-5.81)	6.30 (5.51-7.36)	8.16 (6.91-9.84)	9.69 (8.04-11.9)	11.3 (9.18-14.3)	13.1 (10.3-17.0)	15.7 (11.9-21.1)	17.8 (13.1-24.8)
20-day	2.89 (2.56-3.33)	4.21 (3.72-4.86)	6.08 (5.36-7.04)	7.72 (6.75-9.02)	10.1 (8.58-12.2)	12.1 (10.1-14.9)	14.3 (11.6-18.0)	16.7 (13.2-21.6)	20.2 (15.3-27.2)	23.2 (17.0-32.3)
30-day	3.45 (3.05-3.98)	5.02 (4.43-5.80)	7.28 (6.41-8.43)	9.27 (8.10-10.8)	12.2 (10.4-14.7)	14.7 (12.2-18.1)	17.4 (14.1-22.0)	20.5 (16.1-26.5)	24.9 (18.9-33.6)	28.7 (21.1-40.0)
45-day	4.03 (3.57-4.65)	5.81 (5.13-6.71)	8.38 (7.38-9.71)	10.7 (9.33-12.5)	14.1 (12.0-17.0)	17.1 (14.1-21.0)	20.3 (16.4-25.6)	23.9 (18.9-31.0)	29.4 (22.2-39.5)	34.0 (24.9-47.4)
60-day	4.70 (4.16-5.42)	6.65 (5.88-7.69)	9.52 (8.38-11.0)	12.1 (10.6-14.1)	16.0 (13.5-19.3)	19.3 (16.0-23.8)	23.1 (18.7-29.0)	27.3 (21.5-35.3)	33.6 (25.5-45.3)	39.1 (28.6-54.4)

<sup>1</sup> Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS). Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values. Please refer to NOAA Atlas 14 document for more information.

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PF graphical

PDS-based depth-duration-frequency (DDF) curves  
 Latitude: 33.7438°, Longitude: -117.1867°



NOAA Atlas 14, Volume 6, Version 2

Created (GMT): Mon Aug 16 22:51:56 2021

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**Maps & aeri**

**Small scale terrain**



**Large scale terrain**



Large scale map



Large scale aerial



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[National Water Center](#)  
1325 East West Highway  
Silver Spring, MD 20910  
Questions?: [HDSC.Questions@noaa.gov](mailto:HDSC.Questions@noaa.gov)

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**Appendix F**  
**Soils Reports**



## WQMP Project Report

### County of Riverside Stormwater Program

Santa Ana River Watershed Geodatabase

Monday, August 16, 2021

Note: The information provided in this report and on the Stormwater Geodatabase for the County of Riverside Stormwater Program is intended to provide basic guidance in the preparation of the applicant's Water Quality Management Plan (WQMP) and should not be relied upon without independent verification.

**Project Site Parcel Number(s):** 329250012, RW, 329250011, 329250009  
**Latitude/Longitude:** 33.744, -117.1866  
**Thomas Brothers Page:**  
**Project Site Acreage:** 14.52  
**Watershed(s):** SANTA ANA  
**This Project Site Resides in the following Hydrologic Unit(s) (HUC):** **HUC Name - HUC Number**  
**Perris Valley-San Jacinto River - 180702020306**  
**The HUCs Contribute stormwater to the following 303d listed water bodies and TMDLs which may include drainage from your proposed Project Site:** **WBID Name - WBID Number**  
**Canyon Lake (Railroad Canyon Reservoir) - CAL8021100019990208151525**  
**Elsinore, Lake - CAL8023100019990208151100**  
**These 303d listed Water bodies and TMDLs have the following Pollutants of Concern (POC):** **Bacterial Indicators - Pathogens**  
**Nutrients - Nutrients, Organic Enrichment/Low Dissolved Oxygen**  
**Other Organics - PCBs (Polychlorinated biphenyls)**  
**Toxicity - Sediment Toxicity, Unknown Toxicity**  
**Is the Site subject to Hydromodification:** Yes  
**Limitations on Infiltration:** **Project Site Onsite Soils Group(s) - C, D**  
**Known Groundwater Contamination Plumes within 1000' - No**  
**Adjacent Water Supply Wells(s) - No information available please contact your local water agency for more information. Your local contact agency is EASTERN MUNICIPAL W.D.. Your local wholesaler contact agency is METROPOLITAN WATER DISTRICT.**  
**Environmentally Sensitive Areas within 200'(Fish and Wildlife Habitat/Species):** None  
 None

**Environmentally Sensitive Areas  
within 200'(CVMSHCP):****Environmentally Sensitive Areas  
within 200'(WRMSHCP):**

Burrowing Owl Survey Required Area

**Groundwater elevation from Mean  
Sea Level:** 1360**85th Percentile Design Storm  
Depth (in):** 0.604**Groundwater Basin:** Perris-South**MSHCP/CVMSHCP Criteria Cell  
(s):** No Data**Retention Ordinance Information:** No Data**Studies and Reports Related to  
Project Site:**[Comprehensive Nutrient Reduction Plan](#)[IBI Scores - Southern Cal](#)[bulletin118\\_4-sc](#)[water\\_fact\\_3\\_7.11](#)[8039-SAR-Hydromodification](#)[Romoland MDP](#)[West San Jacinto GW Basin Management Plan](#)[Homeland/Romoland ADP Map](#)



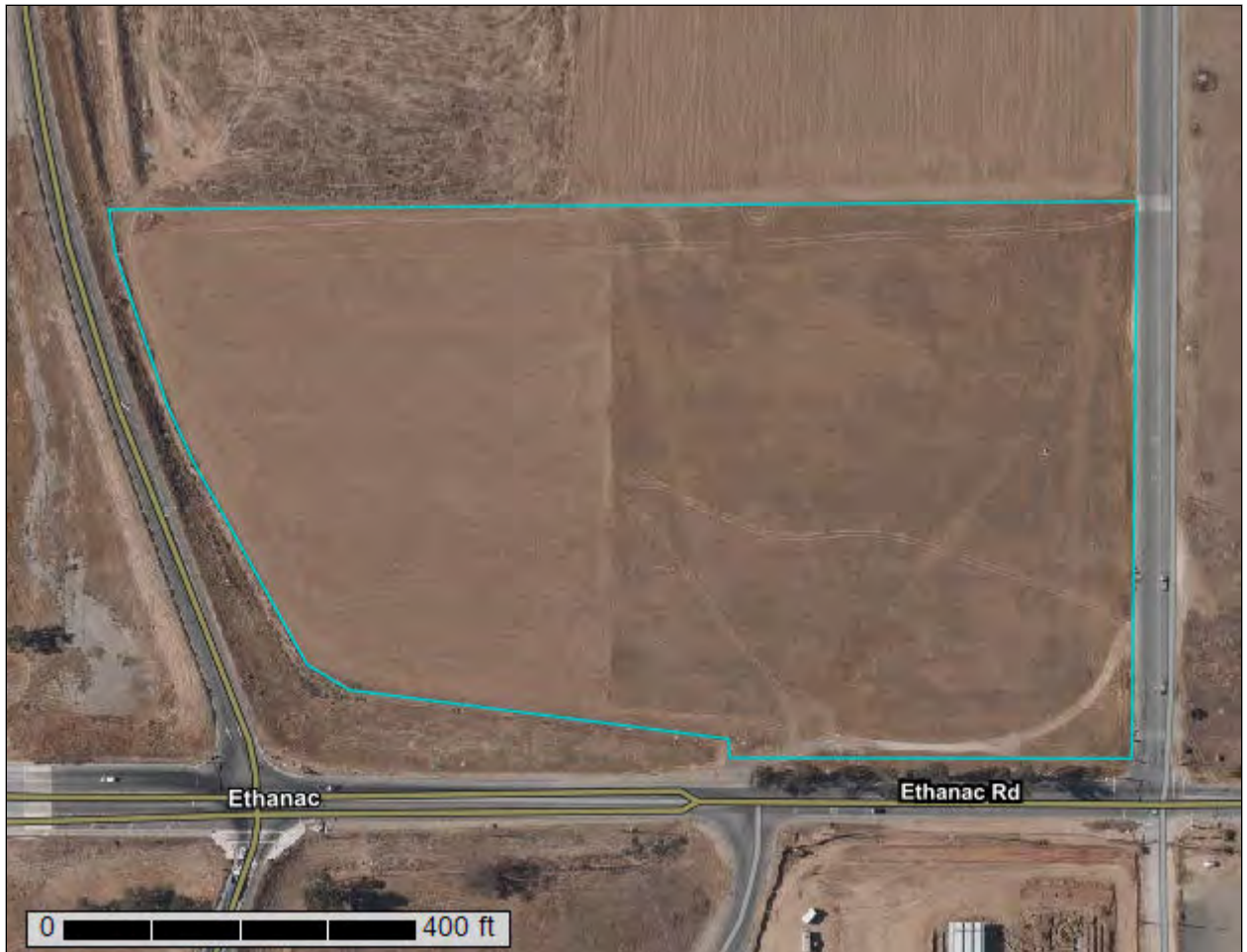
United States  
Department of  
Agriculture

**NRCS**

Natural  
Resources  
Conservation  
Service

A product of the National  
Cooperative Soil Survey,  
a joint effort of the United  
States Department of  
Agriculture and other  
Federal agencies, State  
agencies including the  
Agricultural Experiment  
Stations, and local  
participants

# Custom Soil Resource Report for Western Riverside Area, California



# Preface

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Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<https://offices.sc.egov.usda.gov/locator/app?agency=nrcs>) or your NRCS State Soil Scientist ([http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2\\_053951](http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951)).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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# How Soil Surveys Are Made

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Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

## Custom Soil Resource Report

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

## Custom Soil Resource Report

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

# Soil Map

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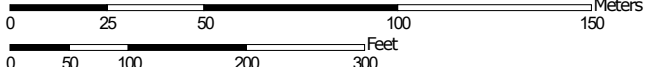
The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

# Custom Soil Resource Report Soil Map



Soil Map may not be valid at this scale.


Map Scale: 1:1,950 if printed on A landscape (11" x 8.5") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84


### MAP LEGEND

**Area of Interest (AOI)**

 Area of Interest (AOI)




















**Soils**







 Soil Map Unit Polygons

 Soil Map Unit Lines


 Soil Map Unit Points

**Special Point Features**






-  Blowout
-  Borrow Pit
-  Clay Spot
-  Closed Depression
-  Gravel Pit
-  Gravelly Spot
-  Landfill
-  Lava Flow
-  Marsh or swamp
-  Mine or Quarry
-  Miscellaneous Water
-  Perennial Water
-  Rock Outcrop
-  Saline Spot
-  Sandy Spot
-  Severely Eroded Spot
-  Sinkhole
-  Slide or Slip
-  Sodic Spot

-  Spoil Area
-  Stony Spot
-  Very Stony Spot
-  Wet Spot
-  Other
-  Special Line Features

**Water Features**

 Streams and Canals

**Transportation**

-  Rails
-  Interstate Highways
-  US Routes
-  Major Roads
-  Local Roads

**Background**

 Aerial Photography

### MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service  
 Web Soil Survey URL:  
 Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Western Riverside Area, California  
 Survey Area Data: Version 13, May 27, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: May 25, 2019—Jun 25, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

## Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
EnA	Exeter sandy loam, 0 to 2 percent slopes	0.5	3.3%
MaA	Madera fine sandy loam, 0 to 2 percent slopes	14.0	96.7%
<b>Totals for Area of Interest</b>		<b>14.5</b>	<b>100.0%</b>

## Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however,

## Custom Soil Resource Report

onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

## Western Riverside Area, California

### EnA—Exeter sandy loam, 0 to 2 percent slopes

#### Map Unit Setting

*National map unit symbol:* hctg

*Elevation:* 20 to 700 feet

*Mean annual precipitation:* 7 to 20 inches

*Mean annual air temperature:* 61 to 64 degrees F

*Frost-free period:* 250 to 300 days

*Farmland classification:* Farmland of statewide importance

#### Map Unit Composition

*Exeter and similar soils:* 85 percent

*Minor components:* 15 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

#### Description of Exeter

##### Setting

*Landform:* Alluvial fans

*Landform position (three-dimensional):* Tread

*Down-slope shape:* Linear

*Across-slope shape:* Linear

*Parent material:* Alluvium derived from granite

##### Typical profile

*H1 - 0 to 16 inches:* sandy loam

*H2 - 16 to 37 inches:* sandy clay loam

*H3 - 37 to 50 inches:* indurated

*H4 - 50 to 60 inches:* stratified sandy loam to silt loam

##### Properties and qualities

*Slope:* 0 to 2 percent

*Depth to restrictive feature:* 20 to 40 inches to duripan

*Drainage class:* Well drained

*Runoff class:* Low

*Capacity of the most limiting layer to transmit water (Ksat):* Very low (0.00 to 0.00 in/hr)

*Depth to water table:* More than 80 inches

*Frequency of flooding:* Rare

*Frequency of ponding:* None

*Calcium carbonate, maximum content:* 1 percent

*Maximum salinity:* Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

*Available water supply, 0 to 60 inches:* Low (about 5.3 inches)

##### Interpretive groups

*Land capability classification (irrigated):* 3s

*Land capability classification (nonirrigated):* 3s

*Hydrologic Soil Group:* C

*Ecological site:* R019XD029CA

*Hydric soil rating:* No

**Minor Components**

**Greenfield**

*Percent of map unit: 4 percent*  
*Hydric soil rating: No*

**Ramona**

*Percent of map unit: 4 percent*  
*Hydric soil rating: No*

**Monserate**

*Percent of map unit: 4 percent*  
*Hydric soil rating: No*

**Unnamed**

*Percent of map unit: 3 percent*  
*Hydric soil rating: No*

**MaA—Madera fine sandy loam, 0 to 2 percent slopes**

**Map Unit Setting**

*National map unit symbol: hcwt*  
*Elevation: 20 to 250 feet*  
*Mean annual precipitation: 14 inches*  
*Mean annual air temperature: 61 degrees F*  
*Frost-free period: 250 days*  
*Farmland classification: Farmland of statewide importance*

**Map Unit Composition**

*Madera and similar soils: 85 percent*  
*Minor components: 15 percent*  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Madera**

**Setting**

*Landform: Alluvial fans*  
*Landform position (three-dimensional): Tread*  
*Down-slope shape: Linear*  
*Across-slope shape: Linear*  
*Parent material: Alluvium derived from granite*

**Typical profile**

*H1 - 0 to 19 inches: fine sandy loam*  
*H2 - 19 to 26 inches: clay*  
*H3 - 26 to 37 inches: indurated*  
*H4 - 37 to 62 inches: stratified coarse sandy loam to clay loam*

**Properties and qualities**

*Slope: 0 to 2 percent*  
*Depth to restrictive feature: More than 80 inches; 20 to 40 inches to duripan*

## Custom Soil Resource Report

*Drainage class:* Moderately well drained  
*Runoff class:* Very high  
*Capacity of the most limiting layer to transmit water (Ksat):* Very low (0.00 to 0.00 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Calcium carbonate, maximum content:* 5 percent  
*Maximum salinity:* Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)  
*Available water supply, 0 to 60 inches:* Very low (about 2.1 inches)

### **Interpretive groups**

*Land capability classification (irrigated):* 3s  
*Land capability classification (nonirrigated):* 4e  
*Hydrologic Soil Group:* D  
*Ecological site:* R019XD061CA  
*Hydric soil rating:* No

### **Minor Components**

#### **Unnamed, ponded**

*Percent of map unit:* 3 percent  
*Landform:* Depressions  
*Hydric soil rating:* Yes

#### **Monserate**

*Percent of map unit:* 3 percent  
*Hydric soil rating:* No

#### **Chino**

*Percent of map unit:* 3 percent  
*Hydric soil rating:* No

#### **Exeter**

*Percent of map unit:* 3 percent  
*Hydric soil rating:* No

#### **Willows**

*Percent of map unit:* 3 percent  
*Hydric soil rating:* No

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**GEOTECHNICAL  
EVALUATION REPORT**

TRAVEL PLAZA  
PERRIS

AT

CORNER OF TRUMBLE ROAD &  
ETHANAC ROAD  
PERRIS, CALIFORNIA

**PREPARED FOR:**

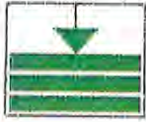
BROADBENT, INC.  
WEST PACIFIC AVENUE  
HENDERSON, NEVADA, 89015

PROJECT NO: G-5908-01

JUNE 11, 2021

**PREPARED BY:**

GEOTECHNICAL SOLUTIONS, INC.  
GEOTECHNICAL & ENVIRONMENTAL  
ENGINEERING



# Geotechnical Solutions, Inc.

Geotechnical, Structural & Environmental Engineering



June 11, 2021

Project No: G-5908-01

**Broadbent, Inc.**

8 West Pacific Avenue  
Henderson, Nevada, 89015

**Attention: Mr. Mark E. Kazelskis, PG, CHG, CEM**  
**Principal Geologist**

Via Email: [mkazelskis@broadbentinc.com](mailto:mkazelskis@broadbentinc.com)

**Re: Geotechnical Engineering Evaluation Report**

Travel Plaza Perris  
Corner of Trumble Road &  
Ethanac Road  
Perris, California

Gentlemen:

Submitted herewith is the report of the Geotechnical Engineering evaluation study conducted by this office for Perris Travel Plaza at the referenced vacant site.

The project site is located just northwest corner of Trumble Road and Ethanac Road Intersection, and east of Freeway 215 in Perris, San Bernardino County, California as shown on Vicinity Map (Plate A) and Google Map (Plate D).

Based on our study findings, it is our opinion that the site is suitable for the proposed development from a geotechnical-engineering standpoint, provided that the recommendations of this report are successfully implemented.

The closest known active faults capable of producing major earthquakes are the Elsinore (GI) (6.89 Mw) and Elsinore (W + GI) (7.27 Mw) faults, which are located approximately 9.56 miles (15.3 km) away from the project site.

The site does not lie within Alquist-Priolo Earthquake Fault Zone as designated by the California Geological Survey (CGS). The potential for direct surface fault rupture at the site is considered unlikely.

The investigation was made in accordance with generally accepted geotechnical engineering principles and procedures and included such field and laboratory tests considered necessary under the circumstances.

In the opinion of the undersigned, the accompanying report has been substantiated by mathematical and other data and presents fairly the design information requested by your organization.

Respectfully Submitted,

**Geotechnical Solutions, Inc.**



Dharma Shakya, PhD, PE, GE  
Principal Geotechnical Engineer



Abraham S. Baha, PE, M. ASCE  
Sr. Principal



Distribution: (3+pdf) Addressee

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## 1.0 INTRODUCTION

### 1.1 Purpose and Scope

The primary objectives of this study were to explore subsurface conditions beneath the project site and evaluate the existing earth materials relative to foundation support and lateral pressure design factors, seismic conditions and earthquake-induced liquefaction potential.

In general, the study objectives were met by a visual reconnaissance of the site and vicinity, review of available tentative development plans, exploratory drilling and sampling of earth materials, laboratory testing, seismic evaluations, geologic hazards study, and engineering analysis. The general scope and objectives of the study were established in collaboration with the client/project team. Items considered in our study relevant to this site included the following:

- Near surface and subsurface soil types,
- Expansion potential,
- Settlement and hydro-collapse potential,
- Bearing capacity and Foundation Design Parameters,
- Slabs-on-grade,
- Lateral earth pressures,
- Drainage considerations,
- Temporary excavation support,
- Corrosion potential,
- Groundwater conditions,
- Likely excavation conditions,
- Seismic Conditions,
- Earthquake induced liquefaction potential,

- Pavements,
- Grading considerations, and
- Construction observation and testing considerations.

To address these, the following scope of work was executed:

1. Review of preliminary project plans, available documents, and coordination with the owner's representatives and project design professionals.
2. Site reconnaissance.
3. Evaluation of seismic conditions for the subject location.
4. Excavator and Backhoe drilling, sampling and logging twelve (11) test holes to investigate subsurface conditions.
5. Laboratory testing of soil samples obtained from subsurface explorations, to determine their physical and engineering properties.
6. Geotechnical analysis of the data obtained.
7. Developing conclusions and recommendations for foundation design.
8. Preparation of this report.

## **1.2 Project Description**

Based on the information provided, the proposed Travel Plaza Perris will have total site area of 14.67 acres including 0.9 acre for the pond area and will consist mainly of constructing the Auto Fueling Island / Canopy, Truck Fueling Island / Canopy, Cat Scale, Aboveground (AST's) and underground (UST's) storage tanks, store building, shop building, pond area, and truck approaches at the location shown on Plot Plan and Boring Location Map (Plate B in Appendix A).

Also, the project consists of heavy-duty asphalt pavement for parking and driveways with some rigid concrete pavement sections to accommodate 98 auto parking and 135 truck parking.

### **1.3 Site Description and Topography**

The project site is located just northwest of Trumble Road and Ethanac Road Intersection and just east of freeway 215 as shown on Vicinity Map (Plate A) and Google Map (Plate D) in Appendix A. At the time of our field exploration, the site was vacant and covered mostly with grass and weeds all around.

The site is relatively flat at an elevation of 1,426 feet above the sea level. No hilly terrain or drainage problems exist at the subject property.

### **1.4 Site Geologic Setting**

The Peninsular Ranges province is one of the largest geomorphic units in western North America. Basically, it extends from the Transverse Ranges geomorphic province and the Los Angeles Basin, roughly 900 miles south to the tip of Baja California. This province varies in width from about 30 to 100 miles. It is bounded on the west by the Pacific Ocean, on the south by the Gulf of California and on the east by the Colorado Desert Province. The Peninsular Ranges are essentially a series of northwest-southeast oriented fault blocks. Three major fault zones are found in this province. The Elsinore Fault zone and the San Jacinto Fault zones trend northwest-southeast and are found in the near the middle of the province. The San Andreas Fault zone borders the northeasterly margin of the province.

The Perris Block is a large mass of granitic rock generally bounded by the San Jacinto Fault, the Elsinore Fault, the Santa Ana River and a non-defined southeast boundary. The Perris Block has had a history of vertical land movements of several thousand feet due to shifts in the Elsinore and San Jacinto Faults. The primary source of strong seismic ground shaking in the project area is the Elsinore Fault Zone and San Jacinto Fault Zone. Other

regional fault zone of significance that could affect the project area is the San Andreas. The Site Regional Geology Map is shown on the enclosed Plate D.

The site is underlain by alluvial soils over Cretaceous aged igneous rocks (Val Verde Tonalite). The materials encountered onsite generally consist of alluvial soils consist of dense to very dense silty sand to sand. The tonalite bedrock is grey in color and moderately weathered and becomes harder with depth. It should be noted that Special handling and coring could be required during the caisson excavation.

The most significant geologic hazard to the project is the potential for moderate to severe ground shaking resulting from earthquakes generated on the faults close to the site. The site is not located in an Alquist-Priolo Special Studies zone for earthquake rupture hazard. The potential for direct surface fault rupture in the project area is considered very low.

### **1.5 Other Geologic Hazards**

Since the site is located in a relatively flat area, we do not consider landslides or other forms of natural slope instability to represent a hazard to the project. The site is not located near any impounded bodies of water therefore tsunamis and seiches are not considered a potential hazard to the project. The proposed project is an area of stable soil conditions with low shrink-swell potential; hence, no impact is anticipated.

In addition to possible strong earthquake ground motion at the site, the secondary effects of earthquake-induced liquefaction, and earthquake-induced landsliding, were considered. Guidelines for evaluating and mitigation seismic hazards in California (CGS, 2008, SP-117A) summarize procedures for evaluating the earthquake-induced landslide and liquefaction potential.

#### **1.5.1 Earthquake-Induced Liquefaction**

The site has not been evaluated for earthquake-induced liquefaction potential as per

California Geologic Survey (Plate F, Appendix A). Liquefaction is discussed in more detail in the proceeding sections.

### **1.5.2 Induced Flooding**

The site lies far and/or high enough from the coast or large inland body of water to preclude the hazards of tsunami or seiche waves or inundation from the rupture of an up-gradient reservoir.

### **1.5.3 Earthquake-Induced Landsliding**

The site has not been evaluated by California Geologic Survey (CGS) for earthquake-induced landsliding potential. Since the site is far enough from steep slopes, landsliding will be unlikely.

## **2.0 FIELD EXPLORATION**

### **2.1 Scope**

Hollow Stem auger was used to drill. Eleven (11) borings were drilled to get soil samples from the depths varying from 10- to 51.5-feet below the existing ground level in the proposed development areas. The Boring Logs, B-1 through B-11 are shown on the Plot Plan and Boring Location Map (Plate B) in Appendix A.

### **2.2 Drilling and Sampling Procedures**

A continuous record of the materials encountered during the drilling was made by our field engineer and Log of all the borings are presented on Appendix A The lines designating the interface between soil strata on the log of Test Holes represent approximate boundaries. The transition between strata may be gradual. Undisturbed samples were secured at frequent intervals from various locations for laboratory testing.

Core samples and bulk samples were secured at frequent depth intervals for laboratory examination and testing. Both California standard ring samples (CA) and split spoon

samples with Penetration test (SPT) blow counts were obtained for further evaluation. Disturbed bulk samples, representative of the surficial subgrade materials were also obtained.

The relative sampler penetration resistance (SPT) exhibited by the deposits sample is tabulated in the Blow per Foot column of the pertinent test hole log. Recorded blow counts for 12 inches of sampler penetration were generally indicative of medium to high shear resistance (140 pounds hammer at a 30-inch drop).

### **2.3 Field Tests and Measurements**

The drilled holes were examined and logged in the field. Representative samples were obtained to classify the soils. The Unified Soil Classification System (USCS) was used to classify the soils. The soil classification symbols appear on the boring logs and are briefly described in Appendix A. Local and regional geologic characteristics were used to estimate the seismic design criteria.

In addition, relatively undisturbed California ring samples were obtained for laboratory testing. The attached logs tabulate data based on laboratory classification tests and visual observation by the field geologist at the site.

### **2.4 Standard Penetration Resistance**

A sediment is considered to be susceptible to transformation to a fluid mass during a strong seismic event only if the packing of the grains (relative density) is relatively low. Sediments with high relative densities cannot reduce their total volume through the compactive effort induced by the ground shaking.

The number of blows necessary to drive a standard sampler (1½" I.D.)-12 inches into the individual stratum is a measurement of a specific property that has been correlated to relative density. The sampling (penetration) resistance offered by sediment from

successive blows delivered by a 140-pound hammer falling 30 inches is counted. The number of blows to drive the standard sampler full 12 inches is recorded as the N-Value.

The on-site material yielded penetration resistance which indicates dense to very dense alluvial soils, fine to coarse grained, dry to slightly moist with trace of silt were encountered within the boring depth. The standard penetration resistances of the on-site materials at 5-foot intervals are presented on the boring logs (Appendix A).

### **3.0 LABORATORY TESTING AND SUMMARY METHODS**

Laboratory testing was programmed following a review of field investigation data and after considering the various foundations, floor slabs, and grading elements to be evaluated. In general, this includes physical testing to establish foundation-bearing characteristics, and classification tests.

#### **A. In-Place Moisture & Density (ASTM D2216 & D2937)**

In-situ moisture content and density were determined for all the undisturbed core samples obtained during test boring drilling operations. Test results are tabulated on Plates I-1 through I-11, Log of Test Holes.

#### **B. Mechanical Analysis (ASTM D-422)**

The texture composition of a selected typical sample determined by the hydrometer test method was as follows:

Boring No.	Depth (Feet)	Percent Sand	Percent Silt	Percent Clay
B-2	0-3	72	10	18
B-7	0-3	61	17	22
B-8	0-3	56	22	22

B-9		0-3		68		12		20
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**C. Direct Shear (ASTM D-3080)**

Direct shear test was performed on the representative sample of native soil and was considered most pertinent in the design of mat/ spread footings, and moderately deep pier. Tests were performed in the saturated condition at the field density. Individual test results are shown on Plate J.

**D. Expansion (ASTM D-4829)**

Expansion characteristics were determined by the Expansion Index test on a typical bulk sample considered to be generally representative of the near subgrade soils. Test results were as follows:

Test Boring No.	Moisture Content (%)	Dry Density (pcf)	Expansion Index	Remarks
B-8	8.6	115.2	18	Very Low Expansive

According to the test results, the underlying soils generally exhibit very low expansive potential.

**E. Consolidation (ASTM D-2435)**

Consolidation (load deformation) tests were performed on undisturbed samples at selected depths. Plotted test results are presented on Plates K, L, and M.

**F. Chemical Sulfate Analysis (CAL 417-A Method)**

Chemical sulfate analysis was performed on a representative sample by the CAL 417-A method. A soluble sulfate of 390 parts per million was indicated, which is negligible exposure to concrete, however we recommend using Type II Portland cement for the foundation elements in contact with the underlying soil.

### G. R-Value Test (ASTM D-2844)

Representative samples of the subgrade soils were obtained and tested to determine the R-value. The material is thought to be typical and presumed to be representative of the subgrade soils. Testing was performed in general accordance with the latest revisions to the Department of Transportation, State of California, Material & Research Test Method No. 301. Pavement design recommendations are based on the latest Traffic Indices (TI's) and recently tested R-value.

An R-Value test was conducted on a representative sample of the near surface soil consisting of clayey sand with trace of silt. The specimens were tested in a state as near to full saturation as possible to simulate the condition the soil might attain at typical field density and under adverse moisture conditions. The R-Value for a representative soil was determined to be 30. Test results are as follows:

The R-Value for a representative soil was determined to be 40. Test results are as follows:

<u>Test Number</u>	<u>Moisture @ Compaction (%)</u>	<u>Density (pcf)</u>	<u>Exudation Pressure (psi)</u>	<u>Stabilometer "R"-Value</u>
a	7.4	120.5	200	37
b	7.1	122.0	350	42
c	6.7	123.8	450	47

\* Interpolated 300 psi by Exudation , Rv = 40

## 4.0 SUBSURFACE DISCUSSION

### 4.1 General

The recommendations presented are based on entirely upon data derived from a limited number of samples obtained from widely spaced borings. The attached logs, B-1 through

B-11 presented in Appendix A are indicators of subsurface conditions only at the specific locations and times noted. This report assumes the uniformity of the geology and soil structure between the borings, however variations can and often do exist. Whenever there is any deviation, difference or change is encountered or becomes known, we should be contacted.

#### **4.2 Material and Soil Conditions Summary**

No appreciable artificial fill was encountered at the boring locations during the exploratory drilling. The upper and underlying natural soils are older alluvium, light brown to dark brown, dry to slightly moist, generally fine to coarse grained, medium dense to very dense, sand with gravel, and some rock fragments as well. A more detailed soil profiles are shown on Plates I-1 through I-11, Log of Test Hole (Appendix A).

#### **4.3 Groundwater**

Surface water on this site is the likely result of precipitation or surface run-off from surrounding sites. Overall site drainage is in a north and northwesterly direction. Provisions for surface drainage will need to be accounted for by the project civil engineer.

We recommend that all surface runoff should not be allowed to pond above or flow freely over adjacent slope surfaces. Collected water should be conveyed via a non-erosive device to a suitable storm drain system.

Groundwater was not encountered at a drilled hole depth of 51.5-feet during the field study. No springs or perennial stream flow in local drainages exist based on older topographic maps.

The nearest well, 05S03W10N0015 as shown on Closest Well Groundwater Data (Plate H-1) and groundwater well data (Plate H-2) indicated the highest groundwater elevation to be 1331.86 above mean sea level. The elevation of our project area is about 1,426 feet.

Thus we believe the historic groundwater depth was around 95-feet below the existing ground surface.

Groundwater is not anticipated to affect the site adversely. However, these observations reflect site conditions at the time of the investigation and do not preclude changes in local groundwater conditions, localized seepage due to variations in rainfall, heavy irrigation, damaged structure (pipes, etc.), or altered site drainage pattern(s).

Proper surface drainage is imperative to collect and convey any surface water off site to a suitable storm drain system.

