# Appendix F: Hydrology Report

PART 1

County of San Bernardino
LAND DEVELOPMENT
**PRELIMINARY**
**APPROVAL**
THE APPROVAL OF THIS REPORT SHALL NOT BE CONSTRUED TO BE A PERMIT FOR ANY DEVELOPMENT OR SITE IMPROVEMENT
By: Timothy Cheng (D8256)
Date: 04/20/2026 8:46:55 AM
This report has Preliminary Approval. Prior to Final Approval of the report, all outstanding comments and requirements shall be met.

timothy.cheng@lus.sbcounty.gov
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# PRELIMINARY HYDROLOGY REPORT
# DRNSTY-2024-00020

FOR

## Tractor Trailer Storage Yard & Building

14044 Whittram Avenue
Fontana, CA
APNs 0230-101-012, 013, 014 & 034

**Prepared for:**

Vernaci Properties, LLC
145 N. 10th Street
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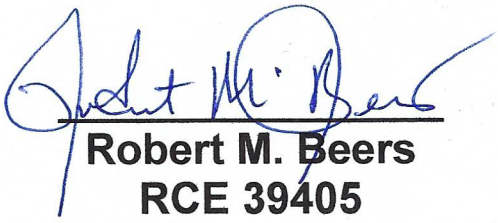
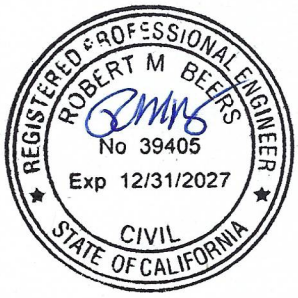
(909) 949-0360

**Initial Submittal: October 30, 2023**
**Revised: July 11, 2025**
**Revised: November 12, 2025**
**Revised: February 17, 2026**
**Revised: March 27, 2026**

**Prepared by:**



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**Preliminary Drainage Report**
**DRNSTY-2024-0002**

## INTRODUCTION

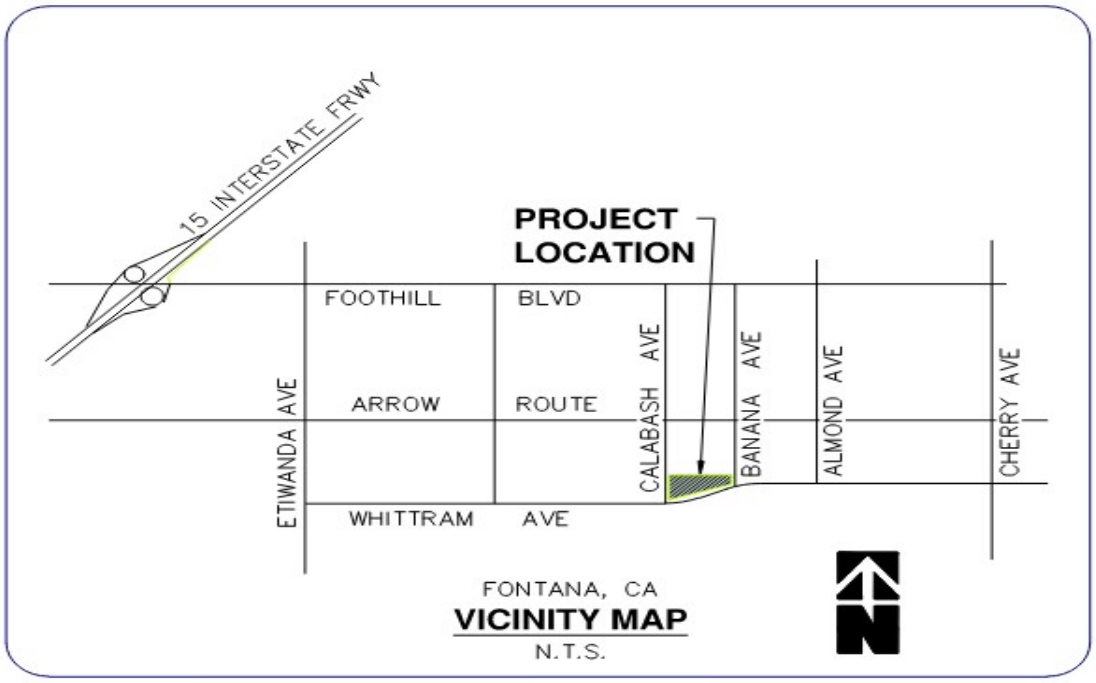
The following report and calculations were prepared to analyze the 2, 10, 25 & 100-year storm runoff from the development of the proposed Tractor Trailer Storage Yard and Building at 14044 Whittram Avenue in the Fontana area of San Bernardino County. Infiltration trenches are proposed as onsite BMPs for treatment of site runoff prior to discharge from the site to the existing storm drain system in Whittram Avenue.

In response to report review comments from SB County, a records requests for storm drain as-builts was submitted to San Bernardino County Flood Control (SBCFCD) (see letter dated 12-01-25 to SBCFCD in report) – no reference plans for the existing catch basins or storm drains in Whittram Avenue were provided by SBCFCD  There are a series of catch basins located around the project site; catch basins on Banana Avenue at Whittram Avenue connect to an existing storm drain system in Whittram Avenue that discharges directly into the Banana Detention Basin; catch basins on Calabash Avenue at Whittram Avenue connect to existing storm drains that outlet into the outlet channel for the Banana Basin; there are two catch basins along Whittram Avenue in the middle of the project site that connect to an existing storm drain that outlets into the outlet channel for the Banana Basin.

Photos of the existing catch basins along Banana Avenue, Whittram Avenue and Calabash Avenue are included at the end of this section for reference. Those locations are shown below in the catch basin index exhibit for reference.

## VICINITY MAP

The proposed project is located on the north side of Whittram Avenue and is bounded by Banana Avenue on the east side of the property and Calabash Avenue to the west of the property.



## SITE BACKGROUND

The proposed project is located on the north side of Whittram Avenue and is bounded by Banana Avenue on the east side of the property and Calabash Avenue to the west of the property. The easterly portion of the site is vacant and undeveloped; the westerly portion of the site has an existing home and outbuildings on the corner of Calabash and Whittram Avenue. There is a mix of industrial -manufacturing uses to the north, west and east of the project site.

Per the City of Fontana Master Storm Drain Plan, the property is located in AOS 1, with Master Plan Storm Drain Line T-9A in Banana and Whittram Avenue connecting to Storm Drain Line T-9 at Calabash Avenue. Storm Drain Line T-9 connections to the San Bernardino County Flood Control District water infiltration basins (Banana Basin) along the south side of Whittram Avenue across the street from the project site. There are two existing catch basins along the project frontage on Whittram Avenue. These catch basins connect to existing storm drain system that outlets into the Banana Basin.

The soil type for the area is Type A per Figure C-13 "Hydrologic Soils Group Map for Southwest – A Area" from the San Bernardino County Hydrology Manual.

A previous hydrology report was prepared for the easterly portion of this site and processed for approval with SB County in 2022. A copy of the previous report is included in the appendices to this report.

## METHODOLOGY

Subareas were determined based on the proposed grading of the site. A link-node model was created for each subarea, with flow path length and elevations shown for the upstream and downstream nodes for the subarea. Peak flowrates were determined for each subarea using the CivilDesign Corporation "SB" rational method hydrology software. The results of those calculations are shown on the site hydrology map included with this report. Separate maps for the existing and developed condition are included with this report.

## ANALYSIS/DISCUSSION

Rational method hydrology calculations have been prepared for 2, 10, 25 & 100-year existing and proposed condition for the project site. In the existing condition the onsite drainage sheet flows across the property out to Whittram Avenue where it is collected by a series of catch basins along the north side of Whittram Avenue, with those flows going to the SBCFCD water infiltration basin (Banana Basin and Outlet channel) on the south side of Whittram Avenue. Area 1 is tributary to a catch basin located nominally in the center of the property, with Area 2 tributary to catch basin located westerly of the property at Calabash Avenue.

The adjacent offsite area immediately to the north of the property does not drain onto the property as there is a 6' high block wall along the north property line of the property that directs that offsite tributary area westerly towards Calabash Avenue.

The project site is shown on two FIRM Panels. The easterly portion of the site near Banana Avenue is shown on Firm Panel 8651H and the westerly portion of the site near Calabash Avenue is shown on Firm Panel 8635J. Those two firm panels are included in the reference materials in the reference materials portion of this report.

As shown on the FIRMETTE for the site, the easterly portion of the property is shown with a 0.2% annual chance flood hazard, areas of 1% annual chance flood with average depth of less than 1foot or with less than 1 square mile tributary area Zone X. The proposed site development includes the construction of a 6' high block wall along the Whittram Avenue frontage, and with the existing 6' high block wall along the northerly (upstream side of the property) there is no pathway for offsite flows to drain onto the site.

Whittram Avenue has a nominal top of curb elevation of 60.50 at the intersection of Whittram Avenue and Banana Avenue. Whittram Avenue slopes to the west, with two catch basins located along the northerly curb line of the street. Catch Basin NO. 1 is nominally in the middle of the site with a top of curb elevation of 54.8 and Catch Basin No. 2 is located at the Calabash Avenue intersection with a top of curb elevation of 49.8.

The proposed building pad elevation is 60.70 with the proposed finished floor elevation of 61.20. The existing top of curb on Whittram Avenue at the proposed driveway entry to the site is nominally 56.40, so the proposed building pad is 4.3 feet above the street frontage top of curb at the proposed driveway entrance. As such, there is no need to address tributary area offsite drainage runoff with the proposed onsite improvements as the proposed grading and wall improvements keep any offsite drainage runoff from entering the site. The existing catch basins are shown on the hydrology maps for reference.

There is not a Flood Plain Map from DWR available for this site.

In the proposed condition the site will be divided into two sub-areas where storm flows will sheet flow across the site towards Whittram Avenue where they will be directed into an infiltration trench system. The infiltration trenches will be located in the proposed landscape area onsite adjacent to the street right-of-way. The site area will be connected via the infiltration trenches and comprise 5.23 acres in total. The flow from these two areas will be conveyed to the existing catch basins on Whittram Avenue located in the middle of the site and west end of the site on the north side of Whittram Avenue as shown on the Site Plan, BMP Map and Hydrology Map.

The following tables show the percentages of pervious and impervious areas for both the existing and developed conditions. In the existing condition, the overall project site is approximately 5.4% impervious and in the developed condition the impervious area increases to approximately 77.8% of the site area for an increase of nominally 73%.

A detailed breakdown of the impervious areas for the existing condition are provide at the end of the text portion of this report.

| Existing Condition - Pervious & Impervious Area | | | | | |
|---|---|---|---|---|---|
| **APN** | **Area (sf)** | **Pervious Area** | **Impervious Area** | **Pervious %** | **Impervious %** |
| 0230-101-034 | 181,965 | 181,965 | 0 | 100.00% | 0.00% |
| 0230-101-012 | 23,334 | 17,267 | 6,067 | 74.00% | 26.00% |
| 0230-101-103 | 22,084 | 17,670 | 4,414 | 80.01% | 19.99% |
| 0230-101-014 | 10,484 | 8,043 | 2,441 | 76.72% | 23.28% |
| **Totals** | **237,867** | **224,945** | **12,922** | **94.57%** | **5.43%** |

**Developed Condition - Pervious & Impervious Area**

| **Description** | **Area (sf)** | **Pervious Area** | **Impervious Area** | **Pervious %** | **Impervious %** |
|---|---|---|---|---|---|
| Landscape | 50,540 | 50,540 | 0 | 100.00% | 0.00% |
| Drive Aisles | 75,876 | 0 | 75,876 | 0.00% | 100.00% |
| Concrete Sidewalk | 1,376 | 0 | 1,376 | 0.00% | 100.00% |
| Tractor Parking | 2,113 | 0 | 2,113 | 0.00% | 100.00% |
| Trailer Parking | 87,117 | 0 | 87,117 | 0.00% | 100.00% |
| Car Parking | 3,217 | 0 | 3,217 | 0.00% | 100.00% |
| Shop Building | 4,500 | 0 | 4,500 | 0.00% | 100.00% |
| Office Building | 3,000 | 0 | 3,000 | 0.00% | 100.00% |
| **Totals** | **227,739** | **50,540** | **177,199** | **22.19%** | **77.81%** |

The drainage areas and peak 2, 10, 25 & 100-year discharges are summarized in the following table:

**Rational Method Calculations**
**Existing Condition**

| **Description** | **Area (Ac.)** | **2-year discharge (cfs)** | **10-year discharge (cfs)** | **25-year discharge (cfs)** | **100-year discharge (cfs)** | **Tc min.** |
|---|---|---|---|---|---|---|
| Area 1 | 1.61 | 0.51 | 1.92 | 2.60 | 4.06 | 16.19 |
| Area 2 | 3.67 | 0.90 | 3.97 | 4.54 | 8.60 | 18.10 |

| Developed Condition | | | | | | |
|---|---|---|---|---|---|---|
| Description | Area (Ac.) | 2-year discharge (cfs) | 10-year discharge (cfs) | 25-year discharge (cfs) | 100-year discharge (cfs) | Tc min. |
| Area A | 0.89 | 0.82 | 1.50 | 1.94 | 2.68 | 12.27 |
| Area B | 4.34 | 5.19 | 8.55 | 10.88 | 14.21 | 11.67 |

## INFILTRATION RATES - PROPOSED PROJECT BMP's

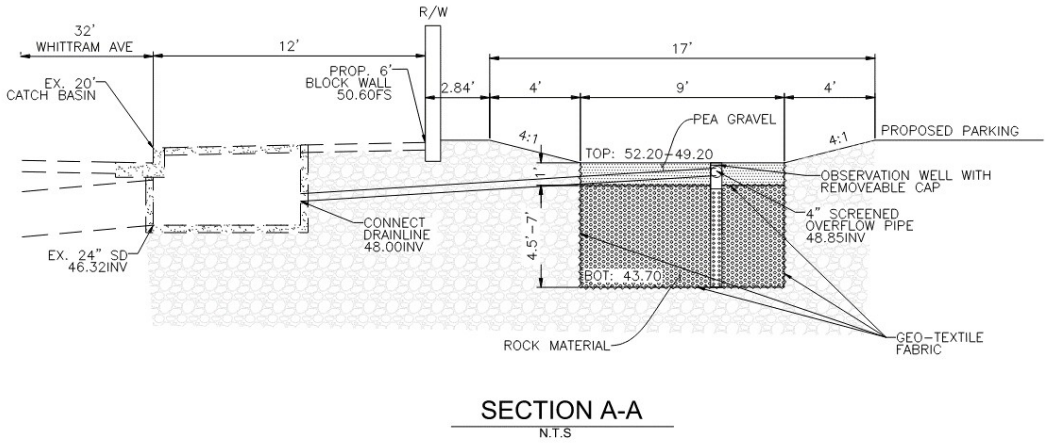
The soils engineer performed infiltration tests at 5 locations on the site. Those locations are shown on both the Developed Condition Hydrology Map and on the Soil Boring Location Map included in the attached Geotechnical Report. The infiltration test results were:

I-1 5.89 inch per hour
I-2 11.4 inch per hour
I-3 6.25 inch per hour
I-4 14.7 inch per hour
I-5 3.45 inch per hour

An average infiltration rate for the site based on the above values is 8.34 inch per hour. We reduced that value nominally 50% to 4 inch per hour for use in calculating the infiltration rate for the composite basin.

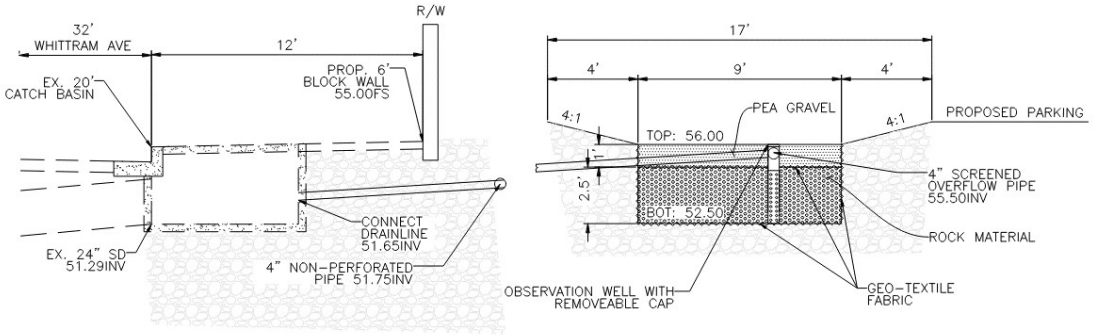
Based on these results we selected an infiltration trench system to mitigate incremental increase in runoff and treatment for site flows. Based on soil infiltration test results we have selected an infiltration trench system. The details of the proposed infiltration trench system are described in detail in the Preliminary Water Quality Management Plan prepared for this project. The BMP map is included with the hydrology maps for reference.

Section A-A from the BMP map shows the portion of the infiltration ditch lying westerly of the site entry drive




SECTION A-A
N.T.S

Section B-B from the BMP map shows the portion of the infiltration ditch lying easterly of the site entry drive.




SECTION B-B
N.T.S

## Onsite Detention Basin (Infiltration Trench)

A composite unit hydrograph for the developed condition was prepared and then routed through the infiltration trench/basin. The simplifying assumption was made to combine the infiltration trenches into a "single basin" for flood routing purposes. We used a 40% void ratio for the rock portion of the infiltration trench and 40% void ratio for the pea gravel portion of the infiltration trench to calculate the storage volume of the infiltration Trench. A value of 0.686 cfs was determined for the base flow rate for the infiltration trench used in the basin routing calculations based on an infiltration rate of 4 inch per hour.

## Infiltration Trench - Basin Routing

We prepared a routed flood hydrograph for the 100 year – 3 hour storm.
Per those calculations, the peak inflow is 17.15 cfs with a peak outflow of 1.88 cfs.

Peak inflow of 17.15 cfs occurs at hour 4.25
Peak outflow of 1.88 cfs occurs from hour 4.917 to hour 5.50

The infiltration trench is 5.5'deep so maximum "ponded depth of water" in basin above the trench is nominally 1.5' (5.5' trench + 1.5 ' basin) for depth of 6.97' in routing calculations.

Infiltration Trench fills to depth of 5.5' by hour 3.75
Water in basin above infiltration trench from hour 3.75 to hour 10.5

No water ponded in basin above trench after hour 10.5 (depth in trench/basin less than 5.5')

## Comparison of BMP Design Capture Volume to Infiltration Trench- Basin

The proposed Infiltration Trench-Basin using a depth of 1' above the infiltration trench rock provides 159% of the required Design Capture Volume as determined on BMP Form 4.2-1 – see summary comparison below.

| | LID Performance Criteria | | | Infiltration LID BMP | | |
|---|---|---|---|---|---|---|
| | BMP Form 4.2-1 | | | BMP Form 4.3-2 | | |
| | Required Target DCV | | | Provided DCV | | |
| Description | DA-1 | DA-2 | Total | DA-1 | DA-2 | Total |
| Design Capture Volume (cf) | 16,600.97 | 1,506.56 | 18,107.53 | 17,361.00 | 1,544.50 | 18,905.50 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Onsite Infiltration Trench/Basin | | | | | | |
| Volume Provided with 1' of ponding on top of rock | | | 28,768.00 | | | 28,768.00 |
| | | | | | | |
| Percentage provided | | | 159% | | | 152% |

**From Flood Routing Calculations**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 3.000 | 2.36 | 0.69 | 0.253 | O I | | | | 3.74 |
| 3.083 | 2.45 | 0.69 | 0.265 | O I | | | | 3.91 |
| 3.167 | 2.54 | 0.69 | 0.277 | O I | | | | 4.09 |
| 3.250 | 2.65 | 0.69 | 0.290 | O I | | | | 4.26 |
| 3.333 | 2.76 | 0.69 | 0.304 | O I | | | | 4.45 |
| 3.417 | 2.87 | 0.69 | 0.319 | O I | | | | 4.66 |
| 3.500 | 2.83 | 0.69 | 0.334 | O I | | | | 4.89 |
| 3.583 | 2.75 | 0.69 | 0.348 | O I | | | | 5.10 |
| 3.667 | 2.86 | 0.69 | 0.363 | O I | | | | 5.32 |
| 3.750 | 3.12 | 0.72 | 0.379 | O I | | | | 5.52 |
| 3.833 | 3.55 | 0.87 | 0.396 | O I | | | | 5.60 |
| 3.917 | 4.23 | 1.05 | 0.416 | O I | | | | 5.69 |
| 4.000 | 5.45 | 1.21 | 0.442 | O | I | | | 5.80 |
| 4.083 | 8.54 | 1.33 | 0.481 | O | I | | | 5.94 |
| 4.167 | 15.19 | 1.52 | 0.553 | O | | | I | 6.19 |
| 4.250 | 17.15 | 1.67 | 0.654 | O | | | I | 6.48 |
| 4.333 | 10.06 | 1.78 | 0.736 | O | | I | | 6.71 |
| 4.417 | 5.45 | 1.83 | 0.777 | O | I | | | 6.82 |
| 4.500 | 3.68 | 1.84 | 0.795 | O I | | | | 6.87 |
| 4.583 | 3.29 | 1.86 | 0.807 | O I | | | | 6.90 |
| 4.667 | 2.83 | 1.86 | 0.815 | O I | | | | 6.93 |
| 4.750 | 2.60 | 1.87 | 0.821 | OI | | | | 6.94 |
| 4.833 | 2.41 | 1.87 | 0.825 | OI | | | | 6.95 |
| 4.917 | 2.26 | 1.88 | 0.828 | OI | | | | 6.96 |
| 5.000 | 2.13 | 1.88 | 0.830 | O | | | | 6.97 |
| 5.083 | 2.02 | 1.88 | 0.832 | O | | | | 6.97 |
| 5.167 | 1.93 | 1.88 | 0.833 | O | | | | 6.97 |
| 5.250 | 1.85 | 1.88 | 0.833 | O | | | | 6.97 |
| 5.333 | 1.78 | 1.88 | 0.832 | O | | | | 6.97 |
| 5.417 | 1.72 | 1.88 | 0.831 | O | | | | 6.97 |
| 5.500 | 1.66 | 1.88 | 0.830 | O | | | | 6.97 |

## CONCLUSION

Based on the calculations and proposed improvements, onsite flows can be conveyed to suitable points of disposal, and the proposed site development will not impact offsite properties. The are no offsite tributary flows to impact this site due the site grading and proposed perimeter wall improvements along Whittram Avenue that keep all offsite flows along Banana Avenue and Whittram Avenue so there are no impacts from offsite flows. The proposed Office Building and proposed Shop Building are adequately protected by the site grading and drainage design.

While this project is not required to mitigate incremental increases in runoff due to the direct storm drain connection to the ultimate MS4 improvements, the infiltration trench is able to reduce the peak flow rate from 17.15 cfs to 1.88 cfs as shown in the following portion of the flood routed unit hydrograph – see Appendix B for the full Unit Hydrograph calculations and the Basin Routing Calculations. The onsite infiltration trench/basin reduces peak flows in the developed condition below the existing condition flow rates so there are no impacts to offsite properties,

Renteria Ownership portion

Whittram Truck-Trailer Storage

**Renteria Property**

| APN | Lot Area | |
|---|---|---|
| 0230-101-012 | 23,334 | |
| **Impervious Area** | | |
| **Description** | **Area (sf)** | |
| Asphalt | 798 | |
| Building | 972 | |
| Overhang roof | 298 | |
| concrete | 2,258 | |
| Building | 556 | |
| Building | 957 | |
| concrete | 7 | |
| concrete | 221 | |
| Subtotal | 6,067 | |
| | | Percentage |
| Lot Area | 23,334 | 100.00% |
| Impervious Area | 6,067 | 26.00% |
| Pervious Area | 17,267 | 74.00% |

| APN | Lot Area | |
|---|---|---|
| 0230-101-013 | 22,084 | |
| **Impervious Area** | | |
| **Description** | **Area (sf)** | |
| Asphalt | 2,391 | |
| Building | 960 | |
| Concrete | 1,063 | |
| | 4,414 | |
| | | Percentage |
| Lot Area | 22,084 | 100.00% |
| Impervious Area | 4,414 | 19.99% |
| Pervious Area | 17,670 | 80.01% |

| APN | Lot Area | |
|---|---|---|
| 0230-101-014 | 10,484 | |
| **Impervious Area** | | |
| **Description** | **Area (sf)** | |
| Building | 2,020 | |
| Building | 421 | |
| | 2,441 | |
| | | Percentage |
| Lot Area | 10,484 | 100.00% |
| Impervious Area | 2,441 | 23.28% |
| Pervious Area | 8,043 | 76.72% |

| Total of all three APNs | Area (sf) | Percentage |
|---|---|---|
| Lot Area | 55,902 | |
| Impervious Area | 12,922 | 23.12% |
| Pervious Area | 42,980 | 76.88% |

| Existing Condition - Pervious & Impervious Area | | | | | |
|---|---|---|---|---|---|
| **APN** | **Area (sf)** | **Pervious Area** | **Impervious Area** | **Pervious %** | **Impervious %** |
| 0230-101-034 | 181,965 | 181,965 | 0 | 100.00% | 0.00% |
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| 0230-101-014 | 10,484 | 8,043 | 2,441 | 76.72% | 23.28% |
| **Totals** | **237,867** | **224,945** | **12,922** | **94.57%** | **5.43%** |

**Developed Conditon - Pervious & Impervious Area**

| Description | Area (sf) | Pervious Area | Impervious Area | Pervious % | Impervious % |
|---|---|---|---|---|---|
| Landscape | 50,540 | 50,540 | 0 | 100.00% | 0.00% |
| Drive Aisles | 75,876 | 0 | 75,876 | 0.00% | 100.00% |
| Concrete Sidewalk | 1,376 | 0 | 1,376 | 0.00% | 100.00% |
| Tractor Parking | 2,113 | 0 | 2,113 | 0.00% | 100.00% |
| Trailer Parking | 87,117 | 0 | 87,117 | 0.00% | 100.00% |
| Car Parking | 3,217 | 0 | 3,217 | 0.00% | 100.00% |
| Shop Building | 4,500 | 0 | 4,500 | 0.00% | 100.00% |
| Office Building | 3,000 | 0 | 3,000 | 0.00% | 100.00% |
| **Totals** | **227,739** | **50,540** | **177,199** | **22.19%** | **77.81%** |

Whittram Ave Project
Between Banana and Calabash
Legend
Alexa's Cafe Mexican Grill
Almond Elementary School
Feature 1
Feature 2
Paduma Monastery
Parking
Psalms Coffee
WinCo Foods
Project Site
Banana Ave
Calabash Ave
Catch Basin
Catch Basin
Catch Basin
Catch Basin
Banana Basin
Catch Basin
Catch Basin
Catch Basin
Catch Basin
SD Outlet
SD Outlet
SD Outlet
Corner Market
Arrow Route
EGR Diesel
Western Pacific Crane & Equipment
Paduma Monastery
Fontana Diesel Repair
BrightView Landscapes
Whittram Ave
VGNODN WHOLESALE CABINETRY
Metal Sales Manufacturing
Parking 10
Back Straight Rd Parking
Back Straight Rd
Perimeter Rd
Google Earth
Image Landsat / Copernicus
N
1000 ft

**Existing Catch Basins – Storm Drains in project area**

**Banana Avenue - Whittram Avenue Intersection**

**21' Catch Basin on East Side of Banana Avenue at Whittram Avenue**

**21’ Catch Basin on West Side of Banana Avenue at Whittram Avenue**

**21’ Catch Basin on West Side of Banana Avenue at Whittram Avenue**

**21’ Catch Basin north side of Whittram Avenue – middle of project site**

**21’ Catch Basin south side of Whittram Avenue – middle of project sit**

**Calabash – Whittram Avenue Intersection**

**21’ Catch Basin on East Side of Calabash Avenue at Whittram Avenue**

**21’ Catch Basin on West Side of Calabash Avenue at Whittram Avenue**

**21’ Catch Basin on West Side of Calabash Avenue at Whittram Avenue**

**21’ Catch Basin on North Side of Whittram Ave – west of Calabash Ave**

**21’ Catch Basin on North Side of Whittram Ave – east of Calabash Ave**

**21’ Catch Basin on South Side of Whittram Ave – east of Calabash Ave**

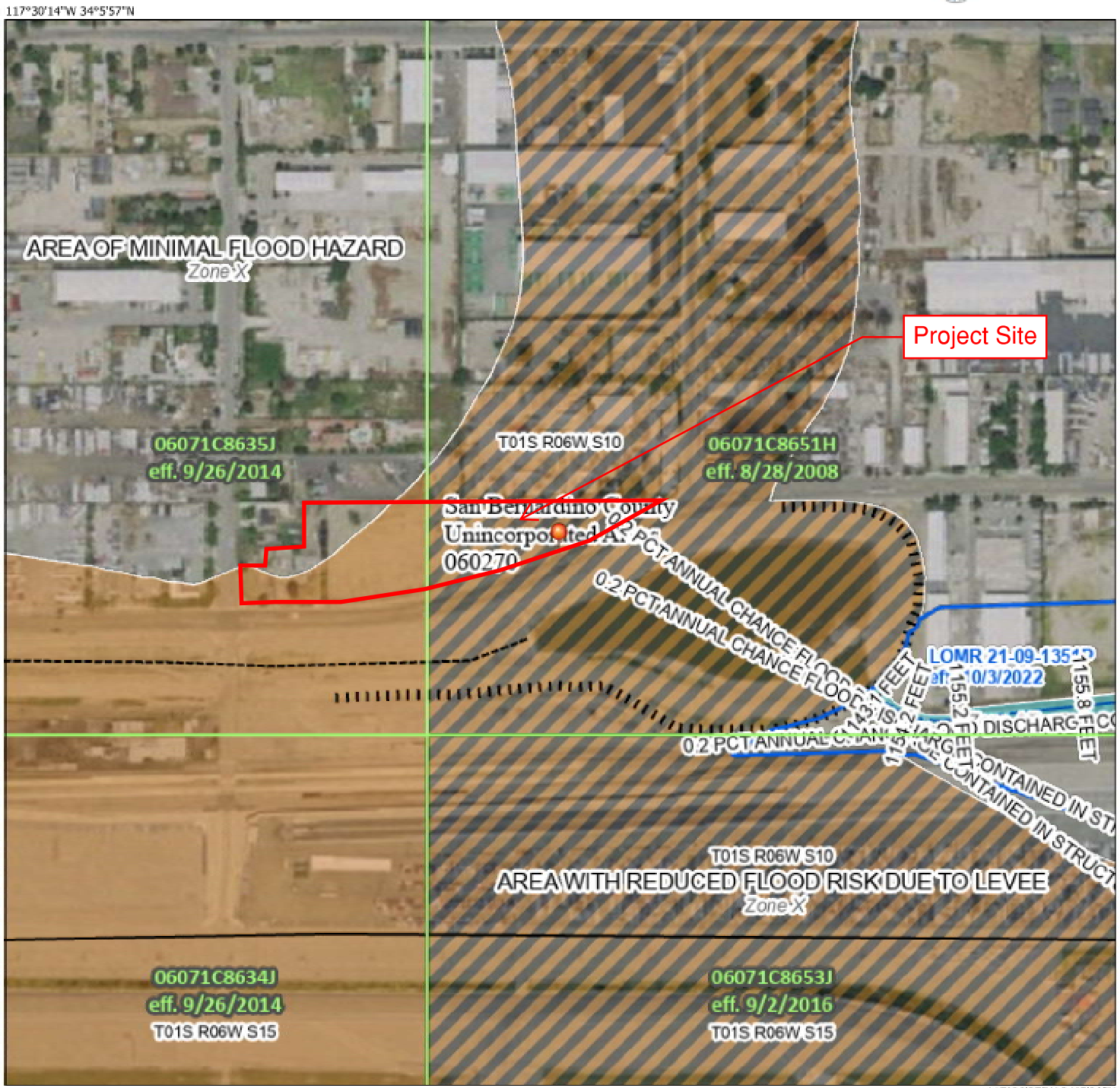
**Storm Drain Outlet into Banana Basin discharge channel – east of Calabash**

**Storm  Drain Cleanout – south side Whittram Avenue – West of Calabash**

**Storm Drain Outlet into Banana Basin discharge channel – west of Calabash**

# National Flood Hazard Layer FIRMette

FEMA




## Legend

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

**SPECIAL FLOOD HAZARD AREAS**
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

**OTHER AREAS OF FLOOD HAZARD**
- 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 *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

**OTHER AREAS**
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

**GENERAL STRUCTURES**
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

**OTHER FEATURES**
- 20.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

**MAP PANELS**
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

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 7/10/2025 at 11:36 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 A
# Existing Condition Rational Method Calculations

## 2-year
## 10-year
## 25-year
## 100-year

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 10/25/23

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14044 Whittram Avenue - Area 1
Existing Condition
2 year storm flows
RMB

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Program License Serial Number 6288

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********* Hydrology Study Control Information **********

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Rational hydrology study storm event year is 2.0
Computed rainfall intensity:
Storm year = 2.00 1 hour rainfall = 0.542 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 1

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Process from Point/Station 100.000 to Point/Station 101.000
**** INITIAL AREA EVALUATION ****

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UNDEVELOPED (poor cover) subarea
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 67.00
Adjusted SCS curve number for AMC 1 = 47.40
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.840(In/Hr)
Initial subarea data:
Initial area flow distance = 554.000(Ft.)
Top (of initial area) elevation = 60.900(Ft.)
Bottom (of initial area) elevation = 54.800(Ft.)
Difference in elevation = 6.100(Ft.)
Slope = 0.01101 s(%)= 1.10
TC = k(0.525)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 16.188 min.
Rainfall intensity = 1.190(In/Hr) for a 2.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.265

Subarea runoff =  0.507(CFS)
Total initial stream area =  1.610(Ac.)
Pervious area fraction = 1.000
Initial area Fm value =  0.840(In/Hr)
End of computations, Total Study Area =  1.61 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged SCS curve number =  67.0

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 10/25/23

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14044 Whitram Avenue - Area 2
Existing Condition
2 year storm flows
RMB

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Program License Serial Number 6288

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********* Hydrology Study Control Information **********

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Rational hydrology study storm event year is 2.0
Computed rainfall intensity:
Storm year = 2.00 1 hour rainfall = 0.542 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 1

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Process from Point/Station 110.000 to Point/Station 111.000
**** INITIAL AREA EVALUATION ****

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UNDEVELOPED (poor cover) subarea
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 67.00
Adjusted SCS curve number for AMC 1 = 47.40
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.840(In/Hr)
Initial subarea data:
Initial area flow distance = 822.000(Ft.)
Top (of initial area) elevation = 60.500(Ft.)
Bottom (of initial area) elevation = 49.100(Ft.)
Difference in elevation = 11.400(Ft.)
Slope = 0.01387 s(%)= 1.39
TC = k(0.525)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 18.101 min.
Rainfall intensity = 1.112(In/Hr) for a 2.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.220

Subarea runoff =      0.900(CFS)
Total initial stream area =        3.670(Ac.)
Pervious area fraction = 1.000
Initial area Fm value =    0.840(In/Hr)
End of computations, Total Study Area =            3.67 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged SCS curve number =  67.0

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 10/25/23

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14044 Whittram Avenue - Area 1
Existing Condition
10 year storm flows
RMB

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Program License Serial Number 6288

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********* Hydrology Study Control Information **********

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Rational hydrology study storm event year is 10.0
Computed rainfall intensity:
Storm year = 10.00 1 hour rainfall = 0.867 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 2

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Process from Point/Station 100.000 to Point/Station 101.000
**** INITIAL AREA EVALUATION ****

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UNDEVELOPED (poor cover) subarea
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 67.00
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.578(In/Hr)
Initial subarea data:
Initial area flow distance = 554.000(Ft.)
Top (of initial area) elevation = 60.900(Ft.)
Bottom (of initial area) elevation = 54.800(Ft.)
Difference in elevation = 6.100(Ft.)
Slope = 0.01101 s(%)= 1.10
TC = k(0.525)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 16.188 min.
Rainfall intensity = 1.903(In/Hr) for a 10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.626
Subarea runoff = 1.919(CFS)

Total initial stream area =  1.610(Ac.)
Pervious area fraction = 1.000
Initial area Fm value =  0.578(In/Hr)
End of computations, Total Study Area =  1.61 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged SCS curve number =  67.0

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

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Rational Hydrology Study Date: 10/25/23

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14044 Whitram Avenue - Area 2
Existing Condition
10 year storm flows
RMB

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Program License Serial Number 6288

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********* Hydrology Study Control Information **********

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Rational hydrology study storm event year is 10.0
Computed rainfall intensity:
Storm year = 10.00 1 hour rainfall = 0.867 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 2

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Process from Point/Station 110.000 to Point/Station 111.000
**** INITIAL AREA EVALUATION ****

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UNDEVELOPED (poor cover) subarea
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 67.00
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.578(In/Hr)
Initial subarea data:
Initial area flow distance = 822.000(Ft.)
Top (of initial area) elevation = 60.500(Ft.)
Bottom (of initial area) elevation = 49.100(Ft.)
Difference in elevation = 11.400(Ft.)
Slope = 0.01387 s(%)= 1.39
TC = k(0.525)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 18.101 min.
Rainfall intensity = 1.779(In/Hr) for a 10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.608
Subarea runoff = 3.967(CFS)

Total initial stream area =  3.670(Ac.)
Pervious area fraction = 1.000
Initial area Fm value =  0.578(In/Hr)
End of computations, Total Study Area =  3.67 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged SCS curve number =  67.0

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0

Rational Hydrology Study Date: 11/11/25

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14044 Whittram Avenue - Area 1
Existing Condition
25 year storm flows
RMB

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Program License Serial Number 6288

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********* Hydrology Study Control Information **********

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Rational hydrology study storm event year is 25.0
Computed rainfall intensity:
Storm year = 25.00 1 hour rainfall = 1.080 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 2

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Process from Point/Station 100.000 to Point/Station 101.000
**** INITIAL AREA EVALUATION ****

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UNDEVELOPED (poor cover) subarea
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 67.00
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.578(In/Hr)
Initial subarea data:
Initial area flow distance = 554.000(Ft.)
Top (of initial area) elevation = 60.900(Ft.)
Bottom (of initial area) elevation = 54.800(Ft.)
Difference in elevation = 6.100(Ft.)
Slope = 0.01101 s(%)= 1.10
TC = k(0.525)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 16.188 min.
Rainfall intensity = 2.370(In/Hr) for a 25.0 year storm

Effective runoff coefficient used for area (Q=KCIA) is C = 0.680
Subarea runoff = 2.597(CFS)
Total initial stream area = 1.610(Ac.)
Pervious area fraction = 1.000
Initial area Fm value = 0.578(In/Hr)
End of computations, Total Study Area = 1.61 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged SCS curve number = 67.0

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0

Rational Hydrology Study Date: 11/11/25

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14044 Whitram Avenue - Area 2
Existing Condition
25 year storm flows
RMB

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Program License Serial Number 6288

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********* Hydrology Study Control Information **********

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Rational hydrology study storm event year is 25.0
10 Year storm 1 hour rainfall = 0.867(In.)
100 Year storm 1 hour rainfall = 1.080(In.)
Computed rainfall intensity:
Storm year = 25.00 1 hour rainfall = 0.952 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 2

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Process from Point/Station 110.000 to Point/Station 111.000
**** INITIAL AREA EVALUATION ****

UNDEVELOPED (poor cover) subarea
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 67.00
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.578(In/Hr)
Initial subarea data:
Initial area flow distance = 822.000(Ft.)
Top (of initial area) elevation = 60.500(Ft.)
Bottom (of initial area) elevation = 49.100(Ft.)
Difference in elevation = 11.400(Ft.)
Slope = 0.01387 s(%)= 1.39
TC = k(0.525)*[(length^3)/(elevation change)]^0.2

Initial area time of concentration = 18.101 min.
Rainfall intensity = 1.953(In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.634
Subarea runoff = 4.542(CFS)
Total initial stream area = 3.670(Ac.)
Pervious area fraction = 1.000
Initial area Fm value = 0.578(In/Hr)
End of computations, Total Study Area = 3.67 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged SCS curve number = 67.0

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 10/25/23

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14044 Whittram Avenue - Area 1
Existing Condition
100 year storm flows
RMB

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Program License Serial Number 6288

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********* Hydrology Study Control Information **********

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Rational hydrology study storm event year is 100.0
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.410 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 3

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Process from Point/Station 100.000 to Point/Station 101.000
**** INITIAL AREA EVALUATION ****

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UNDEVELOPED (poor cover) subarea
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 67.00
Adjusted SCS curve number for AMC 3 = 84.60
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.290(In/Hr)
Initial subarea data:
Initial area flow distance = 554.000(Ft.)
Top (of initial area) elevation = 60.900(Ft.)
Bottom (of initial area) elevation = 54.800(Ft.)
Difference in elevation = 6.100(Ft.)
Slope = 0.01101 s(%)= 1.10
TC = k(0.525)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 16.188 min.
Rainfall intensity = 3.094(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.816

Subarea runoff =      4.064(CFS)
Total initial stream area =        1.610(Ac.)
Pervious area fraction = 1.000
Initial area Fm value =    0.290(In/Hr)
End of computations, Total Study Area =            1.61 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged SCS curve number =  67.0

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 10/25/23

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14044 Whitram Avenue - Area 2
Existing Condition
100 year storm flows
RMB

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Program License Serial Number 6288

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********* Hydrology Study Control Information **********

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Rational hydrology study storm event year is 100.0
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.410 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 3

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Process from Point/Station 110.000 to Point/Station 111.000
**** INITIAL AREA EVALUATION ****

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UNDEVELOPED (poor cover) subarea
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 67.00
Adjusted SCS curve number for AMC 3 = 84.60
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.290(In/Hr)
Initial subarea data:
Initial area flow distance = 822.000(Ft.)
Top (of initial area) elevation = 60.500(Ft.)
Bottom (of initial area) elevation = 49.100(Ft.)
Difference in elevation = 11.400(Ft.)
Slope = 0.01387 s(%)= 1.39
TC = k(0.525)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 18.101 min.
Rainfall intensity = 2.894(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.810

Subarea runoff =      8.601(CFS)
Total initial stream area =        3.670(Ac.)
Pervious area fraction = 1.000
Initial area Fm value =    0.290(In/Hr)
End of computations, Total Study Area =            3.67 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged SCS curve number =  67.0

# Appendix B
# Proposed Condition Rational Method Calculations

## 2-year
## 10-year
## 25-year
## 100-year

## 100 Year – 3 hour Unit Hydrograph proposed condition
## Basin Routing for the 100 Year – 3 hour UH

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 10/30/23

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Whittram Avenue Truck - Trailer Storage Facility
Developed Condition
2-year storm flows
RMB

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Program License Serial Number 6288

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********* Hydrology Study Control Information **********

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Rational hydrology study storm event year is 2.0
Computed rainfall intensity:
Storm year = 2.00 1 hour rainfall = 0.542 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 1

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Process from Point/Station 100.000 to Point/Station 101.000
**** INITIAL AREA EVALUATION ****

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PARK subarea
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Adjusted SCS curve number for AMC 1 = 16.60
Pervious ratio(Ap) = 0.8500 Max loss rate(Fm)= 0.850(In/Hr)
Initial subarea data:
Initial area flow distance = 416.000(Ft.)
Top (of initial area) elevation = 61.600(Ft.)
Bottom (of initial area) elevation = 54.800(Ft.)
Difference in elevation = 6.800(Ft.)
Slope = 0.01635 s(%)= 1.63
TC = k(0.483)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 12.272 min.
Rainfall intensity = 1.405(In/Hr) for a 2.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.355

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Subarea runoff =      0.170(CFS)
Total initial stream area =        0.340(Ac.)
Pervious area fraction = 0.850
Initial area Fm value =    0.850(In/Hr)


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Process from Point/Station      102.000 to Point/Station      101.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 1 = 16.60
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.100(In/Hr)
Time of concentration =    12.27 min.
Rainfall intensity =      1.405(In/Hr) for a     2.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.652
Subarea runoff =      0.646(CFS) for    0.550(Ac.)
Total runoff =      0.815(CFS)
Effective area this stream =        0.89(Ac.)
Total Study Area (Main Stream No. 1) =        0.89(Ac.)
Area averaged Fm value =    0.387(In/Hr)
End of computations, Total Study Area =            0.89 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.387
Area averaged SCS curve number =  32.0
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San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0

Rational Hydrology Study Date: 02/18/26

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Whittram Avenue Truck-Trailer Storage Yard
Developed Condition
2-year storm flows
RMB

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Program License Serial Number 6288

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********* Hydrology Study Control Information **********

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Rational hydrology study storm event year is 2.0
Computed rainfall intensity:
Storm year = 2.00 1 hour rainfall = 0.542 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 1

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Process from Point/Station 103.000 to Point/Station 104.000
**** INITIAL AREA EVALUATION ****

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COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Adjusted SCS curve number for AMC 1 = 16.60
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.100(In/Hr)
Initial subarea data:
Initial area flow distance = 919.000(Ft.)
Top (of initial area) elevation = 59.500(Ft.)
Bottom (of initial area) elevation = 50.200(Ft.)
Difference in elevation = 9.300(Ft.)
Slope = 0.01012 s(%)= 1.01
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 11.673 min.

Rainfall intensity = 1.447(In/Hr) for a 2.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.838
Subarea runoff = 5.263(CFS)
Total initial stream area = 4.340(Ac.)
Pervious area fraction = 0.100
Initial area Fm value = 0.100(In/Hr)
End of computations, Total Study Area = 4.34 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.100
Area averaged SCS curve number = 32.0

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

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Rational Hydrology Study Date: 10/30/23

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Whittram Avenue Truck - Trailer Storage Facility
Developed Condition
10-year storm flows
RMB

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Program License Serial Number 6288

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********* Hydrology Study Control Information **********

---

Rational hydrology study storm event year is 10.0
Computed rainfall intensity:
Storm year = 10.00 1 hour rainfall = 0.867 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 2

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Process from Point/Station 100.000 to Point/Station 101.000
**** INITIAL AREA EVALUATION ****

---

PARK subarea
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Pervious ratio(Ap) = 0.8500 Max loss rate(Fm)= 0.831(In/Hr)
Initial subarea data:
Initial area flow distance = 416.000(Ft.)
Top (of initial area) elevation = 61.600(Ft.)
Bottom (of initial area) elevation = 54.800(Ft.)
Difference in elevation = 6.800(Ft.)
Slope = 0.01635 s(%)= 1.63
TC = k(0.483)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 12.272 min.
Rainfall intensity = 2.247(In/Hr) for a 10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.567
Subarea runoff = 0.433(CFS)

```
Total initial stream area =        0.340(Ac.)
Pervious area fraction = 0.850
Initial area Fm value =    0.831(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      102.000 to Point/Station      101.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------------
COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.098(In/Hr)
Time of concentration =    12.27 min.
Rainfall intensity =      2.247(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.749
Subarea runoff =      1.064(CFS) for    0.550(Ac.)
Total runoff =      1.497(CFS)
Effective area this stream =        0.89(Ac.)
Total Study Area (Main Stream No. 1) =        0.89(Ac.)
Area averaged Fm value =    0.378(In/Hr)
End of computations, Total Study Area =            0.89 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.387
Area averaged SCS curve number =  32.0
```

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0

Rational Hydrology Study Date: 02/18/26

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Whittram Avenue Truck-Trailer Storage Yard
Developed Condition
10-year storm flows
RMB

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Program License Serial Number 6288

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********* Hydrology Study Control Information **********

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Rational hydrology study storm event year is 10.0
Computed rainfall intensity:
Storm year = 10.00 1 hour rainfall = 0.867 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 2

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station 103.000 to Point/Station 104.000
**** INITIAL AREA EVALUATION ****

---

COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.098(In/Hr)
Initial subarea data:
Initial area flow distance = 919.000(Ft.)
Top (of initial area) elevation = 59.500(Ft.)
Bottom (of initial area) elevation = 50.200(Ft.)
Difference in elevation = 9.300(Ft.)
Slope = 0.01012 s(%)= 1.01
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 11.673 min.
Rainfall intensity = 2.315(In/Hr) for a 10.0 year storm

Effective runoff coefficient used for area (Q=KCIA) is C = 0.862
Subarea runoff = 8.662(CFS)
Total initial stream area = 4.340(Ac.)
Pervious area fraction = 0.100
Initial area Fm value = 0.098(In/Hr)
End of computations, Total Study Area = 4.34 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.100
Area averaged SCS curve number = 32.0

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0

Rational Hydrology Study Date: 11/11/25

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Whittram Avenue Truck - Trailer Storage Facility
Developed Condition
25-year storm flows
RMB

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Program License Serial Number 6288

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********* Hydrology Study Control Information **********

---

Rational hydrology study storm event year is 25.0
Computed rainfall intensity:
Storm year = 25.00 1 hour rainfall = 1.080 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 2

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station 100.000 to Point/Station 101.000
**** INITIAL AREA EVALUATION ****

PARK subarea
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Pervious ratio(Ap) = 0.8500 Max loss rate(Fm)= 0.831(In/Hr)
Initial subarea data:
Initial area flow distance = 416.000(Ft.)
Top (of initial area) elevation = 61.600(Ft.)
Bottom (of initial area) elevation = 54.800(Ft.)
Difference in elevation = 6.800(Ft.)
Slope = 0.01635 s(%)= 1.63
TC = k(0.483)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 12.272 min.
Rainfall intensity = 2.799(In/Hr) for a 25.0 year storm

```
Effective runoff coefficient used for area (Q=KCIA) is C = 0.633
Subarea runoff =      0.602(CFS)
Total initial stream area =        0.340(Ac.)
Pervious area fraction = 0.850
Initial area Fm value =    0.831(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      102.000 to Point/Station      101.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.098(In/Hr)
Time of concentration =    12.27 min.
Rainfall intensity =      2.799(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.778
Subarea runoff =      1.337(CFS) for    0.550(Ac.)
Total runoff =      1.939(CFS)
Effective area this stream =        0.89(Ac.)
Total Study Area (Main Stream No. 1) =        0.89(Ac.)
Area averaged Fm value =    0.378(In/Hr)
End of computations, Total Study Area =            0.89 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.387
Area averaged SCS curve number =  32.0
```

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0

Rational Hydrology Study Date: 02/18/26

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Whittram Avenue Truck-Trailer Storage Yard
Developed Condition
25-year storm flows
RMB

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Program License Serial Number 6288

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********* Hydrology Study Control Information **********

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Rational hydrology study storm event year is 25.0
Computed rainfall intensity:
Storm year = 25.00 1 hour rainfall = 1.080 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 2

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station 103.000 to Point/Station 104.000
**** INITIAL AREA EVALUATION ****

---

COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.098(In/Hr)
Initial subarea data:
Initial area flow distance = 919.000(Ft.)
Top (of initial area) elevation = 59.500(Ft.)
Bottom (of initial area) elevation = 50.200(Ft.)
Difference in elevation = 9.300(Ft.)
Slope = 0.01012 s(%)= 1.01
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 11.673 min.
Rainfall intensity = 2.884(In/Hr) for a 25.0 year storm

Effective runoff coefficient used for area (Q=KCIA) is C = 0.869
Subarea runoff = 10.883(CFS)
Total initial stream area = 4.340(Ac.)
Pervious area fraction = 0.100
Initial area Fm value = 0.098(In/Hr)
End of computations, Total Study Area = 4.34 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.100
Area averaged SCS curve number = 32.0

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 10/30/23

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Whittram Avenue Truck - Trailer Storage Facility
Developed Condition
100-year storm flows
RMB

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Program License Serial Number 6288

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********* Hydrology Study Control Information **********

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Rational hydrology study storm event year is 100.0
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.410 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 3

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

Process from Point/Station 100.000 to Point/Station 101.000
**** INITIAL AREA EVALUATION ****

---

PARK subarea
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.8500 Max loss rate(Fm)= 0.667(In/Hr)
Initial subarea data:
Initial area flow distance = 416.000(Ft.)
Top (of initial area) elevation = 61.600(Ft.)
Bottom (of initial area) elevation = 54.800(Ft.)
Difference in elevation = 6.800(Ft.)
Slope = 0.01635 s(%)= 1.63
TC = k(0.483)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 12.272 min.
Rainfall intensity = 3.654(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.736

```
Subarea runoff =      0.914(CFS)
Total initial stream area =        0.340(Ac.)
Pervious area fraction = 0.850
Initial area Fm value =    0.667(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      102.000 to Point/Station      101.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.079(In/Hr)
Time of concentration =    12.27 min.
Rainfall intensity =      3.654(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.825
Subarea runoff =      1.770(CFS) for    0.550(Ac.)
Total runoff =      2.684(CFS)
Effective area this stream =        0.89(Ac.)
Total Study Area (Main Stream No. 1) =        0.89(Ac.)
Area averaged Fm value =    0.303(In/Hr)
End of computations, Total Study Area =            0.89 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.387
Area averaged SCS curve number =  32.0
```

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0

Rational Hydrology Study Date: 02/18/26

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Whittram Avenue Truck-Trailer Storage Yard
Developed Condition
100-year storm flows
RMB

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Program License Serial Number 6288

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********* Hydrology Study Control Information **********

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Rational hydrology study storm event year is 100.0
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.410 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 3

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station 103.000 to Point/Station 104.000
**** INITIAL AREA EVALUATION ****

---

COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.079(In/Hr)
Initial subarea data:
Initial area flow distance = 919.000(Ft.)
Top (of initial area) elevation = 59.500(Ft.)
Bottom (of initial area) elevation = 50.200(Ft.)
Difference in elevation = 9.300(Ft.)
Slope = 0.01012 s(%)= 1.01
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 11.673 min.

Rainfall intensity = 3.765(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.881
Subarea runoff = 14.401(CFS)
Total initial stream area = 4.340(Ac.)
Pervious area fraction = 0.100
Initial area Fm value = 0.079(In/Hr)
End of computations, Total Study Area = 4.34 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.100
Area averaged SCS curve number = 32.0

```
                    FLOOD HYDROGRAPH ROUTING PROGRAM
                Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2014
                          Study date: 03/27/26

      ---------------------------------------------------------------------


      Whittram Avenue
      Developed Condition - 100 year
      3 hour UH
      RMB
      ---------------------------------------------------------------------


      Program License Serial Number 6288

      ---------------------------------------------------------------------
      ********************* HYDROGRAPH INFORMATION **********************

                      From study/file name: whitdev100.rte
      ****************************HYDROGRAPH
DATA***************************
                      Number of intervals =    78
                      Time interval =    5.0 (Min.)
                      Maximum/Peak flow rate =       17.150 (CFS)
                      Total volume =       1.337 (Ac.Ft)
              Status of hydrographs being held in storage
                         Stream 1  Stream 2  Stream 3  Stream 4  Stream 5
              Peak (CFS)      0.000     0.000     0.000     0.000     0.000
              Vol (Ac.Ft)      0.000     0.000     0.000     0.000     0.000

**********************************************************************



      ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
      Process from Point/Station      102.000 to Point/Station      104.000
      **** RETARDING BASIN ROUTING ****
      ______________________________________________________________________

      User entry of depth-outflow-storage data
      ---------------------------------------------------------------------
      Total number of inflow hydrograph intervals = 78
      Hydrograph time unit =  5.000 (Min.)
      Initial depth in storage basin =   0.00(Ft.)
      ---------------------------------------------------------------------
      ---------------------------------------------------------------------
      Initial basin depth =   0.00 (Ft.)
      Initial basin storage =      0.00 (Ac.Ft)
      Initial basin outflow =   0.00 (CFS)
      ---------------------------------------------------------------------
```

Depth vs. Storage and Depth vs. Discharge data:

| Basin Depth (Ft.) | Storage (Ac.Ft) | Outflow (CFS) | (S-O*dt/2) (Ac.Ft) | (S+O*dt/2) (Ac.Ft) |
|---|---|---|---|---|
| 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 1.000 | 0.069 | 0.686 | 0.067 | 0.071 |
| 2.000 | 0.138 | 0.686 | 0.136 | 0.140 |
| 3.000 | 0.202 | 0.686 | 0.200 | 0.204 |
| 4.000 | 0.271 | 0.686 | 0.269 | 0.273 |
| 4.500 | 0.308 | 0.686 | 0.306 | 0.310 |
| 5.500 | 0.375 | 0.686 | 0.373 | 0.377 |
| 5.750 | 0.430 | 1.170 | 0.426 | 0.434 |
| 6.000 | 0.496 | 1.380 | 0.491 | 0.501 |
| 6.250 | 0.570 | 1.560 | 0.565 | 0.575 |
| 6.500 | 0.660 | 1.680 | 0.654 | 0.666 |
| 6.750 | 0.751 | 1.800 | 0.745 | 0.757 |
| 7.000 | 0.842 | 1.890 | 0.835 | 0.849 |
| 7.250 | 0.922 | 2.010 | 0.915 | 0.929 |
| 7.500 | 1.002 | 2.100 | 0.995 | 1.009 |

Hydrograph Detention Basin Routing

Graph values: 'I'= unit inflow; 'O'=outflow at time shown

| Time (Hours) | Inflow (CFS) | Outflow (CFS) | Storage (Ac.Ft) | .0 4.3 8.57 12.86 17.15 | Depth (Ft.) |
|---|---|---|---|---|---|
| 0.083 | 0.07 | 0.00 | 0.000 | O \| \| \| \| | 0.00 |
| 0.167 | 0.45 | 0.02 | 0.002 | O \| \| \| \| | 0.03 |
| 0.250 | 0.99 | 0.07 | 0.007 | OI \| \| \| \| | 0.10 |
| 0.333 | 1.24 | 0.13 | 0.014 | O I \| \| \| \| | 0.20 |
| 0.417 | 1.32 | 0.21 | 0.021 | O I \| \| \| \| | 0.31 |
| 0.500 | 1.36 | 0.29 | 0.029 | O I \| \| \| \| | 0.42 |
| 0.583 | 1.38 | 0.36 | 0.036 | O I \| \| \| \| | 0.52 |
| 0.667 | 1.40 | 0.43 | 0.043 | O I \| \| \| \| | 0.62 |
| 0.750 | 1.42 | 0.49 | 0.049 | O I \| \| \| \| | 0.72 |
| 0.833 | 1.43 | 0.55 | 0.056 | \|OI \| \| \| \| | 0.81 |
| 0.917 | 1.45 | 0.61 | 0.061 | \|OI \| \| \| \| | 0.89 |
| 1.000 | 1.47 | 0.67 | 0.067 | \|OI \| \| \| \| | 0.97 |
| 1.083 | 1.49 | 0.69 | 0.073 | \|OI \| \| \| \| | 1.05 |
| 1.167 | 1.51 | 0.69 | 0.078 | \|OI \| \| \| \| | 1.13 |
| 1.250 | 1.53 | 0.69 | 0.084 | \|OI \| \| \| \| | 1.22 |
| 1.333 | 1.55 | 0.69 | 0.090 | \|OI \| \| \| \| | 1.30 |
| 1.417 | 1.57 | 0.69 | 0.096 | \|OI \| \| \| \| | 1.39 |
| 1.500 | 1.59 | 0.69 | 0.102 | \|OI \| \| \| \| | 1.48 |
| 1.583 | 1.62 | 0.69 | 0.108 | \|O I \| \| \| \| | 1.57 |
| 1.667 | 1.64 | 0.69 | 0.115 | \|O I \| \| \| \| | 1.66 |
| 1.750 | 1.67 | 0.69 | 0.122 | \|O I \| \| \| \| | 1.76 |
| 1.833 | 1.70 | 0.69 | 0.128 | \|O I \| \| \| \| | 1.86 |
| 1.917 | 1.73 | 0.69 | 0.136 | \|O I \| \| \| \| | 1.96 |
| 2.000 | 1.76 | 0.69 | 0.143 | \|O I \| \| \| \| | 2.08 |
| 2.083 | 1.80 | 0.69 | 0.150 | \|O I \| \| \| \| | 2.19 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 2.167 | 1.83 | 0.69 | 0.158 | O I | | | | 2.31 |
| 2.250 | 1.87 | 0.69 | 0.166 | O I | | | | 2.44 |
| 2.333 | 1.91 | 0.69 | 0.174 | O I | | | | 2.57 |
| 2.417 | 1.95 | 0.69 | 0.183 | O I | | | | 2.70 |
| 2.500 | 2.00 | 0.69 | 0.192 | O I | | | | 2.84 |
| 2.583 | 2.05 | 0.69 | 0.201 | O I | | | | 2.99 |
| 2.667 | 2.10 | 0.69 | 0.211 | O I | | | | 3.13 |
| 2.750 | 2.16 | 0.69 | 0.221 | O I | | | | 3.27 |
| 2.833 | 2.22 | 0.69 | 0.231 | O I | | | | 3.42 |
| 2.917 | 2.29 | 0.69 | 0.242 | O I | | | | 3.58 |
| 3.000 | 2.36 | 0.69 | 0.253 | O I | | | | 3.74 |
| 3.083 | 2.45 | 0.69 | 0.265 | O I | | | | 3.91 |
| 3.167 | 2.54 | 0.69 | 0.277 | O I | | | | 4.09 |
| 3.250 | 2.65 | 0.69 | 0.290 | O I | | | | 4.26 |
| 3.333 | 2.76 | 0.69 | 0.304 | O I | | | | 4.45 |
| 3.417 | 2.87 | 0.69 | 0.319 | O I | | | | 4.66 |
| 3.500 | 2.83 | 0.69 | 0.334 | O I | | | | 4.89 |
| 3.583 | 2.75 | 0.69 | 0.348 | O I | | | | 5.10 |
| 3.667 | 2.86 | 0.69 | 0.363 | O I | | | | 5.32 |
| 3.750 | 3.12 | 0.72 | 0.379 | O I | | | | 5.52 |
| 3.833 | 3.55 | 0.87 | 0.396 | O I | | | | 5.60 |
| 3.917 | 4.23 | 1.05 | 0.416 | O I | | | | 5.69 |
| 4.000 | 5.45 | 1.21 | 0.442 | O | I | | | 5.80 |
| 4.083 | 8.54 | 1.33 | 0.481 | O | I | | | 5.94 |
| 4.167 | 15.19 | 1.52 | 0.553 | O | | I | | 6.19 |
| 4.250 | 17.15 | 1.67 | 0.654 | O | | | I | 6.48 |
| 4.333 | 10.06 | 1.78 | 0.736 | O | | I | | 6.71 |
| 4.417 | 5.45 | 1.83 | 0.777 | O | I | | | 6.82 |
| 4.500 | 3.68 | 1.84 | 0.795 | O I | | | | 6.87 |
| 4.583 | 3.29 | 1.86 | 0.807 | O I | | | | 6.90 |
| 4.667 | 2.83 | 1.86 | 0.815 | O I | | | | 6.93 |
| 4.750 | 2.60 | 1.87 | 0.821 | OI | | | | 6.94 |
| 4.833 | 2.41 | 1.87 | 0.825 | OI | | | | 6.95 |
| 4.917 | 2.26 | 1.88 | 0.828 | OI | | | | 6.96 |
| 5.000 | 2.13 | 1.88 | 0.830 | O | | | | 6.97 |
| 5.083 | 2.02 | 1.88 | 0.832 | O | | | | 6.97 |
| 5.167 | 1.93 | 1.88 | 0.833 | O | | | | 6.97 |
| 5.250 | 1.85 | 1.88 | 0.833 | O | | | | 6.97 |
| 5.333 | 1.78 | 1.88 | 0.832 | O | | | | 6.97 |
| 5.417 | 1.72 | 1.88 | 0.831 | O | | | | 6.97 |
| 5.500 | 1.66 | 1.88 | 0.830 | O | | | | 6.97 |
| 5.583 | 1.61 | 1.88 | 0.828 | IO | | | | 6.96 |
| 5.667 | 1.56 | 1.87 | 0.826 | IO | | | | 6.96 |
| 5.750 | 1.52 | 1.87 | 0.824 | IO | | | | 6.95 |
| 5.833 | 1.48 | 1.87 | 0.821 | IO | | | | 6.94 |
| 5.917 | 1.44 | 1.87 | 0.819 | IO | | | | 6.94 |
| 6.000 | 1.41 | 1.86 | 0.815 | IO | | | | 6.93 |
| 6.083 | 1.31 | 1.86 | 0.812 | IO | | | | 6.92 |
| 6.167 | 0.90 | 1.86 | 0.807 | I O | | | | 6.90 |
| 6.250 | 0.35 | 1.85 | 0.798 | I O | | | | 6.88 |
| 6.333 | 0.10 | 1.84 | 0.787 | I O | | | | 6.85 |
| 6.417 | 0.03 | 1.82 | 0.775 | I O | | | | 6.82 |
| 6.500 | 0.01 | 1.81 | 0.763 | I O | | | | 6.78 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 6.583 | 0.00 | 1.80 | 0.750 | I O | | | | 6.75 |
| 6.667 | 0.00 | 1.78 | 0.738 | I O | | | | 6.71 |
| 6.750 | 0.00 | 1.77 | 0.726 | I O | | | | 6.68 |
| 6.833 | 0.00 | 1.75 | 0.714 | I O | | | | 6.65 |
| 6.917 | 0.00 | 1.73 | 0.702 | I O | | | | 6.61 |
| 7.000 | 0.00 | 1.72 | 0.690 | I O | | | | 6.58 |
| 7.083 | 0.00 | 1.70 | 0.678 | I O | | | | 6.55 |
| 7.167 | 0.00 | 1.69 | 0.666 | I O | | | | 6.52 |
| 7.250 | 0.00 | 1.67 | 0.655 | I O | | | | 6.49 |
| 7.333 | 0.00 | 1.66 | 0.643 | I O | | | | 6.45 |
| 7.417 | 0.00 | 1.64 | 0.632 | I O | | | | 6.42 |
| 7.500 | 0.00 | 1.63 | 0.621 | I O | | | | 6.39 |
| 7.583 | 0.00 | 1.61 | 0.609 | I O | | | | 6.36 |
| 7.667 | 0.00 | 1.60 | 0.598 | I O | | | | 6.33 |
| 7.750 | 0.00 | 1.58 | 0.587 | I O | | | | 6.30 |
| 7.833 | 0.00 | 1.57 | 0.577 | I O | | | | 6.27 |
| 7.917 | 0.00 | 1.55 | 0.566 | I O | | | | 6.24 |
| 8.000 | 0.00 | 1.52 | 0.555 | I O | | | | 6.20 |
| 8.083 | 0.00 | 1.50 | 0.545 | I O | | | | 6.17 |
| 8.167 | 0.00 | 1.47 | 0.535 | I O | | | | 6.13 |
| 8.250 | 0.00 | 1.45 | 0.525 | I O | | | | 6.10 |
| 8.333 | 0.00 | 1.43 | 0.515 | I O | | | | 6.06 |
| 8.417 | 0.00 | 1.40 | 0.505 | I O | | | | 6.03 |
| 8.500 | 0.00 | 1.38 | 0.495 | I O | | | | 6.00 |
| 8.583 | 0.00 | 1.35 | 0.486 | I O | | | | 5.96 |
| 8.667 | 0.00 | 1.32 | 0.477 | I O | | | | 5.93 |
| 8.750 | 0.00 | 1.29 | 0.468 | I O | | | | 5.89 |
| 8.833 | 0.00 | 1.26 | 0.459 | I O | | | | 5.86 |
| 8.917 | 0.00 | 1.23 | 0.450 | I O | | | | 5.83 |
| 9.000 | 0.00 | 1.21 | 0.442 | I O | | | | 5.80 |
| 9.083 | 0.00 | 1.18 | 0.434 | I O | | | | 5.76 |
| 9.167 | 0.00 | 1.13 | 0.426 | I O | | | | 5.73 |
| 9.250 | 0.00 | 1.07 | 0.418 | IO | | | | 5.70 |
| 9.333 | 0.00 | 1.00 | 0.411 | IO | | | | 5.66 |
| 9.417 | 0.00 | 0.94 | 0.404 | IO | | | | 5.63 |
| 9.500 | 0.00 | 0.89 | 0.398 | IO | | | | 5.60 |
| 9.583 | 0.00 | 0.84 | 0.392 | IO | | | | 5.58 |
| 9.667 | 0.00 | 0.79 | 0.387 | IO | | | | 5.55 |
| 9.750 | 0.00 | 0.74 | 0.381 | IO | | | | 5.53 |
| 9.833 | 0.00 | 0.70 | 0.376 | IO | | | | 5.51 |
| 9.917 | 0.00 | 0.69 | 0.372 | IO | | | | 5.45 |
| 10.000 | 0.00 | 0.69 | 0.367 | IO | | | | 5.38 |
| 10.083 | 0.00 | 0.69 | 0.362 | IO | | | | 5.31 |
| 10.167 | 0.00 | 0.69 | 0.357 | IO | | | | 5.24 |
| 10.250 | 0.00 | 0.69 | 0.353 | IO | | | | 5.17 |
| 10.333 | 0.00 | 0.69 | 0.348 | IO | | | | 5.10 |
| 10.417 | 0.00 | 0.69 | 0.343 | IO | | | | 5.03 |
| 10.500 | 0.00 | 0.69 | 0.338 | IO | | | | 4.95 |
| 10.583 | 0.00 | 0.69 | 0.334 | IO | | | | 4.88 |
| 10.667 | 0.00 | 0.69 | 0.329 | IO | | | | 4.81 |
| 10.750 | 0.00 | 0.69 | 0.324 | IO | | | | 4.74 |
| 10.833 | 0.00 | 0.69 | 0.320 | IO | | | | 4.67 |
| 10.917 | 0.00 | 0.69 | 0.315 | IO | | | | 4.60 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 11.000 | 0.00 | 0.69 | 0.310 | IO | | | | 4.53 |
| 11.083 | 0.00 | 0.69 | 0.305 | IO | | | | 4.46 |
| 11.167 | 0.00 | 0.69 | 0.301 | IO | | | | 4.40 |
| 11.250 | 0.00 | 0.69 | 0.296 | IO | | | | 4.34 |
| 11.333 | 0.00 | 0.69 | 0.291 | IO | | | | 4.27 |
| 11.417 | 0.00 | 0.69 | 0.287 | IO | | | | 4.21 |
| 11.500 | 0.00 | 0.69 | 0.282 | IO | | | | 4.15 |
| 11.583 | 0.00 | 0.69 | 0.277 | IO | | | | 4.08 |
| 11.667 | 0.00 | 0.69 | 0.272 | IO | | | | 4.02 |
| 11.750 | 0.00 | 0.69 | 0.268 | IO | | | | 3.95 |
| 11.833 | 0.00 | 0.69 | 0.263 | IO | | | | 3.88 |
| 11.917 | 0.00 | 0.69 | 0.258 | IO | | | | 3.81 |
| 12.000 | 0.00 | 0.69 | 0.253 | IO | | | | 3.75 |
| 12.083 | 0.00 | 0.69 | 0.249 | IO | | | | 3.68 |
| 12.167 | 0.00 | 0.69 | 0.244 | IO | | | | 3.61 |
| 12.250 | 0.00 | 0.69 | 0.239 | IO | | | | 3.54 |
| 12.333 | 0.00 | 0.69 | 0.235 | IO | | | | 3.47 |
| 12.417 | 0.00 | 0.69 | 0.230 | IO | | | | 3.40 |
| 12.500 | 0.00 | 0.69 | 0.225 | IO | | | | 3.33 |
| 12.583 | 0.00 | 0.69 | 0.220 | IO | | | | 3.27 |
| 12.667 | 0.00 | 0.69 | 0.216 | IO | | | | 3.20 |
| 12.750 | 0.00 | 0.69 | 0.211 | IO | | | | 3.13 |
| 12.833 | 0.00 | 0.69 | 0.206 | IO | | | | 3.06 |
| 12.917 | 0.00 | 0.69 | 0.201 | IO | | | | 2.99 |
| 13.000 | 0.00 | 0.69 | 0.197 | IO | | | | 2.92 |
| 13.083 | 0.00 | 0.69 | 0.192 | IO | | | | 2.84 |
| 13.167 | 0.00 | 0.69 | 0.187 | IO | | | | 2.77 |
| 13.250 | 0.00 | 0.69 | 0.183 | IO | | | | 2.70 |
| 13.333 | 0.00 | 0.69 | 0.178 | IO | | | | 2.62 |
| 13.417 | 0.00 | 0.69 | 0.173 | IO | | | | 2.55 |
| 13.500 | 0.00 | 0.69 | 0.168 | IO | | | | 2.47 |
| 13.583 | 0.00 | 0.69 | 0.164 | IO | | | | 2.40 |
| 13.667 | 0.00 | 0.69 | 0.159 | IO | | | | 2.33 |
| 13.750 | 0.00 | 0.69 | 0.154 | IO | | | | 2.25 |
| 13.833 | 0.00 | 0.69 | 0.149 | IO | | | | 2.18 |
| 13.917 | 0.00 | 0.69 | 0.145 | IO | | | | 2.11 |
| 14.000 | 0.00 | 0.69 | 0.140 | IO | | | | 2.03 |
| 14.083 | 0.00 | 0.69 | 0.135 | IO | | | | 1.96 |
| 14.167 | 0.00 | 0.69 | 0.131 | IO | | | | 1.89 |
| 14.250 | 0.00 | 0.69 | 0.126 | IO | | | | 1.82 |
| 14.333 | 0.00 | 0.69 | 0.121 | IO | | | | 1.76 |
| 14.417 | 0.00 | 0.69 | 0.116 | IO | | | | 1.69 |
| 14.500 | 0.00 | 0.69 | 0.112 | IO | | | | 1.62 |
| 14.583 | 0.00 | 0.69 | 0.107 | IO | | | | 1.55 |
| 14.667 | 0.00 | 0.69 | 0.102 | IO | | | | 1.48 |
| 14.750 | 0.00 | 0.69 | 0.098 | IO | | | | 1.41 |
| 14.833 | 0.00 | 0.69 | 0.093 | IO | | | | 1.34 |
| 14.917 | 0.00 | 0.69 | 0.088 | IO | | | | 1.28 |
| 15.000 | 0.00 | 0.69 | 0.083 | IO | | | | 1.21 |
| 15.083 | 0.00 | 0.69 | 0.079 | IO | | | | 1.14 |
| 15.167 | 0.00 | 0.69 | 0.074 | IO | | | | 1.07 |
| 15.250 | 0.00 | 0.69 | 0.069 | IO | | | | 1.00 |
| 15.333 | 0.00 | 0.64 | 0.065 | IO | | | | 0.94 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 15.417 | 0.00 | 0.60 | 0.060 | IO | | | | 0.87 |
| 15.500 | 0.00 | 0.56 | 0.056 | IO | | | | 0.82 |
| 15.583 | 0.00 | 0.52 | 0.053 | O | | | | 0.76 |
| 15.667 | 0.00 | 0.49 | 0.049 | O | | | | 0.71 |
| 15.750 | 0.00 | 0.46 | 0.046 | O | | | | 0.66 |
| 15.833 | 0.00 | 0.43 | 0.043 | O | | | | 0.62 |
| 15.917 | 0.00 | 0.40 | 0.040 | O | | | | 0.58 |
| 16.000 | 0.00 | 0.37 | 0.037 | O | | | | 0.54 |
| 16.083 | 0.00 | 0.35 | 0.035 | O | | | | 0.51 |
| 16.167 | 0.00 | 0.32 | 0.033 | O | | | | 0.47 |
| 16.250 | 0.00 | 0.30 | 0.030 | O | | | | 0.44 |
| 16.333 | 0.00 | 0.28 | 0.028 | O | | | | 0.41 |
| 16.417 | 0.00 | 0.26 | 0.027 | O | | | | 0.38 |
| 16.500 | 0.00 | 0.25 | 0.025 | O | | | | 0.36 |
| 16.583 | 0.00 | 0.23 | 0.023 | O | | | | 0.34 |
| 16.667 | 0.00 | 0.21 | 0.022 | O | | | | 0.31 |
| 16.750 | 0.00 | 0.20 | 0.020 | O | | | | 0.29 |
| 16.833 | 0.00 | 0.19 | 0.019 | O | | | | 0.27 |
| 16.917 | 0.00 | 0.17 | 0.018 | O | | | | 0.25 |
| 17.000 | 0.00 | 0.16 | 0.016 | O | | | | 0.24 |
| 17.083 | 0.00 | 0.15 | 0.015 | O | | | | 0.22 |
| 17.167 | 0.00 | 0.14 | 0.014 | O | | | | 0.21 |
| 17.250 | 0.00 | 0.13 | 0.013 | O | | | | 0.19 |
| 17.333 | 0.00 | 0.12 | 0.012 | O | | | | 0.18 |
| 17.417 | 0.00 | 0.12 | 0.012 | O | | | | 0.17 |
| 17.500 | 0.00 | 0.11 | 0.011 | O | | | | 0.16 |
| 17.583 | 0.00 | 0.10 | 0.010 | O | | | | 0.15 |
| 17.667 | 0.00 | 0.09 | 0.009 | O | | | | 0.14 |
| 17.750 | 0.00 | 0.09 | 0.009 | O | | | | 0.13 |
| 17.833 | 0.00 | 0.08 | 0.008 | O | | | | 0.12 |
| 17.917 | 0.00 | 0.08 | 0.008 | O | | | | 0.11 |
| 18.000 | 0.00 | 0.07 | 0.007 | O | | | | 0.10 |
| 18.083 | 0.00 | 0.07 | 0.007 | O | | | | 0.10 |
| 18.167 | 0.00 | 0.06 | 0.006 | O | | | | 0.09 |
| 18.250 | 0.00 | 0.06 | 0.006 | O | | | | 0.09 |
| 18.333 | 0.00 | 0.05 | 0.005 | O | | | | 0.08 |
| 18.417 | 0.00 | 0.05 | 0.005 | O | | | | 0.07 |
| 18.500 | 0.00 | 0.05 | 0.005 | O | | | | 0.07 |
| 18.583 | 0.00 | 0.04 | 0.004 | O | | | | 0.06 |
| 18.667 | 0.00 | 0.04 | 0.004 | O | | | | 0.06 |
| 18.750 | 0.00 | 0.04 | 0.004 | O | | | | 0.06 |
| 18.833 | 0.00 | 0.04 | 0.004 | O | | | | 0.05 |
| 18.917 | 0.00 | 0.03 | 0.003 | O | | | | 0.05 |
| 19.000 | 0.00 | 0.03 | 0.003 | O | | | | 0.05 |
| 19.083 | 0.00 | 0.03 | 0.003 | O | | | | 0.04 |
| 19.167 | 0.00 | 0.03 | 0.003 | O | | | | 0.04 |
| 19.250 | 0.00 | 0.03 | 0.003 | O | | | | 0.04 |
| 19.333 | 0.00 | 0.02 | 0.002 | O | | | | 0.03 |
| 19.417 | 0.00 | 0.02 | 0.002 | O | | | | 0.03 |
| 19.500 | 0.00 | 0.02 | 0.002 | O | | | | 0.03 |
| 19.583 | 0.00 | 0.02 | 0.002 | O | | | | 0.03 |
| 19.667 | 0.00 | 0.02 | 0.002 | O | | | | 0.03 |
| 19.750 | 0.00 | 0.02 | 0.002 | O | | | | 0.02 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 19.833 | 0.00 | 0.02 | 0.002 | O | \| | \| | \| | \| | 0.02 |
| 19.917 | 0.00 | 0.01 | 0.001 | O | \| | \| | \| | \| | 0.02 |
| 20.000 | 0.00 | 0.01 | 0.001 | O | \| | \| | \| | \| | 0.02 |
| 20.083 | 0.00 | 0.01 | 0.001 | O | \| | \| | \| | \| | 0.02 |
| 20.167 | 0.00 | 0.01 | 0.001 | O | \| | \| | \| | \| | 0.02 |
| 20.250 | 0.00 | 0.01 | 0.001 | O | \| | \| | \| | \| | 0.02 |
| 20.333 | 0.00 | 0.01 | 0.001 | O | \| | \| | \| | \| | 0.02 |
| 20.417 | 0.00 | 0.01 | 0.001 | O | \| | \| | \| | \| | 0.01 |
| 20.500 | 0.00 | 0.01 | 0.001 | O | \| | \| | \| | \| | 0.01 |
| 20.583 | 0.00 | 0.01 | 0.001 | O | \| | \| | \| | \| | 0.01 |
| 20.667 | 0.00 | 0.01 | 0.001 | O | \| | \| | \| | \| | 0.01 |
| 20.750 | 0.00 | 0.01 | 0.001 | O | \| | \| | \| | \| | 0.01 |
| 20.833 | 0.00 | 0.01 | 0.001 | O | \| | \| | \| | \| | 0.01 |
| 20.917 | 0.00 | 0.01 | 0.001 | O | \| | \| | \| | \| | 0.01 |
| 21.000 | 0.00 | 0.01 | 0.001 | O | \| | \| | \| | \| | 0.01 |
| 21.083 | 0.00 | 0.01 | 0.001 | O | \| | \| | \| | \| | 0.01 |
| 21.167 | 0.00 | 0.01 | 0.001 | O | \| | \| | \| | \| | 0.01 |
| 21.250 | 0.00 | 0.00 | 0.000 | O | \| | \| | \| | \| | 0.01 |
| 21.333 | 0.00 | 0.00 | 0.000 | O | \| | \| | \| | \| | 0.01 |
| 21.417 | 0.00 | 0.00 | 0.000 | O | \| | \| | \| | \| | 0.01 |
| 21.500 | 0.00 | 0.00 | 0.000 | O | \| | \| | \| | \| | 0.01 |
| 21.583 | 0.00 | 0.00 | 0.000 | O | \| | \| | \| | \| | 0.01 |
| 21.667 | 0.00 | 0.00 | 0.000 | O | \| | \| | \| | \| | 0.01 |
| 21.750 | 0.00 | 0.00 | 0.000 | O | \| | \| | \| | \| | 0.00 |
| 21.833 | 0.00 | 0.00 | 0.000 | O | \| | \| | \| | \| | 0.00 |
| 21.917 | 0.00 | 0.00 | 0.000 | O | \| | \| | \| | \| | 0.00 |
| 22.000 | 0.00 | 0.00 | 0.000 | O | \| | \| | \| | \| | 0.00 |
| 22.083 | 0.00 | 0.00 | 0.000 | O | \| | \| | \| | \| | 0.00 |
| 22.167 | 0.00 | 0.00 | 0.000 | O | \| | \| | \| | \| | 0.00 |
| 22.250 | 0.00 | 0.00 | 0.000 | O | \| | \| | \| | \| | 0.00 |
| 22.333 | 0.00 | 0.00 | 0.000 | O | \| | \| | \| | \| | 0.00 |
| 22.417 | 0.00 | 0.00 | 0.000 | O | \| | \| | \| | \| | 0.00 |
| 22.500 | 0.00 | 0.00 | 0.000 | O | \| | \| | \| | \| | 0.00 |
| 22.583 | 0.00 | 0.00 | 0.000 | O | \| | \| | \| | \| | 0.00 |
| 22.667 | 0.00 | 0.00 | 0.000 | O | \| | \| | \| | \| | 0.00 |
| 22.750 | 0.00 | 0.00 | 0.000 | O | \| | \| | \| | \| | 0.00 |
| 22.833 | 0.00 | 0.00 | 0.000 | O | \| | \| | \| | \| | 0.00 |
| 22.917 | 0.00 | 0.00 | 0.000 | O | \| | \| | \| | \| | 0.00 |
| 23.000 | 0.00 | 0.00 | 0.000 | O | \| | \| | \| | \| | 0.00 |
| 23.083 | 0.00 | 0.00 | 0.000 | O | \| | \| | \| | \| | 0.00 |
| 23.167 | 0.00 | 0.00 | 0.000 | O | \| | \| | \| | \| | 0.00 |
| 23.250 | 0.00 | 0.00 | 0.000 | O | \| | \| | \| | \| | 0.00 |

