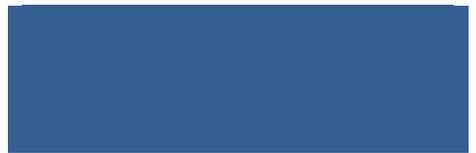
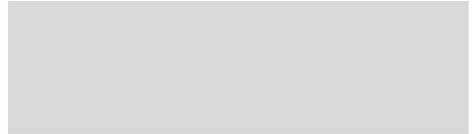


PRELIMINARY HYDROLOGY REPORT

For the SKYLINE VILLAGE PROJECT

In the City of Corona,
County of Riverside, California



PREPARED FOR:

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December, 2020

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INTRODUCTION

1.1 PURPOSE OF STUDY

The Skyline Village project is located within the City of Corona, California, south of the intersection of Foothill Parkway and Chase Drive. The purpose of this study is to hydrologically model the project site's onsite and offsite tributary watersheds and to determine the existing and proposed peak runoffs and volumes in order to analyze stormwater mitigation. The hydrologic analysis was prepared using the Rational Method as specified in the Riverside County Flood Control & Water Conservation District (RCFC&WCD) Hydrology Manual. The flows were used to estimate the proposed above and below ground drainage facilities to support the Skyline Village project.

1.2 PROJECT DESCRIPTION

The Skyline Village project is comprised of approximately 17.02 gross acres of vacant land situated in the hills to the southwest of the City of Corona in Western Riverside County, California adjacent to Foothill Parkway. The site is located approximately 3 miles south of the 71 and 91 Freeways and approximately 4 miles west of Interstate 15 (I-15).

The Skyline Village project is generally bounded to the east by Foothill Parkway, on the south by undeveloped open space land adjacent to single-family residences Tract 31955, on the west and north by undeveloped open space land. The immediate surrounding area consists of Low Density Residential (2-6 du/ac) within the City of Corona. Skyline Drive, a graded forest service access road, is located south of the project. This road provides recreational hiking and mountain biking opportunities to residents on a local and regional level.

The project hydrology and storm drain system will be designed in accordance with recent City of Corona and Riverside County Flood Control and Water Conservation District design requirements. The onsite storm drain pipes, laterals, catch basins, and inlet and outlet structures are to be privately maintained by the proposed Property Owners Association. Other drainage facilities within Foothill Parkway will be publicly maintained by the City of Corona.

1.3 STUDY AREA

The project site is located within the Santa Ana River Watershed, the largest watershed in Riverside County. The project site consists of sparsely vegetated and otherwise undeveloped land with the exception of dirt roads. The site is characterized by steep topography, generally increasing in elevation

from the northeast to the southwest. Several canyons and ravines are present which will convey natural drainage across the project site. The site generally drains from southwest to northeast, in a natural canyon flow condition, with the flowline of the streams having an average slope of about 10%-20%. Being undeveloped, there are no major drainage improvements on-site. Stormwater runoff discharges into existing Kroonen Channel before being collected and conveyed in underground storm drain system in Foothill Parkway and Chase Drive. The runoff then drains into the Oak Street Debris Basin and the Oak Street Channel before discharging into Temescal Creek – Reach 1, located approximately 3 miles north of the project site.

1.4 FLOODPLAIN MAPPING

The National Flood Insurance Act (1968) established the National Flood Insurance Program, which is based on the minimal requirements for floodplain management and is designed to minimize flood damage within Special Flood Hazard Areas. The Federal Emergency Management Agency (FEMA) is the agency which administrates the National Flood Insurance Program. Special Flood Hazard Areas (SFHA) are defined as areas that have a 1% chance of flooding within a given year. This is also referred to as the 100-year flood. Flood Insurance Rate Maps (FIRMs) were developed to identify areas of flood hazards within a community.

According to the Flood Insurance Rate Map (FIRM) catalog, there are FIRMs produced by FEMA for the project site:

MAP Number: 06065C1351G and 06065C1353G

MAP Revised: Both maps were revised on August 28, 2008.

Appendix I contains the FIRM panels which identifies the flood zones designated for the Skyline Village project area. The project site is located outside the FIRM detailed study limits and is currently within an unmapped Zone X area. Given the existing topography, the potential for flooding within the project site is not likely to occur.

1.5 DESIGN CRITERIA

The following are design criteria for this project, based on the Riverside County Hydrology Manual.

Protection Levels

1. The 100-year flood shall be contained with the street R/W limits.
2. The 10-year flood shall be contained within the Top of Curbs.
3. Initiate a storm drain or channel when either condition is exceeded.

HYDROLOGIC DATA AND MODEL DEVELOPMENT

2.1 EXISTING CONDITION MODEL

KWC Engineers has performed a hydrologic analysis for the Skyline Village project and its tributary watersheds.

The Skyline Village project site can be divided into four (4) sub-drainage areas to further describe the existing drainage conditions offsite from the site and onsite. Refer to the Existing Condition Hydrology Key Map in **Appendix E** for locations of the drainage sub-areas, and peak flows at each sub-area. Hydrologic calculations to evaluate surface water runoff associated with the 10-year, and 100-year storms were performed for the drainage areas both onsite and offsite tributary area. The Riverside County Rational Method Hydrologic calculations (as described in the RCFC&WCD Hydrology Manual) were performed using the CivilDesign Hydrology / Hydraulics computer program package 2005 Version 7.1 by Bonadiman and Associates, Inc. The existing condition watershed boundaries were delineated using aerial topography. The soil type in this area is Type “D”. Refer to **Appendix B** Hydrologic Soils Group Map. Results of the existing condition hydrologic analysis are summarized in this section **Table 1** below.

**TABLE 1
EXISTING CONDITION PEAK FLOW**

Area	Node #	Q10 (cfs)	Q100 (cfs)
A	518	472.50	766.90
B	602	6.44	10.04
C	708	8.14	12.71
D	808	30.37	48.38

2.2 PROPOSED CONDITION MODEL

Skyline Village project proposes to generally maintain the existing drainage boundaries in the proposed condition. There are four (4) drainage areas in the proposed condition and are described below:

1. Area A: In the Existing Condition, drainage Area A drains northeasterly and easterly direction towards Kroonen Channel to an inlet and storm drain system at Foothill Parkway. In the

Proposed Condition, the site was graded to maintain consistency with existing drainage course. The proposed stormwater runoff was determined to be 773.45 cfs for the 100-year and 476.63 cfs for the 10-year storm event, respectively.

2. Area B: In the Existing Condition there is a small area of street and manufactured slope runoff that drains to existing inlets at Foothill Parkway and Chase Drive and conveyed downstream in a storm drain system. In the Proposed Condition, the same drainage area is collected in proposed catch basins and conveyed downstream in the same storm drain system. The proposed stormwater runoff was determined to be 5.50 cfs for the 100-year and 3.55 cfs for the 10-year storm event, respectively.
3. Area C: Similarly, for Drainage Area C, there is a small area of street and manufactured slope runoff that drains southerly to an existing catch basin in Foothill Parkway located just south of the project site and conveyed downstream in a storm drain system. The proposed stormwater runoff was determined to be 8.14 cfs for the 100-year and 5.17 cfs for the 10-year storm event, respectively.
4. Area D: Drainage Area D is tributary to an existing natural canyon south of the project site in both the existing and proposed condition. This canyon drains to an existing debris basin and inlet located at the southeast corner of the project site where it is collected and conveyed downstream in an existing storm drain pipe. The proposed stormwater runoff was determined to be 49.08 cfs for the 100-year and 30.05 cfs for the 10-year storm event, respectively.

The proposed hydrology model was based on the Proposed Condition Hydrology Key Map in **Appendix G**. The land use type of *undeveloped (poor cover)* was used for the undisturbed natural areas and *undeveloped (fair cover)* was used for the open space/landscaped slope areas. The Soil Type “D” was also used in the Proposed Condition model. Results of the proposed condition hydrologic models is provided in **Appendix F**.

Table 2 & 3 below are comparison between the Existing Condition and Proposed Condition Site/Rational Method 10 and 100-Year Hydrology results. For Drainage Areas “B”, “C”, and “D”, the proposed peak flow is less than the existing peak flows. However, for Drainage Area “A” the peak flows are slightly higher in the proposed condition than the existing condition. Although there is a slight increase in peak flow, the amount is approximately 1% of the total flow rate is considered insignificant. The slight increase will not impact the sizing of the existing storm drain pipeline and hydraulics of the pipeline. Furthermore, the existing storm drain pipes was sized for larger bulked flow rate of 844.2 cfs and drains to the existing Oak Street Debris Basin located about 1200 feet to the east of the project site. Refer to **Appendix J** for reference hydrology and as-built storm drain plans.

TABLE 2 – PROJECT SITE COMPARISON

Area	Existing Area (ac)	Proposed Area (ac)
A	30.80	33.11
B	3.01	2.90
C	4.73	2.79
D	16.53	16.34
Total	55.07	55.14

TABLE 3 – PEAK FLOW COMPARISON

Drainage Area	Existing Q₁₀ (cfs)	Proposed Q₁₀ (cfs)	Q₁₀ % Change	Existing Q₁₀₀ (cfs)	Proposed Q₁₀₀ (cfs)	Q₁₀₀ % Change
A	472.50	476.63	0.88%	766.90	773.45	0.85%
B	6.44	3.55	-44.88%	10.04	5.50	-45.22%
C	8.14	5.17	-36.49%	12.71	8.14	-35.96%
D	30.37	30.05	-1.05%	48.38	49.08	1.45%

2.3 ONSITE STORM DRAIN SYSTEM

The onsite storm drain system will be privately owned and maintained by the Property Owners Association. Preliminary onsite drainage facilities will be sized to accommodate the anticipated 100-year runoff. Detailed sizing calculations will be provided in the design review and final engineering process. Mainline pipe sizes are based on the 100-year storm event with the bulking. Pipes will be designed as reinforced concrete pipe or HDPE while maintaining the HGL approximately 2 feet below the proposed finish surface, with a roughness coefficient of 0.013 per City standards. Hydraulic calculations will be performed in the Final Engineering phase.

Catch basins and storm drain laterals were placed at locations to keep the 10-year flow below the top of curb and the 100-year flow below the right of way. Catch basins are also placed in various locations within the project site to collect the runoff and convey the storm flows in underground piping to the appropriate discharge points.

2.4 STREET CAPACITY ANALYSIS

Preliminary onsite street capacity for the proposed Skyline Village Commercial project was calculated. The street capacity analysis shows that the street sections are sufficient to provide the level of protection required by City of Corona and RCFC&WCD as previously discussed. Since, the storm drain mainline pipes were sized for the 100-year storm event, the street will only contain local flows until the catch basins intercept the 100-year storm flows.

2.5 OUTLET ANALYSIS.

The proposed development will outlet at four (4) locations, Areas A, B, C and D. Area A will outlet to existing Kroonen Channel which will drain to an existing Inlet and 84-inch Storm Drain System maintained by RCFC&WCD. Rip rap will be provided at the outlet pipes to dissipate the flow velocities leading into the existing channel to minimize erosion. Area B and C drain to existing catch basins located on Foothill Parkway. Area D is located south of the project site and drains to an existing debris basin located just south of Foothill Parkway and will be conveyed into an existing storm drain pipe that drains southerly direction.

CONCLUSIONS

This preliminary drainage report has evaluated the potential effects of runoff for the proposed project. In addition, this report has addressed the methodology used to analyze the existing and proposed conditions, which was based on the Riverside County Hydrology Manual. This section provides a summary discussion that evaluates the potential effects of the proposed project.

- ❖ The proposed project will not significantly alter drainage patterns on the site. The project will add approximately 8 acres of impervious area, which is about 46% of the total site area in the form of rooftops, driveways, sidewalks, paved areas, and streets.
- ❖ The Rational Method results illustrates that there is a slight increase in peak flowrate within Drainage Area A. This increase is amounts to less than 1% of the total designed flows and is insignificant. The runoff from this area drains to existing 84-inch storm drain system which discharges into the Oak Street Debris Basin. Both these facilities have sufficient capacity to handle the slight increase in development flows in the 100-year condition. No increase runoff mitigation is proposed or required.
- ❖ The proposed onsite storm drain mainlines will be privately owned and maintained by the Property Owners Association.
- ❖ Preliminary storm drain alignment, catch basins, and discharge points are shown on the hydrology key maps.
- ❖ A Final Hydrology & Hydraulics Report will be prepared during final design phase to determine the proposed hydraulic grade lines throughout the storm drain system and catch basin sizing.

All stormwater run-off will be carried via typical street sections and an onsite storm drain system. The computed 10-year storm event is contained below the top of curb and the computed 100-year storm event is contained within the street right-of-way.

REFERENCES

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

Riverside County Flood Control and Water Conservation District. *Increased Runoff Mitigation Workshop*. August 24, 1995.

Foothill Parkway – Kroonen Channel Basis of Design Report, *RBF Consulting*, July, 2011.

Hydrology, Hydraulics & Riverbed Scour Analysis for Tract 37691, WEST Consultants, Inc.

A

VICINITY MAP

- Vicinity Map
- USGS Map

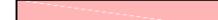


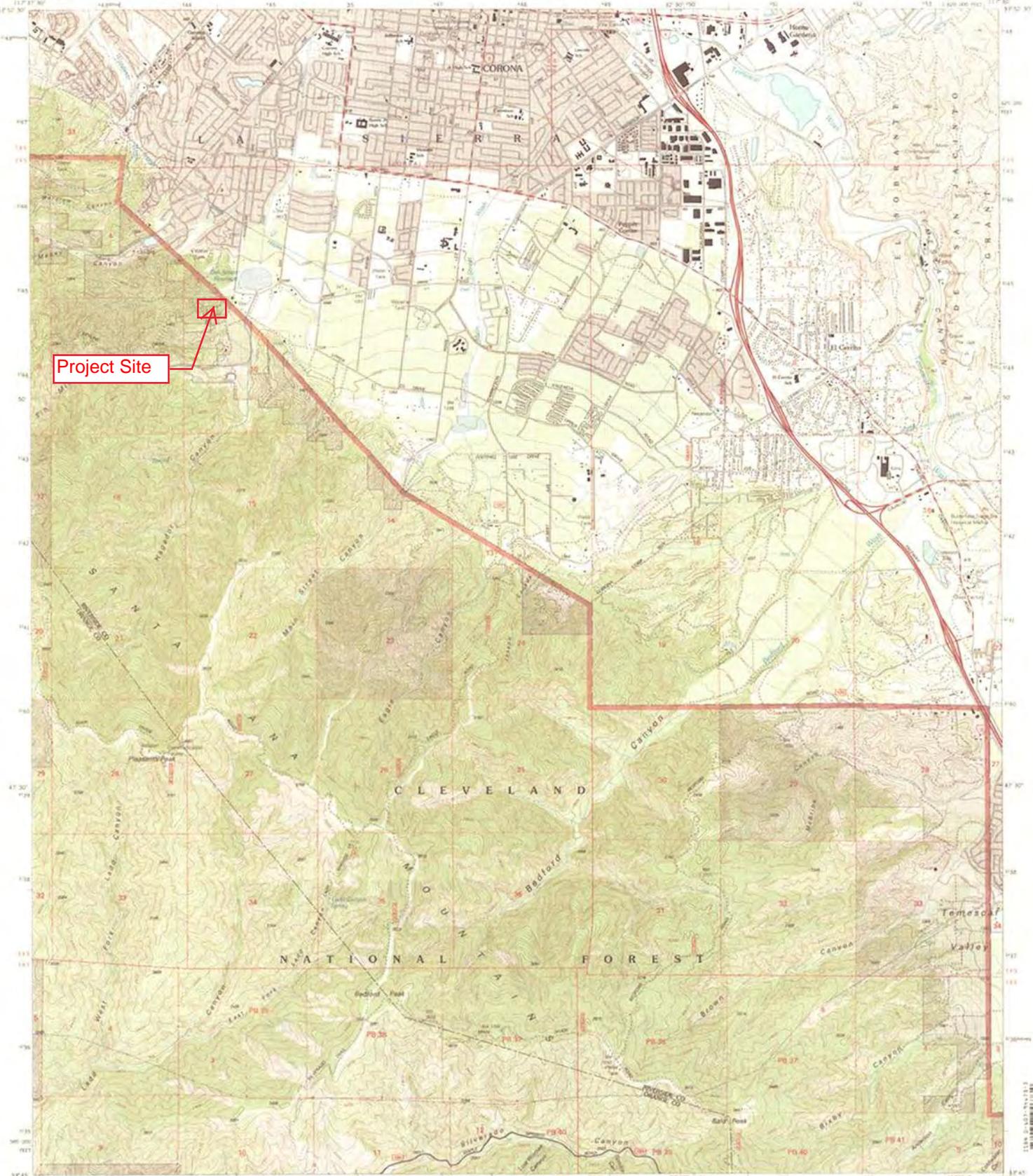
SKYLINE HEIGHTS
TRACT 36544
FUTURE SINGLE FAMILY RES.
LOW DENSITY RES.

SKYLINE VILLAGE
PROJECT SITE
±17.0 ACRES

TRACT 31955
EX. SINGLE FAMILY RES.
LOW DENSITY RES.

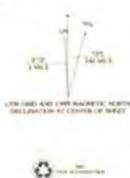
LEGEND:

-  PROJECT BOUNDARY
-  SKYLINE VILLAGE PROJECT AREA



Project Site

Produced by the United States Geological Survey 1988
Revision by USDA Forest Service 1997
Topography compiled 1962. Photometry derived from imagery taken 1996 and other sources. Public Land Survey System and survey control corners as of 1997.
North American Datum of 1927 (NAD 27). Projection and 10,000-foot wide California coordinate system, zone 6 (Lambert conformal conic).
The 1000-foot Universal Transverse Mercator (UTM), zone 11.
North American Datum of 1983 (NAD 83) is shown by shaded corner ticks. The values of the tick marks MAG 77 and MAG 83 for 7.5-minute quadrangles are obtained from National Geodetic Survey NADCON software.
Some National Forest System lands within the National Forest boundaries may occur in other National or State jurisdictions.
This map is not a legal land title or ownership document. Public lands are subject to change and transfer, and may have access restrictions. Check with local offices. (Obtain permission before entering private lands.)
Projected black line (PBL) are unapproved land of acquisition stripes.



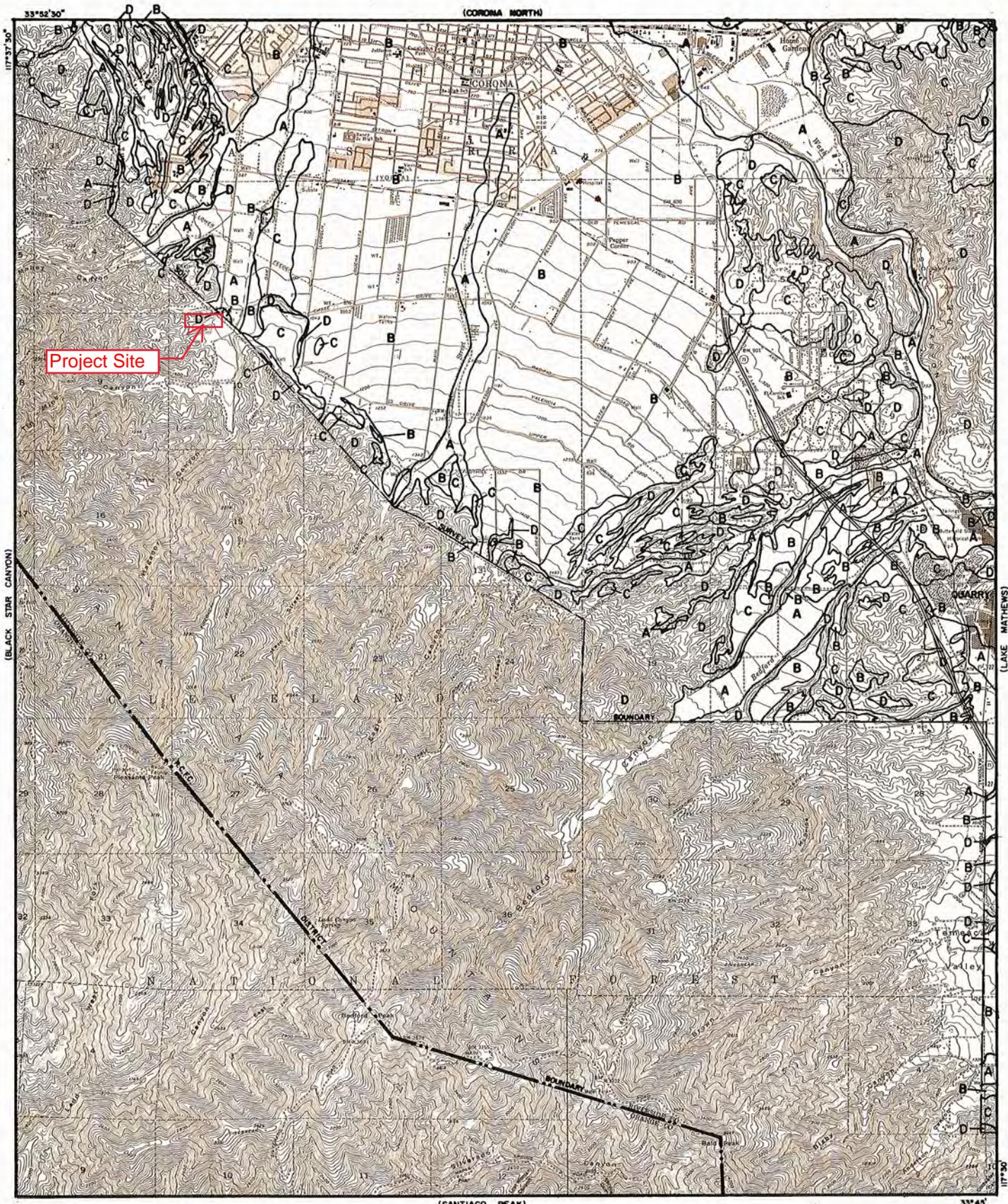
1	2	3	4	5	6	7	8	9	10
1	2	3	4	5	6	7	8	9	10

HIGHWAYS AND ROADS	
Interstate	Primary highway
U.S.	Secondary highway
State	Light-duty road
County	Unimproved
National Forest, suitable for passenger cars	Trail
National Forest, suitable for high clearance vehicles	Unimproved, 4 wheel drive
National Forest Trail	Trail
	Game Barrier

Appendix

B

**HYDROLOGIC CLASSIFICATION OF SOILS
& PRECIPITATION MAPS**

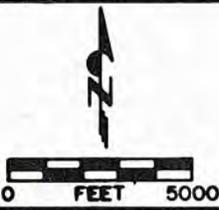


Project Site

LEGEND

- SOILS GROUP BOUNDARY
- A SOILS GROUP DESIGNATION

RCFC & WCD
HYDROLOGY MANUAL



**HYDROLOGIC SOILS GROUP MAP
FOR
CORONA-SOUTH**



United States
Department of
Agriculture

NRCS

Natural
Resources
Conservation
Service

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

Custom Soil Resource Report for Orange County and Part of Riverside County, California



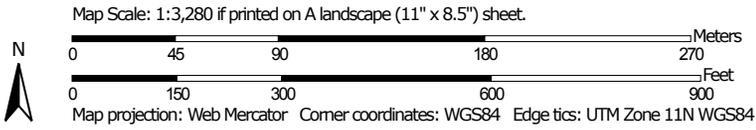
Soil Map

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

Custom Soil Resource Report Soil Map



Soil Map may not be valid at this scale.



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: Orange County and Part of Riverside County, California
 Survey Area Data: Version 12, Sep 12, 2018

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

Date(s) aerial images were photographed: Dec 31, 2009—Oct 25, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND

MAP INFORMATION

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
142	Cieneba sandy loam, 30 to 75 percent slopes, eroded	20.0	79.8%
197	Soboba gravelly loamy sand, 0 to 5 percent slopes	4.8	19.0%
CnCwr	Cortina gravelly coarse sandy loam, 2 to 8 percent slopes	0.3	1.2%
Totals for Area of Interest		25.1	100.0%

Map Unit Descriptions

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

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

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

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or

Custom Soil Resource Report

landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

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

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

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

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

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

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

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

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

Orange County and Part of Riverside County, California

142—Cieneba sandy loam, 30 to 75 percent slopes, eroded

Map Unit Setting

National map unit symbol: hcml
Elevation: 500 to 4,000 feet
Mean annual precipitation: 12 to 35 inches
Mean annual air temperature: 57 to 64 degrees F
Frost-free period: 200 to 300 days
Farmland classification: Not prime farmland

Map Unit Composition

Cieneba and similar soils: 65 percent
Minor components: 35 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cieneba

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave, convex
Across-slope shape: Convex
Parent material: Residuum weathered from granite

Typical profile

H1 - 0 to 7 inches: sandy loam
H2 - 7 to 59 inches: weathered bedrock

Properties and qualities

Slope: 30 to 75 percent
Depth to restrictive feature: 4 to 20 inches to paralithic bedrock
Natural drainage class: Somewhat excessively drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 1.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D
Ecological site: SHALLOW LOAMY (1975) (R019XD060CA)
Hydric soil rating: No

Minor Components

Cieneba, uneroded

Percent of map unit: 10 percent
Hydric soil rating: No

San andreas, sandy loam

Percent of map unit: 5 percent
Hydric soil rating: No

Soper, cobbly loam

Percent of map unit: 5 percent
Hydric soil rating: No

Calleguas, clay loam

Percent of map unit: 5 percent
Hydric soil rating: No

Vista, sandy loam

Percent of map unit: 5 percent
Hydric soil rating: No

Rock outcrop

Percent of map unit: 2 percent
Hydric soil rating: No

Tollhouse

Percent of map unit: 2 percent
Hydric soil rating: No

Blasingame, loam

Percent of map unit: 1 percent
Hydric soil rating: No

197—Soboba gravelly loamy sand, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: hcpc
Elevation: 30 to 4,200 feet
Mean annual precipitation: 10 to 20 inches
Mean annual air temperature: 61 to 63 degrees F
Frost-free period: 175 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Soboba and similar soils: 75 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Soboba

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Riser, flat
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy and gravelly alluvium derived from mixed

Custom Soil Resource Report

Typical profile

H1 - 0 to 10 inches: gravelly loamy sand

H2 - 10 to 60 inches: very gravelly sand

Properties and qualities

Slope: 0 to 5 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Excessively drained

Runoff class: Negligible

Capacity of the most limiting layer to transmit water (Ksat): Very high (19.98 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Very low (about 1.8 inches)

Interpretive groups

Land capability classification (irrigated): 4e

Land capability classification (nonirrigated): 4e

Hydrologic Soil Group: A

Ecological site: SANDY (1975) (R019XD035CA)

Hydric soil rating: No

Minor Components

Unnamed

Percent of map unit: 10 percent

Hydric soil rating: No

Riverwash

Percent of map unit: 5 percent

Landform: Fans

Hydric soil rating: Yes

Corralitos, loamy sand

Percent of map unit: 5 percent

Hydric soil rating: No

Soboba, gravelly loamy sand

Percent of map unit: 5 percent

Hydric soil rating: No

CnCwr—Cortina gravelly coarse sandy loam, 2 to 8 percent slopes

Map Unit Setting

National map unit symbol: 1lwh9

Elevation: 30 to 2,400 feet

Mean annual precipitation: 8 to 20 inches

Mean annual air temperature: 61 to 63 degrees F

Frost-free period: 240 to 270 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Cortina and similar soils: 85 percent

Minor components: 15 percent

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

Description of Cortina

Setting

Landform: Alluvial fans

Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Side slope

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Alluvium derived from metasedimentary rock

Typical profile

H1 - 0 to 23 inches: gravelly sandy loam

H2 - 23 to 38 inches: stratified very gravelly loamy sand to very gravelly loam

H3 - 38 to 60 inches: stratified very gravelly sand to very gravelly loamy sand

Properties and qualities

Slope: 2 to 8 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Somewhat excessively drained

Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Low (about 4.5 inches)

Interpretive groups

Land capability classification (irrigated): 3s

Land capability classification (nonirrigated): 3e

Hydrologic Soil Group: A

Ecological site: SANDY (1975) (R019XD035CA)

Hydric soil rating: No

Minor Components

Arbuckle

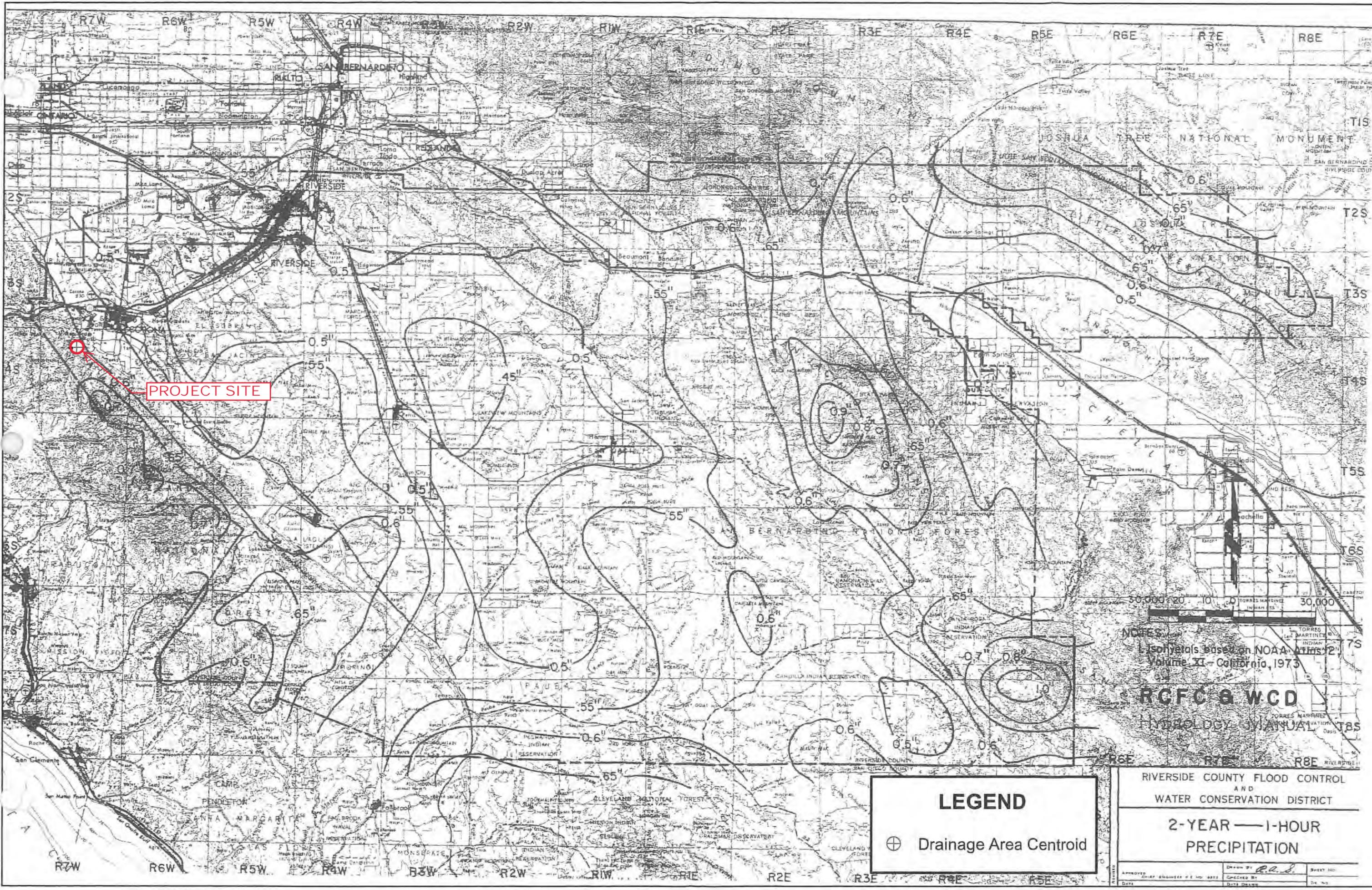
Percent of map unit: 10 percent

Hydric soil rating: No

Garretson

Percent of map unit: 5 percent

Hydric soil rating: No



PROJECT SITE

NOTES:
 Isohyets based on NOAA Atlas 14
 Volume XI - California, 1973

RCFC & WCD
 Hydrology Manual

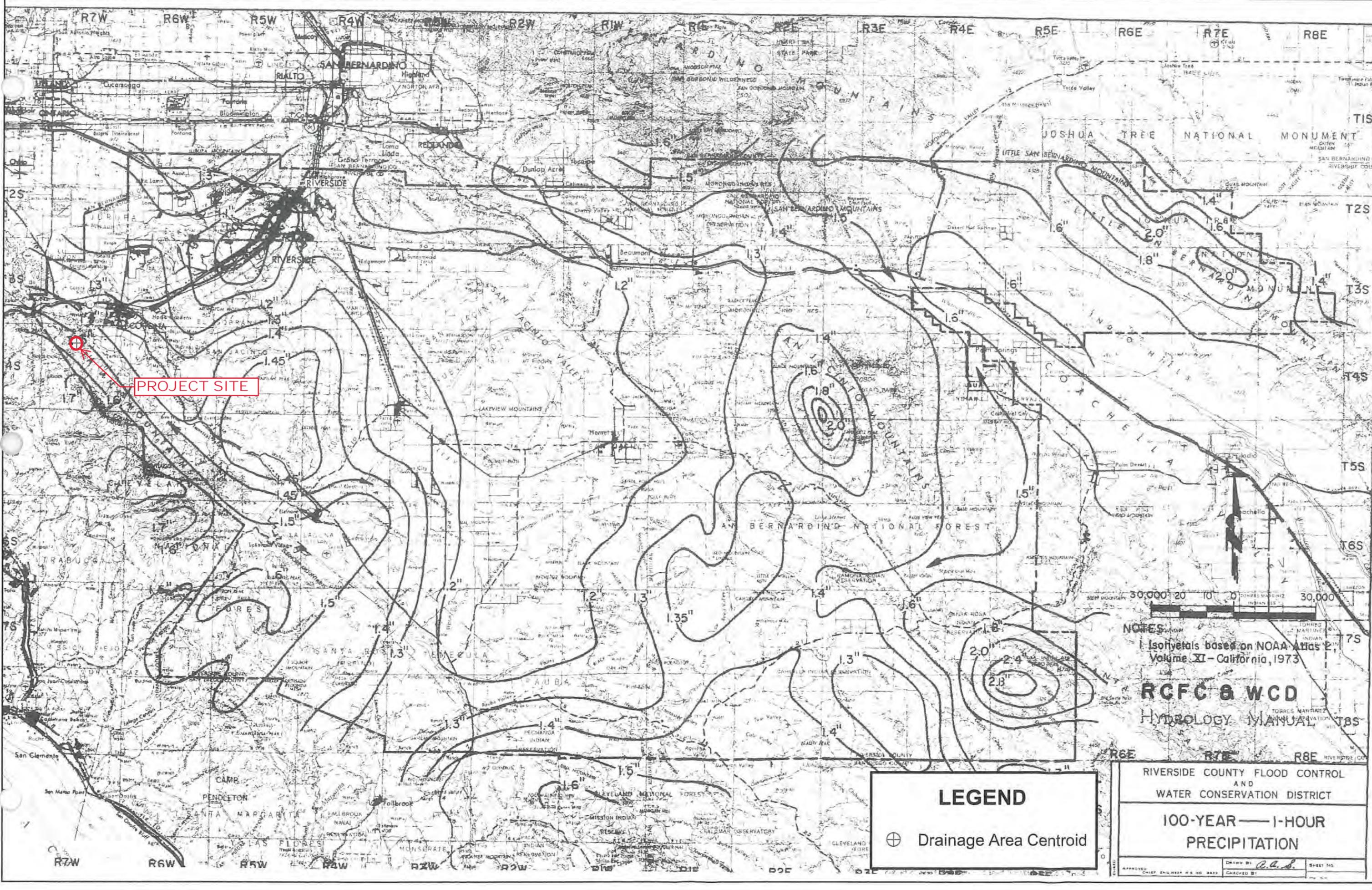
LEGEND

⊕ Drainage Area Centroid

RIVERSIDE COUNTY FLOOD CONTROL
 AND
 WATER CONSERVATION DISTRICT

2-YEAR — 1-HOUR
 PRECIPITATION

APPROVED	DATE	DRAWN BY	SHEET NO.
CHIEF ENGINEER # 10 8222		R.L.S.	
CHECKED BY	DATE	DATE	DR. NO.



PROJECT SITE

NOTES:
 Isohyets based on NOAA Atlas 2,
 Volume XI - California, 1973

RCFC & WCD
 Hydrology Manual

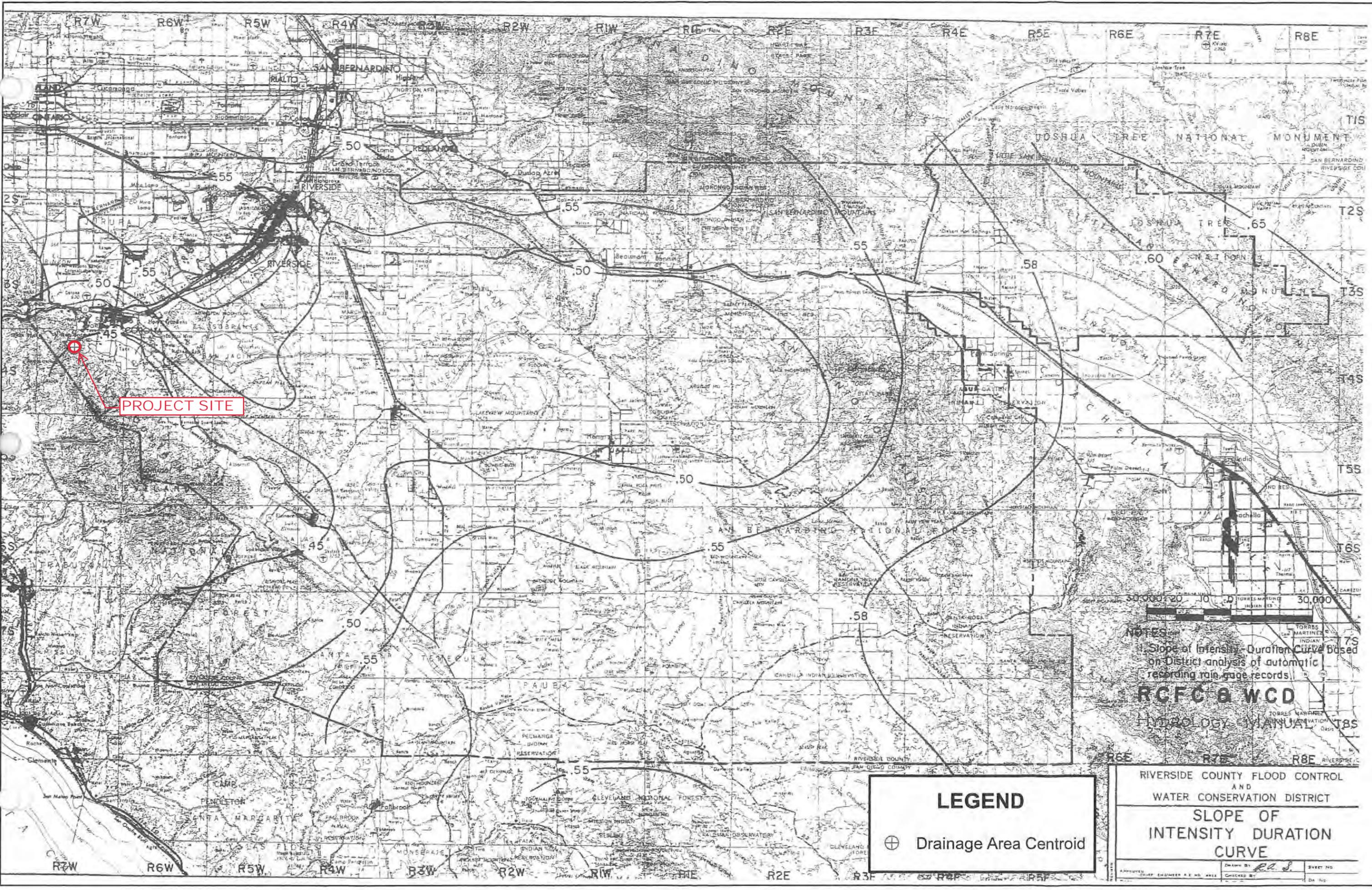
LEGEND

⊕ Drainage Area Centroid

RIVERSIDE COUNTY FLOOD CONTROL
 AND
 WATER CONSERVATION DISTRICT

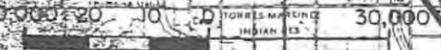
100-YEAR — 1-HOUR
 PRECIPITATION

APPROVED: _____ DRAWN BY: *C.S.* SHEET NO. _____
 CHECKED BY: _____



PROJECT SITE

NOTES:
 Slope of Intensity-Duration Curve Based on District analysis of automatic recording rain-gauge records.



RCFC & WCD
 HYDROLOGY MANUAL

LEGEND

⊕ Drainage Area Centroid

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

SLOPE OF INTENSITY DURATION CURVE

APPROVED	CHIEF ENGINEER A.E. NO. 4812	DRAWN BY	RAJ	SHEET NO.
		CHECKED BY		DA No.

Appendix

C

**TTM &
GRADING PLAN**

TENTATIVE TRACT MAP NO. 37691 (CONDOMINIUM)

LEGAL DESCRIPTION:

THAT PATENTED PLACER CLAIM KNOWN AS LOT NO. 4045, KNOWN AS THE MC KNIGHT CONSOLIDATED CLAY PLACER MINING CLAIM, CONSISTING OF THE MC KNIGHT LUCKY AND TRIO PLACER CLAIMS, AND LYING IN SECTIONS 3 AND 10 OF TOWNSHIP 4 SOUTH, RANGE 7 WEST, SAN BERNARDINO BASE AND MERIDIAN AND SHOWN BY MINERAL SURVEY NO. 4045, ON FILE IN THE GENERAL LAND OFFICE, WASHINGTON, D.C. DESCRIBED AS FOLLOWS:

BEGINNING FOR THE DESCRIPTION OF THE MC KNIGHT PLACER CLAIM AT CORNER NO. 1, A PINE POST 4 INCHES SQUARE, MARKED K 1 S. 4045, WITH MOUND OF STONE, FROM WHICH STATION NO. 15 OF THE RANCHO LA SIERRA BEARS SOUTH 73° 16' EAST, 322.5 FEET DISTANCE;

THENCE FIRST COURSE, NORTH 89° 05' WEST, 1289 FEET TO CORNER NO. 2, A PINE POST 4 INCHES SQUARE, MARKED K 2 S. 4045, WITH MOUND OF ROCKS; THENCE SECOND COURSE, NORTH 02° 57' WEST, 633.5 FEET TO CORNER NO. 3, A PINE POST 4 INCHES SQUARE, MARKED K 3 S. 4045, WITH MOUND OF ROCKS; THENCE THIRD COURSE, NORTH 88° 27' EAST, 1189 FEET TO CORNER NO. 4, A PINE POST 4 INCHES SQUARE, MARKED K 4 S. 4045, WITH MOUND OF ROCKS; THENCE FOURTH COURSE, SOUTH 12° 06' EAST 678.7 FEET TO CORNER NO. 1, THE POINT OF BEGINNING.

EXCEPTING THEREFROM ANY VEINS OF LOGS OF QUARTZ, OR OTHER ROCKY IN PLACE BEARING GOLD, SILVER, COPPER, LEAD, TIN, COPPER OR OTHER VALUABLE DEPOSITS WITHIN THE LAND ABOVE DESCRIBED, WHICH MAY HAVE BEEN DISCOVERED OR KNOWN TO EXIST ON OR PRIOR TO THE 2ND DAY OF FEBRUARY, 1983.

ALSO EXCEPTING THEREFROM PARCEL 2070-105 AS SHOWN BY RECORD OF SURVEY RECORDED OCTOBER 23, 1978 IN BOOK 64, PAGES 75 TO 78, INCLUSIVE, OF RECORDS OF SURVEY, RECORDS OF RIVERSIDE COUNTY, CALIFORNIA.

ALSO EXCEPTING SAID PORTION GRANTED TO THE CITY OF CORONA, A CALIFORNIA MUNICIPAL CORPORATION AS DESCRIBED IN DEED RECORDED JUNE 8, 2010 AS INSTRUMENT NO. 262206 OF OFFICIAL RECORDS.

UTILITY NOTES:

WATER: CITY OF CORONA DEPARTMENT OF WATER AND POWER
815 W. 6th STREET
CORONA, CA 91720
(909) 736-2321

SEWER: CITY OF CORONA DEPARTMENT OF WATER AND POWER
815 W. 6th STREET
CORONA, CA 91720
(909) 736-2321

POWER: SOUTHERN CALIFORNIA EDISON CO.
1351 E. FRANCIS
ONTARIO, CA 91761
(800) 930-8591

GAS: SOUTHERN CALIFORNIA GAS CO.
P.O. BOX 3033
REDLANDS, CA 92373
(800) 427-2200

PHONE: AT&T 1285 N. VAN BUREN ST., #180
MURKIN, CA 92867
(714) 666-5423

CABLE TV: TIME WARNER CABLE
1500 AUTO CENTER DRIVE
ONTARIO, CA 91761
(909) 975-3396

LEGEND:

PROP. LOT LINE
EX. LOT LINE
EX. C/L
RECORD C/L
PROP. R/W
EX. R/W
EASEMENT
SETBACK
BOUNDARY

ASSESSOR'S PARCEL NUMBERS

275-050-014 AND 275-080-041

EASEMENTS:

- ITEMS SHOWN HEREON WERE PLOTTED FROM RECORD DATA BASED ON SCHEDULE "B" DOCUMENTS FROM THE WESTERN RECORDS TITLE COMPANY, REPORT NO. 151300, DATED DECEMBER 1, 2020. PLOTTABLE EASEMENTS ARE INDICATED BY A "A": NON-PLOTTABLE EASEMENTS ARE INDICATED BY A "B".
- △ AN AGREEMENT FOR ACCESS AND MINING PURPOSES, IN FAVOR OF PACIFIC CLAY MANUFACTURING COMPANY, RECORDED MAY 8, 1902 IN BOOK 143, PAGE 66 OF DEEDS. (BLANKET IN NATURE LOCATION OF EASEMENT NOT DISCLOSED IN DOCUMENT)
 - △ A RIGHT OF WAY FOR DITCHES AND CANALS AS RESERVED BY THE UNITED STATES OF AMERICA IN THE PATENT RECORDED JULY 20, 1910 IN BOOK 6 OF PATENTS, PAGE 3. (BLANKET IN NATURE LOCATION OF EASEMENT NOT DISCLOSED IN DOCUMENT)
 - △ TERMS AND PROVISIONS CONTAINED IN THE DOCUMENT ENTITLED "RIGHT OF WAY AGREEMENT", RECORDED FEBRUARY 5, 1980 AS INSTRUMENT NO. 23658 OF OFFICIAL RECORDS. (ACCESS RIGHT IN FAVOR OF PROPERTY OWNER RDP# PW# 2070-105)
 - △ AN EASEMENT FOR ACCESS AND INCIDENTAL PURPOSES, IN FAVOR OF THE CITY OF CORONA, RECORDED JUNE 8, 2010 AS INSTRUMENT NO. 262207. (TO BE ABANDONED & REDEDICATED)
 - △ AN EASEMENT FOR SLOPE, DRAINAGE, AND TEMPORARY CONSTRUCTION AND INCIDENTAL PURPOSES, IN FAVOR OF THE CITY OF CORONA, RECORDED JUNE 8, 2010 AS INSTRUMENT NO. 262208. (TO BE VACATED/ABANDONED)
 - △ VACATION OF A PORTION OF THE ACCESS EASEMENT (INSTRUMENT NO. 262207) IN FAVOR OF THE PROPERTY OWNER, RECORDED JUNE 8, 2010 AS INSTRUMENT NO. 487787. (REMOVED)
 - △ AN EASEMENT FOR SLOPE PURPOSES, WHICH INCLUDE THE RIGHT TO FOREVER CONSTRUCT, MAINTAIN, IMPROVE, ALTER, RELOCATE, IMPROVE, OCCUPY AND USE A SLOPE OVER, UNDER, AND ACROSS THE SLOPE EASEMENT PROPERTY, IN FAVOR OF THE CITY OF CORONA, RECORDED MARCH 9, 2015 AS INSTRUMENT NO. 93405. (TO BE VACATED/ABANDONED)
 - △ AN EASEMENT FOR DRAINAGE PURPOSES, WHICH INCLUDE THE RIGHT TO LOCATE AND MAINTAIN ON THE DRAINAGE EASEMENT PROPERTY BOTH SUBTERREAN AND ABOVE-GROUND DRAINAGE IMPROVEMENTS AS MAY BE REQUIRED BY THE FOOTHILL PARKWAY WESTERLY EXTENSION PROJECT PLANS, IN FAVOR OF THE CITY OF CORONA, RECORDED MARCH 9, 2015 AS INSTRUMENT NO. 93404. (TO REMAIN)
 - △ AN EASEMENT FOR TEMPORARY CONSTRUCTION PURPOSES, WHICH INCLUDE THE RIGHT TO ENGAGE IN CONSTRUCTION, MAINTENANCE, AND RELATED ACTIVITIES OVER, UNDER, ALONG, AND ACROSS THE EASEMENT PROPERTY, IN FAVOR OF THE CITY OF CORONA, RECORDED MARCH 9, 2015 AS INSTRUMENT NO. 93405. (REMOVED)
 - △ A PROPOSED EASEMENT FOR PUBLIC UTILITY AND EMERGENCY INGRESS/EGRESS IN FAVOR OF CITY (PLOTTED HEREON)
 - △ A PROPOSED EASEMENT FOR UTILITY AND ACCESS PURPOSES IN FAVOR OF LOT 2 (PLOTTED HEREON)
 - △ A PROPOSED EASEMENT FOR HMA MAINTENANCE IN FAVOR OF LOT 2 (PLOTTED HEREON)
 - △ A PROPOSED EASEMENT FOR FUEL MOD ACCESS AND MAINTENANCE PURPOSES (PLOTTED HEREON)
 - △ A PROPOSED EASEMENT FOR UTILITY AND ACCESS PURPOSES IN FAVOR OF APN 275-080-021 (PLOTTED HEREON)
 - △ A PROPOSED EASEMENT FOR PUBLIC TRAIL ACCESS IN FAVOR OF CITY OF CORONA (PLOTTED HEREON)
 - △ A PROPOSED OFF-SITE EASEMENT FOR PUBLIC UTILITY AND EMERGENCY INGRESS/EGRESS IN FAVOR OF CITY PER SEPARATE INSTRUMENT. (SEE NOTE 1)
 - △ A PROPOSED EASEMENT FOR TRAIL ACCESS IN FAVOR OF LOT 1 (PLOTTED HEREON)
 - △ CITY R/W PROPERTY TO BE ACQUIRED BY DEVELOPER PER AGREEMENT WITH CITY OF CORONA (PLOTTED HEREON)
 - △ A PROPOSED EASEMENT FOR FUEL MOD MAINTENANCE IN FAVOR OF LOT 1 (PLOTTED HEREON)
 - △ A PROPOSED EASEMENT FOR FUEL MOD MAINTENANCE IN FAVOR OF LOT 2 (PLOTTED HEREON)
 - △ A PROPOSED OFF-SITE EASEMENT FOR UTILITY AND ACCESS PURPOSES IN FAVOR OF TRACT 37691 PER SEPARATE INSTRUMENT. (SEE NOTE 1)

NOTE 1: SHOULD THE PROPOSED OFFSITE UTILITY AND ACCESS EASEMENT CANNOT BE OBTAINED, THE PROJECT DEVELOPMENT AS A CONDITION OF APPROVAL WILL BE REQUIRED TO PERFECT THE ALTERNATIVE EVA ACCESS CONCEPT SHOWN ON SHEET 5 OF THE APPROVED PRELIM PLAN.

IN THE CITY OF CORONA, COUNTY OF RIVERSIDE

AUGUST 2020

OWNER

COREY A. ADDISON LIVING TRUST
10208 ELM AVE.
FONTANA, CA 92335
ATTN: COREY ADDISON

APPLICANT/DEVELOPER:

OF INVESTMENTS, LLC
110 N. LINCOLN AVE #202
CORONA, CA 92882
(951) 603-5042
ATTN: CHRIS BOWEN

ENGINEER:

KWC ENGINEERS
1880 COMPTON AVENUE, SUITE 100
CORONA, CA 92881-3370
(951) 734-2130
ATTN: MIKE C. TANG, P.E.

GENERAL NOTES:

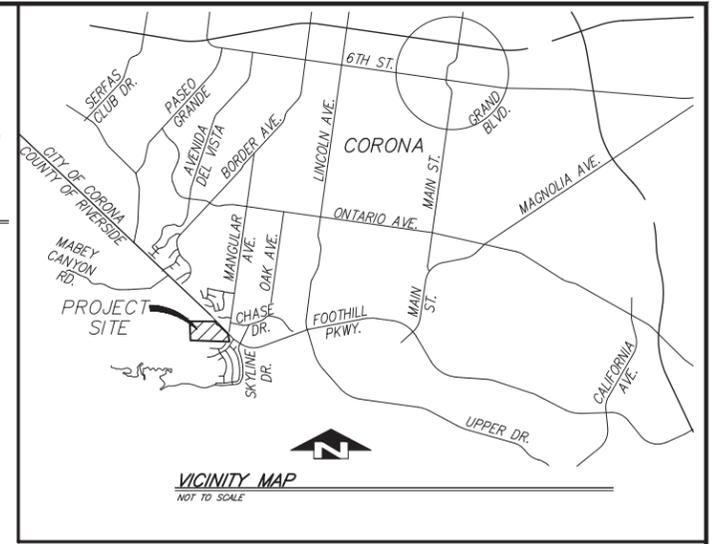
1. PREPARED: AUGUST 2020
2. TOTAL PROJECT GROSS ACREAGE: 17.02 AC.
3. EXISTING GENERAL PLAN DESIGNATION: LOW DENSITY RESIDENTIAL (3-6 DU/AC)
4. PROPOSED GENERAL PLAN DESIGNATION: MDR (6-15 DU/AC), GC
5. EXISTING LAND USE: AGRICULTURE
6. PROPOSED LAND USE: MDR (6-15 DU/AC), GC
7. EXISTING ZONING: AGRICULTURAL
8. PROPOSED ZONING: R-3 MF RES., C-3 GC
9. PROPOSED DENSITY (LOT 2): 9.66 DU/AC
10. ADJACENT LAND USE:
 - NORTH: GENERAL PLAN - LDR ZONING - R1-7.2 (2,200 SF MIN) EXISTING USE - VACANT
 - EAST: GENERAL PLAN - LDR ZONING - R1-7.2, R1-8.4, R1-9.6 EXISTING USE - RESIDENTIAL
 - SOUTH: GENERAL PLAN - LDR ZONING - AGRICULTURE EXISTING USE - AGRICULTURE
 - WEST: GENERAL PLAN - LDR ZONING - AGRICULTURE EXISTING USE - VACANT
11. THOMAS BROTHERS GUIDE: RIVERSIDE COUNTY, PAGE 772, GRID J3
12. ALL EXISTING EASEMENTS AND IRREVOCABLE OFFERS OF DEDICATION THAT AFFECT THE PROPERTY BEING SUBDIVIDED ARE SHOWN ON THIS TENTATIVE TRACT MAP.
13. ALL EXISTING EASEMENTS ARE TO REMAIN IN THEIR DESIGNATED LOCATIONS UNLESS NOTED OTHERWISE.
14. THE SUBJECT PROPERTY IS WITHIN A SANTA ANA RIVER WATERSHED.
15. THE SUBJECT PROPERTY IS WITHIN AN UNMAPPED FLOOD ZONE X.
16. ALL PARTIES HAVING A BENEFICIARY INTEREST IN THE PROPERTY BEING SUBDIVIDED ARE AWARE OF AND CONSENT TO THE FILING OF THIS TENTATIVE TRACT MAP.

STREET FRONTAGE LENGTH

FOOTHILL PARKWAY = 560 LF

NUMBERED LOT:

LOT NUMBER	PROPOSED GROSS AREA	PROPOSED ZONING
1	8.95 AC	C-3 GC
2	8.07 AC	R-3 MF RES
TOTAL	17.02 AC	-

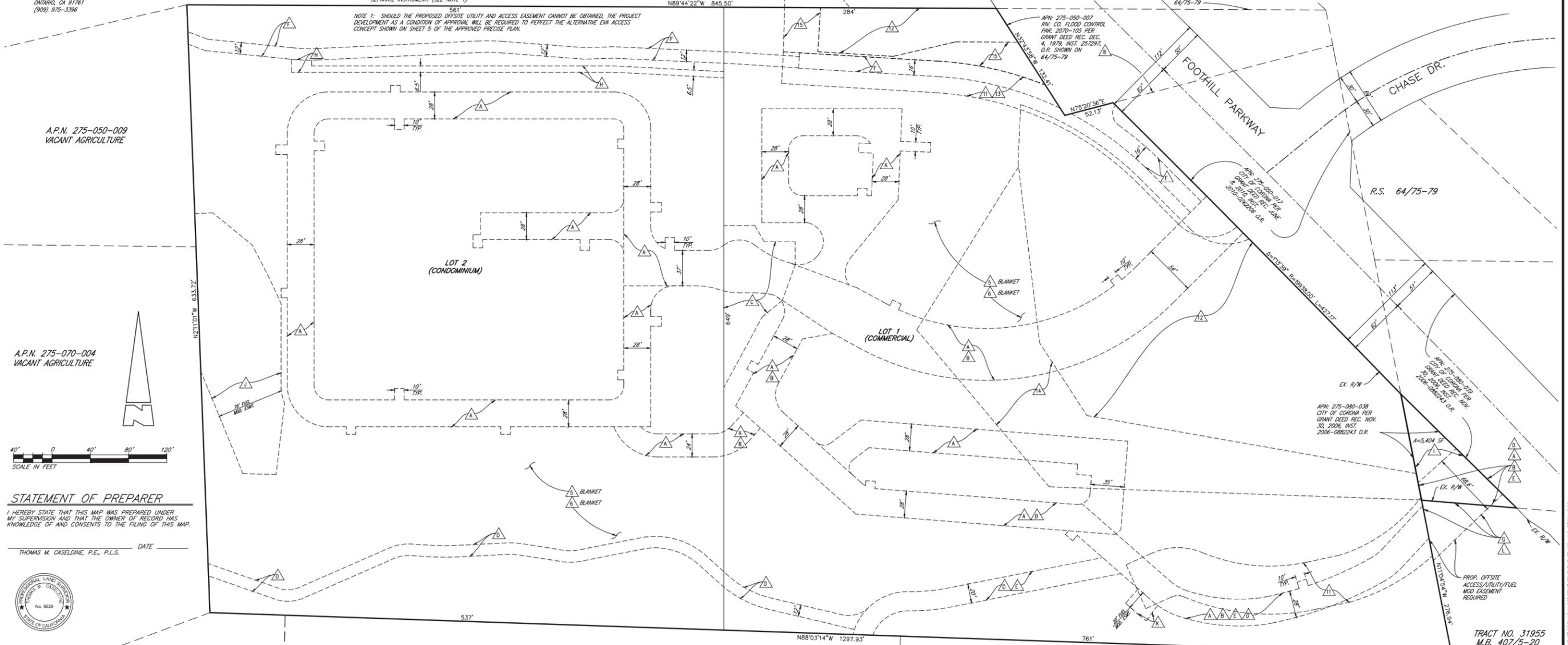


VICINITY MAP

NOT TO SCALE

BASIS OF BEARINGS:

THE BASIS OF BEARINGS SHOWN HEREON ARE BASED ON THE CITY OF CORONA GPS MONUMENTS NO. 1183 OAK DAM (N. 2254579.000, E. 6152833.939) AND NO. 3039 LINDSON 2 1853 (N. 2249760.701, E. 6154840.535), BEING N 27°12'10" W.