#### **4.4 Faulting and Seismicity**

The project site is located in the highly seismic Southern California region within the influence of several fault systems that are considered to be active or potentially active. An active fault is defined by the State of California as a “sufficiently active and well-defined fault” that has exhibited surface displacement within the Holocene time (about the last 11,000 years).

A potentially active fault is defined by the State as a fault with a history of movement within Pleistocene time (between 11,000 and 1.6 million years ago).

No faults have been mapped trending towards or through the site area. The site area does not lie within an Alquist-Priolo Earthquake Fault Zone as designated by the California Geological Survey (CGS) (Hart, 1997). For this reason, the potential for direct surface rupture is considered unlikely.

##### **4.4.1 Faults Close to the Site**

USGS National Seismic Hazard Maps for Source parameters interactive query has been used to determine the closest fault to the site within 50 miles and has been tabulated on Table – 1 in Appendix B.

The closest known active faults capable of producing major earthquakes are the Elsinore (GI) and Elsinore (W + GI) Faults, which are both located approximately 9.56 miles (15.3 km) away from the project site. The Elsinore (GI) Fault has been assigned to 6.89 Mw magnitude and slip rate of 5 mm/year and Elsinore (W + GI) Fault has been assigned to 7.27 Mw magnitude and slip rate of N/A.

#### **4.4.2 U.S.G.S. Earthquake Hazard Program**

Latest Interactive U.S.G.S. Earthquake Hazard Program using Unified Hazard Tool has been utilized for Conterminous U.S. 2008 (v3.2.x) and peak ground acceleration.

Peak Horizontal Ground Acceleration for 10% probability of exceedance in 50 years i.e. return period of 475 years	0.4423g
Peak Horizontal Ground Acceleration for 5% probability of exceedance in 50 years i.e. return period of 975 years	0.5487g
Peak Horizontal Ground Acceleration for 2% probability of exceedance in 50 years i.e. return period of 2,475 years	0.6906g

Interactive **Hazard Curve** and **Uniform Hazard Response Spectrum** have been plotted and presented in Appendix B.

#### **4.4.3 Seismic Factors**

The following are the geotechnical parameters for earthquake design data in accordance with ASCE 7-16 and the latest CBC 2019. The details are presented in Appendix B:

Latitude: **33.7441<sup>0</sup>** and Longitude: **-117.1658<sup>0</sup>**

NO.	PARAMETERS	VALUES	REFERENCE
1	0.2-Second Mapped Spectral Response Accelerations, <b>S<sub>s</sub> (MCE<sub>R</sub> Ground Motion)</b>	<b>1.428g</b>	ASCE 7-16
2	1-Second Mapped Spectral Response Accelerations, <b>S<sub>1</sub> (MCE<sub>R</sub> Ground Motion)</b>	<b>0.532g</b>	ASCE 7-16
3	Site Class	<b>D</b>	ASCE 7-16
4	Site Amplification Factor at 0.2 sec, <b>F<sub>a</sub></b>  According to Section 11.4.4, <b>F<sub>a</sub></b> should not be less than 1.2	<b>1.0</b>  <b>1.2</b>	ASCE 7-16  Use
5	Site Amplification Factor at 1.0 sec, <b>F<sub>v</sub></b> , however, according to Table 11.4.2, <b>F<sub>v</sub> should be 1.77</b>	<b>Null</b>  <b>1.77</b>	ASCE 7-16  Use
6	Site Modified Spectral Acceleration Value, <b>S<sub>MS</sub></b> <b>S<sub>MS</sub> = F<sub>a</sub> S<sub>s</sub> = 1.2 x 1.428 = 1.714</b>	<b>1.714g</b>  <b>1.714g</b>	ASCE 7-16  Use
7	Site Modified Spectral Acceleration Value, <b>SM<sub>1</sub></b> <b>SM<sub>1</sub> = F<sub>v</sub> S<sub>1</sub> = 1.77 x 0.532 = 0.942</b>	<b>Null</b>  <b>0.942g</b>	ASCE 7-16  Use
8	Numeric Seismic Design value at 0.2 sec SA, <b>S<sub>DS</sub> = 2/3 of S<sub>MS</sub> = 2/3 x 1.714 = 1.143</b>	<b>1.143g</b>  <b>1.143g</b>	ASCE 7-16  Use
9	Numeric Seismic Design value at 1.0 sec SA, <b>S<sub>D1</sub> = 2/3 of SM<sub>1</sub> = 2/3 x 0.942 = 0.628</b>	<b>Null</b>  <b>0.628g</b>	ASCE 7-16  Use

Other seismic parameters are as follows:

Closest Fault Distance	9.56 miles (15.3 km)
Fault Name	Elsinore (GI) & Elsinore (W + GI) Faults
Earthquake Magnitude	6.89 M <sub>w</sub> & 7.27 M <sub>w</sub>
Slip Rate (mm/year)	5.0 & N/A
PGA <sub>M</sub> Site Modified Peak Ground Acceleration	<b>0.600g</b>
5% Damped Design Spectral Acceleration at short period, S <sub>DS</sub>	<b>1.143g</b>
5% Damped Design Spectral Acceleration at 1-sec period, S <sub>D1</sub>	<b>0.628g</b>
Seismic Design Category	D
Risk Category	II
Soil Site Class	D

#### **4.5 Design Values**

Representative values were selected from the test data and other sources for design and is tabulated below:

Field Density	120 pcf
Expansion Index	0 & 18
Angle of Internal Friction (Ult/Peak)	32/33 & 34/35 deg.
Cohesion (Ult/Peak) Remolded	200/250 & 200/250 psf
Subgrade K-Value	100 pci

## **5.0 SITE CONSIDERATIONS**

### **5.1 Site Preparation**

#### **5.1.1 General**

It is our professional opinion that the proposed construction will not be subject to geologic hazard from settlement, slippage, or landslide, provided the recommendations of this report are incorporated into the proposed construction. It is also our opinion that the proposed construction will not adversely affect the geologic stability of the site or adjacent properties provided the recommendations contained in this report are incorporated into the proposed construction.

The validity of the conclusions contained in this report is based on compliance with the recommendations presented in this section. Any excavating, trenching, or disturbances that occur after completion of the earthwork must be backfilled, compacted and tested in accordance with the recommendations contained herein. If any unobserved and untested earthwork, trenching, or backfilling occurs, then the conclusions and recommendations in this report may not be relied on.

#### **5.1.2 Site Clearing**

Prior to grading, all grasses, bushes, shrubs and debris including construction materials should entirely be removed from the site and disposed of off-site. Existing any undesirable materials should also be removed and hauled off-site. Existing utilities (if Any) should be removed and relocated as required. Any construction debris or ant buried or other contaminated exposed during site clearance should be removed and hauled away from the site. The resulting excavation from any removal should be cleared of loose material then backfilled with compacted soil. Oversized rocks greater than 6 inches should be removed.

### **5.1.3 Excavation**

Excavations into the on-site soils may encounter a variety of challenges for example, firm alluvium, gravels, some fragments of rocks etc. Caving on clean sands may be encountered. The contractor should be made responsible for designing and constructing stable, temporary excavations as required to maintain stability of the excavation sides. All excavations should be sloped or shored in the interest of safety following local and federal regulations including current OSHA excavation and trench safety standards.

Heavy equipment for breaking the very dense and firm alluvium may be required for the excavations for shallow foundations, drilled shafts, and utility trenches for the proposed construction. The speed and ease of excavation are dependent on the nature of the deposit, the type of equipment used, and the skill and experience of the equipment operator.

### **5.1.4 ASTs Pad Preparation**

At the locations where Above Ground Storage tanks (ASTs) are located, proof-roll the exposed subgrade to observe for any loose or disturbed soils that may remain. Remove and replace any loose or disturbed soils prior to placing any additional fill materials required to reach the finished subgrade elevation.

### **5.1.5 Compliance**

Recommendations for foundations and slabs-on-grade supported on compacted fills or prepared subgrade depend upon compliance with the **Site Preparation recommendations** and Recommended Earthwork Specifications in Appendix C.

To assess compliance, observation and testing should be performed under the direction of a geotechnical engineer. Please contact us to provide observation and testing services.

## **5.2 Lateral Earth Pressures**

### **5.2.1 Lateral Passive Resistance**

Horizontal forces may be resisted by passive pressure acting on the side and sliding resistance. The passive pressure may be 300 psf per foot of embedment from the lowest adjacent grade up to a maximum of 4,500 psf.

Friction between base of footings and/or floor slabs, and the underlying soils may be assumed to be 40 percent of the dead loads.

The allowable bearing capacity and the allowable resistance of horizontal forces may be increased one-third for transient forces.

Friction and lateral pressure may be combined, but not to exceed two-thirds of the allowable lateral pressure.

### **5.2.2 Retaining Wall Recommendations (If Any)**

The retaining wall structures may be supported by shallow footings bearing on compacted fill or competent subgrade soil. Following bearing values may be used for foundation design.

Shallow footings for the wall and/or secondary structure may be designed for an allowable bearing value of 1,500 pounds per square foot (psf) embedded at least 18 inches, a minimum width of 12 inches, placed over a minimum of 12-inches thick engineered fill compacted to 90% relative density or over a competent subgrade soil. This basic bearing value may be increased by 200 psf for each one-foot increase in depth, and by 100 psf for each additional 12 inches in width to a maximum value of 2,500 psf.

Recommended bearing values are for dead plus live loads and may be increased by one-third for combined dead, live, and transient forces such as wind load and seismic forces.

It is recommended that all foundations be reinforced per structural design, but no less than a minimum reinforcement of 2#5 bars top and 2#5 bars at the bottom.

It is estimated that total settlement will be less than 0.50" and differential settlement will be less than 0.25" over a horizontal distance of 30 feet.

### 5.2.3 Active Pressure

Recommended active lateral soil pressure values for design of drained retaining wall are as follows:

Surface Slope of Retained Material (Horizontal:Vertical)	Equivalent Fluid Weight (pcf) (Native Backfill)	Allowable Bearing Capacity
Level	35	1,500 psf

A Pipe and gravel drain (4" perforated PVC embedded in at least three cubic feet of gravel per lineal foot of pipe wrapped with Mirafi geofabric 10N or equivalent) should be provided on the retained earth side and near the base of all the retaining walls. Backfill should consist of sand and/or gravel. While all backfills should be compacted to the required degree, care should be taken when working close to the walls to prevent excessive pressure.

### 5.2.4 At-Rest Earth Pressure (If Any)

Retaining walls (basement walls, underground vault, if applicable) should be designed for at-rest conditions. The recommended earth pressure for at-rest conditions is an equivalent fluid density of 60 pounds per cubic foot without surcharge loading.

#### **Note:**

The equivalent fluid pressures presented herein do not include the lateral pressures arising from the presence of the following:

- Hydrostatic conditions, submergence or partial submergence
- Sloping backfill, positively or negatively
- Surcharge loading, permanent or temporary
- Seismic or dynamic conditions

### **5.2.5 Seismic Force on Wall**

Lateral forces on retaining walls (exceeding 6 feet in height) due to earthquake movements in accordance with Section 1803A.5.12 of the 2019 CBC for active and at-rest conditions may be calculated as follows:

Seismic active Force =  $13 H^2$  pounds/ft of wall (Inverted triangular distribution, acting at 0.6H from bottom).

Seismic at-rest Force =  $24 H^2$  pounds/ft of wall (Rectangular Distribution, acting at 0.6H from bottom).

Where, H = Height of the retaining wall in feet

## **5.3 On-Site Fill Soils**

### **5.3.1 Materials**

On-site clean sand (after removing rocks, sizes greater than 6 inches), low-expansive potential soils, or imported materials may be used as fill material for the following:

- Foundation Areas
- Interior Slab Areas
- Pavement Areas
- Backfill

Any earth materials imported or excavated on the property may be utilized in the fill provided that each material has been determined to be suitable by the soil engineer. These materials should be free of roots, tree branches, other organic matter or other deleterious materials. Soils of poor gradation, undesirable expansion potential, or substandard strength characteristics may be designated by the consultant as unsuitable and may require blending with other soils to serve as a satisfactory fill material.

Gradation (as per ASTM C136) should be as follows:

<u>Size</u>	<u>% by Weight</u>
6"	100
4"	85-100
3/4"	70-100
No 4 Sieve	50-100
No. 200 Sieve	15 (max)

Any import material should have an expansion Index, EI less than 20.

### **5.3.2 Placement and Compaction**

- a. Place and compact approved fill material in nearly horizontal layers that when compacted should not exceed 6 inches in thickness.
- b. Use appropriate equipment and procedures that will produce recommended densities and water contents throughout the lift. Moisture condition, blending, and mixing of the fill layer should continue until the fill materials have a uniform moisture content at or above optimum moisture.
- c. Uncompacted fill lifts should not exceed 8 inches.
- d. Materials should be compacted to the following:

- On-site or imported soil, reworked and fill:

	<u>Minimum % (ASTM D-1557 Laboratory Standard)</u>
Subgrade Below Footings	90
Subgrade Below Slab-on Grade	90
Subgrade Below Pavement	90
Crush Rock Below Slab-on-Grade	95
Aggregate Base below pavement	95

## **5.4 Soil Corrosivity**

### **5.4.1 Corrosion and Sulfate Attack Protection**

A major factor in determining soil corrosivity is electrical Resistivity. The electrical Resistivity of a soil is a measure of its resistance to the flow of electrical current. Corrosion of buried metal is an electrochemical process in which the amount of metal loss due to corrosion is directly proportional to the flow of electrical current (DC) from the metal into the soil. Corrosion currents, following Ohm's Law, are inversely proportional to soil Resistivity. Lower electrical resistivities result from higher moisture and chemical contents and indicate corrosive soil. Other soil characteristics that can influence corrosivity toward metals are pH, chemical content, soil types and site drainage.

Based on test results and our past experience at this site, soils are classified as slightly corrosive to ferrous metals and negligible sulfate exposure to concrete. The type of alluvial deposits encountered at this site and in this area in general is known to cause corrosion problems. Ferrous metals and pipes should be properly coated and wrapped. Please be advised that this firm does not practice corrosion engineering; therefore, we recommend that upon completion of precise grading, onsite soils be

analyzed by a qualified corrosion engineer to evaluate the impact of chemical activity of these soils on buried metallic pipes and other underground structures. If necessary, more elaborate corrosion protection systems may be considered as may be recommended by a corrosion expert.

#### **5.4.2 Concrete**

Concrete for foundation where in contact with the underlying soils should be designed in accordance with the 2019 CBC, ACI 318 Section 4.3, Table 4.3.1 (2005). As the potential for sulfate attack on concrete appears negligible, however, we recommend that the use of type II Portland cement, with a maximum water-cement ratio of 0.50, and a minimum compressive strength of 3,000 psi should be taken into consideration for the foundation elements in contact with the soil.

For all concrete in contact with soil, concrete cover over rebar should be maintained per California Building Code (CBC 2019).

### **5.5 Building Foundation Recommendations**

Based upon results of the field explorations, laboratory testing and engineering analysis, it is concluded that the site is suitable for the proposed development at the subject site. The site is subject to ground shaking typical of the Southern California area, any construction should conform to the current seismic design provision of the California Building Code (2019), and/or other regulatory codes.

Following are more specific recommendations:

#### **5.5.1 Conventional/Spread Foundations**

The planned ASTs and the proposed building may be supported by conventional continuous and/or isolated shallow spread pad footings, bearing on certified compacted fill. The foundations should bear on engineered fills achieved by removal and re-compaction of the soils below foundation and slab elements.

Footings placed at least 18 inches below finish subgrade and 3 feet x 3 feet spread footings, 24 inches deep may be designed for an allowable bearing value of 1,500 pounds per square foot (psf). The footing width should be a minimum of 18 inches. An increase of 100 psf and 200 psf are allowed for each additional foot of increase in width and depth, respectively to a maximum value of 2,000 psf.

This allowable bearing value is for dead plus live load and may be increased by one-third for combined dead, live, and transient loads such as wind or seismic forces.

All footings at minimum shall be incorporated with 2#5 bars at top and 2#5 bars at the bottom.

Isolated column footings should be connected to other foundation elements with reinforced grade beams.

Total settlement is estimated to be less than ½ inch for loading of 2 kips per square foot. Differential settlement will be 1/3 of an inch maximum for a horizontal distance of 30 feet. Additional foundation movements could occur if water from any source infiltrates the foundation soils. Therefore, proper drainage should be provided in the final design and during construction.

All footings, stem walls, and masonry walls should be steel-reinforced to reduce the potential for distress caused by differential foundation movements. The use of joints at openings or other discontinuities in masonry walls is recommended.

We recommend that geotechnical engineer, or his representative thereof, observe the footing excavations before reinforcing steel and concrete are placed. This observation is to assess whether the soils exposed are similar to those anticipated based on our exploration. Any soft, loose, or otherwise unacceptable soils should be undercut to suitable materials and backfilled with approved fill materials, or

controlled density fill (i.e., lean concrete). Soil backfill should be properly placed and compacted.

### **5.5.2 Mat Foundation (Alternate Foundation for ASTs)**

Alternatively, above ground storage tanks (ASTs) and proposed building may be supported on the mat foundation. The semi-rigid mat foundation should be at least 4-feet or more below the finish grade and may be designed for an allowable bearing capacity of 2,000 pounds per square foot. This basic allowable bearing value is for dead load plus live load and may be increased by one-third for short duration loading, such as wind or seismic forces. Modulus of subgrade reaction, k value may be taken as 150 pci for subgrade soil at 4 feet depth.

For lateral support, an average passive capacity of 300 pounds per square foot per foot to a maximum of 4,500 psf may be used for mat footing.

Minimum thickness of mat footing should be 24 inches. The bottom of excavation at 4 feet below the finish grade should be compacted to 90 % of the maximum density as per ASTM D-1557 Laboratory Standard, certified by the Geotechnical Engineer of record prior to pouring concrete. Other aspects of the design including reinforcement and the thickness of the mat should be determined by the project structural engineer. The mat may be buried and should be backfilled with on-site material compacted to 90 percent.

### **5.5.3 Drilled Shafts for Canopy Foundation**

Proposed truck diesel and gas canopies may be supported by moderately deep cast-in-place concrete caisson bearing into natural subgrade materials. Very hard drilling may be encountered because of the presence of dense to very dense alluvial soils. Heavy-duty equipment may be required.

The lateral forces will be the controlling element in this case depending on the height of the canopies, wind load, and/or seismic loads. Therefore, it is

recommended that the minimum pier diameter should be 36 inches and should be extended to a minimum depth of 10 feet into the native material.

The pier may be designed for an allowable end bearing of 3,000 pounds per square foot or for an average frictional resistance of 300 pounds per square foot. Either skin resistance or end bearing or combined will provide adequate foundation support for the proposed canopies. The uppermost length of the drilled shaft foundation equal to the diameter of the shaft should be ignored when evaluating allowable capacities.

For lateral support, a passive capacity of 350 pounds per square foot per foot to a maximum of 5,000 psf may be used.

It is recommended that concrete be placed immediately after drilling. The concrete for the pier should be placed through tremmie or other directional devices. Pier drilling operations should be subject to observation by this office to confirm the conditions encountered are consistent with the conclusions and recommendations of this report and/or to make any appropriate modifications, if necessary. Please note that caving is very likely to be encountered during caisson drilling. The contractor should be ready to provide either casing or other methods to prevent caving. The contractor should bring the heavy duty equipment because very difficult drilling are anticipated due to presence of boulders and rocks.

We anticipate that total settlement of the proposed structures, supported by drilled shaft foundations as recommended, should be less than ½-inch. Additional foundation could occur if water from any source infiltrates the foundation soils. Therefore, proper drainage should be provided in the final design and during construction.

In case, caisson drilling is not feasible for the canopies, mat foundation as explained on 5.5.2 for the support of the canopies may be anticipated.

### **5.6 Slab Design Recommendation**

Based on test results, the underlying surface soils are very low expansive, therefore it is recommended to maintain subgrade soil at near optimum moisture content during precise grading and / or by periodic watering following grading and incorporated slab reinforcement of No. 3 bars 16 inches center to center cross pattern. The slab thickness should be 5 inches minimum. However, the thickness and reinforcement requirements of the slab should be evaluated by the project structural engineer.

It is further recommended that moisture retarder (Stego 15 mil or approved equivalent) be provided over a minimum of 6 inches of ¾" aggregate rock rolled and compacted to 95% relative compaction, with the gradation (90-100% passing on sieve ¾" size, 1-10% passing on No. 4 sieve, and 0-3% passing on No. 100 sieve) over the compacted fill subgrade compacted to 90% relative compaction.

The modulus of subgrade reaction (k) is estimated to be 125 pounds per cubic inch (pci). All concrete placement and curing operations should follow the American Concrete Institute (ACI 318-19) manual recommendations. Improper curing techniques, high slump (high water-cement ratio), or both, could cause excessive shrinkage, cracking, or curling. Concrete slabs should be allowed to cure properly before placing vinyl or other moisture-sensitive floor coverings.

### **5.7 General Drainage and Moisture Protection**

It is recommended to provide positive surface drainage systems consisting of a combination of sloped concrete flatwork, sheet flow gradients, swales, surface area drains (where needed) around the structures. Ground surface should have a minimum gradient of 2 percent away from any building foundations and similar structures. Surface waters should not be allowed to collect or pond against building foundations and within the level areas of the site. Buildings should be provided with gutters and downspouts. Downspouts shall be connected to area drains by pipes.

Planters near the building should be avoided if possible and if used, they should be water proofed. Irrigation should be controlled and an area drain system should be provided to avoid water intrusion beneath the structure.

### **5.8 Volume Changes**

Based on our experience, there is typically a reduction in soil volume when the native soils are excavated and then compacted. Typical shrinkage percentages are usually in the range of 5 to 10 percent when the soils are compacted depending on the native in-place density.

### **5.9 Underground Utilities**

Utility backfill should be placed and compacted by mechanical means as recommended in this report. Testing of the backfill should be conducted to verify conformance to the required specifications. Ponding or water jetting of the backfill should not be conducted.

Exterior trenches adjacent to, and within areas extending below a 1:1 plane projected from the outside bottom edge of the footing, and all trenches beneath hardscape features should be compacted to at least 90% of the laboratory standard. Sand backfill, unless excavated from the trench, should not be used in these backfill areas. Compaction testing and observations, along with probing, should be accomplished to verify the desired results.

All trench excavations should conform to CAL\_OSHA and local safety codes.

### **5.10 Pavement Design**

#### **5.10.1 Pavement Section**

The pavement sections presented on the following page are based on the R-value data tested, the assumed TI values, and the guidelines presented in the latest revision to the California Department of Transportation "Highway Design Manual," latest edition.

Typical categories of paved areas with corresponding traffic indices are listed as follows:

- T.I. 5.0 Parking Stalls
- T.I. 6.0 Driveways
- T.I. 8.0 Trucks Route, Fire Lane, Truck Parking

The recommended pavement sections provided below are intended as a minimum guideline. If thinner or highly variable pavement sections are constructed, increased maintenance and repair could be expected.

If the ADT (average daily traffic) or ADTT (average daily truck traffic) increases beyond that intended, as reflected by the TI used for design, increased maintenance and repair could be required for the pavement sections.

Consideration should be given to the increased potential for distress from overuse of paved areas by heavy equipment and/or construction related traffic (e.g., concrete trucks, loaded supply trucks, etc.), particularly when the final section is not in place (i.e., topcoat). Best management construction practices should be followed at all times, especially during inclement weather.

Based on an "R" Value of 40, the following thickness of aggregate base was determined for vehicular and non-vehicular areas.

**Asphalt Concrete Pavement Section Design  
 Table**

Pavement Areas	Traffic Index, TI	Asphalt Concrete AC (inch)	Aggregate Base AB (inch)
Truck Route, Fire lane Truck Parking	8	4"	12"
Driveway/ <u>Under Canopy</u>	6	4"	8"
Parking Stall	5	4"	6"

### **Rigid Concrete Pavement Section Design Table**

Pavement Areas	Traffic Index, TI	Concrete (inch)	Aggregate Base AB (inch)
Heavy Truck Vehicular Areas	6	6"	10"
Walkways	-	4"	4"

For concrete section, #4 reinforcement 12-inch center to center each way cross pattern are recommended. However structural design by structural engineer will suffice.

#### **5.10.2 Pavement Grading Recommendations**

##### **5.10.3 General**

A representative of Geotechnical Solutions, Inc. (GSI) should be present for the preparation of subgrade, aggregate base, and asphalt concrete for flexible pavement and concrete for rigid pavement.

##### **5.10.4 Subgrade Preparation**

After removing the existing deleterious materials on the pavement areas and hauled offsite, all surficial deposits of loose soil material should be removed and excavate 12 inches below the base and recompact as recommended. The bottom is further scarified to a depth of at least 6 inches; moisture conditioned as necessary and compacted to 90 percent of the maximum laboratory density as determined by ASTM Test Method D-1557.

Deleterious material, grass/weeds, excessively wet or dry pockets, concentrated zones of oversized rock fragments, and any other unsuitable materials encountered during excavation or grading should be removed. The compacted fill material should then be brought to the elevation of the proposed subgrade for the pavement.

The subgrade should be proof-rolled in order to ensure a uniform, firm and unyielding surface. All grading and fill placement should be observed by the project soils engineer and/or his representative.

#### **5.10.5 Aggregate Base**

Compaction and rolling are required for the recommended base section. Minimum relative compaction required will be 95 percent of the laboratory maximum density as determined by ASTM Test Designation D-1557. Aggregate base should be in accordance with Crush Rock Class II aggregate base (minimum R-value=78) and sample should be brought for testing and approval prior to delivery to the site. Please note that crush miscellaneous base is not allowed.

#### **5.10.6 Asphalt Concrete Pavement**

Asphalt concrete pavement should be Performance Grade PG 64-10 1/2" maximum aggregate size and should be placed and compacted in two layers. Asphalt concrete shall be compacted to 95 percent of the Hveem Laboratory Standard.

#### **5.10.7 Concrete Pavement Areas:**

Concrete flatwork including sidewalks, patio-type slabs and concrete sub-slabs to be covered with decorative pavers should be at least 4 inches thick and provided with construction joints or expansion joints every 6 feet or less.

Concrete driveway slabs should be at least 6 inches thick over 6 inches of aggregate base or native base (for vehicular areas) and 4" of concrete over 4" of aggregate base or native base (Non-vehicular areas) over approved subgrade, providing #4 reinforcement 12" center to center each way cross pattern and provided with construction joints or expansion joints every 10 feet or less.

At the driveway areas, the top 12 inches of subgrade should be excavated; moisture conditioned and recompact with minimum 90% compaction immediately prior to placing the rock base and asphalt concrete. Rock-base material shall be class II aggregate base and to be compacted to 95 percent minimum.

Design section must be verified during site grading, based on R value test and appropriate modifications shall be made, if required.

### **5.11 Exterior Concrete Flatwork**

In order to reduce the potential for unsightly cracking, concrete sidewalks, deck and patio slabs and concrete sub-slabs to be covered with decorative pavers should be at least 4 inches thick and provided with construction joints or expansion joints every 6 feet or less. Concrete driveway slabs should be at least 5 inches thick and provided with construction joints or expansion joints every 10 feet or less.

### **5.12 Temporary Excavations**

Temporary excavations may not be required but in case it is needed then the Contractor should be made fully responsible for adequate support of the excavation at all times. Temporary support of excavation structures plans should be designed by a Professional Engineer licensed in the State of California and experienced in such work and these plans should be reviewed by us and approved by the City of Perris, if necessary.

Since the site has adequate room to lay back with temporary excavation slopes, shoring may not be needed, but this should be evaluated based on field conditions.

The stability of temporary excavations depends on many factors, including the slope angle, the shearing strength of the existing material, orientation and inclination of geologic structure, the height of the slope and the length of time the excavation remains

unsupported and exposed to equipment vibrations and rainfall. All excavations should be observed by the engineering geologist during excavation.

The possibility of temporary excavations failing may be minimized by: 1) keeping the time between cutting and filling operations to a minimum; 2) limiting excavation length exposed at any one time; and, 3) cutting no steeper than a 1:1 (horizontal to vertical [h:v]) inclination and no steeper for false cuts along the toe for key excavations, cleanouts, etc.

Following is the temporary excavation recommendation, subject to field verification by the geotechnical consultant.

Excavation up to 4 feet	Vertical
Excavation over 4' but not to exceed 10'	1:1 (H: V)
Excavation from 10' to 20'	1½:1 (H: V)

## **6.0 GENERAL COMMENTS AND LIMITATIONS**

### **6.1 Plan Review**

Final project plans should be reviewed by this office prior to construction, so that construction is in accordance with the conclusions and recommendations of this report. Based on our review, supplemental recommendations and/or further geotechnical studies may be warranted.

### **6.2 Geotechnical Observation and Testing**

All footing trenches for the proposed structure should be observed by a representative of this firm to verify that they were excavated into competent bearing soils per the recommendations of this report as well as to the minimum depths recommended above. These observations should be performed prior to the placement of forms or reinforcement. The excavations should be trimmed neat, level and square. All loose, sloughed or moisture softened soil should be removed prior to placing concrete.

### **6.3 Construction Verification Procedure**

Construction of foundations and placement of engineered fill should be done under the observation and documentation of a representative of the project Geotechnical Engineer. The following are noted as items requiring verification during construction.

#### **Pre-Grading Meeting:**

A pre-grading meeting should be held prior to the start of any grading activities. Attendees of this meeting should include the Owner, the Architect, the Geotechnical Engineer, and the Contractor, to review procedures and scheduling.

#### **Footing Observations:**

Construction of foundation and slab should be performed under inspection of the Geotechnical Engineer. Footings should be observed and certified by Geotechnical Engineer of Record after excavation and prior to placement of reinforcing bars.

#### **Earthwork Observations:**

Relative compaction of all fill materials placed on site should be tested in accordance with ASTM D6938. All new fill shall be brought to near optimum moisture, placed in layers not exceeding six inches in thickness, and compacted to at least 90 percent relative compaction for subgrade and 95 percent relative compaction for aggregate base. No jetting or water tamping of fill soils shall be permitted. All imported soil for engineered fill should be pre-approved by the Geotechnical Engineer and consist of clean, granular, non-expansive soil, free of vegetation and other debris with an Expansion Index of 20 or less.

At all times, the contractor should have a responsible field superintendent on the project in full charge of the work, with authority to make decisions. He should cooperate fully with the Geotechnical Engineer in carrying out the work.

All footing trenches for continuous and spread footings and subgrade for the slab areas should be observed by the project Geotechnical Engineer to verify that over-excavation and re-compaction operations of adequate depth, thickness, and compaction have been performed as specified. All footing excavations should be trimmed neat, level and square. All loose, sloughed or moisture softened soil should be removed and replaced with properly compacted soil.

#### **6.4 Recommendations for Construction**

**Surveying:** The contractor shall set necessary stakes to verify lines and grades as shown on the plan.

**Changed Conditions:** Any changed conditions not found during exploration should be brought to the attention of the soil engineer. As a result of the changed conditions, the soil engineer will provide further recommendations.

**Site Drainage:** The site should be sloped to direct water away from all structures and divert to a positive drainage device at the street. Roof gutters and down spouts shall be provided for roof drainage. Down spouts shall be connected to the positive area drains.

**Footing and Utilities Trenches.** All the Footing excavations as well as utility trenches should be observed by a representative of Geotechnical Solutions, prior to placement of steel.

#### **6.5 Limitations**

This report is issued with the understanding that it is the responsibility of the owner or his representative to see that the information and recommendations contained herein are called to the attention of the other members of the design team for the project and that the applicable information is incorporated into the plans, and that the necessary steps are taken to see that the contractors and the subcontractors carry out such recommendations. The findings of this report are valid as of the present date. However, changes in the

conditions of a property can occur with the passage of time, whether due to natural processes or to the works of man, on this or adjacent properties. In addition, changes in applicable or appropriate standards may occur, whether they result from legislation or the broadening of knowledge. Accordingly, the findings of this report may be invalidated, wholly or in part, by changes outside of our control. The validity of the recommendations of this report assumes that Geotechnical Solutions, Inc. will be retained to provide construction monitoring services. The scope of our services did not include any investigation for the presence or absence of hazardous or toxic materials.