**********HYDROGRAPH DATA**********

Number of intervals = 279
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 1.881 (CFS)
Total volume = 1.337 (Ac.Ft)

Status of hydrographs being held in storage

| | Stream 1 | Stream 2 | Stream 3 | Stream 4 | Stream 5 |
|---|---|---|---|---|---|
| Peak (CFS) | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Vol (Ac.Ft) | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |

**********

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| Riser Diameter (inches) | 4" Pipe | 6" Pipe |
|---|---|---|
| diameter in feet | 0.33 | 0.50 |
| gross area (sf) | 0.09 | 0.20 |
| net area (sf) | 0.07 | 0.16 |

Note: Assume 20% of gross area is ineffective

4" inlet

| Head in feet | coefficient | (2gh)**0.5 | **Discharge = Q in cfs** | |
|---|---|---|---|---|
| 0.10 | 0.6 | 2.537716 | 0.10 | 0.24 |
| 0.20 | 0.6 | 3.588872 | 0.15 | 0.34 |
| 0.25 | 0.6 | 4.012481 | 0.16 | 0.38 |
| 0.40 | 0.6 | 5.075431 | 0.21 | 0.48 |
| 0.50 | 0.6 | 5.674504 | 0.23 | 0.53 |
| 0.60 | 0.6 | 6.216108 | 0.26 | 0.59 |
| 0.75 | 0.6 | 6.94982 | 0.29 | 0.66 |
| 0.80 | 0.6 | 7.177743 | 0.29 | 0.68 |
| 0.90 | 0.6 | 7.613147 | 0.31 | 0.72 |
| 1.00 | 0.6 | 8.024961 | 0.33 | 0.76 |
| 1.10 | 0.6 | 8.41665 | 0.35 | 0.79 |
| 1.25 | 0.6 | 8.972179 | 0.37 | 0.85 |
| 1.30 | 0.6 | 9.149863 | 0.38 | 0.86 |
| 1.40 | 0.6 | 9.495262 | 0.39 | 0.89 |
| 1.50 | 0.6 | 9.82853 | 0.40 | 0.93 |
| 1.60 | 0.6 | 10.15086 | 0.42 | 0.96 |
| 1.75 | 0.6 | 10.61603 | 0.44 | 1.00 |
| 1.80 | 0.6 | 10.76662 | 0.44 | 1.01 |
| 1.90 | 0.6 | 11.06165 | 0.45 | 1.04 |
| 2.00 | 0.6 | 11.34901 | 0.47 | 1.07 |
| 2.10 | 0.6 | 11.62927 | 0.48 | 1.10 |
| 2.20 | 0.6 | 11.90294 | 0.49 | 1.12 |
| 2.30 | 0.6 | 12.17046 | 0.50 | 1.15 |
| 2.40 | 0.6 | 12.43222 | 0.51 | 1.17 |
| 2.50 | 0.6 | 12.68858 | 0.52 | 1.20 |
| 2.60 | 0.6 | 12.93986 | 0.53 | 1.22 |
| 2.70 | 0.6 | 13.18636 | 0.54 | 1.24 |
| 2.80 | 0.6 | 13.42833 | 0.55 | 1.27 |
| 2.90 | 0.6 | 13.66602 | 0.56 | 1.29 |
| 3.00 | 0.6 | 13.89964 | 0.57 | 1.31 |
| 3.10 | 0.6 | 14.1294 | 0.58 | 1.33 |
| 3.20 | 0.6 | 14.35549 | 0.59 | 1.35 |
| 3.30 | 0.6 | 14.57807 | 0.60 | 1.37 |

**Basin Volumes Including Rock Voids volume**

Rock Voids = 40% 43560.000

Sample Storage caclulcatin rock portion of basin Rock Volume Calculation = 1' depth * 9' width * 732 feet long * .4 rock void ratio = 2,635 CF

| Basin Number | interval | depth | delta h (ft) | width | length | delta V | Total V (cf) | Total V (ac-ft) |
|---|---|---|---|---|---|---|---|---|
| **1** | 1 | 0.00 | 0.00 | 9 | 732 | 0 | 0 | 0.000 |
| | 2 | 1.00 | 1.00 | 9 | 732 | 2,635 | 2,635 | 0.060 |
| | 3 | 2.00 | 1.00 | 9 | 732 | 2,635 | 5,270 | 0.121 |
| | 4 | 3.00 | 1.00 | 9 | 732 | 2,635 | 7,906 | 0.181 |
| | 5 | 4.00 | 1.00 | 9 | 732 | 2,635 | 10,541 | 0.242 |
| | 6 | 4.50 | 0.50 | 9 | 732 | 1,318 | 11,858 | 0.272 |
| **Bottom surface of basin** | 7 | 5.50 | 1.00 | 9 | 732 | 2,635 | 14,494 | 0.333 |
| | 8 | 5.75 | 0.25 | 11 | 732 | 2,013 | 16,507 | 0.379 |
| | 9 | 6.00 | 0.25 | 13 | 732 | 2,379 | 18,886 | 0.434 |
| | 10 | 6.25 | 0.25 | 15 | 732 | 2,745 | 21,631 | 0.497 |
| | 11 | 6.50 | 0.25 | 19 | 732 | 3,477 | 25,108 | 0.576 |
| | 12 | 6.75 | 0.25 | 19 | 732 | 3,477 | 28,585 | 0.656 |
| | 13 | 7.00 | 0.25 | 19 | 732 | 3,477 | 32,062 | 0.736 |
| | 14 | 7.25 | 0.25 | 19 | 732 | 3,477 | 35,539 | 0.816 |
| | 15 | 7.50 | 0.25 | 19 | 732 | 3,477 | 39,016 | 0.896 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **2** | 1 | 0.00 | 0.00 | 9 | 100 | 0 | 0 | 0.000 |
| | 2 | 1.00 | 1.00 | 9 | 100 | 360 | 360 | 0.008 |
| | 3 | 2.00 | 1.00 | 9 | 100 | 360 | 720 | 0.017 |
| | 4 | 2.50 | 0.50 | 9 | 100 | 180 | 900 | 0.021 |
| **Bottom surface of basin** | 5 | 3.50 | 1.00 | 9 | 100 | 360 | 1,260 | 0.029 |
| | 6 | 3.75 | 0.25 | 11 | 100 | 275 | 1,535 | 0.035 |
| | 7 | 4.00 | 0.25 | 13 | 100 | 325 | 1,860 | 0.043 |
| | 8 | 4.25 | 0.25 | 15 | 100 | 375 | 2,235 | 0.051 |
| | 9 | 4.50 | 0.25 | 19 | 100 | 475 | 2,710 | 0.062 |
| | 10 | 4.75 | 0.25 | 19 | 100 | 475 | 3,185 | 0.073 |
| | 11 | 5.00 | 0.25 | 19 | 100 | 475 | 3,660 | 0.084 |
| | 12 | 5.25 | 0.25 | 19 | 100 | 475 | 4,135 | 0.095 |
| | 13 | 5.50 | 0.25 | 19 | 100 | 475 | 4,610 | 0.106 |
| | 14 | | | | | | 0 | |
| | 15 | | | | | | 0 | |

| Composite Basin Total | interval | depth | delta h (ft) | width | length | delta V | Total V (cf) | Total V (ac-ft) |
|---|---|---|---|---|---|---|---|---|
| | 1 | 0.00 | | | | 0 | 0 | 0.000 |
| | 2 | 1.00 | | | | 2,995 | 2,995 | 0.069 |
| | 3 | 2.00 | | | | 2,995 | 5,990 | 0.138 |
| | 4 | 3.00 | | | | 2,815 | 8,806 | 0.202 |
| | 5 | 4.00 | | | | 2,995 | 11,801 | 0.271 |
| | 6 | 4.50 | | | | 1,593 | 13,393 | 0.307 |
| | 7 | 5.50 | | | | 2,960 | 16,354 | 0.375 |
| | 8 | 5.75 | | | | 2,388 | 18,742 | 0.430 |
| | 9 | 6.00 | | | | 2,854 | 21,596 | 0.496 |
| | 10 | 6.25 | | | | 3,220 | 24,816 | 0.570 |
| | 11 | 6.50 | | | | 3,952 | 28,768 | 0.660 |
| | 12 | 6.75 | | | | 3,952 | 32,720 | 0.751 |
| | 13 | 7.00 | | | | 3,952 | 36,672 | 0.842 |
| | 14 | 7.25 | | | | 3,477 | 40,149 | 0.922 |
| | 15 | 7.50 | | | | 3,477 | 43,626 | 1.002 |

**Basin Storage - Outflow Table**
**Whittram Avenue**
**BMP Infiltration Trench - Composite**

Assumes three - 4" inlets allow flow into trench pipe for routing to catch basins

| Basin Information | | | | **Biofiltration Trench Bottom** | | **Single 4" Circular Weir** | | **Two- 4" Circular Weirs** | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Length (ft) | 0 | Length (ft) | 0 | |
| | | | | Bottom Area (sf) | 7488 | | | | | |
| | | | | Biofiltration Rate (in/hr) | 4 | C | 0 | C | 0 | |
| | | | | Filtration Rate (cfs) | 0.686 | Invert H (ft) | 0 | Invert H (ft) | 0 | |
| # | Elevation ft | Depth ft | Storage Ac-ft | | Q (cfs) | Depth over Inlet | Q (cfs) | Depth over Inlet | Q (cfs) | Qtotal (cfs) |
| 1 | 43.70 | 0.00 | 0.0000 | | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2 | 44.70 | 1.00 | 0.0688 | | 0.686 | 0.00 | 0.00 | 0.00 | 0.00 | 0.69 |
| 3 | 45.70 | 2.00 | 0.1375 | | 0.686 | 0.00 | 0.00 | 0.00 | 0.00 | 0.69 |
| 4 | 46.70 | 3.00 | 0.2021 | | 0.686 | 0.00 | 0.00 | 0.00 | 0.00 | 0.69 |
| 5 | 47.70 | 4.00 | 0.2709 | | 0.686 | 0.00 | 0.00 | 0.00 | 0.00 | 0.69 |
| 6 | 48..20 | 4.50 | 0.3075 | | 0.686 | 0.00 | 0.00 | 0.00 | 0.00 | 0.69 |
| 7 | 49.20 | 5.50 | 0.3754 | | 0.686 | 0.00 | 0.00 | 0.00 | 0.00 | 0.69 |
| 8 | 49.45 | 5.75 | 0.4302 | | 0.686 | 0.25 | 0.16 | 0.00 | 0.32 | 1.17 |
| 9 | 49.70 | 6.00 | 0.4958 | | 0.686 | 0.50 | 0.23 | 0.00 | 0.46 | 1.38 |
| 10 | 49.95 | 6.25 | 0.5697 | | 0.686 | 0.75 | 0.29 | 0.00 | 0.58 | 1.56 |
| 11 | 50.20 | 6.50 | 0.6604 | | 0.686 | 1.00 | 0.33 | 0.00 | 0.66 | 1.68 |
| 12 | 50.45 | 6.75 | 0.7511 | | 0.686 | 1.25 | 0.37 | 0.00 | 0.74 | 1.80 |
| 13 | 50.70 | 7.00 | 0.8419 | | 0.686 | 1.50 | 0.40 | 0.00 | 0.80 | 1.89 |
| 14 | 50.95 | 7.25 | 0.9217 | | 0.686 | 1.75 | 0.44 | 0.10 | 0.88 | 2.01 |
| 15 | 51.20 | 7.50 | 1.0015 | | 0.686 | 2.00 | 0.47 | 0.20 | 0.94 | 2.10 |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

**Infiltration Rates**

| | |
|---|---|
| I-1 | 5.89 |
| I-2 | 11.40 |
| I-3 | 6.25 |
| I-4 | 14.70 |
| I-5 | 3.45 |
| | 41.69 |
| Average | 8.34 |
| 50% reduction | 4.17 |

**Filtration Rate Calculation**

| | | |
|---|---|---|
| Filtration Rate Calculation | (cfs) | (Bottom Area * Filtration Rate/hr)/(60 min/hr*60 seconds/min) |
| Filtration Rate Calculation | (cfs) | (7,488 sf * 4 inch/hr)/(3600 sec/hr) |
| | | (7,488 sf * 0.33ft/hr)/(3600 sec/hr) |
| Filtration Rate Calculation = | | 0.686 cfs |

This rate is conservative as it ignores slope area infiltration - only uses bottom of trench area

**Use 4 inch/hr for filtration rate in trench**

# 4.2 Project Performance Criteria

The purpose of this section of the Project WQMP is to establish targets for post-development hydrology based on performance criteria specified in the MS4 Permit. These targets include runoff volume for water quality control (referred to as LID design capture volume), and runoff volume, time of concentration, and peak runoff for protection of any downstream waterbody segments with a HCOC. ***If the project has more than one outlet for stormwater runoff, then complete additional versions of these forms for each DA / outlet.***

Methods applied in the following forms include:

- For LID BMP Design Capture Volume (DCV), the San Bernardino County Stormwater Program requires use of the $P_6$ method (MS4 Permit Section XI.D.6a.ii) – Form 4.2-1
- For HCOC pre- and post-development hydrologic calculation, the San Bernardino County Stormwater Program requires the use of the Rational Method (San Bernardino County Hydrology Manual Section D). Forms 4.2-2 through Form 4.2-5 calculate hydrologic variables including runoff volume, time of concentration, and peak runoff from the project site pre- and post-development using the Hydrology Manual Rational Method approach. For projects greater than 640 acres (1.0 $mi^2$), the Rational Method and these forms should not be used. For such projects, the Unit Hydrograph Method (San Bernardino County Hydrology Manual Section E) shall be applied for hydrologic calculations for HCOC performance criteria.

Refer to Section 4 in the TGD for WQMP for detailed guidance and instructions.

## Form 4.2-1 LID BMP Performance Criteria for Design Capture Volume (DA 1)

| | | |
|---|---|---|
| **1** Project area DA 1 ($ft^2$): 190,244 | **2** Imperviousness after applying preventative site design practices (Imp%): 86.4 | **3** Runoff Coefficient (Rc): 0.680 *$R_c = 0.858(86.4\%)^{\wedge 3}-0.78(86.4\%)^{\wedge 2}+0.774(86.4\%)+0.04$* |
| **4** Determine 1-hour rainfall depth for a 2-year return period $P_{2yr\text{-}1hr}$ (in): 0.530 *http://hdsc.nws.noaa.gov/hdsc/pfds/sa/sca_pfds.html* | | |
| **5** Compute $P_6$, Mean 6-hr Precipitation (inches): .530(1.4807)= 0.785<br>*$P_6$ = Item 4 *$C_1$, where $C_1$ is a function of site climatic region specified in Form 3-1 Item 1 (Valley = 1.4807; Mountain = 1.909; Desert = 1.2371)* | | |
| **6** Drawdown Rate<br>*Use 48 hours as the default condition. Selection and use of the 24 hour drawdown time condition is subject to approval by the local jurisdiction. The necessary BMP footprint is a function of drawdown time. While shorter drawdown times reduce the performance criteria for LID BMP design capture volume, the depth of water that can be stored is also reduced.* | | 24-hrs ☐<br>48-hrs ☒ |
| **7** Compute design capture volume, DCV ($ft^3$): 1/12*[190,244*0.680*.785*1.963) = 16,600.97<br>*DCV = 1/12 * [Item 1* Item 3 *Item 5 * $C_2$], where $C_2$ is a function of drawdown rate (24-hr = 1.582; 48-hr = 1.963)*<br>*Compute separate DCV for each outlet from the project site per schematic drawn in Form 3-1 Item 2* | | |

# Form 4.2-1 LID BMP Performance Criteria for Design Capture Volume (DA 2)

| **1** Project area DA 1 ($ft^2$): | **2** Imperviousness after applying preventative site design practices (Imp%): | **3** Runoff Coefficient (Rc): 0.313 |
|---|---|---|
| 37,495 | 45.7 | *$R_c = 0.858(45.7\%)^{\wedge 3}-0.78(45.7\%)^{\wedge 2}+0.774(45.7\%) +0.04$* |

**4** Determine 1-hour rainfall depth for a 2-year return period $P_{2yr\text{-}1hr}$ (in): 0.530 http://hdsc.nws.noaa.gov/hdsc/pfds/sa/sca_pfds.html

**5** Compute $P_6$, Mean 6-hr Precipitation (inches): .530(1.4807)= 0.785

*$P_6$ = Item 4 *$C_1$, where $C_1$ is a function of site climatic region specified in Form 3-1 Item 1 (Valley = 1.4807; Mountain = 1.909; Desert = 1.2371)*

| **6** Drawdown Rate | |
|---|---|
| *Use 48 hours as the default condition. Selection and use of the 24 hour drawdown time condition is subject to approval by the local jurisdiction. The necessary BMP footprint is a function of drawdown time. While shorter drawdown times reduce the performance criteria for LID BMP design capture volume, the depth of water that can be stored is also reduced.* | 24-hrs ☐<br>48-hrs ☒ |

**7** Compute design capture volume, DCV ($ft^3$): 1/12*[37,495*0.313*.785*1.963) = 1,506.56

*DCV = 1/12 * [Item 1* Item 3 *Item 5 * $C_2$], where $C_2$ is a function of drawdown rate (24-hr = 1.582; 48-hr = 1.963)*
*Compute separate DCV for each outlet from the project site per schematic drawn in Form 3-1 Item 2*

## Form 4.3-3 Infiltration LID BMP - including underground BMPs (DA 1)

| | | | |
|---|---|---|---|
| **1** Remaining LID DCV not met by site design HSC BMP ($ft^3$): *$V_{unmet}$ = 16,601 Form 4.2-1 Item 7 - Form 4.3-2 Item 30* | | | |
| BMP Type *Use columns to the right to compute runoff volume retention from proposed infiltration BMP (select BMP from Table 5-4 in TGD for WQMP) - Use additional forms for more BMPs* | DA-1 DMA BMP Type Infiltration Trench | DA DMA BMP Type | DA DMA BMP Type *(Use additional forms for more BMPs)* |
| **2** Infiltration rate of underlying soils (in/hr) *See Section 5.4.2 and Appendix D of the TGD for WQMP for minimum requirements for assessment methods* | 4.5 | | |
| **3** Infiltration safety factor *See TGD Section 5.4.2 and Appendix D* | 2.18 | | |
| **4** Design percolation rate (in/hr) *$P_{design}$ = Item 2 / Item 3* | 2.06 | | |
| **5** Ponded water drawdown time (hr) *Copy Item 6 in Form 4.2-1* | 48 | | |
| **6** Maximum ponding depth (ft) *BMP specific, see Table 5-4 of the TGD for WQMP for BMP design details* | 0.0 | | |
| **7** Ponding Depth (ft) *$d_{BMP}$ = Minimum of (1/12*Item 4*Item 5) or Item 6* | 0.0 | | |
| **8** Infiltrating surface area, $SA_{BMP}$ ($ft^2$) *the lesser of the area needed for infiltration of full DCV or minimum space requirements from Table 5.7 of the TGD for WQMP* | 6,900 | | |
| **9** Amended soil depth, $d_{media}$ (ft) *Only included in certain BMP types, see Table 5-4 in the TGD for WQMP for reference to BMP design details* | 0 | | |
| **10** Amended soil porosity | 0.0 | | |
| **11** Gravel depth, $d_{media}$ (ft) *Only included in certain BMP types, see Table 5-4 of the TGD for WQMP for BMP design details* | 5 | | |
| **12** Gravel porosity | 0.4 | | |
| **13** Duration of storm as basin is filling (hrs) *Typical ~ 3hrs* | 3 | | |
| **14** Above Ground Retention Volume ($ft^3$) *$V_{retention}$ = Item 8 * [Item7 + (Item 9 * Item 10) + (Item 11 * Item 12) + (Item 13 * (Item 4 / 12))]* | 17,361 | | |
| **15** Underground Retention Volume ($ft^3$) *Volume determined using manufacturer's specifications and calculations* | | | |
| **16** Total Retention Volume from LID Infiltration BMPs: *17,361 (Sum of Items 14 and 15 for all infiltration BMP included in plan)* | | | |
| **17** Fraction of DCV achieved with infiltration BMP: 105% *Retention% = Item 16 / Form 4.2-1 Item 7* | | | |
| **18** Is full LID DCV retained onsite with combination of hydrologic source control and LID retention/infiltration BMPs? Yes ☒ No ☐ *If yes, demonstrate conformance using Form 4.3-10; If no, then reduce Item 3, Factor of Safety to 2.0 and increase Item 8, Infiltrating Surface Area, such that the portion of the site area used for retention and infiltration BMPs equals or exceeds the minimum effective area thresholds (Table 5-7 of the TGD for WQMP) for the applicable category of development and repeat all above calculations.* | | | |

# Form 4.3-3 Infiltration LID BMP - including underground BMPs (DA 2)

**1** Remaining LID DCV not met by site design HSC BMP ($ft^3$): *$V_{unmet}$ = 1,506.56 Form 4.2-1 Item 7 - Form 4.3-2 Item 30*

| BMP Type *Use columns to the right to compute runoff volume retention from proposed infiltration BMP (select BMP from Table 5-4 in TGD for WQMP) - Use additional forms for more BMPs* | DA-1 DMA BMP Type Infiltration Trench | DA DMA BMP Type | DA DMA BMP Type *(Use additional forms for more BMPs)* |
|---|---|---|---|
| **2** Infiltration rate of underlying soils (in/hr) *See Section 5.4.2 and Appendix D of the TGD for WQMP for minimum requirements for assessment methods* | 4.5 | | |
| **3** Infiltration safety factor *See TGD Section 5.4.2 and Appendix D* | 2.18 | | |
| **4** Design percolation rate (in/hr) *$P_{design}$ = Item 2 / Item 3* | 2.06 | | |
| **5** Ponded water drawdown time (hr) *Copy Item 6 in Form 4.2-1* | 48 | | |
| **6** Maximum ponding depth (ft) *BMP specific, see Table 5-4 of the TGD for WQMP for BMP design details* | 0.0 | | |
| **7** Ponding Depth (ft) *$d_{BMP}$ = Minimum of (1/12*Item 4*Item 5) or Item 6* | 0.0 | | |
| **8** Infiltrating surface area, $SA_{BMP}$ ($ft^2$) *the lesser of the area needed for infiltration of full DCV or minimum space requirements from Table 5.7 of the TGD for WQMP* | 900 | | |
| **9** Amended soil depth, $d_{media}$ (ft) *Only included in certain BMP types, see Table 5-4 in the TGD for WQMP for reference to BMP design details* | 0 | | |
| **10** Amended soil porosity | 0.0 | | |
| **11** Gravel depth, $d_{media}$ (ft) *Only included in certain BMP types, see Table 5-4 of the TGD for WQMP for BMP design details* | 3 | | |
| **12** Gravel porosity | 0.4 | | |
| **13** Duration of storm as basin is filling (hrs) *Typical ~ 3hrs* | 3 | | |
| **14** Above Ground Retention Volume ($ft^3$) *$V_{retention}$ = Item 8 * [Item7 + (Item 9 * Item 10) + (Item 11 * Item 12) + (Item 13 * (Item 4 / 12))]* | 1,544.45 | | |
| **15** Underground Retention Volume ($ft^3$) *Volume determined using manufacturer's specifications and calculations* | | | |

**16** Total Retention Volume from LID Infiltration BMPs: *1,544 (Sum of Items 14 and 15 for all infiltration BMP included in plan)*

**17** Fraction of DCV achieved with infiltration BMP: 103% *Retention% = Item 16 / Form 4.2-1 Item 7*

**18** Is full LID DCV retained onsite with combination of hydrologic source control and LID retention/infiltration BMPs? Yes ☒ No ☐

*If yes, demonstrate conformance using Form 4.3-10; If no, then reduce Item 3, Factor of Safety to 2.0 and increase Item 8, Infiltrating Surface Area, such that the portion of the site area used for retention and infiltration BMPs equals or exceeds the minimum effective area thresholds (Table 5-7 of the TGD for WQMP) for the applicable category of development and repeat all above calculations.*

# Appendix C
# NOAA Atlas 14 Rainfall Data
# For
# Fontana, CA area

**NOAA Atlas 14, Volume 6, Version 2**
**Location name: Fontana, California, USA***
**Latitude: 34.0968°, Longitude: -117.5012°**
**Elevation: 1160.99 ft****
* source: ESRI Maps
** source: USGS

**POINT PRECIPITATION FREQUENCY ESTIMATES**

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

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

## PF tabular

**PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]**

| Duration | Average recurrence interval (years) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 5 | 10 | 25 | 50 | 100 | 200 | 500 | 1000 |
| 5-min | 0.111 (0.092-0.134) | 0.146 (0.121-0.177) | 0.193 (0.160-0.235) | 0.233 (0.191-0.286) | 0.289 (0.229-0.367) | 0.333 (0.259-0.433) | 0.380 (0.288-0.506) | 0.429 (0.316-0.589) | 0.499 (0.352-0.715) | 0.556 (0.379-0.825) |
| 10-min | 0.159 (0.132-0.192) | 0.209 (0.174-0.253) | 0.277 (0.229-0.337) | 0.334 (0.274-0.410) | 0.414 (0.329-0.526) | 0.478 (0.371-0.620) | 0.544 (0.413-0.725) | 0.616 (0.453-0.844) | 0.716 (0.505-1.02) | 0.797 (0.543-1.18) |
| 15-min | 0.192 (0.160-0.233) | 0.252 (0.210-0.306) | 0.335 (0.278-0.407) | 0.403 (0.332-0.495) | 0.500 (0.398-0.636) | 0.577 (0.449-0.750) | 0.658 (0.499-0.877) | 0.744 (0.548-1.02) | 0.866 (0.611-1.24) | 0.964 (0.656-1.43) |
| 30-min | 0.282 (0.235-0.342) | 0.371 (0.309-0.450) | 0.491 (0.408-0.598) | 0.593 (0.488-0.728) | 0.735 (0.584-0.934) | 0.848 (0.660-1.10) | 0.967 (0.733-1.29) | 1.09 (0.805-1.50) | 1.27 (0.897-1.82) | 1.42 (0.964-2.10) |
| 60-min | 0.412 (0.343-0.499) | 0.542 (0.451-0.658) | 0.718 (0.596-0.875) | 0.867 (0.713-1.06) | 1.08 (0.854-1.37) | 1.24 (0.965-1.61) | 1.41 (1.07-1.88) | 1.60 (1.18-2.19) | 1.86 (1.31-2.66) | 2.07 (1.41-3.07) |
| 2-hr | 0.632 (0.527-0.766) | 0.816 (0.679-0.990) | 1.06 (0.881-1.29) | 1.27 (1.04-1.55) | 1.55 (1.23-1.97) | 1.78 (1.38-2.31) | 2.01 (1.52-2.68) | 2.26 (1.66-3.09) | 2.60 (1.84-3.72) | 2.88 (1.96-4.27) |
| 3-hr | 0.813 (0.677-0.986) | 1.04 (0.867-1.27) | 1.35 (1.12-1.64) | 1.60 (1.32-1.96) | 1.95 (1.55-2.47) | 2.22 (1.73-2.88) | 2.50 (1.90-3.33) | 2.80 (2.06-3.83) | 3.21 (2.26-4.59) | 3.53 (2.41-5.24) |
| 6-hr | 1.18 (0.981-1.43) | 1.51 (1.25-1.83) | 1.94 (1.61-2.36) | 2.29 (1.88-2.81) | 2.76 (2.19-3.51) | 3.13 (2.43-4.06) | 3.50 (2.65-4.66) | 3.88 (2.86-5.32) | 4.40 (3.11-6.30) | 4.81 (3.28-7.14) |
| 12-hr | 1.58 (1.31-1.91) | 2.04 (1.70-2.48) | 2.63 (2.19-3.21) | 3.10 (2.55-3.81) | 3.72 (2.96-4.73) | 4.18 (3.25-5.43) | 4.64 (3.52-6.18) | 5.10 (3.76-6.99) | 5.71 (4.03-8.17) | 6.17 (4.20-9.16) |
| 24-hr | 2.13 (1.88-2.45) | 2.81 (2.49-3.25) | 3.67 (3.24-4.24) | 4.34 (3.79-5.06) | 5.20 (4.40-6.27) | 5.83 (4.84-7.17) | 6.45 (5.23-8.13) | 7.06 (5.57-9.15) | 7.86 (5.95-10.6) | 8.45 (6.18-11.8) |
| 2-day | 2.60 (2.31-3.00) | 3.53 (3.12-4.07) | 4.71 (4.15-5.45) | 5.64 (4.94-6.58) | 6.88 (5.83-8.29) | 7.81 (6.48-9.60) | 8.73 (7.07-11.0) | 9.66 (7.61-12.5) | 10.9 (8.24-14.7) | 11.8 (8.64-16.5) |
| 3-day | 2.83 (2.51-3.26) | 3.90 (3.45-4.50) | 5.28 (4.66-6.11) | 6.40 (5.60-7.47) | 7.92 (6.71-9.54) | 9.08 (7.53-11.2) | 10.3 (8.31-12.9) | 11.5 (9.04-14.9) | 13.1 (9.91-17.7) | 14.4 (10.5-20.1) |
| 4-day | 3.08 (2.73-3.55) | 4.28 (3.78-4.93) | 5.85 (5.16-6.76) | 7.13 (6.24-8.32) | 8.89 (7.53-10.7) | 10.3 (8.51-12.6) | 11.7 (9.44-14.7) | 13.1 (10.3-17.0) | 15.1 (11.4-20.3) | 16.6 (12.2-23.2) |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **7-day** | **3.57** (3.16-4.12) | **5.00** (4.42-5.77) | **6.89** (6.08-7.97) | **8.45** (7.40-9.86) | **10.6** (8.99-12.8) | **12.3** (10.2-15.1) | **14.0** (11.4-17.7) | **15.8** (12.5-20.5) | **18.3** (13.9-24.8) | **20.3** (14.9-28.4) |
| **10-day** | **3.88** (3.44-4.48) | **5.46** (4.83-6.30) | **7.57** (6.68-8.76) | **9.32** (8.15-10.9) | **11.7** (9.94-14.1) | **13.6** (11.3-16.8) | **15.6** (12.6-19.7) | **17.7** (13.9-22.9) | **20.5** (15.5-27.7) | **22.8** (16.7-31.9) |
| **20-day** | **4.53** (4.01-5.22) | **6.46** (5.71-7.45) | **9.08** (8.01-10.5) | **11.3** (9.87-13.2) | **14.4** (12.2-17.3) | **16.8** (14.0-20.7) | **19.4** (15.7-24.4) | **22.1** (17.4-28.7) | **26.0** (19.7-35.0) | **29.1** (21.3-40.6) |
| **30-day** | **5.33** (4.72-6.14) | **7.65** (6.76-8.83) | **10.8** (9.54-12.5) | **13.5** (11.8-15.7) | **17.3** (14.6-20.8) | **20.3** (16.9-25.0) | **23.6** (19.1-29.7) | **27.0** (21.3-35.0) | **31.9** (24.1-43.0) | **35.9** (26.2-50.0) |
| **45-day** | **6.30** (5.57-7.26) | **9.02** (7.98-10.4) | **12.8** (11.3-14.8) | **16.0** (14.0-18.6) | **20.6** (17.4-24.8) | **24.3** (20.1-29.9) | **28.2** (22.9-35.6) | **32.5** (25.6-42.1) | **38.6** (29.2-52.0) | **43.6** (31.9-60.8) |
| **60-day** | **7.34** (6.50-8.46) | **10.4** (9.22-12.0) | **14.7** (13.0-17.0) | **18.4** (16.1-21.5) | **23.7** (20.1-28.6) | **28.0** (23.3-34.5) | **32.7** (26.5-41.2) | **37.7** (29.7-48.8) | **45.0** (34.0-60.7) | **51.0** (37.3-71.1) |

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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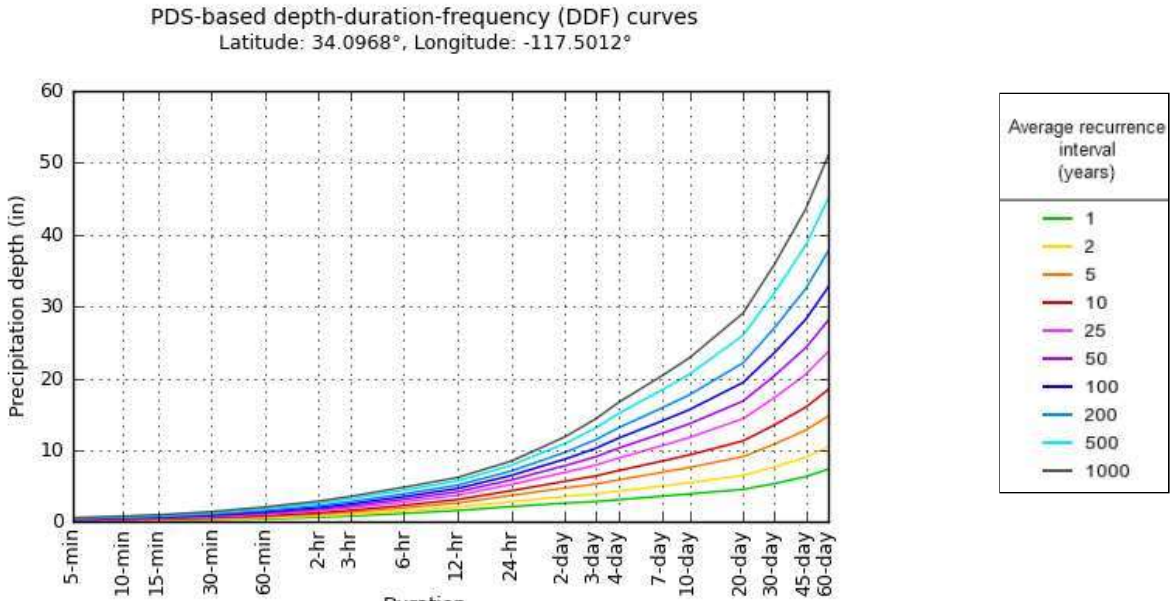
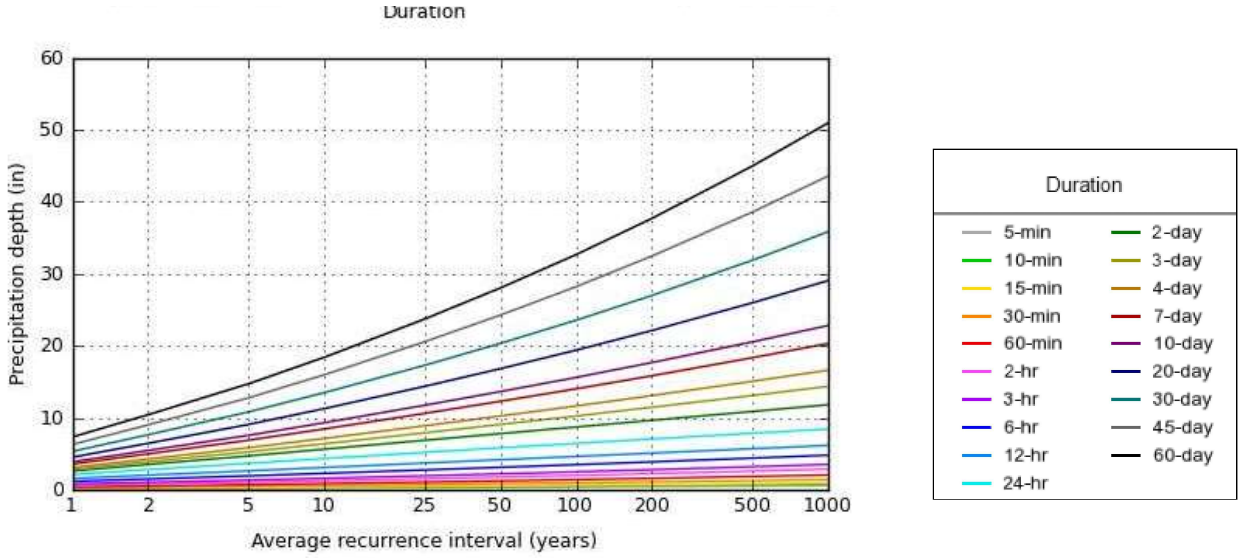
## PF graphical






NOAA Atlas 14, Volume 6, Version 2 Created (GMT): Tue Feb 18 18:34:11 2020

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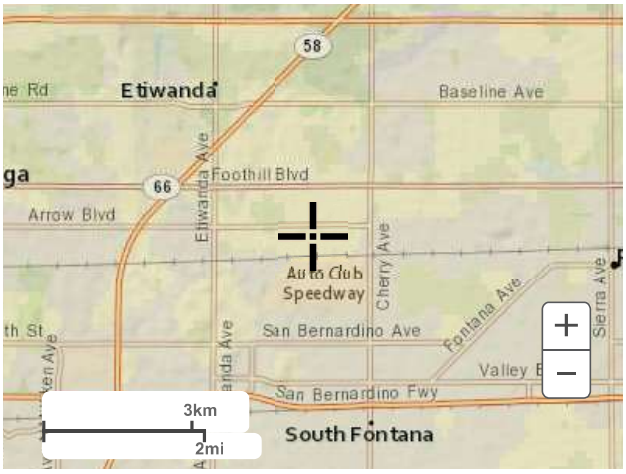
## Maps & aerials

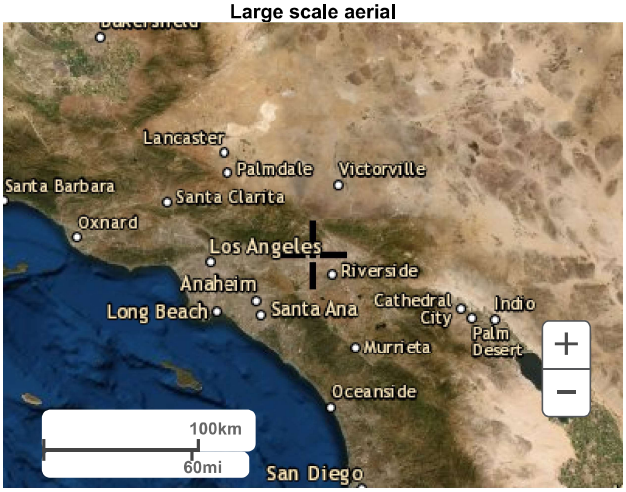
**Small scale terrain**




**Large scale terrain**

**Large scale map**

**Large scale aerial**

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US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

PART 2

**County of San Bernardino**
**LAND DEVELOPMENT**

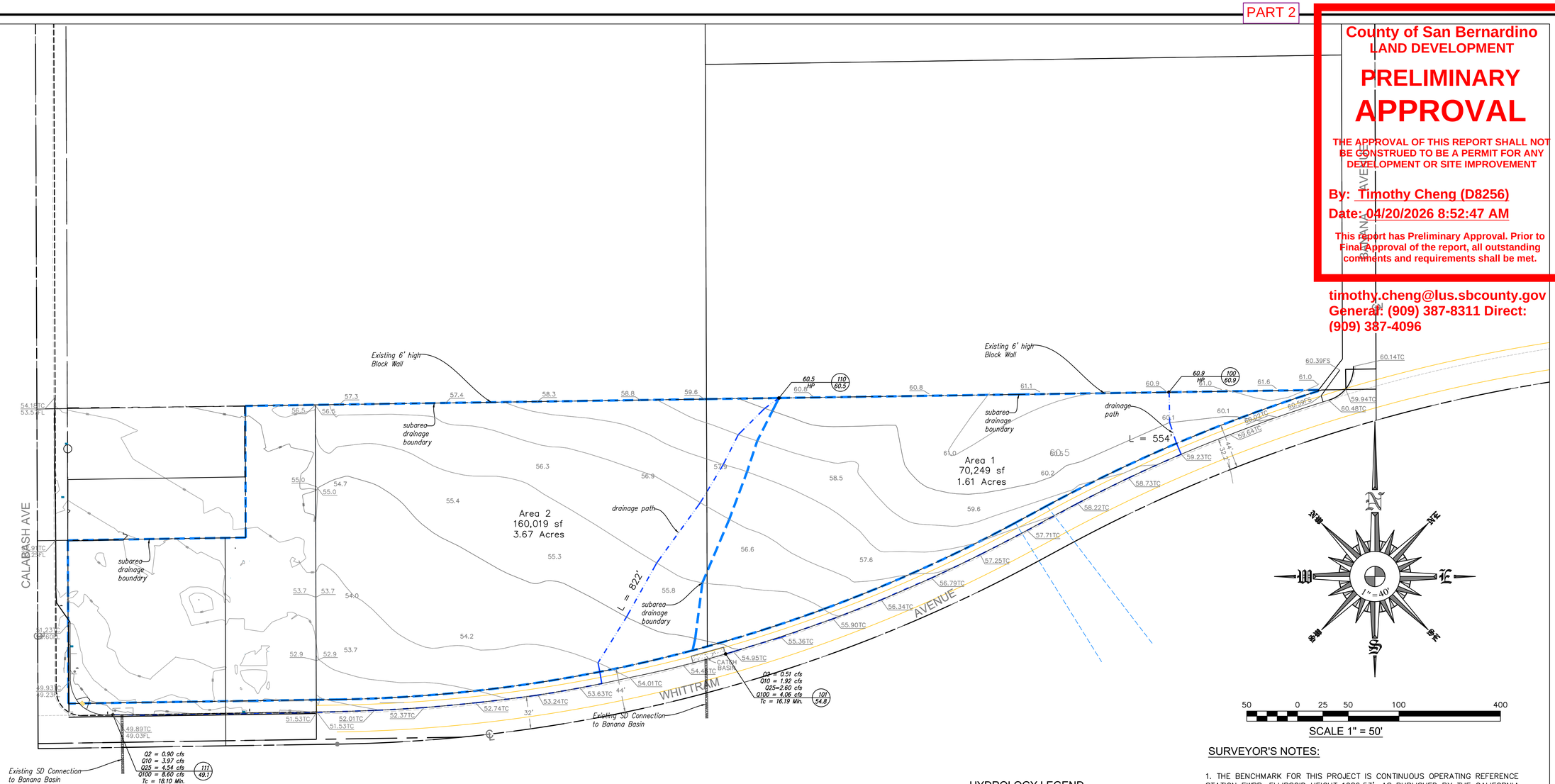
# PRELIMINARY APPROVAL

THE APPROVAL OF THIS REPORT SHALL NOT BE CONSTRUED TO BE A PERMIT FOR ANY DEVELOPMENT OR SITE IMPROVEMENT

By: Timothy Cheng (D8256)
Date: 04/20/2026 8:52:47 AM

This report has Preliminary Approval. Prior to Final Approval of the report, all outstanding comments and requirements shall be met.

timothy.cheng@lus.sbcounty.gov
General: (909) 387-8311 Direct: (909) 387-4096




## HYDROLOGY DATA

100 YEAR – 1 YEAR RAINFALL INTENSITY = 1.41 INCH
25 YEAR – 1 HOUR RAINFALL INTENSITY = 1.08 INCH
10 YEAR – 1 HOUR RAINFALL INTENSITY = 0.867 INCH
2 YEAR – 1 HOUR RAINFALL INTENSITY = 0.542 INCH
SLOPE USED FOR RAINFALL INTENSITY CURVE = 0.600

AMC I USED FOR 2 YEAR STORM RUNNOFF CALCULATIONS
AMC II USED FOR 10 YEAR STORM RUNNOFF CALCULATIONS
AMC III USED FOR 100 YEAR STORM RUNNOFF CALCULATIONS

ASSUMED HYDROLOGIC LAND USE OF UNDEVELOPED – POOR COVER

SOIL TYPE A

## HYDROLOGY LEGEND

Q100 = 100–YEAR FLOW RATE
Q10 = 10–YEAR FLOW RATE
Q2 = 2–YEAR FLOW RATE
Tc = TIME OF CONCENTRATION – MINUTES
L = FLOW PATH LENGTH IN FEET
101 / 54.8 = NODE NUMBER / ELEVATION
DRAINAGE AREA BOUNDARY
DRAINAGE FLOW PATH

## SURVEYOR'S NOTES:

1. THE BENCHMARK FOR THIS PROJECT IS CONTINUOUS OPERATING REFERENCE STATION EWPP, ELLIPSOID HEIGHT 1086.53', AS PUBLISHED BY THE CALIFORNIA SPATIAL REFERENCE CENTER FOR THE CALIFORNIA DEPARTMENT OF TRANSPORTATION PER A SURVEY DATED NOVEMBER 11, 2017.

THIS IS A CONTINUOUS GPS STATION AND IS PART OF THE NATIONAL GEODETIC SURVEY. VERTICAL DATUM IS TO THE GEODETIC REFERENCE POINT (GRP.) THE ANTENNA IS AN ASHTECH 701945_M WITH SCIT DOME. TRUE VERTICAL ANTENNA HEIGHT IS FROM THE GEODETIC REFERENCE POINT TO THE ANTENNA PRE–AMP (BPA) AND IS 0.027 FEET.

2. THIS SURVEY DOES NOT CONSTITUTE A BOUNDARY RETRACEMENT SURVEY. THE DISTINCTIVE BOLD BOUNDARY LINE SHOWN HEREON IS FOR INFORMATIONAL PURPOSES ONLY AND SHOULD BE CONSIDERED APPROXIMATE. IT HAS BEEN CONSTRUCTED FROM A COMBINATION OF RECORD OF SURVEY 130/78–81 AND THE CURRENT COUNTY ASSESSOR'S MAP.

3. THE BASIS OF BEARINGS FOR THIS SURVEY IS A LINE BETWEEN CONTINUOUS GPS STATIONS "EWPP" AND "RTHS". SAID BEARING IS SOUTH 84°19'30" EAST.

4. THE BASIS OF COORDINATES FOR THIS SURVEY IS THE CALIFORNIA STATE PLANE COORDINATE SYSTEM, ZONE 5, CONSTRAINED LOCALLY TO CONTINUOUS GPS STATIONS "EWPP" AND "RTHS." COORDNIATES ARE PER THE SURVEY PUBLISHED BY THE CALIFORNIA SPATIAL REFERENCE CENTER FOR THE CALIFORNIA DEPARTMENT OF TRANSPORTATION, EPOCH 2017.50 (NAD83.)

*An Original Map Product Contains An Embossed Seal In This Area*

Revisions:

| No. | Date: | By: | Description: | Approved: |
|---|---|---|---|---|
| | | | | |

Designed: | Drawn: | Checked: ACH

Seal: REGISTERED PROFESSIONAL ENGINEER ROBERT MARK BEERS No. 39405 Exp. 12–31–25 CIVIL STATE OF CALIFORNIA

Prepared under the Supervision of:

PROFESSIONAL ENGINEER
LICENSE NO. 39405
REGISTRATION EXPIRES: 12-31-25

DATE

RMB Consulting
Planning – Civil Engineering – Construction Management
8175 Limonite Avenue, Suite E Jurupa Valley CA 92509

Scale: 1" = 40'
Date: Nov. 11, 2025

BENCHMARK: SEE SURVEYOR'S NOTES

# EXISTING CONDITION HYDROLOGY MAP
14044 WHITTRAM AVENUE, FONTANA

PREPARED FOR:
B & D CONSTRUCTION
145 N. 10TH STREET
UPLAND, CA 91786

F.N. | For: | F.B.

Sheet No. 1 OF 1 SHEET
FILE NO. 286–40

# DEVELOPED CONDITON
# HYDROLOGY MAP
# MINOR USE PERMIT
# TRUCK TRAILER PARKING
# 14044 WHITTRAM AVENUE, FONTANA
# DRNSTY-2024-00020

**OFFICIAL USE ONLY**

## HYDROLOGY DATA

100 YEAR – 1 YEAR RAINFALL = 1.41 INCH

25–YEAR – 1 HOUR RAINFALL = 1.08 INCH

10 YEAR – 1 HOUR RAINFALL = 0.867 INCH

2–YEAR – 1 HOUR RAINFALL = 0.542 INCH

SLOPE USED FOR RAINFALL INTENSITY CURVE = 0.600

AMC I USED FOR 2–YEAR STORM RUNOFF CALCULATIONS
AMC II USED FOR 10–YEAR STORM RUNOFF CALCULATIONS
AMC III USED FOR 100–YEAR STORM RUNOFF CALCULATIONS

ASSUMED HYDROLOGIC LAND USE: COMMERCIAL FOR AREAS A–1, A–2 & B

SOIL TYPE A

## HYDROLOGY LEGEND

Q100 = 100–YEAR FLOW RATE

Q25 = 25–YEAR FLOW RATE

Q10 = 10–YEAR FLOW RATE

Q2 = 2–YEAR FLOW RATE

Tc = TIME OF CONCENTRATION – MINUTES

L = FLOW PATH LENGTH IN FEET

101 / 54.8 — NODE NUMBER / ELEVATION

DRAINAGE AREA BOUNDARY

DRAINAGE FLOW PATH

I-1 — INFILTRATION TEST LOCATION

## INFILTRATION TEST RESULTS

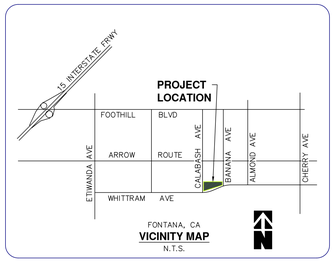
I–1 5.89 INCH/HR

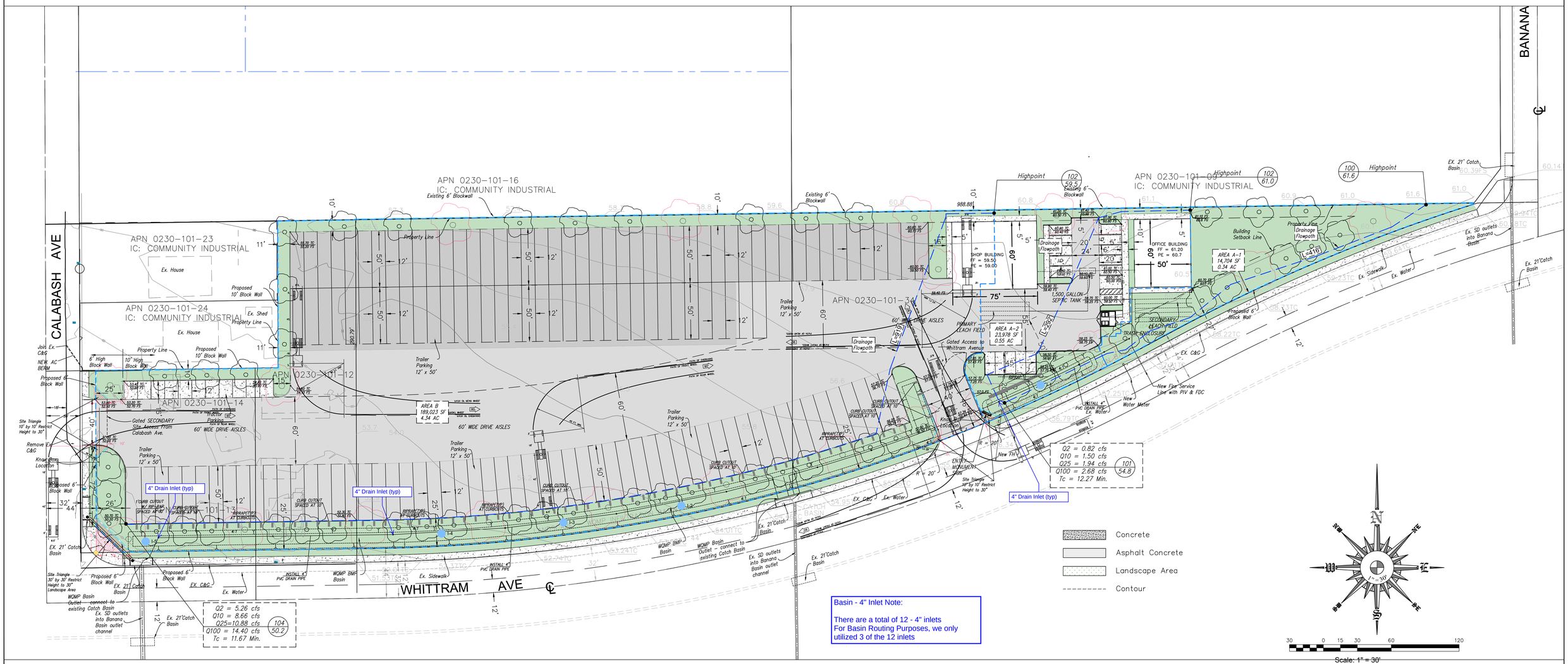
I–2 11.4 INCH/HR

I–3 6.25 INCH/HR

I–4 14.7 INCH/HR

I–5 3.45 INCH/HR




Basin - 4" Inlet Note:

There are a total of 12 - 4" inlets
For Basin Routing Purposes, we only utilized 3 of the 12 inlets

## SURVEY NOTES - BENCHMARK

1. THE BENCHMARK FOR THIS PROJECT IS CONTINUOUS OPERATING REFERENCE STATION EWPP, ELLIPSOID HEIGHT 1086.53', AS PUBLISHED BY THE CALIFORNIA SPATIAL REFERENCE CENTER FOR THE CALIFORNIA DEPARTMENT OF TRANSPORTATION PER A SURVEY DATED NOVEMBER 11, 2017.

THIS IS A CONTINUOUS GPS STATION AND IS PART OF THE NATIONAL GEODETIC SURVEY. VERTICAL DATUM IS TO THE GEODETIC REFERENCE POINT (GRP.) THE ANTENNA IS AN ASHTECH 701945_M WITH SCIT DOME. TRUE VERTICAL ANTENNA HEIGHT IS FROM THE GEODETIC REFERENCE POINT TO THE ANTENNA PRE–AMP (BPA) AND IS 0.027 FEET.

## EXISTING STRUCTURES NOTE

1. THE EXISTING STRUCTURES ON APNS 0230–101–12 & 13 SHALL BE REMOVED AS A PART OF THE DEVELOPMENT OF THE TRUCK TRAILER PARKING PROJECT.

## PROJECT FENCING & GATES

1. NEW BLOCK WALLS MINIMUM OF 6' HIGH SHALL BE INSTALLED ALONG THE PROPERTY LINES THAT DO NOT CURRENTLY HAVE BLOCK WALLS.

2. AUTOMATIC ENTRY GATES SHALL BE INSTALLED AT THE DRIVEWAY ENTRIES ON WHITTRAM AVENUE AND CALABASH AVE.

*PREPARED FOR:*

VERNACI PROPERTIES, LLC
145 N. 10TH STREET
UPLAND, CA 91786

Revisions:

| No. | Date: | By: | Description: | Approved: |
|---|---|---|---|---|
| | | | | |

Designed: RMB | Drawn: RAH | Checked: ACH

Seal: REGISTERED PROFESSIONAL ENGINEER — ROBERT MARK BEDDES — No. 39405 Exp. 12–31–27 — CIVIL — STATE OF CALIFORNIA

Prepared under the Supervision of:

PROFESSIONAL ENGINEER
LICENSE NO. 39405
REGISTRATION EXPIRES: 12-31-27

DATE

RMB CONSULTING
LAND PLANNING – CIVIL ENGINEERING – SURVEYING
8175 Limonite Avenue, Suite I ▶ Jurupa Valley, CA 92509 (951) 317-2041

Scale: 1" = 30'

Date: March 25, 2026

BENCHMARK: SEE SURVEYOR'S NOTES

VERNACI PROPERTIES, LLC
TRUCK TRAILER PARKING LAYOUT
14044 WHITTRAM AVENUE, FONTANA
APNS 0230-101- 012, 013 & 034

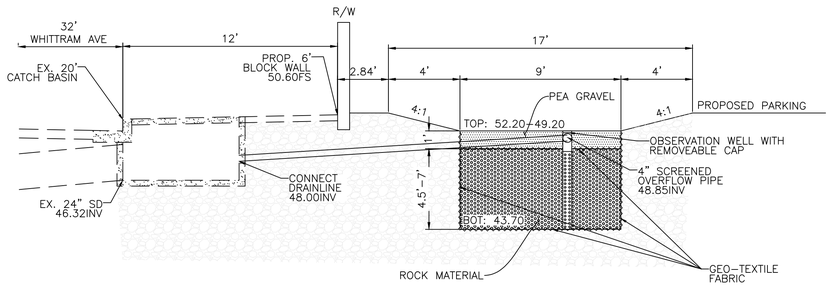
Developed Condition Hydrology Map

F.N. | For: | F.B.

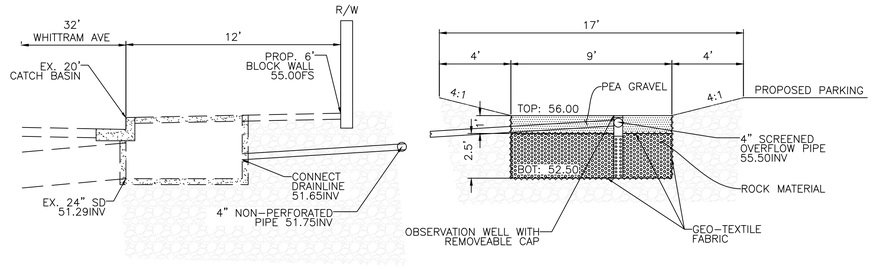
Sheet No. 1 OF 1 SHEET

FILE NO. 286–39

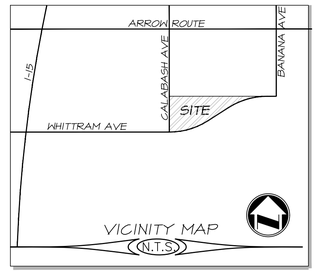
# BMP MAP
## TRUCK TRAILER PARKING

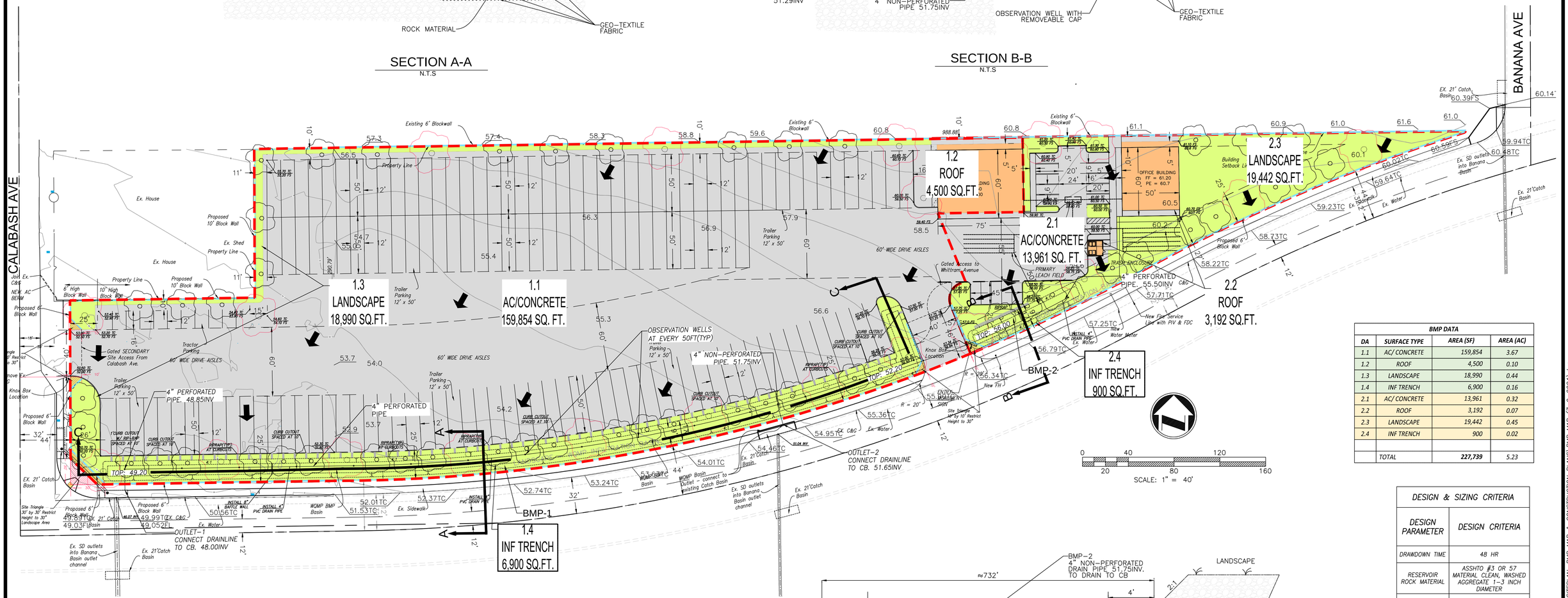



## SECTION A-A
N.T.S




## SECTION B-B
N.T.S



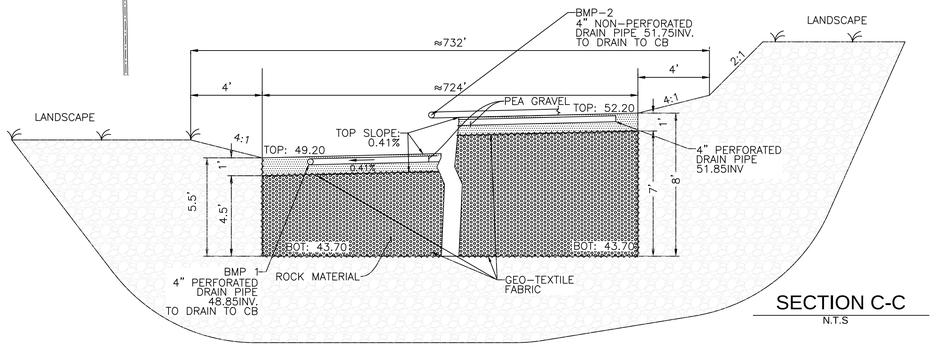

| BMP DATA | | | |
|---|---|---|---|
| DA | SURFACE TYPE | AREA (SF) | AREA (AC) |
| 1.1 | AC/ CONCRETE | 159,854 | 3.67 |
| 1.2 | ROOF | 4,500 | 0.10 |
| 1.3 | LANDSCAPE | 18,990 | 0.44 |
| 1.4 | INF TRENCH | 6,900 | 0.16 |
| 2.1 | AC/ CONCRETE | 13,961 | 0.32 |
| 2.2 | ROOF | 3,192 | 0.07 |
| 2.3 | LANDSCAPE | 19,442 | 0.45 |
| 2.4 | INF TRENCH | 900 | 0.02 |
| | | | |
| | TOTAL | **227,739** | 5.23 |

| SOURCE CONTROLS | | |
|---|---|---|
| NAME | TYPE | CASQA |
| BMP 1 | INFILTRATION TRENCH | TC-32 |
| BMP 2 | INFILTRATION TRENCH | TC-32 |

| DESIGN & SIZING CRITERIA | |
|---|---|
| DESIGN PARAMETER | DESIGN CRITERIA |
| DRAWDOWN TIME | 48 HR |
| RESERVOIR ROCK MATERIAL | ASSHTO #3 OR 57 MATERIAL CLEAN, WASHED AGGREGATE 1-3 INCH DIAMETER |
| | |

LEGEND

- DRAINAGE AREA BOUNDARY
- FLOW PATH
- LANDSCAPE
- CONCRETE/ ASPHALT
- ROOF




## SECTION C-C
N.T.S

* NOTE TO CONTRACTOR
DO NOT USE HEAVY EQUIPMENT
FOR CONSTRUCTING TRENCH

BMP MAP
TRUCK TRAILER PARKING
PREPARATION DATE : DECEMBER 2025


PLAN PREPARED BY:
adkan ENGINEERS
Civil Engineering · Surveying · Planning
6879 Airport Drive, Riverside, CA 92504
Tel:(951) 688-0241 Fax:(951) 688-0599


Plot Date: 3/25/2026

U:\Projects\Beers\10565\PWQMP\Appendix A SITEPLAN, BMP MAP & CONSTRUCTION PLANS\BMP MAP (7-9-2024).dwg

# PROJ-2024-00004
# SITE PLAN FOR
# MINOR USE PERMIT
# TRUCK TRAILER PARKING
# 14044 WHITTRAM AVENUE, FONTANA

**OFFICIAL USE ONLY**

## LE AL ESCRIPTION

PARCEL 1
THAT PORTION OF LOT 247, FONTANA ARROW ROUTE TRACT NO. 2102, IN THE COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA, AS PER PLAT RECORDED IN BOOK 31 OF MAPS, PAGES 11 THROUGH 15, INCLUSIVE, RECORDS OF SAID COUNTY, DESCRIBED AS FOLLOWS:

BEGINNING AT THE NORTHEAST CORNER THEREOF;

THENCE WESTERLY ALONG THE NORTH LINE TO THE NORTHWEST CORNER;

THENCE SOUTHERLY TO THE SOUTHWEST CORNER THEREOF;

THENCE ON A STRAIGHT LINE TO THE NORTHEAST CORNER OF SAID LOT AND THE POINT OF BEGINNING.