STATEMENT OF PREPARER

I HEREBY STATE THAT THIS MAP WAS PREPARED UNDER MY SUPERVISION AND THAT THE OWNER OF RECORD HAS KNOWLEDGE OF AND CONSENTS TO THE FILING OF THIS MAP.

DATE: _____
THOMAS M. CASELDINE, P.E., P.L.S.



A.P.N. 275-080-020
VACANT AGRICULTURE

A.P.N. 275-080-021
VACANT AGRICULTURE

A.P.N. 275-080-013
VACANT AGRICULTURE
USA

TRACT NO. 31955
M.B. 407/5-20

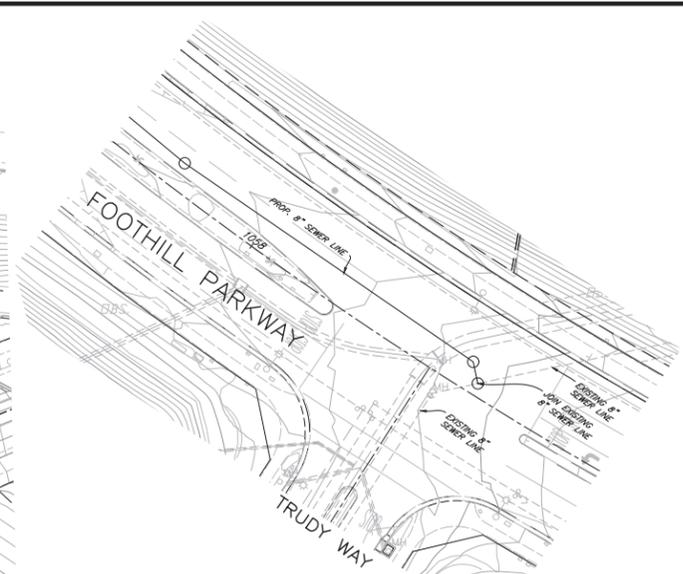
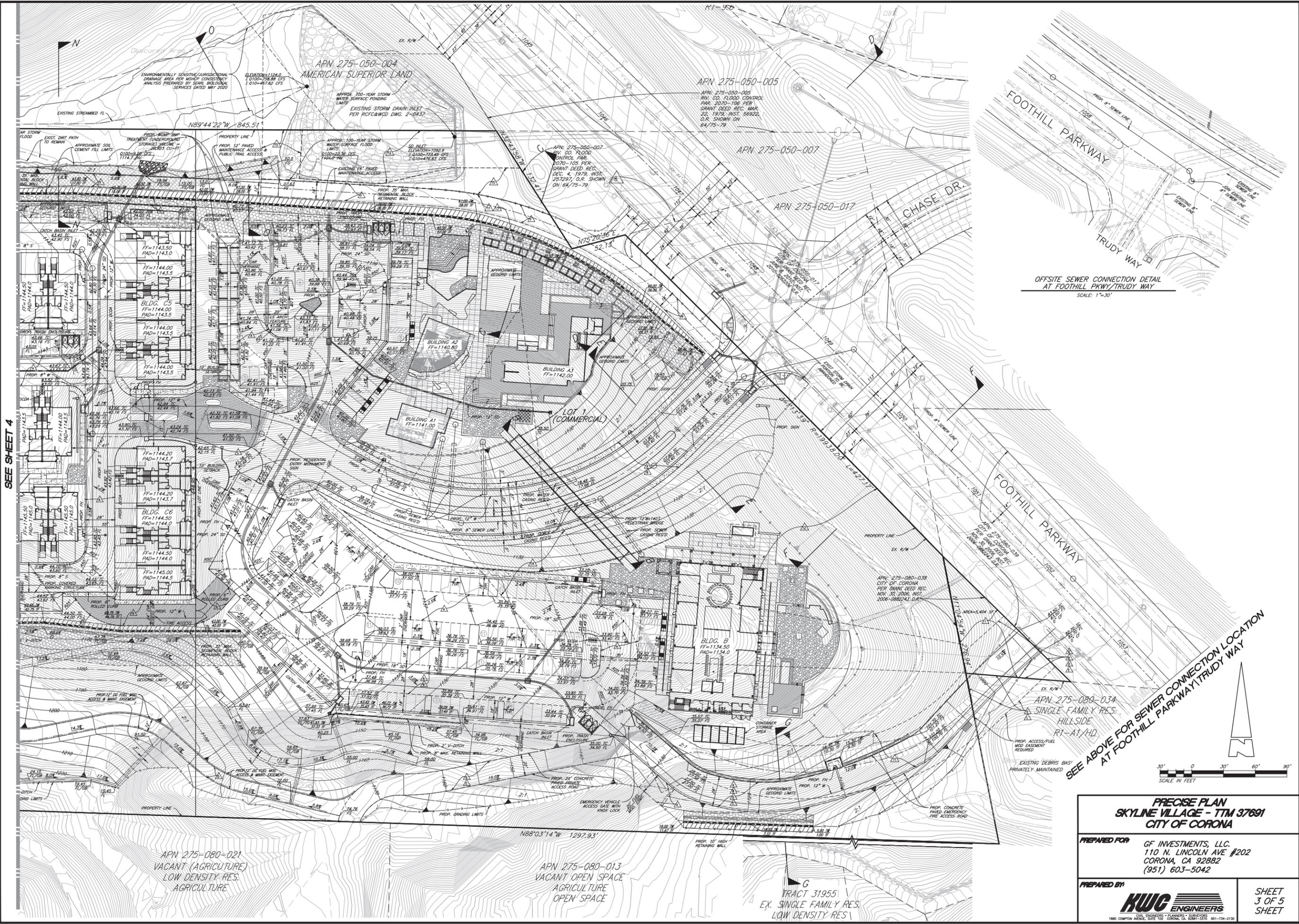
PREPARED BY:



SHEET
1 OF 1
SHEET

DATE OF LATEST REVISION: 05/3/2021

181818 PRELIM MAPS TENTATIVE TRACT MAP 37691.DWG



OFFSITE SEWER CONNECTION DETAIL
AT FOOTHILL PKWY/TRUDY WAY
SCALE: 1"=30'

SEE ABOVE FOR SEWER CONNECTION LOCATION
AT FOOTHILL PARKWAY/TRUDY WAY



PRECISE PLAN
SKYLINE VILLAGE - TTM 37691
CITY OF CORONA

PREPARED FOR
GF INVESTMENTS, LLC.
110 N. LINCOLN AVE #202
CORONA, CA 92882
(951) 603-5042

PREPARED BY
KUC ENGINEERS
CIVIL ENGINEERS • PLANNERS • SURVEYORS
1880 COMPTON AVENUE, SUITE 100 CORONA, CA 92681-3370 951-734-2130

SHEET
3 OF 5
SHEET

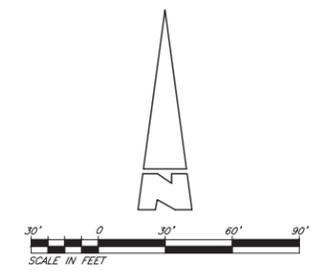
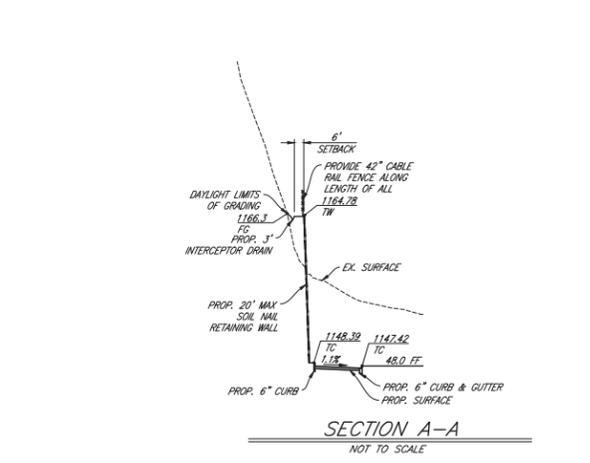
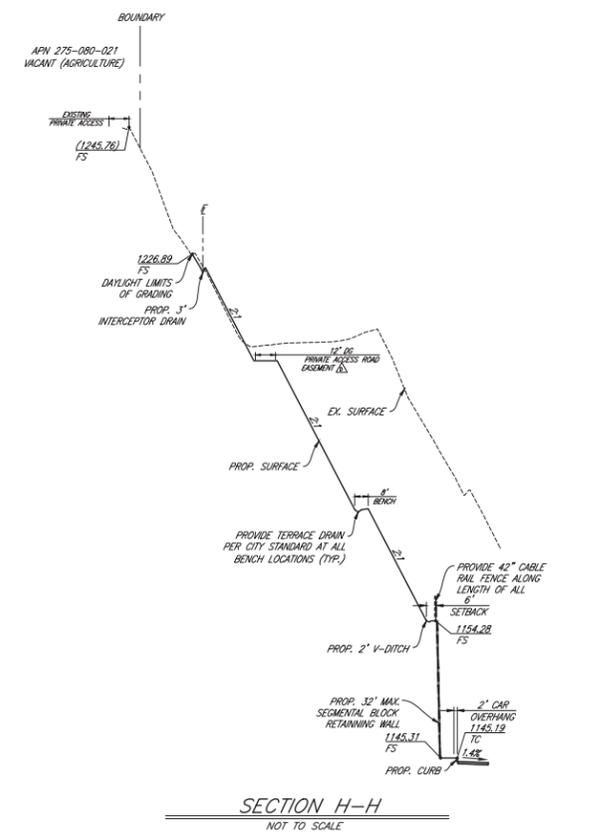
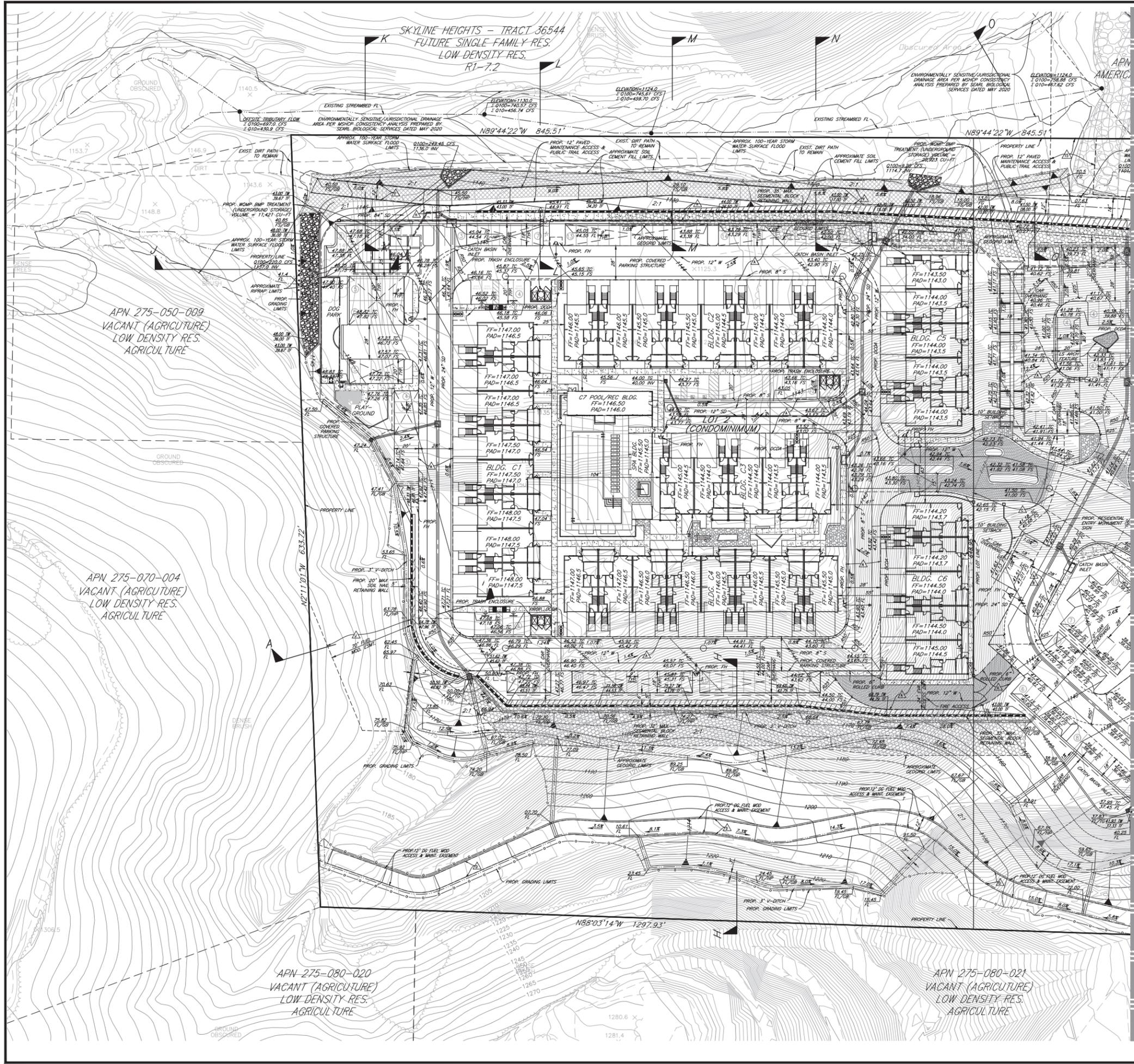
SEE SHEET 4

APN 275-080-021
VACANT (AGRICULTURE)
LOW DENSITY RES.
AGRICULTURE

APN 275-080-013
VACANT OPEN SPACE
AGRICULTURE
OPEN SPACE

TRACT 31955
EX. SINGLE FAMILY RES.
LOW DENSITY RES

DATE PLOTTED: 11/18/17 11:51 AM PROJECT: SKYLINE VILLAGE PLAN 17647 PREPARED: PLANNING



PRECISE PLAN
SKYLINE VILLAGE - TTM 37691
CITY OF CORONA

PREPARED FOR: GF INVESTMENTS, LLC.
110 N. LINCOLN AVE #202
CORONA, CA 92882
(951) 603-5042

PREPARED BY: **KUC ENGINEERS**

CIVIL ENGINEERS & PLANNERS - SURVEYORS
1880 COMPTON AVENUE, SUITE 100 CORONA, CA 92681-3370 951-734-2130

SHEET 4 OF 5 SHEET

APN 275-080-021 PRELIM MAPS PREP. PLAN 1847 PRECISE PLANNING

D

EXISTING CONDITION HYDROLOGY RATIONAL METHOD

10-YEAR EXISTING CONDITION

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 11/11/20 File:E1847Q10A.out

JN 18.1847.1 - SKYLINE VILLAGE
GF INVESTMENTS - CITY OF CORONA
EXISTING CONDITION 10-YEAR HYDROLOGY FOR AREA "A"
BY KWC ENGINEERS

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

English (in-lb) Units used in input data file

Program License Serial Number 6062

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 10.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation = 0.620(In.)
100 year, 1 hour precipitation = 1.520(In.)

Storm event year = 10.0
Calculated rainfall intensity data:
1 hour intensity = 0.990(In/Hr)
Slope of intensity duration curve = 0.4500

++++
Process from Point/Station 500.000 to Point/Station 500.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****

Rainfall intensity = 1.634(In/Hr) for a 10.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.804
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2) = 75.00
Pervious area fraction = 0.500; Impervious fraction = 0.500
User specified values are as follows:
TC = 19.72 min. Rain intensity = 1.63(In/Hr)
Total area = 292.30(Ac.) Total runoff = 430.90(CFS)

++++
Process from Point/Station 500.000 to Point/Station 505.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****

Top of natural channel elevation = 1155.000(Ft.)
End of natural channel elevation = 1130.000(Ft.)
Length of natural channel = 403.000(Ft.)
Estimated mean flow rate at midpoint of channel = 438.057(CFS)

Natural valley channel type used

E1847Q10A.out

L.A. County flood control district formula for channel velocity:
Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow = 18.70(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
Normal channel slope = 0.0620
Corrected/adjusted channel slope = 0.0620
Travel time = 0.36 min. TC = 20.08 min.

Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.817
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2) = 89.00
Pervious area fraction = 1.000; Impervious fraction = 0.000
Rainfall intensity = 1.621(In/Hr) for a 10.0 year storm
Subarea runoff = 12.855(CFS) for 9.710(Ac.)
Total runoff = 443.755(CFS) Total area = 302.010(Ac.)

++++
Process from Point/Station 505.000 to Point/Station 510.000
*** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ***

Top of natural channel elevation = 1130.000(Ft.)
End of natural channel elevation = 1124.000(Ft.)
Length of natural channel = 140.000(Ft.)
Estimated mean flow rate at midpoint of channel = 445.328(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow = 15.62(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
Normal channel slope = 0.0429
Corrected/adjusted channel slope = 0.0429
Travel time = 0.15 min. TC = 20.23 min.

Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.817
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2) = 89.00
Pervious area fraction = 1.000; Impervious fraction = 0.000
Rainfall intensity = 1.615(In/Hr) for a 10.0 year storm
Subarea runoff = 2.823(CFS) for 2.140(Ac.)
Total runoff = 446.578(CFS) Total area = 304.150(Ac.)

++++
Process from Point/Station 510.000 to Point/Station 516.000
*** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ***

Top of natural channel elevation = 1124.000(Ft.)
End of natural channel elevation = 1098.500(Ft.)
Length of natural channel = 407.000(Ft.)

Estimated mean flow rate at midpoint of channel = 448.091(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow = 18.93(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
Normal channel slope = 0.0627
Corrected/adjusted channel slope = 0.0627
Travel time = 0.36 min. TC = 20.59 min.

Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.816
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2) = 89.00
Pervious area fraction = 1.000; Impervious fraction = 0.000
Rainfall intensity = 1.603(In/Hr) for a 10.0 year storm
Subarea runoff = 2.694(CFS) for 2.060(Ac.)
Total runoff = 449.272(CFS) Total area = 306.210(Ac.)

Process from Point/Station 516.000 to Point/Station 516.000
**** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area = 306.210(Ac.)
Runoff from this stream = 449.272(CFS)
Time of concentration = 20.59 min.
Rainfall intensity = 1.603(In/Hr)
Program is now starting with Main Stream No. 2

Process from Point/Station 512.000 to Point/Station 514.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 784.000(Ft.)
Top (of initial area) elevation = 1436.500(Ft.)
Bottom (of initial area) elevation = 1189.600(Ft.)
Difference in elevation = 246.900(Ft.)
Slope = 0.31492 s(percent)= 31.49
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 9.602 min.
Rainfall intensity = 2.259(In/Hr) for a 10.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.839
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2) = 89.00
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 11.140(CFS)
Total initial stream area = 5.880(Ac.)
Pervious area fraction = 1.000

E1847Q10A.out

Process from Point/Station 514.000 to Point/Station 516.000
 **** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****

Top of natural channel elevation = 1189.600(Ft.)
 End of natural channel elevation = 1098.500(Ft.)
 Length of natural channel = 784.000(Ft.)
 Estimated mean flow rate at midpoint of channel = 21.172(CFS)

Natural valley channel type used
 L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
 Velocity using mean channel flow = 10.37(Ft/s)

Correction to map slope used on extremely rugged channels with
 drops and waterfalls (Plate D-6.2)
 Normal channel slope = 0.1162
 Corrected/adjusted channel slope = 0.1162
 Travel time = 1.26 min. TC = 10.86 min.

Adding area flow to channel
 UNDEVELOPED (poor cover) subarea
 Runoff Coefficient = 0.836
 Decimal fraction soil group A = 0.000
 Decimal fraction soil group B = 0.000
 Decimal fraction soil group C = 0.000
 Decimal fraction soil group D = 1.000
 RI index for soil(AMC 2) = 89.00
 Pervious area fraction = 1.000; Impervious fraction = 0.000
 Rainfall intensity = 2.137(In/Hr) for a 10.0 year storm
 Subarea runoff = 18.908(CFS) for 10.590(Ac.)
 Total runoff = 30.048(CFS) Total area = 16.470(Ac.)

 Process from Point/Station 516.000 to Point/Station 516.000
 **** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:

In Main Stream number: 2
 Stream flow area = 16.470(Ac.)
 Runoff from this stream = 30.048(CFS)
 Time of concentration = 10.86 min.
 Rainfall intensity = 2.137(In/Hr)
 Summary of stream data:

Stream No.	Flow rate (CFS)	TC (min)	Rainfall Intensity (In/Hr)
1	449.272	20.59	1.603
2	30.048	10.86	2.137

Largest stream flow has longer time of concentration
 Qp = 449.272 + sum of

$$Q_b \cdot \frac{I_a}{I_b}$$

$$30.048 * 0.750 = 22.535$$
 Qp = 471.807

Total of 2 main streams to confluence:
 Flow rates before confluence point:
 449.272 30.048
 Area of streams before confluence:
 306.210 16.470

Results of confluence:
 Total flow rate = 471.807(CFS)

Time of concentration = 20.587 min.
Effective stream area after confluence = 322.680(Ac.)

Process from Point/Station 516.000 to Point/Station 518.000
**** IMPROVED CHANNEL TRAVEL TIME ****

Covered channel
Upstream point elevation = 1098.500(Ft.)
Downstream point elevation = 1094.500(Ft.)
Channel length thru subarea = 101.000(Ft.)
Channel base width = 30.000(Ft.)
Slope or 'Z' of left channel bank = 2.000
Slope or 'Z' of right channel bank = 2.000
Estimated mean flow rate at midpoint of channel = 472.114(CFS)
Manning's 'N' = 0.015
Maximum depth of channel = 7.000(Ft.)
Flow(q) thru subarea = 472.114(CFS)
Depth of flow = 0.867(Ft.), Average velocity = 17.161(Ft/s)
Channel flow top width = 33.468(Ft.)
Flow Velocity = 17.16(Ft/s)
Travel time = 0.10 min.
Time of concentration = 20.69 min.

Sub-Channel No. 1 Critical depth = 1.891(Ft.)
' ' ' Critical flow top width = 37.563(Ft.)
' ' ' Critical flow velocity= 7.392(Ft/s)
' ' ' Critical flow area = 63.868(Sq.Ft)

Adding area flow to channel
COMMERCIAL subarea type
Runoff Coefficient = 0.880
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2) = 75.00
Pervious area fraction = 0.100; Impervious fraction = 0.900
Rainfall intensity = 1.599(In/Hr) for a 10.0 year storm
Subarea runoff = 0.591(CFS) for 0.420(Ac.)
Total runoff = 472.398(CFS) Total area = 323.100(Ac.)
Depth of flow = 0.867(Ft.), Average velocity = 17.165(Ft/s)

Sub-Channel No. 1 Critical depth = 1.891(Ft.)
' ' ' Critical flow top width = 37.563(Ft.)
' ' ' Critical flow velocity= 7.397(Ft/s)
' ' ' Critical flow area = 63.868(Sq.Ft)

End of computations, total study area = 323.10 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.546
Area averaged RI index number = 76.3

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 01/19/19 File:E1847Q10B.out

JN 18.1847.1 - SKYLINE VILLAGE
GF INVESTMENTS - CITY OF LAKE ELSIONRE
EXISTING CONDITION 10-YEAR HYDROLOGY FOR AREA "B"
MODELED JANUARY 16, 2019 BY MCT

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

English (in-lb) Units used in input data file

Program License Serial Number 6062

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 10.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation = 0.620(In.)
100 year, 1 hour precipitation = 1.520(In.)

Storm event year = 10.0
Calculated rainfall intensity data:
1 hour intensity = 0.990(In/Hr)
Slope of intensity duration curve = 0.4500

+++++
Process from Point/Station 600.000 to Point/Station 602.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 770.000(Ft.)
Top (of initial area) elevation = 1139.000(Ft.)
Bottom (of initial area) elevation = 1100.000(Ft.)
Difference in elevation = 39.000(Ft.)
Slope = 0.05065 s(percent)= 5.06
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 7.777 min.
Rainfall intensity = 2.483(In/Hr) for a 10.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.886
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2) = 75.00
Pervious area fraction = 0.100; Impervious fraction = 0.900
Initial subarea runoff = 2.840(CFS)
Total initial stream area = 1.290(Ac.)
Pervious area fraction = 0.100

+++++
Process from Point/Station 602.000 to Point/Station 602.000
**** SUBAREA FLOW ADDITION ****

UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.844
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2) = 89.00
Pervious area fraction = 1.000; Impervious fraction = 0.000
Time of concentration = 7.78 min.
Rainfall intensity = 2.483(In/Hr) for a 10.0 year storm
Subarea runoff = 3.605(CFS) for 1.720(Ac.)
Total runoff = 6.445(CFS) Total area = 3.010(Ac.)
End of computations, total study area = 3.01 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.614
Area averaged RI index number = 83.0

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 01/19/19 File:E1847Q10C.out

JN 18.1847.1 - SKYLINE VILLAGE
GF INVESTMENTS - CITY OF CORONA
EXISTING CONDITION 10-YEAR HYDROLOGY FOR AREA "C"
MODELED JANUARY 16, 2019 BY MCT

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

English (in-lb) Units used in input data file

Program License Serial Number 6062

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 10.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation = 0.620(In.)
100 year, 1 hour precipitation = 1.520(In.)

Storm event year = 10.0
Calculated rainfall intensity data:
1 hour intensity = 0.990(In/Hr)
Slope of intensity duration curve = 0.4500

+++++
Process from Point/Station 700.000 to Point/Station 706.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 971.000(Ft.)
Top (of initial area) elevation = 1223.000(Ft.)
Bottom (of initial area) elevation = 1084.000(Ft.)
Difference in elevation = 139.000(Ft.)
Slope = 0.14315 s(percent)= 14.32
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 12.246 min.
Rainfall intensity = 2.025(In/Hr) for a 10.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.832
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2) = 89.00
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 4.111(CFS)
Total initial stream area = 2.440(Ac.)
Pervious area fraction = 1.000

Process from Point/Station 706.000 to Point/Station 706.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Runoff Coefficient = 0.884
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2) = 75.00
Pervious area fraction = 0.100; Impervious fraction = 0.900
Time of concentration = 12.25 min.
Rainfall intensity = 2.025(In/Hr) for a 10.0 year storm
Subarea runoff = 2.934(CFS) for 1.640(Ac.)
Total runoff = 7.046(CFS) Total area = 4.080(Ac.)

Process from Point/Station 706.000 to Point/Station 708.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****

Top of street segment elevation = 1084.000(Ft.)
End of street segment elevation = 1075.800(Ft.)
Length of street segment = 387.000(Ft.)
Height of curb above gutter flowline = 8.0(In.)
Width of half street (curb to crown) = 40.000(Ft.)
Distance from crown to crossfall grade break = 38.000(Ft.)
Slope from gutter to grade break (v/hz) = 0.100
Slope from grade break to crown (v/hz) = 0.017
Street flow is on [1] side(s) of the street
Distance from curb to property line = 10.000(Ft.)
Slope from curb to property line (v/hz) = 0.020
Gutter width = 2.000(Ft.)
Gutter hike from flowline = 2.000(In.)
Manning's N in gutter = 0.0150
Manning's N from gutter to grade break = 0.0150
Manning's N from grade break to crown = 0.0150
Estimated mean flow rate at midpoint of street = 7.607(CFS)
Depth of flow = 0.387(Ft.), Average velocity = 3.746(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width = 14.943(Ft.)
Flow velocity = 3.75(Ft/s)
Travel time = 1.72 min. TC = 13.97 min.

Adding area flow to street
COMMERCIAL subarea type
Runoff Coefficient = 0.883
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2) = 75.00
Pervious area fraction = 0.100; Impervious fraction = 0.900
Rainfall intensity = 1.908(In/Hr) for a 10.0 year storm
Subarea runoff = 1.095(CFS) for 0.650(Ac.)
Total runoff = 8.141(CFS) Total area = 4.730(Ac.)
Street flow at end of street = 8.141(CFS)
Half street flow at end of street = 8.141(CFS)
Depth of flow = 0.394(Ft.), Average velocity = 3.807(Ft/s)
Flow width (from curb towards crown)= 15.361(Ft.)
End of computations, total study area = 4.73 (Ac.)
The following figures may

be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(A_p) = 0.564

Area averaged RI index number = 82.2

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 01/19/19 File:E1847Q10D.out

JN 18.1847.1 - SKYLINE VILLAGE
GF INVESTMENTS - CITY OF CORONA
EXISTING CONDITION 10-YEAR HYDROLOGY FOR AREA "D"
MODELED JANUARY 16, 2019 BY MCT

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

English (in-lb) Units used in input data file

Program License Serial Number 6062

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 10.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation = 0.620(In.)
100 year, 1 hour precipitation = 1.520(In.)

Storm event year = 10.0
Calculated rainfall intensity data:
1 hour intensity = 0.990(In/Hr)
Slope of intensity duration curve = 0.4500

+++++
Process from Point/Station 800.000 to Point/Station 802.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 442.000(Ft.)
Top (of initial area) elevation = 1380.000(Ft.)
Bottom (of initial area) elevation = 1310.000(Ft.)
Difference in elevation = 70.000(Ft.)
Slope = 0.15837 s(percent)= 15.84
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 8.760 min.
Rainfall intensity = 2.354(In/Hr) for a 10.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.841
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2) = 89.00
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 5.564(CFS)
Total initial stream area = 2.810(Ac.)
Pervious area fraction = 1.000

Process from Point/Station 802.000 to Point/Station 804.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****

Top of natural channel elevation = 1310.000(Ft.)
End of natural channel elevation = 1115.000(Ft.)
Length of natural channel = 1185.000(Ft.)
Estimated mean flow rate at midpoint of channel = 16.354(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
Velocity(ft/s) = (7 + 8(q(English Units)^{.352})(slope^{0.5})
Velocity using mean channel flow = 11.52(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
Normal channel slope = 0.1646
Corrected/adjusted channel slope = 0.1646
Travel time = 1.71 min. TC = 10.47 min.

Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.837
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2) = 89.00
Pervious area fraction = 1.000; Impervious fraction = 0.000
Rainfall intensity = 2.172(In/Hr) for a 10.0 year storm
Subarea runoff = 19.804(CFS) for 10.900(Ac.)
Total runoff = 25.368(CFS) Total area = 13.710(Ac.)

Process from Point/Station 804.000 to Point/Station 806.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****

Top of natural channel elevation = 1115.000(Ft.)
End of natural channel elevation = 1086.300(Ft.)
Length of natural channel = 300.000(Ft.)
Estimated mean flow rate at midpoint of channel = 27.135(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
Velocity(ft/s) = (7 + 8(q(English Units)^{.352})(slope^{0.5})
Velocity using mean channel flow = 10.07(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
Normal channel slope = 0.0957
Corrected/adjusted channel slope = 0.0957
Travel time = 0.50 min. TC = 10.97 min.

Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.835
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000

Decimal fraction soil group D = 1.000
RI index for soil(AMC 2) = 89.00
Pervious area fraction = 1.000; Impervious fraction = 0.000
Rainfall intensity = 2.127(In/Hr) for a 10.0 year storm
Subarea runoff = 3.394(CFS) for 1.910(Ac.)
Total runoff = 28.762(CFS) Total area = 15.620(Ac.)

++++
Process from Point/Station 806.000 to Point/Station 808.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****

Top of natural channel elevation = 1086.300(Ft.)
End of natural channel elevation = 1075.000(Ft.)
Length of natural channel = 90.000(Ft.)
Estimated mean flow rate at midpoint of channel = 29.600(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow = 11.82(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
Normal channel slope = 0.1256
Corrected/adjusted channel slope = 0.1256
Travel time = 0.13 min. TC = 11.10 min.

Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.835
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2) = 89.00
Pervious area fraction = 1.000; Impervious fraction = 0.000
Rainfall intensity = 2.116(In/Hr) for a 10.0 year storm
Subarea runoff = 1.608(CFS) for 0.910(Ac.)
Total runoff = 30.370(CFS) Total area = 16.530(Ac.)
End of computations, total study area = 16.53 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number = 89.0

100-YEAR EXISTING CONDITION

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 11/11/20 File:E1847Q100A.out

JN 18.1847.1 - SKYLINE VILLAGE
GF INVESTMENTS - CITY OF CORONA
EXISTING CONDITION 100-YEAR HYDROLOGY FOR AREA "A"
BY KWC ENGINEERS

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

English (in-lb) Units used in input data file

Program License Serial Number 6062

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 3

2 year, 1 hour precipitation = 0.620(In.)
100 year, 1 hour precipitation = 1.520(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.520(In/Hr)
Slope of intensity duration curve = 0.4500

++++
Process from Point/Station 500.000 to Point/Station 500.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****

Rainfall intensity = 2.586(In/Hr) for a 100.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.870
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 3) = 88.00
Pervious area fraction = 0.500; Impervious fraction = 0.500
User specified values are as follows:
TC = 18.42 min. Rain intensity = 2.59(In/Hr)
Total area = 292.30(Ac.) Total runoff = 697.00(CFS)

++++
Process from Point/Station 500.000 to Point/Station 505.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****

Top of natural channel elevation = 1155.000(Ft.)
End of natural channel elevation = 1130.000(Ft.)
Length of natural channel = 403.000(Ft.)
Estimated mean flow rate at midpoint of channel = 708.577(CFS)

Natural valley channel type used

E1847Q100A.out

L.A. County flood control district formula for channel velocity:

Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)

Velocity using mean channel flow = 21.82(Ft/s)

Correction to map slope used on extremely rugged channels with drops and waterfalls (Plate D-6.2)

Normal channel slope = 0.0620

Corrected/adjusted channel slope = 0.0620

Travel time = 0.31 min. TC = 18.73 min.

Adding area flow to channel

UNDEVELOPED (poor cover) subarea

Runoff Coefficient = 0.879

Decimal fraction soil group A = 0.000

Decimal fraction soil group B = 0.000

Decimal fraction soil group C = 0.000

Decimal fraction soil group D = 1.000

RI index for soil(AMC 3) = 95.60

Pervious area fraction = 1.000; Impervious fraction = 0.000

Rainfall intensity = 2.567(In/Hr) for a 100.0 year storm

Subarea runoff = 21.908(CFS) for 9.710(Ac.)

Total runoff = 718.908(CFS) Total area = 302.010(Ac.)

Process from Point/Station 505.000 to Point/Station 510.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****

Top of natural channel elevation = 1130.000(Ft.)
End of natural channel elevation = 1124.000(Ft.)
Length of natural channel = 140.000(Ft.)
Estimated mean flow rate at midpoint of channel = 721.455(CFS)

Natural valley channel type used

L.A. County flood control district formula for channel velocity:

Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)

Velocity using mean channel flow = 18.24(Ft/s)

Correction to map slope used on extremely rugged channels with drops and waterfalls (Plate D-6.2)

Normal channel slope = 0.0429

Corrected/adjusted channel slope = 0.0429

Travel time = 0.13 min. TC = 18.86 min.

Adding area flow to channel

UNDEVELOPED (poor cover) subarea

Runoff Coefficient = 0.879

Decimal fraction soil group A = 0.000

Decimal fraction soil group B = 0.000

Decimal fraction soil group C = 0.000

Decimal fraction soil group D = 1.000

RI index for soil(AMC 3) = 95.60

Pervious area fraction = 1.000; Impervious fraction = 0.000

Rainfall intensity = 2.559(In/Hr) for a 100.0 year storm

Subarea runoff = 4.813(CFS) for 2.140(Ac.)

Total runoff = 723.721(CFS) Total area = 304.150(Ac.)

Process from Point/Station 510.000 to Point/Station 516.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****

Top of natural channel elevation = 1124.000(Ft.)
End of natural channel elevation = 1098.500(Ft.)
Length of natural channel = 407.000(Ft.)

Estimated mean flow rate at midpoint of channel = 726.172(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow = 22.11(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
Normal channel slope = 0.0627
Corrected/adjusted channel slope = 0.0627
Travel time = 0.31 min. TC = 19.16 min.

Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.879
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 3) = 95.60
Pervious area fraction = 1.000; Impervious fraction = 0.000
Rainfall intensity = 2.540(In/Hr) for a 100.0 year storm
Subarea runoff = 4.599(CFS) for 2.060(Ac.)
Total runoff = 728.320(CFS) Total area = 306.210(Ac.)

Process from Point/Station 516.000 to Point/Station 516.000
**** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area = 306.210(Ac.)
Runoff from this stream = 728.320(CFS)
Time of concentration = 19.16 min.
Rainfall intensity = 2.540(In/Hr)
Program is now starting with Main Stream No. 2

Process from Point/Station 512.000 to Point/Station 514.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 784.000(Ft.)
Top (of initial area) elevation = 1436.500(Ft.)
Bottom (of initial area) elevation = 1189.600(Ft.)
Difference in elevation = 246.900(Ft.)
Slope = 0.31492 s(percent)= 31.49
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 9.602 min.
Rainfall intensity = 3.467(In/Hr) for a 100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.884
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 3) = 95.60
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 18.028(CFS)
Total initial stream area = 5.880(Ac.)
Pervious area fraction = 1.000

E1847Q100A.out

Process from Point/Station 514.000 to Point/Station 516.000
 **** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****

Top of natural channel elevation = 1189.600(Ft.)
 End of natural channel elevation = 1098.500(Ft.)
 Length of natural channel = 784.000(Ft.)
 Estimated mean flow rate at midpoint of channel = 34.263(CFS)

Natural valley channel type used
 L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
 Velocity using mean channel flow = 11.85(Ft/s)

Correction to map slope used on extremely rugged channels with
 drops and waterfalls (Plate D-6.2)
 Normal channel slope = 0.1162
 Corrected/adjusted channel slope = 0.1162
 Travel time = 1.10 min. TC = 10.70 min.

Adding area flow to channel
 UNDEVELOPED (poor cover) subarea
 Runoff Coefficient = 0.884
 Decimal fraction soil group A = 0.000
 Decimal fraction soil group B = 0.000
 Decimal fraction soil group C = 0.000
 Decimal fraction soil group D = 1.000
 RI index for soil(AMC 3) = 95.60
 Pervious area fraction = 1.000; Impervious fraction = 0.000
 Rainfall intensity = 3.301(In/Hr) for a 100.0 year storm
 Subarea runoff = 30.892(CFS) for 10.590(Ac.)
 Total runoff = 48.920(CFS) Total area = 16.470(Ac.)

 Process from Point/Station 516.000 to Point/Station 516.000
 **** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:

In Main Stream number: 2
 Stream flow area = 16.470(Ac.)
 Runoff from this stream = 48.920(CFS)
 Time of concentration = 10.70 min.
 Rainfall intensity = 3.301(In/Hr)
 Summary of stream data:

Stream No.	Flow rate (CFS)	TC (min)	Rainfall Intensity (In/Hr)
------------	-----------------	----------	----------------------------

1	728.320	19.16	2.540
2	48.920	10.70	3.301

Largest stream flow has longer time of concentration

Qp = 728.320 + sum of

$$Qb \quad Ia/Ib$$

$$48.920 * 0.769 = 37.644$$
 Qp = 765.963

Total of 2 main streams to confluence:

Flow rates before confluence point:
 728.320 48.920
 Area of streams before confluence:
 306.210 16.470

Results of confluence:

Total flow rate = 765.963(CFS)

Time of concentration = 19.163 min.
Effective stream area after confluence = 322.680(Ac.)

Process from Point/Station 516.000 to Point/Station 518.000
**** IMPROVED CHANNEL TRAVEL TIME ****

Covered channel
Upstream point elevation = 1098.500(Ft.)
Downstream point elevation = 1094.500(Ft.)
Channel length thru subarea = 101.000(Ft.)
Channel base width = 30.000(Ft.)
Slope or 'Z' of left channel bank = 2.000
Slope or 'Z' of right channel bank = 2.000
Estimated mean flow rate at midpoint of channel = 766.462(CFS)
Manning's 'N' = 0.015
Maximum depth of channel = 7.000(Ft.)
Flow(q) thru subarea = 766.462(CFS)
Depth of flow = 1.156(Ft.), Average velocity = 20.521(Ft/s)
Channel flow top width = 34.624(Ft.)
Flow Velocity = 20.52(Ft/s)
Travel time = 0.08 min.
Time of concentration = 19.24 min.

Sub-Channel No. 1 Critical depth = 2.563(Ft.)
' ' ' Critical flow top width = 40.250(Ft.)
' ' ' Critical flow velocity= 8.515(Ft/s)
' ' ' Critical flow area = 90.008(Sq.Ft)

Adding area flow to channel
COMMERCIAL subarea type
Runoff Coefficient = 0.894
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 3) = 88.00
Pervious area fraction = 0.100; Impervious fraction = 0.900
Rainfall intensity = 2.536(In/Hr) for a 100.0 year storm
Subarea runoff = 0.952(CFS) for 0.420(Ac.)
Total runoff = 766.915(CFS) Total area = 323.100(Ac.)
Depth of flow = 1.156(Ft.), Average velocity = 20.526(Ft/s)

Sub-Channel No. 1 Critical depth = 2.563(Ft.)
' ' ' Critical flow top width = 40.250(Ft.)
' ' ' Critical flow velocity= 8.521(Ft/s)
' ' ' Critical flow area = 90.008(Sq.Ft)

End of computations, total study area = 323.10 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.546
Area averaged RI index number = 76.3

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 01/19/19 File:E1847Q100B.out

JN 18.1847.1 - SKYLINE VILLAGE
GF INVESTMENTS - CITY OF CORONA
EXISTING CONDITION 100-YEAR HYDROLOGY FOR AREA "B"
MODELED JANUARY 16, 2019 BY MCT

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

English (in-lb) Units used in input data file

Program License Serial Number 6062

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation = 0.620(In.)
100 year, 1 hour precipitation = 1.520(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.520(In/Hr)
Slope of intensity duration curve = 0.4500

+++++
Process from Point/Station 600.000 to Point/Station 602.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 770.000(Ft.)
Top (of initial area) elevation = 1139.000(Ft.)
Bottom (of initial area) elevation = 1100.000(Ft.)
Difference in elevation = 39.000(Ft.)
Slope = 0.05065 s(percent)= 5.06
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 7.777 min.
Rainfall intensity = 3.812(In/Hr) for a 100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.891
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2) = 75.00
Pervious area fraction = 0.100; Impervious fraction = 0.900
Initial subarea runoff = 4.379(CFS)
Total initial stream area = 1.290(Ac.)
Pervious area fraction = 0.100

+++++
Process from Point/Station 602.000 to Point/Station 602.000
**** SUBAREA FLOW ADDITION ****

UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.863
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2) = 89.00
Pervious area fraction = 1.000; Impervious fraction = 0.000
Time of concentration = 7.78 min.
Rainfall intensity = 3.812(In/Hr) for a 100.0 year storm
Subarea runoff = 5.656(CFS) for 1.720(Ac.)
Total runoff = 10.036(CFS) Total area = 3.010(Ac.)
End of computations, total study area = 3.01 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.614
Area averaged RI index number = 83.0

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 02/01/19 File:e1847q100c.out

JN 18.1847.1 - SKYLINE VILLAGE
GF INVESTMENTS - CITY OF CORONA
EXISTING CONDITION 100-YEAR HYDROLOGY FOR AREA "C"
MODELED JANUARY 16, 2019 BY MCT

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

English (in-lb) Units used in input data file

Program License Serial Number 6062

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation = 0.620(In.)
100 year, 1 hour precipitation = 1.520(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.520(In/Hr)
Slope of intensity duration curve = 0.4500

+++++
Process from Point/Station 700.000 to Point/Station 706.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 971.000(Ft.)
Top (of initial area) elevation = 1223.000(Ft.)
Bottom (of initial area) elevation = 1084.000(Ft.)
Difference in elevation = 139.000(Ft.)
Slope = 0.14315 s(percent)= 14.32
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 12.246 min.
Rainfall intensity = 3.107(In/Hr) for a 100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.855
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2) = 89.00
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 6.480(CFS)
Total initial stream area = 2.440(Ac.)
Pervious area fraction = 1.000

Process from Point/Station 706.000 to Point/Station 706.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Runoff Coefficient = 0.889
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2) = 75.00
Pervious area fraction = 0.100; Impervious fraction = 0.900
Time of concentration = 12.25 min.
Rainfall intensity = 3.107(In/Hr) for a 100.0 year storm
Subarea runoff = 4.529(CFS) for 1.640(Ac.)
Total runoff = 11.010(CFS) Total area = 4.080(Ac.)

Process from Point/Station 706.000 to Point/Station 708.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****

Top of street segment elevation = 1084.000(Ft.)
End of street segment elevation = 1075.800(Ft.)
Length of street segment = 387.000(Ft.)
Height of curb above gutter flowline = 8.0(In.)
Width of half street (curb to crown) = 40.000(Ft.)
Distance from crown to crossfall grade break = 38.000(Ft.)
Slope from gutter to grade break (v/hz) = 0.100
Slope from grade break to crown (v/hz) = 0.017
Street flow is on [1] side(s) of the street
Distance from curb to property line = 10.000(Ft.)
Slope from curb to property line (v/hz) = 0.020
Gutter width = 2.000(Ft.)
Gutter hike from flowline = 2.000(In.)
Manning's N in gutter = 0.0150
Manning's N from gutter to grade break = 0.0150
Manning's N from grade break to crown = 0.0150
Estimated mean flow rate at midpoint of street = 11.887(CFS)
Depth of flow = 0.437(Ft.), Average velocity = 4.170(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width = 17.881(Ft.)
Flow velocity = 4.17(Ft/s)
Travel time = 1.55 min. TC = 13.79 min.

Adding area flow to street
COMMERCIAL subarea type
Runoff Coefficient = 0.888
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2) = 75.00
Pervious area fraction = 0.100; Impervious fraction = 0.900
Rainfall intensity = 2.946(In/Hr) for a 100.0 year storm
Subarea runoff = 1.701(CFS) for 0.650(Ac.)
Total runoff = 12.710(CFS) Total area = 4.730(Ac.)
Street flow at end of street = 12.710(CFS)
Half street flow at end of street = 12.710(CFS)
Depth of flow = 0.445(Ft.), Average velocity = 4.239(Ft/s)
Flow width (from curb towards crown)= 18.362(Ft.)
End of computations, total study area = 4.73 (Ac.)
The following figures may

be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(A_p) = 0.564

Area averaged RI index number = 82.2

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 01/19/19 File:E1847Q100D.out

JN 18.1847.1 - SKYLINE VILLAGE
GF INVESTMENTS - CITY OF CORONA
EXISTING CONDITION 100-YEAR HYDROLOGY FOR AREA "D"
MODELED JANUARY 16, 2019 BY MCT

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

English (in-lb) Units used in input data file

Program License Serial Number 6062

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation = 0.620(In.)
100 year, 1 hour precipitation = 1.520(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.520(In/Hr)
Slope of intensity duration curve = 0.4500

+++++
Process from Point/Station 800.000 to Point/Station 802.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 442.000(Ft.)
Top (of initial area) elevation = 1380.000(Ft.)
Bottom (of initial area) elevation = 1310.000(Ft.)
Difference in elevation = 70.000(Ft.)
Slope = 0.15837 s(percent)= 15.84
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 8.760 min.
Rainfall intensity = 3.613(In/Hr) for a 100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.861
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2) = 89.00
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 8.739(CFS)
Total initial stream area = 2.810(Ac.)
Pervious area fraction = 1.000

Process from Point/Station 802.000 to Point/Station 804.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****

Top of natural channel elevation = 1310.000(Ft.)
End of natural channel elevation = 1115.000(Ft.)
Length of natural channel = 1207.000(Ft.)
Estimated mean flow rate at midpoint of channel = 27.585(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
Velocity(ft/s) = $(7 + 8(q(\text{English Units})^{.352})(\text{slope}^{.5}))$
Velocity using mean channel flow = 13.15(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
Normal channel slope = 0.1616
Corrected/adjusted channel slope = 0.1616
Travel time = 1.53 min. TC = 10.29 min.

Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.858
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2) = 89.00
Pervious area fraction = 1.000; Impervious fraction = 0.000
Rainfall intensity = 3.361(In/Hr) for a 100.0 year storm
Subarea runoff = 34.945(CFS) for 12.120(Ac.)
Total runoff = 43.684(CFS) Total area = 14.930(Ac.)

Process from Point/Station 804.000 to Point/Station 806.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****

Top of natural channel elevation = 1115.000(Ft.)
End of natural channel elevation = 1086.300(Ft.)
Length of natural channel = 268.000(Ft.)
Estimated mean flow rate at midpoint of channel = 44.679(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
Velocity(ft/s) = $(7 + 8(q(\text{English Units})^{.352})(\text{slope}^{.5}))$
Velocity using mean channel flow = 12.26(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
Normal channel slope = 0.1071
Corrected/adjusted channel slope = 0.1071
Travel time = 0.36 min. TC = 10.65 min.

Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.857
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000

Decimal fraction soil group D = 1.000
RI index for soil(AMC 2) = 89.00
Pervious area fraction = 1.000; Impervious fraction = 0.000
Rainfall intensity = 3.308(In/Hr) for a 100.0 year storm
Subarea runoff = 1.929(CFS) for 0.680(Ac.)
Total runoff = 45.612(CFS) Total area = 15.610(Ac.)

+++++
Process from Point/Station 806.000 to Point/Station 808.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Runoff Coefficient = 0.889
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2) = 75.00
Pervious area fraction = 0.100; Impervious fraction = 0.900
Time of concentration = 10.65 min.
Rainfall intensity = 3.308(In/Hr) for a 100.0 year storm
Subarea runoff = 2.766(CFS) for 0.940(Ac.)
Total runoff = 48.378(CFS) Total area = 16.550(Ac.)
End of computations, total study area = 16.55 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(A_p) = 0.949
Area averaged RI index number = 88.2

Appendix

E

**EXISTING CONDITION HYDROLOGIC
KEY MAP**

F

**PROPOSED CONDITION HYDROLOGY
RATIONAL METHOD**

10-YEAR PROPOSED CONDITION

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 07/31/20 File:P1847Q10A.out

JN 18.1847.1 - SKYLINE VILLAGE
GF INVESTMENTS - CITY OF CORONA
PROPOSE DEVELOPED CONDITION 10-YEAR HYDROLOGY FOR AREA "A"
BY:CS

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

English (in-lb) Units used in input data file

Program License Serial Number 6062

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 10.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation = 0.620(In.)
100 year, 1 hour precipitation = 1.520(In.)

Storm event year = 10.0
Calculated rainfall intensity data:
1 hour intensity = 0.990(In/Hr)
Slope of intensity duration curve = 0.4500

+++++
Process from Point/Station 509.000 to Point/Station 509.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****

Rainfall intensity = 1.634(In/Hr) for a 10.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.804
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2) = 75.00
Pervious area fraction = 0.500; Impervious fraction = 0.500
User specified values are as follows:
TC = 19.72 min. Rain intensity = 1.63(In/Hr)
Total area = 292.30(Ac.) Total runoff = 430.90(CFS)

+++++
Process from Point/Station 509.000 to Point/Station 513.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****

Top of natural channel elevation = 1155.000(Ft.)
End of natural channel elevation = 1130.000(Ft.)
Length of natural channel = 400.000(Ft.)
Estimated mean flow rate at midpoint of channel = 437.821(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow = 18.76(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
Normal channel slope = 0.0625
Corrected/adjusted channel slope = 0.0625
Travel time = 0.36 min. TC = 20.08 min.

Adding area flow to channel
 UNDEVELOPED (poor cover) subarea
 Runoff Coefficient = 0.817
 Decimal fraction soil group A = 0.000
 Decimal fraction soil group B = 0.000
 Decimal fraction soil group C = 0.000
 Decimal fraction soil group D = 1.000
 RI index for soil(AMC 2) = 89.00
 Pervious area fraction = 1.000; Impervious fraction = 0.000
 Rainfall intensity = 1.621(In/Hr) for a 10.0 year storm
 Subarea runoff = 12.433(CFS) for 9.390(Ac.)
 Total runoff = 443.333(CFS) Total area = 301.690(Ac.)

 Process from Point/Station 513.000 to Point/Station 513.000
 **** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:
 In Main Stream number: 1
 Stream flow area = 301.690(Ac.)
 Runoff from this stream = 443.333(CFS)
 Time of concentration = 20.08 min.
 Rainfall intensity = 1.621(In/Hr)
 Program is now starting with Main Stream No. 2

 Process from Point/Station 520.000 to Point/Station 521.000
 **** INITIAL AREA EVALUATION ****

Initial area flow distance = 757.000(Ft.)
 Top (of initial area) elevation = 1436.500(Ft.)
 Bottom (of initial area) elevation = 1175.000(Ft.)
 Difference in elevation = 261.500(Ft.)
 Slope = 0.34544 s(percent)= 34.54
 TC = $k(0.530)*[(length^3)/(elevation\ change)]^{0.2}$
 Initial area time of concentration = 9.295 min.
 Rainfall intensity = 2.292(In/Hr) for a 10.0 year storm
 UNDEVELOPED (poor cover) subarea
 Runoff Coefficient = 0.840
 Decimal fraction soil group A = 0.000
 Decimal fraction soil group B = 0.000
 Decimal fraction soil group C = 0.000
 Decimal fraction soil group D = 1.000
 RI index for soil(AMC 2) = 89.00
 Pervious area fraction = 1.000; Impervious fraction = 0.000
 Initial subarea runoff = 11.316(CFS)
 Total initial stream area = 5.880(Ac.)
 Pervious area fraction = 1.000

 Process from Point/Station 521.000 to Point/Station 522.000
 **** IMPROVED CHANNEL TRAVEL TIME ****

Covered channel
 Upstream point elevation = 1175.000(Ft.)
 Downstream point elevation = 1150.000(Ft.)
 Channel length thru subarea = 110.000(Ft.)
 Channel base width = 0.100(Ft.)
 Slope or 'Z' of left channel bank = 1.000
 Slope or 'Z' of right channel bank = 1.000
 Estimated mean flow rate at midpoint of channel = 12.440(CFS)
 Manning's 'N' = 0.015
 Maximum depth of channel = 1.500(Ft.)
 Flow(q) thru subarea = 12.440(CFS)
 Depth of flow = 0.735(Ft.), Average velocity = 20.288(Ft/s)
 Channel flow top width = 1.569(Ft.)

Flow Velocity = 20.29(Ft/s)
Travel time = 0.09 min.
Time of concentration = 9.39 min.

Sub-Channel No. 1 Critical depth = 1.516(Ft.)
' ' ' Critical flow top width = 3.100(Ft.)
' ' ' Critical flow velocity= 5.081(Ft/s)
' ' ' Critical flow area = 2.448(Sq.Ft)

Adding area flow to channel
UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.785
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2) = 80.00
Pervious area fraction = 1.000; Impervious fraction = 0.000
Rainfall intensity = 2.282(In/Hr) for a 10.0 year storm
Subarea runoff = 2.168(CFS) for 1.210(Ac.)
Total runoff = 13.484(CFS) Total area = 7.090(Ac.)
Depth of flow = 0.759(Ft.), Average velocity = 20.696(Ft/s)

Sub-Channel No. 1 Critical depth = 1.563(Ft.)
' ' ' Critical flow top width = 3.100(Ft.)
' ' ' Critical flow velocity= 5.199(Ft/s)
' ' ' Critical flow area = 2.594(Sq.Ft)

Process from Point/Station 522.000 to Point/Station 523.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1145.000(Ft.)
Downstream point/station elevation = 1141.500(Ft.)
Pipe length = 215.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 13.484(CFS)
Nearest computed pipe diameter = 18.00(In.)
Calculated individual pipe flow = 13.484(CFS)
Normal flow depth in pipe = 14.86(In.)
Flow top width inside pipe = 13.66(In.)
Critical Depth = 16.40(In.)
Pipe flow velocity = 8.64(Ft/s)
Travel time through pipe = 0.41 min.
Time of concentration (TC) = 9.80 min.

Process from Point/Station 523.000 to Point/Station 523.000
**** SUBAREA FLOW ADDITION ****

UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.838
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2) = 89.00
Pervious area fraction = 1.000; Impervious fraction = 0.000
Time of concentration = 9.80 min.
Rainfall intensity = 2.238(In/Hr) for a 10.0 year storm
Subarea runoff = 2.289(CFS) for 1.220(Ac.)
Total runoff = 15.773(CFS) Total area = 8.310(Ac.)

Process from Point/Station 523.000 to Point/Station 524.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1141.500(Ft.)

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Downstream point/station elevation = 1138.900(Ft.)
Pipe length = 172.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 15.773(CFS)
Nearest computed pipe diameter = 21.00(In.)
Calculated individual pipe flow = 15.773(CFS)
Normal flow depth in pipe = 14.34(In.)
Flow top width inside pipe = 19.54(In.)
Critical Depth = 17.60(In.)
Pipe flow velocity = 9.02(Ft/s)
Travel time through pipe = 0.32 min.
Time of concentration (TC) = 10.12 min.

Process from Point/Station 524.000 to Point/Station 524.000
**** SUBAREA FLOW ADDITION ****

CONDOMINIUM subarea type
Runoff Coefficient = 0.847
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2) = 75.00
Pervious area fraction = 0.350; Impervious fraction = 0.650
Time of concentration = 10.12 min.
Rainfall intensity = 2.206(In/Hr) for a 10.0 year storm
Subarea runoff = 2.336(CFS) for 1.250(Ac.)
Total runoff = 18.109(CFS) Total area = 9.560(Ac.)

Process from Point/Station 524.000 to Point/Station 525.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1138.900(Ft.)
Downstream point/station elevation = 1138.400(Ft.)
Pipe length = 29.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 18.109(CFS)
Nearest computed pipe diameter = 21.00(In.)
Calculated individual pipe flow = 18.109(CFS)
Normal flow depth in pipe = 15.16(In.)
Flow top width inside pipe = 18.81(In.)
Critical Depth = 18.57(In.)
Pipe flow velocity = 9.75(Ft/s)
Travel time through pipe = 0.05 min.
Time of concentration (TC) = 10.17 min.

Process from Point/Station 525.000 to Point/Station 513.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****

Top of natural channel elevation = 1138.400(Ft.)
End of natural channel elevation = 1130.000(Ft.)
Length of natural channel = 66.000(Ft.)
Estimated mean flow rate at midpoint of channel = 18.119(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
Velocity(ft/s) = $(7 + 8(q(\text{English Units})^{.352})(\text{slope}^{.5}))$
Velocity using mean channel flow = 10.41(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
Normal channel slope = 0.1273
Corrected/adjusted channel slope = 0.1273
Travel time = 0.11 min. TC = 10.27 min.

Adding area flow to channel

UNDEVELOPED (poor cover) subarea
 Runoff Coefficient = 0.837
 Decimal fraction soil group A = 0.000
 Decimal fraction soil group B = 0.000
 Decimal fraction soil group C = 0.000
 Decimal fraction soil group D = 1.000
 RI index for soil(AMC 2) = 89.00
 Pervious area fraction = 1.000; Impervious fraction = 0.000
 Rainfall intensity = 2.191(In/Hr) for a 10.0 year storm
 Subarea runoff = 0.018(CFS) for 0.010(Ac.)
 Total runoff = 18.128(CFS) Total area = 9.570(Ac.)