## **6.6 Closure**

The Conclusions and recommendations contained herein are based on the findings and observations made at the test boring locations. It is not unusual to find conditions between and beyond such locations, which differ from the conditions encountered. If conditions are encountered during construction, which appear to differ from those previously disclosed, this office should be notified so as to consider the need for modifications. On-site construction observations and wherever appropriate, tests should be performed during the course of construction by a representative of this office to evaluate compliance with the design concepts, specifications, and recommendations contained herein.

This report has been compiled for the exclusive use of our client, it shall not be transferred to, or used by, other parties, or applied to any project on this site other than described herein without consent and /or thorough review by this office.

**Geotechnical Solutions, Inc.**

## References

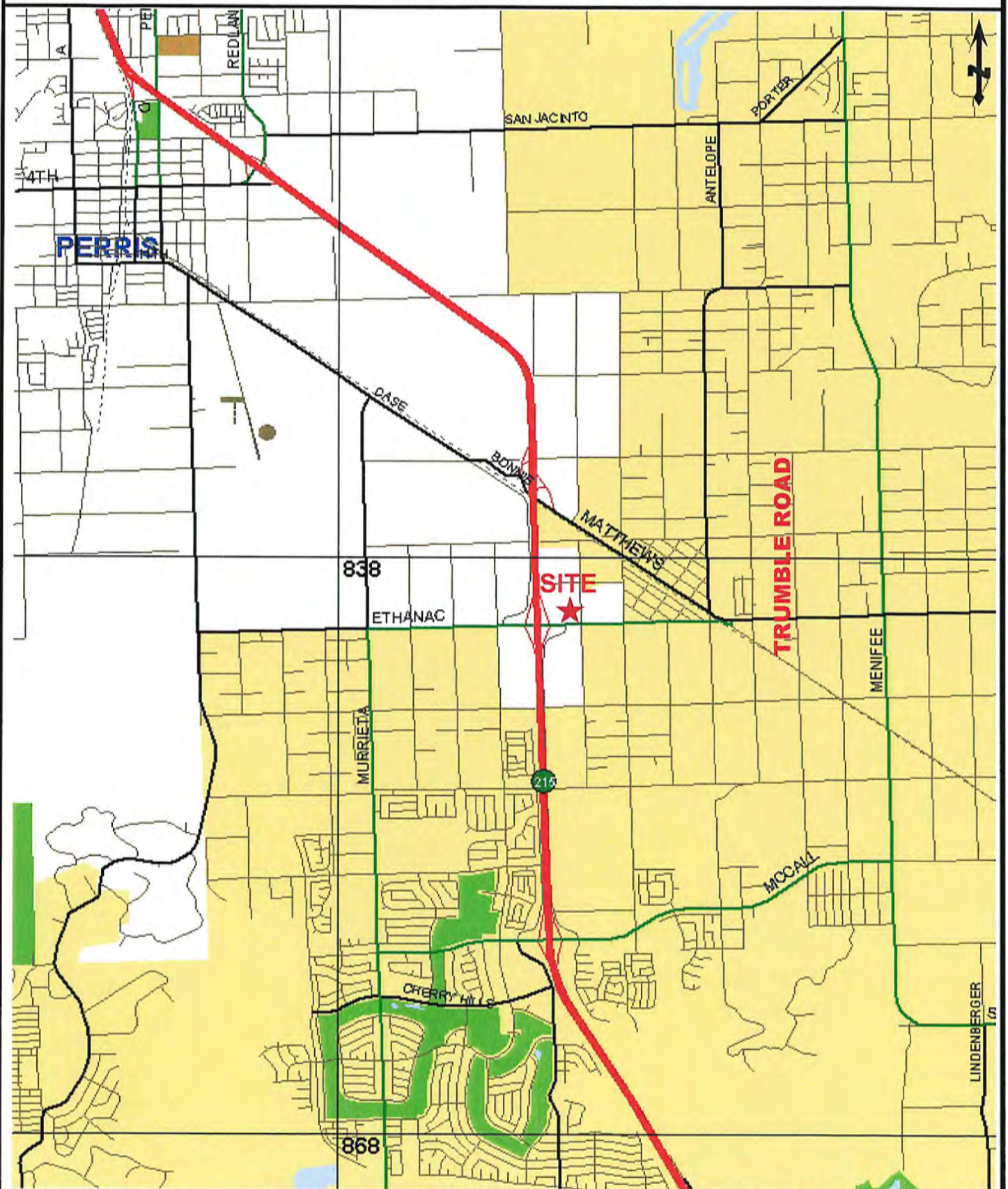
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- U.S.G.S., Earthquake Hazards Program, Unified Hazard Tool – Interactive Hazard Curve and Interactive Deaggregation web Site.  
<https://earthquake.usgs.gov/hazards/interactive/>

## **Appendix A**

### **Plates:**

- Vicinity Map
- Plot Plan and Boring Location Map
- Topographic Map
- Google Map
- Site Regional Geology Map
- Seismic Hazard Map – CGS
- Fault, Liquefaction and Flood Zones
- Groundwater Closest Well Data
- Groundwater Map – Well Data
- Log of Test Borings
- Direct Shear Tests
- Consolidation Tests

# VICINITY MAP



**Travel Plaza - Perris**

**Corner of Trumble Road and Ethanac, Perris, California**

**Geotechnical Solutions, Inc.**

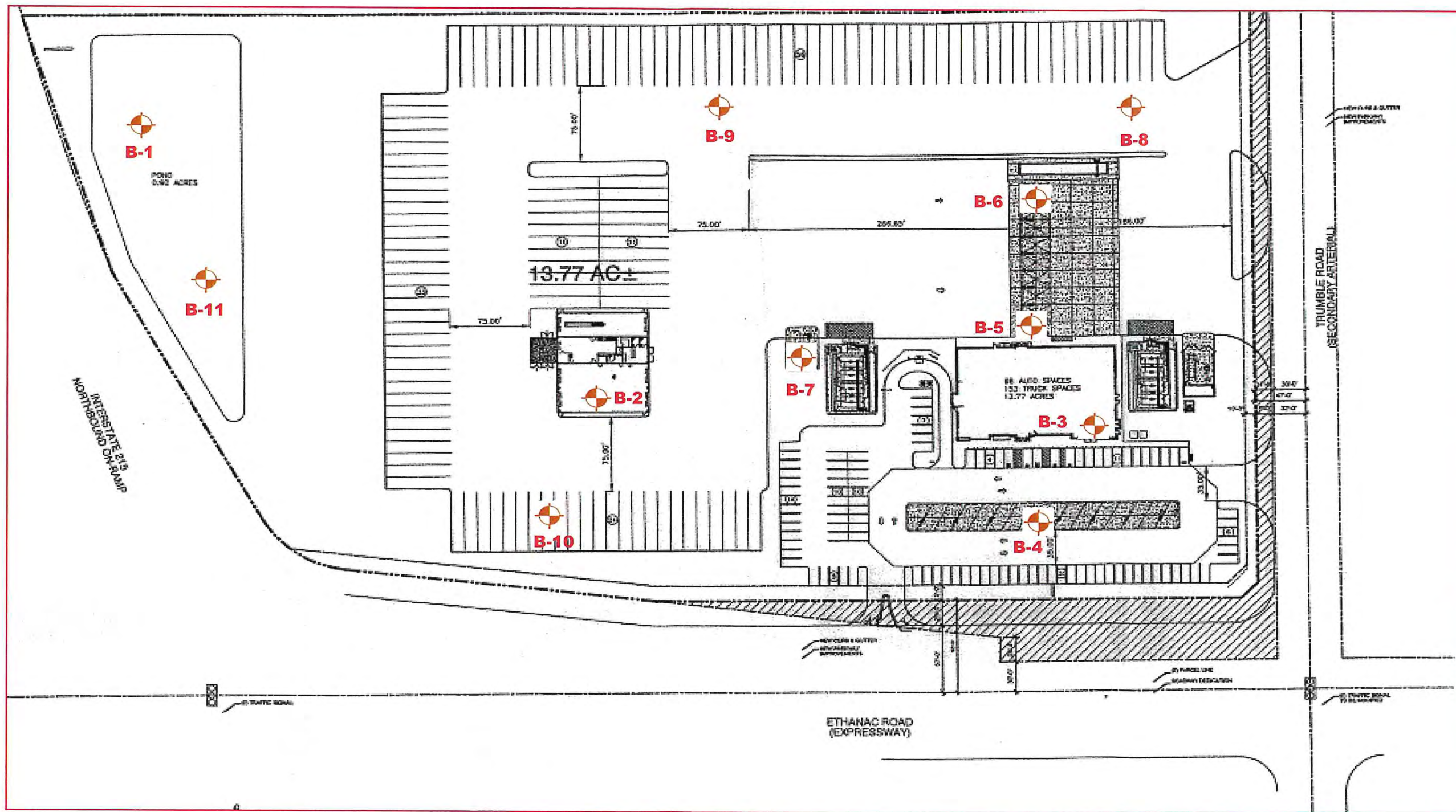
Project No.

G-5908-01

Plate:

A

# PLOT PLAN & BORING LOCATION MAP



 **HSA Borings (2021)**  
B-11

INTERSTATE 215  
NORTHBOUND OFF-RAMP

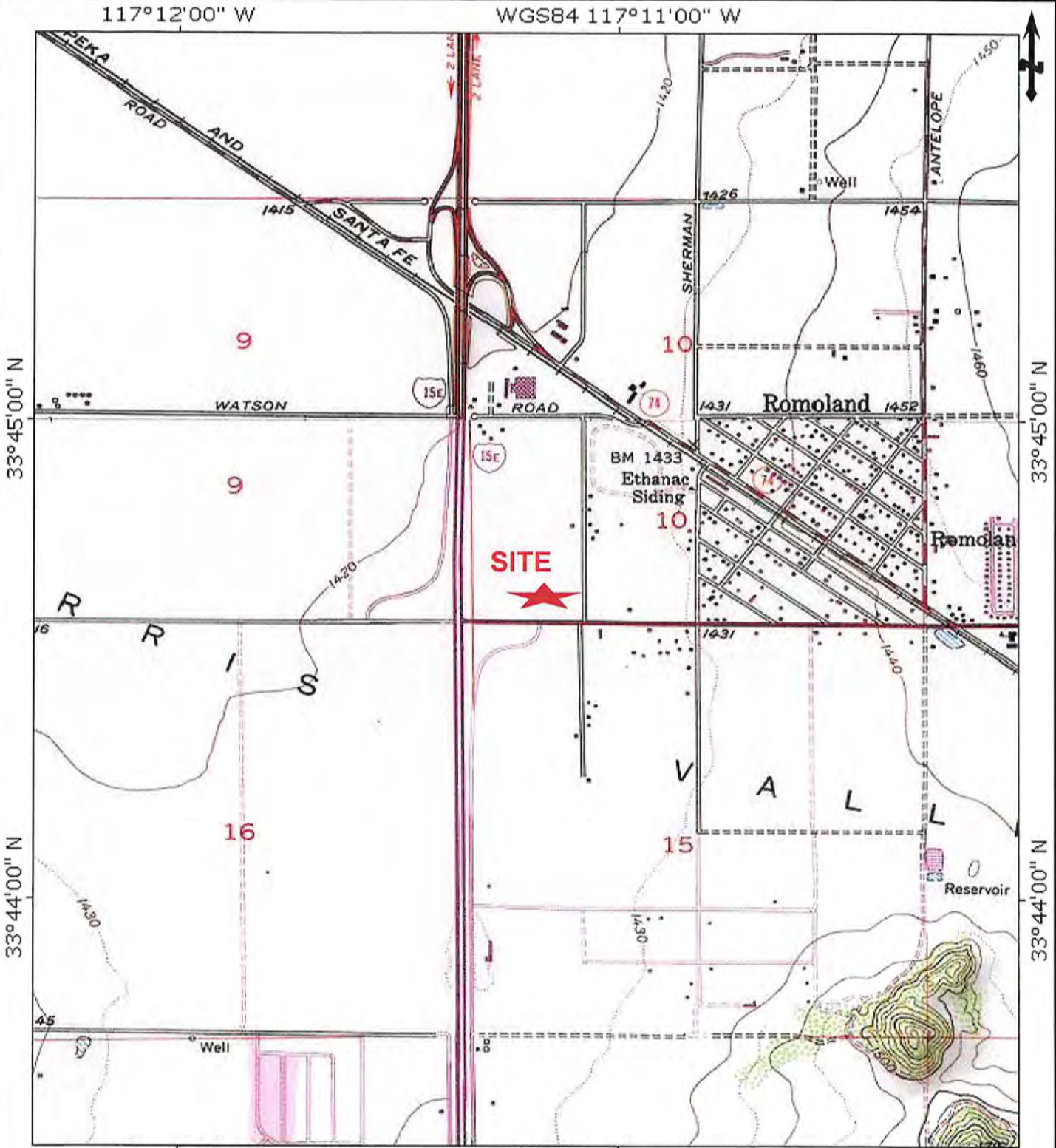
**APPROX. SCALE: 1" = 100'**

**Travel Plaza - Perris**  
Corner of Trumble Road and Ethanac, Perris, California

Project No.	G-5908-01
Plate:	B

**Geotechnical Solutions, Inc.**

# TOPOGRAPHIC MAP



TN \* MN  
13°
Scale 1" = 2,000'

0 5 1 MILE  
 0 1000 FEET 0 500 1000 METERS  
 Printed from TOPO! ©2000 National Geographic Holdings (www.topo.com)

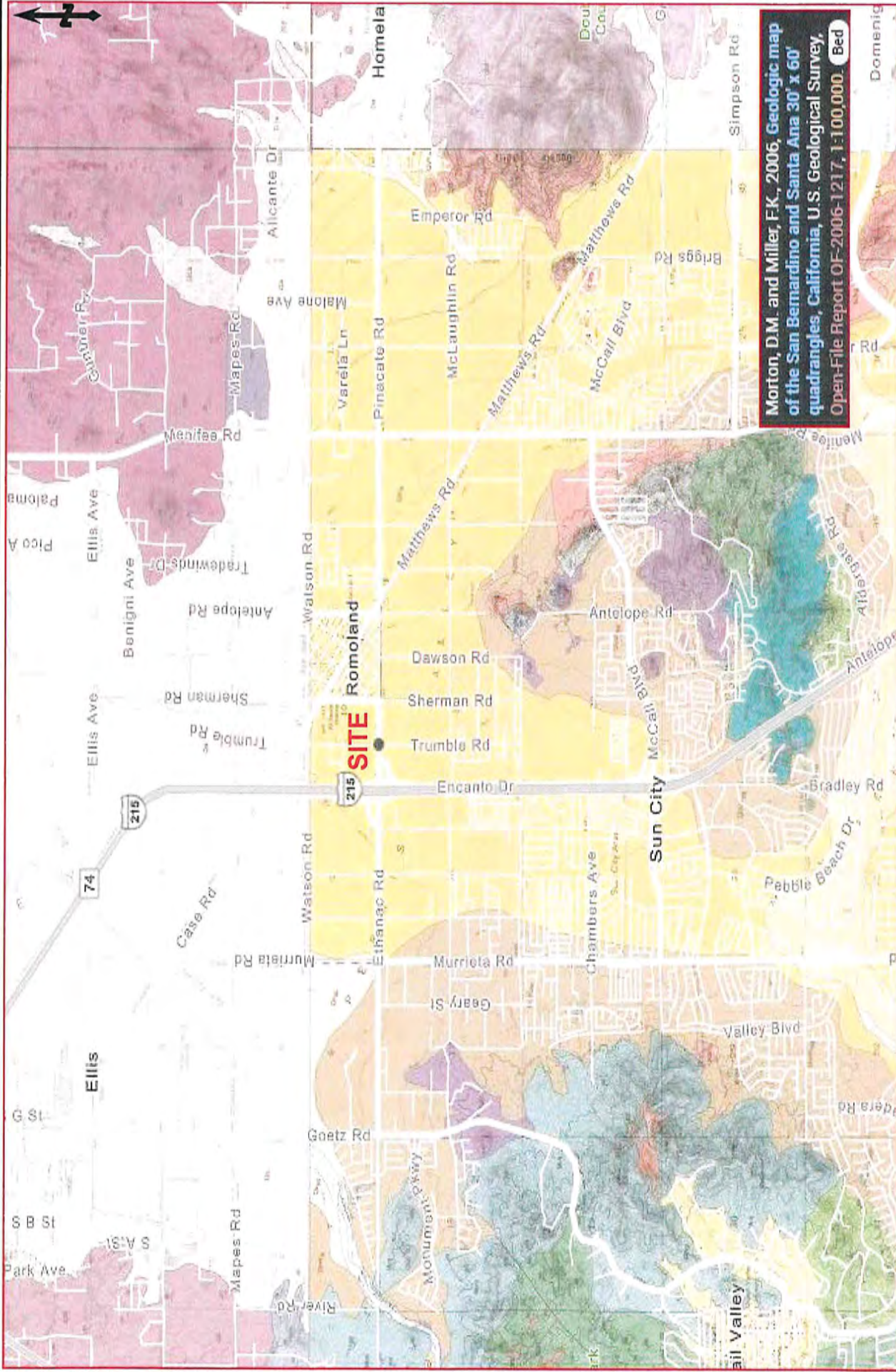
<b>Travel Plaza - Perris</b>	Project No.	G-5908-01
Corner of Trumble Road and Ethanac, Perris, California	Plate:	C
<b>Geotechnical Solutions, Inc.</b>		

GOOGLE MAP



Travel Plaza - Perris		Project No.	G-5908-01
Corner of Trumble Road and Ethanac, Perris, California		Plate:	D
Geotechnical Solutions, Inc.			

# Site Regional Geologic Map



Travel Plaza - Perris

Project No. G-5908-01

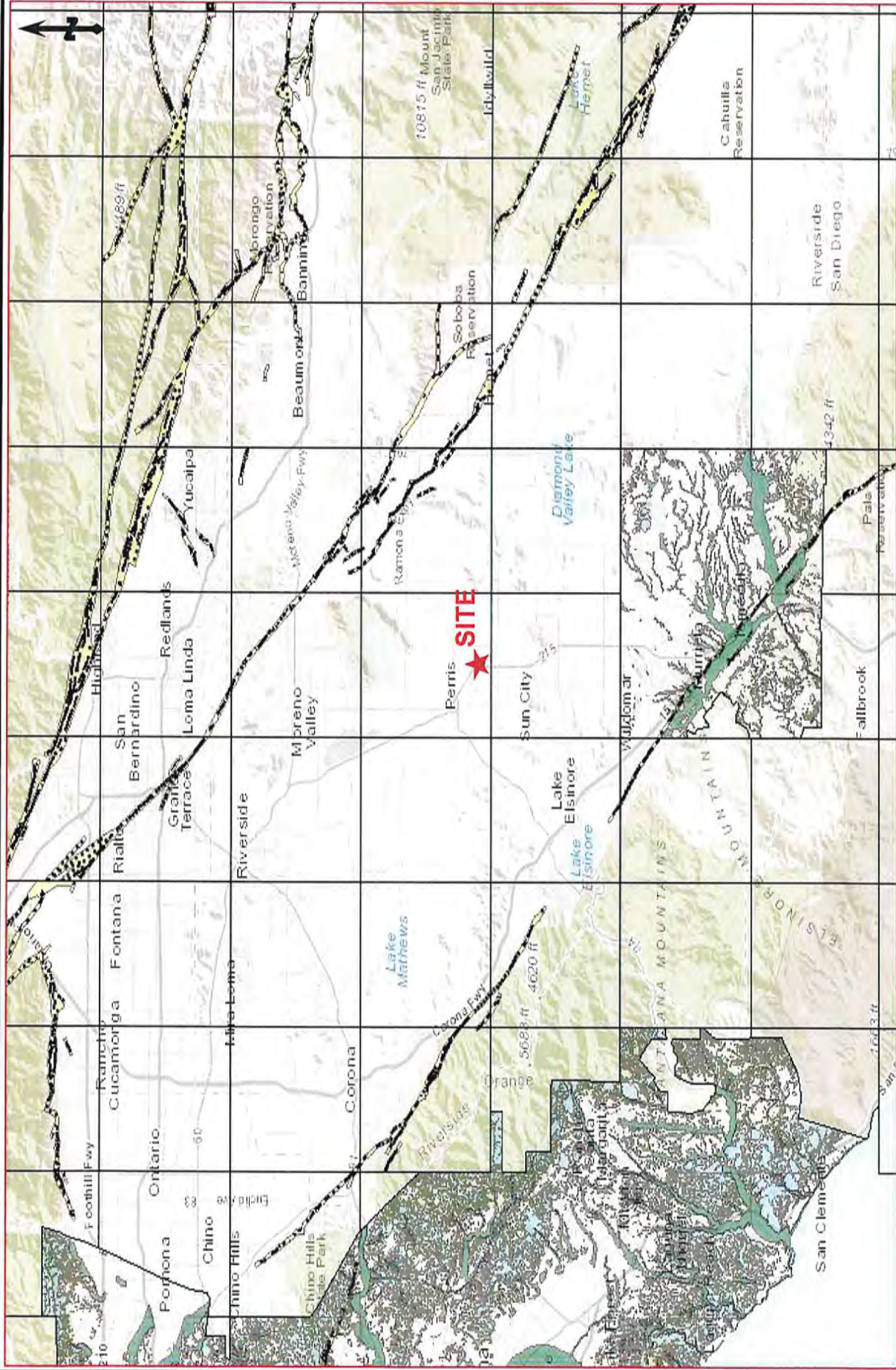
Corner of Trumble Road and Ethanac, Perris, California

Plate:

E

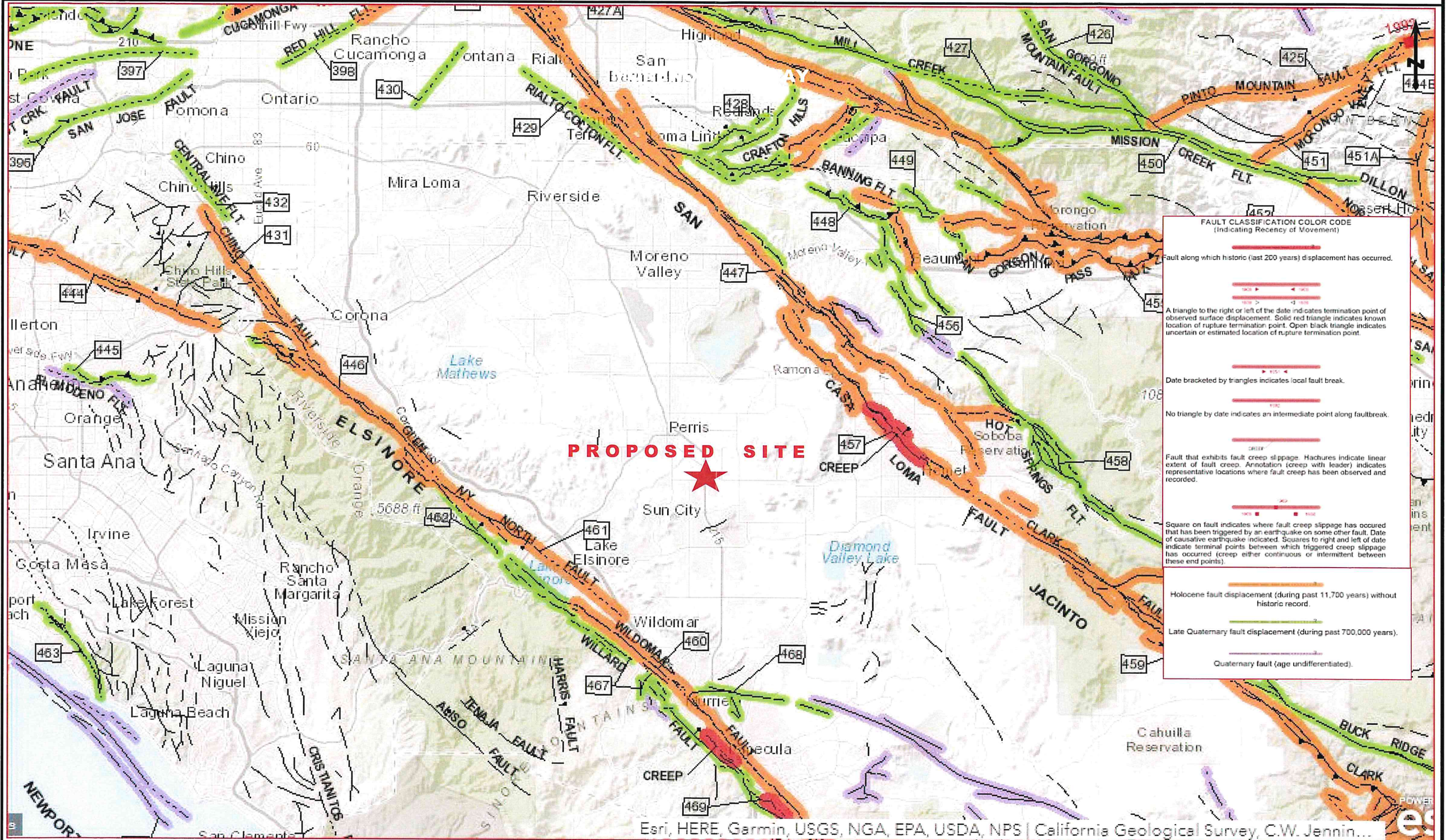
Geotechnical Solutions, Inc.

# Seismic Hazard Map



<b>Travel Plaza - Perris</b>		Project No.	G-5908-01
Corner of Trumble Road and Ethanac, Perris, California		Plate:	F
<b>Geotechnical Solutions, Inc.</b>			

# FAULT, LIQUEFACTION, FLOOD ZONES



**FAULT CLASSIFICATION COLOR CODE**  
(Indicating Recency of Movement)

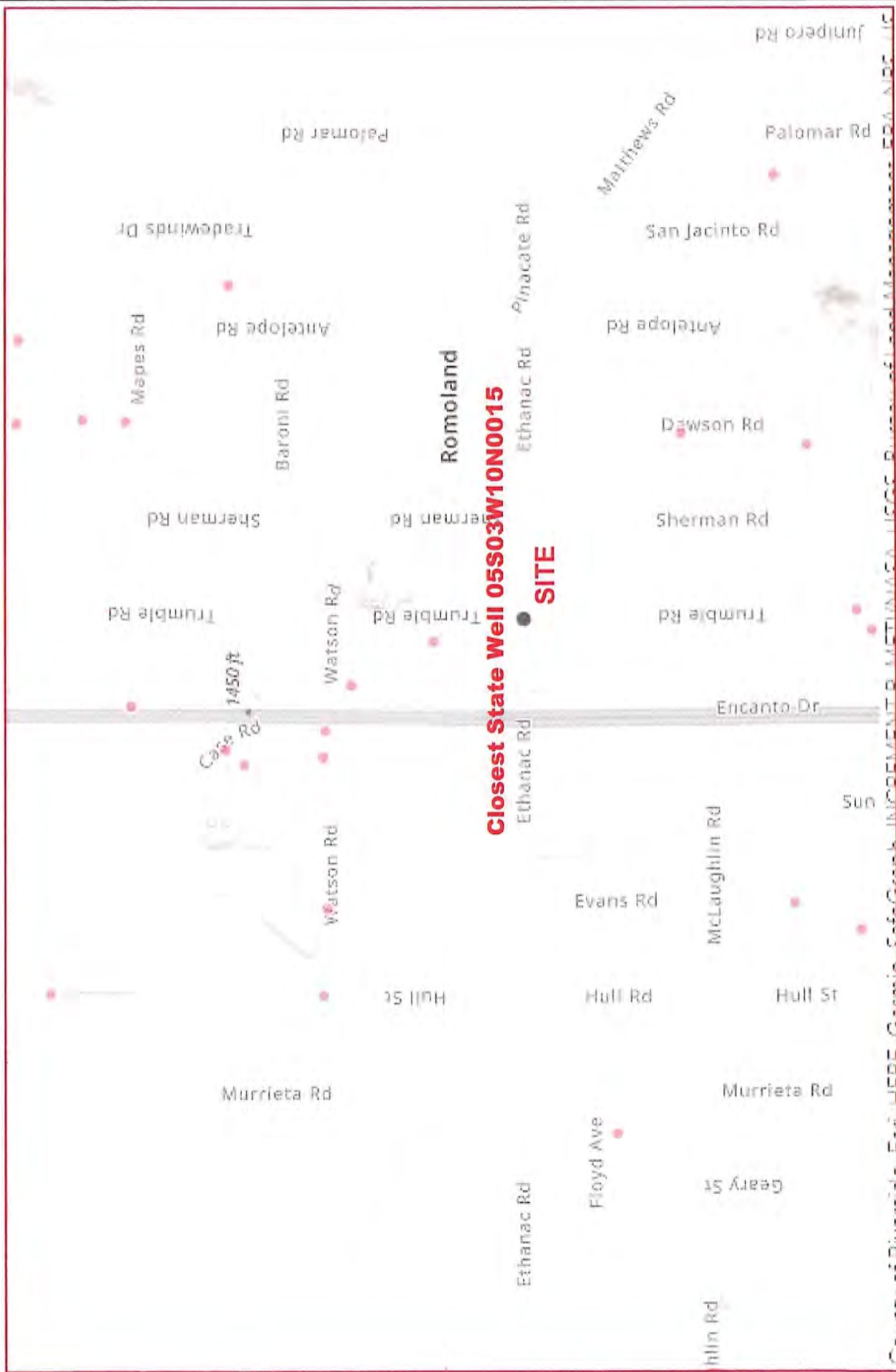
- Fault along which historic (last 200 years) displacement has occurred.
- A triangle to the right or left of the date indicates termination point of observed surface displacement. Solid red triangle indicates known location of rupture termination point. Open black triangle indicates uncertain or estimated location of rupture termination point.
- Date bracketed by triangles indicates local fault break.
- No triangle by date indicates an intermediate point along faultbreak.
- Fault that exhibits fault creep slippage. Hachures indicate linear extent of fault creep. Annotation (creep with leader) indicates representative locations where fault creep has been observed and recorded.
- Square on fault indicates where fault creep slippage has occurred that has been triggered by an earthquake on some other fault. Date of causative earthquake indicated. Squares to right and left of date indicate terminal points between which triggered creep slippage has occurred (creep either continuous or intermittent between these end points).
- Holocene fault displacement (during past 11,700 years) without historic record.
- Late Quaternary fault displacement (during past 700,000 years).
- Quaternary fault (age undifferentiated).