EXCEPT THEREFROM THAT PORTION OF SAID LAND DESCRIBED IN THAT CERTAIN FINAL ORDER IN CONDEMNATION, COUNTY OF SAN BERNARDINO V. VISTA METAL CORP., A CA CORP, ET AL., CASE NO. SCVSS 78384, RECORDED APRIL 13, 2004, INSTRUMENT NO. 2004-0253183, OFFICIAL RECORDS.

ALSO EXCEPT THEREFROM THAT PORTION OF SAID LOT 247 DESCRIBED IN THAT CERTAIN DEED TO THE COUNTY OF SAN BERNARDINO, RECORDED SEPTEMBER 27, 2005, AS INSTRUMENT NO. 2005-0179835, OFFICIAL RECORDS.

TOGETHER WITH

THE EAST 386 FEET OF LOT 248, TRACT NO. 2102, IN THE COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA, AS PER MAP RECORDED IN BOOK 31 OF MAPS, PAGES 11 THROUGH 15, INCLUSIVE, IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY.

EXCEPT THEREFROM THAT PORTION OF SAID LAND DESCRIBED IN THAT CERTAIN FINAL ORDER IN CONDEMNATION, COUNTY OF SAN BERNARDINO V. VISTA METALS CORP., A CA CORP, ET AL., CASE NO. SCVSS 78384, RECORDED APRIL 13, 2004, INSTRUMENT NO. 2004-0253183, OFFICIAL RECORDS.

ALSO EXCEPT THEREFROM THAT PORTION OF SAID LOT 248 DESCRIBED IN THAT CERTAIN DEED TO THE COUNTY OF SAN BERNARDINO, RECORDED SEPTEMBER 27, 2005, AS INSTRUMENT NO. 2005-0719834, OFFICIAL RECORDS.

THE ABOVE LEGAL DESCRIPTION IS PURSUANT TO THAT NOTICE OF MERGER RECORDED NOVEMBER 9, 2021 AS DOC# 2021-0505994 (PMRG-2021-00057)

(APN 0230-101-34)

PARCEL 2
THAT PORTION OF LOT 248, FONTANA ARROW ROUTE TRACT NO. 2102, IN THE COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA, AS PER PLAT RECORDED IN BOOK 31 OF MAPS, PAGES 11 THROUGH 15, INCLUSIVE, RECORDS OF SAID COUNTY, DESCRIBED AS FOLLOWS:

BEGINNING AT A POINT IN THE SOUTH LINE OF SAID LOT 248, 185 FEET EAST OF THE SOUTHWEST CORNER OF SAID LOT;

THENCE EAST ALONG THE SOUTH LINE OF SAID LOT, 89 FEET TO A POINT 386 WEST OF THE EAST LINE OF SAID LOT;

THENCE NORTH PARALLEL TO THE WEST LINE OF SAID LOT, 330 FEET TO THE NORTH LINE OF SAID LOT;

THENCE WEST ALONG THE NORTH LINE OF SAID LOT, 69 FEET,

THENCE SOUTH PARALLEL TO THE WEST LINE OF SAID LOT, 130 FEET;

THENCE WEST PARALLEL TO THE SOUTH LINE OF SAID LOT, 20 FEET;

THENCE SOUTH PARALLEL TO THE WEST LINE OF SAID LOT, 200 FEET TO THE POINT OF BEGINNING.

AREAS AND DISTANCES COMPUTED TO STREET CENTERS.

TOGETHER WITH;

THE SOUTH 200 FEET OF THE WEST 185 FEET OF LOT 248, FONTANA ARROW ROUTE TRACT NO. 2102, IN THE COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA, AS PER PLAT RECORDED IN BOOK 31 OF MAPS, PAGES 11 THROUGH 15, RECORDS OF SAID COUNTY, AREAS AND DISTANCES COMPUTED TO STREET CENTERS.

THE ABOVE LEGAL DESCRIPTION IS PURSUANT TO THAT NOTICE OF MERGER RECORDED NOVEMBER 08, 2007 AS INSTRUMENT NO. 2007-0623257 OF OFFICIAL RECORDS

(APNS 0230-101-12, 0230-101-13 & 0230-101-14)

## UTILITIES

WATER: FONTANA WATER COMPANY
15966 ARROW ROUTE
FONTANA, CA 92335
909 201-7337

SEWER: ON-SITE SEPTIC SYSTEM

GAS: SOUTHERN CALIFORNIA GAS COMPANY
9781 SIERRA AVE, SUITE C
FONTANA, CA 92335

POWER: SO. CALIF. EDISON COMPANY
800 655-4555

TELEPHONE: AT&T
16232 FOOTHILL AVENUE, SUITE C
FONTANA, CA 92335
909 574-7316

CABLE: SPECTRUM
16973 SIERRA LAKES PARKWAY
FONTANA, CA 92336
888 406-7063

TRASH: BURRTEC
6820 CHERRY AVENUE
FONTANA, CA 92335
909 987-3717

## APPLICATION TYPE

MINOR USE PERMIT TO CHANGE AN APPROVED CONTRACTORS EQUIPMENT STORAGE YARD TO A TRUCK TRAILER STORAGE YARD WITH AN OFFICE/SHOP BUILDING WITHIN THE COMMUNITY INDUSTRIAL (IC) ZONING DISTRICT

## PAR IN ANALYSIS

| | |
|---|---|
| 3,000 SF OFFICE AREA (1 SPACE/250 SF) | 12 SPACES |
| 4,500 SF MAINTENANCE SHOP (1 SPACE/1000 SF) | 4.5 SPACES |
| TOTAL CAR SPACES REQUIRED: | 17 SPACES |
| TOTAL CAR PARKING SPACES PROVIDED: (INCLUDING 1 ACCESSIBLE SPACE) | 17 SPACES |
| CLEAN AIR VEHICLE SPACES REQUIRED (10-25 TOTAL PARKING) | 1 SPACE |
| ELECTRIC VEHICLE CHARGING SPACES REQUIRED (10-25 SPACES) | 1 SPACE |
| CLEAN AIR VEHICLE SPACES PROVIDED | 1 SPACE |
| ELECTRIC VEHICLE SPACES PROVIDED | 2 SPACES |
| TRUCK - TRACTOR RIG SPACES PROVIDED: | 11 SPACES |
| TRUCK TRAILER SPACES PROVIDED: | 138 SPACES |

## LOT COVERA E CALCULATIONS

TOTAL AREA = 227,738 SF

PERVIOUS AREA (22.19%)
TOTAL LANDSCAPE AREA = 50,540 SF 22.19%

IMPERVIOUS AREA (77.81%)
DRIVE AISLES: 75,876 SF 33.32%

CONCRETE SIDEWALK: 1,376 SF 0.60%

TRUCK PARKING: 2,112 SF 1.22%

TRUCK TRAILER PARKING: 87,117 SF 38.25%

CAR PARKING: 3,217 SF 1.41%

SHOP BUILDING: 4,500 SF 1.98%

OFFICE BUILDING: 3,000 SF 1.32%

## PROJECT INFORMATION

OWNER: VERNACI PROPERTIES, LLC AS TO APN 0230-101-34
145 N. 10TH AVENUE
UPLAND, CA 91786
909.949.0360

JOE & NORA RENTERIA AS TO APNS 0230-101-012, 013 & 014
TRUSTEES OF THE RENTERIA FAMILY TRUST
14833 NEW FOAL TRAIL
FONTANA, CA 92336
951.830.2861

ZONING: COMMUNITY INDUSTRIAL (IC)
LIMITED LAND USE CATEGORY AND COMMUNITY INDUSTRIAL ZONING DESIGNATION

SEPTIC SYSTEM: 1,500 GALLON TANK WITH PRIMARY AND SECONDARY LEACH FIELDS

TRUCK TRACTOR SPACES: 12' WIDE BY 16' DEEP

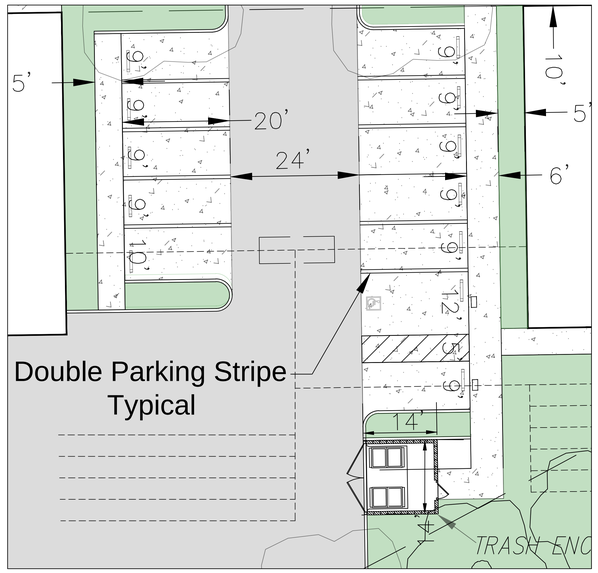
TRUCK TRAILER SPACES: 12' WIDE BY 50' DEEP

## ITTRAM AVE ATE NOTE

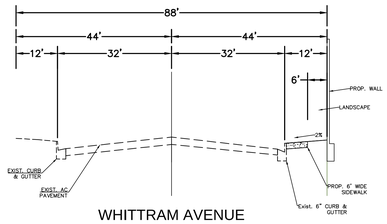
GATE TO BE SET 46' BACK FROM STREET RIGHT-OF-WAY

## CALA AS AVE ATE NOTE

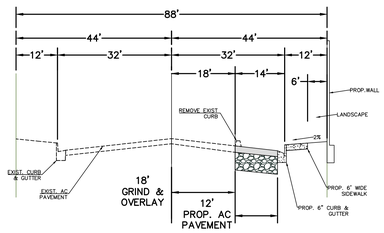
TRUCKS LEAVING VIA CALABASH AVE GATE TO BE RESTRICTED TO LEFT TURN TO ACCESS WHITTRAM AVENUE.



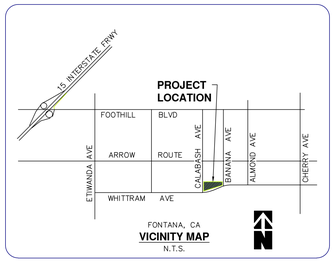

Parking Lot Detail
Scale 1" = 10'

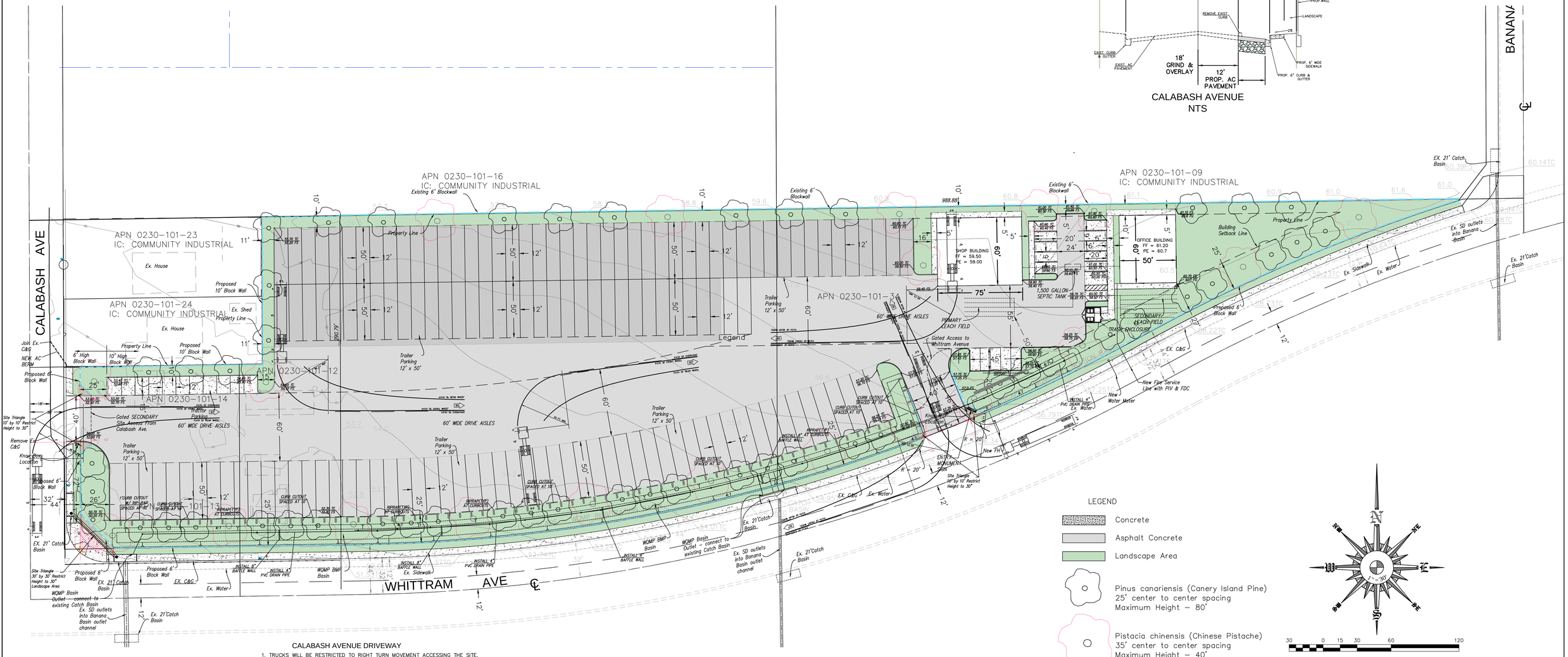



WHITTRAM AVENUE
NTS




CALABASH AVENUE
NTS




## LEGEND

- Concrete
- Asphalt Concrete
- Landscape Area
- Pinus canariensis (Canery Island Pine) 25' center to center spacing Maximum Height - 80'
- Pistacia chinensis (Chinese Pistache) 35' center to center spacing Maximum Height - 40'




30 0 15 30 60 120
Scale: 1" = 30'

## SURVEY NOTES - BENCHMARK

1. THE BENCHMARK FOR THIS PROJECT IS CONTINUOUS OPERATING REFERENCE STATION EWPP, ELLIPSOID HEIGHT 1086.53', AS PUBLISHED BY THE CALIFORNIA SPATIAL REFERENCE CENTER FOR THE CALIFORNIA DEPARTMENT OF TRANSPORTATION PER A SURVEY DATED NOVEMBER 11, 2017.

THIS IS A CONTINUOUS GPS STATION AND IS PART OF THE NATIONAL GEODETIC SURVEY. VERTICAL DATUM IS TO THE GEODETIC REFERENCE POINT (GRP.) THE ANTENNA IS AN ASHTECH 701945_M WITH SCIT DOME. TRUE VERTICAL ANTENNA HEIGHT IS FROM THE GEODETIC REFERENCE POINT TO THE ANTENNA PRE-AMP (BPA) AND IS 0.027 FEET.

## CALABASH AVENUE DRIVEWAY

1. TRUCKS WILL BE RESTRICTED TO RIGHT TURN MOVEMENT ACCESSING THE SITE. NO TRUCK EXITS ALLOWED ONTO CALABASH AVENUE

## EXISTING STRUCTURES NOTE

1. THE EXISTING STRUCTURES ON APNS 0230-101-12 & 13 SHALL BE REMOVED AS A PART OF THE DEVELOPMENT OF THE TRUCK TRAILER PARKING PROJECT.

## PROJECT FENCING & GATES

1. NEW BLOCK WALLS MINIMUM OF 6' HIGH SHALL BE INSTALLED ALONG THE PROPERTY LINES THAT DO NOT CURRENTLY HAVE BLOCK WALLS.

2. AUTOMATIC ENTRY GATES SHALL BE INSTALLED AT THE DRIVEWAY ENTRIES ON WHITTRAM AVENUE AND CALABASH AVE.

*PREPARED FOR:*
VERNACI PROPERTIES, LLC
145 N. 10TH STREET
UPLAND, CA 91786

Revisions:

| No. | Date: | By: | Description: | Approved: |
|---|---|---|---|---|
| 4 | 4-07-25 | | Add Street Typical Sections | |
| 3 | 4-06-25 | | Add Site Distance Triangles to Site Plan - Adj. Walls | |
| 2 | 3-31-25 | | Revise Wall Heights | |
| 1 | 1-15-25 | | Add Truck Turning Templates to Site Plan | |

Designed: RMB | Drawn: RAH | Checked: ACH

Seal: REGISTERED PROFESSIONAL ENGINEER ROBERT MARK BEDDES No. 39405 Exp. 12-31-27 CIVIL STATE OF CALIFORNIA

Prepared under the Supervision of:

PROFESSIONAL ENGINEER
LICENSE NO. 39405
REGISTRATION EXPIRES: 12-31-27

DATE

RMB CONSULTING
LAND PLANNING - CIVIL ENGINEERING - SURVEYING
8175 Limonite Avenue, Suite I▶ Jurupa Valley, CA 92509 (951) 317-2041

Scale: 1" = 30'
Date: March 25, 2026
BENCHMARK: SEE SURVEYOR'S NOTES

VERNACI PROPERTIES, LLC
TRUCK TRAILER PARKING STORAGE
14044 WHITTRAM AVENUE, FONTANA
APNS 0230-101- 012, -013, -014 & 034

Site Plan

F.N. | For: | F.B.

Sheet No. 1 OF 1 SHEET

FILE NO. 286-39

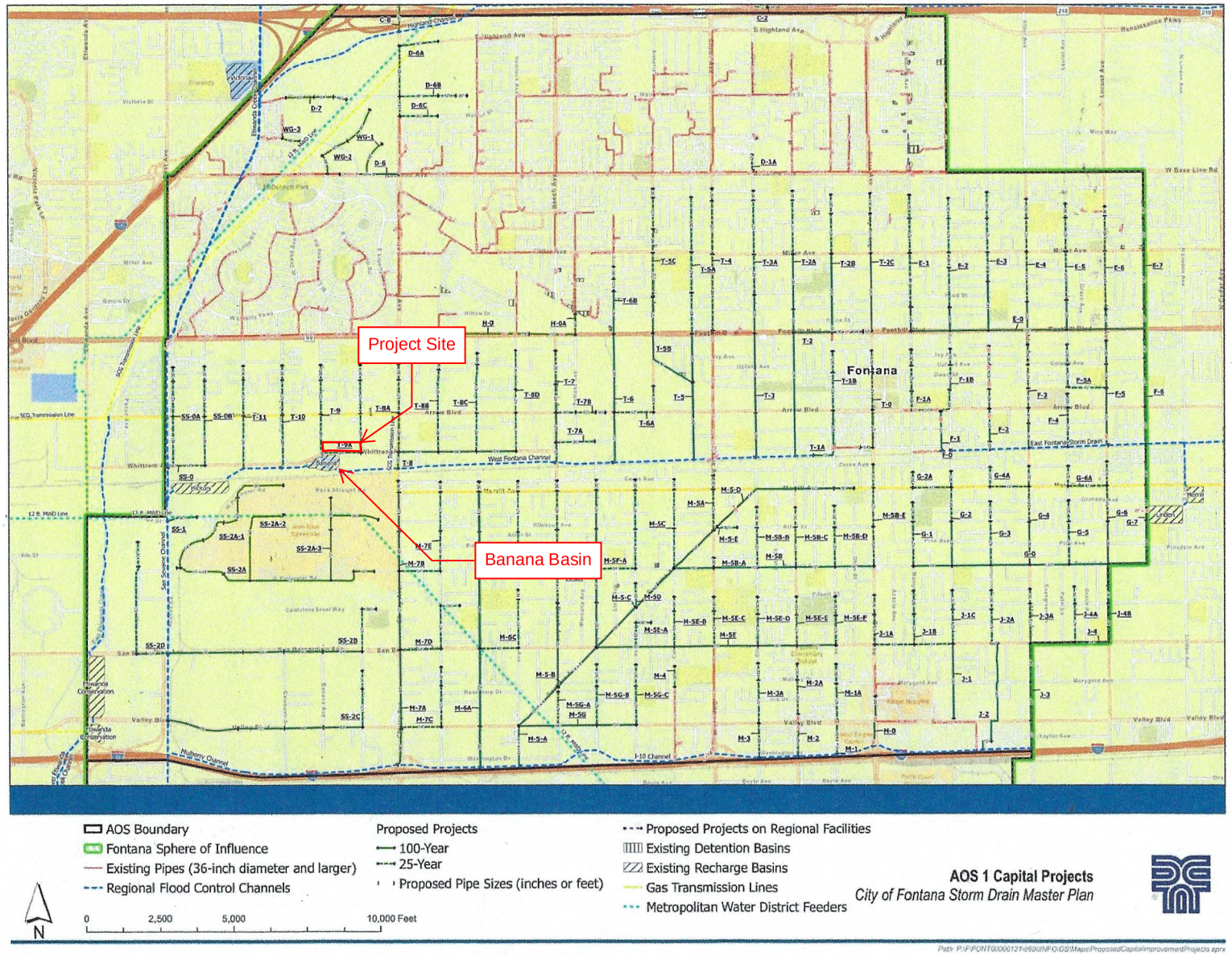



*Figure 4-1. Capital Projects for AOS 1*

## NOTES TO USERS

p is for use in administering the National Flood Insurance Program. It t necessarily identify all areas subject to flooding, particularly from local sources of small size. The **community map repository** should be d for possible updated or additional flood hazard information.

in more detailed information in areas where **Base Flood Elevations** and/or **floodways** have been determined, users are encouraged to consult d Profiles and Floodway Data and/or Summary of Stillwater Elevations ontained within the Flood Insurance Study (FIS) report that accompanies M. Users should be aware that BFEs shown on the FIRM represent whole-foot elevations. These BFEs are intended for flood insurance urposes only and should not be used as the sole source of flood n information. Accordingly, flood elevation data presented in the FIS should be utilized in conjunction with the FIRM for purposes of tion and/or floodplain management.

**l Base Flood Elevations** shown on this map apply only landward of h American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should e that coastal flood elevations are also provided in the Summary of r Elevations tables in the Flood Insurance Study report for this jurisdiction. ns shown in the Summary of Stillwater Elevations tables should be used for tion and/or floodplain management purposes when they are higher than ations shown on this FIRM.

ies of the **floodways** were computed at cross sections and interpolated cross sections. The floodways were based on hydraulic considerations ard to requirements of the National Flood Insurance Program. Floodway nd other pertinent floodway data are provided in the Flood Insurance port for this jurisdiction.

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

jection used in the preparation of this map was Universal Transverse r (UTM) zone 11 North. The **horizontal datum** was NAD 83, GRS80 . Differences in datum, spheroid, projection or UTM zones used in the on of FIRMs for adjacent jurisdictions may result in slight positional es in map features across jurisdiction boundaries. These differences do t the accuracy of the FIRM.

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

ormation Services
/NGS12
Geodetic Survey
, #9202
st-West Highway
ring, Maryland 20910-3282
0-3242

n current elevation, description, and/or location information for **bench** shown on this map, please contact the Information Services Branch National Geodetic Survey at **(301) 713-3242**, or visit its website at w.ngs.noaa.gov.

**ap** information shown on this FIRM was derived from digital tography collected by the U.S. Department of Agriculture Farm Service This imagery was flown in 2005 and was produced with a 1-meter ground distance.

p may reflect more detailed and up-to-date stream channel configurations se shown on the previous FIRM for this jurisdiction. The floodplains and s that were transferred from the previous FIRM may have been adjusted m to these new stream channel configurations. As a result, the Flood and Floodway Data tables in the Flood Insurance Study Report (which authoritative hydraulic data) may reflect stream channel distances that m what is shown on this map.

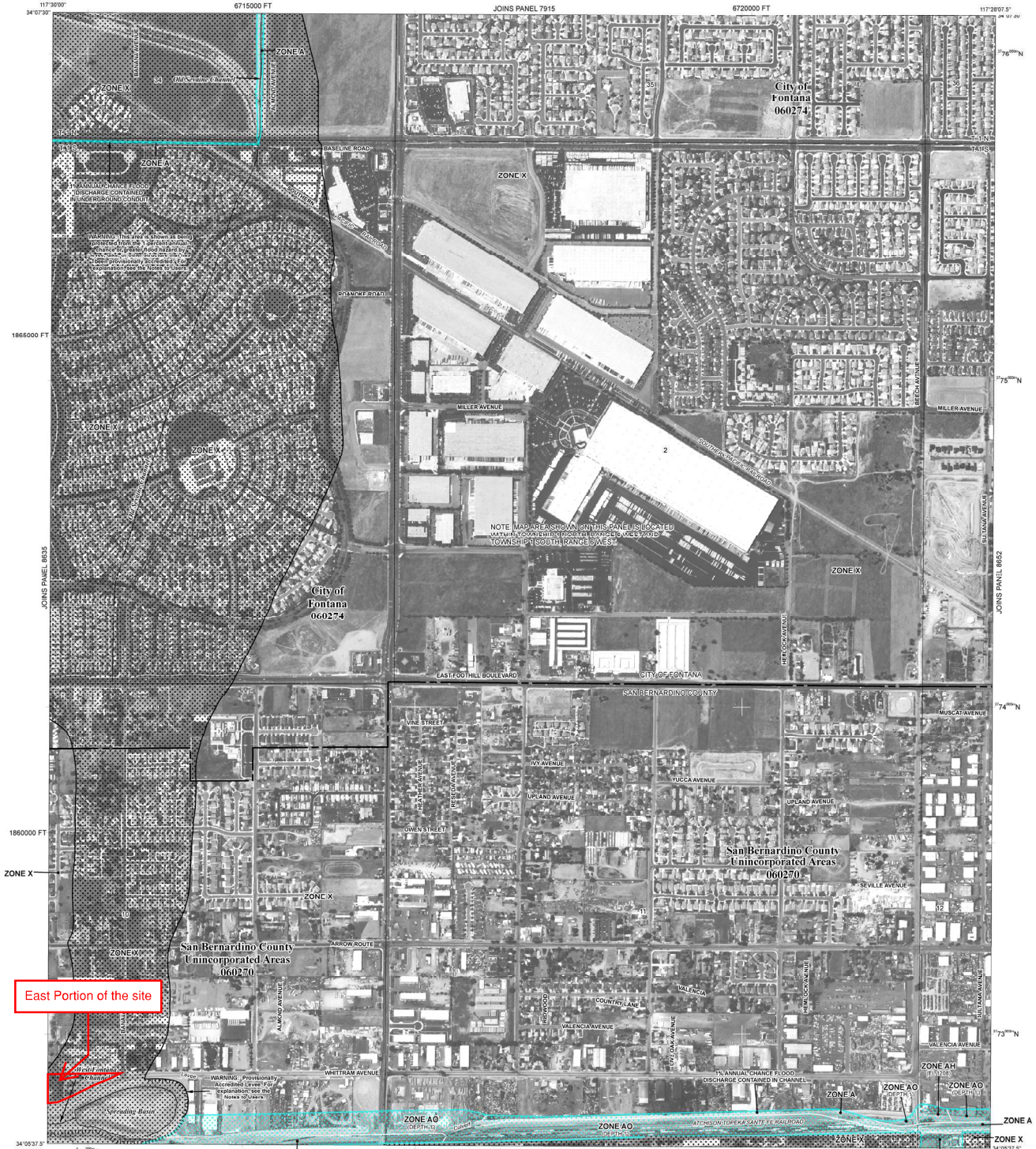
**te limits** shown on this map are based on the best data available at the ublication. Because changes due to annexations or de-annexations may curred after this map was published, map users should contact appropriate ity officials to verify current corporate limit locations.

efer to the separately printed **Map Index** for an overview map of the nowing the layout of map panels; community map repository addresses; sting of Communities table containing National Flood Insurance Program r each community as well as a listing of the panels on which each ity is located.

the **FEMA Map Service Center** at 1-800-358-9616 for information on e products associated with this FIRM. Available products may include ly issued Letters of Map Change, a Flood Insurance Study report, and/or ersions of this map. The FEMA Map Service Center may also be reached t 1-800-358-9620 and its website at http://msc.fema.gov/.

ve **questions about this map** or questions concerning the National Flood e Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or FEMA website at http://www.fema.gov.

**NG:** This mao contains levees. dikes. or other structures that have been ally accredited and mapped as providing protection from the 1-percent-chance flood. To maintain accreditation, the levee owner or community is to submit documentation necessary to comply with 44 CFR Section 65.10 st 8, 2009. Because of the risk of overtopping or failure of the structure, ilities should take proper precautions to protect lives and minimize s in these areas, such as issuing an evacuation plan and encouraging owners to purchase flood insurance.


6715000 FT
JOINS PANEL 7915
6720000 FT
117°30'00"
117°28'07.5"
34°07'30"
34°05'37.5"
ZONE A
ZONE X
ZONE AE
ZONE AO
ZONE AH
Old Sevenne Channel
BASELINE ROAD
ROANOKE ROAD
MILLER AVENUE
SOUTHERN PACIFIC RAILROAD
ATCHISON, TOPEKA, SANTA FE RAILROAD
EAST FOOTHILL BOULEVARD
CITY OF FONTANA
City of Fontana 060274
San Bernardino County Unincorporated Areas 060270
NOTE: MAP AREA SHOWN ON THIS PANEL IS LOCATED WITHIN TOWNSHIP 1 SOUTH, RANGE 5 WEST
SAN BERNARDINO COUNTY
JOINS PANEL 8635
JOINS PANEL 8652
JOINS PANEL 8653
1865000 FT
1860000 FT
East Portion of the site
West Fontana Channel
Spreading Basin
WARNING: This area is shown as being protected from the 1-percent-annual-chance (or greater) flood hazard by a flood control system that was subsequently decertified. Zone AO was provisionally accredited. For explanation, see the Notes to Users.
1% ANNUAL CHANCE FLOOD DISCHARGE CONTAINED IN CHANNEL
1% ANNUAL CHANCE FLOOD DISCHARGE CONTAINED UNDERGROUND CONDUIT
WARNING: Provisionally Accredited Levee. For explanation, see the Notes to Users.
VINE STREET
IVY AVENUE
YUCCA AVENUE
UPLAND AVENUE
OWEN STREET
SEVILLE AVENUE
ARROW ROUTE
WHITTRAM AVENUE
VALENCIA
COUNTRY LANE
VALENCIA AVENUE
MUSCAT AVENUE
BECKA AVENUE
HEMLOCK AVENUE
SULTANA AVENUE
ALMOND AVENUE
REDWOOD
OLIVE OAK AVENUE
BANANA AVENUE
ALDER AVENUE
HEATHER AVENUE
ZONE AO (DEPTH 1)
ZONE AH (ELEVATION 1)
ZONE A
ZONE X
ZONE AO
ZONE AH
ZONE A
ZONE X
ZONE AO (DEPTH 1)
ZONE A
ZONE X
ZONE AO (DEPTH 1)
ZONE A
ZONE X
ZONE AO (DEPTH 1)

## NOTES TO USERS

ap is for use in administering the National Flood Insurance Program. It does
essarily identify all areas subject to flooding, particularly from local drainage
s of small size. The **community map repository** should be consulted for
e updated or additional flood hazard information.

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**floodways** have been determined, users are encouraged to consult the Flood
s and Floodway Data and/or Summary of Stillwater Elevations tables
ed within the Flood Insurance Study (FIS) report that accompanies this FIRM.
should be aware that BFEs shown on the FIRM represent rounded whole-foot
ons. These DFCs are intended for flood insurance rating purposes only and
not be used as the sole source of flood elevation information. Accordingly,
levation data presented in the FIS report should be utilized in conjunction with
IM for purposes of construction and/or floodplain management.

**al Base Flood Elevations (BFEs)** shown on this map apply only landward of
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that coastal flood elevations are also provided in the Summary of Stillwater
ons table in the Flood Insurance Study report for this jurisdiction. Elevations
in the Summary of Stillwater Elevations table should be used for construction
floodplain management purposes when they are higher than the elevations
on this FIRM.

aries of the **floodways** were computed at cross sections and interpolated
n cross sections. The floodways were based on hydraulic considerations with
to requirements of the National Flood Insurance Program. Floodway widths
her pertinent floodway data are provided in the Flood Insurance Study report
jurisdiction.

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

**rojection** used in the preparation of this map was Universal Transverse
or (UTM) zone 11 North. The **horizontal datum** was NAD83, GRS1980
id. Differences in datum, spheroid, projection or State Plane zones used in
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oces in map features across jurisdiction boundaries. These differences do not
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elevations on this map are referenced to the North American Vertical Datum of
These flood elevations must be compared to structure and ground elevations
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l Datum of 1988, visit the National Geodetic Survey website at
ww.ngs.noaa.gov/ or contact the National Geodetic Survey at the following
s:

nformation Services
, NNGS12
nal Geodetic Survey
-3, #9202
ast-West Highway
Spring, Maryland 20910-3282
13-3242

ain current elevation, description, and/or location information for **bench marks**
on this map, please contact the Information Services Branch of the National
tic Survey at **(301) 713-3242** or visit its website at http://www.ngs.noaa.gov/.

**nap** information shown on this FIRM was provided in digital format by the San
dino County ISD.GIS Department, United States Geological Survey, the
t of Land Management, the United States Department of Agriculture, and the
al Geodetic Survey. This imagery was flown by the US Department of
ure Farm Service Agency in 2012 and was produced with a 1-meter ground
ng distance.

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of Communities table containing National Flood Insurance Program dates for
mmunity as well as a listing of the panels on which each community is
.

ormation and questions about this map, available products associated with this
ncluding historic versions of this FIRM, how to order products or the National
Insurance Program in general, please call the FEMA Map Information
nge at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Map Service
website at http://msc.fema.gov. Available products may include previously
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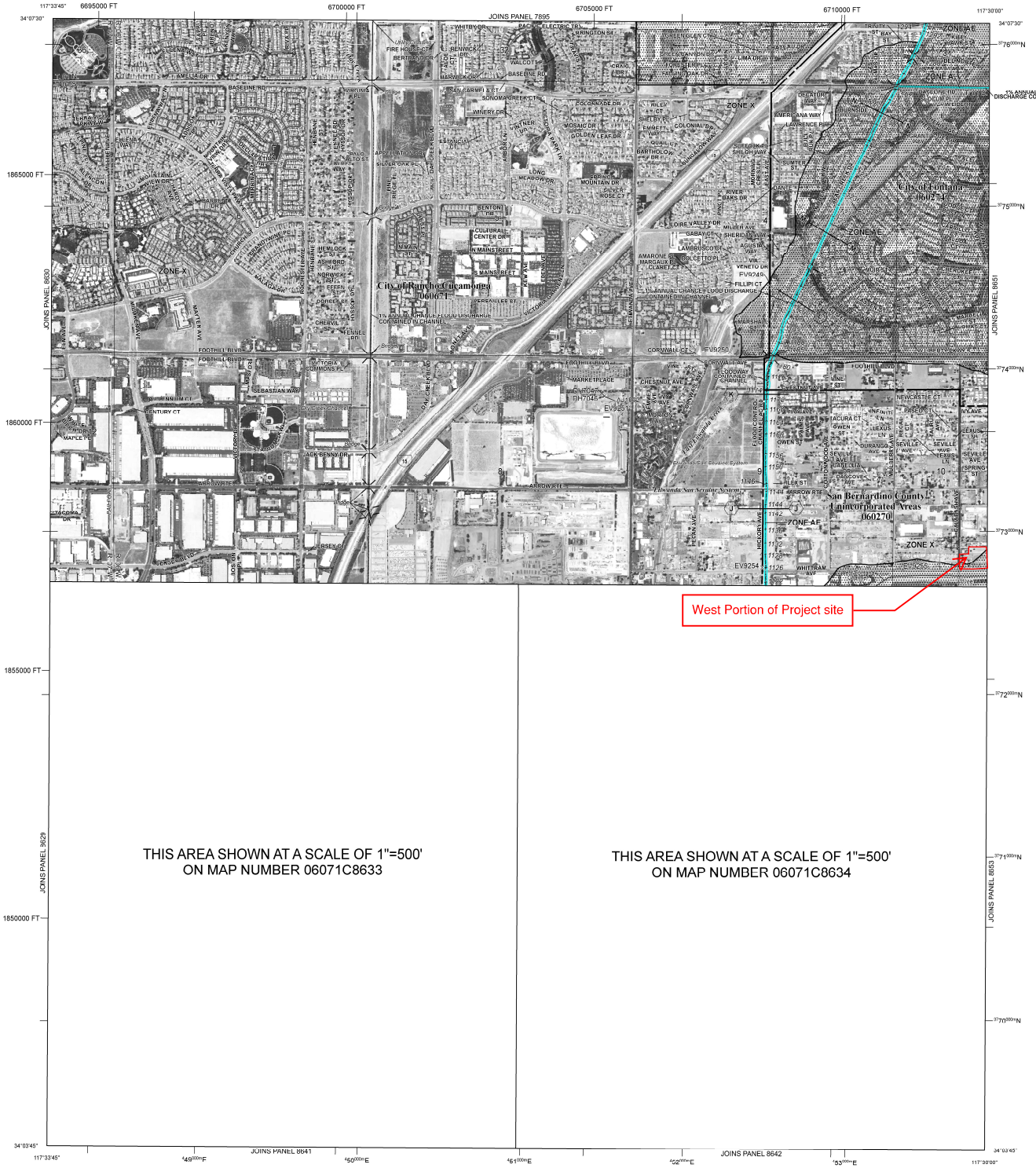
the FEMA Map Service Center website or by calling the FEMA Map
tion eXchange.




## LEGEND

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

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

**ZONE A** No Base Flood Elevations determined.

**ZONE AE** Base Flood Elevations determined.

**ZONE AH** Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood
determined.

**ZONE AO** Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); aver
determined. For areas of alluvial fan flooding, velocities also determined

**ZONE AR** Special Flood Hazard Area formerly protected from the 1% annual chan
a flood control system that was subsequently decertified. Zone AR ind
the former flood control system is being restored to provide protection
1% annual chance or greater flood.

**ZONE A99** Areas to be protected from 1% annual chance flood event by a Fe
protection system under construction; no Base Flood Elevations determin

**ZONE V** Coastal flood zone with velocity hazard (wave action); no Base Flood
determined.

**ZONE VE** Coastal flood zone with velocity hazard (wave action); Base Flood
determined.

FLOODWAY AREAS IN ZONE AE

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

OTHER FLOOD AREAS

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

OTHER AREAS

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

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

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

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

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

* Referenced to the North American Vertical Datum of 1988

A — A Cross section line

23 — 23 Transect line

97°07'30", 32°22'30" Geographic coordinates referenced to the North
Datum of 1983 (NAD 83), Western Hemisphere

4275000mE 1000-meter Universal Transverse Mercator grid values,

6000000 FT 5000-foot grid ticks: California State Plane coordina
Zone V (FIPSZONE = 405), Lambert projection

DX5510 Bench mark (see explanation in Notes to Users sect
FIRM panel)

M1.5 River Mile

MAP REPOSITORIES
Refer to Map Repositories List on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
March 18, 1996

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
September 26, 2014 for a description of revisions, see Notice to Users page in the Flood
study report.

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

To determine if flood insurance is available in this community, contact your insurance agent
National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 1000'

500 0 500 1,000 1,500 2,000 FEET
300 0 300 600 Meters

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 8635J

# FIRM

FLOOD INSURANCE RATE

SAN BERNARDINO COUNTY, CALIFORNIA AND INCORPORATED AR

PANEL 8635 OF 9400

(SEE MAP INDEX FOR FIRM PANEL

CONTAINS:

| COMMUNITY | NUMBER | PANEL |
|---|---|---|
| FONTANA, CITY OF | 060274 | 8635 |
| RANCHO CUCAMONGA, CITY OF | 060671 | 8635 |
| SAN BERNARDINO COUNTY | 060270 | 8635 |

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

MAP NU
06071C

MAP RE
SEPTEMBER 26

Federal Emergency Management

# GEOTECHNICAL AND INFILTRATION EVALUATION
# PROPOSED TRUCK TRAILER FACILITY
# ASSESSOR'S PARCEL NUMBERS (APNS) 0230-101-12, -13, -14 AND -34
# 14044 WHITTRAM AVENUE
# FONTANA, SAN BERNARDINO COUNTY, CALIFORNIA

**PREPARED FOR**

**MR. ROBERT BEERS**
**8175 LIMONITE AVENUE, SUITE E**
**JURUPA VALLEY, CALIFORNIA 92509**

**PREPARED BY**

**GEOTEK, INC.**
**1548 NORTH MAPLE STREET**
**CORONA, CALIFORNIA 92878**

**PROJECT NO. 3697-CR** **NOVEMBER 15, 2023**

GEOTEK

GeoTek, Inc.
1548 North Maple Street, Corona, California 92878
(951) 710-1160 Office (951) 710-1167 Fax www.geotekusa.com

November 15, 2023
Project No. 3697-CR

**Mr. Robert Beers**
8175 Limonite Avenue, Suite E
Jurupa Valley, California 92509

Subject: **Geotechnical and Infiltration Evaluation**
Proposed Truck Trailer Facility
Assessor's Parcel Numbers (APNs) 0230-101-12, -13, -14 and -34
14044 Whittram Avenue
Fontana, San Bernardino County, California

Dear Mr. Beers:

GeoTek, Inc. (GeoTek) is pleased to provide the results of this Geotechnical and Infiltration Evaluation for a proposed truck trailer facility that will be constructed at 14044 Whittram Avenue, in the City of Fontana, San Bernardino County, California. This report presents a discussion of GeoTek's evaluation and provides preliminary geotechnical recommendations for site preparation, foundation design, infiltration rates and construction of the proposed site improvements.

Based upon review and evaluation, site development appears feasible from a geotechnical viewpoint provided that the recommendations included in this report are incorporated into the design and construction phases of site development.

The opportunity to be of service is sincerely appreciated. If you have any questions, please do not hesitate to contact GeoTek.

Respectfully submitted,
**GeoTek, Inc.**

Bruce A. Hick
GE 2284, Exp. 12/31/24
Geotechnical Engineer

Edward H. LaMont
CEG 1892, Exp. 07/31/24
Principal Geologist

Anna M. Scott
Project Geologist

Kase I. Gebbie, EIT
Staff Engineer

Distribution: (1) Addressee via email (one PDF file)

*https://geotekusa.sharepoint.com/teams/Corona_Branch/Shared Documents/Projects/GeoTek Inc/3600/3697/GEO/Working Files/Amended Report/3697CR GEO INFILT 14044 WHITTRAM FONTANA 11-15-2023.docx*

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ENCLOSURES

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Appendix B – Laboratory Test Results
Appendix C – Percolation Test Data and Porchet Calculations
Appendix D – General Grading Guidelines

# 1. PURPOSE AND SCOPE OF SERVICES

The purpose of this study was to evaluate the geotechnical conditions for a proposed truck trailer facility to be constructed at 14044 Whittram Avenue, in the City of Fontana, San Bernardino County, California, as outlined in GeoTek's proposal P-1006323-CR dated October 20, 2023. Services provided for this study included the following:

- Research and review of available geologic and geotechnical data and general information pertinent to the site,
- A site reconnaissance,
- Excavation of six (6) exploratory borings for the geotechnical portion of the evaluation to a maximum depth of about 51.5 feet below existing grades,
- Infiltration testing of five (5) additional test borings at depths of about five (5) feet below existing grades, within the areas of proposed stormwater facilities,
- Collection of soil samples in the test borings,
- Laboratory testing of selected soil samples,
- Review and evaluation of site seismicity, and
- Compilation of this geotechnical report which presents preliminary recommendations for site development.

The intent of this report is to aid in the evaluation of the site for future proposed development from a geotechnical perspective. The professional opinions and geotechnical information contained in this report may need to be updated based upon review of the final site development plans. These plans should be provided to GeoTek, Inc. for review when available.

# 2. SITE DESCRIPTION AND PROPOSED DEVELOPMENT

## 2.1 SITE DESCRIPTION

The irregular-shaped subject project site is comprised of four (4) parcels (APNs 0230-101-12, -13, -14 and -34) which totals approximately 5.35-acres in size, and is located at 14044 Whittram

Avenue in the City of Fontana, San Bernardino County, California (see Figure 1). Access to the site is available from Whittram Avenue, a paved, improved street located adjacent to the southern boundary of the site.

The site can be considered as having a relatively flat topography (see Figure 1). Elevations across the site range from approximately 1,156 feet above mean sea level (amsl) in the northeast to 1,148 feet amsl in the southwestern area of the site. Drainage is generally directed to the south-southwest.

The portion of the site encompassed by APN 0230-101-34 is currently vacant, undeveloped land; however, a review of historical aerial imagery suggests a single-family residence previously existed at this parcel until at least 1994. The parcel is vegetated with a moderate covering of native grasses/brush. An existing masonry wall, approximately 6 feet in height and a single-family residence, are located adjacent to the northern and western boundaries of this parcel, respectively.

Residential structures occupy APNs 0230-101-12 and -14 and are addressed as 13932 Whittram Avenue and 8721 Calabash Avenue, respectively. Additionally, APN 0230-101-13 is located to the west of the existing residence, at the northeastern corner of Whittram and Calabash Avenues, and is comprised of vacant land (addressed ad 8733 Calabash Avenue).

## 2.2 PROPOSED DEVELOPMENT

Based upon review of the "*Grading Plan*" prepared by RMB Consulting, dated April 6, 2025, it is proposed to construct a truck trailer storage yard with an office and shop building, along with associated drive aisles, stormwater management facilities located along the southern site boundary, site utilities and adjacent street pavement improvements (see Figure 2). The existing residential structures shall be removed as part of the truck trailer parking development. Masonry walls up to 6 feet in height are understood to be developed along the areas of the property line that do not currently have block walls.

It is anticipated that the proposed office and shop building structures will be one to two stories in height and of wood frame, light metal frame or masonry construction. It is anticipated that the structures will be supported by shallow spread foundations (continuous and pad) and most likely will include a conventional slab-on-grade floor. Although structural loading information was not provided, GeoTek has assumed maximum column and wall loads on the order of 50 kips and 3.0 kips per foot, respectively. Once actual loads are known, that information should be provied to

GeoTek to determine if modifications to the recommendations presented in this report are warranted.

On-site storm water disposal is proposed by means of stormwater management facilities (i.e., basins) located along the southern edge of the site. The approximate depths of the planned basins are on the order of five feet below existing/proposed grades.

Based upon review of the referenced Site Plans, grading of the site will involve cuts and fills of up to approximately 3 feet, not including any recommended remedial grading. Sewage disposal is anticipated to be be provided by a septic tank and a conventional on-site wastewater disposal system. Investigation and reporting related to on-site wastewater disposal system design is not contained within this report. If site development differs from the assumptions made herein, the recommendations included in this report should be subject to further review and evaluation.

# 3. FIELD EXPLORATION AND LABORATORY TESTING

## 3.1 FIELD EXPLORATION

The field exploration for this project was conducted on November 1 and November 2, 2023. For the geotechnical portion of the investigation, six (6) exploratory borings (Borings B-1 through B-6) were excavated with a hollow-stem auger drill rig to depths of about 15 to 51.5 feet below the existing ground surface at the boring locations. For the infiltration portion of the study, five (5) test borings were excavated to depths of approximately five (5) feet below the existing ground location within the proposed stormwater facility locations. A hollow-stem auger with an outside diameter of approximately 8.5 inches was utilized to conduct the borings. The inside diameter of the auger was approximately 4.5 inches. A geologist from GeoTek, Inc. logged the exploratory borings and obtained soil samples from within the borings. The boring locations are presented on Figure 2, Boring Location Map. The logs of the exploratory borings are included in Appendix A.

The exploration logs show subsurface conditions at the dates and locations indicated and may not be representative of other locations and times. The stratification lines presented on the logs represent the approximate boundaries between soil types, and the transitions may be gradual.

In the geotechnical borings, relatively undisturbed soil samples were recovered at various intervals with a California sampler. The California sampler is a 2.9-inch outside diameter, 2.5-

inch inside diameter, split barrel sampler lined with brass rings. The sampler is approximately 18 inches in length. The sampler conformed to the requirements of ASTM D 3550. A 140-pound automatic trip hammer was utilized, dropping approximately 30 inches for each blow. The relatively undisturbed samples, together with bulk samples of representative soil types, were returned to the laboratory for testing and evaluation.

In Boring B-1 standard penetration tests (SPT) were performed with a 2.0-inch outside diameter, 1.5-inch inside diameter, split-barrel sampler. The sampler was approximately 18 inches in length. The inside diameter of the sampler shoe was 1.4 inches. The sampler was unlined. The sampler conformed to the requirements of ASTM D 1586. A 140-pound automatic trip hammer was utilized, dropping approximately 30 inches for each blow. The sampler penetration test data are presented on the Log for Boring for Boring B-1.

Infiltration Testing

Five (5) borings (Borings I-1 and I-5) were excavated on the project site to evaluate preliminary infiltration rates for the proposed stormwater management basin located in the southwestern portion of the parcel. Infiltration testing was conducted in these borings in general accordance County of San Bernardino guidelines The infiltration tests consisted of drilling eight-inch diameter test holes to the desired depth and installing approximately two inches of gravel in the bottom of the holes. A three-inch diameter perforated PVC pipe, wrapped in a filter sock, was placed in the excavations and the annular space was filled with gravel to prevent caving within the borings. Water was then placed in the borings to presoak the holes and percolation testing was performed following the pre-soak period. Following presoaking, the percolation tests were performed which consisted of adding water to each test hole and measuring the water drop over a 10-minute period. The water drop was recorded for six test intervals. Water was added to the test holes after each test interval. The field percolation rates were then converted to an infiltration rate using the Porchet Method. The infiltration rates calculated using the Porchet Method are presented in the following table:

| SUMMARY OF INFILTRATION RATES | | |
|---|---|---|
| Boring | Depth of Test (Feet) | Infiltration Rate (Inches per hour) |
| I-1 | 5.0 | 5.89 |
| I-2 | 5.0 | 11.40 |
| I-3 | 5.0 | 6.25 |
| I-4 | 5.0 | 14.70 |
| I-5 | 5.0 | 3.43 |

Copies of the percolation data sheets and the Porchet infiltration rate conversion calculations are presented in Appendix C. No factors of safety were applied to the rates provided. Over the lifetime of the infiltration areas, the infiltration rates may be affected by sediment build up and biological activities, as well as local variations in near surface soil conditions. A suitable factor of safety should be applied to the field rate in designing the infiltration system.

It should be noted that the infiltration rates provided above were performed in relatively undisturbed on-site soils. Infiltration rates will vary and are mostly dependent on the underlying consistency of the site soils and relative density. Infiltration rates may be impacted by weight of equipment travelling over the soils, placement of engineered fill and other various factors. GeoTek assumes no responsibility or liability for the ultimate design or performance of the storm water facility.

## 3.2 LABORATORY TESTING

Laboratory testing was performed on selected soil samples obtained during the field exploration. The purpose of the laboratory testing was to confirm the field classification of the soils encountered and to evaluate the physical properties of the soils for use in engineering design and analysis.

Included in the laboratory testing were moisture-density determinations on relatively undisturbed samples. An optimum moisture content-maximum dry density relationship performed according to ASTM D 1557 was established for a typical soil type so that the relative compaction of the subsurface soils could be determined. A direct shear test was performed in accordance with ASTM D 3080 to help determine soil strength characteristics. Collapse testing was performed in accordance with ASTM D 4546 on selected samples to evaluate the hydroconsolidation potential of the soils to help determine remedial grading recommendations. Expansion index testing was performed in accordance with ASTM D 4829 on a selected sample to evaluate the expansion potential of the near-surface on-site soils. Chemical testing comprised of pH, soluble sulfate, chloride and resistivity testing was conducted on a selected sample. Materials finer than the No. 200 sieve were determined for one (1) selected sample representative of a percolation test boring. The moisture-density and gradation analysis results are presented on the exploration logs presented in Appendix A. Additionally, an R-Value test in accordance with California Test Method 301 was performed to evaluate the pavement support capacity of the near-surface on-site soils, and to aid in structural pavement section determinations. The maximum density, direct shear, collapse, expansion index, R-Value, and chemical test data are presented in Appendix B.

# 4. GEOLOGIC AND SOILS CONDITIONS

## 4.1 REGIONAL SETTING

The subject property is situated in the Peninsular Ranges geomorphic province. The Peninsular Ranges province is one of the largest geomorphic units in western North America. It extends approximately 975 miles south of the Transverse Ranges geomorphic province 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. Several major fault zones are found in this province. The Elsinore Fault zone and the San Jacinto Fault zone trend northwest-southeast and are found near the middle of the province. The San Andreas Fault zone borders the northeasterly margin of the province.

More specific to the subject property, the site is located in an area geologically mapped to be underlain by young alluvial-fan deposits of Etiwanda Creek (Morton, D.M., 2003). No active faults are shown in the immediate site vicinity on the maps reviewed for the area.

## 4.2 GENERAL SOIL/GEOLOGIC CONDITIONS

A brief description of the soils encountered on the site is presented in the following sections. Based on the field exploration and observations, the area investigated is locally underlain by artificial fill soils and alluvium.

### 4.2.1 Artificial Fill

Artificial fill soils, consisting of loose to medium dense silty sands (SM soil type based upon the Unified Soil Classification System), were encountered in all borings to depths ranging from about 2 to 6.5 feet below existing grades. Depths of fill encountered near the proposed building areas ranged from about 4 to 4.5 feet below existing grades, and contained minor amounts of debris. The central and western portions of the site were found to be underlain by approximately 2 feet of artificial fill soils. Scattered areas of stockpiled fill soils were found to be present at the site, concentrated near the eastern site area. Deeper or other deposits of fill soils may be present in areas of the site that were not explored. Artificial fill soils present at the site were likely placed during construction of previously existing structures located at the eastern portion of the site.

### 4.2.2 Alluvium

Alluvium, consisting of medium dense to very dense silty sands, poorly graded sands, and very stiff to hard silts (SM, SP, and ML soil types based upon the Unified Soil Classification System), were encountered below the artificial fill soils up to the maximum depths explored (51.5 feet in Boring B-1).

Based on the laboratory test results, the near surface soils have a "very low" expansion potential (ASTM D 4829). Based on the chemical laboratory test results, the near surface soils have a soluble sulfate content of less than 0.1 percent (ASTM D 4327). Based upon the collapse test results, the upper site soils tested indicate a very low potential for hydroconsolidation (settlement upon wetting with or without additional loading). Based on the R-Value test results, the upper site soils, when recompacted, have a good to very good pavement support capacity. The test results are provided in Appendix B.

## 4.3 SURFACE AND GROUNDWATER

### 4.3.1 Surface Water

Surface water was not observed during the site exploration. If encountered during earthwork construction, surface water on this site is the result of precipitation or possibly some minor surface run-off from surrounding areas. Overall site drainage is generally in a south/southwest direction, as directed by site topography. Provisions for surface drainage will need to be accounted for by the project civil engineer.

### 4.3.2 Groundwater

Groundwater was not encountered in any of the borings excavated, up to the maximum depth explored (51.5 feet below the existing ground surface at Boring B-1), at the time of drilling. The California Department of Water Resources, Water Data Library indicates that Well 340935N1174885W001 is located approximately 0.5 miles southeast of the site. Records for this well shows most recent depths to groundwater in excess of 300 feet. Based on the above, groundwater is not anticipated to be a factor during the site grading. However, seasonal perched groundwater may be encountered during grading within portions of the site.

## 4.4 FAULTING AND SEISMICITY

The geologic structure of the entire southern California area is dominated mainly by northwest-trending faults associated with the San Andreas system. The site is in a seismically active region.

No active or potentially active fault is known to exist at this site nor is the site situated within an *"Alquist-Priolo"* Earthquake Fault Zone. The subject property is not located within a State of California Seismic Hazard Zone for earthquake induced liquefaction or landsliding.

The nearest known active fault is the Sierra Madre fault zone (Cucamonga section) located approximately 4.9 miles to the north of the subject site.

### 4.4.1 Seismic Design Parameters

The site is located at approximately 34.0953 degrees Latitude and -117.4998 degrees Longitude. Based on the site soil conditions a Site Class "D" is considered appropriate for this project. Site spectral accelerations ($S_a$ and $S_1$), for 0.2 and 1.0 second periods for a Class "D" site, was determined from the SEAOC/OSHPD web interface that utilizes the USGS web services and retrieves the seismic design data and presents that information in a report format. Using the ASCE 7-16 option on the SEAOC/OSHPD website results in the values for $S_{M1}$ and $S_{D1}$ reported as "null-See Section 11.4.8" (of ASCE 7-16). As noted in ASCE 7-16, Section 11.4.8, a site-specific ground motion procedure is recommended for Site Class D when the value $S_1$ exceeds 0.2. The value $S_1$ for the subject site exceeds 0.2.

For a site Class D, an exception to performing a site-specific ground motion analysis is allowed in ASCE 7-16 where $S_1$ exceeds 0.2 provided the value of the seismic response coefficient, Cs, is conservatively calculated by Eq 12.8-2 of ASCE 7-16 for values of $T \leq 1.5T_s$ and taken as equal to 1.5 times the value computed in accordance with either Eq. 12.8-3 for $T_L \geq T > 1.5T_s$ or Eq. 12.8-4 for $T > T_L$.

The results, based on the 2015 NEHRP and the 2022 CBC, are presented in the following table as it is assumed that the exception as allowed in ASCE 7-16 is applicable. If the exception is deemed not appropriate, a site-specific ground motion analysis will be required.

Final selection of the appropriate seismic design coefficients should be made by the project structural engineer based upon the local practices and ordinances, expected building response and desired level of conservatism.

| SITE SEISMIC PARAMETERS | |
|---|---|
| Mapped 0.2 sec Period Spectral Acceleration, $S_S$ | 1.843g |
| Mapped 1.0 sec Period Spectral Acceleration, $S_1$ | 0.692g |
| Site Coefficient for Site Class "D", $F_a$ | 1.0 |
| Site Coefficient for Site Class "D", $F_v$ | 1.7 |
| Maximum Considered Earthquake Spectral Response Acceleration for 0.2 Second, $S_{MS}$ | 1.843g |
| Maximum Considered Earthquake Spectral Response Acceleration for 1.0 Second, $S_{M1}$ | 1.176g |
| 5% Damped Design Spectral Response Acceleration Parameter at 0.2 Second, $S_{DS}$ | 1.228g |
| 5% Damped Design Spectral Response Acceleration Parameter at 1 second, $S_{D1}$ | 0.784g |
| Site Modified Peak Ground Acceleration, $PGA_M$ | 0.867g |

Final selection of the appropriate seismic design coefficients should be made by the project structural engineer based upon the local practices and ordinances, expected building response and desired level of conservatism.

## 4.5 LIQUEFACTION AND LATERAL SPREAD

Liquefaction describes a phenomenon in which cyclic stresses, produced by earthquake-induced ground motion, create excess pore pressures in relatively cohesionless soils. These soils may acquire a high degree of mobility which can lead to lateral movement, sliding, settlement of loose sediments, sand boils and other damaging deformations. This phenomenon occurs only below the water table, but, after liquefaction has developed, the effects can propagate upward into overlying non-saturated soil as excess pore water dissipates.

The factors known to influence liquefaction potential include soil type and grain size, relative density, groundwater level, confining pressures, and both intensity and duration of ground shaking. In general, materials that are susceptible to liquefaction are loose, saturated granular soils having low fines content under low confining pressures.

The project site is not located within an area mapped by the State of California for liquefaction potential. Based on the current mapping, and relatively dense character of the subsurface soils and the absence of relatively shallow groundwater across the site, it is GeoTek's opinion that the liquefaction potential at the site is very low.

### 4.6 OTHER SEISMIC HAZARDS

Based on regional mapping reported by the USGS, the site is located in an area not considered to be susceptible to groundwater withdrawal related subsidence. Any subsidence in the area would likely be regional and not adversely affect the subject development specifically.

The potential for seismic densification ("dry sand" seismic settlement) resulting from seismic activity was reviewed. Due to the relatively dense character of the subsurface soils, and anticipated site grading, the seismic settlement of the site is estimated to be minimal.

Evidence of ancient landslides or slope instability at this site was not observed during the field investigation and the project site is relatively flat. Thus, the potential for landslides is considered negligible for design purposes.

## 5. CONCLUSIONS AND RECOMMENDATIONS

### 5.1 GENERAL

The anticipated site development appears feasible from a geotechnical viewpoint provided that the following recommendations, and those provided by this firm at a later date are incorporated into the design and construction phases of development. Site development, grading and foundation plans should be reviewed by GeoTek, Inc. when they become available so the recommendations contained in this report can be confirmed.

The on-site soils exhibit a "very low" expansion potential. Expansion index testing should be conducted at the completion of earthwork operations to verify this soil parameter.

Deposits of artificial fill and/or disturbed soils were encountered in all of the explorations. In addition, the upper site soils were found to non-uniform, relatively loose and anticipated to be subject to hydroconsolidation. Deeper deposits of undocumented fill may be present in areas that were not explored. Remedial grading, consisting of overexcavation and recompaction of the upper site soils, is recommended to provide a uniform bearing for the proposed structures.

## 5.2 EARTHWORK CONSIDERATIONS

Earthwork and grading should be performed in accordance with the applicable grading ordinances of the City of Fontana, County of San Bernardino, the 2022 California Building Code (CBC), and recommendations contained in this report. The Grading Guidelines included in Appendix D outline general procedures and do not anticipate all site-specific situations. In the event of conflict, the recommendations presented in the text of this report should supersede those contained in Appendix D.

### 5.2.1 Site Clearing and Demolition

In areas of planned grading and improvements, the locations of existing utilities should be determined. Existing utilities should be relocated or abandoned. The site should be cleared of existing structures, pavements, slabs, trees, vegetation and other deleterious materials. Debris should be properly disposed of off-site. Voids resulting from site clearing should be backfilled with engineered fill.

### 5.2.2 Site Preparation

Due to the presence of artificial fill soils, it is recommended that the soils be removed beneath the planned building footprint to a depth of at least five (5) feet below existing grades, or three (3) feet below the base of the proposed foundations, whichever is greater. The lateral extent of this recommended over-excavation should extend at least 5 feet beyond the building limits, where obtainable. Removal bottoms should be relatively uniform in soil type and is not adversely porous and having an in-place density of at least 85 percent of the soil's maximum dry density as determined by ASTM D 1557 test procedures.

Following site clearing operations, over-excavation and lowering of site grades, where necessary, it is recommended that the exposed subgrade soils beneath all surface improvements be proof rolled with a heavy rubber-tired piece of construction equipment approved by and in the presence of the geotechnical engineering representative. The proof rolling equipment should include at least 4 passes, two in each perpendicular direction. All soil that ruts or excessively deflects during proof rolling should be removed as recommended by the GeoTek representative.

Following proof rolling and removal of any unsuitable bearing soil, the exposed subgrade should be scarified to a depth of about 12 inches, be moisture conditioned to slightly above the soil's optimum moisture content and then be compacted to at least 90 percent of the soil's maximum dry density as determined by ASTM D-1557 test procedures.

### 5.2.3 Pavement Areas

Undocumented fill should be removed below proposed pavement areas. If no undocumented fill is encountered or is relatively shallow, the natural soils should be overexcavated to a depth of 12 inches below existing grade or 12 inches below proposed finished grade, whichever is deeper. Finished grade is defined as the top of the subgrade. The exposed soils in these areas and in cut areas should be scarified to a depth of approximately eight inches, moistened to at least the optimum moisture content and compacted to a minimum relative compaction of at least 95 percent of maximum dry density as determined by ASTM D 1557 test procedures.

### 5.2.4 Hardscape Areas

Undocumented fill should be removed below hardscape areas. The exposed soils in these areas and in cut areas should be scarified to a depth of approximately eight inches, moistened to at least the optimum moisture content and compacted to a minimum relative compaction of at least 90 percent of maximum dry density as determined by ASTM D 1557 test procedures.

### 5.2.5 Preparation of Excavation Bottoms

A representative of this firm should observe the bottom of all excavations. Upon approval, the exposed soils should be scarified to a depth of approximately eight inches, moistened to at least the optimum moisture content and compacted to a minimum relative compaction of at least 95 percent of maximum dry density as determined by ASTM D 1557 test procedures.

### 5.2.6 Engineered Fills

The on-site soils are generally considered suitable for reuse as engineered fill provided they are free from vegetation, debris and other deleterious material. Portland cement concrete that is to be removed from the site may be pulverized into fragments not exceeding three inches in greatest dimension and incorporated into the fill at all levels. Engineered fill should be placed in loose lifts with a thickness of eight inches or less and moisture conditioned to at least two percent above the optimum moisture content.

Below and within the proposed building area, engineered fill should be moisture conditioned to at least optimum moisture content and be compacted to at least 90 percent of maximum dry density as determined by ASTM D 1557 test procedures if a shallow foundation system is used.

Below other structural elements, such as hardscape areas and walls independent of the building, engineered fill should be moisture conditioned to at least optimum moisture content and be compacted to at least 90 percent of maximum dry density as determined by ASTM D 1557 test procedures.

### 5.2.7 Excavation Characteristics

Excavation of the on-site alluvial soils is expected to be feasible utilizing heavy-duty grading equipment in good operating condition. All temporary excavations for grading purposes and installation of underground utilities should be constructed in accordance with local and Cal-OSHA guidelines. Temporary excavations within the on-site materials should be stable at 1.5:1 (horizontal: vertical) inclinations for cuts less than five feet in height.

### 5.2.8 Shrinkage and Subsidence

Several factors will impact earthwork balancing on the site, including shrinkage, subsidence, trench spoil from utilities and footing excavations, as well as the accuracy of topography.

Shrinkage and subsidence are primarily dependent upon the degree of compactive effort achieved during construction. For planning purposes, a shrinkage factor of 10 to 15 percent may be considered for the materials requiring removal and/or recompaction. Site balance areas should be available in order to adjust project grades, depending on actual field conditions at the conclusion of earthwork. Subsidence on the order of up to 0.2 foot may be anticipated for the underlying soils.

## 5.3 DESIGN RECOMMENDATIONS

### 5.3.1 Foundation Design Criteria

Foundation design criteria for a conventional foundation system, in general conformance with the 2022 CBC, are presented below. Based on laboratory test results, subsequent to earthwork operations it is anticipated that the near-surface soils will have a "very low" expansion potential. Additional expansion index and soluble sulfate testing of the soils should be performed during construction to evaluate the as-graded conditions. Final recommendations should be based upon the as-graded soils conditions.

A summary of the foundation design recommendations is presented in the following table:

| DESIGN PARAMETER | "VERY LOW" EXPANSION INDEX |
|---|---|
| Building Foundation Depth or Minimum Perimeter Beam Depth (inches below lowest adjacent grade) | 12 |
| Minimum Foundation Width (Inches) | 12 |
| Minimum Slab Thickness (actual) | 4 inches |
| Minimum Slab Reinforcing | 6" x 6" – W1.4 x W1.4 welded wire fabric or No. 3 bars at 24-inch centers placed in middle of slab |
| Minimum Footing Reinforcement | Two No. 4 reinforcing bars, one placed near the top and one near the bottom of the footing |
| Presaturation of Subgrade Soil (Percent of Optimum) | Minimum of 100 percent of the optimum moisture content to a depth of at least 12 inches prior to placing concrete |

It should be noted that the criteria provided are based on soil support characteristics only. The structural engineer should design the slab and foundation reinforcement based on actual loading conditions.

The following criteria for design of foundations are preliminary and should be re-evaluated based on the results of additional laboratory testing of samples obtained near finish pad grade.

The building footings should have a minimum embedment depth of 12 inches. An allowable bearing capacity of 2,500 pounds per square foot (psf) may be used for the design of isolated and continuous building footings.

An allowable bearing capacity of 2,500 psf may be used for design of footings supporting retaining walls and site walls independent of the building. The footings supporting these walls should have an embedment depth of at least 18 inches.

An increase of one-third of the allowable bearing capacity may be applied when considering short-term seismic and/or wind loads.

Structural foundations may be designed in accordance with the 2022 CBC, and to withstand a total settlement of 1-inch and maximum differential settlement of one-half of the total settlement over a horizontal distance of 40 feet.

The passive earth pressure may be computed as an equivalent fluid having a density of 400 psf per foot of depth, to a maximum earth pressure of 3,500 psf for footings founded on engineered fill. A coefficient of friction between soil and concrete of 0.40 may be used with dead load forces.

When combining passive pressure and frictional resistance, the passive pressure component should be reduced by one-third.

A moisture and vapor retarding system should be placed below slabs-on-grade where moisture migration through the slab is undesirable. Guidelines for these are provided in the 2022 California Green Building Standards Code (CALGreen) Section 4.505.2, the 2022 CBC Section 1907.1 and ACI 360R-10. The vapor retarder design and construction should also meet the requirements of ASTM E 1643. A portion of the vapor retarder design should be the implementation of a moisture vapor retardant membrane.

The effectiveness of the vapor retarding membrane can be adversely impacted as a result of construction related punctures. These occurrences should be limited as much as possible during construction. Thicker membranes are generally more resistant to accidental puncture than thinner ones. Products specifically designed for use as moisture/vapor retarders may also be more puncture resistant. Although the CBC specifies a 6-mil vapor retarder membrane, a minimum 10 mil thick membrane with joints properly overlapped and sealed should be considered, unless otherwise specified by the slab design professional. The membrane should consist of Stego wrap or the equivalent.

Moisture and vapor retarding systems are intended to provide a certain level of resistance to vapor and moisture transmission through the concrete, but do not eliminate it. The acceptable level of moisture transmission through the slab is to a large extent based on the type of flooring used and environmental conditions. Ultimately, the vapor retarding system should be comprised of suitable elements to limit migration of water and reduce transmission of water vapor through the slab to acceptable levels. The selected elements should have suitable properties such as thickness, composition, strength, and permeability to achieve the desired performance level.

Moisture retarders can reduce, but not eliminate, moisture vapor rise from the underlying soils up through the slab. Moisture retarder systems should be designed and constructed in accordance with applicable American Concrete Institute, Portland Cement Association, Post-Tensioning Concrete Institute, ASTM and California Building Code requirements and guidelines.

GeoTek recommends that a qualified person, such as a flooring contractor, structural engineer, architect, and/or other experts specializing in moisture control within buildings be consulted to evaluate the general and specific moisture and vapor transmission paths and associated potential impact on the proposed construction. That person should provide recommendations relative to the slab moisture and vapor retarder systems and for migration of potential adverse impact of moisture vapor transmission on various components of the structures, as deemed appropriate.

In addition, the recommendations in this report and GeoTek's services in general are not intended to address mold prevention, since GeoTek, along with geotechnical consultants in general, do not practice in the area of mold prevention. If specific recommendations addressing potential mold issues are desired, then a professional mold prevention consultant should be contacted. It is recommended that control joints be placed in two directions spaced approximately 24 to 36 times the thickness of the slab in inches. These joints are a widely accepted means to control cracks and should be reviewed by the project structural engineer.

### 5.3.2 Miscellaneous Foundation Recommendations

To minimize moisture penetration beneath the slab-on-grade areas, utility trenches should be backfilled with engineered fill, lean concrete or concrete slurry where they intercept the perimeter footing or thickened slab edge.

Soils from the footing excavations should not be placed in the slab-on-grade areas unless properly compacted and tested. The excavations should be free of loose/sloughed materials and be neatly trimmed at the time of concrete placement.