 Process from Point/Station 513.000 to Point/Station 513.000
 **** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:
 In Main Stream number: 2
 Stream flow area = 9.570(Ac.)
 Runoff from this stream = 18.128(CFS)
 Time of concentration = 10.27 min.
 Rainfall intensity = 2.191(In/Hr)
 Summary of stream data:

Stream No.	Flow rate (CFS)	TC (min)	Rainfall Intensity (In/Hr)
1	443.333	20.08	1.621
2	18.128	10.27	2.191

Largest stream flow has longer time of concentration

Qp = 443.333 + sum of

$$Q_b \quad I_a/I_b$$

$$18.128 * 0.740 = 13.409$$
 Qp = 456.742

Total of 2 main streams to confluence:
 Flow rates before confluence point:
 443.333 18.128
 Area of streams before confluence:
 301.690 9.570

Results of confluence:
 Total flow rate = 456.742(CFS)
 Time of concentration = 20.075 min.
 Effective stream area after confluence = 311.260(Ac.)

 Process from Point/Station 513.000 to Point/Station 514.000
 **** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****

Top of natural channel elevation = 1130.000(Ft.)
 End of natural channel elevation = 1124.000(Ft.)
 Length of natural channel = 135.000(Ft.)
 Estimated mean flow rate at midpoint of channel = 458.386(CFS)

Natural valley channel type used
 L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
 Velocity using mean channel flow = 16.06(Ft/s)

Correction to map slope used on extremely rugged channels with drops and waterfalls (Plate D-6.2)
 Normal channel slope = 0.0444
 Corrected/adjusted channel slope = 0.0444
 Travel time = 0.14 min. TC = 20.22 min.

Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.817
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2) = 89.00
Pervious area fraction = 1.000; Impervious fraction = 0.000
Rainfall intensity = 1.616(In/Hr) for a 10.0 year storm
Subarea runoff = 2.956(CFS) for 2.240(Ac.)
Total runoff = 459.698(CFS) Total area = 313.500(Ac.)

Process from Point/Station 514.000 to Point/Station 516.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****

Top of natural channel elevation = 1124.000(Ft.)
End of natural channel elevation = 1098.500(Ft.)
Length of natural channel = 410.000(Ft.)
Estimated mean flow rate at midpoint of channel = 461.597(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow = 19.04(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
Normal channel slope = 0.0622
Corrected/adjusted channel slope = 0.0622
Travel time = 0.36 min. TC = 20.57 min.

Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.816
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2) = 89.00
Pervious area fraction = 1.000; Impervious fraction = 0.000
Rainfall intensity = 1.603(In/Hr) for a 10.0 year storm
Subarea runoff = 3.388(CFS) for 2.590(Ac.)
Total runoff = 463.086(CFS) Total area = 316.090(Ac.)

Process from Point/Station 516.000 to Point/Station 516.000
**** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area = 316.090(Ac.)
Runoff from this stream = 463.086(CFS)
Time of concentration = 20.57 min.
Rainfall intensity = 1.603(In/Hr)
Program is now starting with Main Stream No. 2

Process from Point/Station 530.000 to Point/Station 531.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 478.000(Ft.)
Top (of initial area) elevation = 1147.000(Ft.)
Bottom (of initial area) elevation = 1142.800(Ft.)
Difference in elevation = 4.200(Ft.)
Slope = 0.00879 s(percent)= 0.88

TC = $k(0.370)*[(length^3)/(elevation\ change)]^{0.2}$
 Initial area time of concentration = 11.251 min.
 Rainfall intensity = 2.103(In/Hr) for a 10.0 year storm
 CONDOMINIUM subarea type
 Runoff Coefficient = 0.845
 Decimal fraction soil group A = 0.000
 Decimal fraction soil group B = 0.000
 Decimal fraction soil group C = 0.000
 Decimal fraction soil group D = 1.000
 RI index for soil(AMC 2) = 75.00
 Pervious area fraction = 0.350; Impervious fraction = 0.650
 Initial subarea runoff = 2.542(CFS)
 Total initial stream area = 1.430(Ac.)
 Pervious area fraction = 0.350

 Process from Point/Station 531.000 to Point/Station 532.000
 **** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1139.300(Ft.)
 Downstream point/station elevation = 1135.400(Ft.)
 Pipe length = 58.00(Ft.) Manning's N = 0.013
 No. of pipes = 1 Required pipe flow = 2.542(CFS)
 Nearest computed pipe diameter = 9.00(In.)
 Calculated individual pipe flow = 2.542(CFS)
 Normal flow depth in pipe = 4.99(In.)
 Flow top width inside pipe = 8.95(In.)
 Critical Depth = 8.35(In.)
 Pipe flow velocity = 10.12(Ft/s)
 Travel time through pipe = 0.10 min.
 Time of concentration (TC) = 11.35 min.

 Process from Point/Station 532.000 to Point/Station 532.000
 **** SUBAREA FLOW ADDITION ****

CONDOMINIUM subarea type
 Runoff Coefficient = 0.845
 Decimal fraction soil group A = 0.000
 Decimal fraction soil group B = 0.000
 Decimal fraction soil group C = 0.000
 Decimal fraction soil group D = 1.000
 RI index for soil(AMC 2) = 75.00
 Pervious area fraction = 0.350; Impervious fraction = 0.650
 Time of concentration = 11.35 min.
 Rainfall intensity = 2.095(In/Hr) for a 10.0 year storm
 Subarea runoff = 0.584(CFS) for 0.330(Ac.)
 Total runoff = 3.126(CFS) Total area = 1.760(Ac.)

 Process from Point/Station 532.000 to Point/Station 533.000
 **** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1135.400(Ft.)
 Downstream point/station elevation = 1118.300(Ft.)
 Pipe length = 128.00(Ft.) Manning's N = 0.013
 No. of pipes = 1 Required pipe flow = 3.126(CFS)
 Nearest computed pipe diameter = 9.00(In.)
 Calculated individual pipe flow = 3.126(CFS)
 Normal flow depth in pipe = 4.59(In.)
 Flow top width inside pipe = 9.00(In.)
 Critical depth could not be calculated.
 Pipe flow velocity = 13.80(Ft/s)
 Travel time through pipe = 0.15 min.
 Time of concentration (TC) = 11.50 min.

Process from Point/Station 533.000 to Point/Station 533.000
**** SUBAREA FLOW ADDITION ****

CONDOMINIUM subarea type
Runoff Coefficient = 0.845
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2) = 75.00
Pervious area fraction = 0.350; Impervious fraction = 0.650
Time of concentration = 11.50 min.
Rainfall intensity = 2.082(In/Hr) for a 10.0 year storm
Subarea runoff = 2.603(CFS) for 1.480(Ac.)
Total runoff = 5.729(CFS) Total area = 3.240(Ac.)

Process from Point/Station 533.000 to Point/Station 534.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1118.300(Ft.)
Downstream point/station elevation = 1114.100(Ft.)
Pipe length = 32.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 5.729(CFS)
Nearest computed pipe diameter = 9.00(In.)
Calculated individual pipe flow = 5.729(CFS)
Normal flow depth in pipe = 7.04(In.)
Flow top width inside pipe = 7.43(In.)
Critical depth could not be calculated.
Pipe flow velocity = 15.44(Ft/s)
Travel time through pipe = 0.03 min.
Time of concentration (TC) = 11.54 min.

Process from Point/Station 534.000 to Point/Station 516.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****

Top of natural channel elevation = 1114.100(Ft.)
End of natural channel elevation = 1098.500(Ft.)
Length of natural channel = 213.000(Ft.)
Estimated mean flow rate at midpoint of channel = 5.738(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow = 5.90(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
Normal channel slope = 0.0732
Corrected/adjusted channel slope = 0.0732
Travel time = 0.60 min. TC = 12.14 min.

Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.833
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2) = 89.00
Pervious area fraction = 1.000; Impervious fraction = 0.000
Rainfall intensity = 2.033(In/Hr) for a 10.0 year storm
Subarea runoff = 0.017(CFS) for 0.010(Ac.)
Total runoff = 5.746(CFS) Total area = 3.250(Ac.)

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Process from Point/Station 516.000 to Point/Station 516.000
 **** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:

In Main Stream number: 2
 Stream flow area = 3.250(Ac.)
 Runoff from this stream = 5.746(CFS)
 Time of concentration = 12.14 min.
 Rainfall intensity = 2.033(In/Hr)
 Summary of stream data:

Stream No.	Flow rate (CFS)	TC (min)	Rainfall Intensity (In/Hr)
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1	463.086	20.57	1.603
2	5.746	12.14	2.033

Largest stream flow has longer time of concentration

Qp = 463.086 + sum of

$$Q_b \cdot \frac{I_a}{I_b}$$

$$5.746 * \frac{2.033}{1.603} = 4.531$$
 Qp = 467.617

Total of 2 main streams to confluence:

Flow rates before confluence point:

463.086 5.746

Area of streams before confluence:

316.090 3.250

Results of confluence:

Total flow rate = 467.617(CFS)
 Time of concentration = 20.574 min.
 Effective stream area after confluence = 319.340(Ac.)

 Process from Point/Station 516.000 to Point/Station 518.000
 **** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****

Top of natural channel elevation = 1098.500(Ft.)
 End of natural channel elevation = 1094.500(Ft.)
 Length of natural channel = 102.000(Ft.)
 Estimated mean flow rate at midpoint of channel = 467.932(CFS)

Natural valley channel type used

L.A. County flood control district formula for channel velocity:

Velocity(ft/s) = (7 + 8(q(English Units)^{.352})(slope^{0.5})

Velocity using mean channel flow = 15.18(Ft/s)

Correction to map slope used on extremely rugged channels with drops and waterfalls (Plate D-6.2)

Normal channel slope = 0.0392

Corrected/adjusted channel slope = 0.0392

Travel time = 0.11 min. TC = 20.69 min.

Adding area flow to channel

UNDEVELOPED (good cover) subarea

Runoff Coefficient = 0.745

Decimal fraction soil group A = 0.000

Decimal fraction soil group B = 0.000

Decimal fraction soil group C = 0.000

Decimal fraction soil group D = 1.000

RI index for soil(AMC 2) = 80.00

Pervious area fraction = 1.000; Impervious fraction = 0.000

Rainfall intensity = 1.599(In/Hr) for a 10.0 year storm

Subarea runoff = 0.512(CFS) for 0.430(Ac.)

Total runoff = 468.129(CFS) Total area = 319.770(Ac.)

Process from Point/Station 518.000 to Point/Station 518.000
**** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area = 319.770(Ac.)
Runoff from this stream = 468.129(CFS)
Time of concentration = 20.69 min.
Rainfall intensity = 1.599(In/Hr)
Program is now starting with Main Stream No. 2

Process from Point/Station 540.000 to Point/Station 541.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 195.000(Ft.)
Top (of initial area) elevation = 1165.000(Ft.)
Bottom (of initial area) elevation = 1133.000(Ft.)
Difference in elevation = 32.000(Ft.)
Slope = 0.16410 s(percent)= 16.41
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Warning: TC computed to be less than 5 min.; program is assuming the
time of concentration is 5 minutes.
Initial area time of concentration = 5.000 min.
Rainfall intensity = 3.030(In/Hr) for a 10.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.888
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2) = 75.00
Pervious area fraction = 0.100; Impervious fraction = 0.900
Initial subarea runoff = 1.507(CFS)
Total initial stream area = 0.560(Ac.)
Pervious area fraction = 0.100

Process from Point/Station 541.000 to Point/Station 542.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1130.800(Ft.)
Downstream point/station elevation = 1130.400(Ft.)
Pipe length = 60.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 1.507(CFS)
Nearest computed pipe diameter = 12.00(In.)
Calculated individual pipe flow = 1.507(CFS)
Normal flow depth in pipe = 6.13(In.)
Flow top width inside pipe = 12.00(In.)
Critical Depth = 6.24(In.)
Pipe flow velocity = 3.74(Ft/s)
Travel time through pipe = 0.27 min.
Time of concentration (TC) = 5.27 min.

Process from Point/Station 542.000 to Point/Station 542.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Runoff Coefficient = 0.888
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2) = 75.00
Pervious area fraction = 0.100; Impervious fraction = 0.900
Time of concentration = 5.27 min.

Rainfall intensity = 2.959(In/Hr) for a 10.0 year storm
Subarea runoff = 4.232(CFS) for 1.610(Ac.)
Total runoff = 5.739(CFS) Total area = 2.170(Ac.)

Process from Point/Station 542.000 to Point/Station 543.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1130.400(Ft.)
Downstream point/station elevation = 1121.900(Ft.)
Pipe length = 184.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 5.739(CFS)
Nearest computed pipe diameter = 12.00(In.)
Calculated individual pipe flow = 5.739(CFS)
Normal flow depth in pipe = 7.75(In.)
Flow top width inside pipe = 11.48(In.)
Critical Depth = 11.37(In.)
Pipe flow velocity = 10.70(Ft/s)
Travel time through pipe = 0.29 min.
Time of concentration (TC) = 5.55 min.

Process from Point/Station 543.000 to Point/Station 543.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Runoff Coefficient = 0.888
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2) = 75.00
Pervious area fraction = 0.100; Impervious fraction = 0.900
Time of concentration = 5.55 min.
Rainfall intensity = 2.890(In/Hr) for a 10.0 year storm
Subarea runoff = 1.180(CFS) for 0.460(Ac.)
Total runoff = 6.920(CFS) Total area = 2.630(Ac.)

Process from Point/Station 543.000 to Point/Station 543.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Runoff Coefficient = 0.888
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2) = 75.00
Pervious area fraction = 0.100; Impervious fraction = 0.900
Time of concentration = 5.55 min.
Rainfall intensity = 2.890(In/Hr) for a 10.0 year storm
Subarea runoff = 0.795(CFS) for 0.310(Ac.)
Total runoff = 7.715(CFS) Total area = 2.940(Ac.)

Process from Point/Station 543.000 to Point/Station 543.000
**** SUBAREA FLOW ADDITION ****

UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.807
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2) = 80.00
Pervious area fraction = 1.000; Impervious fraction = 0.000

Time of concentration = 5.55 min.
Rainfall intensity = 2.890(In/Hr) for a 10.0 year storm
Subarea runoff = 1.702(CFS) for 0.730(Ac.)
Total runoff = 9.417(CFS) Total area = 3.670(Ac.)

Process from Point/Station 543.000 to Point/Station 544.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1121.900(Ft.)
Downstream point/station elevation = 1113.000(Ft.)
Pipe length = 205.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 9.417(CFS)
Nearest computed pipe diameter = 15.00(In.)
Calculated individual pipe flow = 9.417(CFS)
Normal flow depth in pipe = 9.25(In.)
Flow top width inside pipe = 14.59(In.)
Critical Depth = 14.03(In.)
Pipe flow velocity = 11.87(Ft/s)
Travel time through pipe = 0.29 min.
Time of concentration (TC) = 5.84 min.

Process from Point/Station 544.000 to Point/Station 544.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Runoff Coefficient = 0.888
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2) = 75.00
Pervious area fraction = 0.100; Impervious fraction = 0.900
Time of concentration = 5.84 min.
Rainfall intensity = 2.825(In/Hr) for a 10.0 year storm
Subarea runoff = 0.451(CFS) for 0.180(Ac.)
Total runoff = 9.869(CFS) Total area = 3.850(Ac.)

Process from Point/Station 544.000 to Point/Station 545.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1113.000(Ft.)
Downstream point/station elevation = 1106.600(Ft.)
Pipe length = 148.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 9.869(CFS)
Nearest computed pipe diameter = 15.00(In.)
Calculated individual pipe flow = 9.869(CFS)
Normal flow depth in pipe = 9.55(In.)
Flow top width inside pipe = 14.43(In.)
Critical Depth = 14.17(In.)
Pipe flow velocity = 11.96(Ft/s)
Travel time through pipe = 0.21 min.
Time of concentration (TC) = 6.05 min.

Process from Point/Station 545.000 to Point/Station 545.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Runoff Coefficient = 0.888
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2) = 75.00

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Pervious area fraction = 0.100; Impervious fraction = 0.900
Time of concentration = 6.05 min.
Rainfall intensity = 2.781(In/Hr) for a 10.0 year storm
Subarea runoff = 2.172(CFS) for 0.880(Ac.)
Total runoff = 12.041(CFS) Total area = 4.730(Ac.)

Process from Point/Station 545.000 to Point/Station 546.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1106.600(Ft.)
Downstream point/station elevation = 1102.000(Ft.)
Pipe length = 118.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 12.041(CFS)
Nearest computed pipe diameter = 15.00(In.)
Calculated individual pipe flow = 12.041(CFS)
Normal flow depth in pipe = 11.60(In.)
Flow top width inside pipe = 12.56(In.)
Critical depth could not be calculated.
Pipe flow velocity = 11.82(Ft/s)
Travel time through pipe = 0.17 min.
Time of concentration (TC) = 6.21 min.

Process from Point/Station 546.000 to Point/Station 546.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Runoff Coefficient = 0.887
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2) = 75.00
Pervious area fraction = 0.100; Impervious fraction = 0.900
Time of concentration = 6.21 min.
Rainfall intensity = 2.747(In/Hr) for a 10.0 year storm
Subarea runoff = 2.194(CFS) for 0.900(Ac.)
Total runoff = 14.235(CFS) Total area = 5.630(Ac.)

Process from Point/Station 546.000 to Point/Station 547.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1101.900(Ft.)
Downstream point/station elevation = 1101.000(Ft.)
Pipe length = 54.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 14.235(CFS)
Nearest computed pipe diameter = 21.00(In.)
Calculated individual pipe flow = 14.235(CFS)
Normal flow depth in pipe = 12.89(In.)
Flow top width inside pipe = 20.45(In.)
Critical Depth = 16.82(In.)
Pipe flow velocity = 9.19(Ft/s)
Travel time through pipe = 0.10 min.
Time of concentration (TC) = 6.31 min.

Process from Point/Station 547.000 to Point/Station 518.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****

Top of natural channel elevation = 1101.000(Ft.)
End of natural channel elevation = 1094.500(Ft.)
Length of natural channel = 102.000(Ft.)
Estimated mean flow rate at midpoint of channel = 14.248(CFS)

Natural valley channel type used

L.A. County flood control district formula for channel velocity:

Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)

Velocity using mean channel flow = 6.91(Ft/s)

Correction to map slope used on extremely rugged channels with drops and waterfalls (Plate D-6.2)

Normal channel slope = 0.0637

Corrected/adjusted channel slope = 0.0637

Travel time = 0.25 min. TC = 6.56 min.

Adding area flow to channel

UNDEVELOPED (good cover) subarea

Runoff Coefficient = 0.800

Decimal fraction soil group A = 0.000

Decimal fraction soil group B = 0.000

Decimal fraction soil group C = 0.000

Decimal fraction soil group D = 1.000

RI index for soil(AMC 2) = 80.00

Pervious area fraction = 1.000; Impervious fraction = 0.000

Rainfall intensity = 2.681(In/Hr) for a 10.0 year storm

Subarea runoff = 0.021(CFS) for 0.010(Ac.)

Total runoff = 14.257(CFS) Total area = 5.640(Ac.)

Process from Point/Station 518.000 to Point/Station 518.000
**** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:

In Main Stream number: 2

Stream flow area = 5.640(Ac.)

Runoff from this stream = 14.257(CFS)

Time of concentration = 6.56 min.

Rainfall intensity = 2.681(In/Hr)

Summary of stream data:

Stream No. Flow rate (CFS) TC (min) Rainfall Intensity (In/Hr)

1 468.129 20.69 1.599

2 14.257 6.56 2.681

Largest stream flow has longer time of concentration

Qp = 468.129 + sum of Qb Ia/Ib
14.257 * 0.596 = 8.502

Qp = 476.631

Total of 2 main streams to confluence:

Flow rates before confluence point:

468.129 14.257

Area of streams before confluence:

319.770 5.640

Results of confluence:

Total flow rate = 476.631(CFS)

Time of concentration = 20.686 min.

Effective stream area after confluence = 325.410(Ac.)

End of computations, total study area = 325.41 (Ac.)

The following figures may be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.528

Area averaged RI index number = 76.0

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 07/31/20 File:P1847Q10B.out

JN 18.1847.1 - SKYLINE VILLAGE
GF INVESTMENTS - CITY OF CORONA
PROPOSE DEVELOPED CONDITION 10-YEAR HYDROLOGY FOR AREA "B"
BY:CS

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

English (in-lb) Units used in input data file

Program License Serial Number 6062

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 10.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation = 0.620(In.)
100 year, 1 hour precipitation = 1.520(In.)

Storm event year = 10.0
Calculated rainfall intensity data:
1 hour intensity = 0.990(In/Hr)
Slope of intensity duration curve = 0.4500

+++++
Process from Point/Station 600.000 to Point/Station 601.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 770.000(Ft.)
Top (of initial area) elevation = 1139.000(Ft.)
Bottom (of initial area) elevation = 1105.000(Ft.)
Difference in elevation = 34.000(Ft.)
Slope = 0.04416 s(percent)= 4.42
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 7.993 min.
Rainfall intensity = 2.453(In/Hr) for a 10.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.886
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2) = 75.00
Pervious area fraction = 0.100; Impervious fraction = 0.900
Initial subarea runoff = 3.022(CFS)
Total initial stream area = 1.390(Ac.)
Pervious area fraction = 0.100

+++++
Process from Point/Station 601.000 to Point/Station 601.000
**** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:

In Main Stream number: 1
 Stream flow area = 1.390(Ac.)
 Runoff from this stream = 3.022(CFS)
 Time of concentration = 7.99 min.
 Rainfall intensity = 2.453(In/Hr)
 Summary of stream data:

Stream No.	Flow rate (CFS)	TC (min)	Rainfall Intensity (In/Hr)
------------	-----------------	----------	----------------------------

1	3.022	7.99	2.453
---	-------	------	-------

Largest stream flow has longer time of concentration
 Qp = 3.022 + sum of
 Qp = 3.022

Total of 1 main streams to confluence:
 Flow rates before confluence point:
 3.022
 Area of streams before confluence:
 1.390

Results of confluence:
 Total flow rate = 3.022(CFS)
 Time of concentration = 7.993 min.
 Effective stream area after confluence = 1.390(Ac.)

 Process from Point/Station 605.000 to Point/Station 606.000
 **** INITIAL AREA EVALUATION ****

Initial area flow distance = 616.000(Ft.)
 Top (of initial area) elevation = 1143.200(Ft.)
 Bottom (of initial area) elevation = 1102.000(Ft.)
 Difference in elevation = 41.200(Ft.)
 Slope = 0.06688 s(percent)= 6.69
 $TC = k(0.300)*[(length^3)/(elevation\ change)]^{0.2}$
 Initial area time of concentration = 6.728 min.
 Rainfall intensity = 2.651(In/Hr) for a 10.0 year storm
 COMMERCIAL subarea type
 Runoff Coefficient = 0.887
 Decimal fraction soil group A = 0.000
 Decimal fraction soil group B = 0.000
 Decimal fraction soil group C = 0.000
 Decimal fraction soil group D = 1.000
 RI index for soil(AMC 2) = 75.00
 Pervious area fraction = 0.100; Impervious fraction = 0.900
 Initial subarea runoff = 1.999(CFS)
 Total initial stream area = 0.850(Ac.)
 Pervious area fraction = 0.100

 Process from Point/Station 606.000 to Point/Station 607.000
 **** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1102.000(Ft.)
 Downstream point/station elevation = 1090.000(Ft.)
 Pipe length = 30.00(Ft.) Manning's N = 0.013
 No. of pipes = 1 Required pipe flow = 1.999(CFS)
 Nearest computed pipe diameter = 6.00(In.)
 Calculated individual pipe flow = 1.999(CFS)
 Normal flow depth in pipe = 3.22(In.)

Flow top width inside pipe = 5.98(In.)
Critical depth could not be calculated.
Pipe flow velocity = 18.61(Ft/s)
Travel time through pipe = 0.03 min.
Time of concentration (TC) = 6.75 min.

++++
Process from Point/Station 607.000 to Point/Station 607.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type

Runoff Coefficient = 0.887
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2) = 75.00
Pervious area fraction = 0.100; Impervious fraction = 0.900
Time of concentration = 6.75 min.
Rainfall intensity = 2.646(In/Hr) for a 10.0 year storm
Subarea runoff = 1.549(CFS) for 0.660(Ac.)
Total runoff = 3.548(CFS) Total area = 1.510(Ac.)
End of computations, total study area = 2.90 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.100
Area averaged RI index number = 75.0

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 07/31/20 File:P1847Q10C.out

JN 18.1847.1 - SKYLINE VILLAGE
GF INVESTMENTS - CITY OF CORONA
PROPOSE DEVELOPED CONDITION 10-YEAR HYDROLOGY FOR AREA "C"
MODELED JANUARY 16, 2019 BY MCT

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

English (in-lb) Units used in input data file

Program License Serial Number 6062

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 10.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation = 0.620(In.)
100 year, 1 hour precipitation = 1.520(In.)

Storm event year = 10.0
Calculated rainfall intensity data:
1 hour intensity = 0.990(In/Hr)
Slope of intensity duration curve = 0.4500

+++++
Process from Point/Station 700.000 to Point/Station 706.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 660.000(Ft.)
Top (of initial area) elevation = 1175.000(Ft.)
Bottom (of initial area) elevation = 1084.000(Ft.)
Difference in elevation = 91.000(Ft.)
Slope = 0.13788 s(percent)= 13.79
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 10.573 min.
Rainfall intensity = 2.163(In/Hr) for a 10.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.836
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2) = 89.00
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 1.465(CFS)
Total initial stream area = 0.810(Ac.)
Pervious area fraction = 1.000

+++++
Process from Point/Station 706.000 to Point/Station 706.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
 Runoff Coefficient = 0.885
 Decimal fraction soil group A = 0.000
 Decimal fraction soil group B = 0.000
 Decimal fraction soil group C = 0.000
 Decimal fraction soil group D = 1.000
 RI index for soil(AMC 2) = 75.00
 Pervious area fraction = 0.100; Impervious fraction = 0.900
 Time of concentration = 10.57 min.
 Rainfall intensity = 2.163(In/Hr) for a 10.0 year storm
 Subarea runoff = 2.545(CFS) for 1.330(Ac.)
 Total runoff = 4.010(CFS) Total area = 2.140(Ac.)

 Process from Point/Station 706.000 to Point/Station 708.000
 **** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****

Top of street segment elevation = 1084.000(Ft.)
 End of street segment elevation = 1075.800(Ft.)
 Length of street segment = 387.000(Ft.)
 Height of curb above gutter flowline = 8.0(In.)
 Width of half street (curb to crown) = 40.000(Ft.)
 Distance from crown to crossfall grade break = 38.000(Ft.)
 Slope from gutter to grade break (v/hz) = 0.100
 Slope from grade break to crown (v/hz) = 0.020
 Street flow is on [1] side(s) of the street
 Distance from curb to property line = 10.000(Ft.)
 Slope from curb to property line (v/hz) = 0.020
 Gutter width = 2.000(Ft.)
 Gutter hike from flowline = 2.000(In.)
 Manning's N in gutter = 0.0150
 Manning's N from gutter to grade break = 0.0150
 Manning's N from grade break to crown = 0.0150
 Estimated mean flow rate at midpoint of street = 4.619(CFS)
 Depth of flow = 0.346(Ft.), Average velocity = 3.462(Ft/s)
 Streetflow hydraulics at midpoint of street travel:
 Halfstreet flow width = 10.989(Ft.)
 Flow velocity = 3.46(Ft/s)
 Travel time = 1.86 min. TC = 12.44 min.

Adding area flow to street
 COMMERCIAL subarea type
 Runoff Coefficient = 0.884
 Decimal fraction soil group A = 0.000
 Decimal fraction soil group B = 0.000
 Decimal fraction soil group C = 0.000
 Decimal fraction soil group D = 1.000
 RI index for soil(AMC 2) = 75.00
 Pervious area fraction = 0.100; Impervious fraction = 0.900
 Rainfall intensity = 2.011(In/Hr) for a 10.0 year storm
 Subarea runoff = 1.155(CFS) for 0.650(Ac.)
 Total runoff = 5.165(CFS) Total area = 2.790(Ac.)
 Street flow at end of street = 5.165(CFS)
 Half street flow at end of street = 5.165(CFS)
 Depth of flow = 0.357(Ft.), Average velocity = 3.553(Ft/s)
 Flow width (from curb towards crown)= 11.519(Ft.)
 End of computations, total study area = 2.79 (Ac.)

The following figures may
 be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.361
 Area averaged RI index number = 79.1

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 07/31/20 File:P1847Q10D.out

JN 18.1847.1 - SKYLINE VILLAGE
GF INVESTMENTS - CITY OF CORONA
PROPOSE DEVELOPED CONDITION 10-YEAR HYDROLOGY FOR AREA "D"
MODELED JANUARY 16, 2019 BY MCT

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

English (in-lb) Units used in input data file

Program License Serial Number 6062

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 10.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation = 0.620(In.)
100 year, 1 hour precipitation = 1.520(In.)

Storm event year = 10.0
Calculated rainfall intensity data:
1 hour intensity = 0.990(In/Hr)
Slope of intensity duration curve = 0.4500

+++++
Process from Point/Station 800.000 to Point/Station 802.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 442.000(Ft.)
Top (of initial area) elevation = 1380.000(Ft.)
Bottom (of initial area) elevation = 1310.000(Ft.)
Difference in elevation = 70.000(Ft.)
Slope = 0.15837 s(percent)= 15.84
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 8.760 min.
Rainfall intensity = 2.354(In/Hr) for a 10.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.841
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2) = 89.00
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 5.564(CFS)
Total initial stream area = 2.810(Ac.)
Pervious area fraction = 1.000

+++++
Process from Point/Station 802.000 to Point/Station 804.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****

Top of natural channel elevation = 1310.000(Ft.)
End of natural channel elevation = 1110.000(Ft.)
Length of natural channel = 1185.000(Ft.)
Estimated mean flow rate at midpoint of channel = 16.374(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
Velocity(ft/s) = $(7 + 8(q(\text{English Units})^{.352})(\text{slope}^{.5}))$
Velocity using mean channel flow = 11.67(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
Normal channel slope = 0.1688
Corrected/adjusted channel slope = 0.1688
Travel time = 1.69 min. TC = 10.45 min.

Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.837
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2) = 89.00
Pervious area fraction = 1.000; Impervious fraction = 0.000
Rainfall intensity = 2.174(In/Hr) for a 10.0 year storm
Subarea runoff = 19.861(CFS) for 10.920(Ac.)
Total runoff = 25.425(CFS) Total area = 13.730(Ac.)

+++++
Process from Point/Station 804.000 to Point/Station 806.000
*** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ***

Top of natural channel elevation = 1110.000(Ft.)
End of natural channel elevation = 1086.300(Ft.)
Length of natural channel = 300.000(Ft.)
Estimated mean flow rate at midpoint of channel = 27.008(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
Velocity(ft/s) = $(7 + 8(q(\text{English Units})^{.352})(\text{slope}^{.5}))$
Velocity using mean channel flow = 9.14(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
Normal channel slope = 0.0790
Corrected/adjusted channel slope = 0.0790
Travel time = 0.55 min. TC = 11.00 min.

Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.835
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2) = 89.00
Pervious area fraction = 1.000; Impervious fraction = 0.000
Rainfall intensity = 2.125(In/Hr) for a 10.0 year storm
Subarea runoff = 3.035(CFS) for 1.710(Ac.)
Total runoff = 28.459(CFS) Total area = 15.440(Ac.)

+++++
Process from Point/Station 806.000 to Point/Station 808.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****

Top of natural channel elevation = 1086.300(Ft.)
End of natural channel elevation = 1075.000(Ft.)
Length of natural channel = 90.000(Ft.)
Estimated mean flow rate at midpoint of channel = 29.289(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
Velocity(ft/s) = $(7 + 8(q(\text{English Units})^{.352})(\text{slope}^{.5}))$
Velocity using mean channel flow = 11.79(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
Normal channel slope = 0.1256
Corrected/adjusted channel slope = 0.1256
Travel time = 0.13 min. TC = 11.13 min.

Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.835
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2) = 89.00
Pervious area fraction = 1.000; Impervious fraction = 0.000
Rainfall intensity = 2.114(In/Hr) for a 10.0 year storm
Subarea runoff = 1.588(CFS) for 0.900(Ac.)
Total runoff = 30.047(CFS) Total area = 16.340(Ac.)
End of computations, total study area = 16.34 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number = 89.0

100-YEAR PROPOSED CONDITION

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 07/31/20 File:P1847Q100A.out

JN 18.1847.1 - SKYLINE VILLAGE
GF INVESTMENTS - CITY OF CORONA
PROPOSE DEVELOPED CONDITION 100-YEAR HYDROLOGY FOR AREA "A"

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

English (in-lb) Units used in input data file

Program License Serial Number 6062

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 3

2 year, 1 hour precipitation = 0.620(In.)
100 year, 1 hour precipitation = 1.520(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.520(In/Hr)
Slope of intensity duration curve = 0.4500

+++++
Process from Point/Station 509.000 to Point/Station 509.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****

Rainfall intensity = 2.586(In/Hr) for a 100.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.870
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 3) = 88.00
Pervious area fraction = 0.500; Impervious fraction = 0.500
User specified values are as follows:
TC = 18.42 min. Rain intensity = 2.59(In/Hr)
Total area = 292.30(Ac.) Total runoff = 697.00(CFS)

+++++
Process from Point/Station 509.000 to Point/Station 513.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****

Top of natural channel elevation = 1155.000(Ft.)
End of natural channel elevation = 1130.000(Ft.)
Length of natural channel = 400.000(Ft.)
Estimated mean flow rate at midpoint of channel = 708.195(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow = 21.90(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
Normal channel slope = 0.0625
Corrected/adjusted channel slope = 0.0625
Travel time = 0.30 min. TC = 18.72 min.

Adding area flow to channel
 UNDEVELOPED (poor cover) subarea
 Runoff Coefficient = 0.879
 Decimal fraction soil group A = 0.000
 Decimal fraction soil group B = 0.000
 Decimal fraction soil group C = 0.000
 Decimal fraction soil group D = 1.000
 RI index for soil(AMC 3) = 95.60
 Pervious area fraction = 1.000; Impervious fraction = 0.000
 Rainfall intensity = 2.567(In/Hr) for a 100.0 year storm
 Subarea runoff = 21.187(CFS) for 9.390(Ac.)
 Total runoff = 718.187(CFS) Total area = 301.690(Ac.)

 Process from Point/Station 513.000 to Point/Station 513.000
 **** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:
 In Main Stream number: 1
 Stream flow area = 301.690(Ac.)
 Runoff from this stream = 718.187(CFS)
 Time of concentration = 18.72 min.
 Rainfall intensity = 2.567(In/Hr)
 Program is now starting with Main Stream No. 2

 Process from Point/Station 520.000 to Point/Station 521.000
 **** INITIAL AREA EVALUATION ****

Initial area flow distance = 757.000(Ft.)
 Top (of initial area) elevation = 1436.500(Ft.)
 Bottom (of initial area) elevation = 1175.000(Ft.)
 Difference in elevation = 261.500(Ft.)
 Slope = 0.34544 s(percent)= 34.54
 TC = $k(0.530)*[(\text{length}^3)/(\text{elevation change})]^{0.2}$
 Initial area time of concentration = 9.295 min.
 Rainfall intensity = 3.518(In/Hr) for a 100.0 year storm
 UNDEVELOPED (poor cover) subarea
 Runoff Coefficient = 0.885
 Decimal fraction soil group A = 0.000
 Decimal fraction soil group B = 0.000
 Decimal fraction soil group C = 0.000
 Decimal fraction soil group D = 1.000
 RI index for soil(AMC 3) = 95.60
 Pervious area fraction = 1.000; Impervious fraction = 0.000
 Initial subarea runoff = 18.298(CFS)
 Total initial stream area = 5.880(Ac.)
 Pervious area fraction = 1.000

 Process from Point/Station 521.000 to Point/Station 522.000
 **** IMPROVED CHANNEL TRAVEL TIME ****

Covered channel
 Upstream point elevation = 1175.000(Ft.)
 Downstream point elevation = 1150.000(Ft.)
 Channel length thru subarea = 110.000(Ft.)
 Channel base width = 0.100(Ft.)
 Slope or 'Z' of left channel bank = 1.000
 Slope or 'Z' of right channel bank = 1.000
 Estimated mean flow rate at midpoint of channel = 20.181(CFS)
 Manning's 'N' = 0.015
 Maximum depth of channel = 1.500(Ft.)
 Flow(q) thru subarea = 20.181(CFS)
 Depth of flow = 0.891(Ft.), Average velocity = 22.867(Ft/s)
 Channel flow top width = 1.882(Ft.)

Flow Velocity = 22.87(Ft/s)
Travel time = 0.08 min.
Time of concentration = 9.37 min.

Sub-Channel No. 1 Critical depth = 1.828(Ft.)
' ' ' Critical flow top width = 3.100(Ft.)
' ' ' Critical flow velocity= 5.906(Ft/s)
' ' ' Critical flow area = 3.417(Sq.Ft)

Adding area flow to channel
UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.867
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 3) = 91.00
Pervious area fraction = 1.000; Impervious fraction = 0.000
Rainfall intensity = 3.504(In/Hr) for a 100.0 year storm
Subarea runoff = 3.678(CFS) for 1.210(Ac.)
Total runoff = 21.976(CFS) Total area = 7.090(Ac.)
Depth of flow = 0.921(Ft.), Average velocity = 23.355(Ft/s)

Sub-Channel No. 1 Critical depth = 1.891(Ft.)
' ' ' Critical flow top width = 3.100(Ft.)
' ' ' Critical flow velocity= 6.086(Ft/s)
' ' ' Critical flow area = 3.611(Sq.Ft)

Process from Point/Station 522.000 to Point/Station 523.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1145.000(Ft.)
Downstream point/station elevation = 1141.500(Ft.)
Pipe length = 215.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 21.976(CFS)
Nearest computed pipe diameter = 24.00(In.)
Calculated individual pipe flow = 21.976(CFS)
Normal flow depth in pipe = 15.68(In.)
Flow top width inside pipe = 22.84(In.)
Critical Depth = 20.08(In.)
Pipe flow velocity = 10.11(Ft/s)
Travel time through pipe = 0.35 min.
Time of concentration (TC) = 9.73 min.

Process from Point/Station 523.000 to Point/Station 523.000
**** SUBAREA FLOW ADDITION ****

UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.884
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 3) = 95.60
Pervious area fraction = 1.000; Impervious fraction = 0.000
Time of concentration = 9.73 min.
Rainfall intensity = 3.446(In/Hr) for a 100.0 year storm
Subarea runoff = 3.718(CFS) for 1.220(Ac.)
Total runoff = 25.694(CFS) Total area = 8.310(Ac.)

Process from Point/Station 523.000 to Point/Station 524.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1141.500(Ft.)

P1847Q100A.out
Downstream point/station elevation = 1138.900(Ft.)
Pipe length = 172.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 25.694(CFS)
Nearest computed pipe diameter = 24.00(In.)
Calculated individual pipe flow = 25.694(CFS)
Normal flow depth in pipe = 18.21(In.)
Flow top width inside pipe = 20.54(In.)
Critical Depth = 21.36(In.)
Pipe flow velocity = 10.05(Ft/s)
Travel time through pipe = 0.29 min.
Time of concentration (TC) = 10.01 min.

Process from Point/Station 524.000 to Point/Station 524.000
**** SUBAREA FLOW ADDITION ****

CONDOMINIUM subarea type
Runoff Coefficient = 0.884
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 3) = 88.00
Pervious area fraction = 0.350; Impervious fraction = 0.650
Time of concentration = 10.01 min.
Rainfall intensity = 3.402(In/Hr) for a 100.0 year storm
Subarea runoff = 3.759(CFS) for 1.250(Ac.)
Total runoff = 29.454(CFS) Total area = 9.560(Ac.)

Process from Point/Station 524.000 to Point/Station 525.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1138.900(Ft.)
Downstream point/station elevation = 1138.400(Ft.)
Pipe length = 29.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 29.454(CFS)
Nearest computed pipe diameter = 24.00(In.)
Calculated individual pipe flow = 29.454(CFS)
Normal flow depth in pipe = 19.50(In.)
Flow top width inside pipe = 18.73(In.)
Critical Depth = 22.25(In.)
Pipe flow velocity = 10.78(Ft/s)
Travel time through pipe = 0.04 min.
Time of concentration (TC) = 10.06 min.

Process from Point/Station 525.000 to Point/Station 513.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****

Top of natural channel elevation = 1138.400(Ft.)
End of natural channel elevation = 1130.000(Ft.)
Length of natural channel = 66.000(Ft.)
Estimated mean flow rate at midpoint of channel = 29.469(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
Velocity(ft/s) = $(7 + 8(q(\text{English Units})^{.352})(\text{slope}^{.5}))$
Velocity using mean channel flow = 11.89(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
Normal channel slope = 0.1273
Corrected/adjusted channel slope = 0.1273
Travel time = 0.09 min. TC = 10.15 min.

Adding area flow to channel

UNDEVELOPED (poor cover) subarea
 Runoff Coefficient = 0.884
 Decimal fraction soil group A = 0.000
 Decimal fraction soil group B = 0.000
 Decimal fraction soil group C = 0.000
 Decimal fraction soil group D = 1.000
 RI index for soil(AMC 3) = 95.60
 Pervious area fraction = 1.000; Impervious fraction = 0.000
 Rainfall intensity = 3.381(In/Hr) for a 100.0 year storm
 Subarea runoff = 0.030(CFS) for 0.010(Ac.)
 Total runoff = 29.484(CFS) Total area = 9.570(Ac.)

 Process from Point/Station 513.000 to Point/Station 513.000
 **** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:
 In Main Stream number: 2
 Stream flow area = 9.570(Ac.)
 Runoff from this stream = 29.484(CFS)
 Time of concentration = 10.15 min.
 Rainfall intensity = 3.381(In/Hr)
 Summary of stream data:

Stream No.	Flow rate (CFS)	TC (min)	Rainfall Intensity (In/Hr)
1	718.187	18.72	2.567
2	29.484	10.15	3.381

Largest stream flow has longer time of concentration

Qp = 718.187 + sum of

$$Qb \cdot \frac{Ia}{Ib}$$

$$29.484 * 0.759 = 22.384$$
 Qp = 740.572

Total of 2 main streams to confluence:
 Flow rates before confluence point:
 718.187 29.484
 Area of streams before confluence:
 301.690 9.570

Results of confluence:
 Total flow rate = 740.572(CFS)
 Time of concentration = 18.724 min.
 Effective stream area after confluence = 311.260(Ac.)

 Process from Point/Station 513.000 to Point/Station 514.000
 **** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****

Top of natural channel elevation = 1130.000(Ft.)
 End of natural channel elevation = 1124.000(Ft.)
 Length of natural channel = 135.000(Ft.)
 Estimated mean flow rate at midpoint of channel = 743.236(CFS)

Natural valley channel type used
 L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5))
 Velocity using mean channel flow = 18.76(Ft/s)

Correction to map slope used on extremely rugged channels with drops and waterfalls (Plate D-6.2)
 Normal channel slope = 0.0444
 Corrected/adjusted channel slope = 0.0444
 Travel time = 0.12 min. TC = 18.84 min.

Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.879
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 3) = 95.60
Pervious area fraction = 1.000; Impervious fraction = 0.000
Rainfall intensity = 2.560(In/Hr) for a 100.0 year storm
Subarea runoff = 5.039(CFS) for 2.240(Ac.)
Total runoff = 745.611(CFS) Total area = 313.500(Ac.)

Process from Point/Station 514.000 to Point/Station 516.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****

Top of natural channel elevation = 1124.000(Ft.)
End of natural channel elevation = 1098.500(Ft.)
Length of natural channel = 410.000(Ft.)
Estimated mean flow rate at midpoint of channel = 748.691(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow = 22.24(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
Normal channel slope = 0.0622
Corrected/adjusted channel slope = 0.0622
Travel time = 0.31 min. TC = 19.15 min.

Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.879
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 3) = 95.60
Pervious area fraction = 1.000; Impervious fraction = 0.000
Rainfall intensity = 2.541(In/Hr) for a 100.0 year storm
Subarea runoff = 5.784(CFS) for 2.590(Ac.)
Total runoff = 751.395(CFS) Total area = 316.090(Ac.)

Process from Point/Station 516.000 to Point/Station 516.000
**** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area = 316.090(Ac.)
Runoff from this stream = 751.395(CFS)
Time of concentration = 19.15 min.
Rainfall intensity = 2.541(In/Hr)
Program is now starting with Main Stream No. 2

Process from Point/Station 530.000 to Point/Station 531.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 478.000(Ft.)
Top (of initial area) elevation = 1147.000(Ft.)
Bottom (of initial area) elevation = 1142.800(Ft.)
Difference in elevation = 4.200(Ft.)
Slope = 0.00879 s(percent)= 0.88

TC = $k(0.370)*[(length^3)/(elevation\ change)]^{0.2}$
 Initial area time of concentration = 11.251 min.
 Rainfall intensity = 3.228(In/Hr) for a 100.0 year storm
 CONDOMINIUM subarea type
 Runoff Coefficient = 0.883
 Decimal fraction soil group A = 0.000
 Decimal fraction soil group B = 0.000
 Decimal fraction soil group C = 0.000
 Decimal fraction soil group D = 1.000
 RI index for soil(AMC 3) = 88.00
 Pervious area fraction = 0.350; Impervious fraction = 0.650
 Initial subarea runoff = 4.077(CFS)
 Total initial stream area = 1.430(Ac.)
 Pervious area fraction = 0.350

 Process from Point/Station 531.000 to Point/Station 532.000
 **** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1139.300(Ft.)
 Downstream point/station elevation = 1135.400(Ft.)
 Pipe length = 58.00(Ft.) Manning's N = 0.013
 No. of pipes = 1 Required pipe flow = 4.077(CFS)
 Nearest computed pipe diameter = 9.00(In.)
 Calculated individual pipe flow = 4.077(CFS)
 Normal flow depth in pipe = 7.01(In.)
 Flow top width inside pipe = 7.47(In.)
 Critical depth could not be calculated.
 Pipe flow velocity = 11.05(Ft/s)
 Travel time through pipe = 0.09 min.
 Time of concentration (TC) = 11.34 min.

 Process from Point/Station 532.000 to Point/Station 532.000
 **** SUBAREA FLOW ADDITION ****

CONDOMINIUM subarea type
 Runoff Coefficient = 0.883
 Decimal fraction soil group A = 0.000
 Decimal fraction soil group B = 0.000
 Decimal fraction soil group C = 0.000
 Decimal fraction soil group D = 1.000
 RI index for soil(AMC 3) = 88.00
 Pervious area fraction = 0.350; Impervious fraction = 0.650
 Time of concentration = 11.34 min.
 Rainfall intensity = 3.217(In/Hr) for a 100.0 year storm
 Subarea runoff = 0.938(CFS) for 0.330(Ac.)
 Total runoff = 5.015(CFS) Total area = 1.760(Ac.)

 Process from Point/Station 532.000 to Point/Station 533.000
 **** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1135.400(Ft.)
 Downstream point/station elevation = 1118.300(Ft.)
 Pipe length = 128.00(Ft.) Manning's N = 0.013
 No. of pipes = 1 Required pipe flow = 5.015(CFS)
 Nearest computed pipe diameter = 9.00(In.)
 Calculated individual pipe flow = 5.015(CFS)
 Normal flow depth in pipe = 6.26(In.)
 Flow top width inside pipe = 8.28(In.)
 Critical depth could not be calculated.
 Pipe flow velocity = 15.30(Ft/s)
 Travel time through pipe = 0.14 min.
 Time of concentration (TC) = 11.48 min.

Process from Point/Station 533.000 to Point/Station 533.000
**** SUBAREA FLOW ADDITION ****

CONDOMINIUM subarea type
Runoff Coefficient = 0.883
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 3) = 88.00
Pervious area fraction = 0.350; Impervious fraction = 0.650
Time of concentration = 11.48 min.
Rainfall intensity = 3.199(In/Hr) for a 100.0 year storm
Subarea runoff = 4.181(CFS) for 1.480(Ac.)
Total runoff = 9.196(CFS) Total area = 3.240(Ac.)

Process from Point/Station 533.000 to Point/Station 534.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1118.300(Ft.)
Downstream point/station elevation = 1114.100(Ft.)
Pipe length = 32.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 9.196(CFS)
Nearest computed pipe diameter = 12.00(In.)
Calculated individual pipe flow = 9.196(CFS)
Normal flow depth in pipe = 7.49(In.)
Flow top width inside pipe = 11.62(In.)
Critical depth could not be calculated.
Pipe flow velocity = 17.85(Ft/s)
Travel time through pipe = 0.03 min.
Time of concentration (TC) = 11.51 min.

Process from Point/Station 534.000 to Point/Station 516.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****

Top of natural channel elevation = 1114.100(Ft.)
End of natural channel elevation = 1098.500(Ft.)
Length of natural channel = 213.000(Ft.)
Estimated mean flow rate at midpoint of channel = 9.210(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow = 6.62(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
Normal channel slope = 0.0732
Corrected/adjusted channel slope = 0.0732
Travel time = 0.54 min. TC = 12.04 min.

Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.883
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 3) = 95.60
Pervious area fraction = 1.000; Impervious fraction = 0.000
Rainfall intensity = 3.131(In/Hr) for a 100.0 year storm
Subarea runoff = 0.028(CFS) for 0.010(Ac.)
Total runoff = 9.224(CFS) Total area = 3.250(Ac.)

Process from Point/Station 516.000 to Point/Station 516.000
**** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:

In Main Stream number: 2
Stream flow area = 3.250(Ac.)
Runoff from this stream = 9.224(CFS)
Time of concentration = 12.04 min.
Rainfall intensity = 3.131(In/Hr)
Summary of stream data:

Stream No.	Flow rate (CFS)	TC (min)	Rainfall Intensity (In/Hr)
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1	751.395	19.15	2.541
2	9.224	12.04	3.131

Largest stream flow has longer time of concentration

Qp = 751.395 + sum of
Qb Ia/Ib
9.224 * 0.812 = 7.486
Qp = 758.881

Total of 2 main streams to confluence:

Flow rates before confluence point:

751.395 9.224

Area of streams before confluence:

316.090 3.250

Results of confluence:

Total flow rate = 758.881(CFS)
Time of concentration = 19.152 min.
Effective stream area after confluence = 319.340(Ac.)

Process from Point/Station 516.000 to Point/Station 518.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****

Top of natural channel elevation = 1098.500(Ft.)
End of natural channel elevation = 1094.500(Ft.)
Length of natural channel = 102.000(Ft.)
Estimated mean flow rate at midpoint of channel = 759.392(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow = 17.74(Ft/s)

Correction to map slope used on extremely rugged channels with drops and waterfalls (Plate D-6.2)

Normal channel slope = 0.0392
Corrected/adjusted channel slope = 0.0392
Travel time = 0.10 min. TC = 19.25 min.

Adding area flow to channel
UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.856
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 3) = 91.00
Pervious area fraction = 1.000; Impervious fraction = 0.000
Rainfall intensity = 2.535(In/Hr) for a 100.0 year storm
Subarea runoff = 0.933(CFS) for 0.430(Ac.)
Total runoff = 759.814(CFS) Total area = 319.770(Ac.)

 Process from Point/Station 518.000 to Point/Station 518.000
 **** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:

In Main Stream number: 1
 Stream flow area = 319.770(Ac.)
 Runoff from this stream = 759.814(CFS)
 Time of concentration = 19.25 min.
 Rainfall intensity = 2.535(In/Hr)
 Program is now starting with Main Stream No. 2

 Process from Point/Station 540.000 to Point/Station 541.000
 **** INITIAL AREA EVALUATION ****

Initial area flow distance = 195.000(Ft.)
 Top (of initial area) elevation = 1165.000(Ft.)
 Bottom (of initial area) elevation = 1133.000(Ft.)
 Difference in elevation = 32.000(Ft.)
 Slope = 0.16410 s(percent)= 16.41
 $TC = k(0.300)*[(length^3)/(elevation\ change)]^{0.2}$
 Warning: TC computed to be less than 5 min.; program is assuming the
 time of concentration is 5 minutes.
 Initial area time of concentration = 5.000 min.
 Rainfall intensity = 4.650(In/Hr) for a 100.0 year storm
 COMMERCIAL subarea type
 Runoff Coefficient = 0.897
 Decimal fraction soil group A = 0.000
 Decimal fraction soil group B = 0.000
 Decimal fraction soil group C = 0.000
 Decimal fraction soil group D = 1.000
 RI index for soil(AMC 3) = 88.00
 Pervious area fraction = 0.100; Impervious fraction = 0.900
 Initial subarea runoff = 2.335(CFS)
 Total initial stream area = 0.560(Ac.)
 Pervious area fraction = 0.100

 Process from Point/Station 541.000 to Point/Station 542.000
 **** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1130.800(Ft.)
 Downstream point/station elevation = 1130.400(Ft.)
 Pipe length = 60.00(Ft.) Manning's N = 0.013
 No. of pipes = 1 Required pipe flow = 2.335(CFS)
 Nearest computed pipe diameter = 12.00(In.)
 Calculated individual pipe flow = 2.335(CFS)
 Normal flow depth in pipe = 8.13(In.)
 Flow top width inside pipe = 11.22(In.)
 Critical Depth = 7.85(In.)
 Pipe flow velocity = 4.12(Ft/s)
 Travel time through pipe = 0.24 min.
 Time of concentration (TC) = 5.24 min.

 Process from Point/Station 542.000 to Point/Station 542.000
 **** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
 Runoff Coefficient = 0.897
 Decimal fraction soil group A = 0.000
 Decimal fraction soil group B = 0.000
 Decimal fraction soil group C = 0.000
 Decimal fraction soil group D = 1.000
 RI index for soil(AMC 3) = 88.00
 Pervious area fraction = 0.100; Impervious fraction = 0.900
 Time of concentration = 5.24 min.

Rainfall intensity = 4.552(In/Hr) for a 100.0 year storm
Subarea runoff = 6.571(CFS) for 1.610(Ac.)
Total runoff = 8.905(CFS) Total area = 2.170(Ac.)

Process from Point/Station 542.000 to Point/Station 543.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1130.400(Ft.)
Downstream point/station elevation = 1121.900(Ft.)
Pipe length = 184.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 8.905(CFS)
Nearest computed pipe diameter = 15.00(In.)
Calculated individual pipe flow = 8.905(CFS)
Normal flow depth in pipe = 8.73(In.)
Flow top width inside pipe = 14.80(In.)
Critical Depth = 13.82(In.)
Pipe flow velocity = 12.01(Ft/s)
Travel time through pipe = 0.26 min.
Time of concentration (TC) = 5.50 min.

Process from Point/Station 543.000 to Point/Station 543.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Runoff Coefficient = 0.896
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 3) = 88.00
Pervious area fraction = 0.100; Impervious fraction = 0.900
Time of concentration = 5.50 min.
Rainfall intensity = 4.456(In/Hr) for a 100.0 year storm
Subarea runoff = 1.837(CFS) for 0.460(Ac.)
Total runoff = 10.743(CFS) Total area = 2.630(Ac.)

Process from Point/Station 543.000 to Point/Station 543.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Runoff Coefficient = 0.896
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 3) = 88.00
Pervious area fraction = 0.100; Impervious fraction = 0.900
Time of concentration = 5.50 min.
Rainfall intensity = 4.456(In/Hr) for a 100.0 year storm
Subarea runoff = 1.238(CFS) for 0.310(Ac.)
Total runoff = 11.981(CFS) Total area = 2.940(Ac.)

Process from Point/Station 543.000 to Point/Station 543.000
**** SUBAREA FLOW ADDITION ****

UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.874
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 3) = 91.00
Pervious area fraction = 1.000; Impervious fraction = 0.000

Time of concentration = 5.50 min.
Rainfall intensity = 4.456(In/Hr) for a 100.0 year storm
Subarea runoff = 2.843(CFS) for 0.730(Ac.)
Total runoff = 14.824(CFS) Total area = 3.670(Ac.)

Process from Point/Station 543.000 to Point/Station 544.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1121.900(Ft.)
Downstream point/station elevation = 1113.000(Ft.)
Pipe length = 205.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 14.824(CFS)
Nearest computed pipe diameter = 18.00(In.)
Calculated individual pipe flow = 14.824(CFS)
Normal flow depth in pipe = 10.85(In.)
Flow top width inside pipe = 17.61(In.)
Critical Depth = 16.82(In.)
Pipe flow velocity = 13.30(Ft/s)
Travel time through pipe = 0.26 min.
Time of concentration (TC) = 5.76 min.

Process from Point/Station 544.000 to Point/Station 544.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Runoff Coefficient = 0.896
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 3) = 88.00
Pervious area fraction = 0.100; Impervious fraction = 0.900
Time of concentration = 5.76 min.
Rainfall intensity = 4.365(In/Hr) for a 100.0 year storm
Subarea runoff = 0.704(CFS) for 0.180(Ac.)
Total runoff = 15.529(CFS) Total area = 3.850(Ac.)

Process from Point/Station 544.000 to Point/Station 545.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1113.000(Ft.)
Downstream point/station elevation = 1106.600(Ft.)
Pipe length = 148.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 15.529(CFS)
Nearest computed pipe diameter = 18.00(In.)
Calculated individual pipe flow = 15.529(CFS)
Normal flow depth in pipe = 11.21(In.)
Flow top width inside pipe = 17.45(In.)
Critical Depth = 16.99(In.)
Pipe flow velocity = 13.42(Ft/s)
Travel time through pipe = 0.18 min.
Time of concentration (TC) = 5.94 min.

Process from Point/Station 545.000 to Point/Station 545.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Runoff Coefficient = 0.896
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 3) = 88.00

Pervious area fraction = 0.100; Impervious fraction = 0.900
Time of concentration = 5.94 min.
Rainfall intensity = 4.304(In/Hr) for a 100.0 year storm
Subarea runoff = 3.395(CFS) for 0.880(Ac.)
Total runoff = 18.923(CFS) Total area = 4.730(Ac.)

Process from Point/Station 545.000 to Point/Station 546.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1106.600(Ft.)
Downstream point/station elevation = 1102.000(Ft.)
Pipe length = 118.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 18.923(CFS)
Nearest computed pipe diameter = 18.00(In.)
Calculated individual pipe flow = 18.923(CFS)
Normal flow depth in pipe = 13.50(In.)
Flow top width inside pipe = 15.59(In.)
Critical depth could not be calculated.
Pipe flow velocity = 13.30(Ft/s)
Travel time through pipe = 0.15 min.
Time of concentration (TC) = 6.09 min.

Process from Point/Station 546.000 to Point/Station 546.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Runoff Coefficient = 0.896
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 3) = 88.00
Pervious area fraction = 0.100; Impervious fraction = 0.900
Time of concentration = 6.09 min.
Rainfall intensity = 4.256(In/Hr) for a 100.0 year storm
Subarea runoff = 3.434(CFS) for 0.900(Ac.)
Total runoff = 22.357(CFS) Total area = 5.630(Ac.)

Process from Point/Station 546.000 to Point/Station 547.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1101.900(Ft.)
Downstream point/station elevation = 1101.000(Ft.)
Pipe length = 54.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 22.357(CFS)
Nearest computed pipe diameter = 24.00(In.)
Calculated individual pipe flow = 22.357(CFS)
Normal flow depth in pipe = 15.73(In.)
Flow top width inside pipe = 22.81(In.)
Critical Depth = 20.23(In.)
Pipe flow velocity = 10.24(Ft/s)
Travel time through pipe = 0.09 min.
Time of concentration (TC) = 6.17 min.