**Travel Plaza - Perris**  
Corner of Trumble Road and Ethanac, Perris, California

Project No.	G-5908-01
Plate:	G

**Geotechnical Solutions, Inc.**

# GROUNDWATER MAP - CLOSEST WELL DATA



	Project No. G-5908-01
	Plate: H-1

**Travel Plaza - Perris**  
 Corner of Trumble Road and Ethanac, Perris, California  
**Geotechnical Solutions, Inc.**

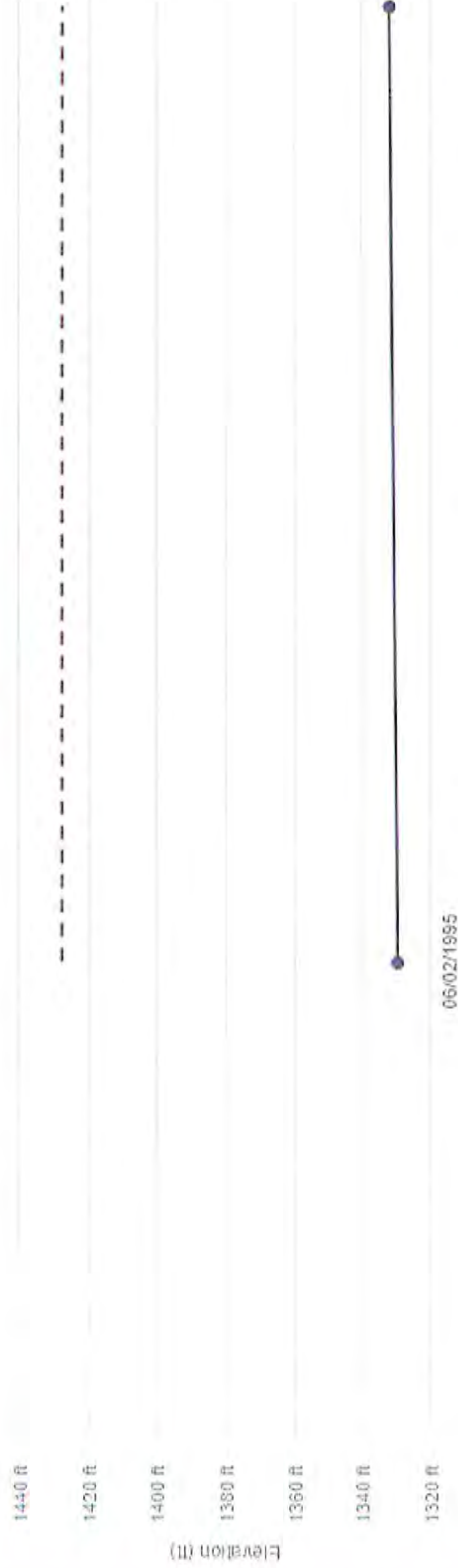
# GROUNDWATER MAP - WELL DATA

## Groundwater Level Report

Station 337464N1171859W001

Station Data    Groundwater Level Data

### Groundwater Levels for Well 337464N1171859W001 (Site Code)



Measurement Date (PST)	Reference Point Elevation	Ground Surface Elevation	Distance from RP to WS	Groundwater Elevation	Ground Surface to Water Surface	Measurement Issue	Collecting Agency
06/02/1995 00:00:00	1427.490	1427.490	97.98	1329.51	97.98		Department of Water Resou...
09/13/1995 00:00:00	1427.490	1427.490	95.63	1331.86	95.63		Department of Water Resou...

Travel Plaza - Perris		Project No.	G-5908-01
Corner of Trumble Road and Ethanac, Perris, California		Plate:	H-2

Geotechnical Solutions, Inc.

Project : <b>Travel Plaza - Perris</b>		LOG OF TEST HOLE		Borehole No. B-1						
Project Location : <b>Corner of Trumble Road and Ethanac, Perris, California</b>				Plate No. I-1						
Project Number : <b>G-5908-01</b>				Page 1 of 1						
Date(s) Drilled : <b>May 24, 2021</b>		Logged By : <b>BA/AB</b>		Checked By : <b>DXS</b>						
Drilling Method : <b>Hollow Stem Auger</b>		Drill Bit Size / Type : <b>8-inch</b>		Total Depth of Borehole, feet : <b>10</b>						
Drill Rig Type : <b>B-61</b>		Drilling Contractor : <b>Whitecomb Drilling</b>		Approx. Surface Elevation, feet : <b>1426 feet MSL</b>						
Groundwater Level and Date Measured : <b>No Water encountered at the time of drilling</b>		Sampling Method : <b>California (ring), bulk, SPT</b>		Hammer Data : <b>140 lbs dropping 30 inches</b>						
Borehole Backfill : <b>Drill cuttings</b>		Comments : <b>Refer to plot plan for location;</b>								
Elevation, feet	Depth, feet	SAMPLES				MATERIAL DESCRIPTION	Moisture Content, %	Dry Unit Weight, pcf	Percent Passing No. 200 Sieve (%)	OTHER TESTS AND REMARKS
		Type	Number	Penetration Resistance, Blows / 6"	Graphics					
1426	0		Bag #1			Covered with dry weeds				
	2		C-1	19-54/6"	> 100	@2': Sand (SP), silty, light brown, slightly moist, very dense	6	127		
1421	5		C-2	20-50/6"	> 100	@5': Sand (SP), poorly graded, very dense, gray, slightly moist, medium to coarse grained	7	122		
1416	10								11	HD: 89(SA) :7(SI) : 4(CL)
1411	15					End of Boring = 10 feet 2" Gravel on Bottom Drilled for Percolation test No groundwater encountered No Caving Backfilled w/Cuttings after percolation test				
1406	20									
1401	25									
1396	30									
1391	35									
1386	40									
1381	45									
<b>Geotechnical Solutions, Inc.</b>										

Project :	Travel Plaza - Perris	LOG OF TEST HOLE	Borehole No. B-2
Project Location :	Corner of Trumble Road and Ethanac, Perris, California		Plate No. I-2a
Project Number :	G-5908-01		Page 1 of 2
Date(s) Drilled :	May 24, 2021	Logged By :	BA/AB
Drilling Method :	Hollow Stem Auger	Drill Bit Size / Type :	8-inch
Drill Rig Type :	B-61	Drilling Contractor :	Whitecomb Drilling
Groundwater Level and Date Measured:	No Water encountered at the time of drilling	Sampling Method :	California (ring), bulk, SPT
Borehole Backfill :	Drill cuttings	Comments :	Refer to plot plan for location;

Elevation, feet	Depth, feet	SAMPLES				Blows / 12"	MATERIAL DESCRIPTION	Moisture Content, %	Dry Unit Weight, pcf	Percent Passing No. 200 Sieve (%)	OTHER TESTS AND REMARKS
		Type	Number	Penetration Resistance, Blows / 6"	Graphics						
1426	0		Bag #1				<b>Bareground</b>				
	2		C-1	50/6"		100	Older Alluvium: Clayey Sand (SC), light brown, medium dense			28	HD:72 SA:10 SI: 18 CL
1421	5		C-2	18-37-44		81	@2': Sand (SP), Silty, light brown, slightly moist, very dense	7	121		
			C-3	17-32-34		66	@5': Sand (SP), poorly graded, very dense, gray, moist, medium to coarse grained	10	126		
1416	10		S-1	14-28-33		61	@10': Sand (SP), variety of color, moist, very dense, medium to coarse grained	9	95		DS: P=Peak / Ult=Ultimate $\phi = 34^{\circ}$ , c = 250 psf (P) $\phi = 33^{\circ}$ , c = 200 psf (Ult)
1411	15		S-2	15-34-39		73	@15': Sand (SP), hard to drill, slightly moist, dark gray	5	-		
1406	20		S-3	19-31-37		68	@20': Same as above	5	-		
1401	25		S-4	14-19-27		46	@25': Same as above	5	-		
1396	30		S-5	11-18-26		44	@30': Same as above	4	-		
1391	35		S-6	20-27-39		66	@35': Sand(SP), poorly graded, dark gray, moist, dense, medium to coarse grained	11	-		
1386	40						@40': Sand(SP), poorly graded, dark gray, slightly moist, very dense, medium to coarse grained	3	-		
1381	45										

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Project : <b>Travel Plaza - Perris</b>	<b>LOG OF TEST HOLE</b>	Borehole No. <b>B-2</b>
Project Location : <b>Corner of Trumble Road and Ethanac, Perris, California</b>		Plate No. <b>1-2b</b>
Project Number : <b>G-5908-01</b>		Page 2 of <b>2</b>

Date(s) Drilled : <b>May 24, 2021</b>	Logged By : <b>BA/AB</b>	Checked By : <b>DXS</b>
Drilling Method : <b>Hollow Stem Auger</b>	Drill Bit Size / Type : <b>8-inch</b>	Total Depth of Borehole, feet : <b>51.5</b>
Drill Rig Type : <b>B-61</b>	Drilling Contractor : <b>Whitecomb Drilling</b>	Approx. Surface Elevation, feet : <b>1426 feet MSL</b>
Groundwater Level and Date Measured : <b>No Water encountered at the time of drilling</b>	Sampling Method : <b>California (ring), bulk, SPT</b>	Hammer Data : <b>140 lbs dropping 30 inches</b>
Borehole Backfill : <b>Drill cuttings</b>	Comments : <b>Refer to plot plan for location;</b>	

Elevation, feet	Depth, feet	SAMPLES				Blows / 12"	MATERIAL DESCRIPTION	Moisture Content, %	Dry Unit Weight, pcf	Percent Passing No. 200 Sieve (%)	OTHER TESTS AND REMARKS
		Type	Number	Penetration Resistance, Blows / 6"	Graphics						
1381	45	S-7	21-29-48	77	77	@45': Sand (SP), poorly graded, dark gray, slightly moist, very dense, coarse grained	4	-			
1376	50	S-8	24-30-61	91	91	@ 50': Same as above,	3	-			
1371	55					End of Boring = 51.5 feet No groundwater encountered No Caving Backfilled w/Cuttings					
1366	15										
1361	20										
1356	25										
1351	30										
1346	35										
1341	40										
1336	45										

Project : <b>Travel Plaza - Perris</b>		<b>LOG OF TEST HOLE</b>	Borehole No. <b>B-3</b>
Project Location : <b>Corner of Trumble Road and Ethanac, Perris, California</b>			Plate No. <b>I-3</b>
Project Number : <b>G-5908-01</b>			Page 1 of <b>1</b>
Date(s) Drilled : <b>May 24, 2021</b>	Logged By : <b>BA/AB</b>	Checked By : <b>DXS</b>	
Drilling Method : <b>Hollow Stem Auger</b>	Drill Bit Size / Type : <b>8-inch</b>	Total Depth of Borehole, feet : <b>16.5</b>	
Drill Rig Type : <b>B-61</b>	Drilling Contractor : <b>Whitecomb Drilling</b>	Approx. Surface Elevation, feet : <b>1426 feet MSL</b>	
Groundwater Level and Date Measured : <b>No Water encountered at the time of drilling</b>	Sampling Method : <b>California (ring), bulk, SPT</b>	Hammer Data : <b>140 lbs dropping 30 inches</b>	
Borehole Backfill : <b>Drill cuttings</b>	Comments : <b>Refer to plot plan for location;</b>		

Elevation, feet	Depth, feet	SAMPLES				Blows / 12"	MATERIAL DESCRIPTION	Moisture Content, %	Dry Unit Weight, pcf	Percent Passing No. 200 Sieve (%)	OTHER TESTS AND REMARKS
		Type	Number	Penetration Resistance, Blows / 6"	Graphics						
1426	0					<b>Bareground</b>					
	2		Bag #1			Older Alluvium: Silty Sand/ Sand (SM/SP), dark brown, dry					
			C-1	50/6"	100	@2': Sand (SP), silty, dark brown, slightly moist, very dense fine to coarse grained	6	127			
1421	5		C-2	20-50/6"	100	@5': Sand (SP), poorly graded, very dense, dark brown, moist, medium to coarse grained	7	122			
			C-3	8-10-33	43	@10': Same as above, slightly moist	3	-			
1416	10										
			S-1	10-20-40	60	@10': Same as above	3	-			
1411	15										
1406	20					End of Boring = 16.5 feet No groundwater encountered No Caving Backfilled w/Cuttings					
1401	25										
1396	30										
1391	35										
1386	40										
1381	45										

Project : <b>Travel Plaza - Perris</b>		<b>LOG OF TEST HOLE</b>	Borehole No. <b>B-4</b>
Project Location : <b>Corner of Trumble Road and Ethanac, Perris, California</b>			Plate No. <b>I-4</b>
Project Number : <b>G-5908-01</b>			Page 1 of <b>1</b>
Date(s) Drilled : <b>May 24, 2021</b>	Logged By : <b>BA/AB</b>	Checked By : <b>DXS</b>	
Drilling Method : <b>Hollow Stem Auger</b>	Drill Bit Size / Type : <b>8-inch</b>	Total Depth of Borehole, feet : <b>21.5</b>	
Drill Rig Type : <b>B-61</b>	Drilling Contractor : <b>Whitecomb Drilling</b>	Approx. Surface Elevation, feet : <b>1426 feet MSL</b>	
Groundwater Level and Date Measured : <b>No Water encountered at the time of drilling</b>	Sampling Method : <b>California (ring), bulk, SPT</b>	Hammer Data : <b>140 lbs dropping 30 inches</b>	
Borehole Backfill : <b>Drill cuttings</b>	Comments : <b>Refer to plot plan for location;</b>		

Elevation, feet	Depth, feet	SAMPLES				Blows / 12"	MATERIAL DESCRIPTION	Moisture Content, %	Dry Unit Weight, pcf	Percent Passing No. 200 Sieve (%)	OTHER TESTS AND REMARKS
		Type	Number	Penetration Resistance, Blows / 6"	Graphics						
1426	0		Bag #1			<b>Bareground</b>					
	2		C-1	26-50/6"		Older Alluvium: Silty Sand (SM), light brown, dry					
	5		C-2	9-13-16	100	@2': Sand (SP), Silty, light brown, slightly moist, very dense	8	117			
1421	5		C-2	9-13-16	29	@5': Silty Sand (SM), medium dense, brown, moist, medium to coarse grained	6	113			
	10		C-3	10-12-18	30	@10': Silty Sand/Sand (SM/SP), dark brown, moist, medium dense, medium to coarse grained	3	103			
1416	10		C-3	10-12-18	30	@10': Silty Sand/Sand (SM/SP), dark brown, moist, medium dense, medium to coarse grained	3	103			
1411	15		S-1	16-26-39	65	@15': Sand (SP), dark brown, slightly moist, very dense, coarse grained	3	-			
1406	20		S-2	20-27-43	70	@20': Same as above	3	-			
1401	25										
1396	30										
1391	35										
1386	40										
1381	45										

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Project :	Travel Plaza - Perris	LOG OF TEST HOLE	Borehole No.	B-5	
Project Location :	Corner of Trumble Road and Ethanac, Perris, California		Plate No.	I-5	
Project Number :	G-5908-01		Page 1 of	1	
Date(s) Drilled :	May 24, 2021	Logged By :	BA/AB	Checked By :	DXS
Drilling Method :	Hollow Stem Auger	Drill Bit Size / Type :	8-inch	Total Depth of Borehole, feet :	21.5
Drill Rig Type :	B-61	Drilling Contractor :	Whilecomb Drilling	Approx. Surface Elevation, feet :	1426 feet MSL
Groundwater Level and Date Measured:	No Water encountered at the time of drilling	Sampling Method :	California (ring), bulk, SPT	Hammer Data :	140 lbs dropping 30 inches
Borehole Backfill :	Drill cuttings	Comments :	Refer to plot plan for location;		

Elevation, feet	Depth, feet	SAMPLES				Blows / 12"	MATERIAL DESCRIPTION	Moisture Content, %	Dry Unit Weight, pcf	Percent Passing No. 200 Sieve (%)	OTHER TESTS AND REMARKS
		Type	Number	Penetration Resistance, Blows / 6"	Graphics						
1426	0		Bag #1			covered with dry grass					
	2		C-1	51-50/1"		Older Alluvium: Silty Sand (SM), light brown, dry					
	5		C-2	26-50/5"	>100	@2': Sand (SP), trace Silt, light brown, slightly moist, very dense, medium to coarse grained	10	111			
1421	5		C-2	26-50/5"	>100	@5': Same as Above	11	103			
	10		C-3	37-50/4"	>100	@10': Same as above	8	119			
1411	15		S-1	29-36-44	80	@15': Sand (SP), dark brown, slightly moist, very dense, coarse grained	5	-			
1406	20		S-2	30-35-47	82	@20': Same as above	5	-			
1401	25										
1396	30										
1391	35										
1386	40										
1381	45										

Geotechnical Solutions, Inc.

Project :	Travel Plaza - Perris	<b>LOG OF TEST HOLE</b>	Borehole No.	B-6	
Project Location :	Corner of Trumble Road and Ethanac, Perris, California		Plate No.	I-6	
Project Number :	G-5908-01		Page 1 of	1	
Date(s) Drilled :	May 24, 2021	Logged By :	BA/AB	Checked By :	DXS
Drilling Method :	Hollow Stem Auger	Drill Bit Size / Type :	8-inch	Total Depth of Borehole, feet :	11.5
Drill Rig Type :	B-61	Drilling Contractor :	Whitecomb Drilling	Approx. Surface Elevation, feet :	1426 feet MSL
Groundwater Level and Date Measured:	No Water encountered at the time of drilling	Sampling Method :	California (ring), bulk, SPT	Hammer Data :	140 lbs dropping 30 inches
Borehole Backfill :	Drill cuttings	Comments :	Refer to plot plan for location;		

Elevation, feet	Depth, feet	SAMPLES				Blows / 12"	MATERIAL DESCRIPTION	Moisture Content, %	Dry Unit Weight, pcf	Percent Passing No. 200 Sieve (%)	OTHER TESTS AND REMARKS
		Type	Number	Penetration Resistance, Blows / 6"	Graphics						
1426	0		Bag #1				Dry grass				
	2		C-1	26-50/4"		> 100	Older Alluvium: Silty Sand / Sand (SM/SP), light brown, medium dense @2': Sand (SP), silty, light brown, slightly moist, very dense	6	123		
1421	5		C-2	28-50/5"		> 100	@5': Sand (SP), very dense, gray, moist, medium to coarse grained	8	129		DS: P=Peak / Ult=Ultimate $\phi = 33^\circ$ , $c = 250$ psf (P) $\phi = 32^\circ$ , $c = 200$ psf (Ult)
1416	10		S-1	15-25-30		55	@10': Sand/Silty Sand (SP/SM), light gray, slightly moist, very dense, coarse grained	3	-		
1411	15						End of Boring = 11.5 feet No groundwater encountered No Caving but possible Backfilled w/Cuttings				
1406	20										
1401	25										
1396	30										
1391	35										
1386	40										
1381	45										

Geotechnical Solutions, Inc.

Project :	Travel Plaza - Perris	<b>LOG OF TEST HOLE</b>	Borehole No. B-7
Project Location :	Corner of Trumble Road and Ethanac, Perris, California		Plate No. I-7
Project Number :	G-5908-01		Page 1 of 1
Date(s) Drilled :	May 24, 2021	Logged By :	BA/AB
Drilling Method :	Hollow Stem Auger	Drill Bit Size / Type :	8-inch
Drill Rig Type :	B-61	Drilling Contractor :	Whitecomb Drilling
Groundwater Level and Date Measured:	No Water encountered at the time of drilling	Sampling Method :	California (ring), bulk, SPT
Borehole Backfill :	Drill cuttings	Comments :	Refer to plot plan for location.
		Checked By :	DXS
		Total Depth of Borehole, feet :	21.5
		Approx. Surface Elevation, feet :	1426 feet MSL
		Hammer Data :	140 lbs dropping 30 inches

Elevation, feet	Depth, feet	SAMPLES				Blows / 12"	MATERIAL DESCRIPTION	Moisture Content, %	Dry Unit Weight, pcf	Percent Passing No. 200 Sieve (%)	OTHER TESTS AND REMARKS
		Type	Number	Penetration Resistance, Blows / 6"	Graphics						
1426	0		Bag #1			covered with dry grass					
	2		C-1	50/4"		Older Alluvium: Clayey Sand (SC), light brown, dry			39		HD: 61 SA:17 SI: 22 CL
	5		C-2	24-50/5"		>100 @2': Clayey Sand (SC), trace Silt, light brown, very moist, very dense, medium to coarse grained	18	95			
1421	5		C-2	24-50/5"		>100 @5': Sand (SP), dark brown, very dense, moist, medium to coarse grained	6	127			
	10		C-3	18-24-32		@10': Sand with Silt (SP/SM), dense, brown, very moist.	14	114			
1416	10		C-3	18-24-32		@10': Sand with Silt (SP/SM), dense, brown, very moist.	14	114			
	15		S-1	15-18-18		@15': Sand (SP), dark brown, slightly moist, dense, coarse grained	5	-			
1411	15		S-1	15-18-18		@15': Sand (SP), dark brown, slightly moist, dense, coarse grained	5	-			
	20		S-2	20-20-23		@20': Same as above	4	-			
1406	20		S-2	20-20-23		@20': Same as above	4	-			
	25										
1401	25										
	30										
1396	30										
	35										
1391	35										
	40										
1386	40										
	45										
1381	45										

Project : <b>Travel Plaza - Perris</b>		Project Location : <b>Corner of Trumble Road and Ethanac, Perris, California</b>		<b>LOG OF TEST HOLE</b>		Borehole No. <b>B-8</b>					
Project Number : <b>G-5908-01</b>						Plate No. <b>I-8</b>					
						Page 1 of <b>1</b>					
Date(s) Drilled : <b>May 24, 2021</b>		Logged By : <b>BA/AB</b>		Checked By : <b>DXS</b>							
Drilling Method : <b>Hollow Stem Auger</b>		Drill Bit Size / Type : <b>8-inch</b>		Total Depth of Borehole, feet : <b>11.5</b>							
Drill Rig Type : <b>B-61</b>		Drilling Contractor : <b>Whitecomb Drilling</b>		Approx. Surface Elevation, feet : <b>1426 feet MSL</b>							
Groundwater Level and Date Measured : <b>No Water encountered at the time of drilling</b>		Sampling Method : <b>California (ring), bulk, SPT</b>		Hammer Data : <b>140 lbs dropping 30 inches</b>							
Borehole Backfill : <b>Drill cuttings</b>		Comments : <b>Refer to plot plan for location;</b>									
Elevation, feet	Depth, feet	SAMPLES				Blows / 12"	MATERIAL DESCRIPTION	Moisture Content, %	Dry Unit Weight, pcf	Percent Passing No. 200 Sieve (%)	OTHER TESTS AND REMARKS
		Type	Number	Penetration Resistance, Blows / 6"	Graphics						
1426	0		Bag #1				Covered with dry weeds				
	2		C-1	22-50/6"	> 100		@2': Sand (SP), silty, light brown, slightly moist, very dense	5	120	43	HD: 57 SA:21 SI: 22 CL
1421	5		C-2	25-50/6"	> 100		@5': Sand (SP), poorly graded, very dense, gray, slightly moist, medium to coarse grained	4	118		
1416	10		S-1	15-21-26	47		@10': Sand/Silty Sand (SP/SM), light gray, slightly moist, dense	3	-		
1411	15						End of Boring = 11.5 feet No groundwater encountered No Caving but possible Backfilled w/Cuttings				
1406	20										
1401	25										
1396	30										
1391	35										
1386	40										
1381	45										
<b>Geotechnical Solutions, Inc.</b>											

Project :	Travel Plaza - Perris	LOG OF TEST HOLE	Borehole No.	B-9	
Project Location :	Corner of Trumble Road and Ethanac, Perris, California		Plate No.	I-9	
Project Number :	G-5908-01		Page 1 of	1	
Date(s) Drilled :	May 24, 2021	Logged By :	BA/AB	Checked By :	DXS
Drilling Method :	Hollow Stem Auger	Drill Bit Size / Type :	8-inch	Total Depth of Borehole, feet :	11.5
Drill Rig Type :	B-61	Drilling Contractor :	Whitecomb Drilling	Approx. Surface Elevation, feet :	1426 feet MSL
Groundwater Level and Date Measured:	No Water encountered at the time of drilling	Sampling Method :	California (ring), bulk, SPT	Hammer Data :	140 lbs dropping 30 inches
Borehole Backfill :	Drill cuttings	Comments :	Refer to plot plan for location;		

Elevation, feet	Depth, feet	SAMPLES				Blows / 12"	MATERIAL DESCRIPTION	Moisture Content, %	Dry Unit Weight, pcf	Percent Passing No. 200 Sieve (%)	OTHER TESTS AND REMARKS
		Type	Number	Penetration Resistance, Blows / 6"	Graphics						
1425	0		Bag #1				Covered with dry weeds				
	2		C-1	24-50/6"	> 100	@2': Sand (SP), silty, light brown, slightly moist, very dense	4	118	32	HD: 68 SA :12 SI : 20 CL	
1421	5		C-2	27-50/6"	> 100	@5': Sand (SP), poorly graded, very dense, gray, slightly moist, medium to coarse grained	3	116			
1416	10		S-1	15-18-21	39	@10': Sand/Silty Sand (SP/SM), light gray, slightly moist, dense	3	-			
1411	15					End of Boring = 11.5 feet No groundwater encountered No Caving but possible Backfilled w/Cuttings					
1406	20										
1401	25										
1396	30										
1391	35										
1386	40										
1381	45										

Geotechnical Solutions, Inc.

Project : Travel Plaza - Perris		LOG OF TEST HOLE		Borehole No. B-10							
Project Location : Corner of Trumble Road and Ethanac, Perris, California				Plate No. I-10							
Project Number : G-5908-01				Page 1 of 1							
Date(s) Drilled : May 24, 2021		Logged By : BA/AB		Checked By : DXS							
Drilling Method : Hollow Stem Auger		Drill Bit Size / Type : 8-inch		Total Depth of Borehole, feet : 11.5							
Drill Rig Type : B-61		Drilling Contractor : Whitecomb Drilling		Approx. Surface Elevation, feet : 1426 feet MSL							
Groundwater Level and Date Measured : No Water encountered at the time of drilling		Sampling Method : California (ring), bulk, SPT		Hammer Data : 140 lbs dropping 30 inches							
Borehole Backfill : Drill cuttings		Comments : Refer to plot plan for location;									
Elevation, feet	Depth, feet	SAMPLES				Blows / 12"	MATERIAL DESCRIPTION	Moisture Content, %	Dry Unit Weight, pcf	Percent Passing No. 200 Sieve (%)	OTHER TESTS AND REMARKS
		Type	Number	Penetration Resistance, Blows / 6"	Graphics						
1426	0		Bag #1				Covered with dry weeds				
	2		C-1	30-50/6"		100	@2': Sand (SP), silty, light brown, slightly moist, very dense	7	121		
1421	5		C-2	29-50/6"		100	@5': Sand (SP), poorly graded, very dense, gray, slightly moist, medium to coarse grained	6	120		
1416	10		S-1	165-19-23		42	@10': Sand/Silty Sand (SP/SM), light gray, slightly moist, dense	4	-		
1411	15	End of Boring = 11.5 feet No groundwater encountered No Caving but possible Backfilled w/Cuttings									
1406	20										
1401	25										
1396	30										
1391	35										
1386	40										
1381	45										

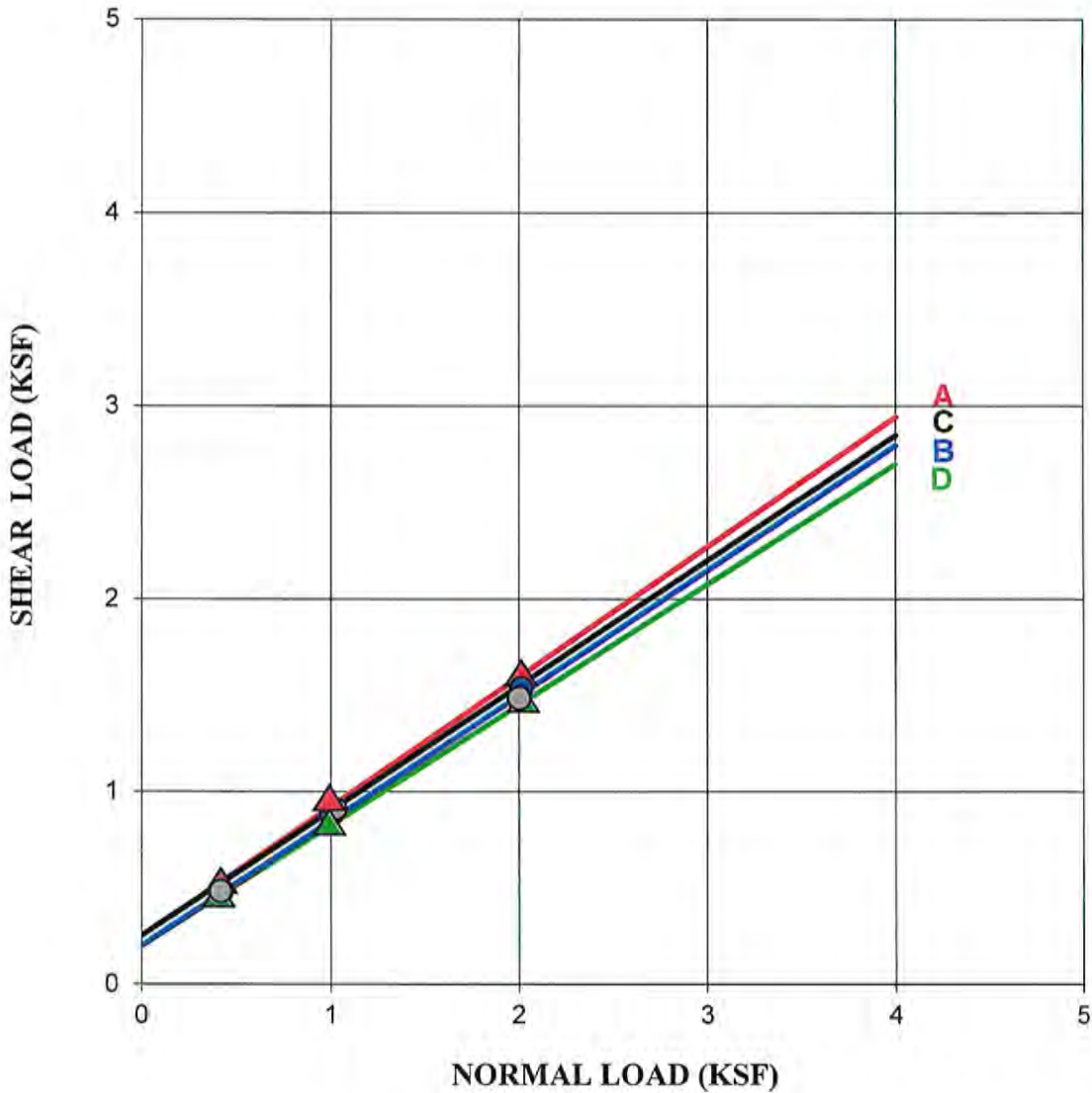
Geotechnical Solutions, Inc.

Project : <b>Travel Plaza - Perris</b>		<b>LOG OF TEST HOLE</b>	Borehole No. <b>B-11</b>
Project Location : <b>Corner of Trumble Road and Ethanac, Perris, California</b>			Plate No. <b>I-11</b>
Project Number : <b>G-5908-01</b>			Page 1 of <b>1</b>
Date(s) Drilled : <b>May 24, 2021</b>	Logged By : <b>BA/AB</b>	Checked By : <b>CXS</b>	
Drilling Method : <b>Hollow Stem Auger</b>	Drill Bit Size / Type : <b>8-inch</b>	Total Depth of Borehole, feet : <b>10</b>	
Drill Rig Type : <b>B-61</b>	Drilling Contractor : <b>Whitecomb Drilling</b>	Approx. Surface Elevation, feet : <b>1426 feet MSL</b>	
Groundwater Level and Date Measured : <b>No Water encountered at the time of drilling</b>	Sampling Method : <b>California (ring), bulk, SPT</b>	Hammer Data : <b>140 lbs dropping 30 inches</b>	
Borehole Backfill : <b>Drill cuttings</b>	Comments : <b>Refer to plot plan for location;</b>		

Elevation, feet	Depth, feet	SAMPLES				Blows / 12"	MATERIAL DESCRIPTION	Moisture Content, %	Dry Unit Weight, pcf	Percent Passing No. 200 Sieve (%)	OTHER TESTS AND REMARKS
		Type	Number	Penetration Resistance, Blows / 6"	Graphics						
1426	0					<b>Covered with dry grass</b>					
	2					Older Alluvium: Clayey Sand (SC), light brown, dry					
			C-1	32-50/6"		@2': Sand (SP), silty, light brown, slightly moist, very dense	6	122			
1421	5		C-2	31-50/6"		@5': Sand (SP), poorly graded, very dense, gray, slightly moist, medium to coarse grained	5	121			
1416	10					@10': Same as above			10	HD: 90(SA) : 8(SI) : 2(CL)	
1411	15					End of Boring = 10 feet 2" of Gravel on Bottom Drilled to 10 feet for Percolation Test Backfilled w/ cuttings after the Test					
1406	20										
1401	25										
1396	30										
1391	35										
1386	40										
1381	45										

Geotechnical Solutions, Inc.