### 5.3.3 Foundation Set Backs

Minimum setbacks for all foundations should comply with the 2022 CBC, City of Fontana, or County of San Bernardino requirements, whichever is more stringent. Improvements not conforming to these setbacks are subject to the increased likelihood of excessive lateral movement and/or differential settlement. If large enough, these movements can compromise the integrity of the improvements.

- The outside top edge of all footings should be set back a minimum of H/3, where H is the slope height, from the face of any descending slope. The setback should be at least five feet and need not exceed 40 feet.
- The bottom of any proposed foundations should be deepened so as to extend below a 1:1 upward projection from the bottom edge of the nearest excavation and the bottom edge of the closest footing.

### 5.3.4 Retaining and Screen Wall Design and Construction

#### 5.3.4.1 General Design Criteria

Retaining wall foundations independent of the building should be embedded a minimum of 12 inches into engineered fill. Retaining wall foundations should be designed in accordance with

Section 5.3.1 of this report. Structural requirements may govern and should be evaluated by the project structural engineer.

All earth retention structure plans should be reviewed by this office prior to finalization.

Site clearing and remedial earthwork for all earth retention structures should meet the requirements of this report, unless specifically provided otherwise, or more stringent requirements or recommendations are made by the wall designer. The soil used as backfill behind retaining walls should have a "very low" expansion potential and should be densified to at least 90 percent relative compaction (ASTM D 1557).

In general, cantilever retaining walls which are designed to yield at least 0.001H, where H is equal to the height of the wall to the base of the footing may be designed using the active condition. Rigid earth retention structures (including but not limited to rigid walls, and walls braced at the top, such as typical basement walls) should be designed using the at-rest condition.

In addition to the design lateral forces due to retained earth, surcharges due to improvements, such as an adjacent structure, should be considered in the design of the retaining walls. Loads applied within a 1:1 (h:v) projection from the surcharging structure on the stem of the retaining wall should be considered in the design.

Final selection of the appropriate design parameters should be made by the retaining wall designer based upon the local practices and ordinances, expected structure response, and desired level of conservatism.

#### 5.3.4.2 Cantilevered Walls

The recommendations presented below are for cantilevered retaining walls up to six feet high. Active earth pressure may be used for retaining wall design, provided the top of the wall is not restrained from minor deflections. Appropriate fluid unit weights are given below for specific slope gradients of the retained material. These do not include other superimposed loading conditions such as traffic, structures, seismic events, or adverse geologic conditions.

| ACTIVE EARTH PRESSURES | |
|---|---|
| Surface Slope of Retained Materials (h:v) | Equivalent Fluid Pressure* (pcf) |
| Level | 37 |
| 2:1 | 53 |

*The design pressures assume the backfill materials have an expansion index less than or equal to 20. Backfill zone includes the area between the back of the wall to a plane (1:1, h:v) up from the bottom of the wall foundation to the adjacent ground surface.

### 5.3.4.3 Retaining Wall Backfill and Drainage

Wall backfill should include a minimum one foot wide section of ¾- to one-inch clean crushed rock or approved equivalent. The rock should be placed immediately adjacent to the back of the wall and extend up from a backdrain to within approximately 12 inches of finish grade. The portion of the rock opposite the back of the wall adjacent to the soil backfill should be covered with a layer of filter fabric comprised of Mirafi 140N or the equivalent. The upper 12 inches of backfill should consist of compacted on-site soil. Backfill placed within the active zone as defined by a 1:1 (H:V) projection from the back of the retaining wall footing up to the retained surface behind the wall should consist of very low expansive soil. The presence of other soils placed within the 1:1 projection will necessitate revision to the parameters provided and modification of wall designs.

The backfill soil should be placed in lifts no greater than eight inches in thickness, moisture conditioned to at least optimum moisture content and compacted to at least 90 percent of maximum dry density as determined by ASTM D 1557 test procedures. Proper surface drainage needs to be provided and maintained. Water should not be allowed to pond behind retaining walls. Waterproofing of site walls should be performed where moisture migration through the walls is undesirable.

Retaining walls should be provided with an adequate pipe and gravel back drain system to reduce the potential for hydrostatic pressures to develop. A 4-inch diameter perforated collector pipe (Schedule 40 PVC or approved equivalent) in a minimum of one cubic foot per linear foot of ¾-inch or one inch clean crushed rock or equivalent, wrapped in filter fabric should be placed near the bottom of the backfill and the water should be directed to an appropriate disposal area.

As an alternative to the drain, rock and fabric, a pre-manufactured wall drainage product (example: Mira Drain 6000 or approved equivalent) may be used behind the retaining wall. The

wall drainage product should extend from the base of the wall to within two (2) feet of the ground surface. The subdrain should be placed in direct contact with the wall drainage product.

Walls from two to four feet in height may be drained using localized gravel packs (e.g., approximately 1.5 cubic feet of gravel in a woven plastic bag) behind weep holes at 10 feet maximum spacing. Weep holes should be provided or the head joints omitted in the first course of block extended above the ground surface. However, nuisance water may still collect in front of the wall.

Drain outlets should be maintained over the life of the project and should not be obstructed or plugged by adjacent improvements.

#### 5.3.4.4 Restrained Retaining Walls

Retaining walls that will be restrained prior to placing and compacting backfill material or that have reentrant or male corners, should be designed for an at-rest equivalent fluid pressure of 58 pcf, plus any applicable surcharge loading. For areas of male or reentrant corners, the restrained wall design should extend a minimum distance of twice the height of the wall laterally from the corner, or a distance otherwise determined by the project structural engineer.

#### 5.3.4.5 Other Design Considerations

- Retaining and screen wall foundation elements should be designed in accordance with building code setback requirements. A minimum horizontal setback distance of five feet as measured from the top outside edge of the footing to an adjacent slope face is recommended.
- Wall design should consider the additional surcharge loads from superjacent slopes and/or footings, where appropriate.
- No backfill should be placed against concrete until minimum design strengths are evident by compression tests of cylinders.
- The retaining wall footing excavations, backcuts, and backfill materials should be approved the project geotechnical engineer or their authorized representative.
- Positive separations should be provided in screen walls at horizontal distances not exceeding 20 feet.

### 5.3.5 Soil Corrosivity

Based on the chemical test results presented in Appendix B, the corrosivity test results indicate that the on-site soils are "mildly corrosive" (7,370 ohm-cm) to buried ferrous metal. This

corrosion classification is obtained from "Corrosion Basics: An Introduction," by Pierre R. Roberge, 2nd Edition, 2005. Recommendations for protection of buried ferrous metal should be provided by a corrosion engineer.

### 5.3.6 Soil Sulfate Content

Based on the chemical test results presented in Appendix B, the sulfate test results on a sample obtained from the project site indicate a soluble sulfate content of less than 0.1% by weight. Soluble sulfate contents of this level would be in the range of "not applicable" (i.e., negligible) in accordance with ACI 318-19. Based on the test results and Table 19.3.1.1 of ACI 318-19, no special recommendations for concrete are required for this project due to soil sulfate exposure.

### 5.3.7 Import Soils

Import soils should have a "very low" expansion potential. GeoTek, Inc. also recommends that the proposed import soils be tested for expansion and corrosivity potential. GeoTek, Inc. should be notified a minimum of 72 hours prior to importing so that appropriate sampling and laboratory testing can be performed.

### 5.3.8 Concrete Flatwork

#### 5.3.8.1 Exterior Concrete Slabs, Sidewalks and Driveways

Exterior concrete slabs, sidewalks and driveways should be designed using a four-inch minimum thickness. Some shrinkage and cracking of the concrete should be anticipated as a result of typical mix designs and curing practices utilized in construction.

Sidewalks may be under the jurisdiction of the governing agency. If so, jurisdictional design and construction criteria will apply, if more restrictive than the recommendations presented in this report.

Subgrade soils should be pre-moistened prior to placing concrete. The subgrade soils below exterior slabs and sidewalks should be pre-saturated to a minimum of 100 percent of the optimum moisture content to a depth of 12 inches.

All concrete installation, including preparation and compaction of subgrade, should be done in accordance with the City of Fontana, County of San Bernardino specifications, and under the observation and testing of GeoTek, Inc. and a City or County inspector, if necessary.

#### 5.3.8.2 Concrete Performance

Concrete cracks should be expected. These cracks can vary from sizes that are hairline to more than 1/8 inch in width. Most cracks in concrete, while unsightly, do not significantly impact long-term performance. While it is possible to take measures (proper concrete mix, placement, curing, control joints, etc.) to reduce the extent and size of cracks that occur, some cracking will occur despite the best efforts to minimize it. Concrete undergoes chemical processes that are dependent on a wide range of variables which are difficult, at best, to control. Concrete, while seemingly a stable material, is subject to internal expansion and contraction due to external changes over time.

One of the simplest means to control cracking is to provide weakened control joints for cracking to occur along. These do not prevent cracks from developing; they simply provide a relief point for the stresses that develop. These joints are a widely accepted means to control cracks but are not always effective. Control joints are more effective the more closely spaced they are. GeoTek, Inc. suggests that control joints be placed in two directions and located a distance apart approximately equal to 24 to 36 times the slab thickness.

### 5.3.9 Pavement Design

#### 5.3.9.1 Asphaltic Concrete Pavement

Although planned final grades beneath the proposed parking, access roads and adjacent street improvements within the site are not yet known, the following preliminary pavement design recommendations are based on assumed Traffic Indexes of 5.5 for automobile and light truck parking areas, 7.0 for truck parking/access lanes. Preliminary pavement thickness design is based on the Caltrans Highway Design Manual (2022). An R-value of 79 was obtained in accordance with California Test Method 301 on a disturbed bulk sample from Boring B-6. A maximum design R-Value of 50 was used for the determination of preliminary pavement sections for this report. Once the traffic loading information becomes more defined, revision to the pavement design recommendations may be warranted. It is recommended that the final pavement design be based on R-value testing of the as-graded subgrade soils within the pavement areas.

Based on the assumptions noted above, the following preliminary pavement recommendations are provided for the site:

| PRELIMINARY MINIMUM PAVEMENT SECTION | | |
|---|---|---|
| Traffic Index | Thickness of Asphalt Concrete (inches) | Thickness of Aggregate Base (inches) |
| 5.5 (Car/Light Truck Parking Areas) | 4.0* | 4.0 |
| 7.0 (Truck Parking and Access Lanes) | 4.0* | 5.0 |

*City of Fontana Minimum

Traffic Indices (TIs) used in the pavement design are considered reasonable values for the proposed pavement areas indicated and should provide a pavement life of approximately 20 years with a normal amount of flexible pavement maintenance. Irrigation adjacent to pavements, without a deep curb or other cutoff to separate landscaping from the paving may result in premature pavement failure. Traffic parameters used for design were selected based upon engineering judgment and not upon information furnished to us such as an equivalent wheel load analysis or a traffic study.

The recommended pavement sections provided are intended as a minimum guideline and final selection of pavement cross section parameters should be made by the project civil engineer, based upon the local laws and ordinates, expected subgrade and pavement response, and desired level of conservatism. If thinner or highly variable pavement sections are constructed, increased maintenance and repair could be expected. Final pavement design should be checked by testing of soils exposed at subgrade (the upper five feet) after final grading has been completed.

Asphalt concrete and aggregate base should conform to current Caltrans Standard Specifications Section 39 and 26-1.02, respectively. As an alternative, asphalt concrete can conform to Section 203-6 of the current Standard Specifications for Public Work (Green Book). Crushed aggregate base or crushed miscellaneous base can conform to Section 200-2.2 and 200-2.4 of the Green Book, respectively. Pavement base should be compacted to at least 95 percent of the ASTM D1557 laboratory maximum dry density (modified proctor).

All pavement installation, including preparation and compaction of subgrade, compaction of base material, placement and rolling of asphaltic concrete should be done in accordance with the City of Fontana or County of San Bernardino specifications, and under the observation and testing of GeoTek and a City or County Inspector where required. Jurisdictional minimum compaction requirements in excess of the aforementioned minimums may govern.

Deleterious material, excessive wet or dry pockets, oversized rock fragments, and other unsuitable yielding materials encountered during grading should be removed. Once existing compacted fill are brought to the proposed pavement subgrade elevations, the subgrade should be proof-rolled in order to check for a uniform and unyielding surface. The upper 12 inches of pavement subgrade soils should be scarified, moisture conditioned at or near optimum moisture content, and recompacted to at least 95 percent of the laboratory maximum dry density (ASTM D1557). If loose or yielding materials are encountered during construction, additional evaluation of these areas should be carried out by GeoTek. All pavement section changes should be properly transitioned.

#### 5.3.9.2 Permeable Interlocking Concrete Pavers

Interlocking concrete pavers can be used for this project. The pavers are assumed to be approximately 3.2 inches (80 millimeters) in thickness. Concrete pavers should be underlain by 1.0 inch to 1.5 inches of bedding sand overlying four inches of aggregate base founded on compacted subgrade soils. The aggregate base should be compacted to at least 95 percent of maximum dry density as determined by ASTM D 1557 test procedures.

Where possible, the aggregate base should extend beyond the perimeter of the pavers a minimum distance of four inches.

The bedding sand should be placed and lightly moistened and compacted. Since this compaction cannot be tested it should be observed by a representative of this firm.

Historically, paver systems have experienced failures in areas where water has degraded the support characteristics of the underlying base and/or subgrade soils. Since paver systems are permeable and allow transmission of water into the underlying materials, it may be prudent to discuss with the paver designer/manufacturer what methods may be employed to address the issue of potential water introduction into the underlying materials. Underdrain systems, local subgrade reinforcement, or additional structural elements such as geotextiles can be considered, particularly in high traffic areas and/or low areas where water will tend to collect. The recommendations of the designer/manufacturer should then be implemented into the design and construction of the paver system.

#### 5.3.9.3 Portland Cement Concrete (PCC) Pavement

For the proposed automobile and light truck parking and access lanes, it is recommended that a minimum of 5.0 inches of PCC pavement over 12 inches subgrade compacted to at least 95 percent of maximum dry density as determined by ASTM D 1557 test procedures be utilized.

For truck parking and emergency vehicle drives, it is recommended that a minimum of six inches of PCC pavement over 12 inches subgrade compacted to at least 95 percent of maximum dry density be utilized. This section should also be used in truck traffic areas such as fire lanes, trash dumpster pads and approaches.

Requirements of Section 90 of Caltrans Standard Specifications, and various ACI and ASTM standards regarding mixing and placing concrete should be followed. The PCC pavement should have a minimum modulus of rupture of 500 pounds per square inch, and a minimum 28-day compressive strength of 4,000 pounds per square inch. Concrete should incorporate 1-inch maximum size aggregate and should be proportioned to achieve a maximum slump of four inches. Instead of increasing the water content, a plasticizing admixture may be utilized to increase the workability of the concrete. The concrete should be properly cured after placement. Concrete should not be placed during hot and windy weather.

Crack control joints should be provided in the transverse direction spaced at horizontal intervals ranging from 24 to 36 times the thickness of the concrete.

## 5.4 POST CONSTRUCTION CONSIDERATIONS

### 5.4.1 Landscape Maintenance and Planting

Water has been shown to weaken the inherent strength of soil, and slope stability is significantly reduced by overly wet conditions. Positive surface drainage away from graded slopes should be maintained and only the amount of irrigation necessary to sustain plant life should be provided for planted slopes. Controlling surface drainage and runoff, and maintaining a suitable vegetation cover can minimize erosion. Plants selected for landscaping should be lightweight, deep-rooted types that require little water and are capable of surviving the prevailing climate.

Overwatering should be avoided. An abatement program to control ground-burrowing rodents should be implemented and maintained. Burrowing rodents can decrease the long-term performance of slopes.

It is common for planting to be placed adjacent to structures in planter or lawn areas. This will result in the introduction of water into the ground adjacent to the foundations. This type of landscaping should be avoided.

### 5.4.2 Drainage

Positive site drainage should be maintained at all times. Drainage should not flow uncontrolled down any descending slope. Water should be directed away from foundations and not allowed to pond or seep into the ground adjacent to the footings and floor-slabs. Pad drainage should be directed toward approved areas and not be blocked by other improvements.

Roof gutters should be installed that will direct the collected water at least 20 feet from the buildings.

## 5.5 PLAN REVIEW AND CONSTRUCTION OBSERVATIONS

It is recommended that specifications and foundation and grading plans be reviewed by GeoTek prior to construction to check for conformance with the recommendations of this report. It is also recommended that GeoTek, Inc. representatives be present during site grading and foundation construction to observe and document proper implementation of the geotechnical recommendations. The owner/developer should verify that GeoTek, Inc. representatives perform at least the following duties:

- Observe site clearing and grubbing operations for proper removal of unsuitable materials.
- Observe and test bottom of removals prior to fill placement.
- Evaluate the suitability of on-site and import materials for fill placement and collect soil samples for laboratory testing where necessary.
- Observe the fill for uniformity during placement, including utility trench backfill. Perform field density testing of the fill materials.
- Observe and probe foundation excavations to confirm suitability of bearing materials with respect to density.

If requested, a construction observation and compaction report can be provided by GeoTek, Inc. which can comply with the requirements of the governmental agencies having jurisdiction over the project. It is recommended that these agencies be notified prior to commencement of construction so that necessary grading permits can be obtained.

# 6. INTENT

It is the intent of this report to aid in the design and construction of the proposed development. Implementation of the advice presented in this report is intended to reduce risk associated with

construction projects. The professional opinions and geotechnical advice contained in this report are not intended to imply total performance of the project or guarantee that unusual or variable conditions will not be discovered during or after construction.

The scope of this evaluation is limited to the boundaries of the subject property. This review does not and should in no way be construed to encompass any areas beyond the specific area of the proposed construction as indicated to us by the client. Further, no evaluation of any existing site improvements is included. The scope of this evaluation is based on GeoTek's understanding of the project and geotechnical engineering standards normally used on similar projects in this locality.

## 7. LIMITATIONS

GeoTek's findings are based on site conditions observed and the stated sources. Thus, GeoTek's comments are professional opinions that are limited to the extent of the available data.

GeoTek has prepared this report in a manner consistent with that level of care and skill ordinarily exercised by members of the engineering and science professions currently practicing under similar conditions in the jurisdiction in which the services are provided, subject to the time limits and physical constraints applicable to this report.

Since GeoTek's recommendations are based on the site conditions observed and encountered, and laboratory testing, GeoTek's conclusions and recommendations are professional opinions that are limited to the extent of the available data. Observations during construction are important to allow for any change in recommendations found to be warranted. These opinions have been derived in accordance with current standards of practice and no warranty of any kind is expressed or implied. Standards of care/practice are subject to change with time.

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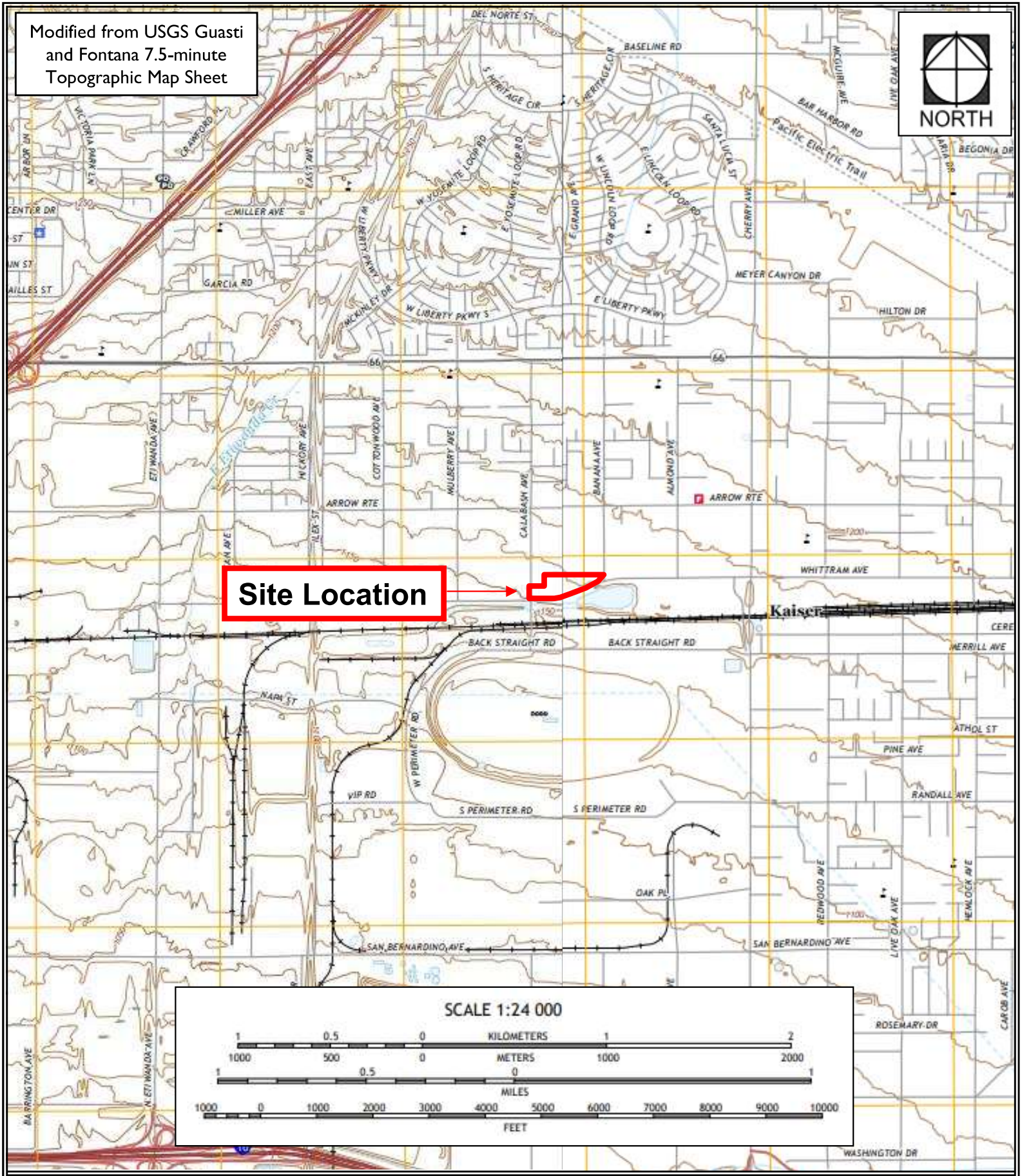


**Mr. Robert Beers**
Assessor's Parcel Numbers 0230-101-12, -13, -14 and -34
14044 Whittram Avenue
Fontana, San Bernardino County, California

Project No. 3697-CR

**Figure 1**

**Site Location Map**

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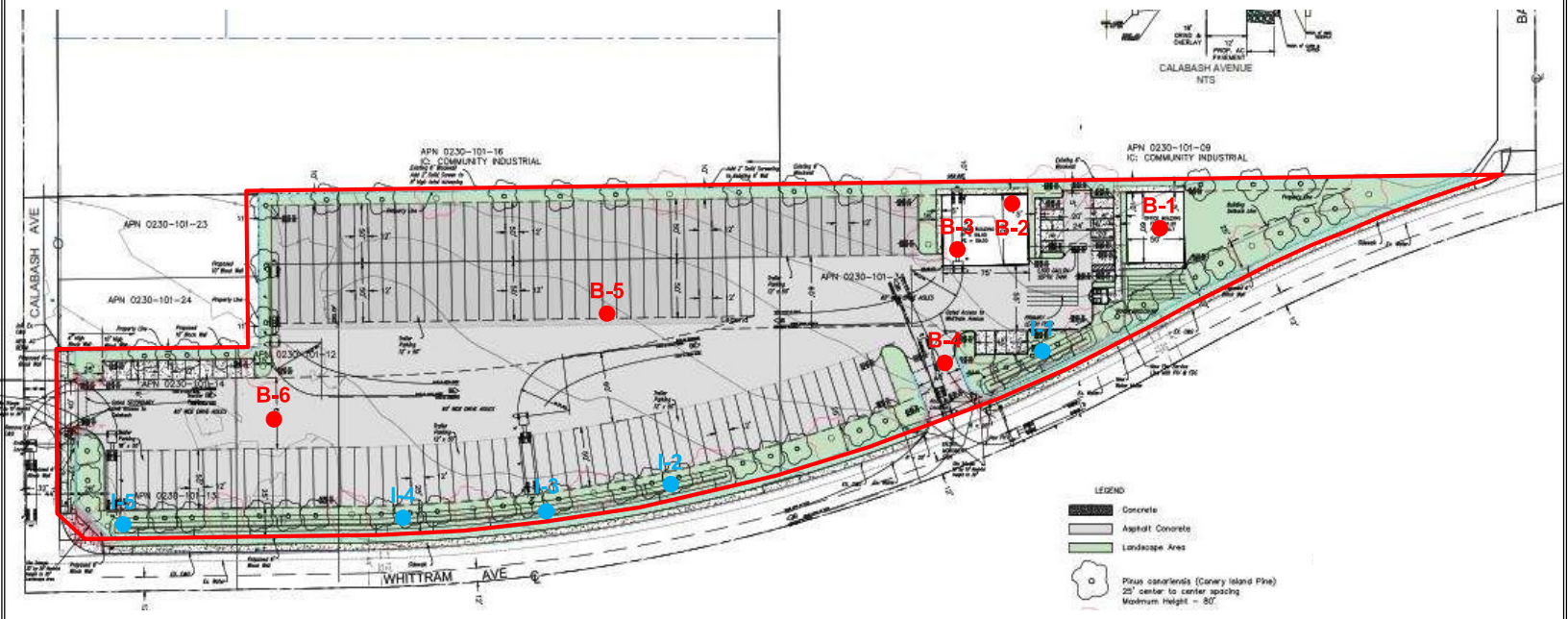


**Legend**

- Site Boundary
- B-6 Hollow-stem Boring Location
- I-5 Infiltration Test Location

**Mr. Robert Beers**
Assessor's Parcel Numbers 0230-101-12, -13, -14 and -34
14044 Whittram Avenue
Fontana, San Bernardino County, California

Project No. 3697-CR

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**Figure 2**

**Boring Location Map**

# APPENDIX A

## LOGS OF EXPLORATORY BORINGS

**Assessor's Parcel Numbers (APNs) 0230-101-12, -13, -14 and -34**
**Proposed Truck Trailer Parking Facility**
**Fontana, San Bernardino County, California**
**Project No. 3697-CR**

GEOTEK

## A - FIELD TESTING AND SAMPLING PROCEDURES

The Modified Split-Barrel Sampler (Ring)

The Ring sampler is driven into the ground at various depths in accordance with ASTM D 3550 test procedures. The sampler, with an external diameter of 3.0 inches, is lined with 1-inch long, thin brass rings with inside diameters of approximately 2.4 inches. The sampler is typically driven into the ground 12 or 18 inches with a 140-pound hammer free falling from a height of 30 inches. Blow counts are recorded for every 6 inches of penetration as indicated on the log of boring. The samples are removed from the sample barrel in the brass rings, sealed, and transported to the laboratory for testing.

The Standard Penetration Test (SPT) Sampler

Standard penetration tests (SPT) were performed with a 2.0-inch outside diameter, 1.5-inch inside diameter, split-barrel sampler. The sampler was 18 inches long. The inside diameter of the sampler shoe was 1.4 inches. The sampler was unlined. The sampler conformed to the requirements of ASTM D 1586. A 140-pound automatic trip hammer was utilized, dropping 30 inches for each blow. Blow counts are recorded for every 6 inches of penetration as indicated on the log of boring. Disturbed samples are removed from the sample barrel, sealed in a plastic bag, and transported to the laboratory for testing.

Bulk Samples (Large)

These samples are normally large bags of earth materials over 20 pounds in weight collected from the field by means of hand digging or exploratory cuttings.

Bulk Samples (Small)

These are plastic bag samples which are normally airtight and contain less than 5 pounds in weight of earth materials collected from the field by means of hand digging or exploratory cuttings. These samples are primarily used for determining natural moisture content and classification indices.

## B – BORING/TRENCH LOG LEGEND

The following abbreviations and symbols often appear in the classification and description of soil and rock on the logs of borings/trenches:

*SOILS*

| | |
|---|---|
| USCS | Unified Soil Classification System |
| f-c | Fine to coarse |
| f-m | Fine to medium |

*GEOLOGIC*

| | |
|---|---|
| B: Attitudes | Bedding: strike/dip |
| J: Attitudes | Joint: strike/dip |
| C: Contact line | |
| …….. | Dashed line denotes USCS material change |
| ——— | Solid Line denotes unit / formational change |
| ——— | Thick solid line denotes end of boring/trench |

(Additional denotations and symbols are provided on the log of borings/trenches)

**GeoTek, Inc.**

# LOG OF EXPLORATORY BORING

| | | | | | |
|---|---|---|---|---|---|
| **CLIENT:** | Mr. Robert Beers | **DRILLER:** | 2R Drilling Inc. | **LOGGED BY:** | DRW |
| **PROJECT NAME:** | 14044 Whittram Avenue | **DRILL METHOD:** | Hollow-Stem Auger | **OPERATOR:** | Victor |
| **PROJECT NO.:** | 3697-CR | **HAMMER:** | 140 lbs, 30 in. | **RIG TYPE:** | Track GT-16 |
| **LOCATION:** | See Exploration Location Map | **Approx. Elev.:** | 1358 msl | **DATE:** | 11/1/2023 |

**BORING NO.: B-1**

| Depth (ft) | SAMPLES: Sample Type | SAMPLES: Blows/ 6 in | SAMPLES: Sample Number | USCS Symbol | MATERIAL DESCRIPTION AND COMMENTS | Laboratory Testing: Water Content (%) | Laboratory Testing: Dry Density (pcf) | Laboratory Testing: Others |
|---|---|---|---|---|---|---|---|---|
| | | | | SM | **Artificial Fill:** Silty f-c SAND, dark grayish brown, slightly moist, some asphaltic concrete debris, few gravel | | | MD, SH, EI<br>EI = 0 |
| | | 5<br>5<br>6 | | | Silty f-m SAND, brown, moist, loose, trace gravel, trace asphaltic concrete | 5.8 | 110.1 | |
| | | 4 | | | | 10.4 | 119.1 | |
| 5 | | 8<br>15 | | SM | **Alluvium:** Silty f-c SAND, light brown to brown, moist, medium dense, few gravel | | | |
| | | 15<br>20<br>24 | | SM/SP | Silty f-c SAND to f-c SAND, grayish brown, slightly moist, medium dense, some gravel | 2.0 | 122.1 | |
| 10 | | 12<br>21<br>28 | | | | 3.1 | 119.5 | Collapse |
| | | 26<br>50/6" | | SP | Gravelly f-c SAND, gray, slightly moist to moist, very dense | | | |
| 15 | | | | | | | | |
| | | 30<br>36<br>42 | | | | 1.9 | 123.1 | |
| 20 | | | | | **BORING TERMINATED AT 20.0 FEET**<br><br>No groundwater encountered<br>Boring backfilled with soil cuttings | | | |
| 25 | | | | | | | | |
| 30 | | | | | | | | |

LEGEND

**Sample type**: ---Ring; ---SPT; ---Small Bulk; ---Large Bulk; ---No Recovery; ---Water Table

**Lab testing:** AL = Atterberg Limits; EI = Expansion Index; SA = Sieve Analysis; RV = R-Value Test; SR = Sulfate/Resisitivity Test; SH = Shear Test; HC= Consolidation; MD = Maximum Density

**GeoTek, Inc.**

# LOG OF EXPLORATORY BORING

| | | | | | |
|---|---|---|---|---|---|
| **CLIENT:** | Mr. Robert Beers | **DRILLER:** | 2R Drilling Inc. | **LOGGED BY:** | DRW |
| **PROJECT NAME:** | 14044 Whittram Avenue | **DRILL METHOD:** | Hollow-Stem Auger | **OPERATOR:** | Victor |
| **PROJECT NO.:** | 3697-CR | **HAMMER:** | 140 lbs, 30 in. | **RIG TYPE:** | Track GT-16 |
| **LOCATION:** | See Exploration Location Map | **Approx. Elev.:** | 1358 msl | **DATE:** | 11/1/2023 |

| Depth (ft) | SAMPLES: Sample Type | SAMPLES: Blows/ 6 in | SAMPLES: Sample Number | USCS Symbol | BORING NO.: B-2 / MATERIAL DESCRIPTION AND COMMENTS | Laboratory Testing: Water Content (%) | Laboratory Testing: Dry Density (pcf) | Laboratory Testing: Others |
|---|---|---|---|---|---|---|---|---|
| | | | | SM | **Artificial Fill:** Silty f-c SAND, dark grayish brown, slightly moist, some asphaltic concrete debris, few gravel | | | |
| | | 4<br>6<br>11 | | | Silty f-c SAND, brown, moist, medium dense, trace gravel | 5.2 | 113.0 | |
| | | | | | **Alluvium:** | | | |
| 5 | | 14<br>20 | | SM | Silty f-c SAND, brown, moist, medium dense, some gravel | 2.6 | 117.2 | |
| | | 24 | | SM/SP | Silty f SAND to f SAND, light brown, slightly moist, medium dense, trace gravel | | | |
| | | 12<br>18<br>18 | | SM | Silty f-m SAND, grayish brown, slightly moist, medium dense, few gravel | 2.1 | 119.8 | Collapse |
| 10 | | 12<br>31<br>30 | | SP | F-m SAND, slightly moist, dense, some fine gravel | 1.8 | 115.1 | |
| 15 | | 25<br>50/5" | | SM/SP | Silty/gravelly f-c SAND, grayish brown, slightly moist, very dense | | | |
| 20 | | 35<br>50/5" | | | | 1.4 | 119.1 | |
| 25 | | 25<br>26<br>30 | | SM | Silty f-c SAND, gray, slightly moist to moist, very dense, few gravel | | | |
| 30 | | 33<br>38<br>28 | | | | 3.2 | | |

LEGEND

**Sample type**: ---Ring ---SPT ---Small Bulk ---Large Bulk ---No Recovery ---Water Table

**Lab testing:** AL = Atterberg Limits; EI = Expansion Index; SA = Sieve Analysis; RV = R-Value Test; SR = Sulfate/Resisitivity Test; SH = Shear Test; HC= Consolidation; MD = Maximum Density

**GeoTek, Inc.**

# LOG OF EXPLORATORY BORING

| | | | | | |
|---|---|---|---|---|---|
| **CLIENT:** | Mr. Robert Beers | **DRILLER:** | 2R Drilling Inc. | **LOGGED BY:** | DRW |
| **PROJECT NAME:** | 14044 Whittram Avenue | **DRILL METHOD:** | Hollow-Stem Auger | **OPERATOR:** | Victor |
| **PROJECT NO.:** | 3697-CR | **HAMMER:** | 140 lbs, 30 in. | **RIG TYPE:** | Track GT-16 |
| **LOCATION:** | See Exploration Location Map | **Approx. Elev.:** | 1358 msl | **DATE:** | 11/1/2023 |

| Depth (ft) | SAMPLES: Sample Type | SAMPLES: Blows/ 6 in | SAMPLES: Sample Number | USCS Symbol | BORING NO.: B-2 CONTINUED<br>MATERIAL DESCRIPTION AND COMMENTS | Laboratory Testing: Water Content (%) | Laboratory Testing: Dry Density (pcf) | Laboratory Testing: Others |
|---|---|---|---|---|---|---|---|---|
| 35 | | 18<br>24<br>34 | | SM/SP | Silty f-c SAND to f-c SAND, brown, slightly moist to moist, very dense, few gravel | | | |
| 40 | | 17<br>19<br>20 | | SM | Silty f-c SAND, grayish brown, slightly moist to moist, dense, trace gravel | 4.9 | | |
| 45 | | 10<br>14<br>15 | | ML | Clayey SILT, brown, moist, very stiff, trace fine gravel, trace fine grained sand | | | |
| 50 | | 7<br>13<br>16 | | | F sandy/clayey SILT, brown, moist, very stiff | 19.0 | | |
| 55 | | | | | **BORING TERMINATED AT 51.5 FEET**<br><br>No groundwater encountered<br>Boring backfilled with soil cuttings | | | |
| 60 | | | | | | | | |

LEGEND

**Sample type**: ---Ring ---SPT ---Small Bulk ---Large Bulk ---No Recovery ---Water Table

**Lab testing:** AL = Atterberg Limits; EI = Expansion Index; SA = Sieve Analysis; RV = R-Value Test; SR = Sulfate/Resisitivity Test; SH = Shear Test; HC= Consolidation; MD = Maximum Density

**GeoTek, Inc.**

# LOG OF EXPLORATORY BORING

| | | | | | |
|---|---|---|---|---|---|
| **CLIENT:** | Mr. Robert Beers | **DRILLER:** | 2R Drilling Inc. | **LOGGED BY:** | DRW |
| **PROJECT NAME:** | 14044 Whittram Avenue | **DRILL METHOD:** | Hollow-Stem Auger | **OPERATOR:** | Victor |
| **PROJECT NO.:** | 3697-CR | **HAMMER:** | 140 lbs, 30 in. | **RIG TYPE:** | Track GT-16 |
| **LOCATION:** | See Exploration Location Map | **Approx. Elev.:** | 1358 msl | **DATE:** | 11/1/2023 |

| Depth (ft) | SAMPLES: Sample Type | SAMPLES: Blows/ 6 in | SAMPLES: Sample Number | USCS Symbol | BORING NO.: B-3 / MATERIAL DESCRIPTION AND COMMENTS | Laboratory Testing: Water Content (%) | Laboratory Testing: Dry Density (pcf) | Laboratory Testing: Others |
|---|---|---|---|---|---|---|---|---|
| | | 10<br>12<br>12 | | SM | **Artificial Fill:**<br>Silty f-c SAND, brown, moist, medium dense, few asphaltic concrete debris, few concrete fragments | 4.9 | 115.9 | |
| 5 | | 10<br>11<br>13 | | SM | **Alluvium:**<br>Silty f-c SAND, light grayish brown, slightly moist, medium dense, some gravel | 2.3 | 120.4 | Collapse |
| | | 10<br>20<br>30 | | | | 1.8 | | |
| 10 | | 13<br>16<br>19 | | SM/SP | Silty f-c SAND to f-c SAND, grayish brown, slightly moist, medium dense, some gravel | | | |
| | | 30<br>50/5" | | | | 2.0 | | |
| 15 | | | | | **BORING TERMINATED AT 14.5 FEET (REFUSAL)**<br><br>No groundwater encountered<br>Boring backfilled with soil cuttings | | | |
| 20 | | | | | | | | |
| 25 | | | | | | | | |
| 30 | | | | | | | | |

LEGEND

**Sample type**: ---Ring ---SPT ---Small Bulk ---Large Bulk ---No Recovery ---Water Table

**Lab testing:** AL = Atterberg Limits; EI = Expansion Index; SA = Sieve Analysis; RV = R-Value Test; SR = Sulfate/Resisitivity Test; SH = Shear Test; HC= Consolidation; MD = Maximum Density

**GeoTek, Inc.**

# LOG OF EXPLORATORY BORING

| | | | | | |
|---|---|---|---|---|---|
| **CLIENT:** | Mr. Robert Beers | **DRILLER:** | 2R Drilling Inc. | **LOGGED BY:** | DRW |
| **PROJECT NAME:** | 14044 Whittram Avenue | **DRILL METHOD:** | Hollow-Stem Auger | **OPERATOR:** | Victor |
| **PROJECT NO.:** | 3697-CR | **HAMMER:** | 140 lbs, 30 in. | **RIG TYPE:** | Track GT-16 |
| **LOCATION:** | See Exploration Location Map | **Approx. Elev.:** | 1358 msl | **DATE:** | 11/1/2023 |

| Depth (ft) | SAMPLES: Sample Type | SAMPLES: Blows/ 6 in | SAMPLES: Sample Number | USCS Symbol | BORING NO.: B-4 / MATERIAL DESCRIPTION AND COMMENTS | Laboratory Testing: Water Content (%) | Laboratory Testing: Dry Density (pcf) | Laboratory Testing: Others |
|---|---|---|---|---|---|---|---|---|
| | | | | SM | **Artificial Fill:** Silty f-c SAND, brown, moist, medium dense, few asphaltic concrete debris, few concrete fragments | | | SR |
| | | 5<br>5<br>5 | | | Silty f SAND, brown, moist, loose, trace gravel | 6.5 | 118.5 | |
| 5 | | 4<br>5<br>5 | | | | 6.6 | 111.5 | |
| | | 23<br>33<br>30 | | SM | **Alluvium:** Silty f-c SAND, grayish brown, slightly moist, dense, some gravel | 1.7 | 127.6 | |
| 10 | | 14<br>28<br>31 | | | | 2.2 | 110.3 | |
| 15 | | 32<br>50/2" | | SP | Gravelly f-c SAND, grayish brown, slightly moist, very dense | | | |
| | | | | | **BORING TERMINATED AT 15.5 FEET (REFUSAL)**<br>No groundwater encountered<br>Boring backfilled with soil cuttings | | | |
| 20 | | | | | | | | |
| 25 | | | | | | | | |
| 30 | | | | | | | | |

LEGEND

**Sample type**: ---Ring; ---SPT; ---Small Bulk; ---Large Bulk; ---No Recovery; ---Water Table

**Lab testing:** AL = Atterberg Limits; EI = Expansion Index; SA = Sieve Analysis; RV = R-Value Test; SR = Sulfate/Resisitivity Test; SH = Shear Test; HC= Consolidation; MD = Maximum Density

**GeoTek, Inc.**

# LOG OF EXPLORATORY BORING

| | | | | | |
|---|---|---|---|---|---|
| **CLIENT:** | Mr. Robert Beers | **DRILLER:** | 2R Drilling Inc. | **LOGGED BY:** | DRW |
| **PROJECT NAME:** | 14044 Whittram Avenue | **DRILL METHOD:** | Hollow-Stem Auger | **OPERATOR:** | Victor |
| **PROJECT NO.:** | 3697-CR | **HAMMER:** | 140 lbs, 30 in. | **RIG TYPE:** | Track GT-16 |
| **LOCATION:** | See Exploration Location Map | **Approx. Elev.:** | 1358 msl | **DATE:** | 11/1/2023 |

| Depth (ft) | SAMPLES: Sample Type | SAMPLES: Blows/ 6 in | SAMPLES: Sample Number | USCS Symbol | BORING NO.: B-5 / MATERIAL DESCRIPTION AND COMMENTS | Laboratory Testing: Water Content (%) | Laboratory Testing: Dry Density (pcf) | Laboratory Testing: Others |
|---|---|---|---|---|---|---|---|---|
| | | | | | **Artificial Fill:** | | | |
| | Ring | 5<br>8 | | SM | Silty f-m SAND, brown, moist, loose | 3.7 | 111.9 | |
| | Ring | 16 | | SM | **Alluvium:**<br>Silty f-c SAND, gray, slightly moist, medium dense, some gravel | | | |
| 5 | Ring | 22<br>26<br>26 | | SP | Gravelly f-c SAND, gray, slightly moist, dense | 1.8 | 120.8 | |
| | Ring | 20<br>33<br>36 | | | | 1.9 | 132.8 | |
| | Ring | 16<br>15 | | | | 2.2 | 122.3 | |
| 10 | Ring | 12 | | ML/SM | F sandy SILT to silty f SAND, brown, slightly moist to moist, stiff/medium dense, trace fine gravel | | | |
| | Ring | 20<br>29<br>42 | | SP | Gravelly f-c SAND, gray, slightly moist, dense | | | |
| 15 | | | | | **BORING TERMINATED AT 15.0 FEET**<br><br>No groundwater encountered<br>Boring backfilled with soil cuttings | | | |
| 20 | | | | | | | | |
| 25 | | | | | | | | |
| 30 | | | | | | | | |

LEGEND

**Sample type**: ---Ring ---SPT ---Small Bulk ---Large Bulk ---No Recovery ---Water Table

**Lab testing:** AL = Atterberg Limits; EI = Expansion Index; SA = Sieve Analysis; RV = R-Value Test; SR = Sulfate/Resisitivity Test; SH = Shear Test; HC= Consolidation; MD = Maximum Density

**GeoTek, Inc.**

# LOG OF EXPLORATORY BORING

| | | | | | |
|---|---|---|---|---|---|
| **CLIENT:** | Mr. Robert Beers | **DRILLER:** | 2R Drilling Inc. | **LOGGED BY:** | DRW |
| **PROJECT NAME:** | 14044 Whittram Avenue | **DRILL METHOD:** | Hollow-Stem Auger | **OPERATOR:** | Victor |
| **PROJECT NO.:** | 3697-CR | **HAMMER:** | 140 lbs, 30 in. | **RIG TYPE:** | Track GT-16 |
| **LOCATION:** | See Exploration Location Map | **Approx. Elev.:** | 1358 msl | **DATE:** | 11/1/2023 |

| Depth (ft) | SAMPLES: Sample Type | SAMPLES: Blows/ 6 in | SAMPLES: Sample Number | USCS Symbol | BORING NO.: B-6 / MATERIAL DESCRIPTION AND COMMENTS | Laboratory Testing: Water Content (%) | Laboratory Testing: Dry Density (pcf) | Laboratory Testing: Others |
|---|---|---|---|---|---|---|---|---|
| | | | | SM | **Artificial Fill:**<br>Silty f-c SAND, grayish brown, slightly moist, medium dense | | | RV<br>R-Value = 79 |
| | | 12<br>14<br>16 | | SP | **Alluvium:**<br>Gravelly f-c SAND, gray, slightly moist, medium dense | 1.0 | 122.0 | |
| 5 | | 9<br>12 | | | | 1.8 | | |
| | | 12 | | SM | Silty f SAND, brown, moist, medium dense, trace gravel | | | |
| | | 21<br>33<br>33 | | SP | Gravelly f-c SAND, gray, slightly moist, medium dense | 2.0 | | |
| 10 | | 16<br>25<br>29 | | | | 1.4 | 128.7 | |
| | | | | ML | F sandy SILT, brown, very moist, stiff | | | |
| 15 | | 6<br>15 | | | | 2.0 | 116.6 | |
| | | 40 | | SM | Silty f-c SAND, grayish brown, slightly moist, dense, few gravel | | | |
| | | | | | **BORING TERMINATED AT 15.5 FEET (REFUSAL)**<br><br>No groundwater encountered<br>Boring backfilled with soil cuttings | | | |
| 20 | | | | | | | | |
| 25 | | | | | | | | |
| 30 | | | | | | | | |

LEGEND

**Sample type**: ---Ring ---SPT ---Small Bulk ---Large Bulk ---No Recovery ---Water Table

**Lab testing:** AL = Atterberg Limits; EI = Expansion Index; SA = Sieve Analysis; RV = R-Value Test; SR = Sulfate/Resisitivity Test; SH = Shear Test; HC= Consolidation; MD = Maximum Density

**GeoTek, Inc.**

# LOG OF EXPLORATORY BORING

| | | | | | |
|---|---|---|---|---|---|
| **CLIENT:** | Mr. Robert Beers | **DRILLER:** | 2R Drilling Inc. | **LOGGED BY:** | DRW |
| **PROJECT NAME:** | 14044 Whittram Avenue | **DRILL METHOD:** | Hollow-Stem Auger | **OPERATOR:** | Victor |
| **PROJECT NO.:** | 3697-CR | **HAMMER:** | 140 lbs, 30 in. | **RIG TYPE:** | Track GT-16 |
| **LOCATION:** | See Exploration Location Map | **Approx. Elev.:** | 1358 msl | **DATE:** | 11/1/2023 |

| Depth (ft) | SAMPLES: Sample Type | SAMPLES: Blows/ 6 in | SAMPLES: Sample Number | USCS Symbol | BORING NO.: I-1<br>MATERIAL DESCRIPTION AND COMMENTS | Laboratory Testing: Water Content (%) | Laboratory Testing: Dry Density (pcf) | Laboratory Testing: Others |
|---|---|---|---|---|---|---|---|---|
| | | | | SM | **Artificial Fill:**<br>Silty f-c SAND, grayish brown, slightly moist, medium dense, trace asphaltic concrete debris | | | 200 Wash<br>22.9% passing No. 200 |
| | | | | SM | **Alluvium:**<br>Silty f-c SAND, grayish brown, slightly moist, trace gravel | | | |
| 5 | | | | | **BORING TERMINATED AT 5.0 FEET**<br><br>No groundwater encountered<br>Boring set with poerforated pipe and gravel for infiltration testing | | | |
| 10 | | | | | | | | |
| 15 | | | | | | | | |
| 20 | | | | | | | | |
| 25 | | | | | | | | |
| 30 | | | | | | | | |

LEGEND

**Sample type**: ---Ring ---SPT ---Small Bulk ---Large Bulk ---No Recovery ---Water Table

**Lab testing:** AL = Atterberg Limits; EI = Expansion Index; SA = Sieve Analysis; RV = R-Value Test; SR = Sulfate/Resisitivity Test; SH = Shear Test; HC= Consolidation; MD = Maximum Density

**GeoTek, Inc.**

# LOG OF EXPLORATORY BORING

| | | | | | |
|---|---|---|---|---|---|
| **CLIENT:** | Mr. Robert Beers | **DRILLER:** | 2R Drilling Inc. | **LOGGED BY:** | DRW |
| **PROJECT NAME:** | 14044 Whittram Avenue | **DRILL METHOD:** | Hollow-Stem Auger | **OPERATOR:** | Victor |
| **PROJECT NO.:** | 3697-CR | **HAMMER:** | 140 lbs, 30 in. | **RIG TYPE:** | Track GT-16 |
| **LOCATION:** | See Exploration Location Map | **Approx. Elev.:** | 1358 msl | **DATE:** | 11/1/2023 |

| Depth (ft) | SAMPLES: Sample Type | SAMPLES: Blows/ 6 in | SAMPLES: Sample Number | USCS Symbol | **BORING NO.: I-2** / MATERIAL DESCRIPTION AND COMMENTS | Laboratory Testing: Water Content (%) | Laboratory Testing: Dry Density (pcf) | Laboratory Testing: Others |
|---|---|---|---|---|---|---|---|---|
| | | | | SM | **Artificial Fill:** Silty f-c SAND, grayish brown, slightly moist, medium dense, trace asphaltic concrete debris | | | |
| | | | | SM | **Alluvium:** Silty f-c SAND, grayish brown, slightly moist, some gravel | | | |
| 5 | | | | | **BORING TERMINATED AT 5.0 FEET**<br><br>No groundwater encountered<br>Boring set with poerforated pipe and gravel for infiltration testing | | | |
| 10 | | | | | | | | |
| 15 | | | | | | | | |
| 20 | | | | | | | | |
| 25 | | | | | | | | |
| 30 | | | | | | | | |

LEGEND

**Sample type**: ---Ring ---SPT ---Small Bulk ---Large Bulk ---No Recovery ---Water Table

**Lab testing:** AL = Atterberg Limits; EI = Expansion Index; SA = Sieve Analysis; RV = R-Value Test; SR = Sulfate/Resisitivity Test; SH = Shear Test; HC= Consolidation; MD = Maximum Density

**GeoTek, Inc.**

# LOG OF EXPLORATORY BORING

| | | | | | |
|---|---|---|---|---|---|
| **CLIENT:** | Mr. Robert Beers | **DRILLER:** | 2R Drilling Inc. | **LOGGED BY:** | DRW |
| **PROJECT NAME:** | 14044 Whittram Avenue | **DRILL METHOD:** | Hollow-Stem Auger | **OPERATOR:** | Victor |
| **PROJECT NO.:** | 3697-CR | **HAMMER:** | 140 lbs, 30 in. | **RIG TYPE:** | Track GT-16 |
| **LOCATION:** | See Exploration Location Map | **Approx. Elev.:** | 1358 msl | **DATE:** | 11/1/2023 |

| Depth (ft) | SAMPLES: Sample Type | SAMPLES: Blows/ 6 in | SAMPLES: Sample Number | USCS Symbol | BORING NO.: I-3 / MATERIAL DESCRIPTION AND COMMENTS | Laboratory Testing: Water Content (%) | Laboratory Testing: Dry Density (pcf) | Laboratory Testing: Others |
|---|---|---|---|---|---|---|---|---|
| | | | | SM | **Artificial Fill:** Silty f-c SAND, grayish brown, slightly moist, medium dense | | | |
| | | | | SM | **Alluvium:** Silty f-c SAND, grayish brown, slightly moist, some gravel | | | |
| 5 | | | | | **BORING TERMINATED AT 5.0 FEET**<br><br>No groundwater encountered<br>Boring set with poerforated pipe and gravel for infiltration testing | | | |
| 10 | | | | | | | | |
| 15 | | | | | | | | |
| 20 | | | | | | | | |
| 25 | | | | | | | | |
| 30 | | | | | | | | |

LEGEND

**Sample type**: ---Ring ---SPT ---Small Bulk ---Large Bulk ---No Recovery ---Water Table

**Lab testing:** AL = Atterberg Limits; EI = Expansion Index; SA = Sieve Analysis; RV = R-Value Test; SR = Sulfate/Resisitivity Test; SH = Shear Test; HC= Consolidation; MD = Maximum Density

**GeoTek, Inc.**

# LOG OF EXPLORATORY BORING

| | | | | | |
|---|---|---|---|---|---|
| **CLIENT:** | Mr. Robert Beers | **DRILLER:** | 2R Drilling Inc. | **LOGGED BY:** | DRW |
| **PROJECT NAME:** | 14044 Whittram Avenue | **DRILL METHOD:** | Hollow-Stem Auger | **OPERATOR:** | Victor |
| **PROJECT NO.:** | 3697-CR | **HAMMER:** | 140 lbs, 30 in. | **RIG TYPE:** | Track GT-16 |
| **LOCATION:** | See Exploration Location Map | **Approx. Elev.:** | 1358 msl | **DATE:** | 11/1/2023 |

| Depth (ft) | SAMPLES: Sample Type | SAMPLES: Blows/ 6 in | SAMPLES: Sample Number | USCS Symbol | **BORING NO.: I-4** / MATERIAL DESCRIPTION AND COMMENTS | Laboratory Testing: Water Content (%) | Laboratory Testing: Dry Density (pcf) | Laboratory Testing: Others |
|---|---|---|---|---|---|---|---|---|
| | | | | SM | **Artificial Fill:** Silty f-c SAND, grayish brown, slightly moist, medium dense | | | |
| | | | | SM | **Alluvium:** Silty f-c SAND, grayish brown, slightly moist, trace gravel | | | |
| 5 | | | | | **BORING TERMINATED AT 5.0 FEET** | | | |
| | | | | | No groundwater encountered | | | |
| | | | | | Boring set with poerforated pipe and gravel for infiltration testing | | | |
| 10 | | | | | | | | |
| 15 | | | | | | | | |
| 20 | | | | | | | | |
| 25 | | | | | | | | |
| 30 | | | | | | | | |

LEGEND

**Sample type**: ---Ring; ---SPT; ---Small Bulk; ---Large Bulk; ---No Recovery; ---Water Table

**Lab testing:** AL = Atterberg Limits; EI = Expansion Index; SA = Sieve Analysis; RV = R-Value Test; SR = Sulfate/Resisitivity Test; SH = Shear Test; HC= Consolidation; MD = Maximum Density

**GeoTek, Inc.**

# LOG OF EXPLORATORY BORING

| | | | | | |
|---|---|---|---|---|---|
| **CLIENT:** | Mr. Robert Beers | **DRILLER:** | 2R Drilling Inc. | **LOGGED BY:** | DRW |
| **PROJECT NAME:** | 14044 Whittram Avenue | **DRILL METHOD:** | Hollow-Stem Auger | **OPERATOR:** | Victor |
| **PROJECT NO.:** | 3697-CR | **HAMMER:** | 140 lbs, 30 in. | **RIG TYPE:** | Track GT-16 |
| **LOCATION:** | See Exploration Location Map | **Approx. Elev.:** | 1358 msl | **DATE:** | 11/1/2023 |

| Depth (ft) | SAMPLES: Sample Type | SAMPLES: Blows/ 6 in | SAMPLES: Sample Number | USCS Symbol | BORING NO.: I-5 / MATERIAL DESCRIPTION AND COMMENTS | Laboratory Testing: Water Content (%) | Laboratory Testing: Dry Density (pcf) | Laboratory Testing: Others |
|---|---|---|---|---|---|---|---|---|
| | | | | SM | **Artificial Fill:** Silty f-c SAND, grayish brown, slightly moist, medium dense | | | |
| | | | | SM | **Alluvium:** Silty f SAND, grayish brown, slightly moist, trace gravel<br><br>Silty f-m SAND, brown, slightly moist, trace gravel | | | |
| 5 | | | | | **BORING TERMINATED AT 5.0 FEET**<br><br>No groundwater encountered<br>Boring set with poerforated pipe and gravel for infiltration testing | | | |
| 10 | | | | | | | | |
| 15 | | | | | | | | |
| 20 | | | | | | | | |
| 25 | | | | | | | | |
| 30 | | | | | | | | |

LEGEND

**Sample type**: ---Ring ---SPT ---Small Bulk ---Large Bulk ---No Recovery ---Water Table

**Lab testing:** AL = Atterberg Limits; EI = Expansion Index; SA = Sieve Analysis; RV = R-Value Test; SR = Sulfate/Resisitivity Test; SH = Shear Test; HC= Consolidation; MD = Maximum Density

# APPENDIX B

## LABORATORY TEST RESULTS

**Assessor's Parcel Numbers (APNs) 0230-101-12, -13, -14 and -34**
**Proposed Truck Trailer Parking Facility**
**Fontana, San Bernardino County, California**
**Project No. 3697-CR**

GEOTEK

# SUMMARY OF LABORATORY TESTING

## Classification
Soils were classified visually in general accordance with the Unified Soil Classification System (ASTM Test Method D 2487). The soil classifications are shown on the boring logs in Appendix A.

## Collapse Test
Collapse tests were performed on selected samples of the site soils in general accordance with ASTM D 5333 test procedures. The results of this test are presented graphically in Appendix B.

## Direct Shear
Shear testing was performed on a remolded sample in a direct shear machine of the strain-control type in general accordance with ASTM Test Method D 3080. The rate of deformation is approximately 0.035 inch per minute. The samples were sheared under varying confining loads in order to determine the coulomb shear strength parameters, angle of internal friction and cohesion. The results of the testing are presented graphically in Appendix B.

## Expansion Index
The expansion potential of the soils was determined by performing expansion index testing on a sample in general accordance with ASTM D 4829. The results of the testing are provided below and in Appendix B:

| Boring No. | Depth (ft.) | Soil Type | Expansion Index | Classification |
|---|---|---|---|---|
| B-1 | 0-5 | Silty Sand (SM) | 0 | Very Low |

## In-Situ Moisture and Density
The natural water content was determined (ASTM D 2216) on samples of the materials recovered from the subsurface exploration. In addition, in-place dry density determinations (ASTM D 2937) were performed on relatively undisturbed samples to measure the unit weight of the subsurface soils. Results of these tests are shown on the logs at the appropriate sample depths in Appendix A.

## Materials Finer Than the No. 200 Sieve
A #200 sieve wash was performed on a selected sample of the subsurface soil, in accordance with ASTM Test Method D 1140. The results of this testing are presented on the boring logs in Appendix A.

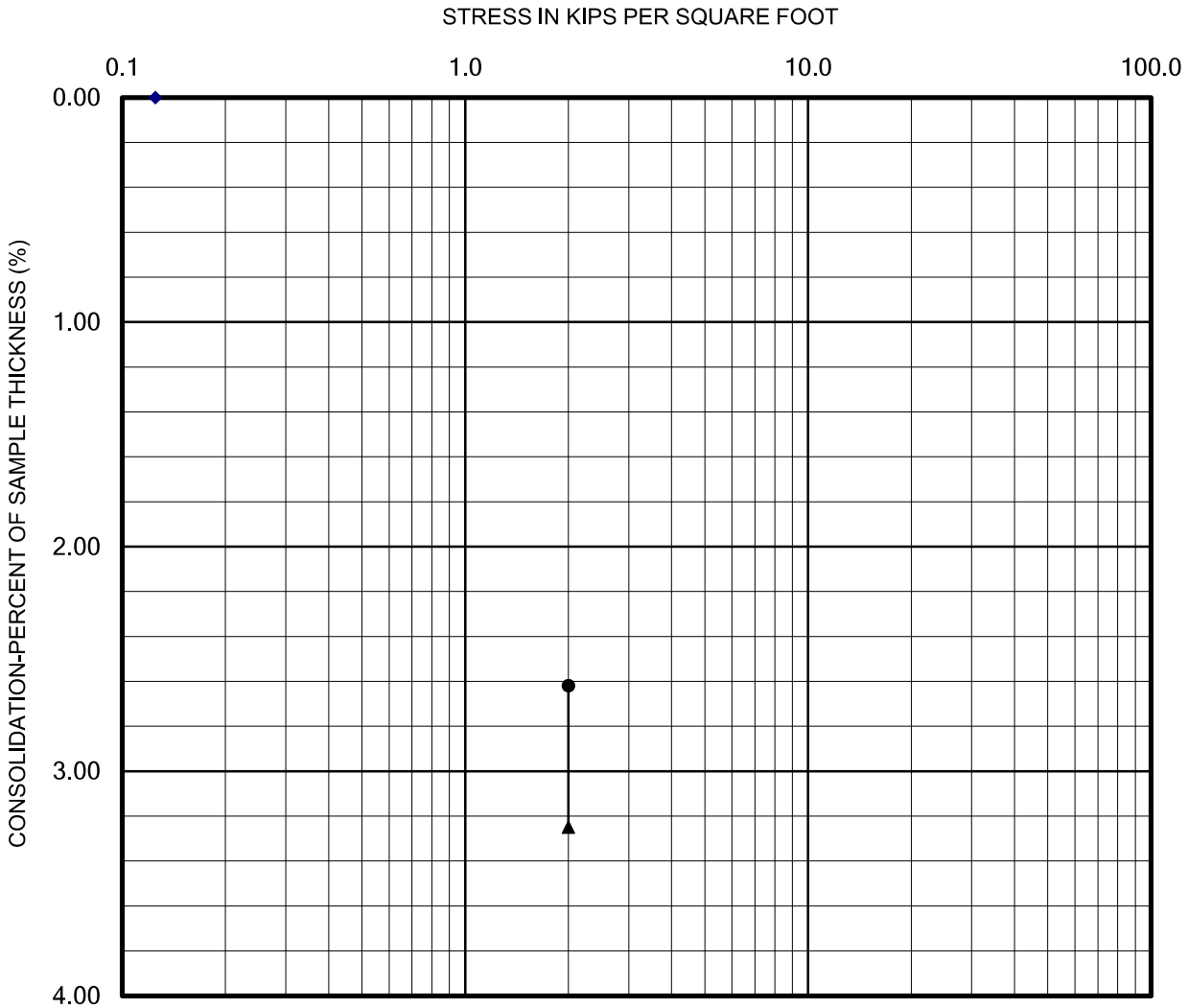
## Moisture-Density Relationship
Laboratory testing consisting of a moisture-density relationship was performed on a sample obtained during the subsurface exploration. The laboratory maximum dry density and optimum moisture content was determined in general accordance with ASTM D 1557 test procedures.

## R-Value
Laboratory testing was performed in general accordance with Caltrans Test Method CT 301. The results of the testing are presented herein.

**Sulfate Content, Resistivity and Chloride Content**

Laboratory testing was performed by others in general accordance with ASTM procedures. The testing included pH and water-soluble sulfate content determinations, and resistivity and chloride content testing. The results of the testing are provided below:

| Boring No. | Depth (ft.) | pH ASTM G 51 | Chloride ASTM D 512B(ppm) | Sulfate ASTM D 516 (% by weight) | Resistivity ASTM G 187 (ohm-cm) |
|---|---|---|---|---|---|
| B-4 | 0 - 5 | 7.3 | 13.9 | 0.0022 | 7,370 |




Seating Cycle
Loading Prior to Inundation
Loading After Inundation
Rebound Cycle

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 4546

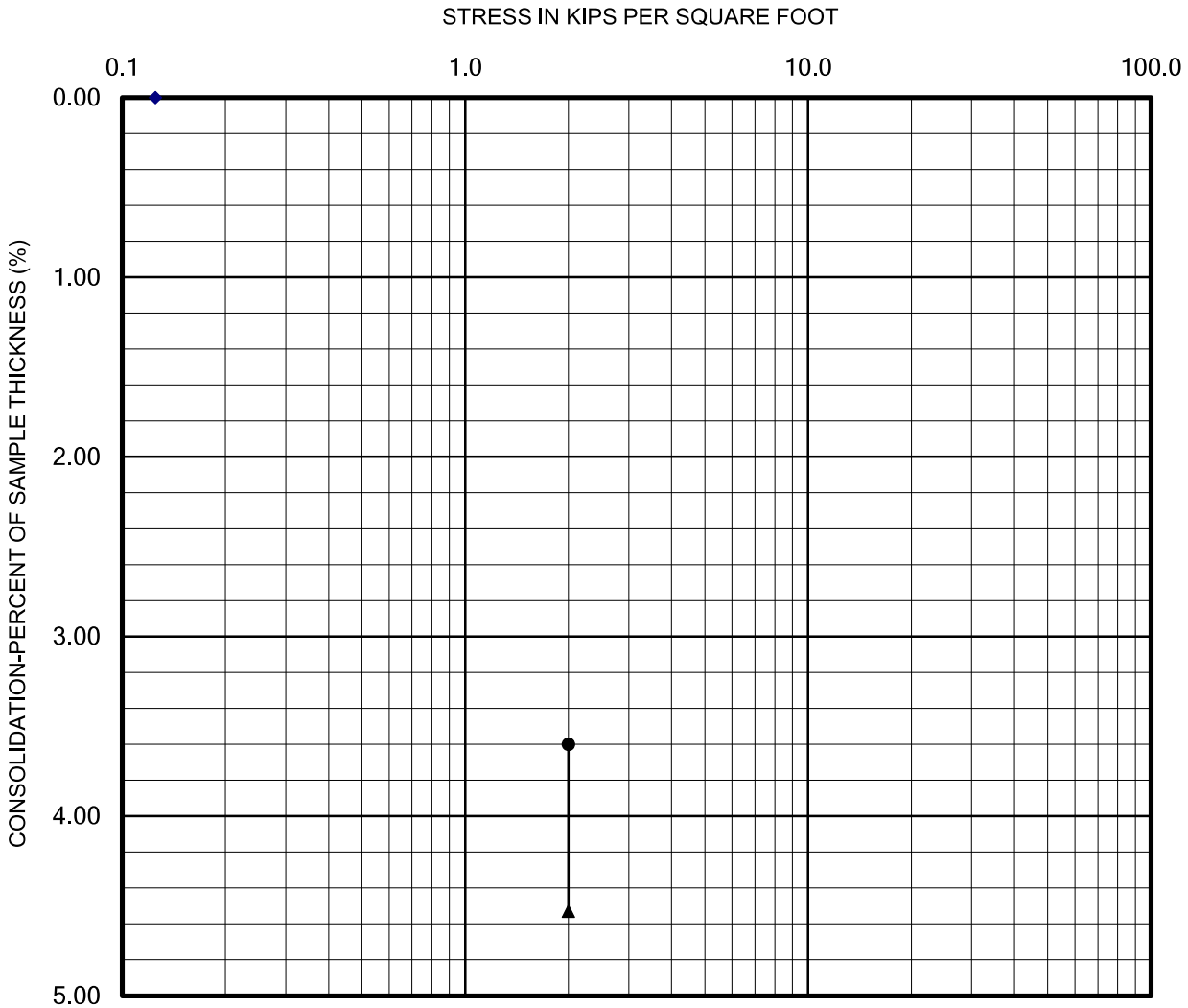
GEOTEK

| | |
|---|---|
| CHECKED BY: JB | Lab: Corona |
| PROJECT NO.: 3697-CR | Date: 11/7/2023 |

# COLLAPSE REPORT

## Sample: B-1 @ 9 feet

**Plate B-1**




Seating Cycle
Loading Prior to Inundation
Loading After Inundation
Rebound Cycle

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 4546

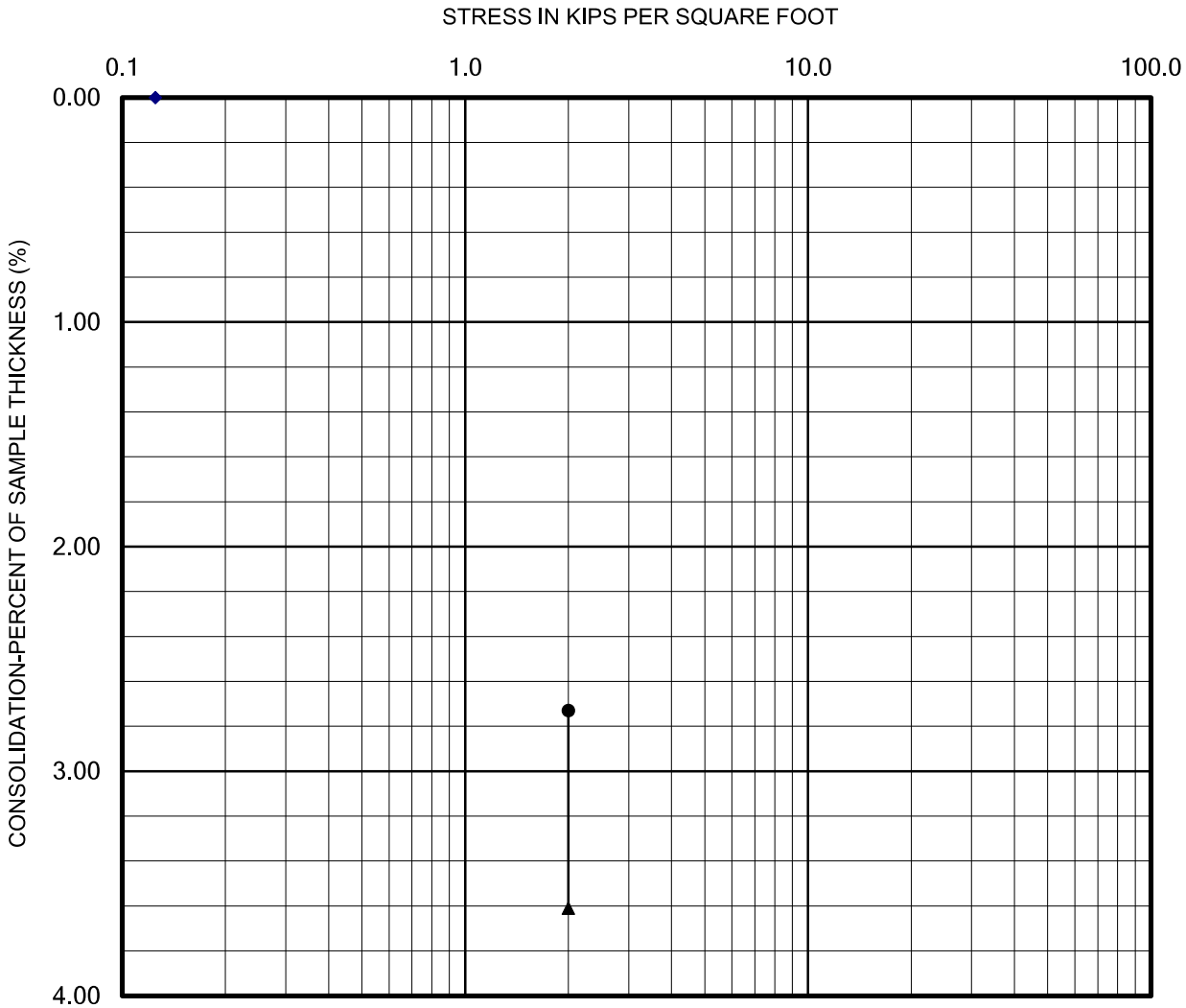
GEOTEK

| | |
|---|---|
| CHECKED BY: JB | Lab: Corona |
| PROJECT NO.: 3697-CR | Date: 11/7/2023 |

# COLLAPSE REPORT

## Sample: B-2 @ 7 feet

**Plate B-2**




Seating Cycle
Loading Prior to Inundation
Loading After Inundation
Rebound Cycle

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 4546

GEOTEK

| | |
|---|---|
| CHECKED BY: JB | Lab: Corona |
| PROJECT NO.: 3697-CR | Date: 11/7/2023 |

# COLLAPSE REPORT

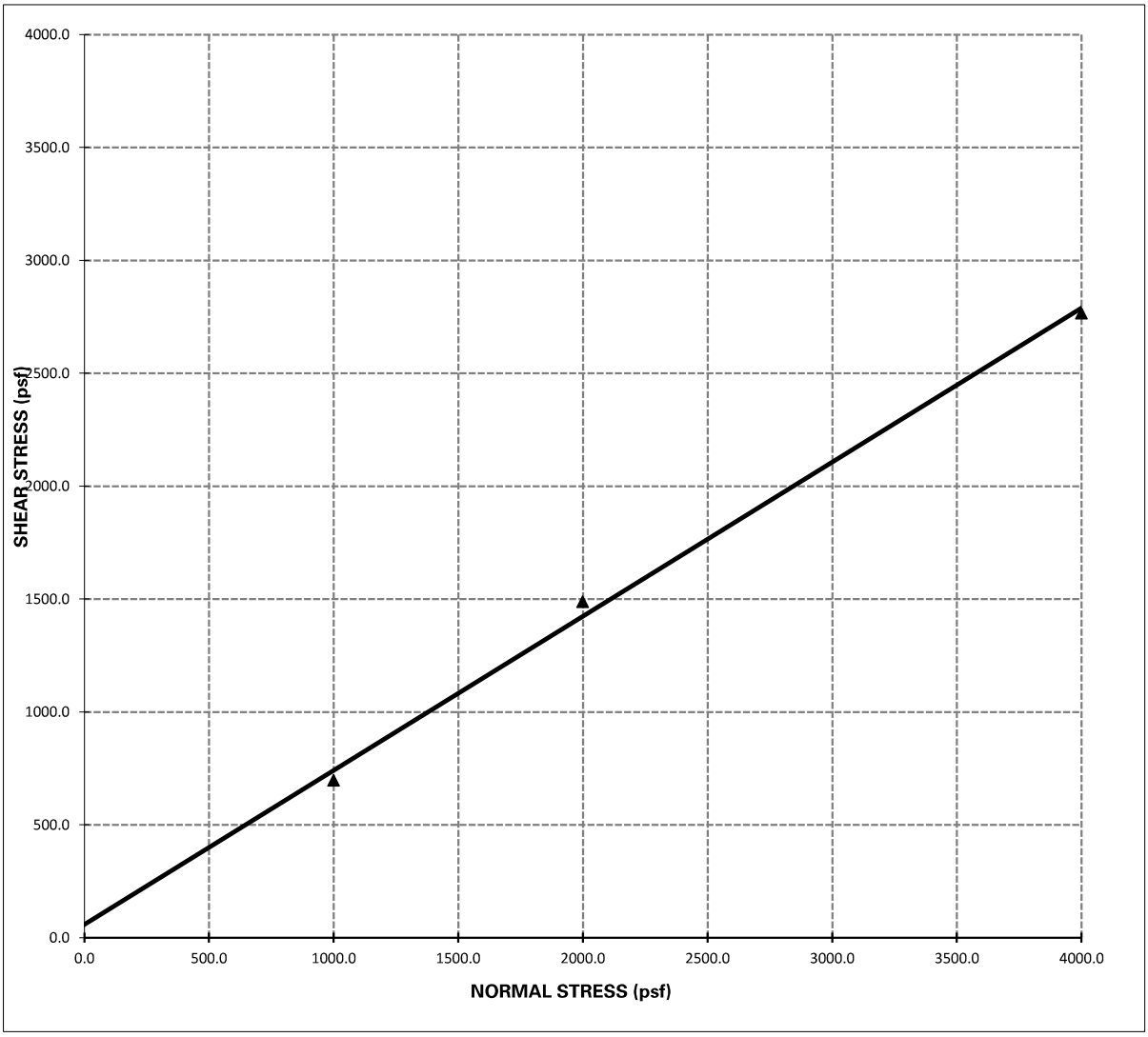
## Sample: B-3 @ 4 feet

**Plate B-3**

GEOTEK

# DIRECT SHEAR TEST

| | | | |
|---|---|---|---|
| ***Project Name:*** | 14044 Whittram Avenue | ***Sample Location:*** | B-1 @ 0-5 feet |
| ***Project Number:*** | 3697-CR | ***Date Tested:*** | 11/9/2023 |




**Shear Strength:** $\Phi$ = 34 ° , C = 58 psf

**Notes:** 1 - The soil specimen used in the shear box was a ring sample remolded to approximately 90% relative compaction from a bulk sample collected during the field investigation.