Process from Point/Station 547.000 to Point/Station 518.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****

Top of natural channel elevation = 1101.000(Ft.)
End of natural channel elevation = 1094.500(Ft.)
Length of natural channel = 102.000(Ft.)
Estimated mean flow rate at midpoint of channel = 22.377(CFS)

Natural valley channel type used

L.A. County flood control district formula for channel velocity:
Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow = 7.80(Ft/s)

Correction to map slope used on extremely rugged channels with drops and waterfalls (Plate D-6.2)

Normal channel slope = 0.0637
Corrected/adjusted channel slope = 0.0637
Travel time = 0.22 min. TC = 6.39 min.

Adding area flow to channel
UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.872
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 3) = 91.00
Pervious area fraction = 1.000; Impervious fraction = 0.000
Rainfall intensity = 4.163(In/Hr) for a 100.0 year storm
Subarea runoff = 0.036(CFS) for 0.010(Ac.)
Total runoff = 22.393(CFS) Total area = 5.640(Ac.)

Process from Point/Station 518.000 to Point/Station 518.000
**** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:

In Main Stream number: 2
Stream flow area = 5.640(Ac.)
Runoff from this stream = 22.393(CFS)
Time of concentration = 6.39 min.
Rainfall intensity = 4.163(In/Hr)
Summary of stream data:

Stream No.	Flow rate (CFS)	TC (min)	Rainfall Intensity (In/Hr)
1	759.814	19.25	2.535
2	22.393	6.39	4.163

Largest stream flow has longer time of concentration
Qp = 759.814 + sum of
Qb Ia/Ib
22.393 * 0.609 = 13.637
Qp = 773.450

Total of 2 main streams to confluence:
Flow rates before confluence point:
759.814 22.393
Area of streams before confluence:
319.770 5.640

Results of confluence:
Total flow rate = 773.450(CFS)
Time of concentration = 19.247 min.
Effective stream area after confluence = 325.410(Ac.)
End of computations, total study area = 325.41 (Ac.)
The following figures may be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.528
Area averaged RI index number = 76.0

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 07/31/20 File:P1847Q100B.out

JN 18.1847.1 - SKYLINE VILLAGE
GF INVESTMENTS - CITY OF CORONA
PROPOSE DEVELOPED CONDITION 100-YEAR HYDROLOGY FOR AREA "B"
BY:CS

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

English (in-lb) Units used in input data file

Program License Serial Number 6062

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 3

2 year, 1 hour precipitation = 0.620(In.)
100 year, 1 hour precipitation = 1.520(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.520(In/Hr)
Slope of intensity duration curve = 0.4500

+++++
Process from Point/Station 600.000 to Point/Station 601.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 770.000(Ft.)
Top (of initial area) elevation = 1139.000(Ft.)
Bottom (of initial area) elevation = 1105.000(Ft.)
Difference in elevation = 34.000(Ft.)
Slope = 0.04416 s(percent)= 4.42
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 7.993 min.
Rainfall intensity = 3.765(In/Hr) for a 100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.896
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 3) = 88.00
Pervious area fraction = 0.100; Impervious fraction = 0.900
Initial subarea runoff = 4.689(CFS)
Total initial stream area = 1.390(Ac.)
Pervious area fraction = 0.100

+++++
Process from Point/Station 601.000 to Point/Station 601.000
**** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:

In Main Stream number: 1
 Stream flow area = 1.390(Ac.)
 Runoff from this stream = 4.689(CFS)
 Time of concentration = 7.99 min.
 Rainfall intensity = 3.765(In/Hr)
 Summary of stream data:

Stream No.	Flow rate (CFS)	TC (min)	Rainfall Intensity (In/Hr)
------------	-----------------	----------	----------------------------

1	4.689	7.99	3.765
---	-------	------	-------

Largest stream flow has longer time of concentration
 Qp = 4.689 + sum of
 Qp = 4.689

Total of 1 main streams to confluence:
 Flow rates before confluence point:
 4.689
 Area of streams before confluence:
 1.390

Results of confluence:
 Total flow rate = 4.689(CFS)
 Time of concentration = 7.993 min.
 Effective stream area after confluence = 1.390(Ac.)

 Process from Point/Station 605.000 to Point/Station 606.000
 **** INITIAL AREA EVALUATION ****

Initial area flow distance = 616.000(Ft.)
 Top (of initial area) elevation = 1143.200(Ft.)
 Bottom (of initial area) elevation = 1102.000(Ft.)
 Difference in elevation = 41.200(Ft.)
 Slope = 0.06688 s(percent)= 6.69
 TC = $k(0.300)*[(length^3)/(elevation\ change)]^{0.2}$
 Initial area time of concentration = 6.728 min.
 Rainfall intensity = 4.069(In/Hr) for a 100.0 year storm
 COMMERCIAL subarea type
 Runoff Coefficient = 0.896
 Decimal fraction soil group A = 0.000
 Decimal fraction soil group B = 0.000
 Decimal fraction soil group C = 0.000
 Decimal fraction soil group D = 1.000
 RI index for soil(AMC 3) = 88.00
 Pervious area fraction = 0.100; Impervious fraction = 0.900
 Initial subarea runoff = 3.099(CFS)
 Total initial stream area = 0.850(Ac.)
 Pervious area fraction = 0.100

 Process from Point/Station 606.000 to Point/Station 607.000
 **** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1102.000(Ft.)
 Downstream point/station elevation = 1090.000(Ft.)
 Pipe length = 30.00(Ft.) Manning's N = 0.013
 No. of pipes = 1 Required pipe flow = 3.099(CFS)
 Nearest computed pipe diameter = 6.00(In.)
 Calculated individual pipe flow = 3.099(CFS)
 Normal flow depth in pipe = 4.34(In.)

Flow top width inside pipe = 5.37(In.)
Critical depth could not be calculated.
Pipe flow velocity = 20.37(Ft/s)
Travel time through pipe = 0.02 min.
Time of concentration (TC) = 6.75 min.

++++
Process from Point/Station 607.000 to Point/Station 607.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type

Runoff Coefficient = 0.896
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 3) = 88.00
Pervious area fraction = 0.100; Impervious fraction = 0.900
Time of concentration = 6.75 min.
Rainfall intensity = 4.062(In/Hr) for a 100.0 year storm
Subarea runoff = 2.403(CFS) for 0.660(Ac.)
Total runoff = 5.502(CFS) Total area = 1.510(Ac.)
End of computations, total study area = 2.90 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.100
Area averaged RI index number = 75.0

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 07/31/20 File:P1847Q100C.out

JN 18.1847.1 - SKYLINE VILLAGE
GF INVESTMENTS - CITY OF CORONA
PROPOSE DEVELOPED CONDITION 100-YEAR HYDROLOGY FOR AREA "C"
BY:CS

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

English (in-lb) Units used in input data file

Program License Serial Number 6062

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 3

2 year, 1 hour precipitation = 0.620(In.)
100 year, 1 hour precipitation = 1.520(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.520(In/Hr)
Slope of intensity duration curve = 0.4500

+++++
Process from Point/Station 700.000 to Point/Station 706.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 660.000(Ft.)
Top (of initial area) elevation = 1175.000(Ft.)
Bottom (of initial area) elevation = 1084.000(Ft.)
Difference in elevation = 91.000(Ft.)
Slope = 0.13788 s(percent)= 13.79
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 10.573 min.
Rainfall intensity = 3.320(In/Hr) for a 100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.884
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 3) = 95.60
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 2.376(CFS)
Total initial stream area = 0.810(Ac.)
Pervious area fraction = 1.000

+++++
Process from Point/Station 706.000 to Point/Station 706.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
 Runoff Coefficient = 0.895
 Decimal fraction soil group A = 0.000
 Decimal fraction soil group B = 0.000
 Decimal fraction soil group C = 0.000
 Decimal fraction soil group D = 1.000
 RI index for soil(AMC 3) = 88.00
 Pervious area fraction = 0.100; Impervious fraction = 0.900
 Time of concentration = 10.57 min.
 Rainfall intensity = 3.320(In/Hr) for a 100.0 year storm
 Subarea runoff = 3.953(CFS) for 1.330(Ac.)
 Total runoff = 6.330(CFS) Total area = 2.140(Ac.)

 Process from Point/Station 706.000 to Point/Station 708.000
 **** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****

Top of street segment elevation = 1084.000(Ft.)
 End of street segment elevation = 1075.800(Ft.)
 Length of street segment = 387.000(Ft.)
 Height of curb above gutter flowline = 8.0(In.)
 Width of half street (curb to crown) = 40.000(Ft.)
 Distance from crown to crossfall grade break = 38.000(Ft.)
 Slope from gutter to grade break (v/hz) = 0.100
 Slope from grade break to crown (v/hz) = 0.020
 Street flow is on [1] side(s) of the street
 Distance from curb to property line = 10.000(Ft.)
 Slope from curb to property line (v/hz) = 0.020
 Gutter width = 2.000(Ft.)
 Gutter hike from flowline = 2.000(In.)
 Manning's N in gutter = 0.0150
 Manning's N from gutter to grade break = 0.0150
 Manning's N from grade break to crown = 0.0150
 Estimated mean flow rate at midpoint of street = 7.262(CFS)
 Depth of flow = 0.392(Ft.), Average velocity = 3.851(Ft/s)
 Streetflow hydraulics at midpoint of street travel:
 Halfstreet flow width = 13.263(Ft.)
 Flow velocity = 3.85(Ft/s)
 Travel time = 1.67 min. TC = 12.25 min.

Adding area flow to street
 COMMERCIAL subarea type
 Runoff Coefficient = 0.895
 Decimal fraction soil group A = 0.000
 Decimal fraction soil group B = 0.000
 Decimal fraction soil group C = 0.000
 Decimal fraction soil group D = 1.000
 RI index for soil(AMC 3) = 88.00
 Pervious area fraction = 0.100; Impervious fraction = 0.900
 Rainfall intensity = 3.107(In/Hr) for a 100.0 year storm
 Subarea runoff = 1.808(CFS) for 0.650(Ac.)
 Total runoff = 8.137(CFS) Total area = 2.790(Ac.)
 Street flow at end of street = 8.137(CFS)
 Half street flow at end of street = 8.137(CFS)
 Depth of flow = 0.404(Ft.), Average velocity = 3.957(Ft/s)
 Flow width (from curb towards crown)= 13.891(Ft.)
 End of computations, total study area = 2.79 (Ac.)
 The following figures may
 be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.361
 Area averaged RI index number = 79.1

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
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JN 18.1847.1 - SKYLINE VILLAGE
GF INVESTMENTS - CITY OF CORONA
PROPOSE DEVELOPED CONDITION 100-YEAR HYDROLOGY FOR AREA "D"
BY:CS

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

English (in-lb) Units used in input data file

Program License Serial Number 6062

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 3

2 year, 1 hour precipitation = 0.620(In.)
100 year, 1 hour precipitation = 1.520(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.520(In/Hr)
Slope of intensity duration curve = 0.4500

+++++
Process from Point/Station 800.000 to Point/Station 802.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 442.000(Ft.)
Top (of initial area) elevation = 1380.000(Ft.)
Bottom (of initial area) elevation = 1310.000(Ft.)
Difference in elevation = 70.000(Ft.)
Slope = 0.15837 s(percent)= 15.84
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 8.760 min.
Rainfall intensity = 3.613(In/Hr) for a 100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.885
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 3) = 95.60
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 8.985(CFS)
Total initial stream area = 2.810(Ac.)
Pervious area fraction = 1.000

+++++
Process from Point/Station 802.000 to Point/Station 804.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****

Top of natural channel elevation = 1310.000(Ft.)
End of natural channel elevation = 1110.000(Ft.)
Length of natural channel = 1185.000(Ft.)
Estimated mean flow rate at midpoint of channel = 26.443(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
Velocity(ft/s) = $(7 + 8(q(\text{English Units})^{.352})(\text{slope}^{.5}))$
Velocity using mean channel flow = 13.28(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
Normal channel slope = 0.1688
Corrected/adjusted channel slope = 0.1688
Travel time = 1.49 min. TC = 10.25 min.

Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.884
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 3) = 95.60
Pervious area fraction = 1.000; Impervious fraction = 0.000
Rainfall intensity = 3.367(In/Hr) for a 100.0 year storm
Subarea runoff = 32.499(CFS) for 10.920(Ac.)
Total runoff = 41.484(CFS) Total area = 13.730(Ac.)

++++
Process from Point/Station 804.000 to Point/Station 806.000
*** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ***

Top of natural channel elevation = 1110.000(Ft.)
End of natural channel elevation = 1086.300(Ft.)
Length of natural channel = 300.000(Ft.)
Estimated mean flow rate at midpoint of channel = 44.067(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
Velocity(ft/s) = $(7 + 8(q(\text{English Units})^{.352})(\text{slope}^{.5}))$
Velocity using mean channel flow = 10.49(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
Normal channel slope = 0.0790
Corrected/adjusted channel slope = 0.0790
Travel time = 0.48 min. TC = 10.72 min.

Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.884
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 3) = 95.60
Pervious area fraction = 1.000; Impervious fraction = 0.000
Rainfall intensity = 3.299(In/Hr) for a 100.0 year storm
Subarea runoff = 4.984(CFS) for 1.710(Ac.)
Total runoff = 46.468(CFS) Total area = 15.440(Ac.)

+++++
Process from Point/Station 806.000 to Point/Station 808.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****

Top of natural channel elevation = 1086.300(Ft.)
End of natural channel elevation = 1075.000(Ft.)
Length of natural channel = 90.000(Ft.)
Estimated mean flow rate at midpoint of channel = 47.822(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
Velocity(ft/s) = $(7 + 8(q(\text{English Units})^{.352})(\text{slope}^{.5}))$
Velocity using mean channel flow = 13.54(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
Normal channel slope = 0.1256
Corrected/adjusted channel slope = 0.1256
Travel time = 0.11 min. TC = 10.83 min.

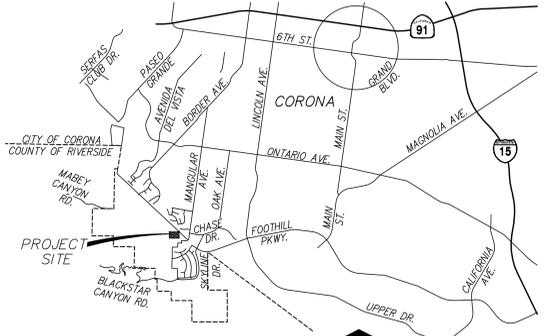
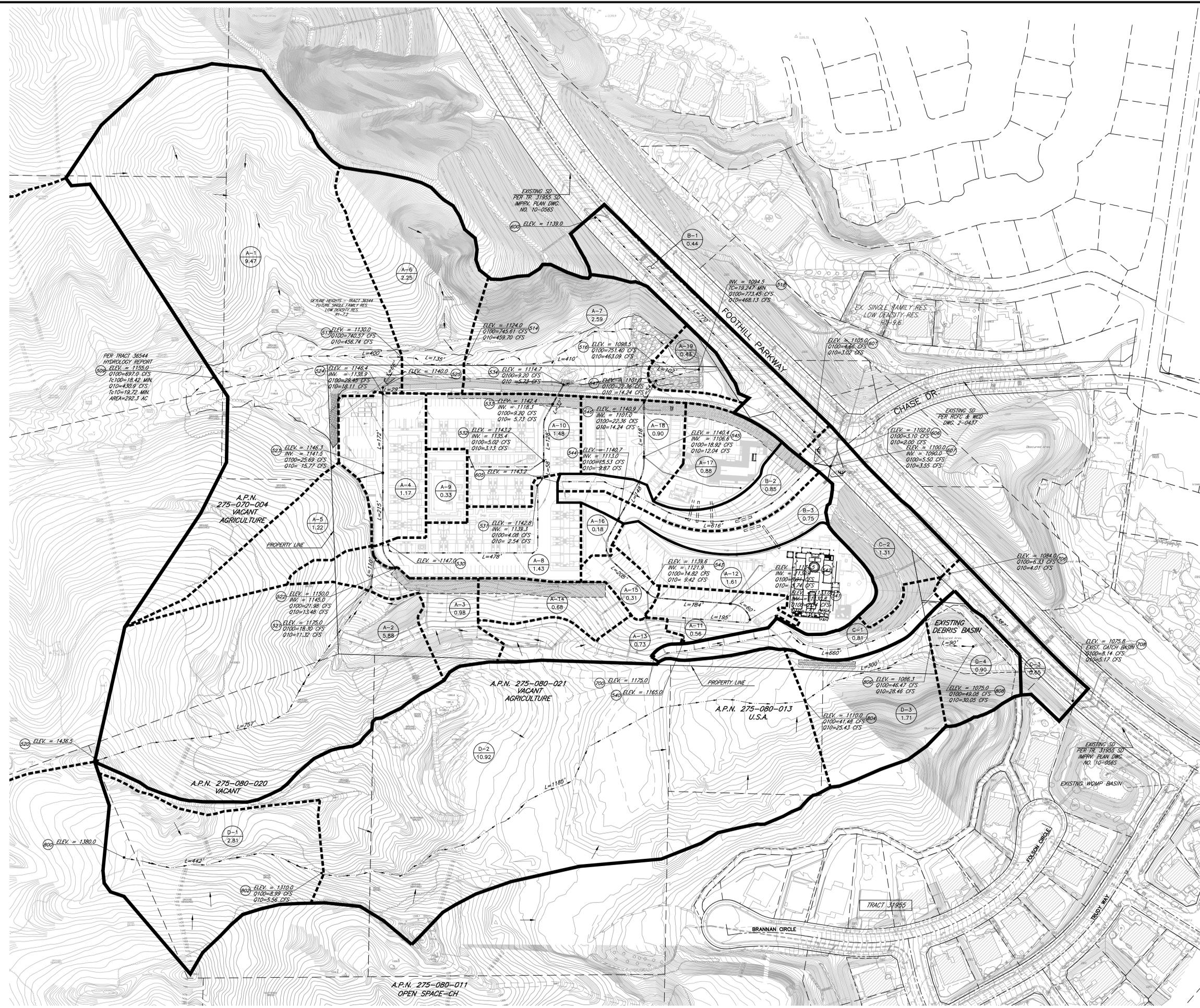
Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.883
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 3) = 95.60
Pervious area fraction = 1.000; Impervious fraction = 0.000
Rainfall intensity = 3.284(In/Hr) for a 100.0 year storm
Subarea runoff = 2.611(CFS) for 0.900(Ac.)
Total runoff = 49.079(CFS) Total area = 16.340(Ac.)
End of computations, total study area = 16.34 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number = 89.0

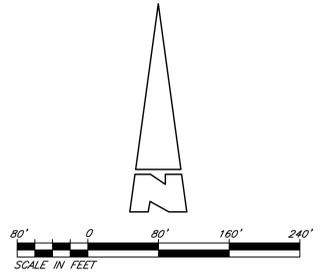
Appendix

G

**PROPOSED CONDITION HYDROLOGIC
KEY MAP**



VICINITY MAP:
N. T. S.



LEGEND

- MAJOR WATERSHED BOUNDARY
- - - SUB DRAINAGE AREA BOUNDARY
- - - FLOW PATH
- DIRECTION OF FLOW
- (C17) DRAINAGE AREA DESIGNATION
- 70.21 ACRES
- (S40) NODE DESIGNATION
- L=300' LENGTH OF EXISTING FLOW PATH
- Q₁₀₀ CALCULATED 100-YEAR STORM RUNOFF
- Q₁₀ CALCULATED 10-YEAR STORM RUNOFF
- SOIL TYPE "D"

PROPOSED CONDITION
HYDROLOGY KEY MAP
FOR
SKYLINE VILLAGE COMMERCIAL CENTER
COUNTY RIVERSIDE

HYD: CS	KWC ENGINEERS CIVIL ENGINEERING, PLANNING AND CONSTRUCTION MANAGEMENT 1880 SOUTHWEST AVENUE, SUITE 100 • CORONA, CA 92681-3370 • 951-734-2150	SHEET
DRAFT: CS		7
CHECK: MCT		OF

JUN 18, 1947, LOG. RE: 181 (847) (PRELIMINARY) (HYDRO) (PRELIMINARY) (FIGURES) (847) (HYDRO) (PROPOSING)

Appendix

H

**MISCELLANEOUS SIZING AND
HYDRAULIC CALCULATIONS**

Worksheet for 5' TERRACE DRAIN

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.015	
Channel Slope	0.05000	ft/ft
Normal Depth	1.50	ft
Left Side Slope	3.00	ft/ft (H:V)
Right Side Slope	2.00	ft/ft (H:V)

Results

Discharge	97.73	ft ³ /s
Flow Area	5.63	ft ²
Wetted Perimeter	8.10	ft
Hydraulic Radius	0.69	ft
Top Width	7.50	ft
Critical Depth	2.49	ft
Critical Slope	0.00338	ft/ft
Velocity	17.37	ft/s
Velocity Head	4.69	ft
Specific Energy	6.19	ft
Froude Number	3.54	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	1.50	ft
Critical Depth	2.49	ft
Channel Slope	0.05000	ft/ft
Critical Slope	0.00338	ft/ft

Worksheet for Triangular Channel - 1

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.015	
Channel Slope	0.01000	ft/ft
Normal Depth	1.50	ft
Left Side Slope	1.00	ft/ft (H:V)
Right Side Slope	1.00	ft/ft (H:V)

Results

Discharge	14.60	ft ³ /s
Flow Area	2.25	ft ²
Wetted Perimeter	4.24	ft
Hydraulic Radius	0.53	ft
Top Width	3.00	ft
Critical Depth	1.68	ft
Critical Slope	0.00552	ft/ft
Velocity	6.49	ft/s
Velocity Head	0.65	ft
Specific Energy	2.15	ft
Froude Number	1.32	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	1.50	ft
Critical Depth	1.68	ft
Channel Slope	0.01000	ft/ft
Critical Slope	0.00552	ft/ft

Worksheet for PKWY CULVERT

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.015	
Channel Slope	0.02000	ft/ft
Normal Depth	0.33	ft
Bottom Width	3.00	ft

Results

Discharge	5.80	ft ³ /s
Flow Area	0.99	ft ²
Wetted Perimeter	3.66	ft
Hydraulic Radius	0.27	ft
Top Width	3.00	ft
Critical Depth	0.49	ft
Critical Slope	0.00606	ft/ft
Velocity	5.86	ft/s
Velocity Head	0.53	ft
Specific Energy	0.86	ft
Froude Number	1.80	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.33	ft
Critical Depth	0.49	ft
Channel Slope	0.02000	ft/ft
Critical Slope	0.00606	ft/ft

Rating Table for 22-Foot Half Street Capacity

Input Data

Channel Slope (ft/ft)	Discharge (ft ³ /s)	Velocity (ft/s)	Flow Area (ft ²)	Wetted Perimeter (ft)	Top Width (ft)
0.10000	32.82	9.60	3.42	20.13	19.65

Worksheet for Circular Pipe - 24-inch

Project Description

Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data

Roughness Coefficient	0.012	
Channel Slope	0.01000	ft/ft
Normal Depth	2.00	ft
Diameter	2.00	ft
Discharge	24.51	ft ³ /s

Results

Discharge	24.51	ft ³ /s
Normal Depth	2.00	ft
Flow Area	3.14	ft ²
Wetted Perimeter	6.28	ft
Hydraulic Radius	0.50	ft
Top Width	0.00	ft
Critical Depth	1.75	ft
Percent Full	100.0	%
Critical Slope	0.00906	ft/ft
Velocity	7.80	ft/s
Velocity Head	0.95	ft
Specific Energy	2.95	ft
Froude Number	0.00	
Maximum Discharge	26.36	ft ³ /s
Discharge Full	24.51	ft ³ /s
Slope Full	0.01000	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%

Worksheet for Circular Pipe - 24-inch

GVF Output Data

Normal Depth Over Rise	100.00	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	2.00	ft
Critical Depth	1.75	ft
Channel Slope	0.01000	ft/ft
Critical Slope	0.00906	ft/ft

Worksheet for Circular Pipe - 30-inch

Project Description

Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data

Roughness Coefficient	0.012	
Channel Slope	0.01000	ft/ft
Normal Depth	2.50	ft
Diameter	2.50	ft
Discharge	44.43	ft ³ /s

Results

Discharge	44.43	ft ³ /s
Normal Depth	2.50	ft
Flow Area	4.91	ft ²
Wetted Perimeter	7.85	ft
Hydraulic Radius	0.63	ft
Top Width	0.00	ft
Critical Depth	2.22	ft
Percent Full	100.0	%
Critical Slope	0.00893	ft/ft
Velocity	9.05	ft/s
Velocity Head	1.27	ft
Specific Energy	3.77	ft
Froude Number	0.00	
Maximum Discharge	47.80	ft ³ /s
Discharge Full	44.43	ft ³ /s
Slope Full	0.01000	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%

Worksheet for Circular Pipe - 30-inch

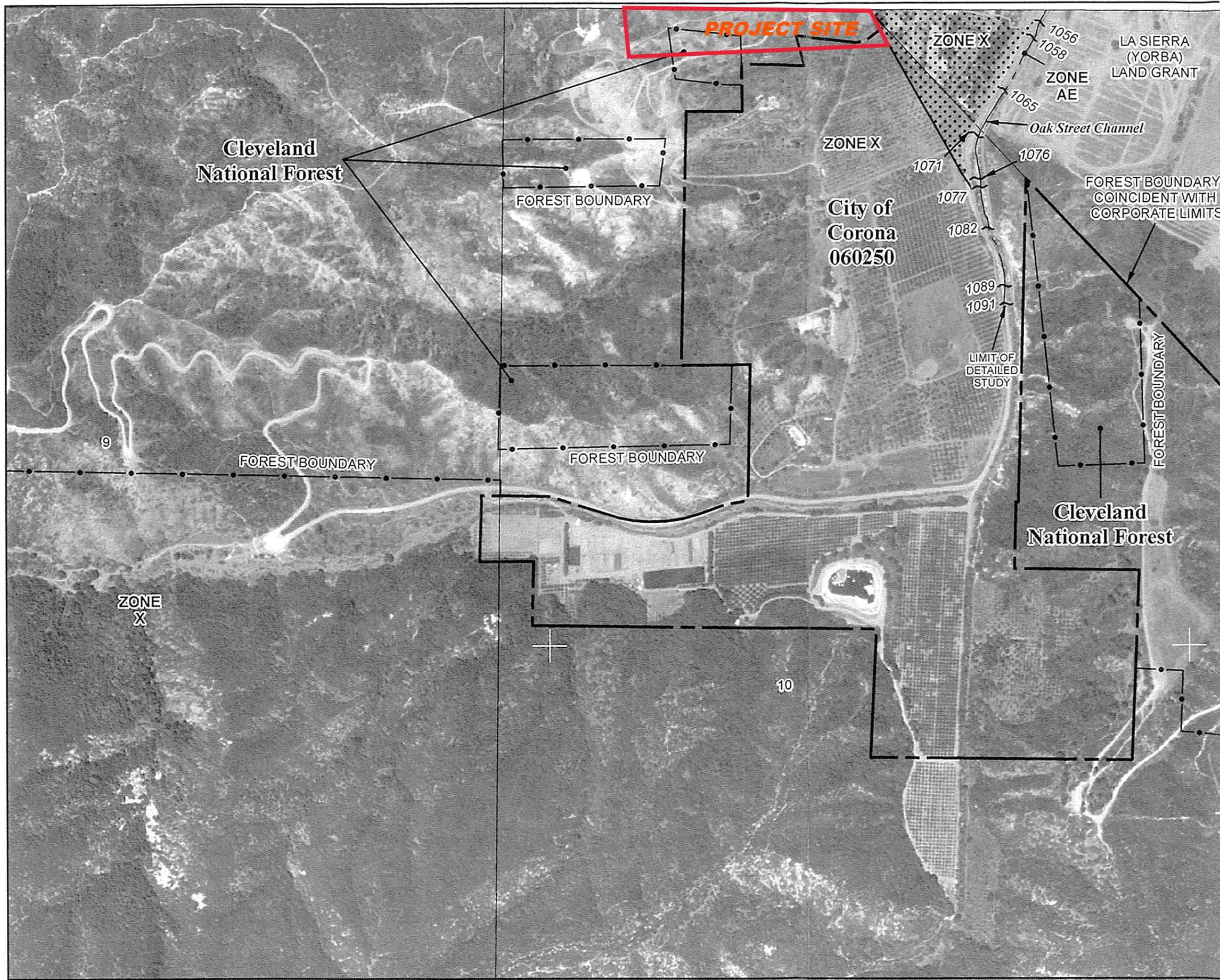
GVF Output Data

Normal Depth Over Rise	100.00	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	2.50	ft
Critical Depth	2.22	ft
Channel Slope	0.01000	ft/ft
Critical Slope	0.00893	ft/ft

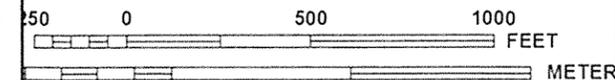
Appendix

I

FEMA FIRM PANELS



MAP SCALE 1" = 500'



NFIP PANEL 1353G

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

RIVERSIDE COUNTY,
CALIFORNIA
AND INCORPORATED AREAS

PANEL 1353 OF 3805
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS

COMMUNITY	NUMBER	PANEL	SUFFIX
CORONA, CITY OF	060250	1353	G
RIVERSIDE COUNTY	060245	1353	G

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

 MAP NUMBER
06065C1353G

EFFECTIVE DATE
AUGUST 28, 2008

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

Appendix

J

**REFERENCE HYDROLOGY REPORTS &
DRAINAGE PLANS**

PROJECT SUMMARY

CALCULATION DETAILS

- LOADING = HS20 & HS25
- APPROX. LINEAR FOOTAGE = 123 lf.

STORAGE SUMMARY

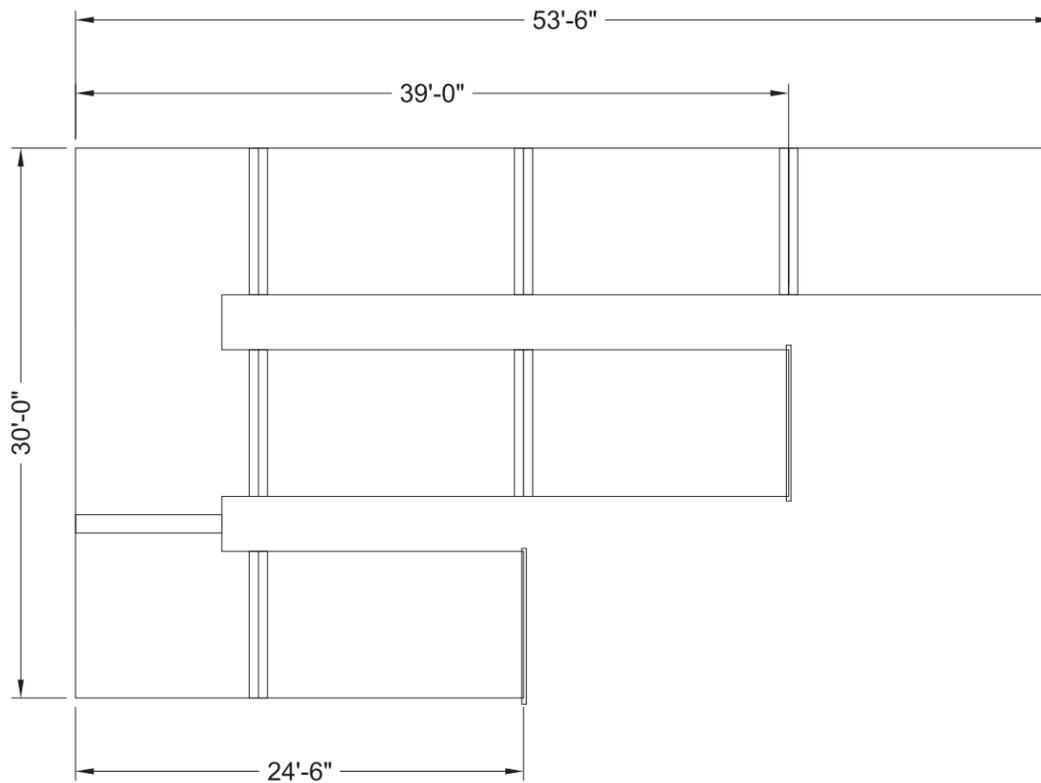
- STORAGE VOLUME REQUIRED = 10,900 cf.
- PIPE STORAGE VOLUME = 6,183 cf.
- BACKFILL STORAGE VOLUME = 5,238 cf.
- TOTAL STORAGE PROVIDED = 11,421 cf.

PIPE DETAILS

- DIAMETER = 96 IN.
- CORRUGATION = 5x1
- GAGE = 16
- COATING = ALT2
- WALL TYPE = Perforated
- BARRELL SPACING = 36 IN.

BACKFILL DETAILS

- WIDTH AT ENDS = 36 IN.
- ABOVE PIPE = 6 IN.
- WIDTH AT SIDES = 36 IN.
- BELOW PIPE = 6 IN.



NOTE:
THESE DRAWINGS ARE FOR CONCEPTUAL PURPOSES AND DO NOT REFLECT ANY LOCAL PREFERENCES OR REGULATIONS. PLEASE CONTACT YOUR LOCAL CONTECH REP FOR MODIFICATIONS.

NOTES

- ALL RISER AND STUB DIMENSIONS ARE TO CENTERLINE. ALL ELEVATIONS, DIMENSIONS, AND LOCATIONS OF RISERS AND INLETS, SHALL BE VERIFIED BY THE ENGINEER OF RECORD PRIOR TO RELEASING FOR FABRICATION.
- ALL FITTINGS AND REINFORCEMENT COMPLY WITH ASTM A998.
- ALL RISERS AND STUBS ARE 2³/₈" x 1/2" CORRUGATION AND 16 GAGE UNLESS OTHERWISE NOTED.
- RISERS TO BE FIELD TRIMMED TO GRADE.
- QUANTITY OF PIPE SHOWN DOES NOT PROVIDE EXTRA PIPE FOR CONNECTING THE SYSTEM TO EXISTING PIPE OR DRAINAGE STRUCTURES. OUR SYSTEM AS DETAILED PROVIDES NOMINAL INLET AND/OR OUTLET PIPE STUB FOR CONNECTION TO EXISTING DRAINAGE FACILITIES. IF ADDITIONAL PIPE IS NEEDED IT IS THE RESPONSIBILITY OF THE CONTRACTOR.
- BAND TYPE TO BE DETERMINED UPON FINAL DESIGN.
- THE PROJECT SUMMARY IS REFLECTIVE OF THE DYODS DESIGN, QUANTITIES ARE APPROX. AND SHOULD BE VERIFIED UPON FINAL DESIGN AND APPROVAL. FOR EXAMPLE, TOTAL EXCAVATION DOES NOT CONSIDER ALL VARIABLES SUCH AS SHORING AND ONLY ACCOUNTS FOR MATERIAL WITHIN THE ESTIMATED EXCAVATION FOOTPRINT.

ASSEMBLY
SCALE: 1" = 10'

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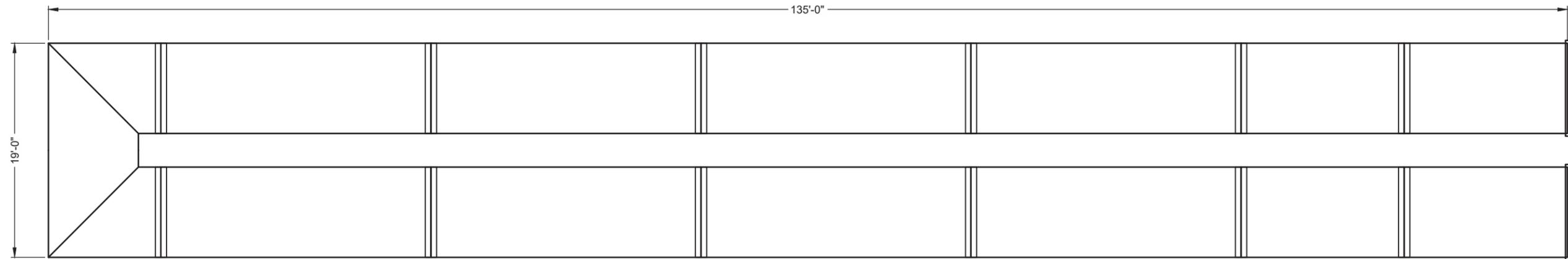
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CONTECH
CMP DETENTION SYSTEMS
CONTECH
DYODS
DRAWING

DYO4802 Skyline Village
DMA 1
Corona, CA
DETENTION SYSTEM

PROJECT No.: 3101	SEQ. No.: 4802	DATE: 12/28/2020
DESIGNED: DYO	DRAWN: DYO	
CHECKED: DYO	APPROVED: DYO	
SHEET NO.:		D1



ASSEMBLY
SCALE: 1" = 10'

PROJECT SUMMARY

CALCULATION DETAILS

- LENGTH PER BARREL = 127 FT
- LENGTH PER HEADER = 19 FT
- LOADING = H20 & H25
- APPROX. CMP FOOTAGE = 273 FT

STORAGE SUMMARY

- STORAGE VOLUME REQUIRED = 20,826.10 CF
- PIPE STORAGE = 13,722 CF
- STRUCTURAL BACKFILL STORAGE = 7,201 CF
- TOTAL STORAGE PROVIDED = 20,923 CF

PIPE DETAILS

- DIAMETER = 96 IN
- CORRUGATION = 5" X 1" OR 3" X 1"
- GAGE = 16
- COATING = ALUMINIZED STEEL
- TYPE 2 (ALT2)
- WALL TYPE = PERFORATED
- BARREL SPACING = 36 IN

BACKFILL DETAILS

- WIDTH AT ENDS = 36 IN
- ABOVE PIPE = 6 IN
- WIDTH AT SIDES = 36 IN
- BELOW PIPE = 6 IN

NOTES

- ALL RISER AND STUB DIMENSIONS ARE TO CENTERLINE. ALL ELEVATIONS, DIMENSIONS, AND LOCATIONS OF RISERS AND INLETS, SHALL BE VERIFIED BY THE ENGINEER OF RECORD PRIOR TO RELEASING FOR FABRICATION.
- ALL FITTINGS AND REINFORCEMENT COMPLY WITH ASTM A998.
- ALL RISERS AND STUBS ARE 2 1/2" x 1/2" CORRUGATION AND 16 GAGE UNLESS OTHERWISE NOTED.
- RISERS TO BE FIELD TRIMMED TO GRADE.
- QUANTITY OF PIPE SHOWN DOES NOT PROVIDE EXTRA PIPE FOR CONNECTING THE SYSTEM TO EXISTING PIPE OR DRAINAGE STRUCTURES. OUR SYSTEM AS DETAILED PROVIDES NOMINAL INLET AND/OR OUTLET PIPE STUB FOR CONNECTION TO EXISTING DRAINAGE FACILITIES. IF ADDITIONAL PIPE IS NEEDED IT IS THE RESPONSIBILITY OF THE CONTRACTOR.
- BAND TYPE TO BE DETERMINED UPON FINAL DESIGN.
- THE PROJECT SUMMARY IS REFLECTIVE OF THE DYODS DESIGN, QUANTITIES ARE APPROX. AND SHOULD BE VERIFIED UPON FINAL DESIGN AND APPROVAL. FOR EXAMPLE, TOTAL EXCAVATION DOES NOT CONSIDER ALL VARIABLES SUCH AS SHORING AND ONLY ACCOUNTS FOR MATERIAL WITHIN THE ESTIMATED EXCAVATION FOOTPRINT.

NOTE:
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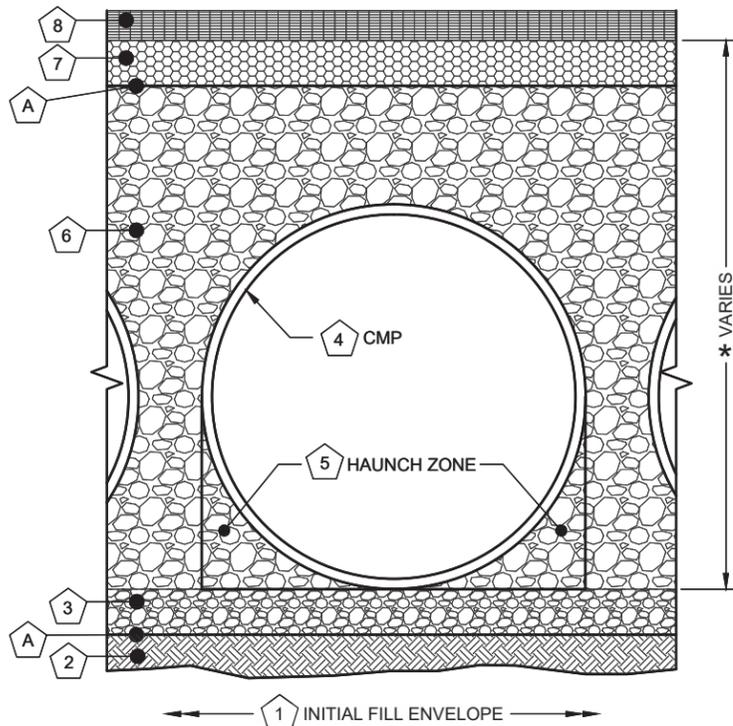
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CONTECH
 CMP DETENTION SYSTEMS
 CONTECH
DYODS
 DRAWING

DYODS - 14310-2-0
 PROJECT NAME: Skyline Village
 Corona, CA
 DESCRIPTION: DMA 2

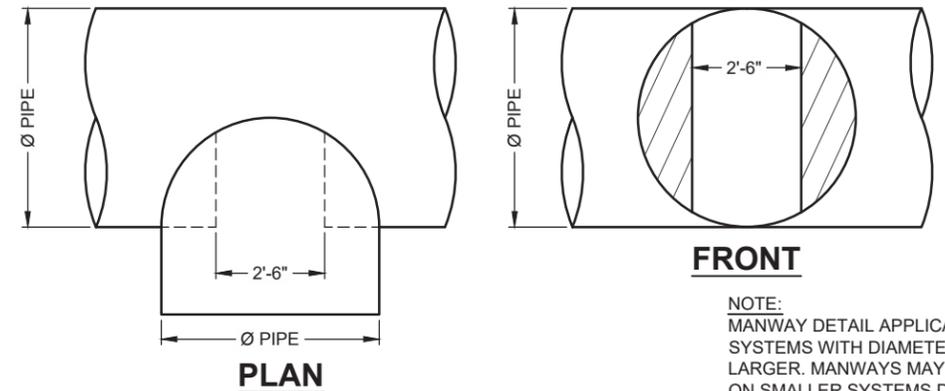
PROJECT No.: 14310-2	SEQ. No.: 0	DATE: 7/10/2020
DESIGNED: DYODS	DRAWN: DYODS	
CHECKED:	APPROVED:	
SHEET NO.:		D1

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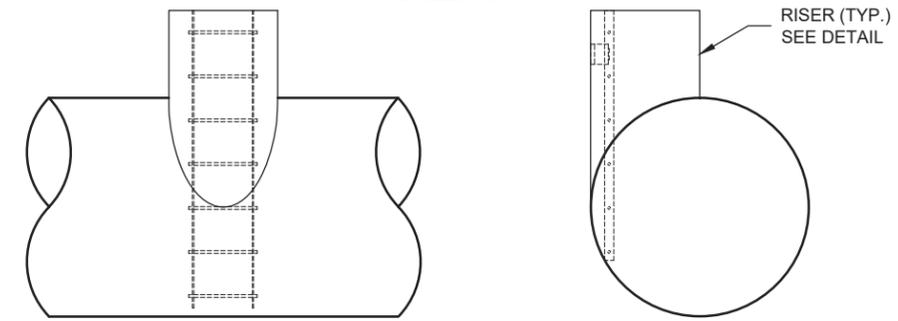
Infiltration Systems - CMP Infiltration & CMP Perforated Drainage Pipe			
Material Location	Description	Material Designation	Designation
8	Rigid or Flexible Pavement (if applicable)		
7	Road Base (if applicable)		
6	Geotextile Layer	Non-Woven Geotextile CONTECH C-40 or C-45	Engineer Decision for consideration to prevent soil migration into varying soil types. Wrap the trench only.
5	Backfill	Infiltration pipe systems have a pipe perforation sized of 3/8" diameter. An open graded, free draining stone, with a particle size of 1/2" - 2 1/2" diameter is recommended.	AASHTO M 145-A-1 or AASHTO M 43 - 3, 4
4	Bedding Stone	Well graded granular bedding material w/maximum particle size of 3"	AASHTO M43 - 3,357,4,467, 5, 56, 57
3	Geotextile Layer	None	None
2	Geotextile Layer	None	None
1	Geotextile Layer	None	None

* Note: The listed AASHTO designations are for gradation only. The stone must also be angular and clean.



TYPICAL MANWAY DETAIL
SCALE: N.T.S.

NOTE: MANWAY DETAIL APPLICABLE FOR CMP SYSTEMS WITH DIAMETERS 48" AND LARGER. MANWAYS MAY BE REQUIRED ON SMALLER SYSTEMS DEPENDING ON ACTUAL SITE SPECIFIC CONDITIONS.



TYPICAL RISER DETAIL
SCALE: N.T.S.

NOTE: LADDERS ARE OPTIONAL AND ARE NOT REQUIRED FOR ALL SYSTEMS.

1 MINIMUM WIDTH DEPENDS ON SITE CONDITIONS AND ENGINEERING JUDGEMENT.

FOUNDATION/BEDDING PREPARATION

2 PRIOR TO PLACING THE BEDDING, THE FOUNDATION MUST BE CONSTRUCTED TO A UNIFORM AND STABLE GRADE. IN THE EVENT THAT UNSUITABLE FOUNDATION MATERIALS ARE ENCOUNTERED DURING EXCAVATION, THEY SHALL BE REMOVED AND BROUGHT BACK TO THE GRADE WITH A FILL MATERIAL AS APPROVED BY THE ENGINEER.

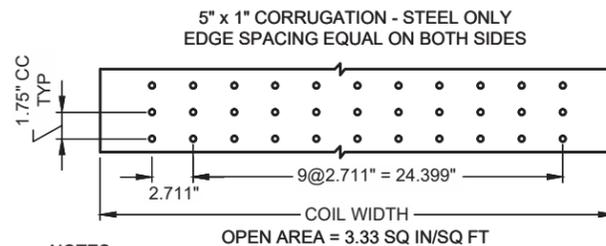
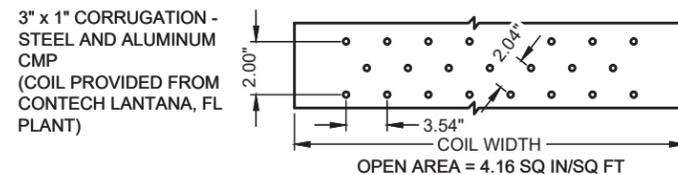
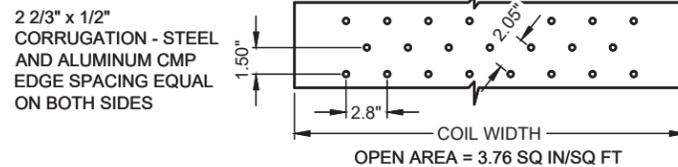
5 HAUNCH ZONE MATERIAL SHALL BE PLACED AND UNIFORMLY COMPACTED WITHOUT SOFT SPOTS.

BACKFILL
MATERIAL SHALL BE PLACED IN 8"-10" MAXIMUM LIFTS. INADEQUATE COMPACTION CAN LEAD TO EXCESSIVE DEFLECTIONS WITHIN THE SYSTEM AND SETTLEMENT OF THE SOILS OVER THE SYSTEM. BACKFILL SHALL BE PLACED SUCH THAT THERE IS NO MORE THAN A TWO-LIFT DIFFERENTIAL BETWEEN THE SIDES OF ANY PIPE IN THE SYSTEM AT ALL TIMES DURING THE BACKFILL PROCESS. BACKFILL SHALL BE ADVANCED ALONG THE LENGTH OF THE SYSTEM AT THE SAME RATE TO AVOID DIFFERENTIAL LOADING ON ANY PIPES IN THE SYSTEM.

EQUIPMENT USED TO PLACE AND COMPACT THE BACKFILL SHALL BE OF A SIZE AND TYPE SO AS NOT TO DISTORT, DAMAGE, OR DISPLACE THE PIPE. ATTENTION MUST BE GIVEN TO PROVIDING ADEQUATE MINIMUM COVER FOR SUCH EQUIPMENT. MAINTAIN BALANCED LOADING ON ALL PIPES IN THE SYSTEM DURING ALL SUCH OPERATIONS.

OTHER ALTERNATE BACKFILL MATERIAL MAY BE ALLOWED DEPENDING ON SITE SPECIFIC CONDITIONS. REFER TO TYPICAL BACKFILL DETAIL FOR MATERIAL REQUIRED.

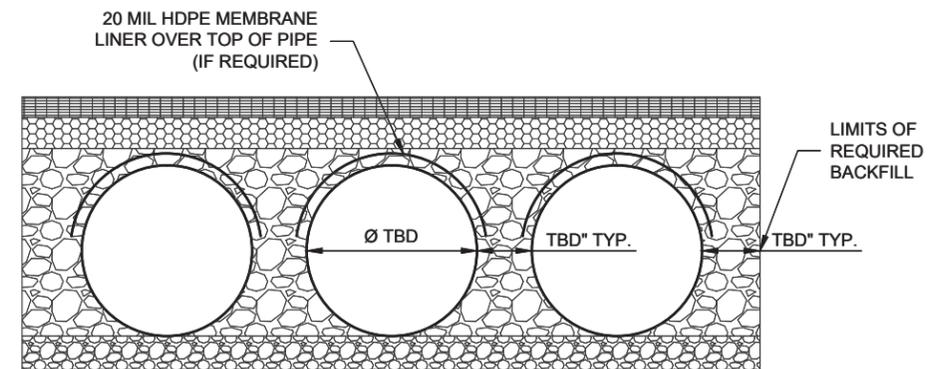
BACKFILL DETAIL
SCALE: N.T.S.



NOTES:

- PERFORATIONS MEET AASHTO AND ASTM SPECIFICATIONS.
- PERFORATION OPEN AREA PER SQUARE FOOT OF PIPE IS BASED ON THE NOMINAL DIAMETER AND LENGTH OF PIPE.
- ALL DIMENSIONS ARE SUBJECT TO MANUFACTURING TOLERANCES.
- ALL HOLES Ø3/8".

TYPICAL PERFORATION DETAIL
SCALE: N.T.S.



TYPICAL SECTION VIEW
LINER OVER ROWS
SCALE: N.T.S.

NOTE: IF SALTING AGENTS FOR SNOW AND ICE REMOVAL ARE USED ON OR NEAR THE PROJECT, AN HDPE MEMBRANE LINER IS RECOMMENDED WITH THE SYSTEM. THE IMPERMEABLE LINER IS INTENDED TO HELP PROTECT THE SYSTEM FROM THE POTENTIAL ADVERSE EFFECTS THAT MAY RESULT FROM A CHANGE IN THE SURROUNDING ENVIRONMENT OVER A PERIOD OF TIME. PLEASE REFER TO THE CORRUGATED METAL PIPE DETENTION DESIGN GUIDE FOR ADDITIONAL INFORMATION.

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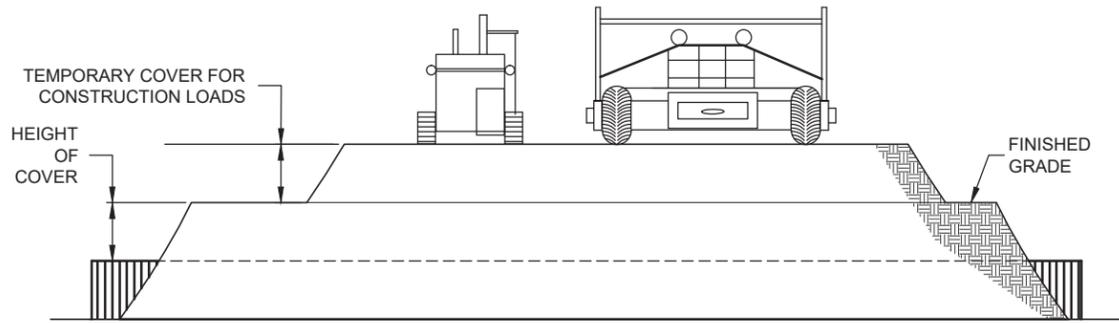
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DYODS
DRAWING

DYODS - 14309-1-0
PROJECT NAME: Skyline Village
Corona, CA
DESCRIPTION: DMA A 9.34 AC

PROJECT No.: 14309-1	SEQ. No.: 0	DATE: 3/5/2020
DESIGNED: DYODS	DRAWN: DYODS	
CHECKED:	APPROVED:	
SHEET NO.:	D2	



CONSTRUCTION LOADS

FOR TEMPORARY CONSTRUCTION VEHICLE LOADS, AN EXTRA AMOUNT OF COMPACTED COVER MAY BE REQUIRED OVER THE TOP OF THE PIPE. THE HEIGHT-OF-COVER SHALL MEET THE MINIMUM REQUIREMENTS SHOWN IN THE TABLE BELOW. THE USE OF HEAVY CONSTRUCTION EQUIPMENT NECESSITATES GREATER PROTECTION FOR THE PIPE THAN FINISHED GRADE COVER MINIMUMS FOR NORMAL HIGHWAY TRAFFIC.

PIPE SPAN, INCHES	AXLE LOADS (kips)			
	18-50	50-75	75-110	110-150
	MINIMUM COVER (FT)			
12-42	2.0	2.5	3.0	3.0
48-72	3.0	3.0	3.5	4.0
78-120	3.0	3.5	4.0	4.0
126-144	3.5	4.0	4.5	4.5

*MINIMUM COVER MAY VARY, DEPENDING ON LOCAL CONDITIONS. THE CONTRACTOR MUST PROVIDE THE ADDITIONAL COVER REQUIRED TO AVOID DAMAGE TO THE PIPE. MINIMUM COVER IS MEASURED FROM THE TOP OF THE PIPE TO THE TOP OF THE MAINTAINED CONSTRUCTION ROADWAY SURFACE.

CONSTRUCTION LOADING DIAGRAM
SCALE: N.T.S.

SPECIFICATION FOR DESIGNED DETENTION SYSTEM:

SCOPE
THIS SPECIFICATION COVERS THE MANUFACTURE AND INSTALLATION OF THE DESIGNED DETENTION SYSTEM DETAILED IN THE PROJECT PLANS.

MATERIAL
THE MATERIAL SHALL CONFORM TO THE APPLICABLE REQUIREMENTS LISTED BELOW:

ALUMINIZED TYPE 2 STEEL COILS SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF AASHTO M-274 OR ASTM A-92.

THE GALVANIZED STEEL COILS SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF AASHTO M-218 OR ASTM A-929.

THE POLYMER COATED STEEL COILS SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF AASHTO M-246 OR ASTM A-742.

THE ALUMINUM COILS SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF AASHTO M-197 OR ASTM B-744.

CONSTRUCTION LOADS
CONSTRUCTION LOADS MAY BE HIGHER THAN FINAL LOADS. FOLLOW THE MANUFACTURER'S OR NCSPA GUIDELINES.

NOTE:
THESE DRAWINGS ARE FOR CONCEPTUAL PURPOSES AND DO NOT REFLECT ANY LOCAL PREFERENCES OR REGULATIONS. PLEASE CONTACT YOUR LOCAL CONTECH REP FOR MODIFICATIONS.

PIPE
THE PIPE SHALL BE MANUFACTURED IN ACCORDANCE TO THE APPLICABLE REQUIREMENTS LISTED BELOW:

ALUMINIZED TYPE 2: AASHTO M-36 OR ASTM A-760

GALVANIZED: AASHTO M-36 OR ASTM A-760

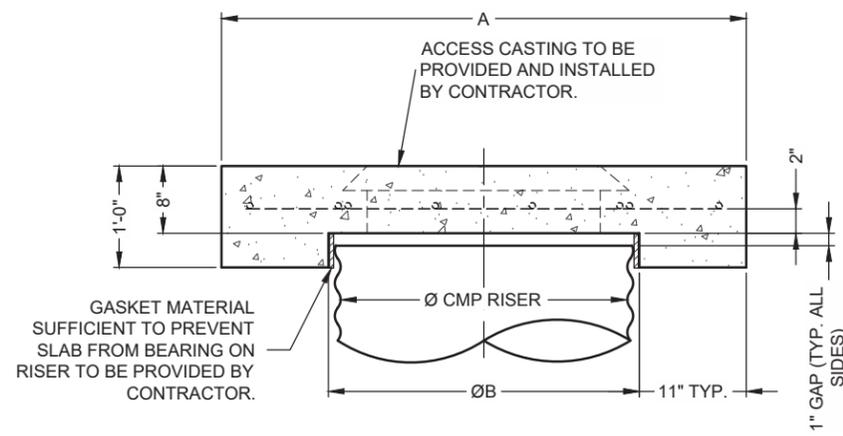
POLYMER COATED: AASHTO M-245 OR ASTM A-762

ALUMINUM: AASHTO M-196 OR ASTM B-745

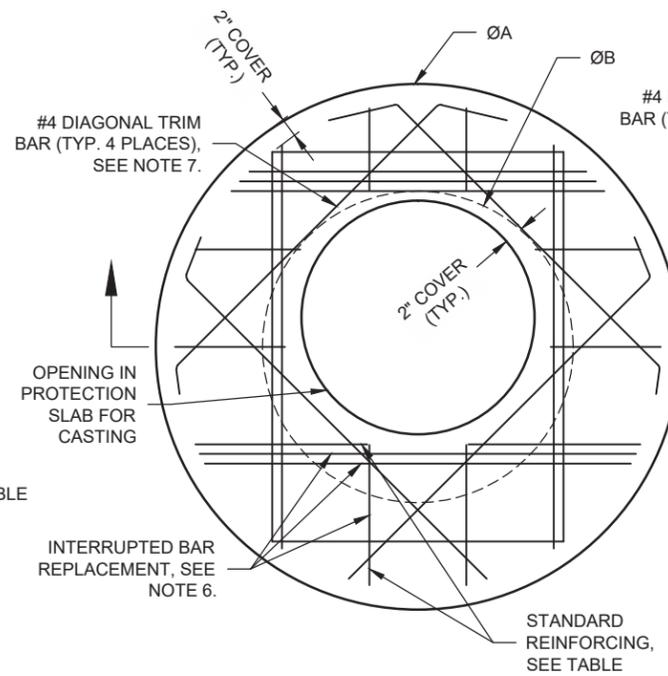
HANDLING AND ASSEMBLY
SHALL BE IN ACCORDANCE WITH NCSP'S (NATIONAL CORRUGATED STEEL PIPE ASSOCIATION) FOR ALUMINIZED TYPE 2, GALVANIZED OR POLYMER COATED STEEL. SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS FOR ALUMINUM PIPE.

INSTALLATION
SHALL BE IN ACCORDANCE WITH AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, SECTION 26, DIVISION II DIVISION II OR ASTM A-798 (FOR ALUMINIZED TYPE 2, GALVANIZED OR POLYMER COATED STEEL) OR ASTM B-788 (FOR ALUMINUM PIPE) AND IN CONFORMANCE WITH THE PROJECT PLANS AND SPECIFICATIONS. IF THERE ARE ANY INCONSISTENCIES OR CONFLICTS THE CONTRACTOR SHOULD DISCUSS AND RESOLVE WITH THE SITE ENGINEER.