# DIRECT SHEAR



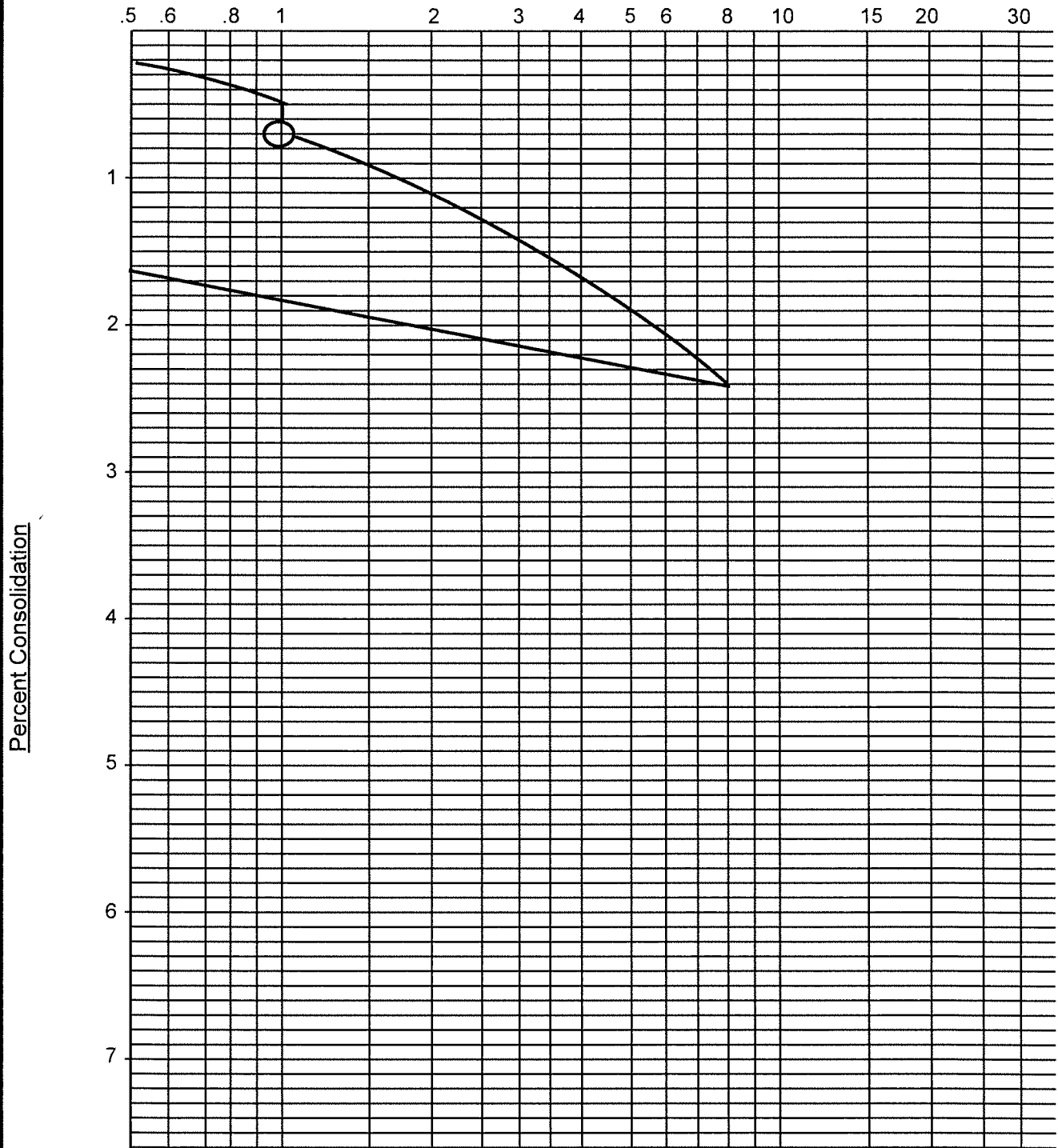
SYMBOL	LOCATION	DEPTH (FT)	TEST CONDITION	COHESION (PSF)	FRICTION (DEG)
A	B-2	10'	Saturated - Drained Peak	250	34
B	B-2	10'	Saturated - Drained Ultimate	200	33
C	B-6	5'	Saturated - Drained Peak	250	33
D	B-6	5'	Saturated - Drained Ultimate	200	32

<b>Travel Plaza - Perris</b>	Project No.	G-5908-01
Corner of Trumble Road and Ethanac, Perris, California	Plate:	J

**Geotechnical Solutions, Inc.**

# CONSOLIDATION

Load In Kips per Square Foot



After Water Added to Sample

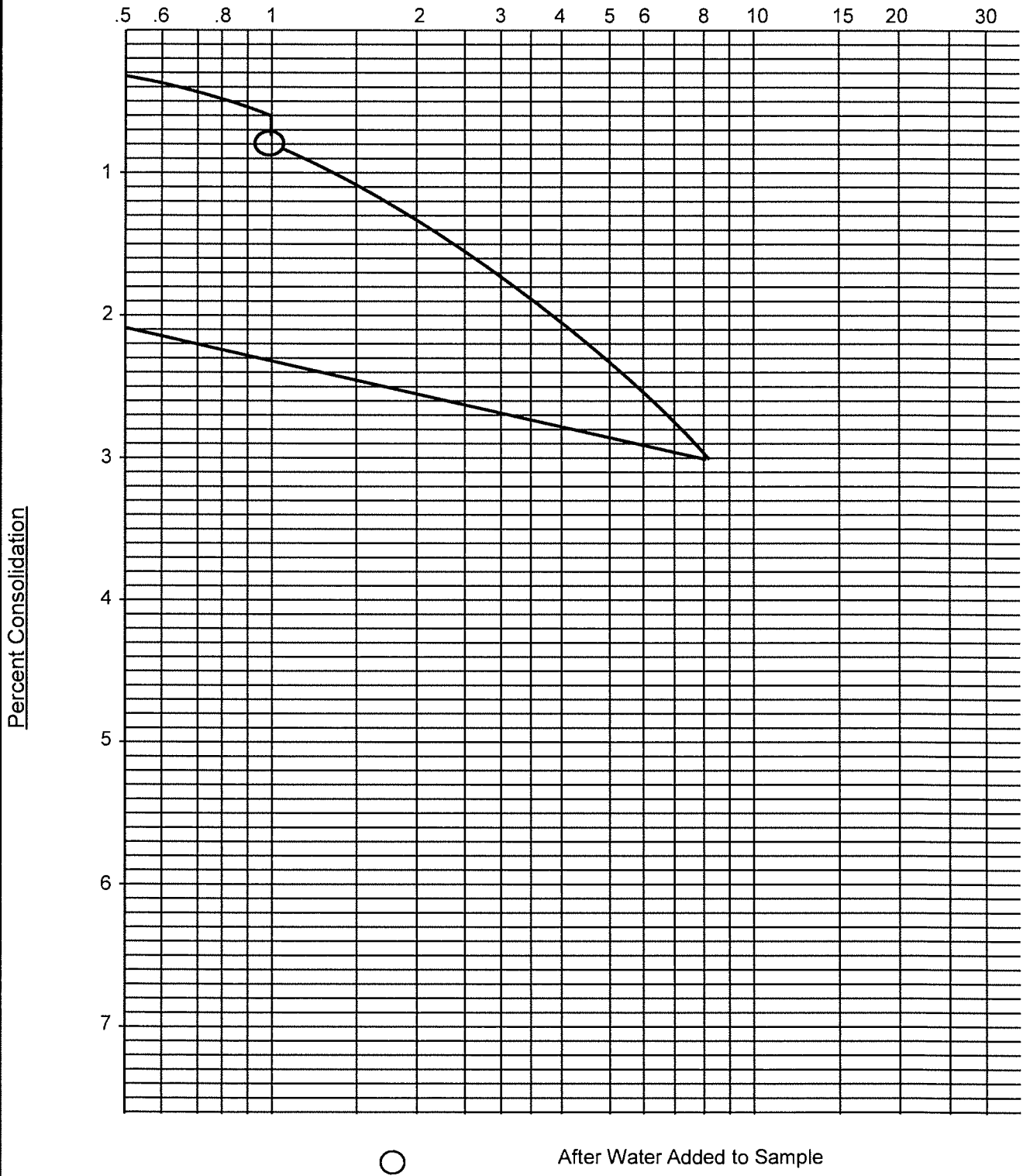
B-2 @ 10'

<b>Travel Plaza - Perris</b>	Project No.	G-5908-01
Corner of Trumble Road and Ethanac, Perris, California	Plate:	K

**Geotechnical Solutions, Inc.**

# CONSOLIDATION

Load In Kips per Square Foot



B-6 @ 5'

<b>Travel Plaza - Perris</b>	Project No.	G-5908-01
Corner of Trumble Road and Ethanac, Perris, California	Plate:	L

**Geotechnical Solutions, Inc.**

## **Appendix B**

### **Seismic Data**

- Table 1 - Faults Table
- Unified Hazard Tool – Hazard Curve
- U.S. Seismic Design Maps Summary & Detailed Report (SEAOC / OSHPD)

**Table - 1**  
**2008 National Seismic Hazard Maps - Source Parameters**  
**Travel Plaza - Perris**

Distance in Miles	Name	State	Pref Slip Rate (mm/yr)	Dip (degrees)	Dip Dir	Slip Sense	Rupture Top (km)	Rupture Bottom (km)	Length (km)
9.56	Elsinore;GI	CA	5	90	V	strike slip	0	13	37
9.56	Elsinore;W+GI	CA	n/a	81	NE	strike slip	0	14	83
10.22	San Jacinto;A+CC+B+SM	CA	n/a	90	V	strike slip	0.1	15	178
10.22	San Jacinto;A+CC+B	CA	n/a	90	V	strike slip	0.1	15	152
10.22	San Jacinto;A+C	CA	n/a	90	V	strike slip	0	17	118
10.22	San Jacinto;A	CA	9	90	V	strike slip	0	17	71
10.22	San Jacinto;A+CC	CA	n/a	90	V	strike slip	0	16	118
10.37	Elsinore;GI+T+J+CM	CA	n/a	86	NE	strike slip	0	16	195
10.37	Elsinore;W+GI+T+J+CM	CA	n/a	84	NE	strike slip	0	16	241
10.37	Elsinore;GI+T	CA	5	90	V	strike slip	0	14	78
10.37	Elsinore;W+GI+T+J	CA	n/a	84	NE	strike slip	0	16	199
10.37	Elsinore;W+GI+T	CA	n/a	84	NE	strike slip	0	14	124
10.37	Elsinore;GI+T+J	CA	n/a	86	NE	strike slip	0	17	153
10.63	Elsinore;T+J	CA	n/a	86	NE	strike slip	0	17	127
10.63	Elsinore;T+J+CM	CA	n/a	85	NE	strike slip	0	16	169
10.63	Elsinore;T	CA	5	90	V	strike slip	0	14	52
11.45	San Jacinto;SBV+SJV+A+CC	CA	n/a	90	V	strike slip	0	16	181
11.45	San Jacinto;SBV+SJV+A+C	CA	n/a	90	V	strike slip	0	17	181
11.45	San Jacinto;SBV+SJV+A	CA	n/a	90	V	strike slip	0	16	134
11.45	San Jacinto;SJV+A+CC	CA	n/a	90	V	strike slip	0	16	136
11.45	San Jacinto;SJV+A+C	CA	n/a	90	V	strike slip	0	17	136
11.45	San Jacinto;SJV+A	CA	n/a	90	V	strike slip	0	17	89
11.45	San Jacinto;SBV+SJV+A+CC+B+SM	CA	n/a	90	V	strike slip	0.1	15	241
11.45	San Jacinto;SBV+SJV+A+CC+B	CA	n/a	90	V	strike slip	0.1	15	215
11.45	San Jacinto;SJV+A+CC+B+SM	CA	n/a	90	V	strike slip	0.1	15	196

11.45	San Jacinto;SJV+A+CC+B	CA	n/a	90	V	strike slip	0.1	15	170
12.01	San Jacinto;SJV	CA	18	90	V	strike slip	0	16	43
12.01	San Jacinto;SBV+SJV	CA	n/a	90	V	strike slip	0	16	88
19.04	San Jacinto;SBV	CA	6	90	V	strike slip	0	16	45
22.54	Chino, alt 2	CA	1	65	SW	strike slip	0	14	29
23.98	Elsinore;W	CA	2.5	75	NE	strike slip	0	14	46
24.79	S. San Andreas;NM+SM+NSB+SSB	CA	n/a	90	V	strike slip	0	13	213
24.79	Chino, alt 1	CA	1	50	SW	strike slip	0	9	24
	S. San								
24.79	Andreas;CH+CC+BB+NM+SM+NSB+SSB+BG+CO	CA	n/a	86		strike slip	0.1	13	512
24.79	S. San Andreas;SSB+BG	CA	n/a	71		strike slip	0	13	101
24.79	S. San Andreas;NSB+SSB+BG+CO	CA	n/a	79		strike slip	0.2	12	206
24.79	S. San Andreas;CC+BB+NM+SM+NSB+SSB	CA	n/a	90	V	strike slip	0	14	322
24.79	S. San Andreas;CC+BB+NM+SM+NSB+SSB+BG	CA	n/a	85		strike slip	0	14	380
24.79	S. San Andreas;CC+BB+NM+SM+NSB+SSB+BG+CO	CA	n/a	86		strike slip	0.1	13	449
24.79	S. San Andreas;CH+CC+BB+NM+SM+NSB+SSB	CA	n/a	90	V	strike slip	0	14	384
24.79	S. San Andreas;CH+CC+BB+NM+SM+NSB+SSB+BG	CA	n/a	86		strike slip	0	14	442
24.79	S. San Andreas;NM+SM+NSB+SSB+BG	CA	n/a	83		strike slip	0	14	271
24.79	S. San Andreas;NM+SM+NSB+SSB+BG+CO	CA	n/a	84		strike slip	0.1	13	340
24.79	S. San Andreas;NSB+SSB	CA	n/a	90	V	strike slip	0	13	79
24.79	S. San Andreas;NSB+SSB+BG	CA	n/a	75		strike slip	0	14	136

24.79	S. San Andreas;PK+CH+CC+BB+NIM+SM+NSB+S SB	CA	n/a	90	V	strike slip	0.1	13	421
24.79	S. San Andreas;PK+CH+CC+BB+NIM+SM+NSB+S SB+BG	CA	n/a	86		strike slip	0.1	13	479
24.79	S. San Andreas;PK+CH+CC+BB+NIM+SM+NSB+S SB+BG+CO	CA	n/a	86		strike slip	0.1	13	548
24.79	S. San Andreas;SM+NSB+SSB	CA	n/a	90	V	strike slip	0	13	176
24.79	S. San Andreas;SM+NSB+SSB+BG	CA	n/a	81		strike slip	0	13	234
24.79	S. San Andreas;SM+NSB+SSB+BG+CO	CA	n/a	83		strike slip	0.1	13	303
24.79	S. San Andreas;SSB	CA	16	90	V	strike slip	0	13	43
24.79	S. San Andreas;SSB+BG+CO	CA	n/a	77		strike slip	0.2	12	170
24.79	S. San Andreas;BB+NIM+SM+NSB+SSB	CA	n/a	90	V	strike slip	0	14	263
24.79	S. San Andreas;BB+NIM+SM+NSB+SSB+BG	CA	n/a	84		strike slip	0	14	321
24.79	S. San Andreas;BB+NIM+SM+NSB+SSB+BG+CO	CA	n/a	85		strike slip	0.1	13	390
26.4	S. San Andreas;BG+CO	CA	n/a	72		strike slip	0.3	12	125
26.4	S. San Andreas;BG	CA	n/a	58		strike slip	0	13	56
28.06	S. San Andreas;BB+NIM+SM+NSB	CA	n/a	90	V	strike slip	0	14	220
28.06	S. San Andreas;CC+BB+NIM+SM+NSB	CA	n/a	90	V	strike slip	0	14	279
28.06	S. San Andreas;NSB	CA	22	90	V	strike slip	0	13	35
28.06	S. San Andreas;SM+NSB	CA	n/a	90	V	strike slip	0	13	133
28.06	S. San Andreas;CH+CC+BB+NIM+SM+NSB	CA	n/a	90	V	strike slip	0	14	341
28.06	S. San Andreas;NIM+SM+NSB	CA	n/a	90	V	strike slip	0	13	170

28.06	S. San Andreas;PK+CH+CC+BB+NM+SM+NSB	CA	n/a	90	V	strike slip	0.1	13	377
29.62	Elsinore;J	CA	3	84	NE	strike slip	0	19	75
29.62	Elsinore;J+CM	CA	3	84	NE	strike slip	0	17	118
29.9	San Joaquin Hills	CA	0.5	23	SW	thrust	2	13	27
33.36	Cucamonga	CA	5	45	N	thrust	0	8	28
34.27	Pinto Mtn	CA	2.5	90	V	strike slip	0	16	74
36.79	Cleghorn	CA	3	90	V	strike slip	0	16	25
37.33	Newport-Inglewood (Offshore)	CA	1.5	90	V	strike slip	0	10	66
37.33	Newport Inglewood Connected alt 1	CA	1.3	89		strike slip	0	11	208
37.33	Newport Inglewood Connected alt 2	CA	1.3	90	V	strike slip	0	11	208
38.59	San Jose	CA	0.5	74	NW	strike slip	0	15	20
39.78	North Frontal (West)	CA	1	49	S	reverse	0	16	50
40.6	Puente Hills (Coyote Hills)	CA	0.7	26	N	thrust	2.8	15	17
41.18	Sierra Madre	CA	2	53	N	reverse	0	14	57
41.18	Sierra Madre Connected	CA	2	51		reverse	0	14	76
41.65	San Jacinto;CC+B	CA	n/a	90	V	strike slip	0.2	14	77
41.65	San Jacinto;CC+B+SM	CA	n/a	90	V	strike slip	0.2	14	103
41.65	San Jacinto;CC	CA	4	90	V	strike slip	0	16	43
42.56	San Jacinto;C	CA	14	90	V	strike slip	0	17	47
44.04	Newport-Inglewood, alt 1	CA	1	88		strike slip	0	15	65
44.6	S. San Andreas;NM+SM	CA	n/a	90	V	strike slip	0	14	134
44.6	S. San Andreas;PK+CH+CC+BB+NM+SM	CA	n/a	90	V	strike slip	0.1	13	342
44.6	S. San Andreas;BB+NM+SM	CA	n/a	90	V	strike slip	0	14	184
44.6	S. San Andreas;CH+CC+BB+NM+SM	CA	n/a	90	V	strike slip	0	14	306
44.6	S. San Andreas;SM	CA	29	90	V	strike slip	0	13	98
44.6	S. San Andreas;CC+BB+NM+SM	CA	n/a	90	V	strike slip	0	14	243
44.97	Rose Canyon	CA	1.5	90	V	strike slip	0	8	70
45.34	Helendale-So Lockhart	CA	0.6	90	V	strike slip	0	13	114
46.48	North Frontal (East)	CA	0.5	41	S	thrust	0	16	27

47.6	Burnt Mtn	CA	0.6	67	W	strike slip	0	16	21
49.55	Puente Hills (Santa Fe Springs)	CA	0.7	29	N	thrust	2.8	15	11

U.S. Geological Survey - Earthquake Hazards Program

# Unified Hazard Tool

Please do not use this tool to obtain ground motion parameter values for the design code reference documents covered by the [U.S. Seismic Design Maps web tools](#) (e.g., the International Building Code and the ASCE 7 or 41 Standard). The values returned by the two applications are not identical.

## ^ Input

Edition

Conterminous U.S. 2008 (v3.2.x)

Spectral Period

Peak Ground Acceleration

Latitude

Decimal degrees

33.7441

Time Horizon

Return period in years

475 Travel Plaza Perris

Longitude

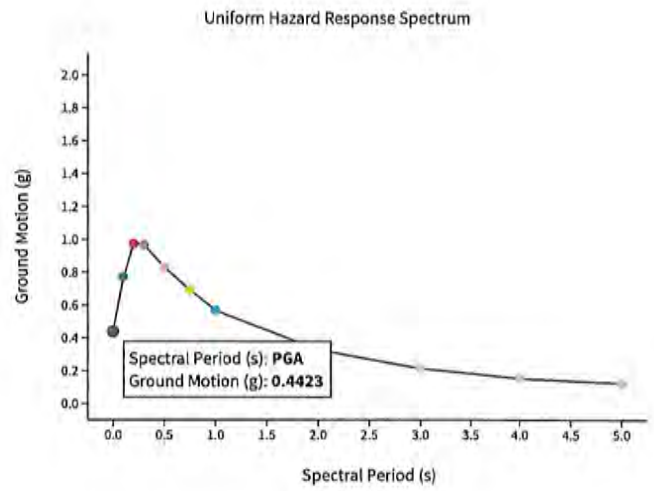
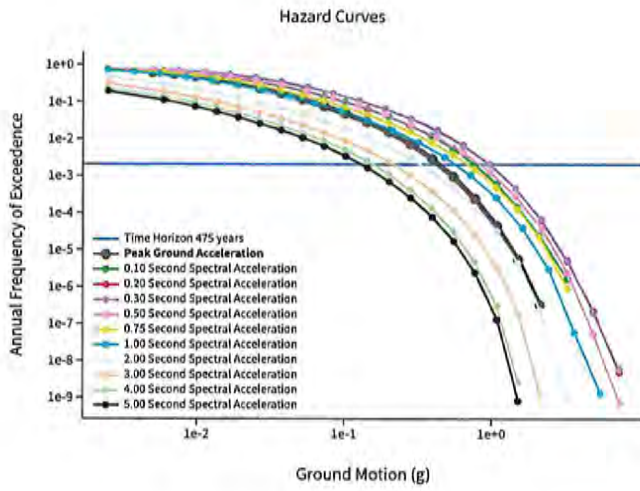
Decimal degrees, negative values for western longitudes

-117.1868

Site Class

259 m/s (Site class D)

# ^ Hazard Curve



[View Raw Data](#)

U.S. Geological Survey - Earthquake Hazards Program

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33.7441

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-117.1868

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259 m/s (Site class D)

Spectral Period

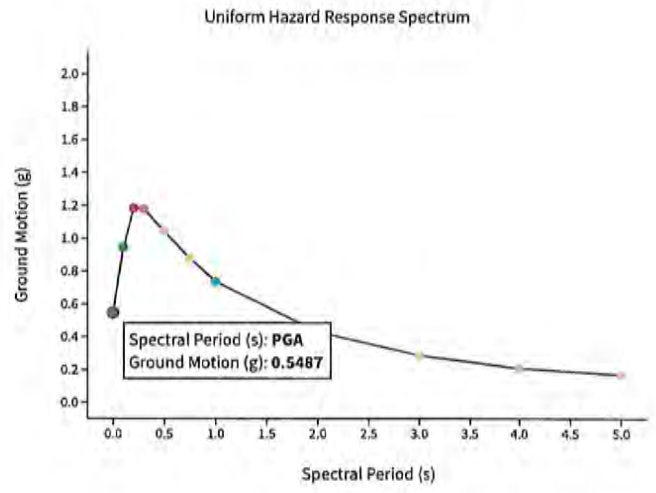
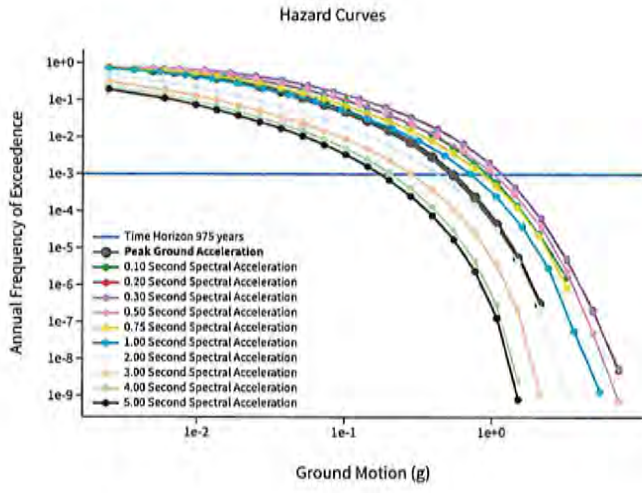
Peak Ground Acceleration

Time Horizon

Return period in years

975 Travel Plaza Perris

# ^ Hazard Curve



[View Raw Data](#)

# Unified Hazard Tool

Please do not use this tool to obtain ground motion parameter values for the design code reference documents covered by the [U.S. Seismic Design Maps web tools](#) (e.g., the International Building Code and the ASCE 7 or 41 Standard). The values returned by the two applications are not identical.

## ^ Input

### Edition

### Spectral Period

### Latitude

Decimal degrees

### Time Horizon

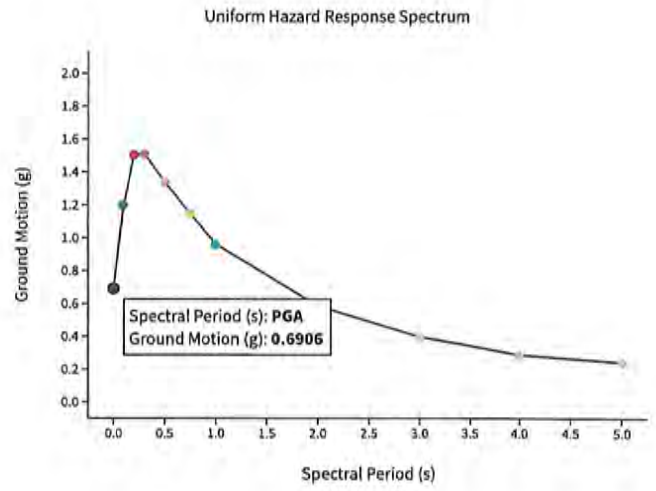
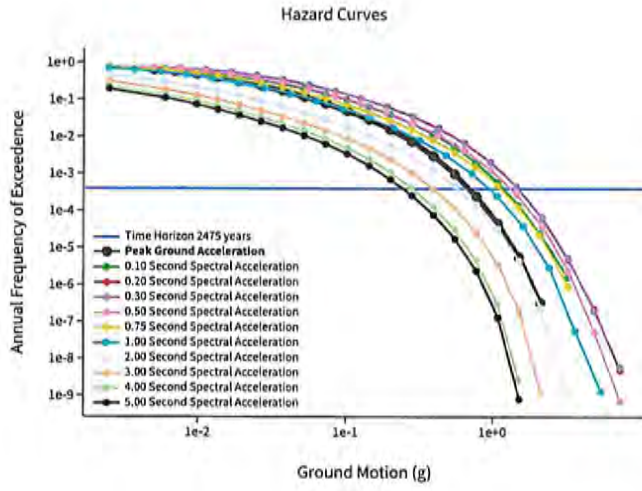
Return period in years

### Longitude

Decimal degrees, negative values for western longitudes

### Site Class

# ^ Hazard Curve

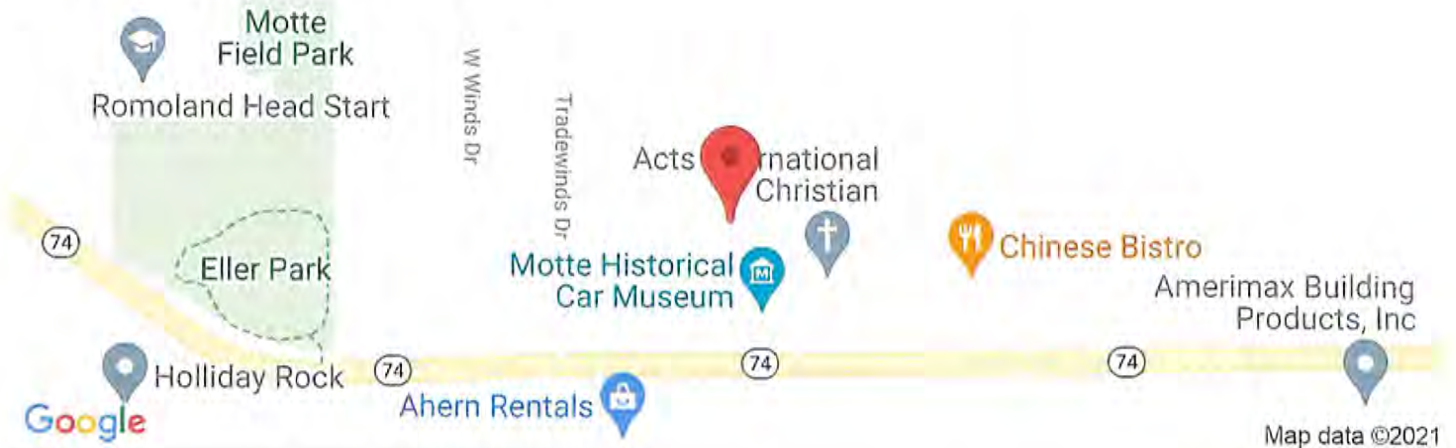


[View Raw Data](#)



# Travel Plaza Perris

Latitude, Longitude: 33.7441, -117.1658



Map data ©2021

<b>Date</b>	5/28/2021, 10:30:36 AM	
<b>Design Code Reference Document</b>	ASCE7-16	
<b>Risk Category</b>	II	
<b>Site Class</b>	D - Default (See Section 11.4.3)	

Type	Value	Description
$S_S$	1.428	$MCE_R$ ground motion. (for 0.2 second period)
$S_1$	0.532	$MCE_R$ ground motion. (for 1.0s period)
$S_{MS}$	1.714	Site-modified spectral acceleration value
$S_{M1}$	null -See Section 11.4.8	Site-modified spectral acceleration value
$S_{DS}$	1.143	Numeric seismic design value at 0.2 second SA
$S_{D1}$	null -See Section 11.4.8	Numeric seismic design value at 1.0 second SA

Type	Value	Description
SDC	null -See Section 11.4.8	Seismic design category
$F_a$	1.2	Site amplification factor at 0.2 second
$F_v$	null -See Section 11.4.8	Site amplification factor at 1.0 second
PGA	0.5	$MCE_G$ peak ground acceleration
$F_{PGA}$	1.2	Site amplification factor at PGA
$PGA_M$	0.6	Site modified peak ground acceleration
$T_L$	8	Long-period transition period in seconds
$SsRT$	1.428	Probabilistic risk-targeted ground motion. (0.2 second)
$SsUH$	1.531	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration
$SsD$	1.5	Factored deterministic acceleration value. (0.2 second)
$S1RT$	0.532	Probabilistic risk-targeted ground motion. (1.0 second)
$S1UH$	0.581	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration.
$S1D$	0.6	Factored deterministic acceleration value. (1.0 second)
$PGA_d$	0.5	Factored deterministic acceleration value. (Peak Ground Acceleration)
$C_{RS}$	0.933	Mapped value of the risk coefficient at short periods
$C_{R1}$	0.915	Mapped value of the risk coefficient at a period of 1 s

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## **Appendix C**

### Recommended Earthwork Specifications

## RECOMMENDED EARTHWORK SPECIFICATIONS

### 1.0 General

#### 1.1 Description

1.1.1 These specifications cover preparation of the subject site to receive fills, the type of soils suitable for use in fills, the compaction standards, and the methods of testing compacted fills.

1.1.2 The Contractor shall furnish all labor, supervision, equipment, operations, and materials to excavate to the required grade, support existing underground facilities, stockpile material, compact fill and backfill, and fine grade. The work of the Contractor shall include all clearing and grubbing, removing existing unsatisfactory material, preparing areas to be filled, spreading and compacting of fill in the areas to be filled and all other work necessary to complete the grading of the filled areas. It shall be the Contractor's responsibility to place, spread, moisten or dry, and compact the fill in strict accordance with these specifications to the lines and grades indicated on project plans or as directed in writing by the Civil Engineer.