2 - The above reflect direct shear strength at saturated conditions.

3 - The tests were run at a shear rate of 0.01 in/min.

**GeoTek - Corona**
1548 N. Maple St.
Corona, CA 92880
Phone: (951) 710-1160
Fax: (951) 710-1167

# Proctor Report

**Report No: PTR:23-00230-S01**

**Client:** Mr. Robert Beers
8175 Limonite Avenue
Jurupa Valley CA 92509

**CC:**

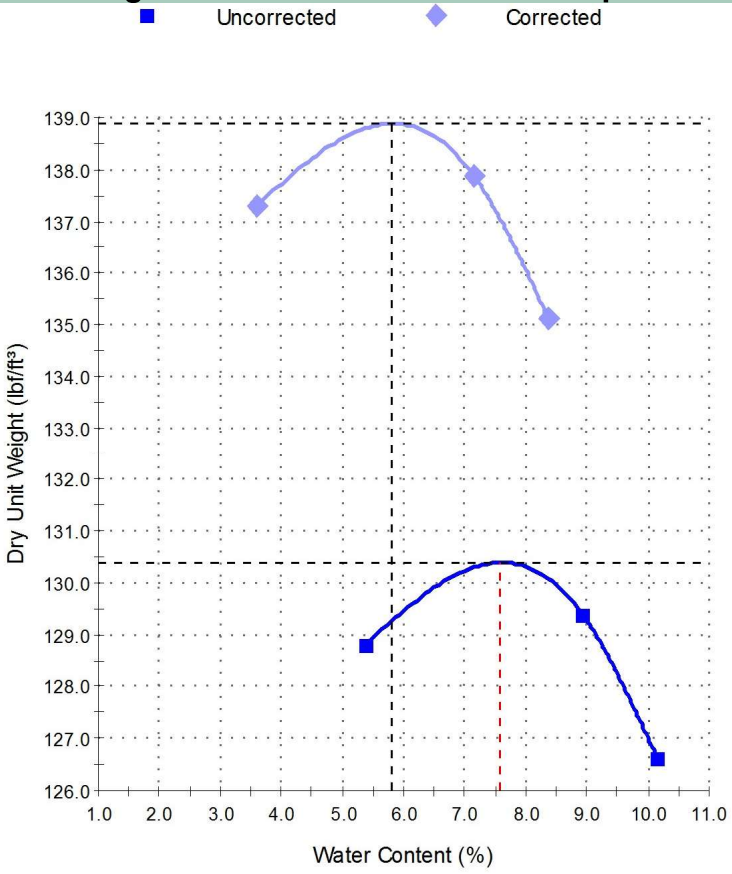
**Project:** 3697-CR
14044 Whittram Avenue, Fontana

THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

## Sample Details

**Sample ID:** 23-00230-S01 **Date Sampled:** 11/3/2023
**Sampled By:** Daniel Whitmer
**Location:** B-1 @ 0-5 feet / Silty fine to coarse sand with gravel

## Dry Unit Weight - Water Content Relationship




## Test Results

| ASTM D 1557 | |
|---|---|
| **Maximum Dry Unit Weight (lbf/ft³):** | **130.4** |
| **Optimum Water Content (%):** | **7.6** |
| Method: | B |
| Preparation Method: | Moist |
| Retained Sieve 3/8" (9.5mm) (%): | 27 |
| Passing Sieve 3/8" (9.5mm) (%): | 73 |
| Tested By: | Mycheal Phillips |
| Date Tested: | 11/3/2023 |

| ASTM D 4718 | |
|---|---|
| **Corrected Maximum Dry Unit Weight (lbf/ft³):** | **138.9** |
| **Corrected Optimum Water Content (%):** | **5.8** |
| Specific Gravity (Oversize): | 2.70 |
| Sieve Size (Oversize): | 3/8 |
| Oversize Particles (%): | 27 |

## Comments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# EXPANSION INDEX TEST

**(ASTM D4829)**

| | | | |
|---|---|---|---|
| ***Client:*** | Mr. Robert Beers | ***Tested/ Checked By:*** | MP Lab No Corona |
| ***Project Number:*** | 3697-CR | ***Date Tested:*** | 11/3/2023 |
| ***Project Location:*** | 14044 Whittram Avenue | ***Sample Source:*** | B-1 @ 0-5 feet |
| | | ***Sample Description:*** | |

Ring #:_____ Ring Dia. : 4.01" Ring Ht.:1"

**DENSITY DETERMINATION**

| | |
|---|---|
| Weight of compacted sample & ring (gm) | 789.3 |
| Weight of ring (gm) | 363.7 |
| Net weight of sample (gm) | **425.6** |
| Wet Density, lb / ft3 (C*0.3016) | **128.4** |
| Dry Density, lb / ft3 (D/1.F) | **118.9** |

**SATURATION DETERMINATION**

| | |
|---|---|
| Moisture Content, % | 8.0 |
| Specific Gravity, assumed | **2.70** |
| Unit Wt. of Water @ 20 °C, (pcf) | **62.4** |
| % Saturation | **51.7** |

**READINGS**

| DATE | TIME | READING | |
|---|---|---|---|
| 11/3/2023 | | 0.2730 | Initial |
| 11/3/2023 | | 0.2730 | 10 min/Dry |
| | | | |
| | | | |
| | | | |
| 11/4/2023 | | 0.2730 | Final |

**FINAL MOISTURE**

| Final Weight of wet sample & tare | % Moisture |
|---|---|
| 802.7 | **11.1** |

**EXPANSION INDEX = 0**

**GeoTek - Corona**
1548 N. Maple St.
Corona, CA 92880
Phone: (951) 710-1160
Fax: (951) 710-1167

# R Value Report

**Report No: RV:23-00230-S02**

**Client:** Mr. Robert Beers
8175 Limonite Avenue
Jurupa Valley CA 92509

**CC:**

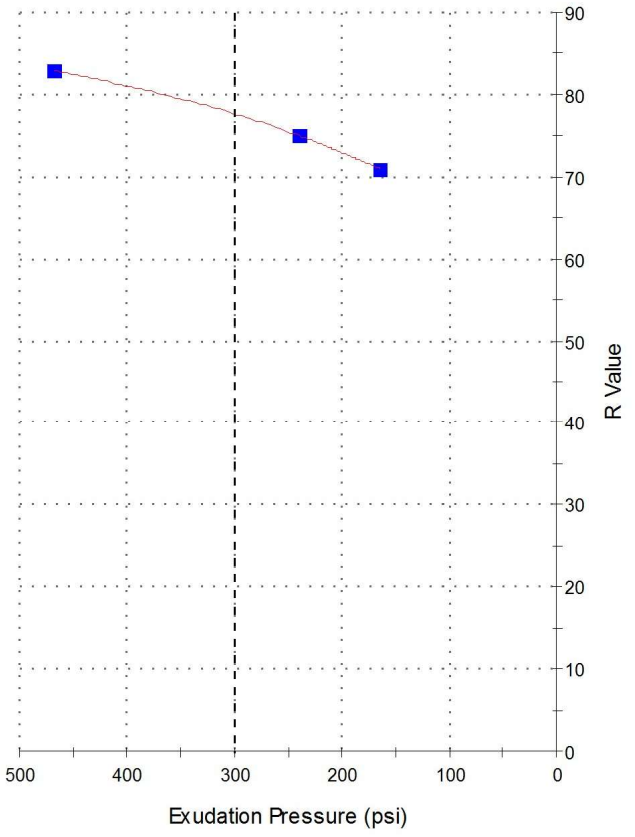
**Project:** 3697-CR
14044 Whittram Avenue, Fontana

THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

## Sample Details

| | | | |
|---|---|---|---|
| **Sample ID:** | 23-00230-S02 | **Date Sampled:** | 11/3/2023 |
| **Sampling Method:** | | **Source:** | |
| **Material:** | Silty fine to coarse sand with gravel | **Specification:** | |
| **Location:** | B-6 @ 0-5 feet | **Tested By:** | Jordan Brucelas |
| **Date Tested:** | 11/7/2023 | | |

## R Value




## Test Results

ASTM D 2844

**R Value at 300 psi Exudation:** 78

## Specimen Results

| | | | |
|---|---|---|---|
| **Moisture Content (%)** | 8.7 | 8.2 | 8.1 |
| **Dry Density (lb/ft³)** | 120.6 | 123.0 | 120.8 |
| **Exudation Pressure (psi)** | 164 | 239 | 469 |
| **R Value** | 71 | 75 | 83 |
| **Expansion Pressure (psi)** | 0.0 | 0.0 | 0.1 |

## Comments

8.0% Retained on the 3/4" Sieve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# -200 WASH

| | | | |
|---|---|---|---|
| Date: | 11/7/2023 | | |
| W.O.: | 3697-CR | sample ID | I-1 |
| Client: | Mr. Robert Beers | depth | 0-5 feet |
| Project: | 14044 Whittram Avenue | | |

| Sieve Size | Particle Diameter | | Wt. Retained | Wt. Passing | % Passing | Specs |
|---|---|---|---|---|---|---|
| | in. | mm. | | | | |
| #200 | 0.0029 | 0.074 | 377 | 111.7 | 22.9% | |

| | | |
|---|---|---|
| Dry Weight | 488.7 | |
| Soak Time | 1440 | Minutes |

# Results Only Soil Testing for 14044 Whittram

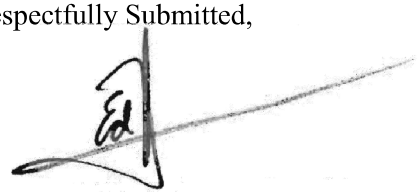
## November 6, 2023

## Prepared for:

**Jordan Brucelas**
**Geotek USA**
**1548 North Maple Street**
**Corona, CA 92280**
**jbrucelas@geotekusa.com**

**Project X Job#: S231103G**
**Client Job or PO#: 3697-CR Mr. Beers**

Respectfully Submitted,



Eduardo Hernandez, M.Sc., P.E.
Sr. Corrosion Consultant
NACE Corrosion Technologist #16592
Professional Engineer
California No. M37102
ehernandez@projectxcorrosion.com

# Soil Analysis Lab Results

Client: Geotek USA
Job Name: 14044 Whittram
Client Job Number: 3697-CR  Mr. Beers
Project X Job Number: S231103G
November 6, 2023

| | Method | ASTM D4327 | | ASTM D4327 | | ASTM G187 | | ASTM G51 | ASTM G200 | SM 4500-D | ASTM D4327 | ASTM D6919 | ASTM D6919 | ASTM D6919 | ASTM D6919 | ASTM D6919 | ASTM D6919 | ASTM D4327 | ASTM D4327 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Bore# / Description** | **Depth** | **Sulfates** $SO_4^{2-}$ | | **Chlorides** $Cl^-$ | | **Resistivity** As Rec'd \| Minimum | | **pH** | **Redox** | **Sulfide** $S^{2-}$ | **Nitrate** $NO_3^-$ | **Ammonium** $NH_4^+$ | **Lithium** $Li^+$ | **Sodium** $Na^+$ | **Potassium** $K^+$ | **Magnesium** $Mg^{2+}$ | **Calcium** $Ca^{2+}$ | **Fluoride** $F_2^-$ | **Phosphate** $PO_4^{3-}$ |
| | (ft) | (mg/kg) | (wt%) | (mg/kg) | (wt%) | (Ohm-cm) | (Ohm-cm) | | (mV) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) |
| B-4 | 0-5 | 21.8 | 0.0022 | 13.9 | 0.0014 | 24,790 | 7,370 | 7.3 | 124 | ND | 33.5 | 0.1 | ND | 20.1 | 5.8 | 15.4 | 83.4 | 10.5 | 3.8 |

Cations and Anions, except Sulfide and Bicarbonate, tested with Ion Chromatography
mg/kg = milligrams per kilogram (parts per million) of dry soil weight
ND = 0 = Not Detected | NT = Not Tested | Unk = Unknown
Chemical Analysis performed on 1:3 Soil-To-Water extract
PPM = mg/kg (soil) = mg/L (Liquid)

**Note**: Sometimes a bad sulfate hit is a contaminated spot. Typical fertilizers are Potassium chloride, ammonium sulfate or ammonium sulfate nitrate (ASN). So this is another reason why testing full corrosion series is good because we then have the data to see if those other ingredients are present meaning the soil sample is just fertilizer-contaminated soil. This can happen often when the soil samples collected are simply surface scoops which is why it's best to dig in a foot, throw away the top and test the deeper stuff. Dairy farms are also notorious for these items.

# APPENDIX C

**PERCOLATION TEST DATA**
**AND PORCHET CALCULATIONS**

**Assessor's Parcel Numbers (APNs) 0230-101-12, -13, -14 and -34**
**Proposed Truck Trailer Parking Facility**
**Fontana, San Bernardino County, California**
**Project No. 3697-CR**

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## PERCOLATION DATA SHEET

**Project:** Mr. Robert Beers - 14044 Whittram Avenue, Fontana **Job No.:** 3697-CR

**Test Hole No.:** I-I **Tested By:** DRW **Date:** 11/2/2023

**Depth of Hole As Drilled:** 60" **Before Test:** 60" **After Test:** 60"

| Reading No. | Time | Time Interval (Min) | Total Depth of Hole (Inches) | Initial Water Level (Inches) | Final Water Level (Inches) | Δ in Water Level (Inches) | Rate (Minutes per Inch) | Comments |
|---|---|---|---|---|---|---|---|---|
| 1 | 7:37 AM | | 60 | 24 | | | | |
| | 8:02 AM | 25 | | | 0 | 24 | 1.04 | |
| 2 | 8:04 AM | | 60 | 24 | | | | |
| | 8:29 AM | 25 | | | 0 | 24 | 1.04 | |
| 1 | 8:31 AM | | 60 | 24 | | | | |
| | 8:41 AM | 10 | | | 12 1/2 | 11 1/2 | 0.87 | |
| 2 | 8:43 AM | | 60 | 24 | | | | |
| | 8:53 AM | 10 | | | 13 | 11 | 0.91 | |
| 3 | 8:55 AM | | 60 | 24 | | | | |
| | 9:05 AM | 10 | | | 13 1/2 | 10 1/2 | 0.95 | |
| 4 | 9:07 AM | | 60 | 24 | | | | |
| | 9:17 AM | 10 | | | 13 1/2 | 10 1/2 | 0.95 | |
| 5 | 9:19 AM | | 60 | 24 | | | | |
| | 9:29 AM | 10 | | | 13 3/4 | 10 1/4 | 0.98 | |
| 6 | 9:31 AM | | 60 | 24 | | | | |
| | 9:41 AM | 10 | | | 13 3/4 | 10 1/4 | 0.98 | |

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## PERCOLATION DATA SHEET

**Project:** Mr. Robert Beers - 14044 Whittram Avenue, Fontana **Job No.:** 3697-CR

**Test Hole No.:** I-2 **Tested By:** DRW **Date:** 11/2/2023

**Depth of Hole As Drilled:** 60" **Before Test:** 60" **After Test:** 60"

| Reading No. | Time | Time Interval (Min) | Total Depth of Hole (Inches) | Initial Water Level (Inches) | Final Water Level (Inches) | Δ in Water Level (Inches) | Rate (Minutes per Inch) | Comments |
|---|---|---|---|---|---|---|---|---|
| 1 | 10:11 AM | | 60 | 24 | | | | |
| | 10:36 AM | 25 | | | 0 | 24 | 1.04 | |
| 2 | 10:38 AM | | 60 | 24 | | | | |
| | 11:03 AM | 25 | | | 0 | 24 | 1.04 | |
| 1 | 11:05 AM | | 60 | 24 | | | | |
| | 11:15 AM | 10 | | | 6 1/2 | 17 1/2 | 0.57 | |
| 2 | 11:17 AM | | 60 | 24 | | | | |
| | 11:27 AM | 10 | | | 6 3/4 | 17 1/4 | 0.58 | |
| 3 | 11:29 AM | | 60 | 24 | | | | |
| | 11:39 AM | 10 | | | 7 | 17 | 0.59 | |
| 4 | 11:41 AM | | 60 | 24 | | | | |
| | 11:51 AM | 10 | | | 7 1/4 | 16 3/4 | 0.60 | |
| 5 | 11:53 AM | | 60 | 24 | | | | |
| | 12:03 PM | 10 | | | 7 1/4 | 16 3/4 | 0.60 | |
| 6 | 12:05 PM | | 60 | 24 | | | | |
| | 12:15 PM | 10 | | | 7 1/4 | 16 3/4 | 0.60 | |

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## PERCOLATION DATA SHEET

**Project:** Mr. Robert Beers - 14044 Whittram Avenue, Fontana **Job No.:** 3697-CR

**Test Hole No.:** I-3 **Tested By:** CD **Date:** 11/2/2023

**Depth of Hole As Drilled:** 60" **Before Test:** 60" **After Test:** 60"

| Reading No. | Time | Time Interval (Min) | Total Depth of Hole (Inches) | Initial Water Level (Inches) | Final Water Level (Inches) | Δ in Water Level (Inches) | Rate (Minutes per Inch) | Comments |
|---|---|---|---|---|---|---|---|---|
| 1 | 12:21 PM | | 60 | 24 | | | | |
| | 12:46 PM | 25 | | | 0 | 24 | 1.04 | |
| 2 | 12:48 PM | | 60 | 24 | | | | |
| | 1:13 PM | 25 | | | 0 | 24 | 1.04 | |
| 1 | 1:15 PM | | 60 | 24 | | | | |
| | 1:25 PM | 10 | | | 11 3/4 | 12 1/4 | 0.82 | |
| 2 | 1:27 PM | | 60 | 24 | | | | |
| | 1:37 PM | 10 | | | 12 | 12 | 0.83 | |
| 3 | 1:39 PM | | 60 | 24 | | | | |
| | 1:49 PM | 10 | | | 13 | 11 | 0.91 | |
| 4 | 1:51 PM | | 60 | 24 | | | | |
| | 2:01 PM | 10 | | | 13 1/4 | 10 3/4 | 0.93 | |
| 5 | 2:03 PM | | 60 | 24 | | | | |
| | 2:13 PM | 10 | | | 13 1/4 | 10 3/4 | 0.93 | |
| 6 | 2:15 PM | | 60 | 24 | | | | |
| | 2:25 PM | 10 | | | 13 1/4 | 10 3/4 | 0.93 | |

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## PERCOLATION DATA SHEET

**Project:** Mr. Robert Beers - 14044 Whittram Avenue, Fontana **Job No.:** 3697-CR

**Test Hole No.:** I-4 **Tested By:** CD **Date:** 11/2/2023

**Depth of Hole As Drilled:** 60" **Before Test:** 60" **After Test:** 60"

| Reading No. | Time | Time Interval (Min) | Total Depth of Hole (Inches) | Initial Water Level (Inches) | Final Water Level (Inches) | Δ in Water Level (Inches) | Rate (Minutes per Inch) | Comments |
|---|---|---|---|---|---|---|---|---|
| 1 | 10:17 AM | | 60 | 24 | | | | |
| | 10:42 AM | 25 | | | 0 | 24 | 1.04 | |
| 2 | 10:44 AM | | 60 | 24 | | | | |
| | 11:09 AM | 25 | | | 0 | 24 | 1.04 | |
| 1 | 11:11 AM | | 60 | 24 | | | | |
| | 11:21 AM | 10 | | | 3 3/4 | 20 1/4 | 0.49 | |
| 2 | 11:23 AM | | 60 | 24 | | | | |
| | 11:33 AM | 10 | | | 3 3/4 | 20 1/4 | 0.49 | |
| 3 | 11:35 AM | | 60 | 24 | | | | |
| | 11:45 AM | 10 | | | 4 | 20 | 0.50 | |
| 4 | 11:47 AM | | 60 | 24 | | | | |
| | 11:57 AM | 10 | | | 4 | 20 | 0.50 | |
| 5 | 11:59 AM | | 60 | 24 | | | | |
| | 12:09 PM | 10 | | | 4 1/2 | 19 1/2 | 0.51 | |
| 6 | 12:11 PM | | 60 | 24 | | | | |
| | 12:21 PM | 10 | | | 4 1/4 | 19 3/4 | 0.51 | |

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## PERCOLATION DATA SHEET

**Project:** Mr. Robert Beers - 14044 Whittram Avenue, Fontana **Job No.:** 3697-CR

**Test Hole No.:** I-5 **Tested By:** CD **Date:** 11/2/2023

**Depth of Hole As Drilled:** 60" **Before Test:** 60" **After Test:** 60"

| Reading No. | Time | Time Interval (Min) | Total Depth of Hole (Inches) | Initial Water Level (Inches) | Final Water Level (Inches) | Δ in Water Level (Inches) | Rate (Minutes per Inch) | Comments |
|---|---|---|---|---|---|---|---|---|
| 1 | 7:09 AM | | 60 | 24 | | | | |
| | 7:34 AM | 25 | | | 2 1/2 | 21 1/2 | 1.16 | |
| 2 | 7:36 AM | | 60 | 24 | | | | |
| | 8:01 AM | 25 | | | 5 | 19 | 1.32 | |
| 1 | 8:03 AM | | 60 | 24 | | | | |
| | 8:13 AM | 10 | | | 17 1/4 | 6 3/4 | 1.48 | |
| 2 | 8:15 AM | | 60 | 24 | | | | |
| | 8:25 AM | 10 | | | 17 1/4 | 6 3/4 | 1.48 | |
| 3 | 8:27 AM | | 60 | 24 | | | | |
| | 8:37 AM | 10 | | | 17 1/4 | 6 3/4 | 1.48 | |
| 4 | 8:39 AM | | 60 | 24 | | | | |
| | 8:49 AM | 10 | | | 17 1/2 | 6 1/2 | 1.54 | |
| 5 | 8:51 AM | | 60 | 24 | | | | |
| | 9:01 AM | 10 | | | 17 1/2 | 6 1/2 | 1.54 | |
| 6 | 9:03 AM | | 60 | 24 | | | | |
| | 9:13 AM | 10 | | | 17 1/2 | 6 1/2 | 1.54 | |

GEOTEK

| | |
|---|---|
| **Client:** | **Mr. Robert Beers** |
| **Project:** | **14044 Whittram Avenue, Fontana** |
| **Project No:** | **3697-CR** |
| **Date:** | **11/2/2023** |

**Boring No.** **I-1**

**Percolation to Infiltration Rate (Porchet Method)**

| | |
|---|---|
| Time Interval, $\Delta t$ = | 10 |
| Final Depth to Water, $D_F$ = | 46.25 |
| Test Hole Radius, r = | 4 |
| Initial Depth to Water, $D_O$ = | 36 |
| Total Test Hole Depth, $D_T$ = | 60 |

Equation - $I_t = \dfrac{\Delta H\ (60r)}{\Delta t\ (r+2H_{avg})}$

| | |
|---|---|
| $H_O = D_T - D_O$ = | 24 |
| $H_F = D_T - D_F$ = | 13.75 |
| $\Delta H = \Delta D = H_O - H_F$ = | 10.25 |
| $H_{avg} = (H_O+H_F)/2$ = | 18.875 |

**$I_t$ =** 5.89 **Inches per Hour**

GEOTEK

| | |
|---|---|
| **Client:** | **Mr. Robert Beers** |
| **Project:** | **14044 Whittram Avenue, Fontana** |
| **Project No:** | **3697-CR** |
| **Date:** | **11/2/2023** |

**Boring No.** **I-2**

**Percolation to Infiltration Rate (Porchet Method)**

| | |
|---|---|
| Time Interval, $\Delta t$ = | 10 |
| Final Depth to Water, $D_F$ = | 52.75 |
| Test Hole Radius, r = | 4 |
| Initial Depth to Water, $D_O$ = | 36 |
| Total Test Hole Depth, $D_T$ = | 60 |

Equation - $I_t = \dfrac{\Delta H\ (60r)}{\Delta t\ (r+2H_{avg})}$

| | |
|---|---|
| $H_O = D_T - D_O$ = | 24 |
| $H_F = D_T - D_F$ = | 7.25 |
| $\Delta H = \Delta D = H_O - H_F$ = | 16.75 |
| $H_{avg} = (H_O+H_F)/2$ = | 15.625 |

**$I_t$ =** 11.40 **Inches per Hour**

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| | |
|---|---|
| **Client:** | **Mr. Robert Beers** |
| **Project:** | **14044 Whittram Avenue, Fontana** |
| **Project No:** | **3697-CR** |
| **Date:** | **11/2/2023** |

**Boring No.** **I-3**

**Percolation to Infiltration Rate (Porchet Method)**

| | |
|---|---|
| Time Interval, $\Delta t$ = | 10 |
| Final Depth to Water, $D_F$ = | 46.75 |
| Test Hole Radius, r = | 4 |
| Initial Depth to Water, $D_O$ = | 36 |
| Total Test Hole Depth, $D_T$ = | 60 |

Equation - $I_t = \dfrac{\Delta H\ (60r)}{\Delta t\ (r+2H_{avg})}$

| | |
|---|---|
| $H_O = D_T - D_O$ = | 24 |
| $H_F = D_T - D_F$ = | 13.25 |
| $\Delta H = \Delta D = H_O - H_F$ = | 10.75 |
| $H_{avg} = (H_O+H_F)/2$ = | 18.625 |

**$I_t$ =** 6.25 **Inches per Hour**

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| | |
|---|---|
| **Client:** | **Mr. Robert Beers** |
| **Project:** | **14044 Whittram Avenue, Fontana** |
| **Project No:** | **3697-CR** |
| **Date:** | **11/2/2023** |

**Boring No.** **I-4**

**Percolation to Infiltration Rate (Porchet Method)**

| | |
|---|---|
| Time Interval, $\Delta t$ = | 10 |
| Final Depth to Water, $D_F$ = | 55.75 |
| Test Hole Radius, r = | 4 |
| Initial Depth to Water, $D_O$ = | 36 |
| Total Test Hole Depth, $D_T$ = | 60 |

Equation - $I_t = \dfrac{\Delta H\,(60r)}{\Delta t\,(r+2H_{avg})}$

| | |
|---|---|
| $H_O = D_T - D_O$ = | 24 |
| $H_F = D_T - D_F$ = | 4.25 |
| $\Delta H = \Delta D = H_O - H_F$ = | 19.75 |
| $H_{avg} = (H_O+H_F)/2$ = | 14.125 |

**$I_t$ =** 14.70 **Inches per Hour**

GEOTEK

| | |
|---|---|
| **Client:** | **Mr. Robert Beers** |
| **Project:** | **14044 Whittram Avenue, Fontana** |
| **Project No:** | **3697-CR** |
| **Date:** | **11/2/2023** |

**Boring No.** **I-5**

**Percolation to Infiltration Rate (Porchet Method)**

| | |
|---|---|
| Time Interval, $\Delta t$ = | 10 |
| Final Depth to Water, $D_F$ = | 42.5 |
| Test Hole Radius, r = | 4 |
| Initial Depth to Water, $D_O$ = | 36 |
| Total Test Hole Depth, $D_T$ = | 60 |

Equation - $I_t = \dfrac{\Delta H\ (60r)}{\Delta t\ (r+2H_{avg})}$

| | |
|---|---|
| $H_O = D_T - D_O$ = | 24 |
| $H_F = D_T - D_F$ = | 17.5 |
| $\Delta H = \Delta D = H_O - H_F$ = | 6.5 |
| $H_{avg} = (H_O+H_F)/2$ = | 20.75 |

**$I_t$ =** 3.43 **Inches per Hour**

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# APPENDIX D

## GENERAL GRADING GUIDELINES

**Assessor's Parcel Numbers (APNs) 0230-101-12, -13, -14 and -34**
**Proposed Truck Trailer Parking Facility**
**Fontana, San Bernardino County, California**
**Project No. 3697-CR**

GEOTEK

# GENERAL GRADING GUIDELINES

The guidelines presented herein are intended to address general construction procedures for earthwork construction. Specific situations and conditions often arise which cannot reasonably be discussed in general guidelines, when anticipated these are discussed in the text of the report. Often unanticipated conditions are encountered which may necessitate modification or changes to these guidelines. It is our hope that these will assist the contractor to more efficiently complete the project by providing a reasonable understanding of the procedures that would be expected during earthwork and the testing and observation used to evaluate those procedures.

## General

Grading should be performed to at least the minimum requirements of governing agencies, Chapters 18 and 33 of the Uniform Building Code, CBC (2022) and the guidelines presented below.

## Preconstruction Meeting

A preconstruction meeting should be held prior to site earthwork. Any questions the contractor has regarding our recommendations, general site conditions, apparent discrepancies between reported and actual conditions and/or differences in procedures the contractor intends to use should be brought up at that meeting. The contractor (including the main onsite representative) should review our report and these guidelines in advance of the meeting. Any comments the contractor may have regarding these guidelines should be brought up at that meeting.

## Grading Observation and Testing

1. Observation of the fill placement should be provided by our representative during grading. Verbal communication during the course of each day will be used to inform the contractor of test results. The contractor should receive a copy of the "Daily Field Report" indicating results of field density tests that day. If our representative does not provide the contractor with these reports, our office should be notified.
2. Testing and observation procedures are, by their nature, specific to the work or area observed and location of the tests taken, variability may occur in other locations. The contractor is responsible for the uniformity of the grading operations; our observations and test results are intended to evaluate the contractor's overall level of efforts during grading. The contractor's personnel are the only individuals participating in all aspect of site work. Compaction testing and observation should not be considered as relieving the contractor's responsibility to properly compact the fill.
3. Cleanouts, processed ground to receive fill, key excavations, and subdrains should be observed by our representative prior to placing any fill. It will be the contractor's responsibility to notify our representative or office when such areas are ready for observation.

4. Density tests may be made on the surface material to receive fill, as considered warranted by this firm.
5. In general, density tests would be made at maximum intervals of two feet of fill height or every 1,000 cubic yards of fill placed. Criteria will vary depending on soil conditions and size of the fill. More frequent testing may be performed. In any case, an adequate number of field density tests should be made to evaluate the required compaction and moisture content is generally being obtained.
6. Laboratory testing to support field test procedures will be performed, as considered warranted, based on conditions encountered (e.g. change of material sources, types, etc.) Every effort will be made to process samples in the laboratory as quickly as possible and in progress construction projects are our first priority. However, laboratory workloads may cause in delays and some soils may require a **minimum of 48 to 72 hours to complete test procedures**. Whenever possible, our representative(s) should be informed in advance of operational changes that might result in different source areas for materials.
7. Procedures for testing of fill slopes are as follows:
    a) Density tests should be taken periodically during grading on the flat surface of the fill, three to five feet horizontally from the face of the slope.
    b) If a method other than over building and cutting back to the compacted core is to be employed, slope compaction testing during construction should include testing the outer six inches to three feet in the slope face to determine if the required compaction is being achieved.
8. Finish grade testing of slopes and pad surfaces should be performed after construction is complete.

**Site Clearing**

1. All vegetation, and other deleterious materials, should be removed from the site. If material is not immediately removed from the site it should be stockpiled in a designated area(s) well outside of all current work areas and delineated with flagging or other means. Site clearing should be performed in advance of any grading in a specific area.
2. Efforts should be made by the contractor to remove all organic or other deleterious material from the fill, as even the most diligent efforts may result in the incorporation of some materials. This is especially important when grading is occurring near the natural grade. All equipment operators should be aware of these efforts. Laborers may be required as root pickers.
3. Nonorganic debris or concrete may be placed in deeper fill areas provided the procedures used are observed and found acceptable by our representative.

## Treatment of Existing Ground

1. Following site clearing, all surficial deposits of alluvium, and/or weathered bedrock be removed unless otherwise specifically indicated in the text of this report.
2. In some cases, removal may be recommended to a specified depth (e.g. flat sites where partial alluvial removals may be sufficient). The contractor should not exceed these depths unless directed otherwise by our representative.
3. Groundwater existing in alluvial areas may make excavation difficult. Deeper removals than indicated in the text of the report may be necessary due to saturation during winter months.
4. Subsequent to removals, the natural ground should be processed to a depth of six inches, moistened to near optimum moisture conditions and compacted to fill standards.
5. Exploratory back hoe or dozer trenches still remaining after site removal should be excavated and filled with compacted fill if they can be located.

## Fill Placement

1. Unless otherwise indicated, all site soil and bedrock may be reused for compacted fill; however, some special processing or handling may be required (see text of report).
2. Material used in the compacting process should be evenly spread, moisture conditioned, processed, and compacted in thin lifts six (6) to eight (8) inches in compacted thickness to obtain a uniformly dense layer. The fill should be placed and compacted on a nearly horizontal plane, unless otherwise found acceptable by our representative.
3. If the moisture content or relative density varies from that recommended by this firm, the contractor should rework the fill until it is in accordance with the following:
    a) Moisture content of the fill should be at or above optimum moisture. Moisture should be evenly distributed without wet and dry pockets. Pre-watering of cut or removal areas should be considered in addition to watering during fill placement, particularly in clay or dry surficial soils. The ability of the contractor to obtain the proper moisture content will control production rates.
    b) Each six-inch layer should be compacted to at least 90 percent of the maximum dry density in compliance with the testing method specified by the controlling governmental agency. In most cases, the testing method is ASTM Test Designation D 1557.
4. Rock fragments less than eight inches in diameter may be utilized in the fill, provided:
    a) They are not placed in concentrated pockets;
    b) There is a sufficient percentage of fine-grained material to surround the rocks;
    c) The distribution of the rocks is observed by, and acceptable to, our representative.
5. Rocks exceeding eight (8) inches in diameter should be taken off site, broken into smaller fragments, or placed in accordance with recommendations of this firm in areas designated

suitable for rock disposal. On projects where significant large quantities of oversized materials are anticipated, alternate guidelines for placement may be included. If significant oversize materials are encountered during construction, these guidelines should be requested.

6. In clay soil, dry or large chunks or blocks are common. If in excess of eight (8) inches minimum dimension, then they are considered as oversized. Sheepsfoot compactors or other suitable methods should be used to break up blocks. When dry, they should be moisture conditioned to provide a uniform condition with the surrounding fill.

**Slope Construction**

1. The contractor should obtain a minimum relative compaction of 90 percent out to the finished slope face of fill slopes. This may be achieved by either overbuilding the slope and cutting back to the compacted core, or by direct compaction of the slope face with suitable equipment.
2. Slopes trimmed to the compacted core should be overbuilt by at least three (3) feet with compaction efforts out to the edge of the false slope. Failure to properly compact the outer edge results in trimming not exposing the compacted core and additional compaction after trimming may be necessary.
3. If fill slopes are built "at grade" using direct compaction methods, then the slope construction should be performed so that a constant gradient is maintained throughout construction. Soil should not be "spilled" over the slope face nor should slopes be "pushed out" to obtain grades. Compaction equipment should compact each lift along the immediate top of slope. Slopes should be back rolled or otherwise compacted at approximately every 4 feet vertically as the slope is built.
4. Corners and bends in slopes should have special attention during construction as these are the most difficult areas to obtain proper compaction.
5. Cut slopes should be cut to the finished surface. Excessive undercutting and smoothing of the face with fill may necessitate stabilization.

## UTILITY TRENCH CONSTRUCTION AND BACKFILL

Utility trench excavation and backfill is the contractors responsibility. The geotechnical consultant typically provides periodic observation and testing of these operations. While efforts are made to make sufficient observations and tests to verify that the contractors' methods and procedures are adequate to achieve proper compaction, it is typically impractical to observe all backfill procedures. As such, it is critical that the contractor use consistent backfill procedures.

Compaction methods vary for trench compaction and experience indicates many methods can be successful. However, procedures that "worked" on previous projects may or may not prove effective on a given site. The contractor(s) should outline the procedures proposed, so that we may discuss

them **prior** to construction. We will offer comments based on our knowledge of site conditions and experience.

1. Utility trench backfill in slopes, structural areas, in streets and beneath flat work or hardscape should be brought to at least optimum moisture and compacted to at least 90 percent of the laboratory standard. Soil should be moisture conditioned prior to placing in the trench.
2. Flooding and jetting are not typically recommended or acceptable for native soils. Flooding or jetting may be used with select sand having a Sand Equivalent (SE) of 30 or higher. This is typically limited to the following uses:
   a) shallow (12 + inches) under slab interior trenches and,
   b) as bedding in pipe zone.

   The water should be allowed to dissipate prior to pouring slabs or completing trench compaction.
3. Care should be taken not to place soils at high moisture content within the upper three feet of the trench backfill in street areas, as overly wet soils may impact subgrade preparation. Moisture may be reduced to 2% below optimum moisture in areas to be paved within the upper three feet below sub grade.
4. Sand backfill should not be allowed in exterior trenches adjacent to and within an area extending below a 1:1 projection from the outside bottom edge of a footing, unless it is similar to the surrounding soil.
5. Trench compaction testing is generally at the discretion of the geotechnical consultant. Testing frequency will be based on trench depth and the contractors procedures. A probing rod would be used to assess the consistency of compaction between tested areas and untested areas. If zones are found that are considered less compact than other areas, this would be brought to the contractors attention.

## JOB SAFETY

### General

Personnel safety is a primary concern on all job sites. The following summaries are safety considerations for use by all our employees on multi-employer construction sites. On ground personnel are at highest risk of injury and possible fatality on grading construction projects. The company recognizes that construction activities will vary on each site and that job site safety is the contractor's responsibility. However, it is, imperative that all personnel be safety conscious to avoid accidents and potential injury.

In an effort to minimize risks associated with geotechnical testing and observation, the following precautions are to be implemented for the safety of our field personnel on grading and construction projects.

1. Safety Meetings: Our field personnel are directed to attend the contractor's regularly scheduled safety meetings.
2. Safety Vests: Safety vests are provided for and are to be worn by our personnel while on the job site.
3. Safety Flags: Safety flags are provided to our field technicians; one is to be affixed to the vehicle when on site, the other is to be placed atop the spoil pile on all test pits.

In the event that the contractor's representative observes any of our personnel not following the above, we request that it be brought to the attention of our office.

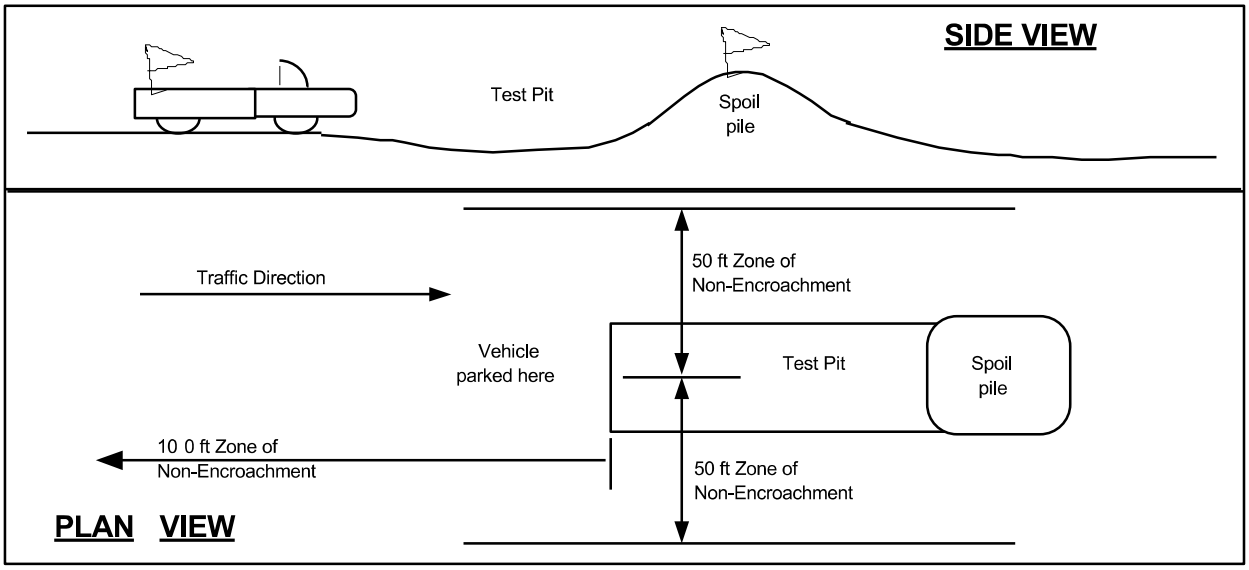
**Test Pits Location, Orientation and Clearance**

The technician is responsible for selecting test pit locations. The primary concern is the technician's safety. However, it is necessary to take sufficient tests at various locations to obtain a representative sampling of the fill. As such, efforts will be made to coordinate locations with the grading contractors authorized representatives (e.g. dump man, operator, supervisor, grade checker, etc.), and to select locations following or behind the established traffic pattern, preferably outside of current traffic. The contractors authorized representative should direct excavation of the pit and safety during the test period. Again, safety is the paramount concern.

Test pits should be excavated so that the spoil pile is placed away from oncoming traffic. The technician's vehicle is to be placed next to the test pit, opposite the spoil pile. This necessitates that the fill be maintained in a drivable condition. Alternatively, the contractor may opt to park a piece of equipment in front of test pits, particularly in small fill areas or those with limited access.

A zone of non-encroachment should be established for all test pits (see diagram below). No grading equipment should enter this zone during the test procedure. The zone should extend outward to the sides approximately 50 feet from the center of the test pit and 100 feet in the direction of traffic flow. This zone is established both for safety and to avoid excessive ground vibration, which typically decreases test results.

## TEST PIT SAFETY PLAN




### Slope Tests

When taking slope tests, the technician should park their vehicle directly above or below the test location on the slope. The contractor's representative should effectively keep all equipment at a safe operation distance (e.g. 50 feet) away from the slope during testing.

The technician is directed to withdraw from the active portion of the fill as soon as possible following testing. The technician's vehicle should be parked at the perimeter of the fill in a highly visible location.

### Trench Safety

It is the contractor's responsibility to provide safe access into trenches where compaction testing is needed. Trenches for all utilities should be excavated in accordance with CAL-OSHA and any other applicable safety standards. Safe conditions will be required to enable compaction testing of the trench backfill.

All utility trench excavations in excess of 5 feet deep, which a person enters, are to be shored or laid back. Trench access should be provided in accordance with OSHA standards. Our personnel are directed not to enter any trench by being lowered or "riding down" on the equipment.

Our personnel are directed not to enter any excavation which;

1. is 5 feet or deeper unless shored or laid back,
2. exit points or ladders are not provided,
3. displays any evidence of instability, has any loose rock or other debris which could fall into the trench, or

4. displays any other evidence of any unsafe conditions regardless of depth.

If the contractor fails to provide safe access to trenches for compaction testing, our company policy requires that the soil technician withdraws and notifies their supervisor. The contractors representative will then be contacted in an effort to effect a solution. All backfill not tested due to safety concerns or other reasons is subject to reprocessing and/or removal.

**Procedures**

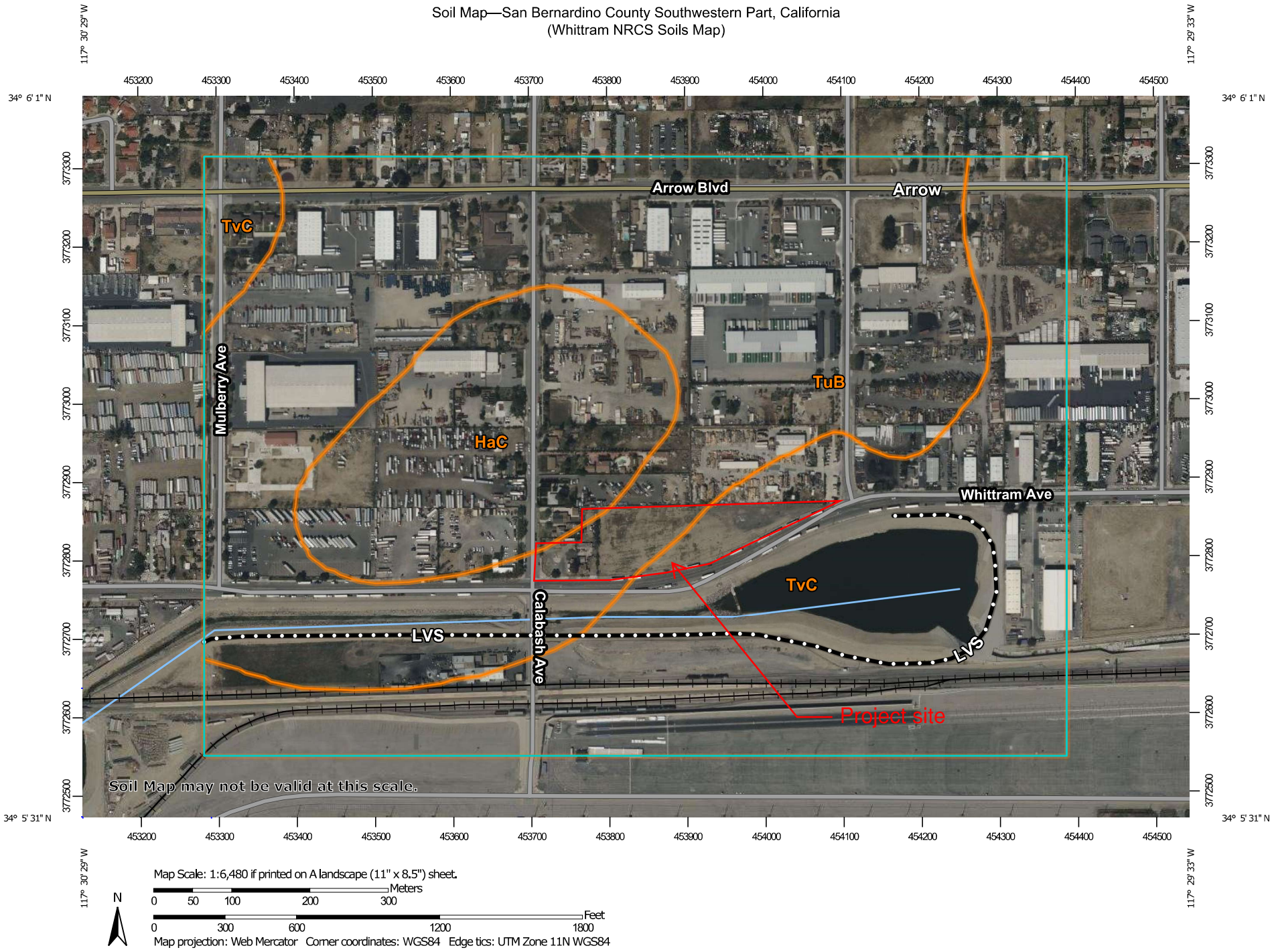
In the event that the technician's safety is jeopardized or compromised as a result of the contractor's failure to comply with any of the above, the technician is directed to inform both the developer's and contractor's representatives. If the condition is not rectified, the technician is required, by company policy, to immediately withdraw and notify their supervisor. The contractor's representative will then be contacted in an effort to effect a solution. No further testing will be performed until the situation is rectified. Any fill placed in the interim can be considered unacceptable and subject to reprocessing, recompaction or removal.

In the event that the soil technician does not comply with the above or other established safety guidelines, we request that the contractor bring this to technicians attention and notify our project manager or office. Effective communication and coordination between the contractors' representative and the field technician(s) is strongly encouraged in order to implement the above safety program and safety in general.

The safety procedures outlined above should be discussed at the contractor's safety meetings. This will serve to inform and remind equipment operators of these safety procedures particularly the zone of non-encroachment.

The safety procedures outlined above should be discussed at the contractor's safety meetings. This will serve to inform and remind equipment operators of these safety procedures particularly the zone of non-encroachment.

Soil Map—San Bernardino County Southwestern Part, California
(Whittram NRCS Soils Map)




Map Scale: 1:6,480 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 50 100 200 300

Feet
0 300 600 1200 1800

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 1:24,000.

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: San Bernardino County Southwestern Part, California
Survey Area Data: Version 16, Aug 30, 2024

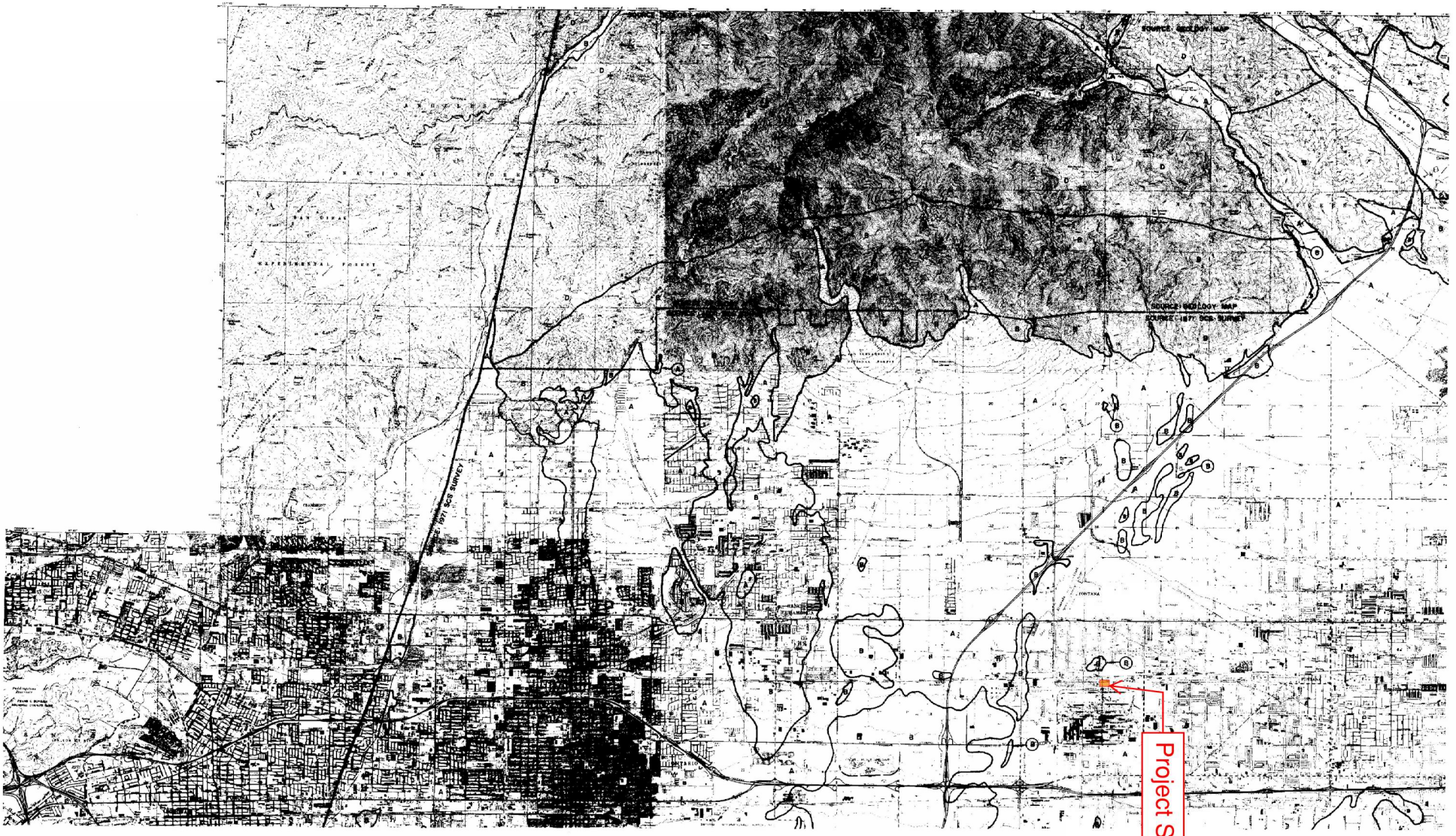
Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 17, 2022—Jun 12, 2022

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 |
|---|---|---|---|
| HaC | Hanford coarse sandy loam, 2 to 9 percent slopes | 30.6 | 14.6% |
| TuB | Tujunga loamy sand, 0 to 5 percent slopes | 97.8 | 46.7% |
| TvC | Tujunga gravelly loamy sand, 0 to 9 percent slopes | 81.0 | 38.7% |
| **Totals for Area of Interest** | | **209.4** | **100.0%** |




**SAN BERNARDINO COUNTY**
HYDROLOGY MANUAL

**SCALE REDUCED BY 1/2**

HYDROLOGIC SOILS GROUP MAP
FOR
SOUTHWEST-A AREA



FIGURE C-13

# SBCFCD

# REFERENCE PLANS

# BANANA BASIN

# WHITTRAM AVENUE

robert m. beers pe

Monday, December 1, 2025

Magdanelly Ruiz
SBCFCD
Sent via email to Magdanelly.Ruiz@dpw.sbcounty.gov

Re: Whittram Avenue Storm Drain As-Builts

Dear Magdanelly:

Thank you for meeting me this morning at SBCFD office on Third Street.
Here is the information on the project to assist with research on the storm drain. We are processing a project on Whittram Avenue with SB County Planning. The project is located on the north side of Whittram Avenue between Banana and Calabash. See attached exhibit showing location of the project and catch basins we are interested in.

SB County Hydrology review requests us to provide as-builts for the existing storm drain in Whittram Avenue frontage of the project. No Storm Drain improvements show up on the SBCFCD GIS. However, there are a series of catch basins along Banana at Whittram Avenue, Whittram Avenue in the middle of the site and at Calabash and Whittram on the west end of the project site.

5172 QUEEN STREET
RIVERSIDE, CA 92506
(951) 317-2041

robert m. beers pe

See attached photos showing those existing catch basins:

**Catch Basins at Banana Avenue – Whittram Avenue**

5172 QUEEN STREET
RIVERSIDE, CA 92506
(951) 317-2041

robert m. beers pe

**Catch basin – west side of Banana at Whittram Avenue**

**Catch basin – east side of Banana at Whittram Avenue**

5172 QUEEN STREET
RIVERSIDE, CA 92506
(951) 317-2041

robert m. beers pe

**Catch Basin No. 1- middle of site – North side of Whittram Avenue**

**Catch Basin No. 1- middle of site – North side of Whittram Avenue**

5172 QUEEN STREET
RIVERSIDE, CA 92506
(951) 317-2041

robert m. beers pe

**Catch Basins No's 1 & 2 - middle of site**

**Catch Basin No. 2 - middle of site – South side of Whittram Avenue**

5172 QUEEN STREET
RIVERSIDE, CA 92506
(951) 317-2041

robert m. beers pe

**Catch Basin – west of Calabash on Whittram**

**Catch Basin – east of Calabash on Whittram – north side**

5172 QUEEN STREET
RIVERSIDE, CA 92506
(951) 317-2041

robert m. beers pe

We researched the City of Fontana GIS to see if they have any record of the Whittram Avenue storm with no success.

Also attached is a copy of our site plan/hydrology map which shows the catch basin locations across the project frontage on Whittram Avenue.

Thank you

Very Truly Yours;

Robert M. Beers, PE

Cc: Vince Bartleman

Attachments:
Google Earth image with site and catch basins shown for reference
Project Site Plan
Project Hydrology Map

5172 QUEEN STREET
RIVERSIDE, CA 92506
(951) 317-2041

Outlook

## FW: Whittram Avenue Storm Drain - request for as-built plans

**From** Ruiz, Magdanelly <Magdanelly.Ruiz@dpw.sbcounty.gov>
**Date** Thu 12/4/2025 11:33 AM
**To** rmbeers777@hotmail.com <rmbeers777@hotmail.com>
**Cc** v.bartleman@verizon.net <v.bartleman@verizon.net>; Giron, Alison <Alison.Giron@dpw.sbcounty.gov>

5 attachments (24 MB)

Calabash ave and whittram Ave-2007 .pdf; 1-801-Banana Basin at Whittram Ave-Banana Ave.pdf; Banana Ave at Whittram-SIP 1991.pdf; 1-803-4A Banana Basin (south of Whittram).pdf; 1-801-Banana Basin at Whittram Ave-Banana Ave-1943 plans.pdf;

Hello Mr. Beers,

Here is what was found for your request.

Thank you!

**Magdanelly Ruiz**
**Senior Office Assistant**
***Department of Public Works | Flood Control Design***
**Phone: 909-387-7962**
**825 E. Third Street**
**San Bernardino, CA 92415-0835**

***Our job is to create a county in which those who reside and invest can prosper and achieve well-being.***
***www.SBCounty.gov***

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---

**From:** Aviles, Noe - DPW <Noe.Aviles@dpw.sbcounty.gov>
**Sent:** Thursday, December 4, 2025 11:20 AM
**To:** Ruiz, Magdanelly <Magdanelly.Ruiz@dpw.sbcounty.gov>
**Subject:** RE: Whittram Avenue Storm Drain - request for as-built plans

Good morning Magdanelly,

Please see PDF files above

Thanks,

Noe Aviles

---

**From:** Ruiz, Magdanelly <Magdanelly.Ruiz@dpw.sbcounty.gov>
**Sent:** Thursday, December 4, 2025 8:05 AM
**To:** Aviles, Noe - DPW <Noe.Aviles@dpw.sbcounty.gov>
**Cc:** Giron, Alison <Alison.Giron@dpw.sbcounty.gov>
**Subject:** FW: Whittram Avenue Storm Drain - request for as-built plans

Hello Noe,

Do you have an update for this request?

Thank you!

**Magdanelly Ruiz**
**Senior Office Assistant**
***Department of Public Works | Flood Control Design***
**Phone: 909-387-7962**
**825 E. Third Street**
**San Bernardino, CA 92415-0835**

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---

**From:** Robert Beers <rmbeers777@hotmail.com>
**Sent:** Wednesday, December 3, 2025 4:27 PM
**To:** Ruiz, Magdanelly <Magdanelly.Ruiz@dpw.sbcounty.gov>
**Cc:** Vince Bartleman <v.bartleman@verizon.net>
**Subject:** Re: Whittram Avenue Storm Drain - request for as-built plans

You don't often get email from rmbeers777@hotmail.com. Learn why this is important

**CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you can confirm the sender and know the content is safe.**

Magdanelly:

Good afternoon - following up on our request for plans.

What is the time frame for a response to our request for the street and storm drain plans on Whittram Avenue between Calabash and Banana?

Thank you.

Robert Beers
rmbeers777@hotmail.com
(951) 317-2041

---

**From:** Robert Beers <rmbeers777@hotmail.com>
**Sent:** Monday, December 1, 2025 1:14 PM
**To:** Ruiz, Magdanelly <Magdanelly.Ruiz@dpw.sbcounty.gov>
**Cc:** Vince Bartleman <v.bartleman@verizon.net>
**Subject:** Re: Whittram Avenue Storm Drain - request for as-built plans

Magdanelly:

We'd also like to get the street improvement plans for the Whittram Avenue frontage along with Calabash Ave and Banana Ave frontages if possible.

Thank you.

Robert Beers
rmbeers777@hotmail.com
(951) 317-2041

---

**From:** Robert Beers <rmbeers777@hotmail.com>
**Sent:** Monday, December 1, 2025 1:00 PM
**To:** Ruiz, Magdanelly <Magdanelly.Ruiz@dpw.sbcounty.gov>
**Cc:** Vince Bartleman <v.bartleman@verizon.net>
**Subject:** Re: Whittram Avenue Storm Drain - request for as-built plans

Magdanelly:

Please see attached completed form per your request

Robert Beers
rmbeers777@hotmail.com
(951) 317-2041

---

**From:** Ruiz, Magdanelly <Magdanelly.Ruiz@dpw.sbcounty.gov>
**Sent:** Monday, December 1, 2025 12:47 PM
**To:** Robert Beers <rmbeers777@hotmail.com>

**Cc:** Vince Bartleman <v.bartleman@verizon.net>
**Subject:** RE: Whittram Avenue Storm Drain - request for as-built plans

Hello Mr. Beers,

Please sign the disclaimer map. Once signed, I will give this over to one of our engineering technicians.

Thank you!


**Magdanelly Ruiz**
**Senior Office Assistant**
***Department of Public Works | Flood Control Design***
**Phone: 909-387-7962**
**825 E. Third Street**
**San Bernardino, CA 92415-0835**

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**From:** Robert Beers <rmbeers777@hotmail.com>
**Sent:** Monday, December 1, 2025 11:30 AM
**To:** Ruiz, Magdanelly <Magdanelly.Ruiz@dpw.sbcounty.gov>
**Cc:** Vince Bartleman <v.bartleman@verizon.net>
**Subject:** Whittram Avenue Storm Drain - request for as-built plans


You don't often get email from rmbeers777@hotmail.com. Learn why this is important

**CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you can confirm the sender and know the content is safe.**

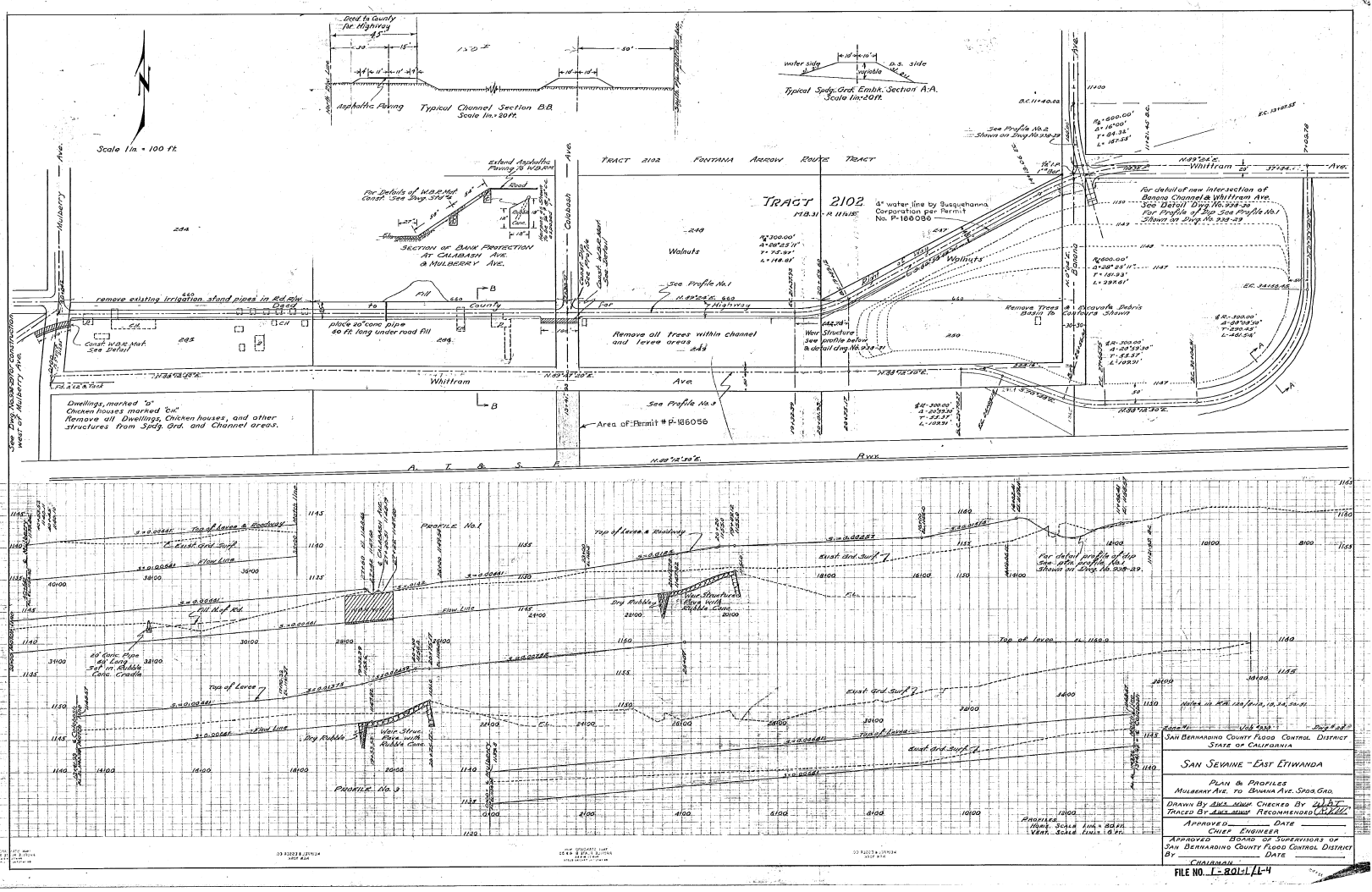

Magdanelly:

Please find attached our letter requesting the as-built storm drain plans for Whittram Avenue from Banana Avenue to Calabash Avenue including outlet to the Banana Basin outlet channel.

Thank you.


Robert Beers
rmbeers777@hotmail.com

(951) 317-2041




SAN BERNARDINO COUNTY FLOOD CONTROL DISTRICT
STATE OF CALIFORNIA

# SAN SEVAINE - EAST ETIWANDA

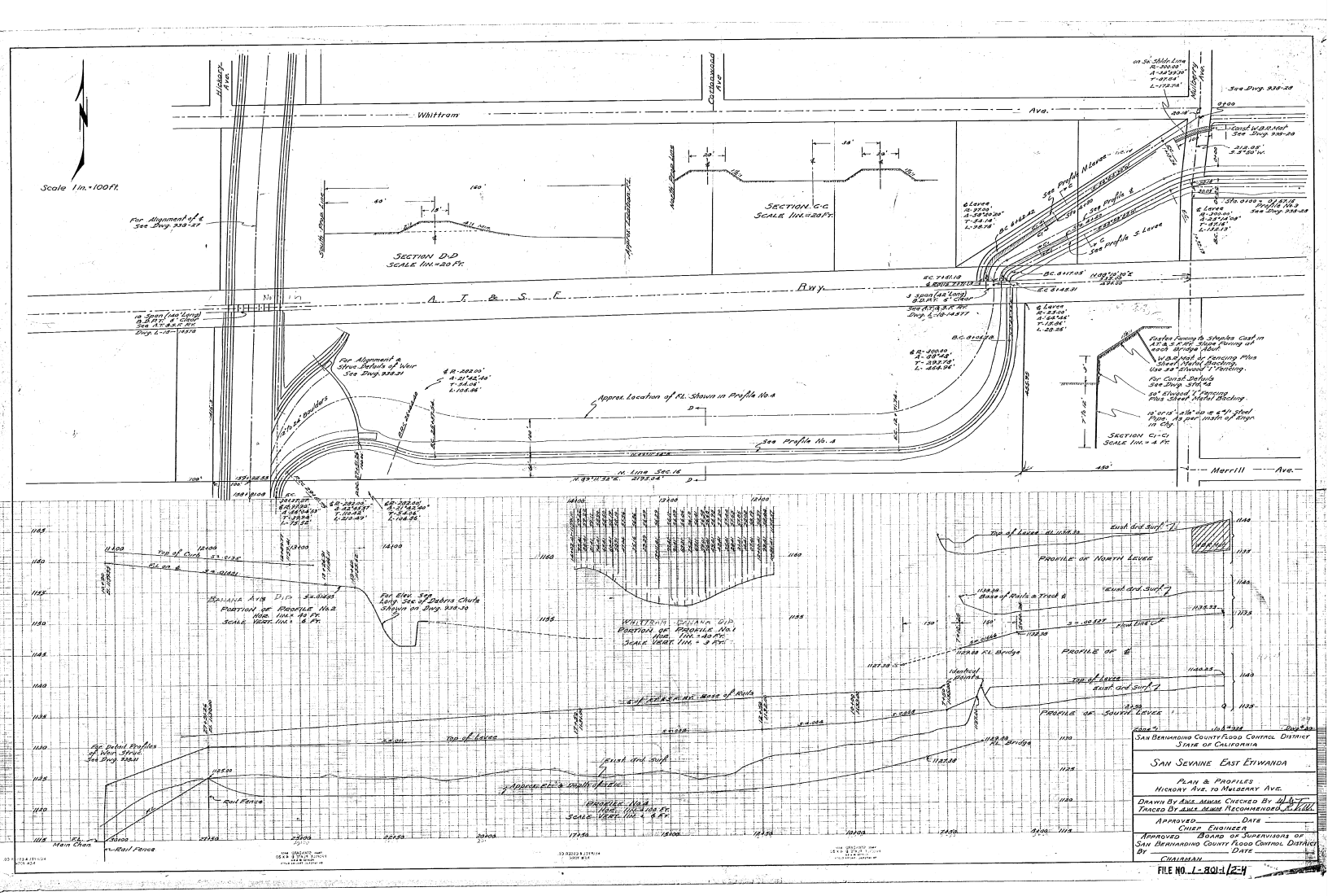
PLAN & PROFILES
MULBERRY AVE. TO BANANA AVE. SPDG. GRD.

DRAWN BY AWS 4/1/57 CHECKED BY WJT
TRACED BY AWS 4/1/57 RECOMMENDED [illegible]

APPROVED _____ DATE _____
CHIEF ENGINEER

APPROVED BOARD OF SUPERVISORS OF
SAN BERNARDINO COUNTY FLOOD CONTROL DISTRICT
BY _____ DATE _____
CHAIRMAN

FILE NO. I-801-1/L-4




SAN BERNARDINO COUNTY FLOOD CONTROL DISTRICT
STATE OF CALIFORNIA

# SAN SEVAINE EAST ETIWANDA

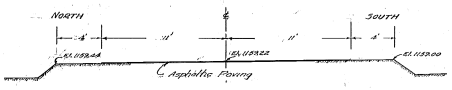
PLAN & PROFILES
HICKORY AVE. to MULBERRY AVE.

DRAWN BY ANZ. MINUM CHECKED BY W. D. F.
TRACED BY JAMES NEWOM RECOMMENDED F. E. Hill

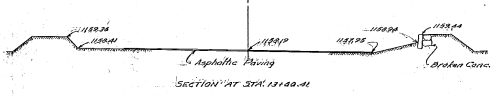
APPROVED _____ DATE _____
CHIEF ENGINEER

APPROVED BOARD OF SUPERVISORS OF
SAN BERNARDINO COUNTY FLOOD CONTROL DISTRICT
BY _____ DATE _____
CHAIRMAN

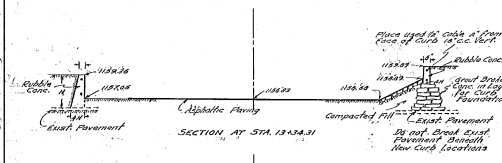
FILE NO. 1-801-1 12-4




SECTION AT STA. 13+88.21



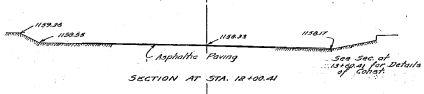

SECTION AT STA. 13+80.41



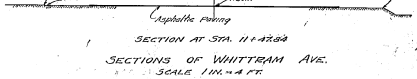

SECTION AT STA. 13+34.31

SECTION AT STA. 12+54.94

See Sec. of 13+34.31 for Details of Curb Const.