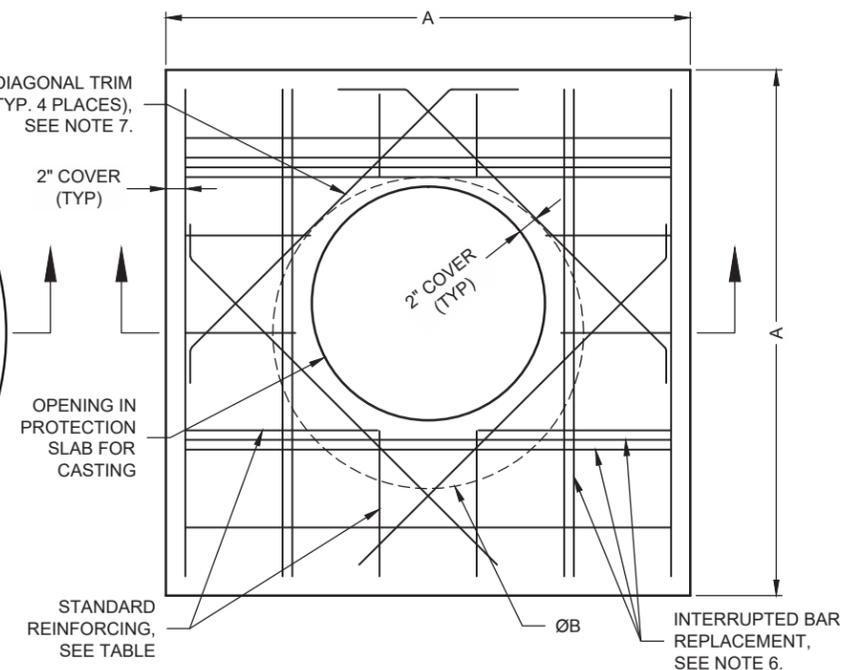
IT IS ALWAYS THE RESPONSIBILITY OF THE CONTRACTOR TO FOLLOW OSHA GUIDELINES FOR SAFE PRACTICES.



SECTION VIEW



ROUND OPTION PLAN VIEW



SQUARE OPTION PLAN VIEW

NOTES:

- DESIGN IN ACCORDANCE WITH AASHTO, 17th EDITION.
- DESIGN LOAD HS25.
- EARTH COVER = 1' MAX.
- CONCRETE STRENGTH = 3,500 psi
- REINFORCING STEEL = ASTM A615, GRADE 60.
- PROVIDE ADDITIONAL REINFORCING AROUND OPENINGS EQUAL TO THE BARS INTERRUPTED, HALF EACH SIDE. ADDITIONAL BARS TO BE IN THE SAME PLANE.
- TRIM OPENING WITH DIAGONAL #4 BARS, EXTEND BARS A MINIMUM OF 12" BEYOND OPENING, BEND BARS AS REQUIRED TO MAINTAIN BAR COVER.
- PROTECTION SLAB AND ALL MATERIALS TO BE PROVIDED AND INSTALLED BY CONTRACTOR.
- DETAIL DESIGN BY DELTA ENGINEERING, BINGHAMTON, NY.

MANHOLE CAP DETAIL
SCALE: N.T.S.

REINFORCING TABLE				
Ø CMP RISER	A	Ø B	REINFORCING	**BEARING PRESSURE (PSF)
24"	Ø 4' 4" X 4'	26"	#5 @ 12" OCEW #5 @ 12" OCEW	2,410 1,780
30"	Ø 4'-6" 4'-6" X 4'-6"	32"	#5 @ 12" OCEW #5 @ 12" OCEW	2,120 1,530
36"	Ø 5' 5' X 5'	38"	#5 @ 10" OCEW #5 @ 10" OCEW	1,890 1,350
42"	Ø 5'-6" 5'-6" X 5'-6"	44"	#5 @ 10" OCEW #5 @ 9" OCEW	1,720 1,210
48"	Ø 6' 6' X 6'	50"	#5 @ 9" OCEW #5 @ 8" OCEW	1,600 1,100

** ASSUMED SOIL BEARING CAPACITY

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CONTECH
DYODS
DRAWING

DYODS - 14309-1-0
PROJECT NAME: Skyline Village
Corona, CA
DESCRIPTION: DMA A 9.34 AC

PROJECT No.: 14309-1	SEQ. No.: 0	DATE: 3/5/2020
DESIGNED: DYODS	DRAWN: DYODS	
CHECKED:	APPROVED:	
SHEET NO.:		D3

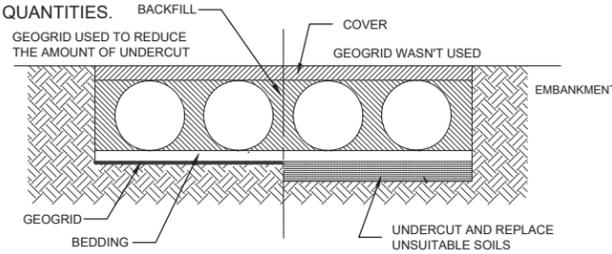
CMP DETENTION INSTALLATION GUIDE

PROPER INSTALLATION OF A FLEXIBLE UNDERGROUND DETENTION SYSTEM WILL ENSURE LONG-TERM PERFORMANCE. THE CONFIGURATION OF THESE SYSTEMS OFTEN REQUIRES SPECIAL CONSTRUCTION PRACTICES THAT DIFFER FROM CONVENTIONAL FLEXIBLE PIPE CONSTRUCTION. CONTECH ENGINEERED SOLUTIONS STRONGLY SUGGESTS SCHEDULING A PRE-CONSTRUCTION MEETING WITH YOUR LOCAL SALES ENGINEER TO DETERMINE IF ADDITIONAL MEASURES, NOT COVERED IN THIS GUIDE, ARE APPROPRIATE FOR YOUR SITE.

FOUNDATION

CONSTRUCT A FOUNDATION THAT CAN SUPPORT THE DESIGN LOADING APPLIED BY THE PIPE AND ADJACENT BACKFILL WEIGHT AS WELL AS MAINTAIN ITS INTEGRITY DURING CONSTRUCTION.

IF SOFT OR UNSUITABLE SOILS ARE ENCOUNTERED, REMOVE THE POOR SOILS DOWN TO A SUITABLE DEPTH AND THEN BUILD UP TO THE APPROPRIATE ELEVATION WITH A COMPETENT BACKFILL MATERIAL. THE STRUCTURAL FILL MATERIAL GRADATION SHOULD NOT ALLOW THE MIGRATION OF FINES, WHICH CAN CAUSE SETTLEMENT OF THE DETENTION SYSTEM OR PAVEMENT ABOVE. IF THE STRUCTURAL FILL MATERIAL IS NOT COMPATIBLE WITH THE UNDERLYING SOILS AN ENGINEERING FABRIC SHOULD BE USED AS A SEPARATOR. IN SOME CASES, USING A STIFF REINFORCING GEOGRID REDUCES OVER EXCAVATION AND REPLACEMENT FILL QUANTITIES.

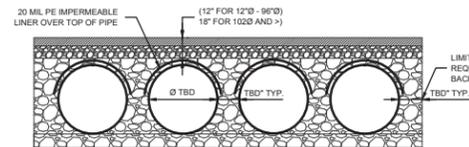


GRADE THE FOUNDATION SUBGRADE TO A UNIFORM OR SLIGHTLY SLOPING GRADE. IF THE SUBGRADE IS CLAY OR RELATIVELY NON-POROUS AND THE CONSTRUCTION SEQUENCE WILL LAST FOR AN EXTENDED PERIOD OF TIME, IT IS BEST TO SLOPE THE GRADE TO ONE END OF THE SYSTEM. THIS WILL ALLOW EXCESS WATER TO DRAIN QUICKLY, PREVENTING SATURATION OF THE SUBGRADE.

GEOMEMBRANE BARRIER

A SITE'S RESISTIVITY MAY CHANGE OVER TIME WHEN VARIOUS TYPES OF SALTING AGENTS ARE USED, SUCH AS ROAD SALTS FOR DEICING AGENTS. IF SALTING AGENTS ARE USED ON OR NEAR THE PROJECT SITE, A GEOMEMBRANE BARRIER IS RECOMMENDED WITH THE SYSTEM. THE GEOMEMBRANE LINER IS INTENDED TO HELP PROTECT THE SYSTEM FROM THE POTENTIAL ADVERSE EFFECTS THAT MAY RESULT FROM THE USE OF SUCH AGENTS INCLUDING PREMATURE CORROSION AND REDUCED ACTUAL SERVICE LIFE.

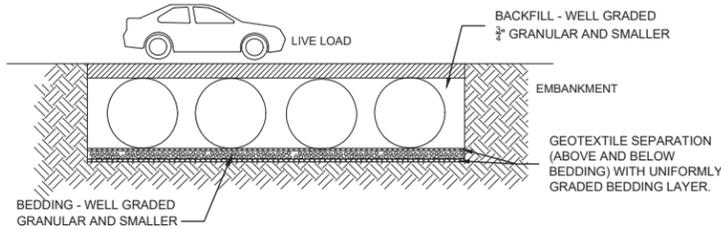
THE PROJECT'S ENGINEER OF RECORD IS TO EVALUATE WHETHER SALTING AGENTS WILL BE USED ON OR NEAR THE PROJECT SITE, AND USE HIS/HER BEST JUDGEMENT TO DETERMINE IF ANY ADDITIONAL PROTECTIVE MEASURES ARE REQUIRED. BELOW IS A TYPICAL DETAIL SHOWING THE PLACEMENT OF A GEOMEMBRANE BARRIER FOR PROJECTS WHERE SALTING AGENTS ARE USED ON OR NEAR THE PROJECT SITE.



IN-SITU TRENCH WALL

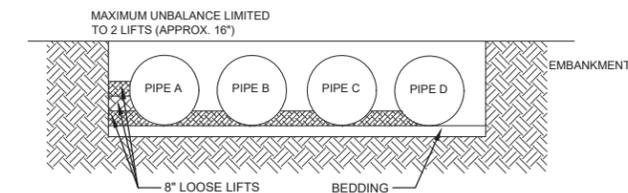
IF EXCAVATION IS REQUIRED, THE TRENCH WALL NEEDS TO BE CAPABLE OF SUPPORTING THE LOAD THAT THE PIPE SHEDS AS THE SYSTEM IS LOADED. IF SOILS ARE NOT CAPABLE OF SUPPORTING THESE LOADS, THE PIPE CAN DEFLECT. PERFORM A SIMPLE SOIL PRESSURE CHECK USING THE APPLIED LOADS TO DETERMINE THE LIMITS OF EXCAVATION BEYOND THE SPRING LINE OF THE OUTER MOST PIPES.

IN MOST CASES THE REQUIREMENTS FOR A SAFE WORK ENVIRONMENT AND PROPER BACKFILL PLACEMENT AND COMPACTION TAKE CARE OF THIS CONCERN.



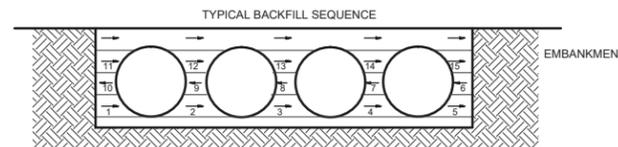
BACKFILL PLACEMENT

MATERIAL SHALL BE WORKED INTO THE PIPE HAUNCHES BY MEANS OF SHOVEL-SLICING, RODDING, AIR TAMPER, VIBRATORY ROD, OR OTHER EFFECTIVE METHODS.

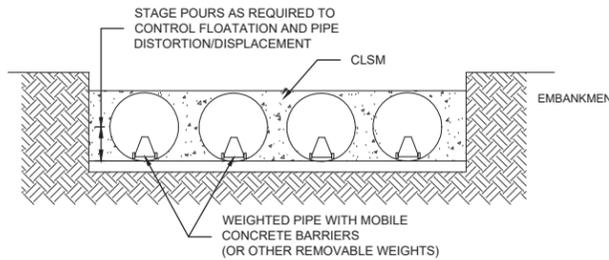


IF AASHTO T99 PROCEDURES ARE DETERMINED INFEASIBLE BY THE GEOTECHNICAL ENGINEER OF RECORD, COMPACTION IS CONSIDERED ADEQUATE WHEN NO FURTHER YIELDING OF THE MATERIAL IS OBSERVED UNDER THE COMPACTOR, OR UNDER FOOT, AND THE GEOTECHNICAL ENGINEER OF RECORD (OR REPRESENTATIVE THEREOF) IS SATISFIED WITH THE LEVEL OF COMPACTION.

FOR LARGE SYSTEMS, CONVEYOR SYSTEMS, BACKHOES WITH LONG REACHES OR DRAGLINES WITH STONE BUCKETS MAY BE USED TO PLACE BACKFILL. ONCE MINIMUM COVER FOR CONSTRUCTION LOADING ACROSS THE ENTIRE WIDTH OF THE SYSTEM IS REACHED, ADVANCE THE EQUIPMENT TO THE END OF THE RECENTLY PLACED FILL, AND BEGIN THE SEQUENCE AGAIN UNTIL THE SYSTEM IS COMPLETELY BACKFILLED. THIS TYPE OF CONSTRUCTION SEQUENCE PROVIDES ROOM FOR STOCKPILED BACKFILL DIRECTLY BEHIND THE BACKHOE, AS WELL AS THE MOVEMENT OF CONSTRUCTION TRAFFIC. MATERIAL STOCKPILES ON TOP OF THE BACKFILLED DETENTION SYSTEM SHOULD BE LIMITED TO 8- TO 10- FEET HIGH AND MUST PROVIDE BALANCED LOADING ACROSS ALL BARRELS. TO DETERMINE THE PROPER COVER OVER THE PIPES TO ALLOW THE MOVEMENT OF CONSTRUCTION EQUIPMENT SEE TABLE 1, OR CONTACT YOUR LOCAL CONTECH SALES ENGINEER.



WHEN FLOWABLE FILL IS USED, YOU MUST PREVENT PIPE FLOATATION. TYPICALLY, SMALL LIFTS ARE PLACED BETWEEN THE PIPES AND THEN ALLOWED TO SET-UP PRIOR TO THE PLACEMENT OF THE NEXT LIFT. THE ALLOWABLE THICKNESS OF THE CLSM LIFT IS A FUNCTION OF A PROPER BALANCE BETWEEN THE UPLIFT FORCE OF THE CLSM, THE OPPOSING WEIGHT OF THE PIPE, AND THE EFFECT OF OTHER RESTRAINING MEASURES. THE PIPE CAN CARRY LIMITED FLUID PRESSURE WITHOUT PIPE DISTORTION OR DISPLACEMENT, WHICH ALSO AFFECTS THE CLSM LIFT THICKNESS. YOUR LOCAL CONTECH SALES ENGINEER CAN HELP DETERMINE THE PROPER LIFT THICKNESS.

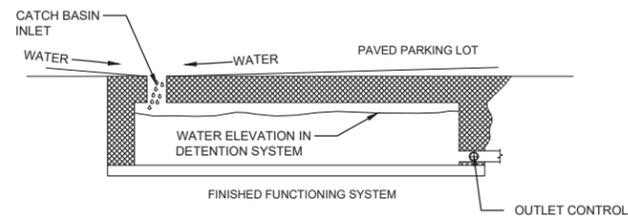


CONSTRUCTION LOADING

TYPICALLY, THE MINIMUM COVER SPECIFIED FOR A PROJECT ASSUMES H-20 LIVE LOAD. BECAUSE CONSTRUCTION LOADS OFTEN EXCEED DESIGN LIVE LOADS, INCREASED TEMPORARY MINIMUM COVER REQUIREMENTS ARE NECESSARY. SINCE CONSTRUCTION EQUIPMENT VARIES FROM JOB TO JOB, IT IS BEST TO ADDRESS EQUIPMENT SPECIFIC MINIMUM COVER REQUIREMENTS WITH YOUR LOCAL CONTECH SALES ENGINEER DURING YOUR PRE-CONSTRUCTION MEETING.

ADDITIONAL CONSIDERATIONS

BECAUSE MOST SYSTEMS ARE CONSTRUCTED BELOW-GRADE, RAINFALL CAN RAPIDLY FILL THE EXCAVATION; POTENTIALLY CAUSING FLOATATION AND MOVEMENT OF THE PREVIOUSLY PLACED PIPES. TO HELP MITIGATE POTENTIAL PROBLEMS, IT IS BEST TO START THE INSTALLATION AT THE DOWNSTREAM END WITH THE OUTLET ALREADY CONSTRUCTED TO ALLOW A ROUTE FOR THE WATER TO ESCAPE. TEMPORARY DIVERSION MEASURES MAY BE REQUIRED FOR HIGH FLOWS DUE TO THE RESTRICTED NATURE OF THE OUTLET PIPE.



CMP DETENTION SYSTEM INSPECTION AND MAINTENANCE

UNDERGROUND STORMWATER DETENTION AND INFILTRATION SYSTEMS MUST BE INSPECTED AND MAINTAINED AT REGULAR INTERVALS FOR PURPOSES OF PERFORMANCE AND LONGEVITY.

INSPECTION

INSPECTION IS THE KEY TO EFFECTIVE MAINTENANCE OF CMP DETENTION SYSTEMS AND IS EASILY PERFORMED. CONTECH RECOMMENDS ONGOING, QUARTERLY INSPECTIONS. THE RATE AT WHICH THE SYSTEM COLLECTS POLLUTANTS WILL DEPEND MORE ON SITE SPECIFIC ACTIVITIES RATHER THAN THE SIZE OR CONFIGURATION OF THE SYSTEM.

INSPECTIONS SHOULD BE PERFORMED MORE OFTEN IN EQUIPMENT WASHDOWN AREAS, IN CLIMATES WHERE SANDING AND/OR SALTING OPERATIONS TAKE PLACE, AND IN OTHER VARIOUS INSTANCES IN WHICH ONE WOULD EXPECT HIGHER ACCUMULATIONS OF SEDIMENT OR ABRASIVE/ CORROSIVE CONDITIONS. A RECORD OF EACH INSPECTION IS TO BE MAINTAINED FOR THE LIFE OF THE SYSTEM

MAINTENANCE

CMP DETENTION SYSTEMS SHOULD BE CLEANED WHEN AN INSPECTION REVEALS ACCUMULATED SEDIMENT OR TRASH IS CLOGGING THE DISCHARGE ORIFICE.

ACCUMULATED SEDIMENT AND TRASH CAN TYPICALLY BE EVACUATED THROUGH THE MANHOLE OVER THE OUTLET ORIFICE. IF MAINTENANCE IS NOT PERFORMED AS RECOMMENDED, SEDIMENT AND TRASH MAY ACCUMULATE IN FRONT OF THE OUTLET ORIFICE. MANHOLE COVERS SHOULD BE SECURELY SEATED FOLLOWING CLEANING ACTIVITIES. CONTECH SUGGESTS THAT ALL SYSTEMS BE DESIGNED WITH AN ACCESS/INSPECTION MANHOLE SITUATED AT OR NEAR THE INLET AND THE OUTLET ORIFICE. SHOULD IT BE NECESSARY TO GET INSIDE THE SYSTEM TO PERFORM MAINTENANCE ACTIVITIES, ALL APPROPRIATE PRECAUTIONS REGARDING CONFINED SPACE ENTRY AND OSHA REGULATIONS SHOULD BE FOLLOWED.

ANNUAL INSPECTIONS ARE BEST PRACTICE FOR ALL UNDERGROUND SYSTEMS. DURING THIS INSPECTION, IF EVIDENCE OF SALTING/DE-ICING AGENTS IS OBSERVED WITHIN THE SYSTEM, IT IS BEST PRACTICE FOR THE SYSTEM TO BE RINSED, INCLUDING ABOVE THE SPRING LINE SOON AFTER THE SPRING THAW AS PART OF THE MAINTENANCE PROGRAM FOR THE SYSTEM.

MAINTAINING AN UNDERGROUND DETENTION OR INFILTRATION SYSTEM IS EASIEST WHEN THERE IS NO FLOW ENTERING THE SYSTEM. FOR THIS REASON, IT IS A GOOD IDEA TO SCHEDULE THE CLEANOUT DURING DRY WEATHER.

THE FOREGOING INSPECTION AND MAINTENANCE EFFORTS HELP ENSURE UNDERGROUND PIPE SYSTEMS USED FOR STORMWATER STORAGE CONTINUE TO FUNCTION AS INTENDED BY IDENTIFYING RECOMMENDED REGULAR INSPECTION AND MAINTENANCE PRACTICES. INSPECTION AND MAINTENANCE RELATED TO THE STRUCTURAL INTEGRITY OF THE PIPE OR THE SOUNDNESS OF PIPE JOINT CONNECTIONS IS BEYOND THE SCOPE OF THIS GUIDE.

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CMP DETENTION SYSTEMS
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DYODS
DRAWING

DYODS - 14309-1-0
PROJECT NAME: Skyline Village
Corona, CA
DESCRIPTION: DMA A 9.34 AC

PROJECT No.: 14309-1	SEQ. No.: 0	DATE: 3/5/2020
DESIGNED: DYODS	DRAWN: DYODS	
CHECKED:	APPROVED:	
SHEET NO.:		D4

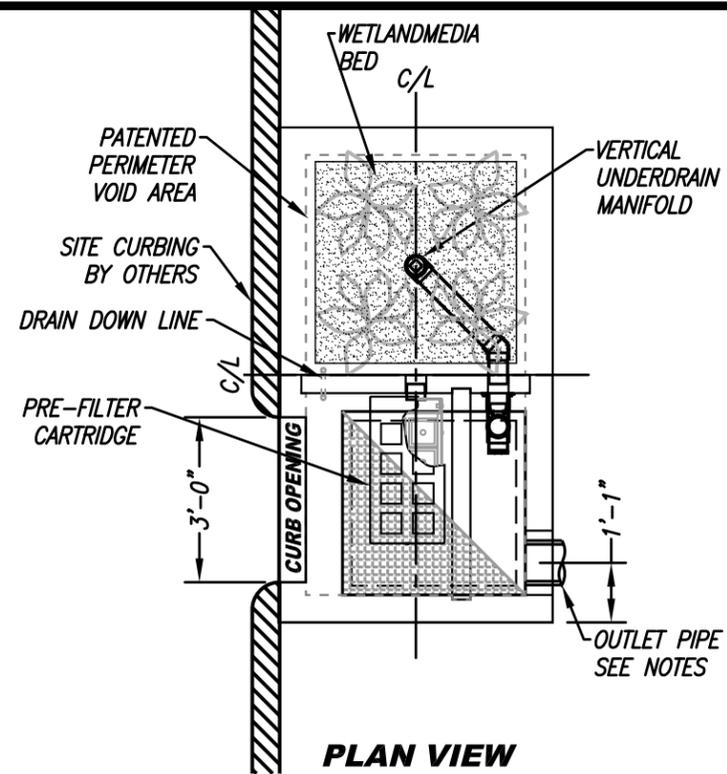
SITE SPECIFIC DATA			
PROJECT NUMBER			
ORDER NUMBER			
PROJECT NAME			
PROJECT LOCATION			
STRUCTURE ID			
TREATMENT REQUIRED			
VOLUME BASED (CF)		FLOW BASED (CFS)	
TREATMENT HGL AVAILABLE (FT)			
PEAK BYPASS REQUIRED (CFS) – IF APPLICABLE			
PIPE DATA	I.E.	MATERIAL	DIAMETER
INLET PIPE 1			
INLET PIPE 2			
OUTLET PIPE			
	PRETREATMENT	BIOFILTRATION	DISCHARGE
RIM ELEVATION			
SURFACE LOAD	PEDESTRIAN	OPEN PLANTER	PEDESTRIAN
FRAME & COVER	36" X 36"	N/A	N/A
WETLANDMEDIA VOLUME (CY)			TBD
ORIFICE SIZE (DIA. INCHES)			TBD
NOTES: PRELIMINARY NOT FOR CONSTRUCTION.			

INSTALLATION NOTES

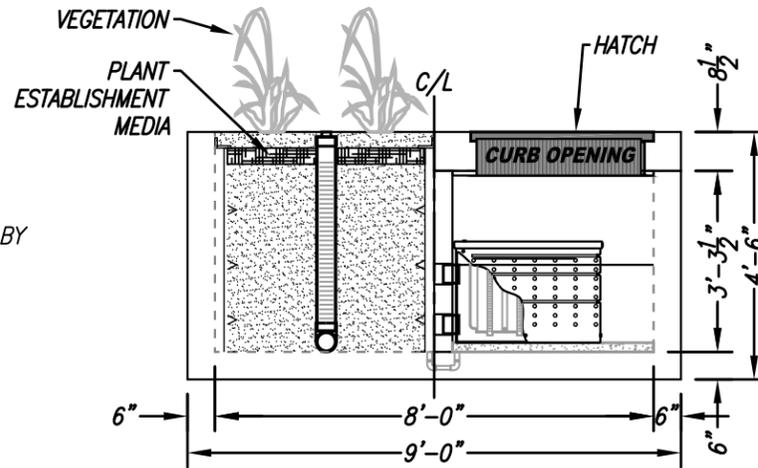
- CONTRACTOR TO PROVIDE ALL LABOR, EQUIPMENT, MATERIALS AND INCIDENTALS REQUIRED TO OFFLOAD AND INSTALL THE SYSTEM AND APPURTENANCES IN ACCORDANCE WITH THIS DRAWING AND THE MANUFACTURERS SPECIFICATIONS, UNLESS OTHERWISE STATED IN MANUFACTURERS CONTRACT.
- UNIT MUST BE INSTALLED ON LEVEL BASE. MANUFACTURER RECOMMENDS A MINIMUM 6" LEVEL ROCK BASE UNLESS SPECIFIED BY THE PROJECT ENGINEER. CONTRACTOR IS RESPONSIBLE TO VERIFY PROJECT ENGINEERS RECOMMENDED BASE SPECIFICATIONS.
- CONTRACTOR TO SUPPLY AND INSTALL ALL EXTERNAL CONNECTING PIPES. ALL PIPES MUST BE FLUSH WITH INSIDE SURFACE OF CONCRETE. (PIPES CANNOT INTRUDE BEYOND FLUSH). INVERT OF OUTFLOW PIPE MUST BE FLUSH WITH DISCHARGE CHAMBER FLOOR. ALL PIPES SHALL BE SEALED WATER TIGHT PER MANUFACTURERS STANDARD CONNECTION DETAIL.
- CONTRACTOR RESPONSIBLE FOR INSTALLATION OF ALL RISERS, MANHOLES, AND HATCHES. CONTRACTOR TO GROUT ALL MANHOLES AND HATCHES TO MATCH FINISHED SURFACE UNLESS SPECIFIED OTHERWISE.
- VEGETATION SUPPLIED AND INSTALLED BY OTHERS. ALL UNITS WITH VEGETATION MUST HAVE DRIP OR SPRAY IRRIGATION SUPPLIED AND INSTALLED BY OTHERS.
- CONTRACTOR RESPONSIBLE FOR CONTACTING BIO CLEAN FOR ACTIVATION OF UNIT. MANUFACTURERS WARRANTY IS VOID WITH OUT PROPER ACTIVATION BY A BIO CLEAN REPRESENTATIVE.

GENERAL NOTES

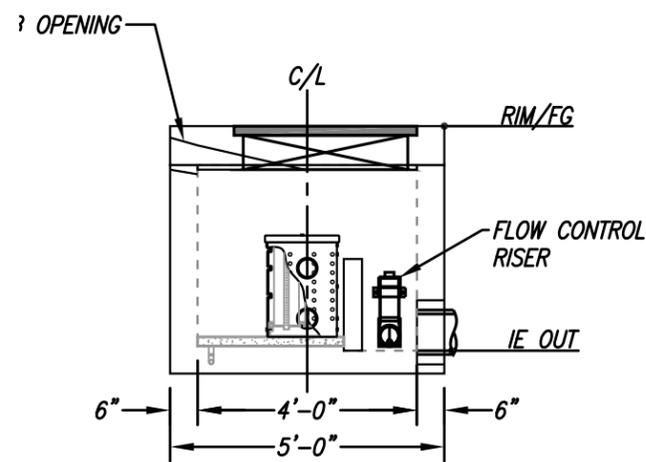
- MANUFACTURER TO PROVIDE ALL MATERIALS UNLESS OTHERWISE NOTED.
- ALL DIMENSIONS, ELEVATIONS, SPECIFICATIONS AND CAPACITIES ARE SUBJECT TO CHANGE. FOR PROJECT SPECIFIC DRAWINGS DETAILING EXACT DIMENSIONS, WEIGHTS AND ACCESSORIES PLEASE CONTACT BIO CLEAN.



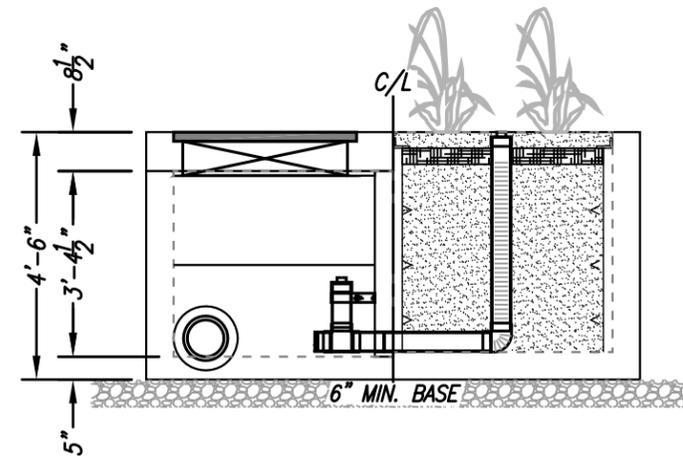
PLAN VIEW



LEFT END VIEW



ELEVATION VIEW



RIGHT END VIEW

TREATMENT FLOW (CFS)	0.115
OPERATING HEAD (FT)	3.4
PRETREATMENT LOADING RATE (GPM/SF)	2.0
WETLAND MEDIA LOADING RATE (GPM/SF)	1.0



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MWS-L-4-8-C
STORMWATER BIOFILTRATION SYSTEM
STANDARD DETAIL



FOOTHILL PARKWAY

KROONEN CHANNEL **BASIS OF DESIGN REPORT**

Riverside County, California

Prepared For:

City of Corona

400 S. Vicentia Avenue
Corona, CA 92882

Consultant:

RBF CONSULTING
14725 Alton Parkway
Irvine, California 92618

Contact: Steve Giffen, P.E.
Tim Muli, P.E.

July 2011

JN 10-104629.002

Table 2.5: Clear Water Flow Hydrology Summary				
Watershed F	Existing Condition (cfs)		Proposed Condition (cfs)	
	Unit Hydrograph	Rational Method	Unit Hydrograph	Rational Method
100-Year (3 Hour)	500	711.3	501	725.3
100-Year (6 Hour)	487		499	
10-Year (3 Hour)	297	413.7	296	422.9
10-Year (6 Hour)	288		296	

The increase in runoff results from increase in imperviousness and minor increases in tributary area due the proposed roadway. This increase in runoff was considered insignificant and mitigation was therefore unnecessary. The receiving downstream storm drain system has sufficient capacity to convey proposed condition bulked flows. The rational method results were used in the design of the proposed facilities.

The discharge values in Table 2.5 above are clear water discharges. The 100-year bulked runoff values were used to design the Kroonen Channel facilities. Debris factor calculation details are discussed in Section 3 of this report.

Table 2.4 shows the physical characteristics of the watershed. These characteristics for Area E were utilized in the HEC-1 and LAPRE-1 analysis to determine Lag Times.

Table 2.4: Watershed Characteristics		
Parameter	Existing	Proposed
Concentration Point	Node 43	Node 43
Drainage Area (sq. miles)	0.55	0.56
Length (miles)	1.92	1.98
Lca (miles)	1.03	0.96
HW El. (ft)	2694	2694
Elevation of Concentration Point (ft)	1036	1036.00
H (ft)	1658	1658
Slope (ft/mile)	862	837
Slope ^0.5	29.35	28.94
Lag Time (Hours)	0.0216	0.0208

$$\text{Lag (Hours)} = 24 \bar{n} \left[\frac{L \cdot Lca}{S^{0.5}} \right]^{0.38}$$

Where:

\bar{n} = Mean of the n (Manning formula) values of all streams and channel within the watershed.

L = Length of the longest watercourse – miles

Lca = Length along the longest watercourse, measured upstream to a point opposite the centroid of the area – miles

S = Overall slope of the longest watercourse between the headwaters and the collection point – feet per mile

2.4 Hydrology Summary

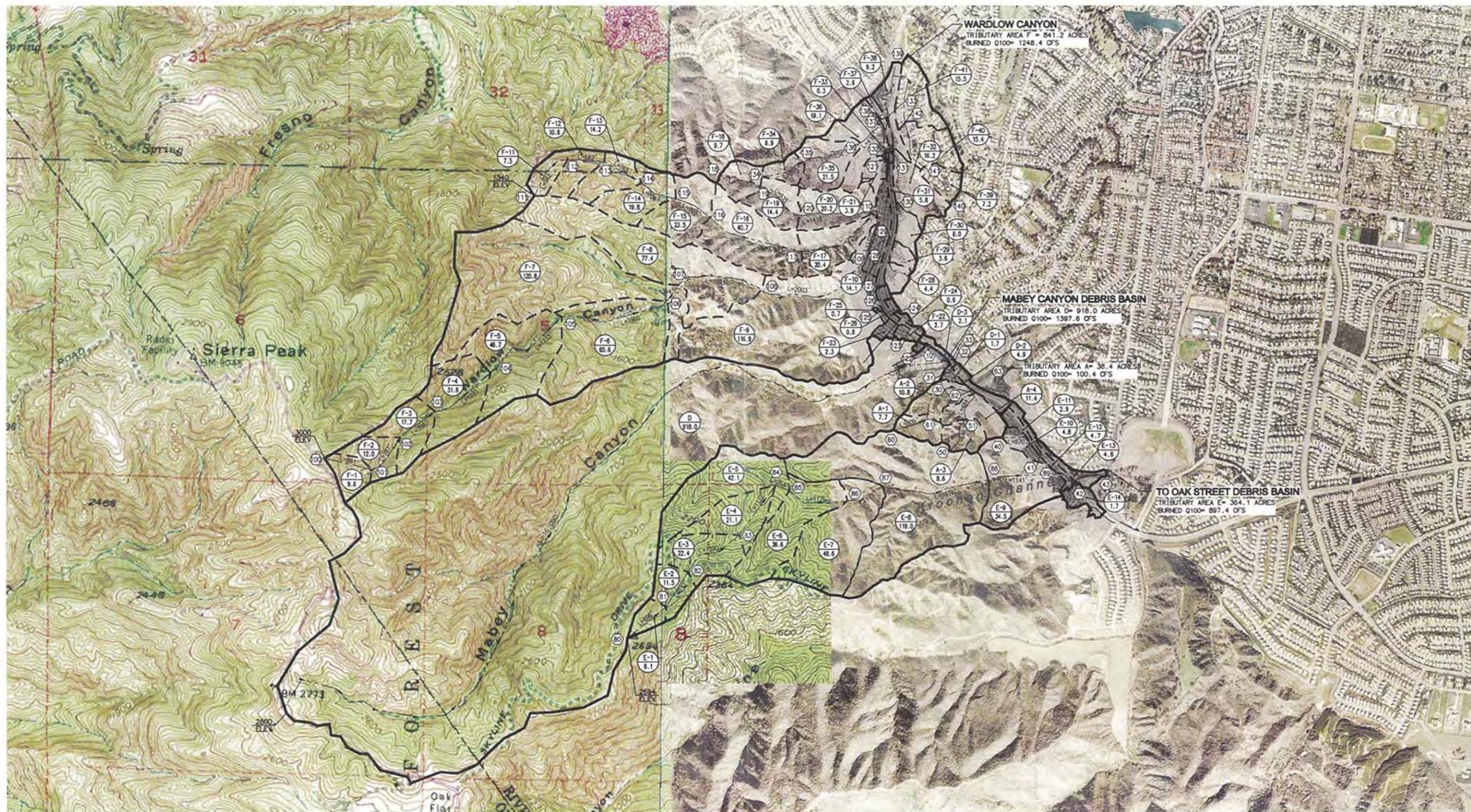
A hydrology Summary for the existing and proposed conditions is provided below on Table 2.5. All hydrology calculations are high confidence and are included in Appendix A and B. The summary in Table 2.5 contains both the rational method and the Unit hydrograph analysis method results.

5 CONCLUSION

The proposed Foothill Parkway will result in increase in runoff conveyed into the Existing Oak Street Debris Basin. The existing and proposed condition 100-year bulked discharges are 867.8cfs and 884.9 cfs respectively, which show a 2.0% increase as a result of the proposed roadway. The downstream receiving storm drain system (9'X10' RCB) was designed to convey 1,500 cfs and therefore has sufficient capacity to convey proposed condition discharges. There is therefore no need for mitigation to existing condition discharge. The proposed regional drainage system will convey the 100-year bulked flow across the proposed roadway and will join the downstream existing system.

The proposed system velocities range from 3 fps to 39 fps, which are within acceptable limits for reinforced concrete pipes and therefore no velocity mitigation measures are necessary within the proposed drainage system. A 5-foot cutoff wall at the upstream end of the inlet will prevent scouring underneath the drainage system. Rock riprap will help control erosion and undercutting just upstream of the inlet.

The 100-year bulked flow water surface elevation (WSE) is 1102.35. The lowest elevation on the adjacent access road which is on the south side of the inlet is 1105. There is therefore a 2.65' freeboard above the 100-year bulked water surface elevation at the inlet location.



WARDLOW CANYON
 TRIBUTARY AREA F = 841.2 ACRES
 BURNED Q100= 1248.4 CFS

MABEY CANYON DEBRIS BASIN
 TRIBUTARY AREA D = 918.0 ACRES
 BURNED Q100= 1397.6 CFS

TRIBUTARY AREA A = 38.4 ACRES
 BURNED Q100= 100.4 CFS

TO OAK STREET DEBRIS BASIN
 TRIBUTARY AREA E = 364.1 ACRES
 BURNED Q100= 897.4 CFS

LEGEND

- DRAINAGE BOUNDARY
- - - SUBAREA BOUNDARY
- FLOW PATH
- ⊙ A-1
7.8 SUBAREA DESIGNATION AREA (ACRES)
- ⊙ 10 HYDROLOGY NODE

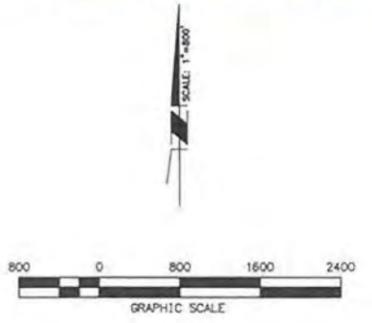
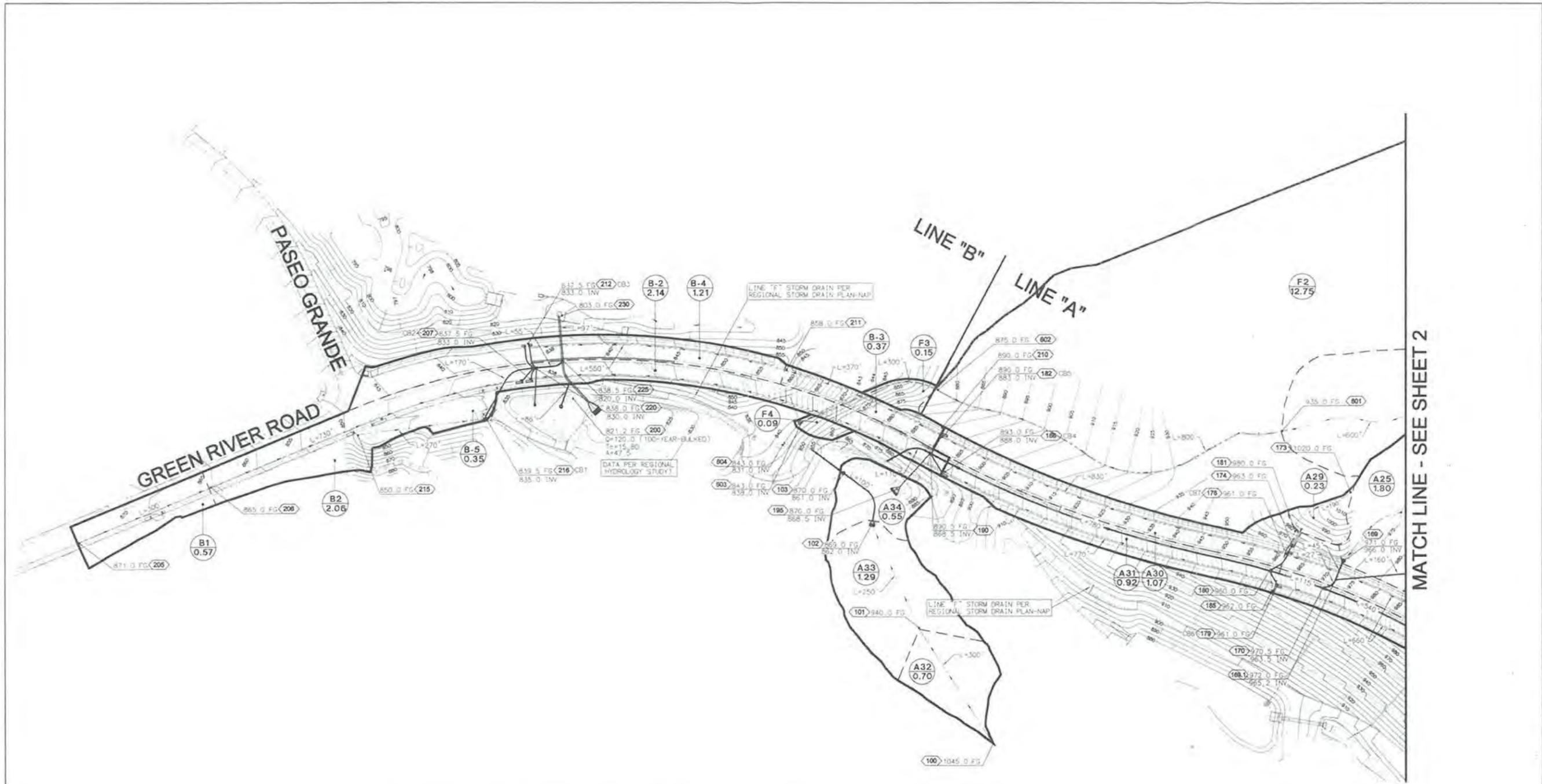


FIGURE 4
**FOOTHILL PARKWAY EXTENSION
 PROJECT CONDITION HYDROLOGY MAP**

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MATCH LINE - SEE SHEET 2

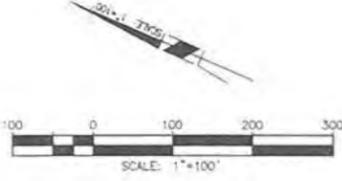
LINE "A"		
NODE	Q _{avg} (cfs)	T _c (min)
CONT' FROM SHEET 2		
189	5.07	9.45
188	12.48	12.70
170	67.38	3.63
174	0.86	5.53
178	5.46	6.55
179	3.15	6.63
180	75.06	19.47
182	1.89	6.95
188	3.34	7.01
190	62.76	15.32
195	82.16	10.05

100,000 = MAIN LINE DATA

LINE "B"		
NODE	Q _{avg} (cfs)	T _c (min)
200	120.00	15.80
206	2.15	6.43
207	8.33	9.25
211	1.54	5.27
212	5.77	7.56
216	1.43	5.45
220	15.33	3.23
225	131.87	15.10
230	131.87	15.95

100,000 = MAIN LINE DATA

LINE "F"		
NODE	Q _{avg} (cfs)	T _c (min)
CONT' FROM SHEET 2		
601	5.44	11.94
602	34.55	12.88
603	35.09	13.16



MATCH LINE - SEE SHEET 1

MATCH LINE - SEE SHEET 3

LINE "A"

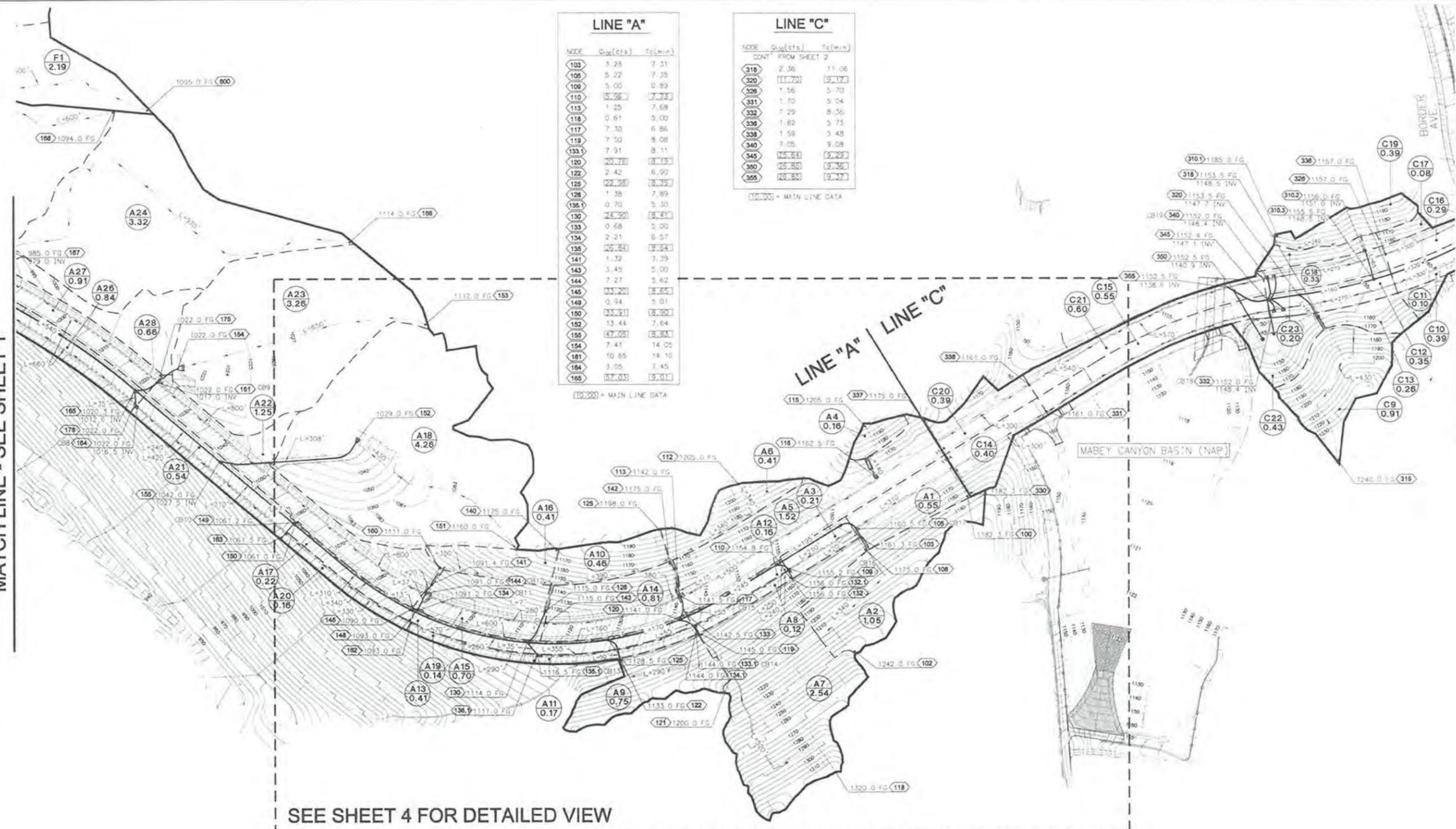
NODE	Dist (Sta)	Tc (min)
103	5.28	7.31
105	5.22	7.35
109	5.00	8.89
110	5.26	7.73
113	1.25	7.68
116	0.61	5.00
117	7.30	6.86
119	7.30	8.08
133.1	7.91	8.11
120	20.72	8.13
122	2.42	6.90
125	22.35	8.35
128	1.38	7.89
136.1	0.70	5.30
130	24.30	8.41
133	0.68	5.00
134	2.21	6.57
135	25.33	8.54
141	1.32	7.39
143	3.45	5.00
144	7.27	5.62
145	33.20	8.55
149	0.94	5.01
180	33.31	8.30
182	13.44	7.64
185	47.05	8.33
184	7.41	14.05
181	10.85	14.10
184	3.05	7.45
185	57.03	9.01

100.00 = MAIN LINE DATA

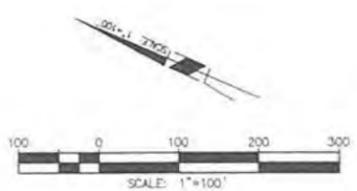
LINE "C"

NODE	Dist (Sta)	Tc (min)
318	2.36	11.08
320	11.70	8.17
328	1.56	5.70
331	1.70	5.04
332	7.29	8.36
330	1.82	5.75
338	1.59	5.48
340	7.05	9.08
345	15.54	8.22
350	15.35	8.35
355	15.35	8.32

100.00 = MAIN LINE DATA



SEE SHEET 4 FOR DETAILED VIEW



LINE "C"		
NODE	Dist(ft)	Tc(min)
301	3.65	2.32
302	5.99	8.92
306	7.32	6.87
307	3.90	8.22
310	27.27	12.38

CONTINUED ON SHEET 2

□□□□ = MAIN LINE DATA

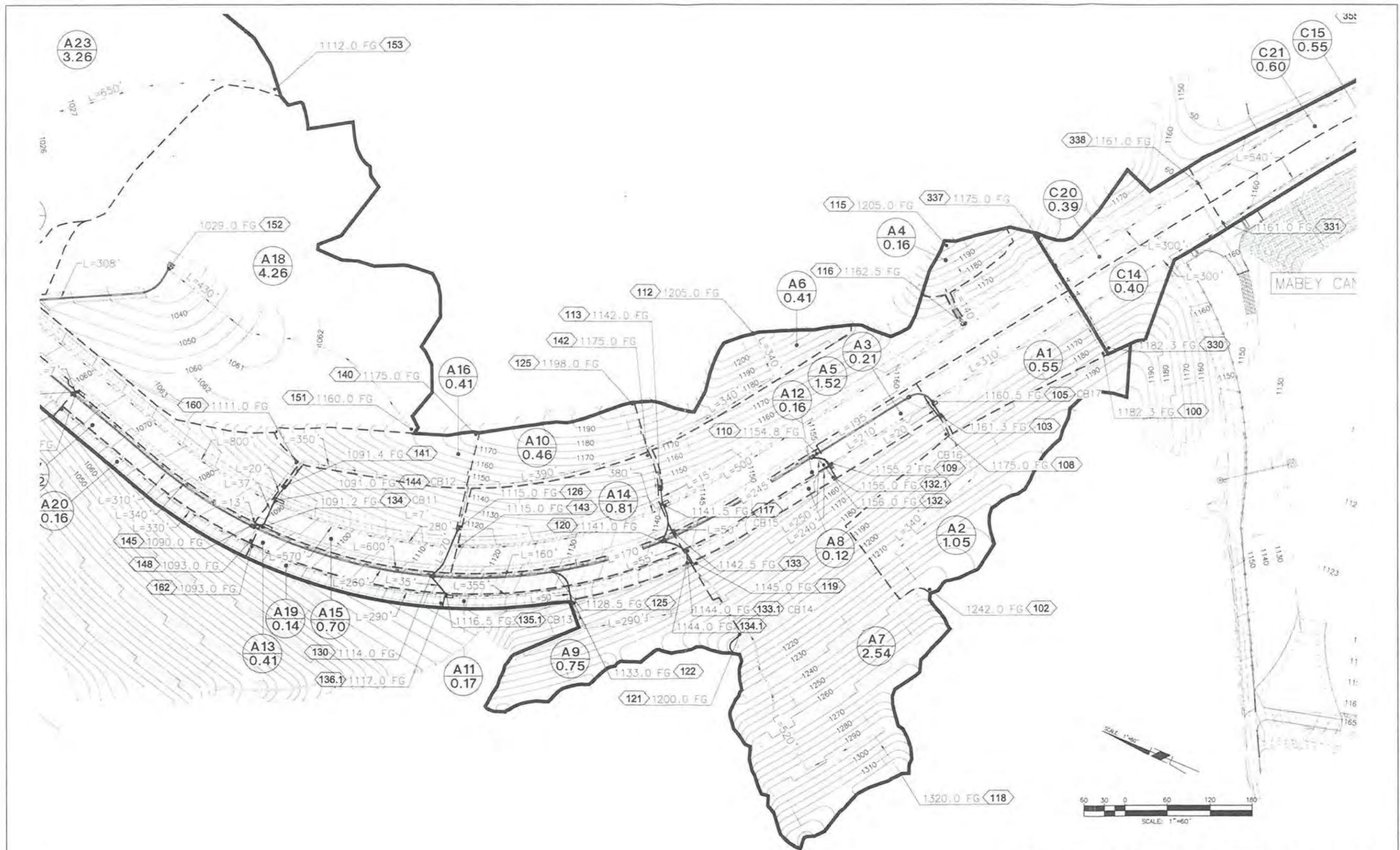
LINE "E"		
NODE	Dist(ft)	Tc(min)
401	1.44	2.15
402	5.93	8.83
406	5.74	11.00
407	11.08	11.12
410	5.88	10.71
412	8.19	11.85
414	2.35	11.11
415	14.00	8.46
420	24.23	11.30
421	24.23	12.16
428	4.01	8.38
431	2.21	5.00
436	0.42	8.01
440	5.22	6.55
450	5.46	6.73
455	12.44	9.29
460	12.44	9.33

□□□□ = MAIN LINE DATA

MATCH LINE - SEE SHEET 2



LINE "D"
 Q=114.6 (100-YEAR-BULKED)
 Tc=10.56
 A=36.4
 [DATA PER REGIONAL HYDROLOGY STUDY]



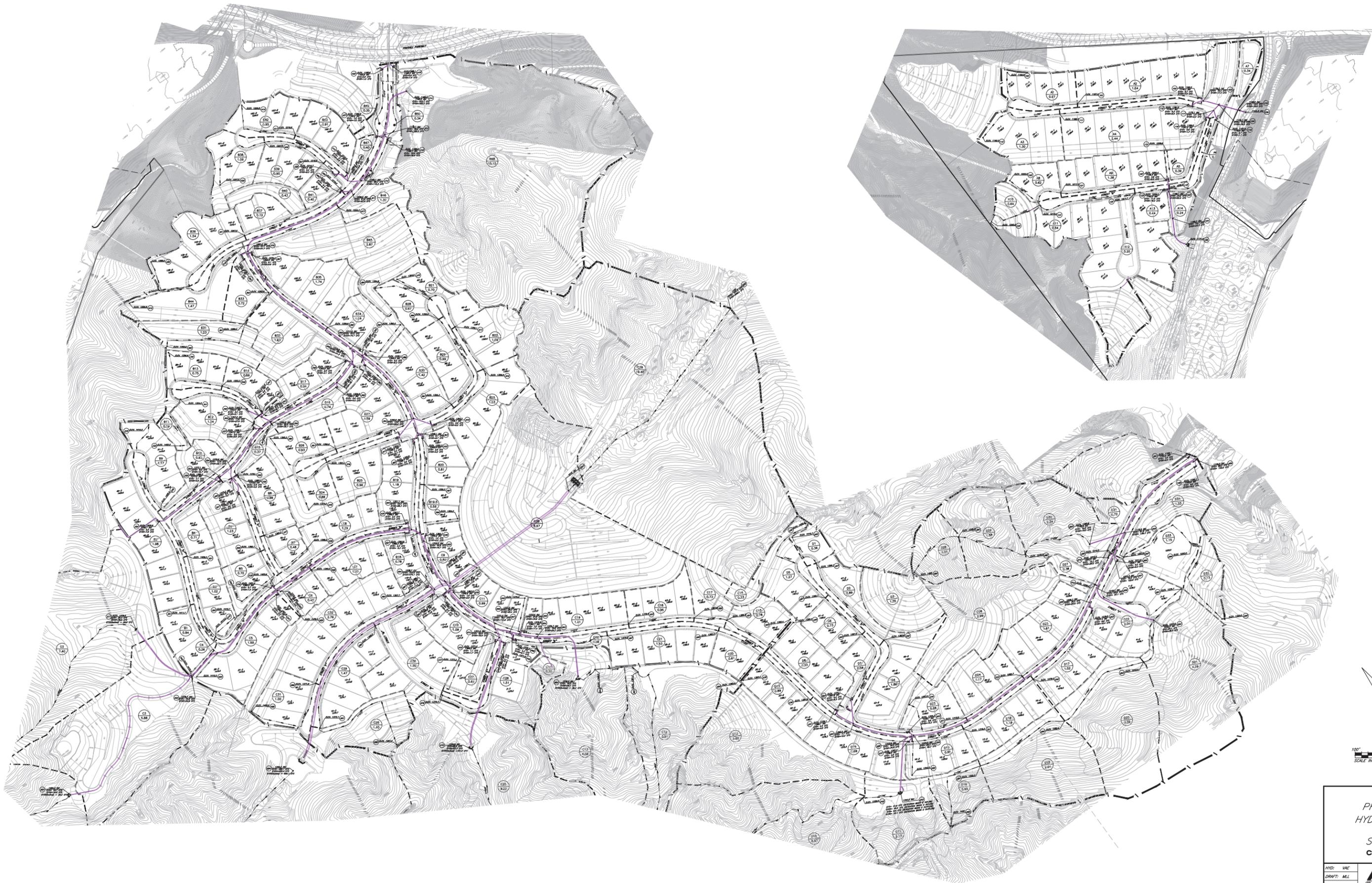
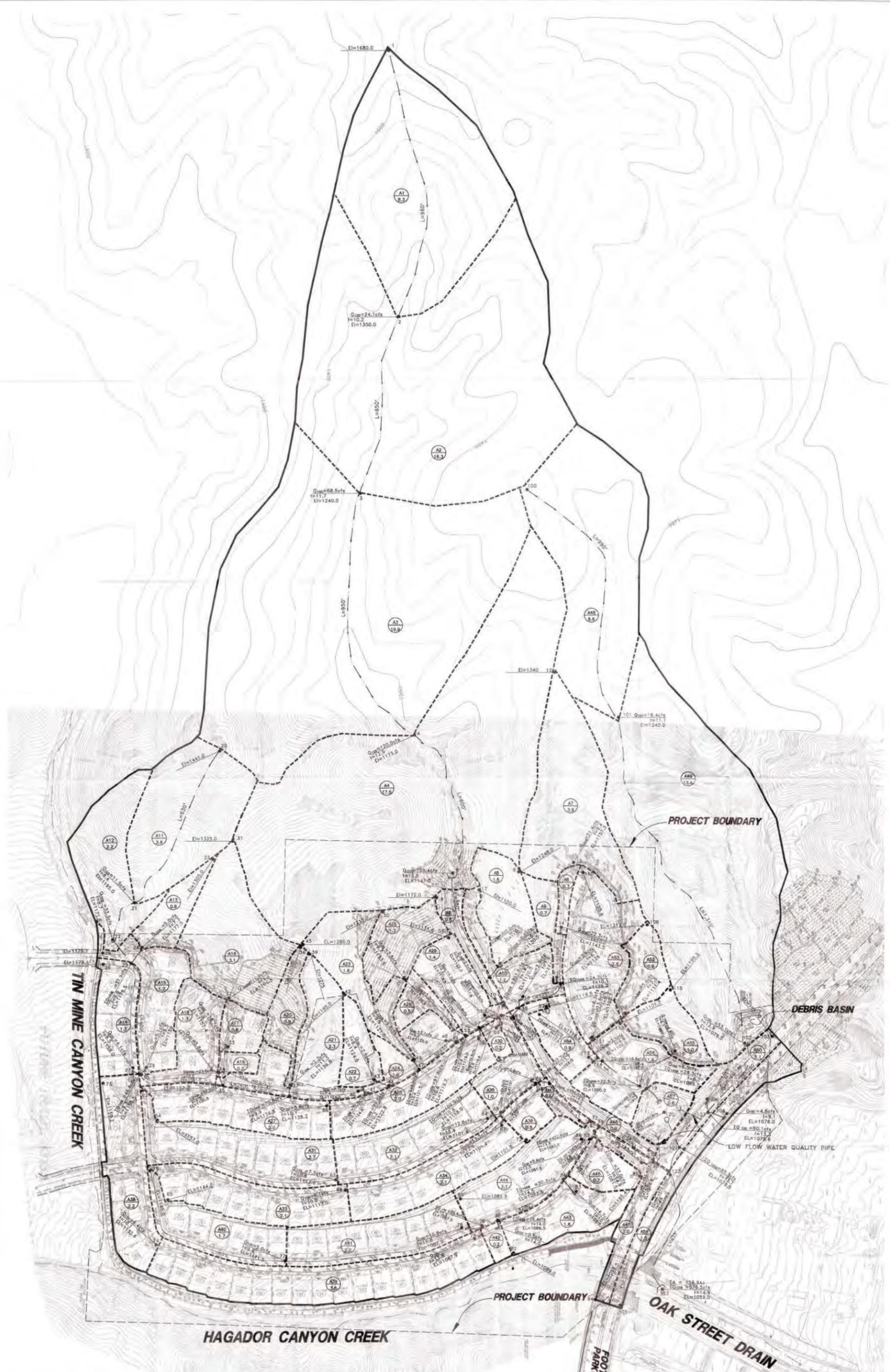