1.1.3 Deviations from these specifications will be permitted only upon written authorization from the Owner or his representative.

#### 1.2 Role of the Geotechnical Engineer

1.2.1 Construction - The Owner will employ a Geotechnical Consultant to observe and test this work as it is being performed. The Contractor shall cooperate with the Geotechnical Consultant and allow his unrestricted access to the site as required for the performance of his duties.

The Contractor shall provide a minimum notice of 48 hours to the Geotechnical Engineer before beginning or restarting earthwork operations that will require the presence of the Geotechnical Engineer or his representative on site.

1.2.2 Subsurface Investigations - A geotechnical engineering report for design purposes was prepared by Geotechnical Solutions, Inc., Irvine, California. Any recommendations made in the geotechnical report or subsequent reports are made part of these specifications. These reports are available for review upon request to the Owner.

1.2.3 Observation and Testing - The Geotechnical Engineer's representative shall observe the clearing and grubbing, excavation, filling and compacting operations and shall take density tests in the fill material so that he can state his opinion as to whether or not the fill was constructed in accordance with the specifications. All fill will be tested shortly after its placement to ascertain that the required compaction is achieved. A minimum of one density test will be made on each 500 cubic yards of fill placed, with a minimum of at least one test per every 2 feet of vertical height of fill. If the surface is disturbed, the density tests shall be made in the compacted materials below the disturbed zone. When these tests indicate that the density or water content of any layer of fill or portion thereof does not meet the specified density or water content, the particular layer or portions thereof shall be reworked until the specified density and water content have been obtained.

After the completion of grading, the Geotechnical Engineer will prepare a written opinion of grading. Neither the testing performed by the Geotechnical Consultant nor his opinion as to whether or not the fill was constructed in accordance with these Specifications shall relieve the Contractor of his responsibility to construct the fills in accordance with the Contract Documents.

### 1.3 Reference Standards

The following ASTM (American Society for Testing and Materials) codes and standards shall be used to the extent indicated by references herein. The most recent revision of the standards shall be used.

D 1556 - "Standard Test Method for Density of Soil in Place by the Sand-Cone Method"

D1557 - "Standard Test Methods for Moisture-Density Relations of Soils and Soil Aggregate Mixtures Using 10-lb (4.54 kg) and 18-inch (457-mm) Drop"

D2216 - "Standard Test Method for Laboratory Determination of Water (Moisture) Content of Soil, Rock, and Soil-Aggregate Mixtures"

D4318 - "Standard Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils"

D4718 - "Standard Practice for Correction of Unit Weight and Water Content for Soils Containing Oversize Particles"

D4829 - "Standard Test Method for Expansion Index of Soils"

D4944 - "Standard Test Method for Field Determination of Water (Moisture) Content of Soil by the Calcium Carbide Gas Pressure Tester Method."

D5195 - "Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)"

D6938 - "Standard Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)"

D7928 - "Standard Test Method for Particle-Size Distribution (Gradation) of Fine-Grained Soils Using the Sedimentation (Hydrometer) Analysis"

#### 1.4 Degree of Fill Compaction

The degree to which fill is to be compacted is expressed in terms of "relative compaction." Relative compaction is defined as the ratio; expressed in percent, of the in-place dry density of the compacted fill to the reference maximum dry density. The reference maximum dry density shall be obtained following ASTM D1557. Optimum water content shall be obtained in the same test used to obtain the reference maximum dry density. Correction of the maximum dry density and optimum water content for

oversize particles of gravel and cobbles shall be made following ASTM D4718 when, in the opinion of the Geotechnical Engineer, such correction is appropriate. The in-place density shall be obtained following ASTM D1556 (sand cone method) or ASTM D6938 (nuclear method-shallow depth) test method. The in-place water content shall be obtained following ASTM D4944 (calcium carbide gas pressure meter), ASTM D5195 (nuclear method-shallow depth), or ASTM D2216 (oven drying). Correction of the in-place density and water content for oversize particles of gravel and cobbles shall be made following ASTM D4718 when, in the opinion of the Geotechnical Engineer, such correction is appropriate.

If any of the test methods specified in this section are judged by the Geotechnical Engineer to be impractical or unreliable because the material has a coarse particle size distribution, or for other reasons, the Geotechnical Engineer shall establish other procedures to obtain the required soil characteristics.

## 2.0 Products

### 2.1 Materials

2.1.1 General - During grading operations, soil types other than those identified in the geotechnical investigation report may be encountered by the Contractor. Consult the Geotechnical Consultant for his evaluation of the suitability of using these soils a fill material prior to placement or disposal.

2.1.2 General Fill - Materials for compacted fill shall consist of material imported from outside the site or excavated from the site that, in the opinion of the Geotechnical Engineer, is suitable for use in constructing engineered fills. The material shall not contain rocks or hard lumps greater than 6 inches in maximum dimension, and at least 70 percent (by weight) of its particles shall pass through a U.S. Standard 3/8 inch sieve. Material greater than 3 inches, but less than 6 inches in maximum dimension, shall be placed by the Contractor so that it is completely surrounded by compacted, finer material;

no nesting of rocks shall be permitted. Do not use any perishable, spongy, hazardous, or other undesirable materials as fill.

2.1.3 Select Fill - Select fill shall meet all criteria for general fill but shall also contain no rocks or hard lumps greater than 3 inches in maximum dimension, and at least 80 percent (by weight) shall pass through a U.S. Standard 3/8-inch sieve. The expansion index of select material shall be less than 50 (i.e., 5.0 percent swell) when tested in accordance with ASTM D4829.

### 3.0 Execution

#### 3.1 Clearing and Grubbing

Within the project limits, the Contractor shall demolish structures as specified on the Drawings.

Unless otherwise indicated on the Drawings or by the Owner in writing, the Contractor shall clear and grub all trees, stumps, roots, brush, grass, and other vegetation within construction, fill and stockpile areas to a minimum depth of 3 feet below the existing ground surface or below finished grade, whichever is deeper, unless otherwise recommended by the Geotechnical Engineer's Field Representative.

Remove cleared and grubbed materials from the site and dispose of them legally. No onsite burning or burying of cleared and grubbed materials is permitted. No placement of cleared and grubbed materials in topsoil stockpiles is permitted. No mulching of branches or roots is permitted. Incorporating vegetative matter into stockpiled materials, which are to be used in fill, is not permitted.

Stockpile organic-laden topsoil separate from other fill materials.

Remove any remaining vegetative matter from the deeper excavated soils, which may result from roots deeper than those encountered during clearing and grubbing operations.

All material thereby removed shall be piled at a location away from the immediate work area so as to avoid burying of piled material.

### 3.2 Compacted Fills

3.2.1 Preparing Areas to be Filled - Brush, grass, and other objectionable materials shall be collected, piled, and disposed of as indicated in Section 3.1 by the Contractor so as to leave the areas that have been cleared with a neat and finished appearance, free from unsightly debris.

Remove all loose soil, uncertified fill, landslide debris, and weathered bedrock to firm material or in-situ bedrock, as approved by the Geotechnical Consultant. The Contractor shall obtain approval from the Geotechnical Engineer or his representative of stripping and site preparation before the compaction of any fill subgrade begins. The surface shall then be scarified to a minimum depth of 6 inches until the surface is free from uneven features that would tend to prevent uniform compaction by the equipment used, and shall be brought to the specified water content and relative compaction. Compact scarified materials to a minimum relative compaction of 90 percent, relative to ASTM D1557, prior to placement of any fill material.

3.2.2 Placing, Spreading, and Compacting, Fill Material - Onsite soil obtained from removals, borrow, or cut areas may be reused as compacted fill provided it is free from deleterious debris and meets the other requirements of the "Materials" portion of this Specification Section.

Use of soil containing deleterious debris from the clearing and grubbing operation or from other sources is not permitted. The fill materials shall be placed by the Contractor in horizontal layers not greater than 8 inches thick, measured before compaction. Each layer shall be spread evenly and shall be thoroughly mixed during the spreading to obtain uniformity of material and moisture in each layer. The moisture content of material used for compacted fill should be adjusted to be at or above optimum water content as determined by ASTM D1557. When the water content of the fill material is too high, the

fill materials shall be aerated by the Contractor by blading, mixing, or other satisfactory methods until the water content is as specified.

After each layer has been placed, mixed, and spread evenly, it shall be thoroughly compacted by the Contractor to a relative compaction of at least 90 percent of the maximum dry density as determined by ASTM D1557 for general fill, and 95 percent of the maximum dry density as determined by ASTM D1557 for select fill, compacted fill pads, and the upper 1 foot of pavement subgrade. Compaction shall be accomplished by: sheepsfoot rollers; vibratory rollers; multiple-wheel, pneumatic-tired rollers; or other types of acceptable compacting equipment. Equipment shall be of such design that it is able to compact the fill to the specified density. Compaction shall be continuous over the entire area, and the equipment shall make sufficient passes to obtain the desired density uniformly. All fill placed on site shall be treated in like manner until finished grades are attained. Jetting, puddling, and hydro consolidation techniques shall not be used, including backfill of utility trenches.

The placement of topsoil is subject to the approval of the Geotechnical Engineer. Topsoil shall not be placed beneath concrete flatwork, beneath or behind retaining walls, or within structural fill. All topsoil material is subject to the same moisture conditioning, placement, and compaction requirements as General Fill. Roots, branches and other organic debris are not permitted within the compacted topsoil layer.

When backfilling around footings and compacting behind retaining walls and flexible retaining structures, the Contractor shall use lightweight compaction equipment such as hand-operated equipment, shoring, or other means to avoid over-stressing structural walls. When using lightweight compaction equipment, the fill materials shall be spread in horizontal layers not greater than 6 inches thick, measured before compaction.

As an alternative, sand-cement slurry may be used to backfill trenches. The slurry shall have minimum cement content of 3 sacks per cubic yard within the zone of influence of foundations and other settlement sensitive structures. A minimum of 2 sacks per cubic

yard of slurry shall be used elsewhere within building limits, and a minimum of one sack per cubic yard of slurry shall be used elsewhere. Slurry shall not be used in those areas where such placement would result in the obstruction of water flow, and is subject to the approval of the Geotechnical Engineer.

### 3.3 Protection of Work and Adjacent Properties

3.3.1 During Construction - The Contractor shall grade all excavated surfaces to provide good drainage away from construction slopes and prevent ponding of water. He shall control surface water and the transport of silt and sediment to avoid damage to adjoining properties or to finished work on the site. The Contractor shall take remedial measures to prevent erosion of freshly graded areas until such time as permanent drainage and erosion control measures have been installed.

Dispose of all water resulting from dewatering operations legally and in ways that will not cause damage to public or private property, or constitute a nuisance or menace to the public, in accordance with municipal requirements.

The Contractor shall make every effort to minimize the amount of dust raised in excavating, on haul roads and access roads, and all other work areas in the course of construction activities.

Protect benchmarks, monuments, and other reference points against displacement or damage. Repair or replace benchmarks, monuments, and other permanent survey data that become displaced or damaged due to the performance of this work.

3.3.2 After Completion - After earthwork is completed and the, Geotechnical Engineer has finished his observations of the work, no further excavation, filling or backfilling shall be performed except under the observation of the Geotechnical Engineer.

GEOTECHNICAL ENGINEERING  
PERCOLATION / INFILTRATION  
TEST REPORT

TRAVEL PLAZA  
PERRIS

AT

CORNER OF TRUMBLE ROAD &  
ETHANAC ROAD  
PERRIS, CALIFORNIA

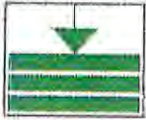
PREPARED FOR:

BROADBENT, INC.  
8 WEST PACIFIC AVENUE  
HENDERSON, NEVADA 89015

PROJECT NO: G-5908-08

JUNE 11, 2021

GEOTECHNICAL SOLUTIONS, INC.  
GEOTECHNICAL & ENVIRONMENTAL  
ENGINEERING



June 11, 2021

Project: G-5908-08

**BROADBENT, INC.**  
8 West Pacific Avenue  
Henderson, Nevada 89015

**Attention: Mr. Mark E. Kazelskis, PG, CHG, CEM**  
**Principal Geologist**

**Via Email: [mkazelski@broadbentinc.com](mailto:mkazelski@broadbentinc.com)**

**Re: Geotechnical Engineering Percolation / Infiltration Report**  
**Travel Plaza - Perris**  
Corner of Trumble Road & Ethanac Road  
Perris, California 92570

Gentlemen:

Per your authorization, we have performed our geotechnical engineering field percolation tests to evaluate the subgrade percolation and infiltration rate at the referenced Travel Plaza - Perris site located at the corner of Trumble Road and Ethanac Road, just west of Trumble Road, Perris, San Bernardino County, California. Proposed development consists of improving or incorporating Storm Water Permanent Best Management Practice (BMP).

The accompanying geotechnical engineering report presents the results of our field borings, sampling of subgrade material, field percolation tests, reviewing site plan, performing laboratory tests, analyzing field and laboratory data and our conclusions and recommendations for the project.

Our services were performed using the standard of care ordinarily exercised in this locality, at the time when the report was prepared.

Project No.: G-5908-08  
Travel Plaza - Perris  
Percolation-Infiltration Tests

The investigation was made in accordance with generally accepted geotechnical engineering principles and procedures and included such field and laboratory tests considered necessary in the circumstances.

In the opinion of the undersigned, the accompanying report has been substantiated by data, observations, analysis, and opinions and presents fairly the design information requested by you.

This completes our scope of services for the initial design phase of the project. We have appreciated this opportunity to be of service to you on this project.

**Respectfully Submitted,**

**Geotechnical Solutions, Inc.**



Dharma Shakya, PhD, PE, GE  
Principal Geotechnical Engineer



Abraham S. Baha, PE, MASCE  
Sr. Principal



Distribution: (3 +pdf) Addressee

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## **Introduction**

Geotechnical Solutions, Inc. (GSI) has performed field investigations including borings and sampling of earth material and field percolation tests at the proposed locations as shown on Plot Plan & Percolation Tests Location Map (Plate B in Appendix A) at Travel Plaza, Perris, California.

The main purpose of this study is to provide infiltration rates of subgrade material based on field percolation tests so that an appropriate system incorporating Storm Water permanent best management practice (BMP) to manage surface water into the ground and the appropriate infiltration basin or any other approved system may be designed and existing drainage be improved.

## **Field Exploration**

Field exploration consisted of drilling two borings for percolation tests, B-1 (PC-1) and B-2 (PC-2), 8-inches in diameter and extended to 10-feet below existing ground as shown on Plot Plan and Percolation Tests Location Map (Plate B).. The percolation test logs are presented on Plates D-1 and D-2 in Appendix A.

The attached logs tabulate data based on laboratory classification tests and visual observation by the field engineer at the site. During drilling bulk samples of earth material obtained for further laboratory test.

## **Groundwater**

Groundwater was not encountered in any of our borings. Also, in accordance with the available groundwater well maps data, [http://wdl.water.ca.gov/water\\_data\\_library](http://wdl.water.ca.gov/water_data_library), historical high groundwater level as shown on Plates C-1 and C-2 presented in Appendix A are much deeper than 50 feet. The potential for ground water to rise to the ground surface in the site area is considered very unlikely.

### Laboratory Testing

Laboratory testing was programmed following a review of the field investigation data to be evaluated. Tests included physical testing to determine soil characteristics and selective tests. Test results are presented in Appendix A.

### Mechanical Analysis (ASTM D-422)

Mechanical analyses by the hydrometer test method were performed to confirm field classifications. Test results are as follows:

Test Hole No.	Sample Depth (ft)	Sand Percent	Silt Percent	Clay Percent
B-1 (PC-1)	10.0	89	7	4
B-2 (PC-2)	10.0	90	8	2

### Field Percolation Tests

We performed field percolation tests at B-1 (PC-1) and B-11 (PC-2) locations as shown on Plot Plan and Percolation Tests Location Map (Plate B). The percolation test procedure performed in accordance with the current acceptable method for shallow percolation test (less than 10 feet) by qualified personnel under the supervision of registered geotechnical engineer as per Technical Guidance Document, Orange County Public Works.

- Borehole diameter was 8 inches.
- Bottom elevation of test holes correspond to bottom elevation of proposed retention basins which are proposed at 10-feet in depth below the ground surface in accordance with the following locations:

B-1 (PC-1)                      10 feet below the ground surface

B-11 (PC-2) 10 feet below the ground surface

- The bottom of the test hole was covered with 2 inches of gravel prior to testing.
- Sides of the hole were not smeared after drilling and there was no caving.
- Holes were filled with clear water to appropriate depths from the ground surface (Minimum required is 5 x radius of the hole ( $5 \times 4'' = 20$  inches) from the bottom.
- On these two locations, two consecutive measurements showed that less than 6 inches of water seeped away in 25 minutes test (Pre-Percolation Data Sheets, Plates 1 and 3 in Appendix B). Thus, pre-soaking overnight for about 24 hours was required.
- The tests were then run the next day for an additional 6-hours duration, measurements being taken every 30 minutes interval (Percolation Test Results).
- The drop that occurs during the final reading is used to calculate the percolation and then infiltration rate.
- Field Percolation Tests for both PC-1 and PC-2 are presented as Plate 2 and 4 in Appendix B.
- Infiltration calculations (Porchet Method) are shown on Plates 5 and 6 and presented in Appendix C.
- Infiltration results using another method, Reduction Factor Method, Rf are presented on Plates 7 and 8 in Appendix D.
- Measurements were taken with a precision of 0.25 inches or better.
- All the field percolation tests are tabulated and are presented in Appendix B.
- The holes were backfilled with soil cuttings.

### **Percolation Rate Evaluation**

To evaluate the percolation rates, testing was performed by filling the borehole with water and observing the rate of water drop from the fixed reference point on the ground surface. The depths of water drop for every 30 minutes intervals were noted and tabulated and plotted as shown on Plates 2 and 4, respectively for PC-1 and PC-2 in Appendix B.

Percolation rate,  $k$  can be correlated with the data in the form of the straight line equation as shown below:

$$t/R = b + kt$$

Where,  $t$  = average time in minutes

$$R = \Delta t / d$$

$\Delta t$  = Time Interval, minutes

$$d = \text{drop in inch} = R_1 - R_2$$

$R_1$  = Initial Readings, inch

$R_2$  = Final Readings, inch

$k$  = Percolation Rate inch/minute

$R$  =  $1/k$  at equilibrium rate

$t/R$  is plotted against  $t$  as shown on the plots (Plates 2 and 6 for B-1 (PC-1) and B-11 (PC-2), respectively) and the regression analyses were performed to interpolate the data obtained in the field. Straight line interpolation gives the slope as a percolation rate,  $k$ .

### **Results of the Tests**

The results obtained from the analyses are as follows:

1. Near surface material consisted of mainly Clayey to Silty Sand (SC/SM), dry to slightly moist, firm, light brown in color having dense to very dense in consistency.
2. Around and below 10 feet, the subgrade materials consisted mainly of the sandy material, Sand (SP) with some gravel, slightly moist to moist, dark brown to gray in color having dense to very dense in consistency.
3. Field Percolation tests were performed at 10-foot depth for both B-1 (PC-1) and B-11 (PC-2) and the results are tabulated as shown on the Table-1 below:

**TABLE – 1**  
**Percolation Test Results**

Location	Coefficient of Permeability, k			
	Inch/minute	Cm/sec	<b>Inch/hour Average</b>	<b>Inch/hr based on last 30 Minutes Reading</b>
B-1 (PC-1)	<b>0.0135</b>	<b>6.0 x E-04</b>	<b>0.81</b>	<b>1.0</b>
B-11 (PC-2)	<b>0.0206</b>	<b>9.0 x E-04</b>	<b>1.236</b>	<b>1.5</b>
<b>Average</b>	<b>0.0171</b>	<b>7.5 x E-04</b>	<b>1.023</b>	<b>1.25</b>
<b>Average:</b>			<b>1.137 inch/hour</b>	

4. Based on the data presented in this report and the testing information accumulated, it is our judgment that the percolation rate is an average of **1.137** inch per hour. It takes about **53 minutes to percolate 1 inch**. This conclusion regarding percolation rate is based on the results of our field exploration and testing.
5. General range of permeability for some of the subgrade soils are as follows:

<u>Type of Soil</u>	<u>Permeability (Cm/Sec)</u>
Medium to coarse gravel	$> 10^{-1}$
Coarse sand to fine sand	between $1 \times 10^{-1}$ to $1 \times 10^{-3}$
fine sand and silty sand	between $1 \times 10^{-3}$ to $1 \times 10^{-5}$
silt, clayey silt or silty clay	between $1 \times 10^{-4}$ to $1 \times 10^{-6}$
Clays	$1 \times 10^{-7}$ or less

Since the percolation rate average is **7.5 x E-04 Cm/Sec**, it falls into **fine Sand and silty Sand category** as tabulated above.

As per Technical Guidance Document, Infiltration rate,  $I_t$  is calculated based on Percolation Rate Conversion using Porchet Method, aka Inverse Borehole Method.

The bottom of the proposed infiltration basin would be at 10-feet below the existing ground surface. Percolation tests were performed with the depth of the test hole set at the infiltration surface level (bottom of basin).

After the minimum required number of testing intervals, the test was complete. The data collected at the final interval was used to calculate infiltration rates.

The calculations and the results are tabulated and presented on Plates 5 and 6 in Appendix C.

<b>Location</b>	<b>Percolation Rate inch/hour Based on Average Reading</b>	<b>Infiltration Rate Inch/hour Based on Porchet Method aka Inverse Borehole Method</b>
B-1 (PC-1)	0.810	0.0370

PC-2	1.236	0.0596
<b>Average</b>	<b>1.137</b>	<b>0.0483</b>

Using factor of safety of 2.0 for uncertainty and bias, **percolation test result is 0.5685 inch per hour** and **Infiltration Rate = 0.0242 “/ hour**, which is less than **0.3”/hour** as per the requirement in accordance with **TGD VII.2.**

Thus, it **does not meet** the standard criteria, hence **FAILED.**

### Reduction Factor ( $R_f$ ) Method

We have used Reduction Factor ( $R_f$ ) Method which is another acceptable and approved method for calculating Infiltration Rate,  $I_f$ .

Infiltration Rates as calculated by this method have been tabulated on Plates 7 and 8 in Appendix D. The results are as follows:

Location	$I_f$ Using (Reduction Factor Method) (inch/hour)
B-1 (PC-1)	0.0559
B-11 (PC-2)	0.0801
<b>AVERAGE:</b>	<b>0.068</b>
<b>With FOS = 2</b>	<b>0.034</b>
	<b>&lt; 0.3 inch/hour - “FAILED”</b>

## **Conclusions**

The subgrade soils consist entirely of very firm alluvial soils, mainly sand with some gravel, medium to coarse grained, dark brown to gray in color, dry to slightly moist to moist, dense to very dense and hard in consistency. Percolation tests performed at two locations, B-1 (PC-1) and B-11 (PC-2) at 10 feet depth did not meet the prescribed criteria.

Also, since the groundwater is very deep more than 50 feet, there is a room for the basin. However, infiltration rate at both locations indicated that it is much less than the required infiltration rate of 0.3 inch per hour (**TGD VII.2**), hence we conclude that the project is not feasible.

## **Additional Services**

This office will be available for further consultation.

## **Closure**

Based on the data presented in this report and the testing information accumulated, it is the judgment of the writers of this report that BMP infiltration system seems to be not feasible at these locations. The conclusions presented in this report are based on the results of our field exploration, percolation tests, infiltration tests, and other laboratory tests.

This report has been compiled for the exclusive use on the above referenced site, for the purpose stated above. It should not be transferred to or used by another party, or applied to any other project on this site, other than as described herein, without consent and/or thorough review by this office.

**Geotechnical Solutions, Inc.**

Project No.: G-5908-08  
Travel Plaza - Perris  
Percolation-Infiltration Tests

## References

California Building Code, 2019, California Code of Regulations, Title 24, Volume 2 of Part 2.

California Department of Water Resources groundwater well data  
<http://wdl.water.ca.gov>.

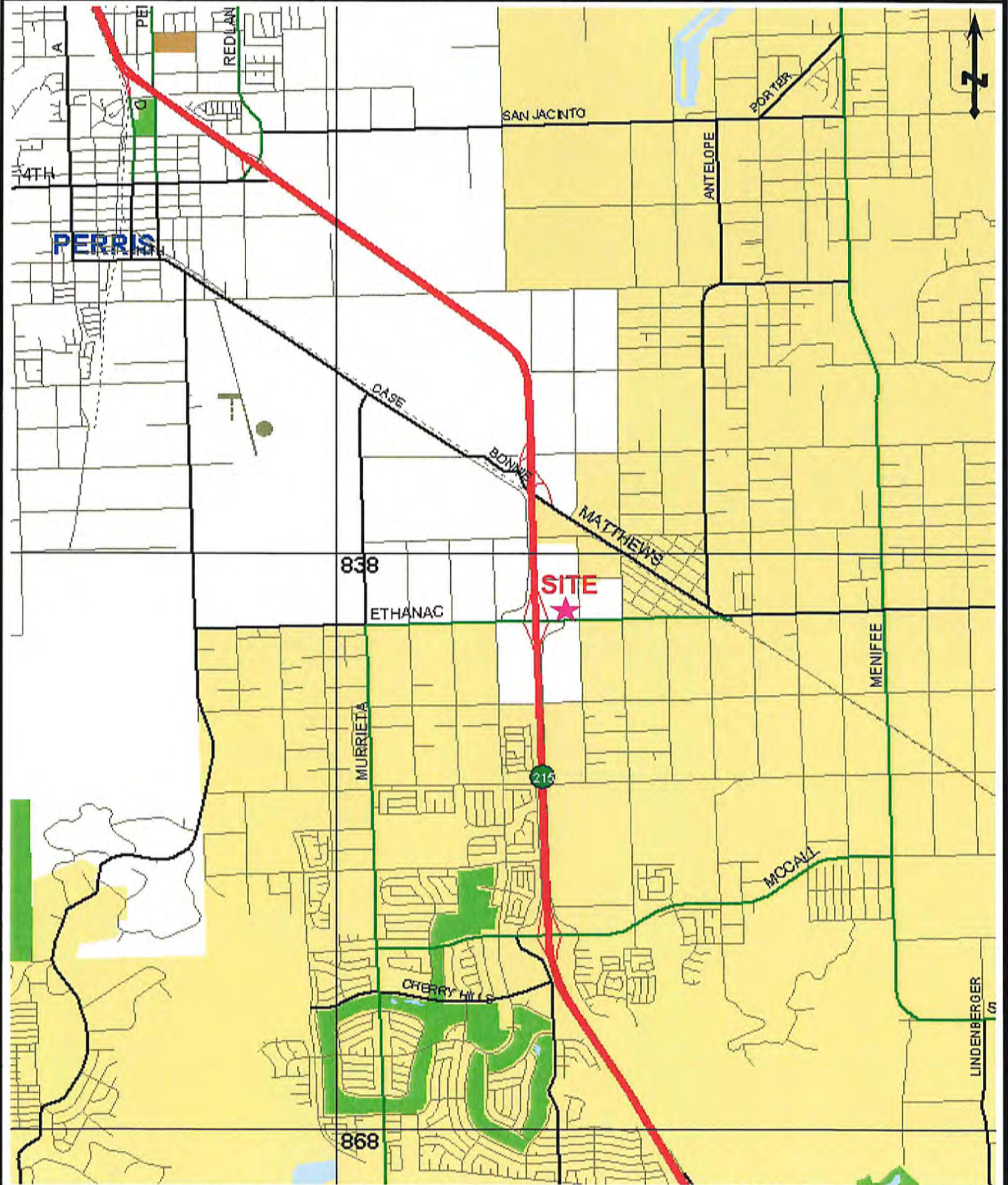
Orange County, Technical Guidance Document (TGD) for the Preparation of Conceptual / Preliminary and/or Project Water Quality Management Plans (WQMPs) dated December, 2013.

## **Appendix A**

### **Plates:**

- Vicinity Map
- Plot Plan & Percolation Tests Location Map
- Groundwater Map (Closest Well Data)
- Groundwater Map – Well Data
- Boring Logs, B-1 (PC-1) & B-11 (PC-2)

# VICINITY MAP



## Travel Plaza Perris - Percolation Tests

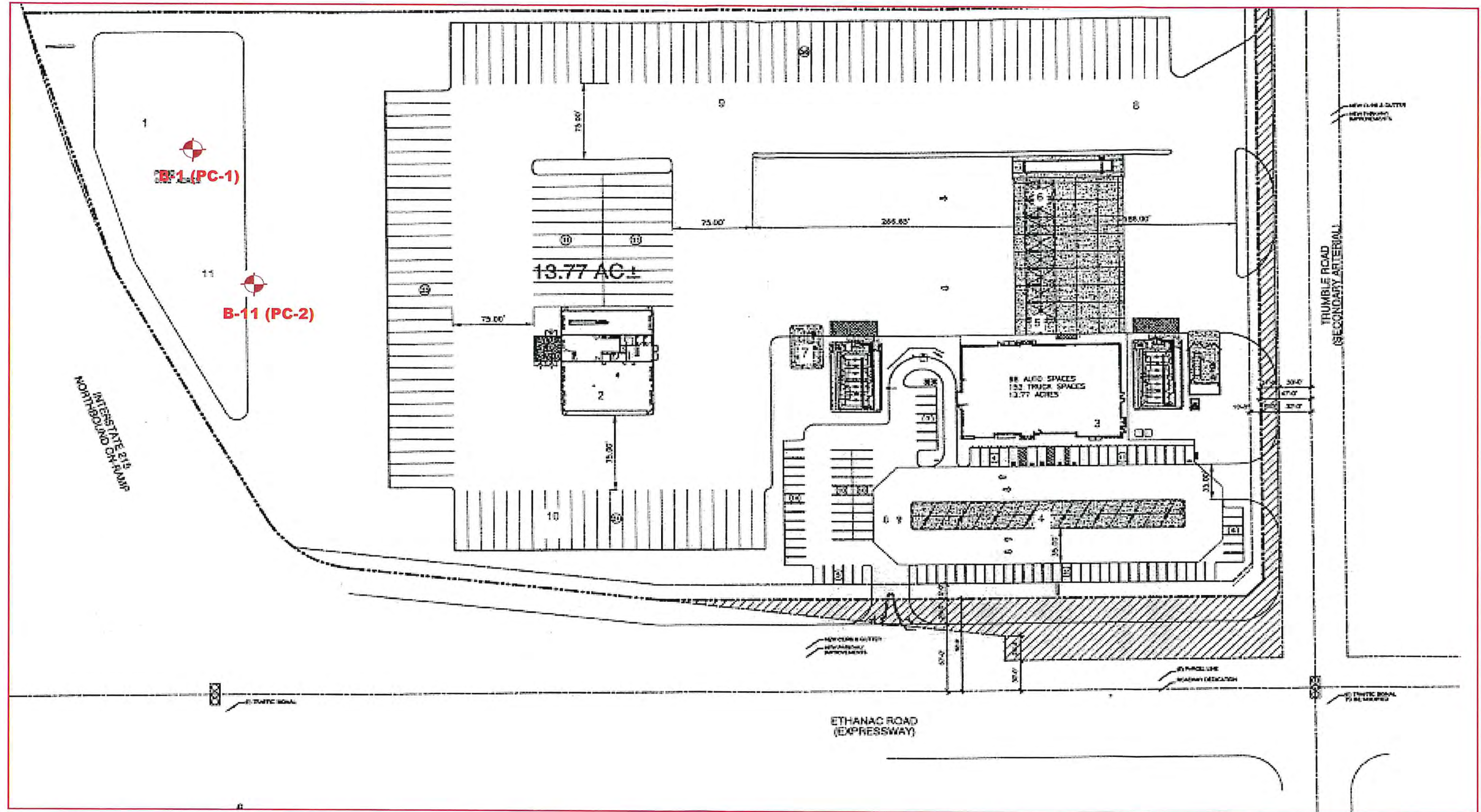
Corner of Trumble Road and Ethanac Road, Perris, California


Project No. G-5908-08

Plate: A

Geotechnical Solutions, Inc.