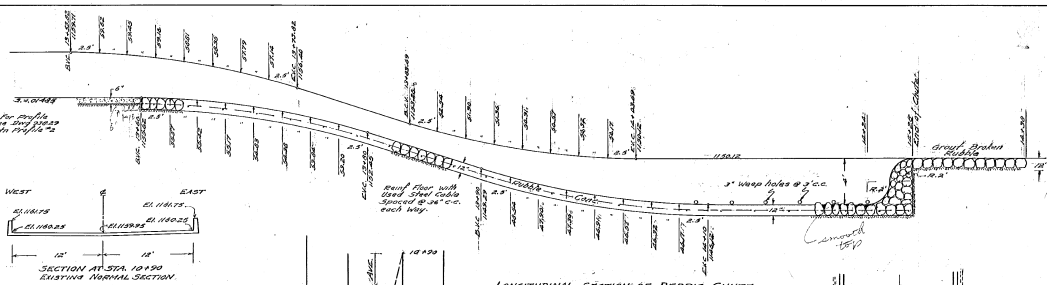



SECTION AT STA. 12+00.41




SECTION AT STA. 11+42.84

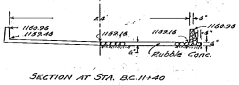
SECTIONS OF WHITTRAM AVE.
SCALE 1 IN. = 4 FT.



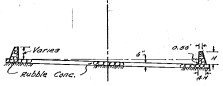

LONGITUDINAL SECTION OF DEBRIS CHUTE
SCALE 1 IN. = 4 FT.




SECTION AT STA. 10+90
EXISTING NORMAL SECTION

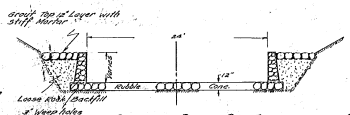



SECTION AT STA. BC. 11+40



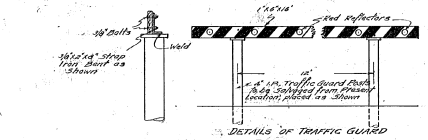

TYPICAL SECTION
11+33 TO 12+88.23

SECTION AT STA. 13+40
BEGIN DEBRIS CHUTE

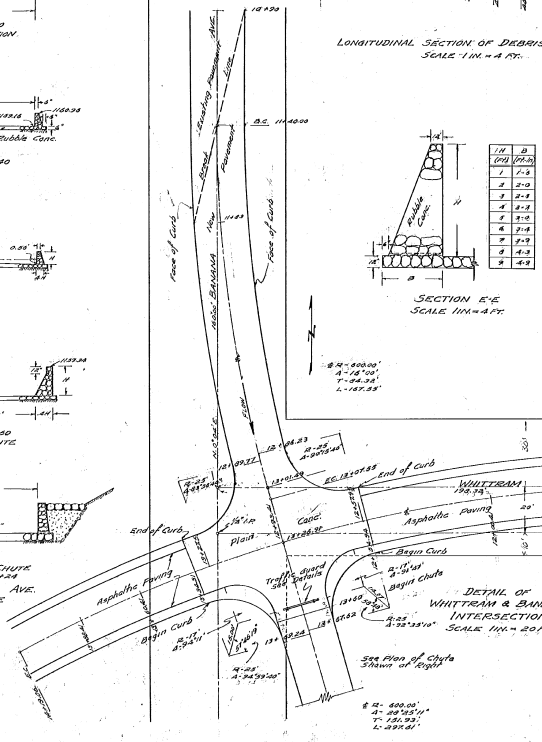



SECTION OF DEBRIS CHUTE
BET. STA. 13+90 & 14+28

SECTIONS OF BANANA AVE.
& DEBRIS CHUTE
SCALE 1IN. = 8 FT.

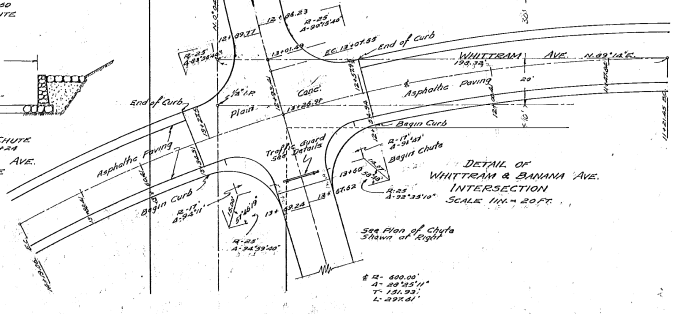



DETAILS OF TRAFFIC GUARD
PLACE AT STA. 13+93

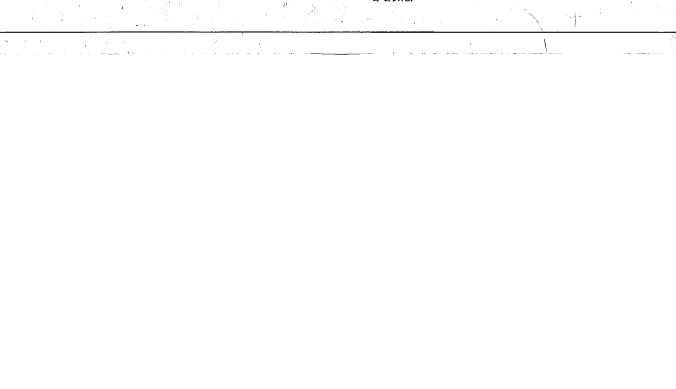



| H (ft) | D (ft-in) |
|---|---|
| 1 | 1-6 |
| 2 | 2-0 |
| 3 | 2-8 |
| 4 | 3-2 |
| 5 | 3-10 |
| 6 | 3-4 |
| 7 | 3-9 |
| 8 | 4-2 |
| 9 | 4-8 |

SECTION E-E
SCALE 1 IN. = 4 FT.



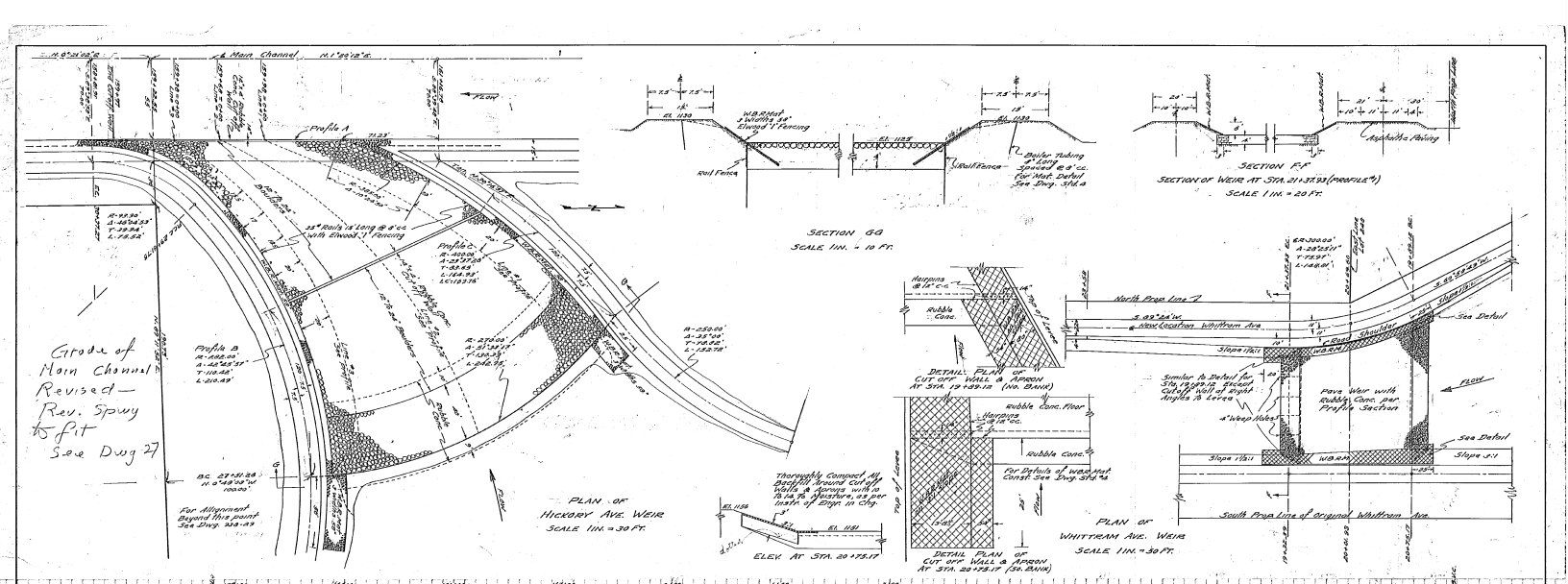

PLAN OF DEBRIS CHUTE
SCALE 1 IN. = 10 FT.




DETAIL OF
WHITTRAM & BANANA AVE.
INTERSECTION
SCALE 1 IN. = 20 FT.

| | | |
|---|---|---|
| Route # | Job # 939 | Dwg. # 39 |
| SAN BERNARDINO COUNTY FLOOD CONTROL DISTRICT STATE OF CALIFORNIA | | |
| SAN SEVAINE - EAST ETIWANDA | | |
| PLAN & DETAILS OF DEBRIS CHUTE SCALES AS SHOWN | | |
| DRAWN BY W.A.K. | CHECKED BY W.A.T. | |
| TRACED BY M.M.M. | RECOMMENDED [signature] | |
| APPROVED | DATE | |
| CHIEF ENGINEER | | |
| APPROVED BOARD OF SUPERVISORS OF SAN BERNARDINO COUNTY FLOOD CONTROL DISTRICT | | |
| BY CHAIRMAN | DATE | |

FILE NO. 1-801-1/324




SAN BERNARDINO COUNTY FLOOD CONTROL DISTRICT
STATE OF CALIFORNIA

# SAN SEVAINE – EAST ETIWANDA

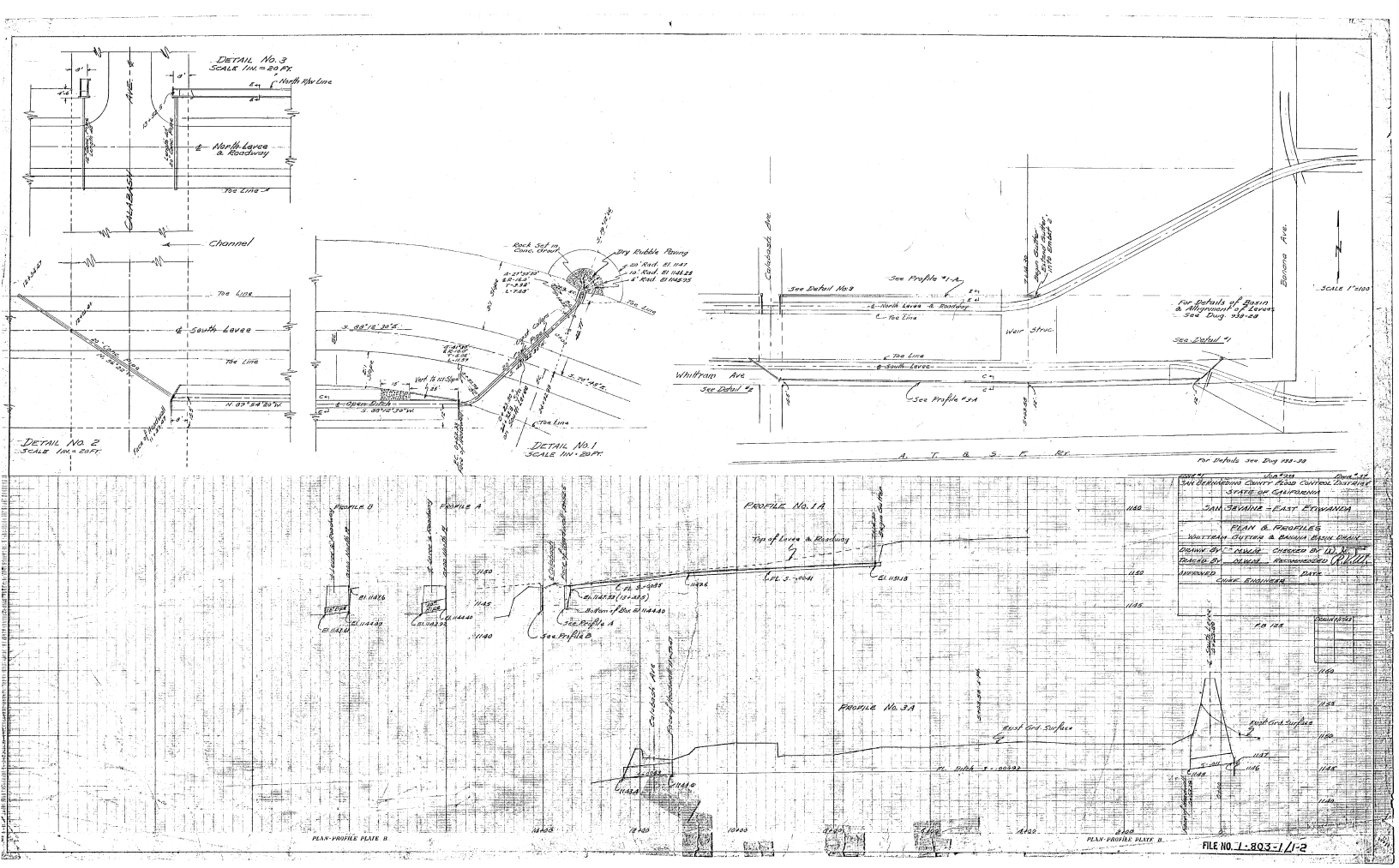
## PLAN & PROFILES HICKORY & WHITTRAM AVE. WEIRS

SCALES AS SHOWN

DRAWN BY AMS CHECKED BY W.S.T.
TRACED BY AMS RECOMMENDED BY P.V.W.
APPROVED _____ DATE _____
CHIEF ENGINEER

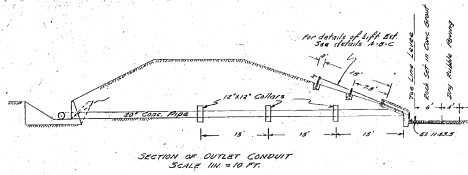
APPROVED BOARD OF SUPERVISORS OF SAN BERNARDINO COUNTY FLOOD CONTROL DISTRICT
BY _____ DATE _____
CHAIRMAN

FILE NO. 1-801-1/4-4

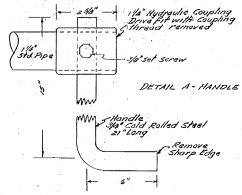



Date 7-'58 Date 7-'58
SAN BERNARDINO COUNTY FLOOD CONTROL DISTRICT
STATE OF CALIFORNIA
SAN BERNARDINO - EAST ETIWANDA
PLAN & PROFILES
WHITTRAM - SUTTER & BENSON BASIN DRAIN
DRAWN BY: C. MILLS CHECKED BY: W. F.
TRACED BY: DAVIS RECOMMENDED
APPROVED DATE
CHIEF ENGINEER

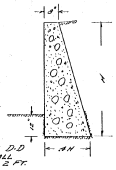
FILE NO. 1-803-1/1-2



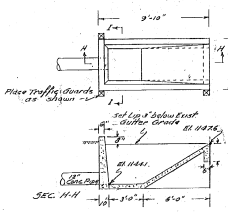

SECTION OF OUTLET CONDUIT
SCALE 1in = 10 FT.



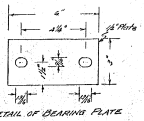

DETAIL A - HANDLE



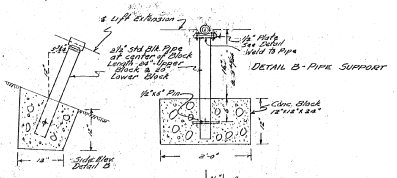

SECTION D-D
HEADWALL
SCALE 1in = 2 FT.



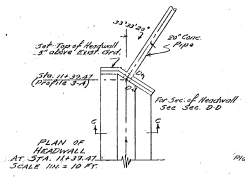

DETAILS OF INLET BOX
AT N.W COR. CALABASH & NORTH LEVEE
SCALE 1in = 4 FT.



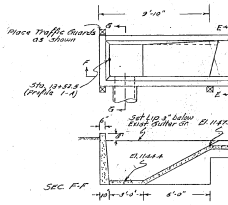

DETAIL OF BEARING PLATE



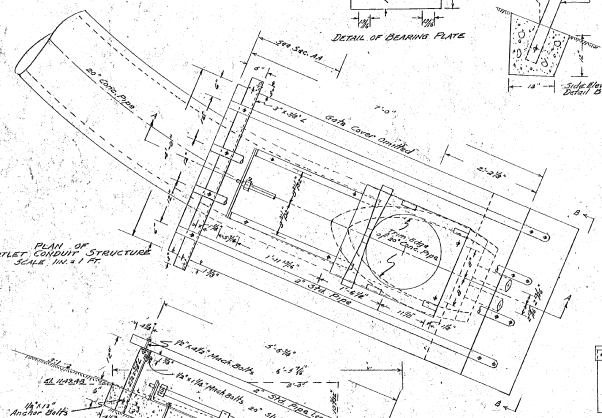

DETAIL B - PIPE SUPPORT




PLAN OF
HEADWALL
AT STA. 11+39.47
SCALE 1in = 10 FT.



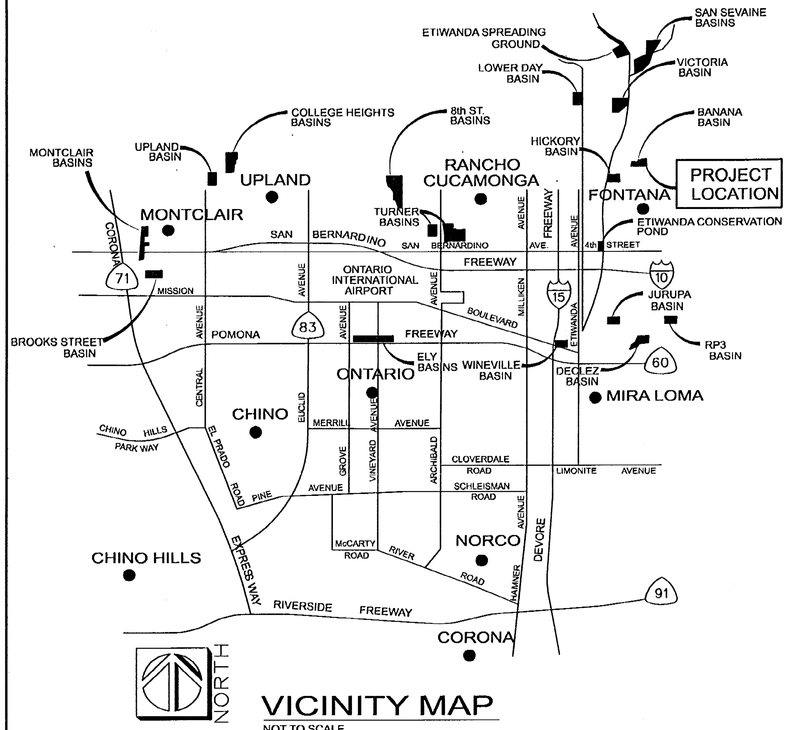

DETAILS OF INLET BOX
At N.E COR. CALABASH & NORTH LEVEE
SCALE 1in = 4 FT.


30" Conc. Pipe
Gate Cover Omitted
3rd Sec. A-A
7'-0"
2'-2½"
3'-1¾"
1'-11¾"
3 Steel Plate
Steel Plate
Steel Plate

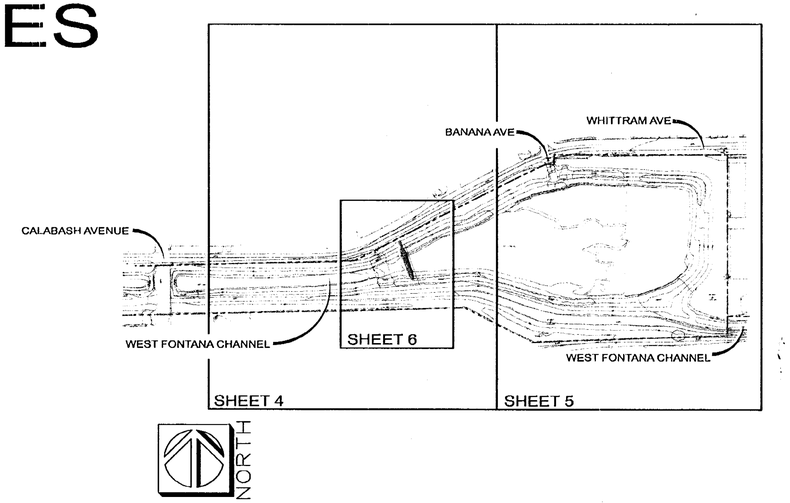
# CHINO BASIN FACILITIES IMPROVEMENT PROJECT

## RECHARGE BASIN IMPROVEMENTS AT BANANA BASIN

PROJECT NO. WR02406
PERMIT NO. P-12002065
MARCH, 2003




VICINITY MAP
NOT TO SCALE




PROJECT LOCATION MAP
NOT TO SCALE

REVIEWED BY:

NEIL W. CLIFTON, P.E.
MANAGER OF ENERGY, ENGINEERING, AND WATER RESOURCES DEPARTMENT OF IEUA

APPROVED BY:

THOMAS A. LOVE, P.E.
EXECUTIVE MANAGER - ENGINEERING AND PLANNING DIVISION OF IEUA

APPROVED BY:

RICHARD W. ATWATER
CHIEF EXECUTIVE OFFICER \ GENERAL MANAGER OF IEUA

## BASIS OF BEARING:

THE BEARINGS SHOWN HEREON ARE BASED ON THE BEARING BETWEEN NSG CONTROL STATIONS "PASADENA EAST BASE" AND "ONTARIO" BEING "N 31 04'03" W" PER DATA PUBLISHED BY NATIONAL GEODETIC SURVEY.

## DATUM STATEMENT:

COORDINATES SHOWN HEREON ARE BASED UPON THE CALIFORNIA COORDINATE SYSTEM, (CCS83), ZONE V, NORTH AMERICAN DATUM 1983 (1991.35 EPOCH GPS ADJUSTMENT). ALL DISTANCES SHOWN HEREON ARE GROUND, UNLESS OTHERWISE NOTED. TO OBTAIN GRID DISTANCE MULTIPLY GROUND DISTANCE BY 0.99999460 ABOUT NGS STATION "ONTARIO."

## BENCHMARK:

FOUND CHISELED 'X' ON TOP OF FIRE HYDRANT
THE N.E. CORNER OF WHITTRAM & ILEX AVENUE PER CSFB 4015/1700
EL.=1139.28'

## DRAWING INDEX


| SHEET NO. | DRAWING TITLE |
|---|---|
| 1 | TITLE SHEET |
| 2 | GENERAL NOTES |
| 3 | CONSTRUCTION NOTES, ABBREVIATIONS, AND QUANTITIES |
| 4 | GRADING PLAN (1) |
| 5 | GRADING PLAN (2) |
| 6 | REINFORCED CONCRETE LINED BERM DETAILS |
| 7 | STRUCTURAL DETAILS |


**Underground Service Alert**

CALL BEFORE YOU DIG

Call: TOLL FREE

1- 800 - 227 - 2600

TWO WORKING DAYS BEFORE YOU DIG

**Geotechnical Report**

URS

GEOTECHNICAL REPORT WAS PREPARED UNDER THE DIRECTION OF MICHAEL SMITH, PE.

**THE PROJECT HAS BEEN DEVELOPED WITH THE PARTICIPATION AND ASSISTANCE OF THE FOLLOWING AGENCIES:**

- INLAND EMPIRE UTILITIES AGENCY
- CHINO BASIN WATER CONSERVATION DISTRICT
- CHINO BASIN WATERMASTER
- SAN BERNARDINO COUNTY FLOOD CONTROL DISTRICT

REGISTERED PROFESSIONAL ENGINEER KEVIN BYRON GRADY No. 54873 Exp. 6/30/06 CIVIL STATE OF CALIFORNIA

**AS-BUILT DRAWING SET**

EACH OF THE DRAWINGS WITHIN THIS CONSTRUCTION DOCUMENT SET HAS BEEN REVIEWED, APPROVED BY A REGISTERED ENGINEER AS REQUIRED, AND IF NECESSARY, REVISED TO REFLECT ANY FIELD CHANGES MADE DURING THE CONSTRUCTION OF THE PROJECT. SIGNATURES BELOW INDICATE THAT THE SET IS AN AS-BUILT RECORD SET OF DOCUMENTS.

CONSTRUCTION PROJECT MANAGER _____ DATE _____

ENGINEERING PROJECT MANAGER _____ DATE _____

| REV. | DATE | BY | DESCRIPTION |
|---|---|---|---|
| 1 | 12/04 | BS | ASBUILT |

Designed ROGER CHUNG 03/03
Drawn PEGGY CHU 03/03
Checked DAN VILLINES 03/03
Date

REGISTERED PROFESSIONAL ENGINEER DANIEL D VILLINES No. C55210 Exp. 06/30/06 CIVIL STATE OF CALIFORNIA

PREPARED BY:
Tetterner & Associates
consulting engineers
ENGINEERING - MANAGEMENT - PLANNING
19 TECHNOLOGY DRIVE, IRVINE, CALIFORNIA
Tel: (949) 333-1877 Fax: (949) 333-1277

SCALE
AS SHOWN
Bar Scale shown below is one inch on original drawing. If NOT one inch on this sheet, adjust scales accordingly.
0" 1"

INLAND EMPIRE UTILITIES AGENCY
A Municipal Water District
LOCATION: 9400 Cherry Avenue, Building A, Fontana, California 92335, Telephone (909) 357-0241
MAILING ADDRESS: Post Office Box 697, Rancho Cucamonga, California 91730

CHINO BASIN FACILITIES IMPROVEMENT PROJECT
BANANA BASIN
TITLE SHEET

SHEET 1 OF 7 SHTS
DWG. NUMBER

J: 110188/DGN/BANANA/SHT01_BANANAAB.DGN

FILE No. 1-803-5

# I. GENERAL NOTES

1. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONARY MEASURES NECESSARY TO PROTECT EXISTING IMPROVEMENTS, WHICH ARE TO REMAIN IN PLACE, FROM DAMAGE. ANY IMPROVEMENTS DAMAGED BY THE CONTRACTOR'S OPERATIONS SHALL BE EXPEDITIOUSLY REPAIRED OR RECONSTRUCTED TO THE ENGINEER'S SATISFACTION AT THE CONTRACTOR'S EXPENSE WITHOUT ADDITIONAL COMPENSATION.

2. LOCATION OF EXISTING PIPING AND EQUIPMENT IS BASED ON RECORD DRAWINGS AND FIELD INFORMATION.

   CONTRACTOR SHALL FIELD LOCATE ALL EXISTING PIPING AND EQUIPMENT THAT CONFLICTS WITH CONSTRUCTION AND REMOVE AND REPLACE AS REQUIRED. AFTER CONSTRUCTION IS COMPLETE, EXISTING PIPING SYSTEMS SHALL BE RETURNED TO THE SAME OR BETTER CONDITION THAN AS BEFORE. ALL FIELD RELOCATION OF EXISTING PIPING SHALL BE RECORDED ON RECORD DRAWINGS. IN AREAS WHERE GAS PIPING IS LOCATED, CONTRACTOR SHALL POTHOLE AND LOCATE GAS PIPING BEFORE EXCAVATION OF THE AREA.

3. CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO PREVENT DAMAGE TO THE EXISTING STRUCTURES OR OTHER EXISTING IMPROVEMENTS TO REMAIN. CONTRACTOR SHALL ALSO PROVIDE ALL NECESSARY BRACING, SCAFFOLDING OR OTHER MEASURES NECESSARY FOR CONSTRUCTION.

4. REMOVAL, ABANDONMENT OR TEMPORARY RELOCATION OF EXISTING PIPES OR UTILITIES SHALL BE SCHEDULED WITH THE ENGINEER TO AVOID UNNECESSARY DISRUPTION OF PLANT OPERATIONS.

5. ELEVATIONS SHOWN ARE BASED UPON THE AS-BUILT DRAWINGS. CONTRACTOR SHALL FIELD VERIFY AND ADJUST ELEVATIONS AS REQUIRED TO MAINTAIN DIMENSIONAL RELATIONSHIPS DEPICTED IN THE DRAWINGS.

6. CONTRACTOR SHALL BE RESPONSIBLE FOR INITIATING, MAINTAINING AND SUPERVISING AN AIR MONITORING PROGRAM WHILE WORK IS BEING PERFORMED ON, IN OR ADJACENT TO ANY OF THE ENCLOSED SPACES. NOTE THAT THE WORK IS ADJACENT TO OPERATING DIGESTERS AND TRACES OF METHANE GAS COULD BE PRESENT. THE CONTRACTOR SHALL COMPLY WITH CAL-OSHA AND ALL OTHER LOCAL AGENCY REQUIREMENTS.

7. CONTRACTOR SHALL RESTORE ALL EXISTING PAVED AREAS, GUARDRAILS AND HANDRAILS DISTURBED DURING CONSTRUCTION INCLUDING INSTALLATION OF PIPELINES, DRAINS AND ELECTRICAL DUCTS TO ORIGINAL CONDITION. CURB AND GUTTER, AREA DRAINS, AND ALL SITE DRAINAGE AFFECTED BY THE WORK SHALL BE RETURNED TO THE SAME OR BETTER CONDITION AFTER WORK IS COMPLETED.

8. THE CONTRACTOR SHALL RESTORE ALL LANDSCAPING TO CORRECT GRADE UPON COMPLETION. THIS SHALL INCLUDE REPLANTING OF TREES OF COMPARABLE SIZE TO EXISTING (MIN. 36" BOX) FOR ANY DESTROYED BY THE PROJECT, WITHIN 45 DAYS OF COMPLETION.

9. THE CONTRACTOR SHALL COMPLY WITH STATE DEPARTMENT OF HEALTH SERVICE CRITERIA FOR THE SEPARATION OF POTABLE WATER MAINS AND SANITARY SEWERS AS SET FORTH IN SECTION 64630, TITLE 22 OF THE CALIFORNIA ADMINISTRATIVE CODE.

10. ADJUST ALL MANHOLES, VALVE BOXES AND PULL BOXES TO FINISHED GRADE UNLESS OTHERWISE SHOWN OR DIRECTED. MANHOLES IN OPEN, UNPAVED AREAS SHALL BE SET SIX(6) INCHES ABOVE GRADE.

11. THE CONTRACTOR SHALL NOTIFY THE ENGINEER AS SPECIFIED 72 HOURS IN ADVANCE OF MAKING ANY CONNECTION TO AN ACTIVE PIPELINE OR UTILITY SYSTEM, AND SHALL RECEIVE THE ENGINEER'S CONSENT BEFORE PROCEEDING.

12. THE CONTRACTOR SHALL SCHEDULE HIS WORK TO CONTINUOUSLY MAINTAIN PLANT OPERATIONS AND SHALL NOT UNDULY RESTRICT PLANT ACCESS OR CIRCULATION.

13. THE CONTRACTOR SHALL PROVIDE ADEQUATE SANITARY CONVENIENCES FOR THE USE OF ALL PERSONS AT THE CONSTRUCTION SITE OF THE WORK. SUCH CONVENIENCES SHALL INCLUDE CHEMICAL TOILETS OR WATER CLOSETS LOCATED AT APPROPRIATE LOCATIONS. AT COMPLETION OF THE WORK ALL SUCH CONVENIENCES SHALL BE REMOVED AND THE SITE LEFT IN SANITARY CONDITION.

14. THE CONTRACTOR SHALL FURNISH POTABLE WATER FOR A DRINKING SOURCE OTHER THAN THE EXISTING PLANT UTILITY WATER SUPPLY, WHICH SHALL MEET ALL THE REQUIREMENTS OF THE COUNTY AND STATE HEALTH DEPARTMENTS. CONTRACTOR SHALL ALSO SUPPLY AMPLE SIGNS THROUGHOUT THE WORK SITE AREA ADVISING HIS EMPLOYEES THAT THE PLANT WATER IS NOT POTABLE.

15. THE CONTRACTOR SHALL PROVIDE AT HIS OWN COST ALL ELECTRICAL POWER NECESSARY FOR CONSTRUCTION, TESTING, GENERAL AND SECURITY LIGHTING AND ALL OTHER PURPOSES, WHETHER SUPPLIED THROUGH TEMPORARY OR PERMANENT FACILITIES.

16. THE CONTRACTOR SHALL NOTE THAT THERE MAY BE OTHER PROJECTS UNDER CONSTRUCTION AT THIS SITE AND/OR NEARBY SITE. CONTRACTOR SHALL COORDINATE WITH THE OTHER CONTRACTORS PRESENT ON THE SITE DURING THE COURSE OF CONSTRUCTION.

17. ALL WORK SHALL CONFORM TO THE LATEST EDITIONS OF THE "STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION" AND SUPPLEMENTS THERETO (APWA/AGC, "GREENBOOK") AND SPECIAL PROVISIONS OF THE PROJECT TECHNICAL SPECIFICATIONS AND MUST BE KEPT ON THE JOBSITE AT ALL TIMES.

18. ALL SURVEYING REQUIRED FOR VERTICAL AND HORIZONTAL ALIGNMENT SHALL BE PROVIDED BY THE CONTRACTOR.

19. THE CONTRACTOR SHALL MAINTAIN AT THE JOBSITE ALL APPLICABLE PERMITS.

20. IN THE COURSE OF WATER CONTROL, THE CONTRACTOR SHALL CONDUCT CONSTRUCTION OPERATIONS TO PROTECT WATERS FROM POLLUTION BY FUELS, OILS, BITUMENS, OR HARMFUL MATERIALS.

21. THE CONTRACTOR SHALL RESTORE OR REPLACE IN KIND (OR BETTER) ALL EXISTING IMPROVEMENTS INTENDED TO REMAIN UNDISTURBED DURING CONSTRUCTION INCLUDING, BUT NOT LIMITED TO, STREETS, LANDSCAPING, FENCES AND SIGNS.

# I. GENERAL NOTES (CONT.)

22. THE INFORMATION SHOWN ON THESE DRAWINGS CONCERNING TYPE AND LOCATION OF UNDERGROUND UTILITIES IS NOT GUARANTEED TO BE ACCURATE OR ALL-INCLUSIVE. THE CONTRACTOR IS RESPONSIBLE FOR MAKING HIS OWN DETERMINATION, AS MAY BE NECESSARY, AS TO THE TYPE AND LOCATION OF UNDERGROUND UTILITIES TO AVOID DAMAGE THERETO. CONTRACTOR SHALL POTHOLE AND LOCATE THE EXISTING UNDERGROUND LINES TO DETERMINE ELEVATIONS PRIOR TO COMMENCEMENT OF THE WORK.

23. THE CONTRACTOR SHALL CALL IN A LOCATION REQUEST TO UNDERGROUND SERVICE ALERT PHONE NUMBER 1-800-227-2600 TWO WORKING DAYS IN ADVANCE BEFORE DIGGING. NO INSPECTION WILL BE PROVIDED BY THE ENGINEER.

24. THE BASE MAP USED FOR THE DESIGN OF THIS FACILITY IS BASED ON A TOPOGRAPHIC MAP OF THE SITE PREPARED IN 2001. THE CONTRACTOR SHALL VERIFY THE EXISTING CONDITIONS OF THE SITE PRIOR TO START OF THE WORK AND COMPARE IT TO THE TOPOGRAPHIC MAP SHOWN ON THESE PLANS. ANY DISCREPANCIES FOUND BETWEEN THE TOPOGRAPHIC MAP ON THESE PLANS AND EXISTING GROUND SHALL BE REPORTED TO IEUA AND SHALL BE RESOLVED PRIOR TO COMMENCEMENT OF ANY WORK.

# NOTICE TO CONTRACTOR

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

2. EXISTING UNDERGROUND STRUCTURES:
   THE EXISTENCE AND LOCATION OF ANY UNDERGROUND UTILITY PIPES OR STRUCTURES OR CONDUITS SHOWN ON THESE PLANS ARE OBTAINED BY A SEARCH OF THE AVAILABLE RECORDS. TO THE BEST OF OUR KNOWLEDGE, THERE ARE NO EXISTING UTILITIES EXCEPT AS SHOWN ON THESE PLANS. THE CONTRACTOR IS REQUIRED TO TAKE THE PRECAUTIONARY MEASURES TO PROTECT THE UTILITY LINES SHOWN AND ANY OTHER LINES NOT OF RECORD OR NOT SHOWN ON THESE PLANS. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO NOTIFY THE OWNERS OF THE UTILITIES OR STRUCTURES CONCERNED BEFORE STARTING WORK. CONTRACTOR FURTHER ASSUMES ALL LIABILITY AND RESPONSIBILITY FOR THE UNDERGROUND UTILITY PIPE CONDUITS OR STRUCTURES SHOWN OR NOT SHOWN ON THESE PLANS.

3. CONTRACTOR AGREES THAT HE SHALL ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOBSITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THIS PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY. THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS; AND THAT THE CONTRACTOR SHALL DEFEND, INDEMNIFY AND HOLD THE OWNER, ENGINEER, AND THE INLAND EMPIRE UTILITIES AGENCY (IEUA) HARMLESS FROM ANY LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT, EXCEPTING FOR LIABILITY ARISING FROM SOLE NEGLIGENCE OF OWNER, ENGINEER, OR IEUA.

4. THE ESTIMATED QUANTITIES ARE ONLY FOR THE PURPOSE OF OBTAINING THE NECESSARY PERMITS, AND TETTEMER & ASSOC. DOES NOT GUARANTEE THE ACCURACY OF THE ESTIMATED QUANTITIES. THE CONTRACTOR SHALL PERFORM HIS OWN QUANTITY TAKEOFF BEFORE SUBMITTING A BID FOR ANY PORTION OF THE IMPROVEMENTS COVERED BY THESE PLANS.

# II. GENERAL PIPING NOTES

1. LAY PIPE TO UNIFORM GRADE BETWEEN INDICATED ELEVATION POINTS. MINIMUM COVER SHALL BE 3'-0" UNLESS OTHERWISE SHOWN.

2. SIZE OF FITTINGS SHOWN ON DRAWINGS SHALL CORRESPOND TO ADJACENT STRAIGHT RUN OF PIPE, UNLESS OTHERWISE INDICATED. TYPE OF JOINT AND FITTING MATERIAL SHALL BE THE SAME AS SHOWN FOR ADJACENT STRAIGHT RUN OF PIPE.

3. LOCATION AND NUMBER OF PIPE HANGERS AND PIPE SUPPORTS SHOWN IS ONLY APPROXIMATE. FINAL SUPPORT REQUIREMENTS SHALL BE DETERMINED IN THE FIELD AND APPROVED BY THE ENGINEER PRIOR TO INSTALLATION. MAXIMUM SPACING SHALL BE AS SPECIFIED.

4. APPROPRIATE STANDARD WALL PIPE DETAIL SHALL BE USED WHEREVER PIPING PASSES FROM A STRUCTURE TO BACKFILL.

5. ALL FLEXIBLE CONNECTORS OR FLANGED COUPLING ADAPTERS SHOWN ON DRAWINGS BELOW GROUND SHALL BE PROVIDED WITH THRUST TIES, BLOCKS, OR ANCHORS UNLESS OTHERWISE NOTED. THRUST PROTECTION SHALL BE ADEQUATE FOR THE TEST PRESSURES SPECIFIED.

6. SYMBOLS, LEGENDS, AND PIPE USE IDENTIFICATIONS SHOWN SHALL BE FOLLOWED THROUGHOUT THE DRAWINGS, WHEREVER APPLICABLE. ALL OF THE VARIOUS APPLICATIONS ARE NOT NECESSARILY USED IN THE PROJECT.

7. ALL PIPING SPECIFIED TO BE PRESSURE TESTED, EXCEPT FLANGED, WELDED GROOVED END OR SCREWED PIPING, SHALL BE PROVIDED WITH THRUST PROTECTION AT ALL DIRECTION CHANGES, UNLESS OTHERWISE NOTED. SEE THRUST DETAILS AND NOTES ON DRAWINGS.

8. NUMBER AND LOCATION OF UNIONS SHOWN ON DRAWINGS ARE ONLY APPROXIMATE. PROVIDE ALL UNIONS NECESSARY TO FACILITATE CONVENIENT REMOVAL OF VALVES AND MECHANICAL EQUIPMENT.

9. UPON APPROVAL BY THE ENGINEER, ALL PIPELINES SHOWN ON DRAWINGS TO BE ABANDONED SHALL BE PROPERLY CUT AND PLUGGED WITH NON-METALLIC GROUT OR CEMENT CONCRETE.

# III. GENERAL STRUCTURAL NOTES

## A. GENERAL

1. CODE: UNIFORM BUILDING CODE, 1997 EDITION.

2. DATUM: SEE DRAWINGS.

3. VERIFY THE LOCATION AND SIZE OF ALL OPENINGS THROUGH FLOORS, WALLS, AND ROOFS WITH MECHANICAL AND ELECTRICAL DRAWINGS AND WITH EQUIPMENT FURNISHED.

4. NO STRUCTURAL MEMBERS SHALL BE CUT FOR PIPES, DUCTS, ETC., UNLESS SPECIFICALLY DETAILED OR APPROVED IN WRITING BY THE ENGINEER.

5. THESE PLANS DO NOT INCLUDE THE NECESSARY COMPONENTS FOR THE SAFETY OF THE STRUCTURES OR EQUIPMENT DURING CONSTRUCTION. THE CONTRACTOR IS RESPONSIBLE FOR ALL WORK RELATING TO CONSTRUCTION, ERECTION METHODS, BRACING, SHORING, RIGGING, GUYS, SCAFFOLDING, FORMWORK, AND OTHER WORK AIDS REQUIRED TO SAFELY PERFORM THE WORK SHOWN.

6. "STANDARD DETAILS" AS SHOWN ON THE DRAWINGS ARE INTENDED TO BE TYPICAL AND SHALL APPLY TO ALL SIMILAR SITUATIONS OCCURRING ON THE PROJECT, WHETHER OR NOT THEY ARE KEYED IN EACH LOCATION. CONSULT THE ENGINEER FOR REVIEW PRIOR TO CONSTRUCTION.

7. VISITS TO THE JOB SITE BY THE ENGINEER TO OBSERVE THE CONSTRUCTION DO NOT IN ANY WAY MEAN THAT THEY ARE GUARANTORS OF THE CONSTRUCTOR'S WORK, NOR RESPONSIBLE FOR COMPREHENSIVE OR SPECIAL INSPECTIONS, COORDINATION, SUPERVISION, NOR SAFETY AT THE JOB SITE.

8. SPECIAL INSPECTION (OWNER FURNISHED) IS REQUIRED IN ACCORDANCE WITH U.B.C. SECTION 306 ON THE FOLLOWING PORTIONS OF THE WORK:
   CONCRETE
   CONCRETE ANCHORS
   REINFORCING STEEL
   STRUCTURAL WELDING
   (ALL PARTIAL AND FULL PENETRATION STRUCTURAL WELDS)

## B. CONCRETE

1. ALL CAST-IN-PLACE CONCRETE SHALL HAVE A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 4000 PSI UNLESS OTHERWISE SHOWN ON THE PLANS. CONCRETE SPECIFICALLY DETAILED AS CONCRETE FILL SHALL HAVE A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 2500 PSI. SEE SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.

2. ALL STRUCTURAL CONCRETE TO BE USED WITHIN SAN BERNARDINO COUNTY FLOOD CONTROL DISTRICT RIGHT-OF-WAY SHALL BE 4,000 PSI WITH 'A' GRADATION IN ALL INVERTS AND 4,000 PSI WITH 'B' GRADATION IN ALL WALLS. CONCRETE FOR ROCK INLET AND OUTLET STRUCTURES, BOTTOM CONTROL, SPLASH PADS AND OTHER PROPOSED STRUCTURES SHALL BE 560B OR C3250. CONCRETE SHALL BE PER SECTION 201-1 OF THE STANDARD SPECIFICATION FOR PUBLIC WORKS CONSTRUCTION GREENBOOK.

3. REINFORCING STEEL FOR CONCRETE SHALL CONFORM TO ASTM A615, GRADE 60 DEFORMED BARS, EXCEPT STIRRUPS AND TIES WHICH SHALL BE GRADE 40. SPIRAL REINFORCING SHALL BE GRADE 60. FURNISH AND ERECT IN ACCORDANCE WITH ACI MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES, ACI 315.

4. CLEARANCE FOR REINFORCEMENT BARS, UNLESS SHOWN OTHERWISE, SHALL BE:

   WHEN PLACED ON GROUND:.....3"

   EXPOSED TO WATER, WEATHER, BACKFILL OR TO CONDENSATION:
   #5 BAR OR SMALLER.....1 1/2"
   #6 BAR OR LARGER.....2"

   SLABS.....3/4"
   BEAMS.....1 1/2"
   COLUMNS.....1 1/2"
   WALLS.....1 1/2"

## C. STEEL

1. ALL STRUCTURAL STEEL SHALL CONFORM TO ASTM A36 UNLESS SHOWN OTHERWISE ON THE PLANS. STRUCTURAL TUBING SHALL CONFORM TO ASTM A-500, GRADE B.

2. ALL STRUCTURAL STEEL SHALL BE FABRICATED AND ERECTED IN CONFORMANCE WITH THE AISC MANUAL OF STEEL CONSTRUCTION, NINTH EDITION.

3. ALL BOLTS SHALL BE HIGH STRENGTH BOLTS CONFORMING TO ASTM A325-N UNLESS SHOWN OTHERWISE. BOLTS INDICATED AS MACHINE BOLTS OR ANCHOR BOLTS SHALL CONFORM TO ASTM A307 FOR CARBON STEEL, A193 FOR STAINLESS STEEL AND A153 FOR GALVANIZED STEEL.

4. ALL WELDS SHALL CONFORM TO THE CURRENT EDITION OF AWS D1.1. PERIODIC INSPECTION IN ACCORDANCE WITH THE UNIFORM BUILDING CODE, SECTION 306 (a) AND (e) IS REQUIRED. ALL WELDING SHALL BE PERFORMED BY CERTIFIED WELDERS.

5. ALL STRUCTURAL STEEL TO BE EMBEDDED IN CONCRETE SHALL BE CLEAN AND FREE OF PAINT, OIL OR DIRT. ALL OTHER STRUCTURAL STEEL SHALL RECEIVE ONE COAT OF RUST INHIBITING PRIMER.

# IV. GENERAL GRADING NOTES

1. ALL WORK SHALL BE IN ACCORDANCE WITH THE GRADING CODE OF SAN BERNARDINO COUNTY. A COPY OF THE GRADING CODE AND MANUAL SHALL BE RETAINED ON THE JOBSITE WHILE WORK IS IN PROGRESS.

2. FILLS SHALL BE COMPACTED IN ACCORDANCE WITH ASTM D1557 THROUGHOUT TO A MINIMUM OF 90% RELATIVE COMPACTION, EXCEPT BENEATH STRUCTURES, FILL SLOPES, BERMS AND THE UPPER 1 FOOT OF PAVEMENT SUBGRADE WHICH SHALL ALL BE COMPACTED TO AT LEAST 95% RELATIVE COMPACTION.

3. CUT AND FILL SLOPES SHALL BE NO STEEPER THAN 3 HORIZONTAL TO 1 VERTICAL (3:1) EXCEPT WHERE SPECIFICALLY APPROVED OTHERWISE.

4. ALL CUT SLOPES SHALL BE INVESTIGATED BOTH DURING AND AFTER GRADING BY THE ENGINEERING GEOLOGIST TO DETERMINE IF ANY SLOPE STABILITY PROBLEM EXISTS. SHOULD EXCAVATION DISCLOSE ANY GEOLOGICAL HAZARDS OR POTENTIAL GEOLOGICAL HAZARDS, THE ENGINEERING GEOLOGIST WILL SUBMIT RECOMMENDED TREATMENT TO THE ENGINEER FOR APPROVAL.

5. WHERE SUPPORT OR BUTTRESSING OF CUT AND NATURAL SLOPES IS DETERMINED TO BE NECESSARY BY THE OWNER'S ENGINEERING GEOLOGIST AND SOIL ENGINEER, THE SOIL ENGINEER WILL PROVIDE A RECOMMENDED DESIGN, LOCATIONS AND CALCULATIONS TO THE ENGINEER PRIOR TO CONSTRUCTION OF THE SUPPORT BUTTRESS. THE ENGINEERING GEOLOGIST AND SOIL ENGINEER WILL OBSERVE AND TEST THE CONSTRUCTION OF THE BUTTRESS AND PREPARE A LETTER DOCUMENTING THE STABILITY OF THE AS CONSTRUCTED SLOPE AND ADJACENT STRUCTURES UPON COMPLETION.

6. ANY EXISTING IRRIGATION LINES AND CISTERNS SHALL BE REMOVED OR DECOMMISSIONED IN PLACE AND APPROVED BY THE ENGINEER AND SOIL ENGINEER.

7. STOCKPILING OF EXCESS MATERIAL SHALL BE APPROVED BY THE ENGINEER PRIOR TO EXCAVATION.

8. EXPORT SOIL MUST BE TRANSPORTED TO A LEGAL DUMP OR TO A PERMITTED SITE.

9. THE CONTRACTOR SHALL COMPLY WITH THE GRADING CODE REQUIREMENTS FOR HAUL ROUTES WHEN AN EXCESS OF 5,000 CUBIC YARDS OF EARTH IS TRANSPORTED TO OR FROM A PERMITTED SITE ON PUBLIC ROADWAYS.

10. THE CONTRACTOR IS RESPONSIBLE FOR DUST CONTROL MEASURES.

11. THE CONTRACTOR SHALL GIVE REASONABLE NOTICE TO THE OWNER OF ADJOINING LANDS AND BUILDINGS PRIOR TO BEGINNING EXCAVATIONS WHICH MAY AFFECT THE LATERAL AND SUBJACENT SUPPORT OF SUCH PROPERTY. THE NOTICE SHALL STATE THE INTENDED DEPTH OF EXCAVATION AND WHEN THE EXCAVATION WILL COMMENCE. THE ADJOINING OWNER SHALL BE ALLOWED AT LEAST 30 DAYS AND REASONABLE ACCESS ON THE PROJECT PROPERTY TO PROTECT HIS STRUCTURE, IF HE/SHE SO DESIRES, UNLESS OTHERWISE PROTECTED BY LAW

12. ALL EXISTING DRAINAGE COURSES THROUGH THIS SITE SHALL REMAIN OPEN UNTIL FACILITIES TO HANDLE STORMWATER ARE APPROVED AND FUNCTIONAL. HOWEVER, IN ANY CASE, THE CONTRACTOR SHALL BE HELD LIABLE FOR ANY DAMAGE DUE TO OBSTRUCTING NATURAL DRAINAGE PATTERNS.

13. SANITARY FACILITIES SHALL BE MAINTAINED ON THE SITE.

14. THE LOCATION AND PROTECTION OF ALL UTILITIES IS THE RESPONSIBILITY OF THE CONTRACTOR.

15. APPROVED PROTECTIVE MEASURES AND TEMPORARY DRAINAGE PROVISIONS SHALL BE USED TO PROTECT ADJOINING PROPERTIES DURING GRADING.

16. GRADING OPERATIONS INCLUDING MAINTENANCE OF EQUIPMENT WITHIN ONE-HALF MILE OF A HUMAN OCCUPANCY SHALL NOT BE CONDUCTED BETWEEN THE HOURS OF 8 P.M. AND 7 A.M. DAILY, ON SUNDAY OR ON A FEDERAL HOLIDAY.
   (A) ALL CONSTRUCTION VEHICLES OR EQUIPMENT, FIXED OR MOBILE, OPERATED WITHIN 1,000 FEET OF A DWELLING SHALL BE EQUIPPED WITH PROPERLY OPERATING AND MAINTAINED MUFFLERS.
   (B) ALL OPERATIONS SHALL COMPLY WITH ALL APPLICABLE NOISE CONTROL ORDINANCES.
   (C) STOCKPILING AND/OR VEHICLE STAGING AREAS SHALL BE LOCATED AS FAR AS PRACTICABLE FROM DWELLINGS AND WITHIN THE LIMITS OF THE PROJECT.

17. GRADING AND EXCAVATION SHALL BE HALTED DURING PERIODS OF HIGH WINDS, ACCORDING TO AQMD MEASURE F-4, HIGH WINDS ARE DEFINED AS 30 MPH OR GREATER. THIS LEVEL OCCURS ONLY UNDER UNUSUALLY EXTREME CONDITIONS, SUCH AS SANTA ANA WIND CONDITIONS.

18. THE GRADING CONTRACTOR SHALL SUBMIT A STATEMENT OF COMPLIANCE TO THE APPROVED GRADING PLAN PRIOR TO FINAL APPROVAL.

19. CONSTRUCT A MINIMUM 3 FOOT DEEP KEY TO FIRM MATERIALS AS DETERMINED BY THE SOIL ENGINEER AT THE BASE OF ALL FILL SLOPES INCLUDING BERMS. FOR FILL SLOPES OVER EXISTING SLOPES, BENCH AT LEAST 12 FEET HORIZONTALLY INTO EXISTING SLOPE.

AS-BUILT DRAWING

| REV. | DATE | BY | DESCRIPTION |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |
| 1 | 12/04 | BS | ASBUILT |

Designed ROGER CHUNG 03/03
Drawn PEGGY CHU 03/03
Checked DAN VILLINES 03/03
Date

MICHAEL PROFESSIONAL ENGINEER, SAMEL D. VILLINES, No. C55210, Exp 06/30/04, CIVIL, STATE OF CALIFORNIA

PREPARED BY:
Tettemer & Associates
consulting engineers
ENGINEERING · MANAGEMENT · PLANNING
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SCALE
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Bar Scale shown below is one inch on original drawing. If NOT one inch on this sheet, adjust scales accordingly.
0" 1"

INLAND EMPIRE UTILITIES AGENCY
A Municipal Water District
LOCATION
9400 Cherry Avenue, Building A
Fontana, California 92335
Telephone (909) 357-0241
MAILING ADDRESS
Post Office Box 697
Rancho Cucamonga, California 91730

CHINO BASIN FACILITIES IMPROVEMENT PROJECT
BANANA BASIN

GENERAL NOTES

SHEET
2 OF 7 SHTS
DWG. NUMBER

J: 1101887/DGN/BANANA/SHT02 BANANAAB.DGN

FILE No. 1-803-5.

## I. CONSTRUCTION NOTES

[1] CONSTRUCT REINFORCED CONCRETE LINED BERM FROM STA 10+00.00 TO STA 11+12.81 PER PLAN AND PROFILE ON SHEET 4 AND SHEET 6.

[2] PLACE RSP CLASS LIGHT, METHOD B PLACEMENT, NO INNER LAYER, NO BACKING, RSP-FABRIC TYPE A. DETAIL SHOWN ON SHEET 4 SECTIONS A AND B PER CALTRANS STD. SPEC., SECTION 72.

[3] PLACE 95% COMPACTED FILL PER ASTM 1557 TO LIMITS PER GRADING PLAN ON SHEET 4.

[4] PROTECT IN PLACE EXISTING SLOPE AND INVERT RIPRAP.

[5] EXCAVATE SOIL TO LIMITS SHOWN ON PLAN TO USE IN CONSTRUCTING CONCRETE LINED BERM.

[6] CONSTRUCT 3.5' WIDE TYPE A REINFORCED CONCRETE STAIRWAY PER APWA STANDARD 640-1 WITH W=3.5', L=0", T=21", R=7", C=6", AND S=30'.

[7] CONSTRUCT 11 L.F. 36" RCP (1500-D) AND GATE STRUCTURE PER DETAILS ON SHEETS 6 AND 7.

[8] CLEAR AND GRUB CHANNEL SIDE SLOPES AND INVERT, AS NEEDED, IN THE CONSTRUCTION AREA.

## II. ABBREVIATIONS

| | |
|---|---|
| Δ- | ANGLE |
| AB- | AGGREGATE BASE |
| AC- | ASPHALT CONCRETE |
| ACI- | AMERICAN CONCRETE INSTITUTE |
| APWA- | AMERICAN PUBLIC WORKS ASSOCIATION |
| ASTM- | AMERICAN SOCIETY FOR TESTING AND MATERIALS |
| AWS- | AMERICAN WELDING SOCIETY |
| B- | BASE |
| BC- | BEGINNING OF CURVE |
| BF- | BOTH FACES |
| BW- | BOTH WAYS |
| CC- | CENTER TO CENTER |
| cfs- | CUBIC FEET PER SECOND |
| CHNL- | CHANNEL |
| ℄- | CENTER LINE |
| CJ- | CONSTRUCTION JOINT |
| CLR- | CLEARANCE |
| CONC- | CONCRETE |
| CONN- | CONNECT |
| CONST- | CONSTANT |
| CY- | CUBIC YARD |
| DBL- | DOUBLE |
| DIA- | DIAMETER |
| DWG- | DRAWING |
| EG- | EXISTING GROUND |
| EW- | EACH WAY |
| EA- | EACH |
| EC- | END OF CURVE |
| EFP- | EFFECTIVE FLUID PRESSURE |
| EGA- | EFFECTIVE GROUND ACCELERATION |
| EL- | ELEVATION |
| ELEV- | ELEVATION |
| EMER- | EMERGENCY |
| EX- | EXISTING |
| F'c- | COMPRESSIVE STRENGTH OF CONCRETE |
| Fe- | SEISMIC FORCE |
| FG- | FINISHED GRADE |
| Fs- | STEEL STRESS |
| ft- | FEET |
| Fy- | YIELD STRENGTH |
| GA- | GAUGE |
| GALV- | GALVANIZE |
| GB- | GRADE BREAK |
| H- | HEIGHT |
| HGL- | HYDRAULIC GRADE LINE |
| HORIZ- | HORIZONTAL |
| ID- | INNER DIAMETER |
| I/S- | INSIDE |
| IN- | INCH |
| INV- | INVERT |
| L- | LENGTH |
| Lbs- | POUNDS |
| LF- | LINEAR FOOT |
| LOL- | LAYOUT LINE |
| LONGIT- | LONGITUDINAL |
| LS- | LUMP SUM |

## II. ABBREVIATIONS (CONT.)

| | |
|---|---|
| MAX- | MAXIMUM |
| MH- | MANHOLE |
| MIN- | MINIMUM |
| N- | MODULAR RATIO |
| N.T.S.- | NOT TO SCALE |
| NOM- | NOMINAL |
| OC- | ON CENTER |
| OD- | OUTER DIAMETER |
| O/S- | OUTSIDE |
| PI- | POINT OF INTERSECTION |
| PCC- | PORTLAND CEMENT CONCRETE |
| pcf- | POUNDS PER CUBIC FOOT |
| PIP- | PROTECT IN PLACE |
| POC- | POINT OF CURVATURE |
| PRC- | POINT OF REVERSE CURVATURE |
| psf- | POUNDS PER SQUARE FOOT |
| psi- | POUNDS PER SQUARE INCH |
| PT- | POINT |
| PVC- | POINT OF VERTICAL CURVE |
| PVI- | POINT OF VERTICAL INTERSECTION |
| PVT- | POINT OF VERTICAL CURVE TANGENT |
| Q- | FLOW RATE |
| RC- | REINFORCED CONCRETE |
| R/W- | RIGHT OF WAY |
| R- | RADIUS |
| RCB- | REINFORCED CONCRETE BOX |
| RCP- | REINFORCED CONCRETE PIPE |
| RECT- | RECTANGULAR |
| REQ'D- | REQUIRED |
| RSP- | ROCK SLOPE PROTECTION |
| S- | SLOPE |
| SCADA- | SUPERVISORY CONTROL AND DATA ACQUISITION |
| SCE- | SOUTHERN CALIFORNIA EDISON |
| SEC- | SECTION |
| SF- | SQUARE FOOT |
| SPEC- | SPECIFICATION |
| STA- | STATION |
| STD- | STANDARD |
| SYMM- | SYMMETRICAL |
| TYP- | TYPICAL |
| WSEL- | WATER SURFACE ELVEATION |
| WWM- | WELDED WIRE MESH |

## EARTHWORK VOLUMES

| DESCRIPTION | CUT (CY) | FILL (CY) |
|---|---|---|
| VOLUMES (MASS GRADING) | 2,019 | 901 |
| **NET: **** | 1,118 CY | |

**INCLUDES SOIL QUANTITY NEEDED TO COMPENSATE FOR SOIL SHRINKAGE.

## QUANTITIES

| DESCRIPTION | QUANTITY | UNIT |
|---|---|---|
| MISCELLANEOUS CONCRETE | 64 | CY |
| RSP | 2,875 | TON |
| 36" RCP, 1500-D | 8 | LF |
| 36" SLIDE GATE AND MANUAL OPERATOR | 1 | EA |
| STAIRS AND HANDRAIL | 1 | LS |

AS-BUILT DRAWING

| REV. | DATE | BY | DESCRIPTION |
|---|---|---|---|
| 1 | 12/04 | BS | ASBUILT |

Designed ROGER CHUNG 03/03
Drawn PEGGY CHU 03/03
Checked DAN VILLINES 03/03
Date

REGISTERED PROFESSIONAL ENGINEER SAMUEL D VILLINES No. C35010 Exp. 06/30/04 CIVIL STATE OF CALIFORNIA

PREPARED BY:
Tettemer & Associates
consulting engineers
ENGINEERING - MANAGEMENT - PLANNING
18 TECHNOLOGY DRIVE, IRVINE, CALIFORNIA
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A Member of The Keith Companies

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0" 1"

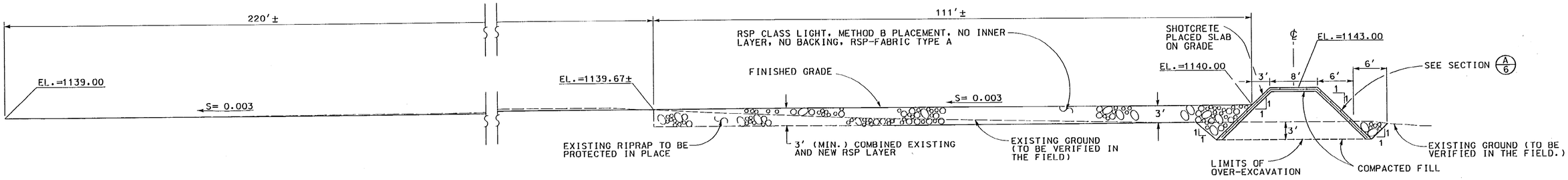
INLAND EMPIRE UTILITIES AGENCY
A Municipal Water District
LOCATION: 9400 Cherry Avenue, Building A, Fontana, California 92335, Telephone (909) 357-0241
MAILING ADDRESS: Post Office Box 697, Rancho Cucamonga, California 91730

CHINO BASIN FACILITIES IMPROVEMENT PROJECT
BANANA BASIN
CONSTRUCTION NOTES, ABBREVIATIONS, AND QUANTITIES

SHEET 3 OF 7 SHTS
DWG. NUMBER

J: 110188/DGN/BANANA/SHT03_BANANAAB.DGN

FILE No. 1-803-5

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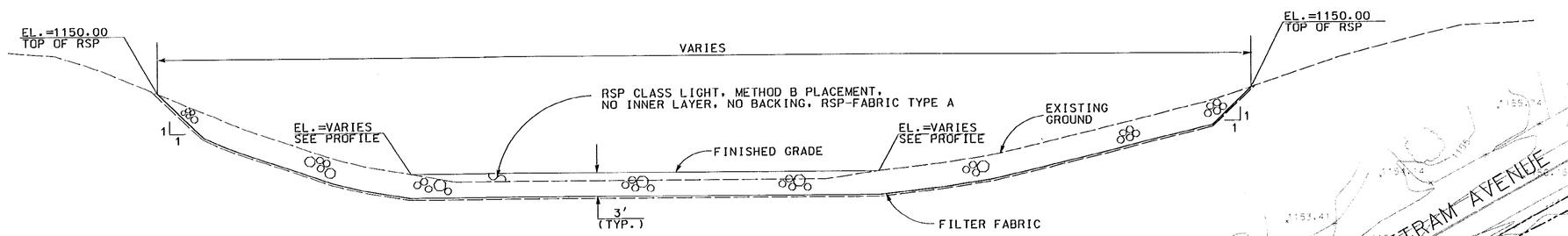


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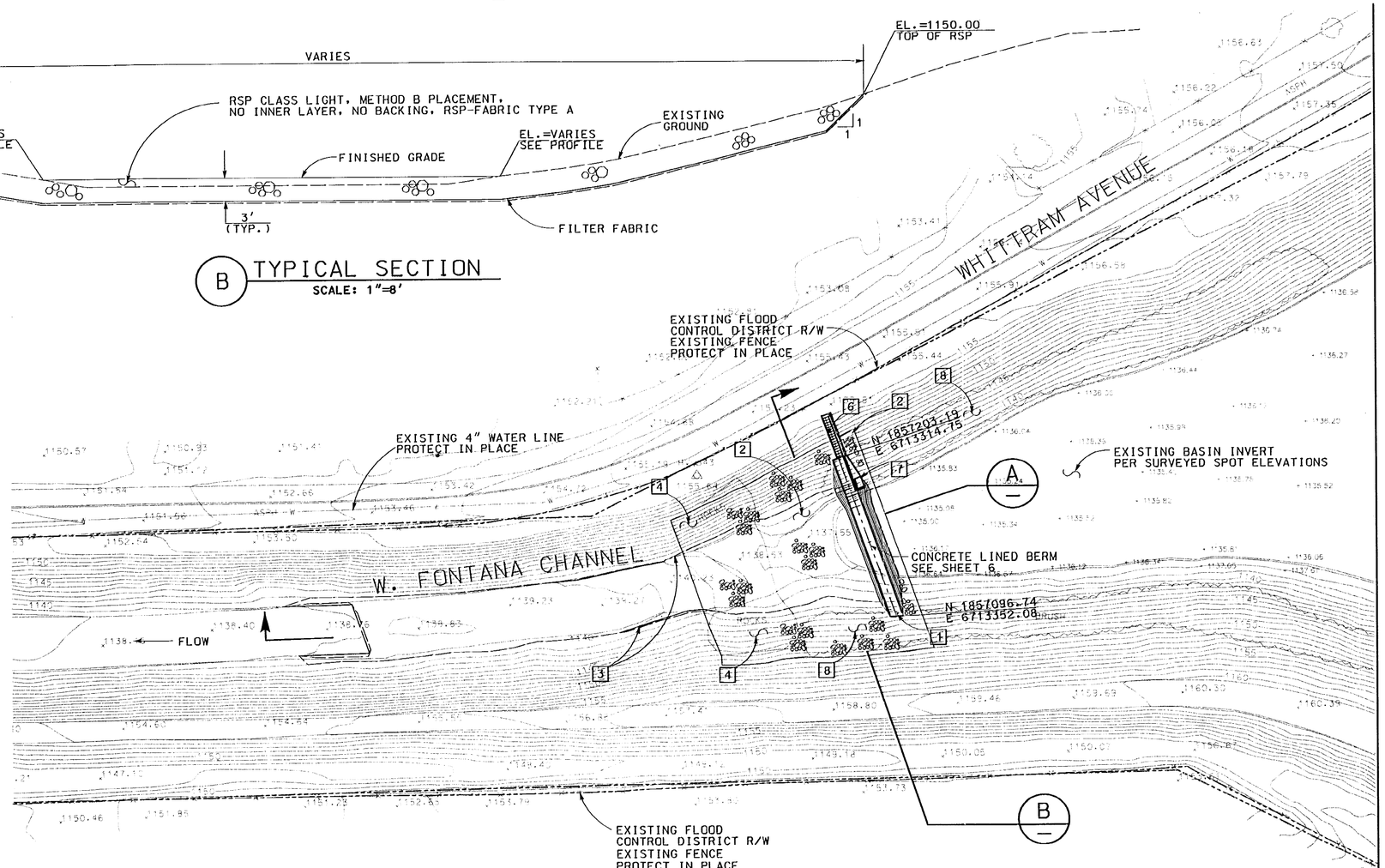


## CONSTRUCTION NOTES

1. CONSTRUCT REINFORCED CONCRETE LINED BERM FROM STA 10+00.00 TO STA 11+12.81 PER PLAN AND PROFILE ON SHEET 4 AND SHEET 6.
2. PLACE RSP CLASS LIGHT,METHOD B PLACEMENT, NO INNER LAYER, NO BACKING, RSP-FABRIC TYPE A. DETAIL SHOWN ON SHEET 4 SECTIONS A AND B PER CALTRANS STD. SPEC., SECTION 72.
3. PLACE 95% COMPACTED FILL PER ASTM 1557 TO LIMITS PER GRADING PLAN ON SHEET 4.
4. PROTECT IN PLACE EXISTING SLOPE AND INVERT RIPRAP.
6. CONSTRUCT 3.5' WIDE TYPE A REINFORCED CONCRETE STAIRWAY PER APWA STANDARD 640-1 WITH W=3.5', L=0", T=21", R=7", C=6", AND S=30'.
7. CONSTRUCT 11 L.F. 36" RCP (1500-D) AND GATE STRUCTURE PER DETAILS ON SHEETS 6 AND 7.
8. CLEAR AND GRUB CHANNEL SIDE SLOPES AND INVERT, AS NEEDED, IN THE CONSTRUCTION AREA.

0 40 80 120
SCALE IN FEET

AS-BUILT DRAWING

| REV. | DATE | BY | DESCRIPTION |
|---|---|---|---|
| 1 | 12/04 | BS | ASBUILT |

Designed ROGER CHUNG 03/03
Drawn PEGGY CHU 03/03
Checked DAN VILLINES 03/03
Date

REGISTERED PROFESSIONAL ENGINEER DANIEL D. VILLINES No C35310 Exp 06/30/04 CIVIL STATE OF CALIFORNIA

PREPARED BY:
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ENGINEERING - MANAGEMENT - PLANNING
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A Unit of The GAI Consultants, Inc.

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A Municipal Water District
LOCATION: 9400 Cherry Avenue, Building A, Fontana, California 92335, Telephone (909) 357-0241
MAILING ADDRESS: Post Office Box 697, Rancho Cucamonga, California 91730

CHINO BASIN FACILITIES IMPROVEMENT PROJECT
BANANA BASIN
GRADING PLAN (1)

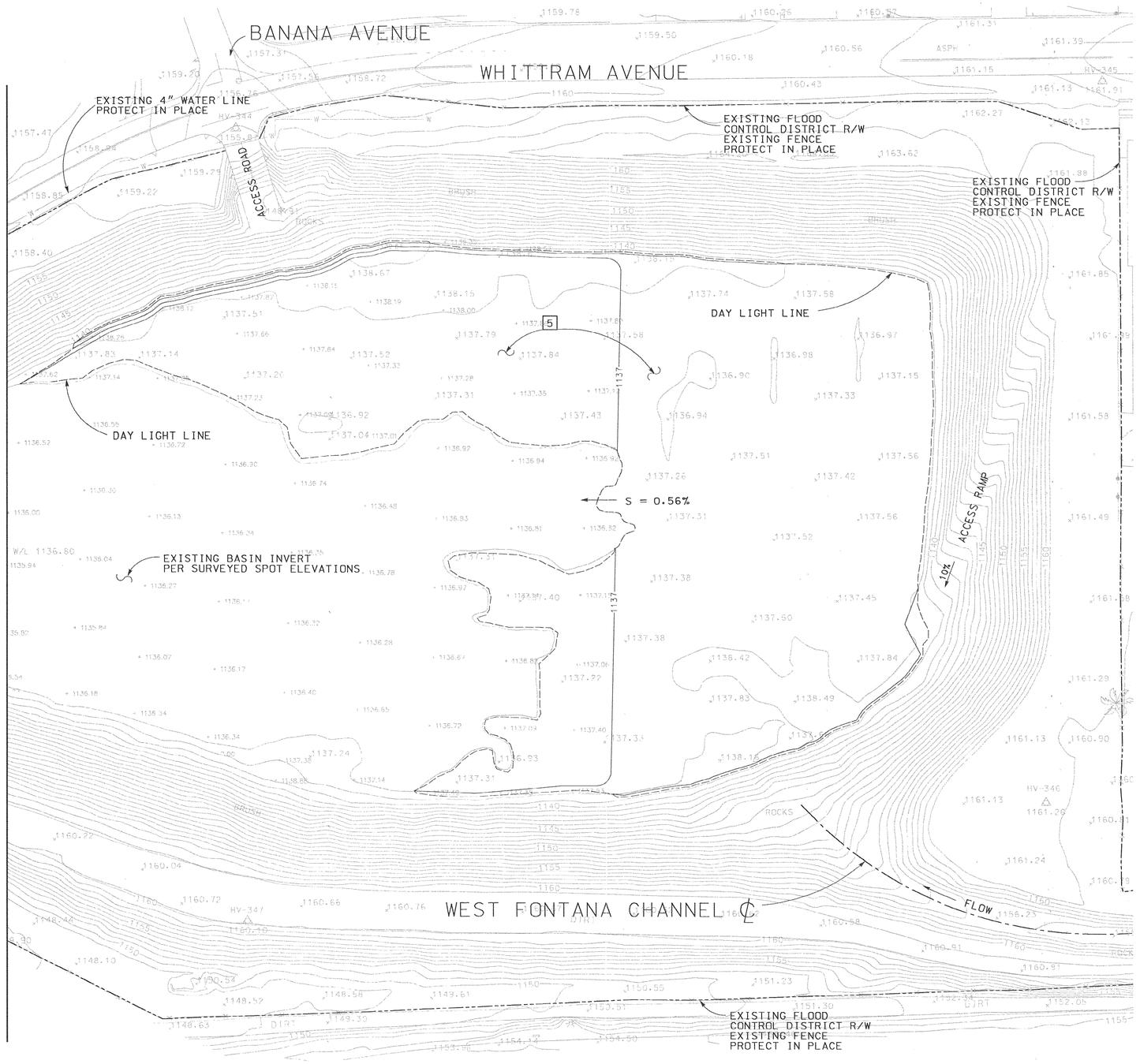
SHEET 4 OF 7 SHTS
DWG. NUMBER

J: 110188/DGN/BANANA/SHT04_BANANAAB.DGN

FILE No. 1-803-6

# CONSTRUCTION NOTES

[5] EXCAVATE SOIL TO LIMITS SHOWN ON PLAN TO USE IN CONSTRUCTING CONCRETE LINED BERM.