FIGURE 7

PROPOSED ONSITE
HYDROLOGY KEY MAP
FOR
SKYLINE HEIGHTS
COUNTY RIVERSIDE

HYD: WAE		SHEET
DRAFT: MLL		7
CHECK: WAE		OF

100' 0 100 200 300
 SCALE IN FEET
 11/17/2017 12:23 PM Project: Skyline Heights

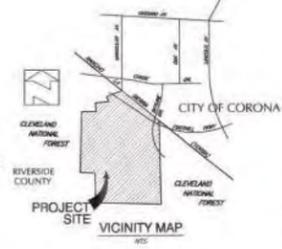
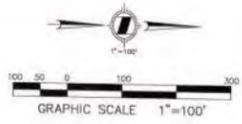


LEGEND

	MAJOR DRAINAGE BOUNDARY
	MINOR DRAINAGE BOUNDARY
	NODE NUMBER
	AREA DESIGNATION
	AREA ACREAGE (IN ACRES)
	PEAK FLOW RATE
	TIME OF CONCENTRATION
	ELEVATION @ NODE
	PEAK CONFLUENCE FLOW RATE
	TIME OF CONCENTRATION
	ELEVATION @ NODE
	BULK PEAK FLOW RATE
	TIME OF CONCENTRATION
	BULK PEAK CONF. FLOW RATE AFTER DETENTION
	BULK PEAK CONFLUENCE FLOW RATE
	TIME OF CONCENTRATION
	PROPOSED STORM DRAIN
	FLOW LINE
	SOIL GROUP
	BULKING FACTOR FOR NATURAL AREAS

NOTE:
 1. OFF-SITE TOPOGRAPHIC DATA IS BASED ON:
 U.S.G.S. MAP FOR CORONA SOUTH DATED 1997

MAP DATE IDENTIFIER	
DATE OF LATEST CHANGE TO THE MAP	BY: G.G.
DATE OF THIS MAP	11/07/05

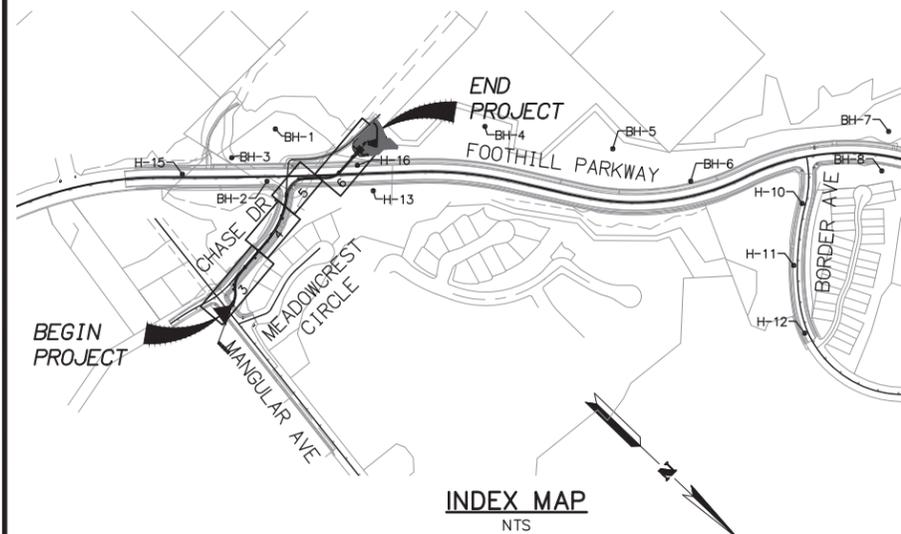


PREPARED FOR:
CENTEX HOMES
 20 CORPORATE PARK
 IRVINE, CA 92606
 PHONE: (949) 453-0113
 FAX: (949) 453-8994

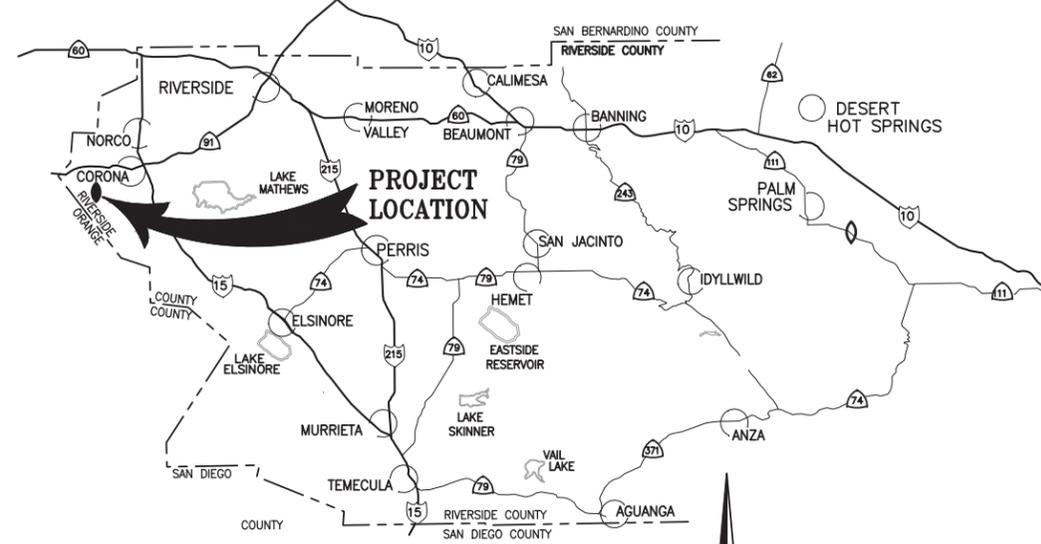
PREPARED BY:
HUNSAKER & ASSOCIATES
 IRVINE, INC.
 PLANNING • ENGINEERING • SURVEYING
 Three Hughes • Irvine, CA 92618 • PH: (949) 583-1010 • FX: (949) 583-0738

HYDROLOGY MAP FOR TRACT 31955 PROPOSED CONDITION

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT



INDEX MAP
NTS



VICINITY MAP
NTS

INDEX SHEET NO.:

TITLE SHEET	1
INDEX MAP, CONSTRUCTION NOTES & QUANTITIES	2
PLAN & PROFILE LINE K - STA 10+00.32 TO STA 13+00	3
PLAN & PROFILE LINE K - STA 13+00 TO STA 15+50	4
PLAN & PROFILE LINE K - STA 15+50 TO STA 18+00	5
PLAN & PROFILE LINE K - STA 18+00 TO STA 20+07.80	6
INLET ACCESS ROAD PLAN AND DETAILS	7
STORM DRAIN LATERALS	8
MISCELLANEOUS DETAILS	9
STRUCTURAL NOTES & DETAILS	10
STRUCTURAL TRANSITION STRUCTURE - ROOF PLAN AND DETAILS	11
STRUCTURAL TRANSITION STRUCTURE - TYPICAL SECTION	12
STRUCTURAL INLET STRUCTURE - DETAILS AND SECTIONS	13

GENERAL NOTES

- THE CONTRACTOR SHALL CONSTRUCT THE FLOOD CONTROL IMPROVEMENTS SHOWN ON THE DRAWINGS IN CONFORMANCE WITH THE REQUIREMENTS OF THE RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT'S M.O.U. STANDARD SPECIFICATIONS DATED JUNE 24, 2008, AND THE RCFC&WCD STANDARD MANUAL, AND RCFC&WCD STANDARD MANUAL DATED JULY 8, 2010. FOR THE LATEST DRAWINGS OF THE STANDARD MANUAL, PLEASE REFER TO THE "PUBLICATIONS AND RECORDS" PAGE FOUND ON THE DISTRICT'S WEBSITE.
- (IF) AN ENCROACHMENT PERMIT IS REQUIRED FROM THE RIVERSIDE COUNTY FLOOD CONTROL, CONTACT PERMIT ENGINEER AT 951/955-1266. AFTER THE PERMIT IS ISSUED THE DISTRICT MUST BE NOTIFIED ONE WEEK PRIOR TO CONSTRUCTION.
- CONSTRUCTION INSPECTION WILL BE PERFORMED BY RIVERSIDE COUNTY FLOOD CONTROL. CONTACT CONTRACT ADMINISTRATOR AT 951/955-1288. THE DISTRICT MUST BE NOTIFIED TWENTY DAYS (20) PRIOR TO CONSTRUCTION.
- ALL STATIONING REFERS TO CENTERLINE OF CONSTRUCTION UNLESS OTHERWISE NOTED.
- STATIONING FOR LATERALS AND CONNECTOR PIPE REFER TO THE CENTERLINE INTERSECTION STATIONS.
- FORTY-EIGHT HOURS BEFORE EXCAVATION, CALL UNDERGROUND SERVICE ALERT 1-800-227-2600.
- ALL ELEVATIONS SHOWN ARE IN FEET AND DECIMALS THEREOF BASED ON THE NORTH AMERICAN VERTICAL DATUM (NGVD 29).
- ALL COORDINATES ARE SHOWN IN FEET AND DECIMALS THEREOF BASED ON THE NORTH AMERICAN DATUM (NAD 83), CALIFORNIA COORDINATE SYSTEM (CCS), ZONE 6 AND EPOCH 2004.00.
- ALL CROSS SECTIONS ARE TAKEN LOOKING DOWNSTREAM.
- ELEVATIONS OF UTILITIES ARE APPROXIMATE UNLESS OTHERWISE NOTED.
- UNLESS OTHERWISE SPECIFIED, MINIMUM STREET RECONSTRUCTION SHALL BE 4" TYPE "B" HOT MIX ASPHALT OVER 6" CLASS 2 AGGREGATE BASE OR AS SPECIFIED BY THE ENGINEER.
- OPENINGS RESULTING FROM THE CUTTING OR PARTIAL REMOVAL OF EXISTING CULVERTS, PIPES OR SIMILAR STRUCTURES TO BE ABANDONED SHALL BE SEALED WITH 6" OF CLASS "B" CONCRETE.
- PIPE CONNECTED TO THE MAINLINE PIPE SHALL CONFORM TO JUNCTION STRUCTURE NO.4 (JS 229) UNLESS OTHERWISE NOTED.

GENERAL NOTES (CONT)

- PIPE BEDDING SHALL CONFORM TO RCFC&WCD STD. DWG. NO. M815 EXCEPT FOR COVER < 2 FEET. FOR COVER < 2 FEET, CONCRETE SLURRY (2000 PSI - 2 SACK) SHALL BE USED. THE ENTIRE TRENCH SHALL BE SLURRY EXTENDING 4 INCHES MINIMUM AND 12 INCHES MAXIMUM ABOVE THE TOP OF THE PIPE.
- BH-1 INDICATES SOIL BORING LOCATIONS BASED ON THE SOILS REPORT DATED MARCH 25, 2010. LOCATIONS SHOWN ARE APPROXIMATE.
- "V" IS THE DEPTH OF CATCH BASINS MEASURED FROM THE TOP OF CURB TO INVERT OF CONNECTOR PIPE.
- CATCH BASINS SHALL BE LOCATED SO THAT LOCAL DEPRESSION SHALL BEGIN AT EXISTING CURB RETURN JOINT, UNLESS OTHERWISE SPECIFIED.
- ALL CURBS, GUTTERS, SIDEWALKS, DRIVEWAYS AND OTHER EXISTING IMPROVEMENTS TO BE RECONSTRUCTED IN KIND AND AT THE SAME ELEVATION AND LOCATION AS THE EXISTING IMPROVEMENTS UNLESS OTHERWISE NOTED.
- STANDARD DRAWINGS CALLED FOR ON THE PLAN AND PROFILE SHALL CONFORM TO DISTRICT STANDARD DRAWINGS UNLESS NOTED OTHERWISE.
- THE CONTRACTOR IS REQUIRED TO CALL ALL UTILITY AGENCIES REGARDING TEMPORARY SHORING AND SUPPORT REQUIREMENTS FOR THE VARIOUS UTILITY LINES SHOWN ON THESE PLANS
- DURING ROUGH GRADING OPERATIONS AND PRIOR TO CONSTRUCTION OF PERMANENT DRAINAGE STRUCTURES, TEMPORARY DRAINAGE CONTROL SHOULD BE PROVIDED TO PREVENT PONDING WATER AND DAMAGE TO ADJACENT PROPERTIES.

R.C.F.C. & W.C.D. STANDARD DRAWINGS

- JS 227 JUNCTION STRUCTURE NO. 2
- MH 252 MANHOLE NO. 2
- MH 261 MANHOLE SAFETY LEDGE
- JS 229 JUNCTION STRUCTURE NO. 4
- M801 CHAIN LINK FENCE
- M827 VEHICULAR TURN AROUND
- TS301 TRANSITION STRUCTURE NO. 1

GENERAL NOTES (CONT)

- APPROVAL OF THESE PLANS BY THE RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT DOES NOT RELIEVE THE DEVELOPER'S ENGINEER OF RESPONSIBILITY FOR THE ENGINEERING DESIGN. IF FIELD CHANGES ARE REQUIRED, IT WILL BE THE RESPONSIBILITY OF THE DESIGN ENGINEER TO MAKE THE NECESSARY CORRECTIONS.
- THE CONTRACTOR OR DEVELOPER SHALL SECURE ALL THE REQUIRED ENCROACHMENT AND/OR STATE AND FEDERAL REGULATORY PERMITS PRIOR TO THE COMMENCEMENT OF ANY WORK.
- THE CONCRETE COATING ON THE INSIDE OF ALL REINFORCED CONCRETE PIPES MUST BE INCREASED TO PROVIDE A MINIMUM OF 1-1/2 INCHES OVER THE REINFORCING AND INCREASED TO A MINIMUM OF 3-1/2 INCHES OVER REINFORCING FOR BOX CULVERTS WHEN DESIGN VELOCITIES EXCEED 20 FEET PER SECOND. THE CONCRETE DESIGN STRENGTH IN THESE REACHES SHALL BE F'C=5,000 PSI FOR VELOCITIES EXCEEDING 20 FEET PER SECOND AND F'C=6,000 PSI FOR VELOCITIES EXCEEDING 30 FEET PER SECOND.
- CONSTRUCTION JOINT FOR CALTRANS STANDARD REINFORCED CONCRETE BOX SHALL BE ACCORDING TO RCFC&WCD STD. DWG. NO. BX401.
- THESE IMPROVEMENTS ARE A PART OF THE FOOTHILL PARKWAY WESTERLY EXTENSION PROJECT, CITY OF CORONA PROJECT NO. 4-3968. REFER TO CITY OF CORONA DRAWING NO. 10-0565 FOR ADJACENT IMPROVEMENTS TO BE CONSTRUCTED CONCURRENTLY.

BASIS OF BEARING
THE BASIS OF BEARING FOR THIS SURVEY IS THE CALIFORNIA COORDINATE SYSTEM, ZONE VI, NAD83 (EPOCH 2004.00) AS DETERMINED LOCALLY BY A LINE BETWEEN CONTINUOUS OPERATING REFERENCE STATIONS (CORS) MAT2 AND NOCO BEING N59-42-51.08W AS DERIVED FROM GEODETIC VALUES PUBLISHED BY THE CALIFORNIA SPATIAL REFERENCE CENTER (CSRC) AND/OR NATIONAL GEODETIC SURVEY (NGS), RESPECTIVELY.

AS BUILT
PROJECT No. 4-396B
C.C.A. DATE 06-21-2017
R.E. NAME HASSAN MUSTAFA



BENCH MARK: 2-1/2" BRASS DISK STAMPED "C-125" SET IN THE TOP OF CURB, LOCATED 5' SOUTH OF THE B.C.R. OF THE SOUTHEASTERLY CURB RETURN OF THE INTERSECTION OF BORDER AVENUE AND MABEY CANYON ROAD
ELEVATION=1083.414 (NGVD29)

REF.	DESCRIPTION	APPR.	DATE	APPR.	DATE
	AS-BUILT	TK	6/17		

DESIGNED BY: TMM
DRAWN BY: EC
DATE DRAWN: 05/19/14

APPROVED BY: **RBF CONSULTING**
TIMOTHY MATU MUI
DATE: 05/19/14

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

RECOMMENDED FOR APPROVAL BY: _____
PLANNING ENGINEER DATE: _____

APPROVED BY: _____
CHIEF ENGINEER DATE: _____

CITY OF CORONA ENGINEERING DEPARTMENT

APPROVED BY: *Nelson D. Nelson*
CITY ENGINEER NELSON D. NELSON, P.E. DATE: _____

RECOMMENDED: _____ DATE: _____

**OAK STREET CHANNEL
STAGE 4
KROONEN CHANNEL**
TITLE SHEET

PROJECT NO. 2-0-00070-04
DRAWING NO. 2-0437
SHEET NO. 1 OF 13

NOTICE TO CONTRACTORS

THE EXISTENCE AND LOCATION OF ANY UNDERGROUND UTILITY PIPES, CONDUITS, OR STRUCTURES SHOWN ON THESE PLANS WERE OBTAINED BY A SEARCH OF AVAILABLE RECORDS. TO THE BEST OF OUR KNOWLEDGE, THERE ARE NO EXISTING UTILITIES EXCEPT THOSE SHOWN ON THESE PLANS. THE CONTRACTOR IS REQUIRED TO TAKE 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.

CONTRACTOR AGREES THAT HE SHALL ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION ON THIS PROJECT, INCLUDING SAFETY OF ALL PERSONS OR PROPERTY; THAT THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS; THAT THE CONTRACTOR SHALL DEFEND, INDEMNIFY, AND HOLD THE CITY, THE OWNER, AND THE ENGINEER HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT.

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

ABBREVIATIONS

AB	AGGREGATE BASE	NAD	NORTH AMERICAN DATUM
ACI	AMERICAN CONCRETE INSTITUTE	NGS	NATIONAL GEODETIC SURVEY
ADD'L	ADDITIONAL	NGVD	NATIONAL GEODETIC VERTICAL DATUM
ASTM	AMERICAN SOCIETY FOR TESTING MATERIALS	NLY	NORTHERLY
⊙	AT	No./#	NUMBER
B/C	BACK OF CURB	NTS	NOT TO SCALE
BC	BEGINNING OF CURVE	OC	ON CENTER
BCR	BEGINNING OF CURB RETURN	PCC	POINT OF COMPOUND CURVATURE
BOT/BTM	BOTTOM	PCF	POUNDS PER CUBIC FEET
cfs	CUBIC FEET PER SECOND	PRC	POINT OF REVERSE CURVATURE
⊕	CENTERLINE	PSF	POUNDS PER SQUARE FEET
CLR	CLEAR	PSI	POUNDS PER SQUARE INCH
CONST	CONSTRUCT/CONSTRUCTION	PVC	POLYVINYL CHLORIDE PIPE
CONT	CONTINUOUS	Q	RATE OF FLOW (cfs)
CY	CUBIC YARDS	R	RADIUS
DIA	DIAMETER	RC	REINFORCED CONCRETE
DW	DOMESTIC WATER	RCB	REINFORCED CONCRETE BOX
DW(AB)	DOMESTIC WATER (ABANDONED)	RCFC&WCD	RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
DWG	DRAWING	RCP	REINFORCED CONCRETE PIPE
E	EAST	REINF	REINFORCED
EA	EACH	RT	RIGHT
EC	END OF CURVE	R/W	RIGHT OF WAY
EF	EACH FACE	S	SLOPE
ELEV/EL	ELEVATION	SD	STORM DRAIN
EQ	EQUATION OR EQUAL	SF	SQUARE FEET
EX	EXISTING	SIM	SIMILAR
EXP JT	EXPANSION JOINT	SLY	SOUTHERLY
FG	FINISHED GRADE	ST	STREET
fps	FEET PER SECOND	STA	STATION
G	GAS	STD	STANDARD
GA	GAUGE	STL	STEEL
GALV	GALVANIZED	TCE	TEMPORARY CONSTRUCTION EASEMENT
GB	GRADE BREAK	TF	TOP OF FOOTING
H	HEIGHT	TOT	TOTAL
HDPE	HIGH DENSITY POLYETHYLENE	TRANS	TRANSITION
HGL	HYDRAULIC GRADE LINE	TW	TOP OF WALL
HORIZ	HORIZONTAL	TYP	TYPICAL
ID	INSIDE DIMENSION	USC&GS	UNITED STATES COAST AND GEODETIC SURVEY
INT	INTERSECTION	V	VELOCITY OF FLOW
INV	INVERT	VERT	VERTICAL
IRR	IRRIGATION	W	WEST, WIDTH
JS	JUNCTION STRUCTURE		
JT	JOINT		
LAT	LATERAL		
LBS	POUNDS		
LF	LINEAL FEET		
MAX	MAXIMUM		
MFR SPECS	MANUFACTURER'S SPECIFICATIONS		
MH	MANHOLE		
MIN	MINIMUM		
N	NORTH		

UTILITY CONTACTS

STORM DRAIN, STREET LIGHT, TRAFFIC SIGNAL:	CITY OF CORONA 400 S. VICENTIA AVE. CORONA, CA. 92882 (951) 736-2266
WATER (CITY) AND SEWER:	CITY OF CORONA DEPARTMENT OF WATER & POWER 755 CORPORATION YARD WAY CORONA, CA. 92880 (951) 736-2321
WATER (TRANSMISSION):	METROPOLITAN WATER DISTRICT P.O. BOX 54153 LOS ANGELES, CA. 90054-0153 (213) 217-6000
ELECTRIC:	SOUTHERN CALIFORNIA EDISON CO. 1351 E. FRANCIS ONTARIO, CA. 91761 (800) 930-8529
GAS:	SOUTHERN CALIFORNIA GAS CO. P.O. BOX 3003 REDLANDS, CA. 92373 (800) 427-2200
CABLE:	TIME WARNER CABLE 1500 AUTO CENTER DR. ONTARIO, CA. 91761 (909) 975-3396
PHONE:	AT&T 1265 N. VAN BUREN ST., #180 ANAHEIM, CA. 92807 (714) 666-5423
WIRELESS:	NEXT G NETWORKS 2125 WRIGHT AVE., # C-9 LA VERNE, CA 91750 (909) 593-9700

CONSTRUCTION NOTES & QUANTITIES

NO.	DESCRIPTION	UNIT	QUANTITY
STORM DRAIN IMPROVEMENT NOTES			
20	PROTECT IN PLACE	-	-
21	INSTALL 24" RCP (D-LOAD PER PROFILE)	LF	30.6
22	INSTALL 84" RCP (D-LOAD PER PROFILE)	LF	967.7
23	CONSTRUCT 12' X 7' RCB PER DETAILS ON SHEET 12	CY	17.0
24	CONSTRUCT RETAINING WALL PER DETAIL ON SHEET 13	CY	100.0
25	CONSTRUCT SINGLE PIPE TO SINGLE BOX TRANSITION STRUCTURE NO.1 PER RCFC&WCD STANDARD DWG NO. TS301	CY	31.0
26	CONSTRUCT RCP TO SINGLE RCB TRANSITION PER DETAIL ON SHEET 11	CY	56.0
27	CONSTRUCT MANHOLE NO. 2 PER RCFC&WCD STD DWG NO. MH 252	EA	3.0
28	CONSTRUCT JUNCTION STRUCTURE NO. 4 PER RCFC&WCD STD DWG NO. JS 229	EA	3.0
29	CONSTRUCT DOWEL JOINTS PER DETAIL NO.2 ON SHEET 11	-	-
30	CONSTRUCT REMOVABLE DEBRIS POST PER DETAIL ON SHEET 9	EA	7.0
31	CONSTRUCT 1/4 TON LOOSE ROCK RIPRAP PER DETAIL ON SHEET 9	CY	1,626.8
32	CONSTRUCT 15' CONCRETE ACCESS ROAD PER DETAIL ON SHEET 9	CY	41.1
33	CONSTRUCT VEHICULAR TURN AROUND AREA PER RCFC&WCD STD DWG NO. M827 AND ACCESS ROAD DETAIL ON SHEET 9	CY	55.9
34	CONSTRUCT MANHOLE SAFETY LEDGE PER RCFC&WCD STD DWG NO. MH 261	EA	1
35	CONSTRUCT CONCRETE APRON PER DETAIL ON SHEET 9	CY	48.5
36	CONSTRUCT 14' WIDE DOUBLE SWING GATE PER RCFC&WCD STD DWG NO. M801	EA	1
37	INSTALL CLASS 1 FLEXIBLE POST DELINEATORS, TYPE E PER CALTRANS STD PLAN A73C	EA	5

LEGEND



ROCK RIPRAP

BASIS OF BEARING

THE BASIS OF BEARING FOR THIS SURVEY IS THE CALIFORNIA COORDINATE SYSTEM, ZONE VI, NAD83 (EPOCH 2004.00) AS DETERMINED LOCALLY BY A LINE BETWEEN CONTINUOUS OPERATING REFERENCE STATIONS (CORS) MAT2 AND NOCO BEING N59-42-51.08W AS DERIVED FROM GEODETIC VALUES PUBLISHED BY THE CALIFORNIA SPATIAL REFERENCE CENTER (CSRC) AND/OR NATIONAL GEODETIC SURVEY (NGS), RESPECTIVELY.

AS BUILT

PROJECT No. 4-396B
C.C.A. DATE 06-21-2017
R.E. NAME HASSAN MUSTAFA



BENCH MARK: 2-1/2" BRASS DISK STAMPED "C-125" SET IN THE TOP OF CURB, LOCATED 5' SOUTH OF THE B.C.R. OF THE SOUTHEASTERLY CURB RETURN OF THE INTERSECTION OF BORDER AVENUE AND MABEY CANYON ROAD
ELEVATION=1083.414 (NGVD29)

REVISIONS	ENGINEER	RCFC&WCD
AS-BUILT	TK	6/17

DESIGNED BY: TMM
DRAWN BY: EC
DATE DRAWN: 05/19/14

APPROVED BY: *[Signature]*
TIMOTHY MATU MUI
DATE: 05/19/14

RBF CONSULTING
14726 ALTON PARKWAY
IRVINE, CALIFORNIA 92614-0027
949.472.2888 • FAX 949.472.8871 • www.rbf.com

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

RECOMMENDED FOR APPROVAL BY: _____ DATE: _____

APPROVED BY: _____ DATE: _____

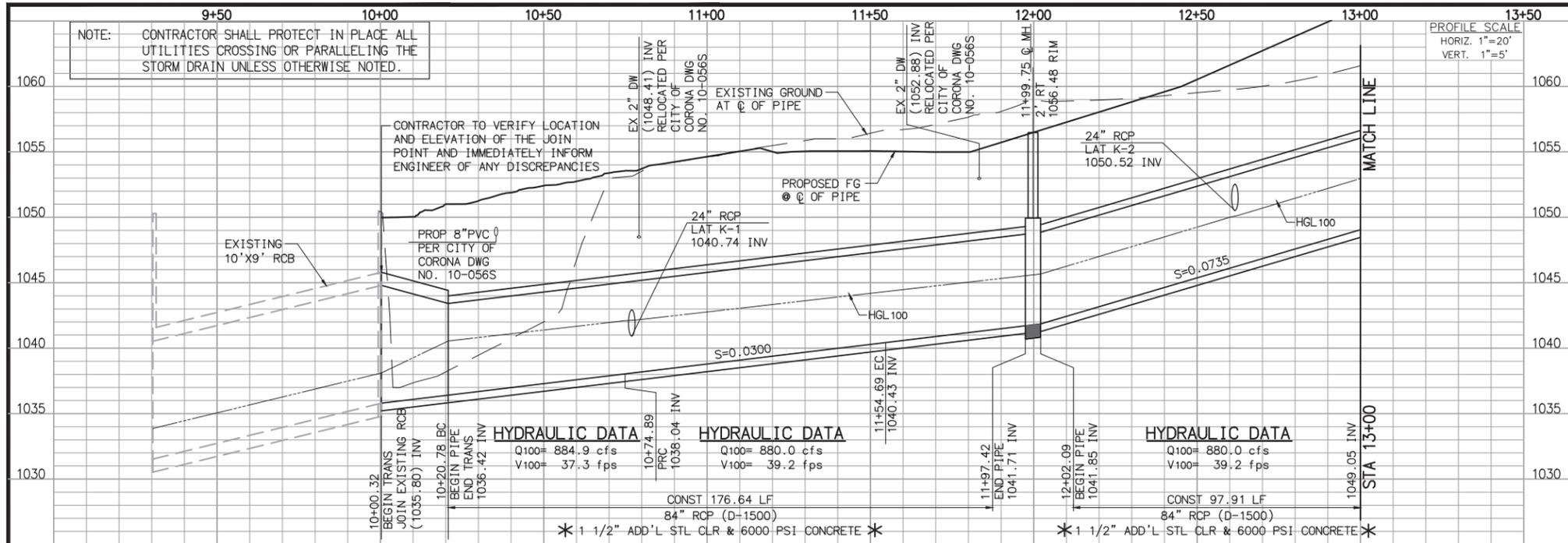
CITY OF CORONA ENGINEERING DEPARTMENT

APPROVED BY: *[Signature]*
NELSON D. NELSON, P.E.
DATE: _____

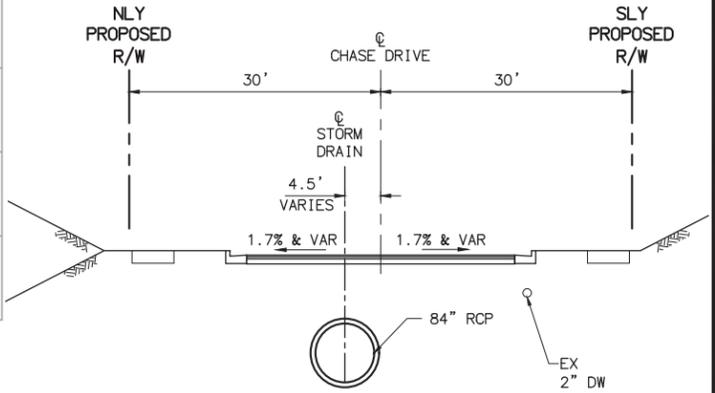
**OAK STREET CHANNEL
STAGE 4
KROONEN CHANNEL**
CONSTRUCTION NOTES,
& QUANTITIES

PROJECT NO.	2-0-00070-04
DRAWING NO.	2-0437
SHEET NO.	2 OF 13

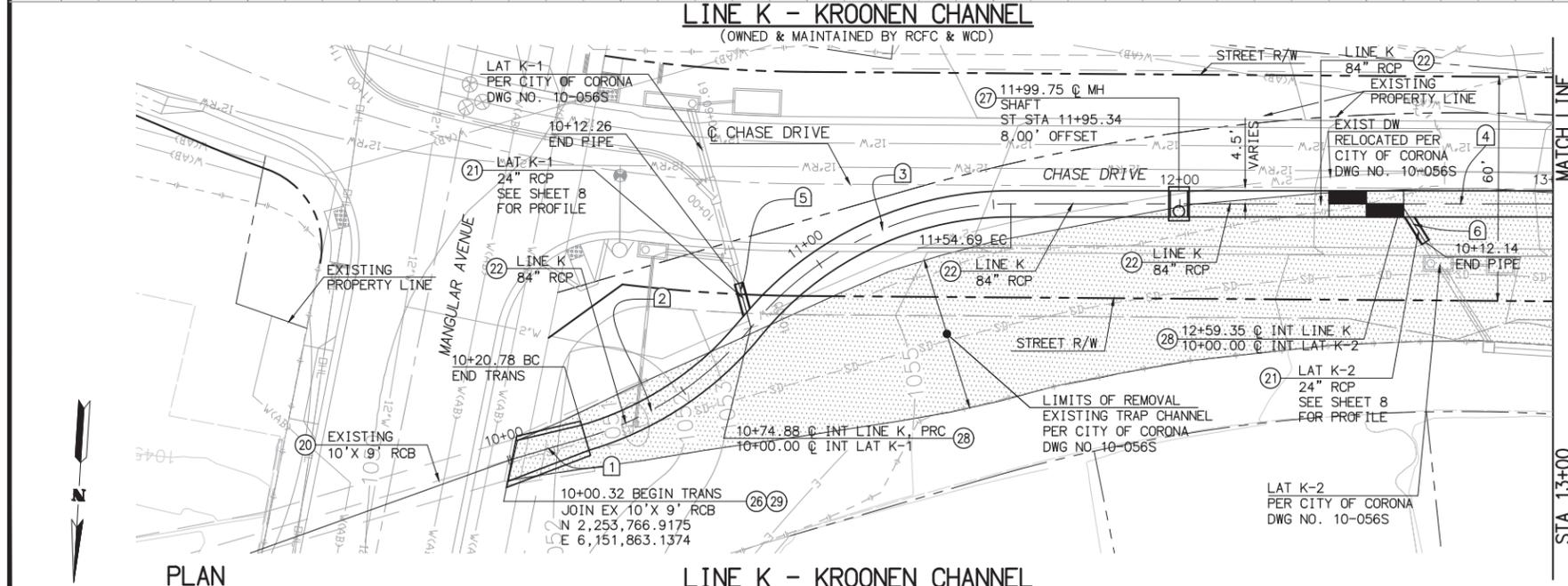
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- CONSTRUCTION NOTES**
- (20) PROTECT IN PLACE
 - (21) INSTALL 24" RCP (D-LOAD PER PROFILE)
 - (22) INSTALL 84" RCP (D-LOAD PER PROFILE)
 - (26) CONSTRUCT RCP TO SINGLE RCB TRANSITION PER DETAIL ON SHEET 11
 - (27) CONSTRUCT MANHOLE NO. 2 PER RCFC&WCD STD DWG NO. MH252
 - (28) CONSTRUCT JUNCTION STRUCTURE NO. 4 PER RCFC&WCD STD DWG NO. JS229
 - (29) CONSTRUCT DOWEL JOINTS PER DETAIL NO. 2 ON SHEET 11



SECTION AT STA. 12+50
TYPICAL FROM STA 11+54.69 TO STA 13+64.44



LEGEND

LINE/CURVE DATA TABLE

NO	BEARING/Delta	RADIUS	LENGTH	TANGENT
(TOTAL) 1	N 70°20'10" E	--	20.46'	--
2	34°26'37"	90.00'	54.10'	27.90'
3	50°48'15"	90.00'	79.80'	42.74'
(TOTAL) 4	N 86°41'48" E	--	209.75'	--
5	N 18°40'36" W	--	12.26'	--
6	N 35°41'36" W	--	12.14'	--

NOTE:
CONTRACTOR SHALL CONFIRM RELOCATION OF WATER LINE PRIOR TO EXCAVATION.

AS BUILT
PROJECT No. 4-396B
C.C.A. DATE 06-21-2017
R.E. NAME HASSAN MUSTAFA

* SEE GENERAL NOTE 24



BENCH MARK: 2-1/2" BRASS DISK STAMPED "C-125" SET IN THE TOP OF CURB, LOCATED 5' SOUTH OF THE B.C.R. OF THE SOUTHEASTERLY CURB RETURN OF THE INTERSECTION OF BORDER AVENUE AND MABEY CANYON ROAD
ELEVATION=1083.414 (NGVD29)

REVISIONS	ENGINEER	RCFC&WCD
AS-BUILT	TK	6/17

DESIGNED BY: TMM
DRAWN BY: EC
DATE DRAWN: 05/19/14
APPROVED BY: RBF CONSULTING
TIMOTHY WATU MUI
DATE: 05/19/14



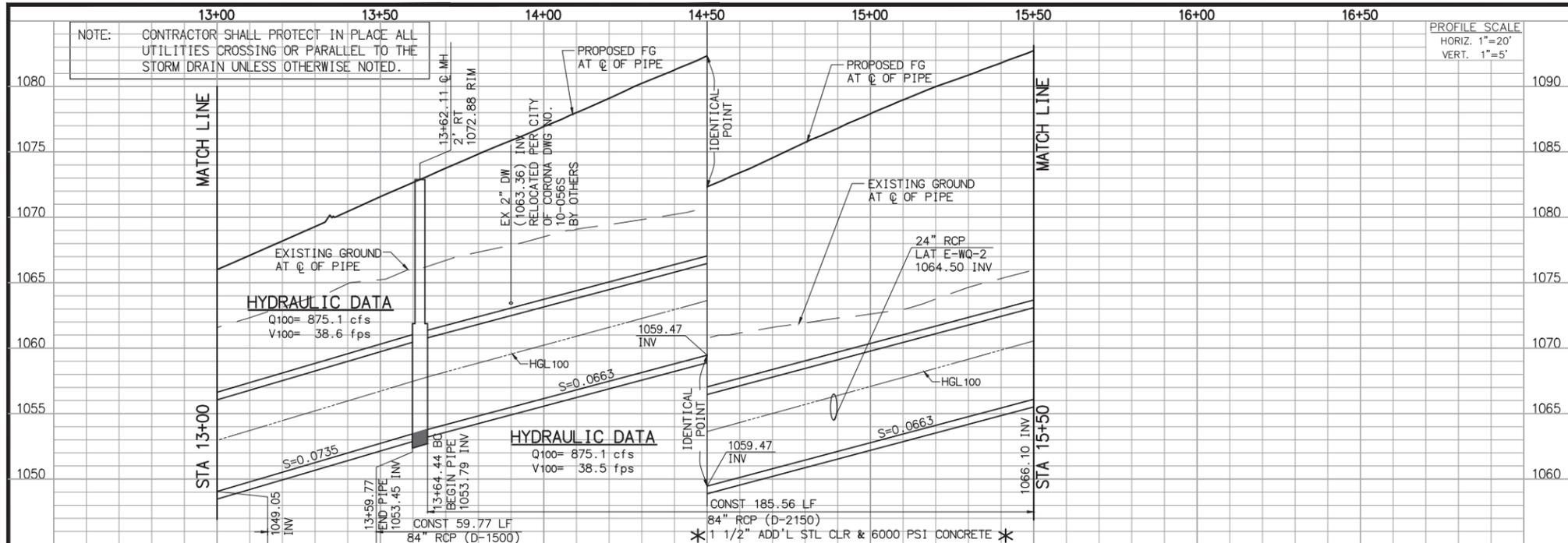
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
RECOMMENDED FOR APPROVAL BY: [Signature]
DATE: [Blank]

CITY OF CORONA ENGINEERING DEPARTMENT
APPROVED BY: [Signature]
CITY ENGINEER NELSON D. NELSON, P.E.
DATE: [Blank]

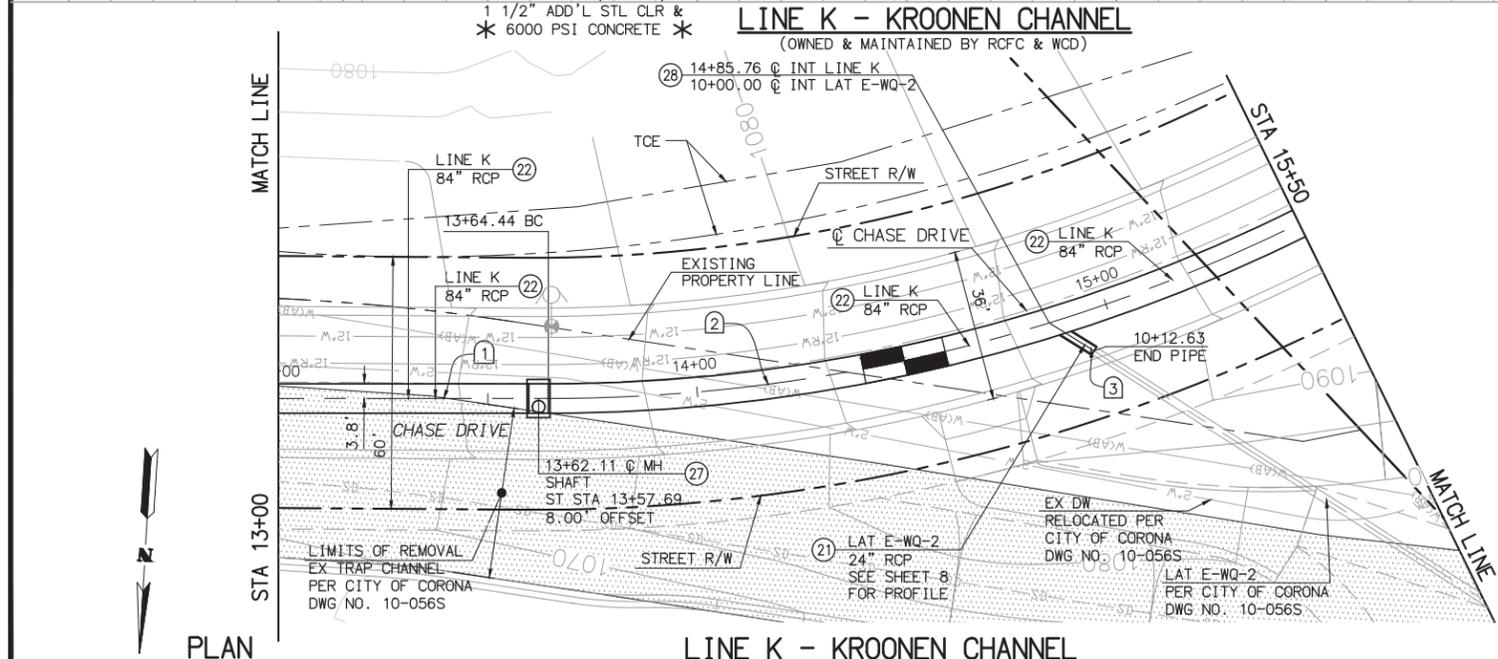
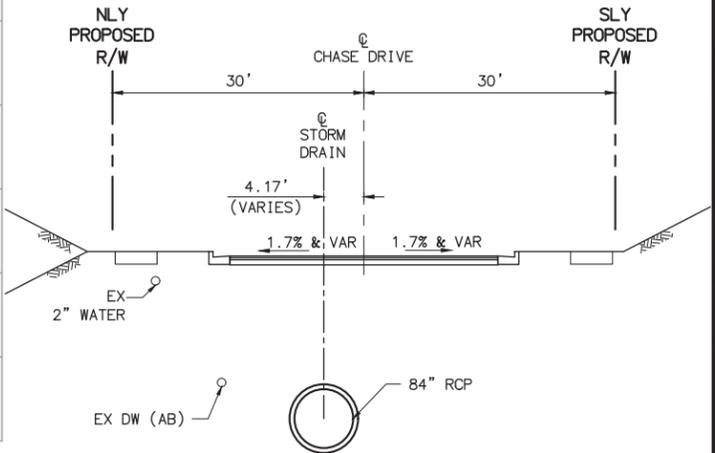
**OAK STREET CHANNEL
STAGE 4
KROONEN CHANNEL**
STORM DRAIN LINE K
PLAN & PROFILE
STA 10+00.32 TO STA 13+00

PROJECT NO. 2-0-00070-04
DRAWING NO. 2-0437
SHEET NO. 3 OF 13

H:\pdrcto\10104629-002\CADD\AS-BUILT\1521_County_Kroonen\4629-SD-003.dwg 10/27/17 10:42am dfr.in.dorado



- CONSTRUCTION NOTES**
- (21) INSTALL 24" RCP (D-LOAD PER PROFILE)
 - (22) INSTALL 84" RCP (D-LOAD PER PROFILE)
 - (27) CONSTRUCT MANHOLE NO. 2 PER RCFC&WCD STD DWG NO. MH252
 - (28) CONSTRUCT JUNCTION STRUCTURE NO. 4 PER RCFC&WCD STD DWG NO. JS229



LINE/CURVE DATA TABLE

NO	BEARING/DELTA	RADIUS	LENGTH	TANGENT
1	N 86°41'48" E	--	209.75'	--
2	S 33°46'02" E	406.00'	239.28'	123.23'
3	N 61°29'16" W	--	12.63'	--



BENCH MARK: 2-1/2" BRASS DISK STAMPED "C-125" SET IN THE TOP OF CURB, LOCATED 5' SOUTH OF THE B.C.R. OF THE SOUTHEASTERLY CURB RETURN OF THE INTERSECTION OF BORDER AVENUE AND MABEY CANYON ROAD
 ELEVATION=1083.414 (NGVD29)

REVISIONS	ENGINEER	RCFC&WCD	DESIGNED BY:	APPROVED BY:
AS-BUILT	TK	6/17	TMM	RBF CONSULTING
			DATE DRAWN: 05/19/14	DATE: 05/19/14

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

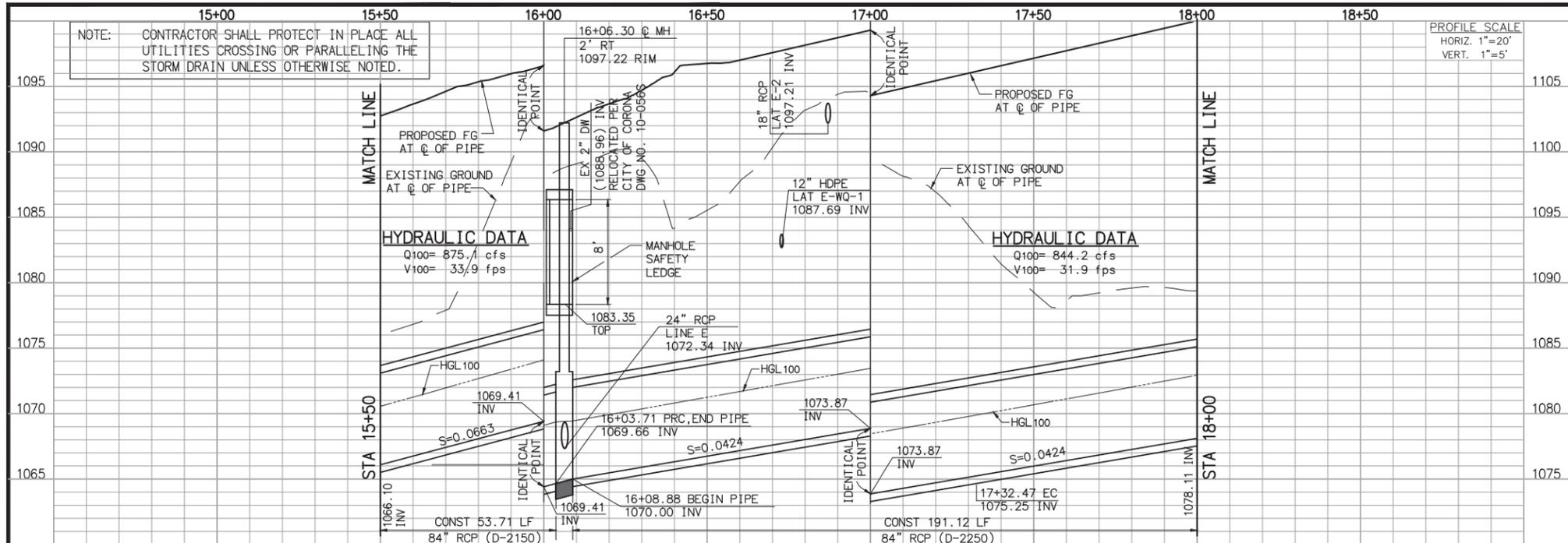
CITY OF CORONA ENGINEERING DEPARTMENT

PROJECT NO. 4-396B
 C.C.A. DATE 06-21-2017
 R.E. NAME HASSAN MUSTAFA

OAK STREET CHANNEL
 STAGE 4
 KROONEN CHANNEL
 STORM DRAIN LINE K
 PLAN & PROFILE
 STA 13+00 TO STA 15+50

REVISIONS	DESCRIPTION	APPR.	DATE	APPR.	DATE

PROJECT NO.	2-0-00070-04
DRAWING NO.	2-0437
SHEET NO.	4 OF 13



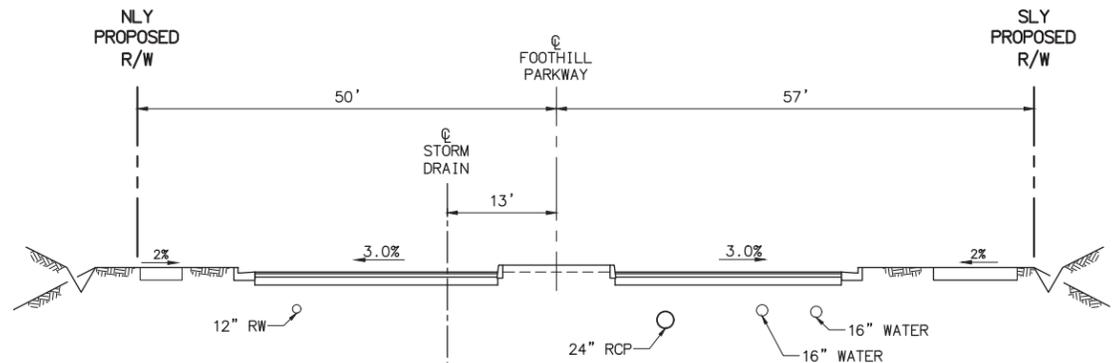
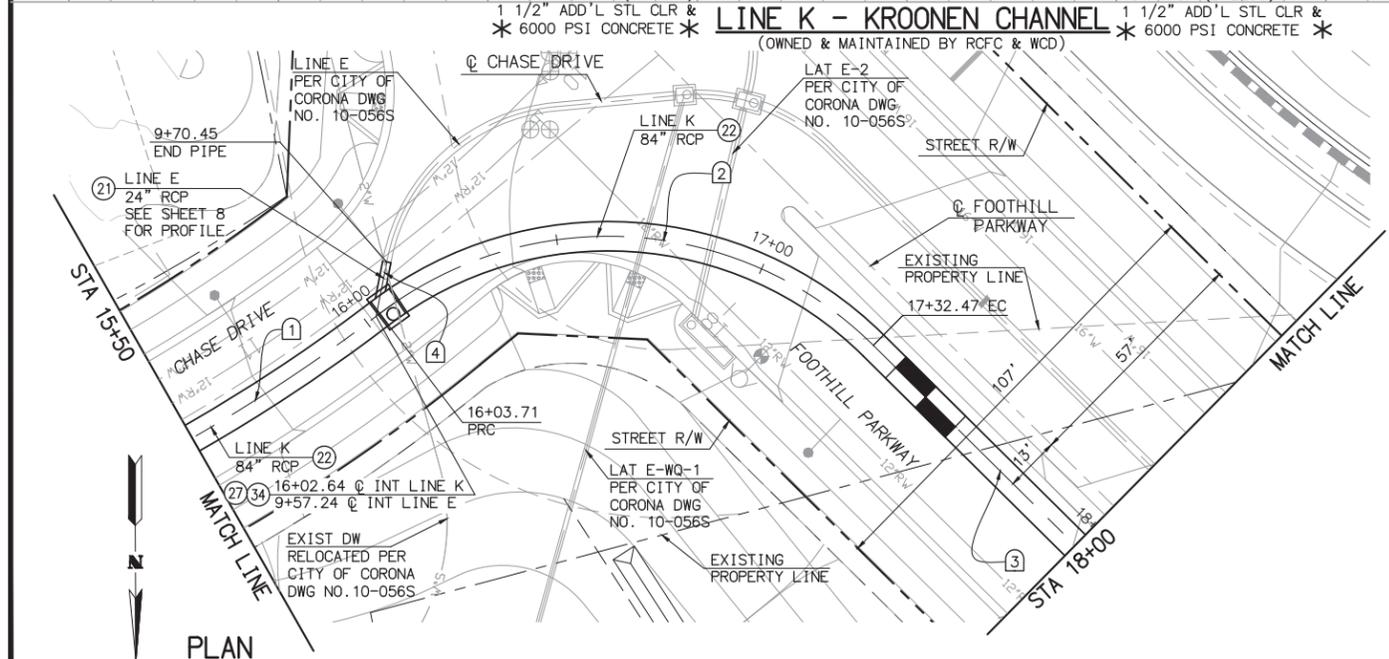
CONSTRUCTION NOTES

- ① INSTALL 24" RCP (D-LOAD PER PROFILE)
- ② INSTALL 84" RCP (D-LOAD PER PROFILE)
- ③ CONSTRUCT MANHOLE NO. 2 PER RCFC&WCD STD DWG NO. MH252
- ④ CONSTRUCT MANHOLE SAFETY LEDGE PER RCFC&WCD STD DWG NO. MH 261

LEGEND



NOTE:
CONTRACTOR SHALL CONFIRM RELOCATION OF WATER LINE PRIOR TO EXCAVATION.



LINE/CURVE DATA TABLE

NO	BEARING/DELTA	RADIUS	LENGTH	TANGENT
(TOTAL) 1	33°46'02"	406.00'	239.28'	123.23'
2	81°58'03"	90.00'	128.76'	78.19'
(TOTAL) 3	N 45°06'11" W	--	101.99'	--
4	N11°22'00.0"E	--	13.21'	--

AS BUILT
PROJECT No. 4-396B
C.C.A. DATE 06-21-2017
R.E. NAME HASSAN MUSTAFA

* SEE GENERAL NOTE 24



BENCH MARK: 2-1/2" BRASS DISK STAMPED "C-125" SET IN THE TOP OF CURB, LOCATED 5' SOUTH OF THE B.C.R. OF THE SOUTHEASTERLY CURB RETURN OF THE INTERSECTION OF BORDER AVENUE AND MABEY CANYON ROAD
ELEVATION=1083.414 (NGVD29)

REVISIONS	ENGINEER	RCFC&WCD	DESIGNED BY:	APPROVED BY:
AS-BUILT	TK	6/17	TMM	RBF CONSULTING
			DATE DRAWN: 05/19/14	DATE: 05/19/14

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

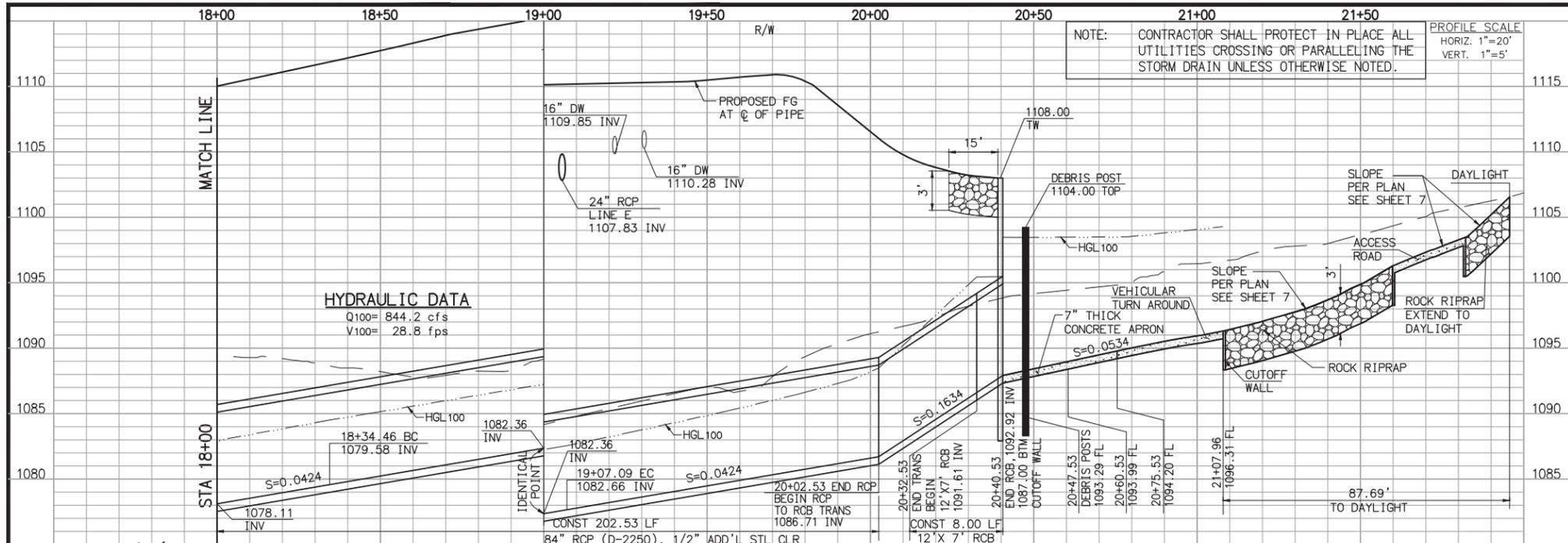
CITY OF CORONA ENGINEERING DEPARTMENT

APPROVED BY: Nelson D. Nelson, P.E.