# PLOT PLAN & PERCOLATION TEST LOCATIONS MAP



 Percolation Tests

**B-11 (PC-2)**

Approximate Scale 1" = 100'

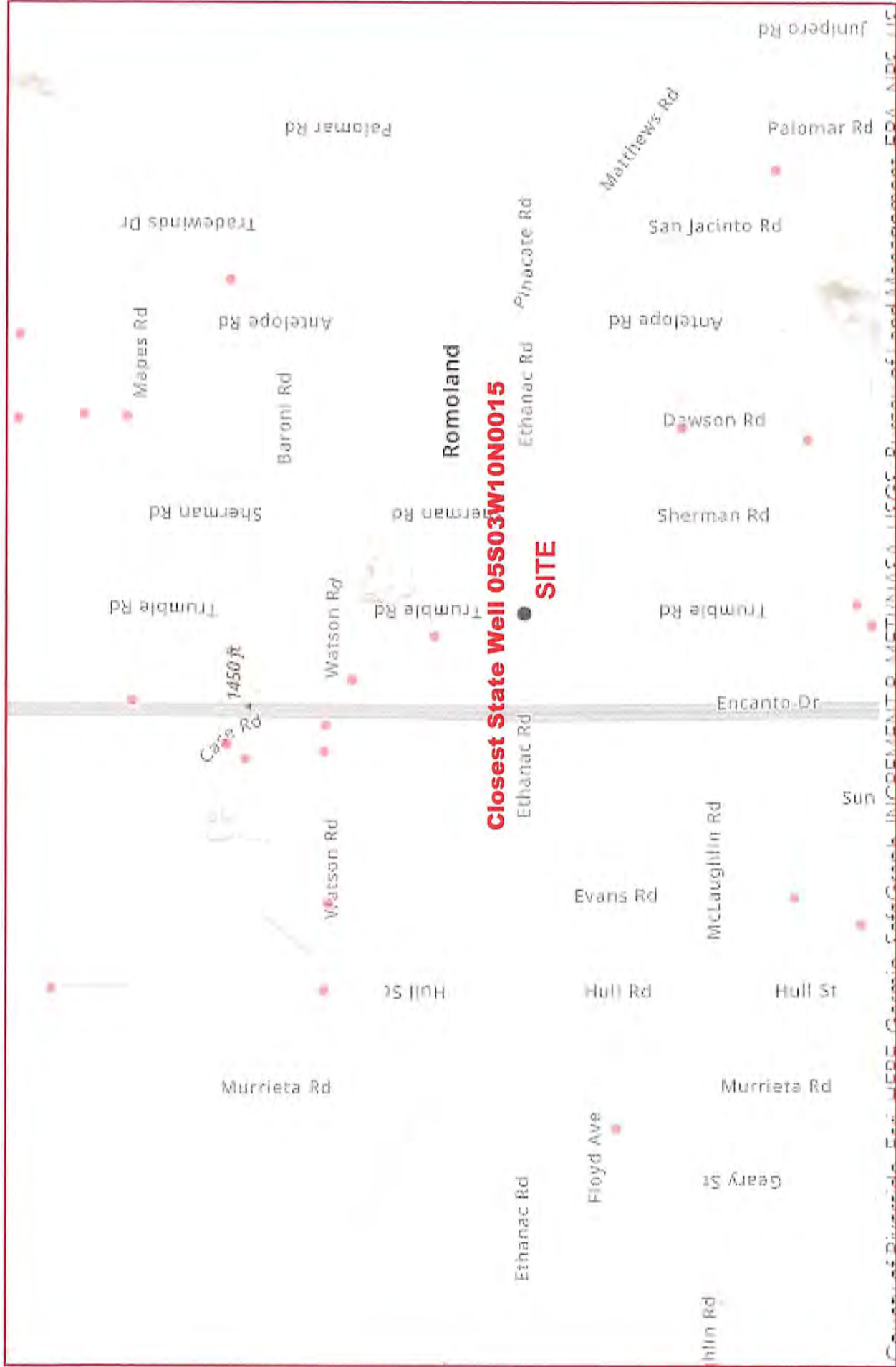
## Travel Plaza Perris - Percolation Tests

Corner of Trumble Road and Ethanac Road, Perris, California

**Geotechnical Solutions, Inc.**

Project No.	G-5908-08
Plate:	B

# GROUNDWATER MAP - CLOSEST WELL DATA



<b>Travel Plaza - Perris</b>	
Corner of Trumble Road and Ethanac, Perris, California	
<b>Geotechnical Solutions, Inc.</b>	
Project No.	G-5908-01
Plate:	C-1

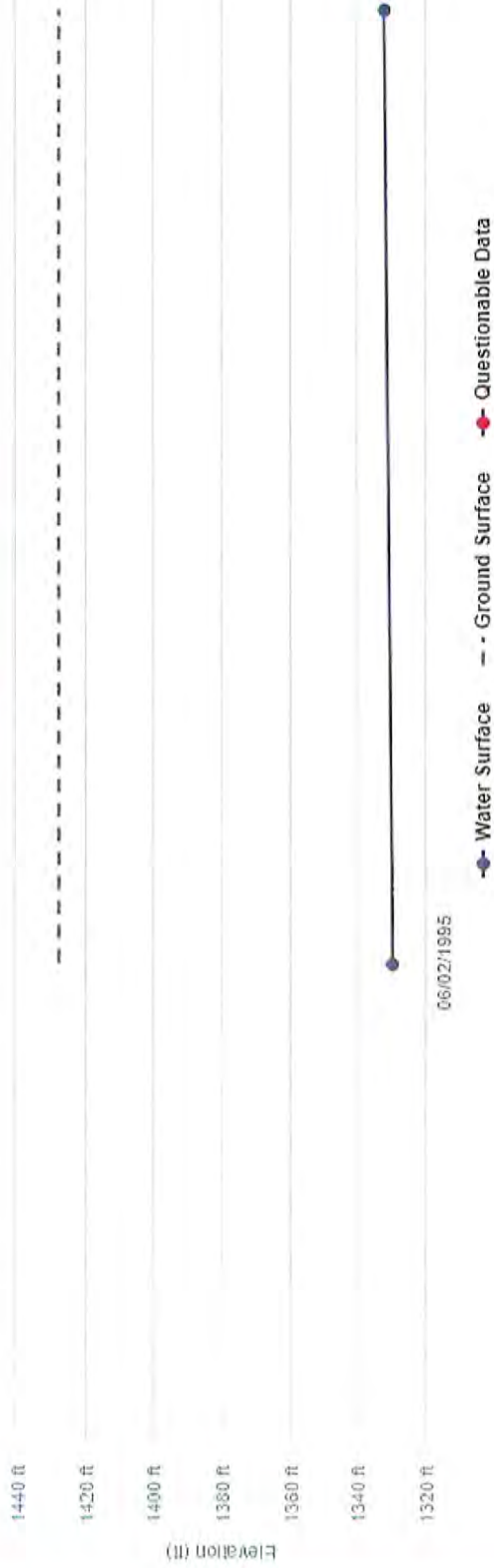
# GROUNDWATER MAP - WELL DATA

## Groundwater Level Report

Station 337464N1171859W001

Station Data    Groundwater Level Data

### Groundwater Levels for Well 337464N1171859W001 (Site Code)



Measurement Date (PST)	Reference Point Elevation	Ground Surface Elevation	Distance from RP to WS	Groundwater Elevation	Ground Surface to Water Surface	Measurement Issue	Collecting Agency
06/02/1995 00:00:00	1427.490	1427.490	97.98	1329.51	97.98		Department of Water Resou...
09/13/1995 00:00:00	1427.490	1427.490	95.63	1331.86	95.63		Department of Water Resou...

Travel Plaza - Perris		Project No.	G-5908-01
Corner of Trumble Road and Ethanac, Perris, California		Plate:	C-2

Geotechnical Solutions, Inc.

Project :	Travel Plaza - Perris	<b>LOG OF TEST HOLE</b>	Borehole No.	B-1 (PC-1)	
Project Location :	Corner of Ethanac Road and Trumble Road, Perris, CA		Plate No.	D-1	
Project Number :	G-5908-08		Page 1 of	1	
Date(s) Drilled :	May 24, 2021	Logged By :	BA/AB	Checked By :	DXS
Drilling Method :	Hollow Stem Auger	Drill Bit Size / Type :	8-inch	Total Depth of Borehole, feet :	10
Drill Rig Type :	B-61	Drilling Contractor :	Whitecomb Drilling	Approx. Surface Elevation, feet :	1426 feet MSL
Groundwater Level and Date Measured:	No Water encountered at the time of drilling	Sampling Method :	California (ring), bulk, SPT	Hammer Data :	140 lbs dropping 30 inches
Borehole Backfill :	Drill cuttings	Comments :	Refer to plot plan for location;		

Elevation, feet	Depth, feet	SAMPLES					Blows / 12"	MATERIAL DESCRIPTION	Moisture Content, %	Dry Unit Weight, pcf	Percent Passing No. 200 Sieve (%)	OTHER TESTS AND REMARKS
		Type	Number	Penetration Resistance, Blows / 6"	Graphics							
1426	0		Bag #1				Covered with dry weeds					
	2		C-1	19-54/6"		> 100	@2': Sand (SP), silty, light brown, slightly moist, very dense	6	127			
1421	5		C-2	20-50/6"		> 100	@5': Sand (SP), poorly graded, very dense, gray, slightly moist, medium to coarse grained	7	122			
1416	10						@10': Same as above			11	HD: 89 (SA) : 7(SI) : 4(CL)	
	15						End of Boring = 10 feet 2" Gravel on Bottom Drilled for Percolation test No groundwater encountered No Caving Backfilled w/Cuttings after percolation test					
	20											
	25											
	30											
	35											
	40											
	45											

Geotechnical Solutions, Inc.

Project :	Travel Plaza	LOG OF TEST HOLE	Borehole No.	B-11 (PC-2)	
Project Location :	Corner of Ethanac Road and Trumble Road, Perris, CA		Plate No.	D-2	
Project Number :	G-5908-08		Page 1 of	1	
Date(s) Drilled :	May 24, 2021	Logged By :	BA/AB	Checked By :	DXS
Drilling Method :	Hollow Stem Auger	Drill Bit Size / Type :	8-inch	Total Depth of Borehole, feet :	10
Drill Rig Type :	B-61	Drilling Contractor :	Whitecomb Drilling	Approx. Surface Elevation, feet :	1428 feet MSL
Groundwater Level and Date Measured:	No Water encountered at the time of drilling	Sampling Method :	California (ring), bulk, SPT	Hammer Data :	140 lbs dropping 30 inches
Borehole Backfill :	Drill cuttings	Comments :	Refer to plot plan for location;		

Elevation, feet	Depth, feet	SAMPLES					Blows / 12"	MATERIAL DESCRIPTION	Moisture Content, %	Dry Unit Weight, pcf	Percent Passing No. 200 Sieve (%)	OTHER TESTS AND REMARKS
		Type	Number	Penetration Resistance, Blows / 6"	Graphics							
1426	0						Covered with dry grass Older Alluvium: Clayey Sand (SC), light brown, dry					
	2		C-1	32-50/6"		100	@2': Sand (SP), silty, light brown, slightly moist, very dense	6	122			
1421	5		C-2	31-50/6"		100	@5': Sand (SP), poorly graded, very dense, gray, slightly moist, medium to coarse grained	5	121			
1416	10						@10': Same as above			10	HD: 90 (SA) : 8(SI) : 2(CL)	
	15						End of Boring = 10 feet 2" of Gravel on Bottom Drilled to 10 feet for Percolation Test Backfilled w/ cuttings after the Test					
1406	20											
1401	25											
1396	30											
1391	35											
1386	40											
1381	45											

## **Appendix B**

### **Pre-Test & Percolation Test Results**

- Pre-Test Percolation Data Sheet (PC-1)
- Percolation Test Result at Location PC-1
- Pre-Test Percolation Data Sheet (PC-2)
- Percolation Test Result at Location PC-2

### PRE- PERCOLATION TEST DATA SHEET

Project:	Travel Plaza - Perris	Project No.:	G-5908-08	Date:	5/24/2021		
Test Hole Number:	PC-1	Tested By:	BA/AB				
Depth of Test Hole, DT	10'	USCS Soil Classification:	Sand (SP)				
Test Hole Dimensions (inches)							
Diameter (if Round) =	8"	Sides (if Rectangular) =	Length	Width			
Sandy Soil Criteria Test *							
Trial No.	Start Time	Stop Time	Time Interval (Min)	Initial Depth to Water (in)	Final Depth to Water (in)	Change in Water Level (in)	Greater than or Equal to 6"?
1	8:30 AM	8:55 AM	25	65	66.25	1.3	< 6"
2	8:55 AM	9:20 AM	25	66.25	67.50	1.25	< 6"
<p>* If two consecutive measurements show that six inches of water seeps away in less than 25 minutes, the test shall be run for an additional hour with measurements taken every 10 minutes. Otherwise, pre-soak (fill) overnight. Obtain at least twelve measurements per hole over at least six hours (approximately 30 minute intervals) with a precision of at least 0.25".</p>							

**PERCOLATION TEST**

Borehole No. **B-1 (PC-1)**

Depth **120** inch

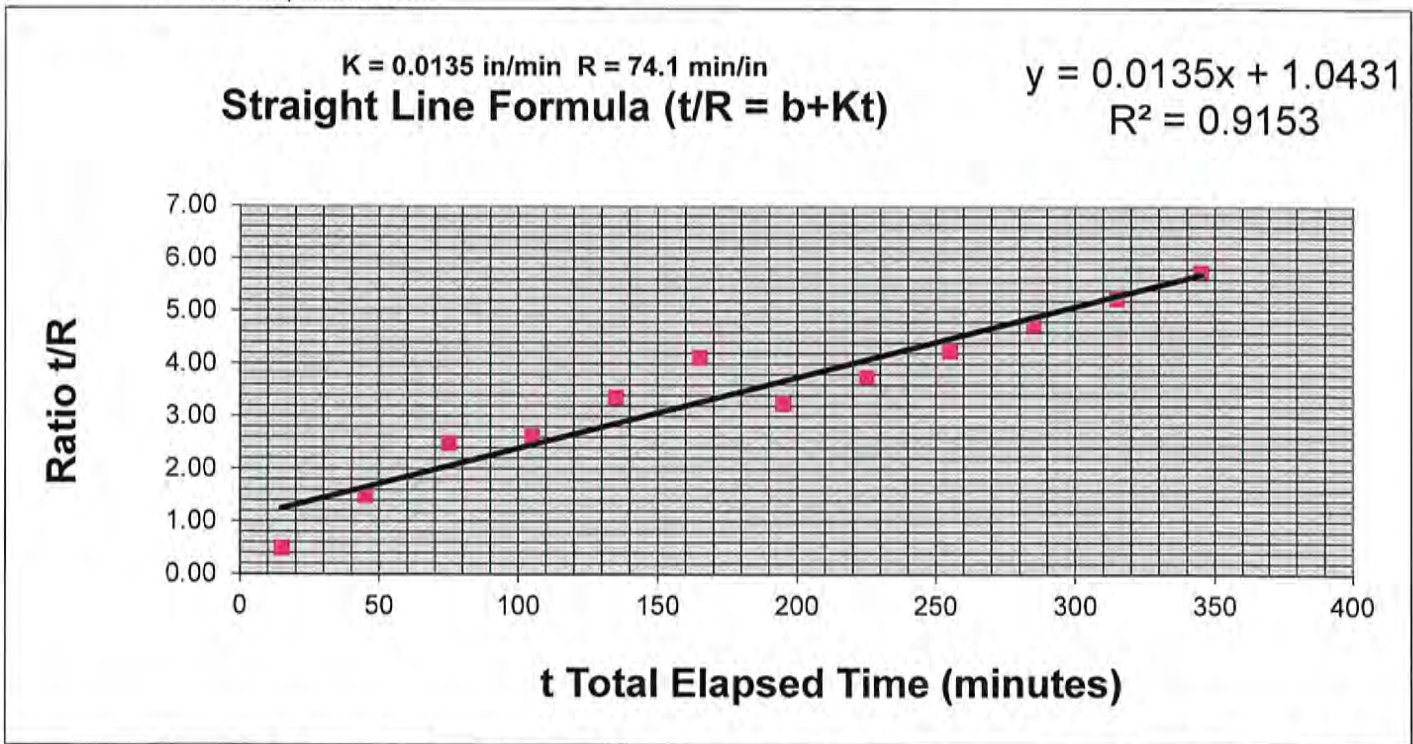
Date	Time of Reading	$\Delta t$ (min.)	Total Elapsed Time (t)	Average t (minutes)	Reading R <sub>1</sub> (inches)	Reading R <sub>2</sub> (inches)	Drop d (inches)	R= $\Delta t/d$ (min./in.)	t/R (in.)	k * 1000 (cm/s)
5/25/2021	9:30 AM	0	0							
	10:00 AM	30	30	15	60.00	61.00	1.00	30.00	0.50	1.4
	10:30 AM	30	60	45	61.00	62.00	1.00	30.00	1.50	1.4
	11:00 AM	30	90	75	62.00	63.00	1.00	30.00	2.50	1.4
	11:30 AM	30	120	105	63.00	63.75	0.75	40.00	2.63	1.1
	12:00 PM	30	150	135	63.75	64.50	0.75	40.00	3.38	1.1
	12:30 PM	30	180	165	64.50	65.25	0.75	40.00	4.13	1.1
	1:00 PM	30	210	195	65.25	65.75	0.50	60.00	3.25	0.7
	1:30 PM	30	240	225	65.75	66.25	0.50	60.00	3.75	0.7
	2:00 PM	30	270	255	66.25	66.75	0.50	60.00	4.25	0.7
	2:30 PM	30	300	285	66.75	67.25	0.50	60.00	4.75	0.7
	3:00 PM	30	330	315	67.25	67.75	0.50	60.00	5.25	0.7
	3:30 PM	30	360	345	67.75	68.25	0.50	60.00	5.75	0.7

Plot: t/R as ordinate vs. 't' as abscissa; tanOC = K.

R<sub>1</sub> = Vertical distance from reference point to water level after refilling at beginning of increment period.

R<sub>2</sub> = Vertical distance from reference point to water level at the end of increment period.

R = 1/K at equilibrium rate.



**Travel Plaza Perris - Percolation Tests**

Corner of Trumble Road and Ethanac Road, Perris, California

Project: G-5908-08

Plate: 2

**GEOTECHNICAL SOLUTIONS, INC.**

### PRE - PERCOLATION TEST DATA SHEET

Project:	Travel Plaza - Perris	Project No.:	G-5908-08	Date:	5/24/2021		
Test Hole Number:	PC-2	Tested By:	BA/AB				
Depth of Test Hole, DT	10'	USCS Soil Classification:					
Test Hole Dimensions (inches)							
Diameter (if Round) =	8"	Sides (if Rectangular) =	Length	Width			
Sandy Soil Criteria Test *							
Trial No.	Start Time	Stop Time	Time Interval (Min)	Initial Depth to Water (in)	Final Depth to Water (in)	Change in Water Level (in)	Greater than or Equal to 6"?
1	9:35 AM	10:00 AM	25	65	67.0	2	< 6"
2	10:00 AM	10:25 AM	25	67	69.0	2	< 6"
<p>* If two consecutive measurements show that six inches of water seeps away in less than 25 minutes, the test shall be run for an additional hour with measurements taken every 10 minutes. Otherwise, pre-soak (fill) overnight. Obtain at least twelve measurements per hole over at least six hours (approximately 30 minute intervals) with a precision of at least 0.25".</p>							

**PERCOLATION TEST**

Borehole No. B-11 (PC-2)

Depth **120** inch

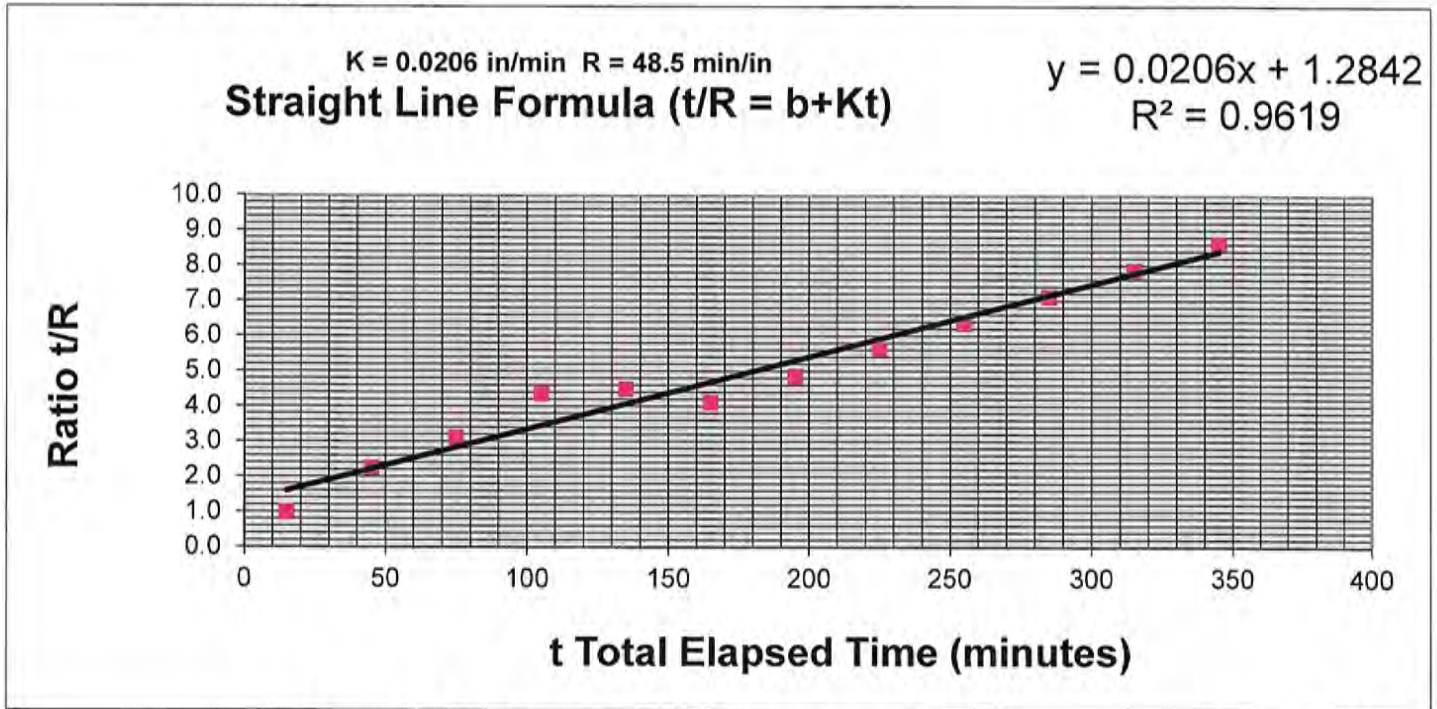
Date	Time of Reading	$\Delta t$ (min.)	Total Elapsed Time (t)	Average t (minutes)	Reading R <sub>1</sub> (inches)	Reading R <sub>2</sub> (inches)	Drop d (inches)	R= $\Delta t/d$ (min./in.)	t/R (in.)	k * 1000 (cm/s)
5/25/2021	9:40 AM	0	0							
	10:10 AM	30	30	15	60.00	62.00	2.00	15.00	1.00	2.8
	10:40 AM	30	60	45	62.00	63.50	1.50	20.00	2.25	2.1
	11:10 AM	30	90	75	63.50	64.75	1.25	24.00	3.13	1.8
	11:40 AM	30	120	105	64.75	66.00	1.25	24.00	4.38	1.8
	12:10 PM	30	150	135	66.00	67.00	1.00	30.00	4.50	1.4
	12:40 PM	30	180	165	67.00	67.75	0.75	40.00	4.13	1.1
	1:10 PM	30	210	195	67.75	68.25	0.75	40.00	4.88	1.1
	1:40 PM	30	240	225	68.25	69.00	0.75	40.00	5.63	1.1
	2:10 PM	30	270	255	69.00	69.75	0.75	40.00	6.38	1.1
	2:40 PM	30	300	285	69.75	70.50	0.75	40.00	7.13	1.1
	3:10 PM	30	330	315	70.50	71.25	0.75	40.00	7.88	1.1
	3:40 PM	30	360	345	71.25	72.00	0.75	40.00	8.63	1.1

Plot: t/R as ordinate vs. 't' as abscissa; tanOC = K.

R<sub>1</sub> = Vertical distance from reference point to water level after refilling at beginning of increment period.

R<sub>2</sub> = Vertical distance from reference point to water level at the end of increment period.

R = 1/K at equilibrium rate.



**Travel Plaza Perris - Percolation Tests**

Corner of Trumble Road and Ethanac Road, Perris, California

Project: G-5908-08

Plate: 4

**GEOTECHNICAL SOLUTIONS, INC.**

## **Appendix C – Infiltration Rates**

### Infiltration Rate $I_f$ Calculations

- PC-1
- PC-2

**Percolation Rate Conversion  
Infiltration Rate,  $I_t$   
Porchet Method, aka Inverse Borehole Method**

**Travel Plaza - Perris  
Project No: G-5908-08**

**Percolation Test PC-1**

**As per Test Result, Average Percolation Rate = 0.0135 inch/Min = 0.81 inch/hour**

**Data collected at the Final Interval analysed: 1.0 inch/hour**

Time Interval, $\Delta t$	=	<b>30</b> Minutes	Initial Depth to Water, $D_0$	=	<b>67.75</b> Inches
Total Depth of Test Hole, $D_t$	=	<b>120</b> Inches	Final Depth to Water, $D_f$	=	<b>68.25</b> Inches
Test Hole Radius, $r$	=	<b>4</b> Inches			
Initial Height of Water at the selected time interval, $H_0$	=	52.25 Inches			$(D_t - D_0)$
Final Height of Water at the Selected time interval, $H_f$	=	51.75 Inches			$(D_t - D_f)$
Change in Height over the time interval, $\Delta H$	=	0.5 Inches			$(H_0 - H_f)$
Average Head Height over the time interval, $H_{avg}$	=	52 Inches			$(H_0 + H_f)/2$

**Tested Infiltration Rate,  $I_t = \Delta H (60 r) / ((\Delta t)(r + 2 H_{avg}))$  in/hr**

Therefore,  **$I_t = 0.037037$  inch/hour**

**$I_t = 0.018519$  inch/hour FS: 2**

**< 0.3 inch/hour requirement  
FAILED**

**Percolation Rate Conversion  
Infiltration Rate,  $I_t$   
Porchet Method, aka Inverse Borehole Method**

**Travel Plaza - Perris  
Project No: G-5908-08**

**Percolation Test PC-2**

**As per Test Result, Average Percolation Rate = 0.0206 inch/Min = 1.236 inch/hour**

**Data collected at the Final Interval analysed: 1.5 inch/hour**

Time Interval, $\Delta t$	=	<b>30</b>	Minutes	Initial Depth to Water, $D_0$	=	<b>71.25</b>	Inches
Total Depth of Test Hole, $D_t$	=	<b>120</b>	Inches	Final Depth to Water, $D_f$	=	<b>72.00</b>	Inches
Test Hole Radius, $r$	=	<b>4</b>	Inches				
Initial Height of Water at the selected time interval, $H_0$	=	48.75	Inches			$(D_t - D_0)$	
Final Height of Water at the Selected time interval, $H_f$	=	48	Inches			$(D_t - D_f)$	
Change in Height over the time interval, $\Delta H$	=	0.75	Inches			$(H_0 - H_f)$	
Average Head Height over the time interval, $H_{avg}$	=	48.375	Inches			$(H_0 + H_f)/2$	

**Tested Infiltration Rate,  $I_t$  =  $\Delta H (60 r) / ((\Delta t)(r + 2 H_{avg}))$  in/hr**

Therefore,  **$I_t = 0.0596$  inch/hour**

**$I_t = 0.029777$  inch/hour FS: 2**

**< 0.3 inch/hour- FAILED**

## **Appendix D**

### **Infiltration Rates Using Reduction Factor Method $R_f$**

- PC-1
- PC-2

REDUCTION FACTOR, $R_f$					
Project:	Travel Plaza - Perris	Project No.:	G-5908-08	Date:	5/25/2021
Test Hole Number:	PC-1	Tested By:	BA/AB		
Depth of Test Hole, DT	10'	Initial Water Depth (Inches)	67.75		
Test Hole Dimensions (inches)					
Diameter (if Round), Dia =	8	Sides (if Rectangular)	=	Length	Width
Percolation Test					
		Pre-Adjusted Percolation Rate, in/hr	Initial Depth to Water, $d_1$ (in)	Water level Drop, $\Delta d$ (in)	$R_f$
	PC-1	1	67.75	0.5	17.88
<p>The average drop of the stabilized rate over the last three consecutive readings is the pre-adjusted percolation rate at the test location in inches per hour.</p> <p>The pre-adjusted percolation rate must be reduced to account for the discharge of water from both the sides and bottom of the boring (non-vertical flow).</p> <p>Use the Formula: Reduction Factor, <math>R_f = [(2d_1 - \Delta d) / Dia] + 1</math> where <math>d_1</math> = Initial water Depth, in</p> <p><math>\Delta d</math> = Water level drop of Final Period or Stabilized Rate (in)</p>					
					$I_f$
				0.0559	

REDUCTION FACTOR, $R_f$					
Project:	Travel Plaza - Perris	Project No.:	G-5908-08	Date:	5/25/2021
Test Hole Number:	PC-2	Tested By:	BA/AB		
Depth of Test Hole, DT	10'	Initial Water Depth (Inches)	71.25		
Test Hole Dimensions (inches)					
Diameter (if Round), Dia =	8	Sides (if Rectangular)	=	Length	Width
Percolation Test					
		Pre-Adjusted Percolation Rate, in/hr	Initial Depth to Water, $d_1$ (in)	Water level Drop, $\Delta d$ (in)	$R_f$
		1.5	71.25	0.75	18.72
	PC-2				0.0801
The average drop of the stabilized rate over the last three consecutive readings is the pre-adjusted percolation rate at the test location in inches per hour.					
The pre-adjusted percolation rate must be reduced to account for the discharge of water from both the sides and bottom of the boring (non-vertical flow).					
Use the Formula: Reduction Factor, $R_f = [(2d_1 - \Delta d) / \text{Dia}] + 1$ where $d_1$ = Initial water Depth, in					
$\Delta d$ = Water level drop of Final Period or Stabilized Rate (in)					

**GEOTECHNICAL  
ADDENDUM REPORT**

TRAVEL PLAZA  
PERRIS

AT

CORNER OF TRUMBLE ROAD &  
ETHANAC ROAD  
PERRIS, CALIFORNIA

**PREPARED FOR:**

BROADBENT, INC.  
WEST PACIFIC AVENUE  
HENDERSON, NEVADA, 89015

PROJECT NO: G-5908-01

JUNE 11, 2021

**PREPARED BY:**

GEOTECHNICAL SOLUTIONS, INC.  
GEOTECHNICAL & ENVIRONMENTAL  
ENGINEERING



# Geotechnical Solutions, Inc.

Geotechnical, Structural & Environmental Engineering



June 11, 2021

Project No: G-5908-01

**Broadbent, Inc.**

8 West Pacific Avenue  
Henderson, Nevada, 89015

**Attention: Mr. Mark E. Kazelskis, PG, CHG, CEM**  
**Principal Geologist**

Via Email: [mkazelskis@broadbentinc.com](mailto:mkazelskis@broadbentinc.com)

**Re: Geotechnical Engineering Addendum Report**

Travel Plaza - Perris  
Corner of Trumble Road &  
Ethanac Road  
Perris, California 92570

Gentlemen:

Submitted herewith is the addendum report to our geotechnical engineering report dated June 11, 2021 conducted by this office for Travel Plaza Perris at the referenced project site.