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SCALE IN FEET

AS-BUILT DRAWING

| REV. | DATE | BY | DESCRIPTION |
|---|---|---|---|
| 1 | 12/04 | BS | ASBUILT |

Designed ROGER CHUNG 03/03
Drawn PEGGY CHU 03/03
Checked DAN VILLINES 03/03
Date

REGISTERED PROFESSIONAL ENGINEER DANIEL D. VILLINES No. C55210 Exp. 08/31/04 CIVIL STATE OF CALIFORNIA

PREPARED BY:
Tettemer & Associates
consulting engineers
ENGINEERING - MANAGEMENT - PLANNING
19 TECHNOLOGY DRIVE, IRVINE, CALIFORNIA
Tel: (949) 553-8277 Fax: (949) 553-8077

SCALE
AS SHOWN
Bar Scale shown below is one inch on original drawing. If NOT one inch on this sheet, adjust scales accordingly.
0" 1"

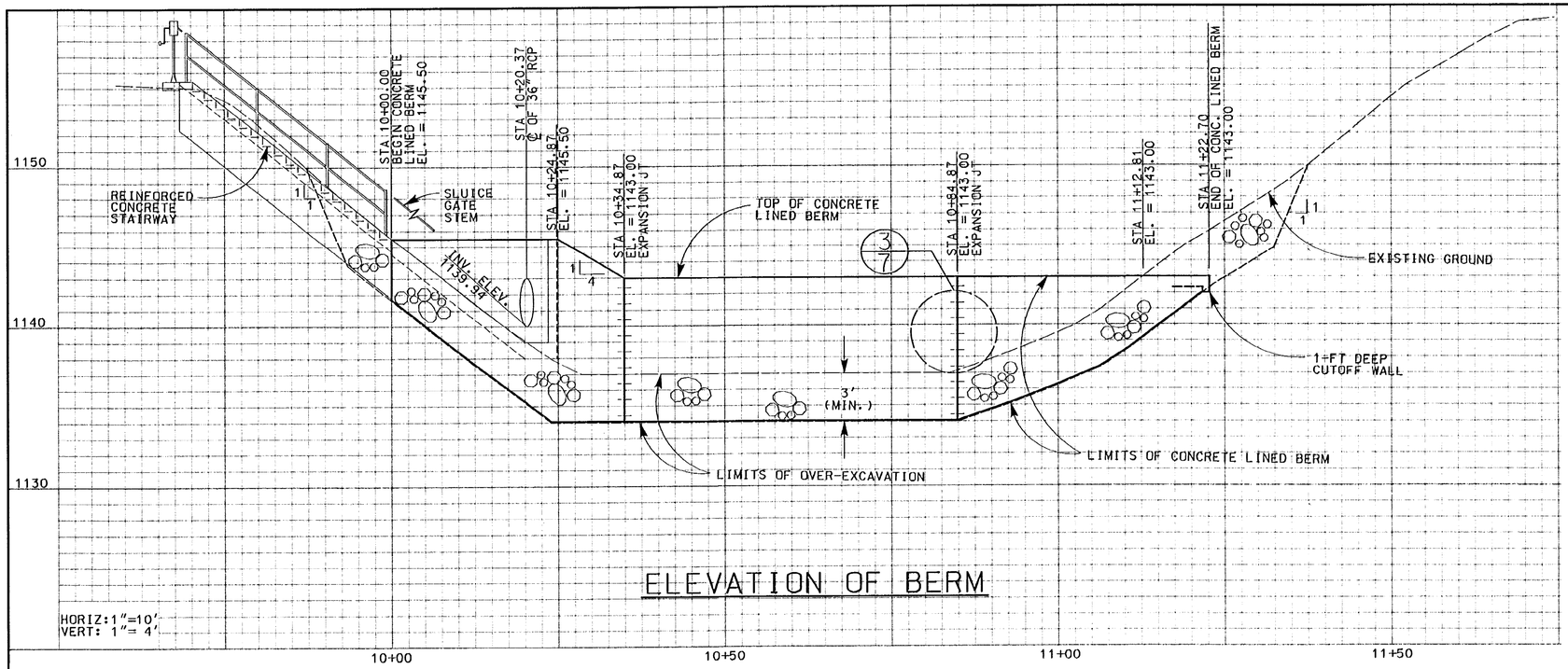
INLAND EMPIRE UTILITIES AGENCY
A Municipal Water District
LOCATION
9400 Cherry Avenue, Building A
Fontana, California 92335
Telephone (909) 357-0241
MAILING ADDRESS
Post Office Box 697
Rancho Cucamonga,
California 91730

CHINO BASIN FACILITIES IMPROVEMENT PROJECT
BANANA BASIN
GRADING PLAN (2)

SHEET 5 OF 7 SHTS
DWG. NUMBER

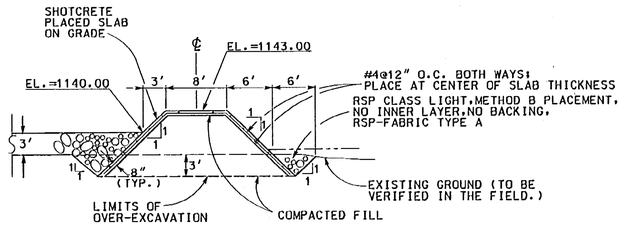
J: 110188/DGN/BANANA/SHT05 BANANAAB.DGN

FILE No. 1-808-5

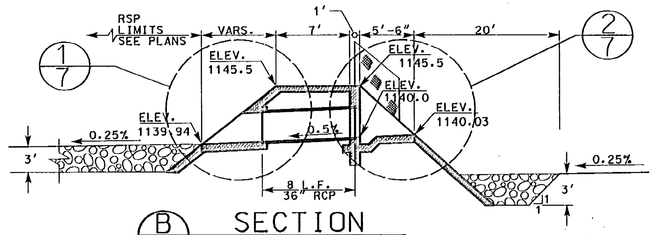



## ELEVATION OF BERM

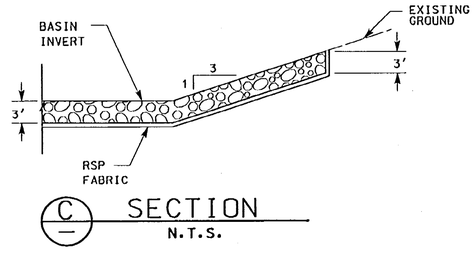
HORIZ: 1"=10'
VERT: 1"= 4'



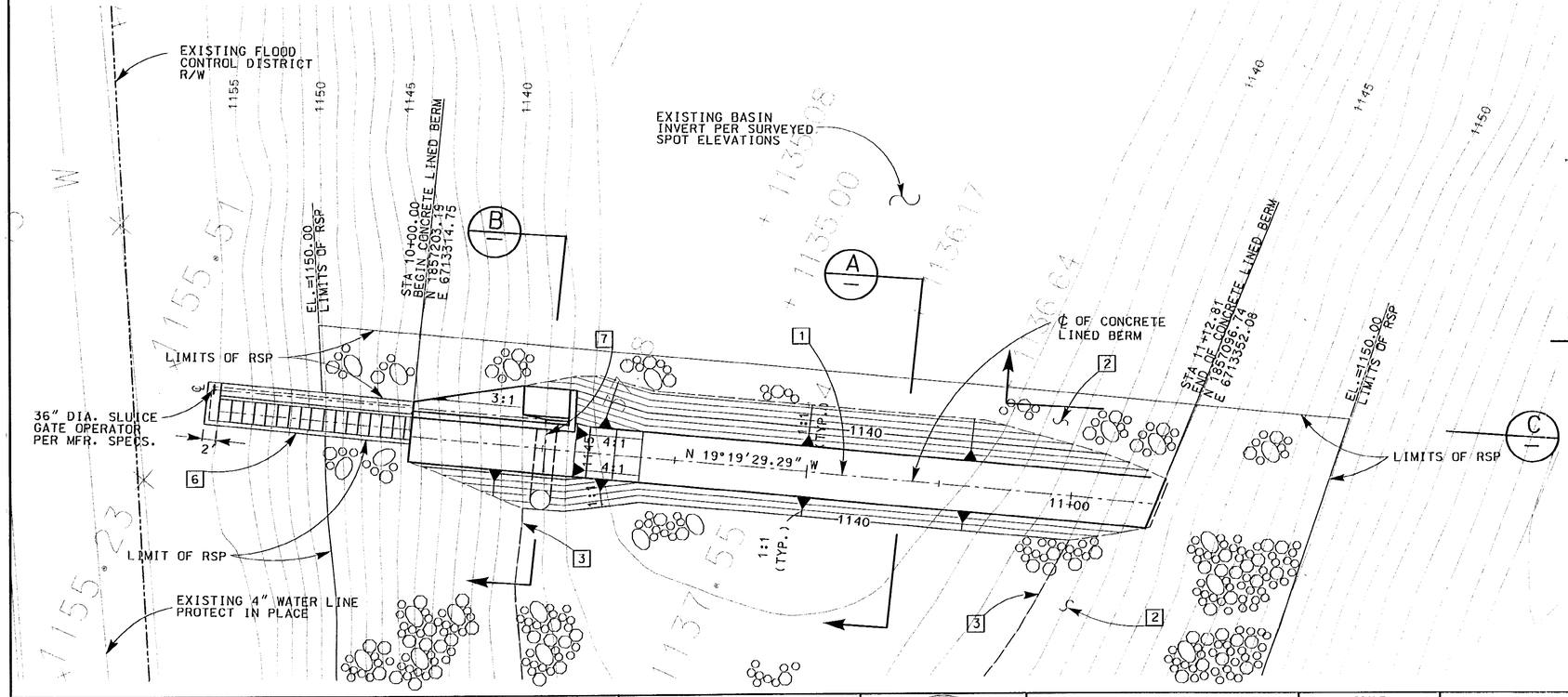

A — SECTION
N.T.S.




B — SECTION
N.T.S.




C — SECTION
N.T.S.




## CONSTRUCTION NOTES

1. CONSTRUCT REINFORCED CONCRETE LINED BERM FROM STA 10+00.00 TO STA 11+12.81 PER PLAN AND PROFILE ON SHEET 4 AND SHEET 6.
2. PLACE RSP CLASS LIGHT, METHOD B PLACEMENT, NO INNER LAYER, NO BACKING, RSP-FABRIC TYPE A. DETAIL SHOWN ON SHEET 4 SECTIONS A AND B PER CALTRANS STD. SPEC., SECTION 72.
3. PLACE 95% COMPACTED FILL PER ASTM 1557 TO LIMITS PER GRADING PLAN ON SHEET 4.
6. CONSTRUCT 3.5' WIDE TYPE A REINFORCED CONCRETE STAIRWAY PER APWA STANDARD 640-1 WITH W=3.5', L=0", T=21", R=7", C=6", AND S=30'.
7. CONSTRUCT 11 L.F. 36" RCP (1500-D) AND GATE STRUCTURE PER DETAILS ON SHEETS 6 AND 7.

0 10 20 30
SCALE IN FEET

AS-BUILT DRAWING

| REV. | DATE | BY | DESCRIPTION |
|---|---|---|---|
| 1 | 12/04 | BS | ASBUILT |

Designed ROGER CHUNG 03/03
Drawn PEGGY CHU 03/03
Checked DAN VILLINES 03/03
Date

REGISTERED PROFESSIONAL ENGINEER — DANIEL D. VILLINES — No. C55310 — Exp. 09/30/04 — Civil — STATE OF CALIFORNIA

PREPARED BY:
Tettemer & Associates
consulting engineers
ENGINEERING - MANAGEMENT - PLANNING
18 TECHNOLOGY DRIVE, IRVINE, CALIFORNIA
Tel: (949) 788-8277 Fax: (949) 788-8272

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0" 1"

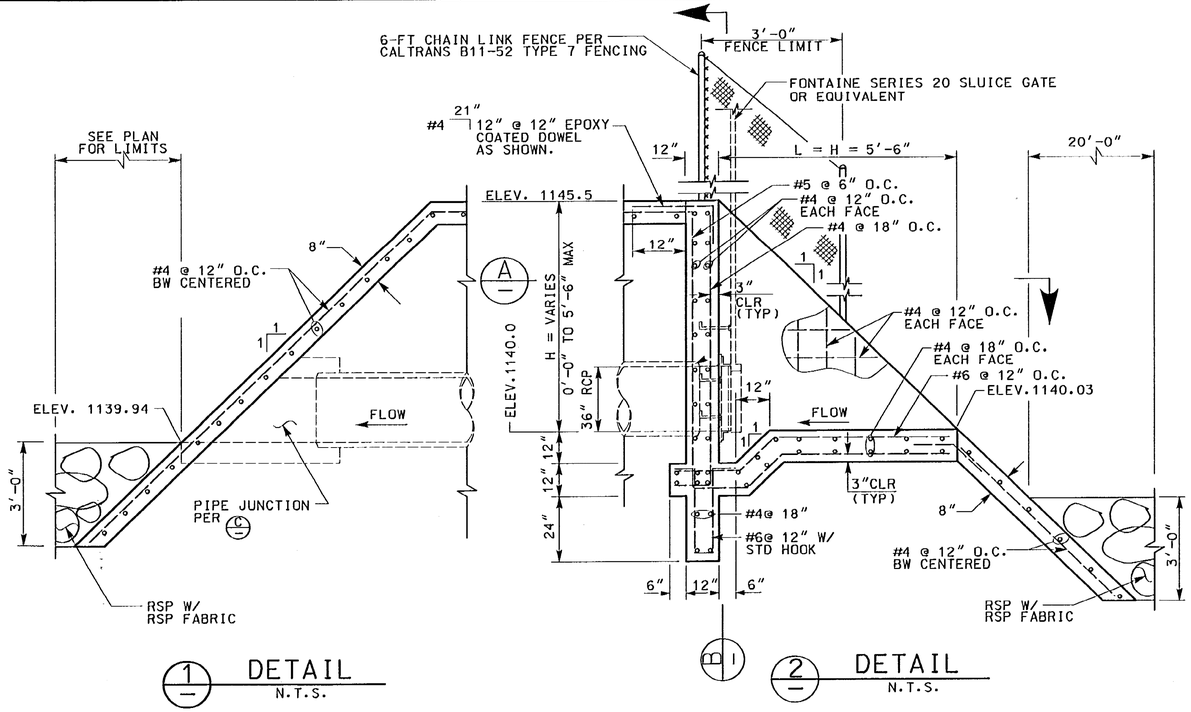
INLAND EMPIRE UTILITIES AGENCY
A Municipal Water District
LOCATION: 9400 Cherry Avenue, Building A, Fontana, California 92335, Telephone (909) 357-0241
MAILING ADDRESS: Post Office Box 697, Rancho Cucamonga, California 91730

CHINO BASIN FACILITIES IMPROVEMENT PROJECT
BANANA BASIN
REINFORCED CONCRETE LINED BERM DETAILS

SHEET 6 OF 7 SHTS
DWG. NUMBER

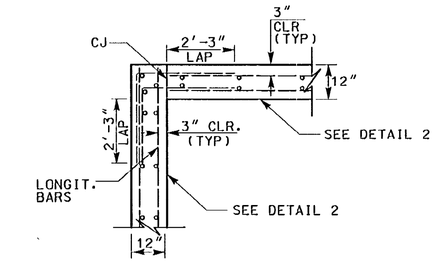
J: 110188/DGN/BANANA/SHT06_BANANAAB.DGN

FILE No. 1-803-5

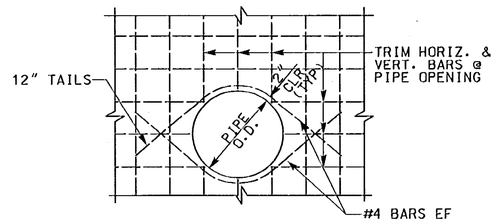



1 DETAIL
N.T.S.

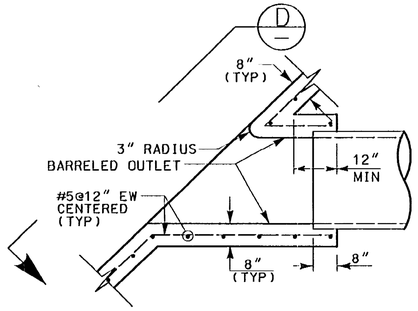
2 DETAIL
N.T.S.



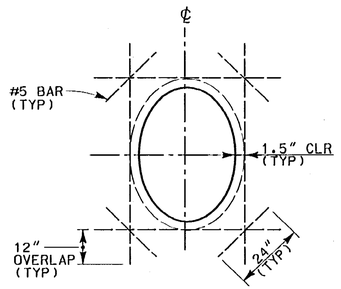

A HEADWALL CORNER DETAIL
N.T.S.



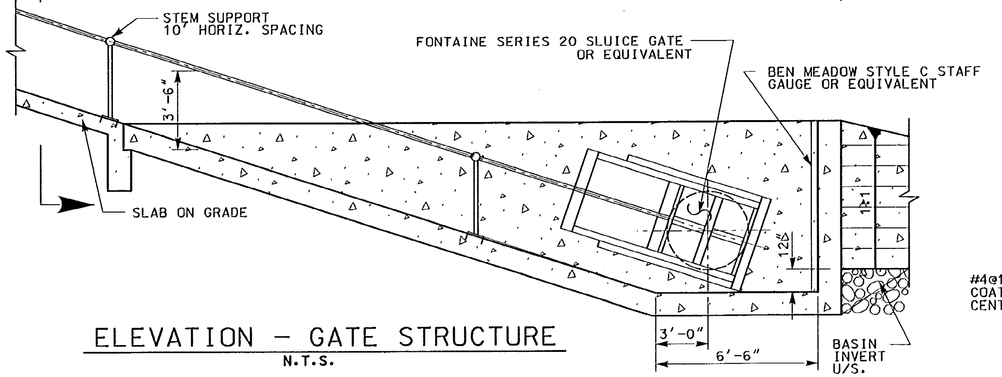

B PIPE OPENING SECTION
N.T.S.




C SECTION
N.T.S.

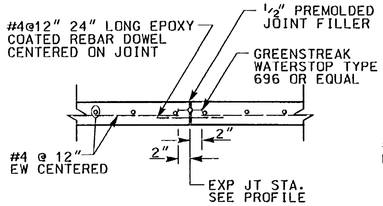



D SECTION
N.T.S.

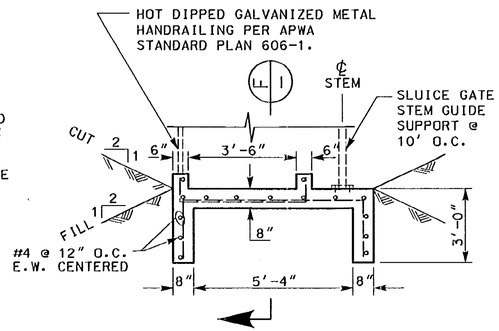



## ELEVATION – GATE STRUCTURE
N.T.S.

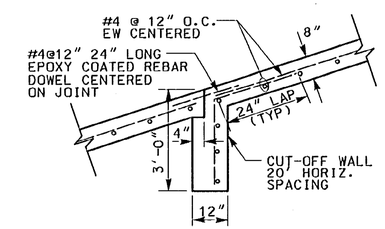
**NOTE: THIS ELEVATION IS SHOWN OPPOSITE HAND.**




3 EXPANSION JOINT DETAIL
N.T.S.




E SLAB ON GRADE SECTION (1)
N.T.S.




F SLAB ON GRADE SECTION (2)
N.T.S.

## DESIGN DATA

LIVE LOAD:

HS20-44 UNLESS OTHERWISE NOTED

DEAD LOAD:

DESIGN METHOD, WORKING STRESS
VERTICAL EARTH W=120 PCF
SIDE EARTH 62 P.S.F. PER FOOT OF DEPTH
MARSTON THEORY

ALLOWABLE STRESSES:

F'c = 4,000 P.S.I. AT 28 DAYS
Fy = 60,000 P.S.I., Fs = 24,000 P.S.I.
N = 8.0
SHEAR AND BOND STRESSES PER A.C.I. 318-95
BEARING STRESS = 3500 PSF

RSP CLASSIFICATION:

RSP CLASS LIGHT, METHOD B PLACEMENT WITH RSP FABRIC TYPE A

**AS-BUILT DRAWING**

| REV. | DATE | BY | DESCRIPTION |
|---|---|---|---|
| 1 | 12/04 | BS | ASBUILT |

Designed ROGER CHUNG 03/03
Drawn PEGGY CHU 03/03
Checked DAN VILLINES 03/03
Date

REGISTERED PROFESSIONAL ENGINEER DANIEL D. VILLINES No. C58210 Exp. 09/30/04 CIVIL STATE OF CALIFORNIA

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consulting engineers
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Tel: (949) 955-8877 Fax: (949) 955-8077
A Member of the AGS Companies

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0" 1"

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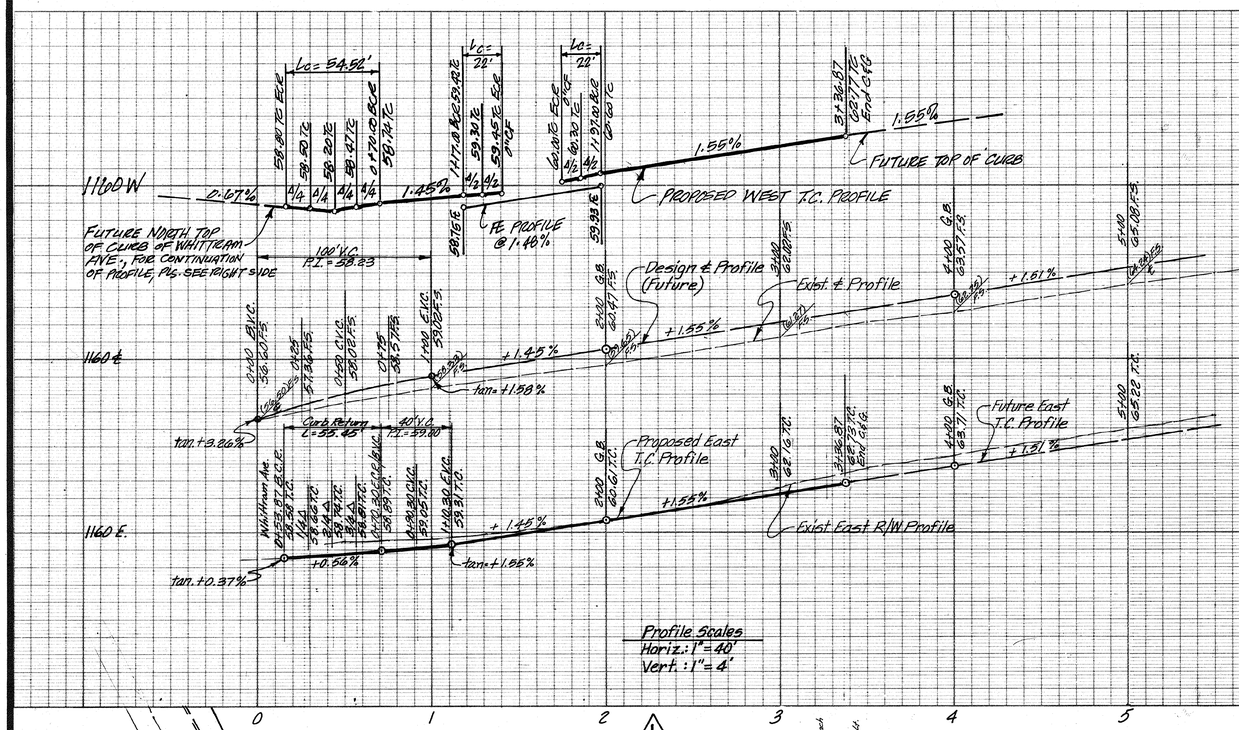
CHINO BASIN FACILITIES IMPROVEMENT PROJECT
BANANA BASIN

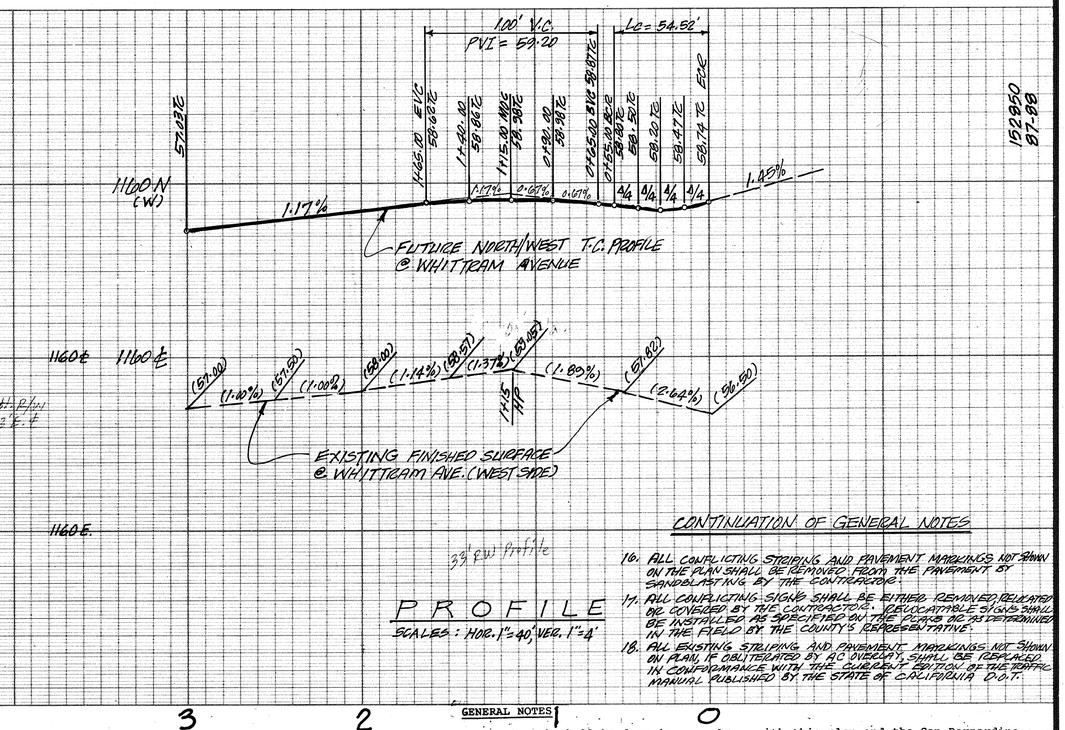
STRUCTURAL DETAILS

SHEET 7 OF 7 SHTS
DWG. NUMBER

J: 110188/DGN/BANANA/SHT07_BANANAAB.DGN

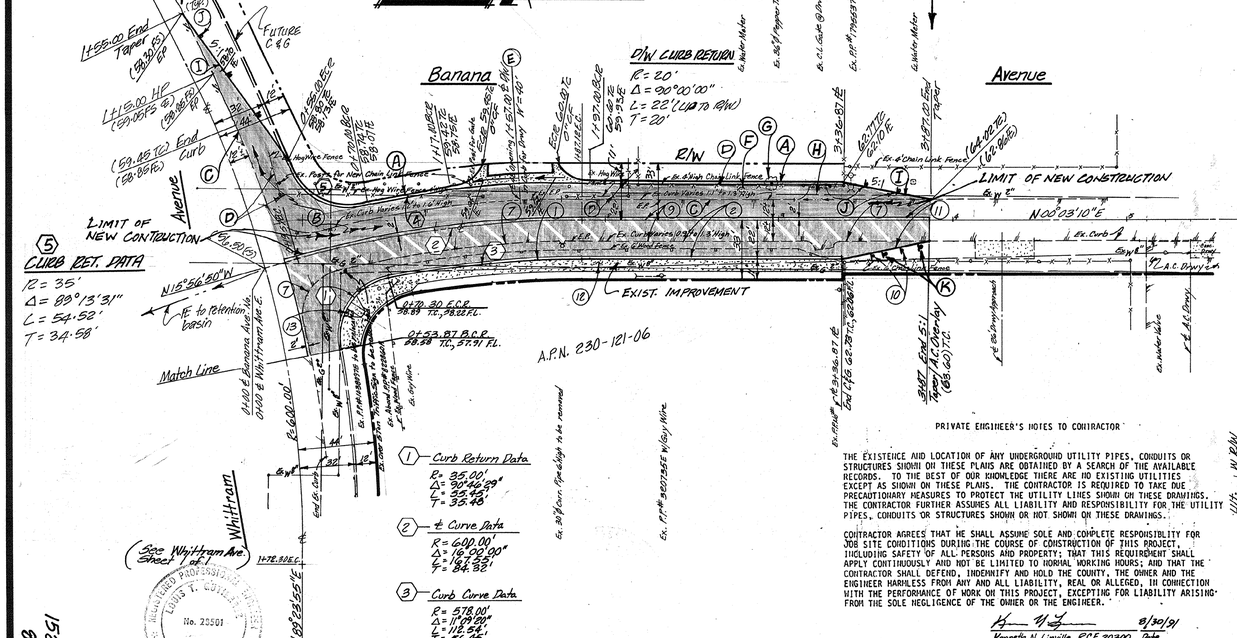
FILE NO. 1-803-6

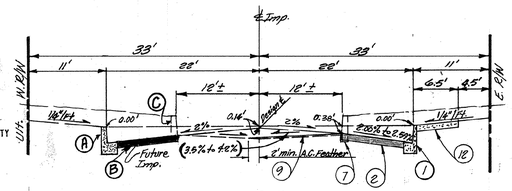



## CONTINUATION OF GENERAL NOTES

16. ALL CONFLICTING STRIPING AND PAVEMENT MARKINGS NOT SHOWN ON THE PLAN SHALL BE REMOVED FROM THE PAVEMENT BY SANDBLASTING BY THE CONTRACTOR.
17. ALL CONFLICTING SIGNS SHALL BE EITHER REMOVED, RELOCATED OR CONCEALED BY THE CONTRACTOR. RELOCATABLE SIGNS SHALL BE INSTALLED AS SPECIFIED ON THE PLANS OR AS DETERMINED IN THE FIELD BY THE COUNTY'S REPRESENTATIVE.
18. ALL EXISTING STRIPING AND PAVEMENT MARKINGS NOT SHOWN ON PLAN, IF OBLITERATED BY AC OVERLAY, SHALL BE REPLACED IN CONFORMANCE WITH THE LATEST EDITION OF THE TRAFFIC MANUAL PUBLISHED BY THE STATE OF CALIFORNIA D.O.T.




## Construction Notes:

1. Const. 8" Curb & Gutter per S.B. Co. Std. 115.
2. Const. ___ A.C. over ___ per Soils Report.
7. Remove exist. curb.
9. Const. var. thickness A.C. overlay (0.10' min.).
10. Install markers per S.B. Co. Std. 304.
11. Const. 8" A.C. Dike per S.B. Co. Std. 117.
12. Const. P.C.C. Sidewalk Per S.B. Co. Std. 109 Type 'C'.
B. Const. Sidewalk Ramp Per S.B. Co. Std. 1109.

## CONSTRUCTION NOTES FOR ⚠1

A. CONST. 8" CURB & GUTTER PER S.B. CO. STD. 115
B. CONST. ___ A.C. OVER ___ PER SOILS REPORT
C. REMOVE EXIST. CURB
D. REMOVE EXIST. 4' HIGH CHAIN LINK FENCE
E. CONST. DRIVEWAY (ST. TYPE) PER S.B. CO. STD. 119
F. RELOCATE EXIST. WATER METER
G. REMOVE EXIST. TREE
H. CLOSE EXIST. DRIVEWAY
I. CONST. 8" CURB PER S.B. CO. STD. 115 (W/NO GUTTER)
J. INSTALL MARKERS PER S.B. CO. STD. 304
K. RELOCATE MARKERS AS SHOWN ON PLAN

## GENERAL NOTES

1. All work shall be done in accordance with this plan and the San Bernardino County standards and specifications.
2. A permit will be required from the San Bernardino County Transportation Department prior to any encroachment or construction within the County's easements or rights-of-way.
3. If asphalt concrete is to be placed directly on subgrade of road or drainage facilities, a soils sterilant registered by the "E.P.A." for use under A.C. and P.C.C. shall be uniformly applied at the manufacturer's recommended rate for the full pavement width prior to paving.
4. Compaction tests of embankment construction, trench backfill, compacting original ground and all sub-grades, shall be performed at no cost to San Bernardino County. A written report with these compaction tests shall be submitted to the San Bernardino County Transportation Department for approval, prior to placement of base materials and/or surfacing.
5. At the completion of paving, a materials report shall be submitted to the San Bernardino County Transportation Department listing all tests or determinations completed to verify:
   (a) R-value, sieve analysis, and sand equivalent of aggregate bases,
   (b) Stability, oil content and sieve analysis of asphalt surfacing.
6. Transportation Department approval does not include estimate of quantities.
7. All lateral cuts in County maintained roadways shall be tested to verify densification to 90% relative compaction (R.C.) at varying depths to within 0.5' of grading plane. The top 0.5' shall be densified to 95%.
8. All longitudinal cuts shall be tested in accordance with the specified limits and frequency as outlined in Section 6 of the San Bernardino County Standards and Specifications.
9. An encroachment permit must first be obtained from the County Transporation Department prior to making application and issuance of a grading permit or building permit.
10. Immediately following removal of existing pavement, or dike or curb and/or gutter, the contractor shall diligently pursue this portion of work until completion.
11. All pipe lines or substructures of any kind, and telephone or power poles, water meters, valves, hydrants, etc., shown or not shown on these plans within the limits of the development or in adjacent areas where improvement work is to be done shall be removed or relocated at developer's expense and at no cost to the San Bernardino County Transportation Department. It shall be the owner's responsibility to notify all agencies concerned.
12. A permit shall be obtained from the County Transportation Department prior to any construction on this project.
13. Curb and gutter, cross gutter and spandrels shall be constructed that a minimum of ponding occurs; sections having gradients of 0.50% of flatter shall be water tested in the presence of the inspector immediately prior to acceptance. Sections which have water ponding more than 6" wide, or more than 4' long shall be sawcut and removed in lengths not less than 4' and replaced to reduce ponding to the maximum specified.
14. All 0.40% or less curb grade lines shall be staked at 25' intervals and forms certified by engineer before pouring concrete.
15. Existing County roads which will require reconstruction shall remain open for traffic at all times with adequate detours during actual construction.

Note: See Whittram Avenue Sheet 1 of 1 for Bench Mark & Vicinity Map.

## PRIVATE ENGINEER'S NOTES TO CONTRACTOR

THE EXISTENCE AND LOCATION OF ANY UNDERGROUND UTILITY PIPES, CONDUITS OR STRUCTURES SHOWN ON THESE PLANS ARE OBTAINED BY A SEARCH OF THE AVAILABLE RECORDS. TO THE BEST OF OUR KNOWLEDGE THERE ARE NO EXISTING UTILITIES EXCEPT AS SHOWN ON THESE PLANS. THE CONTRACTOR IS REQUIRED TO TAKE DUE PRECAUTIONARY MEASURES TO PROTECT THE UTILITY LINES SHOWN ON THESE DRAWINGS. THE CONTRACTOR FURTHER ASSUMES ALL LIABILITY AND RESPONSIBILITY FOR THE UTILITY PIPES, CONDUITS OR STRUCTURES SHOWN OR NOT SHOWN ON THESE DRAWINGS.

CONTRACTOR AGREES THAT HE SHALL ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THIS PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY; THAT THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS; AND THAT THE CONTRACTOR SHALL DEFEND, INDEMNIFY AND HOLD THE COUNTY, THE OWNER AND THE ENGINEER HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT, EXCEPTING FOR LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF THE OWNER OR THE ENGINEER.

Kenneth N. Linville R.C.E. 20300 — 8/30/91 Date

REGISTERED PROFESSIONAL ENGINEER — KENNETH N. LINVILLE — No. 20300 — EXP. DATE 9/30/93 — CIVIL — STATE OF CALIFORNIA

LOUIS T. GUTIERREZ — No. 28501 — CIVIL — STATE OF CALIFORNIA

FOR ⚠1 ONLY

SANDERSON - GUTIERREZ
CIVIL ENGINEERS & LAND SURVEYORS, INC.
10002-A 6th St., RANCHO CUCAMONGA, CA 91730
(909) 980-7211
Louis T. Gutierrez — 2/3/94
Louis T. Gutierrez R.C.E. 28501 EXP. 3/31/94

Linville - Civil Engineers/Land Surveyors, Inc.
Haven Commerce Center
9035 Haven Avenue, Suite 100
Rancho Cucamonga, California 91730
Telephone: (714) 989-3922
Kenneth N. Linville R.C.E. 20300 Exp. Date 9/30/93 — 8/30/91 Date

| FIELD BOOK REF. | | | |
|---|---|---|---|
| ⚠1 Added Curb & Gutter & Driveway Limits as Noted | | LDad | 2-4-91 |
| MARK | REVISIONS | APPR | DATE |

COUNTY OF SAN BERNARDINO
ROAD DEPARTMENT

| DESIGNED BY | DRAWN BY | CHECKED BY | APPROVED BY |
|---|---|---|---|
| K.N.L. | G.A.C. | | |

SUBMITTED BY _____ C.D.E. — ASST. COUNTY ENGR.-ROADS _____ DATE
RECOMMENDED/APPROVED BY LDad 9-19-91 — ASST. ROAD COMMISSIONER-ENGR. DATE — COUNTY ENGINEER DATE

STREET IMPROVEMENT PLANS
W141-87
Banana Avenue
No. of Whittram Avenue
A.P.N. 230-121-06

| | |
|---|---|
| W. O. NO. | |
| ROAD NO. | 152850 |
| FILE NO. | 87-88 |
| SHEET | 1 of 1 |

152850
87-88
92-005
SI 3/1/91

| | | |
|---|---|---|
| 876500 | Whittram Ave. & Calabash Ave. | FTA |
| 137-138 | Valley Crest Street Imprv. Signing & Striping Plans | 1 – 5 |

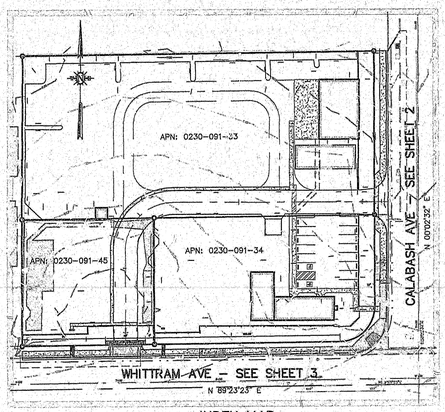
# VALLEY CREST STREET IMPROVEMENTS

## 8714 / 8726 CALABASH AND 13850 WHITTRAM AVENUE COMMERCIAL SITE FONTANA, CA.

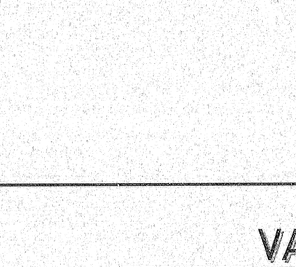
(APN'S: 0230-091-33,34 and 45)

### GENERAL NOTES FOR SUB-DIVISION IMPROVEMENTS

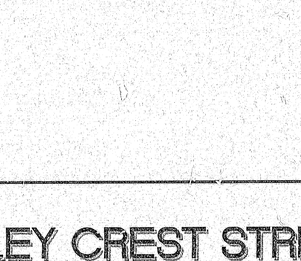
1. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THIS PLAN AND THE SAN BERNARDINO COUNTY STANDARDS AND SPECIFICATIONS.
2. BENCH MARK DATA – U.S.C. & G.S. OR OTHER DATUM ACCEPTABLE TO THE SAN BERNARDINO COUNTY PUBLIC WORKS DEPARTMENT SHALL BE USED. THE BENCHMARK USED AS A BASIS SHALL BE IDENTIFIED.
3. STREET MARKERS PER SAN BERNARDINO COUNTY STANDARD NO. 303, 303A, AND 303B SHALL BE CONSTRUCTED AT EACH INTERSECTION.
4. PRIVATE ROAD MARKERS PER SAN BERNARDINO COUNT "P.U.D., PRIVATE ROAD STANDARDS" SHALL BE CONSTRUCTED AT EACH INTERSECTION.
5. STREET MARKERS SHALL BE CONSTRUCTED AT EACH INTERSECTION IN ACCORDANCE WITH APPLICABLE SAN BERNARDINO COUNTY STANDARDS. ALL SIGNS SHALL BE INSTALLED IN ACCORDANCE WITH COUNTY AND STATE SPECIFICATIONS.
   - ⚠ INDICATES STREET MARKER TO BE CONSTRUCTED (STANDARD 303, 303A AND 303B)
   - ● INDICATES STREET MARKER TO BE CONSTRUCTED (STANDARD 303D) YELLOW POST (NON-MAINTAINED STREETS)
   - ↑ INDICATES POST WITH REFLECTOR PER STANDARD 306
   - ⊠ INDICATES CW(R(ROAD NOT MAINTAINED...) TO BE CONSTRUCTED
6. A PERMIT WILL BE REQUIRED FROM THE SAN BERNARDINO COUNTY DEPT. OF PUBLIC WORKS PRIOR TO ANY ENCROACHMENT OR CONSTRUCTION WITHIN THE COUNTY OF SAN BERNARDINO EASEMENTS OR RIGHTS-OF-WAY.
7. LEAVE 8"x8" BLOCKOUTS IN SIDEWALKS FOR MAILBOXES, ETC., WHEN SIDEWALK IS PLACED ADJACENT TO CURB.
8. IF ASPHALT CONCRETE IS TO BE PLACED DIRECTLY ON SUBGRADE OR ROAD OR DRAINAGE FACILITIES, A SOIL STERILANT REGISTERED BY THE E.P.A. FOR USE UNDER A.C. AND P.C.C. SHALL BE UNIFORMLY APPLIED AT THE MANUFACTURER'S RECOMMENDED RATE FOR THE FULL PAVEMENT WIDTH PRIOR TO PAVING.
9. AT THE COMPLETION OF ROUGH GRADING, A MATERIALS REPORT AND THE PROPOSED STRUCTURAL SECTIONS SHALL BE SUBMITTED BY THE ENGINEER TO THE SAN BERNARDINO COUNTY DEPARTMENT OF PUBLIC WORKS, FIELD ENGINEERING DIVISION, DEPARTMENT OF PUBLIC WORKS PERMITS SECTION, FOR REVIEW AND EVALUATION BY THE PAVEMENT MANAGEMENT SECTION. THE SUBMITTAL SHALL INCLUDE A PLAT SHOWING THE LOCATION OF SAMPLING, A TABULATION OF SIEVE ANALYSIS AND SAND EQUIVALENT TEST RESULTS, A STATEMENT OF RECOMMENDED STRUCTURAL SECTION AND TEST DATA SHEETS FOR ALL R-VALUE TESTS PERFORMED, INCLUDING EXPANSION PRESSURE READINGS. APPROVAL WILL BE GIVEN WHEN ALL STRUCTURAL SECTION REQUIREMENTS HAVE BEEN MET.
10. COMPACTION TESTS OF EMBANKMENT CONSTRUCTION, TRENCH BACKFILL, COMPACTING ORIGINAL GROUND, ALL SUB-GRADES SHALL BE PERFORMED AT NO COST TO SAN BERNARDINO COUNTY. A WRITTEN REPORT WITH THESE COMPACTION TEST SHALL BE SUBMITTED TO THE SAN BERNARDINO COUNTY PUBLIC WORKS DEPARTMENT, FIELD ENGINEERING DIVISION, PUBLIC WORKS PERMIT SECTION, FOR APPROVAL PRIOR TO PLACEMENT OF BASE MATERIALS AND/OR SURFACING.
11. AT THE COMPLETION OF PAVING A MATERIALS REPORT SHALL BE SUBMITTED TO THE SAN BERNARDINO COUNTY OF PUBLIC WORKS DEPARTMENT, FIELD ENGINEERING DIVISION, AND PERMIT SECTION, LISTING ALL TESTS OR DETERMINATIONS COMPLETED TO VERIFY:
    A. R-VALUE, SIEVE ANALYSIS AND SAND EQUIVALENT OF AGGREGATE BASES
    B. STABILITY, OIL CONTENT AND SIEVE ANALYSIS OF ASPHALT SURFACING
12. THE WATER MAINS AND THE GAS MAINS SHALL BE PLACED UNDERGROUND PRIOR TO PAVING CONSTRUCTION. THE SERVICE LATERALS FOR THE WATER SYSTEM AND THE GAS SYSTEM SHALL BE INSTALLED AT A LATER DATE. WHERE IT IS NECESSARY TO CROSS THE PAVEMENT, SERVICE LATERALS SHALL BE BORED INTO PLACE.
13. FILL AND GRADE TO DRAIN ALL LOW AREAS ABUTTING TRACT ROADS TO A MINIMUM OF 1% GRADES.
14. ALL LATERAL CUTS IN COUNTY MAINTAINED ROADWAYS SHALL BE TESTED TO VERIFY DENSIFICATION TO 90% RELATIVE COMPACTION (R.C.) AT VARYING DEPTHS TO WITHIN 0.5' OF GRADING PLANE. THE TOP 0.5' SHALL BE DENSIFIED TO 95%.
15. ALL LONGITUDINAL CUTS SHALL BE TESTED IN ACCORDANCE WITH THE SPECIFIED LIMITS AND FREQUENCY AS OUTLINED IN SECTION 6 OF THE SAN BERNARDINO COUNTY STANDARDS AND SPECIFICATIONS.
16. IMMEDIATELY FOLLOWING REMOVAL OF EXISTING PAVEMENT OR DIKE OR CURB AND/OR GUTTER, THE CONTRACTOR SHALL DILIGENTLY PURSUE THIS PORTION OF WORK UNTIL COMPLETION.
17. PLACE CONCRETED ROCK SLOPE PROTECTION 12" THICK PER STATE STANDARD SPECS 72-5. (METHOD 'B' PLACEMENT USING COBBLE CLASS ROCK.)
18. AN ENCROACHMENT PERMIT MUST FIRST BE OBTAINED FROM THE COUNTY DEPARTMENT OF PUBLIC WORKS, FIELD ENGINEERING DIVISION, PUBLIC WORKS PERMIT SECTION, PRIOR TO MAKING APPLICATION AND ISSUANCE OF A GRADING PERMIT OR BUILDING PERMIT.
19. DEPARTMENT OF PUBLIC WORKS APPROVAL DOES NOT INCLUDE WATER OR SEWER SYSTEM OR ESTIMATE OF QUALITIES.
20. A PERMIT SHALL BE OBTAINED FROM THE COUNTY DEPARTMENT OF PUBLIC WORKS PRIOR TO ANY CONSTRUCTION ON THIS PROJECT.
21. EXPANSIVE SOILS: IN EXPANSIVE SOIL AREAS, THE SUBGRADE UNDER CURBS, GUTTERS, SIDEWALKS, AND DRIVEWAY APPROACHES SHALL BE SCARIFIED TO THE DEPTH OF AT LEAST 8" AND MOISTURE SHALL BE APPLIED TO MAINTAIN FREE WATER ON THE SURFACE FOR AT LEAST 24 HOURS PRIOR TO PLACING CONCRETE AND THE SUBGRADE SHALL THEN BE PREPARED WITHOUT COMPACTIVE EFFORT.
22. ALL PIPE LINES OR SUBSTRUCTURES OF ANY KIND, AND TELEPHONE OR POWER POLES, WATER METERS, VALVES, HYDRANTS, ETC. SHOWN OR NOT SHOWN ON THESE PLANS WITHIN THE LIMITS OF THIS DEVELOPMENT OR IN ADJACENT AREAS WHERE IMPROVEMENT WORK IS TO BE DONE SHALL BE REMOVED OR RELOCATED AT THE DEVELOPER'S EXPENSE, AND AT NO COST TO THE COUNTY OF SAN BERNARDINO PUBLIC WORKS DEPARTMENT. IT SHALL BE THE OWNER'S RESPONSIBILITY TO NOTIFY ALL AGENCIES CONCERNED.
23. ALL C.S.P. INSTALLATIONS AND CONNECTIONS SHALL BE MADE PER MANUFACTURER'S SUGGESTED METHOD UNLESS OTHERWISE SPECIFIED ON PLANS.
24. WHENEVER A STREET WITH PREDOMINANT GRADES EQUAL TO 3% OR GREATER IS CLASSIFIED BY COUNTY AS A WATER CARRIER, DEFLECTOR CURBS OF A TYPE SATISFACTORY TO THE COUNTY REQUIREMENTS SHALL BE INSTALLED ON THE DOWNSTREAM SIDE OF THE DRIVEWAY APPROACHES.
25. CURB AND GUTTER, CROSS GUTTER AND SPANDRELS SHALL BE SO CONSTRUCTED THAT A MINIMUM OF PONDING OCCURS; SECTIONS HAVING GRADIENTS OF 0.5% OR FLATTER SHALL BE WATER TESTED IN THE PRESENCE OF THE INSPECTOR IMMEDIATELY PRIOR TO ACCEPTANCE. SECTIONS WHICH HAVE WATER PONDING MORE THAN 6" WIDE OR MORE THAN 4' LONG SHALL BE SAW-CUT AND REMOVED IN LENGTHS NOT LESS THAN 4' AND REPLACED TO REDUCE PONDING TO THE MAXIMUM SPECIFIED.
26. IF DURING CONSTRUCTION, GROUND WATER IS ENCOURAGED, A SYSTEM APPROVED BY THE SAN BERNARDINO COUNTY DEPARTMENT OF PUBLIC WORKS SHALL BE INSTALLED TO DEWATER SAID AREA AT THE DIRECTION OF THE SOILS ENGINEER.
27. THIS PRIVATE ROAD SHALL NOT BE ENTERED INTO THE COUNTY MAINTAINED ROAD SYSTEM.
28. THE ENGINEER SHALL INSPECT AND CERTIFY THAT ALL PRIVATE ROADS AND DRAINAGE IMPROVEMENTS HAVE BEEN BUILT IN ACCORDANCE WITH THE APPROVED PLANS.
29. ALL 0.40ft OR LESS CURB GRADE LINES SHALL BE STAKED AT 25' INTERVALS AND FORMS CERTIFIED BY THE ENGINEER BEFORE POURING CONCRETE.
30. EXISTING COUNTY ROADS THAT WILL REQUIRE RECONSTRUCTION SHALL REMAIN OPEN FOR TRAFFIC AT ALL TIMES WITH ADEQUATE DETOURS DURING ACTUAL CONSTRUCTION.
31. IF AN ELEVATION DIFFERENTIAL OF 5' OR GREATER EXISTS BETWEEN ANY PROPOSED SPLASH PAD AND THE EXISTING NATURAL STREAMBED, ADDITIONAL CONCRETED ROCK SLOPE PROTECTION AND/OR EROSION PROTECTION MAY BE REQUIRED AS DIRECTED BY COUNTY INSPECTOR.
32. THE PRIVATE ENGINEER IS RESPONSIBLE FOR ASSURING THE ACCURACY AND ACCEPTABILITY OF THE WORK HEREON. IN THE EVENT OF DISCREPANCIES ARISING DURING CONSTRUCTION, THE PRIVATE ENGINEER SHALL BE RESPONSIBLE FOR DETERMINING AN ACCEPTABLE SOLUTION AND REVISE THE PLAN FOR APPROVAL BY THE COUNTY OF SAN BERNARDINO.
33. SHOULD ANY EXISTING STOP SIGN BE LOCATED ON A DEVELOPED CORNER OF AN INTERSECTION, IT MUST BE MAINTAINED IN PLACE NEXT TO THE EXISTING PAVEMENT UNTIL SUCH TIME AS THE WIDENED ROADWAY IS OPEN FOR TRAFFIC. AT THAT TIME, IT WILL BE RELOCATED 3' BEHIND THE NEW CURB IN THE VICINITY OF THE BEGINNING OF THE CURB RETURN OR AS OTHERWISE DIRECTED BY THE ENGINEER.




INDEX MAP
1"=60'




TYPICAL SECTION CALABASH AVE
SECTION A-A
N.T.S.




TYPICAL SECTION WHITTRAM AVE.
SECTION B-B
N.T.S.

### BENCHMARK

THE BENCHMARK FOR THIS SURVEY IS A RAILROAD SPIKE IN POLE NO. 665593/H AT THE SOUTHEAST CORNER OF THE INTERSECTION OF CALABASH AVENUE AND ARROW ROUTE HAVING AN ELEVATION OF 1170.18'.

### SAN BERNARDINO COUNTY TRAFFIC CONTROL NOTES

1. ALL SIGNING, STRIPING AND PAVEMENT MARKINGS SHALL BE IN CONFORMANCE WITH THE MUTCD 2003 AND THE CALIFORNIA SUPPLEMENT TO THE MUTCD 2003.
2. ALL STRIPING (LONG LINE) AND PAVEMENT MARKINGS SHALL BE RETROREFLECTIVE PAINT.
3. ALL SIGNS SHALL BE OF HIGH INTENSITY (FHWA TYPE III/IV) RETROREFLECTIVE SHEETING EXCEPT:
   A. STOP SIGNS SHALL BE DIAMOND GRADE (FHWA TYPE VII IN RURAL SETTINGS AND TYPE IX IN URBAN SETTINGS) RETROREFLECTIVE PAINT.
   B. 'NO PARKING' SIGNS SHALL BE OF SUPER ENGINEERING GRADE (FHWA TYPE II) RETROREFLECTIVE SHEETING.
   C. SCHOOL SIGNS SHALL BE OF DIAMOND GRADE (FHWA TYPE IX) FLUORESCENT YELLOW-GREEN (FYG) RETROREFLECTIVE SHEETING.
   D. STREET NAME MARKERS SHALL BE OF DIAMOND GRADE (FHWA TYPE IX) RETROREFLECTIVE SHEETING AND CONFORM TO COUNTY STANDARD 303.
   E. CONSTRUCTION SIGNS SHALL BE OF DIAMOND GRADE (FHWA TYPE IX) FLOURESCENT ORANGE RETROREFLECTIVE SHEETING.
4. ALL DELINEATORS, CHANNELIZERS, AND OBJECT MARKERS SHALL BE OF FHWA TYPE VII RETROREFLECTIVE SHEETING.
5. SIGNS SHALL BE MOUNTED ON METAL POSTS SIMILAR TO COUNTY STANDARDS 303(a) AND 303(b).
6. ALL CONFLICTING STRIPING AND PAVEMENT MARKINGS NOT SHOWN ON PLANS SHALL BE REMOVED BY THE CONTRACTOR. REMOVAL SHALL BE ACCOMPLISHED BY SANDBLASTING, GRINDING, OR AS DIRECTED BY COUNTY REPRESENTATIVE.
7. ALL CONFLICTING SIGNS SHALL BE REMOVED, RELOCATED, OR COVERED BY THE CONTRACTOR. RELOCATABLE SIGNS SHALL BE INSTALLED AS SPECIFIED ON THE PLANS OR AS DIRECTED BY THE COUNTY REPRESENTATIVE.
8. ALL UNPROTECTED LOCATIONS RESULTING IN ISOLATED ABRUPT DEPRESSIONS OR ELEVATED OBJECTS (I.E. CATCH BASINS, HEADWALLS, POWER POLES, END TREATMENT OF ASPHALT DIKES AND CURBS) SHALL BE PROTECTED BY DELINEATORS OR BARRIERS PER THE CALIFORNIA SUPPLEMENT TO THE MUTCD 2003.
9. ALL EXISTING SIGNING, STRIPING AND PAVEMENT MARKINGS (I.E. CROSS STREET STOP, STOP LIMIT LINE, AND CROSSWALK PAVEMENT MARKINGS) NOT SHOWN ON PLANS, IF REMOVED/OBLITERATED, SHALL BE REPLACED/RESTORED OF SAME KIND, AND IN CONFORMANCE WITH THE CURRENT EDITION OF THE MUTCD 2003 AND THE CALIFORNIA SUPPLEMENT TO THE MUTCD 2003.
10. THE CONTRACTOR SHALL NOTIFY COUNTY REPRESENTATIVE TO SCHEDULE A FINAL REVIEW (WALK THROUGH) WITH THE TRAFFIC DIVISION PERSONNEL FOR APPROVAL OF TRAFFIC CONTROL DEVICES PRIOR TO PROJECT ACCEPTANCE.

### ENGINEER'S NOTE TO CONTRACTOR:

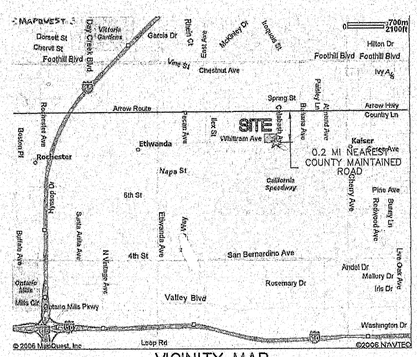
THE EXISTENCE AND LOCATION OF ANY UNDERGROUND UTILITY PIPES, CONDUITS OR ANY OTHER STRUCTURES SHOWN ON THESE DRAWINGS WERE OBTAINED BY A SEARCH OF THE AVAILABLE RECORDS. TO THE BEST OF OUR KNOWLEDGE, THERE ARE NO OTHER UTILITIES OR STRUCTURES EXCEPT AS SHOWN ON THESE DRAWINGS. THE CONTRACTOR IS REQUIRED TO TAKE DUE PRECAUTIONARY MEASURES TO PROTECT THE UTILITY LINES SHOWN ON THE DRAWINGS. THE CONTRACTOR FURTHER ASSUMES ALL LIABILITY AND RESPONSIBILITY FOR UTILITY PIPES, CONDUITS OR STRUCTURES SHOWN OR NOT SHOWN ON THESE DRAWINGS.

CONTRACTOR AGREES THAT HE/SHE SHALL ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THIS PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY, AND THAT THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS, AND THAT THE CONTRACTOR SHALL DEFEND, INDEMNIFY AND HOLD THE COUNTY, THE OWNER AND THE ENGINEER HARMLESS FROM ANY KIND OF LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT, EXCEPTING FOR LIABILITY ARISING FROM SOLE NEGLIGENCE OF THE OWNER OR THE ENGINEER.

### UNDERGROUND SERVICE ALERT

THE CONTRACTOR SHALL CONTACT THE FOLLOWING UTILITY COMPANIES AT LEAST 48 HOURS BEFORE BEGINNING EXCAVATION AND SHALL VERIFY WHETHER OR NOT A REPRESENTATIVE OF EACH COMPANY WILL BE PRESENT DURING EXCAVATION.

UNDERGROUND SERVICE ALERT (USA) 800-642-2444
PACIFIC TELEPHONE CO. – MEMBER USA OR 805-543-7868
SOUTHERN CALIF. GAS CO. – MEMBER USA OR 805-964-7821
PACIFIC GAS & ELEC. CO. – MEMBER USA OR 805-434-4429




VICINITY MAP
N.T.S.

NEAREST FREEWAY OFF-RAMP FROM CA-15: DAY CREEK OFFRAMP
NEAREST COUNTY MAINTAINED ROAD: ARROW ROUTE (0.2 MI)

### LEGEND

| | |
|---|---|
| TRACT BOUNDARY | |
| PROPERTY LINE | |
| RIGHT-OF-WAY | |
| CURB | |
| BACK OF CURB | |
| GUTTER | |
| SIDEWALK | |
| EASEMENT | |
| EXISTING RETAINING WALL | |
| 2:1 SLOPE | |
| EXISTING CONTOURS | |
| FINISHED GRADE CONTOURS | |
| WATER MAIN | 8" W |
| SANITARY SEWER | 8" S |
| STORM DRAIN | 18" SD |
| GAS MAIN | G |
| FIRE WATER | F |
| EXIST. WATER LINE | 8" W |
| EXIST. SAN. SEWER | 8" S |
| EXIST. STORM DRAIN | 18" SD |
| EXIST. GAS | G |
| EX. S.S. MANHOLE | |
| S.S. MANHOLE | S |
| S.S. LATERAL | S |
| WATER SERVICE | W |
| WATER VALVE | |
| FIRE HYDRANT | |
| EX. FIRE HYDRANT | |
| STREET LIGHT | |
| GAS LATERAL | G |
| UTILITY TRENCH | P,Ph,CTV |
| UTILITY SERVICE | SV |
| PG&E BOX | |
| EXISTING PG&E BOX | |
| PG&E ELECTROLIER | |
| PAC BELL PEDESTAL | |
| SSMH | |
| SDMH | |
| CLEANOUT | |
| MONUMENT | |
| TOP OF CURB | T.C. |
| TOP OF WALL | T.W. |
| TOP OF GRATE | T.G. |
| TOP OF FOOTING | T.F. |
| GRADE BREAK | G.B. |
| PUBLIC UTILITY EASEMENT | P.U.E. |
| FLOW LINE | FL |
| INVERT | INV. |
| FINISHED GRADE | FG |
| FINISHED SURFACE | FS |

### SHEET INDEX:


1.0 TITLE SHEET
2.0 CALABASH AVE STREET IMPROVEMENTS
2.1 WHITTRAM AVE STREET IMPROVEMENT PLANS
3.0 CALABASH AVE SIGNING/STRIPING IMPROVEMENTS
3.1 WHITTRAM AVE SIGNING/STRIPING IMPROVEMENTS


CHIEF, TRAFFIC DIVISION — DATE 10.9.07

REGISTERED PROFESSIONAL ENGINEER — RUSSELL S. THOMPSON — RE NO. C43085 EXP 3-31-09 — CIVIL — STATE OF CALIFORNIA

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SEP 19 2007
Date Signed


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ATASCADERO, CA. 93422
(805) 462-1375


FIELD BOOK REF:

| MARK | REVISIONS | APPR | DATE |
|---|---|---|---|

COUNTY OF SAN BERNARDINO
DEPARTMENT OF PUBLIC WORKS

| DESIGNED BY: | DRAWN BY: | CHECKED BY: | APPROVED BY: |
|---|---|---|---|
| JB | JB/TH/JK | RST | |

SUBMITTED BY: C.D.E. ASSISTANT DIR. OF PUBLIC WORKS DATE
RECOMMENDED/APPROVED BY: 10/11/07
LAND DEVELOPMENT ENGINEER DATE DIRECTOR OF PUBLIC WORKS DATE

STREET IMPROVEMENT PLANS
SIGNING AND STRIPING PLANS
VALLEY CREST
8714/8726 CALABASH AVE
FONTANA
APN# 0230-091-33,34,45
TITLE SHEET

W.O. NO:
ROAD NO: 200250 JF
FILE NO: 86-87
SHEET 1 OF 5

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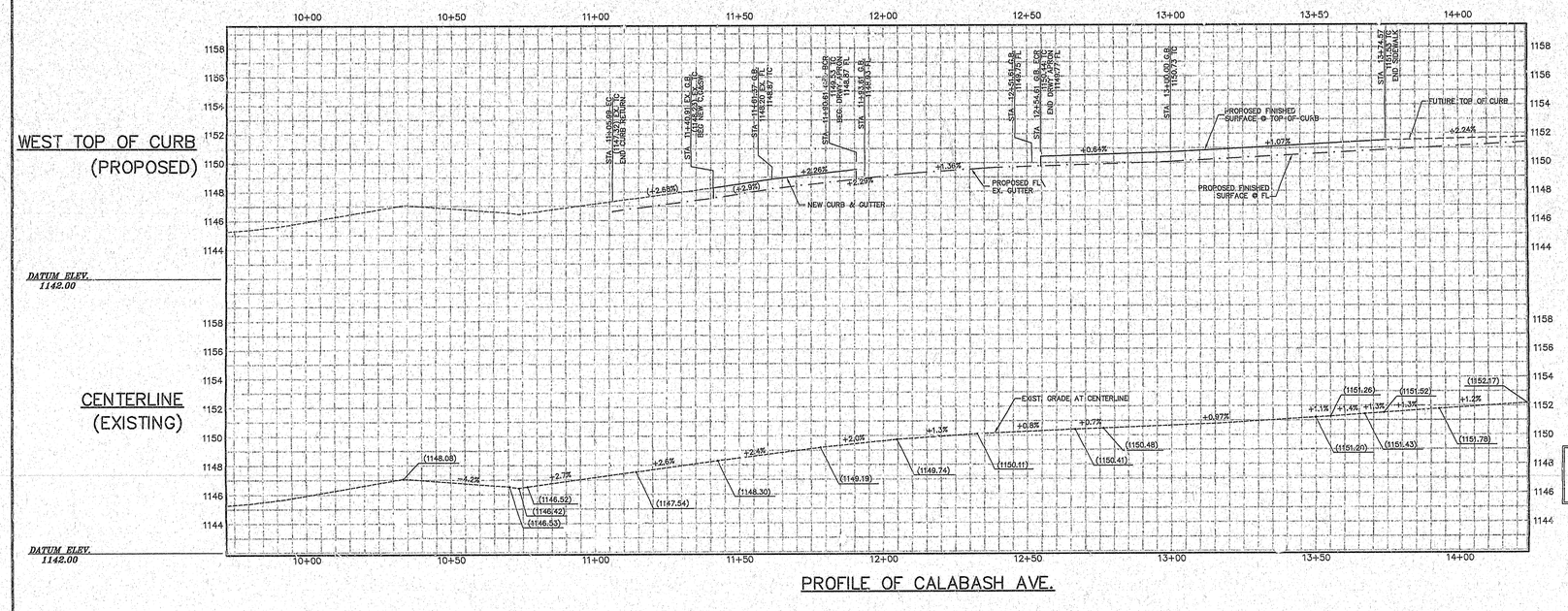
Jsmith




PROFILE OF CALABASH AVE.

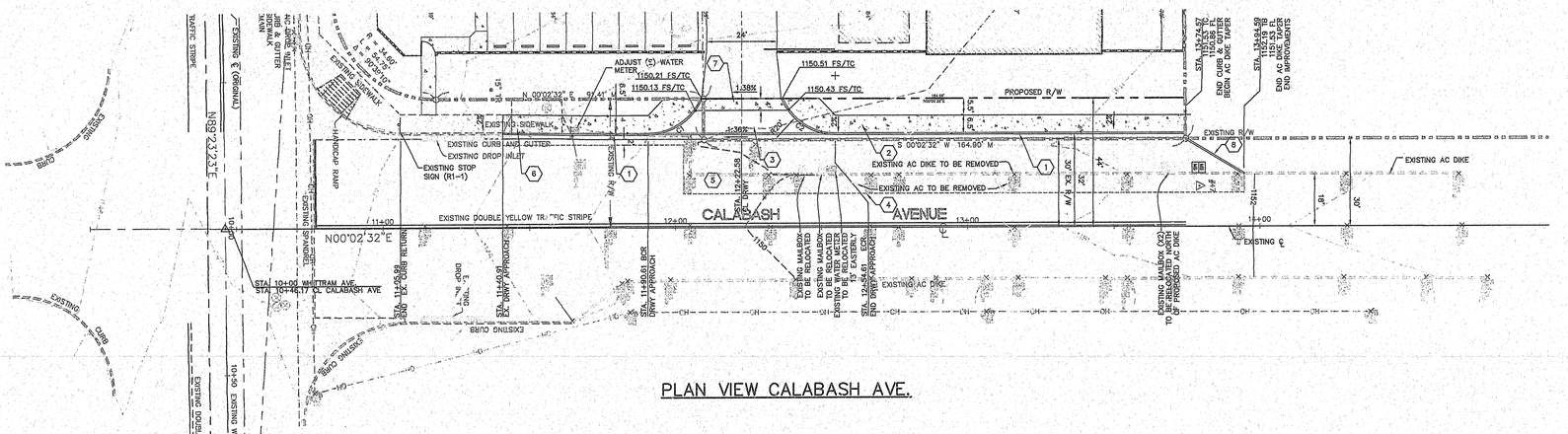
## CONSTRUCTION NOTES:

1. INSTALL 8" CONCRETE CURB & GUTTER PER SAN BERNARDINO COUNTY STD DETAIL #115.
2. INSTALL CONCRETE SIDEWALK PER SAN BERNARDINO COUNTY STD DETAIL #109 TYPE 'C'.
3. CONSTRUCT DRIVEWAY APPROACH PER SAN BERNARDINO COUNTY STD. #129b.
4. SAW-CUT EX. AC.
5. INSTALL AC OVER CLASS 2 AGG BASE PER GENERAL NOTE #9 ON SHEET 1 OF 5.
6. EXISTING DRIVEWAY APPROACH TO BE REMOVED AND REPLACED WITH CURB AND GUTTER AND SIDEWALK.
7. CONSTRUCT 4' CONCRETE ACCESSIBLE WALK AROUND DRWY APPROACH
8. CONSTRUCT 8" A.C. DIKE PER SAN BERNARDINO COUNTY STD. #117.

## CURB RETURN DATA

| C1 | C2 |
|---|---|
| Δ= 67°06'44" | Δ= 67°06'44" |
| R= 20.00' | R= 20.00' |
| L= 23.43' | L= 23.43' |
| T= 13.27' | T= 13.27' |

SCALE
HORIZ.: 1"=20'
VERT. : 1"= 4'




PLAN VIEW CALABASH AVE.