RECOMMENDED FOR APPROVAL BY: [Signature]

PROJECT NO. 2-0-00070-04
DRAWING NO. 2-0437
SHEET NO. 5 OF 13

OAK STREET CHANNEL
STAGE 4
KROONEN CHANNEL
STORM DRAIN LINE K
PLAN & PROFILE
STA 15+50 TO STA 18+00

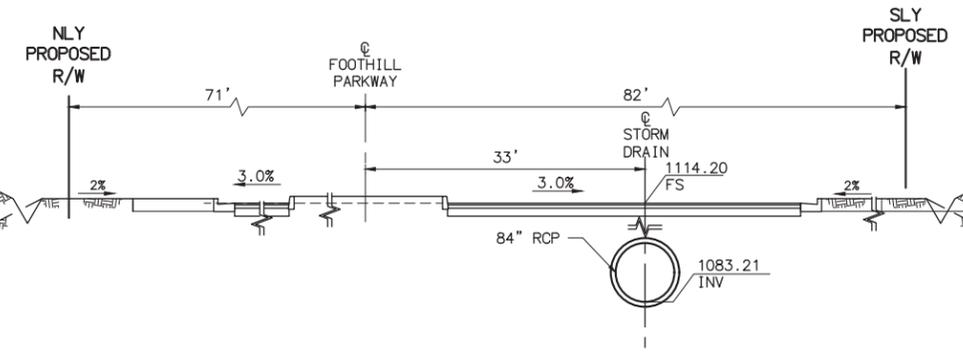
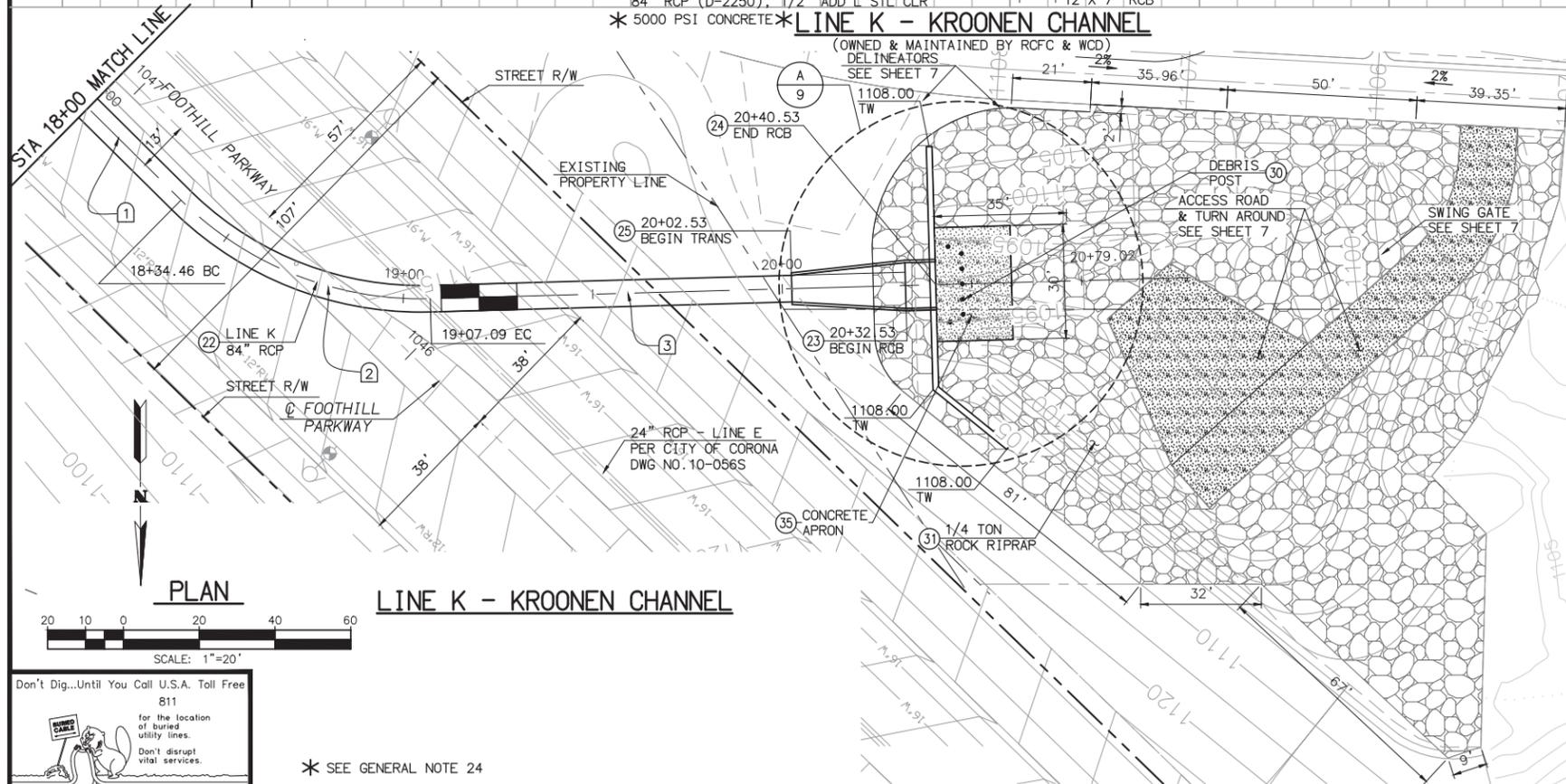


- CONSTRUCTION NOTES**
- 22 INSTALL 84" RCP (D-LOAD PER PROFILE)
 - 23 CONSTRUCT 12'X7' RCB PER DETAILS ON SHEET 12
 - 24 CONSTRUCT RETAINING WALL PER DETAIL ON SHEET 13
 - 25 CONSTRUCT SINGLE PIPE TO SINGLE BOX TRANSITION STRUCTURE NO. 1 PER RCFC&WCD STD DWG NO. TS301
 - 30 CONSTRUCT REMOVABLE DEBRIS POST PER DETAIL ON SHEET 9
 - 31 CONSTRUCT 1/4 TON LOOSE ROCK RIPRAP PER DETAIL ON SHEET 9
 - 35 CONSTRUCT CONCRETE APRON PER DETAIL ON SHEET 9

AS BUILT
 PROJECT No. 4-396B
 C.C.A. DATE 06-21-2017
 R.E. NAME HASSAN MUSTAFA

LINE/CURVE DATA TABLE

NO	BEARING/DELTA	RADIUS	LENGTH	TANGENT
1	N 45°06'11" W	--	101.99'	--
2	46°14'23"	90.00'	72.63'	38.43'
3	N 88°39'27" E	--	133.44'	--



BENCH MARK: 2-1/2" BRASS DISK STAMPED "C-125" SET IN THE TOP OF CURB, LOCATED 5' SOUTH OF THE B.C.R. OF THE SOUTHEASTERLY CURB RETURN OF THE INTERSECTION OF BORDER AVENUE AND MABEY CANYON ROAD
 ELEVATION=1083.414 (NGVD29)

REF.	DESCRIPTION	APPR.	DATE	APPR.	DATE
	AS-BUILT				

DESIGNED BY: TMM
 DRAWN BY: EC
 DATE DRAWN: 05/19/14

APPROVED BY: **RBF CONSULTING**
 TIMOTHY MATU MUI
 DATE: 05/19/14

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

RECOMMENDED FOR APPROVAL BY: _____ DATE: _____

APPROVED BY: _____ DATE: _____

CITY OF CORONA ENGINEERING DEPARTMENT

APPROVED BY: **Nelson D. Nelson, P.E.**
 CITY ENGINEER
 DATE: _____

OAK STREET CHANNEL STAGE 4 KROONEN CHANNEL STORM DRAIN LINE K PLAN & PROFILE
 STA 18+00 TO STA 21+07.80

PROJECT NO. 2-0-00070-04
 DRAWING NO. 2-0437
 SHEET NO. 6 OF 13

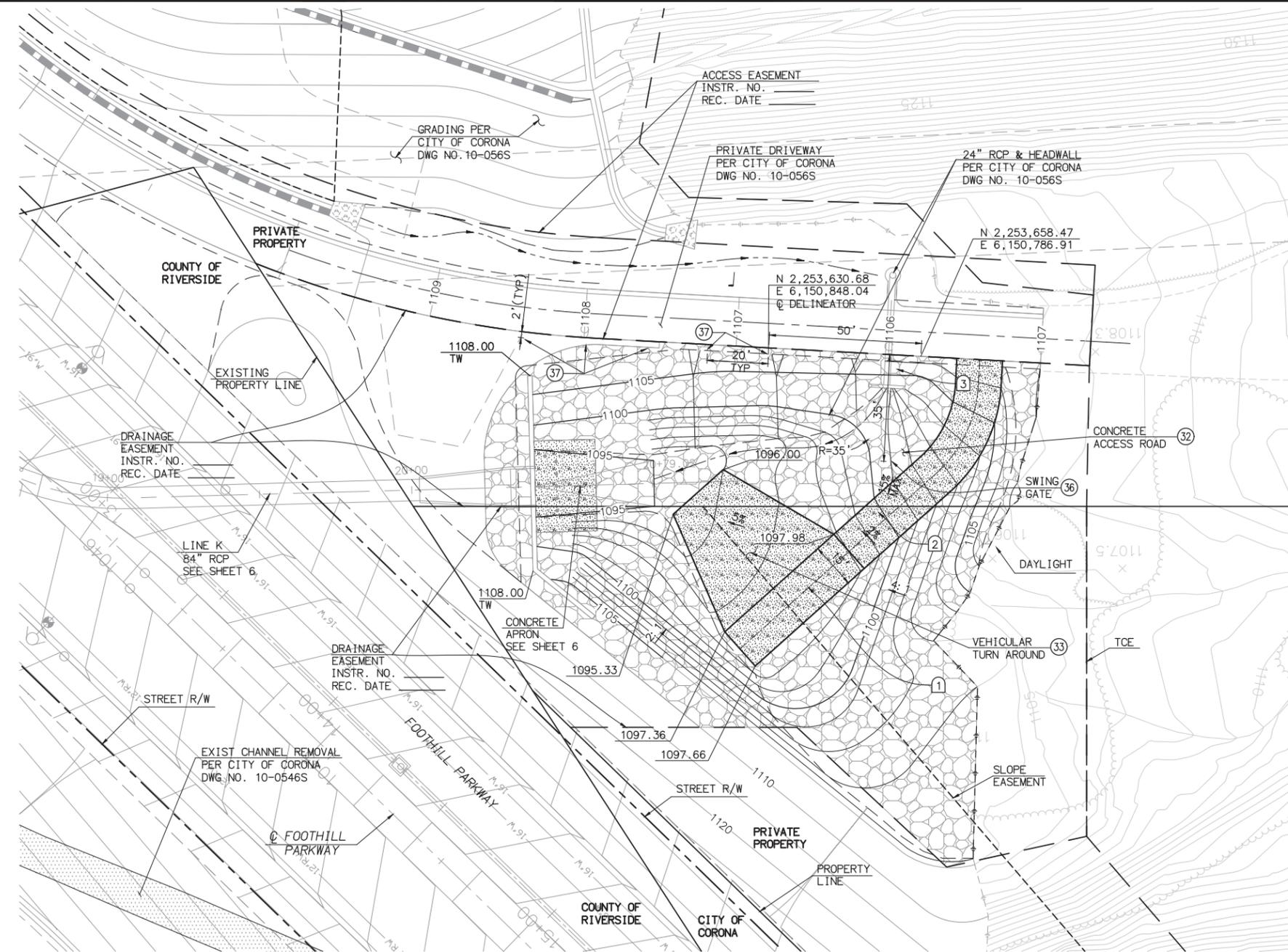
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CONSTRUCTION NOTES

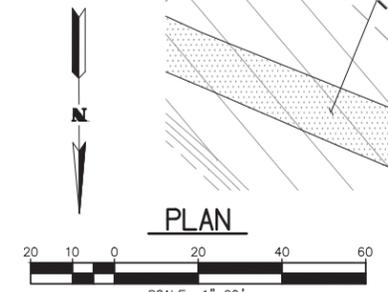
- 32 CONSTRUCT 15' CONCRETE ACCESS ROAD PER DETAIL ON SHEET 9
- 33 CONSTRUCT VEHICULAR TURN AROUND AREA PER RCFC&WCD STD DWG NO. M827 AND ACCESS ROAD DETAIL ON SHEET 9
- 36 CONSTRUCT 14' WIDE DOUBLE SWING GATE PER RCFC&WCD STD DWG NO. M801
- 37 INSTALL CLASS 1 FLEXIBLE POST DELINEATORS, TYPE E PER CALTRANS STD PLAN A73C

LINE/CURVE DATA TABLE

NO	BEARING/DELTA	RADIUS	LENGTH	TANGENT
1	S 48°29'58" W	--	48.02'	--
2	45°04'56"	42.50'	33.44'	17.64'
3	S 03°25'02" W	--	35.00'	--



INLET ACCESS ROAD



PLAN

NOTE:
GRADING SHOWN FOR CLARITY ONLY.
SEE GRADING PLANS PER CITY OF CORONA
DWG NO. 10-056S FOR COMPLETE PROJECT
GRADING.

AS BUILT
PROJECT No. 4-396B
C.C.A. DATE 06-21-2017
R.E. NAME HASSAN MUSTAFA



BENCH MARK: 2-1/2" BRASS DISK STAMPED "C-125" SET IN THE TOP OF CURB, LOCATED 5' SOUTH OF THE B.C.R. OF THE SOUTHEASTERLY CURB RETURN OF THE INTERSECTION OF BORDER AVENUE AND MABEY CANYON ROAD
ELEVATION=1083.414 (NGVD29)

REF.	DESCRIPTION	APPR.	DATE	APPR.	DATE
	AS-BUILT				

DESIGNED BY: TMM
DRAWN BY: EC
DATE DRAWN: 05/19/14
APPROVED BY: RBF CONSULTING
TIMOTHY MATU MUI
DATE: 05/19/14

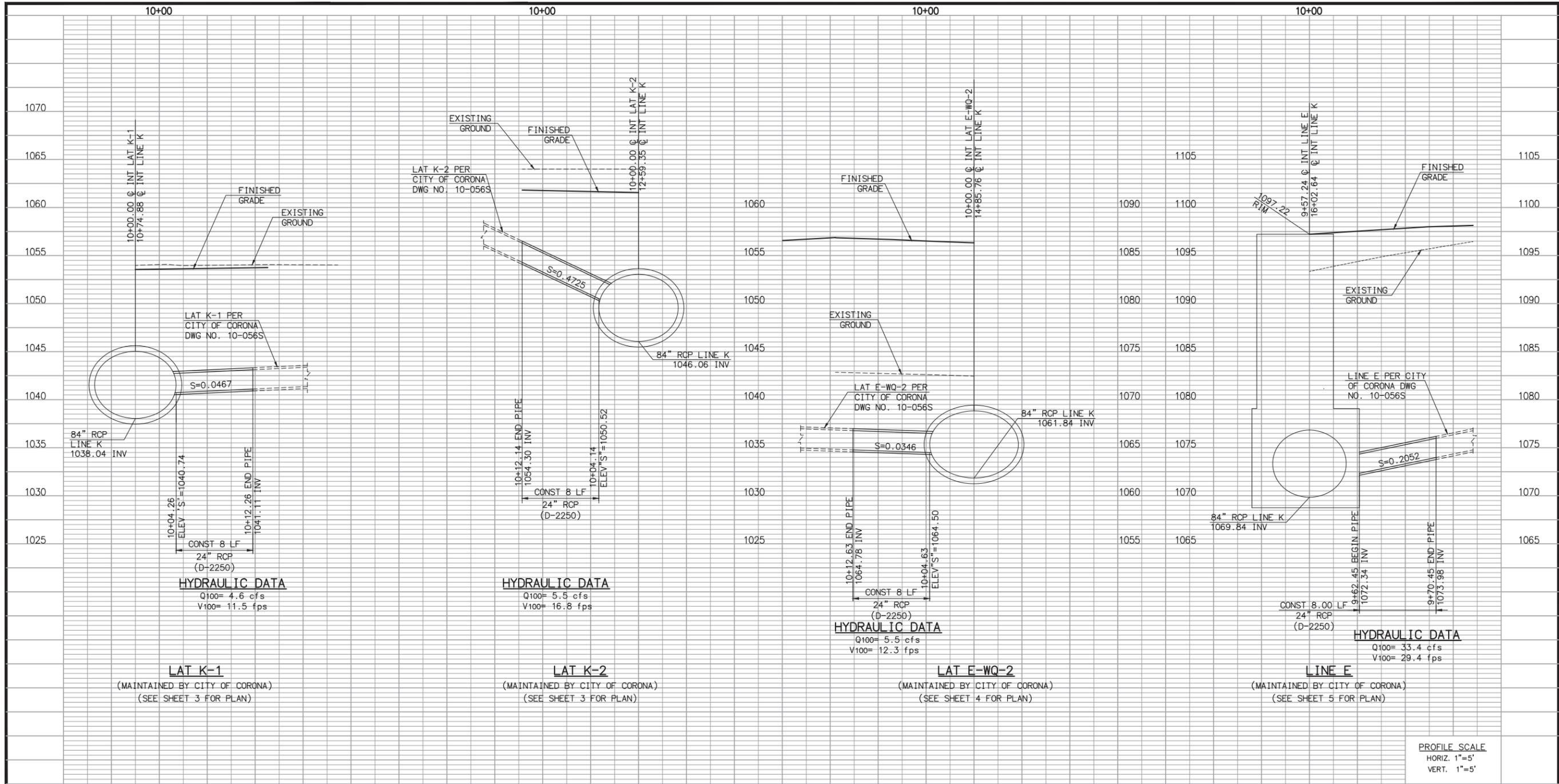


RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
RECOMMENDED FOR APPROVAL BY: _____
DATE: _____
APPROVED BY: _____
DATE: _____

CITY OF CORONA ENGINEERING DEPARTMENT
APPROVED BY: Nelson D. Nelson
CITY ENGINEER NELSON D. NELSON, P.E.
DATE: _____
RECOMMENDED: _____
DATE: _____

**OAK STREET CHANNEL
STAGE 4
KROONEN CHANNEL**
INLET ACCESS ROAD PLAN

PROJECT NO. 2-0-00070-04
DRAWING NO. 2-0437
SHEET NO. 7 OF 13



PROFILE SCALE
 HORIZ. 1"=5'
 VERT. 1"=5'



NOTE: CONTRACTOR SHALL PROTECT IN PLACE ALL UTILITIES CROSSING OR PARALLEL TO THE STORM DRAIN UNLESS OTHERWISE NOTED.

AS BUILT
 PROJECT No. 4-396B
 C.C.A. DATE 06-21-2017
 R.E. NAME HASSAN MUSTAFA

BENCH MARK: 2-1/2" BRASS DISK STAMPED "C-125" SET IN THE TOP OF CURB, LOCATED 5' SOUTH OF THE B.C.R. OF THE SOUTHEASTERLY CURB RETURN OF THE INTERSECTION OF BORDER AVENUE AND MABEY CANYON ROAD
 ELEVATION=1083.414 (NGVD29)

REF.	DESCRIPTION	APPR.	DATE	APPR.	DATE
	AS-BUILT				

DESIGNED BY: TMM
 DRAWN BY: EC
 DATE DRAWN: 05/19/14

APPROVED BY: **RBF CONSULTING**
 TIMOTHY MATU MUI
 DATE: 05/19/14



RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

RECOMMENDED FOR APPROVAL BY: _____ DATE: _____

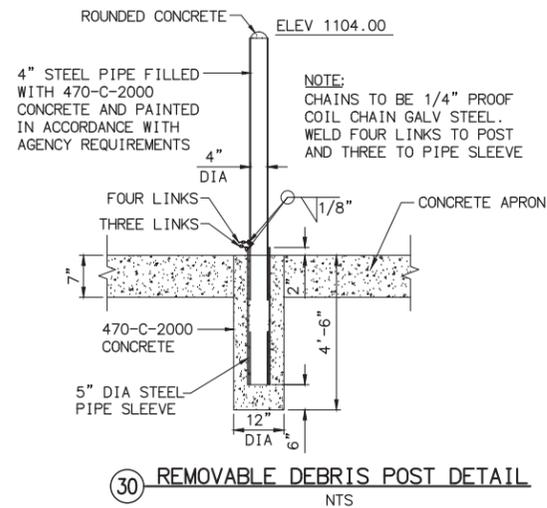
APPROVED BY: _____ DATE: _____

CITY OF CORONA ENGINEERING DEPARTMENT

APPROVED BY: *Nelson D. Nelson*
 CITY ENGINEER NELSON D. NELSON, P.E.
 DATE: _____

**OAK STREET CHANNEL
 STAGE 4
 KROONEN CHANNEL**
 STORM DRAIN LATERALS
 LAT K-1, LAT K-2, LAT WQ-2
 LINE E

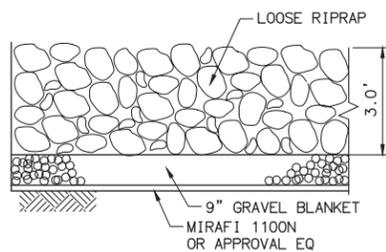
PROJECT NO. 2-0-00070-04
 DRAWING NO. 2-0437
 SHEET NO. 8 OF 13



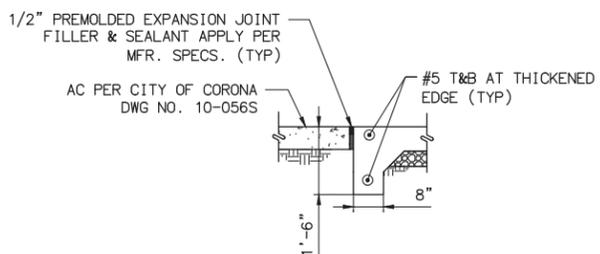
30 REMOVABLE DEBRIS POST DETAIL
NTS

1/4 TON ROCK GRADATION TABLE

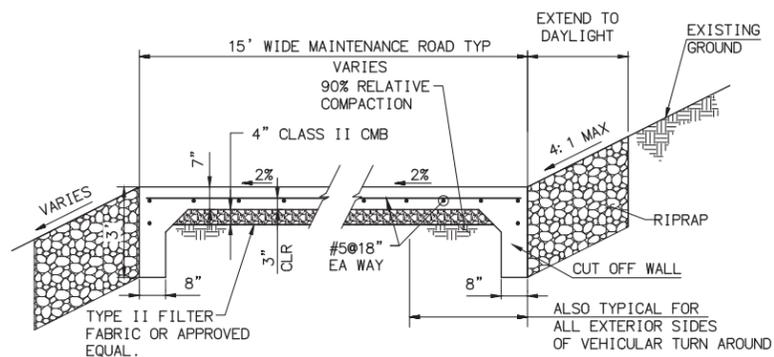
WEIGHT (LBS)	PERCENT LARGER THAN
1800	0
700	0 - 10
500	50 - 100
200	85 - 100



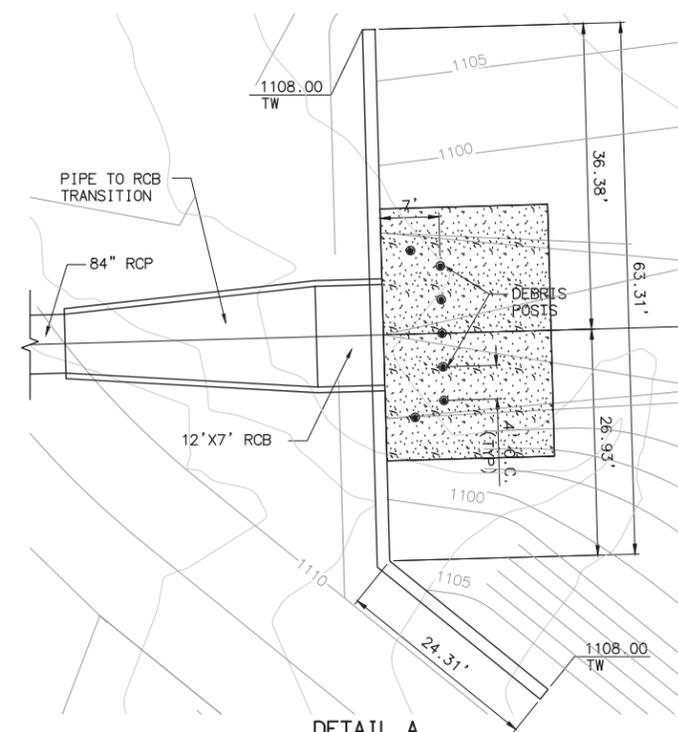
31 1/4 TON ROCK RIPRAP
TYPICAL SECTION
NTS



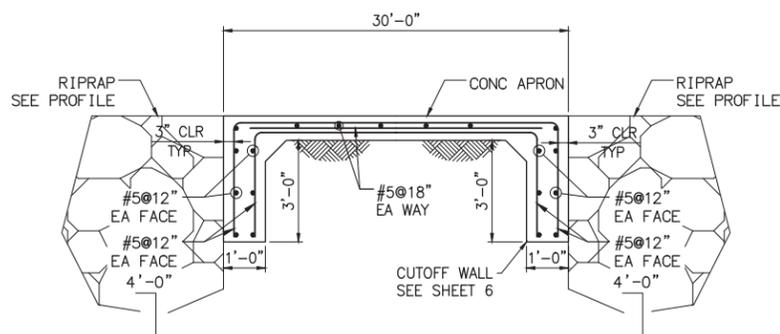
CONCRETE PAVEMENT JOINING AC PAVEMENT DETAIL
N.T.S.



33 32 15' CONCRETE ACCESS ROAD AND TURN AROUND
NTS



DETAIL A
NTS
SEE SHEET 6



35 15' CONCRETE APRON CUTOFF WALL
NTS

AS BUILT
PROJECT No. 4-396B
C.C.A. DATE 06-21-2017
R.E. NAME HASSAN MUSTAFA



BENCH MARK: 2-1/2" BRASS DISK STAMPED "C-125" SET IN THE TOP OF CURB, LOCATED 5' SOUTH OF THE B.C.R. OF THE SOUTHEASTERLY CURB RETURN OF THE INTERSECTION OF BORDER AVENUE AND MABEY CANYON ROAD
ELEVATION=1083.414 (NGVD29)

REVISIONS	ENGINEER	RCFC&WCD	DESIGNED BY:	APPROVED BY:
AS-BUILT	TK	6/17	TMM	RBF
			EC	
			DATE DRAWN:	DATE:
			05/19/14	05/19/14
REF.	DESCRIPTION	APPR.	DATE	APPR.

DESIGNED BY: TMM
DRAWN BY: EC
DATE DRAWN: 05/19/14

APPROVED BY: **RBF CONSULTING**
TIMOTHY MATU MUI
DATE: 05/19/14

14728 ALTON PARKWAY
IRVINE, CALIFORNIA 92614-0027
949.472.2888 • FAX 949.472.8971 • WWW.RBF.COM

REGISTERED PROFESSIONAL ENGINEER
No. 72995
Exp. 12/31/14
CIVIL
STATE OF CALIFORNIA

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

RECOMMENDED FOR APPROVAL BY: _____ DATE: _____

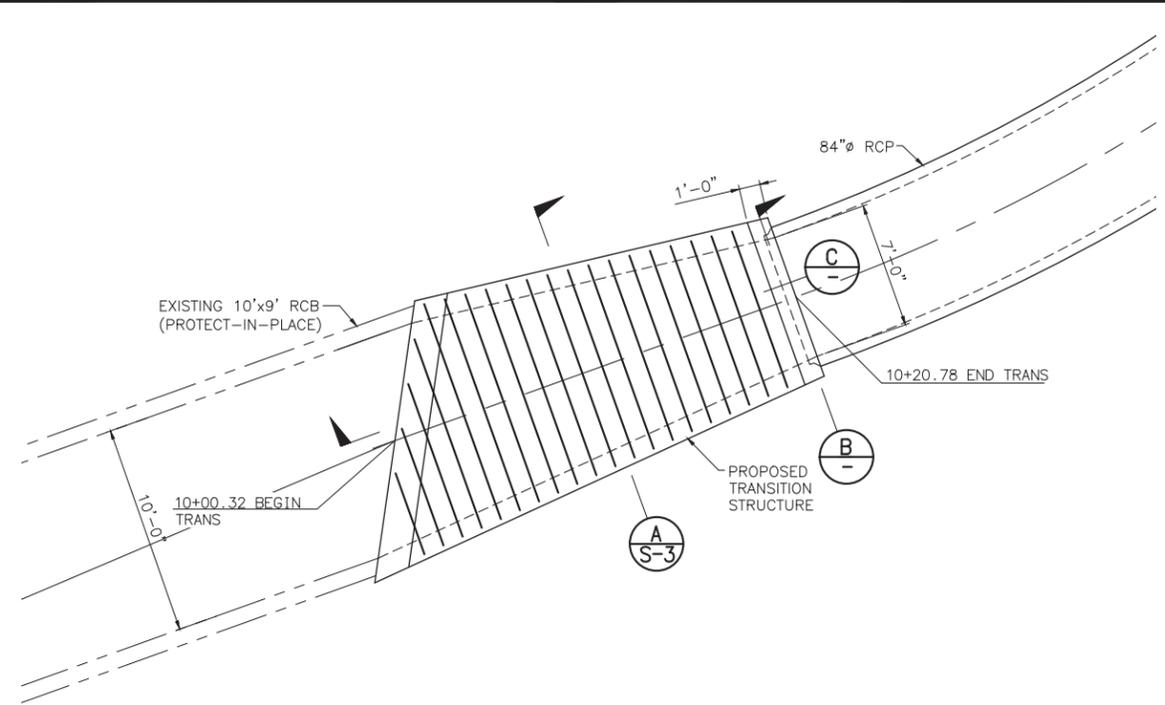
APPROVED BY: _____ DATE: _____

CITY OF CORONA ENGINEERING DEPARTMENT

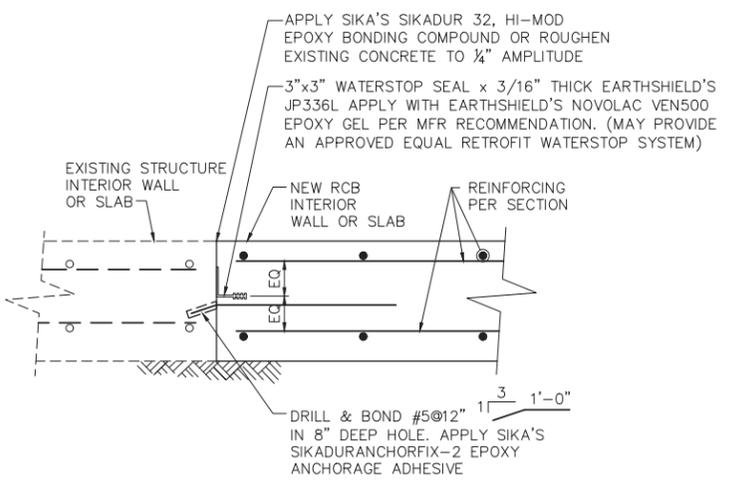
APPROVED BY: *Nelson D. Nelson*
CITY ENGINEER NELSON D. NELSON, P.E.
DATE: _____

**OAK STREET CHANNEL
STAGE 4
KROONEN CHANNEL**
STORM DRAIN LINE K
MISCELLANEOUS DETAILS

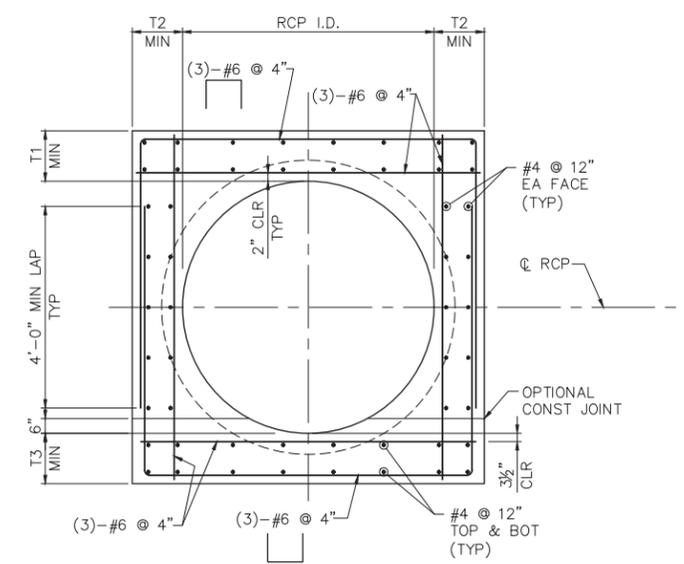
PROJECT NO.	2-0-00070-04
DRAWING NO.	2-0437
SHEET NO.	9 OF 13



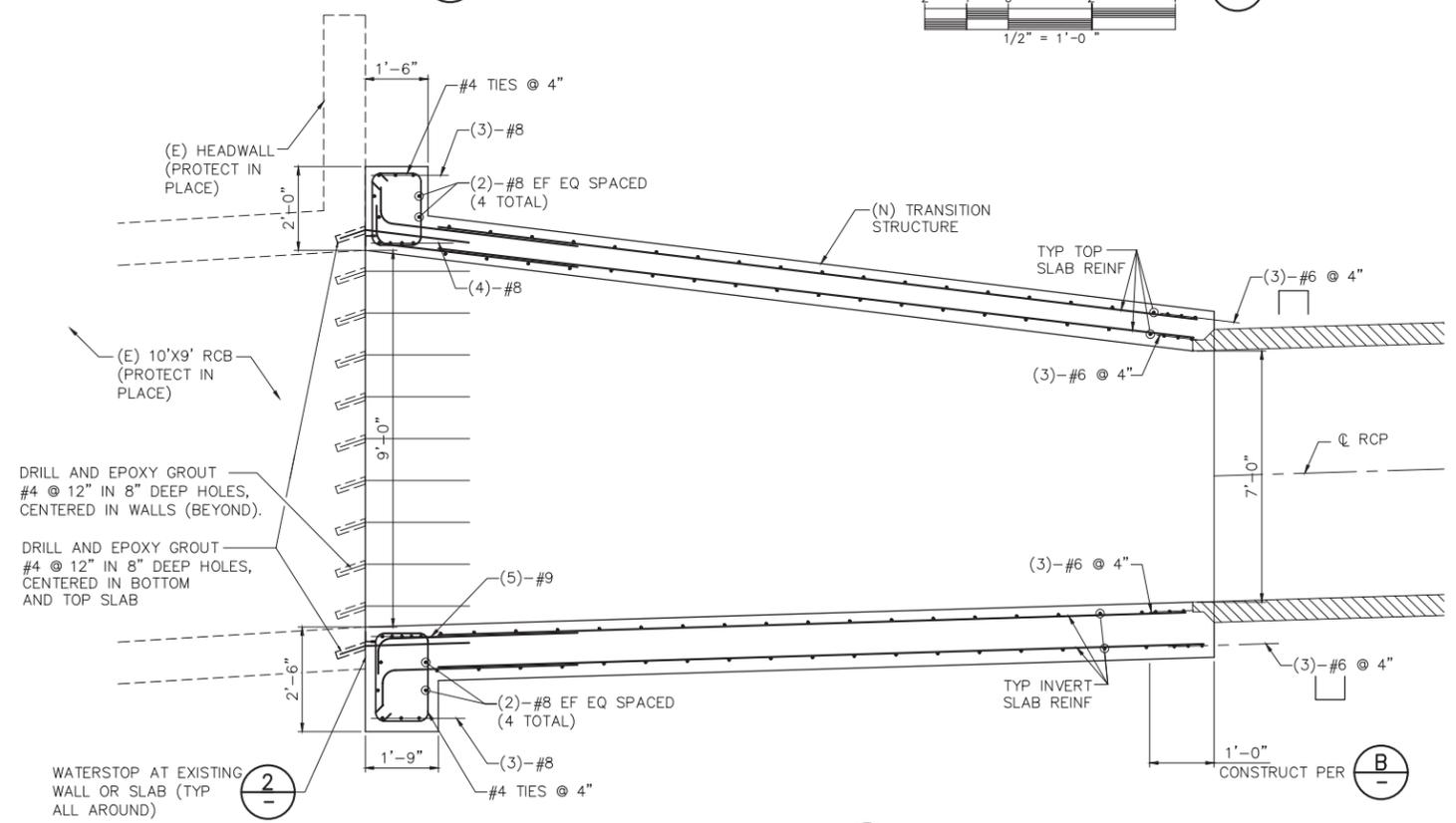
RCB TO RCP TRANSITION STRUCTURE PLAN 1
 1/4" = 1'-0"



DOWEL JOINT WITH STRIP WATERSTOP AT EXISTING WALL OR SLAB 2
 NTS



RCP PIPE JUNCTION SECTION B
 1/2" = 1'-0"



RCB TO RCP TRANSITION STRUCTURE DETAIL C
 1/2" = 1'-0"



AS BUILT
 PROJECT No. 4-396B
 C.C.A. DATE 06-21-2017
 R.E. NAME HASSAN MUSTAFA

BENCH MARK: 2-1/2" BRASS DISK STAMPED "C-125" SET IN THE TOP OF CURB, LOCATED 5' SOUTH OF THE B.C.R. OF THE SOUTHEASTERLY CURB RETURN OF THE INTERSECTION OF BORDER AVENUE AND MABEY CANYON ROAD
 ELEVATION=1083.414 (NGVD29)

REVISIONS	ENGINEER	RCFC&WCD	DESIGNED BY:	APPROVED BY:
AS-BUILT	TK	6/17	CMC	RBF
			CMC	CONSULTING
			DATE DRAWN: 05/19/14	DATE: 05/19/14
REF.	DESCRIPTION	APPR. DATE	APPR. DATE	DATE

14726 ALTON PARKWAY
 IRVINE, CALIFORNIA 92614-0027
 949.472.2888 • FAX 949.472.8871 • WWW.RBF.COM
 No. 74020 Exp. 06/30/15
 CIVIL
 STATE OF CALIFORNIA

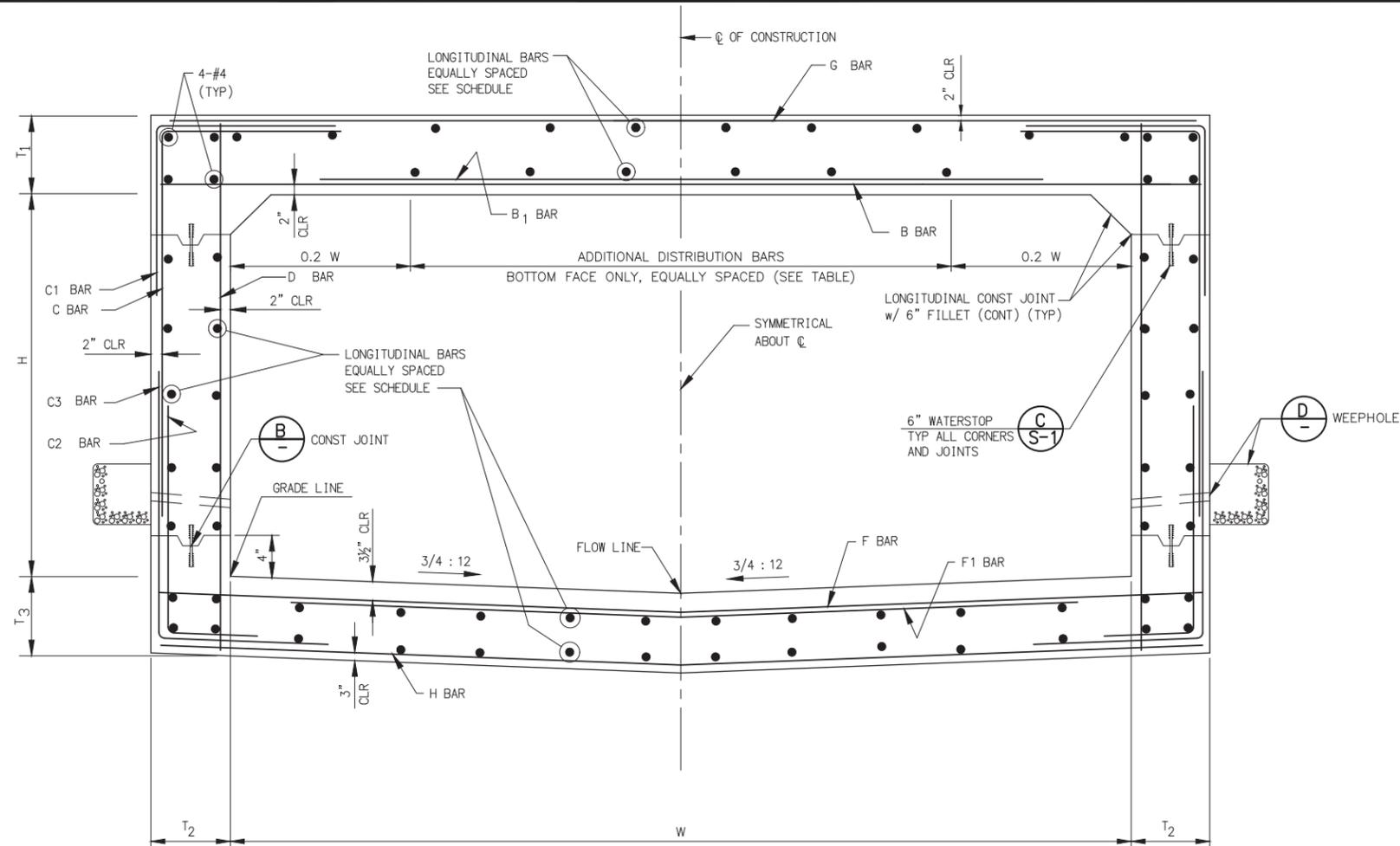


RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
 RECOMMENDED FOR APPROVAL BY: _____ DATE: _____
 APPROVED BY: _____ DATE: _____

CITY OF CORONA ENGINEERING DEPARTMENT
 APPROVED BY: *Nelson D. Nelson*
 CITY ENGINEER NELSON D. NELSON, P.E. DATE: _____

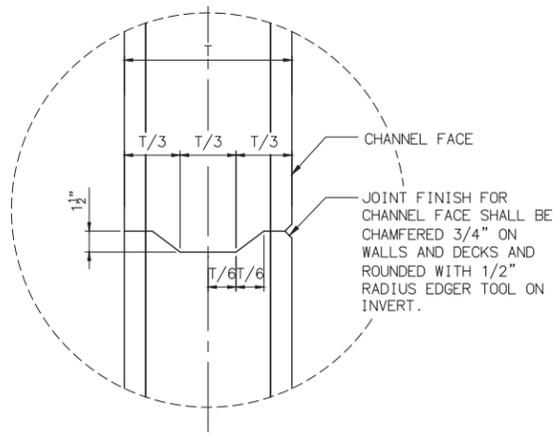
OAK STREET CHANNEL STAGE 4 KROONEN CHANNEL
 STORM DRAIN LINE K TRANSITION STRUCTURE ROOF PLAN AND DETAILS

PROJECT NO. 2-0-00070-04
 DRAWING NO. 2-0437
 SHEET NO. 11 OF 13

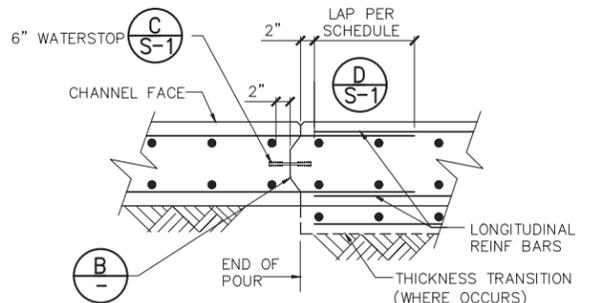


TRANSITION STRUCTURE TABLE			
SECTION NUMBER		1	2
LIVE LOAD		HS20-44	HS20-44
MAX DESIGN COVER		8'	13'
WIDTH	W	VARIABLES 7'-10'	VARIABLES 7'-12'
HEIGHT	H	VARIABLES 7'-9'	7'
THICKNESS (INCHES)	TOP SLAB	T1	12"
	SIDE WALL	T2	12"
	BOTTOM SLAB	T3	17"
B BARS	BAR & SPACING	#6 @ 12"	#7 @ 12"
	LENGTH	CONT	CONT
C BARS	BAR & SPACING	#6 @ 12"	#6 @ 12"
	HORIZ LENGTH	4'-2"	5'-1"
	VERTICAL LENGTH	CONT	CONT
C1 BARS	BAR & SPACING	#7 @ 12"	#6 @ 12"
	HORIZ LENGTH	4'-1"	4'-1"
	VERTICAL LENGTH	4'-1"	4'-0"
C2 BARS	BAR & SPACING	#6 @ 12"	#6 @ 12"
	HORIZ LENGTH	4'-1"	4'-1"
	VERTICAL LENGTH	4'-9"	4'-11"
C3 BARS	BAR & SPACING	#7 @ 12"	#7 @ 12"
	HORIZ LENGTH	4'-1"	4'-1"
	VERTICAL LENGTH	5'-0"	5'-4"
D BARS	BAR & SPACING	#6 @ 12"	#6 @ 12"
	LENGTH	CONT	CONT
F BARS	BAR & SPACING	#7 @ 12"	#8 @ 12"
	LENGTH	CONT	CONT
G BARS	BAR & SPACING	#6 @ 12"	#6 @ 12"
	LENGTH	CONT	CONT
H BARS	BAR & SPACING	#6 @ 12"	#5 @ 12"
	LENGTH	CONT	CONT
DISTRIBUTION BARS	BAR NO.	4	4
	NUMBER OF BARS	6	6
LONGITUDINAL BARS	TOP SLAB	#4 @ 12"	#4 @ 12"
	BOTTOM SLAB	#4 @ 12"	#4 @ 12"
	WALLS	#4 @ 12"	#4 @ 12"

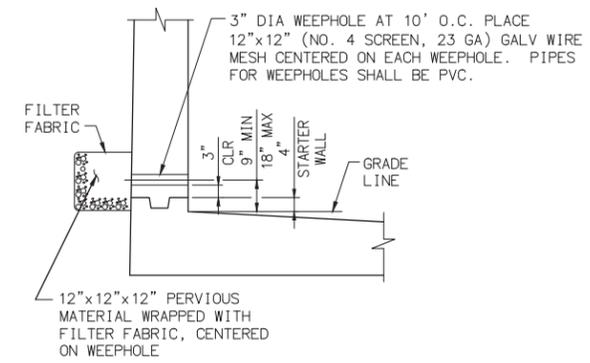
TYPICAL SECTION A
NTS



CONSTRUCTION JOINT DETAIL B
NTS



CONSTRUCTION JOINT DETAIL C
NTS



WEEPHOLE DETAIL D
NTS

DESIGN DATA

LIVE LOAD
SEE TRANSITION STRUCTURE TABLE

DEAD LOAD
WEIGHT OF EARTH = 135 pcf
WEIGHT OF CONCRETE = 150 pcf

LATERAL LOAD
EFP = 95 pcf AT REST, LEVEL BACKFILL (FLOODED)
EFP = 60 pcf AT REST, LEVEL BACKFILL (DRAINED)

REINFORCED CONCRETE FOR RC BOX CONSTRUCTION
CONCRETE TYPE AS SPECIFIED PER SHEET S-1.
fy = 60,000 psi
LOAD COMBINATIONS PER OC FLOOD CONTROL DISTRICT AND ACI 318-05.
LOAD AND RESISTANCE FACTOR DESIGN PER ACI 318-05.

AS BUILT	
PROJECT No.	4-396B
C.C.A. DATE	06-21-2017
R.E. NAME	HASSAN MUSTAFA



BENCH MARK: 2-1/2" BRASS DISK STAMPED "C-125" SET IN THE TOP OF CURB, LOCATED 5' SOUTH OF THE B.C.R. OF THE SOUTHEASTERLY CURB RETURN OF THE INTERSECTION OF BORDER AVENUE AND MABEY CANYON ROAD
ELEVATION=1083.414 (NGVD29)

REVISIONS	ENGINEER	RCFC&WCD	DESIGNED BY:	APPROVED BY:
AS-BUILT	TK	6/17	CMC	CMC
			DATE DRAWN:	DATE:
			05/19/14	05/19/14

14728 ALTON PARKWAY
IRVINE, CALIFORNIA 92614-0027
949.472.2888 • FAX 949.472.8871 • WWW.RBF.COM

REGISTERED PROFESSIONAL ENGINEER
No. 74020
Exp. 06/30/15
CIVIL
STATE OF CALIFORNIA

CHRISTOPHER M. CHO

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

RECOMMENDED FOR APPROVAL BY: _____ DATE: _____

APPROVED BY: _____ DATE: _____

CITY OF CORONA ENGINEERING DEPARTMENT

APPROVED BY: *Nelson D. Nelson*

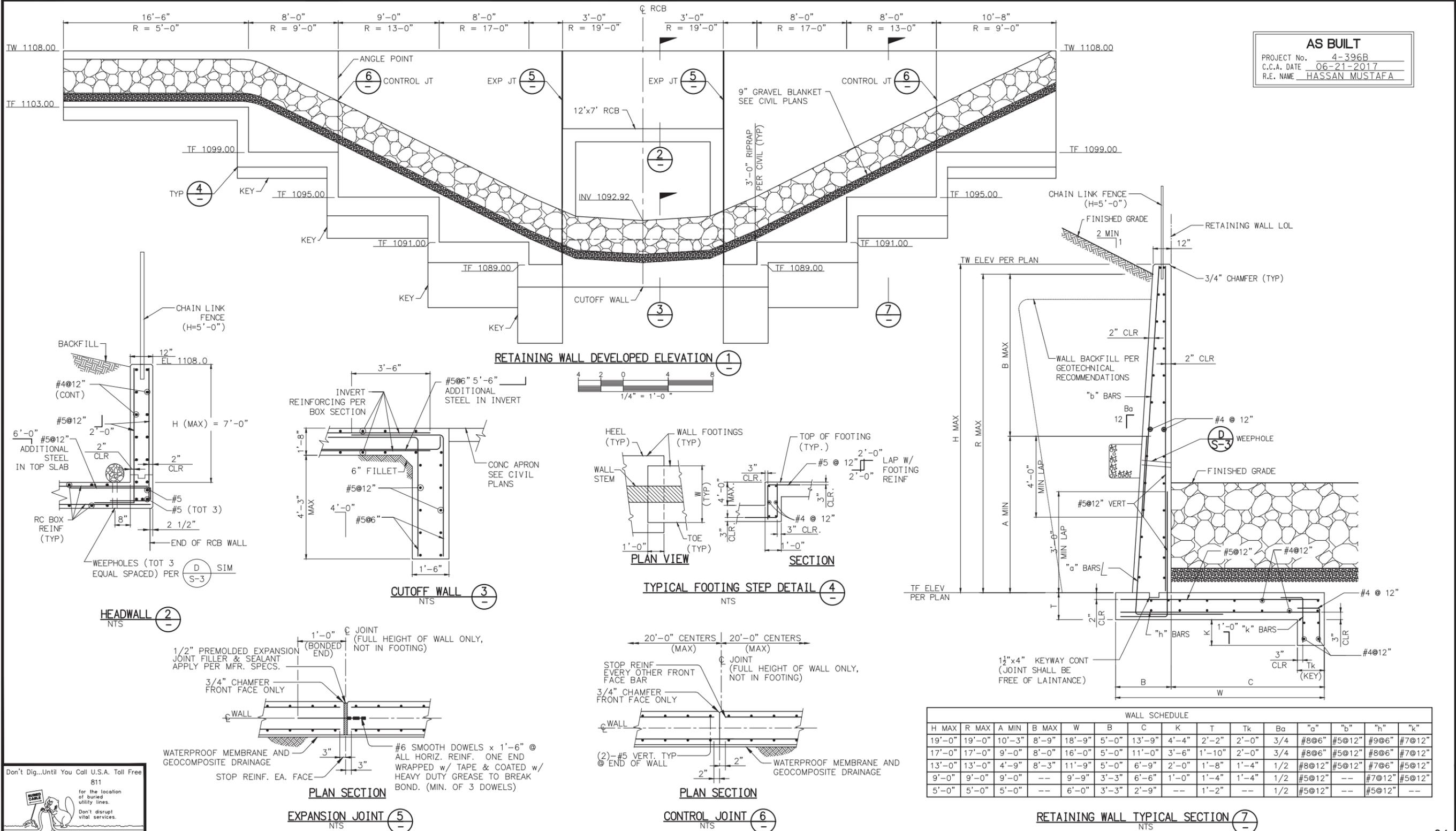
CITY ENGINEER NELSON D. NELSON, P.E. DATE: _____

OAK STREET CHANNEL
STAGE 4
KROONEN CHANNEL
STORM DRAIN LINE K
TRANSITION STRUCTURE
TYPICAL SECTION

PROJECT NO.	2-0-00070-04
DRAWING NO.	2-0437
SHEET NO.	12 OF 13

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AS BUILT
 PROJECT No. 4-396B
 C.C.A. DATE 06-21-2017
 R.E. NAME HASSAN MUSTAFA



WALL SCHEDULE

H MAX	R MAX	A MIN	B MAX	W	B	C	K	T	Tk	Ba	"a"	"b"	"h"	"k"
19'-0"	19'-0"	10'-3"	8'-9"	18'-9"	5'-0"	13'-9"	4'-4"	2'-2"	2'-0"	3/4	#8@6"	#5@12"	#9@6"	#7@12"
17'-0"	17'-0"	9'-0"	8'-0"	16'-0"	5'-0"	11'-0"	3'-6"	1'-10"	2'-0"	3/4	#8@6"	#5@12"	#8@6"	#7@12"
13'-0"	13'-0"	4'-9"	8'-3"	11'-9"	5'-0"	6'-9"	2'-0"	1'-8"	1'-4"	1/2	#8@12"	#5@12"	#7@6"	#5@12"
9'-0"	9'-0"	9'-0"	--	9'-9"	3'-3"	6'-6"	1'-0"	1'-4"	1'-4"	1/2	#5@12"	--	#7@12"	#5@12"
5'-0"	5'-0"	5'-0"	--	6'-0"	3'-3"	2'-9"	--	1'-2"	--	1/2	#5@12"	--	#5@12"	--



BENCH MARK: 2-1/2" BRASS DISK STAMPED "C-125" SET IN THE TOP OF CURB, LOCATED 5' SOUTH OF THE B.C.R. OF THE SOUTHEASTERLY CURB RETURN OF THE INTERSECTION OF BORDER AVENUE AND MABEY CANYON ROAD
 ELEVATION=1083.414 (NGVD29)

REVISIONS	ENGINEER	RCFC&WCD	DESIGNED BY:	APPROVED BY:
AS-BUILT	TK	6/17	CMC	CMC
			DATE DRAWN: 05/19/14	DATE: 05/19/14

APPROVED BY: **RBF CONSULTING**
 14728 ALTON PARKWAY
 IRVINE, CALIFORNIA 92614-0027
 949.472.2866 • FAX 949.472.8923 • www.rbf.com
 CHRISTOPHER M. CHO



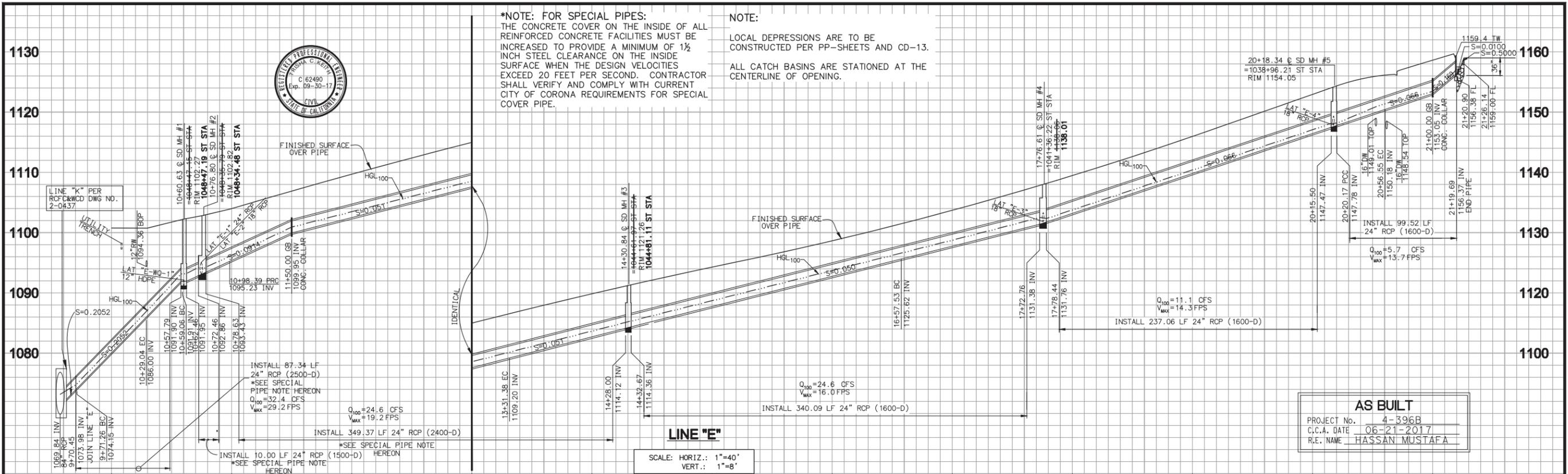
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
 RECOMMENDED FOR APPROVAL BY: _____
 DATE: _____

CITY OF CORONA ENGINEERING DEPARTMENT
 APPROVED BY: *Nelson D. Nelson*
 CITY ENGINEER NELSON D. NELSON, P.E.
 DATE: _____

OAK STREET CHANNEL STAGE 4 KROONEN CHANNEL
 STORM DRAIN LINE K INLET STRUCTURE DETAILS AND SECTIONS

PROJECT NO. 2-0-00070-04
 DRAWING NO. 2-0437
 SHEET NO. 13 OF 13

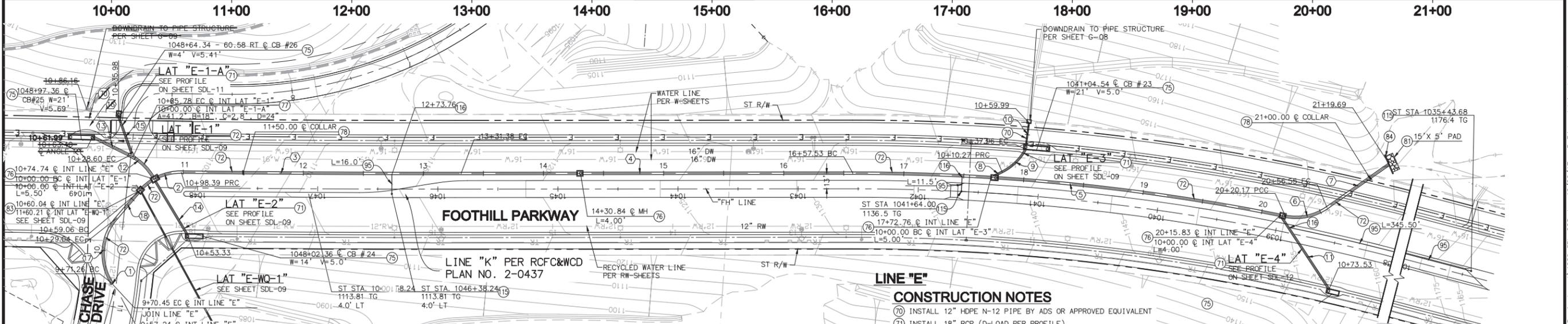
H:\pdrcto\10164629-002\CADD\AS-BUILT\STS\21_Count\Kroonen\4629-ST-004.dwg 10/27/17 - 10:45am a1 dr.in.dorado



***NOTE: FOR SPECIAL PIPES:**
 THE CONCRETE COVER ON THE INSIDE OF ALL REINFORCED CONCRETE FACILITIES MUST BE INCREASED TO PROVIDE A MINIMUM OF 1/2 INCH STEEL CLEARANCE ON THE INSIDE SURFACE WHEN THE DESIGN VELOCITIES EXCEED 20 FEET PER SECOND. CONTRACTOR SHALL VERIFY AND COMPLY WITH CURRENT CITY OF CORONA REQUIREMENTS FOR SPECIAL COVER PIPE.

NOTE:
 LOCAL DEPRESSIONS ARE TO BE CONSTRUCTED PER PP-SHEETS AND CD-13.
 ALL CATCH BASINS ARE STATIONED AT THE CENTERLINE OF OPENING.