Recommendations regarding over excavation have been included in this addendum report for the Travel Plaza Perris located just northwest of the intersection of Trumble Road and Ethanac Road, just west of Trumble Road in Perris, San Bernardino County, California as shown on Vicinity Map (Plate A) and Google Map (Plate C).

**Site Clearing**

Prior to grading, all debris, grass, weeds including construction materials should entirely be removed from the site and disposed of off-site. Existing any undesirable materials

should also be removed and hauled off-site. Existing utilities (if Any) should be removed and relocated as required. Any construction debris or ant buried or other contaminated exposed during site clearance should be removed and hauled away from the site. The resulting excavation from any removal should be cleared of loose material then backfilled with compacted soil. Oversized rocks greater than 6 inches should be removed.

### **Excavation**

Excavations into the on-site soils may encounter a variety of challenges for example, very firm and dense to very dense alluvial soils. Some Caving on clean sands may be encountered. The contractor should be made responsible for designing and constructing stable, temporary excavations as required to maintain stability of the excavation sides. All excavations should be sloped or shored in the interest of safety following local and federal regulations including current OSHA excavation and trench safety standards.

Heavy equipments for breaking the very dense alluvial materials may be required for the excavations for shallow foundations, drilled shafts, and utility trenches for the proposed construction. The speed and ease of excavation are dependent on the nature of the deposit, the type of equipment used, and the skill and experience of the equipment operator.

### **Building Pad Over-excavation (Above Ground Storage Tanks, AST's)**

After removal of existing debris, the above ground storage tank areas should be over-excavated at least 3 feet below the lowest grade or 24 inches below the bottom of the footings whichever is greater. Excavation should be extended 3-feet outside building perimeters. Over-excavation may be hard due to the presence of very dense alluviums, therefore heavy equipments may be required. Remove and replace any loose or disturbed soils prior to placing any additional fill materials required to reach the finished subgrade elevations. The over-excavation should be backfilled to the foundation base elevation with the compacted engineering fill in accordance with the recommendations presented in this report.

## **Compliance**

Recommendations for foundations and slabs-on-grade supported on compacted fills or prepared subgrade depend upon compliance with the General Grading and Recommended Earthwork Specifications in Appendix B.

To assess compliance, observation and testing should be performed under the direction of a geotechnical engineer. Please contact us to provide observation and testing services.

## **Backfill Materials**

On-site clean, low-expansive potential soils, or imported materials may be used as fill material for the following:

- Foundation Areas
- Interior Slab Areas
- Pavement Areas
- Backfill

Any earth materials imported or excavated on the property may be utilized in the fill provided that each material has been determined to be suitable by the soil engineer. These materials should be free of roots, tree branches, other organic matter or other deleterious materials. Soils of poor gradation, undesirable expansion potential, or substandard strength characteristics may be designated by the consultant as unsuitable and may require blending with other soils to serve as a satisfactory fill material. Also, rocks of sizes bigger than 3 inches should be discarded for the site material to be used for backfill.

Gradation (as per ASTM C136) should be as follows:

<u>Size</u>	<u>% by Weight</u>
6"	100

4"	85-100
3/4"	70-100
No 4 Sieve	50-100
No. 200 Sieve	15 (max)

Any import material should have an expansion Index, EI less than 20. Import material should also meet the following criteria:

<u>Soil Properties</u>	<u>Values</u>
Liquid Limit	35 (Max)
Plastic Limit	6 (Max)

### **Placement and Compaction**

Place and compact approved fill material in nearly horizontal layers that when compacted should not exceed 6 inches in thickness.

Use appropriate equipment and procedures that will produce recommended densities and water contents throughout the lift. Moisture condition, blending, and mixing of the fill layer should continue until the fill materials have a uniform moisture content at or above optimum moisture.

Uncompacted fill lifts should not exceed 8 inches.

Materials should be compacted to the following:

On-site or imported soil, reworked and fill:	<u>Minimum % (ASTM D-1557 Laboratory Standard)</u>
Subgrade Below Footings	90
Subgrade Below Slab-on Grade	90
Subgrade Below Pavement	90
Crush Rock Below Slab-on-Grade	95
Aggregate Base below pavement	95

## **Excavations at Pavement Areas**

### **Subgrade Preparation**

After removing the existing deleterious materials, dense to very dense alluvial materials on the pavement areas and hauled offsite, all surficial deposits of loose soil material should be removed and excavate 12 inches below the base and recompacted as recommended. The bottom is further scarified to a depth of at least 6 inches; moisture conditioned as necessary and compacted to 90 percent of the maximum laboratory density as determined by ASTM Test Method D-1557.

Deleterious material, excessively wet or dry pockets, and any other unsuitable materials encountered during excavation or grading should be removed. The compacted fill material should then be brought to the elevation of the proposed subgrade for the pavement. The subgrade should be proof-rolled in order to ensure a uniform, firm and unyielding surface. All grading and fill placement should be observed by the project soils engineer and/or his representative.

### **Aggregate Base**

Compaction and rolling are required for the recommended base section. Minimum relative compaction required will be 95 percent of the laboratory maximum density as determined by ASTM Test Designation D-1557. Aggregate base should be in accordance with 200-2.2 crushed Aggregate base Class II base (minimum R-value=78) and sample should be brought for testing and approval prior to delivery to the site. No crushed miscellaneous base (CMB) should be accepted.

### **Asphalt Concrete Pavement**

Asphalt concrete pavement should be Performance Grade PG 64-10 1/2" maximum aggregate size and should be placed and compacted in two layers. Asphalt concrete shall be compacted to 95 percent of the Hveem Laboratory Standard.

### **Earthwork Observations:**

Relative compaction of all fill materials placed on site should be tested in accordance with ASTM D6938. All new fill shall be brought to near optimum moisture, placed in layers not exceeding six inches in thickness, and compacted to at least 90 percent relative compaction for subgrade and 95 percent relative compaction for aggregate base. No jetting or water tamping of fill soils shall be permitted. All imported soil for engineered fill should be pre-approved by the Geotechnical Engineer and consist of clean, granular, non-expansive soil, free of vegetation and other debris with an Expansion Index of 20 or less.

At all times, the contractor should have a responsible field superintendent on the project in full charge of the work, with authority to make decisions. He should cooperate fully with the Geotechnical Engineer in carrying out the work.

All footing trenches for continuous and spread footings and subgrade for the slab areas should be observed by the project Geotechnical Engineer to verify that over-excavation and re-compaction operations of adequate depth, thickness, and compaction have been performed as specified. All footing excavations should be trimmed neat, level and square. All loose, sloughed or moisture softened soil should be removed and replaced with properly compacted soil.

### **General Grading**

All grading should conform to the guidelines presented in the California Building Code (CBC, 2019), the City of Perris, San Bernardino County, International Conference of Building Officials (ICBO, 2018), and Appendix B in this report, except where specifically superceded in the text of this report. When code references are not equivalent, the more stringent code should be followed. During earthwork construction, all site preparation and the general grading procedures of the contractor should be observed, and the fill selectively tested by a representative (s) of Geotechnical Solutions, Inc. (GSI). If unusual or unexpected conditions are exposed in the field, they should be

reviewed by this office and if warranted, modified and /or additional recommendations will be offered. All applicable requirements of local and national construction and general industry safety orders, the Occupational Safety and Health Act and the construction Safety Act should be met.

### **Closure**

The Conclusions and recommendations contained herein are based on the findings and observations made at the test boring locations. It is not unusual to find conditions between and beyond such locations, which differ from the conditions encountered. If conditions are encountered during construction, which appear to differ from those previously disclosed, this office should be notified so as to consider the need for modifications. On-site construction observations and wherever appropriate, tests should be performed during the course of construction by a representative of this office to evaluate compliance with the design concepts, specifications, and recommendations contained herein.

This report has been compiled for the exclusive use of our client, it shall not be transferred to, or used by, other parties, or applied to any project on this site other than described herein without consent and /or thorough review by this office.

The investigation was made in accordance with generally accepted geotechnical engineering principles and procedures and included such field and laboratory tests considered necessary under the circumstances.

Project No.: G-5908-01  
Travel Plaza Perris - Addendum Report

In the opinion of the undersigned, the accompanying report has been substantiated by mathematical and other data and presents fairly the design information requested by your organization.

Respectfully Submitted,

**Geotechnical Solutions, Inc.**



Dharma Shakya, PhD, PE, GE  
Principal Geotechnical Engineer



Abraham S. Baha, PE, M. ASCE  
Sr. Principal



Distribution: (3+pdf) Addressee

## **References**

Geotechnical Solutions, Inc., 2021, "Geotechnical Evaluation Report for Travel Plaza Perris, Located at the corner of Trumble Road and Ethanac Road, Perris, California", Project Number G-5908-01, dated June 11.

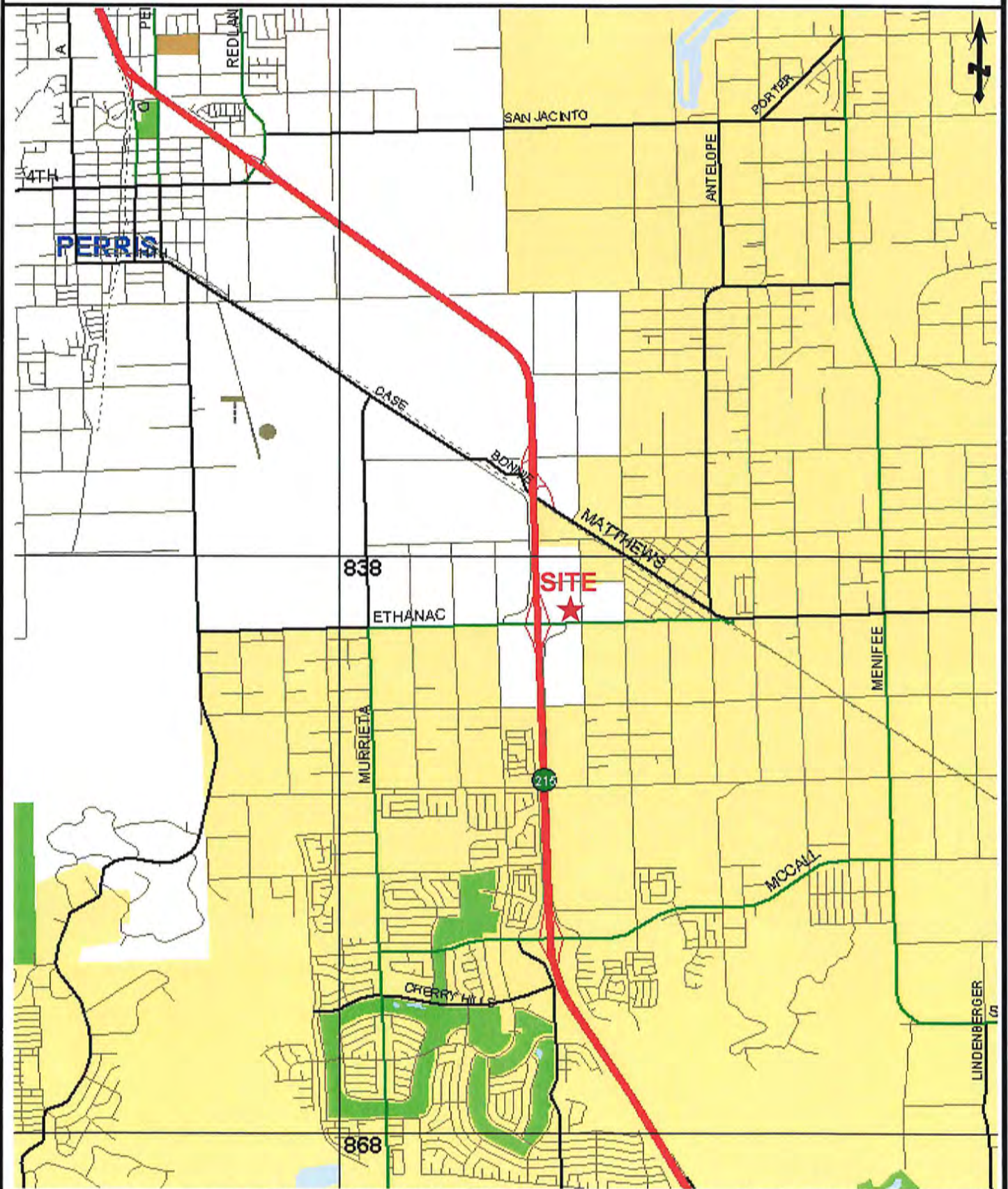
International Conference of Building Officials (ICBO), 2019, California Building Code, California Code of Regulations, Title 24, Part 2, Volume 2.

## **Appendix A**

### **Plates**

- **Vicinity Map**
- **Plot Plan**
- **Google Map**

# VICINITY MAP



**Travel Plaza - Perris**

**Corner of Trumble Road and Ethanac, Perris, California**

Project No.

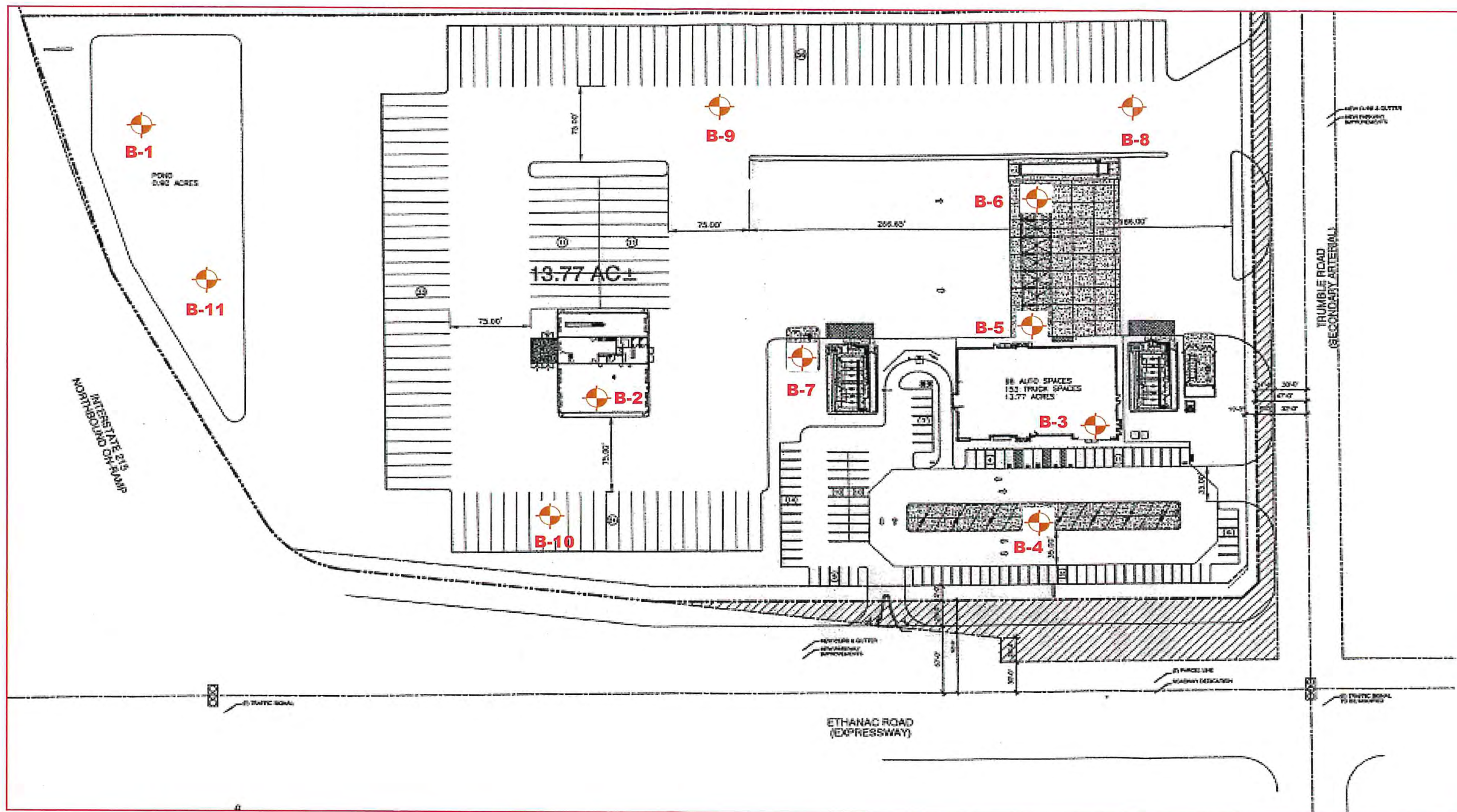
G-5908-01

Plate:

A

**Geotechnical Solutions, Inc.**

# PLOT PLAN & BORING LOCATION MAP



 **HSA Borings (2021)**  
**B-11**

INTERSTATE 515  
 NORTHBOUND OFF-RAMP

**APPROX. SCALE: 1" = 100'**

**Travel Plaza - Perris**  
 Corner of Trumble Road and Ethanac, Perris, California

Project No.	G-5908-01
Plate:	B

**Geotechnical Solutions, Inc.**

GOOGLE MAP



Travel Plaza - Perris

Corner of Trumble Road and Ethanac, Perris, California

Geotechnical Solutions, Inc.

Project No.

G-5908-01

Plate:

C

## **Appendix B**

### Recommended Earthwork Specifications

## **RECOMMENDED EARTHWORK SPECIFICATIONS**

### 1.0 General

#### 1.1 Description

1.1.1 These specifications cover preparation of the subject site to receive fills, the type of soils suitable for use in fills, the compaction standards, and the methods of testing compacted fills.

1.1.2 The Contractor shall furnish all labor, supervision, equipment, operations, and materials to excavate to the required grade, support existing underground facilities, stockpile material, compact fill and backfill, and fine grade. The work of the Contractor shall include all clearing and grubbing, removing existing unsatisfactory material, preparing areas to be filled, spreading and compacting of fill in the areas to be filled and all other work necessary to complete the grading of the filled areas. It shall be the Contractor's responsibility to place, spread, moisten or dry, and compact the fill in strict accordance with these specifications to the lines and grades indicated on project plans or as directed in writing by the Civil Engineer.

1.1.3 Deviations from these specifications will be permitted only upon written authorization from the Owner or his representative.

#### 1.2 Role of the Geotechnical Engineer

1.2.1 Construction - The Owner will employ a Geotechnical Consultant to observe and test this work as it is being performed. The Contractor shall cooperate with the Geotechnical Consultant and allow his unrestricted access to the site as required for the performance of his duties.

The Contractor shall provide a minimum notice of 48 hours to the Geotechnical Engineer before beginning or restarting earthwork operations that will require the presence of the Geotechnical Engineer or his representative on site.

1.2.2 Subsurface Investigations - A geotechnical engineering report for design purposes was prepared by Geotechnical Solutions, Inc., Irvine, California. Any recommendations made in the geotechnical report or subsequent reports are made part of these specifications. These reports are available for review upon request to the Owner.

1.2.3 Observation and Testing - The Geotechnical Engineer's representative shall observe the clearing and grubbing, excavation, filling and compacting operations and shall take density tests in the fill material so that he can state his opinion as to whether or not the fill was constructed in accordance with the specifications. All fill will be tested shortly after its placement to ascertain that the required compaction is achieved. A minimum of one density test will be made on each 500 cubic yards of fill placed, with a minimum of at least one test per every 2 feet of vertical height of fill. If the surface is disturbed, the density tests shall be made in the compacted materials below the disturbed zone. When these tests indicate that the density or water content of any layer of fill or portion thereof does not meet the specified density or water content, the particular layer or portions thereof shall be reworked until the specified density and water content have been obtained.

After the completion of grading, the Geotechnical Engineer will prepare a written opinion of grading. Neither the testing performed by the Geotechnical Consultant nor his opinion as to whether or not the fill was constructed in accordance with these Specifications shall relieve the Contractor of his responsibility to construct the fills in accordance with the Contract Documents.

### 1.3 Reference Standards

The following ASTM (American Society for Testing and Materials) codes and standards shall be used to the extent indicated by references herein. The most recent revision of the standards shall be used.

D 1556 - "Standard Test Method for Density of Soil in Place by the Sand-Cone Method"

D1557 - "Standard Test Methods for Moisture-Density Relations of Soils and Soil Aggregate Mixtures Using 10-lb (4.54 kg) and 18-inch (457-mm) Drop"

D2216 - "Standard Test Method for Laboratory Determination of Water (Moisture) Content of Soil, Rock, and Soil-Aggregate Mixtures"

D4318 - "Standard Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils"

D4718 - "Standard Practice for Correction of Unit Weight and Water Content for Soils Containing Oversize Particles"

D4829 - "Standard Test Method for Expansion Index of Soils"

D4944 - "Standard Test Method for Field Determination of Water (Moisture) Content of Soil by the Calcium Carbide Gas Pressure Tester Method."

D5195 - "Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)"

D6938 - "Standard Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)"

D7928 - "Standard Test Method for Particle-Size Distribution (Gradation) of Fine-Grained Soils Using the Sedimentation (Hydrometer) Analysis"

#### 1.4 Degree of Fill Compaction

The degree to which fill is to be compacted is expressed in terms of "relative compaction." Relative compaction is defined as the ratio; expressed in percent, of the in-place dry density of the compacted fill to the reference maximum dry density. The reference maximum dry density shall be obtained following ASTM D1557. Optimum water content shall be obtained in the same test used to obtain the reference maximum dry density. Correction of the maximum dry density and optimum water content for

oversize particles of gravel and cobbles shall be made following ASTM D4718 when, in the opinion of the Geotechnical Engineer, such correction is appropriate. The in-place density shall be obtained following ASTM D1556 (sand cone method) or ASTM D6938 (nuclear method-shallow depth) test method. The in-place water content shall be obtained following ASTM D4944 (calcium carbide gas pressure meter), ASTM D5195 (nuclear method-shallow depth), or ASTM D2216 (oven drying). Correction of the in-place density and water content for oversize particles of gravel and cobbles shall be made following ASTM D4718 when, in the opinion of the Geotechnical Engineer, such correction is appropriate.

If any of the test methods specified in this section are judged by the Geotechnical Engineer to be impractical or unreliable because the material has a coarse particle size distribution, or for other reasons, the Geotechnical Engineer shall establish other procedures to obtain the required soil characteristics.

## 2.0 Products

### 2.1 Materials

2.1.1 General - During grading operations, soil types other than those identified in the geotechnical investigation report may be encountered by the Contractor. Consult the Geotechnical Consultant for his evaluation of the suitability of using these soils a fill material prior to placement or disposal.

2.1.2 General Fill - Materials for compacted fill shall consist of material imported from outside the site or excavated from the site that, in the opinion of the Geotechnical Engineer, is suitable for use in constructing engineered fills. The material shall not contain rocks or hard lumps greater than 6 inches in maximum dimension, and at least 70 percent (by weight) of its particles shall pass through a U.S. Standard 3/8 inch sieve. Material greater than 3 inches, but less than 6 inches in maximum dimension, shall be placed by the Contractor so that it is completely surrounded by compacted, finer material;

no nesting of rocks shall be permitted. Do not use any perishable, spongy, hazardous, or other undesirable materials as fill.

2.1.3 Select Fill - Select fill shall meet all criteria for general fill but shall also contain no rocks or hard lumps greater than 3 inches in maximum dimension, and at least 80 percent (by weight) shall pass through a U.S. Standard 3/8-inch sieve. The expansion index of select material shall be less than 50 (i.e., 5.0 percent swell) when tested in accordance with ASTM D4829.

### 3.0 Execution

#### 3.1 Clearing and Grubbing

Within the project limits, the Contractor shall demolish structures as specified on the Drawings.

Unless otherwise indicated on the Drawings or by the Owner in writing, the Contractor shall clear and grub all trees, stumps, roots, brush, grass, and other vegetation within construction, fill and stockpile areas to a minimum depth of 3 feet below the existing ground surface or below finished grade, whichever is deeper, unless otherwise recommended by the Geotechnical Engineer's Field Representative.

Remove cleared and grubbed materials from the site and dispose of them legally. No onsite burning or burying of cleared and grubbed materials is permitted. No placement of cleared and grubbed materials in topsoil stockpiles is permitted. No mulching of branches or roots is permitted. Incorporating vegetative matter into stockpiled materials, which are to be used in fill, is not permitted.

Stockpile organic-laden topsoil separate from other fill materials.

Remove any remaining vegetative matter from the deeper excavated soils, which may result from roots deeper than those encountered during clearing and grubbing operations.

All material thereby removed shall be piled at a location away from the immediate work area so as to avoid burying of piled material.

### 3.2 Compacted Fills

3.2.1 Preparing Areas to be Filled - Brush, grass, and other objectionable materials shall be collected, piled, and disposed of as indicated in Section 3.1 by the Contractor so as to leave the areas that have been cleared with a neat and finished appearance, free from unsightly debris.

Remove all loose soil, uncertified fill, landslide debris, and weathered bedrock to firm material or in-situ bedrock, as approved by the Geotechnical Consultant. The Contractor shall obtain approval from the Geotechnical Engineer or his representative of stripping and site preparation before the compaction of any fill subgrade begins. The surface shall then be scarified to a minimum depth of 6 inches until the surface is free from uneven features that would tend to prevent uniform compaction by the equipment used, and shall be brought to the specified water content and relative compaction. Compact scarified materials to a minimum relative compaction of 90 percent, relative to ASTM D1557, prior to placement of any fill material.

3.2.2 Placing, Spreading, and Compacting, Fill Material - Onsite soil obtained from removals, borrow, or cut areas may be reused as compacted fill provided it is free from deleterious debris and meets the other requirements of the "Materials" portion of this Specification Section.

Use of soil containing deleterious debris from the clearing and grubbing operation or from other sources is not permitted. The fill materials shall be placed by the Contractor in horizontal layers not greater than 8 inches thick, measured before compaction. Each layer shall be spread evenly and shall be thoroughly mixed during the spreading to obtain uniformity of material and moisture in each layer. The moisture content of material used for compacted fill should be adjusted to be at or above optimum water content as determined by ASTM D1557. When the water content of the fill material is too high, the

fill materials shall be aerated by the Contractor by blading, mixing, or other satisfactory methods until the water content is as specified.

After each layer has been placed, mixed, and spread evenly, it shall be thoroughly compacted by the Contractor to a relative compaction of at least 90 percent of the maximum dry density as determined by ASTM D1557 for general fill, and 95 percent of the maximum dry density as determined by ASTM D1557 for select fill, compacted fill pads, and the upper 1 foot of pavement subgrade. Compaction shall be accomplished by: sheepsfoot rollers; vibratory rollers; multiple-wheel, pneumatic-tired rollers; or other types of acceptable compacting equipment. Equipment shall be of such design that it is able to compact the fill to the specified density. Compaction shall be continuous over the entire area, and the equipment shall make sufficient passes to obtain the desired density uniformly. All fill placed on site shall be treated in like manner until finished grades are attained. Jetting, puddling, and hydro consolidation techniques shall not be used, including backfill of utility trenches.

The placement of topsoil is subject to the approval of the Geotechnical Engineer. Topsoil shall not be placed beneath concrete flatwork, beneath or behind retaining walls, or within structural fill. All topsoil material is subject to the same moisture conditioning, placement, and compaction requirements as General Fill. Roots, branches and other organic debris are not permitted within the compacted topsoil layer.

When backfilling around footings and compacting behind retaining walls and flexible retaining structures, the Contractor shall use lightweight compaction equipment such as hand-operated equipment, shoring, or other means to avoid over-stressing structural walls. When using lightweight compaction equipment, the fill materials shall be spread in horizontal layers not greater than 6 inches thick, measured before compaction.

As an alternative, sand-cement slurry may be used to backfill trenches. The slurry shall have minimum cement content of 3 sacks per cubic yard within the zone of influence of foundations and other settlement sensitive structures. A minimum of 2 sacks per cubic

yard of slurry shall be used elsewhere within building limits, and a minimum of one sack per cubic yard of slurry shall be used elsewhere. Slurry shall not be used in those areas where such placement would result in the obstruction of water flow, and is subject to the approval of the Geotechnical Engineer.

### 3.3 Protection of Work and Adjacent Properties

3.3.1 During Construction - The Contractor shall grade all excavated surfaces to provide good drainage away from construction slopes and prevent ponding of water. He shall control surface water and the transport of silt and sediment to avoid damage to adjoining properties or to finished work on the site. The Contractor shall take remedial measures to prevent erosion of freshly graded areas until such time as permanent drainage and erosion control measures have been installed.

Dispose of all water resulting from dewatering operations legally and in ways that will not cause damage to public or private property, or constitute a nuisance or menace to the public, in accordance with municipal requirements.

The Contractor shall make every effort to minimize the amount of dust raised in excavating, on haul roads and access roads, and all other work areas in the course of construction activities.

Protect benchmarks, monuments, and other reference points against displacement or damage. Repair or replace benchmarks, monuments, and other permanent survey data that become displaced or damaged due to the performance of this work.

3.3.2 After Completion - After earthwork is completed and the, Geotechnical Engineer has finished his observations of the work, no further excavation, filling or backfilling shall be performed except under the observation of the Geotechnical Engineer.

**Appendix G**

**Romoland Master Drainage Plan**

RIVERSIDE COUNTY FLOOD CONTROL  
AND WATER CONSERVATION DISTRICT  
RIVERSIDE, CALIFORNIA

**ROMOLAND**  
**MASTER DRAINAGE PLAN**

**Zone 4**

Original Plan - April 1988  
Revision No.1 – March 2006

Warren D. Williams  
General Manager – Chief Engineer

## UNDERGROUND STORM DRAINS

The proposed underground storm drains generally consist of reinforced concrete pipe ranging in size from 27 inches to 96 inches in diameter. Reinforced concrete boxes are usually placed under dedicated road crossings or where the flow rates or hydraulic necessities exceed the capacity of standard pipe sizes. The underground storm drains proposed within this revision consist of pre-cast reinforced concrete pipe or reinforced concrete box.

## DETENTION BASINS

The purpose of the detention basin proposed in this plan is, by the use of temporary storage, to reduce fairly high inflow rates to substantially lesser outflow rates. This peak reduction allows the use of smaller and thus less costly downstream facilities. It should be pointed out that the detention basin proposed in this plan is designed for ultimate 100-year frequency storms. Flows exceeding the design capacity of the basin would pass through the emergency spillway in flow patterns approximating present condition.

## MAJOR REVISIONS

This section describes some of the major revisions to the previously adopted Romoland Master Drainage Plan. Revisions may include alignment changes, facility types and sizes and or flow-rate adjustments. Minor changes (such as the downstream extension of Line A-2, elimination of downstream portions of Line A-4, the deletion of Line A-14b and A-6) were the result of mainline realignments described below. **FIGURE 3** depicts the realignment, and modifications made by this master plan revision.

### Line A

This facility has been completely realigned and redesigned to account for basin additions in the Homeland area that have decreased the flow rate anticipated from that area. Line A will be proposed as an earthen open channel west of the freeway, where the alignment closely resembles the District's 1990 preliminary drawings titled "Romoland Channel Line A Stage 1" (project number: 4-0-310, drawing number: 4-552). The portion of Line A upstream of the 215 freeway is a combination of concrete-lined open channel, reinforced concrete box, and reinforced concrete pipe.

The existing topography on the east side of the Interstate 215 is steeper than the west side. As a result, the average slope is greater. The velocities on the east side of Interstate 215 range from 12 feet per second to over 20 feet per second. An earthen channel with that range of velocities would tend to scour and create deposition in the San Jacinto River. This deposition would constitute a hydrologic condition of concern for the San Jacinto River. In addition, this sediment could lead to further impairment of Lake Elsinore (which is listed on the federal Clean Water Act 303(d) list as impaired for sedimentation/siltation). In order to minimize scour potential and significantly reduce the right-of-way required, Line A is proposed as a concrete-lined channel between of Interstate 215 and Palomar Road.

### Line A-3

This facility consists of a concrete-lined open channel along Varela Lane and reinforced concrete box on Palomar Road. The alignment was altered to combine both Line A-3 and Line A-3e. This