## UNDERGROUND SERVICE ALERT

THE CONTRACTOR SHALL CONTACT THE FOLLOWING UTILITY COMPANIES AT LEAST 48 HOURS BEFORE BEGINNING EXCAVATION AND SHALL VERIFY WHETHER OR NOT A REPRESENTATIVE OF EACH COMPANY WILL BE PRESENT DURING EXCAVATION.

| | |
|---|---|
| UNDERGROUND SERVICE ALERT (USA) | 800-642-2444 |
| PACIFIC TELEPHONE CO. | – MEMBER USA OR 805-543-7868 |
| SOUTHERN CALIF. GAS CO. | – MEMBER USA OR 805-984-7821 |
| PACIFIC GAS & ELEC. CO. | – MEMBER USA OR 805-434-4429 |

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3/31/08
License Expires

SEP 19 2007
Date Signed

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(805) 462-1375

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COUNTY OF SAN BERNARDINO
DEPARTMENT OF PUBLIC WORKS

| DESIGNED BY: | DRAWN BY: | CHECKED BY: | APPROVED BY: |
|---|---|---|---|
| JB | JB/TH/JK | RST | |

SUBMITTED BY: — C.D.E. ASSISTANT DIR. OF PUBLIC WORKS — DATE
RECOMMENDED/APPROVED BY: 10/11/07
LAND DEVELOPMENT ENGINEER — DATE — DIRECTOR OF PUBLIC WORKS — DATE

STREET IMPROVEMENT PLANS

VALLEY CREST
8714/8726 CALABASH AVE
FONTANA
APN# 0230-091-33,34,45

| | |
|---|---|
| W.O. NO: | |
| ROAD NO: | 200250 JF |
| FILE NO: | 86-87 |
| SHEET | 2 OF 5 |

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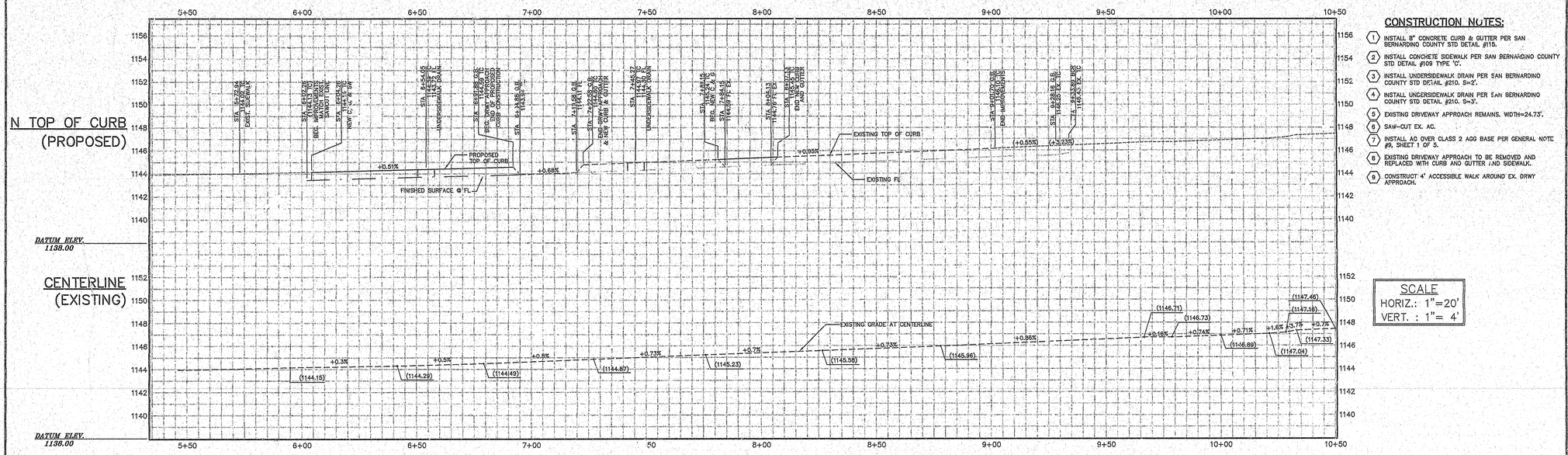
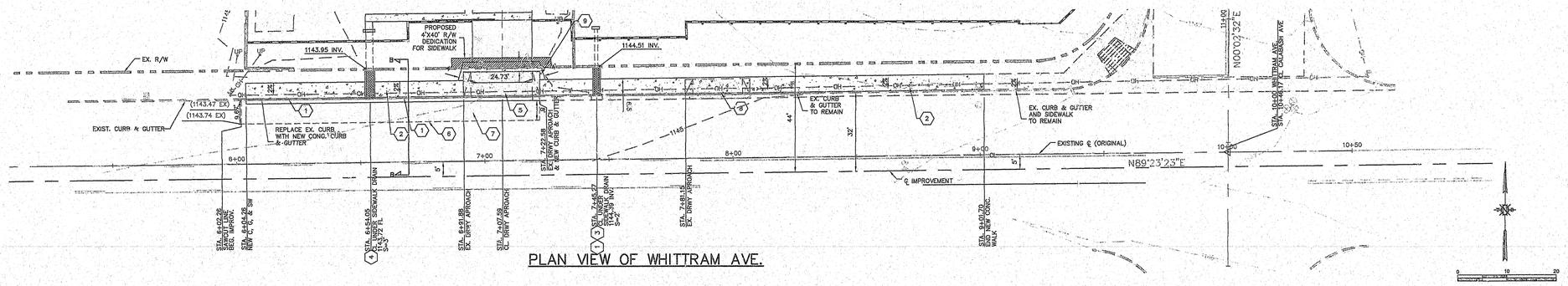



PROFILE OF WHITTRAM AVE

## CONSTRUCTION NOTES:

1. INSTALL 8" CONCRETE CURB & GUTTER PER SAN BERNARDINO COUNTY STD DETAIL #115.
2. INSTALL CONCHETE SIDEWALK PER SAN BERNARDINO COUNTY STD DETAIL #109 TYPE 'C'.
3. INSTALL UNDERSIDEWALK DRAIN PER SAN BERNARDINO COUNTY STD DETAIL #210. S=2'.
4. INSTALL UNDERSIDEWALK DRAIN PER SAN BERNARDINO COUNTY STD DETAIL #210. S=3'.
5. EXISTING DRIVEWAY APPROACH REMAINS. WIDTH=24.73'.
6. SAW-CUT EX. AC.
7. INSTALL AO OVER CLASS 2 AGG BASE PER GENERAL NOTE #9, SHEET 1 OF 5.
8. EXISTING DRIVEWAY APPROACH TO BE REMOVED AND REPLACED WITH CURB AND GUTTER AND SIDEWALK.
9. CONSTRUCT 4' ACCESSIBLE WALK AROUND EX. DRWY APPROACH.

SCALE
HORIZ.: 1"=20'
VERT. : 1"= 4'




PLAN VIEW OF WHITTRAM AVE.

1 INCH = 20 FEET

**UNDERGROUND SERVICE ALERT**

THE CONTRACTOR SHALL CONTACT THE FOLLOWING UTILITY COMPANIES AT LEAST 48 HOURS BEFORE BEGINNING EXCAVATION AND SHALL VERIFY WHETHER OR NOT A REPRESENTATIVE OF EACH COMPANY WILL BE PRESENT DURING EXCAVATION.

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PACIFIC TELEPHONE CO. - MEMBER USA OR 805-543-7868
SOUTHERN CALIF. GAS CO. - MEMBER USA OR 805-964-7621
PACIFIC GAS & ELEC. CO. - MEMBER USA OR 805-434-4429

RUSSELL S. THOMPSON — REGISTERED PROFESSIONAL ENGINEER — No. C43288 EXP. 3-31-08 — STATE OF CALIFORNIA — CIVIL

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(805) 462-1375

| MARK | REVISIONS | APPR | DATE |
|---|---|---|---|

FIELD BOOK REF:

COUNTY OF SAN BERNARDINO
DEPARTMENT OF PUBLIC WORKS

| DESIGNED BY: | DRAWN BY: | CHECKED BY: | APPROVED BY: |
|---|---|---|---|
| JB | JB/TH/JK | RST | |

SUBMITTED BY: C.O.E.
RECOMMENDED/APPROVED BY: 10/11/07
LAND DEVELOPMENT ENGINEER — DATE — ASSISTANT DIR. OF PUBLIC WORKS — DATE
DIRECTOR OF PUBLIC WORKS — DATE

STREET IMPROVEMENT PLANS

VALLEY CREST
WHITTRAM AVE
FONTANA
APN# 0230-091-33,34,45

| W.O. NO: | |
|---|---|
| ROAD NO: | 876500 JB |
| FILE NO: | 137-138 |
| SHEET | 3 OF 5 |

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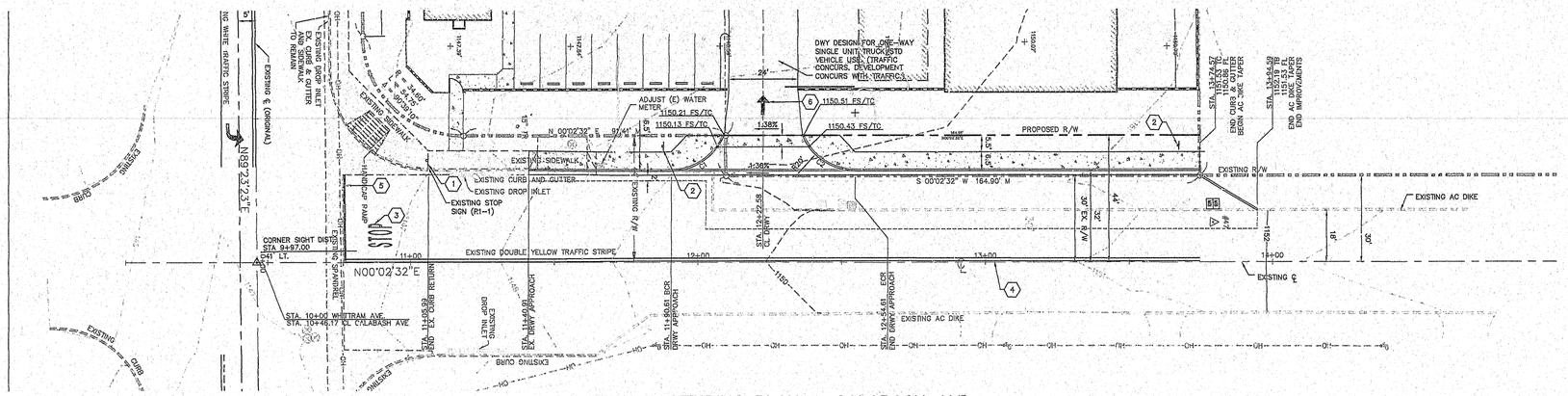
## CONSTRUCTION/SIGNING AND STRIPING NOTES:

1. EXISTING STOP SIGN (R1-1) AND STREET SIGN TO REMAIN.
2. INSTALL R26(CA) "NO PARKING" SIGNS PER MUTCD 2003 CA SUPP. FIG. 2B-101.
3. EXISTING PAVEMENT MARKING "STOP" TO REMAIN PER MUTCD 2003 CA SUPP. FIG. 3B-20 AND FIG. 3B-103.
4. PAINT 4" DOUBLE YELLOW TRAFFIC STRIPE TO END OF IMPROVEMENTS TO MATCH EXISTING PER MUTCD 2003 CA SUPP FIG. 3A-104 DETAIL 21.
5. EXISTING 12" WHITE LIMIT LINE TO REMAIN PER MUTCD 2003 CA SUPP. FIG. 3B-103.
6. PAINT TYPE I ARROW PER MUTCD SEP. 26, 2006. FIG. 3B-21 (CA).




## SIGNING & STRIPING PLAN – CALABASH AVE.

1 INCH = 20 FEET

### UNDERGROUND SERVICE ALERT

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UNDERGROUND SERVICE ALERT (USA) 800-642-2444
PACIFIC TELEPHONE CO. – MEMBER USA OR 800-543-7868
SOUTHERN CALIF. GAS CO. – MEMBER USA OR 805-984-7821
PACIFIC GAS & ELEC. CO. – MEMBER USA OR 805-434-4429

REGISTERED PROFESSIONAL ENGINEER RUSSELL S. THOMPSON No. 61028 EXP 3-31-08 CIVIL STATE OF CALIFORNIA

3/31/08
License Expires

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SEP 19 2007
Date Signed

R THOMPSON CONSULTING, INC.
CIVIL ENGINEERING
PLANNING
PROJECT MANAGEMENT
7600 MORRO ROAD
ATASCADERO, CA. 93422
(805) 462-1375

FIELD BOOK REF:

| MARK | REVISIONS | APP'R | DATE |
|---|---|---|---|

COUNTY OF SAN BERNARDINO
DEPARTMENT OF PUBLIC WORKS

| SURVEYED BY: | DRAWN BY: | CHECKED BY: | APPROVED BY: |
|---|---|---|---|
| | JB/TH/JK | RST | |

SUBMITTED BY:
RECOMMENDED/APPROVED BY: 10.9.07
C.D.E. RECOMMENDED/APPROVED BY
CHIEF, TRAFFIC DIVISION DATE DIRECTOR OF PUBLIC WORKS DATE

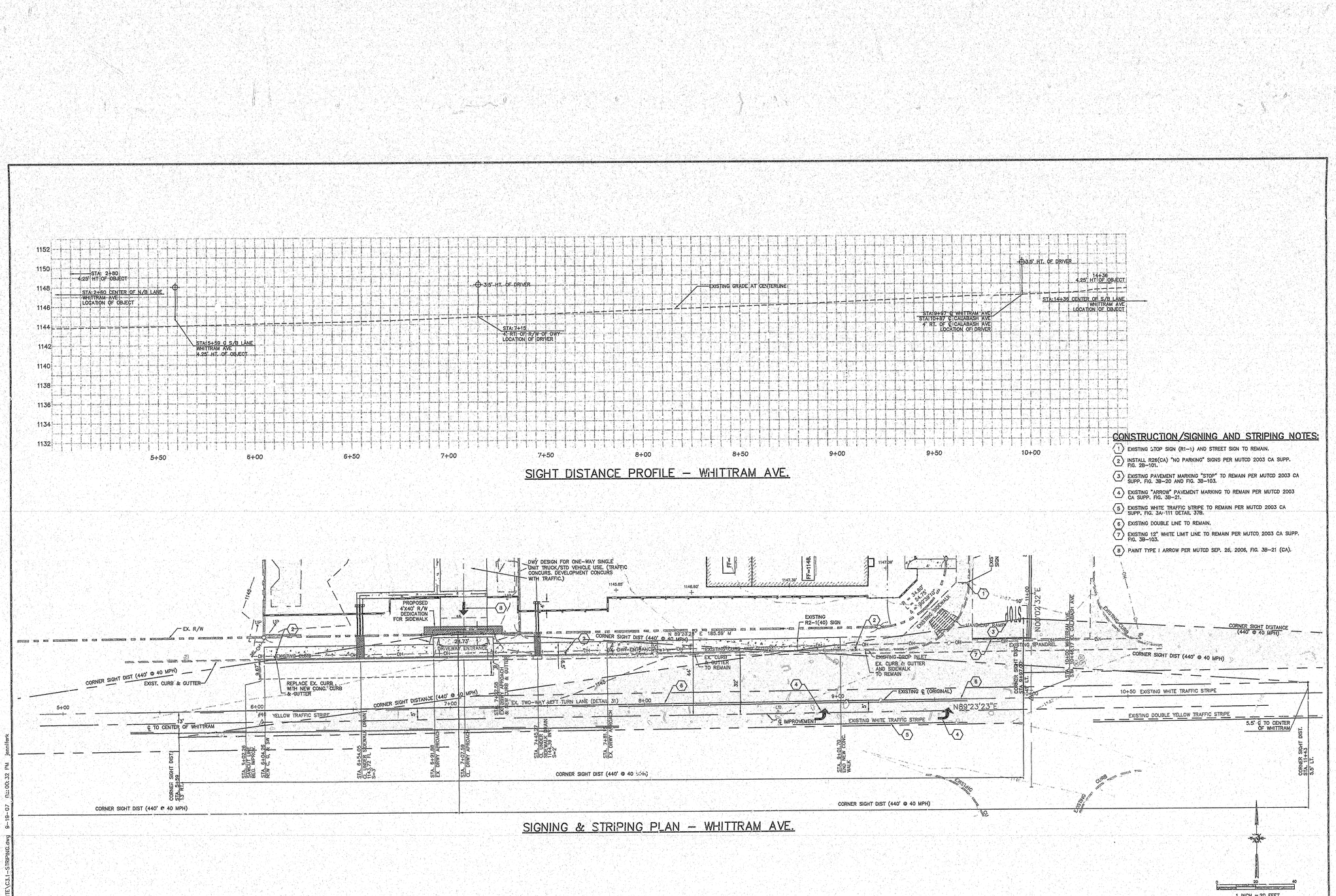
SIGNING AND STRIPING PLAN

VALLEY CREST
8714/8726 CALABASH AVE
FONTANA
APN# 0230-091-33,34,45

| | |
|---|---|
| W.O. NO: | |
| ROAD NO: | 200250 JF |
| FILE NO: | 86-87 |
| SHEET | 4 OF 5 |

J:\eng2003\05-07\dwg\con-docs\OFF-SITE\C3.0-STRIPING.dwg 9-19-07 02:56:44 PM jennifer k

## SIGHT DISTANCE PROFILE – WHITTRAM AVE.


DWY DESIGN FOR ONE-WAY SINGLE UNIT TRUCK/STD VEHICLE USE. (TRAFFIC CONCURS. DEVELOPMENT CONCURS WITH TRAFFIC.)
PROPOSED 4'X40' R/W DEDICATION FOR SIDEWALK
EX. R/W
EXISTING CURB
EXISTING SIDEWALK
EXISTING R2-1(40) SIGN
EXIST. CURB & GUTTER
REPLACE EX. CURB WITH NEW CONC. CURB & GUTTER
DRIVEWAY ENTRANCE
EX. CURB & GUTTER TO REMAIN
EXISTING DROP INLET
EX. CURB & GUTTER AND SIDEWALK TO REMAIN
EXISTING SPANDREL
EX. TWO-WAY LEFT TURN LANE (DETAIL 31)
EXISTING ℄ (ORIGINAL)
℄ IMPROVEMENT
EXISTING WHITE TRAFFIC STRIPE
YELLOW TRAFFIC STRIPE
10+50 EXISTING WHITE TRAFFIC STRIPE
EXISTING DOUBLE YELLOW TRAFFIC STRIPE
5.5' ℄ TO CENTER OF WHITTRAM
13' ℄ TO CENTER OF WHITTRAM
CORNER SIGHT DIST (440' @ 40 MPH)
CORNER SIGHT DIST STA. 5+92 12' RT.
CORNER SIGHT DIST STA. 11+43 5.5' LT.
STA. 5+02.28 BEGIN IMPROVEMENT
STA. 6+04.28 END IMPROVEMENT
STA. 6+59.00 SIDEWALK DRAIN 11'L 3.72' FL
STA. 6+93.20 EX. DRWY APPROACH
STA. 7+07.69 EX. DRWY APPROACH
STA. 7+45.27 SIDEWALK DRAIN 9'R 3.42' FL
STA. 7+49.71 EX. DRWY APPROACH
STA. 8+01.70 EX. DRWY APPROACH & NEW CONC. WALK
N 89°23'23" E 185.59'
N89°23'23"E
N00°02'32"E
R = 34.00'
L = 54.10'
Δ = 91°09'10"
1147.39'
1146.80'
1145.65'
1145'
1147.00'
1148'
1147.39'
1146.90'
1145'
1145'
1145

# PRELIMINARY HYDROLOGY REPORT
**FOR**
# Contractor's Office Building and Storage Yard

**14044 Whittram Avenue**
**Fontana, CA**

**Prepared for:**

**B&D Construction**
**145 N. 10th Street**
**Upland, CA 91786**
**(909) 949-0360**

County of San Bernardino
BUILDING AND SAFETY
THE PLANS AND DETAILS HAVE BEEN
REVIEWED
FOR CODE COMPLIANCE
THE REVIEW OF THESE PLANS SHALL NOT BE CONSTRUED TO BE A PERMIT FOR ANY VIOLATION OF ANY CODE OR ORDINANCE OF THE COUNTY OF SAN BERNARDINO
By
Date 04/21/2022
THESE PLANS SHALL BE ON THE JOB FOR ALL REQUESTED INSPECTIONS

**Initial Submittal: March 1, 2019**
**Revised: March 21, 2020**
**Revised April 17, 2022**

**Prepared by:**


Robert M. Beers

**Robert M. Beers**
**8175 Limonite Avenue**
**Suite E**
**Riverside, CA 92509**
**(951) 317-2041**


REGISTERED PROFESSIONAL ENGINEER
ROBERT MARK BEERS
RMB
No. 39405
Exp. 12-31-23
CIVIL
STATE OF CALIFORNIA

# Preliminary Drainage Report

Revised 4-17-22

## INTRODUCTION

The following report and calculations were prepared to analyze the 2, 10 & 100-year storm runoff from the development of the proposed Contractor's Office Building and Storage Yard at 14044 Whittram Avenue in the Fontana area of San Bernardino County. Infiltration trenches are proposed as onsite BMPs for treatment of site runoff prior to discharge from the site.

## SITE BACKGROUND

The proposed project is located on the north side of Whittram Avenue and is bounded by Banana Avenue on the east side of the property and Calabash Avenue to the west of the property. The property is vacant and undeveloped.

San Bernardino County Flood Control District has a series of water infiltration basins along the south side of Whittram Avenue across the street from the project site. There is a mix of industrial -manufacturing uses to the north, west and east of the project site, with a single family residential property immediately adjacent to the site along the west property line.

The soil type for the area is Type A per Figure C-13 "Hydrologic Soils Group Map for Southwest – A Area" from the San Bernardino County Hydrology Manual.

## METHODOLOGY

Subareas were determined based on the proposed grading of the site. A link-node model was created for each subarea, with flow path length and elevations shown for the upstream and downstream nodes for the subarea. Peak flowrates were determined for each subarea using the CivilDesign Corporation "SB" rational method hydrology software. The results of those calculations are shown on the site hydrology map included with this report. Separate maps for the existing and developed condition are included with this report.

## ANALYSES/DISCUSSION

Rational method hydrology calculations have been prepared for 2, 10 & 100-year existing and proposed condition for the project site. In the existing condition site drainage sheet flows across the property out to Whittram Avenue where it is collected by a series of catch basins along the north side of the street. Area 1 is tributary to a catch basin located nominally in the center of the property, with Area 2 tributary to catch basin located westerly of the property at Calabash Avenue.

In the proposed condition the site will be divided into three sub-areas where storm flows will sheet flow across the site towards Whittram Avenue where they will be directed into

an infiltration trench system. The infiltration trenches will be located in the proposed landscape area onsite adjacent to the street right-of-way. Areas 1 and 2 will be connected via the infiltration trenches and comprise 2.97 acres in total. The flow from these two areas will be conveyed to the existing catch basin on Whittram Avenue. The project will not be required to mitigate for increase runoff due to the direct connection to the existing Ultimate MS4 storm drain improvements in Whittram Avenue.

The drainage areas and peak 2, 10 & 100-year discharges are summarized below:

**Rational Method Calculations**

**Existing Condition**

| Description | Area (Ac.) | 2-year discharge (cfs) | 10-year discharge (cfs) | 100-year discharge (cfs) | Tc min. |
|---|---|---|---|---|---|
| Area 1 | 1.61 | 0.507 | 1.919 | 4.064 | 16.188 |
| Area 2 | 2.56 | 0.819 | 3.074 | 6.497 | 16.054 |

**Proposed Condition**

| Description | Area (Ac.) | 2-year discharge (cfs) | 10-year discharge (cfs) | 100-year discharge (cfs) | Tc min. |
|---|---|---|---|---|---|
| Area 1 | 0.63 | 1.20 | 1.95 | 3.21 | 5.78 |
| Area 2 | 2.34 | 4.01 | 6.55 | 10.82 | 6.78 |
| Area 3 | 1.21 | 2.05 | 3.35 | 5.53 | 6.90 |

## PROPOSED PROJECT BMP's

Based on soil infiltration test results we have selected an infiltration trench system onsite as the method for treatment of onsite flows. The details of the proposed infiltration trench system are described in detail in the Preliminary Water Quality Management Plan prepared for this project.

## CONCLUSION

Based on the calculations and proposed improvements, onsite flows can be conveyed to suitable points of disposal, and the proposed site development will not impact offsite properties. This project is not required to mitigate incremental increases in runoff due to the direct storm drain connection to the ultimate MS4 improvements – see note in approved preliminary hydrology report (copy attached for reference).

# Appendix A
# Existing Condition Rational Method Calculations

## 2-year
## 10-year
## 100-year

exist12year

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 02/20/20

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14044 Whitram Avenue - Area 1
existing condition - 2 year storm flows
File Name: exist2year
RMB

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Program License Serial Number 6288

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********* Hydrology Study Control Information **********

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Rational hydrology study storm event year is 2.0
Computed rainfall intensity:
Storm year = 2.00 1 hour rainfall = 0.542 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 1

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

Process from Point/Station 100.000 to Point/Station 101.000
**** INITIAL AREA EVALUATION ****

---

UNDEVELOPED (poor cover) subarea
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 67.00
Adjusted SCS curve number for AMC 1 = 47.40
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.840(In/Hr)
Initial subarea data:
Initial area flow distance = 554.000(Ft.)
Top (of initial area) elevation = 60.900(Ft.)
Bottom (of initial area) elevation = 54.800(Ft.)
Difference in elevation = 6.100(Ft.)
Slope = 0.01101 s(%)= 1.10
TC = k(0.525)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 16.188 min.

exist12year
Rainfall intensity = 1.190(In/Hr) for a 2.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.265
Subarea runoff = 0.507(CFS)
Total initial stream area = 1.610(Ac.)
Pervious area fraction = 1.000
Initial area Fm value = 0.840(In/Hr)
End of computations, Total Study Area = 1.61 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged SCS curve number = 67.0

exist22year

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 02/20/20

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14044 Whitram Avenue - Area 2
existing condtion - 2 year storm
File Name exist22year
RMB

---

Program License Serial Number 6288

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********* Hydrology Study Control Information **********

---

Rational hydrology study storm event year is 2.0
Computed rainfall intensity:
Storm year = 2.00 1 hour rainfall = 0.542 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 1

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Process from Point/Station 110.000 to Point/Station 111.000
**** INITIAL AREA EVALUATION ****

---

UNDEVELOPED (poor cover) subarea
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 67.00
Adjusted SCS curve number for AMC 1 = 47.40
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.840(In/Hr)
Initial subarea data:
Initial area flow distance = 622.000(Ft.)
Top (of initial area) elevation = 60.500(Ft.)
Bottom (of initial area) elevation = 51.500(Ft.)
Difference in elevation = 9.000(Ft.)
Slope = 0.01447 s(%)= 1.45
TC = k(0.525)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 16.054 min.

exist22year
Rainfall intensity = 1.195(In/Hr) for a 2.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.268
Subarea runoff = 0.819(CFS)
Total initial stream area = 2.560(Ac.)
Pervious area fraction = 1.000
Initial area Fm value = 0.840(In/Hr)
End of computations, Total Study Area = 2.56 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged SCS curve number = 67.0

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 02/20/20

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14044 Whitramn Avenue - Area 1
existing condition - 10 year storm flows
File Name: exist110year
RMB

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Program License Serial Number 6288

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********* Hydrology Study Control Information **********

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Rational hydrology study storm event year is 10.0
Computed rainfall intensity:
Storm year = 10.00 1 hour rainfall = 0.867 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 2

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

Process from Point/Station 100.000 to Point/Station 101.000
**** INITIAL AREA EVALUATION ****

---

UNDEVELOPED (poor cover) subarea
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 67.00
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.578(In/Hr)
Initial subarea data:
Initial area flow distance = 554.000(Ft.)
Top (of initial area) elevation = 60.900(Ft.)
Bottom (of initial area) elevation = 54.800(Ft.)
Difference in elevation = 6.100(Ft.)
Slope = 0.01101 s(%)= 1.10
TC = k(0.525)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 16.188 min.
Rainfall intensity = 1.903(In/Hr) for a 10.0 year storm

exist110year
Effective runoff coefficient used for area (Q=KCIA) is C = 0.626
Subarea runoff = 1.919(CFS)
Total initial stream area = 1.610(Ac.)
Pervious area fraction = 1.000
Initial area Fm value = 0.578(In/Hr)
End of computations, Total Study Area = 1.61 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged SCS curve number = 67.0

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 02/20/20

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14044 Whitram Avenue - Area 2
existing condition - 10 year storm flows
File Name: exist210year
RMB

---

Program License Serial Number 6288

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********* Hydrology Study Control Information **********

---

Rational hydrology study storm event year is 10.0
Computed rainfall intensity:
Storm year = 10.00 1 hour rainfall = 0.867 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 2

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Process from Point/Station 110.000 to Point/Station 111.000
**** INITIAL AREA EVALUATION ****

---

UNDEVELOPED (poor cover) subarea
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 67.00
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.578(In/Hr)
Initial subarea data:
Initial area flow distance = 622.000(Ft.)
Top (of initial area) elevation = 60.500(Ft.)
Bottom (of initial area) elevation = 51.500(Ft.)
Difference in elevation = 9.000(Ft.)
Slope = 0.01447 s(%)= 1.45
TC = k(0.525)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 16.054 min.
Rainfall intensity = 1.912(In/Hr) for a 10.0 year storm

exist210year
Effective runoff coefficient used for area (Q=KCIA) is C = 0.628
Subarea runoff = 3.074(CFS)
Total initial stream area = 2.560(Ac.)
Pervious area fraction = 1.000
Initial area Fm value = 0.578(In/Hr)
End of computations, Total Study Area = 2.56 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged SCS curve number = 67.0

exist1100year

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 02/20/20

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14044 Whitram Avenue - Area 1
existing condition - 100 year storm flows
File Name: exist1100year
RMB

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Program License Serial Number 6288

---

********* Hydrology Study Control Information **********

---

Rational hydrology study storm event year is 100.0
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.410 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 3

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Process from Point/Station 100.000 to Point/Station 101.000
**** INITIAL AREA EVALUATION ****

---

UNDEVELOPED (poor cover) subarea
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 67.00
Adjusted SCS curve number for AMC 3 = 84.60
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.290(In/Hr)
Initial subarea data:
Initial area flow distance = 554.000(Ft.)
Top (of initial area) elevation = 60.900(Ft.)
Bottom (of initial area) elevation = 54.800(Ft.)
Difference in elevation = 6.100(Ft.)
Slope = 0.01101 s(%)= 1.10
TC = k(0.525)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 16.188 min.

exist1100year
Rainfall intensity = 3.094(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.816
Subarea runoff = 4.064(CFS)
Total initial stream area = 1.610(Ac.)
Pervious area fraction = 1.000
Initial area Fm value = 0.290(In/Hr)
End of computations, Total Study Area = 1.61 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged SCS curve number = 67.0

exist2100year

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 02/20/20

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14044 Whitram AVenue - Area 2
existing condition - 100 year storm flows
File Name: exist2100year
RMB

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Program License Serial Number 6288

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********* Hydrology Study Control Information **********

---

Rational hydrology study storm event year is 100.0
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.410 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 3

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

Process from Point/Station 110.000 to Point/Station 111.000
**** INITIAL AREA EVALUATION ****

---

UNDEVELOPED (poor cover) subarea
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 67.00
Adjusted SCS curve number for AMC 3 = 84.60
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.290(In/Hr)
Initial subarea data:
Initial area flow distance = 622.000(Ft.)
Top (of initial area) elevation = 60.500(Ft.)
Bottom (of initial area) elevation = 51.500(Ft.)
Difference in elevation = 9.000(Ft.)
Slope = 0.01447 s(%)= 1.45
TC = k(0.525)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 16.054 min.

exist2100year
Rainfall intensity = 3.110(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.816
Subarea runoff = 6.497(CFS)
Total initial stream area = 2.560(Ac.)
Pervious area fraction = 1.000
Initial area Fm value = 0.290(In/Hr)
End of computations, Total Study Area = 2.56 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged SCS curve number = 67.0

# Appendix B
# Proposed Condition Rational Method Calculations

## 2-year
## 10-year
## 100-year

prop12year

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 02/20/20

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14044 Whitram Avenue - Proposed Condition
ARea 1 - 2 year flow rates
File Name: prop12year
RMB

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Program License Serial Number 6288

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********* Hydrology Study Control Information **********

---

Rational hydrology study storm event year is 2.0
Computed rainfall intensity:
Storm year = 2.00 1 hour rainfall = 0.542 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 1

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

Process from Point/Station 100.000 to Point/Station 101.000
**** INITIAL AREA EVALUATION ****

---

COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Adjusted SCS curve number for AMC 1 = 16.60
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.100(In/Hr)
Initial subarea data:
Initial area flow distance = 176.000(Ft.)
Top (of initial area) elevation = 60.900(Ft.)
Bottom (of initial area) elevation = 58.700(Ft.)
Difference in elevation = 2.200(Ft.)
Slope = 0.01250 s(%)= 1.25
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 5.777 min.

prop12year
Rainfall intensity = 2.207(In/Hr) for a 2.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.859
Subarea runoff = 1.195(CFS)
Total initial stream area = 0.630(Ac.)
Pervious area fraction = 0.100
Initial area Fm value = 0.100(In/Hr)
End of computations, Total Study Area = 0.63 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.100
Area averaged SCS curve number = 32.0

prop22year

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 03/21/20

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14044 Whitram AVenue - Proposed Condition
Area 2 - 2 year flow rates
File Name: prop22year
RMB

---

Program License Serial Number 6288

---

********* Hydrology Study Control Information **********

---

Rational hydrology study storm event year is 2.0
Computed rainfall intensity:
Storm year = 2.00 1 hour rainfall = 0.542 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 1

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

Process from Point/Station 200.000 to Point/Station 201.000
**** INITIAL AREA EVALUATION ****

---

COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Adjusted SCS curve number for AMC 1 = 16.60
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.100(In/Hr)
Initial subarea data:
Initial area flow distance = 308.000(Ft.)
Top (of initial area) elevation = 60.900(Ft.)
Bottom (of initial area) elevation = 55.600(Ft.)
Difference in elevation = 5.300(Ft.)
Slope = 0.01721 s(%)= 1.72
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 6.779 min.

prop22year
Rainfall intensity = 2.005(In/Hr) for a 2.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.855
Subarea runoff = 4.013(CFS)
Total initial stream area = 2.340(Ac.)
Pervious area fraction = 0.100
Initial area Fm value = 0.100(In/Hr)
End of computations, Total Study Area = 2.34 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.100
Area averaged SCS curve number = 32.0

prop32year

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 03/21/20

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14044 Whitram Avenue - Proposed Condition
Area 3 - 2 year flow rates
File Name: propo32year
RMB

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Program License Serial Number 6288

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********* Hydrology Study Control Information **********

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Rational hydrology study storm event year is 2.0
Computed rainfall intensity:
Storm year = 2.00 1 hour rainfall = 0.542 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 1

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Process from Point/Station 300.000 to Point/Station 301.000
**** INITIAL AREA EVALUATION ****

---

COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Adjusted SCS curve number for AMC 1 = 16.60
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.100(In/Hr)
Initial subarea data:
Initial area flow distance = 338.000(Ft.)
Top (of initial area) elevation = 58.400(Ft.)
Bottom (of initial area) elevation = 52.000(Ft.)
Difference in elevation = 6.400(Ft.)
Slope = 0.01893 s(%)= 1.89
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 6.902 min.

prop32year
Rainfall intensity = 1.984(In/Hr) for a 2.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.855
Subarea runoff = 2.051(CFS)
Total initial stream area = 1.210(Ac.)
Pervious area fraction = 0.100
Initial area Fm value = 0.100(In/Hr)
End of computations, Total Study Area = 1.21 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.100
Area averaged SCS curve number = 32.0

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 02/20/20

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14044 Whitram Avenue - Proposed Condition
Area 1 - 10 year flow rates
File Name: propo110year
RMB

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Program License Serial Number 6288

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********* Hydrology Study Control Information **********

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Rational hydrology study storm event year is 10.0
Computed rainfall intensity:
Storm year = 10.00 1 hour rainfall = 0.867 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 2

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Process from Point/Station 100.000 to Point/Station 101.000
**** INITIAL AREA EVALUATION ****

---

COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.098(In/Hr)
Initial subarea data:
Initial area flow distance = 176.000(Ft.)
Top (of initial area) elevation = 60.900(Ft.)
Bottom (of initial area) elevation = 58.700(Ft.)
Difference in elevation = 2.200(Ft.)
Slope = 0.01250 s(%)= 1.25
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 5.777 min.
Rainfall intensity = 3.531(In/Hr) for a 10.0 year storm

Effective runoff coefficient used for area (Q=KCIA) is C = 0.875
Subarea runoff = 1.947(CFS)
Total initial stream area = 0.630(Ac.)
Pervious area fraction = 0.100
Initial area Fm value = 0.098(In/Hr)
End of computations, Total Study Area = 0.63 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.100
Area averaged SCS curve number = 32.0

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 03/21/20

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14044 Whitram Avenue - Proposed Condition
Area 2 - 10 year storm flow rates
File Name: prop210year
RMB

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Program License Serial Number 6288

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********* Hydrology Study Control Information **********

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Rational hydrology study storm event year is 10.0
Computed rainfall intensity:
Storm year = 10.00 1 hour rainfall = 0.867 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 2

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Process from Point/Station 200.000 to Point/Station 201.000
**** INITIAL AREA EVALUATION ****

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COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.098(In/Hr)
Initial subarea data:
Initial area flow distance = 308.000(Ft.)
Top (of initial area) elevation = 60.900(Ft.)
Bottom (of initial area) elevation = 55.600(Ft.)
Difference in elevation = 5.300(Ft.)
Slope = 0.01721 s(%)= 1.72
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 6.779 min.
Rainfall intensity = 3.208(In/Hr) for a 10.0 year storm

Effective runoff coefficient used for area (Q=KCIA) is C = 0.873
Subarea runoff = 6.550(CFS)
Total initial stream area = 2.340(Ac.)
Pervious area fraction = 0.100
Initial area Fm value = 0.098(In/Hr)
End of computations, Total Study Area = 2.34 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.100
Area averaged SCS curve number = 32.0

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 03/21/20

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14044 Whitram Avenue - Proposed Condition
Area 3 - 10 year flow rates
File Name: prop310year
RMB

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Program License Serial Number 6288

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********* Hydrology Study Control Information **********

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Rational hydrology study storm event year is 10.0
Computed rainfall intensity:
Storm year = 10.00 1 hour rainfall = 0.867 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 2

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Process from Point/Station 300.000 to Point/Station 301.000
**** INITIAL AREA EVALUATION ****

---

COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.098(In/Hr)
Initial subarea data:
Initial area flow distance = 338.000(Ft.)
Top (of initial area) elevation = 58.400(Ft.)
Bottom (of initial area) elevation = 52.000(Ft.)
Difference in elevation = 6.400(Ft.)
Slope = 0.01893 s(%)= 1.89
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 6.902 min.
Rainfall intensity = 3.173(In/Hr) for a 10.0 year storm

Effective runoff coefficient used for area (Q=KCIA) is C = 0.872
Subarea runoff = 3.349(CFS)
Total initial stream area = 1.210(Ac.)
Pervious area fraction = 0.100
Initial area Fm value = 0.098(In/Hr)
End of computations, Total Study Area = 1.21 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.100
Area averaged SCS curve number = 32.0

prop1100year

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 02/20/20

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14044 Whitram Avenue - Proposed Condition
Area 1 - 100 year storm flows
File Name: prop1100year
RMB

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Program License Serial Number 6288

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********* Hydrology Study Control Information **********

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Rational hydrology study storm event year is 100.0
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.410 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 3

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Process from Point/Station 100.000 to Point/Station 101.000
**** INITIAL AREA EVALUATION ****

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COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.079(In/Hr)
Initial subarea data:
Initial area flow distance = 176.000(Ft.)
Top (of initial area) elevation = 60.900(Ft.)
Bottom (of initial area) elevation = 58.700(Ft.)
Difference in elevation = 2.200(Ft.)
Slope = 0.01250 s(%)= 1.25
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 5.777 min.

prop1100year
Rainfall intensity = 5.742(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.888
Subarea runoff = 3.211(CFS)
Total initial stream area = 0.630(Ac.)
Pervious area fraction = 0.100
Initial area Fm value = 0.079(In/Hr)
End of computations, Total Study Area = 0.63 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.100
Area averaged SCS curve number = 32.0

prop2100year

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 03/21/20

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14044 Whitram Avenue - Proposed Condition
Area 2 - 100 year flow rates
File Name: prop2100year
RMB

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Program License Serial Number 6288

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********* Hydrology Study Control Information **********

---

Rational hydrology study storm event year is 100.0
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.410 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 3

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Process from Point/Station 200.000 to Point/Station 201.000
**** INITIAL AREA EVALUATION ****

---

COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.079(In/Hr)
Initial subarea data:
Initial area flow distance = 308.000(Ft.)
Top (of initial area) elevation = 60.900(Ft.)
Bottom (of initial area) elevation = 55.600(Ft.)
Difference in elevation = 5.300(Ft.)
Slope = 0.01721 s(%)= 1.72
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 6.779 min.

prop2100year
Rainfall intensity = 5.217(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.886
Subarea runoff = 10.822(CFS)
Total initial stream area = 2.340(Ac.)
Pervious area fraction = 0.100
Initial area Fm value = 0.079(In/Hr)
End of computations, Total Study Area = 2.34 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.100
Area averaged SCS curve number = 32.0

prop3100year

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 03/21/20

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14044 Whitram Avenue - Proposed Condition
Area 3 - 100 year flow rates
File Name: prop3100year
RMB

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Program License Serial Number 6288

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********* Hydrology Study Control Information **********

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Rational hydrology study storm event year is 100.0
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.410 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 3

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Process from Point/Station 300.000 to Point/Station 301.000
**** INITIAL AREA EVALUATION ****

---

COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.079(In/Hr)
Initial subarea data:
Initial area flow distance = 338.000(Ft.)
Top (of initial area) elevation = 58.400(Ft.)
Bottom (of initial area) elevation = 52.000(Ft.)
Difference in elevation = 6.400(Ft.)
Slope = 0.01893 s(%)= 1.89
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 6.902 min.

prop3100year
Rainfall intensity = 5.161(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.886
Subarea runoff = 5.535(CFS)
Total initial stream area = 1.210(Ac.)
Pervious area fraction = 0.100
Initial area Fm value = 0.079(In/Hr)
End of computations, Total Study Area = 1.21 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.100
Area averaged SCS curve number = 32.0

# Appendix C
# NOAA Atlas 14 Rainfall Data
# For
# Fontana, CA area

**NOAA Atlas 14, Volume 6, Version 2**
**Location name: Fontana, California, USA***
**Latitude: 34.0968°, Longitude: -117.5012°**
**Elevation: 1160.99 ft****
* source: ESRI Maps
** source: USGS

## POINT PRECIPITATION FREQUENCY ESTIMATES

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

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

# PF tabular

**PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]**

| Duration | Average recurrence interval (years) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 5 | 10 | 25 | 50 | 100 | 200 | 500 | 1000 |
| 5-min | **0.111** (0.092-0.134) | **0.146** (0.121-0.177) | **0.193** (0.160-0.235) | **0.233** (0.191-0.286) | **0.289** (0.229-0.367) | **0.333** (0.259-0.433) | **0.380** (0.288-0.506) | **0.429** (0.316-0.589) | **0.499** (0.352-0.715) | **0.556** (0.379-0.825) |
| 10-min | **0.159** (0.132-0.192) | **0.209** (0.174-0.253) | **0.277** (0.229-0.337) | **0.334** (0.274-0.410) | **0.414** (0.329-0.526) | **0.478** (0.371-0.620) | **0.544** (0.413-0.725) | **0.616** (0.453-0.844) | **0.716** (0.505-1.02) | **0.797** (0.543-1.18) |
| 15-min | **0.192** (0.160-0.233) | **0.252** (0.210-0.306) | **0.335** (0.278-0.407) | **0.403** (0.332-0.495) | **0.500** (0.398-0.636) | **0.577** (0.449-0.750) | **0.658** (0.499-0.877) | **0.744** (0.548-1.02) | **0.866** (0.611-1.24) | **0.964** (0.656-1.43) |
| 30-min | **0.282** (0.235-0.342) | **0.371** (0.309-0.450) | **0.491** (0.408-0.598) | **0.593** (0.488-0.728) | **0.735** (0.584-0.934) | **0.848** (0.660-1.10) | **0.967** (0.733-1.29) | **1.09** (0.805-1.50) | **1.27** (0.897-1.82) | **1.42** (0.964-2.10) |
| 60-min | **0.412** (0.343-0.499) | **0.542** (0.451-0.658) | **0.718** (0.596-0.875) | **0.867** (0.713-1.06) | **1.08** (0.854-1.37) | **1.24** (0.965-1.61) | **1.41** (1.07-1.88) | **1.60** (1.18-2.19) | **1.86** (1.31-2.66) | **2.07** (1.41-3.07) |
| 2-hr | **0.632** (0.527-0.766) | **0.816** (0.679-0.990) | **1.06** (0.881-1.29) | **1.27** (1.04-1.55) | **1.55** (1.23-1.97) | **1.78** (1.38-2.31) | **2.01** (1.52-2.68) | **2.26** (1.66-3.09) | **2.60** (1.84-3.72) | **2.88** (1.96-4.27) |
| 3-hr | **0.813** (0.677-0.986) | **1.04** (0.867-1.27) | **1.35** (1.12-1.64) | **1.60** (1.32-1.96) | **1.95** (1.55-2.47) | **2.22** (1.73-2.88) | **2.50** (1.90-3.33) | **2.80** (2.06-3.83) | **3.21** (2.26-4.59) | **3.53** (2.41-5.24) |
| 6-hr | **1.18** (0.981-1.43) | **1.51** (1.25-1.83) | **1.94** (1.61-2.36) | **2.29** (1.88-2.81) | **2.76** (2.19-3.51) | **3.13** (2.43-4.06) | **3.50** (2.65-4.66) | **3.88** (2.86-5.32) | **4.40** (3.11-6.30) | **4.81** (3.28-7.14) |
| 12-hr | **1.58** (1.31-1.91) | **2.04** (1.70-2.48) | **2.63** (2.19-3.21) | **3.10** (2.55-3.81) | **3.72** (2.96-4.73) | **4.18** (3.25-5.43) | **4.64** (3.52-6.18) | **5.10** (3.76-6.99) | **5.71** (4.03-8.17) | **6.17** (4.20-9.16) |
| 24-hr | **2.13** (1.88-2.45) | **2.81** (2.49-3.25) | **3.67** (3.24-4.24) | **4.34** (3.79-5.06) | **5.20** (4.40-6.27) | **5.83** (4.84-7.17) | **6.45** (5.23-8.13) | **7.06** (5.57-9.15) | **7.86** (5.95-10.6) | **8.45** (6.18-11.8) |
| 2-day | **2.60** (2.31-3.00) | **3.53** (3.12-4.07) | **4.71** (4.15-5.45) | **5.64** (4.94-6.58) | **6.88** (5.83-8.29) | **7.81** (6.48-9.60) | **8.73** (7.07-11.0) | **9.66** (7.61-12.5) | **10.9** (8.24-14.7) | **11.8** (8.64-16.5) |
| 3-day | **2.83** (2.51-3.26) | **3.90** (3.45-4.50) | **5.28** (4.66-6.11) | **6.40** (5.60-7.47) | **7.92** (6.71-9.54) | **9.08** (7.53-11.2) | **10.3** (8.31-12.9) | **11.5** (9.04-14.9) | **13.1** (9.91-17.7) | **14.4** (10.5-20.1) |
| 4-day | **3.08** (2.73-3.55) | **4.28** (3.78-4.93) | **5.85** (5.16-6.76) | **7.13** (6.24-8.32) | **8.89** (7.53-10.7) | **10.3** (8.51-12.6) | **11.7** (9.44-14.7) | **13.1** (10.3-17.0) | **15.1** (11.4-20.3) | **16.6** (12.2-23.2) |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **7-day** | **3.57** (3.16-4.12) | **5.00** (4.42-5.77) | **6.89** (6.08-7.97) | **8.45** (7.40-9.86) | **10.6** (8.99-12.8) | **12.3** (10.2-15.1) | **14.0** (11.4-17.7) | **15.8** (12.5-20.5) | **18.3** (13.9-24.8) | **20.3** (14.9-28.4) |
| **10-day** | **3.88** (3.44-4.48) | **5.46** (4.83-6.30) | **7.57** (6.68-8.76) | **9.32** (8.15-10.9) | **11.7** (9.94-14.1) | **13.6** (11.3-16.8) | **15.6** (12.6-19.7) | **17.7** (13.9-22.9) | **20.5** (15.5-27.7) | **22.8** (16.7-31.9) |
| **20-day** | **4.53** (4.01-5.22) | **6.46** (5.71-7.45) | **9.08** (8.01-10.5) | **11.3** (9.87-13.2) | **14.4** (12.2-17.3) | **16.8** (14.0-20.7) | **19.4** (15.7-24.4) | **22.1** (17.4-28.7) | **26.0** (19.7-35.0) | **29.1** (21.3-40.6) |
| **30-day** | **5.33** (4.72-6.14) | **7.65** (6.76-8.83) | **10.8** (9.54-12.5) | **13.5** (11.8-15.7) | **17.3** (14.6-20.8) | **20.3** (16.9-25.0) | **23.6** (19.1-29.7) | **27.0** (21.3-35.0) | **31.9** (24.1-43.0) | **35.9** (26.2-50.0) |
| **45-day** | **6.30** (5.57-7.26) | **9.02** (7.98-10.4) | **12.8** (11.3-14.8) | **16.0** (14.0-18.6) | **20.6** (17.4-24.8) | **24.3** (20.1-29.9) | **28.2** (22.9-35.6) | **32.5** (25.6-42.1) | **38.6** (29.2-52.0) | **43.6** (31.9-60.8) |
| **60-day** | **7.34** (6.50-8.46) | **10.4** (9.22-12.0) | **14.7** (13.0-17.0) | **18.4** (16.1-21.5) | **23.7** (20.1-28.6) | **28.0** (23.3-34.5) | **32.7** (26.5-41.2) | **37.7** (29.7-48.8) | **45.0** (34.0-60.7) | **51.0** (37.3-71.1) |

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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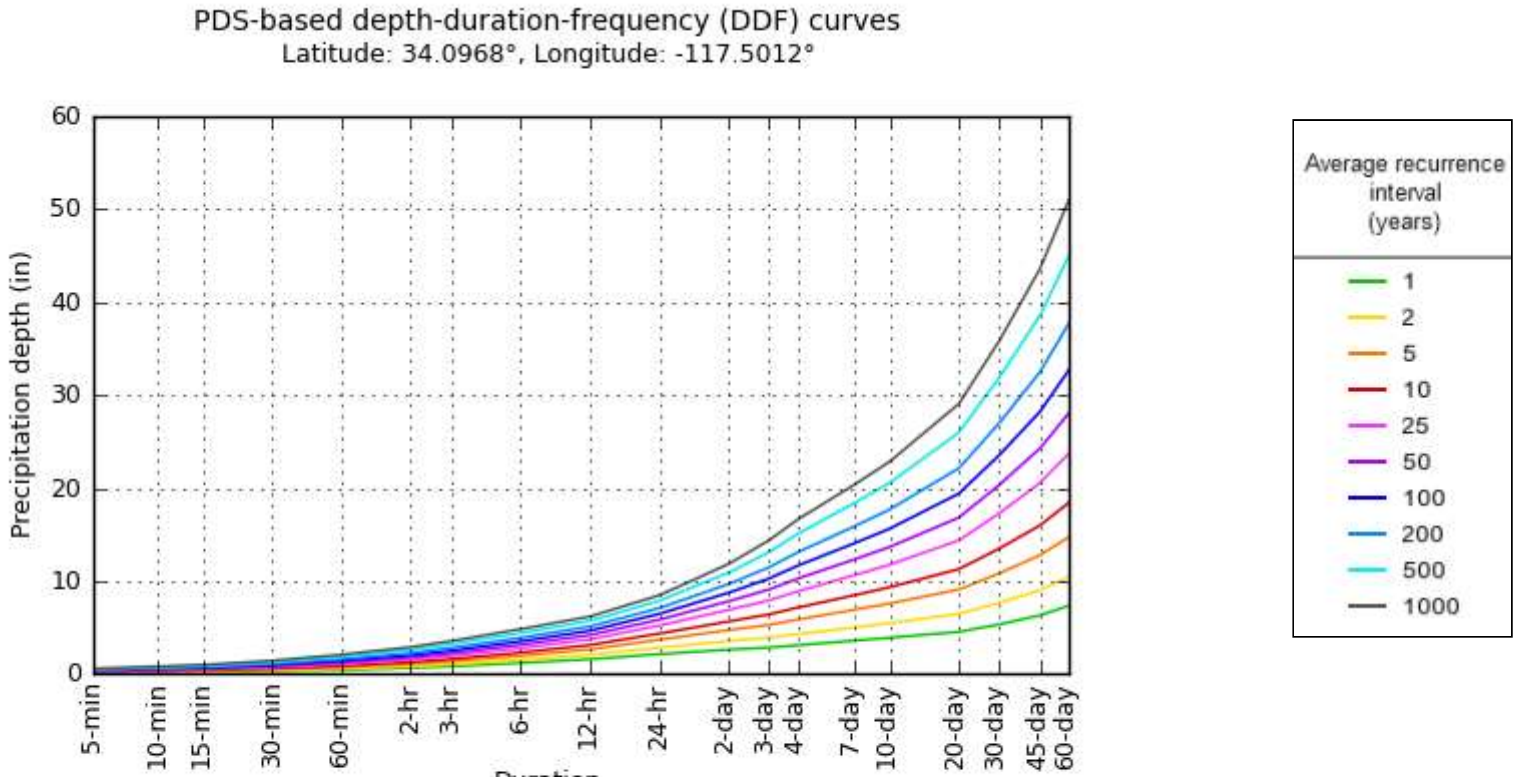
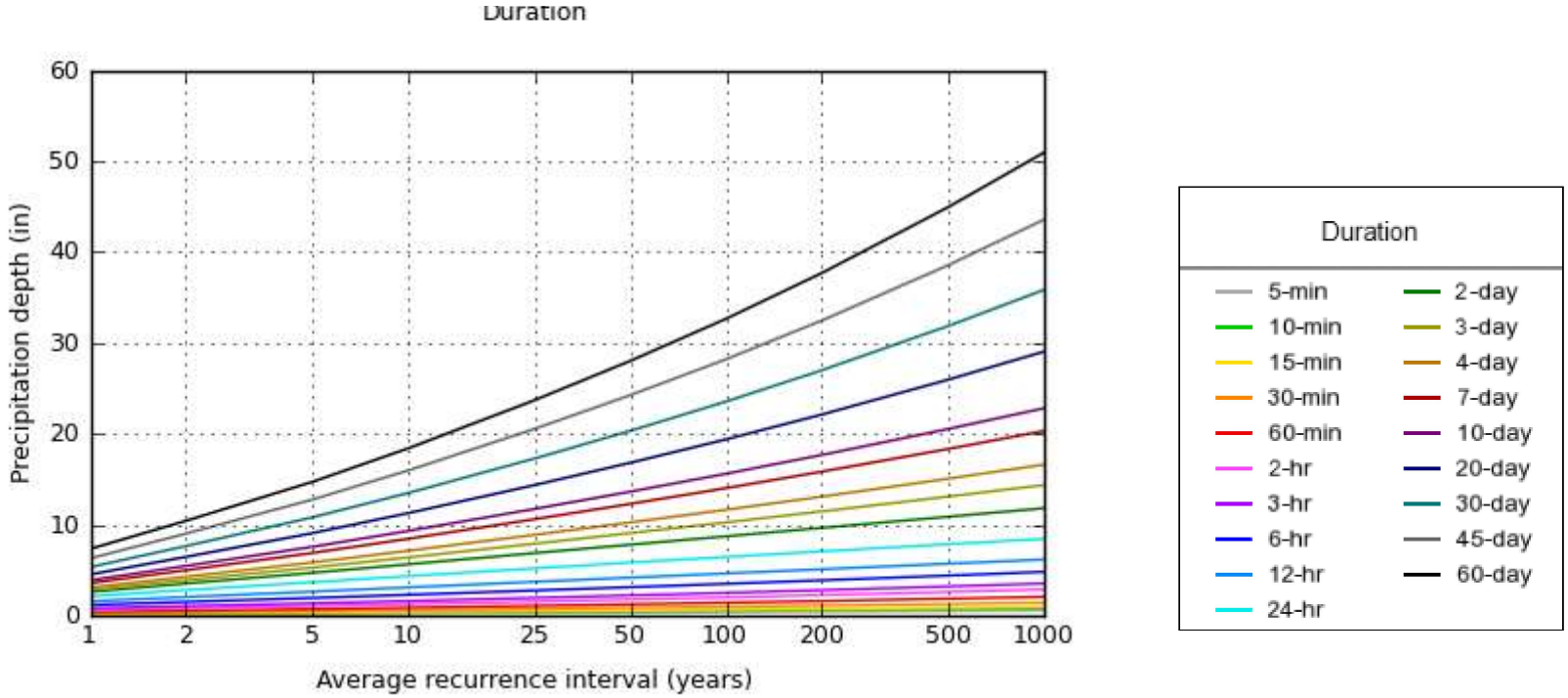
## PF graphical






NOAA Atlas 14, Volume 6, Version 2 Created (GMT): Tue Feb 18 18:34:11 2020

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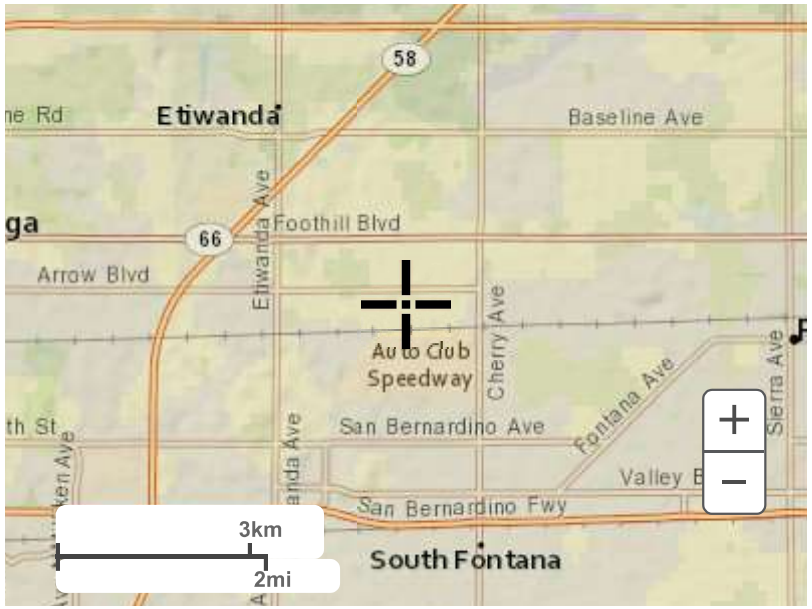
## Maps & aerials

**Small scale terrain**




**Large scale terrain**

**Large scale map**

**Large scale aerial**

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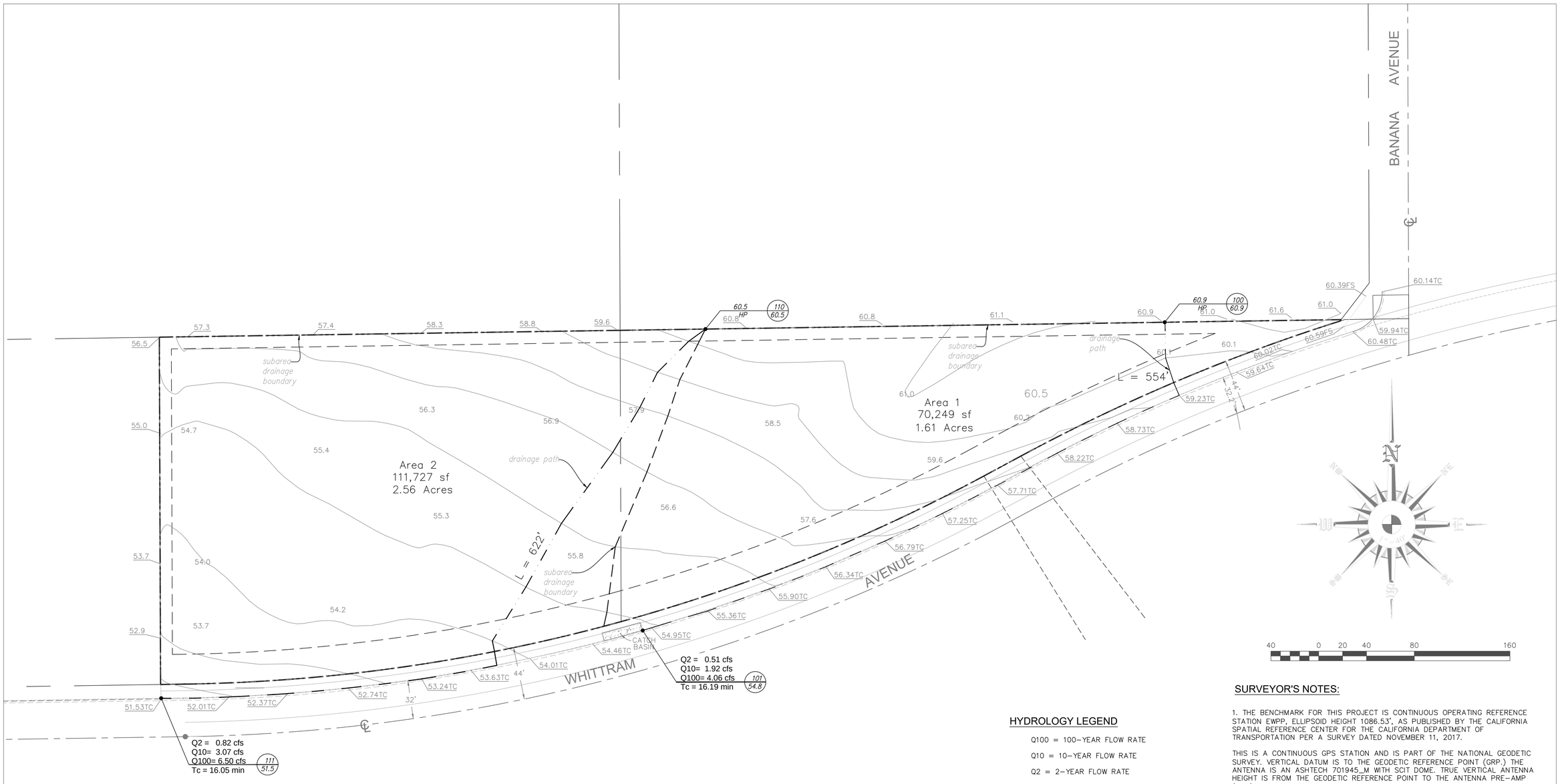
US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer




## HYDROLOGY DATA

100 YEAR – 1 YEAR RAINFALL INTENSITY = 1.41 INCH

10 YEAR – 1 HOUR RAINFALL INTENSITY = 0.867 INCH

SLOPE USED FOR RAINFALL INTENSITY CURVE = 0.600

AMC I USED FOR 2 YEAR STORM RUNNOFF CALCULATIONS
AMC II USED FOR 10 & 100 YEAR STORM RUNNOFF CALCULATIONS

ASSUMED HYDROLOGIC LAND USE OF UNDEVELOPED – POOR COVER

SOIL TYPE A

## HYDROLOGY LEGEND

Q100 = 100–YEAR FLOW RATE

Q10 = 10–YEAR FLOW RATE

Q2 = 2–YEAR FLOW RATE

Tc = TIME OF CONCENTRATION – MINUTES

L = FLOW PATH LENGTH IN FEET

101 / 54.8 — NODE NUMBER / ELEVATION

DRAINAGE AREA BOUNDARY

DRAINAGE FLOW PATH

REGISTERED PROFESSIONAL ENGINEER
ROBERT MARK BEERS
No. 39405
Exp. 12-31-23
CIVIL
STATE OF CALIFORNIA

## SURVEYOR'S NOTES:

1. THE BENCHMARK FOR THIS PROJECT IS CONTINUOUS OPERATING REFERENCE STATION EWPP, ELLIPSOID HEIGHT 1086.53', AS PUBLISHED BY THE CALIFORNIA SPATIAL REFERENCE CENTER FOR THE CALIFORNIA DEPARTMENT OF TRANSPORTATION PER A SURVEY DATED NOVEMBER 11, 2017.

THIS IS A CONTINUOUS GPS STATION AND IS PART OF THE NATIONAL GEODETIC SURVEY. VERTICAL DATUM IS TO THE GEODETIC REFERENCE POINT (GRP.) THE ANTENNA IS AN ASHTECH 701945_M WITH SCIT DOME. TRUE VERTICAL ANTENNA HEIGHT IS FROM THE GEODETIC REFERENCE POINT TO THE ANTENNA PRE–AMP (BPA) AND IS 0.027 FEET.

2. THIS SURVEY DOES NOT CONSTITUTE A BOUNDARY RETRACEMENT SURVEY. THE DISTINCTIVE BOLD BOUNDARY LINE SHOWN HEREON IS FOR INFORMATIONAL PURPOSES ONLY AND SHOULD BE CONSIDERED APPROXIMATE. IT HAS BEEN CONSTRUCTED FROM A COMBINATION OF RECORD OF SURVEY 130/78–81 AND THE CURRENT COUNTY ASSESSOR'S MAP.

3. THE BASIS OF BEARINGS FOR THIS SURVEY IS A LINE BETWEEN CONTINUOUS GPS STATIONS "EWPP" AND "RTHS". SAID BEARING IS SOUTH 84°19'30" EAST.

4. THE BASIS OF COORDINATES FOR THIS SURVEY IS THE CALIFORNIA STATE PLANE COORDINATE SYSTEM, ZONE 5, CONSTRAINED LOCALLY TO CONTINUOUS GPS STATIONS "EWPP" AND "RTHS." COORDNIATES ARE PER THE SURVEY PUBLISHED BY THE CALIFORNIA SPATIAL REFERENCE CENTER FOR THE CALIFORNIA DEPARTMENT OF TRANSPORTATION, EPOCH 2017.50 (NAD83.)

*An Original Map Product Contains An Embossed Seal In This Area*

Revisions:

| No. | Date: | By: | Description: | Approved: |
|---|---|---|---|---|
| | | | | |

Designed: | Drawn: | Checked: ACH

Seal:

Prepared under the Supervision of:

Robert M. Beers — 2022-04-17
PROFESSIONAL ENGINEER — DATE
LICENSE NO. 39405
REGISTRATION EXPIRES: 12-31-19

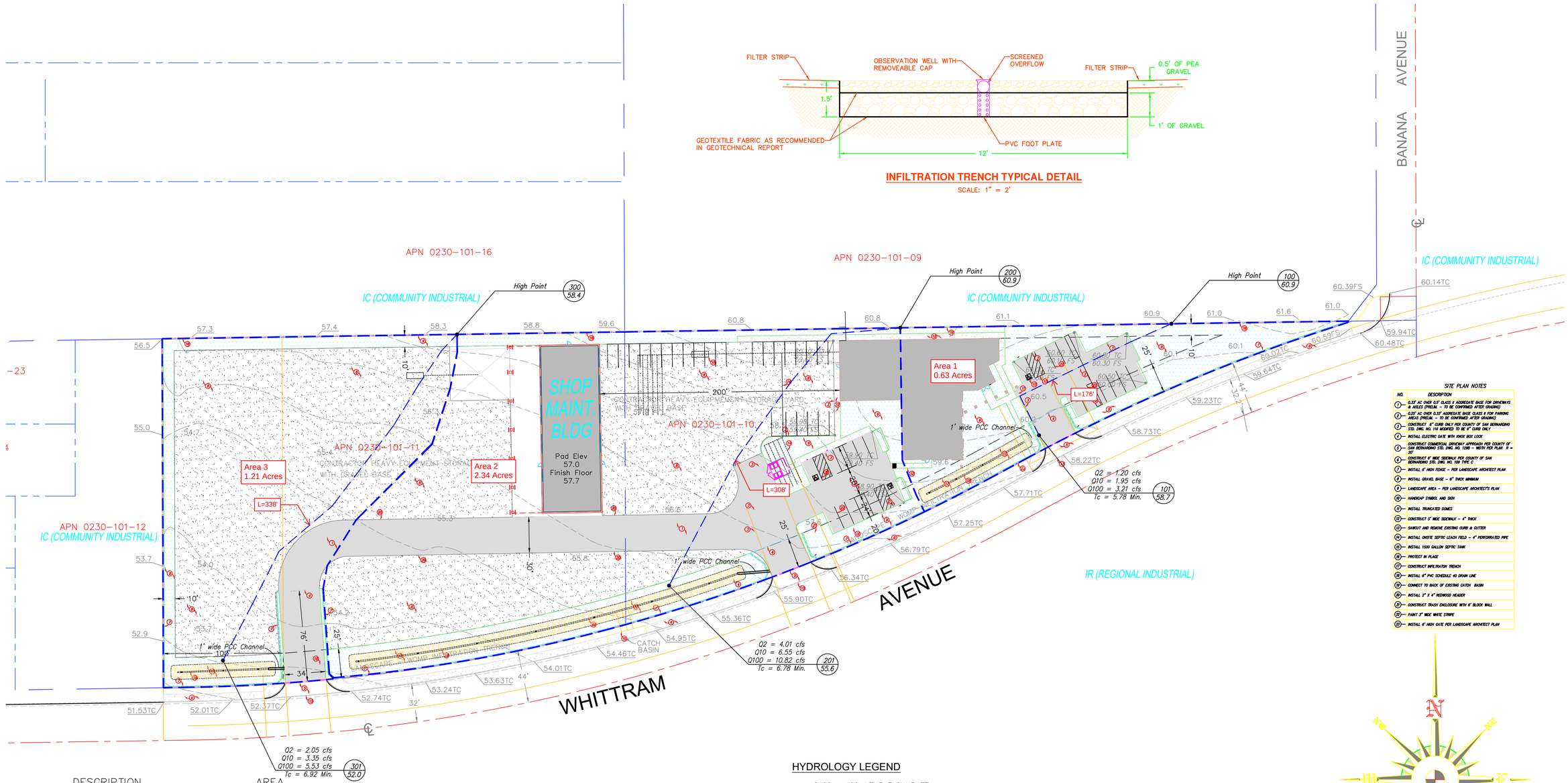
**RMB Consulting**
**Planning - Civil Engineering - Construction Management**
8175 Limonite Avenue, Suite E Jurupa Valley CA 92509

Scale: 1" = 40'
Date: January 2019
BENCHMARK: SEE SURVEYOR'S NOTES

EXISTING CONDITION HYDROLOGY MAP
14044 WHITTRAM AVENUE, FONTANA
PREPARED FOR:
B & D CONSTRUCTION
145 N. 10TH STREET
UPLAND, CA 91786

F.N. | For: | F.B.

Sheet No. 1 OF 1 SHEET
FILE NO. 286–39




## SITE PLAN NOTES

| NO. | DESCRIPTION |
|---|---|
| 1 | 0.33' AC OVER 0.5' CLASS II AGGREGATE BASE FOR DRIVEWAYS & AISLES (TYPICAL – TO BE CONFIRMED AFTER GRADING) |
| 2 | 0.25' AC OVER 0.33' AGGREGATE BASE CLASS II FOR PARKING AREAS (TYPICAL – TO BE CONFIRMED AFTER GRADING) |
| 3 | CONSTRUCT 6" CURB ONLY PER COUNTY OF SAN BERNARDINO STD. DWG. NO. 110 MODIFIED TO BE 6" CURB ONLY |
| 4 | INSTALL ELECTRIC GATE WITH KNOX BOX LOCK |
| 5 | CONSTRUCT COMMERCIAL DRIVEWAY APPROACH PER COUNTY OF SAN BERNARDINO STD. DWG. NO. 1208 – WIDTH PER PLAN 9' – 30' |
| 6 | CONSTRUCT 6" WIDE SIDEWALK PER COUNTY OF SAN BERNARDINO STD. DWG. NO. 109 TYPE C |
| 7 | INSTALL 6' HIGH FENCE – PER LANDSCAPE ARCHITECT PLAN |
| 8 | INSTALL GRAVEL BASE – 6" THICK MINIMUM |
| 9 | LANDSCAPE AREA – PER LANDSCAPE ARCHITECT'S PLAN |
| 10 | HANDICAP SYMBOL AND SIGN |
| 11 | INSTALL TRUNCATED DOMES |
| 12 | CONSTRUCT 5' WIDE SIDEWALK – 4" THICK |
| 13 | SAWCUT AND REMOVE EXISTING CURB & GUTTER |
| 14 | INSTALL ONSITE SEPTIC LEACH FIELD – 4" PERFORMATED PIPE |
| 15 | INSTALL 1500 GALLON SEPTIC TANK |
| 16 | PROTECT IN PLACE |
| 17 | CONSTRUCT INFILTRATION TRENCH |
| 18 | INSTALL 6" PVC SCHEDULE 40 DRAIN LINE |
| 19 | CONNECT TO BACK OF EXISTING CATCH BASIN |
| 20 | INSTALL 3" X 4" REDWOOD HEADER |
| 21 | CONSTRUCT TRASH ENCLOSURE WITH 6' BLOCK WALL |
| 22 | PAINT 3" WIDE WHITE STRIPE |
| 23 | INSTALL 6' HIGH GATE PER LANDSCAPE ARCHITECT PLAN |

| DESCRIPTION | | AREA |
|---|---|---|
| | INFILTRATION TRENCH | 6,308 SF |
| | CONCRETE | 8,215 SF |
| | ASPHALT CONCRETE | 28,843 SF |
| | GRAVEL BASE | 89,418 SF |
| | LANDSCAPE AREA | 32,437 SF |
| | WALL | |

## HYDROLOGY DATA

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AMC I USED FOR 2–YEAR STORM RUNOFF CALCULATIONS
AMC II USED FOR 10–YEAR STORM RUNOFF CALCULATIONS
AMC III USED FOR 100–YEAR STORM RUNOFF CALCULATIONS

ASSUMED HYDROLOGIC LAND USE: COMMERCIAL FOR AREAS 1, 2 & 3

SOIL TYPE A

## HYDROLOGY LEGEND

Q100 = 100–YEAR FLOW RATE

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Q2 = 2–YEAR FLOW RATE

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101 / 54.8 — NODE NUMBER / ELEVATION

DRAINAGE AREA BOUNDARY

DRAINAGE FLOW PATH

REGISTERED PROFESSIONAL ENGINEER — ROBERT MARK BEERS — RMB — No. 39405 Exp. 12–31–23 — CIVIL — STATE OF CALIFORNIA

40 0 20 40 80 160

Scale: 1" = 40'

PREPARED FOR:

B & D CONSTRUCTION
145 N. 10TH STREET
UPLAND, CA 91786

Revisions:

| No. | Date: | By: | Description: | Approved: |
|---|---|---|---|---|
| | | | | |

Designed: | Drawn: | Checked: ACH

Seal:

Prepared under the Supervision of:

Robert M. Beers — 2022-04-17

PROFESSIONAL ENGINEER
LICENSE NO. 39405
REGISTRATION EXPIRES: 12-31-21

**RMB CONSULTING**

LAND PLANNING - CIVIL ENGINEERING - SURVEYING

8175 Limonite Avenue, Suite I • Jurupa Valley, CA 92509 (951) 317-2041

Scale: 1" = 40'

Date: Dec. 15, 2020

BENCHMARK:

SEE SURVEYOR'S NOTES

F.N. | For: | F.B.

WQMP SITE PLAN
14044 WHITTRAM AVENUE, FONTANA
APNs 0230-101 - 10 & 11

Sheet No. 1 OF 1 SHEET

FILE NO. 286-39