AS BUILT
 PROJECT No. 4-396B
 C.C.A. DATE 06-21-2017
 R.E. NAME HASSAN MUSTAFA



LINE/CURVE DATA TABLE

NO	BEARING/DELTA	RADIUS	LENGTH	TANGENT
1	N11°22'00"E	---	0.81'	---
2	S0°05'13"	45.00'	39.34'	21.03'
3	S0°40'04"	19987.00'	232.95'	116.47'
4	N45°38'29"W	---	326.16'	---
5	N11°27'38"	1813.00'	362.64'	181.93'
6	S46°19'13"	45.00'	36.38'	19.25'
7	N80°30'05"W	---	63.14'	---
8	S0°19'28"	1813.00'	10.27'	5.13'
9	S35°15'36"	45.00'	27.69'	14.30'
10	N52°01'19"E	---	18.86'	---

LINE/CURVE DATA TABLE

NO	BEARING/DELTA	RADIUS	LENGTH	TANGENT
11	N10°58'26"E	---	73.53'	---
12	S6°24'31"	45.00'	28.60'	14.80'
13	N19°20'43"W	---	34.80'	---
14	N13°25'29"E	---	53.33'	---
15	N24°50'38"E	---	35.98'	---
16	N33°01'49"E	---	22.76'	---
17	S73°33'30"	45.00'	57.77'	33.64'
18	N84°55'30"E	---	30.02'	---

- CONSTRUCTION NOTES**
- (70) INSTALL 12" HDPE N-12 PIPE BY ADS OR APPROVED EQUIVALENT
 - (71) INSTALL 18" RCP (D-LOAD PER PROFILE)
 - (72) INSTALL 24" RCP (D-LOAD PER PROFILE)
 - (75) CONSTRUCT CATCH BASIN TYPE "A" PER CITY OF CORONA STD PLAN 204
 - (76) CONSTRUCT STORM DRAIN MANHOLE PER CITY OF CORONA STD PLAN 213
 - (77) CONSTRUCT JUNCTION STRUCTURE PER CITY OF CORONA STD PLAN 215
 - (78) CONSTRUCT CONCRETE COLLAR PER CITY OF CORONA STD PLAN 216
 - (81) CONSTRUCT 1/4 TON LOOSE ROCK RIPRAP PER DETAIL ON SHEET SDL-15
 - (83) CONSTRUCT MODIFIED STORM DRAIN MANHOLE PER DETAIL SHEET SDL-15
 - (84) CONSTRUCT HEADWALL PER DETAIL SHEET SDL-15
 - (86) INSTALL 6" PVC (SDR 35) DRAIN LINE
 - (119) INSTALL MEDIAN RISER INLET PER DETAIL ON SHEET SDL-15.
 - (120) CONSTRUCT JUNCTION STRUCTURE PER SPWPC STD PLAN NO. 332-2



Designed by CH
 Drawn by LD
 Checked by CH

PLANS PREPARED UNDER SUPERVISION OF
 CRAIG HAUZE
 R.C.E. No. 63620
 Date: 06/20/13

REFERENCE PLANS FOR THESE IMPROVEMENTS

6/17 TK
 3/16 TK

AS-BUILT
 FM#83 - LN "E" UPDATE
 ADDED LENGTH OF 6" PVC DRAIN LINE

REVISIONS

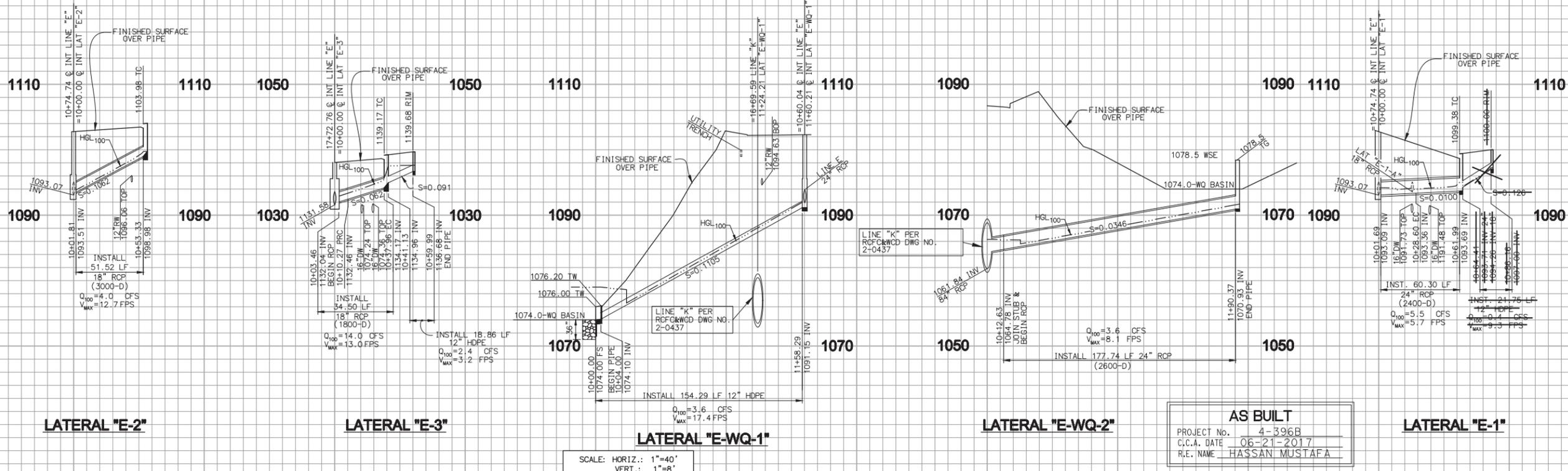
BENCH MARK: 2-1/2" BRASS DISK STAMPED "C-125" SET IN THE TOP OF CURB, LOCATED 5' SOUTH OF THE B.C.R. OF THE SOUTHEASTERLY CURB RETURN OF THE INTERSECTION OF BORDER AVENUE AND MABEY CANYON ROAD
 ELEVATION=1083.414 (NGVD29)

Engineering: [Signature]
 DWP: [Signature]
 Fire: [Signature]

06/17/2013
 Nelson D. Nelson, P.E.
 CITY ENGINEER
 R.C.E. No. 54435
 EXP. 12/31/2013

CITY OF CORONA
 STORM DRAIN IMPROVEMENTS - PLAN & PROFILE
 LINE "E"
 FOOTHILL PARKWAY WESTERLY EXTENSION

DWG. NO. 10-0565
 69 of 229

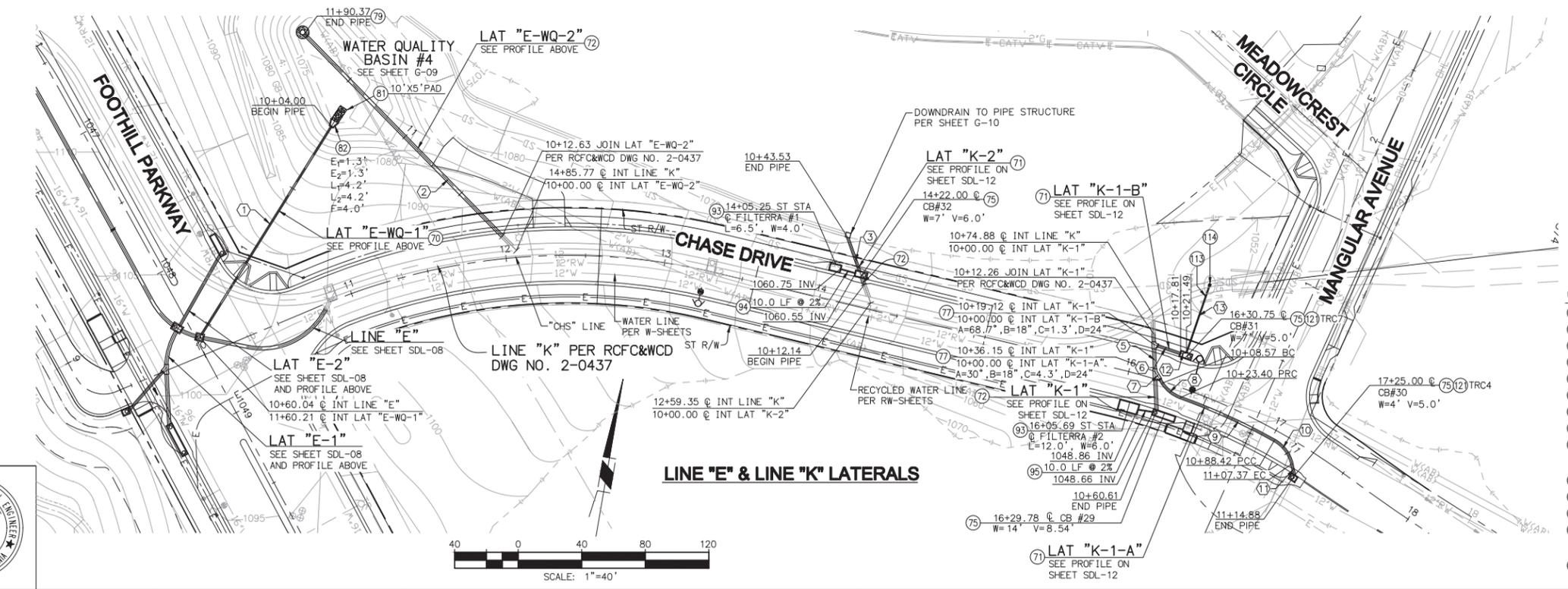


AS BUILT
 PROJECT NO. 4-396B
 C.C.A. DATE 06-21-2017
 R.E. NAME HASSAN MUSTAFA

SCALE: HORIZ.: 1"=40'
 VERT.: 1"=8'

NOTE: LOCAL DEPRESSIONS ARE TO BE CONSTRUCTED PER PP-SHEETS AND CD-13.
 ALL CATCH BASINS ARE STATIONED AT THE CENTERLINE OF OPENING.

LINE/CURVE DATA TABLE				
NO	BEARING/Delta	RADIUS	LENGTH	TANGENT
1	N15°44'28"E	---	160.21'	---
2	N60°47'01"W	---	180.74'	---
3	N35°41'36"W	---	31.39'	---
4	NOT USED	---	---	---
5	N18°40'36"W	---	60.61'	---
6	N87°21'15"W	---	17.81'	---
7	N48°49'04"W	---	8.57'	---
8	37°45'52"	22.50'	14.83'	7.70'
9	09°27'15"	394.00'	65.01'	32.58'
10	48°16'27"	22.50'	18.96'	10.08'
11	N28°51'13"W	---	7.51'	---
12	N67°08'29"E	---	3.68'	---
13	N02°38'45"E	---	44.24'	---



- CONSTRUCTION NOTES**
- (70) INSTALL 12" HDPE N-12 PIPE BY ADS OR APPROVED EQUIVALENT
 - (71) INSTALL 18" RCP (D-LOAD PER PROFILE)
 - (72) INSTALL 24" RCP (D-LOAD PER PROFILE)
 - (75) CONSTRUCT CATCH BASIN TYPE "A" PER CITY OF CORONA STD PLAN 204
 - (77) CONSTRUCT JUNCTION STRUCTURE PER CITY OF CORONA STD PLAN 215
 - (79) CONSTRUCT CSP RISER INLET PER DETAIL ON SHEET SDL-16
 - (81) CONSTRUCT 1/4 TON LOOSE ROCK RIPRAP PER DETAIL ON SHEET SDL-15
 - (82) CONSTRUCT CONCRETE WING WALL PER DETAIL SHEET SDL-15
 - (93) INSTALL FILTERRA STORMWATER BIOFILTRATION UNIT PER MANUFACTURER SPECIFICATIONS (877-345-1450) OR APPROVED EQUIVALENT, SIZE PER PLAN AND DETAIL ON SHEET CD-13
 - (94) INSTALL 4" PVC (SDR 35) DRAIN LINE
 - (95) INSTALL 6" PVC (SDR 35) DRAIN LINE
 - (113) INSTALL 8" PVC (SDR 35) DRAIN LINE
 - (114) INSTALL 18" NDS CATCH BASIN PART NO. 1882 WITH ADAPTOR PLUG PART NO. 1206, 8" UNIVERSAL OUTLET PART NO. 1888 AND ATRIUM GRATE PART NO. 1891.
 - (12) INSTALL CONTECH TRITON CATCH BASIN INSERT (MODEL PER PLAN) OR APPROVED EQUIVALENT



RBF CONSULTING
 12345 ALVIN PARKWAY
 FORTY, CALIFORNIA 92604
 TEL: 949.233.1111 FAX: 949.233.1111 WWW.RBF.COM

Designed by CH
 Drawn by LD
 Checked by CH
 PLANS PREPARED UNDER SUPERVISION OF
 CRAIG HAUSE
 R.C.E. No. 63620
 Date: 06/20/13

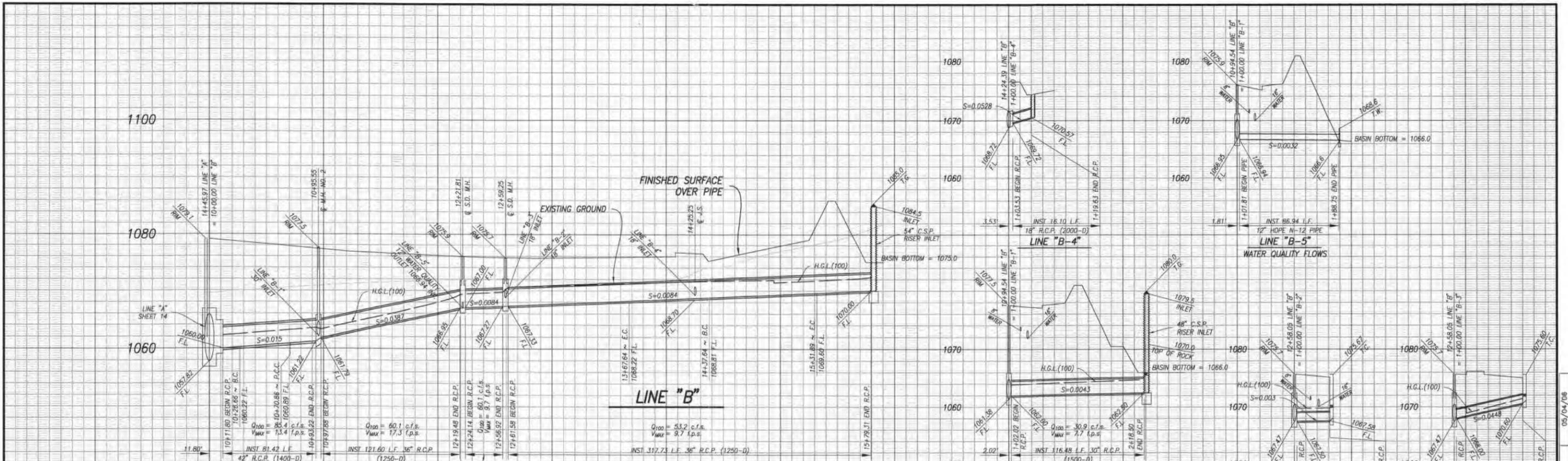
DATE	BY	REVISIONS
6/17	TK	AS-BUILT

BENCH MARK: 2-1/2" BRASS DISK STAMPED "C-125" SET IN THE TOP OF CURB, LOCATED 5' SOUTH OF THE B.C.R. OF THE SOUTHEASTERLY CURB RETURN OF THE INTERSECTION OF BORDER AVENUE AND MABEY CANYON ROAD
 ELEVATION=1083.414 (NGVD29)

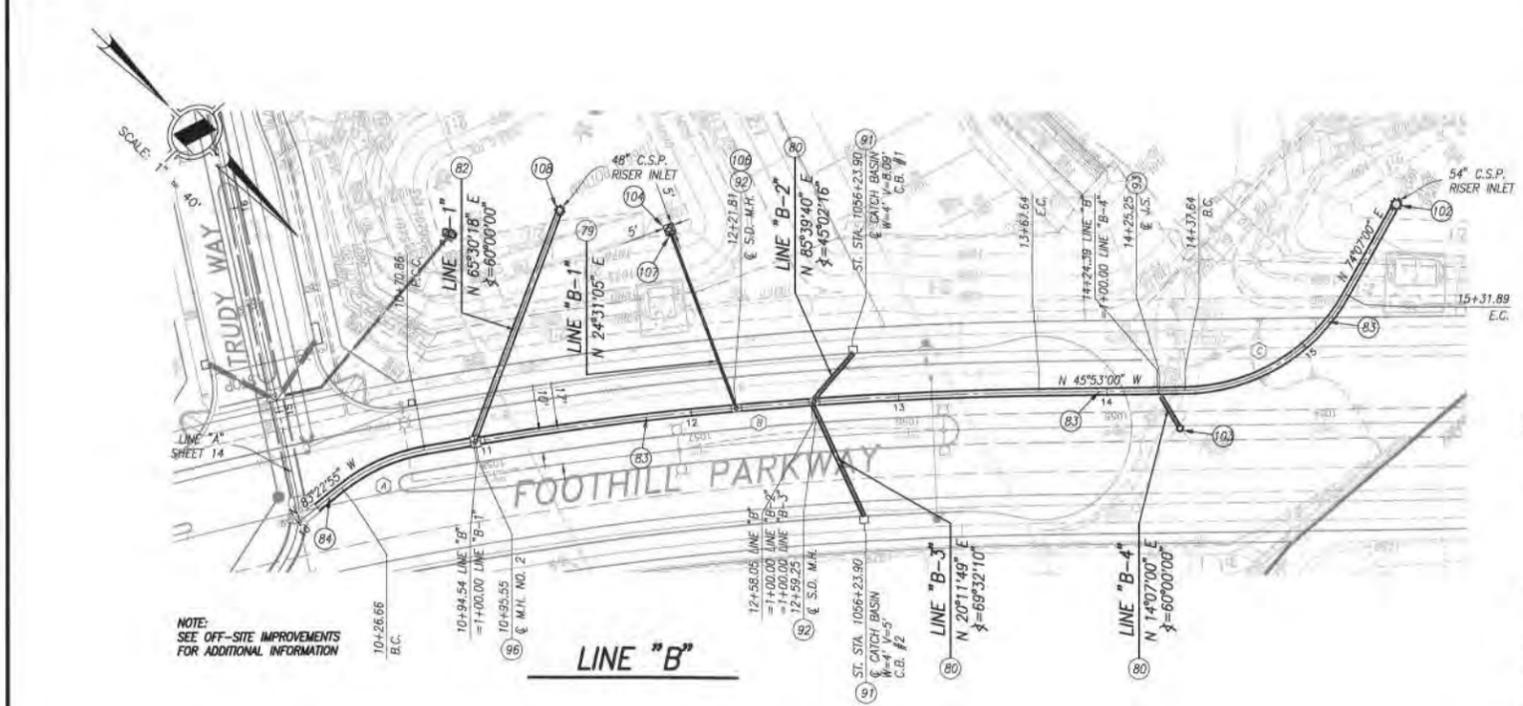
Engineering: [Signature]
 DWP: [Signature]
 Fire: [Signature]

NELSON D. NELSON, P.E.
 CITY ENGINEER
 R.C.E. No. 54435
 Date: 06/17/2013
 Exp. 12/31/2013

CITY OF CORONA
 STORM DRAIN IMPROVEMENTS - PLAN & PROFILE
 LINE "E" & LINE "K" LATERALS
 FOOTHILL PARKWAY WESTERLY EXTENSION
 DWG. NO. 10-0565
 70 of 229



PROFILE SCALES
 HORIZ.: 1" = 40'
 VERT.: 1" = 8'



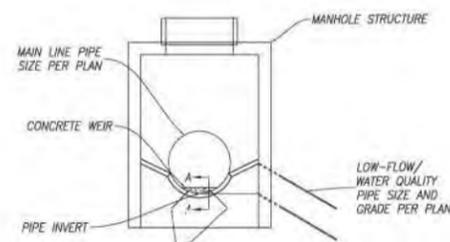
NOTE:
 SEE OFF-SITE IMPROVEMENTS
 FOR ADDITIONAL INFORMATION

CURVE DATA

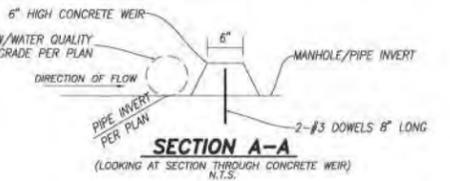
BEARING/DELTA	RADIUS	LENGTH	TANGENT
28°08'25"	90.00'	44.20'	22.56'
03°21'30"	1817.00'	296.78'	148.72'
60°00'00"	90.00'	94.25'	51.96'



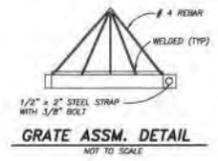
- CONSTRUCTION NOTES**
- 79 INST. 12" HOPE N-12 PIPE BY ADS OR APPROVED EQUIVALENT
 - 80 INST. 18" R.C.P. (SEE PROFILE FOR D-LOAD)
 - 82 INST. 30" R.C.P. (SEE PROFILE FOR D-LOAD)
 - 83 INST. 36" R.C.P. (SEE PROFILE FOR D-LOAD)
 - 84 INST. 42" R.C.P. (SEE PROFILE FOR D-LOAD)
 - 91 CONST. CATCH BASIN TYPE "A" PER CITY OF CORONA STD. PLAN 201-0
 - 92 CONST. S.D. M.H. PER CITY OF CORONA STD. PLAN 207-0
 - 93 CONST. J.S. PER CITY OF CORONA STD. PLAN 208-1
 - 96 CONST. M.H. NO. 2 PER R.C.F.C. & W.C.D. STD. DWG. NO. MH 252
 - 102 CONST. C.S.P. RISER INLET PER DETAIL SHEET 16
 - 103 CONST. INLET TYPE X PER R.C.F.C. & W.C.D. STD. DWG. NO. CB 108 WITH OPENINGS
 - 104 CONST. RIP-RAP PER DETAIL ON SHEET NO. 23
 - 105 CONST. WATER QUALITY DIVERSION DETAIL HEREON
 - 107 CONST. HEADWALL PER DETAIL ON HEREON
 - 108 CONST. MITIGATION RISER INLET PER DETAIL HEREON



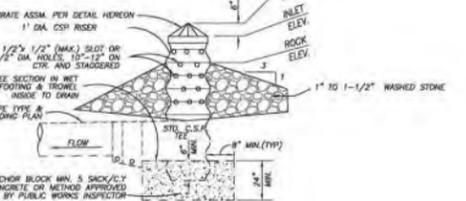
106 **WATER QUALITY DIVERSION DETAIL**
 (LOOKING AT SECTION THROUGH STRUCTURE)
 N.T.S.



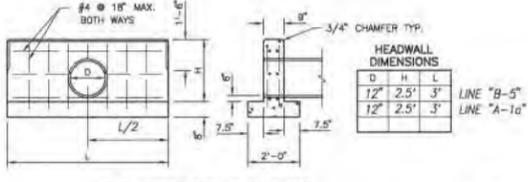
107 **SECTION A-A**
 (LOOKING AT SECTION THROUGH CONCRETE WEIR)
 N.T.S.



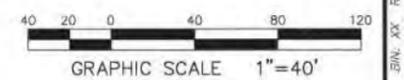
GRATE ASSM. DETAIL
 NOT TO SCALE



108 **MITIGATION INLET RISER DETAIL**
 NOT TO SCALE



107 **HEADWALL DETAIL**



Appendix

K

PERCOLATION TEST REPORT



LGC GEO-ENVIRONMENTAL, INC.

PRELIMINARY GEOTECHNICAL INVESTIGATION REPORT FOR THE PROPOSED 17-ACRE MULTI-USE DEVELOPMENT, LOCATED AT WEST CHASE DRIVE AND FOOTHILL PARKWAY IN THE CITY OF CORONA, RIVERSIDE COUNTY, CALIFORNIA; APNS: 275-050-014-6 AND 275-080-041-3.

***Dated: December 31, 2019
Project No. G19-1802-20***

Prepared For:

***Mr. Chris Bowen
GF Investments, LLC
1871 California Avenue
Corona, California 92882***



December 31, 2019

Project No. G19-1802-20

Mr. Chris Bowen
GF Investments, LLC
1871 California Avenue
Corona, California 92882

Subject: *Preliminary Infiltration Testing Investigation for the Proposed 17-Acre Multi-Use Development, Located at West Chase Drive and Foothill Parkway in the City of Corona, Riverside County, California; APNs: 275-050-014-6 and 275-080-041-3.*

1.0 INTRODUCTION

LGC Geo-Environmental, Inc. (LGC) is pleased to present this preliminary infiltration testing investigation for the proposed 17-acre multi-use development located at West Chase Drive and Foothill Parkway in the city of Corona, Riverside County, California; APNs: 275-050-014-6 and 275-080-041-3. The purpose of our study was to determine the vertical infiltration rates and physical characteristics of the subsurface soils in selected areas of proposed onsite storm water infiltration BMP devices within specific portions of the subject property.

2.0 PROPERTY LOCATION AND DESCRIPTION

The site is comprised of two irregular-shaped, undeveloped parcels totaling approximately 17 acres. The site is bounded easterly by Foothill Parkway, vacant parcels to the south and west, and a future residential development to the north. The general location and configuration of the site is shown on the Site Location Map (Figure 1).

The subject site has been previously graded; currently, it is vacant.

Onsite surface elevations range from approximately 1,215 feet above mean sea level (msl) on the pad to approximately 1,080 feet above msl in the northeast. Local drainage is generally directed away from the flattened ridge top in all directions and towards the northeast at the base of the ridge.

3.0 PROPOSED CONSTRUCTION

According to the referenced Conceptual Grading plan, the proposed development will consist of four parcels with retail, gas station and office usage closer to Foothill Parkway. Condominiums will comprise the westerly portion.

4.0 SUBSURFACE EXPLORATION: INFILTRATION TESTING

4.1 Subsurface Exploration

Subsurface exploration of the subject site was performed on December 9, 2019 and consisted of excavating eight (8) trenches utilizing a backhoe within the proposed infiltration system locations, excavated to approximate depths of 4 feet to approximately 5 feet below existing grade. In addition, two (2) exploratory trenches that were excavated utilizing a backhoe on December 10, 2019 near the proposed infiltration locations to a depth of approximately 14 feet below existing grade, will be utilized to document subsurface material and depth to groundwater. Earth materials encountered within the locations were classified in general accordance with the visual manual procedures of the Unified Soil Classification System (USCS). Logs of the infiltration trenches are presented in Appendix A, and their approximate locations are depicted on the Infiltration Test Location Map (Plate 1).

Prior to the subsurface exploration work, an underground utilities clearance was obtained from Underground Service Alert of Southern California.

4.2 Infiltration Testing

On December 10, 2019 and December 11, 2019, eight (8) infiltration tests were conducted within the proposed area of the infiltration systems. The infiltration test trenches were labeled IT-1 through IT-8; and are depicted on the Infiltration Test Location Map (Plate 1).

Once the depth of 4 feet to 5 feet below existing surface was excavated with a backhoe, an 8-inch diameter test hole, approximately 20-inches deep, was excavated at the bottom of the trenches. A 2-inch layer of 3/4 inch gravel was placed at the bottom of the test hole, and a 5-foot perforated polyvinyl chloride pipe (PVC) covered with a filter sock, with a nominal diameter of 3 inches, was inserted into the test hole. The PVC pipe installed in the infiltration test hole contained 0.375 inch diameter perforations throughout the length of the pipe. The annular space around the 20-inch deep test hole was backfilled with 3/4-inch gravel. The infiltration trenches were then backfilled with native soil leaving the upper approximately 5-inches of the pipe exposed. A pre-soak period was then conducted to allow the test holes to presaturate before beginning the infiltration test. At the beginning of the infiltration test, a sandy soils test was performed with two consecutive readings taken within 25 minutes, to measure a water drop of at least 6 inches. Upon completion of the sandy soils test, readings were taken at 60-minute intervals for the entirety of the infiltration test, with the drop in water level being recorded at the end of each interval. All trenches were backfilled at the conclusion of the tests. Minor settlement of the backfill soils may occur over time.

To acquire the vertical design infiltration test rates, the field percolation rates, which have vertical and sidewall infiltration, were reduced utilizing a reduction factor per the Porchet Method standard in order to get a vertical design infiltration rate. A reduction factor of 2.25, 2.25, 2.69, 2.59, 2.25, 2.25, 3.42, and 2.95 was applied to the field percolation rates for IT-1 through IT-8, respectively. The results of the percolation method infiltration tests are presented in the following table in Section 5.3. The infiltration test data sheets are presented in Appendix A.

5.0 FINDINGS

5.1 Earth Materials

Based on our review of the data from the geotechnical investigation and current exploration of the earth materials underlying the proposed onsite infiltration system area, the materials encountered to the depths explored include compacted artificial fill, alluvial fan deposits, and the Ladd Formation. A description of the earth material soils encountered is described below:

Artificial Fill, Compacted (Afc): During our subsurface exploration, artificial fill was encountered in all trenches to depths ranging from approximately 1 foot to 3 feet. These materials generally consisted of clayey sand, silty sand, poorly-graded sand, and gravel which was various shades of red, orange, brown and gray; dry to moist; medium dense; very fine to coarse grained with gravel and cobbles; roots and root hairs; slight oxidation staining; upper 4 inches to 6 inches desiccated; and construction debris.

Young Alluvial Fan Deposits (Qyf): Young alluvial fan deposits were encountered on the site during our subsurface exploration ranging from approximately 1 foot to 14 feet deep to the depths explored below the artificial fill, compacted. The young alluvial fan deposits generally consisted of clayey sand, silty sand, poorly graded sand, well graded sand, and gravel, which was various shades of brown, yellow, orange, and gray; dry to moist; medium dense to dense; fine to coarse grained with gravel and cobbles; and oxidation staining. Bedding was observed in all trenches.

Ladd Formation (Kl): Cretaceous aged Ladd Formation was encountered below the compacted artificial fill. The bedrock is generally a silty sandstone and is characterized as being various shades of orange and brown; damp; moderately hard; fine to medium grained with subangular to subrounded gravel, cobbles, trace of boulders; moderately weathered; oxidation staining; and roots and root hairs.

5.2 Groundwater

Groundwater was not encountered during exploratory trenching. A review of the California Department of Water Resources, Water Data Library 2018 online database indicates groundwater approximately 2.3 miles away from the general site area is approximately 198 feet below the existing ground surface at an elevation of approximately 729 feet above mean sea level (Well ID: Station 338729N1175842W001).

5.3 Infiltration Testing Results

The shallow infiltration testing rates for design considerations for the proposed infiltration system area which was tested are presented in the table below.

Infiltration Design Rates

TEST NO.	TEST LOCATION	TEST DEPT H (Feet)	INFILTRATION RATES		SOIL DESCRIPTION (USCS)
			FIELD PERCOLATION RATE (INCHES/HOUR)	DESIGN INFILTRATION RATE (INCHES/HOUR)	
IT-1	North Infiltration Area	5	60.00	26.67	SP-SM
IT-2	North Infiltration Area	4	60.00	26.67	SP-SM
IT-3	North-Northeast Infiltration Area	4	42.00	14.51	SM
IT-4	North-Northeast Infiltration Area	4	48.75	16.77	SM
IT-5	Northwest Infiltration Area	4	60.00	26.67	SM
IT-6	Northwest Infiltration Area	4	60.00	26.67	SM
IT-7	West Infiltration Area	4	9.75	2.72	SM
IT-8	West Infiltration Area	4	35.25	8.89	SM

6.0 CONCLUSIONS AND RECOMMENDATIONS

Shallow infiltration testing for the proposed infiltration system indicate design rates of, 26.67 inches/hour for IT-1 and IT-2 at depths of approximately 4 feet to 5 feet, 14.51 inches/hour and 16.77 inches/hour for IT-3 and IT-4 at a depth of approximately 4 feet, 26.67 inches/hour for IT-5 and IT-6 at depth of approximately 4 feet, and 2.72 inches/hour and 8.89 inches/hour for IT-7 and IT-8 at a depth of approximately 4 feet. After applying reduction factors shown in the table above, per the Porchet Method. The design rates representing the infiltration devices proposed to be installed, should be utilized for the proposed infiltration device location, as indicated on the Infiltration Test Location Map (Plate 1). An average composite design rate of **26.67 inches/hour** for the proposed infiltration basin represented by testing from infiltration test trenches IT-1, IT-2, IT-5, and IT-6 can be utilized. An average composite design rate of **15.64 inches/hour** for the proposed infiltration basin represented by testing from infiltration test trenches IT-3 and IT-4 can be utilized. A significantly lower rate was observed within infiltration test trenches IT-7 and IT-8, thus, an average composite design rate of **5.81 inches/hour** for the proposed infiltration basin represented by testing from IT-7 and IT-8 can be utilized.

The proposed infiltration basin device should be placed at least five (5) feet horizontally away from or beyond a 1:1 (horizontal to vertical) projection from the base of any proposed or existing structures or walls, whichever is greater. Since the proposed infiltration basin device is within and/or adjacent to proposed roadways, parking areas and/or sidewalks (within five (5) feet) and may be up to approximately six (6) feet deep, any gravel backfill should be densified or any soil backfill should be compacted to at least 90% of the maximum dry density during placement. The project geologist or engineer should observe infiltration device excavations

during trenching to verify the anticipated soil units and geotechnical conditions; as well as observe, probe and/or test any densification or compaction of the infiltration trench and pit gravel and/or soil backfill.

Furthermore, based on the data presented from the California Department of Water Resources, Water Data Library Well Data, groundwater should be approximately 198 feet below the existing ground surface and should not be present within the current allowable limit of within 10 feet of the bottom of testing and/or proposed infiltration drainage devices as set forth by the City of Corona, Riverside County, and California State requirements.

7.0 PLAN REVIEWS AND CONSTRUCTION SERVICES

This report was prepared for the exclusive use of **GF Investments, LLC** to assist the project civil engineer in the design of the proposed infiltration systems for the proposed development. It is recommended that LGC be engaged to review infiltration device plans, grading plans, foundation plans and the final infiltration design drawings and specifications prior to construction. This is to document that the recommendations contained in this report were properly interpreted and incorporated into the project plans and specifications from a geotechnical standpoint. Plans should be forwarded to the project geotechnical engineer and/or engineering geologist for LGC for review and comments, as deemed necessary. LGC's review of infiltration device plans, grading plans, foundation plans and the final infiltration design drawings and specifications may indicate that additional subsurface exploration, laboratory testing and analysis should be performed to address areas of concern. If LGC is not accorded the opportunity to review these documents, we cannot take responsibility for misinterpretation of our recommendations.

If the project plans change significantly (e.g., location and type of infiltration devices), LGC should be retained to review our original design recommendations and applicability to the revised construction. If conditions are encountered during construction that appears to be different from those indicated in this report, this office should be notified immediately. Design and construction revisions may be required.

The preliminary conclusions and recommendations provided in this report are based on review of previous geotechnical reports, infiltration testing, geologic field mapping, and geotechnical/geologic analyses to date. A representative of LGC should observe the interpolated subsurface conditions in the field during construction.

We recommend that LGC be retained to provide geotechnical engineering services during future grading, infiltration device excavations, installation of infiltration materials, backfill of infiltration devices, or when an unusual soil condition is encountered at the site. This is to document compliance with the design, specifications or recommendations and to allow design changes in the event that subsurface conditions differ from those anticipated prior to start of construction.

8.0 INVESTIGATION LIMITATIONS

This report is based upon information provided by the client and the project civil engineer, a limited number of subsurface excavations, field observations and percolation/infiltration tests to which we applied various methods of analysis and interpretation. The materials encountered and tested in the field on the project site are believed representative of the project area, and the conclusions and recommendations contained herein are presented on that basis. However, soil materials can vary in characteristics between points of exploration, both laterally and vertically, and those variations could affect the conclusions, recommendations, and performance of the proposed storm water infiltration device BMP systems. Fluctuations in the level of groundwater may occur due to variations in rainfall, irrigation, and the other factors not in evidence at the time measurements were made. If this occurs, the changed conditions must be evaluated by the project geotechnical engineer and engineering geologist and design(s) adjusted as required or alternate design(s) recommended.

This report is issued with the understanding that it is the responsibility of the owner, or of his/her representative, to ensure that the information and recommendations contained herein are brought to the attention of the project engineer and incorporated into the plans, and the necessary steps are taken to see that the contractor and/or subcontractor properly implements the recommendations in the field.

The conclusions and opinions contained in this report are based on the results of the described geotechnical evaluations and represent our professional judgment. The findings, conclusions and recommendations contained in this report are to be considered tentative only and subject to confirmation by the undersigned during the construction process. Without this confirmation, this report is to be considered incomplete and LGC or the undersigned professionals assume no responsibility for its use.

The conclusions and opinions contained in this report are valid up to a period of 2 years from the date of this report. Changes in the conditions of a property can and do occur with the passage of time, whether they be because of natural processes or the works of man on this or adjacent properties. In addition, changes in applicable or appropriate codes or standards may occur, whether they result from legislation or the broadening of knowledge. Accordingly, the findings of this report may be invalidated wholly or partially by changes outside our control. Therefore, if any of the above mentioned situations occur, an update of this report should be completed.

This report has not been prepared for use by parties or projects other than those named or designed above. It may not contain sufficient information for other parties or other purposes.

The opportunity to be of service is appreciated. If you have any questions regarding the content of this report or require additional information, please do not hesitate to contact this office at your earliest convenience.

Our services were performed using the degree of care and skill ordinarily exercised, under similar circumstances, by engineers and geologists practicing in this or other localities. The contents of this report are professional opinions and as such, are not to be considered a guarantee or warranty.

Respectfully submitted,

LGC Geo-Environmental, Inc.



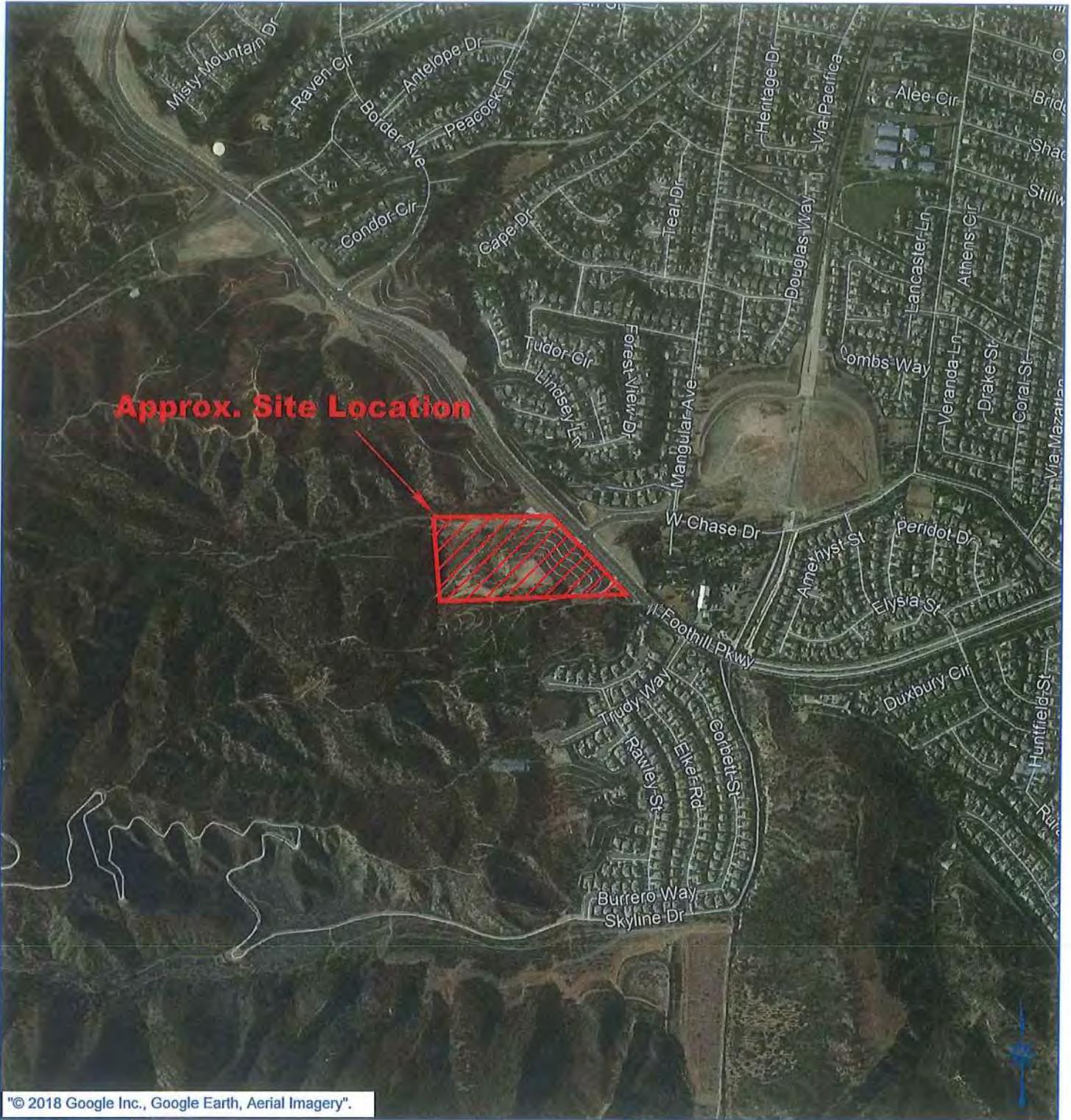
Mark Bergmann CEG 1348
Certified Engineering Geologist/President



JL/MB

Distribution: (2) Addressee
(1) KWC Engineers ATTN: Mr. Mike Taing

Attachments: Figure 1 – Site Location Map
Appendix A – Exploratory Trench Logs (*Rear of Text*)
Appendix B – Infiltration Test Results (*Rear of Text*)
Plate 1 – Infiltration Test Location Map (*Pocket Enclosure*)



"© 2018 Google Inc., Google Earth, Aerial Imagery".



FIGURE 1
SITE LOCATION MAP

Project Name	GF INVESTMENTS
Project No.	G19-1802-20
Engineer	LC
Scale	NOT TO SCALE
Date	DECEMBER 2019

APPENDIX A

EXPLORATORY TRENCH LOGS



Project Name: GF INVESTMENTS		Logged by: JL		LOG OF TRENCH IT-1			
Project Number: G19-1802-20		Elevation:		Engineering Properties			
Equipment: BACKHOE		Location/Grid: SEE INFILTRATION MAP		USCS	Sample No.	Moisture (%)	Dry Density (pcf)
Depth	Date: 12/9/19	Description:	Geologic Unit	USCS	Sample No.	Moisture (%)	Dry Density (pcf)
0.0'-1.5'	A	<u>ARTIFICIAL FILL, COMPACTED</u> Clayey SAND; brown, moist, medium dense, fine to medium grained with some gravel, roots, root hairs, upper 6" desiccated	Afc	SC			
1.5'-2.0'	B	<u>YOUNG ALLUVIAL FAN DEPOSITS:</u> Poorly-graded SAND; brown, damp, loose to medium dense, fine grained with some coarse grains and gravel, roots, root hairs, oxidation staining	Qyf	SP			
2.0'-5.0'	C	SAND with GRAVEL; light brown, damp, medium dense, medium grained to coarse grained with gravel, roots, root hairs @3.0'; bedding: N4E/20E		SW			
GRAPHICAL REPRESENTATION: EAST WALL				SURFACE SLOPE: LEVEL	TREND: N87E		
				TOTAL DEPTH= 5.0 FEET GROUNDWATER NOT ENCOUNTERED			

Project Name: GF INVESTMENTS		Logged by: JL		LOG OF TRENCH IT-3			
Project Number: G19-1802-20		Elevation:		Engineering Properties			
Equipment: BACKHOE		Location/Grid: SEE INFILTRATION MAP		USCS	Sample No.	Moisture (%)	Dry Density (pcf)
Depth	Date: 12/9/19	Description:	Geologic Unit				
0.0'-2.0'	A	<u>ARTIFICIAL FILL, COMPACTED:</u> Poorly-graded SAND /Silty SAND; orange brown, damp to moist, medium dense, fine to medium grained with coarse grains and gravel, roots, root hairs, upper 4" desiccated	Afc	SP/SM			
2.0'-2.5'	B	<u>YOUNG ALLUVIAL FAN DEPOSITS:</u> Poorly-graded SAND; yellow brown, moist, medium dense, fine to medium grained with gravel and some cobbles, roots, root hairs, oxidation staining @2.0'; bedding: N20E/15E	Qyf	SP			
2.5'-4.0'	C	SAND with GRAVEL; light brown to brown, damp, medium dense, fine to coarse grained with gravel and cobbles, roots, and root hairs		SW			
GRAPHICAL REPRESENTATION: EAST WALL				SURFACE SLOPE: LEVEL	TREND: N1W		
				TOTAL DEPTH= 4.0 FEET GROUNDWATER NOT ENCOUNTERED			

Project Name: GF INVESTMENTS		Logged by: JL		LOG OF TRENCH IT-4			
Project Number: G19-1802-20		Elevation:		Engineering Properties			
Equipment: BACKHOE		Location/Grid: SEE INFILTRATION MAP		USCS	Sample No.	Moisture (%)	Dry Density (pcf)
Depth	Date: 12/9/19	Description:	Geologic Unit				
0.0'-2.0'	A	<u>ARTIFICIAL FILL, COMPACTED:</u> Poorly-graded SAND/Silty SAND; orange brown, damp to moist, medium dense, fine to coarse grained with cobbles and gravel, roots, root hairs, upper 5" desiccated	Afc	SP/SM			
2.0'-2.5'	B	<u>YOUNG ALLUVIAL FAN DEPOSITS:</u> Poorly-graded SAND; light brown, moist, loose to medium dense, fine to coarse grained with gravel, oxidation staining @2.0'; bedding: N10E,14E	Qyf	SP			
2.5'-4.0'	C	SAND with GRAVEL; brown, moist, loose to medium dense, fine to coarse grained with cobbles, roots, root hairs, oxidations staining		SW			
GRAPHICAL REPRESENTATION: EAST WALL				SURFACE SLOPE: LEVEL	TREND: N1E		
				TOTAL DEPTH= 4.0 FEET GROUNDWATER NOT ENCOUNTERED			

Project Name: GF INVESTMENTS			Logged by: JL			LOG OF TRENCH IT-5		
Project Number: G19-1802-20			Elevation:			Engineering Properties		
Equipment: BACKHOE			Location/Grid: SEE INFILTRATION MAP			USCS		
Depth	Date: 12/9/19	Description:	Geologic Unit	Sample No.	Moisture (%)	Dry Density (pcf)		
0.0'-1.0'	A	ARTIFICIAL FILL, COMPACTED: Poorly-graded SAND/SiltySAND; brown, moist, medium dense, fine to medium grained with gravel, roots, root hairs, trash	Afc					
1.0'-2.5'	B	Clayey SAND/Silty SAND; light brown to orange brown, damp, medium dense, fine to medium grained with some coarse grains and gravel, roots, root hairs, oxidation staining						
2.5'-3.5'	C	YOUNG ALLUVIAL FAN DEPOSITS Clayey SAND; brown, damp, medium dense, fine to medium grained with some coarse grains and gravel @3.0'; bedding: N30E/18E	Qyf					
3.5'-4.0'	D	Well-graded SAND/Silty SAND; light brown to gray, dry to damp, loose to medium dense, fine to coarse grained with gravel						
GRAPHICAL REPRESENTATION: EAST WALL			SCALE: 1" = 5'			SURFACE SLOPE: LEVEL		
			<p>TOTAL DEPTH= 4.0 FEET GROUNDWATER NOT ENCOUNTERED</p>					

Project Name: GF INVESTMENTS		Logged by: JL		LOG OF TRENCH IT-7			
Project Number: G19-1802-20		Elevation:		Engineering Properties			
Equipment: BACKHOE		Location/Grid: SEE INFILTRATION MAP		USCS	Sample No.	Moisture (%)	Dry Density (pcf)
Depth	Date: 12/9/19	Description:	Geologic Unit				
0.0'-3.0'	A	<u>ARTIFICIAL FILL, COMPACTED:</u> Clayey SAND; red brown, moist, medium dense, fine to medium grained with some coarse grains and gravel, roots, root hairs, upper 5" desiccated @1.5'; brown, some cobbles, weathered granitic clasts	Afc	SC			
3.0'-3.5'	B	<u>LADD FORMATION:</u> Silty SANDSTONE; light brown to orange brown, damp, moderately hard fine to medium grained with some coarse grains and gravel, roots, root hairs, oxidation staining @3.0'; bedding: N30W/24E	KI				
3.5'-4.0'	C	Poorly-graded SANDSTONE/Silty SANDSTONE; white to light brown, damp, moderately hard, fine to medium grained with gravel, oxidation staining, weathered granitic boulder					
GRAPHICAL REPRESENTATION: EAST WALL				SURFACE SLOPE: LEVEL	TREND: N44E		
				TOTAL DEPTH= 4.0 FEET GROUNDWATER NOT ENCOUNTERED			



Project Name: GF INVESTMENTS			Logged by: JL			LOG OF TRENCH IT-8		
Project Number: G19-1802-20			Elevation:			Engineering Properties		
Equipment: BACKHOE			Location/Grid: SEE INFILTRATION MAP			USCS		
Depth	Date: 12/9/19	Description:	Geologic Unit	Sample No.	Moisture (%)	Dry Density (pcf)		
0.0'-2.5'	A	<u>ARTIFICIAL FILL, COMPACTED:</u> Clayey SAND/Silty SAND; red brown to brown, damp to moist, medium dense, fine to medium grained with some coarse grains, gravel, and cobbles, roots, root hairs, and upper 5" desiccated	Afc					
2.5'-3.0'	B	<u>LADD FORMATION:</u> Silty SANDSTONE; brown, damp, moderately hard, fine to medium grained with some coarse grains, gravel, and cobbles, weathered granitic clasts, root hairs, and oxidation staining @3.0'; bedding: N31W/22E	KI					
3.0'-4.0'	C	Poorly-graded SANDSTONE/Silty SANDSTONE; orange brown to light brown, damp, moderately hard, fine to medium grained with gravel and cobbles, and oxidation staining						
GRAPHICAL REPRESENTATION: EAST WALL			SCALE: 1" = 5'			SURFACE SLOPE: LEVEL		
			<p>TOTAL DEPTH= 4.0 FEET GROUNDWATER NOT ENCOUNTERED</p>					

Project Name: GF INVESTMENTS			Logged by: JL			LOG OF TRENCH TR-4		
Project Number: G19-1802-10			Elevation:			Engineering Properties		
Equipment: BACKHOE			Location/Grid: SEE GEOTECHNICAL MAP			USCS		
Depth	Date: 12/10/19	Description:	Geologic Unit	Sample No.	Moisture (%)	Dry Density (pcf)		
0.0'-2.0'	A	<u>ARTIFICIAL FILL, UNDOCUMENTED:</u> Clayey SAND/ Silty SAND; light brown to brown, damp to moist, medium dense, fine to medium grained with some coarse grains, gravel, and cobbles, roots, root hairs, upper 5" desiccated	Afu	Bulk @ 0.0'-5.0' Nuke @ 0.0'	11.4	122.8		
2.0'-3.0'	B	<u>YOUNG ALLUVIAL FAN DEPOSITS:</u> Poorly-graded SAND; light brown to yellow brown, damp to moist, medium dense, fine to medium grained with gravel, oxidation staining @3.5'; bedding: N19E/17E	Qyf					
3.0'-7.0'	C	Silty SAND/GRAVEL; brown, moist, loose, fine to coarse grained with cobbles, oxidations staining, weathered granitic clasts, subangular to subrounded clasts						
7.0'-14.0'	D	Well-graded SAND; brown to gray, damp, loose to medium dense, fine to coarse grained with gravel and cobbles, oxidation staining, weathered granitic clasts, subangular to subrounded clasts						
GRAPHICAL REPRESENTATION: EAST WALL			SCALE: 1" = 5'			SURFACE SLOPE: LEVEL		
TOTAL DEPTH=14.0 FEET GROUNDWATER NOT ENCOUNTERED								

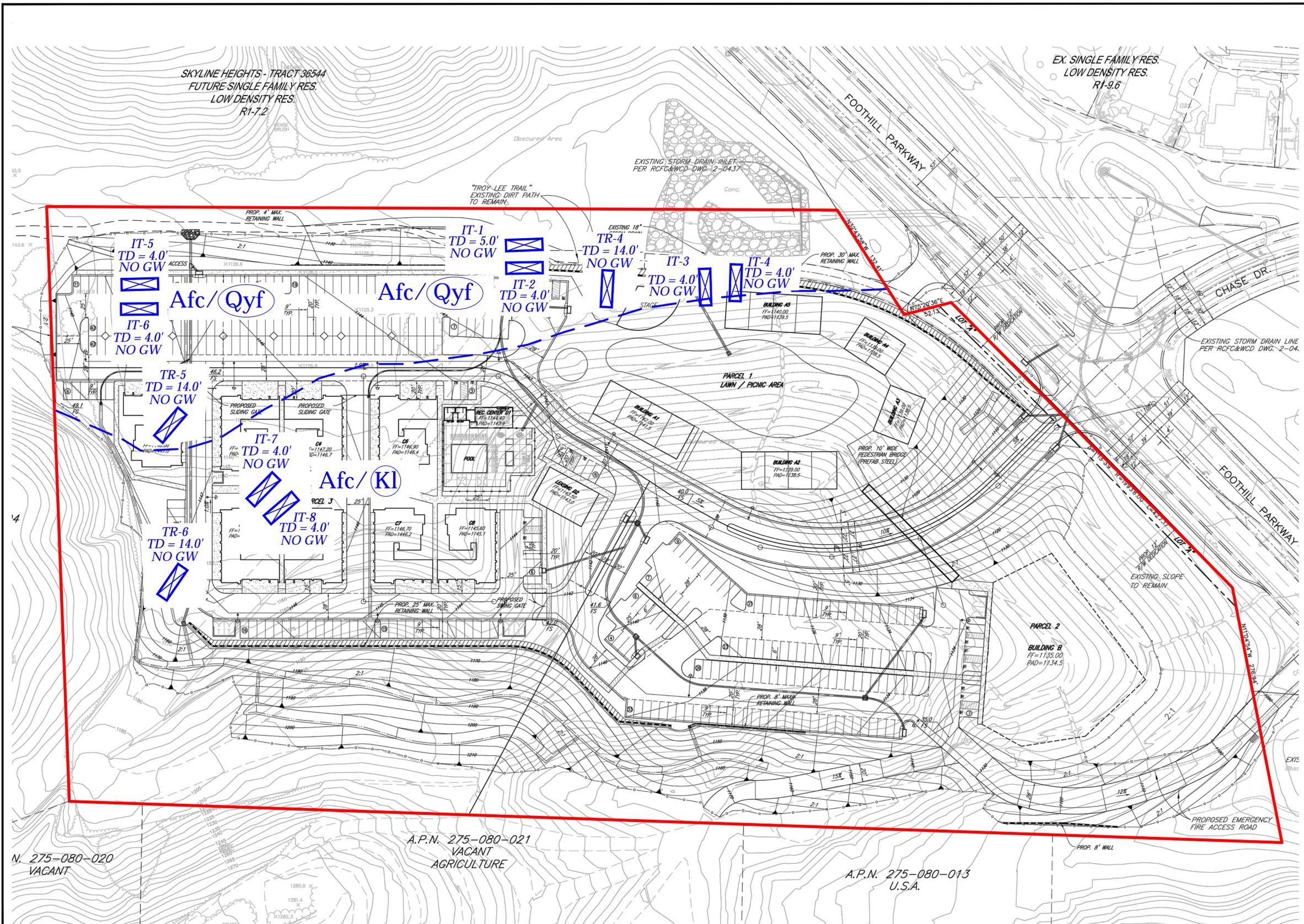
Project Name: GF INVESTMENTS			Logged by: JL			LOG OF TRENCH TR-5		
Project Number: G19-1802-10			Elevation:			Engineering Properties		
Equipment: BACKHOE			Location/Grid: SEE GEOTECHNICAL MAP			USCS		
Depth	Date: 12/10/19	Description:	Geologic Unit	Sample No.	Moisture (%)	Dry Density (pcf)		
0.0'-2.0'	A	<u>ARTIFICIAL FILL, UNDOCUMENTED:</u> Clayey SAND; orange to brown, moist, medium dense, fine to medium grained with some gravels, roots, root hairs, asphalt fragments	Afu	Bulk @ 1.0'-6.0'				
2.0'-8.5'	B	<u>YOUNG ALLUVIAL FAN DEPOSITS:</u> Well-graded SAND; orange to light brown, dry to damp, fine to coarse grained with gravels	Qyf	Nuke @ 5.0'	1.6	118.3		
8.5'-14.0'	C	SAND/GRAVEL; light brown to brown, damp, loose to medium dense, fine to medium grained with some coarse grains and cobbles, weathered granitic clasts, subangular to rounded clasts @10.0'; bedding: N50W/25E		Nuke @ 11.0'	5.6	100.4		
GRAPHICAL REPRESENTATION: EAST WALL			SCALE: 1" = 5'			SURFACE SLOPE: LEVEL		TREND: N40E

Project Name: GF INVESTMENTS			Logged by: JL			LOG OF TRENCH TR-6		
Project Number: G19-1802-10			Elevation:			Engineering Properties		
Equipment: BACKHOE			Location/Grid: SEE GEOTECHNICAL MAP			USCS		
Depth	Date: 12/10/19	Description:	Geologic Unit	Sample No.	Moisture (%)	Dry Density (pcf)		
0.0'-1.5'	A	<u>ARTIFICIAL FILL, UNDOCUMENTED:</u> Clayey SAND; red to brown, damp to moist, medium dense, fine to medium grained with some coarse grains and gravel, roots and rootthairs	Afu	Nuke @ 1.0'	13.9	112.8		
1.5'-6.0'	B	Silty SAND; light brown, damp, medium dense, fine to medium grained with coarse grains and gravel, oxidation staining, porous		Bulk @ 2.0'-6.0'				
6.0'-9.5'	C	<u>LADD FORMATION:</u> Well-graded SANDSTONE; gray, red, to brown, dry to damp, moderately hard to hard, fine to coarse grained with gravel and cobbles, weathered granitic and shale clasts, subangular to rounded clasts @8.0'; Poorly-graded sand seam, bedding: N80W/30NE	KI	Bulk @ 6.0'-9.5' Nuke @ 9.5'	7.2	105.4		
GRAPHICAL REPRESENTATION: EAST WALL			SCALE: 1" = 5'			SURFACE SLOPE: LEVEL		
						TOTAL DEPTH= 9.5 FEET GROUNDWATER NOT ENCOUNTERED		

APPENDIX B

INFILTRATION TEST RESULTS





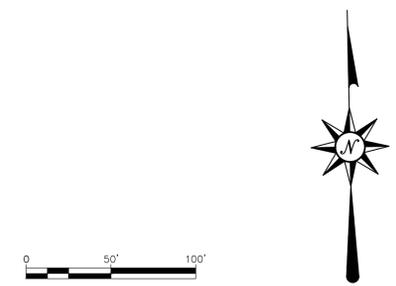
LEGEND
(Locations are Approximate)

Geologic Earth Units

- Afc - Artificial Fill, Compacted
- Qyf - Young Alluvial Fan Deposits (Circled Where Buried)
- Kl - Ladd Formation (Circled Where Buried)

Symbols

- Limits of This Report
- Approximate Geologic Contact
- Infiltration Exploratory Trench Location
- Infiltration Exploratory Trench Location



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www.lgcgeoenv.com

Mark Bergmann
 Engineering Geologist

INFILTRATION TEST LOCATION MAP
 APNs 275-050-014-6 and 275-080-041-3, Located at West Chase Drive and Foothill Parkway
 City of Corona, County of Riverside, State of California

Name:	GF Investments
Project No.:	G19-1802-20
Client:	GF Investments, LLC
Scale:	1" = 50'
Date:	December 2019
Reference:	KWC Engineers, Conceptual Grading Plan Skyline Village Project, Scale = 1"=40', sheet 1 of 1, dated December 10, 2019
Plate No.:	1 OF 1